Brigham Young University
BYU ScholarsArchive

All Theses and Dissertations

2011-11-28

Using Commodity Flow Data for Predicting Truck Freight Flow on State Truck Routes

Goangsung Jin
Brigham Young University - Provo

Follow this and additional works at: https://scholarsarchive.byu.edu/etd

Part of the Civil and Environmental Engineering Commons

BYU ScholarsArchive Citation

Jin, Goangsung, "Using Commodity Flow Data for Predicting Truck Freight Flow on State Truck Routes" (2011). *All Theses and Dissertations*. 2867.
https://scholarsarchive.byu.edu/etd/2867

This Dissertation is brought to you for free and open access by BYU ScholarsArchive. It has been accepted for inclusion in All Theses and Dissertations by an authorized administrator of BYU ScholarsArchive. For more information, please contact scholarsarchive@byu.edu, ellen_amatangelo@byu.edu.

Using Commodity Flow Data for Predicting Truck Freight Flow on State Truck Routes

Goangsung Jin

A dissertation submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

Mitsuru Saito, Chair
Grant G. Schultz
Richard J. Balling
E. James Nelson
Dennis L. Eggett

Department of Civil and Environmental Engineering

Brigham Young University

December 2011

Copyright © 2011 Goangsung Jin

All Rights Reserved

ABSTRACT

Using Commodity Flow Data for Predicting Truck Freight Flow on State Truck Routes

Goangsung Jin
Department of Civil and Environmental Engineering, BYU
Doctor of Philosophy

The increase in truck traffic on highways has brought many problems and challenges to transportation planning and traffic operation, including traffic congestion, transportation system deficiency (insufficient truck parking, etc.), safety, infrastructure deterioration, environmental impacts (air quality and noise), economic development, and so forth. Along with the increase in truck traffic, the need for developing a statewide truck freight demand model has grown so that a state can estimate truck traffic at any point on its highways. The most significant hurdle to including freight transportation in the transportation modeling process is that most of the demand forecasting methodologies currently available were developed for passenger trips, not freight trips. This type of modeling methodology usually makes an assumption that freight trips follow the same behavioral mechanism as passenger trips. In order to overcome the weakness of using a typical four-step demand forecasting modeling process, the concept of commodity flow models (CFMs) can be used to develop a truck freight flow model. It is widely accepted that focusing on the freights enables CFMs to capture more accurately the fundamental economic mechanisms that drive freight movements. The type of commodity being carried is one of the most important characteristics of truck movements, and it is sometimes a challenge to obtain such information from the carriers. Thus, lately, the integration of the freight flow modeling and land use modeling has emerged as an alternate tool to estimate freight movements than the previously developed models. In this study, county-level multiple regression models relating land use to commodity flow were developed using a geographical information system and statistics. Then, a statistical/mathematical statewide commodity flow distribution model was developed by using a physical friction factor (physical distance), a statistical friction factor (Euclidean distance), and economic factors (differences of population and difference of employment among the counties). The commodity flow distributed among truck traffic analysis zones (TTAZs) by the statewide commodity flow distribution model were converted to truck trips and the resulting truck trips were assigned to Utah‘s truck routes using the all-or-nothing assignment procedure of TransCAD and a genetic algorithm. Truck freight data from the US Census Bureau‘s Commodity Flow Surveys, which have become available to the public for free via the Internet, enabled the development of a commodity flow based statewide truck freight demand model. It was found that the integration of the freight flow and land use data could be a practical method for modeling tuck traffic demand on state-wide truck routes although the current level of data availability on commodity flow and land use data still constrains the full capability of this type of modeling.

Keywords: commodity flow, truck traffic analysis zone (TTAZ), commodity flow generation modeling, commodity flow distribution model, truck traffic assignment, and genetic algorithm

ACKNOWLEDGMENTS

The author would like to acknowledge the contributions and time that Dr. Mitsuru Saito has given to this dissertation. Also, the author thanks Daniel B. Kuhn, Lee Theobald and Toni Butterfield of the UDOT Planning Division, and Srini Sundaram, member of technical support team of Caliper Corporation for their assistance. The author also would like to thank Dr. Grant G. Schultz, Dr. Richard J. Balling, Dr. E. James Nelson, and Dr. Dennis L. Eggett for serving on his committee and providing valuable feedback. Additionally, the author thanks everyone else who assisted him by providing information and, thus, helping him to complete this dissertation, especially Bradley Mecham for his assistance in computer programming.

Finally, the author would like to thank his parents, Seonryei Kim and Seokgun Jin, family members, and friends for providing the love and support he needed to complete this dissertation.

TABLE OF CONTENTS

LIST OF TABLES xiii

LIST OF FIGURES xvii

1 Introduction 1

1.1 Background 1

1.2 Problem Statement 2

1.2.1 Difference Between Supply and Demand 3

1.2.2 Less Attention Paid to Unique Characteristics of Freight Transportation 3

1.2.3 Numerous and Complicated Contributing Factors for Determining Freight Flow 4

1.2.4 Complexity of Freight Demand Modeling 5

1.2.5 Limitations of Existing Freight Demand Models 5

1.2.6 Limitations of Freight Data and Information 7

1.2.7 Summary of Types of Freight Demand Modeling 7

1.3 Goals of the Proposed Study 8

1.4 Research Objectives 8

1.5 Scope of the Study 9

1.6 Statement of Work 9

1.6.1 Literature Review 10

1.6.2 Understanding of the Characteristics of Freight Flow Using GIS Tools 10

1.6.3 Development of a Statewide Commodity Freight Demand Model 11

1.6.4 Development of a Statewide Commodity Flow Distribution Model 11

1.6.5 Estimation of Truck Traffic Data With Increased Accuracy Level 11

1.6.6 Assignment of Truck Traffic to Utah‘s Truck Routes 12

1.6.7 Conclusions and Future Research 12

1.7 Contribution of the Research 12
1.8 Organization of the Dissertation 13
2 Literature Review 17
2.1 Current and Previous Freight Related Research Studies 17
2.1.1 General Characteristics of Freight Transportation Systems 17
2.1.2 Freight Demand Modeling 19
2.1.3 Relationship Between Freight System and GIS 41
2.1.4 Freight Data and Information 44
2.1.5 Importance of Truck Traffic Data With Increased Accuracy Level 50
2.1.6 Summary of Existing Researches 51
2.2 Limitations of Current and Previous Research Studies 57
2.2.1 Limitations of Current and Previous Freight Transportation Research Studies 58
2.2.2 Limitations of Existing Freight Demand Modeling 59
2.2.3 Limitations of Freight Data and Information 62
2.3 Need for a New Methodology 64
2.3.1 Searching for a New Direction for Freight Demand Modeling 65
2.3.2 Characteristics of a New Freight Demand Modeling Method 69
2.3.3 Direction for Developing a New Freight Demand Modeling Method 69
2.4 Chapter Summary 71
3 Methodology 73
3.1 Development of Commodity Flow Generation Models Using Relationships Between Commodity Flow and Land Use Characteristics 74
3.1.1 Types of Data Needed 74
3.1.2 Commodity Flow Generation Models 76
3.2 Development of a Statewide Commodity Flow Distribution Model 77

3.3 Development of a Procedure for Assigning Freight Truck Trips on Utah's Truck Routes (Freight Truck Trip Assignment) ... 79
3.4 Chapter Summary ... 82
4 Data Collection and Preparation ... 85
4.1 Data Collection ... 85
4.1.1 Data Sources ... 85
4.1.2 Structures and Formats of Raw Data ... 86
4.2 Data Reduction and Classification ... 96
4.2.1 Classification of Data by Industry Code ... 96
4.2.2 Subdivision of Commodity Flow Data to Counties ... 100
4.3 Data Sorting ... 100
4.4 Data Transformation ... 100
4.5 Chapter Summary ... 102
5 Understanding the Characteristics of Freight Flow Using GIS Tools ... 107
5.1 Needs for a Study on Understanding the Characteristics of Freight Flow Using GIS Tools ... 107
5.2 Methodology ... 108
5.3 Analysis Results ... 109
5.3.1 Correlations Between Commodity Flow and Economic Factors ... 111
5.3.2 Correlation Between Commodity Flow and Land Use ... 111
5.3.3 Correlation Between Business Pattern Factors and Land Use ... 111
5.3.4 Correlation Between Contributing Economic Factors and Land Use ... 117
5.3.5 Geographic Analysis ... 119
5.4 Chapter Summary ... 120
6 Development of County-Level Multiple Regression Models for Commodity Flow ... 125
6.1 Methodology ... 125

6.1.1 Procedures 126
6.1.2 Stepwise Multiple Regression Analysis 127
6.1.3 Estimation of Schwarz's Bayesian Information Criterion (BIC) to Choose the Best Model 130
6.2 Three Multiple Regression Models 131
6.2.1 First Model Between Commodity Flow and Land Use Type 131
6.2.2 Second Model Between Commodity Flow and Employment Data 131
6.2.3 Third Model Between Commodity Flow and Factors Describing Land Use Characteristics 137
6.3 Comparison of the Commodity Flow Estimated by the Models and CFS 2007 140
6.3.1 2007 Commodity Flow Estimated by the Two Multiple Regression Models 141
6.3.2 Comparison of Commodity Flows Estimated by the Models and the CFS 2007 142
6.3.3 Evaluation of the Two Models, Model 2 and Model 3 145
6.4 Chapter Summary 147
7 Developing a Statewide Commodity Flow Distribution Model Using Composite Friction Factors 149
7.1 Necessity of Developing a Commodity Flow Distribution Model 150
7.2 Model Development 152
7.2.1 Model Development Process 152
7.2.2 Core Concept 153
7.2.3 Characteristics of Friction Factors 154
7.2.4 Commodity Flow Distribution Model 156
7.3 Application of the Model 158
7.3.1 Data Collection 159
7.3.2 Determination of Model Parameters 160
7.3.3 Results of an Initial Run of the Model 160

7.4 Model Parameter Calibration 166
7.4.1 Initial Screening for Attraction Zones 166
7.4.2 Two-Stage Calibration Method 167
7.4.3 Calibration Results 168
7.4.4 Determination of Production and Attraction Between Zones 170
7.5 Chapter Summary 175
8 Adjusing Truck Traffic Data for Increased Accuracy 177
8.1 Review of the Importance of Accuracy of Truck Traffic 177
8.1.1 Importance of Accuracy of Truck VMT 178
8.1.2 Data Collection Methods for Estimating Accuracy of Traffic Data 178
8.2 Truck Traffic Data Collection Methodology 179
8.3 Estimation Process and Improvement in Truck Traffic Data Accuracy 180
8.3.1 Conditions of Utah ATR Stations 180
8.3.2 Ground Truth Data Collection and Reduction 182
8.3.3 Reclassification of Truck Traffic Types of Utah ATR Stations 183
8.3.4 Accuracy of Total Truck Traffic 184
8.3.5 Accuracy After Regrouping of Vehicle Classes by Vehicle Length 186
8.4 Estimation Procedure of Truck Traffic With Increased Accuracy 188
8.4.1 Determination of the Day and Time for Analysis 189
8.4.2 Allocation of ATR Stations to Each Region 191
8.4.3 Data Collection and Reduction 192
8.4.4 Estimation of Average Error Rates by Region 192
8.4.5 Truck Traffic Data With Increased Accuracy for 2002 192
8.5 Chapter Summary 193
9 Assignment of Truck Trips to Utah‘s Truck Routes 199

9.1 Analysis Process 199
9.2 Data Preparation for Developing a Truck Traffic Assignment Model 200
9.2.1 Commodity Flow by Transportation Mode Crossing Utah's State Borders 201
9.2.2 Commodity Flow Through State Border TTAZs for Trade Between Utah and Other States 202
9.2.3 Adding the New TTAZs 204
9.2.4 Building Truck Routes 206
9.2.5 Conversion of Commodity Measuring Unit (Tonnage) to Truck Traffic (Trips) 206
9.2.6 2002 ATR Stations on Highway Network 208
9.3 Truck Traffic Assignment to Utah's Truck Routes Using TransCAD and Genetic Algorithm 208
9.3.1 Required Data for All-or-Nothing Shortest Path Assignment 210
9.3.2 Assignment Processes Using TransCAD 210
9.4 Analysis Results 216
9.4.1 Initial Outputs 217
9.4.2 Choosing Best Number of Centroid Connectors 217
9.4.3 Optimization Methodology 221
9.4.4 Matching ATR Data With a Genetic Algorithm 223
9.4.5 Optimization Results Using Genetic Algorithm and TransCAD 229
9.4.6 Truck Traffic Assignment on Utah Truck Routes 231
9.5 Discussion 232
9.6 Chapter Summary 235
10 Conclusion and Recommendations 237
10.1 Summary of the Tasks 237
10.1.1 Understanding Characteristics of Commodity Flow Using GIS Tools 237

10.1.2 County-Level Multiple Regression Commodity Flow Generation Models 239
10.1.3 Statewide Commodity Flow Distribution Model 241
10.1.4 Application of the Statewide Truck Freight Flow Models to Utah's Truck Routes 243
10.2 Conclusion 245
10.3 Recommendation for Future Research 248
REFERENCES 251
APPENDICES 263

LIST OF TABLES

Table 1-1: Summary of Advantages and Disadvantages of the Existing Freight Demand Models 6

Table 1-2: Summary of Freight Demand Model Types Currently Available 8

Table 2-1: Most Frequently Used Modeling Platforms and Approaches 24

Table 2-2: Existing Representative Research Studies on Freight Modeling Using CFS Data 25

Table 2-3: Summary of the Characteristics of Models Used in Each Step of the Four-Step Approach 26

Table 2-4: Model Components of Commodity-Based Four-Step Approach 30

Table 2-5: Freight Related Research Studies Using GIS 46

Table 2-6: Summary of Research Results on Accuracy Level of Truck Traffic Data 52

Table 2-7: Examples of Statewide or Regional Freight Demand Models 56

Table 4-1: Detailed CBP by NAICS Code (Source: FHWA 2009) 97

Table 4-2: Commodity Flows by SIC Code (Source: FHWA 2009) 98

Table 4-3: Detailed EMPBI by NAICS Code (Source: The Official Website for the State of Utah 2009) 99

Table 4-4: Detailed EMPBI by NAICS Code (Source: The Official Website for the State of Utah 2009) 99

Table 4-5: Total Estimation of Each Classified Data for Utah County (Source: The Official Website for the State of Utah 2009 and FHWA 2009) 101

Table 4-6: CBP Data for Utah County (Source: FHWA 2009) 102

Table 4-7: CFS Data for Utah County 103

Table 4-8: Other Analysis Data for Utah County (Source: The Official Website for the State of Utah 2009) 104

Table 5-1: Correlation Between Commodity Flow and Contributing Economic Factors 112

Table 5-2: Correlation Between Commodity Flow and Land Use 113

Table 5-3: Correlation Between Land Use and Business Pattern Factor 113

Table 5-4: Correlation Between Land Use and Other Contributing Factors 117

Table 6-1: Example of BIC Values of Commodity Flow Attraction Models for Commodity Item 19 (CFS2A19) 130

Table 6-2: Best Multiple Linear Regression Models With Land Use Types for CFS-Production.....132

Table 6-3: Best Multiple Linear Regression Models With Land Use Types for CFS-Attraction 133

Table 6-4: Best Multiple Linear Regression Model With Land Use Types for CFS-Within Utah.....134

Table 6-5: Best Multiple Regression Model With Employment for Production 135

Table 6-6: Best Multiple Regression Model With Employment for Attraction 136

Table 6-7: Best Multiple Regression Model With Employment for Within Utah.....137

Table 6-8: Best Multiple Regression Models With Major Contribution Factors for Production.....138

Table 6-9: Best Multiple Regression Model With Major Contribution Factors for Attraction 139

Table 6-10: Best Multiple Regression Model With Major Contribution Factors for Within 140

Table 6-11: Comparison of Commodity Flows by County Estimated by the Two Models (Thousand Tons).....143

Table 6-12: Comparison of Commodity Flow by Commodity Type Estimated by the Two Models (Thousand Tons).....144

Table 6-13: Comparison of Commodity Flows by the Models and by the CFS 2007.....145

Table 6-14: Comparison of Commodity Flows by County by the Models and by the CFS 2007 146

Table 8-1: Summaries of Archived Operations Data Collection Methods and Data Quality (Lomax et al. 2001).....179

Table 8-2: Types of UDOT‘s ATR Stations 182

Table 8-3: Summary of the Full-Scale Ground Truth Data Collection (Source: Saito and Jin 2009) 183

Table 8-4: Regrouping of FHWA‘s 13 Vehicle Classes.....184

Table 8-5: Error Rates Without Outliers (All Vehicle Length Group) 186

Table 8-6: Error Rates of Two Vehicle Length Groups 187

Table 8-7: Number of Samples Needed for the 95 Percent Confidence Level 188

Table 8-8: Data Collection Day of Ground Truth Data 189

Table 8-9: Data Collection Time of Ground Truth Data 190

Table 8-10: Error Rates of ATR Stations Used for Ground Truth Data Collection (Total) 190

Table 8-11: Error Rates of ATR Stations Used for Ground Truth Data Collection (Truck) 191

Table 8-12: ATR Stations Used in the Ground Truth Data Collection by Region 191

Table 8-13: Remaining ATR Stations by Region 192

Table 8-14: Average Error Rates of Truck Traffic Data for ATR Stations by Region 193

Table 8-15: Comparison of Hourly Traffic Volume From ATR Stations With Estimated Hourly Traffic Volume With Increased Accuracy Level for Year 2002 194

Table 9-1: Commodity Flow by Transportation Mode From Utah to Other States (Production) 201

Table 9-2: Commodity Flow by Transportation Mode From Other States to Utah (Attraction) 202

Table 9-3: Main Truck Entrances and Exits for Utah (Source: Google 2010) 203

Table 9-4: Estimation of RMSE of Initial Run of the All-or-Nothing Shortest-Path Assignment Method With Different Numbers of Centroid Connectors 220

Table 9-5: Information of Seven Problematic ATR Stations 229

Table 9-6: Comparison of Daily Truck Traffic Between ATR Stations and the Model Using Genetic Algorithm 236

LIST OF FIGURES

Figure 2-1: Components of Transportation and Land Use System (Source: Rodriguez 2009) 43

Figure 3-1: TTAZ, Centroid Connectors and Truck Routes 81

Figure 3-2: Plot of RMSE Against Iteration Number 82

Figure 3-3: Research Process for the Dissertation 83

Figure 4-1: Shipment Characteristics by Mode of Transportation for State of Origin for 2002 for Utah (Source: BTS and Bureau of Census 2009) 88

Figure 4-2: Shipment Characteristics by Mode of Transportation for State of Origin in Percent of Total for Year 2002 and Year 1997 for Utah (Source: BTS and Bureau of Census 2009) 88

Figure 4-3: Shipment Characteristics by Total Modal Activity for State of Origin for Year 2002 for Utah (Source: BTS and Bureau of Census 2009) 89

Figure 4-4: Shipment Characteristics by Mode of Transportation and Distance Shipped for State of Origin for 2002 for Utah (Source: BTS and Bureau of Census 2009) 89

Figure 4-5: Sample CBP Data for Utah County (Source: FHWA 2009) 90

Figure 4-6: CBP Data by County for NAICS Code 21, Mining (Source: FHWA 2009) 91

Figure 4-7: Geographic Files of Highway Networks Including Utah County and Salt Lake County (Source: UDOT 2008) 92

Figure 4-8: Maps of UDOT‘s ATR Stations Using ArcGIS (Source: UDOT 2008) 93

Figure 4-9: Geographic Map (Shape File) and Geo-Database of Utah County for Year 2002 (Source: Utah Geographic Information Council 2009) 94

Figure 4-10: Utah Population Estimates 2000-2008 by County and Statewide (Number of People) (Source: The Official Website for the State of Utah 2009) 95

Figure 4-11: Sample Profile of Selected Economic Characteristics (Number of Jobs) (Source: The Official Website for the State of Utah 2009) 96

Figure 4-12: Comparison of Distributions of Raw Data (Left Column) and Transformed Data (Right Column) 105

Figure 5-1: Analysis Process 110

Figure 5-2: Map of Total CFS and URB by County....121

Figure 5-3: Band Map From Freeway Interchanges (15 Miles)....122

Figure 6-1: Example of Stepwise Multiple Regression Analysis-Commodity Flow Attraction of Commodity Item 19 (CFS2A19)....129

Figure 7-1: Relationship Between the Differences in Population and in Employment and Direction of Commodity Flow....156

Figure 7-2: Physical Distance Matrix (One Hundredth of Raw Data Value)....161

Figure 7-3: Euclidean Distance Matrix (One Hundredth of Values From SPSS Analysis)....162

Figure 7-4: Difference in Employment Matrix (Log Transformed Values)....163

Figure 7-5: Difference in Population Matrix (Log Transformed Values)....164

Figure 7-6: Results of an Initial Run of the Commodity Flow Distribution Model....165

Figure 7-7: Optimization Process....170

Figure 7-8: Comparison of Ration of Attraction, and Ratio of Difference of Population and Employment....171

Figure 7-9: Optimal Commodity Flow Distribution Between Zones i and j With Optimal....172

Figure 7-10 : Average Growth Factor Method in Trip Distribution (Inserted From Abraham 2010)....173

Figure 7-11: Final Commodity Flow Distribution Between Zones i and j After Using the Growth Factor Methods (Thousand Tons)....174

Figure 8-1: Methodology for Collecting Truck Traffic Data With Increased Accuracy....181

Figure 9-1: Commodity Flows Between Utah and the Other States at State Borders....205

Figure 9-2: TTAZs and Utah‘s Truck Routes (Source: Utah Geographic Information Council 2009)....207

Figure 9-3: Truck Traffics O-D Matrix Among the Counties and New TTAZs Added at the State Borers (County=TTAZ)....209

Figure 9-4: O-D Matrix of Truck Traffic....212

Figure 9-5: Creation of Centroids for TTAZs....213

Figure 9-6: Creation of Centroid Connectors....214

Figure 9-7: Building a Truck Route 215

Figure 9-8: Performing Traffic Assignment 216

Figure 9-9: Initial Results of All-or-Nothing Shortest-Path Assignment Method Using TransCAD 218

Figure 9-10: Best Initial Result of All-or-Nothing Shortest-Path Assignment Method Using TransCAD 219

Figure 9-11: Chromosome for a Candidate Design 224

Figure 9-12: Optimization Results of 25 Generations With 1000 Chromosomes With and Without Seven Problematic ATR Stations 230

Figure 9-13: Changes of RMSE Through 81 Generations of 1000 Chromosomes in Genetic Algorithms 231

Figure 9-14: Final Assignment Result: Link Volume on Utah‘s Truck Routes (Statewide) 233

Figure 9-15: Final Assignment Results: Link Volume on Utah‘s Truck Routes (Salt Lake Valley) 234

1 INTRODUCTION

1.1 Background

The increase in truck traffic on highways has brought many problems and challenges to transportation planning and traffic operation including traffic congestion, transportation system deficiencies including insufficient truck parking, traffic safety, infrastructure deterioration, environmental impacts including air quality and noise, quality of life, economic development, losses in productivity, and so forth. Information of accurate truck traffic data on state highway networks is essential for transportation experts to solve truck related problems. However, some studies on truck traffic reported that the accuracy level of truck traffic data was not only unclear but also unacceptable in some cases (Krishnan and Hancock 1998).

The most significant hurdle to including freight transportation in the transportation modeling process is that most of the demand forecasting methodologies currently available were developed for passenger trips, not for freight trips. This type of modeling methodology usually makes an assumption that freight trips follow a similar behavioral mechanism as passenger trips, that is, truck traffic is estimated as a function of passenger-car traffic (Ogden 1992).

In order to overcome the weakness of using a typical four-step demand forecasting modeling process for passenger cars, the concept of commodity flow modeling can be applied to develop a truck freight demand model. Commodity flow models (CFMs) focus on modeling the amount of freight transported, measured in tons, or any comparable unit of weight, through state highway networks. It is widely accepted by researchers in this field that focusing on the

movement of freights enables CFMs to capture more accurately the fundamental economic mechanisms that drive freight movements. The type of commodity being carried is one of the most important characteristics of truck movements, and it is sometimes a challenge to obtain such information from the carriers. Thus, the integration of freight flow modeling and land use modeling has recently emerged as an alternate and better tool to estimate freight movements on state highway networks (University of Westminster et. al 2002, Holguin-Veras and Thorson 2003, Transportation Research Board 1997, and Friedrich et. al 2003).

Usually, truck routes are practically defined by truck drivers‘ desire for efficiency, minimizing economic and time cost. Obtaining valid truck freight data has been a major challenge for developing a reliable statewide truck freight flow model. Truck freight data from the US Census Bureau‘s Commodity Flow Survey (CFS) are available for developing a commodity-flow-based statewide truck freight model (Sorratini and Smith Jr. 2000). Also, the findings from the study on truck traffic data accuracy conducted by Saito and Jin (2009) can be used to calibrate and validate a truck freight flow model that can be developed using the CFM concept.

1.2 Problem Statement

The major difficulty in building truck freight demand models has been the lack of reliable and coherent data and the lack of appropriate methodologies. This section summarizes the findings from reviewing existing research studies on difference between supply and demand, less attention paid to unique characteristics of freight transportation, numerous and complicated contributing factors for determining freight flow, complexity of freight demand modeling, limitation of existing freight demand models, and limitations of freight data and information.

1.2.1 Difference Between Supply and Demand

Many problems in a system begin with the difference between supply and demand. Freight transportation is no exception. The difference between supply and demand of freight transportation on highway networks has produced traffic congestion, transportation system deficiency, declining safety, infrastructure deterioration, environmental pollution, economic development, and so on. Productivity and efficiency of freight transportation on highway networks have become the main motives for paying much attention to the builders or managers because the aims of traffic control strategies are to ameliorate the negative environmental impacts of truck traffic upon local communities and estimate future freight supply and demand in order to estimate future infrastructure needs.

1.2.2 Less Attention Paid to Unique Characteristics of Freight Transportation

Freight transportation has received limited attention with little or no integration into major regional planning efforts since the heavy vehicle component of traffic flows on highway has been relatively small, generally less than 15 percent of total traffic (Krishnan and Hancock 1998). Less attention paid to freight transportation and methodologies that relied on passenger vehicle trips have created problems for freight transportation modeling, affected traffic and infrastructure performance, worsened highway conditions for traveling public, and consequently imposed higher costs to highway users. Also, overemphasis on passenger trip modeling has resulted in lack of sufficient and easily accessible data sources on freight transportation. Until the enactment of Intermodal Surface Transportation Efficiency Act (ISTEA) (1991) and Transportation Equity Act for the 21st century (TEA-21) (1998), few states have had freight demand modeling and freight transportation plan.

The concept of modeling a transportation systems starts with demand modeling that will help make supply plans. One of the major difficulties of freight demand modeling is that most of the demand forecasting methodologies have been developed for passenger vehicle trips. Freight trips were considered to follow the same behavioral mechanism as passenger trips and truck traffic was estimated as a function of passenger car traffic.

Similarities do exist between freight demand modeling and passenger demand modeling. For instance, both trips use the same highway network and the same estimation units (vehicles/hour). But many differences exist between them including units of measure, value of time, loading versus unloading, types of vehicles, the number of decision makers, restrictive characteristics of freight transportation which require specific infrastructure for loading and unloading, and various ranges of transported goods (items) from an urgent single parcel to non-urgent bulk shipments of thousands of tons. Freight traffic needs the supply network for freight (nodes and links and terminal nodes). Also, freight service and transport cost are undefined until a potential sender makes an inquiry.

1.2.3 Numerous and Complicated Contributing Factors for Determining Freight Flow

Contributing factors that affect the tasks of freight demand modeling are varied and complicated. They complicate the tasks of building appropriate freight demand models. Contributing factors include location factors (origin and destination, or intermediate locations), physical factors (size, volume, or weight), operational factors (type of company, distribution policy, and geographical dispersion of freight facilities), dynamic factors (seasonal preferences or tastes and demand of the users), and pricing factors (Ortuzar and Willumsen 2002, Jiang et al. 1999, and MEandP et al. 2002b).

1.2.4 Complexity of Freight Demand Modeling

Freight demand modeling considers a combination of factors including multiple dimensions, a number of decision makers, private sector behaviors, and cargo opportunity costs. Freight demand modeling is mainly composed of three dimensions including volume, weight, and trips; whereas passenger car is one dimension, the number of trips. Freight demand modeling is affected by multiple decision makers including drivers, dispatchers, and freight forwarders. Understanding of behaviors of the private sector is one of the most difficult tasks for building a freight demand model. Usually, the opportunity cost of cargo is determined by a combination of intrinsic cargo values, which are determined by market values and replacement costs, and logistic cargo values which are a function of the importance of the cargo for the production system at given moment in time and at given level of inventory.

1.2.5 Limitations of Existing Freight Demand Models

In order to deal with multiple dimensions (i.e., volume, weight, and the number of trips), two major modeling platforms for freight demand modeling have been used: commodity-based modeling and trip-based modeling. The two modeling approaches have three different modeling platforms each, including variants of the four-step model, direct demand model, and input-output model. For regional application, the commodity-based modeling framework can be used by variants of the four-step model and the input-output model. On the other hand, the direct demand modeling framework can be applied to corridor analysis and the trip-based modeling framework can be used by variants of the four-step model.

As for truck demand forecasting methods, trend-line analysis used for forecasting statewide truck travel does not have a direct link to the economic activities of the study area because the primary commodities generated by heavy truck trips could not explain interactions

among traffic analysis zones. A few states had attempted to develop standard network-based travel demand models at state levels, but most states had not been willing to obtain the costly origin-destination (O-D) survey data needed for calibration. Three methods, including estimation of simple rates, linear regression models, and commodity flow models are widely used for estimating truck trips.

The four-step passenger trip demand forecasting modeling framework has been used as a useful means for summarizing freight modeling approaches even though the modeling framework has advantages and disadvantages.

Existing freight demand models have problems that are caused by the way freight data are collected and used in model building. Model structure depends on time and place for models to apply, relationship among variables, integrity and connectivity of models, and so on. Table 1-1 shows a summary of advantages and disadvantages of the existing freight demand models.

Table 1-1: Summary of Advantages and Disadvantages of the Existing Freight Demand Models

	Advantages	Disadvantages
Trip-based models	- Significant amount of data available. - Not a major problem on empty-trips.	- Questionable applicability to multiple freight transportation modes. - No association with actual commodity flow - Unable to explain the characteristics of cargoes.
Commodity-based models	- Able to explain the characteristics of cargoes. - Complementary models using probability principles to formulate the empty trips as a part of commercial vehicle trip chains.	- Estimate commodity flow through expensive and time-consuming origin-destination surveys. - Unable to model empty trip.
O-D trip matrix estimation model	- No need of trip distribution.	- A generalized least-square problem caused form a critical shortcoming between target O-D matrix and true O-D matrix.
O-D synthesis estimation models	- No need of trip distribution. - Complement the disadvantages of the O-D trip matrix estimation.	- Limitation in depicting freight movements (empty trips).

1.2.6 Limitations of Freight Data and Information

Less attention made to freight transportation and complicated contributing factors for building freight demand models make it difficult to collect a set of "good" data appropriate for model development. Most of the data about freight transportation are aggregated and the heterogeneous nature of data for commodity movements makes it nearly impossible to achieve accurate predictions of freight flows. One of the major limitations to freight planning efforts is the scarcity of comprehensive data.

Freight transportation data from many uncoordinated data sources provide an incomplete picture of the universe of freight movements in the system. Also, difficulties in combining data from diverse sources have limited the usefulness of currently available data sets for freight transportation analyses.

1.2.7 Summary of Types of Freight Demand Modeling

As mentioned in previous sections, two types of freight demand modeling are trip-based models (structured models) and commodity-based models (direct models). Freight demand modeling methods are divided into three types, including variants of the four-step model, direct demand models, and input-output models. Each model has its own characteristics, advantages and disadvantages. Table 1-2 shows a summary of currently available freight demand model types.

Table 1-2: Summary of Freight Demand Model Types Currently Available

		Input-Output		Spatial Interaction		OD-synthesis
		Multi-regional I-O**	Hybrid I-O Formulation	Trip-based	Commodity-based	
Data requirement						
For calibration	Technical coefficients	○	○	○	○	○
	Commodity flow data	○	○	○	○	○
	Screen line counts	○	○	○	○	
	Traffic counts	○	○	○	○	○
	Employment data	○	○	○	○	○
	Interregional trade flow coefficients	○				
	Characteristics of major generators	○	○	○	○	○
For forecasting	I-O modeling	○	○			
	Freight modeling	○	○	○	○	○
	Network analysis	○	○	○	○	○
	GIS	○	○	○	○	○
	Freight logistics in the area	○	○	○	○	○
Costs*		+++++	+++	++	+++	+
Computing power	Top-of-the-line PC	○	○	○	○	○

Source: Adapted from Holguin-Veras, J., List, G. F., Meyburg, A. H., Ozbay, K., Passwell, R. E., Teng, H., and Yahalom, S., (2001).
○: Possible,
*: From the most expensive, marked with "+++++," to the least expensive, i.e., "+".
**I-O: input-output.

1.3 Goals of the Proposed Study

The goal of this study is to develop a statewide truck freight flow model which is based on a commodity flow-based spatial interaction model to enable forecasting present and future truck traffic on Utah's truck routes.

1.4 Research Objectives

The four objectives of the proposed study are:

- To prepare a summary of the state-of-the-art and state-of-the-practice of the trend on truck-related freight modeling, the use of geographical information system (GIS) for

analyzing truck freight routes, and the importance of collecting truck traffic data with increased accuracy level,

- To analyze the characteristics of freight flow (generation and attraction) by land use using GIS tools,
- To develop a statewide truck freight flow model based on CFMs using the CFS 2002 data, and
- To simulate and validate the statewide truck freight flow model developed in the study with the TransCAD transportation planning software using truck traffic data with increased accuracy level.

1.5 Scope of the Study

This study used the US Census Bureau‘s 2002 and 2007 CFS data, the 2002 economic census data, and freight analysis framework (FAF) data for developing a statewide truck freight flow model. As an example of applying the model to a real world, the FAF 2007 estimation data were used.

As the spatial scope of this study, Utah‘s state highway networks, especially state highways included in Utah‘s truck routes, were used. The 29 counties in the state of Utah were used as truck traffic analysis zones (TTAZs) for developing a truck freight flow model.

1.6 Statement of Work

This section discusses concisely the entire flow of each task. This study consists of seven tasks including literature review, understanding of characteristics of freight flow using GIS tools, development of statewide commodity freight demand model, development of statewide

commodity flow distribution model, estimation of truck traffic data with increased accuracy level, assignment of truck traffic to Utah's truck routes, and conclusions and recommendations.

1.6.1 Literature Review

Using the Transportation Research Information Service (TRIS) and other literature search tools, a literature review focusing on the state-of-the-art methods of truck freight modeling, the use of GIS for analyzing truck freight flow, and the importance of collecting truck traffic data with increased accuracy level was conducted. The difference between traditional transportation demand modeling and freight demand modeling was carefully studied.

1.6.2 Understanding of the Characteristics of Freight Flow Using GIS Tools

Using GIS tools, characteristics of freight flow was analyzed with a set of factors that determined attraction and production levels of freight traffic among the TTAZs. By identifying interrelationship between the freight traffic flow (in terms of attraction and production) and the social and economic factors used for the analysis, the characteristics of truck freight flow by type of land use of each traffic analysis zone was studied. For this analysis, CFS data, FAF data, Utah GIS portal data, and Utah city and county data available in Utah Governor's Office of Planning and Budget (UGOPB) website were used.

The sources of data for using in this analysis include FAF (http://ops.fhwa.dot.gov/freight/freight analysis/faf/), CFS (http://www.census.gov/econ /www/ se0700.html), UDOT's highway network file, Utah GIS Portal (http://agrc.its.state.ut.us/), and the UGOPB (http://www.utah.gov/government/governor.html). These websites provide CFS results including shipment characteristics by mode of transportation for origin state in 2002 (CFS), business patterns by county and by industry (FAF), geographic map files and geodata base by

county (Utah GIS Portal), and Utah population estimates and profiles of social and economic characteristics of Utah (State of Utah).

1.6.3 Development of a Statewide Commodity Freight Demand Model

The concept of CFM was used to develop a commodity freight flow demand model for the state highway networks in Utah. First, directions for developing a statewide commodity freight flow model was explored through the literature review. The findings from understanding the characteristics of commodity flow and land use using statistical tools and GIS tools were considered for developing the statewide commodity demand models. Using the CFS data and FAF data, CFMs by county for Utah were developed by evaluating relationships such as commodity flow-land use types, commodity flow-employment, and commodity flow-contributing land use.

1.6.4 Development of a Statewide Commodity Flow Distribution Model

To apply the statewide truck freight flow model developed in Section 1.6.3 based on CFMs to Utah‘s truck routes, a statewide commodity flow distribution model was developed. An enhanced gravity model with three composite friction factors including physical, statistical, and economic factors was developed. The model was validated using Utah‘s commodity flow data.

1.6.5 Estimation of Truck Traffic Data With Increased Accuracy Level

In order to calibrate the statewide commodity flow distribution model developed in Section 1.6.4, truck traffic data needed to be collected or truck traffic data obtained in previous years needed to be adjusted. Findings from a previous research project by Saito and Jin (2009),

entitled *Evaluating the Accuracy Level of Truck Traffic Data on State Highways*, were used to adjust truck traffic data collected by automatic traffic recorders (ATRs). Using the error rates by region, tuck traffic data with increased accuracy level were obtained for the state highway networks.

1.6.6 Assignment of Truck Traffic to Utah's Truck Routes

The O-D commodity flow matrix obtained in Section 1.6.4 was converted to the number of trucks and the truck trips were assigned to Utah's truck routes in this task using TransCAD. Truck traffic assignment was done using the all-or-nothing shortest-path method of TransCAD and genetic algorithm to obtain optimal assignment of truck trips to Utah's truck routes. Estimated link volumes were compared with ATR volumes obtained in Section 1.6.5.

1.6.7 Conclusions and Future Research

The final task of the research work is to identify conclusions and recommendations based upon observations and analyses in each of the tasks mentioned above. This task also includes the identification of areas that would require additional research.

1.7 Contribution of the Research

Contributions of this study to the field of truck freight flow modeling include the following:

- A new method for commodity and freight transportation analysis using GIS,
- A method for directly checking the relationship between commodity flow and land use,

- A statewide commodity flow generation model considering CFMs and land use characteristics,
- A statewide commodity flow distribution model that consists of three composite friction factors,
- A statewide commodity flow model that can be used to estimate truck traffic in the future on Utah‘s state highway network, and
- A method of calibrating the assigned truck traffic produced by the model and its accuracy using truck traffic with the increased accuracy obtained by ATR stations.

1.8 Organization of the Dissertation

The dissertation is organized into 10 chapters. Chapter 1 provides an introduction to the research and includes discussion on the background, problem statement, research objectives, statement of work, contribution of the research, and organization of the dissertation.

Chapter 2 provides a detailed literature review outlining the state of the art of truck demand modeling. Topics of interest include general characteristics of freight transportation systems, freight demand modeling, relationships between freight system and GIS, freight data and information, and the importance of truck traffic data with increased accuracy level.

Chapter 3 discusses the methodology of this research. The objectives, data and methodology for developing three models including freight generation models using relationships between commodity flow and land use characteristics (trip generation), statewide truck freight distribution models (trip distribution), and a procedure for assigning truck-freight flow on Utah‘s truck routes are described in this chapter.

Chapter 4 outlines data collection and preparation including data sources, data structure and format, data reduction and classification, data analysis method, and data transformation.

Chapter 5 identifies the characteristics of commodity flow in relation to contributing factors using data which were sorted, reduced, and transformed. TransCAD features and the SPSS statistical software program are used for analyzing correlation between commodity flow and contributing land use, geographic and economic factors.

Chapter 6 discusses the development process and results of three multiple regression commodity flow models using land use and its characteristics identified as significant in Chapter 5, which are: (a) commodity flow versus land use type, (b) commodity flow versus employee by industry, and (c) commodity flow and other independent variables. The last two commodity flow models were validated by using the CFS 2007 data, but the first model was not validated.

Chapter 7 discusses the process of developing a commodity flow distribution model using three composite friction factors, including physical distance, statistical distance (Euclidean distance) which reflects the interrelationship among the variables that characterizes the commodity flow generation at the county level, and economic factors, consisting of the difference in population and the difference in employment between TTAZs. The model overcomes the conceptual deficiency of a traditional gravity model. A unique two-level calibration method was used to determine an optimal combination of model parameter values for distributing commodity flow among the counties in a state. The model was applied to distributing within-the-state commodity flow among the counties in Utah.

Chapter 8 discusses the process of collecting, sorting and reducing truck traffic data with increased accuracy level. These truck traffic data were used for calibrating and validating a statewide truck flow assignment model presented in Chapter 9 using the assignment module of TransCAD and genetic algorithm.

Chapter 9 discusses the results of the statewide truck traffic assignment model as applied to Utah‘s state highway networks. TransCAD is used for assigning truck traffic estimated by the commodity flow distribution models presented in Chapter 7. The method used for assigning truck traffic to Utah‘s truck routes was the all-or-nothing shortest path algorithm which is a feature of the TransCAD‘s assignment module and genetic algorithm.

Chapter 10 presents a summary of the study, conclusions, and recommendations for future research.

In addition to the 10 chapters, this dissertation includes eight appendices. Appendix A provides raw data needed for determining potential contributing factors of commodity freight flow and difference of raw data and their log transformation. Appendix B provides analysis results of relationship between land use and contributing factors of commodity flow. Appendix C, D, and E provide the results of developing three multiple regression models for commodity flow generation. Appendix F contains developing county-level commodity flow distribution model. Appendix G provides information of ATR stations in Utah. Appendix H provides the data for truck traffic assignment discussed in Chapter 9. Appendix I contains program source code for the genetic algorithm developed for assigning truck traffic to Utah‘s truck routes interacting with TransCAD, and input and output of the optimization steps.

2 LITERATURE REVIEW

Existing research studies on freight transportation systems, freight demand modeling methods, relationship between freight system and GIS, freight data and information, and importance of truck traffic data with increased accuracy level are reviewed. The currrent research materials were obtained through transportation related journals, reports, and Internet websites. This chapter presents a summary of current and previous freight related research studies, limitations of existing and previous research studies, need for a new methodology, and a chapter summary.

2.1 Current and Previous Freight Related Research Studies

The focus of the literature review of existing and previous research studies was on general characteristics of freight transportation systems, freight demand modeling, relationship between freight systems and GIS, freight data and information, and the need for truck traffic data with increased accuracy level.

2.1.1 General Characteristics of Freight Transportation Systems

In order to understand general characteristics of freight transportation systems, key factors affecting freight movements and the legislative foundation of statewide freight planning were reviewed.

2.1.1.1 Key Factors Affecting Freight Movements

Freight movement from an origin to a destination is determined by a number of key locations where certain activities related to freight take place, including production and consumption sites, warehouses, and other intermediate distribution centers or storage facilities. Also, freight movement is affected by multiple measuring units of freight transportation (volume, weight, transport mode, and volume of freight traffic) and by multiple decision makers (shippers, receivers, and carriers), implicating that variables or factors which determine how freight moves through the transport system are complicated and intertwined with each other. Ortuzer and Willumsen (2002) discussed the following key factors affecting freight movements in the United Kingdom (UK):

- Location factors: location of resources, location of production, and location of intermediate and final market;
- Physical factors: characteristics of new materials and products that influence the way they are transported;
- Operational factors: the size of the firm, its distribution policy, and its geographical dispersion;
- Dynamic factors: seasonal variations in demand and changes in customers‘ tastes; and
- Pricing factors: changes in price of product including technology and political policy.

Jiang et al. (1999) studied the characteristics of freight demand and mode choice by analyzing the results of disaggregated modeling with preference data. In their study, they discussed factors that strongly influence mode choice of freight transportation, including the attributes of the shipper (firm); the attributes of the goods to be transported; the spatial attributes such as shipments‘ frequency, distance, origin, and destination; long term factors such as firm‘s

nature, size, location, information system, structure, and trucks owned by the firm; and short term factors such as physical attributes of goods and the spatial distribution characteristics of shipments.

In the process of establishing the Great Britain Freight Model (GBFM), MEandP et al. (2002a) considered the role of freight model with four types of factors that represent the industry‘s wider context or environment, including economic factors, technological factors, political and legal factors, and socio-cultural factors. These factors are superimposed onto a micro-economic model. These four factors could be seen as pressures from the outside industry to the inside industry to which actors must respond.

2.1.1.2 Legislative Foundation of Statewide Freight Planning

ISTEA and TEA-21 have become legitimate bases for making statewide freight planning (Brogan et al. 2001). Statewide freight planning was introduced with the principles of ISTEA in 1991, in which the federal government encouraged states to undertake a continuing, cooperative, and comprehensive transportation planning process, dealing explicitly with the transport of freight, including not only international border crossings and access to ports, airports, and intermodal transportation facilities, but also major freight distribution routes and methods to enhance the efficient movement of commercial vehicles. TEA-21 further strengthened ISTEA‘s public involvement mandate by identifying ―freight shippers [and] providers of freight transportation services” as participants in the transportation planning process (Reference ?).

2.1.2 Freight Demand Modeling

This section discusses trends on theories, methodologies, applications, and issues of freight demand modeling in order to evaluate the existing methodologies of freight demand

modeling and draw conclusions on the necessity of new methodologies for freight demand modeling. The focus of this section is on the differences between passenger and freight transportation modeling and on trends in freight transportation.

2.1.2.1 Differences Between Passenger and Freight Demand Modeling

The transportation demand modeling process is needed for forecasting future traffic demand, in combination with network modeling to analyze the supply of highway network infrastructure. For the most part, the evolving transportation modeling paradigms have focused on passenger transportation while paying little or no attention to freight transportation. Passenger issues traditionally have received higher priorities, which reduced the amount of resources and attention allocated to freight transportation research and education.

An appropriate consideration of freight transportation issues is important in both modeling and policy making because truck freight transportation has generated externalities such as air pollution and highway congestion, in addition to making significant contributions to the economy (productivity). For these reasons, an increasing number of planning studies have focused on: 1) defining the role of advanced technologies to enhance system productivity and efficiency, 2) defining traffic control strategies aimed at ameliorating the negative environmental impacts of truck traffic upon local communities, and 3) estimating future freight demand and supply to estimate future infrastructure demand and supply (Ogden 1992).

One of the significant difficulties of freight transportation in the traditional transportation modeling process has been that most of the demand forecasting methodologies have been developed for forecasting passenger trips, not freight trips. Consequently, in using such methodologies, a simplistic assumption that freight trips would follow the same behavioral mechanism as passenger trips was made. This is an example of an implicit assumption where

truck traffic is estimated as a function of passenger car traffic. Although the error introduced by this assumption might not have major consequences for small urban areas where the number of freight trips is relatively small, it could produce huge differences in large metropolitan areas such as New York City where freight-related trips are a major contributor to urban congestion (List et al. 2002).

Holguin-Veras and Thorson (2003a, 2003b) pointed out that the complexity of modeling freight demand has arisen from a combination of factors. First, multiple dimensions are to be considered. In passenger car transportation, there is only one unit of demand – that is, the driver who, for the most part, is the decision maker. In freight transportation, there are multiple dimensions (volume, weight, transport mode, and volume of freight traffic) under the control of a number of decision makers (drivers, dispatchers, freight forwarders) who interact in a dynamic environment. Also, they cited that the significant differences in time value, or opportunity costs, exhibited by freights would be a major factor in determining the level of complexity of modeling freight transportation. While passenger‘s time value ranges within the same order of magnitude, freight‘s time value exhibits a much a wider range because of a wide range in opportunity costs that are affected by the types of cargoes carried by them. The opportunity costs of cargo were determined by a combination of intrinsic cargo values (determined by market value and replacement costs) and logistic cargo values (a function of the importance of the cargo for the production system given moment in time and inventory levels).

Cambridge Systematics Inc. et al. (1997) discussed key differences between passenger and freight transportation including unit of measures, value of time, cost of loading and unloading, types of vehicles, and the number of decision makers. Friedrich et al. (2003) discussed the similarity and difference between freight and passenger transport modeling in their

research including data issues, survey methods, and demand and network models. Their findings include (Friedrich et al. 2003):

- Passenger and freight vehicles use the same network, which might imply the use of modified passenger transport models for modeling freight movement;
- Freight is entirely passive and therefore may require specific infrastructure for loading and unloading;
- Many freight vehicles are specifically designed for a particular type of goods;
- The items being transported range from an urgent singular parcel to non-urgent bulk shipment of thousands of tons;
- In the freight transport market, several actors (consignor and consignee, freight forwarder and carrier, driver) influence the travel itinerary of freight items;
- A supply network for freight consists not only of nodes and links but also of terminal nodes (freight hubs, logistic centers, shunting yards, warehouses) with specific characteristics concerning capacity and transfer delay time;
- Service frequency and transport costs for shipment are often undefined until a potential sender makes an enquiry; and
- The complex interactions among the actors are one reason why freight is more complicated to model the decision process in freight transport than passenger transport.

2.1.2.2 Trends in Freight Demand Modeling

Given the importance of freight transportation to the economy, freight movement planning should be established as a basic component of the statewide planning process.

Cambridge Systematics Inc. et al. (1997) discussed two major existing freight demand forecasting approaches that were used at the time of the study: structured approach and direct approach. The structured approach is a pattern of the classic four-step urban transportation planning process and needs significant amounts of data because it involved comprehensive interrelationship among economic activities, production and attraction by industry, distribution or linkages among production and consumption nodes, mode choice and shipment size decisions, vehicle trips, and route assignments.

The direct approach is a simplification process of the structured approach in that it usually addresses a specific aspect or component of goods movement rather than estimating the entire freight demand of the transportation system. This approach is more useful in case of limited data availability than the structured approach.

Ogden (1992) suggested that the multiple dimensions that could be used for freight demand modeling (i.e., weight, volume, transport mode, and volume of freight traffic) have given rise to two major modeling platforms: commodity-based modeling and trip-based modeling. Different modeling approaches could be used on a framework of these platforms.

Input-output (I-O) models are a family of analytical formulation that represents the inter-linkages among economic sectors as a function of the amount of inputs, in economic terms, required to produce a given output. In simple terms, I-O models represent the economic output of an economy as a function of the inputs utilized in the production process. This mathematical relationship enables the estimation of the inputs that are required to achieve a given level of output in an economic sector (Holguin-Veras et al. 2001).

As shown in Table 2-1, the most widely used options included such variants as those used in the structured four step model, a direct demand model, and an I-O model (Ogden 1992).

Table 2-1: Most Frequently Used Modeling Platforms and Approaches

		Modeling Approach		
		Variants of the four steps model	Direct demand models	I-O models
Modeling Framework	Commodity-based	Used in both urban and regional application	Frequently used in corridor analysis	Used in regional economic development studies, rarely in urban areas, though land use transportation models are based on I_O.
	Trip-based	Used in both urban and regional applications	Frequently used in corridor analysis	Not applicable

Sources: Holguin-Veras, J., and Thorson, E. (2000).

2.1.2.2.1 First Comprehensive Freight Modeling Study – Commodity Flow Survey (CFS)

The CFS, a major partnership effort between the United States Department of Transportation and the Bureau of the Census (1993), has been the first comprehensive framework of freight modeling since the mid-1970s to learn where and how goods were transported. This database contained commodity flow within and between states, classified by the type of freight and of shipment. The CFS procedure was a good starting point for modeling truck freight movement. Table 2-2 shows existing representative research studies on freight modeling related to CFS.

2.1.2.2.2 Four Steps in a Comprehensive Freight Transport Model

Many research studies have been based on the four-step passenger modeling framework as a means of summarizing freight modeling approaches. They pointed out that one of many disadvantages of the freight models which explicitly used a four-step approach was that they were completely lacking elements of logistic organization of freight transportation. A better methodology with the freight distribution by industry was required to overcome this weakness, and some models have made progress in this respect by modeling logistic processes such as the

number and location of distribution centers. University of Westminster et al. (2002) summarized the characteristics of four-step approach in a comprehensive freight transportation model. Table 2-3 shows a summary of the characteristics of models used in each step of the four-step approach.

Table 2-2: Existing Representative Research Studies on Freight Modeling Using CFS Data

Researchers	Main Topics	Main CFS Data
Reed (1967)	First empirical studies of CFS with two separate models, outflows and inflows in Bengal Bihar area, India.	
Chisholm and O'Sullivan (1973)	Study on gravity model and the linear programming model in the United Kingdom in 1962. R^2 and Linear programming solutions were better, especially for homogeneous commodities.	1964 CF data over 78 zones and 13 commodity groups
Black (1971, 1972)	Analysis of the properties and determinants of the distance exponents in the gravity model.	1967 US CFS for 24 major shipper groups
Ashtakala and Murthy (1988)	Production-constrained gravity model to forecast CFS in Alberta.	
Broker (1989)	Proof that all forms of the gravity model (constrained, unconstrained, and elasticity constrained) were reduced forms of spatial price equilibriums of interregional trade, using a modified version of the Spatial Price Equilibrium (SPE) model developed by Samuelson (1952).	
List and Turnquist (1994)	Trip matrix estimation method in order to track travel pattern in urban area.	
Celik and Guldmann (2002)	Adaption of the Broker model (1989) to an empirically estimable model (empirical commodity flow model) through using origin, destination, geography, two specific variables, and three dummy variables.	1993 CFS
Celik and Guldmann (2002)	Spatial interaction modeling, which incorporated some variables into the model and used a flexible Box-Cox functional form, which was automatically used to identify suitable power transformation for the data.	1993 CFS

Table 2-3: Summary of the Characteristics of Models Used in Each Step of the Four-Step Approach

	Type of Model	Advantages	Disadvantages
Trip Generation	Time series	- Limited data requirements	- Little insight into causality and limited scope for policy effects
	System dynamics	- Limited data requirement. - Can give land use interactions - External and policy effects variables can be included	- No statistical tests on parameter values
	I-O	- Have link to the economy - Can give land use interactions - Can check policy effects if elastic coefficient is used	- Need input-output table - Restrictive assumptions if fixed coefficients are used - Need conversion from values to tons - Need to regionalize predicted flows - Need to identify import and export trade flows
	I-O, multi-regional	- Link to the economy - Can give land use interactions - Policy effects if elastic coefficients	- Need multi-regional input-output table - Restrictive assumptions if fixed coefficients - Need conversion from values to tons - Need to identify import and export trade flows
Trip Distribution	Gravity	- Limited data requirements - Some policy effects through transport cost function	- Limited scope for including explanatory factors and policy effects - Limited number of calibration parameters
	I-O, multi-regional	- Link to the economy - Can give land use interactions - Policy effects if elastic coefficients	- Need multi-regional input-output table - Restrictive assumptions if fixed coefficient - Need conversion from values to tones - Need to identify import and export trade flows
Modal Split	Aggregate mode split	- Limited data requirements	- Weak theoretical basis - Little insight into casualty - Limited scope for policy effects
	Disaggregate mode split	- Theoretical basis - Potential to include many casual variables and policy measure	- Need disaggregate data (shipper or commodity survey)
	Multi-modal network	- Limited data requirements - Theoretical basis - Can include elastic demand	- Little insight into casualty - Limited scope for policy effects - Mostly with fixed demand
Traffic Assignment	Separate assignment	- Mode choice can be disaggregate - Allows interaction with passenger trips if freight and passenger trips are assigned together	- Absence of interaction between demand and assignment can be unrealistic: this can only be done iteratively - Transport chains are difficult, but not impossible to incorporate
	Multi-modal network	- Substitution takes place between mode-route combinations - Different modes on a route can be handled, i.e., intermodal	- Little scope for controlling the optimization process

Sources: University of Westminster and Katalysis Ltd., DfT Integrated Transport and Economics Appraisal (2002).

2.1.2.2.3 Classification of Freight Demand Models by Methodology

In this subsection, existing freight demand models are presented, grouped by their methodologies. Existing freight demand models are linear regression models, I-O models, vehicle trip-based models, commodity-based models, spatial interaction models, O-D trip matrix estimation models, and O-D synthesis estimation models.

2.1.2.2.3.1 Linear Regression Models: Simple and Straightforward as Vehicle-Based Methods

Linear regression models use a simplified form of mathematical formulation of the freight demand modeling to quantify freight production and attraction by industry based on business patterns and population. The main methods of this model are route-specific growth factors using linear regression, and multiple linear regression models to estimate interstate truck traffic as a function of key demographic and economic indicators.

As a latest example of linear regression models, cross-classification and regression models were used to estimate regional economic impacts with temporary loss of transportation services and use short-term forecasting and disaggregated O-D matrix for sub-state levels (Chin and Hwang 2007). They categorized the industries into homogeneous groups (by three-digit North American Industry Classification System (NAICS) code) and subsequently quantified freight production and attraction in terms of value and weight of commodities transported, based on the corresponding business patterns in each individual state using the 2002 CFS data, the 2002 county business patterns data, and the 2002 I-O account data. They used both a freight production model and a freight attraction model.

2.1.2.2.3.2 Input-Output (I-O) Models: Regional Industrial Multiplier System (RIMS)

I-O models are a family of analytical formulations that represented the inter-linkages among economic sectors as a function of the amount of inputs and a given output. In simple terms, I-O models represented the economic output of an economy as a function of the inputs used in the production process. This mathematical relationship made the estimation of the inputs that are required to achieve a given level of output in an economic sector.

According to Holguin-Veras et al. (2001), I-O models require the following assumptions: (a) in a given sector, the products were homogeneous; (b) production technologies within a sector can be represented by the level of technology; (c) the technology of production can be assumed to be constant; and (d) there is equilibrium between total supply and total demand.

2.1.2.2.3.3 Vehicle Trip-Based Models

Trip-based models, as the name implies, focus on modeling vehicle trips. They only had three components including trip generation (to estimate the number of vehicle trips produced and attracted by each zone), trip distribution (to estimate the number of vehicle trips between each origin-destination pair), and traffic assignment (to estimate the traffic in the network). Since the focus is on vehicle trips, which assumes that mode selection and vehicle selection already are done, trip based models do not need mode-split or vehicle-loading models (Holguín-Veras and Thorson 2000).

Trip-based models have some advantages. First, they focus on a unit (the vehicle trip), for which there is a significant amount of data in the form of traffic counts, screen counts, and so forth. Furthermore, an increasing number of intelligent transportation system applications are able to track the movements of vehicles through, at least, segments of the highway networks,

thus increasingly becoming an important source of traffic data. Second, empty trips do not show up as major problems since the focus is on the vehicle trip.

Trip-based models, however, have some disadvantages. First, they have restrictive applicability to situations in which multiple freight transportation modes are to be considered. Second, since the vehicle trip – the focus of trip-based models – is in itself the result of a mode choice and vehicle selection processes (which have not been explicitly taken into account). That is, the identification and modeling of the economic and behavioral mechanisms that determine freight demand become more difficult because these mechanisms are associated with the actual commodities being transported.

There are a number of applications of gravity models to trip-based modeling. Swan Wooster (1979) calibrated three gravity models, one for each truck type. Southworth (1982) incorporated truck route circuitry into a gravity model formulation for Chicago. Ogden (1978) analyzed a gravity model of truck trip distribution for various trip purposes. Meyburg (1976) reviewed early gravity model experiments. Button and Pearman (1981) described British work in the 1970s. A more recent formulation is presented by Cambridge Systematics (1996).

In their study, modeling of loaded and empty trips for depicting commercial vehicle flows (i.e., truck trips), Holguin-Veras and Thorson (2003a) showed the limitation of the trip-based model as follows:

- Vehicle-trip-based modeling could not explain the economic characteristics of cargo, which are important in decision making, as demonstrated theoretically and empirically in the context of optimal pricing.

- The vehicle-trip-based model had limited applicability to multimodal freight transportation systems because it focused on the vehicle trip – in itself, the result of a decision already made.

2.1.2.2.3.4 Commodity-Based Models

Commodity-based models, in general, attempt to replicate the process of freight movement that takes place in real life. As part of this process, a set of models were developed in order to capture the different components of commodity movement. Commodity-based applications require more sub-models than their counterparts in trip-based modeling because they explicitly take into account the mode choice process and require vehicle loading models to estimate the number of vehicle-trips from the commodity flows (Holguín-Veras and Thorson 2000).

Commodity-based models focus on modeling the amount of freight measured in tons, or any comparable unit of weight. It was widely accepted that the focus on the cargoes enables commodity-based models to capture more accurately the fundamental economic mechanisms that drive freight movements, which largely are determined by the cargoes‘ attributes (e.g., shape and unit weight). In general terms, the components of the modeling process are those described in Table 2-4.

Table 2-4: Model Components of Commodity-Based Four-Steps Approach

Step	Activities	Approach
1	Commodity generation	Commodity generation rates or zone regression models
2	Commodity distribution	Gravity models
3	Commodity modal split	Logit models
4	Vehicle loading	Loading rates based on previous surveys
5	Traffic assignment	Standard traffic assignment techniques

Source: Adapted from Ogden, K. W. (1992).

The techniques described in NCHRP 260, Application of Statewide Freight Demand Forecasting Techniques (Fredrick 1983), included the application of commodity flow databases, the allocation of origins and destinations to the county level using employment shares by industry sector, and the use of I-O tables to allocate destinations for commodities based on consumption ratios. All of these techniques were used in the Southern California Association of Governments (SCAG) external model (Fisher et al. 2000).

There have been a number of more recent efforts to apply commodity flow techniques to statewide modeling by Parsons Brinckerhoff Quade and Douglas, Inc (1998), Donnelly et al. (1999), Souleyrotte et al. (1996), Rockliff et al. (1998), Souleyrotte et al. (1998), and Horowitz and Farmer (1998). Fischer et al. (2000) discussed additional studies using commodity flow analysis and I-O modeling techniques. The commodity-based approach was well suited for representing freight movements to and from manufacturers, and movements into or out of the region as noted by Krishanan and Hancock (1998) in modeling Massachusetts statewide freight transportation flows using a GIS. In analyzing Wisconsin models, Huang and Smith (1998) used two approaches to allocate the external trips to external stations: the Boundary Balancing Method (BBM) and the Global Shortest Path Method (GSPM). The BBM model distributed truck traffic to the external stations using the existing truck traffic proportions for each boundary with adjoining states. In contrast, the GSPM model used the shortest path from external zones to assign trips to the external stations traversed by the trips.

Ogden (1992) discussed the potential problems and limitations for capturing the fundamental mechanisms of the freight demand process with viewpoints of commodity-based approaches as follows:

- One of the disadvantages is that commodity-based approaches require commodity flows, estimated through expensive and time-consuming O-D surveys.
- Commodity-based models have a limitation that is related to their inability to model empty trips, which is the result of logistic decisions not directly explained by commodity flows.

The second limitation outlined by Ogden (1992) was usually addressed by expanding the commodity distribution matrix so that the resulting traffic assignment resembled the calibration values from ground truth data. To overcome this commodity-based modeling limitation, Holguin-Veras and Pati (2007) suggested that complementary models could be developed to depict empty trips as a function of the routing choices of commercial operators, which were based on the commodity flows in the study area. They took this approach to formulate a model of the empty trips as a part of commercial vehicle trip chains using probability principles as a function of the commodity flow matrices.

2.1.2.2.3.5 Spatial Interaction Models

Spatial interaction models are a family of models for describing interactions among analysis zones. The term –spatial integration" encompasses a family of gravity, intervening opportunities, and direct demand models. There has been a long tradition stemmed from the first applications of transportation modeling using spatial interaction models to represent destination choice problems. In freight transportation, spatial interaction models have been used both in trip-based as well as in commodity based modeling.

According to Holguin-Veras et al. (2001), the main types of spatial interaction models were gravity models, intervening opportunities models (the fundamental assumption that the probability of selecting a destination is a function of the probability of not selecting one of the

prior destinations of the trip), direct demand models, and general econometric models (attempting to represent transportation demand, either total or by mode as a function of a set of relevant attributes).

2.1.2.2.3.6 Origin-Destination (O-D) Trip Matrix Estimation Models

O-D matrix models are based on commodity flow between any O-D pair. O-D matrix models use the available information including field data, selected-link volumes, partial O-D tables, originating and terminating trips by zone, and screen-line counts. Park and Smith Jr. (1997) studied a statewide truck-travel demand model based on a small sample O-D survey of truck registration, supplemented by an external cordon O-D survey and O-D data from 17 urban areas in the state of Wisconsin. Rios et al. (2002) developed a multimodal freight O-D estimation model. To solve the multimodal freight O-D estimation problem, they used an optimization technique. To compare the estimated and true O-D table, root mean square (RMS) was used to test their closeness. Crainic et al. (2001) developed demand matrix adjustment for multimodal freight networks using strategic transportation analysis. Holguin-Veras et al. (2001) summarized methods of origin-destination trip matrix estimation as follows:

- Conventional analysis (i.e., use of survey data to determine real trip distribution): Fratar models, gravity-opportunity models (a formulation to obtain the parameters of the gravity model that best reproduce a given set of traffic counts), gravity models and quick response models (a method of synthesizing trip tables from more conveniently available information);
- Applied analysis: traffic count-based models, gravity-based models (parameter calibration models), entropy models, linear programming models, and equilibrium

models based on the principle of the user optimization of traffic flow, called the ―Equilibrium-Principle" or ―Wardrop's-Principle" (Wardrop 1952);

- Statistical models: alternative least square estimation models proposed by Carey et al. (1981), McNeil and Hendrickson (1985), and Cascetta (1984), generalized least square estimation (GLSE) model (McNeil 1983), constrained maximum-likelihood (CML) models (Geva 1983, Spiess 1987, Walting and Maher 1992, and Walting and Grey 1991), and matrix estimation using structure explicitly (MEUSE) (Bierlaire and Toint 1995), which used both historic data and parking data as input; and
- Applied analysis using new techniques: artificial intelligence, neural network, and fuzzy weight models.

2.1.2.2.3.7 Origin-Destination Synthesis Estimation Models

Empty trips are important because empty trips are 30 percent to 40 percent of total truck trips while a commodity-based model estimates loaded truck trips. An integrated O-D synthesis model combined with a complementary model of empty trips avoided significant empty trip errors in the estimation of directional traffic.

Holguin-Veras and Pati (2007) pointed out the limitations of current O-D synthesis formulation. They stated that current freight O-D synthesis formulations had limitations in their ability to significantly depict freight movements. The most obvious one is that the commodity-based formulations did not take explicitly into account empty trips, whereas the vehicle-based formulations could not explain the role played by the commodity type on freight generation, distribution, and mode choice.

One of the advanced O-D synthesis estimation models is entropy maximizing (EM) model for estimating travel by automobile and trucks. A maximum entropy probability

distribution is a probability distribution whose entropy is at least as great as that of all other members of a specified class of distributions. The EM model formulation also permits easy updating of the O-D trip tables when more recent traffic count data become available (Park and Smith Jr. 1997).

2.1.2.2.4 Model Classification by Regional Scale

Freight models in the U.S could be divided into two regional scales: 1) urban area models and 2) regional models (the state and national level models).

2.1.2.2.4.1 Urban Freight Models

There are two main urban freight models that are well known, the Seattle FASTrucks model and the New York City Best Practice model. The Seattle FASTruck model (Cambridge Systematics Inc. 2000) was a regional truck forecasting model, with the adaptation of the three-step travel forecasting process: trip generation, trip distribution, and traffic assignment. This model was based primarily upon average national values or information imported from elsewhere. There is no local truck behavior data; only limited truck count data were used.

As a truck model, the New York City Best Practice model was described as a best practice model (BPM) and based largely on synthetic matrix estimation techniques, which attempted to adjust the interchange values in a trip table through an iterative process of assigning the table to the network, calculating deviations from coded traffic counts, and using this information to re-factor the trip table. The work was summarized by Parsons Brinckerhoff Inc. (2002) and in more detail by List et al. (2001). The BPM coupled an extension of traditional matrix estimation techniques with estimates of zonal trip generation and attraction to derive truck flows. The matrix estimation model used a linear programming solution that minimized the

deviations of the observed factors while conserving the flows in the seed matrix. List et al. (2001) found that the use of a linear programming approach allowed an objective function with several constraints to be optimized, rather than the singular maximum likelihood technique.

2.1.2.2.4.2 Regional Models (Statewide and National Levels)

In regional models, the orientation of freight demand modeling is changed from truck volume to commodity flow, and in the viewpoint of methodology, neither quick response approach nor synthetic matrix estimation is employed. A representative regional model of freight demand modeling is FAF developed by Census Bureau et al. (2006). The characteristics of FAF are the following:

- Prototype national commodity flow model for use in policy and legislative analyses (FHWA 2002) ;
- FAF for comprehensive forecasts of intercity freight flow to help rationalize various Interstate highway corridors;
- TRANSEARCH database (Reebie Associates, a third-party database of country-to-country flows by commodity and mode of transportation) and U.S. foreign trade data (monthly summaries of imports and exports by commodity, mode of transportation and trip ends within the U.S); and
- Synthetic techniques for allocating foreign trade data from the state to county level.

Also, many states have developed their own freight demand models or freight system plans. The following examples show the characteristics and issues of regional freight demand models:

- Washington Department of Transportation (DOT): Washington DOT developed FASTruck model using employment estimates (Cambridge Systematics Inc. 2000).

- Florida DOT: Florida DOT developed an intermodal statewide highway freight model that identified and measured truck activity in the state, providing adequate insight into highway connections for other transportation modes and regional freight hubs (Black 1999).
- Oregon DOT: Oregon DOT used Travel and Land Use Model Integration Program (TLUMIP), a suite of integrated land use-transport model. Using a bi-level hybrid simulation, an upper-level regional commodity flow model (a tonnage flows by commodity and mode of transport – 40 different commodities) and a lower-level microscopic model of truck flows using Monte-Carlo Process (generation of discrete shipments, micro-simulation of trip ends, trans-shipment allocation, itinerary generation, and itinerary optimization) (Donnelly 2002).
- Virginia DOT: Virginia DOT used commodity flow and statistical analysis techniques to define relationship among commodity production, attraction, and publicly available socio-economic data. These relationships were used to predict productions and attractions of commodities in each county and major city (Brogan et al. 2001).
- New Jersey DOT: New Jersey DOT used truck trip tables considering four truck classes, based on regional commodity flows, and using a standard gravity models. Boile et al. (1988) developed a model for assigning multi-commodity, multi-class truck trips to New Jersey‘s highways.
- Iowa DOT: The Iowa State University developed a layered approach to transportation demand modeling in 1998 and demonstrated the modeling of truck freight traffic with commodities of a few dominating economic sectors. Later other commodities were

added. O-D data were estimated using the Iowa Truck Weight Survey. Later the TRANSEARCH database was used.

- Minnesota DOT: A regional freight flow survey in 1998 was conducted to identify the value of commodity flow along major corridors. This survey was limited to 12 counties in the northwest corner of the state and the model included only truck and rail flows. Commodity flow information from the 1993 CFS for Minnesota and TRANSEARCH database were used in this layered approach using an I-O model based on the IMPLAN economic model.
- Wisconsin DOT: A comprehensive freight planning study was conducted as part of Wisconsin‘s long-range transportation plan, *Translinks 21*, in 1996. A multimodal approach using TRANSEARCH county-level commodity flow data were obtained for the truck, rail, water, and air modes. Wisconsin DOT forecasted 2020 commodity flow data by estimating changes in industrial employment (92 industry classes).
- Utah DOT (UDOT): Recently, the Utah statewide travel model (USTM) (Wilbur Smith Associates 2008 and UDOT Research Division 2010) was developed using one of the standard multi-modal statewide models using a specific transportation planning software. The USTM was developed by Wilbur Smith Associates in cooperation with Resource System, Inc. in 2008 as a standard four-step model with trip generation, trip distribution, model split, and traffic assignment using Citilab‘s Cube transportation planning software, in order to forecast average annual daily traffic (AADT) patterns on the interstate facilities based on roadway capacity and socio-economic plans to make traffic forecasts easy to visualize by UDOT and stakeholders, to complement traffic forecasting techniques provided by the metropolitan planning organizations

(MPOs), and to support strategic planning and investment management at the state level. The model developed new statewide model networks and traffic analysis zones (TAZs) for the rural part of the state, in order to maintain the integrity of the MPO models‘ data set and structure and to develop complete inputs to the statewide model. The highway networks are developed into GIS shape files. UDOT stated in the UDOT Research Division‘s March 2010 Newsletter that USTM would also be capable of forecasting freight movements in Utah on the state highway system. The primary data source for this application is the U.S. DOT FAF (FAF2.2). The model is capable of modeling commercial, single, and multi-unit trucks. While the USTM was one of the standard multi-modal statewide models using Citilab‘s Cube transportation planning software, the model developed by the author focuses on truck freight flow on state highways using commodity flow-land use relationships.

2.1.2.2.4.3 Truck Trip Demand Models

Owing to the requirements outlined in ISTEA, several states and major cities have developed some types of regional truck traffic model capable of predicting truck traffic on most highways and arterials (Marker and Goulias 1998); but, their modeling methodologies were simple because they used a trip ratio or trend line analysis. Also, the Federal Highway Administration (FHWA) has updated the Quick Response Freight Manual (QRFM) (Cohen et al. 1996 and Cambridge Systematics Inc. et al. 1996) to allow simple, low-cost, and relatively accurate truck traffic forecasting on either a regional or a local level. QRFM was a truck commodity model based on the four-step approach.

Smadi and Maze (1996), Tadi and Balbach (1994), Schlappi et al. (1993) Nixon (1993), and Ruiter (1992) attempted to follow the methodology used in the four-step process, also known

as the Urban Transportation Planning System (UTPS), typically using employment of traffic analysis area, in some form, to predict truck trip generation. The models performed trip distribution by means of a gravity model using travel time for impedance. They employed a large number of TAZs based on census tracts, municipalities, or counties.

Sorratini and Smith Jr. (2000) analyzed past trends in truck traffic forecasting methods in order to improve the modeling of statewide truck travel demand models by using commodity flow data from the US Census Bureau, a private freight database (TRANSEARCH), and input-output coefficient. After reviewing existing methods, they made the following conclusions:

- Many states did a trend-line analysis of truck traffic counts to estimate and forecast statewide truck traffic. These analyses did not have a direct link to the economic activities. Therefore, the primary source of heavy truck trips could not explain interactions between the highway links and truck freight flows.
- A few states had attempted to develop a standard network-based travel demand model at the state level, but most states were not willing to obtain costly O-D survey data that is needed for calibration.

Boile and Golias (2004) grouped methods for estimating truck trips into three main types; estimation of simple rates, linear regression models (simple and straightforward vehicle-based methods), and commodity flow models.

Al-Battaineh and Kaysi (2005) suggested a commodity-based truck origin-destination matrix estimation method using I-O data and genetic algorithm. Their model had two sub-models: the trip generation model using I-O data with employment and population data to estimate zonal level of commodity production and attraction, and the genetic algorithm model for

searching globally for the optimum O-D matrix. Also, Whitley (1994) and Caliper Corporation (2001) used an option of TransCAD as a module to estimate the O-D matrix from traffic counts.

Fisher et al. (2000) developed SCAG Model, an urban truck trip model based on commodity flow. The characteristics of SCAG model are as follows:

- No other metropolitan truck model has used detailed commodity flow and employment data to generate and distribute truck trips at the traffic analysis zone level.
- The SCAG model was the first model to allocate commodity flows to a complete set of truck weight classes that matched the current mobile source emission model categories (and thus can be used more readily in conformity analysis).
- Unlike the earlier statewide commodity flow models, this model explicitly recognized the need to allocate origins and destinations of some commodity flow to distribution centers or warehouses. The technique of using land use data to allocate destinations of certain nonmanufacturing flows also was unique to this model.

2.1.3 Relationship Between Freight System and GIS

In order to find out relationship between freight system and GIS, the characteristics of GIS in transportation (GIS-T) and freight system using GIS tools were reviewed.

2.1.3.1 GIS in Transportation (GIS-T)

GIS-T is an application of GIS to and an integration of GIS into transportation analyses. A representative sample of the applications in which GIS technology has been used today to improve decision-making process of the transportation system includes infrastructure planning, design and management, public transit planning and operations, traffic analysis and control,

transportation safety analysis, environmental impacts assessment, hazards mitigation, and configuring and managing complex logistics systems (ESRI 2009).

By allowing a wide range of information to be integrated with location, GIS-T fosters a general perspective on complex land-use and transportation problems. GIS-T allows analytical and computational tools to be used in conjunction with detailed representations of the local geography, allowing analysis and problem solving to be tailored to the local context. GIS-T could greatly reduce the differences between analysis and communication, allowing greater public input into analytical decisions such as choice of data, modeling assumptions, and scenario development (ESRI 2009). GIS-T could also make transportation information more accessible, potentially enhancing location and transportation decision-making by the public at large and encouraging wider participation in the transportation planning process (Miller and Shaw 2001).

Palem (2004) pointed out the needs of GIS in transportation because traffic generation was viewed as a function of characteristics of TAZs and land use models in transportation planning process sought to understand and predict the location of current and future activities. Figure 2-1 shows the relationship between the GIS and transportation planning.

GIS-T applications could cover much of the broad scope of transportation. The following are some of the research studies of GIS-T applications to the transportation field:

- Development of hyper-map database for intelligent transportation systems (ITS) and GIS for developing a methodology that combined video images and digital maps for ITS and GIS (Kim et al. 2001);
- Comprehensive regional modeling for long-range planning linking integrated urban models and GIS (Johnston and de la Barra, 2000);

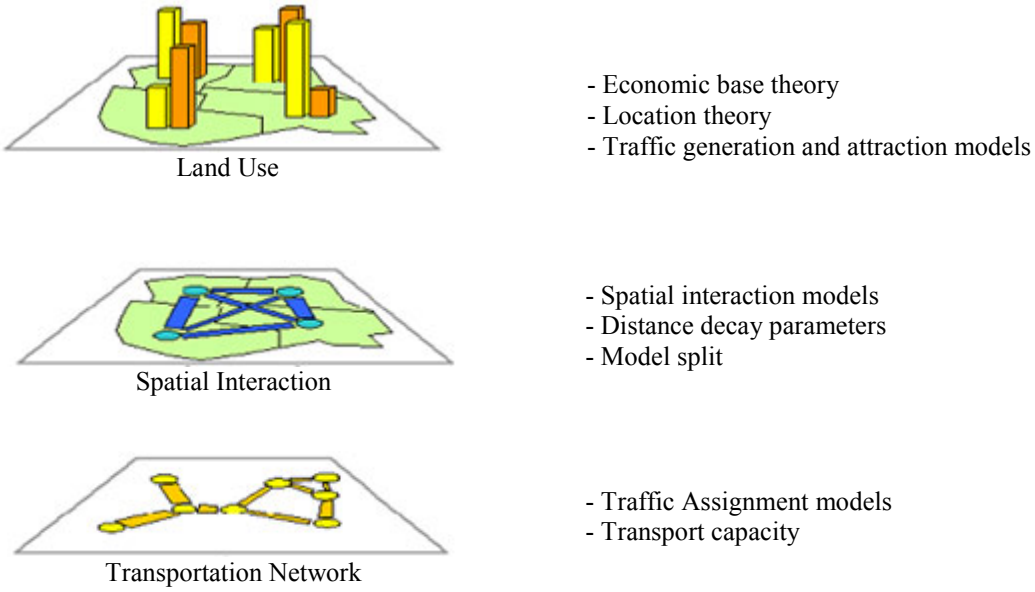


Figure 2-1: Components of Transportation and Land Use System (Source: Rodriguez 2009)

- Investigation of the application of GIS database to address statewide freight transportation planning (Shannon and Demetsky 2002);
- GIS-based add-on system to transport planning for estimating the environmental impacts from road traffic networks (Brown and Affum, 2002);
- Development of an aggregate supply and demand modeling using GIS in order to utilize GIS techniques to distribute aggregate supplies from supply areas to demand areas by various allocation models through a highway transportation network, and evaluate the results (Karakas and Turner 2004);
- A survey on the statewide condition of the integration of GIS and transportation modeling to document active use of GIS-T at the 50 state DOTs and MPOs, and determining if GIS has been properly integrated into the transportation planning process (Boxill 2005);
- Study on factors affecting the use of GIS in urban transportation planning and management (Khan et al. 2005);

- Study on integrating GIS, simulation models, and three-dimensional (3D) visualization (Wang 2005);
- Use of GIS, especially assisting in finding solutions to geographic problems by computer through a multi-objective GIS (Chen et al. 2008); and
- Development of a travel demand model using TransCAD‘s built-in four-step model that omitted the mode choice step for low-class roads (Zhong and Hanson 2007).

2.1.3.2 Freight System Using GIS Tools

In order to clearly show freight movements, the need to conveniently visualize the transportation infrastructure, demographic, economic and socio-economic characteristics driving the freight movement system has grown (Khan et al. 2005). Many research studies on GIS-use in freight transportation analysis were directed toward demonstrating certain integration techniques in GIS to analyze freight flow characteristics. Such analyses include location analysis of transportation facilities, location analysis of freight generators, truck flow map creation, and travel time contour generation. These research studies can be classified into five areas, including freight capacity and density analysis, freight flow study and corridor analysis, trucking and logistic application of the GIS-T, freight demand modeling using GIS-T, and other applications. Table 2-5 shows freight related research studies using GIS.

2.1.4 Freight Data and Information

Data and information on transportation are some of the most important parts for establishing transportation planning and policy, analyzing traffic operation, and determining the future investments. There are no exceptions in freight transportation.

2.1.4.1 Importance of Freight Data

Transportation-related strategic planning in both the public and the private sectors relies on data on the movement of goods and people. Analysis of these data provides the information needed to make policy and investment decisions. A TRB special report 234 (National Research Council 1992) on data requirements for making national transportation policy noted that without good data, decisions would be arbitrary, options overlooked, and solutions reactive. Also, the Bureau of Transportation Statistics (BTS) emphasized the importance of the data by saying that good decisions required having the right information in the right form at the right time (BTS 1998).

The effectiveness and efficiency of the freight transportation system are heavily dependent on reliable data on economic and infrastructure investments and policy issues to inform a range of decision makers at all levels of governments and in the private sectors. Meyburg et al. (2003) concluded that data on goods movements were essential to identify and evaluate options to mitigate congestion, improve regional and global economic competitiveness, enable effective land use planning, inform investment and policy decisions about modal optimization, enhance transportation safety and security, identify transportation marketing opportunities, reduce fuel consumption, and improve air quality. While data alone cannot guarantee good decisions, informed choices are not possible without good data (Meyburg et al. 2003).

Freight transportation planners and policy-makers need coherent freight data. Because data collection by federal agencies and other public- and private-sector entities efforts have not been well coordinated, the resulting data sets have been of varying quality and reliability and provided an incomplete picture of the universe of freight movements.

Table 2-5: Freight Related Research Studies Using GIS

Application Fields	Authors	Main Topic
Freight Capacity and Density Analysis	Ammah-Tagoe and Johnson (2004)	Study on determining potential freight bottlenecks or choke points with the Geofreight.
	Wong et al. (1997)	Development of GIS-based freight density and capacity modeling using existing and proposed facility or driver domicile locations, information regarding seasonality of freight density by region, and demographic information.
Freight Flow Study and Corridor Analysis	Krishnan and Hankock (1998)	Study on applying commodity flow data to the modeling of statewide freight transportation flows in Massachusetts.
	Alam and Fekpe (1998)	Investigation of the nature of tucking activities along the corridor and its influence at a regional level.
Freight Flow Study and Corridor Analysis	Golias and Boile (2005)	Investigation of North Dakota‘s agricultural freight flows using GIS tools.
	Shannon and Demetsky (2002)	Investigation of the application tool of GIS database of Virginia state freight transportation planning for building effective GIS database.
	Kim et al. (2001)	Study on applying GIS technologies to freight movement in a corridor analysis.
	Boile and Golias (2004)	Study on dynamic GIS-based tool for truck volume estimation for estimating truck volumes and flows using classification counts and socio-economic data.
	Craig and Walton (2002)	Use of GIS technology for identifying the strategic freight corridors (SFC).
	Gordon and Pan (2001)	Study on a GIS-based origin-destination matrix for southern California freight flows.
Trucking and Logistic	Wong et al. (1997)	Study on trucking and logistic application using the GIS.
Freight Demand Modeling	Golias and Boile (2005)	Study on applying a GIS framework using database imported from such models for visualization using ArcView.
	Marker Jr. and Goulias (1998)	Study on truck traffic prediction using QRFM under different degrees of geographic resolution – GIS application in Pennsylvania using TransCAD.
	Chin (2006)	Development of a routing model to assign data on freight flows to various components of the transportation network using GeoFreight.
Other Applications	Dantas et al. (2000)	Development of a methodology to determine the best location for a postal freight terminal.
	Sutton and Bennett (2001)	Analysis of different scenarios, testing different inputs under various modeling parameters, and displaying results on digital map using a GIS-based decision support system (GDSS).
	Zhou et al. (2001)	Establishment of logistics planning using the Programming in Operational and Expressive Models (POEM) language system composed of a core technology and natural constraint language (NCL) and visual script.
	Palem (2004)	Development of a conceptual framework for an internet or web based freight management.
	Wang et al. (2004)	Study on applying spatial information technology for logistics in ITS.

Furthermore, difficulties in combining data from the diverse sources have limited the usefulness of current data sets for freight transportation analyses. To remedy these deficiencies, a national freight data framework was needed (Meyburg et al. 2003).

The keys to these issues are data on items such as origin and destination of shipments, commodities moved, modes of shipment, vehicle and vessel type, routing, and time of day of shipping. These data need to be provided in a timely fashion so that decisions can be made using up-to-date information. Coordinated information and modeling strategies have been essentially the most cost effective and productive direction to move into for greater and more usable freight analyses and forecasting (Meyburg et al. 2003).

2.1.4.2 Essential Data for Freight Planning and Policy

Many types of data are needed for making good freight planning and policy development. MEandP et al. (2002b) described types of data and sources for freight planning and policy. They suggested that the following were the types of data needed in freight transportation:

- Economic and financial data (e.g. operating costs, tariffs, wealth indicators);
- Statistics (e.g. trends, import and export, vehicle registrations);
- Surveys (e.g. interviews with operators, roadside interviews, traffic counts);
- Land use data (e.g. area usage categories, usage quantities, gazetteers);
- Network data (e.g. link and junction locations and types, speeds); and
- Operational data (e.g. logistics relationships, transshipment locations).

To estimate commodity flows and related freight transportation activity among states, sub-state regions, and major international gateways; to forecast future flows among regions; and to relate those flows to the transportation network, the Census Bureau, U.S. Department of

Commerce, and BTS created the FAF (FHWA 2002). The FAF included an O-D database of commodity flows among regions and a network database in which flows were converted to truck payloads and related to specific routes and it estimated tonnage and values of commodity movements among regions by mode of transportation and by type of commodity. At the time that this research was completed, FAF 2.2 (FHWA 2006), which contained projected commodity flow data ranging from 2010 to 2035 in five-year intervals as well as the corrected 2002 base case data from Version 2.1, was available.

The FAF 2.2 (FHWA 2006) includeed data such as (1) two four-dimensional matrices (one for tonnage and one for value) for domestic movements in which the four dimensions used are origin, destination, commodity, and mode; and (2) four five-dimensional matrices for international movements (one for tonnage and one for value) in which the five dimensions are origin, destination, commodity, mode, and coast (port of entry and exit). These matrices are referred to as the freight flow database (FFD), which contains origins and destinations of freight. The FFD is comprised of 114 regions as defined and used in the 2002 CFS plus 17 additional international gateways and 7 international regions. Commodities are defined at the 2-digit standard classification of transported goods (SCTG) level. The complete FAF 2.2 2002 U.S. Commodity flows matrix is comprised of 138 origin and destination regions, broken down by 43 commodity classes and by 7 major mode and mode combinations.

Also, other data sources available for a comprehensive statewide freight plan are Cambridge Systematics Inc., US Army Corps of Engineers, Federal Railway Administration 2003 Rail Waybill, and the TRANSEARCH Database by Reebie Associates (Parsons Brinckerhoff, Quade and Douglas Inc., 2007a). Cambridge Systematics Inc. (2007) described the characteristics of TRANSERACH data as follows:

- TRANSEARCH was a commercial data product developed by Reebie Associates (now a part of Global Insight, Inc.). TRANSEARCH provided estimates of county-to-county and state-to-state freight flows by truck, rail, air, and water. TRANSEARCH also provided separate estimates for different commodity types.
- TRANSEARCH utilized proprietary data to estimate truck flows, Federal Railroad Administration Waybill Sample Data for rail flows, and other public sources for air and water flows.
- The TRANSEARCH data captured domestic commodity tonnage moving within the United States. It did not capture "non-freight" vehicle movements (empty trucks or railcars, service vehicles, etc.). Nor did it capture international movements. However, the effect of cross-border truck and rail moves were in the data, as domestic moves from the point where they entered the U.S. Similarly, the "domestic leg" of international air cargo and waterborne cargo — the moves to and from airports and seaports — were covered in the data.

Braslau and Fruin (1998) described the characteristics of IMPLAN data, another data source of freight transportation for region and counties as follows:

- The IMPLAN I-O model was a systematic tool for examining the structure and inter-industry relationships within regions down to the county level. The model was originally developed for the United States Forest Service to analyze impacts in federal lands managed by the Forest Service, but was extended by the University of Minnesota to cover all regions of the United States. The model is currently updated and distributed by the Minnesota IMPLAN Group (MIG) in Stillwater, Minnesota.

- The IMPLAN model database containd information on 528 different industry types ranging from agricultural crops to the United States Postal Service. The U.S. Bureau created a Census Standard Industrial Classification (SIC) for identifying industry groups. The SIC classifies industries into one, two, three and four digit groups as the number of industry increases.

2.1.5 Importance of Truck Traffic Data with Increased Accuracy Level

The FHWA Traffic Monitoring Guide (TMG) (2001) discussed available vehicle classification technologies, including use of axle, vehicle length, and machine vision classifiers. Hallmark (2002) has shown that the current methods used in the estimation of heavy vehicle-mile-traveled (VMT) are often less accurate than those used for passenger vehicles. In the evaluation of existing truck VMT calculation methods, Hallmark identified deficiencies of the existing truck VMT calculation methods and made recommendations for reducing uncertainties in heavy-vehicle VMT estimates. Estimation of truck VMT serves as a vital input for geometric and pavement design of highways. Truck VMT was also a key factor in traffic safety.

According to the TMG (FHWA 2001), two types of error were possible in collecting and analyzing traffic data. They were errors in data collection process and errors in data reduction process. A wide range of factors including power failure, recorder malfunction, and detector malfunction are sources of invalid data or missing data from the permanent counters. When permanent counts contain errors, there is no available correction process. The only manual step in reducing permanent counter data is to review the data set for completeness and to manually exclude data that have been rendered invalid through a power failure or machine malfunction.

The TMG (2001) also stated that there should be a sufficient number of days of valid traffic measurements during a year to compute average traffic characteristics at the site. The

number of days needed was determined by whether or not an automated editing process was used to evaluate the recorded data. If automated edits are performed, it is recommended that agencies adopt at least once a week, one week for each month for the year, a total of 12. Until agencies have implemented automated edits, the American Association of State Highways and Transportation Officials (AASHTO) recommends that at least two-days a week, one week for each month for the year, a total of 24, be adopted (Hallmark 2002).

According to the previous studies, truck data collection methods were grouped into four categories: use of axle, vehicle length, machine vision classifiers, and other new technologies. Collecting more accurate truck traffic data is important as the number of heavy vehicles on highways affects traffic operations, safety, pavement performance, design, and so forth. Also, with more accurate truck traffic data collected, VMTs and vehicle classification become vital inputs in the design and operation of an efficient highway infrastructure system.

In order to improve the quality of truck traffic data collected at permanent traffic count stations, researchers have experimented trial-and-error methods. Therefore, only a few studies have been conducted to evaluate accuracy levels of truck traffic data. Table 2-6 summarizes the results of the existing research studies on accuracy levels of truck traffic data which aimed at lessening the errors at permanent truck traffic data collection stations.

2.1.6 Summary of Existing Researches

Based on reviewing current and previous freight research studies, the characteristics of existing statewide freight demand modeling and trends in freight demand modeling were summarized in this section.

2.1.6.1 Characteristics of Existing Statewide Freight Demand Models

The characteristics of existing statewide freight demand models were reviewed in terms of prototype national commodity models, scale of statewide commodity models, type of mode selection, and types of freight demand modeling. Table 2-7 shows the summary of statewide or regional freight demand modeling.

Table 2-6: Summary of Research Results on Accuracy Level of Truck Traffic Data

Researcher	Methodology	Accuracy Level
Wang et al. (2006)	Paired video and single-loop sensors.	The accuracy for vehicle detection was above 97 percent, and the total truck count error was lower than 9 percent for all three tests.
Fung et al. (2002)	A statistical shadow image removal algorithm based upon construction of a probability map called the Shadow Confidence Score (SCS).	The algorithm achieved an error rate of 14 percent.
Lai et al. (2001)	Angle control of camera through the use of a set of coordinate mapping functions.	This method estimated vehicle lengths to within 10 percent of error margin in every instance.
Gupte et al. (2002)	Determining the relationship between the tracked regions and vehicle image based analysis.	In a 20-minute trial of the program, 90 percent of all vehicles were properly detected and tracked, and 70 percent of those vehicles were properly classified.
Hasegawa and Kanade (2005)	A system capable of detecting and classifying moving objects by both type and color.	In a test of 180 presented objects, 91 percent was correctly identified.
Graettinger et al. (2005)	Video data collected from an Autoscope Solo Pro commercial detection system to provide classifications corresponding to the 13 FHWA vehicle classes.	An overall misclassification rate of 3.4 percent was achieved.
Saito and Jin (2009)	Estimation of accuracy level of truck traffic of 30 automatic traffic recorder (ATR) stations through comparing ground truth data with truck data from ATR stations.	Truck traffic was underestimated by 21 percent.

2.1.6.1.1 Prototype National Commodity Flow Models

There are currently two prototype national commodity flow models: FAF and QRFM. FAF helps the analyst use various interstate highway corridors for comprehensive forecasts of intercity freight flow. FAF integrates data from a variety of sources to estimate commodity flows and related freight transportation activities among states, regions, and major international gateways. FAF 2.2 (FHWA 2006) provides estimates of commodity flows for year 2002 and

2006 with forecasts through year 2035. QRFM developed by Cambridge Systems Inc. provides a simple method of forecasting urban truck trips. FHWA has updated QRFM to allow simple, low-cost, and relatively accurate truck traffic forecasting on either a regional or local levels. Virginia and Pennsylvania developed freight demand modeling based on this manual.

2.1.6.1.2 Scale of Statewide Commodity Models

A variety of freight commodity models have been developed in order to cover single state or multiple states, and urban areas or regions. The following is a summary of statewide commodity and regional commodity flow based models:

- Statewide models covering single state: Oregon, Wisconsin, Kentucky, Florida, Iowa, New Jersey, Virginia, and Wyoming;
- Statewide models covering most of multiple state (North America): Michigan and Indiana;
- Regional models covering several counties: southern California, and northwest Minnesota; and
- Urban models: Cincinnati-Dayton, New York City, Seattle, and Portland.

2.1.6.1.3 Type of Mode Selection

The existing freight flow models mainly deal with the movement of commodity transported by single modes (truck, rail, water, air, pipeline, and so on) or multiple modes (truck and rail, truck and water, rail and water, and other multiple modes). The following summarizes modes that statewide and regional models deal with:

- Intermodal or multi-modal models: California, Florida, Iowa, Michigan, Oregon, Virginia, Wisconsin, and Wyoming;

- Freight or commodity flow models: Indiana, Massachusetts, New Jersey, New Mexico, and North Dakota;
- Truck related models: Florida, Kentucky, Minnesota, New Jersey, Pennsylvania, Wisconsin, Cincinnati-Dayton, and Seattle (FASTtrucks model); and
- Special industry related model: North Dakota (Agriculture).

2.1.6.1.4 Types of Freight Demand Modeling

Freight demand models are categorized by type of demand forecasting methodology, such as commodity-based model, vehicle trip-based model, O-D matrix based estimation model, and so on. The following are types of demand forecasting methodologies used in statewide and regional freight demand forecasting models:

- Commodity flow-based models: Indiana, California, New Jersey, Oregon, and Virginia;
- O-D matrix, synthetic matrix, or synthetic matrix estimation based models: Florida, New Mexico, Cincinnati-Dayton, southern California regional model, and NYC Best Practice model;
- I-O models: Minnesota, southern California regional model, and two Seattle regional models;
- Layered approach models with different scaled layers (macro and micro levels): Iowa, Oregon, and Portland metro model;
- GIS related models: SCAG‘s regional model;
- Land use-based models: Oregon, and SCAG‘s regional model; and

- Four step-based models: Florida (dynamic assignment), Indiana (gravity model), Massachusetts (assignment), New Jersey (gravity model and assignment), North Dakota (three-step model based on trip generation, distribution, and assignment), Pennsylvania (three-step model), Virginia (distribution and assignment), and Wisconsin (four-step and three-step).

2.1.6.2 Trends in Freight Demand Modeling

The existing freight demand forecasting methods are grouped into two categories: structured and direct approaches. The structured approach is patterned in the classic four-step urban planning process and needs a significant amount of data because it involves comprehensive interrelationship among economic activities, production and consumption by mode, distribution or linkages between production and consumption nodes, mode choice and shipment size decisions, vehicle trips, and route assignments. The direct approach is a simplified process of the structured approach in that it usually estimates freight demand with specific aspect or component of commodity movement rather than the entire freight demand of the transportation system. This approach is more useful in the case of limited data availability than the full-scaled structured approach.

Two major modeling platforms used for freight demand modeling are commodity-based and trip-based approaches with three different modeling approaches for each platform including variants of the traditional four step model, direct demand model, and input-output model.

Trends in truck traffic forecasting methods in the past are QFRM, trend-line analysis of truck traffic counts (estimation of simple rates, linear regression models, commodity flow models), and network-based travel demand models.

Table 2-7: Examples of Statewide or Regional Freight Demand Models

State	Models/Model Specification	Modeling Program
California	- Intermodal management program - Multi-modal model	Oracle and ArcView
Florida (Al-Deek et al 2002)	- Intermodal statewide highway freight model (Black 1999)	
	- Heavy truck freight movement model - O-D matrix - Dynamic traffic assignment problem	CORSIM and VISSIM
Indiana	- Commodity flow based model - Multi-variate regression analysis and entropy-based GM* model	TransCAD
Iowa	- Layered approach model with different scaled models (macro- and micro- levels)	
Kentucky	- Truck-travel demand model based on small survey	
Massachusetts	- Highway freight flow assignment using GIS - User equilibrium assignment using TransCAD	TransCAD
Michigan	- Multi-modal multiphase model	TransCAD
Minnesota	- Truck travel estimation model using route growth factors from linear regression	
	- I-O** IMPLAN economic model	
New Jersey (List et al. 2002)	- Comprehensive freight plan	
	- Truck trip tables considering four truck classes - Regional commodity flow using a standard GM - Assign multi-commodity, multi-class truck trips	
New Mexico	- Synthetic matrix estimation	
North Dakota (Mitra et al. 2007)	- Agricultural freight flow - Two major agricultural freight flow model - Three-step transportation model: trip generation (GIS), trip distribution (GM), and trip assignment (Minimize cost)	CUBE
Oregon	- Travel and land use model integration program (TLUMIP) - Upper network level regional commodity flow model - Lower network level micro simulation model representing individual truck flow	
Pennsylvania	- Truck traffic prediction using QRFM*** under different degree of geographic resolution - Three-step transportation model: trip generation (cross classification model), trip distribution (constrained GM), and trip assignment (User equilibrium)	TransCAD
Virginia (Jackson et al. 2004)	- Commodity flow and statistical analysis techniques	
	- Intermodal freight planning methodology (QRFM) - Distribution by GM/Fratar growth economic model - Assignment by all-or-nothing/capacity-restrained assignment	

Table 2-7: Continued

State	Models/Model Specification	Modeling Program
Wisconsin (Proussaloglou et al. 2007)	- Truck trip forecasting model based on commodity based on commodity flows and I-O coefficient	TRANPLAN
	- Passenger and freight statewide model using TRANSEARCH data - Four step model: trip generation (production rate), Trip distribution (GM), trip assignment (capacity constrained method)	
	- Truck travel demand model with limited O-D**** survey data with external Cordon survey - Three step model: trip generation (simple trip rate), Trip distribution (GM), trip assignment (all-or-nothing minimum path algorithm)	
Wyoming	- Entropy maximization model for estimating travel by automobile and trucks (Fratar model)	QRSII and TRANPLAN
Regional Scale	-Southern California freight flows: GIS-based O-D matrix estimation	
	- Cincinnati-Dayton: Synthetic matrix estimation techniques to build up truck matrices (Gliebe 2001)	TransCAD
	-Southern California Association of Government (SCAG)'s regional I-O model (trip rates and GM)	
	- New York City Best Practice model using synthetic matrix estimation from linear program (Ambite et al. 2002)	
	- Northwest Minnesota freight flow study	QRS II
	- Portland metro in Oregon commodity flow analysis techniques using O-D matrix	
	- Seattle Puget Sound regional Council commodity flow study using national I-O tables and county level employment data (Roberts and Chiang 1981)	
	- Seattle urban FASTtrucks model using estimating trip attraction rates output form national I-O tables (Cambridge Systematics INC. 2000)	

*GM: Gravity Model, ** I-O: Input-Output, ***QRFM: Quick Response Freight Model, and **** O-D: origin-Destination

2.2 Limitations of Current and Previous Research Studies

Less attention has been given to freight movement than to passenger movement even though the two movements have shared the same highway networks. This trend has created problems on the studies of freight movements, which resulted in limitations of data and created constraints to methodologies. Based on results of the literature review on research direction and methodologies, this section discusses limitations of current and previous freight transportation

research studies, limitation of existing freight demand modeling, and limitations of freight data and information.

2.2.1 Limitations of Current and Previous Freight Transportation Research Studies

Transportation planning has focused on moving people efficiently and safely. Freight demand modeling and assignment have received limited attention with little or no integration into major regional planning efforts (Krishnan and Hancock 1998).

One important limitation of the existing major freight planning efforts has been the scarcity of comprehensive data (Krishnan and Hancock 1998, Boile and Golias 2004, and Golias and Boile 2005). Commodity movement prediction has not received much attention because of the lack of sufficient and easily accessible data. Since most data gave aggregated commodity movements and freight data were heterogeneous, accurate predictions of truck flows have been difficult. The truck flow was assigned to the important highways and validated against existing survey counts.

The complexity of freight transportation is attributed to a large number of private shippers, arrangers, transporters, and recipients. Often, no single party knows all the players and modes that are involved in moving the shipment from a shipper to its ultimate destination. Compiling a database for all freight movements is an enormous undertaking, so there has not been sufficient research in commodity movement prediction. Boile and Golias (2004, 2005) discussed the problems of forecasting freight supply and demand including lack of appropriate freight transportation modeling methodology and complexity of the freight transportation system. Also, Holguin-Veras and Pati (2007) pointed out a number of factors that added complexity to freight demand modeling, including:

- There are multiple dimensions (e.g., weight, volume, trips) to be considered;

- There are multiple decision makers (e.g., drivers, dispatchers) interacting dynamically to make decisions that affect freight demand (which have stood in sharp contrast to the passenger demand case, in which the passenger is the key decision maker);
- These interactions have taken place in a private context and, for the most part, have not been available to be assessed by transportation planners;
- Freight demand data have been for the most part considered to be commercially sensitive; and
- The opportunity costs of the cargos have varied widely, resulting in multiple user class products ranging, for instance from gypsum with a market value of $9 per ton to computer chips that cost in excess of $500,000 per ton.

2.2.2 Limitations of Existing Freight Demand Modeling

Many research studies have concluded that one of the most significant difficulties including freight transportation in the transportation modeling process was that most of the freight demand forecasting methodologies were based on those that have been developed for passenger trip demand forecasting and not specifically developed to consider freight trips. This type of freight demand forecasting is usually filled with simplified approaches that assume that freight trips would follow the same behavioral pattern as passenger trips. Under this assumption, freight traffic is estimated as a function of passenger car traffic.

Boile and Golias (2004) concluded the difficulty of addressing the issue of forecasting freight supply and demand to estimate future needs was attributed to the lack of appropriate freight transportation models, methodologies, data, and the complexity of the freight transportation system. Also, Gordon and Pan (2001) drew the following findings on freight movement analysis:

- Freight movement analysis is a complex and largely unexplored issue due to the variety of data sources, many of them corresponding to various geographical and sectoral definitions;
- Freight movement analysis lacks standard methodologies, software programs, and approaches; and
- Freight movement analysis has followed the concept used for passenger travel, which would produce substantial errors when a large-scale highway networks is loaded with just passenger traffic data.

As for methodologies of freight demanding modeling, many research studies pointed out the limitations and problems. Golias and Boile (2005) discussed the problems of existing approach problems that focused on commodity-based or trip-based models using a three-step process (trip generation, distribution, and assignment) as follows:

- Trip-based models have certain critical limitations including insufficient data and accuracy level of the measured truck counts, different vehicle classification methods that brought the limitation of the available data, limited through traffic data, time and place dependence of the models, and choice of the independent variable set;
- Commodity-based model‘s challenge is in translating commodity flow into truck flow. The lack of detailed information necessary to perform this task led to a series of assumptions that were not easily substantiated by accounting for the economic activity production and attraction of commodities and determining the amount and direction of flow for each commodity.

Some studies (Rios et al. 2002, Kim et al. 2001) discussed problems associated with the O-D matrix estimation methods as follows:

- O-D matrix estimation methods need to determine the type of measurement of shipment.
- O-D matrix estimation methods are costly, labor-intensive, and time disruptive.
- O-D matrix estimation methods would be more accurate in economically developing regions if those regions have data on land use and population with rapid changes.

Also, Park and Smith Jr. (1997) evaluated trends in statewide truck traffic demand modeling. Their findings are summarized as follows:

- Development of a statewide truck-travel demand model based on the standard three-step process for a single mode (trip generation, distribution, and assignment) has been limited by the high cost of developing O-D trip tables needed for model calibration.
- The Fratar trip distribution model has been used to forecast future truck trips because of the high cost of the initial O-D data collection.
- The high cost of O-D travel surveys might be avoided in part by direct O-D trip matrix estimation. The gravity model has been used in urban areas to produce the initial trip table. The entropy maximization (EM) and information minimization models have also been developed for direct trip table estimation.

Al-Battaineh and Kaysi (2005) pointed out the features of the Wisconsin passenger and freight statewide model that they developed. Before its development, they analyzed trends in statewide or regional truck transportation modeling and made a summary on traditional four-stage planning paradigm as follows:

- Characteristics of truck movements are different from those of passenger vehicle movements; that is, trucks differ in their vehicle characteristics, trip lengths, and trip purposes.

- The type of commodity being carried is one of the most important characteristics of truck movements, and it is sometimes a challenge to obtain such information.
- Urban freight movement is very different from urban passenger vehicle movement because truck trips in an urban area typically involve multiple deliveries, single pickups and mixed pickups, and complicated delivery trips.

2.2.3 Limitations of Freight Data and Information

Reliable and coherent data always are one of the most important factors for forecasting and modeling freight demand in the future. Ambite et al. (2002) discussed issues about current freight flow estimation and analysis methods and pointed out the following issues related to the data and estimation methods used for truck demand modeling:

- The usual method of modeling truck flows in metropolitan areas, for example, is to use the rule-of-thumb fixed factors derived from passenger vehicle flows and truck counts observed at a small number of locations on the highway network considered.
- The methods of freight flow estimation evaluated in their study had many disadvantages mostly due to lack of appropriate, accessible, and reliable data. Development of a truck traffic estimation method based on data readily available or collected directly from freight transporters is needed.
- Reliance on conventional secondary data sources has its own problems. Metro level analysis requires fine geography; most of the existing data are at regional level or larger regional level.
- As for commodities, there are various classification systems, measurement units (dollars, tons), varying levels of aggregation, and little information and data on intra-

regional shipments. Modal splits of imported and exported freight bring uncertainty to freight flow estimation and analysis.

- There exist problems associated with procedures of accounting for empty trucks, warehouse and secondary processing activities, intermodal exchanges within any region, and methods of accounting for data collected at different times and time intervals.

Meyburg et al. (2003) focused on major issues and problems originated from national freight data program findings and recommendations, including:

- Reliable, consistent, comprehensive, and timely data on the movement of freight in the United States is essential for informing decision-makers at all levels of government and in the private sector. Decision making on all these issues requires data on items such as the origin and destination of shipments, the commodities moved, the modes of shipment, the vehicle and vessel type, the routing, and the time of day. These data need to be provided in a timely fashion so that decisions can be made based on up-to-date information.
- The current disjointed patchwork of freight data sources has been costly to generate and maintain, and has not provided decision makers with the right data they needed. To remedy this deficiency, a national freight data framework is needed to guide the development of a national freight database and related data collection and synthesis activities to meet users‘ data requirements. The combination of data from different sources, often known as ―data fusion,‖ has frequently been problematic. Most of the existing sources of data on freight transportation had been developed independently of each other to meet the needs of specific users. Thus, these sources varied

considerably in terms of their modal coverage, data collection strategies, and data definitions.

- A national freight data framework offers potential advantages for enhancing transportation security and for sustaining and growing the economy.
- The following data would capture important characteristics of freight movements and meet the major needs of a wide variety of data users in the public and private sectors: (a) origin and destination; (b) commodity characteristics, weight, and value; (c) modes of shipment; (d) routing and time of day of shipment; and (e) vehicle and vessel type and configuration.
- The federal government is uniquely positioned to provide the proactive leadership needed for the success of a program to develop and implement a national freight data framework.

2.3 Need for a New Methodology

In order to solve the current problems of freight transportation modeling and prepare for an efficient method to cope with future demand, the task of forecasting future demand in freight is a fundamental step. As time has passed, methodologies of freight demand modeling have improved and elaborated in order to solve complicated problems of freight movements and reflect complicated factors used in the models.

Freight transportation is essentially concerned with movement of goods: therefore, analyzing it with a viewpoint of transported commodity is a logical planning approach for assessing freight transportation policy implications. Furthermore, identifying the value of transported commodities among different zones at the regional or statewide level, in some cases, may provide more relevant information than truck movements.

This section discusses a search for a new direction for freight demand modeling, development of a statewide commodity flow model that incorporates land use characteristics, and development of a statewide truck freight flow assignment model using truck traffic with increased accuracy.

2.3.1 Searching for a New Direction for Freight Demand Modeling

The new direction needs to be established by understanding the relationship between commodity flow and land use, developing a statewide truck freight flow model that reflects the characteristics of land use, and developing a statewide truck freight flow assignment model that is calibrated with truck traffic with increased accuracy.

2.3.1.1 Analysis of Relationships Between Commodity Flow and Land Use Using GIS Tools

As discussed in Section 2.1.1, characteristics of freight flow have been determined by many contributing factors including location factors, physical factors, operational factors, dynamic factors, and pricing factors. Among those factors, location factors are major factors for producing or attracting freight traffic flow. The characteristics of location factors can be determined by types of land use.

2.3.1.1.1 Existing Studies

Even though the SCAG‘ model and the TLUMIP forecast freight traffic demand using land use, these models don‘t discuss directly the relationship between land use and freight demand. These models are briefly summarized below.

The SCAG‘s model is a regional I-O model. Trip generation is done using trip rates for each of eight different land use types using socioeconomic data inputs (households and

employment by industry sector). Trip rates are calculated for each of three different truck gross-vehicle-weight classes (Fisher et al. 2000 and Kostas Goulias et al. 2009).

The TLUMIP is a suite of integrated land use-transport model by Oregon DOT. TLUIMP uses the changes in land use due to urban growth and forecasts truck traffic based on travel demand by land use. Bi-level hybrid methods are used for simulation: (1) an upper-level regional commodity flow model (a tonnage flows by commodity and mode of transport – 40 different commodities) and (2) a lower-level microscopic model of truck flows using the Monte-Carlo process (generation of discrete shipments → micro-simulation of trip ends → trans-shipment allocation → itinerary generation → itinerary optimization). TLUIMP can be a land use model that interfaces with an existing travel model, or an integrated urban model with land development and travel model together. These models including the Disaggregated Residential Allocation Model/EMPloyment Allocation Model (DRAM/EMPAL), an integrated land use and transportation model (TRANUS), and METROPolitan Integrated Land Use System (METROPILUS) generally use land prices, and sometimes floor space lease values, to represent demand for space (Donnelly 2002).

2.3.1.1.2 Need for Investigating Direct Relationship Between Land Use and Freight Demand

A model of explaining the direct relationship between land use and freight demand is needed. The development of a statistical model on the relationship between freight flow and land use should be explored by investigating the characteristics of the relationship between freight flow and land use using available GIS-T tools.

2.3.1.2 Development of a Statewide Commodity Flow Model That Incorporates Land Use Characteristics

In order to set a new direction for improving the validity of statewide truck freight flow models, a strategy that incorporates land use characteristics in the modeling is needed.

2.3.1.2.1 Existing Studies

The methodologies of modeling truck freight demand are QFRM, trend-line analysis of truck traffic counts (estimation of simple rates, linear regression models, commodity flow models), and standard network-based travel demand models (Sorratini and Smith Jr. 2000).

These analyses did not directly link the economic activities reflecting the characteristics of land use. Therefore, the primary source of heavy truck trips could not explain interactions among TAZs. A few states had attempted to develop standard network-based travel demand models at state levels, but most states have not been willing to obtain the costly O-D survey data needed for model calibration (Sorratini and Smith Jr. 2000, and Boile and Golias 2004).

2.3.1.2.2 Need for Developing a Statewide Truck Freight Flow Model That Considers Land Use Characteristics

A truck freight flow model, which has a direct link to economic activities, is capable of explaining relationships among the production zones of heavy truck trips with contributing factors of describing economic activities and truck freight flow. Therefore, a statewide truck freight flow model incorporating the characteristics of land use, which is a new paradigm for modeling truck freight flow, should be explored.

2.3.1.3 Development of a Statewide Truck Freight Flow Assignment Model Using Truck Traffic With Increased Accuracy

In order to apply a statewide truck freight flow model in the real world, truck traffic data with higher accuracy is needed.

2.3.1.3.1 Existing Studies

Krishnan and Hancock (1998) studied on highway freight flow assignment in Massachusetts using GIS. In their study, they discussed the limitation of commodity movement prediction including: (a) most data sources give aggregated commodity movements because of the heterogeneity of freight; (b) accurate predictions of truck flows are impossible; and (c) trucks are assigned to the important highways and estimated truck counts are calibrated against existing truck counts. Sorratini and Smith Jr. (2000) stated that many truck freight flow models required costly O-D survey data obtained by cordon-survey data and interview survey for validation.

2.3.1.3.2 Need for a Statewide Truck Freight Flow Assignment Model Incorporating Truck Traffic Data With Increased Accuracy Level for Its Calibration

Truck traffic data with improved accuracy level obtained by a previous UDOT study (Saito and Jin 2009) can be used to calibrate estimated truck traffic instead of conducting costly O-D surveys such as cordon surveys and interviews. Saito and Jin (2009) reported that truck traffic was underestimated. Hence, the potential errors in truck counts could have affected the results of the previous assignment models that employed truck traffic collected at ATR stations as a model calibration parameter.

2.3.2 Characteristics of a New Freight Demand Modeling Method

In order to remedy the issues and problems of the existing and previous freight demand models, a new direction for freight demand modeling needs to be set. A new freight demand model should have the following characteristics:

- A systematic and comprehensive freight flow forecasting methodology in order to keep the balance between supply and demand of freight demand modeling and to reflect contributing factors;
- A method that will alleviate the difficulty in obtaining sufficient and readily accessible data;
- Ability to overcomes the weakness of a four-step comprehensive transportation model that has been developed for passenger trip demand forecasting;
- Analytical and computational models that are used in conjunction with detailed representations of the contents of geographical database;
- Building the relationship between commodity flow and land use; and
- Being calibrated using truck traffic count data taken at ATR stations and other truck count stations.

2.3.3 Direction for Developing a New Freight Demand Modeling Method

The availability of the following desired capabilities in a freight demand model will set the direction for the development of a new freight demand modeling method. The desired capabilities include:

- Forecast future freight demand at an acceptable accuracy level in order to conduct an appropriate investment in freight transportation related infrastructure including highway networks, freight facilities, and so on;

- Apply appropriate contribution factors for determining freight movements to better reflect the real world;
- Reflect regional and spatial characteristics of freight movements instead of the characteristics of freight flow which was focused on point or route analyses;
- Be more accessible and easily understood;
- Utilize the publicly available data framework for freight demand analysis like FAF in order to save money for data collection and data analysis;
- Combine the structured and direct freight demand forecasting methods;
- Have practical utility in spite of limited data availability of freight data and information;
- Be capable of reflecting logistic aspects of commodity flow;
- Consider the demand for freight services that affect industrial location and distribution decisions by reviewing interrelationship between commodity transport and land-use patterns;
- Incorporate the features available in existing GIS-T software programs; and
- Forecast the commodity flow movement using contributing factors that will describe land use characteristics.

The commodity-based approach is more suited for modeling freight movements to and from manufacturers and freight movements into or out of the region than the vehicle trip-based modeling. The features available form existing GIS-T can contribute significantly to meet these requirements.

2.4 Chapter Summary

This chapter discussed trends of existing research studies on general characteristics of freight flow system, freight demand modeling, relationship between freight system and geographic information system, freight data and information, and the importance of truck traffic data with increased accuracy level.

Through reviewing literature on freight flow modeling, problems and issues associated with the existing models were identified and discussed, and the direction for the development of a new freight flow model was recommended.

3 METHODOLOGY

Some state DOTs have developed their own freight demand models, many of which use TRANSEARCH database, a proprietary database by Reebie Associates (Cambridge Systematics Inc. 2007). Even though TRANSEARCH database provides county-to-county and state-to-state freight flows by truck, rail, air, and water, it is costly and not open to the public. Therefore, a new efficient and economical statewide freight demand modeling that can use publicly available data is desired. Also, the TRB's Freight Subcommittee sees the use of land use data in estimating freight flow as one of its future research topics (TRB 2010).

The main goal of this research is to develop a framework for a new methodology for developing a statewide freight demand model that is based on the relationships between commodity flow and land use characteristics. A GIS-T software called TransCAD and the SPSS statistical analysis software are used for developing desired models.

This chapter discusses the methodology for developing commodity flow generation models using relationships between commodity flow and land use characteristics, development of a statewide commodity flow distribution, and development of a procedure for assigning freight truck trips on Utah's truck routes.

3.1 Development of Commodity Flow Generation Models Using Relationships Between Commodity Flow and Land Use Characteristics

In this task, TransCAD and statistical software programs are used to first understand the characteristics of freight flow among the Utah‘s counties by sorting, reducing, and analyzing the datasets available for the research. Then statistical models describing relationships between commodity flow and land use characteristics are developed. This is a major contribution of this study to the field of freight flow modeling, which has not yet been explored.

3.1.1 Types of Data Needed

Data needed for determining potential contributing factors for commodity flow by truck, including land use data (industrial/commercial type by county), commodity freight data (Utah business pattern by county), economic and social data (economic activity data and population), and geographic data (Utah county map and highway networks) were collected. The following are the data available for the study:

- Utah‘s six types of land use (LU) (2002): irrigation (IR), urban area (URB), non-irrigation (NI), residential area (RES), water area (WATER), and riparian (RIP).
- Utah business pattern (21 types) (2002) by county and by industry: Forestry, fishing, hunting, and agriculture support; Mining; Utilities; Construction; Manufacturing; Wholesale trade; Retail trade; Transportation and warehousing; Information; Finance and insurance; Real estate and rental and leasing; Professional, scientific and technical services; Management of companies and enterprises; Administration, support, waste management, remediation services; Educational services; Health care and social assistance; Arts, entertainment and recreation; Accommodation and food

services; Other services (except public administration); Auxiliaries (except corporate, subsidiary and regional management); Unclassified establishments.

- Utah economic activity data or population (employment by county and by industry) for 2002 and 2035: Natural resources; Mining; Utilities; Construction; Manufacturing; Wholesale trade; Retail trade; Transportation and warehousing; Information; Finance and insurance; Real estate, rental and leasing; Professional and technical services; Management of companies; Administrative and waste services; Educational services; Health and social services; Arts, entertainment and recreation; Accommodation and food services; Other services; State and local government; Federal civilian; Federal military; Farm; State government; Local government.
- Commodity flow (CF) (two-digit Standard Classifications of Transported Goods (SCTG)) from and to Utah by industry and transportation mode (2002 and 2035): Live animals and live fish; Cereal grains; Other agricultural products; Animal feed and products of animal origin, necessity; Meat, fish, seafood, and their preparations; Milled grain products and preparations, and bakery products; Other prepared foodstuffs and fats and oils; Alcoholic beverages; Tobacco products; Monumental or building stone; Natural sands; Gravel and crushed stone; Nonmetallic minerals necessity; Metallic ores and concentrates; Coal; Gasoline and aviation turbine fuel; Fuel oils; Coal and petroleum products, necessity; Basic chemicals; Pharmaceutical products; Fertilizers; Chemical products and preparations, necessity; Plastics and rubber; Logs and other wood in the rough; Wood products; Pulp, newsprint, paper, and paperboard; Paper or paperboard articles; Printed products; Textiles, leather, and articles of textiles or leather; Nonmetallic mineral products; Base metal in primary or

semi-finished forms and in finished basic shapes; Articles of base metal; Machinery; Electronic and other electrical equipment and components and office equipment; Motorized and other vehicles (including parts) Transportation equipment, necessity; Precision instruments and apparatus; Furniture, mattresses and mattress supports, lamps, lighting fittings, and; Miscellaneous manufactured products; Waste and scrap; Mixed freight.

3.1.2 Commodity Flow Generation Models

To develop correlation matrices of contributing factors that describe relationships between commodity flow and land use characteristics, the following relationships were evaluated by sorting, reducing, and analyzing the available data using TransCAD (Caliper Corporation 2010) and the SPSS statistical software program (SPSS Inc. 2004):

- Types of land use vs. Utah business pattern,
- Types of land use vs. economic activity data, or population,
- Types of land use vs. commodity flow,
- Utah business pattern vs. commodity flow,
- Economic activity data vs. commodity flow, and
- Population vs. commodity flow.

To develop relationships between commodity flow and contributing factors, stepwise multiple regression models were developed by examining the results of correlation analysis. Three types of multiple linear regression models were developed in this study, including: 1) commodity flow versus land use type, 2) commodity flow versus the number of employees by industry, and 3) commodity flow versus any other independent variables obtained from the

correlation matrix that results in better models. Equations 3-1 through 3-3 were the three multiple linear regression models explored in this study:

- Multiple linear regression model (MLRM) 1: commodity flow (CF_i) versus land use type (LU_i),

$$CF_i = aLU_1 + bLU_2 + cLU_3 + dLU_4 + \cdots \quad (3\text{-}1)$$

- MLRM 2: commodity flow (CF_i) versus number of employees by industry (EM_i), and

$$CF_i = aEM_1 + bEM_2 + cEM_3 + dEM_4 + \cdots \quad (3\text{-}2)$$

- MLRM 3: commodity flow (CF_i) and other independent variables (e.g., *A, B, C, D*, …) which describe the characteristics of land use better than the first two models. The results of the correlation analysis will guide variable selection.

$$CF_i = \alpha A_i + \beta B_i + \gamma C_i + \delta D_i + \cdots \quad (3\text{-}3)$$

3.2 Development of a Statewide Commodity Flow Distribution Model

In this task, a statewide statistical and mathematical commodity distribution model was developed using the results of the commodity flow generation discussed in Section 3.1.

Steps for developing a statistical and mathematical statewide commodity distribution model include; 1) determining the direction for developing a comprehensive statewide commodity distribution model, 2) defining constraints and conditions, factors, scopes, and guidelines for developing a new model, 3) classifying commodity flow ~~–to~~", ~~–fr~~om", and ~~–w~~ithin" the state using FAF database, 4) developing a distribution model for commodities transported by truck using three friction factors including physical, statistical and economic factors, and 5) calibrating it using a two-stage calibration method.

The statistical and mathematical statewide commodity trip distribution model is developed by using statistical tools. The statewide commodity trip distribution model proposed here is based on TTAZ (county-level unit).

The commodity flow distribution model developed in this study started with the framework of a gravity model using counties as traffic analysis zones (TTAZ). In this enhanced gravity model, in addition to the physical friction factor (i.e., distances between TTAZs), three new factors that would complement the shortcoming of the traditional gravity model were added. It was assumed that in addition to the physical distance, commodity flow between an origin TTAZ (*i*) and a destination TTAZ (*j*) is affected by a statistical distance among the variables (Euclidean distance) and two economic factors (difference in population and difference in employment between zones *i* and *j*). In order to bring the distribution of raw data closer to a normal distribution for the data, raw data of the factors used in the model were transformed using a natural log transformation to reduce the statistical effect on analysis results due to large differences in raw data values among the factors. Population and employment data for the counties were also transformed using a natural log transformation.

Based on the concept and the contributing factors explained in the previous section, a commodity flow distribution model in the form of a gravity model was developed. Equation 3-4 shows the amount of commodity exchange between zones *i* and *j* within a state.

$$C_{ij} = \frac{C_i C_j f_{ij} U_{ij} N_{ij} K_{ij}}{\sum_{n=1}^{m} C_j f_{ij} U_{ij} N_{ij} K_{ij}} \quad (3\text{-}4)$$

where,

C_{ij} = commodity flow (thousand tons) from production zone *i* to attraction zone *j,*

C_i = commodity flow (thousand tons) produced in zone *i,*

C_j = commodity flow (thousand tons) attracted to zone *j,*

f_{ij} = physical friction factor, a physical distance (P_{ij}) (miles) between production zone *i* and attraction zone *j,*

U_{ij} = statistical friction factor, a Euclidean distance (u_{ij}) between production zone *i* and attraction zone *j,*

N_{ij} = economic factor consisting of the difference between the difference in employment (ΔM_{ij}) and the difference in population (ΔO_{ij}) between zones *i* and *j*, and

K_{ij} = adjustment factor for commodity flow interchange between zone *i* and zone *j*. Assumed $K_{ij} = 1$ during the parameter calibration step.

3.3 Development of a Procedure for Assigning Freight Truck Trips on Utah's Truck Routes (Freight Truck Trip Assignment)

To apply the statewide truck freight demand models to Utah's truck routes and estimate the amount of truck traffic on each link of Utah's truck routes, the following steps were taken:.

1) Build Utah's truck routes using UDOT's truck data;
2) Convert tonnage of commodities to truck traffic using the estimation method found in FAF 2.2 (FHWA 2006);
3) Overlay the results of Task 2, commodity flow distribution models, that is, the distribution of truck trips among Utah's 29 TTAZs, onto Utah's truck routes; and
4) Assign truck traffic by the all-or-nothing shortest path algorithm available in TransCAD and optimize the allocation of truck trips to centroid connector links.

Utah's major truck routes or corridors were set up within TransCAD by using the data collected by the truck traffic accuracy evaluation study by Saito and Jin (2009). To assign truck traffic obtained from the truck freight distribution model to Utah's truck routes, truck traffic

assignment was done by the all-or-nothing shortest path algorithm which is a feature of the TransCAD‘s assignment module. Length between the TTAZs was used as the assignment parameter. To assign truck traffic generated in TTAZs to Utah‘s truck routes and to compare truck traffic counts obtained from the assignment model with UDOT‘s ATR counts, the centroids of TTAZs needed to be connected with Utah‘s truck routes. Through the centroid connectors, truck traffic of each TTAZ was assigned to certain nodes of the truck routes as shown in Figure 3-1. Truck traffic of each TTAZ was equally assigned to the number of centroid connectors by default. By changing the ratio of truck traffic of each centroid connector, optimum allocation of truck traffic to centroid connectors was achieved that will minimize the difference between the assigned truck traffic and the truck traffic collected at ATR locations. The root mean squared error (RMSE) of the difference between the counts obtained from the assignment model and the truck traffic counts measured at the ATRs was determined according to Equation 3-5. To accomplish this goal, an optimization technique was used. This assignment exercise provided two outcomes, including: 1) truck traffic assignment over truck routes and 2) allocation of truck traffic among TTAZs.

$$Minimize\ RMSE = \sqrt{\frac{\sum_{i=1}^{n} (X_{Field,i} - X_{model,i})^2}{n}} \quad (3\text{-}5)$$

where,

$X_{Field,i}$ = Truck count at ATR i,

$X_{model,i}$ = Truck count at ATR location i produced by the assignment model, and

i = ATR number, from 1 to n (n = 38 on truck routes).

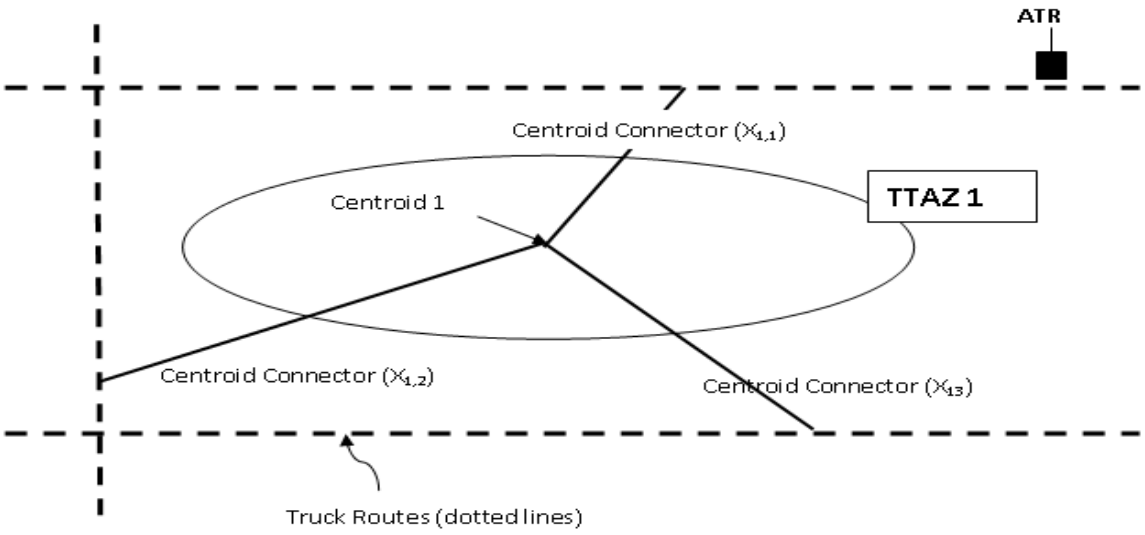


Figure 3-1: TTAZ, Centroid Connectors and Truck Routes

The proportions of truck traffic from the centroids of TTAZs were adjusted until the minimum average RMSE value is achieved by using an optimization technique. One drawback of centroid connector created by TransCAD was that trips were loaded on centroid connectors like regular links. This may not exist in reality. Hence, before these steps were followed, centroid connectors that create incorrect paths were removed from optimization process by the author's judgement on logical connectivity between the centroids and nearby truck routes.

1) Assign freight truck trips to each TTAZ using centroid connectors and utilize the relationship in Equation 3-6.

$$\sum_{j=1}^{m} X_{ij} = F_i \quad (3\text{-}6)$$

where,

X_{ij} = truck counts of centroid connector j in TTAZ i,

F_i = total truck counts of TTAZ i,

i = number of TTAZ, county number (1, ..., 29) and

m = number of centroid connectors in each TTAZ i.

2) Step 2: Run the all-or-nothing shortest path algorithm in TransCAD's assignment module.
3) Step 3: Compute RMSE utilize the relationship in Equation 3-6.
4) Step 4: Recalculate the number of truck trips assigned to each centroid connector of TTAZ using a selected optimization method.
5) Step 5: Repeat Step 2, 3, 4 for a number of iterations that is required to achieve a minimum RMSE.
6) Step 6: Select the case that has the lowest RMSE as shown in Figure 3-2.

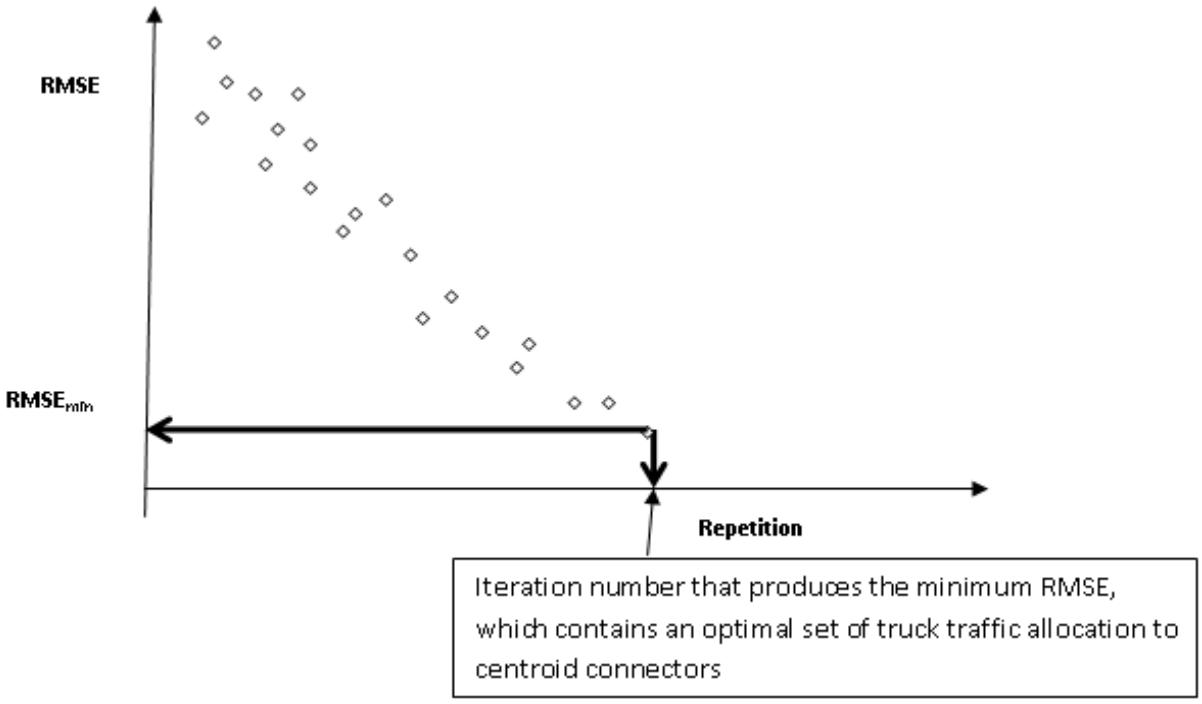


Figure 3-2: Plot of RMSE Against Iteration Number

3.4 Chapter Summary

Figure 3-3 presents a graphic summary of the tasks conducted in this research. The shaded tasks are the author's contributions to the area of freight flow modeling. Technical papers summarizing the findings of these three tasks are planned to be submitted for publication in archival, peer-reviewed technical journals and/or peer-reviewed conferences.

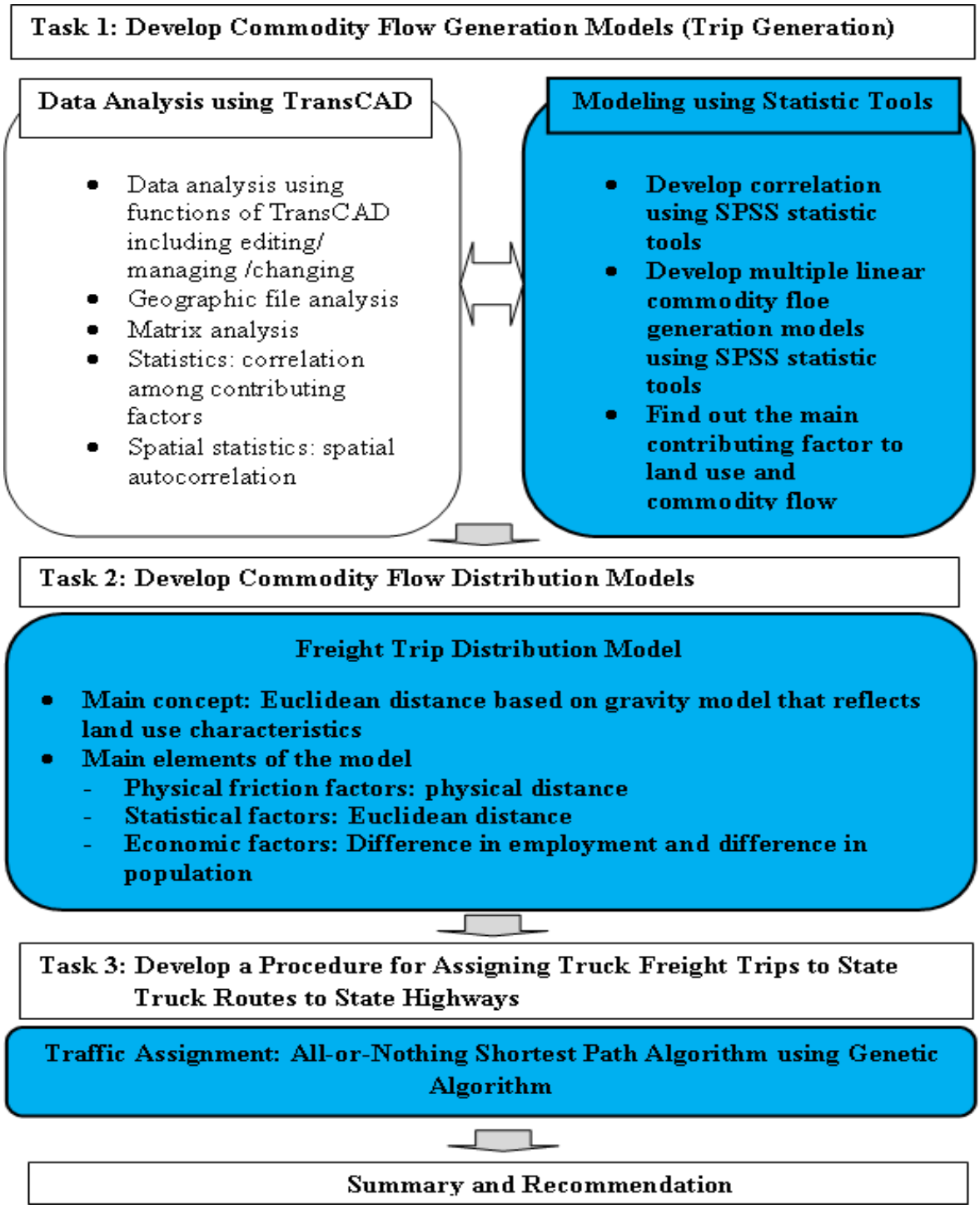


Figure 3-3: Research Process for the Dissertation

4 DATA COLLECTION AND PREPARATION

Data are an important factor that determines the success of a project. This chapter discusses data collection, data reduction and classification, data sorting, and data transformation carried out for this study.

4.1 Data Collection

Data required for this study included commodity flow data, land use data (industrial and commercial type), business pattern data, economic and social data, and geographic data. This section discusses data sources, and structures and formats of raw data,

4.1.1 Data Sources

Commodity flow data were collected from commodity- or freight- related websites open to the public, including FAF (FHWA 2009), CFS (BTS and Bureau of Census 2009), UDOT‘s highway network files (UDOT 2008), Utah GIS Portal website (Utah Geographical Information Council 2009), and the official website of the state of Utah (2009).

The CFS related website (BTS and Bureau of Census 2009) has provided results of a CFS, including shipment characteristics by mode of transportation for origin state in year 2002. CBP in 2002 data were extracted from the FAF website (FHWA 2009). The Utah GIS Portal provided geographic map files and geodata database by county. Utah population in 2002 and the

profiles of social and economic characteristics of Utah were obtained from the official website of the state of Utah (2009).

4.1.2 Structures and Formats of Raw Data

From the above websites open to the public, raw data were downloaded in the Microsoft Excel (2007) format and other appropriate formats. This section describes in detail the representative structures and formats of the data obtained from the websites.

4.1.2.1 Commodity Flow Survey Data

The 2002 commodity flow survey was conducted by BTS and the U.S. Census Bureau (2009). The website has various commodity related data including:

- Shipment characteristics by mode of transportation for state of origin, 2002;
- Shipment characteristics by mode of transportation for state of origin, percent of total for 2002 and 1997;
- Shipment characteristics by total modal activity for state of origin, 2002;
- Shipment characteristics by mode of transportation and distance shipped for state of origin, 2002;
- Shipment characteristics by mode of transportation and shipment size for state of origin, 2002;
- Shipment characteristics by two-digit commodity for state of origin, 2002;
- Shipment characteristics by two-digit commodity for state of origin, percent of total for 2002 and 1997;
- Shipment characteristics by two–digit commodity and mode of transportation for state of origin, 2002;
- Outbound shipment characteristics by state of destination for state of origin, 2002;
- Inbound shipment characteristics by state of origin for state of destination, 2002;
- Shipment characteristics by mode of transportation for state of origin, 2002 and 1997;

- Shipment characteristics by commodity group for state of origin, 2002 and 1997;
- Shipment characteristics by three–digit commodity for state of origin, 2002;
- Shipment characteristics by destination and mode of transportation for state of origin, 2002;
- Shipment characteristics by origin state and mode of transportation for state of destination, 2002;
- Shipment characteristics by two–digit commodity and shipment size for state of origin, 2002;
- Shipment characteristics by two–digit commodity and distance shipped for state of origin, 2002; and
- Shipment characteristics by commodity group and mode of transportation for state of origin, 2002 and 1997.

Users of this website can download selectively the commodity data which they need according to geographical region; origin and destination (state, metropolitan area, and national level); transportation mode; and two-digit SIC code. Sample data obtained from this website are shown in Figure 4-1 through Figure 4-4. Figure 4-1 shows shipment characteristics by mode of transportation for state of origin for year 2002 for the state of Utah. Figure 4-2 shows shipment characteristics by mode of transportation for state of origin, percent of total for year 2002 and year 1997 for the state of Utah. Figure 4-3 shows shipment characteristics by total modal activity for state of origin for year 2002 for the state of Utah. Figure 4-4 shows shipment characteristics by mode of transportation and distance shipped for state of origin for year 2002 for the state of Utah.

Table 1-A	Shipment Characteristics by Mode of Transportation for State of Origin: 2002							
		Value		Tons		Ton–miles (1)		Average miles per shipment
State of Origin	Mode of transportation	2002 (million $)	Percent of total	2002 (thousands)	Percent of total	2002 (millions)	Percent of total	
Utah	**All modes**	**61,515**	**100.0**	**109,672**	**100.0**	**38,046**	**100.0**	**823**
Utah	**Single modes**	**51,301**	**83.4**	**99,372**	**90.6**	**36,517**	**96.0**	**329**
Utah	Truck (2)	45,233	73.5	72,361	66.0	17,857	46.9	192
Utah	For–hire Truck	28,715	46.7	34,609	31.6	10,664	28.0	608
Utah	Private Truck	16,478	26.8	37,723	34.4	7,177	18.9	63
Utah	Rail	3,366	5.5	21,829	19.9	17,995	47.3	995
Utah	Water	—	—	—	—	—	—	—
Utah	Shallow draft	—	—	—	—	—	—	—
Utah	Great Lakes	—	—	—	—	—	—	—
Utah	Deep draft	—	—	—	—	—	—	—
Utah	Air (including truck and air)	1,659	2.7	S	S	S	S	2,027
Utah	Pipeline (3)	1,044	1.7	5,020	4.6	S	S	S
Utah	**Multiple modes**	**8,458**	**13.7**	**980**	**0.9**	**944**	**2.5**	**1,241**
Utah	Parcel, USPS or courier	8,239	13.4	211	0.2	224	0.6	1,242
Utah	Truck and rail	187	0.3	S	S	S	S	765
Utah	Truck and water	28	—	9	—	30	—	3,190
Utah	Rail and water	—	—	—	—	—	—	—
Utah	Other multiple modes	S	S	S	S	S	S	9
Utah	**Other and unknown modes**	**1,756**	**2.9**	**9,320**	**8.5**	**585**	**1.5**	**164**

Figure 4-1: Shipment Characteristics by Mode of Transportation for State of Origin for 2002 for Utah (Source: BTS and Bureau of Census 2009)

Table 1-B	Shipment Characteristics by Mode of Transportation for State of Origin: Percent of Total for :						
		Value		Tons		Ton–miles (1)	
State of Origin	Mode of transportation	2002 (percent)	1997 (percent)	2002 (percent)	1997 (percent)	2002 (percent)	1997 (percent)
Utah	**All modes**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Utah	**Single modes**	**83.4**	**84.5**	**90.6**	**89.1**	**96.0**	**71.5**
Utah	Truck (2)	73.5	70.0	66.0	64.6	46.9	21.5
Utah	For–hire Truck	46.7	36.0	31.6	21.5	28.0	15.6
Utah	Private Truck	26.8	34.0	34.4	43.0	18.9	5.9
Utah	Rail	5.5	7.8	19.9	21.2	47.3	49.5
Utah	Water	—	—	—	—	—	—
Utah	Shallow draft	—	—	—	—	—	—
Utah	Great Lakes	—	—	—	—	—	—
Utah	Deep draft	—	—	—	—	—	—
Utah	Air (including truck and air)	2.7	4.3	S	—	S	0.2
Utah	Pipeline (3)	1.7	2.3	4.6	3.3	S	S
Utah	**Multiple modes**	**13.7**	**12.9**	**0.9**	**S**	**2.5**	**S**
Utah	Parcel, USPS or courier	13.4	12.3	0.2	0.2	0.6	0.3
Utah	Truck and rail	0.3	S	S	S	S	S
Utah	Truck and water	—	S	—	S	—	S
Utah	Rail and water	—	—	—	—	—	—
Utah	Other multiple modes	S	—	S	—	S	—
Utah	**Other and unknown modes**	**2.9**	**2.6**	**8.5**	**1.8**	**1.5**	**S**

Figure 4-2: Shipment Characteristics by Mode of Transportation for State of Origin in Percent of Total for Year 2002 and Year 1997 for Utah (Source: BTS and Bureau of Census 2009)

Table 2	Shipment Characteristics by Total Modal Activity for State of			
State of Origin	Mode of transportation (1)	Ton–miles (2) 2002 (millions)	Ton–miles 2002 (percent)	Average miles per shipment 2002
Utah	**Total**	**38,046**	**100.0**	**823**
Utah	Truck	17,857	46.9	192
Utah	Rail	17,995	47.3	995
Utah	Shallow draft	—	—	—
Utah	Great Lakes	—	—	—
Utah	Deep draft	—	—	—
Utah	Air	S	S	2,027
Utah	Parcel, USPS or courier	110	0.3	S
Utah	Pipeline (3)	S	S	S
Utah	Other and unknown modes	585	1.5	164

Figure 4-3: Shipment Characteristics by Total Modal Activity for State of Origin for Year 2002 for Utah (Source: BTS and Bureau of Census 2009)

Table 3	Shipment Characteristics by Mode of Transportation and Distance Shipped for State of Origin: 2002							
			Value		Tons		Ton–miles (1)	
State of Origin	Mode of transportation	Distance Shipped	2002 (million $)	Percent	2002 (thousands)	Percent	2002 (millions)	Percent
Utah	All modes	All distanc	61,515	100.0	109,672	100.0	38,046	100.0
Utah	All modes	Less than	21,690	35.3	53,815	49.1	1,491	3.9
Utah	All modes	50 to 99 m	2,289	3.7	5,991	5.5	720	1.9
Utah	All modes	100 to 249	4,741	7.7	11,618	10.6	2,454	6.4
Utah	All modes	250 to 499	8,085	13.1	16,305	14.9	8,713	22.9
Utah	All modes	500 to 749	11,909	19.4	13,585	12.4	11,699	30.7
Utah	All modes	750 to 999	1,331	2.2	2,122	1.9	2,546	6.7
Utah	All modes	1,000 to 1	5,989	9.7	5,118	4.7	8,101	21.3
Utah	All modes	1,500 to 1	4,422	7.2	994	0.9	2,013	5.3
Utah	All modes	2,000 mile	1,059	1.7	124	0.1	309	0.8
Utah	Single modes	All distanc	51,301	100.0	99,372	100.0	36,517	100.0
Utah	Single modes	Less than	19,690	38.4	45,405	45.7	1,411	3.9
Utah	Single modes	50 to 99 m	2,057	4.0	5,924	6.0	714	2.0
Utah	Single modes	100 to 249	4,139	8.1	11,379	11.5	2,401	6.6
Utah	Single modes	250 to 499	6,888	13.4	15,889	16.0	8,541	23.4
Utah	Single modes	500 to 749	10,141	19.8	12,697	12.8	10,972	30.0
Utah	Single modes	750 to 999	897	1.7	2,062	2.1	2,462	6.7
Utah	Single modes	1,000 to 1	4,347	8.5	4,986	5.0	S	S
Utah	Single modes	1,500 to 1	2,534	4.9	928	0.9	1,875	5.1
Utah	Single modes	2,000 mile	628	1.2	102	0.1	249	0.7
Utah	Truck (2)	All distanc	45,233	100.0	72,361	100.0	17,857	100.0
Utah	Truck	Less than	17,409	38.5	40,751	56.3	1,396	7.8

Figure 4-4: Shipment Characteristics by Mode of Transportation and Distance Shipped for State of Origin for 2002 for Utah (Source: BTS and Bureau of Census 2009)

4.1.2.2 County Business Pattern Data From FAF

The raw data of 2002 CBP obtained from FAF were divided by industry or by county (FHWA 2009). CBP data were classified as ―paid employees for paid period including March 12", ―first-quarter payroll," ―annual payroll," and ―total establishments." CBP data were classified into 22 types by the North America Industry Classification System (NAICS) industry code. Figure 4-1 shows sample CBP data for Utah County. As shown in Figure 4-5, Utah County had 132,413 total paid number employees for paid period including March 12 in 2002, $813,960,000 for total first-quarter payroll in 2002, $3,491,049,000 for total annual payroll in 2002, and 8,063 total business establishments in 2002. Also, Utah County had 960 pay employees for paid period including March 12 in 2002, $5,674,000 for first-quarter payroll in 2002, $26,224,000 for annual payroll in 2002, and 139 establishments in 2002 in the transportation and warehousing industry (industry code 48).

2002 County Business Patterns					
Utah	UT				
Major industry					
Industry code	Industry code description	Paid employees for paid period including March 12 (number)	First-quarter payroll ($1,000)	Annual payroll ($1,000)	Total establishments
------	Total	132413	813960	3491049	8063
11----	Forestry, fishing, hunting, and agriculture support	B	D	D	12
21----	Mining	B	D	D	11
22----	Utilities	178	2613	12548	13
23----	Construction	7819	50320	240701	1174
31----	Manufacturing	12475	129647	538544	448
42----	Wholesale trade	3417	30808	158810	357
44----	Retail trade	18027	79824	342131	1150
48----	Transportation & warehousing	960	5674	26224	139
51----	Information	4052	44917	183813	251
52----	Finance & insurance	3304	28698	115971	540
53----	Real estate & rental & leasing	1488	6105	29179	396
54----	Professional, scientific & technical services	9105	68420	288776	952
55----	Management of companies & enterprises	2598	34133	143299	32
56----	Admin, support, waste mgt, remediation services	13414	70609	309703	400
61----	Educational services	18550	92319	378509	112
62----	Health care and social assistance	14200	91180	411862	776
71----	Arts, entertainment & recreation	1109	2801	11919	90
72----	Accommodation & food services	9981	22677	94131	476
81----	Other services (except public administration)	2837	12901	54683	492
95----	Auxiliaries (exc corporate, subsidiary & regional mgt)	143	1433	5978	10
99----	Unclassified establishments	38	182	831	46

Figure 4-5: Sample CBP Data for Utah County (Source: FHWA 2009)

Figure 4-6 shows CBP data by county for the NAICS code 21, mining. In mining (industry code 21) Utah County had 1,065 paid employees for paid period including March 12 in 2002, $10,508,000 for first-quarter payroll in 2002, $45,819,000 for annual payroll in 2002, and 78 establishments in 2002. Among the 78 establishments, 34 establishments had one to four employees, 16 had five to nine employees, 16 had 10-19 employees, five had 20-49 employees, six had 50-99 employees, and one had 100-249 employees.

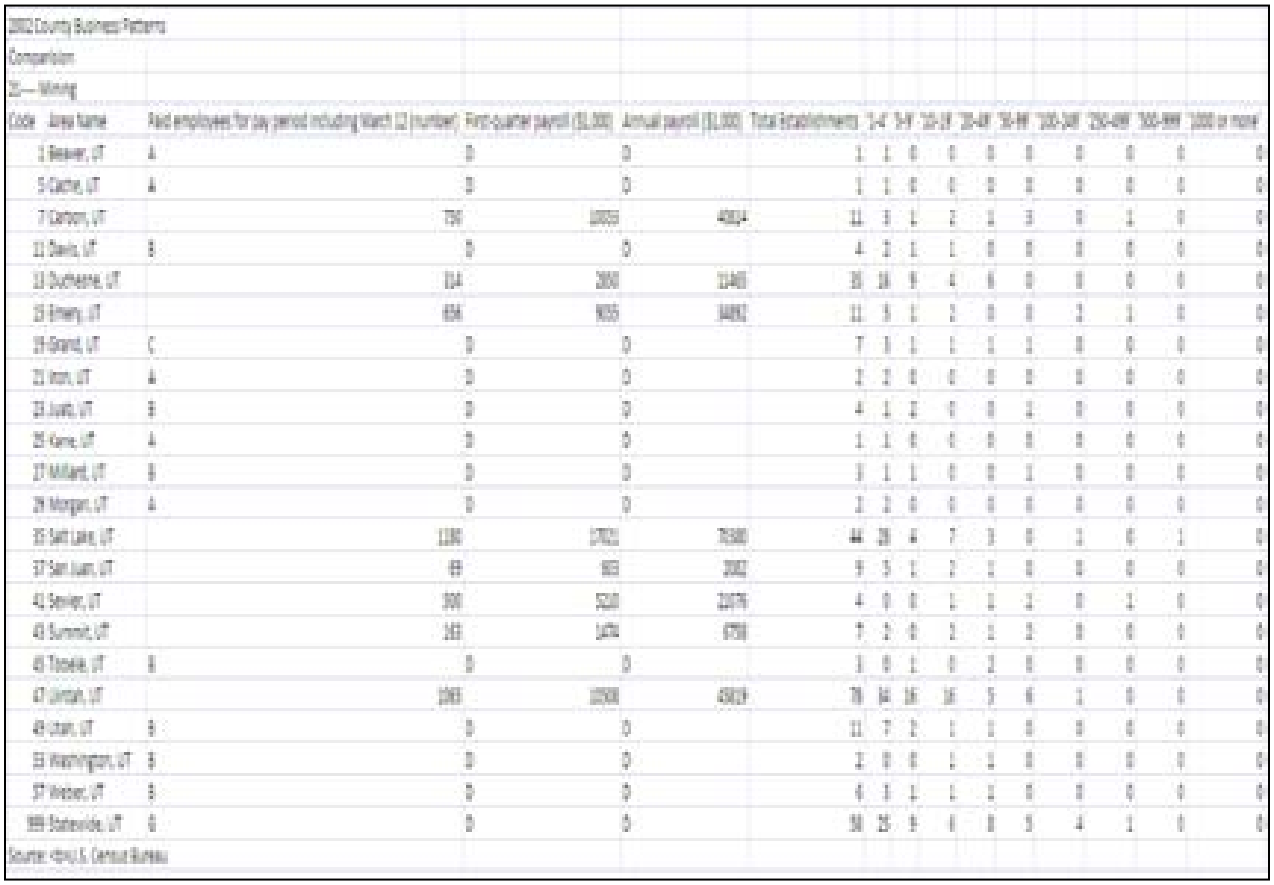


Figure 4-6: CBP Data by County for NAICS Code 21, Mining (Source: FHWA 2009)

4.1.2.3 Geographic Files of Highway Network

With the help of UDOT, recent Utah highway networks and highway related information were obtained (UDOT 2008). The data were divided into geographic files and geo-database files,

which include the characteristics of geographic files. Figure 4-7 shows geographic maps of highway networks including Utah County and Salt Lake County. Figure 4-8 shows the locations of ATR stations in Utah.

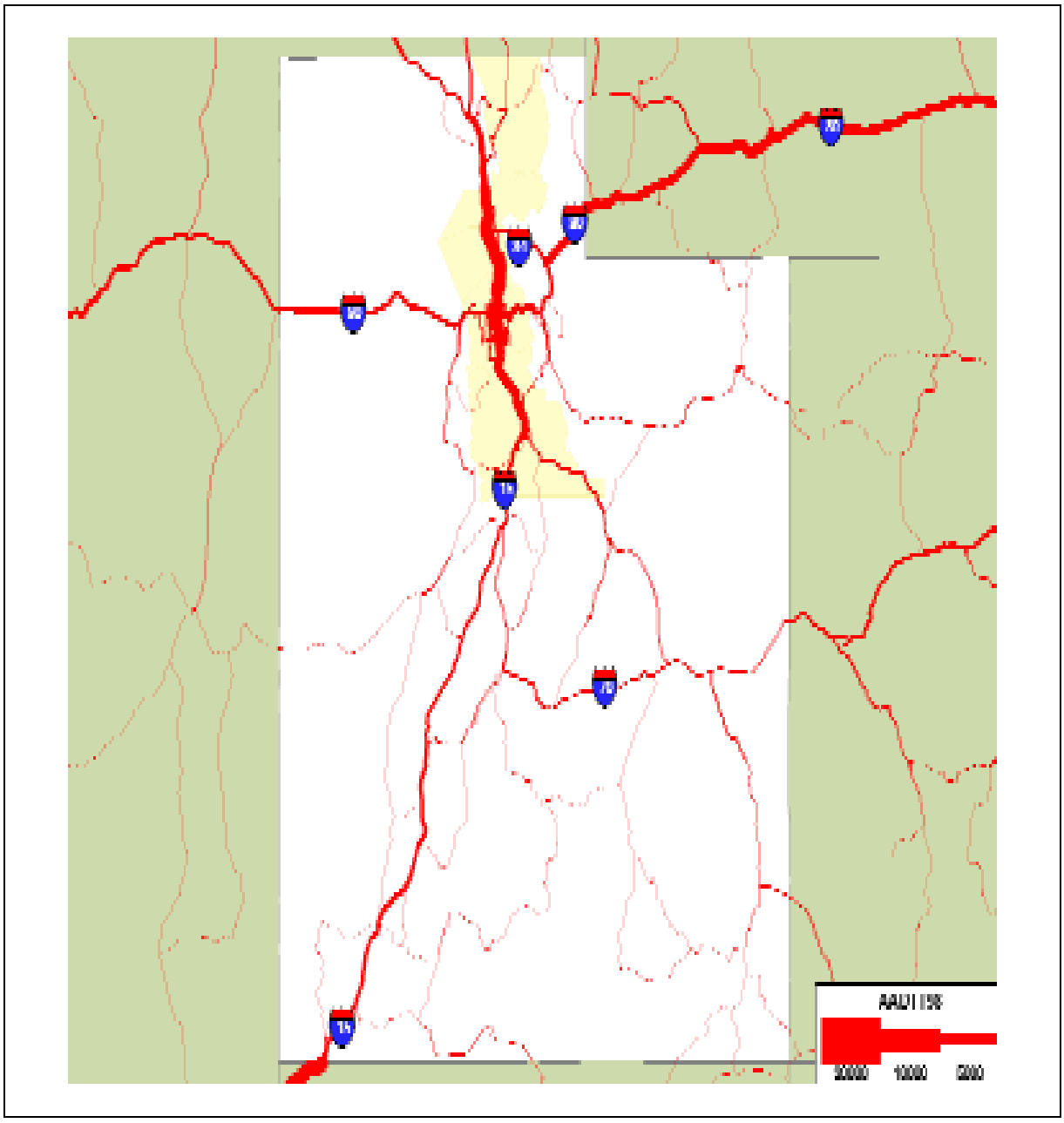


Figure 4-7: Geographic Files of Highway Networks Including Utah County and Salt Lake County (Source: UDOT 2008)

Number of Operating Stations		
Type of Data	Collection Method	Number of Station
Class	Loops	2
Length	Loops	70
	Microwave	3
Volume	Loops	15
Total		90

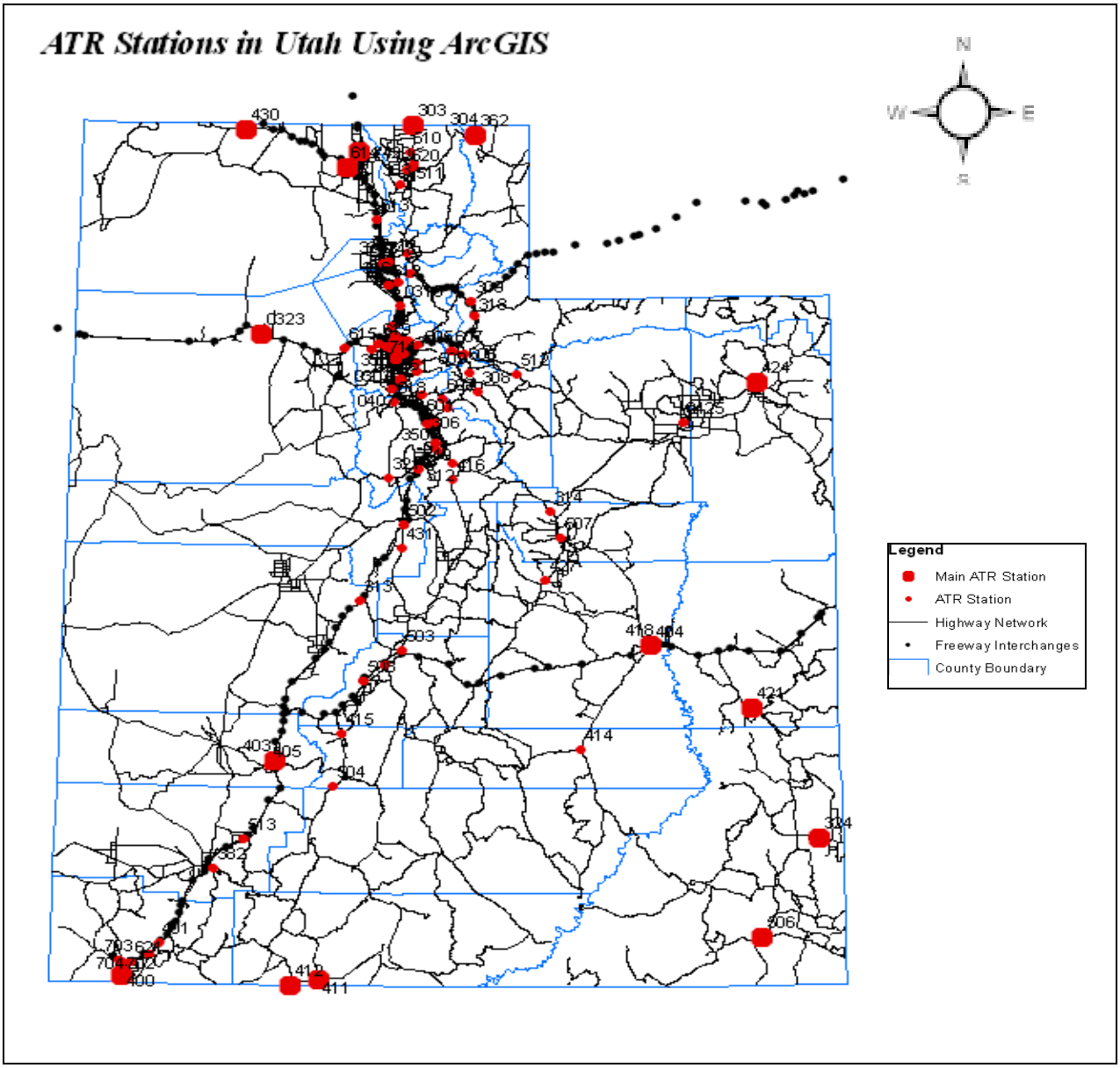


Figure 4-8: Maps of UDOT's ATR Stations Using ArcGIS (Source: UDOT 2008)

4.1.2.4 Utah GIS Portal (AGRC/SGID)

The Utah GIS Portal website (Utah Geographic Information Council 2009) has various data on geographic map (shape) files and geo-database information including bioscience, boundaries, cadastre, demographic, economy, elevation, energy, environment, geosciences, health, history, indices, location, planning, political, recreation, transportation, utilities, and water. The website has land use related information by county and by land use type. Figure 4-9 shows the SGID93_PLANNING_Water Related Land Use geographic map (shape) file and geo-database for Utah County for year 2002.

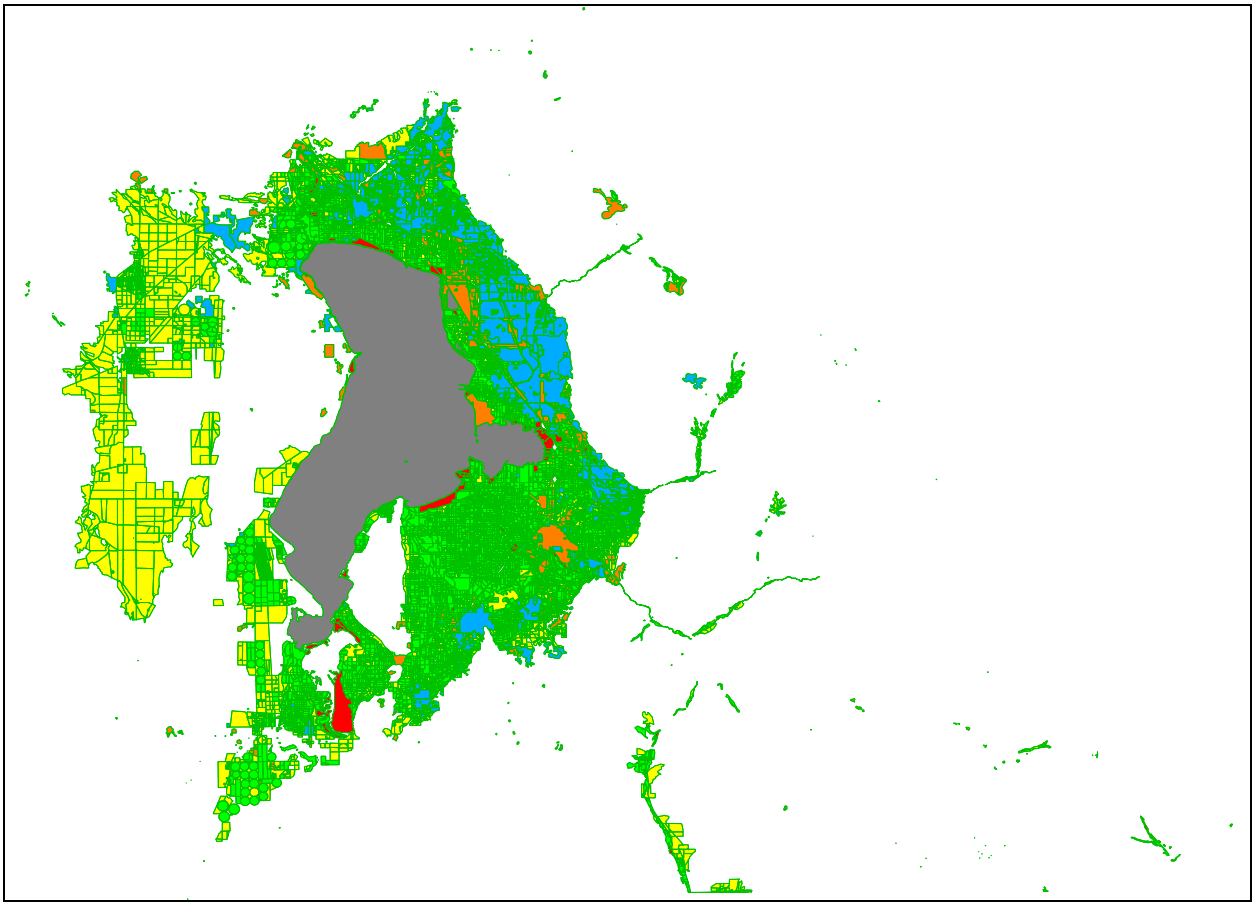


Figure 4-9: Geographic Map (Shape File) and Geo-Database of Utah County for Year 2002 (Source: Utah Geographic Information Council 2009)

4.1.2.5 Utah Government Official Website

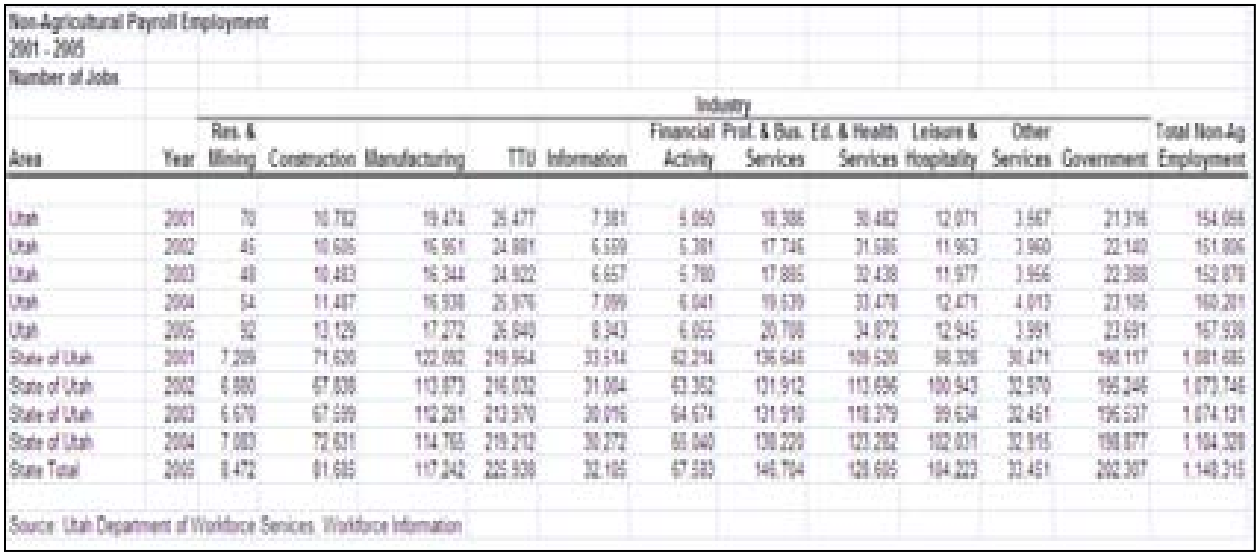
The official website for the state of Utah (2009) has social and economic data including Utah population estimates from year 2000 to 2008 by county and statewide, profile of selected economic characteristics, profile of general demographic characteristics, profile of selected social characteristics, and profile of selected housing characteristics. Figure 4-10 shows Utah population estimates from 2000 to 2008 by county and statewide. Figure 4-11 shows a sample profile of the selected economic characteristic, number of jobs.

Utah Population Estimates Committee
Total Population by County: 1940 - 2008

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Beaver County	6,023	6,156	6,285	6,285	6,308	6,341	6,428	6,466	6,523
Box Elder County	42,860	43,245	43,812	44,022	44,654	45,394	45,987	47,491	48,712
Cache County	91,897	93,372	95,469	98,176	100,182	103,664	106,671	109,022	111,841
Carbon County	20,396	19,858	19,858	19,558	19,385	19,338	19,504	19,736	19,841
Daggett County	933	944	916	921	954	963	949	969	964
Davis County	240,204	245,744	255,099	262,038	268,916	278,279	286,547	296,029	301,915
Duchesne County	14,397	14,646	14,856	14,698	14,933	15,237	15,586	16,163	16,765
Emery County	10,782	10,473	10,548	10,477	10,493	10,491	10,438	10,461	10,610
Garfield County	4,763	4,630	4,599	4,532	4,625	4,703	4,772	4,872	5,044
Grand County	8,537	8,423	8,468	8,464	8,611	8,826	9,024	9,125	9,326
Iron County	34,079	35,541	36,122	37,559	38,925	41,397	43,424	44,813	46,341
Juab County	8,310	8,570	8,643	8,713	8,826	8,974	9,315	9,654	10,039
Kane County	6,037	6,037	5,958	5,937	6,056	6,211	6,294	6,448	6,663
Millard County	12,461	12,486	12,760	13,068	13,127	13,171	13,230	13,414	13,550
Morgan County	7,181	7,548	7,639	7,938	8,249	8,516	8,888	9,266	9,645
Piute County	1,436	1,404	1,409	1,358	1,366	1,368	1,373	1,386	1,447
Rich County	1,966	1,983	2,050	2,079	2,069	2,062	2,121	2,162	2,279
Salt Lake County	902,777	918,279	927,564	940,465	955,166	978,285	996,374	1,018,904	1,030,519
San Juan County	14,360	14,063	14,216	14,240	14,353	14,571	14,647	14,807	15,206
Sanpete County	22,846	23,572	24,521	24,787	25,043	25,464	25,799	26,464	26,960
Sevier County	18,938	19,180	19,232	19,318	19,415	19,649	19,984	20,442	20,619
Summit County	30,048	31,279	32,236	34,073	35,090	36,283	36,871	38,412	39,951
Tooele County	41,549	44,425	47,819	48,956	50,075	52,133	54,375	56,536	58,214
Uintah County	25,297	26,849	25,984	26,019	26,224	26,883	27,747	28,806	30,446
Utah County	371,894	390,447	405,977	423,296	437,627	456,073	475,425	501,447	519,632
Wasatch County	15,433	16,278	17,476	18,515	19,177	19,999	21,053	21,951	22,845
Washington County	91,104	96,902	103,758	109,767	117,316	127,127	134,899	140,908	144,710
Wayne County	2,515	2,509	2,584	2,487	2,518	2,594	2,535	2,635	2,637
Weber County	197,541	200,567	203,377	205,882	209,547	213,684	215,870	220,781	224,536
State of Utah	2,246,563	2,305,652	2,368,330	2,413,618	2,469,230	2,547,389	2,615,129	2,699,554	2,767,779

Note: All UPEC data is dated July 1st the calendar year

Figure 4-10: Utah Population Estimates 2000-2008 by County and Statewide (Number of People) (Source: The Official Website for the State of Utah 2009)



Non-Agricultural Payroll Employment
2001 - 2005
Number of Jobs

		Industry											
Area	Year	Res. & Mining	Construction	Manufacturing	TTU	Information	Financial Activity	Prof. & Bus. Services	Ed. & Health Services	Leisure & Hospitality	Other Services	Government	Total Non-Ag Employment
Utah	2001	70	10,782	19,474	25,477	7,381	5,050	18,386	30,482	12,071	3,567	21,316	154,055
Utah	2002	45	10,605	16,951	24,881	6,559	5,381	17,746	31,585	11,963	3,960	22,140	151,806
Utah	2003	48	10,483	16,344	24,922	6,657	5,780	17,885	32,438	11,977	3,956	22,388	152,878
Utah	2004	54	11,487	16,938	25,976	7,099	6,041	19,539	33,478	12,471	4,013	23,105	160,201
Utah	2005	92	13,129	17,272	26,840	8,343	6,055	20,708	34,872	12,945	3,991	23,691	167,938
State of Utah	2001	7,209	71,620	122,092	219,954	33,514	62,214	136,646	109,520	98,328	30,471	190,117	1,081,685
State of Utah	2002	6,880	67,838	113,873	216,032	31,004	63,362	131,912	113,696	100,943	32,970	196,246	1,073,746
State of Utah	2003	6,670	67,599	112,291	213,970	30,016	64,674	131,910	118,379	99,634	32,451	196,537	1,074,131
State of Utah	2004	7,083	72,631	114,765	219,212	30,272	65,040	138,220	123,282	102,031	32,915	198,877	1,104,328
State Total	2005	8,472	81,685	117,242	225,938	32,105	67,583	146,704	128,605	104,223	33,451	202,307	1,148,315

Source: Utah Department of Workforce Services, Workforce Information

Figure 4-11: Sample Profile of Selected Economic Characteristics (Number of Jobs) (Source: The Official Website for the State of Utah 2009)

4.2 Data Reduction and Classification

To prepare for subsequent data analyses, all downloaded data were classified and reduced using the Microsoft Excel (2007) spreadsheet software. The results of data classification and reduction are found in Appendix 1B. This section discusses the classification of data by industry code,and the subdivision of commodity flow data to counties.

4.2.1 Classification of Data by Industry Code

Data related to CBP in 2002 (FHWA 2009) were divided into paid employees for paid period including March 12 (CBPE), first-quarter payroll (CBPFQP), annual payroll (CBPAP), and total establishments (CBPTE). CBP data were classified into 22 types by NAICS code. Table 4-1 shows detailed classification of CBP by NAICS code. The acronyms indicated above in the parentheses and in Table 4-1 are variable names assigned to these data items for subsequent analyses.

Table 4-1: Detailed CBP by NAICS Code (Source: FHWA 2009)

NAICS Code	Industry Type	CBPE	CBPFQP	CBPAP	CBPET
------	Total	CBPET	CBPFQPT	CBPAPT	CBPTET
11----	Forestry, fishing, hunting, and agriculture support	CBPE11	CBPFQP11	CBPAP11	CBPTE11
21----	Mining	CBPE21	CBPFQP21	CBPAP21	CBPTE21
22----	Utilities	CBPE22	CBPFQP22	CBPAP22	CBPTE22
24----	Construction	CBPE23	CBPFQP23	CBPAP23	CBPTE23
31----	Manufacturing	CBPE31	CBPFQP31	CBPAP31	CBPTE31
42----	Wholesale trade	CBPE42	CBPFQP42	CBPAP42	CBPTE42
44----	Retail trade	CBPE44	CBPFQP44	CBPAP44	CBPTE44
48----	Transportation and warehousing	CBPE48	CBPFQP48	CBPAP48	CBPTE48
51----	Information	CBPE51	CBPFQP51	CBPAP51	CBPTE51
52----	Finance and insurance	CBPE52	CBPFQP52	CBPAP52	CBPTE52
54----	Real estate and rental and leasing	CBPE53	CBPFQP53	CBPAP53	CBPTE53
54----	Professional, scientific and technical services	CBPE54	CBPFQP54	CBPAP54	CBPTE54
55----	Management of companies and enterprises	CBPE55	CBPFQP55	CBPAP55	CBPTE55
56----	Admin, support, waste mgt, remediation services	CBPE56	CBPFQP56	CBPAP56	CBPTE56
61----	Educational services	CBPE61	CBPFQP61	CBPAP61	CBPTE61
62----	Health care and social assistance	CBPE62	CBPFQP62	CBPAP62	CBPTE62
71----	Arts, entertainment and recreation	CBPE71	CBPFQP71	CBPAP71	CBPTE71
72----	Accommodation and food services	CBPE72	CBPFQP72	CBPAP72	CBPTE72
81----	Other services (except public administration)	CBPE81	CBPFQP81	CBPAP81	CBPTE81
95----	Auxiliaries (except corporate, subsidiary and regional mgt)	CBPE95	CBPFQP95	CBPAP95	CBPTE95
99----	Unclassified establishments	CBPE99	CBPFQP99	CBPAP99	CBPTE99

The commodity flow data (BTS and US Census Bureau 2009) were classified into 44 industries by SIC code. Commodity flow data obtained from the CFS website were also classified into three groups: 2002 produced commodity (CFS2P), 2002 attracted commodity (CFS2A) and 2002 commodity distributed within Utah (CFS2I). Here, *production* refers to commodities produced in a county in Utah and sent to other states or including Utah, *attraction* refers to commodities attracted to a county in Utah from other states or including Utah, and *distributed within* refers to a sum total of commodities produced in one county in Utah and attracted to the county from the other counties in Utah. Table 4-2 shows commodity flows by SIC code with their variable names used for subsequent analyses.

Table 4-2: Commodity Flows by SIC Code (Source: FHWA 2009)

SIC Code	Industry Type	Production	Attraction	Within
—	All Commodities (2)	CFS2PT	CFS2AT	CFS2IT
1	Live animals and live fish	CFS2P1	CFS2A1	CFS2I1
2	Cereal grains	CFS2P2	CFS2A2	CFS2I2
3	Other agricultural products	CFS2P3	CFS2A3	CFS2I3
4	Animal feed and products of animal origin, nec	CFS2P4	CFS2A4	CFS2I4
5	Meat, fish, seafood, and their preparations	CFS2P5	CFS2A5	CFS2I5
6	Milled grain products and preparations, and bakery products	CFS2P6	CFS2A6	CFS2I6
7	Other prepared foodstuffs and fats and oils	CFS2P7	CFS2A7	CFS2I7
8	Alcoholic beverages	CFS2P8	CFS2A8	CFS2I8
9	Tobacco products	CFS2P9	CFS2A9	CFS2I9
10	Monumental or building stone	CFS2P10	CFS2A10	CFS2I10
11	Natural sands	CFS2P11	CFS2A11	CFS2I11
12	Gravel and crushed stone	CFS2P12	CFS2A12	CFS2I12
13	Nonmetallic minerals nec	CFS2P13	CFS2A13	CFS2I13
14	Metallic ores and concentrates	CFS2P14	CFS2A14	CFS2I14
15	Coal	CFS2P15	CFS2A15	CFS2I15
17	Gasoline and aviation turbine fuel	CFS2P17	CFS2A17	CFS2I17
18	Fuel oils	CFS2P18	CFS2A18	CFS2I18
19	Coal and petroleum products, nec	CFS2P19	CFS2A19	CFS2I19
20	Basic chemicals	CFS2P20	CFS2A20	CFS2I20
21	Pharmaceutical products	CFS2P21	CFS2A21	CFS2I21
22	Fertilizers	CFS2P22	CFS2A22	CFS2I22
23	Chemical products and preparations, nec	CFS2P23	CFS2A23	CFS2I23
24	Plastics and rubber	CFS2P24	CFS2A24	CFS2I24
25	Logs and other wood in the rough	CFS2P25	CFS2A25	CFS2I25
26	Wood products	CFS2P26	CFS2A26	CFS2I26
27	Pulp, newsprint, paper, and paperboard	CFS2P27	CFS2A27	CFS2I27
28	Paper or paperboard articles	CFS2P28	CFS2A28	CFS2I28
29	Printed products	CFS2P29	CFS2A29	CFS2I29
30	Textiles, leather, and articles of textiles or leather	CFS2P30	CFS2A30	CFS2I30
31	Nonmetallic mineral products	CFS2P31	CFS2A31	CFS2I31
32	Base metal in primary or semi-finished forms and in finished basic shapes	CFS2P32	CFS2A32	CFS2I32
33	Articles of base metal	CFS2P33	CFS2A33	CFS2I33
34	Machinery	CFS2P34	CFS2A34	CFS2I34
35	Electronic and other electrical equipment and components and office equipment	CFS2P35	CFS2A35	CFS2I35
36	Motorized and other vehicles (including parts)	CFS2P36	CFS2A36	CFS2I36
37	Transportation equipment, nec	CFS2P37	CFS2A37	CFS2I37
38	Precision instruments and apparatus	CFS2P38	CFS2A38	CFS2I38
39	Furniture, mattresses and mattress supports, lamps, lighting fittings	CFS2P39	CFS2A39	CFS2I39
40	Miscellaneous manufactured products	CFS2P40	CFS2A40	CFS2I40
41	Waste and scrap	CFS2P41	CFS2A41	CFS2I41
43	Mixed freight	CFS2P43	CFS2A43	CFS2I43
——	Commodity unknown	CFS2P99	CFS2A99	CFS2I99

Employment data by area and by industry (EMPBI) were classified into 26 types by NAICS code. Table 4-3 shows EMPBI classes by NAICS code and their variable names assigned to them for subsequent analyses. Number of jobs (NOJ) and wage (W) data were classified into 12 types by NAICS code. Table 4-4 shows classifications of NOJ and W by NAICS code with their variable names assigned to them for subsequent analyses.

Table 4-3: Detailed EMPBI by NAICS Code (Source: The Official Website for the State of Utah 2009)

NAICS Code	Industry Type	EMPBI	NASIC Code	Industry Type	EMPBI
0	Total Employment	EMPBIT	13	Management of Companies	EMPBI13
1	Natural Resources	EMPBI1	14	Administrative and Waste Services	EMPBI14
2	Mining	EMPBI2	15	Educational Services	EMPBI15
3	Utilities	EMPBI3	16	Health and Social Services	EMPBI16
4	Construction	EMPBI4	17	Arts, Entertainment and Recreation	EMPBI17
5	Manufacturing	EMPBI5	18	Accommodation and Food Services	EMPBI18
6	Wholesale Trade	EMPBI6	19	Other Services	EMPBI19
7	Retail Trade	EMPBI7	20	State and Local Government	EMPBI20
8	Transportation and Warehousing	EMPBI8	21	Federal Civilian	EMPBI21
9	Information	EMPBI9	22	Federal Military	EMPBI22
10	Finance and Insurance	EMPBI10	23	Farm	EMPBI23
11	Real Estate, Rental and Leasing	EMPBI11	24	State Government	EMPBI24
12	Professional and Technical Services	EMPBI12	25	Local Government	EMPBI25

Table 4-4: Detailed EMPBI by NAICS Code (Source: The Official Website for the State of Utah 2009)

NAICS Code	Industry Type	W	NOJ
0	Total	WT	NOJT
1	Natural Res. and Mining	W1	NOJ1
2	Construction	W2	NOJ2
3	Manufacturing	W3	NOJ3
4	TTU	W4	NOJ4
5	Information	W5	NOJ5
6	Financial Activity	W6	NOJ6
7	Prof. and Bus. Services	W7	NOJ7
8	Ed. and Health Services	W8	NOJ8
9	Leisure and Hospitality	W9	NOJ9
10	Other Services	W10	NOJ10
11	Government	W11	NOJ11

4.2.2 Subdivision of Commodity Flow Data to Counties

Commodity flows produced from (production), attracted to (attraction), and distributed within Utah by SIC code were subdivided to each county by multiplying the ratio of the county's total employment by the state total employment (in number of people). Use of employment data has been reported to be a good estimator of commodity flow (Fisher et al. 2000 and Iding 2002). Because the CFS is given in state level, this subdivision of commodity flow to each county is a necessary step for subsequent analyses carried out in this research.

4.3 Data Sorting

After a series of data handling including data reduction, classification, and subdivision, data sorting were carried out. All data used for subsequent analyses were classified by NAICS or SIC code and by county. Table 4-5 through Table 4-8 show sample data sets for Utah County. Table 4-5 shows the total of each classified data item, Table 4-6 shows CBP data, Table 4-7 shows CFS data, and Table 4-8 shows employment, number of jobs, and wage data, respectively. The entire set of detailed data by county and by NAICS or SIC for this study is found in Appendix 1B. Abbreviations used in the tables such as CBPE, CFS2PT, EMPBIT, etc. are the variable names used in the analysis.

4.4 Data Transformation

Ramsey and Schafer (2002) state that when the ratio of the largest to the smallest measurement in a group is greater than 10, the data are probably more conveniently expressed on the log scale. Also, if the graphical display of raw data shows a skewed distribution and if the data with a larger average also has a larger spread, log transformation is likely to be a good choice to normalize the data for subsequent analysis. Distributions of the collected raw data did

show trends described above; hence, all raw data were transformed by natural log (ln) in order to normalize data distribution.

Table 4-5: Total Estimation of Each Classified Data for Utah County (Source: The Official Website for the State of Utah 2009 and FHWA 2009)

Classification	Unit	Contents
County Name	-	Utah County
Population	Person	405,977
Area	Square mile	1,998.00
CBP-PE	Person	160,267.00
CBP-FQP	$1,000	1,167,771.00
CBP-AP	$1,000	5,105,558.00
CBP-TE	EA	10,867.00
EMPBI	Person	203,507.00
NOJ	EA	151,806.00
Wages	$1,000	4,099,385,107.00
IR	Acres	99,223.74
NI	Acres	104,296.41
RES	Acres	56,956.37
RIP	Acres	8,262.14
URB	Acres	25,342.46
WATER	Acres	94,247.22
CFS2PT	1,000 ton	16,688.26
CFS2IT	1,000 ton	8,994.25
CFS2AT	1,000 ton	11,952.05

Figure 4-12 shows the distributions of a sample of the raw data before and after natural log transformation. While the distribution before the transformation of raw data is skewed, the distribution after natural log transformation shows more normal distribution. In Figure 4-12, the distribution charts on the left are raw data and those on the right are their distributions after natural log transformation. All natural log transformed data show visually a more normal distribution than the raw data. Appendix 1C contains the comparison of before and after natural log transformation of the data used for the subsequent analyses.

Table 4-6: CBP Data for Utah County (Source: FHWA 2009)

CBPE		CBPFQP($1000)		CBPAP ($1000)		CBPTE	
SIC code	25	SIC code	25	SIC code	25	SIC code	25
County	Utah	County	Utah	County	Utah	County	Utah
CBPET	132413	CBPFQPT	813960	CBPAPT	3491049	CBPTET	8063
CBPE11	B	CBPFQP11	D	CBPAP11	D	CBPTE11	12
CBPE21	B	CBPFQP21	D	CBPAP21	D	CBPTE21	11
CBPE22	178	CBPFQP22	2615	CBPAP22	11546	CBPTE22	13
CBPE23	7819	CBPFQP23	50320	CBPAP23	240701	CBPTE23	1374
CBPE31	15675	CBPFQP31	129647	CBPAP31	536544	CBPTE31	448
CBPE42	5417	CBPFQP42	50606	CBPAP42	198610	CBPTE42	357
CBPE44	18027	CBPFQP44	79824	CBPAP44	345151	CBPTE44	1150
CBPE48	960	CBPFQP48	5674	CBPAP48	26224	CBPTE48	139
CBPE51	4052	CBPFQP51	44917	CBPAP51	183613	CBPTE51	231
CBPE52	3304	CBPFQP52	28696	CBPAP52	115971	CBPTE52	540
CBPE53	1498	CBPFQP53	6105	CBPAP53	29379	CBPTE53	396
CBPE54	9335	CBPFQP54	66420	CBPAP54	288774	CBPTE54	952
CBPE55	3598	CBPFQP55	54133	CBPAP55	243299	CBPTE55	32
CBPE56	15614	CBPFQP56	70609	CBPAP56	309783	CBPTE56	400
CBPE61	18535	CBPFQP61	92319	CBPAP61	378509	CBPTE61	112
CBPE62	14200	CBPFQP62	91180	CBPAP62	411862	CBPTE62	776
CBPE71	1109	CBPFQP71	2801	CBPAP71	13919	CBPTE71	96
CBPE72	9981	CBPFQP72	22977	CBPAP72	94151	CBPTE72	476
CBPE81	2837	CBPFQP81	12901	CBPAP81	54683	CBPTE81	492
CBPE95	143	CBPFQP95	1433	CBPAP95	5978	CBPTE95	10
CBPE99	36	CBPFQP99	182	CBPAP99	831	CBPTE99	46

4.5 Chapter Summary

All data necessary for this study were downloaded from public websites. Downloaded data were collected with sorting, classified, reduced, and transformed for subsequent analyses. To conduct statistical analyses, raw data were transformed by natural log to make their distributions closer to normal distribution. Appendix 1 contains all raw data used for subsequent analyses and their transformed data.

Table 4-7: CFS Data for Utah County

Production (tons)	
NAICS code	25
County	Utah
CFS2PT	16688.26
CFS2P3	15.37
CFS2P6	236.01
CFS2P7	400.50
CFS2P8	39.26
CFS2P12	456.50
CFS2P13	838.73
CFS2P15	4567.85
CFS2P17	1609.30
CFS2P18	3397.85
CFS2P19	146.54
CFS2P23	172.25
CFS2P24	39.11
CFS2P26	243.46
CFS2P27	15.06
CFS2P28	70.30
CFS2P29	19.93
CFS2P30	36.52
CFS2P32	567.42
CFS2P34	51.13
CFS2P35	47.02
CFS2P39	13.54
CFS2P40	84.30
CFS2P43	311.33

Attraction (tons)	
NAICS code	25
County	Utah
CFS2AT	11952.05
CFS2A3	90.34
CFS2A5	64.66
CFS2A6	175.72
CFS2A7	449.81
CFS2A8	61.44
CFS2A11	30.80
CFS2A12	419.46
CFS2A13	331.01
CFS2A14	43.78
CFS2A15	3396.23
CFS2A17	1292.67
CFS2A18	2146.62
CFS2A19	266.94
CFS2A21	69.76
CFS2A23	110.63
CFS2A24	107.13
CFS2A26	287.23
CFS2A27	87.28
CFS2A28	55.90
CFS2A29	33.28
CFS2A30	50.94
CFS2A31	519.87
CFS2A32	309.56
CFS2A33	132.38
CFS2A34	83.19
CFS2A35	24.67
CFS2A36	90.49
CFS2A39	14.59
CFS2A40	99.83
CFS2A41	92.09
CFS2A43	305.33
CFS2A99	15.91

Within Utah (tons)	
NAICS code	25
County	Utah
CFS2IT	8994.25
CFS2I3	10.22
CFS2I6	68.01
CFS2I7	254.39
CFS2I8	37.36
CFS2I12	408.80
CFS2I13	104.65
CFS2I14	35.32
CFS2I15	2889.64
CFS2I17	1227.87
CFS2I18	2120.93
CFS2I19	108.88
CFS2I21	32.84
CFS2I26	123.76
CFS2I27	11.24
CFS2I28	21.75
CFS2I29	7.44
CFS2I31	343.13
CFS2I32	206.52
CFS2I33	40.14
CFS2I34	30.94
CFS2I35	3.21
CFS2I40	31.09
CFS2I43	169.88

Table 4-8: Other Analysis Data for Utah County
(Source: The Official Website for
the State of Utah 2009)

EMPBI		NOJ		W ($1000)	
SIC code	25	SIC code	25	SIC code	25
County	Utah	County	Utah	County	Utah
EMPBIT	252480	NOJT	151806	WT	4099385107
EMPBI1	604	NOJ1	45	W1	1912212
EMPBI2	37	NOJ2	10605	W2	301979349
EMPBI3	303	NOJ3	16951	W3	558838987
EMPBI4	20103	NOJ4	24881	W4	600561559
EMPBI5	18755	NOJ5	6559	W5	370859821
EMPBI6	5323	NOJ6	5381	W6	174317206
EMPBI7	31572	NOJ7	17746	W7	501701487
EMPBI8	2763	NOJ8	31585	W8	774725229
EMPBI9	9250	NOJ9	11953	W9	121883877
EMPBI10	11089	NOJ10	3960	W10	78916525
EMPBI11	9615	NOJ11	22140	W11	613688855
EMPBI12	18573				
EMPBI13	1805				
EMPBI14	15439				
EMPBI15	21021				
EMPBI16	21751				
EMPBI17	5053				
EMPBI18	14717				
EMPBI19	14049				
EMPBI20	24959				
EMPBI21	1110				
EMPBI22	2051				
EMPBI23	2538				
EMPBI24	7078				
EMPBI25	17881				

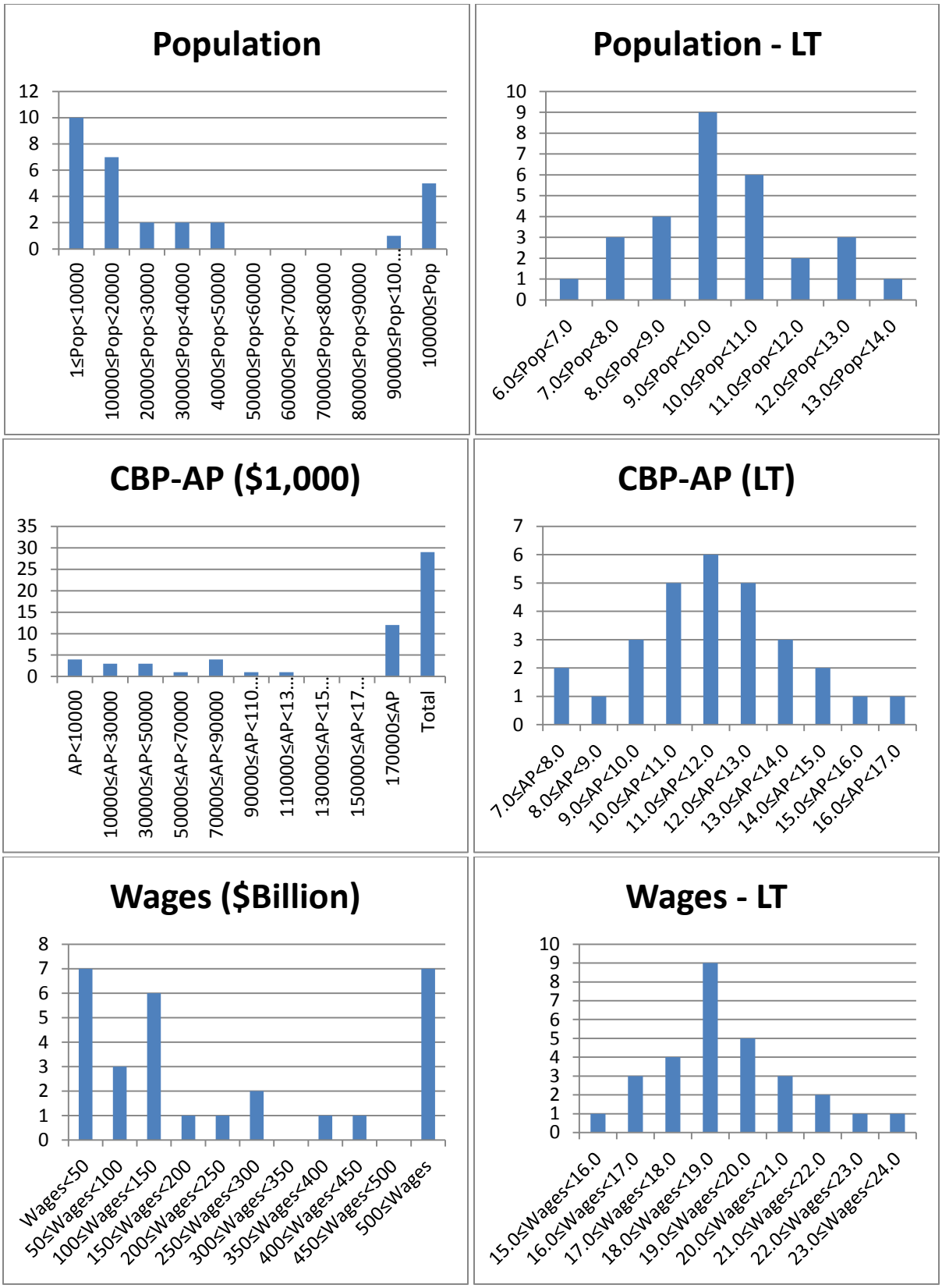


Figure 4-12: Comparison of Distributions of Raw Data (Left Column) and Transformed Data (Right Column)

5 UNDERSTANDING THE CHARACTERISTICS OF FREIGHT FLOW USING GIS TOOLS

TransCAD and SPSS statistical software program were used to better understand the characteristics of freight flow related to the contributing factors which were sorted, reduced, and transformed datasets prepared in Chapter 4. This chapter discusses the needs for a study on understanding the characteristics of freight flow using GIS tools, methodology, analysis results, and a chapter summary.

5.1 Needs for a Study on Understanding the Characteristics of Freight Flow Using GIS Tools

The increase in truck traffic on highways has created problems and challenges to transportation planning and traffic operations, including traffic congestion and a deficiency of transportation systems, including insufficient truck parking spaces, increase in traffic crashes related to trucks, deterioration of transportation infrastructure, environmental pollution, and lowered quality of life near truck routes.

Freight demand modeling requires a significant amount of data because it requires a comprehensive analysis of the relationships among economic activities, production and attraction trends by industry, distribution or linkages between production and attraction nodes, mode choice, shipment size decisions, vehicle trips, and route assignments. Multiple dimensions that reflect freight demand modeling (i.e., weight, volume, transport mode, and volume of freight

traffic) have given rise to two major modeling platforms: commodity-based modeling and trip-based modeling (Ogden 1992).

It was widely accepted that the fundamental economic mechanisms among regions drives freight movements, which largely are determined by attributes of land use of each analysis zone. Some research studies have pointed out the need for GIS applications in transportation because traffic generation was viewed as a function of the characteristics of TAZs. Land use models in the transportation planning process are essential for transportation planners to understand and predict the location of current and future economic activities (Palem 2004).

The existing commodity flow models have used complex procedures to estimate commodity flow. Given the availability of data on land use for a particular year and commodity flow for that year, there should be a way to estimate statewide commodity flow directly from land use data. The study presented in this chapter was conducted to explore developing relationships between commodity flow and land use type, using available GIS-T tools such that transportation planners can quickly estimate commodity flow from land use data available to them.

To better understand the characteristics of commodity flow, a study was conducted to establish relationships between commodity flow and land use using features of GIS. Data necessary for conducting commodity flow analysis are now publicly available to a certain extent, from organizations such as United States Census Bureau‘s CFS data, FAF data, Utah GIS portal data, Utah city and county data available from the UGOPB.

5.2 Methodology

Data collected, reduced and transformed in Chapter 4 for this analysis were used in the analysis. To develop correlation matrices of contributing factors that can describe relationships

between land use and commodity flow using, the following relationships were evaluated by sorting, reducing, and analyzing the available data using TransCAD and SPSS statistical software:

- Types of land use vs Utah business pattern;
- Types of land use vs. economic activity data, or population;
- Types of land use and commodity flow;
- Utah business pattern and commodity flow;
- Economic activity data and commodity flow; and
- Population (y_{3i}) and commodity flow (y_{4i}).

The analysis process shown in Figure 5-1 was utilized to analyze the relationship between commodity flow and land use using TransCAD and SPSS. Data collected for the analysis were sorted and reduced using Microsoft Excel, and analyzed and modeled using SPSS and TransCAD.

5.3 Analysis Results

Results of correlation analyses using SPSS and TransCAD are presented in this section, including results of Pearson correlation analysis between land use and contributing economic factors, and GIS maps showing relationships between commodity flow and land use. The results of correlation analysis are included in Appendix 2. This section discusses correlations between commodity flow and economic factors, correlations between commodity flow and land use, correlations between business pattern factors and land use, correlations between contributing economic factors and land use, and geographic analysis.

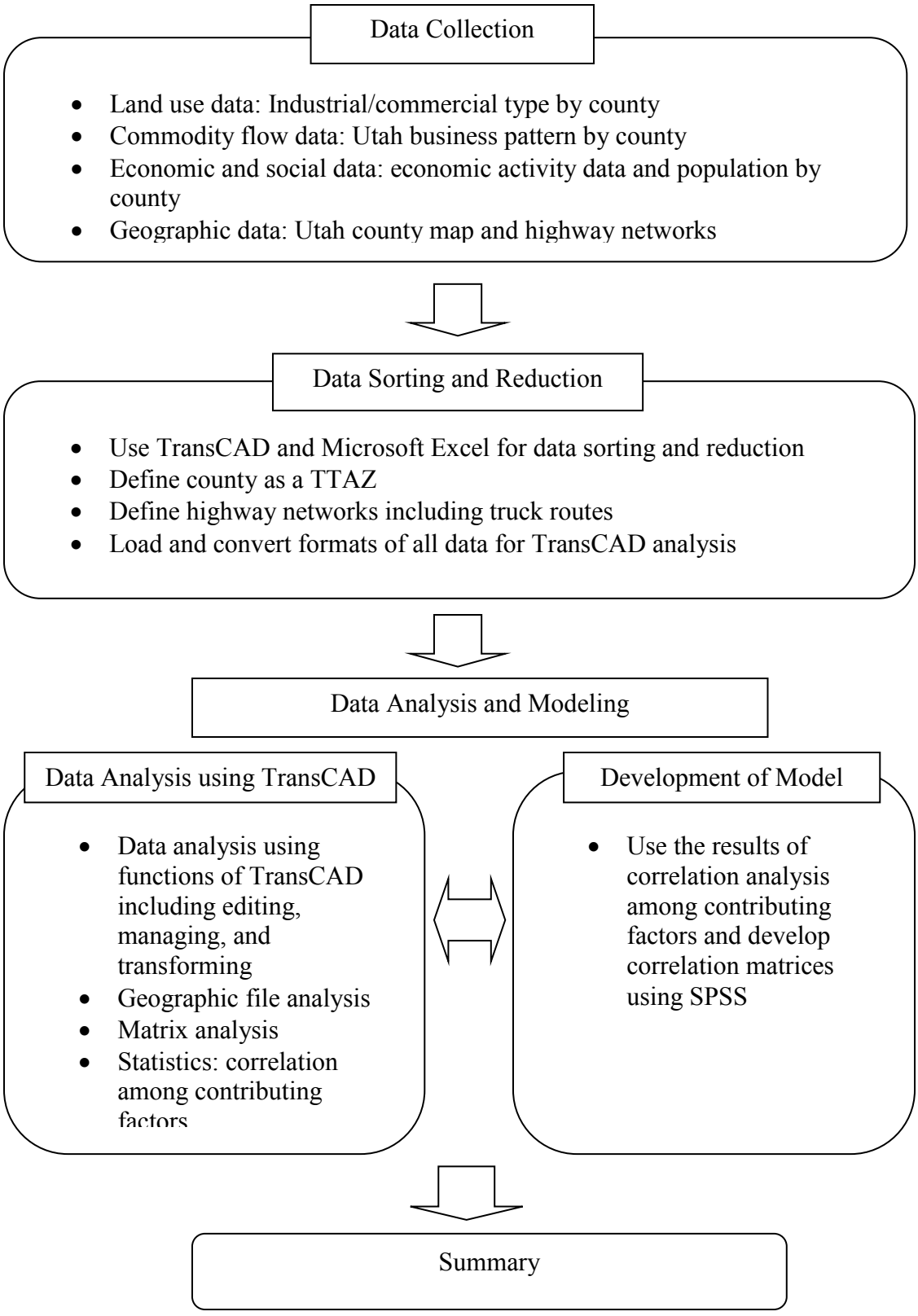


Figure 5-1: Analysis Process

5.3.1 Correlations Between Commodity Flow and Economic Factors

Correlation analyses between commodity flow and contributing economic factors were performed and key economic factors for estimating commodity flow were identified. Table 5-1 shows the correlation values between commodity flow and key economic factors. All key economic factors with high correlation with commodity flow, as shown in Table 5-1, were CFS2PT, CFS2IT, and CFS2AT except AREA. Therefore, CBPE, CBPFQP, CBPAP, EMPBI, NOJ and W were selected as main economic factors used to estimate the amount of commodity flow. See Table 4-1 and 4-2 for the definition of abbreviations.

5.3.2 Correlation Between Commodity Flow and Land Use

There are six land use types including irrigation area, non-irrigation area, residential area, riparian, urban area, and water area in the Utah GIS Portal data set. Table 5-2 shows the Pearson correlation values between commodity flow and land use. It was found that the residential land use had the closest correlation with commodity flow with Pearson correlation values of about 91.0 percent. Land use with the second highest Pearson correlation value was urban land use (URB) with Pearson correlation value of about 86.0 percent. Non-irrigation and riparian areas had much less correlation with commodity flow.

5.3.3 Correlation Between Business Pattern Factors and Land Use

5.3.3.1 Total Business Pattern Factors and Land Use

Next, correlation between business pattern factors and land use was discussed. Table 5-3 shows the results of the correlation analysis. The business pattern factors considered in this analysis include total county business pattern data including CBPE, CBPFQP, CBPAP, and CBPTE. Like the results of the correlation analysis between commodity flow and land use, urban

areas and residential areas had the closest correlation with the four types of business pattern data with Pearson correlation values ranging from 81.4 to 86.8 percent and from 90.0 to 91.7 percent. Non-irrigation areas and riparian areas had slightly related with commodity flows; however, irrigation and water area didn‘t have any correlation with CBP data.

Table 5-1: Correlation Between Commodity Flow and Contributing Economic Factors

(Unit: CFS – thousand ton)

		CFS2PT	CFS2IT	CFS2AT
AREA ($mile^2$)	Pearson Correlation	-0.17274	-0.18348	-0.18348
	Sig. (2-tailed)	0.37020	0.34072	0.34073
	N	29	29	29
CBPE	Pearson Correlation	0.99394	0.99329	0.99329
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29.0	29.0	29.0
CBPFQP ($1,000)	Pearson Correlation	0.98833	0.98631	0.98631
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPAP ($1,000)	Pearson Correlation	0.99062	0.98884	0.98884
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE	Pearson Correlation	0.99225	0.99182	0.99182
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI	Pearson Correlation	0.99881	1.00000	1.00000
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
NOJ	Pearson Correlation	0.99648	0.99802	0.99802
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
Wages ($1,000)	Pearson Correlation	0.99417	0.99454	0.99454
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29

Table 5-2: Correlation Between Commodity Flow and Land Use

(Unit: CFS – thousand ton, Land Use-acres)

		CFS2PT	CFS2IT	CFS2AT
IR	Pearson Correlation	0.20660	0.20507	0.20508
	Sig. (2-tailed)	0.28224	0.28589	0.28588
	N	29	29	29
NI	Pearson Correlation	0.50098	0.49788	0.49788
	Sig. (2-tailed)	0.00564	0.00599	0.00599
	N	29	29	29
RES	Pearson Correlation	0.91391	0.91428	0.91428
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
RIP	Pearson Correlation	0.46455	0.47419	0.47419
	Sig. (2-tailed)	0.01112	0.00936	0.00936
	N	29	29	29
URB	Pearson Correlation	0.85691	0.86032	0.86032
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
WATER	Pearson Correlation	-0.05855	-0.06858	-0.06858
	Sig. (2-tailed)	0.76287	0.72372	0.72372
	N	29	29	29

Table 5-3: Correlation Between Land Use and Business Pattern Factor

(Unit: Land Use-acres)

		CBPE	CBPFQP ($1,000)	CBPAP ($1,000)	CBPTE
IR	Pearson Correlation	0.22595	0.24447	0.23540	0.17282
	Sig. (2-tailed)	0.23857	0.20122	0.21898	0.36999
	N	29	29	29	29
NI	Pearson Correlation	0.50584	0.51101	0.50737	0.46745
	Sig. (2-tailed)	0.00512	0.00461	0.00496	0.01056
	N	29	29	29	29
RES	Pearson Correlation	0.91728	0.90007	0.90132	0.91365
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29
RIP	Pearson Correlation	0.47155	0.47595	0.48063	0.41697
	Sig. (2-tailed)	0.0098	0.0091	0.0083	0.0244
	N	29	29	29	29
URB	Pearson Correlation	0.84825	0.86784	0.86882	0.81417
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29
WATER	Pearson Correlation	-0.06657	-0.07093	-0.05714	-0.05406
	Sig. (2-tailed)	0.73151	0.71466	0.76843	0.78061
	N	29	29	29	29

5.3.3.2 Business Pattern Factors and Land Use

Between land use and detailed CBPE, the Pearson correlation value of IR varied considerably from 4.5 percent (CBPE55-Management of companies and enterprises) to 25.9 percent (CBPE31-Manufacturing). The Pearson correlation value of NI varied from 24.8 percent (CBPE11-Forestry, finishing, hunting, and agriculture support) to 60.9 percent (CBPE56-Administration support, waste management, reduction service). The Pearson correlation value of RES varied from 74.6 percent (CBPE11-Forestry, finishing, hunting, and agriculture support) to 95.5 percent (CBPE56-Administration support, waste management, reduction service). The Pearson correlation value of RIP varied from 10.1 percent (CBPE99-Unclassified establishments) to 55.3 percent (CBPE56-Administration support, waste management, reduction service). The Pearson correlation value of URB varied from 51.2 percent (CBPE11-Forestry, finishing, hunting, and agriculture support) to 84.1 percent (CBPE31-manufacturing). The Pearson correlation value of Water varied from -22.0 percent (CBPE56-Administration support, waste management, reduction service) to 12.5 percent (CBPE99-Unclassified establishments). Based on the correlation analysis, the administration support, waste management, reduction service class (CBPE56) and the manufacturing class (CBPE31) were the best factors for checking correlation between land use and CBPE.

Between land use and detailed CBPFQP, the Pearson correlation value of IR varied considerably from -1.5 percent (CBPFQP99-Unclassified establishments) to 25.0 percent (CBPFQP11-Forestry, finishing, hunting, and agriculture support). The Pearson correlation value of NI varied from 29.8 percent (CBPFQP11-Forestry, finishing, hunting, and agriculture support) to 58.1 percent (CBPFQP56-Administration support, waste management, reduction service). Pearson correlation value of RES varied from 78.4 percent (CBPFQP95-Auxiliaries cooperate, subsidy and regional management) to 93.4 percent (CBPFQP56-Administration support, waste

management, reduction service). The Pearson correlation value of RIP varied from 13.5 percent (CBPFQP99-Unclassified establishments) to 53.9 percent (CBPFQP56-Administration support, waste management, reduction service). The Pearson correlation value of URB varied from 61.6 percent (CBPFQP99-Unclassified establishments) to 83.2 percent (CBPFQP31-manufacturing). The Pearson correlation value of Water varied from -20.8 percent (CBPFQP56-Administration support, waste management, reduction service) to 11.3 percent (CBPFQP99-Unclassified establishments). Based on the correlation analysis, the administration support, waste management, reduction service class (CBPFQP56) and forestry, finishing, hunting, and agriculture support class (CBPFQP11) were the best factors for checking correlation between land use and CBPFQP.

Between land use and detailed CBPAP, the Pearson correlation value of IR varied from -3.6 percent (CBPTE99-Unclassified establishments) to 27.6 percent (CBPAP11-Forestry, finishing, hunting, and agriculture support). The Pearson correlation value of NI varied from 25.4 percent (CBPAP11-Forestry, finishing, hunting, and agriculture support) to 60.0 percent (CBPAP56-Administration, support, waste management, remediation services). The Pearson correlation value of RES varied from 72.5 percent (CBPTE11-Forestry, finishing, hunting, and agriculture support) to 93.7 percent (CBPAP56-Administration, support, waste management, remediation services). The Pearson correlation value of RIP varied from 19.5 percent (CBPAP11- Forestry, finishing, hunting, and agriculture support) to 49.1 percent (CBPAP55-Management of companies and enterprises). Pearson correlation value of URB varied from 49.2 percent (CBPAP11-Forestry, finishing, hunting, and agriculture support) to 81.0 percent (CBPAP31-Manufacturing). The Pearson correlation value of Water varied from -22.7 percent (CBPAP48-Transportation and warehousing) to 7.5 percent (CBPAP53-Real estate and rental

and leasing). Based on the correlation analysis, CBPAP11 (Forestry, finishing, hunting, and agriculture support), and CBPAP56 (administration, support, waste management, remediation services) were the best factors for checking correlation between land use and CBPAP.

Between land use and detailed CBPTE, the Pearson correlation value of IR varied from -10.8 percent (CBPTE95-Auxiliaries except cooperate, subsidy and regional management) to 28.3 percent (CBPTE48-Transportation and warehousing). The Pearson correlation value of NI varied from 24.8 percent (CBPTE71-Arts, entertainment and recreation) to 54.6 percent (CBPTE48-Transportation and warehousing). The Pearson correlation value of RES varied from 69.0 percent (CBPTE11- Forestry, finishing, hunting, and agriculture support) to 93.0 percent (CBPTE81-other services except public administration). The Pearson correlation value of RIP varied from 22.2 percent (CBPTE71-Arts, entertainment and recreation) to 48.3 percent (CBPTE48-Transportation and warehousing). The Pearson correlation value of URB varied from 60.0 percent (CBPTE11-Forestry, finishing, hunting, and agriculture support) to 84.0 percent (CBPTE81-other services except public administration). The Pearson correlation value of Water varied from -10.0 percent (CBPTE72-Accomodation and food services) to 11.1 percent (CBPTE99-Unclassified establishments). The correlation between land use and detailed CBPTE were different from trends of the three previous correlation analyses. Based on the correlation analysis, CBPTE48 (Transportation and warehousing), CBPTE71 (arts, entertainment and recreation), and CBPTE81 (other services except public administration) were the best factors for checking correlation between land use and CBPTE.

5.3.4 Correlation Between Contributing Economic Factors and Land Use

5.3.4.1 Contributing Economic Factors and Land Use

Correlation between land use and contributing economic factors obtained from the UGOPB website had similar results as that between land use and the county business pattern data. Residential and urban areas had the closest correlation with the economic factors obtained from the UGOPB website, including population, employment by industry, number of jobs and wages. The Pearson correlation values ranged from 86.6 percent to 88.1 percent. However, the variable area didn't have any relations with land use types. Wage data had the highest Pearson correlation value of 88.1 percent. In residential areas, employment data had the highest Pearson correlation value of 91.4 percent. Table 5-4 shows the correlation between land use and other contributing factors.

Table 5-4: Correlation Between Land Use and Other Contributing Factors

(Unit: Land Use-acres)

		POP	AREA ($mile^2$)	EMPBI	NOJ	W ($1,000)
IR	Pearson Correlation	0.22594	0.20562	0.20508	0.19173	0.20125
	Sig. (2-tailed)	0.23859	0.28459	0.28588	0.31908	0.29518
	N	29	29	29	29	29
NI	Pearson Correlation	0.53433	0.32444	0.49788	0.49381	0.49382
	Sig. (2-tailed)	0.00283	0.08596	0.00599	0.00648	0.00648
	N	29	29	29	29	29
RES	Pearson Correlation	0.90294	-0.10939	0.91428	0.90785	0.89481
	Sig. (2-tailed)	0.00000	0.57215	0.00000	0.00000	0.00000
	N	29	29	29	29	29
RIP	Pearson Correlation	0.46702	0.18957	0.47419	0.48600	0.49462
	Sig. (2-tailed)	0.01064	0.32467	0.00936	0.00752	0.00638
	N	29	29	29	29	29
URB	Pearson Correlation	0.87697	-0.02827	0.86032	0.86028	0.88144
	Sig. (2-tailed)	0.00000	0.88427	0.00000	0.00000	0.00000
	N	29	29	29	29	29
WATER	Pearson Correlation	-0.06203	0.11161	-0.06858	-0.06551	-0.06603
	Sig. (2-tailed)	0.74923	0.56433	0.72372	0.73564	0.73361
	N	29	29	29	29	29

5.3.4.2 Detailed Contributing Economic Factors and Land Use

Between land use and detailed EMPBI, the Pearson correlation value of IR varied considerably from 3.9 percent (EMPBI17-Arts, entertainment and recreation) to 74.4 percent (EMPBI23-Farm). The Pearson correlation value of NI varied from 27.0 percent (EMPBI21-Federal civilian) to 68.9 percent (EMPBI23-Farm). The Pearson correlation value of RES varied from 67.0 percent (EMPBI3-Utilities) to 91.1 percent (EMPBI7-Retail trade). The Pearson correlation value of RIP varied from 14.7 percent (EMPBI2-Natural resources) to 54.5 percent (EMPBI21-Federal civilian). The Pearson correlation value of URB varied from 63.3 percent (EMPBI3- Utilities) to 86.6 percent (EMPBI15-Administrative and waste services). The Pearson correlation value of Water varied from -17.9 percent (EMPBI15-Administrative and waste services) to 6.2 percent (EMPBI9-Infromation). Based on the correlation analysis, no special industry (criteria) was for checking correlation between EMPBI and land uses.

Between land use and detailed NOJ, the Pearson correlation value of IR varied considerably from 1.2 percent (NOJ9-Leisure and hospitality) to 25.7 percent (NOJ5-Information). The Pearson correlation value of NI varied from 23.8 percent (NOJ1-Natural resources and mining) to 55.5 percent (NOJ3-manufacturing). The Pearson correlation value of RES varied from 36.8 percent (NOJ1-Natural resources and mining) to 93.5 percent (NOJ6-Financial Activity). The Pearson correlation value of RIP varied from 12.6 percent (NOJ1-Natural resources and mining) to 53.4 percent (NOJ8-Education and health services). The Pearson correlation value of URB varied from 38.4 percent (NOJ1-Natural resources and mining) to 86.6 percent (NOJ7-Professional and business services). The Pearson correlation value of Water varied from -11.8 percent (NOJ8- Education and health services) to 3.1 percent (NOJ1- Natural resources and mining). Based on the correlation analysis, natural resources and mining (NOJ1) was the best factor for checking correlation between land use and NOJ.

Between land use and detailed wage, the Pearson correlation value of IR varied considerably from -7.0 percent (W9-Leisure and hospitality) to 28.2 percent (W8-Education and health services). The Pearson correlation value of NI varied from 28.8 percent (W1-Natural resources and mining) to 53.3 percent (W3-Manufacturaing). The Pearson correlation value of RES varied from 36.5 percent (W1-Natural resources and mining) to 92.9 percent (W6-Financial activity). The Pearson correlation value of RIP varied from 7.4 percent (W1-Natural resources and mining) to 50.0 percent (W11-Total). The Pearson correlation value of URB varied from 38.8 percent (W1-Natural resources and mining) to 87.5 percent (W11-Total). The Pearson correlation value of Water varied from -13.9 percent (W8-Education and health services) to 11.8 percent (W5-Infromation). Based on the correlation analysis, natural resources and mining (NOJ1) was the best factor for checking correlation between land use and wages.

5.3.5 Geographic Analysis

All data related to the contributing factors can be placed on the Utah map by using geographic analysis functions of TransCAD such as merging, making bands, overlaying, and showing areas of influence. Also, analysis and presentation functions of various theme maps of TransCAD such as color pattern, dot-density, pie and bar chart, and scaled-symbol themes, enable the user to perform multiple geographical map analyses. Figure 5-2 and Figure 5-3 demonstrate the results of correlation analysis among commodity flow, land use, and contributing economic factors.

Figure 5-2 shows a color and pattern theme map with pie-charts describing the relationship between commodity flow and land use type. The larger the size of urban area is, the more the commodity flow exists. Therefore, the area size of urban land use is an appropriate variable for estimating the amount of commodity flow. As shown in Figure 5-2, most of the

commodity flow produced from, attracted to, and moved within Utah are concentrated on three urban areas in Utah; the Wasatch Front (Salt Lake County, Utah County, and Davis County), northern Utah (Weber County and Cache County), and southern Utah (Washington County).

Figure 5-3 shows a band theme map with 15–mile distance from the highway interchanges, describing relationships between commodity flow and the transportation facility. The denser the highway interchanges are located, the more the interchanges affect the amount of commodity flow.

5.4 Chapter Summary

Levels of commodity flow produced from, attracted to, and distributed within Utah are a function of location, physical attributes, operation, and pricing. Land use is a governing factor that can be used for estimating the level of commodity flow. Better prediction of land use will enable transportation planners to more quickly estimate commodity flow and plan for the development of future transportation facilities. Several variables (total values), including CBPET (Paid Employees for Pay Period Including March 12), CBPFQPT (First-quarter Payroll), CBPAPT (Annual Payroll), EMPBIT (Employment Data by Area and Industry), NOJT (Number of Jobs), and WT (Wage), were found to have strong correlation with total commodity flow values.

Understanding the relationship between commodity flow and land use, and between land use and contributing economic factors, is a fundamental step for estimating the level of commodity flow. It was found that the land use types most closely related to the level of commodity flow were urban and residential area land use types.

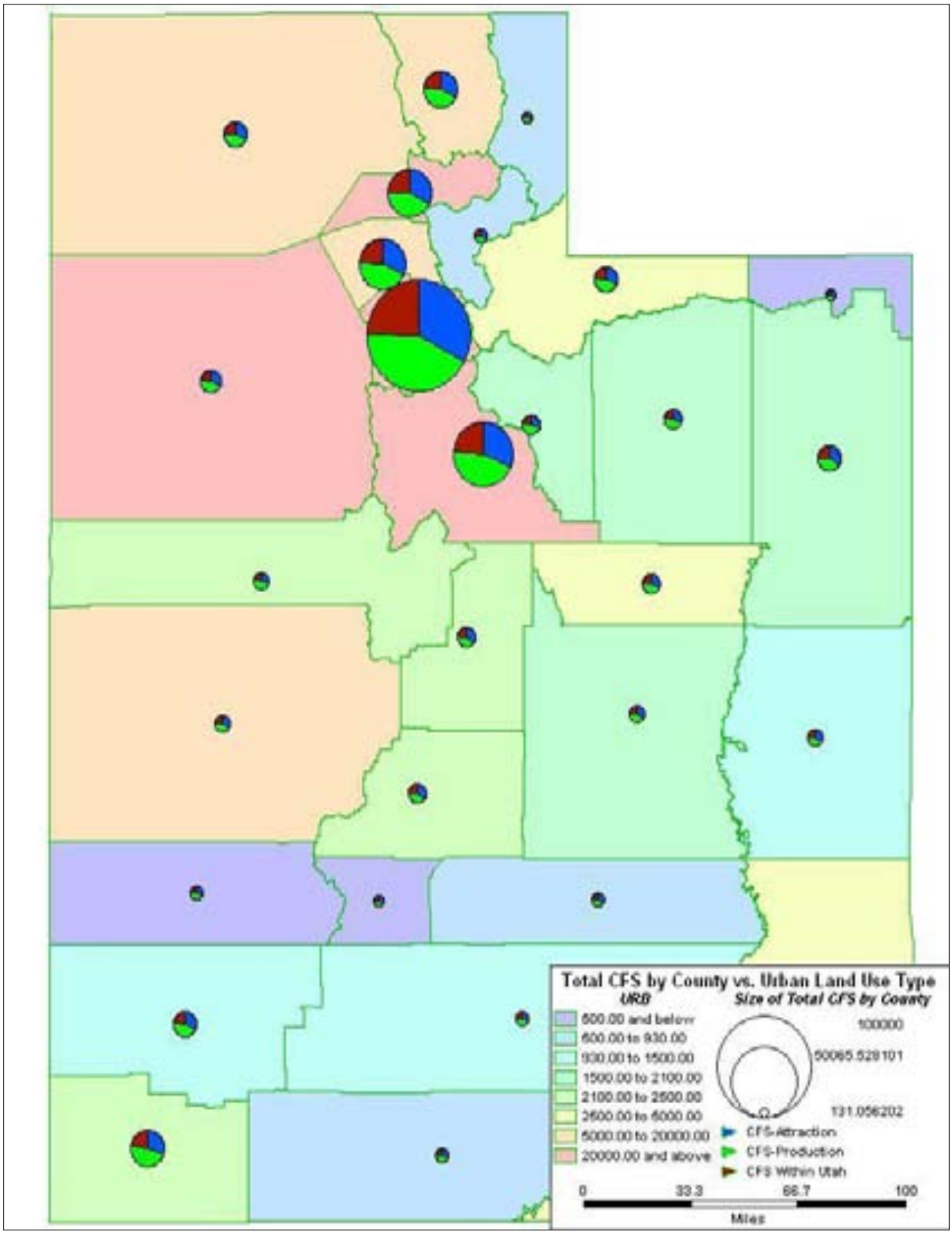


Figure 5-2: Map of Total CFS and URB by County

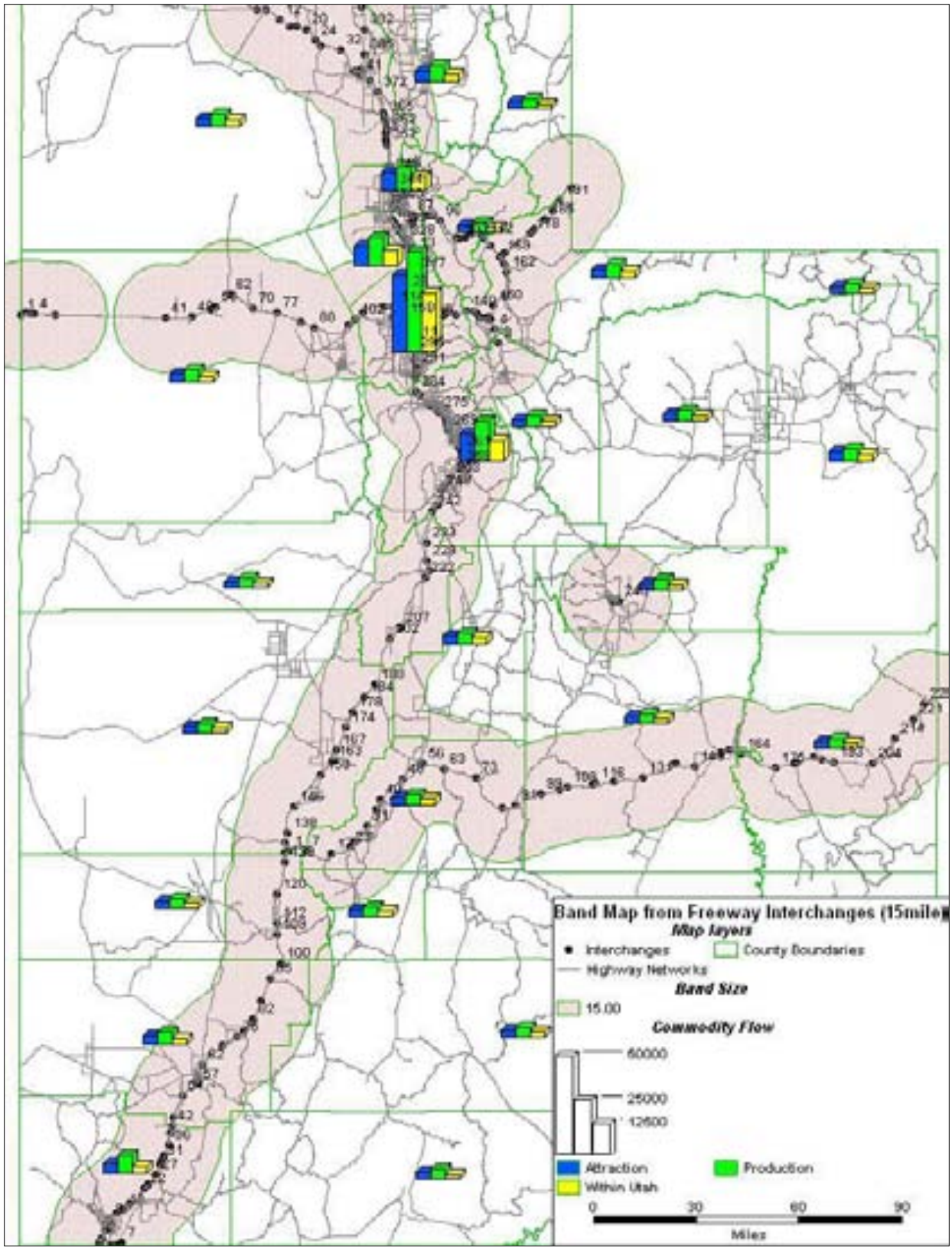


Figure 5-3: Band Map From Freeway Interchanges (15 Miles)

The Pearson correlation values of these two areas for the three commodity flow types were 91.4 percent and from 85.7 to 86.0 percent, respectively. Geographical map analysis functions of TransCAD were used in the study to help clearly understand the relationship between levels of commodity flow and land use, and the relationship between levels of commodity flow and the spatial spread of transportation facilities.

6 DEVELOPMENT OF COUNTY-LEVEL MULTIPLE REGRESSION MODELS FOR COMMODITY FLOW

Forecasting reliable freight demand has become essential in freight transportation management to systematically plan for future transportation facility needs. Commodity-based freight demand modeling techniques have been in the main stream because these techniques overcome the weakness of applying a typical four-step demand forecasting modeling process to freight transportation and capture more accurately the fundamental economic mechanisms that drive freight movement. Land use is one of the most important factors that affect major contributing factors such as location factors, physical factors, operational factors, dynamic factors such as seasonal variations in demand and changes in customers‘ tastes, and pricing factors (Ortuzer and Willumsen 2002).

This chapter consists of the methodology used for model development, three multiple regression models developed as an extension of the analysis discussed in Chapter 5, comparison of the commodity flow estimated by the models and the 2007 CFS (CFS 2007), and a chapter summary.

6.1 Methodology

To establish the relationships between commodity flow and contributing factors to land use, stepwise multiple linear regression analysis was performed by examining the results of correlation analysis. Three types of multiple linear regression models were developed in this

study, including; 1) commodity flow versus land use type, 2) commodity flow versus the number of employees by industry, and 3) commodity flow versus any other independent variables obtained from the correlation matrix that results in better models.

6.1.1 Procedures

To build a statewide commodity-based demand model describing commodity flows with contributing economic factors, it was necessary to build a database. This section presents the procedure followed to collect and analyze data, which are publicly available via the Internet. The analysis went through the following steps:

1) Data collection from special websites related to social and economic data, allocation of state‘s total commodity flow to each county using total employment by county as a commodity allocation parameter, and data reduction and log transformation of raw data All processes of data handling are mentioned in Chapter 4.
2) Determination of major contributing factors describing the relationship between commodity flow and land use characteristics, was conducted in Chapter 5,
3) Application of stepwise multiple linear regression analysis by SPSS to develop two models discussed in the previous section (a commodity-based model using employment and a commodity-based model using land use characteristics),
4) Estimation of Schwarz‘s Bayesian Information Criterion (BIC) to choose the best model,
5) Prediction of 2007 commodity flows using the two models, and
6) Comparison of the performance of the two models with the CFS 2007 data.

6.1.2 Stepwise Multiple Regression Analysis

Using the results of the correlation analysis between land use and economic factors and geographical map analysis, potential variables that would be included in stepwise multiple regression analysis were identified. Multiple linear regression models by stepwise regression analysis were developed for each commodity type to estimate the level of commodity flow per county for production of, attraction to, and distributed within Utah commodity flow using the two-digit SIC code. The stepwise multiple linear regression analysis was accomplished by using SPSS with natural log transformed data of all contributing factors describing land use characteristics.

Six land use types, which are irrigation area (IR), non-irrigation area (NI), residential area (RES), riparian (RIP), urban area (URB) and water area (Water), were used as independent variables of the first model between commodity flow and land use. The dependent variables were classified by NAICS code.

As independent variables of the second model between commodity flow and employment, 25 detailed EMPBIs by SIC code except total EMPBI (EMPBIT) were used. Commodity flows produced from (production), attracted to (attraction), and distributed within Utah (within-Utah) by the SIC code were dependent variables. Also, the dependent variables were classified by NAICS code.

In the third model 68 contributing factors including 21 CBPTE variables, 11 NOJ variables, 11 W variables and 25 EMPBI variables were entered. Even though all four types of county business pattern data were applied to the stepwise multiple linear regression analysis, CBPE, CBPAP, and CBPFQP variables were excluded because these variables had many missing data points. Commodity flows produced from (production), attracted to (attraction), and distributed within Utah by the SIC code were dependent variables. Also, dependent variables

were classified by the SIC code. Equations 6-1 through 6-3 show the general multiple linear regression formulae of the three models.

Model 1: $CFS_i = Constant_i + \sum_{j=1}^{6} a_{ij} LandUse_j$ (6-1)

Model 2: $CFS_i = Constant_i + \sum_{j=1}^{25} a_{ij} EMPBI_j$ (6-2)

Model 3:

$$CFS_i = Constant_i + \sum_{j=1}^{25} a_{ij} EMPBI_j + \sum_{k=1}^{21} b_{ik} CBPTE_k + \sum_{l=1}^{11} c_{il} NOJ_l + \sum_{m=1}^{25} d_{im} W_m \quad (6\text{-}3)$$

where,

CFS_i = commodity flow of each SCI code *i* (*i* = 1 to 44),

$LandUse_j$ = *j* land use type (*j* = 1 to 6),

$EMPBI_j$ = employment data of *j* industrial type (*j* = 1 to 25),

$CBPTE_k$ = total annual payroll of *k* industrial type (*k* = 1 to 21),

NOJ_l = total number of jobs of *l* industrial type (*l* = 1 to 11),

W_m = wages of *m* industrial type (*m* = 1 to 11), and

a_{ij}, b_{ik}, c_{il} , and d_{im} = coefficients of each variable *i, j, k, l,* and *m*.

Figure 6-1 shows results of one example of stepwise multiple linear regression analysis between the 2002 commodity attraction of commodity SIC code 19 (CFS2A19, Coal and petroleum products) and employment related variables (EMPB series variables). In this case six linear regression models were listed from the stepwise linear regression analysis. Detailed analysis results of the multiple linear regression models are found in Appendix 3, Appendix 4, and Appendix 5.

Regression (CFS2A19)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99153	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11412
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A19

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25053	1	76.25053	1876.46565	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34768	28			
2	Regression	76.73967	2	38.36984	1640.79347	0.00000
	Residual	0.60801	26	0.02338		
	Total	77.34768	28			
3	Regression	76.92432	3	25.64144	1514.17241	0.00000
	Residual	0.42336	25	0.01693		
	Total	77.34768	28			
4	Regression	77.03514	4	19.25879	1478.88560	0.00000
	Residual	0.31254	24	0.01302		
	Total	77.34768	28			
5	Regression	77.11022	5	15.42204	1493.76965	0.00000
	Residual	0.23746	23	0.01032		
	Total	77.34768	28			
6	Regression	77.16529	6	12.86088	1551.26255	0.00000
	Residual	0.18239	22	0.00829		
	Total	77.34768	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A19

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.68943	0.15041		-24.52950	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31819	0.00000
2	(Constant)	-3.89736	0.12282		-31.73112	0.00000
	EMPBI7	0.57969	0.07117	0.64156	8.14567	0.00000
	EMPBI19	0.37710	0.08245	0.36021	4.57351	0.00010
3	(Constant)	-4.10978	0.12273		-33.48652	0.00000
	EMPBI7	0.43793	0.07423	0.48467	5.89936	0.00000
	EMPBI19	0.38824	0.07025	0.37086	5.52687	0.00001
	EMPBI18	0.16837	0.05099	0.15446	3.30211	0.00289
4	(Constant)	-4.36287	0.13824		-31.56007	0.00000
	EMPBI7	0.36939	0.06921	0.40881	5.33746	0.00002
	EMPBI19	0.29166	0.06993	0.27860	4.17055	0.00034
	EMPBI18	0.16133	0.04478	0.14800	3.60288	0.00143
	EMPBI20	0.19338	0.06629	0.17725	2.91714	0.00755
5	(Constant)	-4.83980	0.21547		-22.46140	0.00000
	EMPBI7	0.25238	0.07537	0.27932	3.34879	0.00278
	EMPBI19	0.33144	0.06399	0.31659	5.17937	0.00003
	EMPBI18	0.24687	0.05095	0.22648	4.84546	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75642	0.01124
	EMPBI23	0.10837	0.04019	0.05893	2.69674	0.01287
6	(Constant)	-4.64086	0.20795		-22.31767	0.00000
	EMPBI7	0.21747	0.06888	0.24068	3.15715	0.00457
	EMPBI19	0.33958	0.05743	0.32438	5.91291	0.00001
	EMPBI18	0.23102	0.04607	0.21194	5.01476	0.00005
	EMPBI20	0.14313	0.05439	0.13119	2.63132	0.01525
	EMPBI23	0.09594	0.03633	0.05217	2.64058	0.01494
	EMPBI5	0.05506	0.02137	0.07465	2.57717	0.01719

a Dependent Variable: CFS2A19

Figure 6-1: Example of Stepwise Multiple Regression Analysis-Commodity Flow Attraction of Commodity Item 19 (CFS2A19)

6.1.3 Estimation of Schwarz's Bayesian Information Criterion (BIC) to Choose the Best Model

According to Ramsey and Schafer (2002), the evaluation criteria of choosing best model can be based directly on the key issues including enough explanatory variables to model the response accurately without the loss of precision that occurs when essentially redundant and unnecessary terms are included. Even though the R^2 of each model is often one of the evaluation criteria for choosing a best model, they can't be used in this type of analysis because R^2 is not meant for making a sensible selection.

As a method of choosing the best model, Schwarz's BIC, which is a numerical test for the fit of a model, was used. The smaller the BIC value, the better the model. Table 6-1 shows an example of BIC values for the 2002 commodity attraction models for commodity 19 (CFS2A19). Model 6 was the best model among six models because the BIC of Model 6 was the smallest. The process of selecting the best model among the multiple linear regression models developed are found in Appendix 3, Appendix 4, and Appendix 5.

Table 6-1: Example of BIC Values of Commodity Flow Attraction Models for Commodity Item 19 (CFS2A19)

Regression (CFS2A19)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-38.87794
2	0.99606	0.99214	0.99153	29	2	0.02338	-44.37871
3	0.99726	0.99453	0.99387	29	3	0.01693	-46.98175
4	0.99798	0.99596	0.99529	29	4	0.01302	-48.82669
5	0.99846	0.99693	0.99626	29	5	0.01032	-47.36429
6	0.99882	0.99764	0.99700	29	6	0.00829	-51.58753

* Note: $BIC = n \times \log(\hat{\sigma}^2) + plog(n)$, where n is the sample size, p is the number of variables, and $\hat{\sigma}^2$ is the estimate of σ^2.

6.2 Three Multiple Regression Models

6.2.1 First Model Between Commodity Flow and Land Use Type

Through the stepwise multiple regression, each commodity flow type (production from, attraction to, and distributed within Utah) by two-digit SIC code was created. Models with the best fit, as evaluated by BIC, were chosen for each commodity type. Table 6-2 through Table 6-4 show selected multiple regression models with land use type for CFS-Production, CFS-Attraction, and CFS-Within Utah by two-digit SIC code. Even though the models between commodity flow and land use type can‘t be validated with real data due to the lack of future land use data at the time of this study, the models suggest that there is a strong relationship between commodity flow and land use. In these tables, constants are all near zero, indicating that there is no commodity flow when predictor values are zero. Variable selection was done using a 95 percent confidence level.

6.2.2 Second Model Between Commodity Flow and Employment Data

In the second multiple linear regression models between commodity flow and employment, six or seven dependent variables among 25 variables were selected. The independent variables included in the first model were EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI25, EMPBI5, and EMPBI3. Table 6-5 through Table 6-7 shows the constants and coefficients by commodity type of the second multiple regression models (Equation 6-2). Note that different combinations of the above independent variables were selected by SPSS as significant variables as shown in Table 6-5 through Table 6-7.

Table 6-2: Best Multiple Linear Regression Models With Land Use Types for CFS-Production

CFST-P	(Constant)	RES_T	URB_T	RIP_T	NI_T
CFSTP3	0.0000800101	2.9161			
CFSTP4	0.0000026377	4.3172			1.1156
CFSTP5	0.0000019376	4.3171			1.1156
CFSTP6	0.0000400626	3.5137	1.6226	0.7299	
CFSTP7	0.0000661411	3.5272	1.6231	0.7286	
CFSTP8	0.0000048204	3.6764	1.6287	0.7156	
CFSTP12	0.0001648088	2.9842	1.8642	0.7015	
CFSTP13	0.0001681593	3.4329	1.6195	0.7373	
CFSTP15	0.0006585555	3.5948	1.6257	0.7226	
CFSTP17	0.0002522777	3.5530	1.6241	0.7263	
CFSTP18	0.0001264083	4.5880			
CFSTP19	0.0002029898	3.2926			
CFSTP21	0.0000006530	4.3171			1.1156
CFSTP22	0.0000029770	4.3171			1.1156
CFSTP23	0.0000195904	3.7160	1.6302	0.7123	
CFSTP24	0.0000529435	3.2995			
CFSTP25	0.0000003737	4.3172			1.1156
CFSTP26	0.0000364609	3.5758	1.6250	0.7243	
CFSTP27	0.0000033302	3.3863	1.6176	0.7417	
CFSTP28	0.0000184642	3.3057	1.6144	0.7495	
CFSTP29	0.0000217639	3.3653			
CFSTP30	0.0000014188	4.3181	1.6507	0.6672	
CFSTP31	0.0000776226	4.3172			1.1156
CFSTP32	0.0004442777	3.4695			
CFSTP33	0.0000043250	4.3172			1.1156
CFSTP34	0.0000177194	3.1800	1.6092	0.7622	
CFSTP35	0.0000036229	3.9239	1.6376	0.6956	
CFSTP36	0.0000017570	4.3172			1.1156
CFSTP37	0.0000000172	4.3172			1.1156
CFSTP38	0.0000002019	4.3172			1.1156
CFSTP39	0.0000317855	3.1372			
CFSTP40	0.0000304324	2.9842	1.8642	0.7015	
CFSTP42	0.0000089661	4.3171			1.1156
CFSTP43	0.0003515399	3.3549			

Table 6-3: Best Multiple Linear Regression Models With Land Use Types for CFS-Attraction

CFST-A	(Constant)	RES_T	URB_T	RIP_T	NI_T
CFSTA2	0.000006597	4.3172			1.1156
CFSTA3	0.000024078	3.2927	1.6101	0.7544	
CFSTA4	0.000002943	4.3172			1.1156
CFSTA5	0.000021021	3.2025	1.6064	0.7636	
CFSTA6	0.000024856	3.5976	1.6220	0.7259	
CFSTA7	0.000136632	3.2330	1.6076	0.7604	
CFSTA8	0.000011096	3.4768	1.6174	0.7368	
CFSTA11	0.000012136	2.9433	1.8555	0.7096	
CFSTA12	0.001406241	3.0402			
CFSTA13	0.000021974	3.9989	1.6364	0.6932	
CFSTA14	0.000086220	3.1923			
CFSTA15	0.000689348	3.4205	1.6152	0.7420	
CFSTA17	0.000263673	3.4181	1.6151	0.7422	
CFSTA18	0.000166701	4.2942			
CFSTA19	0.000202669	3.4839			
CFSTA20	0.000004640	4.3172			1.1156
CFSTA21	0.000002527	4.6053			
CFSTA22	0.000001310	4.3172			1.1156
CFSTA23	0.000017020	3.5556	1.6205	0.7296	
CFSTA24	0.000118237	3.3664			
CFSTA26	0.000072943	3.3150	1.6110	0.7522	
CFSTA27	0.000031592	3.1548	1.6044	0.7686	
CFSTA28	0.000042201	3.4857			
CFSTA29	0.000025818	3.4770			
CFSTA30	0.000010629	3.4073	1.6147	0.7433	
CFSTA31	0.002273012	2.9671			
CFSTA32	0.000127399	3.0987	1.6020	0.7746	
CFSTA33	0.000035883	3.2849	1.6098	0.7552	
CFSTA34	0.000015952	3.4478	1.6164	0.7394	
CFSTA35	0.000011177	3.0573	1.6002	0.7792	
CFSTA36	0.000020751	3.3626	1.6129	0.7475	
CFSTA37	0.000000095	4.3172			1.1156
CFSTA39	0.000014201	3.4055			
CFSTA40	0.000031446	3.2167	1.6070	0.7621	
CFSTA43	0.000149715	3.0237	1.5987	0.7829	
CFSTA99	0.000006269	2.9433	1.8555	0.7096	

Table 6-4: Best Multiple Linear Regression Model With Land Use Types for CFS-Within Utah

CFST-I	(Constant)	RES_T	URB_T	RIP_T	NI_T
CFSTI2	0.00000048	4.3171			1.1156
CFSTI3	0.00006267	2.876			
CFSTI4	0.00000118	4.3172			1.1156
CFSTI5	0.00000070	4.3171			1.1156
CFSTI6	0.00001614	3.3465	1.6123	0.7491	
CFSTI7	0.00003867	3.5615	1.6207	0.7291	
CFSTI8	0.00000509	3.6162	1.6227	0.7243	
CFSTI12	0.00016109	2.9433	1.8555	0.7097	
CFSTI13	0.00004124	2.9433	1.8555	0.7096	
CFSTI14	0.00001392	2.9433	1.8555	0.7096	
CFSTI15	0.00054814	3.4531	1.6165	0.7389	
CFSTI17	0.00024517	3.4283	1.6155	0.7413	
CFSTI18	0.00012282	4.4113			
CFSTI19	0.00017090	3.2594			
CFSTI20	0.00000210	4.3171			1.1156
CFSTI21	0.00000192	4.4076			
CFSTI22	0.00000042	4.3171			1.1156
CFSTI23	0.00000056	4.3172			1.1156
CFSTI24	0.00000135	4.3171			1.1156
CFSTI25	0.00000037	4.3172			1.1156
CFSTI26	0.00003767	3.2322	1.6076	0.7605	
CFSTI27	0.00000354	3.2163	1.6069	0.7621	
CFSTI28	0.00002348	3.3731			
CFSTI29	0.00000293	2.9433	1.8555	0.7096	
CFSTI30	0.00000005	4.3172			1.1156
CFSTI31	0.00211310	2.8753			
CFSTI32	0.00009562	3.0480	1.5998	0.7801	
CFSTI33	0.00003244	3.4639			
CFSTI34	0.00001103	3.1616	1.6047	0.7676	
CFSTI35	0.00000832	3.1130			
CFSTI36	0.00000026	4.3172			1.1156
CFSTI38	0.00000003	4.3172			1.1156
CFSTI39	0.00000020	4.3172			1.1156
CFSTI40	0.00001359	3.0725	1.6008	0.7775	
CFSTI41	0.00000847	4.3172			1.1156
CFSTI43	0.00022255	3.3139			

Table 6-5: Best Multiple Regression Model With Employment for Production

CFS-LT-P	(Constant)	EMPBI7	EMPBI19	EMPBI18	EMPBI23	EMPBI3
CFS2P3	-7.65044	0.37925	0.39793	0.23807	0.11403	-0.04441
CFS2P6	-4.91899	0.37921	0.39794	0.23811	0.11404	-0.04441
CFS2P7	-4.39001	0.37924	0.39794	0.23808	0.11402	-0.04441
CFS2P8	-6.71268	0.37920	0.39796	0.23811	0.11403	-0.04440
CFS2P12	-4.25914	0.37920	0.39797	0.23809	0.11401	-0.04441
CFS2P13	-3.65089	0.37921	0.39796	0.23809	0.11402	-0.04440
CFS2P15	-1.95599	0.37921	0.39796	0.23809	0.11402	-0.04440
CFS2P17	-2.99929	0.37924	0.39793	0.23808	0.11403	-0.04441
CFS2P18	-2.25189	0.37921	0.39796	0.23809	0.11402	-0.04440
CFS2P19	-5.39559	0.37921	0.39794	0.23811	0.11404	-0.04441
CFS2P23	-5.23389	0.37924	0.39793	0.23808	0.11403	-0.04441
CFS2P24	-6.71650	0.37919	0.39798	0.23810	0.11402	-0.04441
CFS2P26	-4.88787	0.37919	0.39796	0.23811	0.11403	-0.04440
CFS2P27	-7.67044	0.37925	0.39793	0.23807	0.11403	-0.04441
CFS2P28	-6.13000	0.37919	0.39797	0.23811	0.11401	-0.04440
CFS2P29	-7.39035	0.37920	0.39796	0.23809	0.11402	-0.04440
CFS2P30	-6.78500	0.37924	0.39794	0.23808	0.11403	-0.04441
CFS2P32	-4.04165	0.37920	0.39796	0.23809	0.11402	-0.04440
CFS2P34	-6.44842	0.37923	0.39794	0.23809	0.11402	-0.04441
CFS2P35	-6.53229	0.37924	0.39793	0.23808	0.11403	-0.04441
CFS2P39	-7.77692	0.37926	0.39793	0.23807	0.11402	-0.04441
CFS2P40	-5.94840	0.37919	0.39797	0.23811	0.11401	-0.04440
CFS2P43	-4.64199	0.37924	0.39793	0.23808	0.11403	-0.04441

Table 6-6: Best Multiple Regression Model With Employment for Attraction

CFS-LT-A	(Constant)	EMPBI7	EMPBI19	EMPBI18	EMPBI20	EMPBI23	EMPBI5
CFS2A3	-5.72422	0.21746	0.33960	0.23102	0.14311	0.09594	0.05507
CFS2A5	-6.05866	0.21751	0.33956	0.23099	0.14314	0.09590	0.05507
CFS2A6	-5.05892	0.21746	0.33960	0.23102	0.14311	0.09594	0.05507
CFS2A7	-4.11909	0.21746	0.33959	0.23102	0.14313	0.09594	0.05506
CFS2A8	-6.10979	0.21746	0.33959	0.23102	0.14313	0.09594	0.05506
CFS2A11	-6.80050	0.21745	0.33959	0.23101	0.14314	0.09593	0.05507
CFS2A12	-4.18883	0.21748	0.33958	0.23099	0.14314	0.09592	0.05507
CFS2A13	-4.42570	0.21745	0.33959	0.23101	0.14314	0.09593	0.05507
CFS2A14	-6.44855	0.21749	0.33956	0.23102	0.14314	0.09592	0.05507
CFS2A15	-2.09736	0.21750	0.33959	0.23099	0.14311	0.09593	0.05506
CFS2A17	-3.06333	0.21748	0.33958	0.23099	0.14314	0.09592	0.05507
CFS2A18	-2.55615	0.21749	0.33958	0.23100	0.14312	0.09592	0.05507
CFS2A19	-4.64086	0.21747	0.33958	0.23102	0.14313	0.09594	0.05506
CFS2A21	-5.98270	0.21747	0.33962	0.23101	0.14310	0.09594	0.05506
CFS2A23	-5.52165	0.21748	0.33956	0.23101	0.14313	0.09592	0.05507
CFS2A24	-5.55381	0.21747	0.33960	0.23101	0.14310	0.09594	0.05506
CFS2A26	-4.56744	0.21752	0.33954	0.23099	0.14315	0.09590	0.05507
CFS2A27	-5.75872	0.21748	0.33958	0.23101	0.14313	0.09592	0.05506
CFS2A28	-6.20439	0.21746	0.33959	0.23102	0.14313	0.09594	0.05506
CFS2A29	-6.72299	0.21747	0.33959	0.23100	0.14312	0.09593	0.05507
CFS2A30	-6.29714	0.21752	0.33954	0.23099	0.14315	0.09590	0.05507
CFS2A31	-3.97414	0.21751	0.33955	0.23099	0.14314	0.09590	0.05507
CFS2A32	-4.49269	0.21747	0.33959	0.23100	0.14312	0.09593	0.05507
CFS2A33	-5.34219	0.21747	0.33959	0.23100	0.14312	0.09593	0.05507
CFS2A34	-5.80679	0.21746	0.33959	0.23102	0.14313	0.09594	0.05506
CFS2A35	-7.02243	0.21747	0.33960	0.23102	0.14312	0.09593	0.05506
CFS2A36	-5.72256	0.21750	0.33959	0.23099	0.14311	0.09593	0.05506
CFS2A39	-7.54704	0.21752	0.33954	0.23099	0.14315	0.09590	0.05507
CFS2A40	-5.62440	0.21745	0.33959	0.23101	0.14314	0.09593	0.05507
CFS2A41	-5.70502	0.21746	0.33960	0.23102	0.14311	0.09594	0.05507
CFS2A43	-4.50634	0.21752	0.33954	0.23099	0.14315	0.09590	0.05507
CFS2A99	-7.46095	0.21749	0.33958	0.23100	0.14312	0.09592	0.05507

Table 6-7: Best Multiple Regression Model With Employment for Within Utah

CFS-I-LT	(Constant)	EMPBI7	EMPBI19	EMPBI18	EMPBI20	EMPBI23	EMPBI5
CFS2I3	-7.90382	0.21748	0.33958	0.23101	0.14313	0.09592	0.05506
CFS2I6	-6.00817	0.21750	0.33955	0.23101	0.14314	0.09592	0.05506
CFS2I7	-4.68893	0.21748	0.33958	0.23099	0.14314	0.09592	0.05507
CFS2I8	-6.60704	0.21751	0.33955	0.23099	0.14314	0.09590	0.05507
CFS2I12	-4.21469	0.21746	0.33959	0.23102	0.14313	0.09594	0.05506
CFS2I13	-5.57714	0.21752	0.33954	0.23099	0.14315	0.09590	0.05507
CFS2I14	-6.66346	0.21748	0.33959	0.23102	0.14312	0.09594	0.05506
CFS2I15	-2.25892	0.21748	0.33958	0.23101	0.14313	0.09592	0.05506
CFS2I17	-3.11489	0.21746	0.33959	0.23102	0.14313	0.09594	0.05506
CFS2I18	-2.56821	0.21747	0.33960	0.23101	0.14310	0.09594	0.05506
CFS2I19	-5.53766	0.21747	0.33958	0.23102	0.14313	0.09594	0.05506
CFS2I21	-6.73623	0.21747	0.33960	0.23102	0.14312	0.09593	0.05506
CFS2I26	-5.40945	0.21749	0.33956	0.23102	0.14314	0.09592	0.05507
CFS2I27	-7.80852	0.21746	0.33960	0.23102	0.14311	0.09594	0.05507
CFS2I28	-7.14836	0.21748	0.33960	0.23100	0.14311	0.09592	0.05507
CFS2I29	-8.22056	0.21747	0.33958	0.23102	0.14313	0.09594	0.05506
CFS2I31	-4.38972	0.21748	0.33958	0.23101	0.14313	0.09592	0.05506
CFS2I32	-4.89745	0.21749	0.33956	0.23102	0.14314	0.09592	0.05507
CFS2I33	-6.53544	0.21752	0.33954	0.23099	0.14315	0.09590	0.05507
CFS2I34	-6.79577	0.21750	0.33955	0.23101	0.14314	0.09592	0.05506
CFS2I35	-9.06129	0.21747	0.33959	0.23100	0.14312	0.09593	0.05507
CFS2I40	-6.79102	0.21748	0.33958	0.23101	0.14313	0.09592	0.05506
CFS2I43	-5.09266	0.21750	0.33959	0.23099	0.14311	0.09593	0.05506

6.2.3 Third Model Between Commodity Flow and Factors Describing Land Use Characteristics

In the third multiple regression models between commodity flow and land use characteristic variables, six or 10 dependent variables among the 68 contributing factors (including 21 CBPTE variables, 11 NOJ variables, 11 W variables and 25 EMPBI variables) were selected. These independent variables were EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, EMPBI15, NOJ9, W8, W11, CBPTE 21, CBPTE22, CBPTE31, and CBPTE95. Table 6-8, Table 6-9 and Table 6-10 show the detailed logarithm constants and coefficients by commodity type of the third multiple linear regression model (Equation 6-3).

Table 6-8: Best Multiple Regression Models With Major Contribution Factors for Production

CFS-P	Constant	EMPBI 7	EMPBI 19	EMPBI 18	EMPBI 23	EMPBI 3	NOJ 9	W 8	CBPTE 21	CBPTE 31	CBPTE 22
CFS7P3	0.00079	1.50307	1.33258	1.66117	1.13242	0.92408	0.76703	0.97724	1.04419	1.10142	1.06114
CFS7P6	0.01216	1.50304	1.33258	1.66135	1.13244	0.92408	0.76699	0.97724	1.0442	1.1014	1.06112
CFS7P7	0.02064	1.50305	1.33261	1.66125	1.13241	0.92409	0.76701	0.97725	1.04419	1.1014	1.06111
CFS7P8	0.00202	1.50301	1.33262	1.66125	1.13243	0.92409	0.76703	0.97724	1.04419	1.10139	1.06112
CFS7P12	0.02353	1.50299	1.33264	1.66122	1.1324	0.92409	0.76702	0.97724	1.0442	1.10142	1.06111
CFS7P13	0.04323	1.503	1.33261	1.66117	1.1324	0.92409	0.76703	0.97724	1.04419	1.10144	1.06112
CFS7P15	0.23543	1.503	1.33261	1.66117	1.1324	0.92409	0.76703	0.97724	1.04419	1.10144	1.06112
CFS7P17	0.08294	1.50304	1.33257	1.66128	1.13241	0.92408	0.76698	0.97724	1.04419	1.10144	1.06115
CFS7P18	0.17513	1.503	1.33261	1.66117	1.1324	0.92409	0.76703	0.97724	1.04419	1.10144	1.06112
CFS7P19	0.00755	1.50304	1.33258	1.66135	1.13244	0.92408	0.76699	0.97724	1.0442	1.1014	1.06112
CFS7P23	0.00888	1.50304	1.33257	1.66128	1.13241	0.92408	0.76698	0.97724	1.04419	1.10144	1.06115
CFS7P24	0.00202	1.50298	1.33264	1.66122	1.13241	0.92409	0.76703	0.97724	1.04419	1.10142	1.06111
CFS7P26	0.01254	1.503	1.33262	1.66125	1.13243	0.92409	0.76703	0.97724	1.04419	1.1014	1.06112
CFS7P27	0.00078	1.50307	1.33258	1.66117	1.13242	0.92408	0.76703	0.97724	1.04419	1.10142	1.06114
CFS7P28	0.00362	1.50298	1.33264	1.66128	1.13241	0.92409	0.76701	0.97724	1.04419	1.1014	1.06112
CFS7P29	0.00103	1.503	1.33264	1.66128	1.13241	0.92409	0.767	0.97724	1.04418	1.10139	1.06112
CFS7P30	0.00188	1.50307	1.33259	1.66126	1.13242	0.92408	0.76699	0.97724	1.04419	1.10141	1.06115
CFS7P32	0.02924	1.503	1.33264	1.66128	1.13241	0.92409	0.767	0.97724	1.04418	1.10139	1.06112
CFS7P34	0.00263	1.50303	1.33261	1.66128	1.1324	0.92409	0.767	0.97725	1.04419	1.10141	1.0611
CFS7P35	0.00242	1.50304	1.33257	1.66128	1.13241	0.92408	0.76698	0.97724	1.04419	1.10144	1.06115
CFS7P39	0.0007	1.5031	1.33258	1.66124	1.13241	0.92408	0.76699	0.97724	1.04419	1.10141	1.06115
CFS7P40	0.00434	1.50298	1.33264	1.66128	1.13241	0.92409	0.76701	0.97724	1.04419	1.1014	1.06112
CFS7P43	0.01604	1.50304	1.33257	1.66128	1.13241	0.92408	0.76698	0.97724	1.04419	1.10144	1.06115

Table 6-9: Best Multiple Regression Model With Major Contribution Factors for Attraction

CFSA	(Constant)	EMPBI7	CBPTE31	W11	EMPBI15	CBPTE95	EMPBI19
CFS7A3	0.00427202	1.46445	1.18289	1.16035	1.05324	1.11017	1.14941
CFS7A5	0.00305576	1.46450	1.18284	1.16039	1.05324	1.11018	1.14937
CFS7A6	0.00830939	1.46445	1.18289	1.16035	1.05324	1.11017	1.14941
CFS7A7	0.02126150	1.46447	1.18286	1.16039	1.05324	1.11018	1.14939
CFS7A8	0.00290432	1.46447	1.18286	1.16039	1.05324	1.11018	1.14939
CFS7A11	0.00145548	1.46448	1.18286	1.16039	1.05323	1.11019	1.14938
CFS7A12	0.01982380	1.46448	1.18285	1.16039	1.05323	1.11018	1.14939
CFS7A13	0.01564474	1.46448	1.18286	1.16039	1.05323	1.11019	1.14938
CFS7A14	0.00206957	1.46446	1.18287	1.16039	1.05325	1.11016	1.14937
CFS7A15	0.16055028	1.46449	1.18285	1.16037	1.05324	1.11016	1.14941
CFS7A17	0.06109214	1.46448	1.18285	1.16039	1.05323	1.11018	1.14939
CFS7A18	0.10146099	1.46453	1.18284	1.16038	1.05323	1.11019	1.14939
CFS7A19	0.01261948	1.46447	1.18287	1.16038	1.05324	1.11018	1.14938
CFS7A21	0.00329828	1.46446	1.18286	1.16036	1.05324	1.11017	1.14942
CFS7A23	0.00522911	1.46446	1.18287	1.16039	1.05325	1.11016	1.14937
CFS7A24	0.00506550	1.46446	1.18286	1.16035	1.05324	1.11016	1.14942
CFS7A26	0.01357472	1.46450	1.18285	1.16040	1.05324	1.11018	1.14935
CFS7A27	0.00412553	1.46448	1.18285	1.16038	1.05324	1.11015	1.14941
CFS7A28	0.00264216	1.46447	1.18286	1.16039	1.05324	1.11018	1.14939
CFS7A29	0.00157335	1.46449	1.18286	1.16036	1.05324	1.11019	1.14939
CFS7A30	0.00240731	1.46450	1.18285	1.16040	1.05324	1.11018	1.14935
CFS7A31	0.02457213	1.46449	1.18286	1.16039	1.05324	1.11018	1.14936
CFS7A32	0.01463637	1.46449	1.18286	1.16036	1.05324	1.11019	1.14939
CFS7A33	0.00625893	1.46449	1.18286	1.16036	1.05324	1.11019	1.14939
CFS7A34	0.00393220	1.46447	1.18286	1.16039	1.05324	1.11018	1.14939
CFS7A35	0.00116616	1.46445	1.18288	1.16037	1.05324	1.11016	1.14941
CFS7A36	0.00427766	1.46449	1.18285	1.16037	1.05324	1.11016	1.14941
CFS7A39	0.00068977	1.46450	1.18285	1.16040	1.05324	1.11018	1.14935
CFS7A40	0.00471823	1.46448	1.18286	1.16039	1.05323	1.11019	1.14938
CFS7A41	0.00435483	1.46445	1.18289	1.16035	1.05324	1.11017	1.14941
CFS7A43	0.01442999	1.46450	1.18285	1.16040	1.05324	1.11018	1.14935
CFS7A99	0.00075192	1.46453	1.18284	1.16038	1.05323	1.11019	1.14939

Table 6-10: Best Multiple Regression Model With Major Contribution Factors for Within

CFS-LT-I	(Constant)	EMPBI7	CBPTE31	W11	EMPBI15	CBPTE95	EMPBI19
CFS7I3	-7.63566	0.38150	0.16793	0.14874	0.05187	0.10450	0.13925
CFS7I6	-5.74004	0.38149	0.16795	0.14876	0.05188	0.10450	0.13922
CFS7I7	-4.42097	0.38150	0.16792	0.14876	0.05187	0.10452	0.13923
CFS7I8	-6.33904	0.38150	0.16794	0.14876	0.05187	0.10452	0.13920
CFS7I12	-3.94646	0.38149	0.16794	0.14875	0.05187	0.10452	0.13923
CFS7I13	-5.30925	0.38152	0.16793	0.14876	0.05187	0.10452	0.13920
CFS7I14	-6.39505	0.38151	0.16794	0.14873	0.05187	0.10453	0.13923
CFS7I17	-2.84666	0.38149	0.16794	0.14875	0.05187	0.10452	0.13923
CFS7I18	-2.29970	0.38149	0.16794	0.14872	0.05187	0.10451	0.13926
CFS7I19	-5.26931	0.38150	0.16794	0.14874	0.05187	0.10452	0.13922
CFS7I21	-6.46784	0.38148	0.16795	0.14874	0.05187	0.10451	0.13925
CFS7I26	-5.14132	0.38149	0.16795	0.14876	0.05188	0.10450	0.13922
CFS7I27	-7.53997	0.38148	0.16796	0.14872	0.05187	0.10451	0.13925
CFS7I28	-6.88025	0.38150	0.16792	0.14875	0.05187	0.10452	0.13924
CFS7I29	-7.95221	0.38150	0.16794	0.14874	0.05187	0.10452	0.13922
CFS7I31	-4.12156	0.38150	0.16793	0.14874	0.05187	0.10450	0.13925
CFS7I32	-4.62932	0.38149	0.16795	0.14876	0.05188	0.10450	0.13922
CFS7I33	-6.26755	0.38152	0.16793	0.14876	0.05187	0.10452	0.13920
CFS7I34	-6.52764	0.38149	0.16795	0.14876	0.05188	0.10450	0.13922
CFS7I35	-8.79285	0.38151	0.16793	0.14873	0.05187	0.10454	0.13923
CFS7I40	-6.52286	0.38150	0.16793	0.14874	0.05187	0.10450	0.13925
CFS7I43	-4.82445	0.38150	0.16792	0.14874	0.05187	0.10450	0.13925

6.3 Comparison of the Commodity Flow Estimated by the Models and CFS 2007

As the final step of the analysis, the results of the two models were compared with CFS 2007 values to determine which model would be more appropriate for estimating future commodity flows since the first model between commodity flow and land use type can‘t be validated with real data due to the lack of future land use data at the time of this study.

The CFS 2007 is used for validating the two models. The CFS 2007 was conducted by a partnership between the BTS and the U.S. Census Bureau. The commodity-based models developed in this study were used to predict commodity flows—production, attraction, and

distributed within—for year 2007. Commodity flow survey for year 2007 (CFS 2007) is available over the Internet; hence, they can be used to validate the models.

6.3.1 2007 Commodity Flow Estimated by the Two Multiple Regression Models

The first model (Equation 6-1) was an exploratory model for the purpose of examining the relationship between freight flow and these aggregated land use types. The first model described the relationship between the commodity flow and six types of land use including IR, URB, NI, RES, WATER, and RIP. The model, however, couldn‘t fully explain freight traffic movements because of the lack of detailed information on types of land use in urban areas such as the size of land use by industry; hence, this model was not used in this section.

Table 6-11 compares commodity flows by county estimated by the two models, Model 2 and Model 3. The year 2007 CFS values were estimated by the two multiple linear regression models. Commodity flow was classified by three types including production from, attraction to, and distributed within the Utah. Total estimated commodity flow by Model 2, between commodity flow and employment, was 254,094.40 thousand tons with production of 102,939.40 thousand tons, attraction of 87,066.24 thousand tons, and within Utah commodity flow of 64,088.76 thousand tons. Total estimated commodity flow by Model 3, between commodity flow and contributing factors describing land use characteristics, was 266,664.14 thousand tons with production of 108,556.24 thousand tons, attraction of 91,071.63 thousand tons, and within Utah commodity flow of 67,036.28 thousand tons.

The three types of total commodity flows, production, attraction, and within commodity flow, by the second model were by 4 to 5 percentages higher than those by the first model. For commodity flow production, the ranges of the difference between the two models were 26.8 percent (Rich County) to -23.8 percent (Daggett County). For commodity flow attraction, the

ranges of the difference between the two models were 33.6 percent (Kane County) to -36.0 percent (Wayne County). For commodity flow within the state, the ranges of the difference between the two models were 33.6 percent (Kane County) to -36.0 percent (Wayne County) as shown in Table 6-11, the comparison of commodity flow by county, estimated by the two models.

Table 6-12 shows comparison of commodity flow by commodity type by the SIC code estimated by the two models. The three types commodity flows by the SIC code (production, attraction, and within commodity flow) by Model 3 were higher than those by Model 2. The commodity flows by Model 3 were by 4 to 5 percent more than the amount by Model 2. Production commodity flow by Model 3 was by 5.2 percent more than the amount by Model 2. Attraction and within commodity flows by Model 3 were by 4.4 percent more than the amount by Model 2. Commodity SIC code 15 (coal), had the largest difference between the two models in all three commodity flows between the two models.

6.3.2 Comparison of Commodity Flows Estimated by the Models and the CFS 2007

To validate the two models developed in this study, the commodity flows estimated by the two multiple regression models were compared with the commodity flows estimated by the CFS 2007 (BTS and the US Census Bureau 2009). Table 6-13 shows side by side the commodity flows estimated by the two linear regression models, Model 2 and Model 3, and the CFS 2007 by BTS and the US Census Bureau. In general the commodity flows by the two models were estimated to be slightly lower than those by the CFS 2007. The total commodity flow for Utah in 2007 estimated by the CFS 2007 was 305,414 thousand tons, with attraction of 104,616 thousand tons, production of 123,245 thousand tons, and distributed within of 77,553 thousand tons.

Table 6-11: Comparison of Commodity Flows by County Estimated by the Two Models (Thousand Tons)

County	Model 2				Model 3			
	CFS7A-E	CFS7P-E	CFS7I-E	Total	CFS7A-cfEs	CFS7P-cfEs	CFS7I-cfEs	Total
Beaver	198.44	226.67	146.07	**571.18**	182.13	201.01	134.06	**517.21**
Box Elder	1522.42	1769.27	1120.63	**4412.31**	1468.03	1871.31	1080.60	**4419.93**
Cache	3949.71	4520.73	2907.34	**11377.78**	3376.91	4589.38	2485.75	**10452.04**
Carbon	746.05	857.15	549.16	**2152.37**	762.85	846.32	561.53	**2170.70**
Daggett	29.78	29.02	21.92	**80.73**	37.11	38.06	27.32	**102.50**
Davis	7792.03	10161.88	5735.64	**23689.55**	9315.18	9648.27	6856.71	**25820.16**
Duchesne	551.40	657.09	405.88	**1614.36**	562.69	802.20	414.19	**1779.08**
Emery	334.35	396.25	246.11	**976.71**	316.05	401.17	232.64	**949.86**
Garfield	196.47	224.10	144.62	**565.19**	194.47	225.70	143.15	**563.31**
Grand	347.18	433.50	255.56	**1036.23**	385.09	437.86	283.46	**1106.41**
Iron	1450.67	1625.02	1067.82	**4143.51**	1505.36	1704.61	1108.09	**4318.06**
Juab	291.23	307.48	214.37	**813.09**	268.16	302.48	197.39	**768.02**
Kane	357.79	421.97	263.37	**1043.14**	267.70	356.26	197.05	**821.01**
Millard	464.39	512.92	341.84	**1319.14**	425.62	611.54	313.29	**1350.45**
Morgan	179.19	207.64	131.90	**518.73**	219.36	219.26	161.47	**600.08**
Piute	29.99	31.64	22.07	**83.70**	34.40	36.74	25.32	**96.46**
Rich	73.45	80.59	54.06	**208.10**	76.00	63.58	55.94	**195.52**
Salt Lake	36522.98	40959.02	26884.31	**104366.30**	41190.20	46008.19	30319.09	**117517.48**
San Juan	330.09	355.91	242.98	**928.98**	361.86	327.11	266.36	**955.34**
Sanpete	693.41	702.24	510.40	**1906.05**	642.79	675.89	473.16	**1791.84**
Sevier	701.37	808.26	516.27	**2025.90**	704.42	776.20	518.52	**1999.15**
Summit	1839.04	2498.60	1353.73	**5691.37**	1452.69	2309.73	1069.32	**4831.74**
Tooele	1223.52	1472.85	900.61	**3596.98**	1275.25	1502.29	938.70	**3716.24**
Uintah	994.49	1209.60	732.03	**2936.12**	881.33	1351.24	648.74	**2881.31**
Utah	14146.33	17552.52	10413.02	**42111.87**	13519.21	18625.19	9951.40	**42095.80**
Wasatch	605.69	737.66	445.84	**1789.19**	585.72	712.80	431.15	**1729.67**
Washington	4143.55	5524.85	3050.04	**12718.44**	4073.12	5660.73	2998.17	**12732.02**
Wayne	73.40	86.56	54.03	**213.99**	114.66	83.67	84.40	**282.72**
Weber	7277.84	8568.40	5357.15	**21203.40**	6873.26	8167.45	5059.31	**20100.02**
Total	**87066.24**	**102939.40**	**64088.76**	**254094.40**	**91071.63**	**108556.24**	**67036.28**	**266664.14**

*CFS7A (P, I) -E: Estimated attraction (production, within) commodity flow 2007 by Model 1 between commodity flow and employment.

** CFS7A (P, I) –cfEs: Estimated attraction (production, within) commodity flow 2007 by Model 2 between commodity flow and entire economic contributing factors.

Table 6-12: Comparison of Commodity Flow by Commodity Type Estimated by the Two Models (Thousand Tons)

Attraction	Model 2	Model 3
CFS7A3	698.58	730.71
CFS7A5	499.96	522.96
CFS7A6	1358.79	1421.28
CFS7A7	3478.31	3638.32
CFS7A8	475.14	496.99
CFS7A11	238.13	249.09
CFS7A12	3243.57	3392.80
CFS7A13	2559.65	2677.42
CFS7A14	338.58	354.15
CFS7A15	26261.55	27469.59
CFS7A17	9995.88	10455.78
CFS7A18	16599.21	17362.94
CFS7A19	2064.18	2159.13
CFS7A21	539.46	564.27
CFS7A23	855.48	894.82
CFS7A24	828.36	866.46
CFS7A26	2221.05	2323.23
CFS7A27	674.90	705.93
CFS7A28	432.25	452.13
CFS7A29	257.32	269.16
CFS7A30	393.88	412.00
CFS7A31	4020.01	4204.93
CFS7A32	2393.73	2503.87
CFS7A33	1023.63	1070.73
CFS7A34	643.29	672.89
CFS7A35	190.73	199.50
CFS7A36	699.71	731.89
CFS7A39	112.86	118.05
CFS7A40	771.95	807.47
CFS7A41	712.12	744.87
CFS7A43	2360.99	2469.60
CFS7A99	123.02	128.68
Total	87066.24	91071.63

Production	Model 2	Model 3
CFS7P3	118.24	124.69
CFS7P6	1815.84	1914.93
CFS7P7	3081.39	3249.53
CFS7P8	302.06	318.54
CFS7P12	3512.28	3703.92
CFS7P13	6453.19	6805.28
CFS7P15	35144.72	37062.23
CFS7P17	12381.87	13057.65
CFS7P18	26142.82	27569.18
CFS7P19	1127.44	1188.96
CFS7P23	1325.29	1397.62
CFS7P24	300.89	317.30
CFS7P26	1873.21	1975.42
CFS7P27	115.90	122.22
CFS7P28	540.89	570.41
CFS7P29	153.37	161.74
CFS7P30	280.98	296.32
CFS7P32	4365.73	4603.97
CFS7P34	393.37	414.83
CFS7P35	361.76	381.51
CFS7P39	104.20	109.88
CFS7P40	648.60	684.00
CFS7P43	2395.36	2526.09
Total	102939.40	108556.24

Within	Model 2	Model 3
CFS7I3	79.00	82.63
CFS7I6	525.92	550.11
CFS7I7	1967.13	2057.63
CFS7I8	288.92	302.21
CFS7I12	3161.18	3306.60
CFS7I13	809.19	846.42
CFS7I14	273.12	285.68
CFS7I15	22345.01	23372.50
CFS7I17	9494.81	9931.60
CFS7I18	16400.21	17154.48
CFS7I19	841.92	880.65
CFS7I21	253.93	265.60
CFS7I26	957.05	1001.06
CFS7I27	86.90	90.90
CFS7I28	168.16	175.90
CFS7I29	57.56	60.21
CFS7I31	2653.30	2775.30
CFS7I32	1596.96	1670.40
CFS7I33	310.36	324.64
CFS7I34	239.26	250.26
CFS7I35	24.83	25.97
CFS7I40	240.39	251.44
CFS7I43	1313.65	1374.07
Total	64088.76	67036.28

The estimates by Model 2 were 83 percent to 84 percent of the estimates by the CFS 2007. On the other hand, the estimates by Model 3 were 86 percent to 88 percent of the estimates by the CFS 2007.

Table 6-13: Comparison of Commodity Flows by the Models and by the CFS 2007

2007CFS	Unit	Model		BTS
		Model 2	Model 3	
Production	1000 tons	102939.40	108556.24	123245.00
	Ratio	0.84	0.88	1.00
Attraction	1000 tons	87066.24	91072	104616.00
	Ratio	0.83	0.87	1.00
Within	1000 tons	64088.76	67036.28	77553.00
	Ratio	0.83	0.86	1.00
Total	1000 tons	254096.06	266665.89	305414.00
	Ratio	0.83	0.87	1.00

Table 6-14 shows a comparison of commodity flows by county, by the two models and by the CFS 2007. Average differences expressed by the ratio between the commodity flow by county, by the two models and by the CFS 2007 were 0.864 and 0.870 of the commodity flows estimated by the CFS 2007. On the other hand, the standard deviation of difference in the ratio between the commodity flows by county, by the two models and by the CFS 2007 was 0.121 for the first model and 0.071 for the second model, indicating the latter results in less variation in the estimated commodity flow values and is considered more reliable.

6.3.3 Evaluation of the Two Models, Model 2 and Model 3

The comparison of commodity flows estimated by the two multiple linear regression models and by the CFS 2007 showed that Model 3, a model showing the relationship between commodity flow and major contributing factors describing land use characteristics, is better than Model 2, a model showing the relationship between commodity flow and the employment related factors based on standard deviation.

Table 6-14: Comparison of Commodity Flows by County, by the Models and by the CFS 2007

CFS2007	The Model (1000 tons)		BTS (1000 tons)	Ratio		
	Model 2	Model 3		Model 2	Model 3	BTS
Beaver	571.18	517.21	616.99	0.93	0.84	1.00
Box Elder	4412.31	4419.93	5240.40	0.84	0.84	1.00
Cache	11377.78	10452.04	12244.18	0.93	0.85	1.00
Carbon	2152.37	2170.70	2491.36	0.86	0.87	1.00
Daggett	80.73	102.50	131.06	0.62	0.78	1.00
Davis	23689.55	25820.16	28421.88	0.83	0.91	1.00
Duchesne	1614.36	1779.08	1916.70	0.84	0.93	1.00
Emery	976.71	949.86	1289.21	0.76	0.74	1.00
Garfield	565.19	563.31	651.05	0.87	0.87	1.00
Grand	1036.23	1106.41	1233.25	0.84	0.90	1.00
Iron	4143.51	4318.06	4448.36	0.93	0.97	1.00
Juab	813.09	768.02	961.39	0.85	0.80	1.00
Kane	1043.14	821.01	841.19	1.24	0.98	1.00
Millard	1319.14	1350.45	1316.45	1.00	1.03	1.00
Morgan	518.73	600.08	694.30	0.75	0.86	1.00
Piute	83.70	96.46	132.34	0.63	0.73	1.00
Rich	208.10	195.52	251.99	0.83	0.78	1.00
Salt Lake	104366.30	117517.48	138294.41	0.75	0.85	1.00
San Juan	928.98	955.34	1102.38	0.84	0.87	1.00
Sanpete	1906.05	1791.84	1977.62	0.96	0.91	1.00
Sevier	2025.90	1999.15	2078.12	0.97	0.96	1.00
Summit	5691.37	4831.74	6142.70	0.93	0.79	1.00
Tooele	3596.98	3716.24	4028.50	0.89	0.92	1.00
Uintah	2936.12	2881.31	3600.91	0.82	0.80	1.00
Utah	42111.87	42095.80	46473.39	0.91	0.91	1.00
Wasatch	1789.19	1729.67	1979.65	0.90	0.87	1.00
Washington	12718.44	12732.02	13973.86	0.91	0.91	1.00
Wayne	213.99	282.72	319.17	0.67	0.89	1.00
Weber	21203.40	20100.02	22561.17	0.94	0.89	1.00
Total	254094.40	266664.14	305414.00	0.83	0.87	1.00
			Average	0.8636	0.8699	1.00
			S.D.	0.1207	0.0710	
			Range	0.62-1.24	0.73-1.03	

Model 3 is more reliable than Model 2 because Model 3 has a narrower standard deviation and a higher ratio between the commodity flows by Model 3 and by the CFS 2007. Even though Model 3 requires more input data, extra work will not be overwhelming because all data of these variables are available to the public over the Internet; hence, it might be concluded that Model 3 is considered superior to Model 2.

6.4 Chapter Summary

Rapid increase in freight trade has made commodity flow a major issue in the transportation field. Especially, the increase in truck traffic on highways has generated many problems and challenges to surface transportation planning, operation, and management. Hence, developing a reliable freight demand forecasting model has become an important task for state transportation agencies.

In this chapter, three commodity-based freight generation models were developed for the state of Utah using various factors describing land use types and their characteristics. Model 1 is a commodity-based model relating commodity flow to land use type. Due to the lack of commodity flow data for years other than 2002, this model has not been validated. If future land use plans became available, commodity flow produced from, attracted to, and moved within Utah can be predicted using land use type as a variable because the models are considered to be quite reliable with high R^2 values and small BIC values.

Model 2 is a commodity-based model relating commodity flow to employment related factors. Employment-related factors have been used by existing statewide freight demand forecasting models.

Model 3 is a commodity-based model using factors describing land use characteristics, including employment, business pattern factors, job availability, and wage related factors. The

performance of the two models was compared by using them to estimate 2007 commodity flows and compare their results with the CFS 2007 by BTS and US Census Bureau. It was found that Model 3 performed better than Model 2.

This model development effort demonstrated that commodity flow can be estimated by using multiple linear regression models. The data needed for the independent variables are available to the public via the Internet, thus making commodity flow estimation economical.

7 DEVELOPING A STATEWIDE COMMODITY FLOW DISTRIBUTION MODEL USING COMPOSITE FRICTION FACTORS

Reliable freight demand modeling helps freight transportation planners and engineers determine the level of infrastructure supply in the future. However, current commodity flow data available to the public consist of state-level summaries and do not include detailed commodity flow data at the county level. This lack of data makes it difficult to estimate commodity flow within a state through its highway network, generating a need for a methodology that will fill this data gap and help build an improved freight demand model. A gravity model-based commodity flow distribution model that uses the data available to the public via the Internet was developed in this chapter. The model uses composite friction factors, including physical distance, statistical distance (Euclidean distance) that reflects the interrelationships among the variables characterizing the commodity generation at the county level, and economic factors (consisting of difference in population and difference in employment among the counties), thus, overcoming the conceptual deficiency of a traditional gravity model. A unique two-stage calibration method was used to find an optimal combination of model parameter values. An initial commodity flow distribution was then made, followed by final adjustments to the commodity flow distribution values using the average growth method.

In this chapter, the process of developing a commodity flow distribution model is discussed. This chapter consists of a discussion on the necessity of the model, the development

process of the model, the application of the model, the calibration of model parameters, and a chapter summary.

7.1 Necessity of Developing a Commodity Flow Distribution Model

An increasing number of studies related to freight planning have focused not only on defining the role of advanced technologies in enhancing system productivity and efficiency but also on suggesting traffic control strategies aimed at ameliorating the negative environmental impacts of truck traffic upon local communities and estimating future freight supply and demand to determine future needs for highway infrastructures. The most significant hurdle to including freight transportation in the transportation modeling process is that most of the current demand forecasting methodologies were developed for passenger trips, not for freight trips. This traditional modeling methodology usually makes an assumption that freight trips follow a behavioral mechanism similar to that of passenger trips; that is, truck traffic is estimated as a function of passenger-trip traffic (Ogden 1992).

To overcome the weakness of applying a typical four-step demand forecasting model based on passenger trips to freight transportation, the concept of commodity flow modeling can be applied to develop a statewide freight flow model. Commodity-based demand models focus on modeling the amount of freight transported, measured in tons or any comparable unit of weight through state highway networks. It is widely accepted by researchers in this field that focusing on the movement of cargo enables commodity-based demand models to more accurately capture the fundamental economic mechanisms that drive freight movements (University of Westminster et. al 2002; Holguin-Veras and Thorson 2003; Cambridge Systematics et al. 1997; and Friedrich et. al 2003).

Commodities generated by a commodity demand model need to be distributed among TAZs. Commodity flow data obtained from the CFS website (BTS and the U.S. Census Bureau 2009) are classified into three groups: 2002 production commodity from a state, 2002 attraction commodity to a state, and 2002 commodity distributed within a state. Here, the term *production* means commodities produced in the counties in a state and sent to all the other states in the United States including the state under study, *attraction* means commodities transported to the counties in the state from all the other states in the United States, and *within* means a sum total of commodities produced in one county in a state and transported to the other counties in the state and attracted to the county from the other counties in the state.

To forecast the commodity flow within a state, it is necessary to study factors contributing to the understanding of the behaviors and characteristics of commodity flow and develop a methodology that can systematically distribute commodities from one county to other counties in a state. This section presents a new methodology for distributing commodity flow among counties in a state, based on county-level total commodity flow. The distribution methodology is an enhanced gravity model that employs composite friction factors consisting of physical distance, Euclidean distance of the factors considered for commodity generation, and the economic factors of population difference and employment difference among the counties in a state. The FAF version 3 (FHWA 2010), the most recent FAF publication, does not yet provide commodity flow information among the counties.

To strengthen the advantages of existing trip distribution models and complement their shortcomings, a new paradigm that identifies major contributing factors for understanding the behaviors of commodity flow and characteristics of commodity flow is needed. Additionally, a methodology that systematically distributes commodities among the counties in a state using

these contributing factors such as the behaviors of commodity flow and characteristics of commodity flow is necessary in order to estimate freight movements on a state highway system. This was the motivation of the dissertation presented this chapter.

7.2 Model Development

The commodity flow distribution model developed in this study responds to the needs mentioned in the literature review section. It builds upon a traditional gravity model and adds a new paradigm and a systematic approach. This section discusses the model development process, the core concept, the description of the factors included in the model, and the commodity flow distribution model.

The commodity flow distribution model presented in this chapter distributes the commodity generated in a county to the other counties within a state. This does not include commodity produced in the state and sent to the other states (production as defined by FAF) or commodity attracted from the other states to the state (attraction as defined as FAF) in question. The model is an enhanced gravity model with composite friction factors that would complement the weakness of the typical gravity model. Coefficients of the friction factors used in the model are calibrated using the 2002 CFS data for Utah.

7.2.1 Model Development Process

To build a statewide commodity distribution model that will make up for the shortcomings of the traditional gravity model, a new set of friction factors were developed and added. The new model considers not only a traditional friction factor (in this model physical distance is used) but also statistical distance (Euclidean distance of the factors identified as significant parameters for commodity generation) and economic factors (difference in

populations and difference in employment between counties). The factors used to determine Euclidean distance were established in an analysis the author conducted prior to this study to evaluate the relationships between commodity flows with factors that reflect the characteristics of land use.

The statewide commodity flow distribution model with composite friction factors were developed using the following steps:

1) Development of a new concept for commodity distribution among the counties in a state,
2) Selection of friction factors used in the model,
3) Development of a framework for the model,
4) Determination of the format of each friction factor,
5) Application of the model to the real data (the state of Utah was used in this study),
6) Calibration of friction factor parameters, and
7) Adjustment of production and attraction values.

7.2.2 Core Concept

The commodity flow distribution model developed in this study started with the framework of gravity model using counties as TTAZs. In this enhanced gravity model, in addition to the physical friction factor (i.e., physical distances between TTAZs), three new factors that would complement the shortcoming of the traditional gravity model were added. It was assumed that besides the physical distance, commodity flow between an origin TTAZ (i) and a destination TTAZ (j) is affected by a statistical distance among the variables (Euclidean distance) and two economic factors (difference in population and difference in employment between zones i and j). To bring the distribution of raw data closer to the bell-shaped normal distribution of the data, raw data of the factors used in the model were transformed using a

natural log transformation to reduce the statistical effect on analysis results due to large differences in raw data values among the factors. Population and employment data for the counties were also transformed using a natural log transformation.

7.2.3 Characteristics of Friction Factors

As mentioned previously, the commodity flow distribution model developed in this study employs two friction factors in addition to physical distance, which are statistical friction factor and economic friction factors.

7.2.3.1 Physical Friction Factor (Physical Distance)

The gravity model was developed with the concept that trips between zones *i* and *j* were made by an analogy drawn between the spatial interaction and gravitational interaction between zones *i* and *j* (Meyer and Miller 2001). The physical friction factor is typically an inverse function of the travel cost between zones *i* and *j* (e.g., travel time, distance, monetary out-of-pocket cost, generalized cost, etc.). The same analogy was used for the commodity flow distribution model developed in this study. In this commodity flow distribution model, straight distances between the geographical centers of zones *i* and *j* were used to represent the physical distance between the two zones *i* and *j,* P_{ij}.

7.2.3.2 Statistical Friction Factor (Euclidean Distance)

Commodity flow can be influenced by more than just the physical distance between two zones. To include the effect of more factors affecting commodity flow, a statistical distance was also considered. To simultaneously reflect the influence of multiple factors, Euclidean distance was selected. Prior to this study, the author studied relationships between commodity flow and

other economic factors. He found the following factors (all in total values) to be influential for estimating commodity generation in the zones: CBPE, CBPFQP, CBPAP, EMPBI, NOJ and W, which were obtained from the FAF version 3 (FHWA 2010).

The Euclidean distance or Euclidean metric, u_{ij}, is the ordinary distance between two points that one would measure with a ruler, and is given by the Pythagorean formula (Deza et al. 2009). By using this formula as distance, Euclidean space (or any inner product space) becomes a metric space. The Euclidean distance between points p and q is the length of the line segment connecting zone i and zone j. In Cartesian coordinates, if $p = (p_1, p_2,..., p_n)$ and $q = (q_1, q_2,..., q_n)$ are two points in Euclidean n-space, then the distance from p to q is given by Equation 7-1. SPSS computes this value.

$$d(p,q) = \sqrt{(p_1 - q_1)^2 + (p_2 - q_2)^2 + \cdots (p_n - q_n)^2} = \sqrt{\sum_{i=1}^{n}(p_i - q_i)^2} \qquad (7\text{-}1)$$

7.2.3.3 Economic Factors (Difference in Population and Employment)

To reflect economic factors in the gravity model, the difference in population (O) and the difference in employment (M) were included in the model as production and attraction factors. It was assumed that the difference in population ($\Delta O_{ij} = O_i - O_j$) between zones i and j and the difference in the level of employment as measured in number of employees ($\Delta M_{ij} = M_i - M_j$) between zones i and j would contribute to the production and attraction of commodities between zones i and j. The rationale of using these factors is explained in Figure 7-1. When ΔO_{ij} is positive, commodity flows from zone j to zone i because there are more consumers in zone i (commodity is attracted to zone i). Similarly, when ΔM_{ij} is positive, more products are produced in zone i than zone j. Thus, commodity flows out from zone i to zone j.

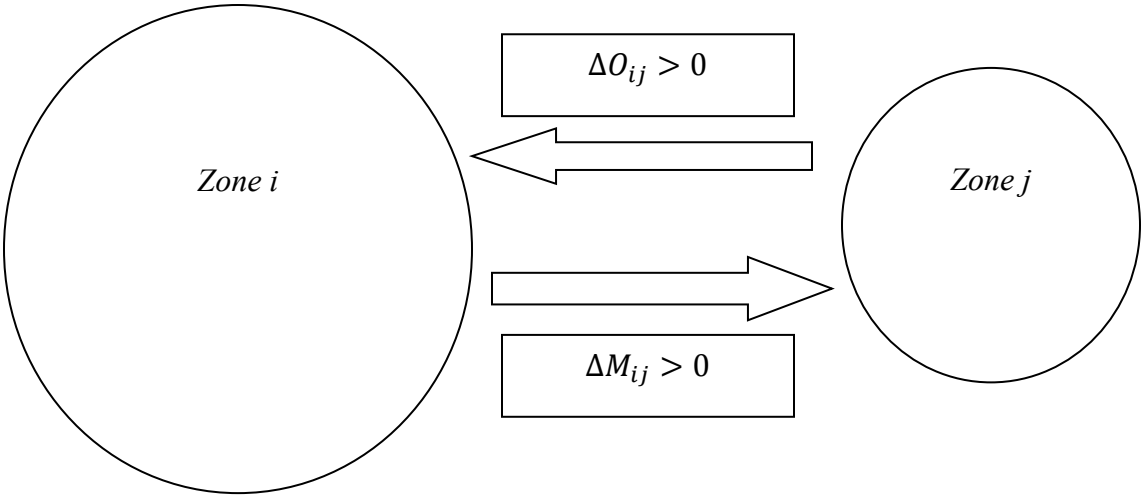


Figure 7-1: Relationship Between the Differences in Population and in Employment and Direction of Commodity Flow

7.2.4 Commodity Flow Distribution Model

Based on the concept and the contributing factors explained in the previous section, a commodity flow distribution model in the form of a gravity model was developed. Equation 7-2 shows the amount of commodity exchange between zones *i* and *j* within a state.

$$C_{ij} = \frac{C_i C_j f_{ij} U_{ij} N_{ij} K_{ij}}{\sum_{n=1}^{m} C_j f_{ij} U_{ij} N_{ij} K_{ij}} \tag{7-2}$$

where,

C_{ij} = commodity flow (thousand tons) from production zone *i* to attraction zone *j,*

C_i = commodity flow (thousand tons) produced in zone *i,*

C_j = commodity flow (thousand tons) attracted to zone *j,*

f_{ij} = physical friction factor, a function of the physical distance (P_{ij}) (miles) between production zone *i* and attraction zone *j,*

U_{ij} = statistical friction factor, a function of the Euclidean distance (u_{ij}) between production zone *i* and attraction zone *j,*

N_{ij} = economic factor, a function consisting of the difference between the difference in employment (ΔM_{ij}) and the difference in population (ΔO_{ij}) between zones *i* and *j*, and

K_{ij} = adjustment factor for commodity flow interchange between zone *i* and zone *j*. Assumed $K_{ij} = 1$ during parameter calibration step.

7.2.4.1 Physical Friction Factor

The physical friction factor, often known as a travel impedance factor and denoted f_{ij}, can have the following form outlined in Equation 7-3, adapted from (Meyer and Miller 2001):

$$f_{ij} = e^{-aP_{ij}} \tag{7-3}$$

where,

P_{ij} = physical distance between zones *i* and *j,* and

a = model parameter.

7.2.4.2 Statistical Friction Factor (Euclidean distance)

The Euclidean distance, denoted u_{ij}, between zones *i* and *j* was estimated by the SPSS statistical software (SPSS Inc. 2004) in this study using the factors determined as most influential in commodity generation estimation, including population, Paid Employees for Pay Period Including March 12, First-quarter Payroll, Annual Payroll, Employment Data by Area and Industry, Number of Jobs, and Wage. In the model, the statistical friction factor denoted as u_{ij}, can have the form, shown in Equation 7-4. In determining Euclidean distance, raw data were transformed using a natural log transformation because of the large difference in values among these factors and to make the data set as normally distributed as possible.

$$U_{ij} = e^{-bu_{ij}} \quad (7\text{-}4)$$

where,

u_{ij} = Euclidean distance between zones *i* and *j*, and

b = model parameter.

7.2.4.3 Economic Factors

As the economic factors, the difference of population ($\Delta O_{ij} = O_i - O_j$) between zones *i* and *j* and the difference of employment ($\Delta M_{ij} = M_i - M_j$) between zones *i* and *j* were used. In the model, the economic factor, which is a commodity flow indicator and denoted N_{ij}, was assumed to have the form outlined in Equation 7-5:

$$N_{ij} = e^{c\Delta M_{ij} - d\Delta O_{ij}} \quad (7\text{-}5)$$

where,

ΔM_{ij} = difference in employment (number of people) between zones *i* and *j*,

ΔO_{ij} = difference in population (number of people) between zones *i* and *j*,

c and *d* = model parameters

7.3 Application of the Model

Commodity data obtained from the CFS website (BTS and the U.S. Census Bureau 2009) were classified into three groups: 2002 commodity production from Utah (CFS2P = 109,672 thousand tons), 2002 commodity attraction to Utah (CFS2A = 81,892 thousand tons), and 2002 commodity distributed within Utah (CFS2I = 61,626 thousand tons).

The statewide commodity flow distribution model presented in the previous section was applied to the state of Utah for distributing the total amount of within-Utah commodities (CFS2I)

into each county in Utah. This section contains discussion on data collection, determination of model parameters, and results of the initial run of the model.

7.3.1 Data Collection

Data necessary for this research were collected from commodity- and freight-related websites open to the public, including the FAF (FAF 2009), the CFS (BTS and U.S Census Bureau 2009), and the official website of the state of Utah (Utah State 2009). The CFS website provides results of the commodity flow survey conducted by BTS and the U.S. Census Bureau, including shipment characteristics by mode of transportation for the origin state in 2002.

The 2002 CBP data were drawn from the FAF website (FAF 2009). The 2002 Utah social and economic characteristics of Utah including employment, number of jobs, wages and population were obtained from the official website of the state of Utah (Utah State 2009).

CFS data are state-level aggregated values. It is necessary to allocate them to the counties within a state. To run the model county-level commodity values must be known. Previous research studies found that number of employment was closely related to the amount of commodity flow generated (Fisher et al. 2000, Iding et al. 2002). Hence, the state-level aggregate commodity flow in Utah was allocated to each county in Utah using the number of employees.

Statewide commodity flow totals produced from (production), attracted to (attraction), and distributed within (within) Utah were allocated to each country by two-digit standard industrial classification (SIC) code using the proportion of the county total employment to the statewide total employment.

7.3.2 Determination of Model Parameters

By using the collected data, all factor values were determined: physical distance, Euclidean distance, difference in population, and difference in employment between zones *i* and *j*. Since physical distance and Euclidean distance values were too large compared to the economic factor values, they were scaled down by a factor of 100 (one hundredth) to make them compatible to the economic factor values when used in the distribution model. For the employment and population data, log-transformed values were used. Figure 7-2 through Figure 7-5 show the reduced data of each factor.

7.3.3 Results of an Initial Run of the Model

With all input data for the model ready, an initial run of the enhanced gravity model with composite friction factors was applied to the within-Utah commodity flow with all model parameters and K_{ij} values set to 1 to investigate how the model performs. Figure 7-6 shows the result of this initial model run. With the gravity model framework, production totals were correct, but as expected, attraction totals were unrealistic. Hence, the parameters needed to be calibrated to the within-Utah commodity flow condition.

PFF/100	Beaver	Box Elder	Cache	Carbon	Daggett	Davis	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Millard	Morgan	Piute	Rich	Salt Lake	San Juan	Sanpete	Sevier	Summit	Tooele	Uintah	Utah	Wasatch	Washingto	Wayne	Weber
Beaver	0	2.1876	2.4555	1.6779	2.6441	1.9150	2.0133	1.4370	1.0344	2.0240	0.3452	0.9607	1.0439	0.5002	2.0842	0.6009	2.4962	1.7427	1.9352	1.1360	0.8190	2.1171	1.4463	2.3336	1.4781	1.7547	0.7583	1.2640	2.1314
Box Elder	2.1876	0	0.7052	1.8400	1.9096	0.6235	1.6240	2.1489	2.6785	2.5506	2.5325	1.2660	2.9952	1.6912	0.8380	2.2576	0.9529	0.8437	3.2071	1.6814	2.0314	1.1939	0.7413	2.0976	1.2174	1.2938	2.9387	2.4919	0.6301
Cache	2.4555	0.7052	0	1.5557	1.2968	0.5407	1.2002	1.9617	2.6769	2.2124	2.7924	1.4982	3.0668	1.9647	0.4463	2.3482	0.2650	0.7350	3.0121	1.6250	2.0556	0.7180	1.1386	1.6021	1.1080	1.0072	3.2094	2.3895	0.3248
Carbon	1.6779	1.8400	1.5557	0	1.0285	1.2260	0.4574	0.4540	1.3217	0.7131	1.9091	1.1683	1.7774	1.3994	1.1225	1.2262	1.4134	0.9963	1.4598	0.5595	0.9005	0.8649	1.4539	0.6557	0.6596	0.5628	2.2724	0.9301	1.3192
Daggett	2.6441	1.9096	1.2968	1.0285	0	1.3615	0.6308	1.4509	2.3360	1.3164	2.9077	1.9113	2.7967	2.2781	1.0870	2.2470	1.0394	1.2737	2.2585	1.5126	1.9160	0.7574	1.9234	0.5264	1.2543	0.9528	3.2866	1.9201	1.2812
Davis	1.9150	0.6235	0.5407	1.2260	1.3615	0	1.0047	1.5667	2.1953	1.9325	2.2527	0.9576	2.5627	1.4241	0.2887	1.8335	0.6319	0.2437	2.6310	1.1518	1.5579	0.6090	0.6519	1.4862	0.6443	0.6720	2.6697	1.9506	0.2191
Duchesne	2.0133	1.6240	1.2002	0.4574	0.6308	1.0047	0	0.9110	1.7741	1.0170	2.2799	1.3146	2.2256	1.6550	0.8125	1.6321	1.0160	0.8275	1.8762	0.8835	1.2991	0.4822	1.4278	0.4931	0.6683	0.3921	2.6637	1.3875	1.0278
Emery	1.4370	2.1489	1.9617	0.4540	1.4509	1.5667	0.9110	0	0.8854	0.6074	1.6066	1.2156	1.3471	1.2892	1.5177	0.8945	1.8434	1.3241	1.0644	0.5366	0.6183	1.3001	1.6354	1.0017	0.9322	0.9548	1.9308	0.4773	1.6962
Garfield	1.0344	2.6785	2.6769	1.3217	2.3360	2.1953	1.7741	0.8854	0	1.2786	1.0072	1.4669	0.4629	1.2299	2.2358	0.4990	2.6120	1.9601	0.9091	1.0520	0.6472	2.0981	2.0073	1.8779	1.5696	1.7169	1.1967	0.4374	2.3727
Grand	2.0240	2.5506	2.2124	0.7131	1.3164	1.9325	1.0170	0.6074	1.2786	0	2.1576	1.7884	1.7208	1.8962	1.8008	1.4499	2.0326	1.7075	0.9455	1.1083	1.2131	1.4959	2.1467	0.7901	1.3676	1.2616	2.4401	0.8511	2.0078
Iron	0.3452	2.5325	2.7924	1.9091	2.9077	2.2527	2.2799	1.6066	1.0072	2.1576	0	1.3024	0.8640	0.8450	2.4121	0.7129	2.8240	2.0732	1.9107	1.3966	1.0124	2.4238	1.7912	2.5588	1.7875	2.0515	0.4170	1.3366	2.4678
Juab	0.9607	1.2660	1.4982	1.1683	1.9113	0.9576	1.3146	1.2156	1.4669	1.7884	1.3024	0	1.7393	0.4665	1.1508	1.0078	1.5585	0.8067	2.1546	0.6827	0.8429	1.2560	0.5471	1.7548	0.6571	0.9589	1.7184	1.3880	1.1757
Kane	1.0439	2.9952	3.0668	1.7774	2.7967	2.5627	2.2256	1.3471	0.4629	1.7208	0.8640	1.7393	0	1.4001	2.6338	0.7381	3.0231	2.3369	1.1665	1.4531	1.0115	2.5255	2.2858	2.3408	1.9620	2.1396	0.8889	0.8968	2.7532
Millard	0.5002	1.6912	1.9647	1.3994	2.2781	1.4241	1.6550	1.2892	1.2299	1.8962	0.8450	0.4665	1.4001	0	1.6101	0.7313	2.0202	1.2659	2.0467	0.8420	0.7323	1.6815	0.9505	2.0403	1.0501	1.3452	1.2581	1.2928	1.6420
Morgan	2.0842	0.8380	0.4463	1.1225	1.0870	0.2887	0.8125	1.5177	2.2358	1.8008	2.4121	1.1508	2.6338	1.6101	0	1.9246	0.4121	0.3443	2.5725	1.1852	1.6226	0.3564	0.9276	1.2668	0.6718	0.5653	2.8275	1.9432	0.2165
Piute	0.6009	2.2576	2.3482	1.2262	2.2470	1.8335	1.6321	0.8945	0.4990	1.4499	0.7129	1.0078	0.7381	0.7313	1.9246	0	2.3246	1.6140	1.3567	0.7756	0.3332	1.8569	1.5547	1.8639	1.2561	1.4699	1.0479	0.6632	2.0299
Rich	2.4962	0.9529	0.2650	1.4134	1.0394	0.6319	1.0160	1.8434	2.6120	2.0326	2.8240	1.5585	3.0231	2.0202	0.4121	2.3246	0	0.7546	2.8720	1.5701	2.0149	0.5488	1.2787	1.3774	1.0685	0.9002	3.2393	2.2927	0.4274
Salt Lake	1.7427	0.8437	0.7350	0.9963	1.2737	0.2437	0.8275	1.3241	1.9601	1.7075	2.0732	0.8067	2.3369	1.2659	0.3443	1.6140	0.7546	0	2.3883	0.9123	1.3278	0.5250	0.6516	1.3195	0.4011	0.4597	2.4894	1.7077	0.4164
San Juan	1.9352	3.2071	3.0121	1.4598	2.2585	2.6310	1.8762	1.0644	0.9091	0.9455	1.9107	2.1546	1.1665	2.0467	2.5725	1.3567	2.8720	2.3883	0	1.5415	1.3342	2.3232	2.6436	1.7333	1.9939	2.0072	2.0434	0.7688	2.7574
Sanpete	1.1360	1.6814	1.6250	0.5595	1.5126	1.1518	0.8835	0.5366	1.0520	1.1083	1.3966	0.6827	1.4531	0.8420	1.1852	0.7756	1.5701	0.9123	1.5415	0	0.4497	1.0832	1.1092	1.2097	0.5177	0.6955	1.7845	0.8105	1.3219
Sevier	0.8190	2.0314	2.0556	0.9005	1.9160	1.5579	1.2991	0.6183	0.6472	1.2131	1.0124	0.8429	1.0115	0.7323	1.6226	0.3332	2.0149	1.3278	1.3342	0.4497	0	1.5328	1.3711	1.5467	0.9507	1.1451	1.3727	0.5681	1.7436
Summit	2.1171	1.1939	0.7180	0.8649	0.7574	0.6090	0.4822	1.3001	2.0981	1.4959	2.4238	1.2560	2.5255	1.6815	0.3564	1.8569	0.5488	0.5250	2.3232	1.0832	1.5328	0	1.1763	0.9130	0.6390	0.3878	2.8306	1.7578	0.5707
Tooele	1.4463	0.7413	1.1386	1.4539	1.9234	0.6519	1.4278	1.6354	2.0073	2.1467	1.7912	0.5471	2.2858	0.9505	0.9276	1.5547	1.2787	0.6516	2.6436	1.1092	1.3711	1.1763	0	1.9166	0.8027	1.0359	2.1984	1.8891	0.8525
Uintah	2.3336	2.0976	1.6021	0.6557	0.5264	1.4862	0.4931	1.0017	1.8779	0.7901	2.5588	1.7548	2.3408	2.0403	1.2668	1.8639	1.3774	1.3195	1.7333	1.2097	1.5467	0.9130	1.9166	0	1.1366	0.8817	2.9116	1.4479	1.4828
Utah	1.4781	1.2174	1.1080	0.6596	1.2543	0.6443	0.6683	0.9322	1.5696	1.3676	1.7875	0.6571	1.9620	1.0501	0.6718	1.2561	1.0685	0.4011	1.9939	0.5177	0.9507	0.6390	0.8027	1.1366	0	0.3022	2.1969	1.3066	0.8048
Wasatch	1.7547	1.2938	1.0072	0.5628	0.9528	0.6720	0.3921	0.9548	1.7169	1.2616	2.0515	0.9589	2.1396	1.3452	0.5653	1.4699	0.9002	0.4597	2.0072	0.6955	1.1451	0.3878	1.0359	0.8817	0.3022	0	2.4542	1.3935	0.7568
Washingto	0.7583	2.9387	3.2094	2.2724	3.2866	2.6697	2.6637	1.9308	1.1967	2.4401	0.4170	1.7184	0.8889	1.2581	2.8275	1.0479	3.2393	2.4894	2.0434	1.7845	1.3727	2.8306	2.1984	2.9116	2.1969	2.4542	0	1.5927	2.8848
Wayne	1.2640	2.4919	2.3895	0.9301	1.9201	1.9506	1.3875	0.4773	0.4374	0.8511	1.3366	1.3880	0.8968	1.2928	1.9432	0.6632	2.2927	1.7077	0.7688	0.8105	0.5681	1.7578	1.8891	1.4479	1.3066	1.3935	1.5927	0	2.1045
Weber	2.1314	0.6301	0.3248	1.3192	1.2812	0.2191	1.0278	1.6962	2.3727	2.0078	2.4678	1.1757	2.7532	1.6420	0.2165	2.0299	0.4274	0.4164	2.7574	1.3219	1.7436	0.5707	0.8525	1.4828	0.8048	0.7568	2.8848	2.1045	0

Figure 7-2: Physical Distance Matrix (One Hundredth of Raw Data Value)

ED/100	Beaver	Box Elder	Cache	Carbon	Daggett	Davis	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Millard	Morgan	Piute	Rich	Salt Lake	San Juan	Sanpete	Sevier	Summit	Tooele	Uintah	Utah	Wasatch	Washington	Wayne	Weber
Beaver		0.071	0.090	0.048	0.056	0.113	0.032	0.030	0.005	0.023	0.057	0.014	0.008	0.027	0.008	0.059	0.031	0.166	0.018	0.034	0.041	0.070	0.056	0.051	0.129	0.033	0.089	0.021	0.111
Box Elder	0.071		0.021	0.024	0.126	0.043	0.039	0.044	0.073	0.049	0.016	0.058	0.065	0.045	0.066	0.130	0.102	0.095	0.056	0.038	0.030	0.008	0.017	0.021	0.059	0.039	0.020	0.092	0.041
Cache	0.090	0.021		0.043	0.145	0.023	0.058	0.064	0.092	0.068	0.033	0.077	0.083	0.065	0.086	0.149	0.121	0.075	0.074	0.056	0.049	0.022	0.035	0.039	0.039	0.058	0.003	0.111	0.021
Carbon	0.048	0.024	0.043		0.103	0.066	0.015	0.021	0.049	0.025	0.012	0.034	0.041	0.022	0.043	0.106	0.078	0.119	0.032	0.016	0.007	0.023	0.011	0.006	0.082	0.016	0.042	0.068	0.064
Daggett	0.056	0.126	0.145	0.103		0.168	0.088	0.083	0.054	0.078	0.113	0.069	0.062	0.082	0.061	0.012	0.028	0.221	0.072	0.090	0.097	0.125	0.111	0.106	0.184	0.088	0.144	0.035	0.166
Davis	0.113	0.043	0.023	0.066	0.168		0.081	0.087	0.114	0.090	0.055	0.100	0.106	0.087	0.108	0.171	0.143	0.053	0.096	0.079	0.072	0.044	0.057	0.062	0.017	0.080	0.025	0.134	0.003
Duchesne	0.032	0.039	0.058	0.015	0.088	0.081		0.012	0.034	0.011	0.025	0.020	0.026	0.008	0.028	0.091	0.063	0.133	0.017	0.007	0.009	0.038	0.024	0.019	0.097	0.003	0.056	0.053	0.079
Emery	0.030	0.044	0.064	0.021	0.083	0.087	0.012		0.031	0.013	0.033	0.016	0.024	0.006	0.024	0.087	0.059	0.139	0.019	0.017	0.017	0.044	0.030	0.026	0.103	0.013	0.063	0.050	0.085
Garfield	0.005	0.073	0.092	0.049	0.054	0.114	0.034	0.031		0.024	0.059	0.016	0.009	0.028	0.010	0.058	0.029	0.167	0.019	0.036	0.043	0.071	0.058	0.053	0.131	0.035	0.090	0.020	0.113
Grand	0.023	0.049	0.068	0.025	0.078	0.090	0.011	0.013	0.024		0.035	0.012	0.016	0.009	0.019	0.082	0.053	0.143	0.011	0.015	0.019	0.047	0.035	0.029	0.107	0.011	0.066	0.044	0.089
Iron	0.057	0.016	0.033	0.012	0.113	0.055	0.025	0.033	0.059	0.035		0.045	0.051	0.033	0.053	0.116	0.088	0.108	0.041	0.024	0.017	0.014	0.008	0.007	0.072	0.025	0.031	0.079	0.054
Juab	0.014	0.058	0.077	0.034	0.069	0.100	0.020	0.016	0.016	0.012	0.045		0.009	0.013	0.009	0.072	0.044	0.153	0.009	0.023	0.028	0.057	0.043	0.038	0.117	0.021	0.076	0.034	0.098
Kane	0.008	0.065	0.083	0.041	0.062	0.106	0.026	0.024	0.009	0.016	0.051	0.009		0.021	0.008	0.066	0.037	0.159	0.012	0.028	0.035	0.063	0.050	0.044	0.123	0.026	0.082	0.028	0.104
Millard	0.027	0.045	0.065	0.022	0.082	0.087	0.008	0.006	0.028	0.009	0.033	0.013	0.021		0.021	0.085	0.057	0.140	0.014	0.013	0.016	0.045	0.030	0.026	0.104	0.010	0.063	0.047	0.086
Morgan	0.008	0.066	0.086	0.043	0.061	0.108	0.028	0.024	0.010	0.019	0.053	0.009	0.008	0.021		0.064	0.036	0.161	0.015	0.031	0.037	0.065	0.051	0.046	0.125	0.028	0.084	0.027	0.106
Piute	0.059	0.130	0.149	0.106	0.012	0.171	0.091	0.087	0.058	0.082	0.116	0.072	0.066	0.085	0.064		0.029	0.224	0.075	0.093	0.100	0.129	0.115	0.110	0.188	0.092	0.147	0.038	0.170
Rich	0.031	0.102	0.121	0.078	0.028	0.143	0.063	0.059	0.029	0.053	0.088	0.044	0.037	0.057	0.036	0.029		0.196	0.048	0.065	0.072	0.100	0.087	0.081	0.160	0.063	0.119	0.011	0.142
Salt Lake	0.166	0.095	0.075	0.119	0.221	0.053	0.133	0.139	0.167	0.143	0.108	0.153	0.159	0.140	0.161	0.224	0.196		0.149	0.132	0.125	0.096	0.110	0.115	0.036	0.133	0.077	0.187	0.055
San Juan	0.018	0.056	0.074	0.032	0.072	0.096	0.017	0.019	0.019	0.011	0.041	0.009	0.012	0.014	0.015	0.075	0.048	0.149		0.018	0.026	0.054	0.040	0.035	0.113	0.018	0.072	0.038	0.095
Sanpete	0.034	0.038	0.056	0.016	0.090	0.079	0.007	0.017	0.036	0.015	0.024	0.023	0.028	0.013	0.031	0.093	0.065	0.132	0.018		0.010	0.037	0.023	0.018	0.095	0.007	0.055	0.056	0.077
Sevier	0.041	0.030	0.049	0.007	0.097	0.072	0.009	0.017	0.043	0.019	0.017	0.028	0.035	0.016	0.037	0.100	0.072	0.125	0.026	0.010		0.029	0.016	0.010	0.088	0.009	0.048	0.062	0.070
Summit	0.070	0.008	0.022	0.023	0.125	0.044	0.038	0.044	0.071	0.047	0.014	0.057	0.063	0.045	0.065	0.129	0.100	0.096	0.054	0.037	0.029		0.019	0.019	0.060	0.037	0.020	0.091	0.042
Tooele	0.056	0.017	0.035	0.011	0.111	0.057	0.024	0.030	0.058	0.035	0.008	0.043	0.050	0.030	0.051	0.115	0.087	0.110	0.040	0.023	0.016	0.019		0.009	0.074	0.025	0.034	0.077	0.056
Uintah	0.051	0.021	0.039	0.006	0.106	0.062	0.019	0.026	0.053	0.029	0.007	0.038	0.044	0.026	0.046	0.110	0.081	0.115	0.035	0.018	0.010	0.019	0.009		0.079	0.018	0.038	0.072	0.060
Utah	0.129	0.059	0.039	0.082	0.184	0.017	0.097	0.103	0.131	0.107	0.072	0.117	0.123	0.104	0.125	0.188	0.160	0.036	0.113	0.095	0.088	0.060	0.074	0.079		0.097	0.041	0.150	0.018
Wasatch	0.033	0.039	0.058	0.016	0.088	0.080	0.003	0.013	0.035	0.011	0.025	0.021	0.026	0.010	0.028	0.092	0.063	0.133	0.018	0.007	0.009	0.037	0.025	0.018	0.097		0.056	0.054	0.079
Washington	0.089	0.020	0.003	0.042	0.144	0.025	0.056	0.063	0.090	0.066	0.031	0.076	0.082	0.063	0.084	0.147	0.119	0.077	0.072	0.055	0.048	0.020	0.034	0.038	0.041	0.056		0.110	0.023
Wayne	0.021	0.092	0.111	0.068	0.035	0.134	0.053	0.050	0.020	0.044	0.079	0.034	0.028	0.047	0.027	0.038	0.011	0.187	0.038	0.056	0.062	0.091	0.077	0.072	0.150	0.054	0.110		0.132
Weber	0.111	0.041	0.021	0.064	0.166	0.003	0.079	0.085	0.113	0.089	0.054	0.098	0.104	0.086	0.106	0.170	0.142	0.055	0.095	0.077	0.070	0.042	0.056	0.060	0.018	0.079	0.023	0.132	

Figure 7-3: Euclidean Distance Matrix (One Hundredth of Values From SPSS Analysis)

LN-dEMPBIT	Beaver	Box Elder	Cache	Carbon	Daggett	Davis	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Millard	Morgan	Piute	Rich	Salt Lake	San Juan	Sanpete	Sevier	Summit	Tooele	Uintah	Utah	Wasatch	Washington	Wayne	Weber
Beaver		9.959	10.858	9.033	7.784	11.737	8.542	7.710	3.219	7.907	9.715	6.924	6.524	8.075	4.663	7.787	7.530	13.390	7.809	8.892	8.872	10.001	9.511	9.297	12.208	8.522	10.798	7.193	11.565
Box Elder	9.959		10.336	9.454	10.066	11.553	9.681	9.847	9.958	9.821	8.427	9.910	9.926	9.794	9.954	10.067	10.043	13.357	9.835	9.537	9.547	6.823	8.939	9.233	12.097	9.688	10.232	10.020	11.341
Cache	10.858	10.336		10.683	10.903	11.201	10.754	10.814	10.858	10.805	10.474	10.839	10.845	10.794	10.856	10.904	10.894	13.307	10.810	10.707	10.711	10.306	10.557	10.623	11.908	10.757	8.025	10.884	10.885
Carbon	9.033	9.454	10.683		9.285	11.668	8.086	8.723	9.030	8.641	9.012	8.904	8.948	8.549	9.020	9.286	9.234	13.377	8.685	7.002	7.127	9.524	8.545	7.837	12.166	8.117	10.610	9.180	11.482
Daggett	7.784	10.066	10.903	9.285		11.756	8.926	8.441	7.794	8.540	9.851	8.137	8.034	8.633	7.827	1.946	6.288	13.393	8.490	9.178	9.162	10.105	9.675	9.496	12.220	8.912	10.846	6.977	11.587
Davis	11.737	11.553	11.201	11.668	11.756		11.696	11.720	11.737	11.716	11.595	11.729	11.732	11.711	11.737	11.757	11.752	13.177	11.718	11.678	11.679	11.544	11.623	11.646	11.229	11.697	11.242	11.748	9.896
Duchesne	8.542	9.681	10.754	8.086	8.926	11.696		7.970	8.537	7.787	9.345	8.321	8.399	7.555	8.521	8.927	8.852	13.382	7.886	7.674	7.603	9.737	9.035	8.663	12.183	4.625	10.687	8.772	11.515
Emery	7.710	9.847	10.814	8.723	8.441	11.720	7.970		7.699	6.182	9.571	7.102	7.346	6.891	7.662	8.442	8.318	13.386	5.447	8.526	8.497	9.895	9.331	9.068	12.197	7.934	10.751	8.178	11.543
Garfield	3.219	9.958	10.858	9.030	7.794	11.737	8.537	7.699		7.897	9.714	6.899	6.486	8.067	4.394	7.797	7.544	13.390	7.799	8.889	8.868	10.000	9.510	9.295	12.208	8.517	10.797	7.212	11.565
Grand	7.907	9.821	10.805	8.641	8.540	11.716	7.787	6.182	7.897		9.536	7.438	7.618	6.213	7.867	8.542	8.429	13.385	5.529	8.425	8.393	9.870	9.287	9.011	12.195	7.744	10.741	8.305	11.539
Iron	9.715	8.427	10.474	9.012	9.851	11.595	9.345	9.571	9.714	9.536		9.652	9.673	9.500	9.709	9.851	9.822	13.364	9.554	9.137	9.153	8.610	8.025	8.642	12.122	9.354	10.384	9.793	11.394
Juab	6.924	9.910	10.839	8.904	8.137	11.729	8.321	7.102	6.899	7.438	9.652		5.814	7.695	6.813	8.139	7.966	13.388	7.277	8.742	8.718	9.954	9.433	9.199	12.203	8.296	10.777	7.760	11.555
Kane	6.524	9.926	10.845	8.948	8.034	11.732	8.399	7.346	6.486	7.618	9.673	5.814		7.837	6.354	8.036	7.842	13.389	7.485	8.794	8.772	9.970	9.460	9.233	12.205	8.376	10.784	7.606	11.558
Millard	8.075	9.794	10.794	8.549	8.633	11.711	7.555	6.891	8.067	6.213	9.500	7.695	7.837		8.042	8.635	8.533	13.385	6.621	8.309	8.273	9.844	9.240	8.948	12.192	7.500	10.730	8.422	11.534
Morgan	4.663	9.954	10.856	9.020	7.827	11.737	8.521	7.662	4.394	7.867	9.709	6.813	6.354	8.042		7.830	7.586	13.389	7.765	8.878	8.857	9.997	9.504	9.287	12.208	8.500	10.796	7.270	11.564
Piute	7.787	10.067	10.904	9.286	1.946	11.757	8.927	8.442	7.797	8.542	9.851	8.139	8.036	8.635	7.830		6.301	13.393	8.491	9.178	9.163	10.105	9.676	9.497	12.220	8.913	10.846	6.984	11.587
Rich	7.530	10.043	10.894	9.234	6.288	11.752	8.852	8.318	7.544	8.429	9.822	7.966	7.842	8.533	7.586	6.301		13.392	8.373	9.120	9.104	10.083	9.641	9.455	12.218	8.837	10.835	6.280	11.582
Salt Lake	13.390	13.357	13.307	13.377	13.393	13.177	13.382	13.386	13.390	13.385	13.364	13.388	13.389	13.385	13.389	13.393	13.392		13.386	13.378	13.379	13.355	13.369	13.373	13.023	13.382	13.312	13.392	13.214
San Juan	7.809	9.835	10.810	8.685	8.490	11.718	7.886	5.447	7.799	5.529	9.554	7.277	7.485	6.621	7.765	8.491	8.373	13.386		8.479	8.448	9.883	9.310	9.041	12.196	7.847	10.746	8.241	11.541
Sanpete	8.892	9.537	10.707	7.002	9.178	11.678	7.674	8.526	8.889	8.425	9.137	8.742	8.794	8.309	8.878	9.178	9.120	13.378	8.479		4.984	9.601	8.739	8.197	12.172	7.720	10.637	9.060	11.493
Sevier	8.872	9.547	10.711	7.127	9.162	11.679	7.603	8.497	8.868	8.393	9.153	8.718	8.772	8.273	8.857	9.163	9.104	13.379	8.448	4.984		9.611	8.762	8.237	12.172	7.653	10.640	9.043	11.495
Summit	10.001	6.823	10.306	9.524	10.105	11.544	9.737	9.895	10.000	9.870	8.610	9.954	9.970	9.844	9.997	10.105	10.083	13.355	9.883	9.601	9.611		9.053	9.319	12.092	9.743	10.198	10.060	11.330
Tooele	9.511	8.939	10.557	8.545	9.675	11.623	9.035	9.331	9.510	9.287	8.025	9.433	9.460	9.240	9.504	9.676	9.641	13.369	9.310	8.739	8.762	9.053		7.866	12.139	9.047	10.474	9.605	11.428
Uintah	9.297	9.233	10.623	7.837	9.496	11.646	8.663	9.068	9.295	9.011	8.642	9.199	9.233	8.948	9.287	9.497	9.455	13.373	9.041	8.197	8.237	9.319	7.866		12.153	8.680	10.545	9.412	11.456
Utah	12.208	12.097	11.908	12.166	12.220	11.229	12.183	12.197	12.208	12.195	12.122	12.203	12.205	12.192	12.208	12.220	12.218	13.023	12.196	12.172	12.172	12.092	12.139	12.153		12.183	11.929	12.215	11.463
Wasatch	8.522	9.688	10.757	8.117	8.912	11.697	4.625	7.934	8.517	7.744	9.354	8.296	8.376	7.500	8.500	8.913	8.837	13.382	7.847	7.720	7.653	9.743	9.047	8.680	12.183		10.689	8.757	11.516
Washington	10.798	10.232	8.025	10.610	10.846	11.242	10.687	10.751	10.797	10.741	10.384	10.777	10.784	10.730	10.796	10.846	10.835	13.312	10.746	10.637	10.640	10.198	10.474	10.545	11.929	10.689		10.825	10.941
Wayne	7.193	10.020	10.884	9.180	6.977	11.748	8.772	8.178	7.212	8.305	9.793	7.760	7.606	8.422	7.270	6.984	6.280	13.392	8.241	9.060	9.043	10.060	9.605	9.412	12.215	8.757	10.825		11.577
Weber	11.565	11.341	10.885	11.482	11.587	9.896	11.515	11.543	11.565	11.539	11.394	11.555	11.558	11.534	11.564	11.587	11.582	13.214	11.541	11.493	11.495	11.330	11.428	11.456	11.463	11.516	10.941	11.577	

Figure 7-4: Difference in Employment Matrix (Log Transformed Values)

LN-dPOP	Beaver	Box Elder	Cache	Carbon	Daggett	Davis	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Millard	Morgan	Piute	Rich	Salt Lake	San Juan	Sanpete	Sevier	Summit	Tooele	Uintah	Utah	Wasatch	Washington	Wayne	Weber
Beaver		10.533	11.398	9.516	8.588	12.424	9.056	8.356	7.430	7.688	10.304	7.766	5.790	8.776	7.211	8.492	8.351	13.734	8.979	9.811	9.469	10.164	10.615	9.888	12.898	9.323	11.487	8.238	12.191
Box Elder	10.533		10.852	10.084	10.667	12.261	10.274	10.412	10.577	10.473	8.948	10.468	10.541	10.343	10.496	10.655	10.640	13.692	10.295	9.867	10.110	9.357	8.073	9.789	12.800	10.179	11.001	10.629	11.980
Cache	11.398	10.852		11.233	11.457	11.981	11.297	11.349	11.417	11.374	10.991	11.372	11.402	11.323	11.383	11.452	11.445	13.632	11.305	11.170	11.241	11.054	10.788	11.149	12.646	11.264	9.023	11.440	11.589
Carbon	9.516	10.084	11.233		9.849	12.368	8.518	9.140	9.633	9.340	9.697	9.325	9.540	8.868	9.411	9.823	9.787	13.719	8.638	8.447	6.439	9.424	10.210	8.720	12.864	7.776	11.337	9.762	12.120
Daggett	8.588	10.667	11.457	9.849		12.446	9.543	9.172	8.211	8.930	10.469	8.952	8.526	9.380	8.813	6.201	7.034	13.739	9.496	10.069	9.816	10.352	10.739	10.129	12.912	9.715	11.541	7.370	12.218
Davis	12.424	12.261	11.981	12.368	12.446		12.389	12.407	12.431	12.416	12.297	12.415	12.426	12.398	12.419	12.444	12.441	13.419	12.392	12.348	12.371	12.314	12.246	12.342	11.924	12.378	11.927	12.440	10.854
Duchesne	9.056	10.274	11.297	8.518	9.543	12.389		8.370	9.236	8.762	9.965	8.734	9.094	7.648	8.884	9.507	9.458	13.724	6.461	9.176	8.384	9.763	10.379	9.317	12.877	7.871	11.395	9.422	12.147
Emery	8.356	10.412	11.349	9.140	9.172	12.407	8.370		8.690	7.636	10.150	7.548	8.430	7.705	7.973	9.119	9.047	13.729	8.210	9.545	9.070	9.985	10.504	9.645	12.888	8.844	11.443	8.992	12.170
Garfield	7.430	10.577	11.417	9.633	8.211	12.431	9.236	8.690		8.261	10.358	8.305	7.215	9.007	8.020	8.068	7.843	13.735	9.171	9.900	9.591	10.227	10.655	9.970	12.903	9.463	11.504	7.647	12.200
Grand	7.688	10.473	11.374	9.340	8.930	12.416	8.762	7.636	8.261		10.228	5.165	7.828	8.365	6.720	8.862	8.767	13.731	8.657	9.684	9.284	10.076	10.560	9.771	12.893	9.106	11.465	8.693	12.180
Iron	10.304	8.948	10.991	9.697	10.469	12.297	9.965	10.150	10.358	10.228		10.221	10.314	10.059	10.257	10.455	10.436	13.701	9.995	9.359	9.734	8.265	9.296	9.224	12.821	9.833	11.122	10.423	12.027
Juab	7.766	10.468	11.372	9.325	8.952	12.415	8.734	7.548	8.305	5.165	10.221		7.895	8.323	6.912	8.887	8.794	13.731	8.626	9.673	9.268	10.069	10.555	9.761	12.893	9.086	11.463	8.722	12.179
Kane	5.790	10.541	11.402	9.540	8.526	12.426	9.094	8.430	7.215	7.828	10.314	7.895		8.825	7.427	8.423	8.271	13.734	9.019	9.829	9.494	10.176	10.623	9.905	12.899	9.352	11.491	8.147	12.193
Millard	8.776	10.343	11.323	8.868	9.380	12.398	7.648	7.705	9.007	8.365	10.059	8.323	8.825		8.541	9.337	9.279	13.726	7.283	9.373	8.775	9.877	10.442	9.490	12.882	8.459	11.419	9.236	12.158
Morgan	7.211	10.496	11.383	9.411	8.813	12.419	8.884	7.973	8.020	6.720	10.257	6.912	7.427	8.541		8.737	8.629	13.732	8.791	9.734	9.358	10.110	10.581	9.817	12.895	9.194	11.473	8.544	12.185
Piute	8.492	10.655	11.452	9.823	6.201	12.444	9.507	9.119	8.068	8.862	10.455	8.887	8.423	9.337	8.737		6.463	13.739	9.458	10.048	9.788	10.336	10.728	10.109	12.911	9.685	11.536	6.999	12.216
Rich	8.351	10.640	11.445	9.787	7.034	12.441	9.458	9.047	7.843	8.767	10.436	8.794	8.271	9.279	8.629	6.463		13.738	9.406	10.020	9.752	10.315	10.714	10.083	12.909	9.644	11.530	6.118	12.213
Salt Lake	13.734	13.692	13.632	13.719	13.739	13.419	13.724	13.729	13.735	13.731	13.701	13.731	13.734	13.726	13.732	13.739	13.738		13.725	13.714	13.719	13.705	13.688	13.712	13.165	13.721	13.622	13.738	13.493
San Juan	8.979	10.295	11.305	8.638	9.496	12.392	6.461	8.210	9.171	8.657	9.995	8.626	9.019	7.283	8.791	9.458	9.406	13.725		9.240	8.520	9.799	10.398	9.373	12.878	8.089	11.402	9.368	12.150
Sanpete	9.811	9.867	11.170	8.447	10.069	12.348	9.176	9.545	9.900	9.684	9.359	9.673	9.829	9.373	9.734	10.048	10.020	13.714	9.240		8.573	8.951	10.021	7.288	12.852	8.860	11.280	10.000	12.094
Sevier	9.469	10.110	11.241	6.439	9.816	12.371	8.384	9.070	9.591	9.284	9.734	9.268	9.494	8.775	9.358	9.788	9.752	13.719	8.520	8.573		9.473	10.232	8.818	12.866	7.471	11.345	9.725	12.123
Summit	10.164	9.357	11.054	9.424	10.352	12.314	9.763	9.985	10.227	10.076	8.265	10.069	10.176	9.877	10.110	10.336	10.315	13.705	9.799	8.951	9.473		9.601	8.741	12.831	9.600	11.178	10.300	12.050
Tooele	10.615	8.073	10.788	10.210	10.739	12.246	10.379	10.504	10.655	10.560	9.296	10.555	10.623	10.442	10.581	10.728	10.714	13.688	10.398	10.021	10.232	9.601		9.954	12.791	10.294	10.946	10.704	11.960
Uintah	9.888	9.789	11.149	8.720	10.129	12.342	9.317	9.645	9.970	9.771	9.224	9.761	9.905	9.490	9.817	10.109	10.083	13.712	9.373	7.288	8.818	8.741	9.954		12.848	9.049	11.261	10.064	12.086
Utah	12.898	12.800	12.646	12.864	12.912	11.924	12.877	12.888	12.903	12.893	12.821	12.893	12.899	12.882	12.895	12.911	12.909	13.165	12.878	12.852	12.866	12.831	12.791	12.848		12.870	12.619	12.908	12.219
Wasatch	9.323	10.179	11.264	7.776	9.715	12.378	7.871	8.844	9.463	9.106	9.833	9.086	9.352	8.459	9.194	9.685	9.644	13.721	8.089	8.860	7.471	9.600	10.294	9.049	12.870		11.365	9.614	12.133
Washington	11.487	11.001	9.023	11.337	11.541	11.927	11.395	11.443	11.504	11.465	11.122	11.463	11.491	11.419	11.473	11.536	11.530	13.622	11.402	11.280	11.345	11.178	10.946	11.261	12.619	11.365		11.525	11.509
Wayne	8.238	10.629	11.440	9.762	7.370	12.440	9.422	8.992	7.647	8.693	10.423	8.722	8.147	9.236	8.544	6.999	6.118	13.738	9.368	10.000	9.725	10.300	10.704	10.064	12.908	9.614	11.525		12.210
Weber	12.191	11.980	11.589	12.120	12.218	10.854	12.147	12.170	12.200	12.180	12.027	12.179	12.193	12.158	12.185	12.216	12.213	13.493	12.150	12.094	12.123	12.050	11.960	12.086	12.219	12.133	11.509	12.210	

Figure 7-5: Difference in Population Matrix (Log Transformed Values)

County	Beaver	Box Elder	Cache	Carbon	Daggett	Davis	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Millard	Morgan	Piute	Rich	Salt Lake	San Juan	Sanpete	Sevier	Summit	Tooele	Uintah	Utah	Wasatch	Washington	Wayne	Weber	Production
Beaver	0	2.07	1.61	3.87	1.06	2.33	2.72	4.26	0.18	5.65	13.07	5.73	25.62	10.32	0.34	8.99	1.24	3.70	1.55	4.36	8.20	3.36	2.60	1.80	3.54	2.64	7.58	3.43	2.00	133.83
Box Elder	15.16	0	74.39	21.29	18.46	65.13	27.00	16.34	8.85	9.98	11.96	39.21	6.53	26.20	60.63	13.14	49.43	72.06	6.22	33.16	18.68	6.15	286.93	17.77	35.59	41.57	6.19	10.57	69.47	1068.05
Cache	26.93	170.16	0	68.67	80.12	153.81	97.32	45.51	21.14	34.12	20.84	71.54	14.47	45.65	204.46	28.05	230.92	189.32	16.41	69.11	42.25	133.04	144.61	67.46	89.50	122.31	8.74	27.71	206.21	2430.40
Carbon	8.68	6.53	9.21	0	14.50	10.78	31.99	32.37	10.98	18.76	5.83	15.57	7.10	13.87	16.67	12.18	10.22	18.40	18.62	10.47	63.42	35.93	3.45	16.85	18.71	62.33	3.77	16.27	10.46	503.93
Daggett	0.27	0.64	1.22	1.65	0	0.98	2.36	0.93	0.54	1.51	0.24	0.55	0.31	0.40	1.06	0.01	1.46	1.42	0.32	0.74	0.62	2.90	0.40	2.53	1.07	1.42	0.14	0.86	1.12	27.67
Davis	81.77	312.15	322.27	168.42	134.30	0	208.42	118.79	61.26	81.09	60.90	216.01	42.78	137.08	419.64	83.64	285.52	720.52	41.14	184.48	121.11	297.25	325.97	130.93	318.14	294.26	42.06	76.92	379.41	5666.23
Duchesne	5.19	7.04	11.10	27.22	17.69	11.34	0	17.90	5.48	9.07	3.61	11.70	3.53	11.61	20.17	6.72	12.47	18.26	42.08	6.14	8.32	38.93	4.10	20.93	15.61	1.76	2.18	8.31	11.81	360.29
Emery	6.58	3.45	4.20	22.29	5.64	5.23	14.49	0	8.08	6.83	5.92	10.17	4.67	6.59	8.53	10.36	3.91	8.94	1.16	11.28	16.23	12.96	3.18	10.93	9.68	8.31	3.71	14.23	4.90	232.43
Garfield	0.21	1.37	1.43	5.53	2.40	1.98	3.25	5.91	0	7.52	7.20	2.22	11.99	4.42	0.11	17.41	2.10	3.36	3.99	4.88	9.69	3.63	1.61	2.94	3.63	2.68	5.42	16.31	1.76	134.93
Grand	8.03	1.94	2.90	11.88	8.41	3.29	6.75	6.28	9.45	0	2.80	80.27	7.14	0.87	25.52	7.85	4.44	5.57	0.84	4.63	5.99	8.70	1.58	10.32	5.70	3.59	1.98	13.87	3.24	253.82
Iron	96.72	12.09	9.21	19.23	6.85	12.85	13.98	28.34	47.08	14.57	0	38.33	54.97	61.92	12.80	62.16	7.66	21.00	23.82	50.44	52.03	32.12	12.09	11.18	20.17	20.23	79.57	33.69	11.10	866.20
Juab	4.92	4.61	3.68	5.97	1.85	5.30	5.27	5.66	1.68	48.56	4.46	0	0.66	10.01	8.60	4.87	2.66	8.23	0.90	5.89	7.31	7.26	5.47	2.87	7.01	5.16	2.53	2.79	4.54	178.73
Kane	36.49	1.27	1.23	4.50	1.76	1.74	2.64	4.31	15.11	7.16	10.58	1.09	0	4.51	1.22	15.24	1.53	2.93	3.33	4.05	8.56	3.06	1.52	2.36	3.11	2.17	9.37	11.58	1.53	163.92
Millard	20.65	7.16	5.46	12.37	3.16	7.82	12.17	8.54	7.82	1.22	16.75	23.29	6.34	0	8.37	15.43	4.19	12.27	4.63	10.35	20.17	12.13	7.94	5.19	11.15	6.97	9.44	8.17	6.71	275.87
Morgan	0.24	5.91	8.71	5.30	2.97	8.54	7.54	3.94	0.07	12.81	1.23	7.14	0.61	2.98	0	1.39	5.66	10.76	0.68	3.16	2.90	14.71	3.21	3.98	5.70	6.93	0.69	0.98	9.78	138.51
Piute	1.58	0.32	0.30	0.96	0.01	0.42	0.62	1.18	2.71	0.97	1.48	1.00	1.89	1.36	0.34	0	0.50	0.70	0.56	1.09	2.15	0.68	0.41	0.47	0.73	0.60	0.94	3.03	0.37	27.36
Rich	0.47	2.55	5.21	1.72	2.17	3.07	2.47	0.96	0.70	1.18	0.39	1.17	0.41	0.79	2.99	1.07	0	3.64	0.25	1.05	0.86	5.50	1.16	1.65	1.95	2.26	0.23	1.56	4.01	51.44
Salt Lake	457.67	1217.30	1398.08	1013.87	690.91	2539.61	1182.12	715.08	367.02	484.00	350.84	1183.13	253.98	757.98	1864.20	490.05	1190.35	0	245.18	1096.00	724.36	1648.06	1475.86	738.76	2438.61	1713.33	245.15	463.17	2055.81	29000.49
San Juan	4.11	2.26	2.60	22.01	3.32	3.11	58.47	2.00	9.36	1.57	8.54	2.79	6.20	6.14	2.52	8.49	1.79	5.26	0	9.17	22.30	9.42	2.15	11.43	5.74	9.68	5.84	13.50	2.93	242.68
Sanpete	11.57	12.03	10.96	12.39	7.72	13.97	8.54	19.40	11.46	8.64	18.11	18.20	7.55	13.73	11.77	16.44	7.41	23.55	9.18	0	1.63	58.43	8.36	67.98	25.66	14.81	7.81	15.37	12.65	455.35
Sevier	19.26	6.00	5.93	66.40	5.75	8.11	10.24	24.69	20.14	9.89	16.52	19.98	14.11	23.67	9.53	28.69	5.37	13.76	19.74	1.44	0	19.92	4.75	9.75	14.63	31.28	9.88	22.26	7.19	448.90
Summit	13.61	3.40	32.19	64.87	46.07	34.33	82.60	33.98	12.99	24.80	17.58	34.21	8.71	24.56	83.50	15.54	59.06	54.00	14.39	89.12	34.34	0	24.95	100.11	33.83	107.58	3.09	17.66	37.59	1108.66
Tooele	13.51	203.72	44.89	8.00	8.26	48.29	11.17	10.70	7.38	5.78	8.49	33.02	5.53	20.62	23.40	12.03	15.97	62.03	4.21	16.36	10.50	32.00	0	3.31	39.65	18.21	12.24	8.54	43.31	731.09
Uintah	6.57	8.88	14.73	27.46	36.30	13.65	40.09	25.87	9.50	26.55	5.53	12.22	6.05	9.49	20.38	9.69	15.97	21.85	15.76	93.59	15.18	90.36	2.33	0	19.05	36.19	3.29	14.67	14.64	615.83
Utah	179.76	247.08	271.58	423.64	212.49	460.77	415.45	318.37	163.08	203.64	138.51	414.15	111.07	282.98	405.64	211.62	262.28	1002.05	109.95	490.73	316.32	424.20	387.66	264.68	0	603.75	95.69	208.34	368.78	8994.25
Wasatch	4.64	9.96	12.81	48.71	9.77	14.71	1.62	9.43	4.16	4.43	4.79	10.51	2.67	6.10	17.04	5.99	10.52	24.30	6.40	9.78	23.35	46.57	6.15	17.36	20.84	0	2.55	6.16	14.45	355.78
Washington	225.78	25.22	15.57	50.11	16.95	35.75	34.04	71.56	142.86	41.50	320.56	87.85	196.04	140.59	28.99	159.26	18.23	59.11	65.64	87.66	125.36	22.77	70.24	26.86	56.15	43.38	0	94.90	32.45	2295.38
Wayne	1.75	0.74	0.85	3.71	1.72	1.12	2.23	4.71	7.38	4.99	2.33	1.66	4.16	2.09	0.70	8.80	2.12	1.92	2.60	2.96	4.85	2.23	0.84	2.05	2.10	1.80	1.63	0	1.02	75.05
Weber	59.71	283.72	368.16	139.36	131.67	323.30	184.90	94.75	46.42	68.07	44.85	157.64	32.01	100.16	409.51	62.21	317.09	497.00	33.03	142.39	91.48	277.30	249.11	119.69	216.97	246.22	32.54	59.67	0	4788.93
Attraction	1311.84	2559.58	2640.46	2261.38	1472.28	3791.32	2470.46	1631.76	1002.87	1144.85	1103.90	2500.33	837.10	1726.68	3668.64	1317.32	2530.07	2865.91	692.59	2444.48	1758.18	3249.57	3038.62	1672.14	3424.23	3411.42	604.27	1174.53	3319.23	

Figure 7-6: Results of an Initial Run of the Commodity Flow Distribution Model

7.4 Model Parameter Calibration

As shown in Section 7.3.3., the initial run demonstrated the need for calibrating parameter values of the four factors used in the model (i.e., physical friction factor, statistical friction factor, population, and employment). This section presents initial screening of attraction zones, details of two-stage calibration method used for determining parameter values of the four factors, and results of the two-state calibration method.

7.4.1 Initial Screening for Attraction Zones

While the commodity flow distribution model focuses on the production side of commodity flow between zones *i* (production zone) and *j* (attraction zone), calibration of the parameters of the four factors focuses on the attraction side of the commodity flow. There are 29 counties in Utah; hence, the range of *i* and *j* is 1 to 29. As a criterion for stopping the calibration task, one of the economic factors in the model, the sum of difference in population for zone *j* , $\Delta O_{ij} = O_i - O_j$, was used. It was assumed that when the total difference in population in zone *j*, $\sum_{i=1}^{29} \Delta O_{ij}$, was more than the average difference in population of all zones, $Average\ (\Delta O_{ij})\ of\ all\ zones$, the commodity attracted to that zone is more than the commodity produced in that zone (see Figure 7-1). Based on this concept, the following two conditions exist:

- If total difference in population for zone *j* = $\sum_{i=1}^{29} \Delta O_{ij}$ > average of ΔO_{ij} for all zones = $\frac{\sum_{j=1}^{29}\sum_{i=1}^{29} \Delta O_{ij}}{29}$ from j=1…29, zone *i* attracts more commodity than zone *j* (the larger the population, the more the need for commodity), and
- If not, zone *i* attracts less commodity than zone *j*.

It was found that 16 counties out of 29 counties in Utah had $\sum_{i=1}^{29} \Delta O_{ij}$ greater than the average of ΔO_{ij} of all zones, meaning these zones attract more commodity than the remaining zone*s*.

7.4.2 Two-Stage Calibration Method

Following the procedure mentioned in the previous section, the calibration of model parameters proceeds as follows (a macro was run within EXCEL to handle these steps):

1) Find the zone number of the attraction zone *j* whose total ratios of attraction is higher than total ratio of production by comparing each $\sum_{i=1}^{29} \Delta O_{ij}$ by attraction (A) with the average of $\Delta O_{ij}\, of\ all\ zones$ (B) (if A>B, then zone *i* attracts more commodity than zone *j*) (16 zones out of 29 zones were found to meet this criteria.), as outlined in Equation 7-6.

$$Find\ the\ number\ of\ attraction\ zone\ j\ that\ meets\ the\ criteria\ A > B \tag{7-6}$$

where,

$A = \sum_{i=1}^{29} \Delta O_{ij}$, $and\ B = \frac{\sum_{j=1}^{29}\sum_{i=1}^{29} \Delta O_{ij}}{29}$

2) Compare the ratio of the model (attraction ratio > production ratio) by zone (start with *a*, *b*, *c*, *d* = 1, and K_{ij} = 1) as outlined in Equation 7-7:

$Ratio\ of\ C_{ij} = RC_{ij} = \frac{C_j f_{ij} U_{ij} N_{ij}}{\sum_{n=1}^{m} C_j f_{ij} U_{ij} N_{ij}}$, and

$$Find\ the\ number\ of\ zone\ j\ with\ C > D \tag{7-7}$$

where,

$C = \sum_{i=1}^{29} RC_{ij}\ for\ zone\ j$, and

$D = \frac{\sum_{j=1}^{29}\sum_{i=1}^{29} RC_{ij}}{29} = ratio\ of\ production\ of\ each\ zone = 1.0$.

3) Determine *a*, *b*, *c*, and *d* with maximum number of zones satisfying the conditions in Step 1 and Step 2 by estimating the coefficients *a*, *b*, *c*, and *d*, using an enumeration method

(of a total 103,173 cases, 20,104 cases were found to have the 16 counties that were identified in Step 1 and Step 2 above $RC_{ij} > 1$),

4) Find the best combination of parameter values *a*, *b*, *c*, and *d* that satisfies Equation 7-8 among the cases that had the 16 counties above $RC_{ij} > 1$ found in Step 3,

$$Min\ Z = (Normalized\ \Delta Pop - Normalized\ Attraction) \quad (7\text{-}8)$$

where,

$Normalized\ \Delta Pop = \sqrt{[(A-B)/B\ ]^2}$, and

$Normalized\ Attraction = \sqrt{[(C-D)/D\ ]^2}$

5) Step 5: Determine the attraction and production commodity flow values using the average growth factor method by adjusting K_{ij} values.

7.4.3 Calibration Results

These five steps were applied to the within-Utah commodity flows. The optimal combination of model parameter values met the two requirements, namely: 1) the number of zones that have more than average difference in population between zone *i* and zone *j* and 2) a minimum difference between the normalized population difference and the normalized attraction values, that is, meeting the criteria in Equation 7-8.

7.4.3.1 Maximum Number of Zones That Meets the Criterion

It was found that 16 of the 29 zones (i.e. counties) satisfy the conditions set in Step 1 through Step 3 mentioned in the previous section. Hence, during the enumeration of parameter values, cases that produced the number of zones that had difference in population greater than the average difference in population were identified.

7.4.3.2 Finding an Optimal Combination of Parameter Values

To determine optimal parameter values of the model (*a, b, c,* and *d*) that satisfy requirements in Step 4, an enumeration method was used. Parameter values *a, b, c,* and *d* were modified with an incrementally decreased scale size of 0.25 (2.0, 1.75, 1.5, 1.0, 0.75, … 0.0001) for each value. A total of 103,173 combinations of parameter values were evaluated to find an optimal combination of parameter values that satisfy the conditions presented in Step 1 and Step 2 in Section 7.4.2. The number of combinations of parameter values that satisfied these conditions was 20,104.

Next, Step 4 was performed to find an optimal combination of parameter values that would minimize the results of Equation 7-6. The optimal combinations of parameter values among the 18,196 that produced the least objective function value were found to be $a = 0.0001$, $b = 0.0050$, $c = 0.0001$ and $d = 0.0010$. The minimum difference in Equation (7-6) was $z = 0.00000052$. Figure 7-7 shows the results of the optimization process.

7.4.3.3 Characteristics of the Case That Gives Optimal Parameter Values

With the optimal combination of parameter values found, trends in difference in population and employment were reviewed. Figure 7-8 shows a comparison of the trend of attraction by county and the trend of ratio of difference in population and employment for the case that produces the least value of the objective function. It is shown that the attraction ratio and the normalized difference in population show a similar trend, meaning the resulting attraction ratio reflects the trend of difference in population. What is interesting is that the trend in the ratio of difference in population is opposite to the trend in employment. For instance, county 18 is Salt Lake County, where the employment ratio is positive, meaning more commodities are produced while the trend in the difference in population is negative, meaning

less commodity moves to Salt Lake County. This means that Salt Lake County is a major production center. The same trend is seen in county 25, Utah County. Another major production center is county 6, Davis County. This result is logical considering that these three counties are home to major producers of commodities.

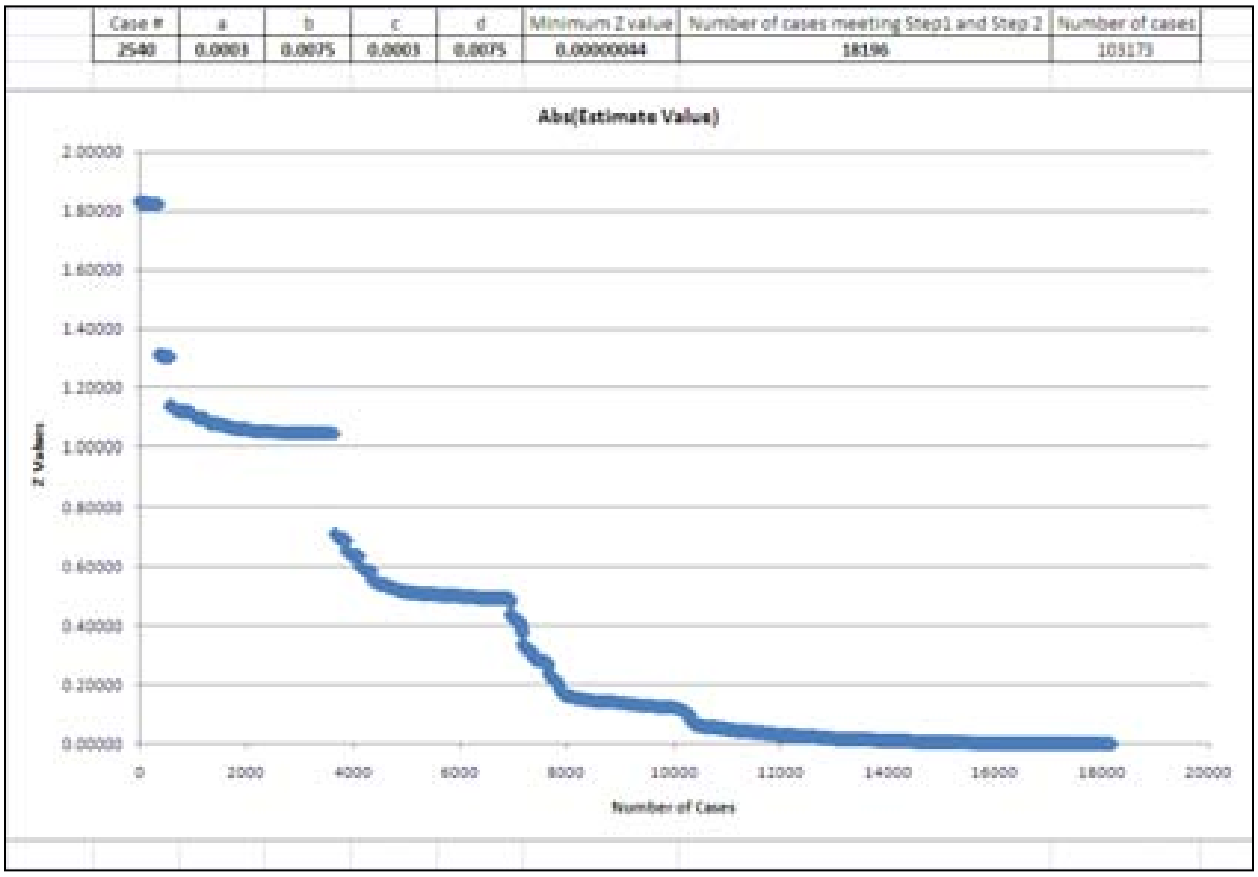


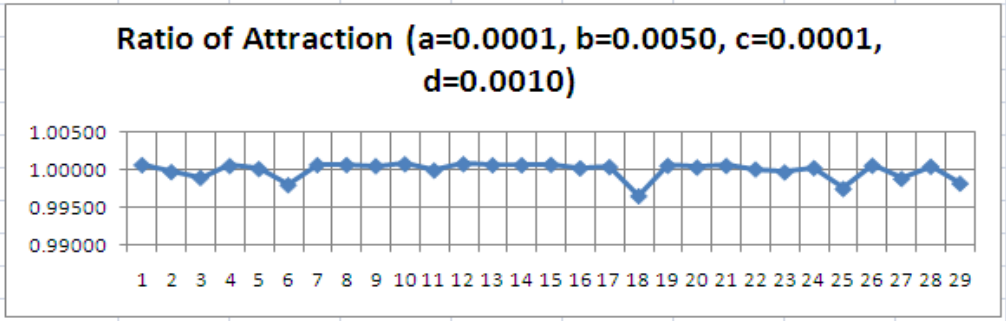
Figure 7-7: Optimization Process

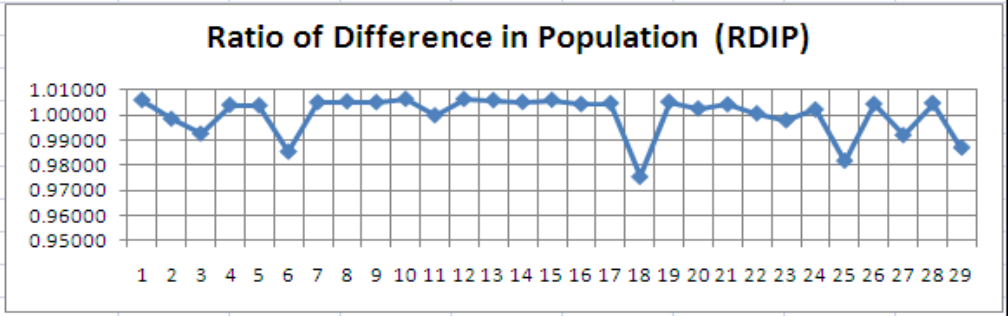
7.4.4 Determination of Production and Attraction Between Zones

Now that the ratio matrix is complete, the total amount of commodity production and attraction must be determined as outlined in Step 5. Using the optimal combination of parameter values *a*, *b*, *c*, and *d*; commodity flows between zones *i* and *j* were determined. Figure 7-9 shows the first run of commodity flow distribution algorithm.

Case #	a	b	c	d	Minimum Z value
719	0.0001	0.0050	0.0001	0.0010	0.00000052

	County	Attraction	RDIP	RDIE
1	Beaver	1.00073	1.00585	0.99973
2	Box Elder	0.99982	0.99841	1.00009
3	Cache	0.99905	0.99251	1.00033
4	Carbon	1.00062	1.00391	0.99989
5	Daggett	1.00023	1.00373	0.99982
6	Davis	0.99809	0.98538	1.00058
7	Duchesne	1.00074	1.00498	0.99981
8	Emery	1.00075	1.00528	0.99976
9	Garfield	1.00061	1.00498	0.99972
10	Grand	1.00086	1.00628	0.99976
11	Iron	1.00002	0.99976	1.00004
12	Juab	1.00087	1.00623	0.99977
13	Kane	1.00072	1.00577	0.99976
14	Millard	1.00072	1.00507	0.99979
15	Morgan	1.00079	1.00591	0.99974
16	Piute	1.00031	1.00424	0.99982
17	Rich	1.00048	1.00460	0.99983
18	Salt Lake	0.99662	0.97539	1.00110
19	San Juan	1.00064	1.00512	0.99976
20	Sanpete	1.00042	1.00246	0.99985
21	Sevier	1.00064	1.00412	0.99984
22	Summit	1.00017	1.00053	1.00010
23	Tooele	0.99978	0.99779	0.99999
24	Uintah	1.00035	1.00209	0.99995
25	Utah	0.99758	0.98176	1.00073
26	Wasatch	1.00065	1.00427	0.99981
27	Washington	0.99892	0.99193	1.00031
28	Wayne	1.00054	1.00464	0.99982
29	Weber	0.99829	0.98698	1.00053
Average		1	1	1





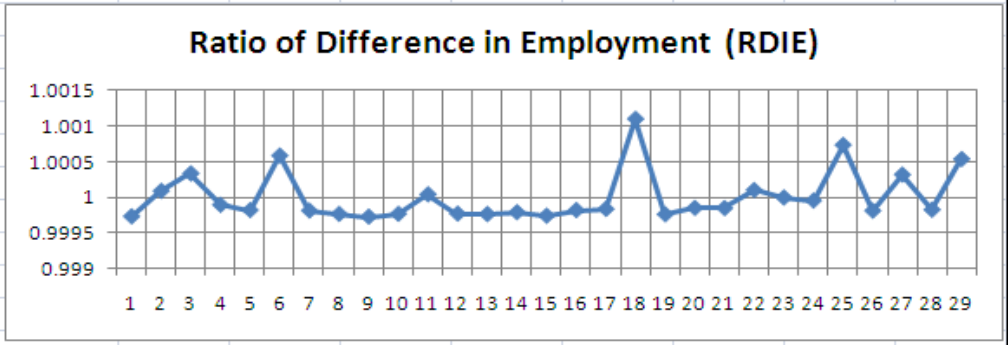


Figure 7-8: Comparison of Ration of Attraction, and Ratio of Difference of Population and Employment

Original	Beaver	Box Elder	Cache	Carbon	Daggett	Davis	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Millard	Morgan	Piute	Rich	Salt Lake	San Juan	Sanpete	Sevier	Summit	Tooele	Uintah	Utah	Wasatch	Washington	Wayne	Weber	Sum	Target Value (P)	Fi
Beaver	0	2.38067	2.37853	2.38327	2.38486	2.37616	2.38435	2.38600	2.38753	2.38757	2.38176	2.38752	2.39220	2.38534	2.38810	2.38554	2.38570	2.37286	2.38456	2.38282	2.38363	2.38159	2.38072	2.38225	2.37506	2.38377	2.37873	2.38629	2.37664	66.72401	66.72401	1.00
Box Elder	19.08434	0	19.08661	19.08713	19.07728	19.06009	19.09290	19.08910	19.08241	19.08664	19.11629	19.08850	19.08320	19.09108	19.08808	19.07648	19.08192	19.03091	19.08819	19.10035	19.09585	19.10871	19.13736	19.10212	19.04820	19.09535	19.07937	19.08004	19.06522	534.41370	534.41370	1.00
Cache	43.54794	43.59217	0	43.56849	43.53863	43.54704	43.56436	43.55766	43.54582	43.55473	43.57505	43.55596	43.54653	43.55862	43.55836	43.53350	43.54897	43.47210	43.55293	43.56827	43.56482	43.58300	43.59091	43.57257	43.51515	43.56673	43.65484	43.54194	43.56407	1219.64116	1219.64116	1.00
Carbon	8.98211	8.97830	8.96848	0	8.97746	8.95846	8.99277	8.98749	8.98131	8.98520	8.98186	8.98476	8.98204	8.98891	8.98376	8.97735	8.97873	8.94576	8.99058	8.99231	9.01061	8.98521	8.97727	8.99099	8.95424	8.99936	8.96690	8.97977	8.96052	251.44253	251.44253	1.00
Daggett	0.49382	0.49277	0.49241	0.49324	0	0.49191	0.49343	0.49356	0.49403	0.49370	0.49284	0.49367	0.49384	0.49343	0.49378	0.49484	0.49467	0.49122	0.49339	0.49313	0.49322	0.49299	0.49276	0.49313	0.49166	0.49333	0.49227	0.49447	0.49202	13.80954	13.80954	1.00
Davis	101.89958	101.96299	101.99914	101.93540	101.87523	0	101.92838	101.91787	101.89525	101.91145	101.93694	101.91668	101.89619	101.91996	101.91906	101.86879	101.89551	101.86041	101.90388	101.93194	101.92892	101.95700	101.95771	101.93727	102.00727	101.93310	101.98248	101.88706	102.11418	2854.07966	2854.07966	1.00
Duchesne	6.42089	6.41384	6.40763	6.42560	6.41713	6.40064	0	6.42630	6.41984	6.42363	6.41563	6.42367	6.42064	6.43031	6.42290	6.41661	6.41818	6.39161	6.43773	6.42110	6.42581	6.41793	6.41335	6.42071	6.39752	6.42797	6.40608	6.41842	6.40212	179.68378	179.68378	1.00
Emery	4.14506	4.13683	4.13301	4.14280	4.14086	4.12871	4.14569	0	4.14387	4.14808	4.13826	4.14853	4.14475	4.14796	4.14671	4.14123	4.14167	4.12297	4.14510	4.14111	4.14302	4.13897	4.13673	4.14053	4.12686	4.14366	4.13264	4.14260	4.12961	115.91783	115.91783	1.00
Garfield	2.40849	2.40133	2.39930	2.40399	2.40681	2.39693	2.40490	2.40626	0	2.40732	2.40236	2.40704	2.40989	2.40553	2.40700	2.40755	2.40786	2.39362	2.40526	2.40353	2.40429	2.40234	2.40138	2.40307	2.39586	2.40435	2.39945	2.40890	2.39742	67.30205	67.30205	1.00
Grand	4.52632	4.51378	4.50989	4.51973	4.52007	4.50522	4.52215	4.52664	4.52404	0	4.51525	4.53790	4.52586	4.52287	4.53088	4.52023	4.52100	4.49896	4.52163	4.51814	4.51978	4.51611	4.51365	4.51784	4.50317	4.52045	4.50938	4.52202	4.50620	126.50914	126.50914	1.00
Iron	15.47108	15.48987	15.45975	15.48048	15.46049	15.44039	15.47523	15.47317	15.46908	15.47090	0	15.47174	15.47056	15.47568	15.46894	15.46384	15.46300	15.41766	15.47445	15.48580	15.48114	15.50107	15.48563	15.48657	15.43255	15.47766	15.46138	15.46619	15.44403	433.11832	433.11832	1.00
Juab	3.18712	3.17867	3.17571	3.18239	3.18255	3.17249	3.18427	3.18776	3.18521	3.19535	3.17957	0	3.18618	3.18576	3.18982	3.18300	3.18351	3.16806	3.18418	3.18157	3.18271	3.17997	3.17871	3.18085	3.17096	3.18324	3.17536	3.18388	3.17314	89.08201	89.08201	1.00
Kane	2.93014	2.91584	2.91331	2.91918	2.92126	2.91040	2.92041	2.92233	2.92611	2.92417	2.91726	2.92355	0	2.92135	2.92483	2.92212	2.92225	2.90638	2.92087	2.91857	2.91958	2.91708	2.91589	2.91799	2.90910	2.91967	2.91369	2.92330	2.91100	81.72763	81.72763	1.00
Millard	4.91880	4.91090	4.90597	4.91827	4.91389	4.90086	4.92398	4.92361	4.91726	4.91965	4.91288	4.92119	4.91815	0	4.91953	4.91477	4.91507	4.89396	4.92499	4.91616	4.91905	4.91324	4.91088	4.91499	4.89851	4.92008	4.90585	4.91581	4.90189	137.59020	137.59020	1.00
Morgan	2.47141	2.46420	2.46210	2.46687	2.46783	2.45953	2.46830	2.47022	2.46929	2.47335	2.46451	2.47290	2.47117	2.46891	0	2.46777	2.46871	2.45604	2.46807	2.46617	2.46691	2.46530	2.46404	2.46585	2.45817	2.46759	2.46130	2.46857	2.46010	69.05517	69.05517	1.00
Piute	0.48833	0.48714	0.48674	0.48761	0.48920	0.48627	0.48777	0.48798	0.48855	0.48809	0.48733	0.48811	0.48836	0.48789	0.48814	0	0.48924	0.48560	0.48782	0.48755	0.48768	0.48732	0.48715	0.48744	0.48605	0.48769	0.48676	0.48907	0.48636	13.65325	13.65325	1.00
Rich	0.91788	0.91582	0.91514	0.91660	0.91912	0.91417	0.91697	0.91724	0.91834	0.91752	0.91588	0.91754	0.91790	0.91704	0.91780	0.91952	0	0.91288	0.91687	0.91642	0.91659	0.91617	0.91576	0.91633	0.91367	0.91681	0.91479	0.91992	0.91439	25.66509	25.66509	1.00
Salt Lake	524.21476	524.46696	524.55302	524.38440	524.09249	524.74259	524.35174	524.30835	524.19853	524.27674	524.36390	524.29866	524.20110	524.31044	524.30128	524.06517	524.18436	0	524.22864	524.35761	524.35114	524.47363	524.43989	524.38082	524.90313	524.37351	524.46209	524.15949	524.69275	14682.13720	14682.13720	1.00
San Juan	4.32577	4.31959	4.31534	4.32752	4.32252	4.31073	4.33675	4.32843	4.32534	4.32675	4.32164	4.32715	4.32591	4.33264	4.32634	4.32300	4.32311	4.30467	0	4.32509	4.32812	4.32216	4.31950	4.32431	4.30875	4.32961	4.31535	4.32433	4.31167	121.03206	121.03206	1.00
Sanpete	8.12248	8.12195	8.11165	8.13325	8.11807	8.10236	8.12797	8.12556	8.12175	8.12397	8.12659	8.12433	8.12225	8.12669	8.12321	8.11871	8.11938	8.09073	8.12713	0	8.13092	8.12998	8.12115	8.14304	8.09852	8.13074	8.11064	8.12049	8.10419	227.37772	227.37772	1.00
Sevier	8.00219	7.99707	7.98818	8.02639	7.99655	7.97943	8.01076	8.00621	8.00128	8.00386	8.00112	8.00417	8.00202	8.00834	8.00261	7.99790	7.99794	7.96811	8.00965	8.00779	0	8.00267	7.99655	8.00756	7.97570	8.01823	7.98791	7.99963	7.98118	223.98100	223.98100	1.00
Summit	19.79016	19.80777	19.78069	19.81099	19.78386	19.75620	19.80400	19.79768	19.78881	19.79513	19.82995	19.79492	19.78972	19.79891	19.79518	19.78166	19.78745	19.72737	19.79828	19.81869	19.80829	0	19.80638	19.82439	19.74543	19.80746	19.77399	19.78623	19.76127	554.15087	554.15087	1.00
Tooele	13.06875	13.10474	13.06961	13.07570	13.06314	13.05115	13.07330	13.07139	13.06737	13.06965	13.08673	13.07145	13.06789	13.07298	13.07017	13.06353	13.06584	13.03118	13.07083	13.07812	13.07547	13.08421	0	13.07770	13.04344	13.07494	13.06614	13.06576	13.05447	365.93564	365.93564	1.00
Uintah	10.98522	10.98814	10.97428	11.00080	10.98174	10.96120	10.99460	10.99047	10.98473	10.98913	10.99395	10.98785	10.98533	10.99092	10.98742	10.98030	10.98263	10.94538	10.99214	11.01566	10.99894	11.00116	10.98569	0	10.95569	10.99715	10.97161	10.98324	10.96389	307.56925	307.56925	1.00
Utah	162.05036	162.12564	162.16545	162.10653	162.00739	162.29723	162.09264	162.08198	162.04682	162.07098	162.10305	162.07488	162.04775	162.08039	162.06779	162.00467	162.03070	162.11315	162.05847	162.10060	162.09692	162.12883	162.12248	162.10434	0	162.10001	162.15119	162.03463	162.24940	4538.71438	4538.71438	1.00
Wasatch	6.34181	6.33722	6.33062	6.35267	6.33833	6.32366	6.35037	6.34560	6.34089	6.34370	6.33916	6.34406	6.34150	6.34764	6.34352	6.33809	6.33956	6.31470	6.34954	6.34574	6.35415	6.34155	6.33671	6.34466	6.32057	0	6.32907	6.33968	6.32510	177.49988	177.49988	1.00
Washington	41.15087	41.17364	41.24848	41.15963	41.12710	41.13990	41.15298	41.15295	41.14804	41.14927	41.17744	41.15044	41.15153	41.15657	41.14389	41.13580	41.13280	41.06869	41.15225	41.16152	41.16200	41.16666	41.17713	41.16071	41.11287	41.15519	0	41.14165	41.15533	1152.26536	1152.26536	1.00
Wayne	1.33911	1.33566	1.33458	1.33707	1.34007	1.33327	1.33751	1.33815	1.34003	1.33856	1.33615	1.33844	1.33930	1.33776	1.33859	1.34071	1.34176	1.33144	1.33769	1.33684	1.33719	1.33621	1.33568	1.33660	1.33268	1.33725	1.33457	0	1.33354	37.43640	37.43640	1.00
Weber	86.04778	86.10711	86.14812	86.08039	86.02931	86.21156	86.07453	86.06446	86.04432	86.05923	86.08225	86.06246	86.04512	86.06560	86.06686	86.02151	86.04762	85.98914	86.05285	86.07717	86.07403	86.10095	86.10136	86.08336	86.09592	86.07823	86.13266	86.03743	0	2410.08133	2410.08133	1.00
Sum	1107.33259	1091.12059	1066.71375	1101.13639	1108.89324	1008.35853	1103.61303	1105.78442	1107.25596	1105.33431	1094.59559	1106.71807	1106.76686	1105.02955	1107.41455	1108.86418	1108.66911	584.70558	1105.47798	1101.94980	1102.06080	1090.45201	1097.10243	1099.11797	947.97671	1103.74314	1068.95649	1108.22082	1024.23171	31077.5962		
Taget Value (A)	66.93771	533.97587	1214.61899	252.04103	13.83501	2830.39848	180.21057	116.25778	67.48626	126.96386	433.10639	89.40363	81.98164	137.98654	69.28277	13.68088	25.72836	14475.66701	121.37996	227.72498	224.52208	554.37889	365.50626	307.96962	4491.67217	177.94819	1147.06595	37.53275	2392.41683	30777.6904		
Fj	0.06	0.49	1.14	0.23	0.01	2.81	0.16	0.11	0.06	0.11	0.40	0.08	0.07	0.12	0.06	0.01	0.02	24.76	0.11	0.21	0.20	0.51	0.33	0.28	4.74	0.16	1.07	0.03	2.34			

Figure 7-9: Optimal Commodity Flow Distribution between Zones i and j With Optimal

With the enhanced gravity model, production values (row values) add up to the total amount of commodity of each county. However, it is not guaranteed that attraction values add up to the total value of commodity in each county. The average growth method by Abraham (2010) was used to make adjustments to production and attraction values. In the average growth method, T_{ij}^{k} in the next iteration were estimated by the growth factors of the previous iteration, F_1^{K-1} and F_j^{K-1}, as shown in Figure 7-10:

Original Data

	A	B	C	D	P_i	P_i^*	F_i
A	-	12	10	18	40	80	2
B	12	-	14	6	32	48	1.5
C	10	14	-	14	38	114	3
D	18	6	14	-	38	38	1
P_j	40	32	38	38	148	280	
P_j^*	80	48	114	38			
F_j	2	1.5	3	1			

$$F_i = \frac{P_i^*}{P_i}, F_j = \frac{P_j^*}{P_j}, \; T_{ij}^1 = T_{ij}^0(F_1^0 + F_j^0)/2 \; , T_{ij}^k = T_{ij}^{k-1}(F_1^{K-1} + F_j^{K-1})/2$$

First Iteration

	A	B	C	D	P_i	P_i^*	F_i
A	-	**21.0 [=$T_{ij}^0(F_1^0 + F_j^0)/2$ = [12]*[2+1.5]/2)]**	25.0	27.0	73.0	80	1.095
B	21	-	31.5	7.5	60.0	48	1.5
C	25.0	31.5	-	28.0	84.5	114	1.350
D	27.0	7.5	28.0	-	62.5	38	0.608
P_j	73.0	60	84.5	62.5	280.0	280	
P_j^*	80	48	114	38			
F_j	1.095	0.800	1.350	0.608			

Figure 7-10 : Average Growth Factor Method in Trip Distribution (Inserted From Abraham 2010)

The ratios of production ($F_i = P_i^*/P_i$) and attraction ($F_j = P_j^*/P_j$) were used instead of P_i^* and P_j^* in the original growth factor method by Abraham (2010). After 16 iterations, the goal that F_i and F_j were within ±0.05 of 1.00, the target value (i.e., ±5 percent of target values), was achieved. Figure 7-11 shows the final results of the commodity flow distribution model.

16th Iteration	Beaver	Box Elder	Cache	Carbon	Daggett	Davis	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Millard	Morgan	Piute	Rich	Salt Lake	San Juan	Sanpete	Sevier	Summit	Tooele	Uintah	Utah	Wasatch	Washington	Wayne	Weber	Sum	Target Value (P)	Fi
Beaver	0	0.38747	0.96994	0.16246	0.00517	2.42892	0.18928	0.06479	0.03176	0.87205	0.30506	0.04731	0.04273	0.07951	0.03485	0.00511	0.01069	55.33319	0.06819	0.14412	0.14178	0.48452	0.25959	0.29543	4.81075	0.10761	0.91105	0.01674	2.02561	68.37868	66.72481	0.976
Box Elder	0.27022	0	7.82488	1.31234	0.04194	19.57343	0.88280	0.52345	0.27286	0.58155	2.46541	0.38221	0.34454	0.62444	0.28160	0.04140	0.08663	445.52885	0.55121	1.16487	1.14532	3.26670	2.02901	1.69867	32.30851	0.86972	7.34688	0.13545	16.32617	547.86921	534.41370	0.975
Cache	0.62957	7.22999	0	3.03908	0.09808	45.12944	2.04733	1.21615	0.63533	1.35075	5.69332	0.88891	0.80163	1.48146	0.65581	0.09681	0.20232	1025.71692	1.28035	2.69817	2.65343	7.54259	4.68481	3.84032	74.45690	2.01686	16.98601	0.31600	37.65356	1251.05101	1219.64126	0.975
Carbon	0.12632	1.46494	3.66460	0	0.01958	9.17324	0.41354	0.24496	0.12756	0.27215	1.15344	0.17875	0.16121	0.30073	0.13164	0.01933	0.04045	208.01402	0.25807	0.54562	0.53367	1.52993	0.94755	0.77761	15.14594	0.40766	3.44133	0.06327	7.65060	257.71159	251.44253	0.976
Daggett	0.00590	0.00812	0.20063	0.01958	0	0.50245	0.02258	0.01338	0.00697	0.01488	0.06306	0.00977	0.00881	0.01642	0.00719	0.00106	0.00221	11.44768	0.01409	0.02979	0.02930	0.08365	0.05181	0.04247	0.82968	0.02224	0.18838	0.00346	0.41803	14.15159	13.80954	0.976
Davis	1.55404	17.48832	43.43315	7.48170	0.24496	0	5.06458	2.98686	1.56923	3.33431	13.79159	2.18928	1.97911	3.65624	1.61881	0.24582	0.50366	2454.37810	3.14299	6.57817	6.47040	18.21237	11.36446	9.33142	178.68656	4.93959	40.80576	0.78459	90.48808	2932.16187	2854.07966	0.973
Duchesne	0.09015	1.04545	2.61606	0.43883	0.01397	6.54942	0	0.17489	0.09102	0.19427	0.82301	0.12759	0.11498	0.21482	0.09396	0.01378	0.02886	149.17532	0.18451	0.38911	0.38294	1.09170	0.67617	0.55466	10.81393	0.29078	2.45649	0.04514	5.46222	184.15401	179.68378	0.976
Emery	0.05810	0.67368	1.68612	0.28269	0.00899	4.22190	0.19015	0	0.05866	0.12528	0.53034	0.08228	0.07411	0.13839	0.06057	0.00888	0.01859	96.17329	0.11884	0.25065	0.24661	0.70340	0.43569	0.35729	6.87138	0.18721	1.58350	0.02909	3.52097	118.79632	115.91783	0.976
Garfield	0.03372	0.39080	0.97832	0.16386	0.00522	2.44994	0.11029	0.06533	0	0.07264	0.30767	0.04769	0.04304	0.08018	0.03512	0.00516	0.01079	55.81333	0.06877	0.14536	0.14299	0.40801	0.25274	0.20721	4.84566	0.10853	0.91891	0.01689	2.04314	68.97111	67.30295	0.976
Grand	0.06348	0.73534	1.84048	0.30845	0.00983	4.60829	0.20751	0.12308	0.06408	0	0.57889	0.09005	0.08097	0.15097	0.06622	0.00970	0.02030	104.97124	0.12948	0.27360	0.26916	0.76779	0.47559	0.39002	7.60826	0.20433	1.72843	0.03177	3.84323	129.69157	126.58914	0.976
Iron	0.25853	2.53399	6.33852	1.06194	0.03389	15.84008	0.71455	0.42338	0.22066	0.47039	0	0.30908	0.27867	0.51970	0.22766	0.03346	0.07001	360.62731	0.44591	0.94272	0.92683	2.64521	1.63924	1.34346	26.15040	0.70359	5.94695	0.10950	13.21345	443.97939	433.13832	0.976
Juab	0.04405	0.51751	1.29532	0.21702	0.00691	3.24359	0.14600	0.08660	0.04507	0.09647	0.40737	0	0.05695	0.10624	0.04657	0.00682	0.01428	73.88930	0.09110	0.19251	0.18938	0.54029	0.33469	0.27440	5.35584	0.14376	1.21646	0.02234	2.70503	91.29246	89.08201	0.976
Kane	0.04105	0.47470	1.18825	0.19905	0.00634	2.97554	0.13389	0.07938	0.04140	0.08827	0.37374	0.05795	0	0.09742	0.04269	0.00626	0.01311	67.78455	0.08356	0.17658	0.17371	0.49560	0.30700	0.25171	4.91341	0.13185	1.11617	0.02051	2.48548	83.75518	81.72769	0.976
Millard	0.06898	0.79998	2.00195	0.33563	0.01068	5.05256	0.22594	0.13387	0.06964	0.14865	0.62982	0.09765	0.08798	0	0.07189	0.01054	0.02207	114.17848	0.14102	0.29768	0.29291	0.83524	0.51740	0.42427	8.27661	0.22238	1.88024	0.03453	4.18034	141.00895	137.59020	0.976
Morgan	0.03466	0.40103	1.00391	0.16814	0.00535	2.53190	0.11311	0.06706	0.03482	0.07463	0.31562	0.04899	0.04414	0.08229	0	0.00528	0.01106	57.26813	0.07057	0.14914	0.14671	0.41869	0.25933	0.21262	4.15074	0.11138	0.94258	0.01731	2.09654	70.76780	69.05537	0.976
Piute	0.00683	0.07922	0.19835	0.03320	0.00106	0.49876	0.02233	0.01323	0.00690	0.01471	0.06236	0.00966	0.00871	0.01624	0.00711	0	0.00219	11.31797	0.01393	0.02946	0.02898	0.08270	0.05123	0.04199	0.82032	0.02198	0.18636	0.00342	0.41427	13.99542	13.65325	0.976
Rich	0.01264	0.14894	0.37264	0.06242	0.00199	0.93193	0.04198	0.02488	0.01297	0.02766	0.11721	0.01816	0.01638	0.03053	0.01337	0.00197	0	21.27718	0.02619	0.05537	0.05446	0.15549	0.09631	0.07895	1.54206	0.04134	0.35013	0.00644	0.77887	26.30895	25.66509	0.976
Salt Lake	60.93718	456.86108	1027.99420	220.08040	13.10445	2423.45957	159.81959	104.05014	61.42195	113.31264	372.40249	80.67931	74.38758	122.82149	63.08022	12.90151	24.03093	0	108.48374	199.47520	196.75660	473.92535	355.70224	267.38001	3936.31927	157.10075	971.00784	34.72429	2038.43019	14089.54860	14682.13720	1.042
San Juan	0.06065	0.70952	1.79069	0.29525	0.00939	4.40844	0.19894	0.11765	0.06124	0.13070	0.55391	0.08584	0.07736	0.14457	0.06320	0.00927	0.01941	100.41995	0	0.26182	0.25766	0.73462	0.45500	0.37328	7.27933	0.19564	1.65368	0.03037	3.67655	124.03786	121.03206	0.976
Sanpete	0.13412	1.32439	3.31274	0.55573	0.01768	8.28268	0.37347	0.22127	0.11523	0.24585	1.04293	0.16148	0.14555	0.27166	0.11882	0.01746	0.03653	188.86957	0.23308	0	0.48481	1.38345	0.85660	0.70377	13.69223	0.36801	3.11106	0.05716	6.91612	233.04255	227.37772	0.976
Sevier	0.11246	1.30433	3.26301	0.54857	0.01742	8.16848	0.36819	0.21809	0.11356	0.24229	1.02708	0.15914	0.14344	0.26778	0.11710	0.01720	0.03600	186.03920	0.22978	0.48564	0	1.36210	0.84367	0.69224	13.48722	0.36302	3.06463	0.05633	6.81252	229.56857	223.98100	0.976
Summit	0.28057	3.24701	8.11505	1.36269	0.04356	20.30129	0.91661	0.54348	0.28331	0.60380	2.55961	0.39682	0.35772	0.66698	0.29239	0.04300	0.08996	462.09234	0.57235	1.20985	1.18920	0	2.10178	1.72420	33.51195	0.90308	7.69375	0.14065	16.93326	568.92283	554.15087	0.975
Tooele	0.13410	2.54008	5.34385	0.89522	0.02854	13.37111	0.60196	0.35678	0.18589	0.39642	1.68217	0.26045	0.23477	0.43798	0.19183	0.02818	0.05867	304.45240	0.37573	0.79447	0.78114	2.22678	0	1.13225	22.07351	0.59303	5.05789	0.09223	11.15216	375.09280	365.97564	0.976
Uintah	0.15467	1.79408	4.48662	0.75286	0.02398	11.22921	0.50607	0.29986	0.15619	0.33318	1.41285	0.21884	0.19727	0.36808	0.16119	0.02367	0.04954	255.71228	0.31585	0.66867	0.65688	1.87443	1.16041	0	18.51952	0.49862	4.23302	0.07749	9.36556	315.25116	307.56925	0.976
Utah	2.63396	28.88780	71.29837	12.33760	0.42054	177.27675	8.37662	5.02825	2.65935	5.57318	22.84958	3.69760	3.34118	6.14143	2.74226	0.41516	0.86140	4001.30702	5.28813	10.97875	10.80888	30.12196	18.85712	15.51920	0	8.25477	67.01450	1.33779	147.96332	4671.97852	4538.71438	0.971
Wasatch	0.08901	1.03275	2.58415	0.43375	0.01378	6.48958	0.29156	0.17264	0.08988	0.19180	0.81303	0.12587	0.11353	0.21200	0.09277	0.01361	0.02849	147.35899	0.18194	0.38445	0.37858	1.07849	0.66794	0.54796	10.68214	0	2.42652	0.04457	5.39560	181.91549	177.49888	0.976
Washington	0.59326	6.81982	17.06643	2.86646	0.09240	42.58282	1.93063	1.14679	0.59905	1.27374	5.37255	0.83810	0.75596	1.40660	0.61794	0.09124	0.19062	968.18811	1.20747	2.54493	2.50295	7.11468	4.41895	3.62223	70.27983	1.90198	0	0.29788	35.53590	1181.86912	1152.26536	0.975
Wayne	0.01674	0.21728	0.54399	0.09109	0.00290	1.36237	0.06126	0.03631	0.01893	0.04036	0.17104	0.02650	0.02390	0.04456	0.01952	0.00287	0.00601	31.03833	0.03822	0.08080	0.07948	0.22684	0.14051	0.11519	2.24971	0.06033	0.52092	0	1.13615	38.36413	37.43640	0.976
Weber	1.29231	14.62401	36.39743	6.17954	0.20306	90.92590	4.17365	2.48774	1.30486	2.76122	11.53172	1.82197	1.64415	3.04684	1.34626	0.20044	0.41789	2059.79662	2.69213	5.48030	5.40009	15.25430	9.48823	7.79695	149.81798	4.11210	34.19218	0.65147	0	2474.89737	2410.08133	0.974
Sum	69.73073	553.40112	1257.77185	261.61936	14.49169	2933.47158	187.21752	120.92048	71.38053	132.01405	449.03887	93.05734	85.36327	143.45355	72.18654	14.33101	26.88207	14018.97865	126.23380	236.43808	233.12083	574.51049	379.07609	319.52291	4664.03457	184.87328	1187.83727	39.55670	2478.61787	38927.64930	38927.64930	
Target Value (A)	66.93771	533.67587	1214.61899	252.04103	13.83501	2830.39848	180.23957	116.25778	67.48626	126.96386	433.33639	89.48363	81.99564	137.98654	69.28277	13.68088	25.72836	14475.66701	121.37986	227.72498	224.52208	554.37089	365.50626	307.96962	4491.67217	177.94819	1147.06595	37.53275	2392.41683	30777.6804		
Fj	0.960	0.965	0.966	0.963	0.955	0.965	0.963	0.961	0.960	0.962	0.965	0.961	0.961	0.962	0.960	0.955	0.957	1.033	0.962	0.963	0.963	0.965	0.964	0.964	0.963	0.963	0.966	0.958	0.965			

Figure 7-11: Final Commodity Flow Distribution between Zones i and j After Using the Growth Factor Methods (Thousand Tons)

7.5 Chapter Summary

Commodity movements are typically represented by an O-D matrix that contains both the type and quality of goods moved vis-à-vis vehicle movements, which are represented by traffic flows in different modes. Hence, creating an O-D matrix of commodity flow is the first step before assigning commodity flow to a network of highways. To create the distribution matrix, a new commodity flow distribution matrix based on the concept of the gravity model was developed. This model consists of composite friction factors including physical distance, statistical distance (Euclidean distance), and economic factors consisting of the difference in population and the difference in employment among the zones.

For physical distance, straight-line distance between the geographical centers of the two counties was used. For determining Euclidean distance, factors identified as major factors affecting commodity generations were used. This model was applied to allocate commodities distributed in each country within Utah obtained by the CFS 2002 conducted by BTS and the U.S. Census Bureau (2009) and the official website for the state of Utah (2009).

The model parameters were calibrated using an enumeration method for the commodity data of the state of Utah for year 2002 using the difference in population function, $\Delta O_{ij} = O_i - O_j$, one of the economic factors in the commodity flow distribution model as a criterion for finding combinations of parameter values that result in the number of counties above the average difference in population. After the combinations of parameter values meeting the trend in difference in population were identified, the difference between the attraction ratio for each county and the ratio of population difference were minimized to find an optimal combination of model parameters that minimize this difference.

The total amount of commodities in each county was distributed to production zone *i* and attraction zone *j* using the commodity flow distribution model, and then the growth factor method was used to adjust the production and attraction distribution values to achieve the results within ±5 percent of target values.

The procedure presented in this chapter is one method to distribute commodity flow among the counties in a state when detailed data of commodity flow at the county-level is not available. At present there are no data to validate this model because neither CFS nor FAF provides county-level commodity flow data. However, according to the level of details in commodity flow data currently available via the Internet, this methodology seems to be a promising approach for distributing within-state commodity flow to the counties in a state.

8 ADJUSING TRUCK TRAFFIC DATA FOR INCREASED ACCURACY

Collecting accurate truck traffic data is essential as the number of heavy vehicles on a road affects highway planning, operations, geometric design, safety, and pavement performance. The process used for collecting, sorting and reducing truck traffic data for improved accuracy is discussed in this chapter. Truck traffic data obtained in the field are used for calibrating a truck trip assignment model developed in this study and presented in Chapter 9.

To use truck traffic data collected on state highways at UDOT‘s ATRs for truck trip assignments on state highways, it is necessary that raw data be adjusted for higher accuracy. The error rates obtained for each region of UDOT as found in the literature (Saito and Jin 2009) were used for this task.

This chapter consists of a review of the importance of accuracy of truck traffic data, truck traffic data collection methodology, truck traffic data accuracy estimation process, results of determining average truck traffic data accuracy by region, and a chapter summary.

8.1 Review of the Importance of Accuracy of Truck Traffic

Truck traffic affects traffic operation, safety, and pavement performance on highway networks. Truck traffic with increased accuracy level is sought by transportation planners and engineers. This section discusses the importance of accuracy of truck vehicle miles traveled and data collection methods for estimating the accuracy of truck traffic data.

8.1.1 Importance of Accuracy of Truck VMT

The truck traffic counts and VMT by truck type are vital inputs to the design and operation of an efficient highway system. In particular, heavy truck VMT is important as the number of heavy vehicles on a highway affects traffic operation, safety, and pavement performance (Hallmark 2002).

According to Hallmark (2002), the prediction error was the lowest for the method that developed expansion factors separately for the different truck groups for both single- and multi-unit trucks. This indicates that the use of expansion factors specific to heavy vehicle classes results in better estimates of AADT, and subsequently, VMT, than using aggregate expansion factors and applying a percentage of trucks.

As the estimation of truck VMT serves as a vital input for geometric and pavement design of highways, truck VMT is also a key factor in traffic safety. VMT estimates by vehicle class are needed to determine crash rates by vehicle class and compare them across vehicle class. A better understanding of where trucks are located in the highway system will assist in evaluating the causes of truck-related crashes and consequently in minimizing fatalities and injuries that result from such crashes. Also, reliable estimates of truck VMT are essential for maintaining accurate inventories of emissions.

8.1.2 Data Collection Methods for Estimating Accuracy of Traffic Data

To evaluate the accuracy of truck traffic data, Lomax et al. (2001) surveyed the archived operation data collection methods of 10 major cities in the United States. They summarized the archived data collection methods and their data quality as shown in Table 8-1.

Table 8-1: Summaries of Archived Operations Data Collection Methods and Data Quality (Lomax et al. 2001)

City Name	Data Collection Method	Average Sensor Spacing (mile)	Speed Derivation Method	Submitted Derivation method		Average Percentage of Records Passing Quality Control Test (percent)[1,2]	
				Roadway	Time Interval (min)	Volume Records (percent)	Speed Records (percent)
Atlanta, GA	Video image processing	0.4	Direct measurement	By lane	15	89	89
Cincinnati, OH/KY	Mainly single inductance loops; some video and radar	0.5	Estimated[3]	By direction	15	93	93
Detroit, MI	Double inductance loops	2.0	Direct measurement	By lane	1	99.7	99.7
Hampton Roads, VA	Double inductance loops	0.5	Direct measurement	By lane	2	91	91
Houston, TX	Regional AVI[4] (probe reader[5])	2.8	Direct measurement	By link	Individual vehicle travel time	99.0	94.7
Minneapolis, MN	Single inductance loops	0.5	Estimated	By lane	5	99.9	87
Phoenix, AZ	Double inductance loops; Some passive loops	0.3	Direct measurement	By lane	5	94	84
San Antonio, TX	Mainly double inductance loops; some acoustic detectors	0.5	Direct measurement	By lane	20-30 seconds	99	99
Seattle, WA	Single inductance loops	0.4	Estimated	By lane	5	100	100

Notes:
[1] Quality control was performed on original data as submitted which varied from 20sec to 15min.
[2] Percentage of records based upon the average across all days of the year 2000. Or as otherwise noted
[3] Calculated using volume and occupancy measurements; formulae vary from city to city
[4] AVI = Automated Vehicle identification
[5] Volumes were estimated from AADTs provided by TxDOT.

8.2 Truck Traffic Data Collection Methodology

To prepare truck traffic data on state highways for validating a truck assignment model, one of the findings of a previous study by Saito and Jin (2009) was used for adjusting truck

traffic data collected by ATRs. To obtain adjusted tuck traffic data with increased accuracy error rates by region were developed which were used for adjusting raw truck traffic data obtained by UDOT's ATRs. Truck traffic data from all ATR stations for two years, 2002 and 2008, were obtained from UDOT. Error rates which were estimated from the ground truth data obtained at ATR stations included in Saito and Jin's previous study (2009) were recalculated for each region. These error rates by region were applied to raw truck traffic data to estimate truck traffic at all ATR stations with increased accuracy. The reason of using 2008 data of ATR stations was that the data collection for Saito and Jin's work was done in 2008. Figure 8-1 shows the process of estimating truck traffic data with increased accuracy. The final result of this evaluation process is 2002 truck traffic data with increased accuracy on highway networks which are used for calibrating the truck traffic assignment model for a planning level analysis.

8.3 Estimation Process and Improvement in Truck Traffic Data Accuracy

This section presents conditions of Utah ATR stations, ground truth data collection and reduction, reclassification of truck traffic types of Utah ATR stations, accuracy of total truck traffic, and accuracy after regrouping of vehicle classes by vehicle length.

8.3.1 Conditions of Utah ATR Stations

Truck traffic data on Utah's highways are collected together with other traffic data including motorcycles, passenger cars, and buses at UDOT's ATR stations. UDOT has three different traffic data types collected at its ATR stations: volume only, volume by length, and volume by vehicle class. They are called "volume," "length," and "class" counters by UDOT personnel. Volume counters are typically inductive loops embedded in pavement and count the number of axles which is converted to the number of vehicles.

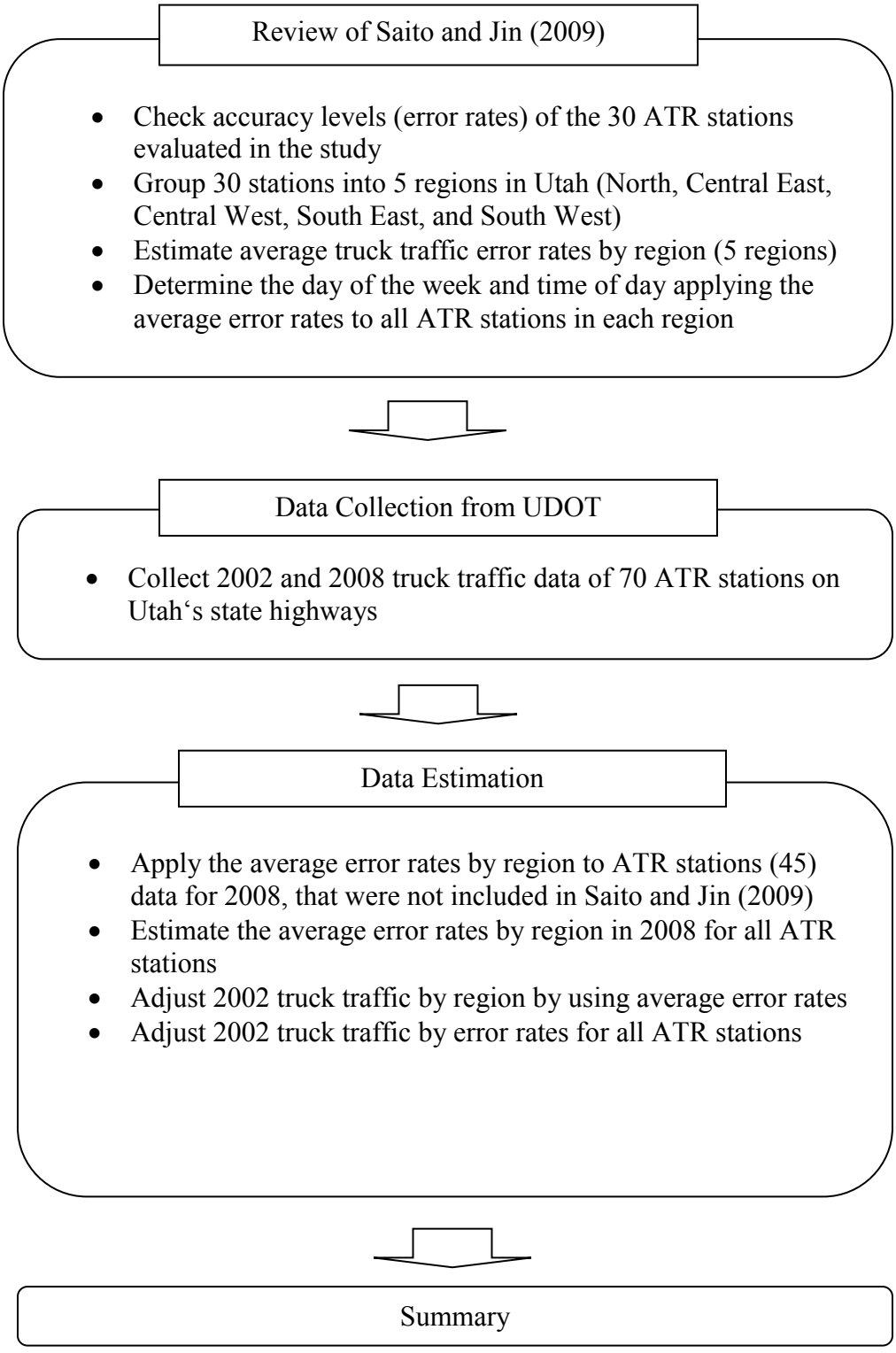


Figure 8-1: Methodology for Collecting Truck Traffic Data With Increased Accuracy

Length counters are typically inductive loops (some are microwave sensors) that count the number of vehicles by length group. Class counters are Piezo cable sensors and part of the weigh-in-motion (WIM) system. They count the number of vehicles by FHWA vehicle classification (FHWA 2001).

Table 8-2 shows a summary of UDOT's ATR stations. At the time of the study done by Saito and Jin (2009), 90 stations of the 95 ATR stations were operating. Five stations were not functioning for various reasons such as under construction or simply stopped functioning. Refer to Appendix 7 for Utah's 90 ATR stations including ATR series number, location, data collection type, and data collection method.

Table 8-2: Types of UDOT's ATR Stations

Number of Operating Stations		
Type of Data	Collection Method	Number of Station
Class	Loops	2
Length	Loops	70
	Microwave	3
Volume	Loops	15
Total		90

8.3.2 Ground Truth Data Collection and Reduction

Ground truth data collection was carried out from May 5, 2008 to July 18, 2008. Thirty ATR stations were chosen in order to use a sampling method to collect ground truth truck traffic data. Data collection was done twice at each ATR station at the same time of day, and on the same day of the week one to seven weeks apart. Table 8-3 shows a summary of ground truth data collection. Interstate highways had 14 ATR stations and non-interstate highways had 16 ATR stations. Because two class-type ATR stations were located only on non-interstate highways, the remaining 28 length-type ATR stations were evenly allocated in interstate and non-interstate

highways. Three length-type ATR stations equipped with a microwave sensor were included in the analysis, although there were only three stations of this type.

Table 8-3: Summary of the Full-Scale Ground Truth Data Collection (Source: Saito and Jin 2009)

Highway Class	#	Station by Routes	Data Collection Method
Interstate Highway	14	I-15 (8): #306, #310, #349, #401, #403, #502, #611,#613 I-70 (1): #404 I-80 (3): #318, #323, #615 I-84 (2): #307, #614	Class (0) Length (14): Loop (11), **Microwave (3) (#611, #614, #615)**
Non-Interstate Highway	16	US-6 (2): #321, #507 US-89 (2): #316, #411 One Station in a Route: SR-10 (**#427**), SR-11 (#412), SR-21 (#405), SR-28 (#431), SR-35 (**#512**), SR-39 (#320), US-40 (#509), SR-73 (#618), US-91 (#363), US-189 (#350), US-191 (#421), SR-218 (#510)	**Class (2): #427, #512** Length: Loop (14)
Total	30	Interstae:14 Non-Interstate: 16	Class: 2 Length: 28

Ground truth data were then reduced and analyzed. The EZ MPEG (a type of video format) to audio video interleave (AVI) converter was used in order to allow faster and more convenient data reduction process. The field data reduction was performed in the following steps. Also, a comparison of truck traffic data between ground truth data and the data from the ATR stations from UDOT were performed (Saito and Jin 2009):

1) Convert video to AVI file using the EZ MPEG to AVI converter program,
2) Analyze frame by frame using the DelayAnnotator,
3) Count vehicles by station, by hour, and by vehicle class, and
4) Enter traffic counts in Excel spreadsheet for statistical analyses.

8.3.3 Reclassification of Truck Traffic Types of Utah ATR Stations

With the help of UDOT, the traffic data from the ATR stations for the same data collection date and time as those for the ground truth data collection were obtained. After data

reduction, the vehicles in the ground truth data were categorized into FHWA's 13 vehicle classes. The traffic count data from the ATR stations were then categorized into length groups used by UDOT. Length-type detectors categorize vehicles into five length groups consisting of 0 to 16-feet, 16.1 to 30-feet, 30.1 to 50-feet, 50.1 to 79-feet, and greater then 79-feet length groups.

To compare the two vehicle counts, these two different categories were matched using the standard criteria of vehicle length, described in the AASHTO's *A Policy on Geometric Design of Highways and Streets, 5th Edition* (AASHTO 2004). Table 8-4 shows the results of the regrouping of FHWA's 13 vehicle classes that match UDOT's five length groups.

Table 8-4: Regrouping of FHWA's 13 Vehicle Classes

Length Group by UDOT	Regrouped Ground Truth Data
16 Feet (up to 16-ft)	Class 1 and Class 2
30 Feet (16.1ft to 30-ft)	Class 3
50 Feet (30.1 ft to 50-ft)	Class 4 to Class 8
79 Feet (50.1 ft to 79-ft)	Class 9 to Class 12
> 79 Feet	Class 13

8.3.4 Accuracy of Total Truck Traffic

Two main factors, the error rate and the difference between ground truth traffic volume and the traffic volume from ATR stations, were first analyzed. These two factors reflected the performance of traffic counters and were identified as such in Saito and Jin's (2009). The difference between the ground truth traffic volume and the traffic volume from ATR station, (ATR traffic volume – Ground truth traffic volume), was determined and the error rate was computed according to Equation 8-1:

$$ErrorRate(\%) = \frac{ATRTrafficVolume - GroundTruthTrafficVolume}{GroundTruthTrafficVolume} \times 100 \qquad (8\text{-}1)$$

The error rate is an indicator of accuracy of traffic count data. A larger error rate means a lower accuracy while a smaller error rate means a higher accuracy. Error rates 5 percent and 10 percent were used as the target tolerance values, which were identified by the state DOT survey conducted by Saito and Jin (2009).

Table 8-5 shows error rates of the length groups and the entire truck traffic data (Total). The average error rate of the entire data was 0.0012 (only 0.12 percent off the ground truth data) and the standard deviation was 0.0717. The standard deviation of error rate without the outlier (0.0717) was slightly less than that with the outlier (0.0821). On the other hand, the error rate of each length group significantly varied as shown in Table 8-5, ranging from 20.1244 of the 30-ft length group to -0.0304 of the 79-ft length group, while the standard deviation of each length group varied from 20.4194 of the 30-ft length group to 0.2173 of the 16-ft length group. Positive error rates are overestimation while negative error rates are underestimation.

Confidence intervals of each vehicle group and the total were computed at the 95 percent confidence level. As shown in Table 8-5, the confidence interval of the total data ranged from -0.0176 to 0.0200 containing zero, meaning the difference was statistically zero. Using the same logic, all length groups but the 79-ft length group had the statistically significant difference.

In terms of reliability of the average value, the confidence interval can be used. The interval length of the total data is the narrowest (0.0376 = 0.0200-(-0.0176)) and that of the 30-ft length group was the widest (10.6963 = 25.4726-14.7763), meaning the average value of total traffic data is most reliable and the 30-ft length group was least reliable.

Table 8-5: Error Rates Without Outliers (All Vehicle Length Group)

Vehicle Length	16 Feet	30 Feet	50 Feet	79 Feet	> 79 Feet	Total
Average	-0.2004	20.1244	-0.4332	-0.0304	1.8509	0.0012
Variance	0.0472	416.9507	0.0251	0.0889	22.4007	0.0051
S D*	0.2173	20.4194	0.1583	0.2982	4.7329	0.0717
Upper Bound of CI	-0.1434	25.4726	-0.3917	0.0477	3.0905	0.0200
Lower Bound of CI**	-0.2573	14.7763	-0.4747	-0.1085	0.6113	-0.0176

* SD: Standard deviation
** CI: Confidence interval

8.3.5 Accuracy After Regrouping of Vehicle Classes by Vehicle Length

Regrouping of vehicle classes into vehicle length groups became necessary to continue statistical analyses because error rates by original five vehicle length group did not show a clear picture of accuracy level of truck traffic data. The 16-ft and 30-ft length groups were combined into one group, called as a ―passenger car group" and the remaining longer vehicles were combined into a ―truck" group. This reclassification helped clearly understand the issue of truck traffic data accuracy level as presented in the subsequent sections.

A major objective of the study of Saito and Jin (2009) was to evaluate the data accuracy of truck counts; hence, error rates were computed for the reclassified length groups. Table 8-6 shows the error rates for the reclassified length groups and the total traffic count. The error rate of passenger car group (shorter than or equal to 30 feet) was 0.0573 and that of the truck group (longer than 30 feet) was -0.2113. This means that the passenger car group was over counted by 5.73 percent and the truck group was under counted by 21.13 percent. Since neither group contains zero in the confidence interval, these differences were statistically significant at a 95 percent confidence level.

As shown in Table 8-6, the confidence interval of the passenger car group was 0.0515 = 0.0831-0.0316, while that of the truck group (over 30-ft) was 0.0876 = (-0.1675)-(-0.2551). Hence, the average error rate of the passenger car group was slightly more reliable than that of

the truck group, meaning that the confidence interval of the passenger car group (0.0515) was narrower than that of the truck group (0.0876). The number of samples is a parameter for evaluating if there were an adequate number of samples collected to infer the accuracy level of truck traffic at a 95 percent confidence level. The number of samples, *N*, is determined using the standard error of the mean formula in Equation 8-2:

Table 8-6: Error Rates of Two Vehicle Length Groups

	Passenger Car Group (Shorter than or equal to 30 feet)	Truck Group (Longer than 30 feet)	Total
Average	0.0573	-0.2113	0.0012
Variance	0.0097	0.0279	0.0051
S D*	0.0983	0.1672	0.0717
Upper Bound of CI**	0.0831	-0.1675	0.0200
Lower Bound of CI	0.0316	-0.2551	-0.0176

where,

E = standard error of the mean

z = z-score, 1.96 for a 95 percent confidence level

σ = standard deviation

N = Number of samples

Using equation 8-2, the required number of samples given the standard deviation of the sample data set was determined for the 95 percent confidence level at 5 percent and 10 percent tolerance levels. Table 8-7 shows the required number of samples. For each length group, the number of samples available for the analysis was larger than the required number of samples except for the 30-ft and greater than 79-ft length group for the tolerance (E) level of 10 percent. For the 5 percent tolerance level, the available number of samples (54) was enough for the

regrouped passenger car and truck groups but, not adequate for original five vehicle groups except for the 50-ft length and total count groups.

Table 8-7: Number of Samples Needed for the 95 Percent Confidence Level

Total-Without 3 stations	18-ft	30-ft	50-ft	79-ft	> 79-ft	Total	Passenger Car (Shorter than or equal to 30 feet))	Truck (Longer than 30 feet)
E=5 percent	73	640,703	39	137	34,422	8	15	43*
E=10 percent	18	160,176	10	34	8,605	2	4	11

* The field data samples used for the analysis was 56; hence, as long as tolerance is 5 percent or 10 percent, the number of samples was adequate for the two reclassified vehicle length groups.

8.4 Estimation Procedure of Truck Traffic With Increased Accuracy

To apply the accuracy levels (the error rates), which were presented in the previous section, to the truck traffic data obtained at ATR‘s of two years, 2002 and 2008, and finally to use the truck traffic data in the validation of a truck traffic assignment procedure, the following steps were followed:

1) Select the time and the day of application of error rates obtained through analyzing the time and day of the ground truth data collection and error rate of truck traffic.
2) Group ATR stations by region, by characteristics of traffic flow, and by highway functional class.
3) Estimate average accuracy levels (average error rates) of truck traffic by region in 2008 for all ATR stations to estimate truck traffic for two years 2002 and 2008.
4) Apply the average accuracy level by region (average error rate) to ATR stations not included in Saito and Jin (2009) in 2008 (There are 45 of them).
5) Estimate truck traffic data with year 2002 on Utah‘s highway networks for calibration of a statewide truck traffic assignment procedure discussed in Chapter 9.

8.4.1 Determination of the Day and Time for Analysis

In ground truth data collection, the number of ATR station was 30, and data collection was made twice at each ATR station. Table 8-8 shows the number of data collected on each week day of the week. Tuesday had the highest number of data collection followed by Wednesday and Friday.

Table 8-8: Data Collection Day of Ground Truth Data

Day	# of Data Collection
Monday	12
Tuesday	18
Wednesday	14
Thursday	2
Friday	14
	60

Table 8-9 shows the distribution of the collection times of ground truth data. Among 12 hourly data collection slots, 11:00AM to 12:00PM, 1:00 to 2:00PM and 3:00 to 4:00PM had the highest number of ground truth data collection.

Table 8-10 and Table 8-11 show the error rates by day and by time for applying error rates of the representative ATR stations for the entire traffic and vehicle, respectively. For the entire data collection time zone, average error rates of total traffic for the PM time zone (-0.0037) were lower than that for the AM time zone (0.0127). And the Wednesday average error rate of total traffic (0.0042) is the lowest among the average error rates of the five week days.

Table 8-9: Data Collection Time of Ground Truth Data

Time	#	Time Zone	Total
7:00-8:00AM	4	AM	28
8:00-9:00AM	2		
9:00-10:00AM	4		
10:00-11:00AM	8		
11:00-12:00PM	10		
12:00-1:00PM	4	PM	32
1:00-2:00PM	10		
2:00-3:00PM	2		
3:00-4:00PM	10		
4:00-5:00PM	2		
6:00-7:00PM	4		
Total	60	Total	60

On the other hand, the average error rates of truck traffic for the AM time zone (-0.1610) were lower than that for the PM time zone (0.2324). Even though the Thursday average error rate of truck traffic (-0.0520) was the lowest among the average error rates of the five days, it was not certain that Thursday‘s average error rate would be the lowest accurate error rate because the number of samples collected were very small, just four samples.

Table 8-10: Error Rates of ATR Stations Used for Ground Truth Data Collection (Total)

Main Contents		Average	S D	Lower bound CI	Upper bound CI
Data Collection Time Zone	AM	0.0127	0.0944	-0.0309	0.0563
	PM	-0.0037	0.0606	-0.0229	0.0156
Data Collection Day of the Week	Monday	-0.0178	0.0797	-0.0629	0.0273
	Tuesday	-0.0102	0.0336	-0.0266	0.0063
	Wednesday	0.0042	0.0862	-0.0410	0.0493
	Thursday	0.1002	0.1234	-0.0709	0.2712
	Friday	0.0135	0.0665	-0.0241	0.0511

Table 8-11: Error Rates of ATR Stations Used for Ground Truth Data Collection (Truck)

Main Contents		Average	S D	Lower bound CI	Upper bound CI
Data Collection Time Zone	AM	-0.1610	0.1742	-0.2415	-0.0805
	PM	-0.2324	0.1618	-0.2839	-0.1810
Data Collection Day of the Week	Monday	-0.1862	0.2024	-0.3007	-0.0716
	Tuesday	-0.2678	0.1371	-0.3350	-0.2006
	Wednesday	-0.1818	0.1928	-0.2828	-0.0808
	Thursday	-0.0520	0.0807	-0.1639	0.0598
	Friday	-0.2313	0.1265	-0.3029	-0.1597

Therefore, based on the review of the error rates and their confidential intervals by time and day of the ground truth data collection, the time zone, 11:00AM to 12:00PM, on Wednesday was chosen as the best data collection time and day zone for applying the error rates obtained from the 30 ATR stations used for the ground truth data collection to the entire ATR stations.

8.4.2 Allocation of ATR Stations to Each Region

All ATR stations were classified by region and by highway functional class. The state of Utah was divided into five regions consisting of the north region, east region and west region in central Utah, and east region and west region in southern Utah, considering the size of region and the regional allocation of truck traffic. Table 8-12 shows the ATR stations by region used for ground truth data collection. Table 8-13 shows the remaining ATR stations by region.

Table 8-12: ATR Stations Used in the Ground Truth Data Collection by Region

Covered Area		#	ATR Station Numbers	
			Interstate Highway (Freeway)	Highway
North		6	310, 613, 614	320, 363, 510
Central	East	3	318	509, 512
	West	10	306, 307, 323, 349, 611, 615	316, 321, 350, 618
South	East	4	404	421, 427, 507
	West	7	401, 403, 502	405, 411, 412, 431
Total		30	14	16

Table 8-13: Remaining ATR Stations by Region

Covered Area		#	ATR Station Numbers	
			Interstate Highway (Freeway) (I)	Non-Interstate Highway (NI)
North		6	-	303, 304, 362, 420, 430, 511
Central	East	6	309, 315	308, 424, 425, 606
	West	18	301, 340, 351, 353 612, 616, 617	312, 317, 322, 335, 407, 408, 416, 601, 609, 619, 704
South	East	5	-	314, 324, 414, 418, 506
	West	11	313, 400, 513	305, 382, 402, 415, 503, 504, 508, 621
Total		45	12	33

8.4.3 Data Collection and Reduction

With the help of UDOT, traffic counts of all ATR stations by direction, by lane, and by vehicle size between 11:00AM and 12:00PM on May 22, Wednesday, 2002 and May 14, Wednesday, 2008 were obtained from UDOT‘s traffic count data program. These data sets were reduced into Microsoft Excel spreadsheet by direction and by vehicle size.

8.4.4 Estimation of Average Error Rates by Region

Based on the error rates shown in Table 8-14, average error rates of all ATR stations were recalculated by region and by vehicle length. Table 8-14 shows the average error rates by region and the state of Utah including their standard deviations.

8.4.5 Truck Traffic Data With Increased Accuracy for 2002

Using the error rates by region and by vehicle length shown in Table 8-14, traffic by vehicle length of all ATR stations were estimated. Table 8-15 shows the comparison of hourly traffic volume from the ATR stations with estimated hourly traffic volume with increased accuracy for year 2002. These data will be used for calibrating the truck traffic assignment procedure presented in Chapter 9.

Table 8-14: Average Error Rates of Truck Traffic Data for ATR Stations by Region

	16 Feet	30 Feet	50 Feet	79 Feet	> 79 Feet	All Group
North-I	-0.0467	6.9024	-0.3803	-0.1225	1.1143	0.0316
North-NI	-0.1441	9.6452	-0.5325	-0.1846	2.5000	-0.0067
CEast-I	-0.1673	17.7500	-0.5579	0.0057	1.0000	0.0122
CEast-NI	-0.1927	12.8750	-0.5000	-0.3654	-0.6471	-0.0582
CWest-I	-0.2910	8.2409	-0.4096	-0.0998	1.6684	-0.0116
CWest-NI	-0.1784	13.4930	-0.4966	0.0952	0.8571	-0.0120
SEast-I	-0.2549	8.5765	-0.5143	-0.0308	0.3750	-0.0143
SEast-NI	-0.0299	33.0000	-0.5125	-0.2424	0.9231	0.0607
SWest-I	-0.1096	25.2222	-0.3333	-0.0794	1.0833	-0.0320
SWest-NI	-0.3062	19.5714	-0.3485	0.0333	0.1333	0.0082
Total Average	-0.1721	16.3000	-0.4586	-0.0990	0.9008	-0.0022
Total SD	0.0944	8.5766	0.0822	0.1377	0.8498	0.0330

* I: Interstate Highway, NI: Non-Interstate Highway.
**: CEast: Eastern area in the Central Utah, CWest: Western area in the Central Utah
SEast: Eastern area in the Southern Utah, SWest: Western area in the Southern Utah

8.5 Chapter Summary

Truck traffic significantly alters the amount of user costs incurred by delays caused by work zones and incidents. Truck traffic also plays an important role in many aspects of UDOT‘s daily activities, including transportation planning, highway operational analysis, and design of pavement and bridges. The accuracy of truck traffic data had not been clearly known by UDOT engineers until the study by Saito and Jin (2009) was conducted.

This chapter discussed a method of improving the accuracy of truck traffic data collected at ATR stations on Utah‘s highways. The method is based on the findings presented by Saito and Jin (2009). Truck traffic volumes with increased accuracy obtained from the method is used to calibrate the truck traffic assignment procedure discussed in the next chapter.

Table 8-15: Comparison of Hourly Traffic Volume From ATR Stations With Estimated Hourly Traffic Volume With Increased Accuracy Level for Year 2002

ATR #	Direction	Traffic Hourly Volume from ATR						Traffic Hourly Volume With Increased Accuracy					
		15 Feet	24 Feet	50 Feet	75 Feet	> 75 Feet	All Lengths	15 Feet	24 Feet	50 Feet	75 Feet	> 75 Feet	All Lengths
301	East	755	98	61	108	3	1025	1065	11	103	120	1	1300
	West	809	170	40	83	12	1114	1141	18	68	92	4	1324
	Total	1564	268	101	191	15	2139	2206	29	171	212	6	2624
302	North					0		0	0	0	0	0	0
	South	2180	738	188	155	66	3327	3075	80	318	172	25	3670
	Total	2180	738	188	155	66	3327	3075	80	318	172	25	3670
303	North	106	37	15	7	1	166	124	3	32	9	0	168
	South	131	37	12	5	2	187	153	3	26	6	1	189
	Total	237	74	27	12	3	353	277	7	58	15	1	357
305	North	70	9	4	6	0	89	101	0	6	6	0	113
	South	61	8	12	3	0	84	88	0	18	3	0	110
	Total	131	17	16	9	0	173	189	1	25	9	0	223
306	North	1150	1144	122	146	55	2617	1622	124	207	162	21	2135
	South	1180	1159	138	160	65	2702	1664	125	234	178	24	2226
	Total	2330	2303	260	306	120	5319	3286	249	440	340	45	4361
309	East	7	92	131	17	165	412	8	5	296	17	83	409
	West	4	90	131	17	153	395	5	5	296	17	77	399
	Total	11	182	262	34	318	807	13	10	593	34	159	808
310	North	153	33	21	71	3	281	160	4	34	81	1	281
	South	143	43	17	38	6	247	150	5	27	43	3	229
	Total	296	76	38	109	9	528	310	10	61	124	4	510
312	East	184	10	20	31	4	249	224	1	40	28	2	295
	West	152	33	9	33	3	230	185	2	18	30	2	237
	Total	336	43	29	64	7	479	409	3	58	58	4	532
313	North	193	14	26	67	7	307	217	1	39	73	3	332
	South	221	43	17	65	16	362	248	2	26	71	8	354
	Total	414	57	43	132	23	669	465	2	65	143	11	686
314	North	146	34	22	31	5	238	150	1	45	41	3	240
	South	118	27	18	28	4	195	122	1	37	37	2	198
	Total	264	61	40	59	9	433	272	2	82	78	5	439
315	North	2479	354	168	202	43	3246	2977	19	380	201	22	3598
	South	0	0	0	0	0	0	0	0	0	0	0	0
	Total	2479	354	168	202	43	3246	2977	19	380	201	22	3598

Table 8-15: Continued

ATR #	Direction	Traffic Hourly Volume from ATR						Traffic Hourly Volume With Increased Accuracy					
		15 Feet	24 Feet	50 Feet	75 Feet	> 75 Feet	All Lengths	15 Feet	24 Feet	50 Feet	75 Feet	> 75 Feet	All Lengths
316	North	464	204	41	26	8	743	565	14	81	24	4	688
	South	505	241	37	15	13	811	615	17	73	14	7	725
	Total	969	445	78	41	21	1554	1179	31	155	37	11	1414
317	East	53	10	0	1	0	64	65	1	0	1	0	66
	West	58	7	0	0	0	65	71	0	0	0	0	71
	Total	111	17	0	1	0	129	135	1	0	1	0	137
318	East	136	85	31	113	11	376	163	5	70	112	6	356
	West	175	83	21	82	9	370	210	4	48	82	5	348
	Total	311	168	52	195	20	746	373	9	118	194	10	704
320	East	101	35	15	2	0	153	118	3	32	2	0	156
	West	137	71	6	1	0	215	160	7	13	1	0	181
	Total	238	106	21	3	0	368	278	10	45	4	0	337
321	East	30	9	2	2	0	43	37	1	4	2	0	43
	West	33	6	7	0	0	46	40	0	14	0	0	54
	Total	63	15	9	2	0	89	77	1	18	2	0	97
323	East	132	27	19	78	4	260	186	3	32	87	1	309
	West	113	36	23	76	7	255	159	4	39	84	3	289
	Total	245	63	42	154	11	515	346	7	71	171	4	599
324	East	48	18	7	19	0	92	49	1	14	25	0	89
	West	36	14	10	21	0	81	37	0	21	28	0	86
	Total	84	32	17	40	0	173	87	1	35	53	0	175
335	East	682	166	18	3	2	871	830	11	36	3	1	881
	West	711	122	13	1	4	851	865	8	26	1	2	903
	Total	1393	288	31	4	6	1722	1695	20	62	4	3	1784
349	North	443	143	53	93	38	770	625	15	90	103	14	848
	South	459	95	60	107	25	746	647	10	102	119	9	888
	Total	902	238	113	200	63	1516	1272	26	191	222	24	1735
350	North	784	135	21	12		955	954	9	42	11	2	1018
	South	862	209	23	9	1	1104	1049	14	46	8	1	1118
	Total	1646	344	44	21	4	2059	2003	24	87	19	2	2136
351	East	2353	376	92	59	23	2903	3319	41	156	66	9	2903
	West					0		0	0	0	0	0	0
	Total	2353	376	92	59	23	2903	3319	41	156	66	9	2903
362	East	19	27	5	1	1	53	22	3	11	1	0	37
	West	41	11	2	3	0	57	48	1	4	4	0	57
	Total	60	38	7	4	1	110	70	4	15	5	0	94

Table 8-15: Continued

ATR #	Direction	Traffic Hourly Volume from ATR						Traffic Hourly Volume With Increased Accuracy					
		15 Feet	24 Feet	50 Feet	75 Feet	> 75 Feet	All Lengths	15 Feet	24 Feet	50 Feet	75 Feet	> 75 Feet	All Lengths
363	North	376	43	21	34	3	477	439	4	45	42	1	531
	South	86	12	8	9	379	494	100	1	17	11	108	238
	Total	462	55	29	43	382	971	540	5	62	53	109	769
382	East	53	16	9	0	0	78	76	1	14	0	0	91
	West	45	5	5	0	0	55	65	0	8	0	0	73
	Total	98	21	14	0	0	133	141	1	21	0	0	164
400	North	415	66	53	130	10	674	466	3	80	141	5	694
	South	243	81	33	81	8	446	273	3	50	88	4	417
	Total	658	147	86	211	18	1120	739	6	129	229	9	1111
401	North	365	26	42	141	12	586	410	1	63	153	6	633
	South	243	51	30	79	16	419	273	2	45	86	8	413
	Total	608	77	72	220	28	1005	683	3	108	239	13	1046
402	East	287	120	31	7	5	450	414	6	48	7	4	478
	West	344	116	26	3	4	493	496	6	40	3	4	548
	Total	631	236	57	10	9	943	910	11	87	10	8	1026
403	North	322	8	41	129	8	508	362	0	62	140	4	567
	South	301	13	30	78	6	428	338	0	45	85	3	471
	Total	623	21	71	207	14	936	700	1	107	225	7	1039
404	East	24	0	2	2	171	199	32	0	4	2	124	163
	West	104	39	17	34	7	201	140	2	35	35	5	217
	Total	128	39	19	36	178	400	172	2	39	37	129	380
405	East	32	10	9	0	0	51	46	0	14	0	0	60
	West	28	11	7	2	0	48	40	1	11	2	0	54
	Total	60	21	16	2	0	99	86	1	25	2	0	114
407	North	200	12	10	2	4	228	243	1	20	2	2	268
	South	172	12	6	2	1	193	209	1	12	2	1	224
	Total	372	24	16	4	5	421	453	2	32	4	3	493
411	East	38	11	9	4	2	64	55	1	14	4	2	75
	West	38	30	23	12	6	109	55	1	35	12	5	108
	Total	76	41	32	16	8	173	110	2	49	15	7	183
412	North	98	26	17	2	1	144	141	1	26	2	1	171
	South	85	31	8	8	3	135	123	2	12	8	3	147
	Total	183	57	25	10	4	279	264	3	38	10	4	318
414	North	14	6	2	1	0	23	14	0	4	1	0	20
	South	12	13	12	0	0	37	12	0	25	0	0	37
	Total	26	19	14	1	0	60	27	1	29	1	0	57

Table 8-15: Continued

ATR #	Direction	Traffic Hourly Volume from ATR						Traffic Hourly Volume With Increased Accuracy					
		15 Feet	24 Feet	50 Feet	75 Feet	> 75 Feet	All Lengths	15 Feet	24 Feet	50 Feet	75 Feet	> 75 Feet	All Lengths
415	North	29	11	6	5	0	51	42	1	9	5	0	56
	South	20	6	5	7	3	41	29	0	8	7	3	46
	Total	49	17	11	12	3	92	71	1	17	12	3	103
416	North	41	11	5	3	0	60	50	1	10	3	0	63
	South	29	8	4	1	0	42	35	1	8	1	0	45
	Total	70	19	9	4	0	102	85	1	18	4	0	108
418	North	78	6	13	17	2	116	80	0	27	22	1	131
	South	125	10	22	22	2	181	129	0	45	29	1	204
	Total	203	16	35	39	4	297	209	0	72	51	2	335
420	North	58	12	11	20	1	102	68	1	24	25	0	117
	South	62	37	17	22	1	139	72	3	36	27	0	140
	Total	120	49	28	42	2	241	140	5	60	52	1	257
421	North	105	75	15	27	3	225	108	2	31	36	2	178
	South	112	35	17	27	1	192	115	1	35	36	1	188
	Total	217	110	32	54	4	417	224	3	66	71	2	366
424	North	44	5	11	1	1	62	55	0	22	2	3	81
	South	23	16	6	6	1	52	28	1	12	9	3	54
	Total	67	21	17	7	2	114	83	2	34	11	6	135
425	East	220	66	22	8	2	318	273	5	44	13	6	340
	West	196	28	17	15	2	258	243	2	34	24	6	308
	Total	416	94	39	23	4	576	515	7	78	36	11	648
427	North	64	91	8	5	17	185	66	3	16	7	9	100
	South	61	30	12	4	17	124	63	1	25	5	9	102
	Total	125	121	20	9	34	309	129	4	41	12	18	203
430	East	6	5	3	1	0	15	7	0	6	1	0	15
	West	4	0	2	8	0	14	5	0	4	10	0	19
	Total	10	5	5	9	0	29	12	0	11	11	0	34
431	North	40	18	13	7	24	102	58	1	20	7	21	106
	South	36	14	10	9	1	70	52	1	15	9	1	78
	Total	76	32	23	16	25	172	110	2	35	15	22	184
502	North	193	18	40	68	5	324	217	1	60	74	2	354
	South	227	17	36	83	16	379	255	1	54	90	8	407
	Total	420	35	76	151	21	703	472	1	114	164	10	761
503	North	99	21	26	10	11	167	143	1	40	10	10	203
	South	113	40	33	11	18	215	163	2	51	11	16	242
	Total	212	61	59	21	29	382	306	3	91	20	26	445

Table 8-15: Continued

ATR #	Direction	Traffic Hourly Volume from ATR						Traffic Hourly Volume With Increased Accuracy					
		15 Feet	24 Feet	50 Feet	75 Feet	> 75 Feet	All Lengths	15 Feet	24 Feet	50 Feet	75 Feet	> 75 Feet	All Lengths
504	North	20	4	4	3	0	31	29	0	6	3	0	38
	South	31	3	4	3	2	43	45	0	6	3	2	56
	Total	51	7	8	6	2	74	74	0	12	6	2	94
506	North	43	20	14	2	0	79	52	1	28	2	0	83
	South	48	9	3	7	0	67	58	1	6	6	0	71
	Total	91	29	17	9	0	146	111	2	34	8	0	155
508	East	124	35	18	60	1	238	179	2	28	58	1	267
	West	88	23	5	35	29	180	127	1	8	34	26	195
	Total	212	58	23	95	30	418	306	3	35	92	26	462
509	East	297	59	9	23	5	393	368	4	18	36	14	441
	West	280	39	24	19	3	365	347	3	48	30	9	436
	Total	577	98	33	42	8	758	715	7	66	66	23	877
510	East	7	78	16	2	1	104	8	7	34	2	0	52
	West	52	37	14	2	1	106	61	3	30	2	0	97
	Total	59	115	30	4	2	210	69	11	64	5	1	149
511	North	128	8	6	0	0	142	150	1	13	0	0	163
	South	131	17	3	0	0	151	153	2	6	0	0	161
	Total	259	25	9	0	0	293	303	2	19	0	0	324
512	East	5	3	0	0	0	8	6	0	0	0	0	6
	West	4	1	1	0	0	6	5	0	2	0	0	7
	Total	9	4	1	0	0	14	11	0	2	0	0	13
513	North	268	92	33	148	18	559	301	4	50	161	9	523
	South	253	41	21	73	6	394	284	2	32	79	3	399
	Total	521	133	54	221	24	953	585	5	81	240	12	923
601	East	8	4	0	0	0	12	10	0	0	0	0	10
	West	7	5	2	0	0	14	9	0	4	0	0	13
	Total	15	9	2	0	0	26	18	1	4	0	0	23
606	East	190	84	19	0	0	293	235	6	38	0	0	279
	West	121	199	9	0	0	329	150	14	18	0	0	182
	Total	311	283	28	0	0	622	385	20	56	0	0	462
611	North	1428	557	111	145	23	2264	2014	60	188	161	9	2432
	South	1228	464	115	169	34	2010	1732	50	195	188	13	2178
	Total	2656	1021	226	314	57	4274	3746	110	383	349	21	4610

9 ASSIGNMENT OF TRUCK TRIPS TO UTAH'S TRUCK ROUTES

The commodity flow distributed among TTAZs by the statewide commodity flow distribution model using composite friction factors developed in Chapter 7 needs to be assigned to Utah's highway networks together with commodity flows produced from Utah's counties and attracted to Utah's counties from the other states. Distributed commodity flows are first converted to the daily truck traffic before they are assigned to Utah's highway networks, specifically to Utah's truck routes. To assign the distributed truck traffic on Utah's truck routes, the TransCAD transportation planning software (Caliper 2008) was used. The trucks distributed to Utah's truck routes are compared with ATR station data discussed in Chapter 8.

This chapter presents the process of truck traffic assignment on Utah's truck routes and consists of methodology, data preparation for developing a truck traffic assignment model, truck traffic assignment to Utah's truck routes using TransCAD and genetic algorithm, analysis results, discussions, and a chapter summary.

9.1 Analysis Process

To assign the distributed truck traffic using the enhanced gravity model presented in Chapter 7 to Utah's truck routes, the traffic assignment technique available in TransCAD was used. Truck traffic data from the ATR stations with increased accuracy discussed in Chapter 8 was used for validating the truck traffic assigned by TransCAD's traffic assignment feature. A genetic algorithm was used to best assign truck traffic to Utah's truck routes given origins and

destinations of trucks. Through truck traffic across Utah are not included because data were not available. To estimate the amount of truck traffic that will travel Utah‘s truck routes, the following steps were taken:

1) Determine Utah‘s produced and attracted commodity flows crossing Utah boundary with surrounding states,
2) Create TTAZs that contains commodity flow produced from and attracted to Utah,
3) Build Utah‘s truck route GIS database,
4) Convert the commodity in tonnage to the number of trucks using the estimation method in Chapter 3 in the FAF 2.2 documents (FHWA 2009),
5) Prepare truck traffic data with improved accuracy level using data from Utah‘s ATR stations for validating the truck traffic assigned by the traffic assignment module of TransCAD,
6) Assign truck traffic to Utah‘s truck routes by the all-or-nothing shortest path algorithm available in TransCAD using link length as the parameter, and
7) Compare the assigned truck traffic on Utah‘s truck routes with the number of trucks recorded at UDOT‘s ATR stations.

9.2 Data Preparation for Developing a Truck Traffic Assignment Model

To assign truck traffic on Utah‘s truck routes using TransCAD, it was necessary to perform four tasks: 1) add new TTAZ for dealing with the commodity flow produced outside and attracted to Utah, 2) build a highway network that includes Utah‘s ATR stations located on Utah‘s truck routes, 3) estimate commodity flow outside of Utah, and 4) convert commodity flow measuring unit (tonnage) into truck traffic using the truck traffic estimation method presented in FAF 2.2 (FHWA 2009).

9.2.1 Commodity Flow by Transportation Mode Crossing Utah's State Borders

Commodity flow data by transportation mode, produced from and attracted to Utah, were extracted from the CFS 2002 (BTS and the U.S. Census Bureau 2009). Table 9-1 shows the commodity flow by transportation mode from Utah to other states (production). The third row for trucks in the table was highlighted to show the ratio of the commodities transported by truck. 73.5% of commodities were transported by truck only from Utah to other states.

Table 9-1: Commodity Flow by Transportation Mode From Utah to Other States (Production)

State of Origin	State of Destination	Mode of transportation	Value		Tons		Ton-miles (1)		Average miles per shipment
			2002 (million $)	Percent of total	2002 (thousands)	Percent of total	2002 (millions)	Percent of total	
Utah	Total	**All modes**	**61,515**	**100.0**	**109,672**	**100.0**	**38,046**	**100.0**	**823**
Utah	Total	**Single modes**	**51,301**	**83.4**	**99,372**	**90.6**	**36,517**	**96.0**	**329**
Utah	Total	Truck	45,233	73.5	72,361	66.0	17,857	46.9	192
Utah	Total	For-hire Truck	28,715	46.7	34,609	31.6	10,664	28.0	608
Utah	Total	Private Truck	16,478	26.8	37,723	34.4	7,177	18.9	63
Utah	Total	Rail	3,366	5.5	21,829	19.9	17,995	47.3	995
Utah	Total	Water	–	–	–	–	–	–	–
Utah	Total	Shallow draft	–	–	–	–	–	–	–
Utah	Total	Great Lakes	–	–	–	–	–	–	–
Utah	Total	Deep draft	–	–	–	–	–	–	–
Utah	Total	Air (including truck and air)	1,659	2.7	S	S	S	S	2,027
Utah	Total	Pipeline (3)	1,044	1.7	5,020	4.6	S	S	S
Utah	Total	**Multiple modes**	**8,458**	**13.7**	**980**	**0.9**	**944**	**2.5**	**1,241**
Utah	Total	Parcel, USPS or courier	8,239	13.4	211	0.2	224	0.6	1,242
Utah	Total	Truck and rail	187	0.3	S	S	S	S	765
Utah	Total	Truck and water	28	–	9	–	30	–	3,190
Utah	Total	Rail and water	–	–	–	–	–	–	–
Utah	Total	Other multiple modes	S	S	S	S	S	S	9
Utah	Total	**Other and unknown modes**	**1,756**	**2.9**	**9,320**	**8.5**	**585**	**1.5**	**164**

*Source: Summarize the downloaded data from BTS & bureau of Census (2009)
**S: Not estimated due to insufficient data

Table 9-2 shows the commodity flow by transportation mode from other states to Utah (attraction). The third row for trucks in the table was highlighted to show the ratio of the

commodities transported by truck. 72.4% of commodities were transported by truck only from other states to Utah.

Table 9-2: Commodity Flow by Transportation Mode From Other States to Utah (Attraction)

State of Destination	State of Origin	Mode of transportation	Value		Tons		Ton-miles (2)		Average miles per shipment
			2002 (million $)	Percent of total	2002 (thousands)	Percent of total	2002 (millions)	Percent of total	
Utah	Total	All modes	62,354	100.0	81,952	100.0	20,439	100.0	819
Utah	Total	Single modes	50,598	81.1	72,285	88.2	19,277	94.3	466
Utah	Total	Truck	45,147	72.4	58,581	71.5	12,719	62.2	281
Utah	Total	For-hire Truck	28,207	45.2	30,469	37.2	9,791	47.9	856
Utah	Total	Private Truck	16,837	27.0	28,067	34.2	2,901	14.2	66
Utah	Total	Rail	3,035	4.9	9,606	11.7	6,522	31.9	771
Utah	Total	Water	–	–	–	–	–	–	–
Utah	Total	Shallow draft	–	–	–	–	–	–	–
Utah	Total	Great Lakes	–	–	–	–	–	–	–
Utah	Total	Deep draft	–	–	–	–	–	–	–
Utah	Total	Air (including truck and air)	1,436	2.3	12	–	24	0.1	2,397
Utah	Total	Pipeline (3)	980	1.6	4,086	5.0	S	S	S
Utah	Total	Multiple modes	9,699	15.6	960	1.2	877	4.3	1,211
Utah	Total	Parcel, USPS or courier	8,648	13.9	173	0.2	187	0.9	1,211
Utah	Total	Truck and rail	1,047	1.7	S	S	S	S	1,025
Utah	Total	Truck and water	–	–	–	–	–	–	–
Utah	Total	Rail and water	–	–	–	–	–	–	–
Utah	Total	Other multiple modes	S	S	S	S	S	S	9
Utah	Total	Other and unknown modes	2,058	3.3	8,706	10.6	285	1.4	S

*Source: Summarize the downloaded data from BTS & bureau of Census (2009)
**S: Not estimated due to insufficient data

9.2.2 Commodity Flow Through State Border TTAZs for Trade Between Utah and Other States

To add commodity flow by truck that travel through the state border, 18 extra TTAZs for entry to and exit from Utah were added. The new 18 TTAZs are bordering with five states including Idaho, Wyoming, Colorado, Arizona, and Nevada.

The shortest routes from Utah to the other states were obtained by using a map website that showed travel distances and routes (Google 2010). Overall, the state of Utah was divided into three main areas; north, central, and south. Table 9-3 shows the main entry and exit points for commodities carried by trucks to cross the border to and from the state of Utah.

Table 9-3: Main Truck Entrances and Exits for Utah (Source: Google 2010)

State	North (Logan)	Central (SLC)	South (St. George)
Alaska	US-91	I-15	I-15
Arizona		US-89 / I-15 /US-191 / SR- 163	
Arkansas	SR-30	I-80	SR-59
California	SR-30	I-15 / I-80	
Colorado	SR-30	US-40 / I-70 /US-491	
Connecticut	SR-30	I-80	I-70
Delaware	SR-30	I-80	I-70
District of Columbia	SR-30	I-80	I-70
Florida	SR-30	I-80	SR-59
Georgia	SR-30	I-80	SR-59
Idaho		I-84 / I-15 /US-91	
Illinois	SR-30	I-80	I-70
Indiana	SR-30	I-80	I-70
Iowa	SR-30	I-80	I-70
Kansas	SR-30	I-80	I-70
Kentucky	SR-30	I-80	I-70
Louisiana	SR-30	US-491	SR-59
Maine	SR-30	I-80	I-70
Maryland	SR-30	I-80	I-70
Massachusetts	SR-30	I-80	I-70
Michigan	SR-30	I-80	I-70
Minnesota	US-91	I-80	I-80
Mississippi	SR-30	I-80	SR-59
Missouri	SR-30	I-80	I-70
Montana	US-91	I-15	I-15
Nebraska	SR-30	I-80	I-70
Nevada		I-80 / US-6 / I-15	
New Hampshire	SR-30	I-80	I-70
New Jersey	SR-30	I-80	I-70
New Mexico	US-491	US-491	I-70
New York	SR-30	I-80	I-70
North Carolina	SR-30	I-80	I-70
North Dakota	US-91	I-80	I-80
Ohio	SR-30	I-80	I-70
Oklahoma	SR-30	I-80	SR-59
Oregon	I-84	I-84 / I-15 /US-91	SR-56

Table 9-3: Continued

State	North (Logan)	Central (SLC)	South (St. George)
Pennsylvania	SR-30	I-80	I-70
Rhode Island	SR-30	I-80	I-70
South Carolina	SR-30	I-80	SR-59
South Dakota	SR-30	I-80	I-70
Tennessee	SR-30	I-80	I-70
Texas	US-491	US-491	SR-59
Vermont	SR-30	I-80	I-70
Virginia	SR-30	I-80	I-70
Washington	SR-30	I-84	I-84
West Virginia	SR-30	I-80	I-70
Wisconsin	SR-30	I-80	I-70
Wyoming		I-80 / US-89 / I-15	

Total commodity flow by truck produced from Utah and traded with other states in year 2002 was 72,361,000 tons. Also total commodity flow by truck attracted from other states to Utah was 58,581,000 thousand tons. Commodity flows attracted to and produced from Utah were distributed to each entrances and exits. Figure 9-1 shows commodity flows traded between Utah and other states through the 18 entry and exit border locations.

9.2.3 Adding the New TTAZs

Based on the assignment of commodity flow to and from Utah to state border entry and exit points, 18 TTAZs were added at the locations shown in Figure 9-2. These new 18 TTAZs were added to the shape file used for commodity flow distribution in Chapter 7. Figure 9-2 shows the new TTAZs and Utah‘s truck routes. TTAZ numbers with 30 or greater show the new TTAZs added.

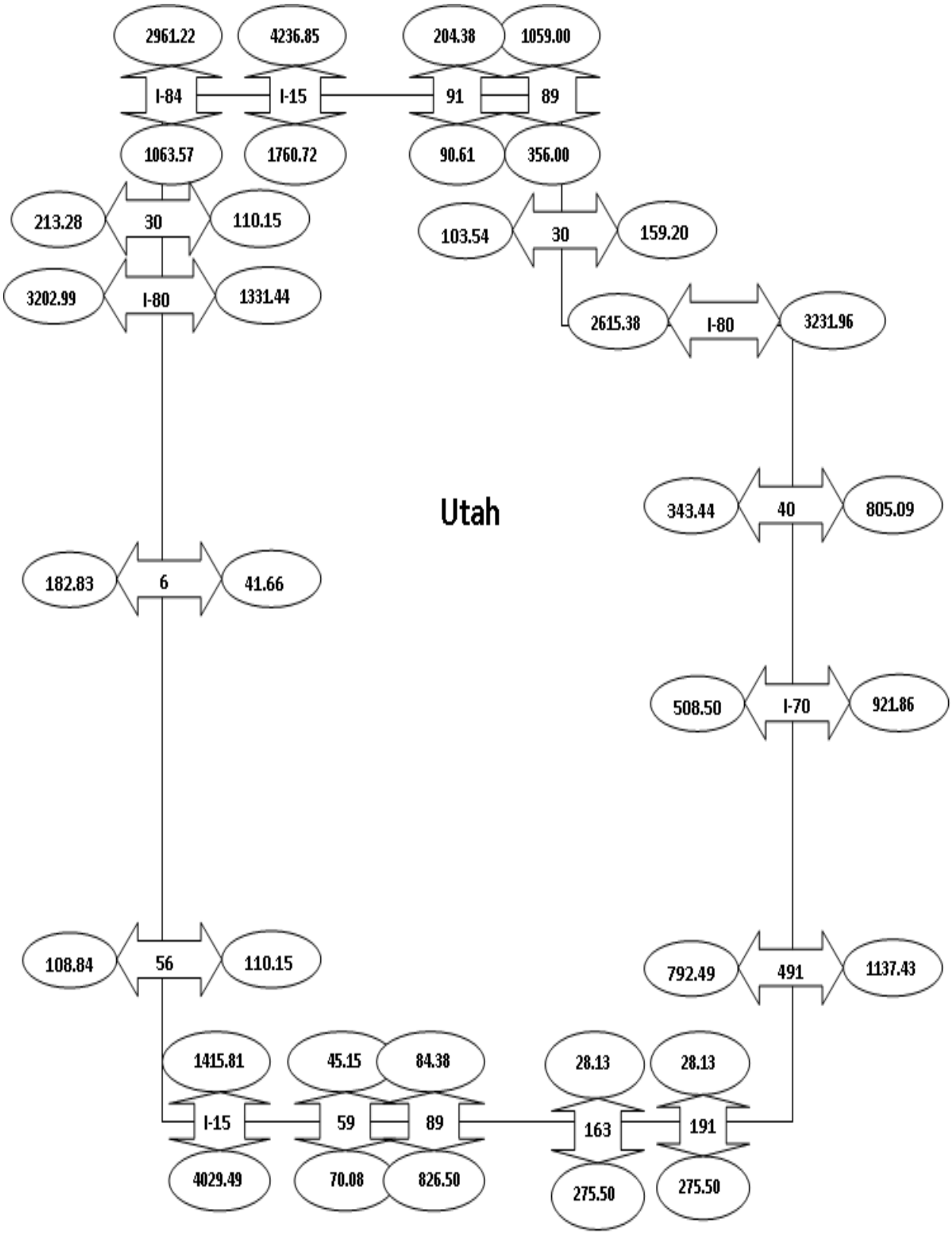


Figure 9-1: Commodity Flows Between Utah and the Other States at State Borders

9.2.4 Building Truck Routes

According to Kuhn and Keeslar (UDOT 2009), main corridors of freight transportation crossing the Utah borders are I-80, US-40, I-70, US-491 as eastern gates, I-15 and I-84 as northern gates, I-80 as western gates, and I-15, US-89 and US-191 as southern gates. Also, US-89, US-50, US-6 and I-215 are added to these routes to cover the entire Utah; their functional classes are major arterials, connecting major cities and regions in Utah.

Therefore, a shape file containing main arterial highways and interstate highways were built as truck routes for Utah. Figure 9-2 shows the new border TTAZs and the 29 county based TTAZs together with the truck routes built for truck traffic assignment.

9.2.5 Conversion of Commodity Measuring Unit (Tonnage) to Truck Traffic (Trips)

Chapter 3 –Development of Truck Payload Equivalency Factor" of the FAF2.2 report contains truck equivalent factors that can be used to convert daily commodity flow in tonnage into daily truck traffic (Alam et al. 2007). Using these truck equivalent factors, the commodity flow units (tonnages) were converted to the daily truck traffic flow. Also, empty truck trips were estimated by using empty truck equivalent factors used in FAF 2.2. Hourly O-D truck traffic was converted to daily O-D truck traffic using the ratio of the hourly traffic volume divided by daily traffic volume obtained from UDOT's ATRs.

Figure 9-3 shows truck traffic O-D matrix among the counties and new TTAZs added at state borders. The values in the matrix are the number of truck trips between TTAZs. Refer to Appendix 7 for the detailed average daily truck traffic estimation process and results of conversion from commodity flow in tonnage to truck traffic.

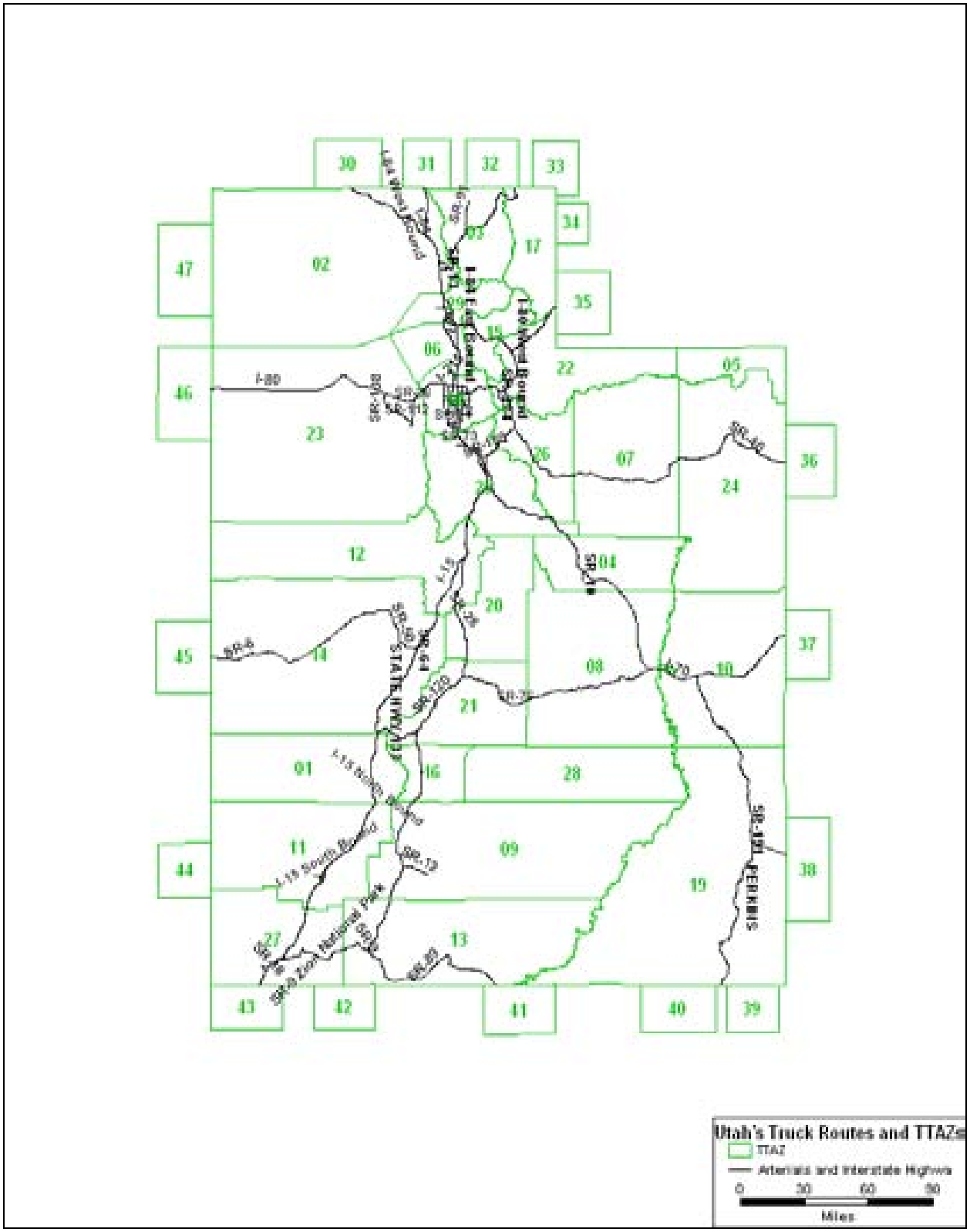


Figure 9-2: TTAZs and Utah's Truck Routes (Source: Utah Geographic Information Council 2009)

9.2.6 2002 ATR Stations on Highway Network

In 2008, 90 ATR stations in Utah were operational including two class data collection types, 73 length data collection types, and 15 volume data collection types (Refer to Table 8-3). 30 ATR stations among 75 ATR stations (2 class data collection types and 73 length data collection types) were available for Saito and Jin‘s study (2009). However, there were only 46 ATR stations which could classify vehicle types including trucks in 2002. Out of these 46 ATR stations, the number of ATR stations on arterial and interstate highways was 38 in 2002. Appendix 7-C contains the locations and descriptions of the 38 ATR stations. Figure 9-3 shows truck traffic O-D matrix among the counties and new TTAZs added at the state borders.

9.3 Truck Traffic Assignment to Utah’s Truck Routes Using TransCAD and Genetic Algorithm

Traffic assignment models are used to estimate the traffic flows on a network. These models take as input a matrix of rows that indicate the volume of traffic between O-D pairs. They also take as input of the network topology including link characteristics and link performance functions. The flow for each O-D pair is loaded onto the given network based on travel time or other impedance parameters. TransCAD provides a wide array of traffic assignment procedures that can be used for modeling urban traffic assignment. These procedures include numerous variables that can be used for modeling intercity passenger and freight traffic (Caliper 2008).

Because of the constraints of available data and the nature of planning level truck traffic assignment, the method of traffic assignment used for this research is the all-or-nothing shortest path assignment.

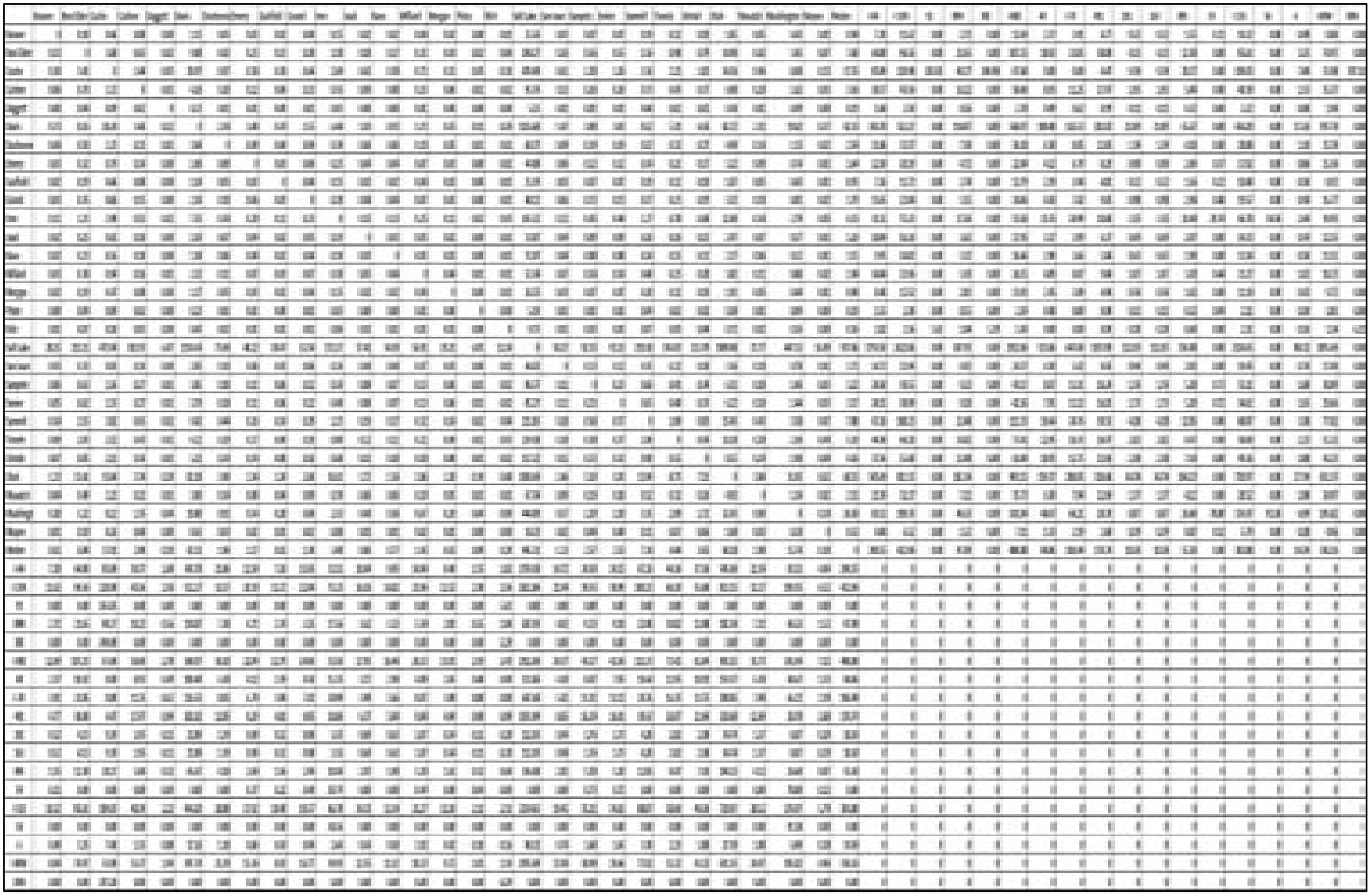


Figure 9-3: Truck Traffics O-D Matrix Among the Counties and New TTAZs Added at the State Borers (County=TTAZ)

The all-or-nothing assignment method is one of the non-equilibrium traffic assignment methods. This method may not be adequate for operational analysis but is adequate for a planning level assignment considered in this study. This section discusses the required data for all-or-nothing shortest path assignment and the assignment process using TransCAD.

9.3.1 Required Data for All-or-Nothing Shortest Path Assignment

The all-of-nothing shortest path assignment model assigns traffic flows between O-D pairs to the shortest paths that connect the origins and destinations under all-or-nothing assignment. This model is unrealistic when used for passenger vehicle assignment in that only one path between every O-D pair is used, even if there is another path with the same or nearly the same travel time or cost. Also, traffic on links is assigned without considering whether or not there is adequate capacity or heavy congestion and travel time is a fixed input and does not vary depending on the congestion on a link. The all-of-nothing shortest path assignment method is for a planning-level analysis, where congestion factor is not an issue, and can be used for assigning truck trips or for assigning inter-city or inter-regional truck trips. Required data for the all-or-nothing traffic assignment used in the study include an O-D matrix, a network with appropriate attribute fields, and the line layer from which the network used for assignment is derived (Caliper 2008).

9.3.2 Assignment Processes Using TransCAD

With the required data for all-or-nothing shortest path traffic assignment method prepared, the assignment of truck traffic is performed in the following steps:

1) Make a truck traffic distribution O-D matrix,
2) Build centroids of all TTAZs,

3) Build a truck route network,
4) Connect the centroids with the truck route network and determine the number of centroid connectors needed for the assignment task, and
5) Assign truck traffic to truck routes using the all-or-nothing shortest-path method and genetic algorithm.

9.3.2.1 Truck Traffic Distribution O-D Matrix

The O-D matrix containing truck traffic distribution among the TTAZs was prepared as described in Section 9.2. The identification numbers (IDs) contained in the row and column headings of the matrix were matched with the node IDs in the network.

The truck traffic O-D matrix was made by using the truck traffic distribution model developed in the Chapter 7 and the TTAZs added to take care of commodity flows to and from other states. The measuring unit of truck traffic O-D matrix is not tonnage but average daily truck traffic between each origin and destination pairs. Truck traffic between each origin and destination pairs in Excel spreadsheet format is automatically converted to O-D trip matrix by using the converting features of TransCAD (Caliper 2008). Figure 9-4 shows a screen shot of TransCAD showing the O-D matrix used for this study.

9.3.2.2 Building Centroids of Each TTAZ

Centroids are special nodes in a network that represent the center of a TTAZs. In many transportation forecasting applications, trips either start or end at centroids (Caliper 2008).

TransCAD‘s export of geographic function was used to build the centroids of the TTAZs used in this study. Figure 9-5 shows the creation process of centroids by TransCAD of each

TTAZ in this study. The left figure shows only TTAZs and the right figure shows the centroids of those TTAZs (black dots in the TTAZs).

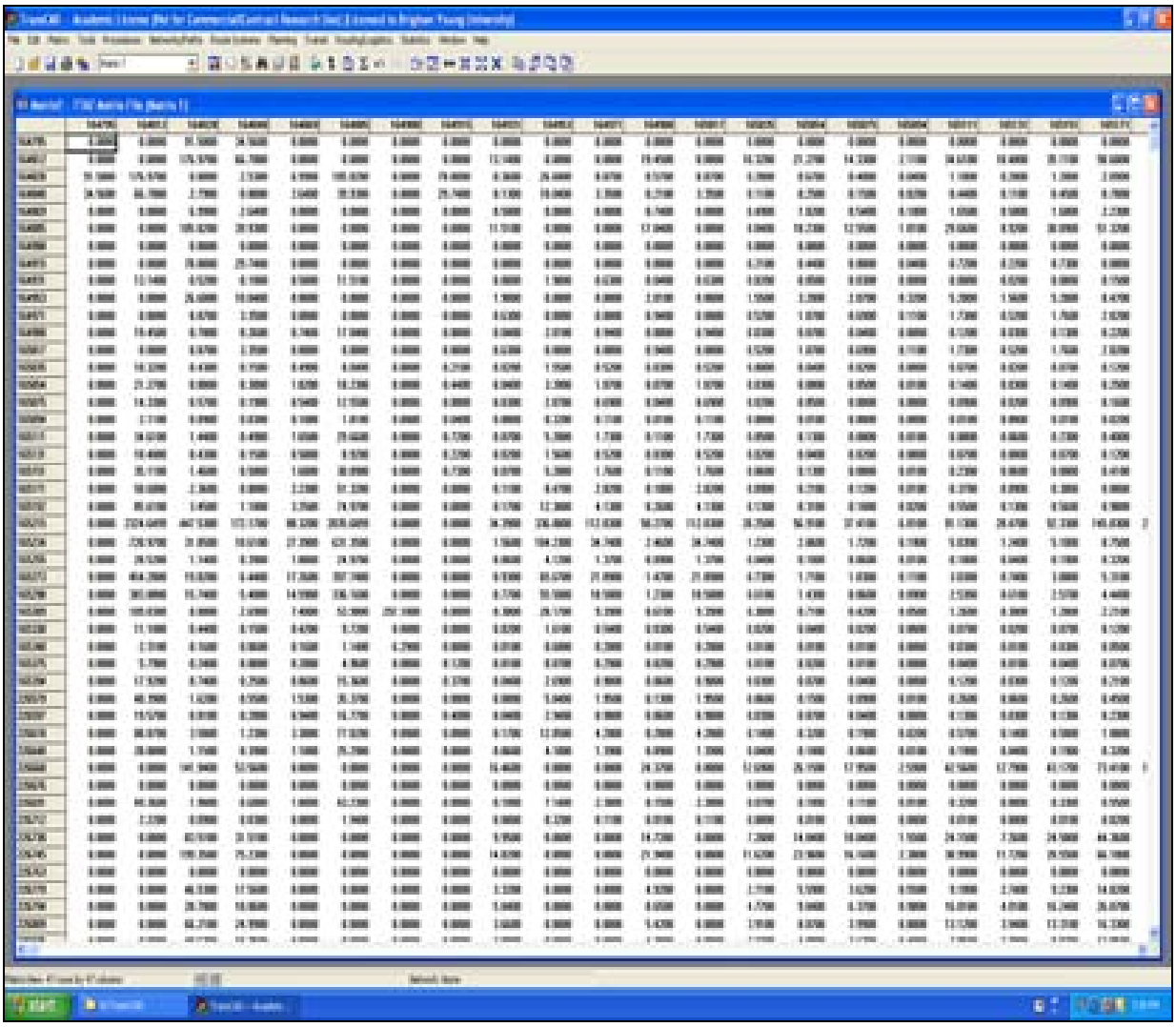


Figure 9-4: O-D Matrix of Truck Traffic

9.3.2.3 Creating Centroid Connectors to Connect Centroids with Truck Routes

Links that connect centroids to the other links in a network are known as centroid connectors. Centroid connectors connect TTAZs to the rest of the highway network. These centroid connectors are not real physical links, but instead are a simplified representation of the

local road network that let trucks access the highway network. These additional links are necessary to connect truck traffic from centroids to the truck route.

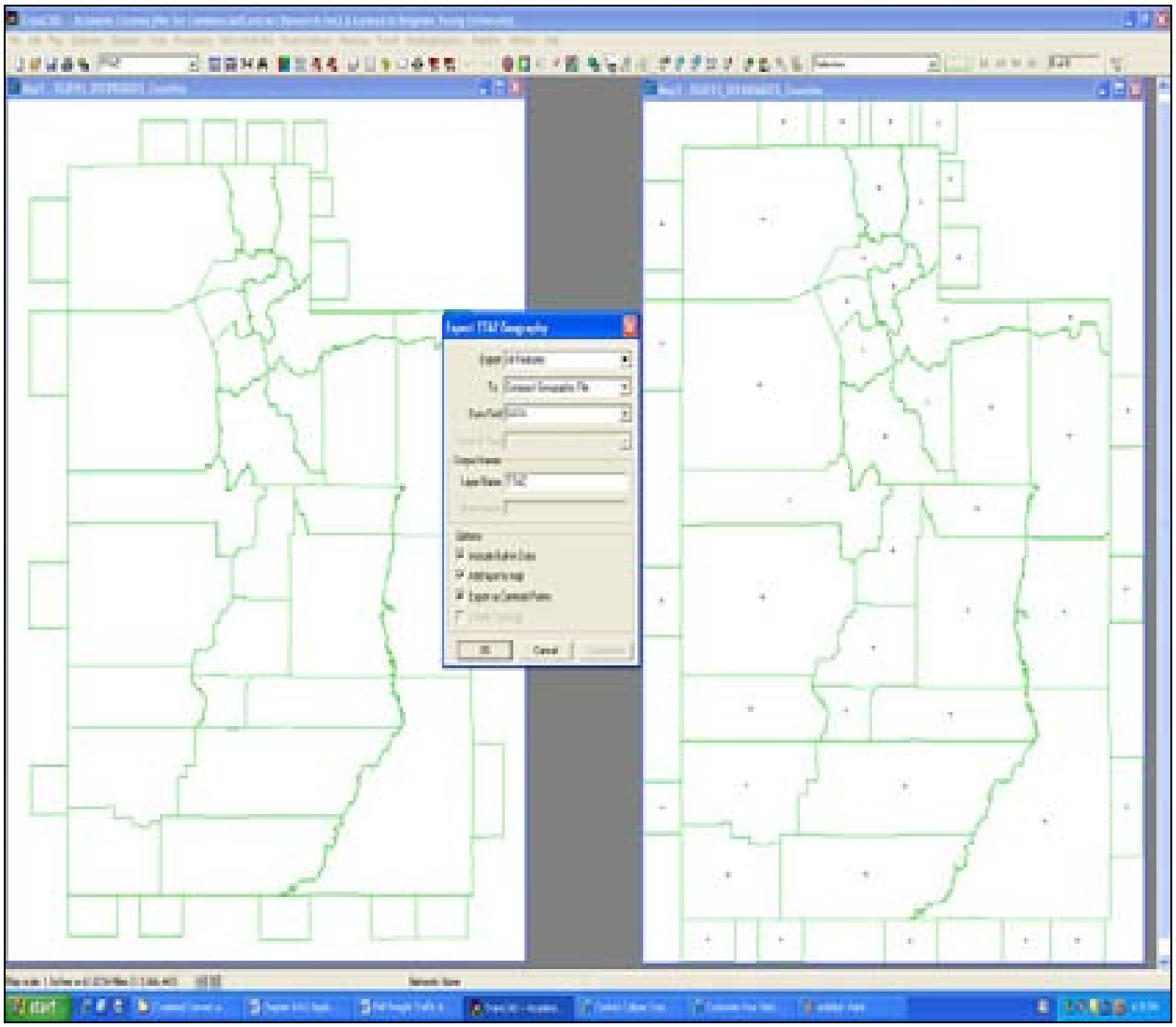


Figure 9-5: Creation of Centroids for TTAZs

TransCAD provides a centroid connection tool that helps the user automatically create the number of centroid connectors that the user requests. Figure 9-6 shows how centroids are connected to the truck routes by connectors. The figure shows a case of one connector per each centroid.

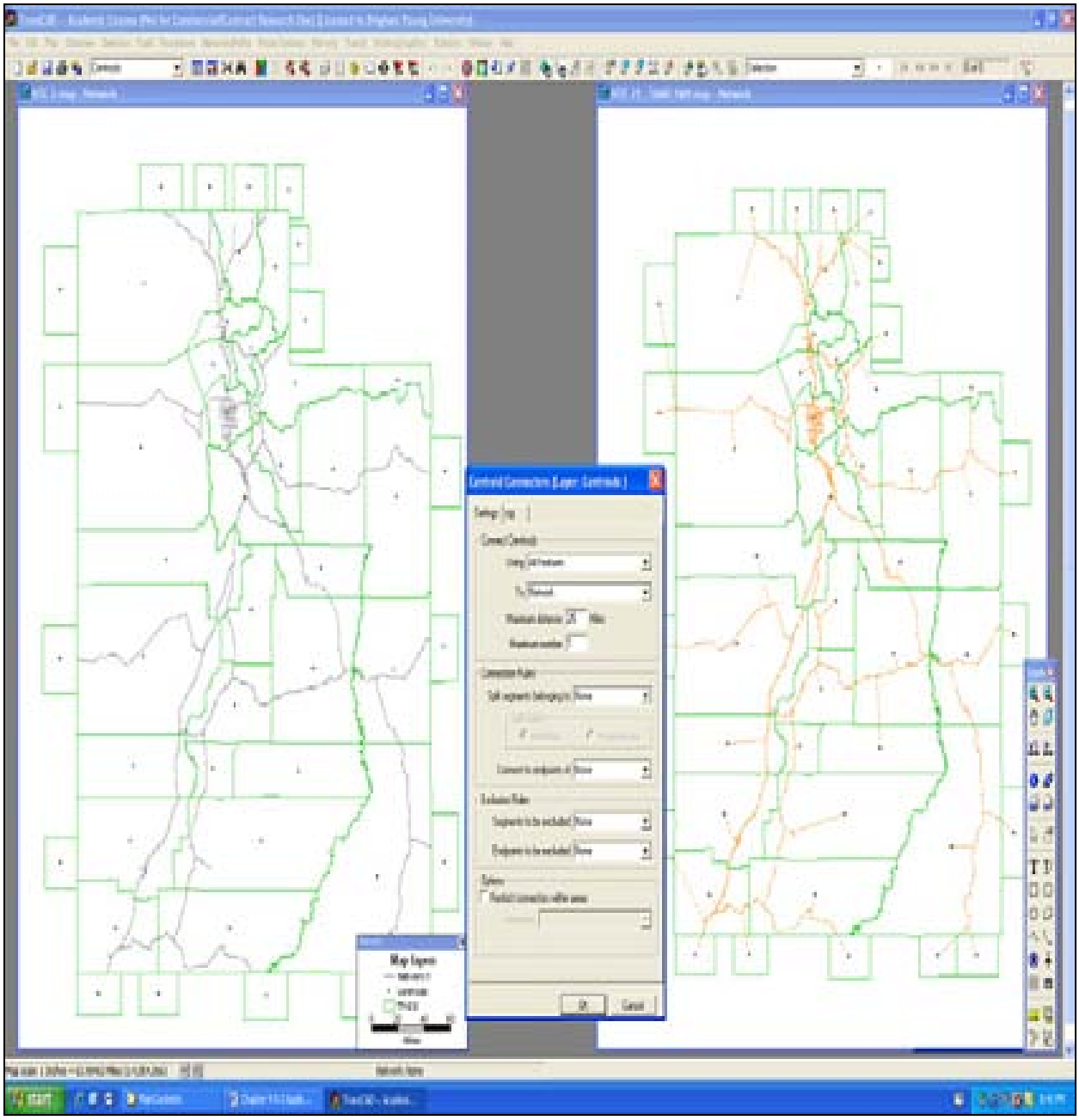


Figure 9-6: Creation of Centroid Connectors

9.3.2.4 Building a Truck Route Network

A network is a special TransCAD data structure that stores important connectivity, link, and node characteristics of transportation systems and facilities. The network is created by the

_create network' function of TransCAD. (Caliper 2008) Figure 9-7 shows the truck route network built and used in this study.

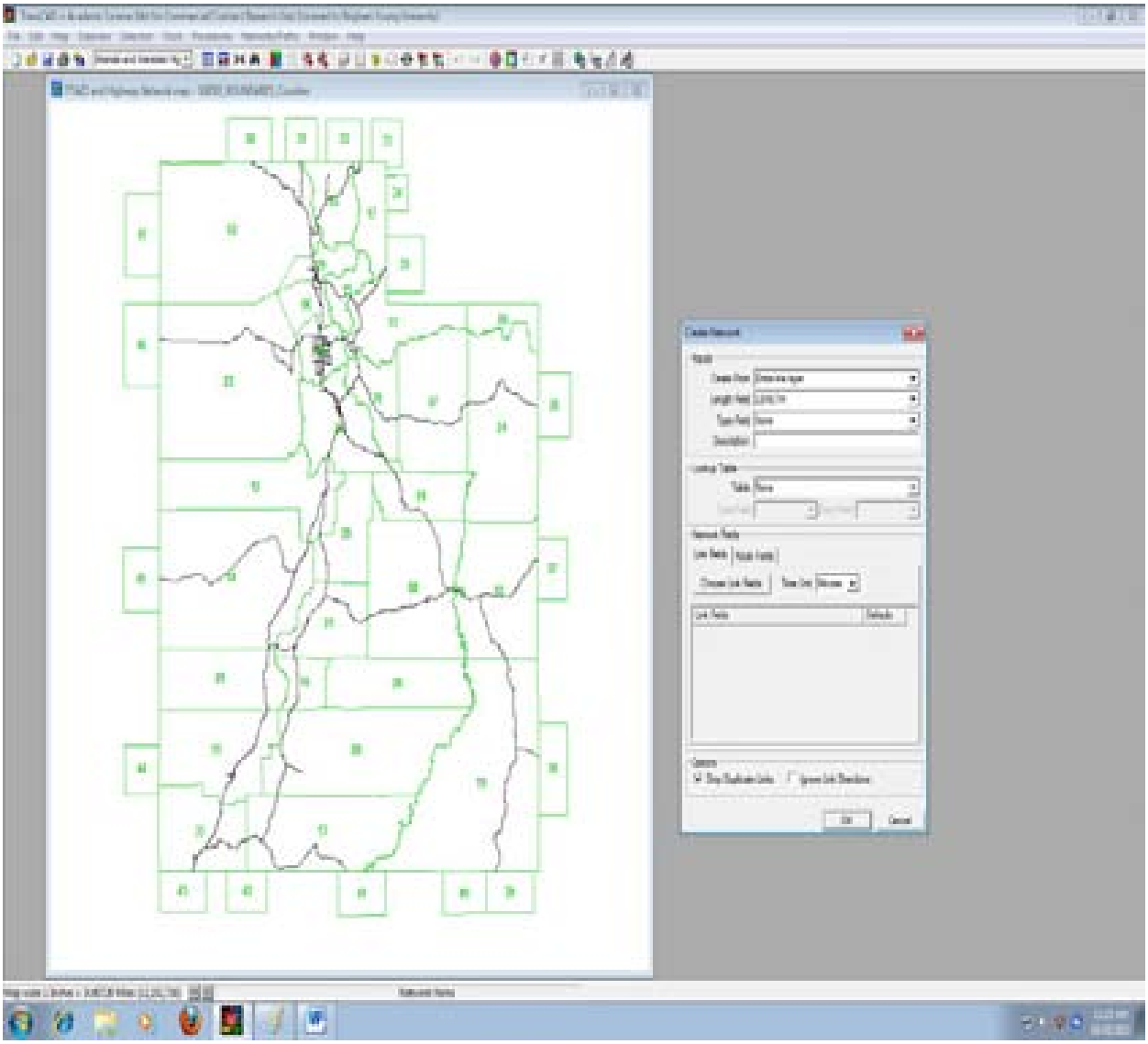


Figure 9-7: Building a Truck Route

9.3.2.5 Truck Traffic Assignment

When the user performs a traffic assignment, he or she provides the O-D matrix defining the traffic volumes that need to be assigned to the highway network, along with required and optional input network attributes, which are used for assigning truck traffic. The outcomes of the

assignment procedure include the assigned flows, volume-to-capacity ratios, travel times on congested condition, and speeds for all the links in the network on congested condition (Caliper 2008). Figure 9-8 shows the workspace of traffic assignment for this study, which shows the centroids, centroid connectors and truck routes.

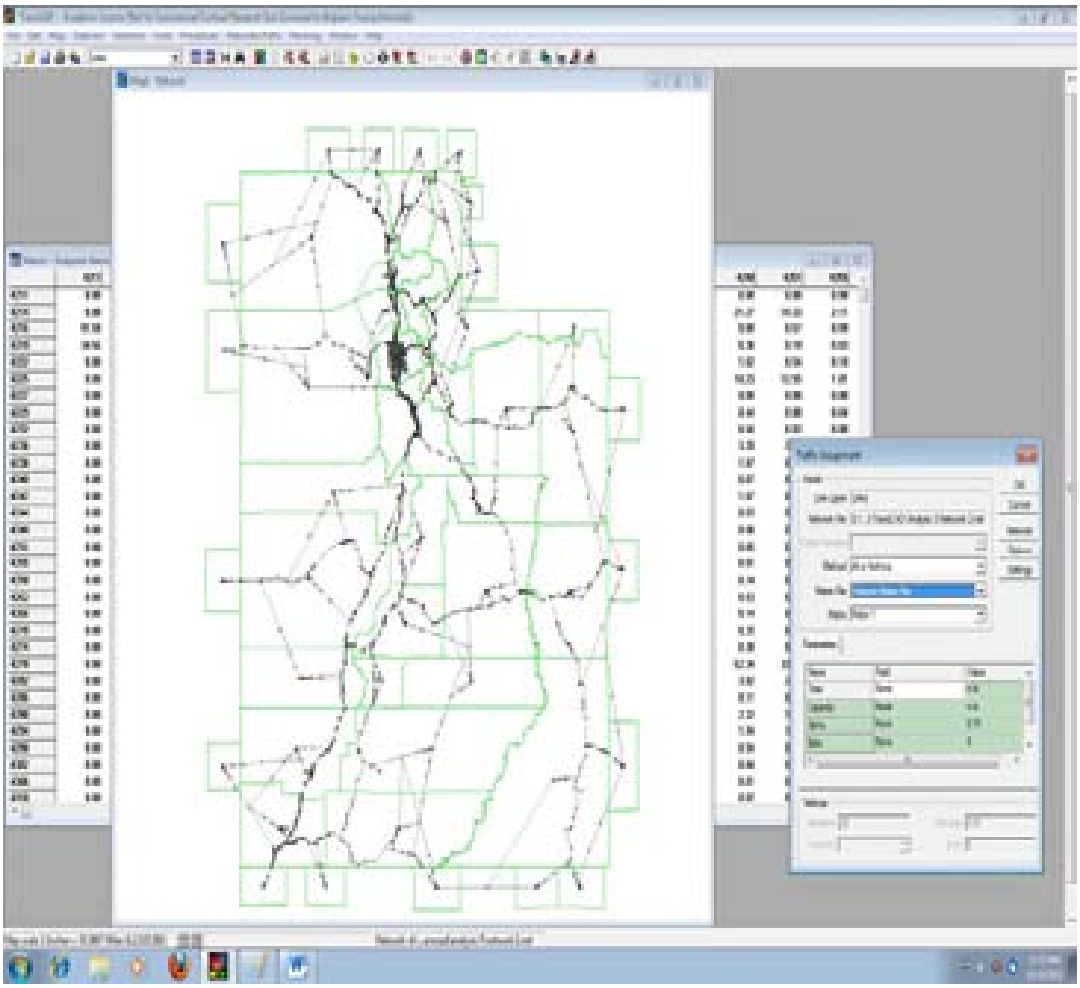


Figure 9-8: Performing Traffic Assignment

9.4 Analysis Results

Based on the assignment processes for using TransCAD outlined in Section 9.3, the assignment results of truck traffic on Utah‘s truck routes were obtained. This section discusses initial outputs, the choosing best initial output, optimization methodology, matching ATR data

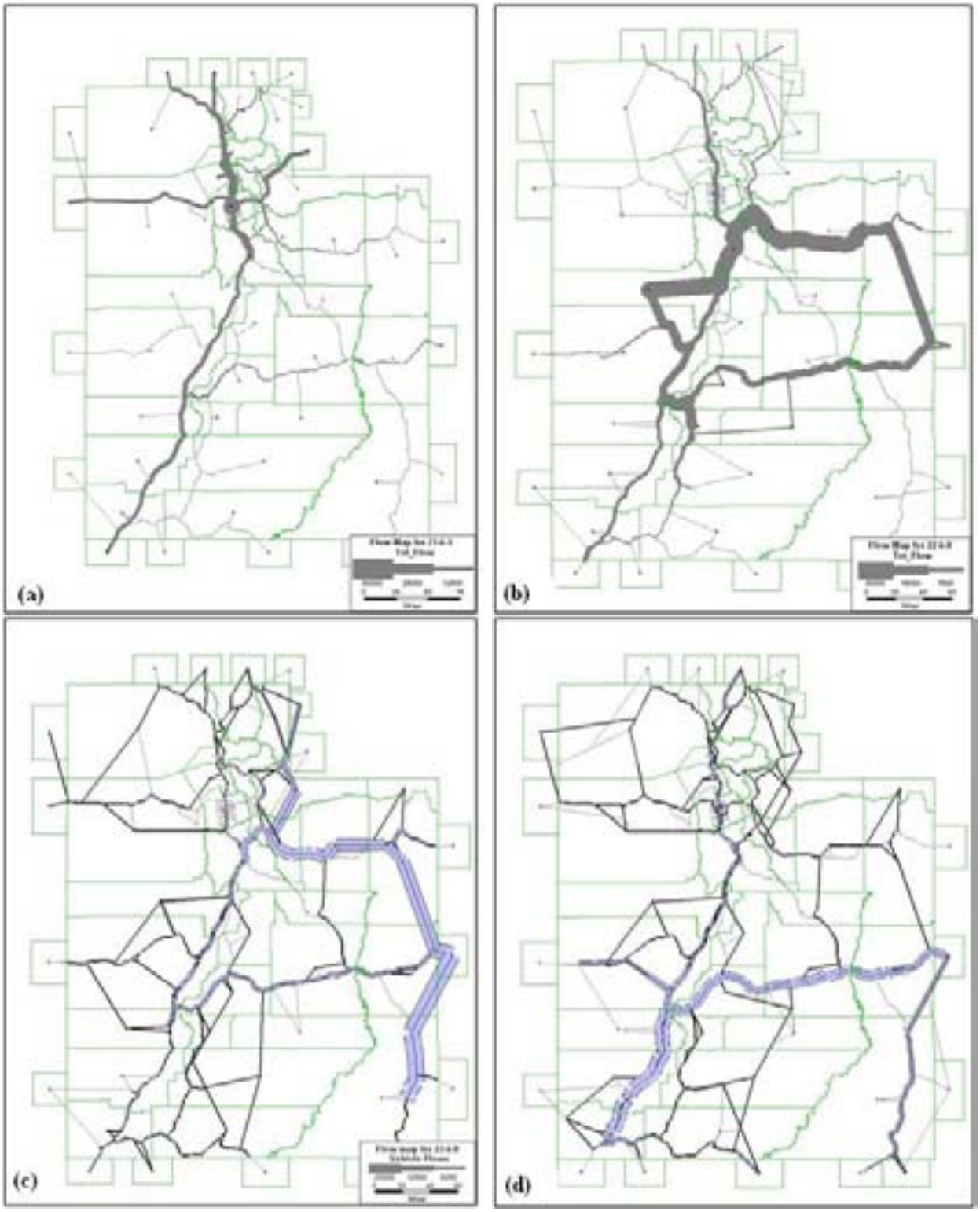
with a genetic algorithm, and optimization results, and optimization results using genetic algorithm and TransCAD.

9.4.1 Initial Outputs

O-D trip distribution truck traffic was assigned on Utah‘s truck routes using a feature of TransCAD, the all-or-nothing shortest-path algorithm assignment method. The number of centroid connectors is a main factor for resulting in an appropriate assignment before the optimization process begins. Figure 9-9 shows the initial results of all-or-nothing shortest-path assignment algorithm using TransCAD with various numbers of centroild connectors. Figure 9-10 show the best initial assignment result of the all-or-nothing shortest-path assignment algorithm by TransCAD. Obviously this truck assignment requires improvement because the assignment result does not appear to be realistic. For instance the assignment to Interstate 15 is unrealistically low.

9.4.2 Choosing Best Number of Centroid Connectors

The RMSE‘s of the difference between the counts obtained from the assignment model and the truck traffic counts measured at the ATRs were determined in order to achieve realistic truck assignment to Utah‘s truck routes using a genetic algorithm.



*: (a) one centroid connector, (b) two centroid connectors, (c) three centroid connectors, and (d) four centroid connectors.

Figure 9-9: Initial Results of All-or-Nothing Shortest-Path Assignment Method Using TransCAD

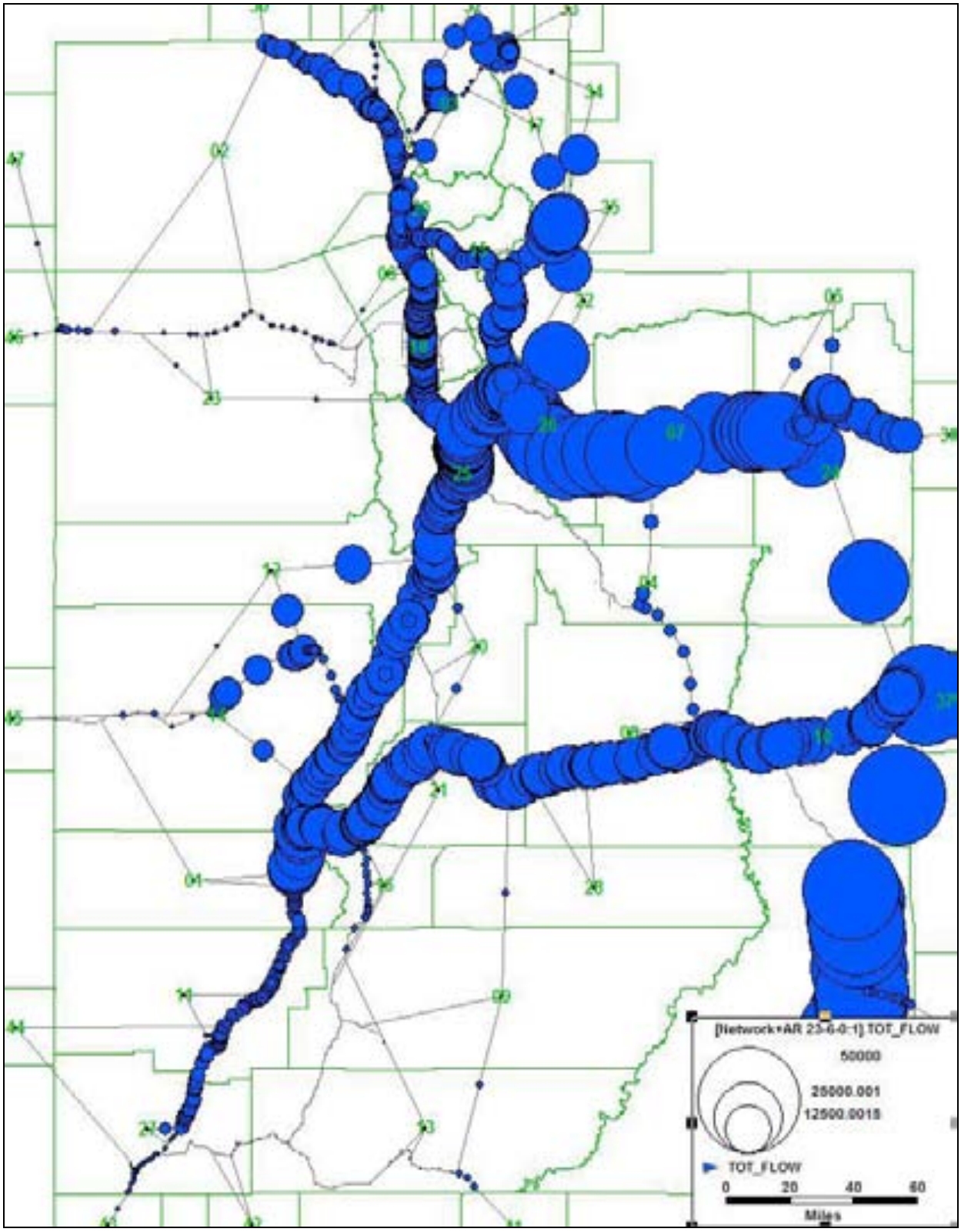


Figure 9-10: Best Initial Result of All-or-Nothing Shortest-Path Assignment Method Using TransCAD

The initial truck assignment done by TransCAD in Figure 9-10 appears visually to be the most reasonable among the results of the five initial runs. Equation 9-1 was used to determine which run resulted in best initial result of the all-or-nothing shortest-path assignment algorithm of TransCAD. The RMSE of the difference between the counts obtained from the assignment model and the truck traffic counts measured at the ATRs was determined for each run. The lower RMSE is, the better the assignment is. Table 9-4 shows the RMSE of each initial run of the all-or-nothing shortest-path assignment method. The run with three centroid connectors with some reductions in the number of centroid connectors at some TTAZs, especially at the ones at the border TTAZs resulted in the least RMSE.

$$Minimize\ RMSE = \sqrt{\frac{\sum_{i=1}^{n} (X_{Field,i} - X_{model,i})^2}{n}} \quad (9\text{-}1)$$

where,

$X_{Field,i}$: Truck count at ATR i,

$X_{model,i}$: Truck count at ATR location i produced by the assignment model,

i : ATR number, from 1 to n, and

n : number of ATR stations (n = 38 on truck routes).

Table 9-4: Estimation of RMSE of Initial Run of the All-or-Nothing Shortest-Path Assignment Method With Different Numbers of Centroid Connectors

Alternative	Number of Centroid Connectors	RSME	Evaluation
1	1	3891	
2	2	3939	
3	3	5549	
4	4	9922	
5	3	3727	Best

9.4.3 Optimization Methodology

To optimally assign truck traffic on Utah‘s truck routes by the all-or-nothing shortest path algorithm available in TransCAD using travel time (distance) as the assignment parameter, a genetic algorithm was used. This section presents the core concept of optimization, optimization process, optimization results, and discussion.

9.4.3.1 Concept

Utah‘s major truck routes or corridors were set up within TransCAD using the data collected by the truck traffic accuracy evaluation study by Saito and Jin (2009). To assign truck traffic obtained from the truck freight distribution model to Utah‘s truck routes, truck traffic assignment is performed by the all-or-nothing shortest path algorithm, which is a feature of the TransCAD‘s assignment module. The distance between the centroids of the TTAZs is used as the assignment parameter. In order to assign truck traffic generated in TTAZs to Utah‘s truck routes and to compare truck traffic counts obtained from the assignment model with UDOT‘s ATR counts, the centroids of TTAZs need to be connected with Utah‘s truck routes by link called centroid connectors. Through the controid connectors, truck traffic of each TTAZ is assigned to certain nodes of the truck routes as shown in Figure 3-1. Truck traffic of each TTAZ is equally assigned at the beginning to the number of centroid connectors by default. By changing the ratio of truck traffic of each centroid connector, optimum allocation of truck traffic to centroid connectors can be achieved that would minimize the difference between the assigned truck traffic and the truck traffic collected at ATR locations. For this optimization process, a genetic algorithm is used.

9.4.3.2 Optimization Process

In this process, the proportion of truck traffic from the centroids of TTAZs to centroid connecters was adjusted in TransCAD until the minimum RMSE value was achieved. The iteration process below was followed to determine an optimal assignment of truck traffic on Utah's truck routes. One drawback of centroid connectors created by TransCAD was that trips were loaded on centroid connectors like regular links. This might not exist in reality. Hence, before these steps were followed, centroid connectors that would create incorrect paths needed to be removed from the optimization process. Once this modification was made, the following optimization process was used:

1) Assign freight truck trips to each TTAZ using centroid connectors according to Equation 9-2.

   $$\sum_{j=1}^{m} X_{ij} = F_i \quad (9\text{-}2)$$

   where,

   X_{ij} = tuck counts of centroid connector j in TTAZ i,

   F_i = total truck counts of TTAZ i,

   i = number of TTAZ, county number (1, …, 29) and

   m = number of centroid connectors in each TTAZ i.

2) Run the all-or-nothing shortest path algorithm in TransCAD's assignment module using its default trip assignment.

3) Compute RMSE suing Equation 9-1.

4) Recalculate the number of truck trips assigned to each centroid connector of TTAZ by modifying percentage allocation of trips to each centroid using a genetic algorithm.

5) Repeat Step 2, 3, 4 for the number of iterations that is required to achieve a lowest RMSE that meets the criterion to stop the optimization process as shown in Figure 3-2.

6) Select the case that has the lowest average RMSE as shown in Figure 3-2..

9.4.4 Matching ATR Data With a Genetic Algorithm

A genetic algorithm was used for carrying out the optimization process. Genetic algorithms are appropriate for use in such conditions as: 1) the search space is large, 2) the search space is not smooth or unimodal, 3) the search space is not well understood, or 4) the fitness function is noisy (i.e. there is a random term in the function) (Mitchell 1997). Genetic algorithms have some limitations in that they have no way of determining whether a solution is the absolute best possible and they tend not to converge on local extremes. They can only compare a solution to others that have been tried. Thus, genetic algorithms are most appropriate in situation where a –good enough" solution is desired, rather than an absolute optimum (Mitchell 1997). This section presents the representation, generation, fitness function, and genetic algorithm process.

9.4.4.1 Representation

To apply a genetic algorithm to a particular optimization problem, a representation of a candidate chromosome needs to be devised first. The simplest representation is a value presentation where the chromosome consists of the values of the design values placed side by side (Parkinson 2006).

Among the 47 TTAZs existing in this analysis, 24 TTAZs have three centroid connectors, 14 TTAZs have two centroid connectors, and nine TTAZs had one centroid connector. The one-centroid TTAZs need not be in optimization process because the value is always 100 percent.

Only TTAZs that have two centroid connectors and three centroid connectors are included in the chromosome; hence, a total of 38 TTAZs are included in the chromosome. Each TTAZ requires two genes: one for in-direction (A-B) and the other for out-direction (B-A); hence, a total of 76 genes exist in each chromosome that is created in the process.

The genes representing two centroid connectors have 21 possible percentage value combinations (a direction of flow 0 to 100 percent by increment of 5 percent). The genes representing three centroid connectors have 231 possible percentage combination values, each of which represents a possible combination of flow percentages along the three connectors. For instance, one combination would be a combination of 0% - 5% - 95%.

As a chromosome is created, each gene for a TTAZ with two centroid connectors gets one of 0 to 20 discrete value that represents one combination of percentage splits for the two centroid connectors, while each gene for a TTAZ with three centroid connectors gets one of 0 to 230 discrete value that represents one combination of percentage splits to the three centroid connectors. These discrete values are then converted to percentage split values and sent to TransCAD for executing the all-or-nothing shortest path algorithm for truck assignments using user-input percentage values for centroid connector truck trip assignment (see Section 9.4.4.4.3). Figure 9-11 shows a sample representation of the chromosome for a candidate design.

Number of Centroid Connectors	TTAZ with 2 connectors					TTAZ with 3 connectors				
TTAZ (number)	TTAZ(3)		.....	TTAZ(42)		TTAZ(1)		.....	TTAZ(47)	
Genes in Chromosome	A-B	B-A	.....	A-B	B-A	A-B	B-A	.....	A-B	B-A

Figure 9-11: Chromosome for a Candidate Design

9.4.4.2 Generation

Genetic algorithms work with generations of designs. The designer specifies the generation size N, which is the number of designs in each generation. The genetic algorithm begins with a starting generation of randomly generated designs. This is accomplished by randomly generating the values of the genes of the N chromosomes in the starting generation. From the starting generation, the genetic algorithm creates the second generation, and then the third generation, and so forth until a specified M number of generation has been created (Parkinson, 2006). In this analysis, it generated 999 additional similar chromosomes and stored each one of them. In the end, 1000 sets of percents, i.e., chromosomes, were generated in the system.

9.4.4.3 Fitness Function

The genetic algorithm requires that a fitness function be evaluated for each chromosome in current generation. The fitness is a single number indicating the quality of the design represented by the chromosome. To evaluate the fitness, each design must be analyzed to evaluate the objective function *f*(minimized) and constraints $g_i \leq 0$ (i=1 to m). If there are no constraints, the fitness is simply the value of the objective function *f* (Parkinson 2006). In this analysis, the objective function was the RMSE in Equation 9-1. This objective function *f* was calculated the RMSE between $X_{model,i}$ estimated by TransCAD and $X_{Field,i}$ from ATR stations.

9.4.4.4 Genetic Algorithm Process

The genetic algorithm has four distinct processes including 1) initialization, 2) generation, 3) evaluation, and 4) repetition. The first step, initialization, needs to run only once,

and the fourth step repeats from the second step to the third step for as many generations as the algorithm is set to run.

The genetic algorithm used in this analysis found an optimal value after 81 generations. The algorithm was written by C++ language and the evaluation was written by TransCAD functions. The C++ program source code for the genetic algorithm and the input/output data of TransCAD are found in Appendix 9. A 2010 MacBook Pro with a 2.30 GHz Intel i7 and 4.0 GB of RAM, running Windows 7 64-bit, was used for executing the genetic algorithm, and the program ran for approximately 61 hours to complete 81 generations with 1000 chromosomes. The following sections discuss the analysis process in detail.

9.4.4.4.1 Initialization

As mentioned in Section 9.4.4.1 and Section 9.4.4.2, the initialization process runs only once for each gene at the beginning. It allocates memory for the chromosomes and sets the boundaries for the genes. In this study, it also created the variables needed to encode percentages and decode their associated genes. Each gene represented a set of values, which indicated how much percentage of truck trips were assigned to the centroid connectors from a centroid of each TTAZ.

9.4.4.4.2 Generation

From the second generation to the end, the generation process consists of four sub-steps, including 1) selection (tournament selection), 2) uniform crossover (0.6 crossover ratio was used), 3) mutation with five percents, and 4) elitism. In every generation, in order to produce 1000 new chromosomes or children, the algorithm carries out the following steps:

1) Selection. For every pair of new chromosomes, two parents are selected at random from the results of the previous generation. Parent chromosomes may serve as parents for multiple sets of children, but no one chromosome may serve as both parents in any set.
2) Uniform Crossover. In the crossover process, the parents‘ genes are duplicated to the children as child A receivers parent A‘s gene and child B receiver parent B‘s genes. However, in this analysis 60 percent, a typical crossover ratio, of the values are swapped (child A gets parent B‘s gene and child B gets parent A‘s gene). Through crossover, such a process creates new children that will hopefully have the positive qualities of both parents.
3) Mutation. The purpose of this process is to make feasible exploration. In the mutation process, every gene in every new chromosome is examined. Five percent of the time, the value of that gene is changed to another random value in the acceptable range for that gene. Mutation of low percentage keeps most of the gene values that will yield better results.
4) Elitism: After mutation, the entire sets of 1000 chromosomes are sent off to be evaluated. When they return to the genetic algorithm, they are ranked with their parents according to their RMSE values in ascending order. The top 1000 of these 2000 chromosomes are selected for the pool of available parents in the next generation.

9.4.4.4.3 Evaluation

As mentioned in the previous subsection, the evaluation step takes place in steps between 3 and 4 of the genetic algorithm. However, because the evaluation is entirely done in separate function in this analysis, the evaluation step is considered to be distinct from the genetic algorithm itself. The evaluation process in the application follows three major steps: 1)

initialization, 2) assignment, and 3) evaluation. These steps are repeated for every child generated in the genetic algorithm and the results of the evaluation are returned to the algorithm for use in the elitism step. The following explains these three steps:

1) Initialization. In the initialization step, each gene is decoded into the two or three percentage values it represents, and these percentages are placed upon the appropriate centroid connectors in the model. At the end of the initialization step, every connector in the state has been given a percentage value for both A_B and B_A flow.
2) Assignment. Using these percentages, TranCAD assign trips and estimates daily truck traffic for every link in the truck routes. Specificaally, it runs a multi-point assignment algorithm with the shortest path all-or-nothing assignment method.
3) Evaluation. Finally, using the total flow, the sum of both directions, along each link, the estimated daily truck traffic obtained for the model are compared to the actual daily truck traffic obtained from the ATR stations. The RMSE is determined and stored. The three steps are repeated for every child chromosome in the generation and then the values are returned to the genetic algorithm until the optimal value is achieved.

9.4.4.4.4 Repetition

After the elitism step mentioned in 9.4.4.4.2, the process for one generation is completed. The process repeats until the program has run for as many generations as are required until an optimal value is reached. It is assumed that the optimal value was achieved when the minimum RMSE value repeats for 5 generations.

9.4.5 Optimization Results Using Genetic Algorithm and TransCAD

Using the genetic algorithms and TranCAD, the optimization results, an optimum value of RMSE, were obtained. The optimum value meant the minimum value of RMSE, the difference between model assigned truck traffic values and counts obtained at ATRs. In this section, the estimation process of the optimum value is presented. This subsection consists of initial and final optimization results.

9.4.5.1 Initial Optimization Results

First, an exploratory analysis of 25 generations of 1000 chromosomes was performed. The analysis located seven problematic ATR stations. The links containing these ATR stations didn‘t get any truck traffic assigned by TransCAD as the genetic algorithm was run. Table 9-5 shows the locations of the seven ATR stations. Initially unconnected links were suspected and links were carefully examined. It was found that there was no disconnected links in the highway link file. Hence, it was presumed these links were simply not selected by TransCAD‘s assignment process.

Table 9-5 Information of Seven Problematic ATR Stations

Link ID	ATR	Location
4519	303	US-91, 1.5 miles North of SR 61, Webster Jct.
16	310	I-15, 3 miles South of Plymouth Int., Plymouth
3569	316	US-89, 2 miles South of SR 193, Hillfield Road, Layton
556	400	I-15, 1 mile South of Bloomington Int., Bloomington
1062	403	I-15, 0.5 mile North of North Beaver Int., Beaver
1042	513	I-15, 1 mile North of South Parowan Int., Parowan
3339	606	SR-248, 0.5 mile West of US-40, Park City

Figure 9-12 shows the changes in the objective function value of 25 generations of 1000 chromosomes with the seven problematic ATR stations shown in Table 9-5. The figure plots ten

best RMSE values for each generation. The RMSEs after 25 generations of genetic algorithm with and without seven ATR stations were 3875 and 3804, respectively. Figure 9-12 indicates a shows that those seven links were hindering the optimization process. Considering the locations of ATR stations and based on the results of connectivity check of the links containing the seven ATR stations, these ATR stations links were excluded in the final genetic algorithm optimization.

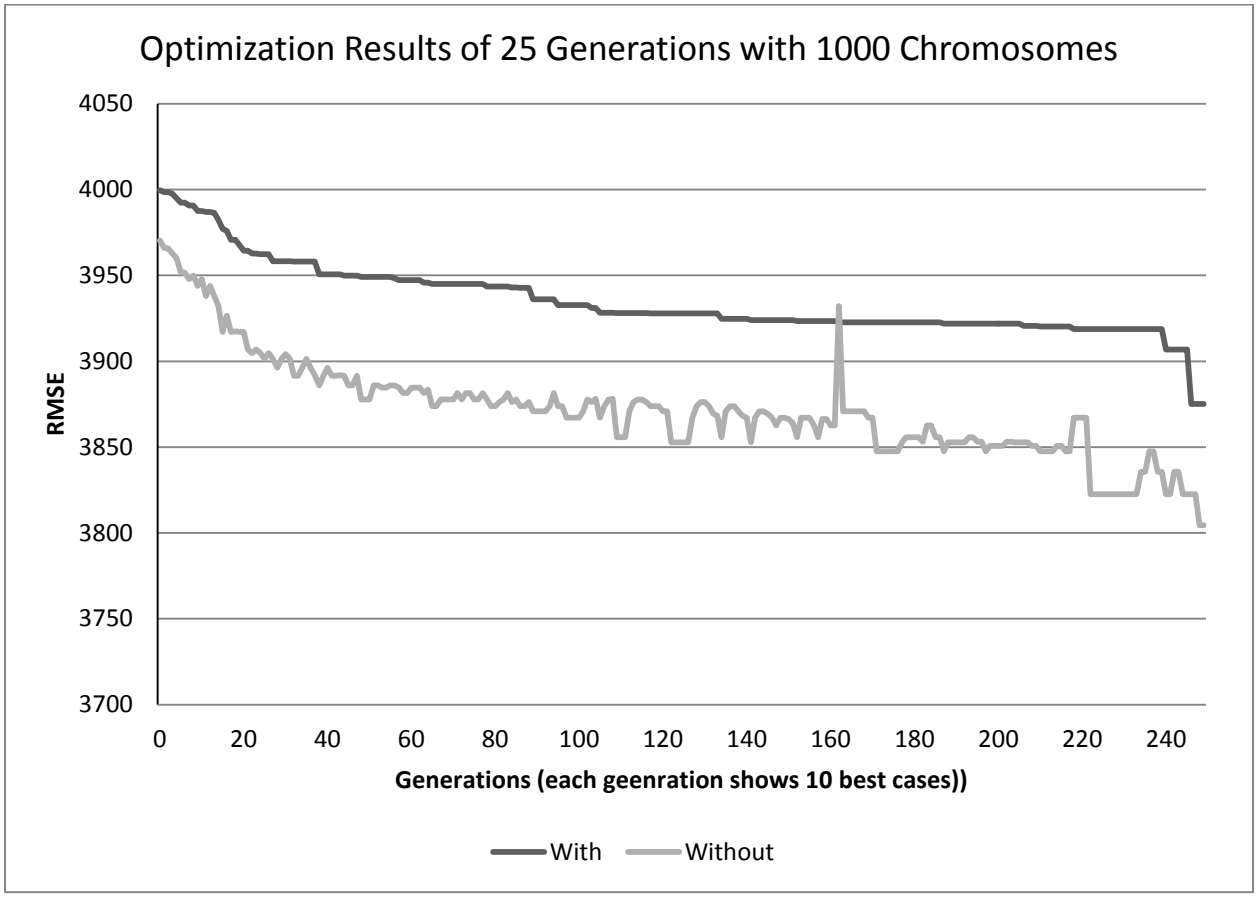


Figure 9-12: Optimization Results of 25 Generations With 1000 Chromosomes With and Without Seven Problematic ATR Stations

9.4.5.2 Final Optimization Results

Results of the final optimization utilizing the genetic algorithm process with 81 generations of 1000 chromosomes without the seven problematic ATR stations are presented in

this section. Figure 9-13 shows the changes in the RMSE as the final optimization was run. The optimal value of RMSE, the difference between model values and counts at ATRs, was decreased from the initial 3875 down to 3777.

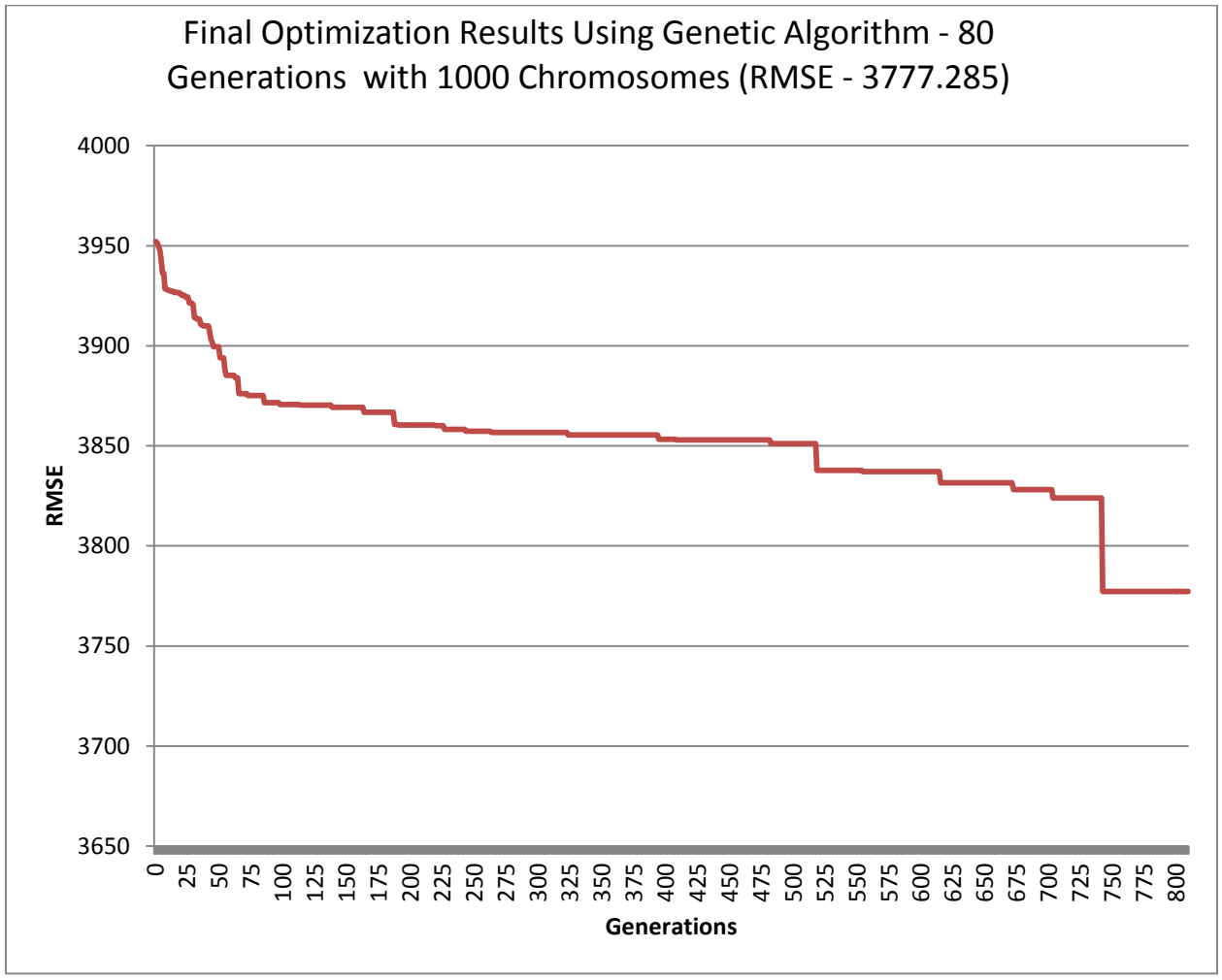


Figure 9-13: Changes of RMSE Through 81 Generations of 1000 Chromosomes in Genetic Algorithms

9.4.6 Truck Traffic Assignment on Utah Truck Routes

Using the results of the final optimization run, truck traffic was assigned to Utah‘s truck routes, which were discussed in Section 9.4.3.2. Ratios of both directions of centroid connectors that were connected to each origin (the centroid of each TTAZ) were extracted from the final

optimization result. These ratios were used to assign truck traffic to the centroid connectors. Next, truck traffic was assigned by the all-or-nothing shortest-path method by TransCAD. Figure 9-14 shows the results of the optimal truck traffic assignment for Utah‘s truck routes while Figure 9-15 shows the results of the optimal truck traffic assignment for truck routes in the Salt Lake Valley.

9.5 Discussion

The 81 generation with 1000 chromosomes resulted in RMSE 3777 indicating that on the average, ATR counts have almost 3000 less trucks than modeled assigned trucks. Table 9-6 shows the comparison of daily truck traffic between ATR stations and the model using a genetic algorithm. The initial truck traffic assigned using only the TransCAD functions with one run was unevenly distributed to the truck routes as shown in Figure 9-10. The final assigned truck traffic using genetic algorithm and TransCAD was more evenly distributed over the Utah‘s truck routes. Therefore, it can be said that the final output from the 81 generations of genetic algorithm appears more reasonable than the initial run described in Section 9.4.1.

The optimization concept based on genetic algorithm seems to be functioning. Nevertheless, further research is required on assignment because the differences between individual daily truck traffic by ATR and the truck traffic estimated by the assignment model utilizing the genetic algorithm were significantly larger than expected.

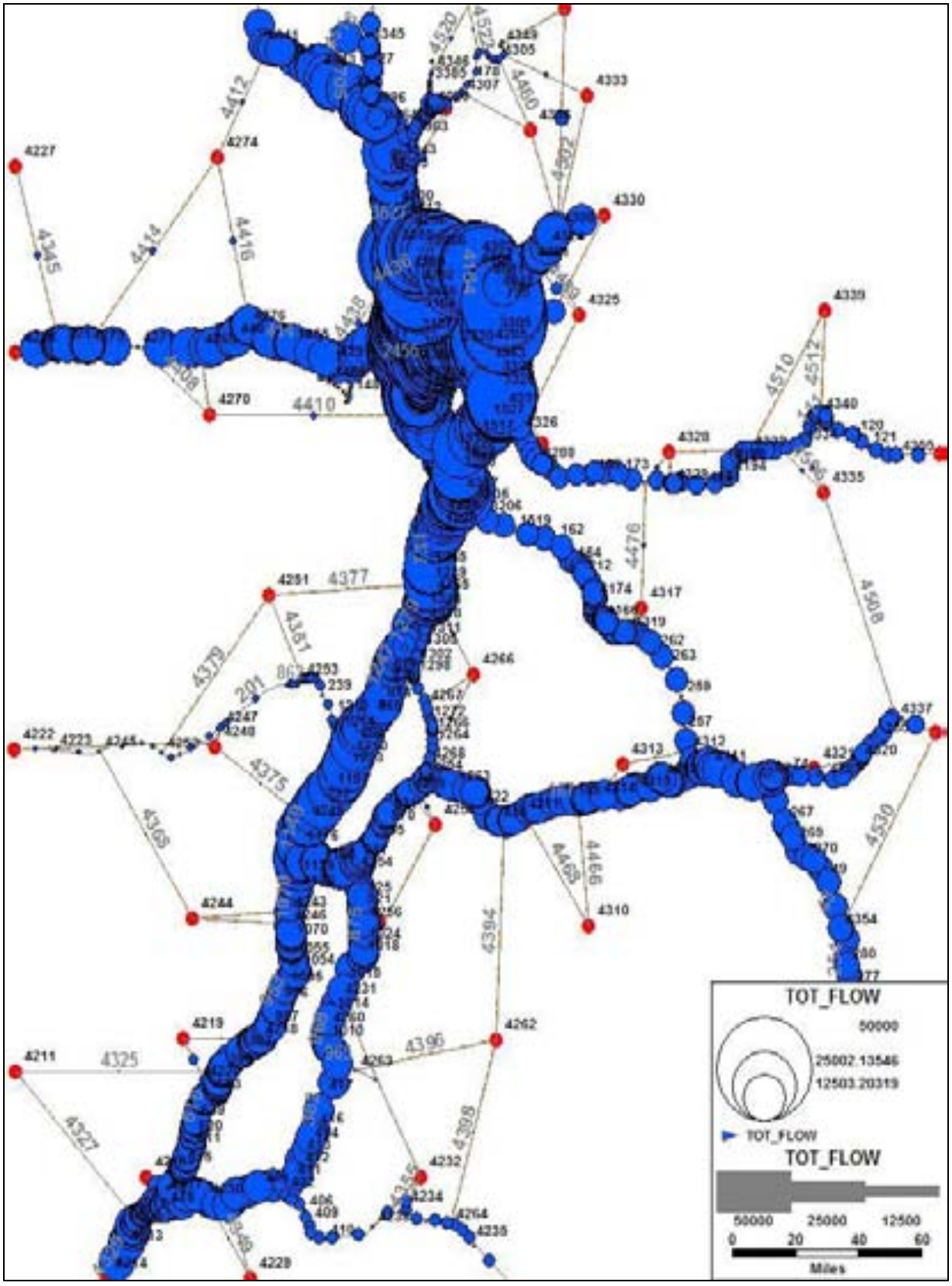


Figure 9-14: Final Assignment Result: Link Volume on Utah's Truck Routes (Statewide)

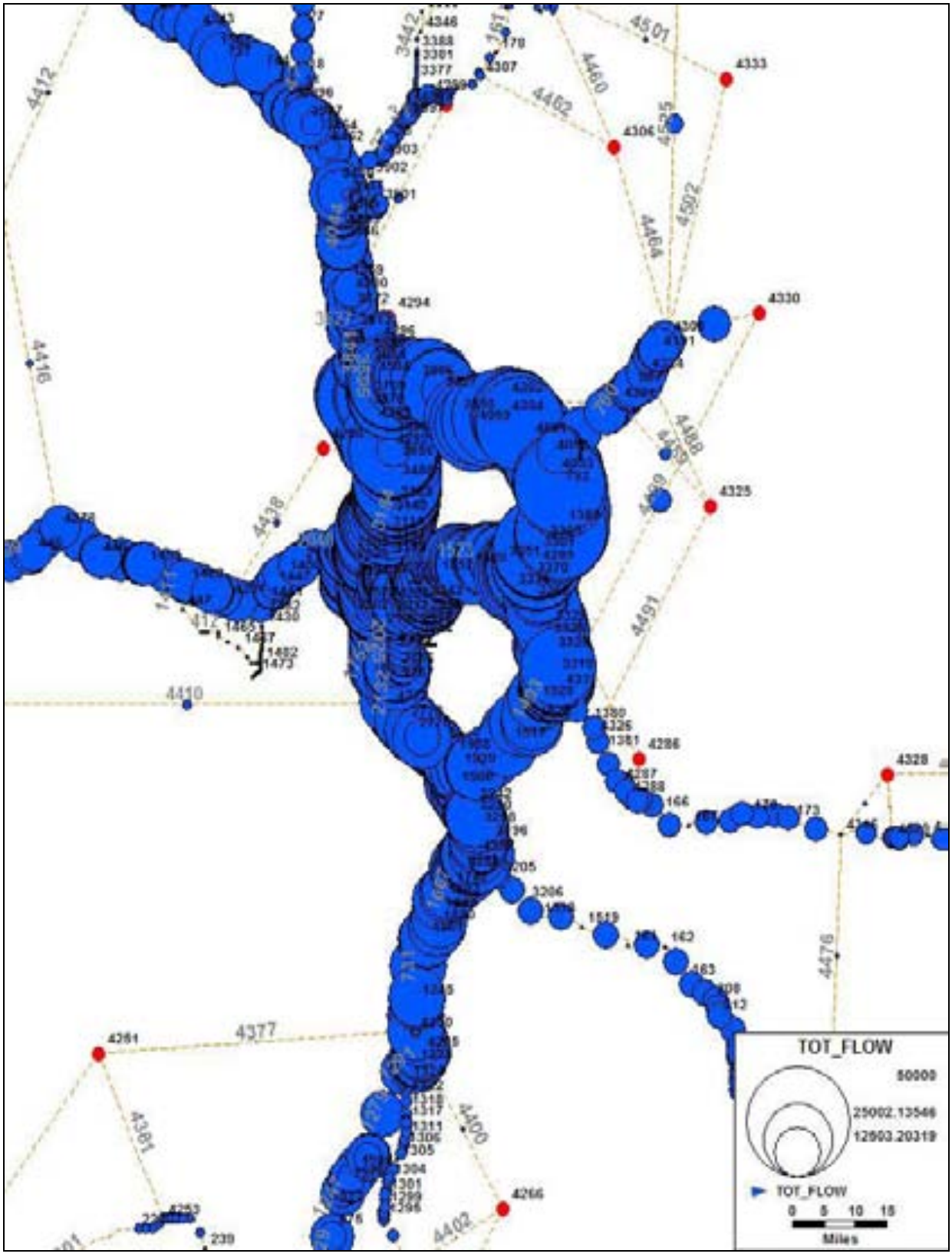


Figure 9-15: Final Assignment Results: Link Volume on Utah's Truck Routes (Salt Lake Valley)

There are potential reasons for the significant differences between the two truck traffic values, including inaccuracy in the vehicle classification at ATR stations, potential errors in the conversion of hourly truck traffic into daily truck traffic, the need for more centroid connectors for TTAZs that have many ways to reach nearby truck routes, unguaranteed optimality inherent to the genetic algorithm process, and so on.

One major reason for the large differences between them, which ranged from 148 to 35455 truck trips, might have been the lack of data about through trucks that do not have origins and destinations in Utah. Collecting data on through trucks that cross the state of Utah is one of the most important tasks associated with the truck traffic assignment performed in this study to lessen the differences between the truck traffic data from ATR stations and the model estimates.

9.6 Chapter Summary

To assign the commodity flow distributed among the TTAZs through the statewide commodity flow distribution model using composite friction factors developed in Chapter 7 on the truck routes in Utah, a series of truck traffic assignment using TransCAD were first performed. TransCAD‘s all-or-nothing traffic assignment method, which is generally used for truck traffic assignment or commodity flow assignment (Caliper 2008), was used. To validate the assigned truck traffic, truck traffic data obtained from Utah‘s ATR stations were used. The genetic algorithm which minimizes the balance between the model assigned truck counts and the truck counts from the ATRs, was developed and used for finding the optimum assignment of truck traffic to Utah‘s truck routes.

Though several issues still exist in assigning truck traffic, such as errors in truck counts at ATRs and the lack of truck data that pass through Utah‘s truck routes without origins or destinations within Utah, the genetic algorithm developed for assigning truck traffic produced,

attracted and distributed within the state appears a useful tool for finding an optimal assignment of truck trips over Utah‘s truck routes.

Table 9-6: Comparison of Daily Truck Traffic Between ATR Stations and the Model Using Genetic Algorithm

# of ATR Station	Route	Link ID in TransCAD	Daily Truck Traffic from ATR (A)	Daily Truck Traffic from TransCAD (B)	Difference (A-B)
301	I-80	1513	7339	26398	-19059
306	I-15	1571	15824	2687	13136
309	I-80	4152	13298	11421	1877
313	I-15	821	3338	5774	-2437
314	US-6	190	2274	4400	-2126
315	I-15	3536	12178	7370	4808
318	I-80	1353	5727	41182	-35455
323	I-80	407	3716	10120	-6404
324	US-491	35	1240	4071	-2831
349	I-15	1811	8065	18264	-10199
350	US-189	1787	2002	20	1983
351	I-215	1722	4972	396	4576
362	US-89	95	290	634	-344
363	US-91	29	4271	2566	1705
401	I-15	456	5821	359	5462
402	SR-9	434	1758	7249	-5491
404	I-70	4205	2790	6042	-3252
411	US-89	375	1034	1671	-637
415	US-89	880	442	7213	-6770
418	US-6	4206	2047	4315	-2268
421	US-191	241	2117	5350	-3233
424	US-191	4512	911	34	877
425	US-40	4314	2084	3156	-1072
431	SR-28	1283	1112	1692	-581
502	I-15	1292	4346	5774	-1428
503	US-89	1222	2044	1613	431
504	US-89	970	279	7218	-6939
506	US-191	330	601	952	-351
508	I-70	925	2268	5124	-2856
509	US-40	3374	2817	29679	-26863
611	I-15	3214	14271	14122	148

10 CONCLUSION AND RECOMMENDATIONS

This chapter presents a summary of all the tasks carried out in this research, conclusion and recommendations for further research.

10.1 Summary of the Tasks

The goal of this study was to develop a statewide truck freight flow model which is based on a commodity flow-based spatial interaction model to enable forecasting present and future truck traffic on Utah‘s truck routes using commodity and other necessary data that are publicly available. To achieve the goal of this study, four major tasks were performed: 1) the understanding of the characteristics of commodity flow using relationships between commodity flow and land use using GIS, 2) development of county-level multiple regression commodity flow generation models, 3) development of a statewide commodity distribution model, and 4) truck traffic assignment on Utah‘s truck routes. This section recaps the tasks performed in this study for meeting the four goals of the study.

10.1.1 Understanding Characteristics of Commodity Flow Using GIS Tools

To develop the relationships between commodity flow and land use characteristics, available commodity flow data were analyzed using TransCAD and the SPSS statistical software.

A correlation analysis between commodity flow and land use type revealed that the residential land use had the closest correlation with commodity flow with a Pearson correlation value of 91.0 percent. The land use with the second highest Pearson correlation value was the urban land use with a Pearson correlation value of 86.0 percent. The non-irrigation and riparian areas had much less correlation with commodity flow as one might expect.

Like the results of the correlation analysis between commodity flow and land use, the urban area and the residential area had the closest correlation with four types of business pattern data with Pearson correlation values ranging from 81.4 percent to 86.8 percent (urban area – all county business pattern data) and from 90.0 percent to 91.7 percent (residential area – all county business pattern data). The non-irrigation area and the riparian area were slightly related with commodity flow; however, the irrigation and water areas didn‘t have any significant correlation with all county business pattern data.

Correlation between land use and contributing economic factors had results similar to the relationships between land use and county business pattern data. The residential and urban areas had the closest correlation with economic factors including population, number of employment by industry, number of jobs, and wages. The Pearson correlation values between land use and contributing economic factors ranged from 86.6 percent to 88.1 percent. However, the size of county (area) didn‘t have any correlations with land use type. Wage data had the highest Pearson correlation value of 88.1 percent with land use type. In residential area, employment data had the highest Pearson correlation value of 91.4 percent.

Geographical map analysis of TransCAD was used in the study to spatially understand the relationship between the level of commodity flow and land use, and the relationship between the amount of commodity flow and the spatial spread of transportation facilities.

10.1.2 County-Level Multiple Regression Commodity Flow Generation Models

Understanding the characteristics of freight flow using GIS tools was the first step for developing three multiple regression commodity flow generation models using the land use characteristics. To develop multiple linear regression models relating to commodity flow to land use characteristics using SPSS, the results of correlation analysis among the factors were evaluated to determine what factors may be included in the models. Three types of multiple linear regression models were developed in this study: 1) commodity flow versus land use type, 2) commodity flow versus number of employee by industry, and 3) commodity flow and other selected independent variables obtained from the correlation matrix.

Commodity flows produced from (production), attracted to (attraction), and distributed within Utah (within) were categorized by the SIC code. Equation 10-1, Equation 10-2, and Equation 10-3 show the general multiple regression formulae of the three multiple regression models. Refer to Chapter 6 for variables definitions.

Model 1: $$CFS_i = Constant_i + \sum_{j=1}^{6} a_{ij} LandUse_j \quad (10\text{-}1)$$

Model 2: $$CFS_i = Constant_i + \sum_{j=1}^{25} a_{ij} EMPBI_j \quad (10\text{-}2)$$

Model 3: $$CFS_i = Constant_i + \sum_{j=1}^{25} a_{ij} EMPBI_j + \sum_{k=1}^{21} b_{ik} CBPTE_k + \sum_{l=1}^{11} c_{il} NOJ_l + \sum_{m=1}^{25} d_{im} W_m \quad (10\text{-}3)$$

In Model 3, 68 contributing factors including 21 CBPTE variables, 11 NOJ variables, 11 W variables and 25 EMPBI variables were entered. Even though all four types of county business pattern data were considered in the stepwise multiple regression linear analysis, CBPE, CBPAP, and CBPFQP variables were excluded because these variables had several missing data points.

As the final step of the regression analysis, commodity flows estimated by the two models, Model 2 and Model 3, were compared to determine which model would be more appropriate for estimating future commodity flow. Since it can‘t be validated with real data due to the lack of future land use data at the time of this study, the first model (Model 1) between commodity flow and land use type was excluded from the comparison of the performance of the models.

The CFS 2007 data were used for validating the two models: Model 2 and Model 3. The CFS 2007 was conducted by a partnership between the BTS and the U.S. Census Bureau. The commodity-based models developed in this study were used to predict commodity flows - production, attraction, and within – for 2007. The CFS 2007 was available via the Internet; hence, they were used to validate the models without any cost.

The total commodity flow for Utah in 2007, estimated by BTS and the US Census Bureau, was 305,414 thousand tons, with attraction of 104,616 thousand tons, production of 123,245 thousand tons, and distributed within of 77,553 thousand tons. The estimates by Model 2 were 83 percent to 84 percent of the value‘s estimates by BTS and the US Census Bureau. On the other hands, the estimates by Model 3 were 86 percent to 88 percent of the estimates by BTS and the US Census Bureau.

Average difference expressed by the ratio between the commodity flow by county, by the two models and by the CFS 2007 was 86.4 percent and 87.0 percent of the CFS 2007. While the standard deviation of difference in the ratio between the commodity flows by county, by the two models and by the CFS 2007 was 12.1 percent for the Model 2 and 7.1 percent for Model 3, indicating that the latter results were in less variation in the estimated commodity flow values than the former one, as a result, Model 3 was considered more reliable. Even though Model 3

requires more input data, extra work that is required for gathering input data will not be overwhelming because all data of these variables are available to the public over the Internet.

10.1.3 Statewide Commodity Flow Distribution Model

An enhanced gravity model-based commodity flow distribution model was developed using the data available to the public via the Internet. The model used composite friction factors, including physical distance, statistical distance (Euclidean distance) that reflects the interrelationship among the variables that characterizes the commodity generation at the county level, and economic factors which included the difference in population and difference in employment, thus overcoming the conceptual deficiency of a traditional gravity model.

Based on the concept and the contributing factors just explained, a commodity flow distribution model based on the concept of gravity model was developed. Equation 10-4 shows the amount of commodity exchange between zones *i* and *j* within a state.

By using the collected data from commodity- or freight-related websites open to the public, including the FAF (FHWA 2002), the CFS (BTS and U.S Census Bureau, 2009), and the official website for the state of Utah (state of Utah 2009), all factors including physical distance, Euclidean distance, difference in employment, and difference in population between zones *i* and *j* were determined. Since physical distance and Euclidean distance values were so large compared to the economic factor values, they were scaled down to the one hundredth of those data to make them compatible to the economic factor values when they were used in the distribution model. As for the employment and population data, their log-transformed values in the commodity generation model were used.

$$C_{ij} = \frac{C_i C_j f_{ij} U_{ij} N_{ij} K_{ij}}{\sum_{n=1}^{m} C_j f_{ij} U_{ij} N_{ij} K_{ij}} \quad (10\text{-}4)$$

where,

C_{ij} = commodity flow from production zone *i* to attraction zone *j,*

C_i = commodity flow produced in zone *i,*

C_j = commodity flow attracted to zone *j,*

f_{ij} = physical friction factor, a physical distance (P_{ij}) between production zone *i* and attraction zone *j,*

U_{ij} = statistical friction factor, a Euclidean distance (u_{ij}) between production zone *i* and attraction zone *j,*

N_{ij} = economic factor consisting of the difference between the difference in employment (ΔM_{ij}) and the difference in population (ΔO_{ij}) between zones *i* and *j*, and

K_{ij} = adjustment factor for commodity flow interchange between zone *i* and zone *j*.

A unique two-level calibration method was used to determine an optimal combination of model parameter values for distributing commodities among the counties in a state. The model was applied to distributing the within-Utah total commodity among the counties in Utah. Using the optimal combination of parameter values of the model factors determined by the two-level calibration method, commodities were distributed among the counties in Utah.

While the commodity flow distribution model focused on the production side of commodity flow between zones *i* and *j*, the calibration of the parameters of the four factors focused on the attraction side of the commodity flow. As a criterion for stopping the calibrating task, the difference in population function, $\Delta O_{ij} = O_i - O_j$, one of the economic factors in the model was used. It was assumed that when the total difference in population in a zone, ΔO_{ij}, is

more than the average difference in population of all zones, $Average\ (\Delta O_{ij}) of\ all\ zones$, the commodity attracted to that zone is more than the commodity produced in that zone.

A seven-step calibration process was applied to the distribution of within-Utah commodity flows. The optimal combination of the model parameter values met the two requirements, namely 1) the number of zones that have more than average difference in population between origin and destination zone and 2) the minimum difference between the normalized population difference and the normalized attraction values (that is, meeting Equation 7-6). The optimal combination of parameter values were found to be a = 0.0001, b = 0.0050, c = 0.0001 and d = 0.0010. The minimum Z value was 0.00000052 for this parameter value combination. The total amount of commodities in each county was distributed to production and attraction TTAZs using the model, and the growth factor method was used to adjust the production and attraction distribution values to achieve the results within ± 5 percent of the target values.

10.1.4 Application of the Statewide Truck Freight Flow Models to Utah's Truck Routes

The commodity flow distributed among TTAZs by the statewide commodity flow distribution model using composite friction factors developed in Chapter 7 and the production and attraction commodity flows were assigned to the Utah's truck routes in order to check truck traffic flow conditions on Utah's truck routes. To assign the distributed truck traffic on Utah's truck routes, TransCAD was used with the ATR station data, which were prepared in Chapter 8, as the data for model validation.

To assign truck traffic on Utah's truck routes, a five-step procedure was used: 1) adding the new TTAZ to GIS data sets for analyzing the truck traffic flow outside of Utah, 2) building highway network for making connection to Utah's truck traffic taken at 2002 ATR stations, 3)

checking ATR stations on truck highway networks, 4) estimating truck traffic flow outside of Utah, and 5) converting commodity measuring unit (tonnage) to truck traffic using the estimation method described in FAF 2.2 (FHWA 2009).

TransCAD provides a wide array of traffic assignment procedures that can be used for modeling urban traffic. These procedures include numerous variables that can be used for modeling intercity passenger and freight traffic (Caliper 2008). As the truck assignment considered by this study is a planning level traffic, the all-or-nothing assignment feature was selected for truck traffic assignment. The all-or-nothing assignment is a non-equilibrium traffic assignment method, but it is sufficient for a planning level assignment like the one dealt with in this study.

A genetic algorithm was used for finding the optimum assignment of truck traffic to Utah‘s truck routes by comparing RMSE between the truck traffic from ATR stations and the truck traffic assigned by TransCAD. When compared between the initial assignment by TransCAD and the assignment after the 81 generations with 1000 chromosomes in a genetic algorithm, truck traffic over Utah‘s truck routes were more evenly assigned.

The optimization concept based on a genetic algorithm seems to be functioning. Nevertheless, further research is required on assignment because the differences between individual daily truck traffic by ATR and the truck traffic estimated by the assignment model by genetic algorithm were significantly larger than expected. There are potential reasons for the significant differences between the two truck traffic values, including inaccuracy in the vehicle classification at ATR stations, potential errors in the conversion of hourly truck traffic into daily truck traffic, need for more centroid connectors for TTAZs that have many ways to reach nearby truck routes, and unguaranteed optimality inherent to the genetic algorithm process. One major

reason for the large differences between them, which ranged from 148 trucks/hr to 35455 trucks/hr, might have been the lack of data about through trucks that do not have origins and destinations in Utah.

10.2 Conclusion

CFMs focus on modeling the amount of freight transported, measured in tons, or any comparable unit of weight, through state highway networks. It is widely accepted by researchers in this field that focusing on the movement of freights enables CFMs to capture more accurately the fundamental economic mechanisms that drive freight movements.

The type of commodity being carried is one of the most important characteristics of truck movements, and it is sometimes a challenge to obtain such information from the carriers. Thus, lately, the integration of the commodity flow modeling and land use modeling has emerged as an alternative tool to estimate freight movements. The final purpose of this study was to develop a statewide truck freight flow model which is based on a commodity flow-based spatial interaction model to enable forecasting present and future truck traffic on Utah‘s highway networks through the understanding of the characteristics of commodity flow.

Understanding the relationship between commodity flow and land use and between land use and contributing economic factors is a fundamental step for estimating the level of commodity flow. This study found that the land use types most closely related to the level of commodity flow generated were the urban and residential area land use types. Geographical map analysis functions of TransCAD used in the study was useful for clearly understanding the relationship between the level of commodity flow and land use, and the relationship between the level of commodity flow and the spatial spread of transportation facilities.

Correlation analyses between commodity flow generation and contributing economic factors were performed and key economic factors for estimating commodity flow generation were identified. All key economic factors with high correlation to commodity flow including CFS2PT, CFS2IT, and CFS2AT were CBPE, CBPFQP, CBPAP, EMPBI, NOJ and W. Better prediction of land use will enable transportation planners to more quickly estimate commodity flow and plan for the development of future transportation facilities.

The three commodity-based multiple regression commodity flow generation models were developed by first examining the land use characteristics. The first model was a commodity-based model relating commodity flow to land use type. Due to the lack of commodity flow data and land use data for years other than 2002, the first model has not yet been validated. Once future land use plans become available, commodity flows produced from, attracted to, and distributed within Utah can be predicted at acceptable accuracy because the models are considered to be quite reliable with high R^2 and small BIC values. The second model was a commodity-based model relating commodity flow to employment related factors. Employment-related factors have been used by the existing statewide freight demand forecasting models (Fisher et al. 2000). The third model was a commodity-based model using factors describing land use characteristics, including employment, business pattern factors, job availability, and wage related factors. The reliability of the two models, Model 2 and Model 3, was checked by using them to estimate 2007 commodity flows and compare their results with the CFS 2007 by BTS and U.S. Census Bureau. It was found that Model 3 performed better than Model 2 and with higher R^2 values obtained. This type of commodity flow generation models can be used for practical applications.

The modeling effort demonstrated that commodity flows could be estimated by using multiple linear regression models. The data needed for the independent variables are available to the public via the Internet, thus making commodity flow estimation task economical.

Commodity movements are typically represented by an origin-destination matrix that contains both the type and quality of goods moved vis-à-vis vehicle movements, which are represented by traffic flows in different modes. The procedure used in the development of the enhanced gravity model for commodity distribution is one method that could distribute commodity flow first among the counties in a state when detailed data of commodity flow at the county-level is not known. At present there is no data to validate this model. However, given the level of details in commodity flow data that is currently available, this methodology can be a practical method to distribute within-state commodity flow to the counties in a state. Creating an O-D matrix of commodity flow is the first step before assigning commodity flow to a network of highways. To create the distribution matrix, a new commodity flow distribution matrix based on the concept of gravity model was developed. This model consisted of composite friction factors including physical distance, statistical distance (Euclidean distance), and economic factor consisting of the difference in population and the difference in employment among the zones.

To assign the commodity flow distributed among TTAZs through the statewide commodity flow distribution model using composite friction factors developed in Chapter 7 to Utah‘s major truck routes, a series of truck traffic assignments using TransCAD were conducted. The all-or-nothing traffic assignment method, which is used for truck traffic assignment or commodity flow by TransCAD, was used for the study.

In conclusion, the integration of the freight flow modeling and land use modeling was proved to be a practical tool compared to the other methods presented in the literature review for

estimating freight flow. In summary, the model developed in this study consisted of commodity flow generation modeling using three multiple regression models, commodity trip distribution with an enhanced gravity methodology using the three composite friction factors, and a truck traffic assignment using the all-or-nothing assignment procedure of TransCAD and a genetic algorithm. The assigned truck traffic on Utah highway network using the genetic algorithm and TransCAD was more evenly distributed through Utah‘s truck route than a single TransCAD run. Nevertheless, further research is required on truck traffic assignment because the differences between individual daily truck traffic by ATR and the truck traffic estimated by the assignment model by genetic algorithm were significantly larger than expected. There are potential reasons for the significant differences between the two truck traffic values, including inaccuracy in the vehicle classification at ATR stations, potential errors in the conversion of hourly truck traffic into daily truck traffic, and unguaranteed optimality inherent to the genetic algorithm process. One major reason for the large differences between them might have been the lack of data about through trucks that do not have origins and destinations in Utah as mentioned in the summary section.

10.3 Recommendation for Future Research

Although the research presented in this study provides several contributions to the freight transportation literature in the area of commodity flow modeling by the integration of land use and its characteristics, there are still a number of issues that need to be addressed as mentioned in the conclusion section.

Correlation between six land use types and various economic factors contributing to commodity flow was investigated in this research for understanding the characteristics of commodity flow relating to land use. However, to more systematically define the relationship

between commodity flow and land use types, modeling with further broken down land use types and industrial classifications is recommended where such detailed land use type and industry classification data become available.

Among the three commodity-based multiple regression commodity flow generation models, the commodity-based model using factors describing land use characteristics (Model 3), including employment, business pattern factors, job availability, and wage related factors, was the most reliable among the three models in comparing the estimation of 2007 commodity flows and the estimation of the CFS 2007 by BTS and U.S. Census Bureau. It is recommended that regression Model 3 be run over the CFS 2007 data to see if similar coefficients are obtained for the models.

To overcome the conceptual deficiency of a traditional gravity model for commodity flow distribution, an enhanced gravity model that employs composite friction factors consisting of physical distance, Euclidean distance of the factors considered for commodity generation, and economic factors including population difference and employment difference among the counties, was developed in this study. The model still requires validation. Collection of commodity flow data at the county level is recommended.

Truck traffic plays an important role in many aspects of highway activities, including transportation planning, highway operational analysis, and design of pavement and bridges. Adjusted truck traffic data collected on state highways at ATRs were used for the truck assignment model in this research. However, the level of accuracy of truck traffic data is often not clearly known by traffic engineers. Therefore, it is recommended to develop data collection and reduction methods that employ the following three strategies for improving the overall accuracy of truck traffic counts on highway systems:

- Statistical analysis for determining the overall accuracy of the current truck traffic data,
- Systematic data collection procedure to improve the accuracy of truck traffic data, and
- Efficient data management and operation systems for understanding the characteristics of truck traffic data and for regularly checking the data accuracy.

The optimization based on genetic algorithm seems to be functioning. One reason of larger differences between the model and the ground truth data was possibly the exclusion of through truck traffic because through truck traffic data were not available at the time of this study and hence not included in the model. In order to lessen the differences between the model and the ground truth data, estimation of through truck traffic using the information collected at the ports of entry is recommended.

Finally, one fundamental question that still remains to be answered when validating the traffic assignment model using the all-or-nothing method is the limitation that the method does not consider capacity limitation and equilibrium status of truck traffic flow in the network. Therefore, truck traffic assignment using other traffic assignment methods available in TransCAD such as user equilibrium method, capacity restraint method, and multiple class traffic assignment by truck vehicle type is recommended to be pursued once the data limitation issues mentioned in previous paragraphs are resolved.

REFERENCES

Abraham, J. K. (2010). Trip Distribution, A Lecture Note of CE 7630, Wayne State University, Detroit, MI. http://www.scribd.com/doc/43082492/Trip-Distribution-1 (Accessed on October 1, 2009).

Alam M., Fekpe, E., and Majed, M. (2007). "FAF - Freight Traffic Analysis." FHWA, Freight Management and Operations website: http://ops.fhwa.dot.gov/freight/freight_analysis/faf/faf2_reports/reports7/index.htm, (Accessed on October 13, 2009).

Al-Battaineh, O., and Kaysi, I. A. (2005). "Commodity - based truck origin - destination matrix estimation using input-output data and genetic algorithm." *Transportation Research Record,* 1923, TRB, National Research Council, Washington, D.C., pp. 37 - 45.

Al-Deek, H., Klodzinski, J., El-Helw, A., Sarareddy, P., and Emam, E. (2002). "Development of a statewide model for heavy truck freight movement on external networks connecting with Florida ports." Florida Department of Transportation, Tallahassee, FL.

Alam M., and Fekpe, E. (1998). "Application of geographic information systems technology in freight data analysis, case study of I - 90 / I - 94 corridor analysis." *Transportation Research Record,* 1625, TRB, National Research Council, Washington, D.C., pp. 173 - 183.

Ambite, J. L., Giuliano, G., Gordon, P., Pan, Q., and Bhattacharjee, S. (2002). "Integrating heterogeneous data sources for better freight flow analysis and planning." Digital Government Society of North America, Columbia University, NY.

American Association of State Highway and Transportation Officials (AASHTO). (1992). "Guidelines for traffic data programs." Washington D.C.

Ammah-Tagoe, F., and Johnson, D. (2004). "Understanding potential freight bottlenecks in the United States: a look at the Geofreight visual display tool." *MTS Research and Technology Coordination Conference*, Washington, D.C., Nov. 16 - 18, 2004.

Ashtakala, B. and Murthy, A. S. N. (1988). "Optimized gravity models for commodity transportation." *J. Transportation Engineering*, 114 (4), pp. 393 - 408.

Black, W. R. (1971). "The utility of the gravity model and estimates of its parameters in commodity flow studies." *Proc. of the Association of American Geographers*, 3, pp. 132 - 143.

Black, W. R. (1972). "Interregional commodity flows: some experiments with the gravity model." *J. Regional Science*, 12 (1), pp. 5 - 21.

Black, W. R. (1999). "Commodity flow modeling." *Transportation Research Circular*, E - C011, TRB, National Research Council, Washington, D.C., pp. 136 - 155.

Boile, M. P., Benson, S., and Rowinski, J. (1998). "Assignment of commodity flows over the New Jersey highway network." *Proc. of 40th Annual Meeting of the Transportation Research Forum*, 1**,** 1 October 29-31, 1998, Philadelphia**,** PA. pp. 86 - 211

Boile, M., and Golias, M. (2004). "A dynamic GIS-based tool for truck volume estimation." *J. Institute of Transportation Engineers***,** 74 (12), pp. 42 - 46.

Boxill, S. A. (2005). "The integration of GIS and transportation modeling: a state-of-the-practice review." National Technical Information Service, Springfield, VA.

Braslau, D., and Fruin, J. (1998). "Northwest Minnesota freight flow study - freight flow estimation and identification of significance corridors." National Technical Information Service, Springfield, VA.

Brogan, J. J., Brich, C. S., and Demetsky, J. M. (2001). "Application of a statewide intermodal freight planning methodology." *Final Report*, Virginia Transportation Council, VA.

Brown, A. L., and Affum, J. K. (2002). "A GIS-based environmental modeling system for transportation planners." *J. Computers, Environment and Urban Systems*, 26 (6), pp. 577 - 590.

Bureau of Transportation Statistics (BTS) and Bureau of Census. (2009). CFS website, <http://www.census.gov/econ /www/ se0700.html> (Accessed on October 15, 2009).

Bureau of Transportation Statistics (BTS). (1998). "Transportation statistics 1998." *Annual Report*, Washington, D.C.

Button K.J. and Pearman, A. D. (1981). "The economics of urban freight transport." *Macmillan,* London.

Caliper Corporation. (2001). "Travel demand modeling with TransCAD 4.0." Newton, MA.

Caliper Corporation. (2008). Travel demand modeling with TransCAD Version 5.0 User's Guide." Newton MA.

Caliper Corporation. (2010). Academic TransCAD License Version 5.0 r3 Build 1850, Serial #: TCU - 964 - FKR - 186 - REC, © 1994-2010 Caliper Corporation, Newton, MA.

Cambridge Systematics Inc. (2007). "The New Jersey comprehensive statewide freight plan - Appendix: New Jersey 2003 statewide freight data profile." <http://www.state.nj.us/transportation/freight/plan/study.shtm> (Accessed on October 12, 2009).

Cambridge Systematics Inc., COMSIS Corporation, and University of Wisconsin - Milwaukee, (1996). "Quick response freight manual." U.S. Department of Transportation, Washington, D.C.

Cambridge Systematics Inc. (1996). "Quick response freight manual." Report No. DTFH61 - 93 - C - 00075, U.S. Department of Transportation, Washington, D.C.

Cambridge Systematics Inc. (2000). "FASTrucks corridor needs study: truck model documentation." *Technical report*, Washington State Department of Transportation, WA.

Cambridge Systematics Inc., Leeper, Cambridge and Campbell Inc., Sydec Inc., Corsi, T. M., and Grimm, C. M. (1997). "A guidebook for forecasting freight transportation demand." *NCHRP Report,* 388, Transportation Research Board, National Research Council, Washington, D.C.

Celik H. M., and Guldmann, J. (2002). "Spatial interaction modeling of interregional commodity flow." *The 42nd European Congress of the Regional Science Association*, Dortmund, Germany, August 27-31, 2002.

Census Bureau, U.S. Department of Commerce, and Bureau of Transportation Statistics. (2006). "Freight analysis framework (FAF) version 2.2, user guide, commodity origin - destination database 2002-2035." Washington, D.C.

Chen, Y. W., Wang, C. H., and Lin, S. J. (2008). "A multi- objective geographic information system for route selection of nuclear waste transport." *J. Omega*, 36, pp. 363 - 372.

Chin, S. M. (2006). "A geographical information system - based decision support tool: GeoFreight." Oak Ridge National Laboratory, Oak Ridge, TN.

Chin, S., and Hwang, H. (2007). "National freight demand modeling - bridging the gap between freight flow statistics and U.S. economic patterns." *Compendium of Papers CD-ROM of the 86th Annual Meeting*, TRB, National Research Council, Washington, D.C.

Cohen, H. S., Alfelor, R. M., Rhoades, K. L., Horowitz, A. J., Chatterjee, S., McAdams, M., Matherly, D.W., and Sosslau, A. (1996). "Quick response freight manual." U.S. Department of Transportation, Washington, D.C.

Craig B. W., and Walton, M. (2002). "GIS to identify strategic freight corridors in Texas." *Final Report,* SWUTC/02/467504 - 1, Southwest Regional University Transportation Center, TTI, College Station, TX.

Crainic, T. G., Dufour, G., Florian, M., Larin, D., and Leve, Z. (2001). "Demanding matrix adjustment for multimodal freight networks." *Transportation Research Record,* 1771, TRB, National Research Council, Washington, D.C., pp. 140 - 147.

Dantas, A., Yamashita, Y., and Yamamoto, K. (2000). "Location of postal freight terminal using GIS and AHP." University of Canterbury, New Zealand.

Donnelly, R. (2002). "Development of the TLUMIP commercial travel(CT) component." *Working Paper,* Oregon Department of Transportation, OR. <http://www.odot.state.or.us/tddtpau/modeling.html> (Accessed on September 9, 2009).

Donnelly, R., Costinett, P., and Hunt, J.D. (1999). "The Oregon statewide integrated land use - transport models." *Travel Model Improvement Program Annual Meeting*, April, 1999.

ESRI website. < www.esri.com> (Accessed on April 15, 2009).

FHWA. (2001). "Traffic monitoring guide." U.S. Department of Transportation, Washington, D.C.

FHWA, FAF version 2 website, <http://ops.fhwa.dot.gov/ freight/freight_analysis/faf/> (Accessed on October 12, 2009).

FHWA, FAF version 3 website, <http://ops.fhwa.dot.gov/freight/freight_analysis/faf/index.htm> (September 21, 2010).

FHWA. (2002). "Freight analysis framework." U.S. Department of Transportation, Washington, D.C., <http://ops.fhwa.dot.gov/freight/adfrmwrk/> (Accessed on May 12, 2009).

FHWA. (2006). "Freight analysis framework 2.2." U.S. Department of Transportation, Washington, D.C., <http://ops.fhwa.dot.gov/freight/adfrmwrk/> (Accessed on May 12, 2009).

Fischer, M. J., and Han, M. (2001). "Truck trip generation data: a synthesis of highway practice." *NCHRP Synthesis*, 298, TRB, National Research Council, Washington, D.C.

Fisher, M., Ang-Olson, J., and La, A. (2000). "External urban truck trips based on commodity flow." *Transportation Research Record,* 1707, TRB, National Research Council, Washington, D.C., pp. 73 - 80.

Friedrich, M., Haupt, T., and Nokel, K. (2003). "Freight modeling: data issues, survey methods, demand and network models." *10th International Conference on Travel Behavior Research,* Lucerne, Switzerland, August 10 - 15, 2003.

Fung, G. S. K., Yung, N. H. C., Pang, G. K. H., and Lai, A. H. S. (2002). "Effective moving cast shadow detection for monocular color traffic image sequences." *J. Optical Engineering*, 41 (6), pp. 1425 - 1440.

Gliebe, J. (2001). "The north-south transportation initiative: truck travel forecasting methodology report." *Technical Report,* Ohio - Kentucky - Indiana Regional Council, OH.

Golias, M. and Boile, M. P. (2005). "Truck demand modeling with ArcInfo 9.0." <http://proceedings.esri.com/library/userconf/proc05/papers/pap1092.pdf> (Accessed on September 12, 2009).

Google Maps website: <http://maps.google.com/maps?hl=enandtab=wl> (Accessed on September 14, 2010)

Gordon, P., and Pan, Q. S. (2001). "Assembling and processing freight shipment data: developing a GIS - based origin - destination matrix for southern California freight flows." *Final report*, METRANS Research Project 99-25, University of Southern California, CA.

Graettinger, A. J., Kilim , R. R., Govindu, M. R., Johnson, P. W., and Durrans, S. R. (2005). "Federal highway administration vehicle classification from video data and a disaggregation model." *Journal of Transportation Engineering*, Vol. 131, No. 9. pp. 689 - 698.

Gupte, S., Masoud, O., Martin, R. F. K., and Papanikolopoulos, N. P. (2002). "Detection and classification of vehicles." *IEEE Transactions on Intelligent Transportation Systems*, 3 (1), pp. 37 - 47.

Hallmark, S. L. (2002). "Calculating heavy - truck VMT." Iowa State University, IA.

Hasegawa, O. and Kanade, T. (2005). "Type classification, color estimation, and specific target detection of moving targets on public streets." *Machine Vision and Applications*, 16 (2), pp. 116 - 121.

Holguin-Veras, J., and Pati, G. R. (2007). "Integrated origin-destination synthesis model for freight with commodity-based and empty trip models." *Transportation Research Record 2007*, TRB, National Research Council, Washington, D.C., pp. 60 - 66.

Holguin-Veras, J., and Thorson, E. (2000). "Trip length distributions in commodity-based and trip-based freight demand modeling." *Transportation Research Record,* 1707, TRB, National Research Council, Washington, D.C., pp. 37 - 48.

Holguin-Veras, J., and Thorson, E. (2003a). "Modeling commercial vehicle empty trips with a first order trip chain model." *J. Transportation Research B*, 37 (2), pp. 129 - 148.

Holguin-Veras, J., and Thorson, E. (2003b). –Practical implications of modeling commercial vehicle empty trips.” *Transportation Research Record,* 1833, TRB, National Research Council, Washington, D.C., pp. 87 - 94.

Holguin-Veras, J., List, G. F., Meyburg, A. H., Ozbay, K., Passwell, R. E., Teng, H., and Yahalom, S. (2001). –An assessment of methodological alternatives for a regional freight model in the NYMTC region.” *Final Report*, New York Metropolitan Transportation Council (NYMTC), NY.

Horowitz, A. J. and Farmer, D. D. (1998). –A critical review of statewide travel forecasting practice.” *Compendium of Papers CD - ROM of the 77th Annual Meeting*, TRB, National Research Council, Washington, D.C.

Huang, W. and Smith, Jr R.L. (1998). –Development of a truck travel demand model for Wisconsin using commodity flow survey data.” *Transportation Research Record,* 1685, TRB, National Research Council, Washington, D.C., pp. 1 - 6.

Jackson, R. W., Schwarm, W. R., Okuyama, Y., and Islam, S. (2004). –A method for constructing commodity by industry flow matrices.” *Research Paper,* 2004 - 5, Regional Research Institute, West Virginia University, WV.

Jiang, F., Johnson, P., and Calzada C. (1999). –Freight demand characteristics and mode choice: an analysis of the results of modeling with disaggregate revealed preference data.” *J. Transportation and Statistics*, December 1999, pp. 149 - 158.

Johnston, R. A., and de la Barra, T. (2000). –Comprehensive regional modeling for long - range planning; linking integrated urban models and geographic information systems.” *J. Transportation Research A,* 34, pp. 125 - 136.

Karakas, A., and Turner, K. (2004). –Aggregate supply and demand modeling using GIS methods for the front range urban corridor - Colorado.” *J. Computer and Geoscience,* 30, pp. 579 - 590.

Khan, A. M., Taylor, S. J., and Armstrong, J. M. (2005). –Factors affecting the use of GIS in urban transportation planning and management.” <http://www.gisdevelopment.net/proceedings/gisdeco/2004/paper/ata1.htm > (Accessed on August 12, 2009).

Kim, H., Baek, S., and Lim, Y. (2001). –Origin-destination matrices estimated with a genetic algorithm from link traffic counts.” *Transportation Research Record,* 1771, TRB, National Research Council, Washington, D.C., pp. 156 - 163.

Krishnan V., and Hancock, K. L. (1998). –Highway freight flow assignment in Massachusetts using geographic information systems.” *Transportation Research Record,* 1625, TRB, National Research Council, Washington, D.C., pp. 156 - 164.

Kuhn D. B., and Keeslar, V. (2009). ―Freight in Utah - The crossroads of the west" UDOT Planning Section." UDOT, SLC, UT.

Lai, A. H. S., Fung, G. S. K., and Yung, N. H. C. (2001). ―Vehicle type classification from visual-based dimension estimation." *Proc. of the IEEE Intelligent Transportation Systems Conference*, August 25 - 29, 2001, Oakland, CA, pp. 201 - 206.

List, G. F., and Turnquist, M. A. (1994). ―Estimating truck travel patterns in urban areas." *Transportation Research Record,* 1430, TRB, National Research Council, Washington, D.C., pp. 1 - 9.

List, G. F., Konieczny, L. A., Durnford, C. L., and Papayanoulis, V. (2002). ―Best - practice truck flow estimation model for the New York City region." *Transportation Research Record,* 1790, TRB, National Research Council, Washington, D.C., pp. 97 - 103.

List, G., Konieczny, L., Dumford C., and Papayanoulis, V. (2001). ―A best practice truck flow estimation model for the New York City region." *Proceedings of the Eighth TRB Conference on Transportation Planning Methods*, April 22-26, 2001, Corpus Christi, TX.

Lomax, T., Turner, S., and Margiotta, R. (2001). ―Monitoring urban roadways in 2000: using archived operations data for reliability and mobility measurement." Final report.

Marker, Jr., J. T., and Goulias, K. G. (1998). ―Truck traffic prediction using quick response freight model under different degrees of geographic resolution - geographic information system application in Pennsylvania." *Transportation Research Record,* 1625, TRB, National Research Council, Washington, D.C., pp. 118 - 123.

MEandP, WSP, Katalysis Ltd., John Bates Services, MDS - Transmodal, and Dft Integrated Transport and Economic Appraisal. (2002a). ―Review of freight modeling." *Initial Projects,* Cambridge, England.

MEandP, WSP, University of Westminster, Katalysis Ltd., and DfT Integrated Transport and Economic Appraisal. (2002b). ―Review of freight modeling, Report A1 - Issues in logistics and the freight industry." Cambridge, England.

Meyburg, A. H., Bingham, P. H., Boyer, K. D., Costello, R., Ganovski, Jr., D. L., Lahsene, S., Lawson, C. T., Martinez, R. E., Tardif, R., and Walton, C. M. (2003). ―A concept for a national freight data program." *Special Report,* 276, Transportation Research Board. Washington, D.C.

Meyburg, A.H. (1976). ―Modeling in the Context of Urban Goods Movement Problems." *2nd Conference on Goods Transportation in Urban Areas*, Engineering Foundation, New York, pp. 127 - 168.

Microsoft® Office Excel® 2007 (12.0.6524.5003) SP2 MSO (12.0.6425.1000) Part of Microsoft Office Enterprise 2007 © 2006 Microsoft Corporation

Miller, H. J., and Shaw, S. (2001). –Geographic information systems for transportation - principles and applications.” Spatial Information Systems, Oxford University Press, New York.

Mitchell, M. (1997). –An Introduction to Genetic Algorithms.” The MIT Press, Cambridge, MA.

Mitra, S., Tollive, D., Varma, A., and Dybing, A. (2007). –Analyzing effects of spring highway load restrictions on North Dakota‘s agricultural freight flows.” *Transportation Research Record,* 2007, TRB, National Research Council, Washington, D.C., pp. 92 - 99.

National Research Council (1992). –Data for decisions.” *Transportation Special Report* 234*,* TRB, Washington, D.C.

Nixon, T. (1993). –Truck trip generation rates by land use in the central artery tunnel project study area.” Boston Metropolitan Planning Organization, MA.

Ogden, K. W. (1992). –Urban goods movement: a guide to policy and planning.” Ashgate Publishing Limited, Aldershot, Hampshire, United Kingdom.

Ogden, K.W. (1978). –The distribution of truck trips and commodity flow in urban areas: a gravity model analysis.” *Transportation Research*, 12 - 2, pp. 131 - 137.

Ortuzar, J. de D. and Willumsen, L. G. (2002). –Modeling transport - 3rd ed.”, John Wiley and Sons, New York.

Palem, S. (2004). –Design and implementation of an internet based spatial decision support system (SDSS) for freight management.” *A Thesis,* University of Toledo, OH.

Park, M. and Smith Jr., R. L. (1997). –Development of a statewide truck - travel demand model with limited origin-destination survey data.” *Transportation Research Record,* 1602, TRB, National Research Council, Washington, D.C., pp. 14 - 21.

Parkinson, A. (2006). –Optimization techniques in engineering.” Course Notes of MEEn 575 in Brigham Young University, Provo UT.

Parsons Brinckerhoff Quade and Douglas, Inc. (1998). –The Second Generation Michigan Statewide Truck Travel Demand Forecasting Model.” *Draft for Review for the Travel Demand Analysis Section,* Michigan Department of Transportation, MI.

Parsons Brinckerhoff Quade and Douglas, Inc. (2007a). –The New Jersey comprehensive statewide freight plan.” *Final Report,* New Jersey Department of Transportation, NJ.

Parsons Brinckerhoff Inc. (2002). –Final specification of travel forecasting models for the New York City region.” *Technical Report,* New York Metropolitan Transportation Commission, NY.

Proussaloglou, K., Popuri, Y., Tempesta, D., Kasturirangan, K., and Cipra, D. (2007). "Wisconsin passenger and freight statewide model." *Transportation Research Record,* 2003, TRB, National Research Council, Washington, D.C., pp. 120 - 129.

Ramsey F. L. and Schafer D. W. (2002). "The statistical sleuth - A course in methods of data analysis, Second Edition.", Duxbury, Pacific Grove, CA. Bureau of Transporation Statisitcs (BTS) and Bureau of Census, CFS website, <http://www.census.gov/econ /www/ se0700.html> (Accessed on October 15, 2009).

Ramsey F. L. and Schafer D. W. (2002). "The statistical sleuth - A course in methods of data analysis, Second Edition.", Duxbury, Pacific Grove, CA.

Reed, W. E. (1967). "Areal interaction in India." *Research Paper*, Duke University, Chicago, IL.

Rios, A. L., Nozick, L. K., and Turnquist, M. A. (2002). "Value of difference categories of information in estimating freight origin-destination tables." *Transportation Research Record,* 1783, TRB, National Research Council, Washington, D.C., pp. 42 - 48.

Roberts, P., and Chiang, Y. (1981). "Development of a policy-sensitive model for forecasting freight demand." Report No.DOT-P-30-81-04, U.S. Department of Transportation, Washington, D.C.

Rodriguez J. P. (2003). Transportation Geography on the Website, Dept. of Economics and Geography, Hofstra University, <http://people.hofstra.edu/geotrans/index.html> (Accessed on September 15, 2009).

Ruiter, E. R. (1992). "Development of an urban truck travel model for the Phoenix Metropolitan area." Report No.FHWA-AZ92-314, Arizona State Department Transportation, AZ.

Saito, M., and Jin, G. T. (2009). "Evaluating the accuracy level of truck traffic data on state highways." Report No.UT-09.02*,* Utah Department of Transportation, UT.

Schlappi, M. L., Marshall, R. G., and Itamura, I. T. (1993). "Truck travel in the San Francisco bay area." *Transportation Research Record,* 1383, TRB, National Research Council, Washington, D.C., pp. 85 - 94.

Shannon, B. K., and Demetsky, M. J. (2002). "Investigating the application of GIS database to address statewide freight transportation planning." *Final Report*, Virginia Transportation Research Council and the Mid-Atlantic Universities Transportation Center, VA.

Smadi, A., and Maze, T. H. (1996). "Statewide truck transportation planning: methodology and case study." *Transportation Research Record,* 1522, TRB, National Research Council, Washington, D.C., pp. 55 - 63.

Sorratini, J. A., and Smith, Jr., R. L. (2000). –Development of a statewide truck trip forecasting model based on commodity flows and input-output coefficient." *Transportation Research Record,* 1707, TRB, National Research Council, Washington, D.C., pp. 49 - 55.

Souleyrotte, R., Maze, T. H., Pathak, S. and Smadi, A. (1996). –Statewide freight demand modeling: a multi- commodity layered approach." Center for Transportation Research and Education, Ames, IA.

Souleyrotte, R., Maze, T. H., Strauss, T., Preissig, D. and Smadi, A. (1998). –A freight planning typology." *Transportation Research Record,* 1613, TRB, National Research Council, Washington, D.C. pp. 12 - 19.

Southworth, F. (1982). –The spatial accessibility of truck terminals in the presence of multi-destination truck circuits." Civil Engineering Department, University of Illinois at Urbana - Champaign, IL, 15.

SPSS Inc. (2004). Version 1.0 © Copyright 2004, an IBM Company Headquarters, Chicago, IL.

Sutton, J., and Bennett, K. (2001). –Decision support for multimodal freight transportation." GIS/Trans Ltd., Oakland, CA.

Swan Wooster Engineering Co Ltd. (1979). –Evaluation of Urban Trucking Rationalization in Vancouver - Phase 1 and 2," *Transport Canada*, Montreal, Canada

Tadi, R. R., and Balbach, P. (1994). –Truck trip generation characteristics of nonresidential land uses." ***J.*** *Institute of Transportation Engineers*, 64 (7), pp. 43 - 47.

The Utah Governor's Office of Planning and Budget, <http://www.utah.gov/government/governor.html>, (Accessed on September 16, 2009).

TRB's Freight Subcommittee. (2010). AHB10(6), Marriott, Tyler 10:15AM to Noon, January 12, 2010.

University of Westminster and Katalysis Ltd., DfT Integrated Transport and Economics Appraisal, (2002). –Review of freight modeling, Report B2 - Review of models in continental Europe and elsewhere." *Final Report*, <http://www.transforum-eu.net/IMG/pdf/dft_reviewoffreightmodelse.pdf> (Accessed on October 1, 2009).

Utah Department of Transportation (UDOT) website <http://www.udot.utah.gov/> (Accessed on October 20, 2009)

UDOT Research Division's March 2010 Newsletter Website. <http://www.udot.gov/main/uconowner.gf?n=13028532324956273 > (April 15. 2010).

Utah Geographic Information Council, Utah GIS Portal website. <http://agrc.its.state.ut.us/ > (Accessed on September. 12, 2009.

Utah Geographic Information Council, Utah GIS Portal website. <http://agrc.its.state.ut.us/ > (Accessed on September. 12, 2009.

Wang, Z., Zhang, F., Yang, D., and Lou, Y. (2004). "Application of spatial information technology for logistics in ITS." *International Geoscience and Remote Sensing Symposium*, 4, pp. 2565 - 2567.

Wang, X. (2005). "Integrating GIS, simulation models, and visualization in traffic impact analysis." *J. Computers, Environment and Urban Systems*, 29, pp. 471 - 496.

Wang, Y., Nihan, N., Avery, R., and Zhang, G. (2006). "Improving truck and speed data using paired video and single-loop sensors." *Final Report,* WA-RD 656.1., Washington State DOT, WA.

Wang, Y., Nihan, N., Avery, R., and Zhang, G. (2006). "Improving truck and speed data using paired video and single - loop sensors", University of Washington, WA.

Whitley, D. A. (1994). "Genetic algorithm tutorial." *Statistics and Computing*, 4, pp. 65 - 85.

Wilbur Smith Associates. (2008). "Utah statewide travel model - draft architecture and best practice report." Utah Department of Transportation, UT.

Wong, A., Taylor, G. D., Taha, H. A., and Wootton, J. (1997). "GIS - based freight density and capacity modeling." Mack-Blackwell Rural Transportation Center, AK.

Zhong, M., and Hanson, B. L. (2007). "GIS-based travel demand modeling for estimating traffic on low-class roads." *Compendium of Papers CD-ROM of the 86th Annual Meeting*, TRB, National Research Council, Washington, D.C.

Zhou, J., Zhou, J., Zhou, J., Courtet, Y., Wu, W., and Ni, H. (2001). "Logistics planning using the POEM language system." < http://www.enginest.com> (Accessed on July 9, 2009).

APPENDICES

Appendices are quite large and therefore are included in a PDF on a separate CD-ROM attached to this dissertation. There are nine appendices. The following page lists the Table of Contents for these Appendices.

TABLE OF CONTENTS

Appendix A: Raw Data Needed for Determining Potential Contributing Factors of Commodity Freight Flow and Difference of Raw Data and Their Log Transformation 267

A-1 Index of Data Classification 267

A-2 Raw Data Needed for Determining Potential Contributing Factors of Commodity 271

A-3 Comparison of Distribution Between Raw Data of Contributing Factors and Their Log Transformation 290

A-4 Maps, TransCAD Analysis Results 297

Appendix B: Analysis Results of Relationship Between Land Use and the Contributing Factors of Commodity Flow 355

B-1 Correlation Analysis Results 355

B-2 Correlation Between Commodity Flow and Contribution Factors 374

Appendix C: Multiple Regression Model Between Commodity Flow and Land Use 389

C-1 Summary, ANOVA and Coefficient of Multiple Regression Model Between Commodity Flow and Land Use 389

C-2 Best Model Choice Procedure of Multiple Regression Model Between Commodity Flow and Land Uses 496

Appendix D: Multiple Regression Model Between Commodity Flow and Employment 519

D-1 Summary, ANOVA and Coefficient of Multiple Regression Model Between Commodity Flow and Employment 519

D-2 Best Model Choice Procedure of Multiple Regression Model Between Commodity Flow and Employment 597

Appendix E: Multiple Regression Model Between Commodity Flow and Other Contributing Factors 649

E-1 Summary, ANOVA and Coefficient of Multiple Regression Model Between Commodity Flow and Employment 649

E-2 Best Model Choice Procedure of Multiple Regression Model Between Commodity Flow and CF-Entire Entries 805

Appendix F: Developing County Level Freight Flow Distribution Model 853
F-1 Raw Data of Each Factor in the Model 853
F-2 Commodity Flow Data 867
F-3 Results of the Model 868
Appendix G: Information of ATR Station in Utah 897
Appendix H: Data for Traffic Assignment 901
H-1 Commodity Flow by Truck and by Industry Crossing Utah Boundary 901
H-2 Conversion of Commodity Flow From Tonnage to Number of Truck Vehicles 917
H-3 Process of 2002 ATR Stations on Main Utah Truck Networks 946
Appendix I: Program Source Code and Input / Output Data for Optimization 951
I-1 Source Code for Genetic Algorithms 951
I-2 Input and Output Data for Optimization 987

Appendix A: Raw Data Needed for Determining Potential Contributing Factors of Commodity Freight Flow and Difference of Raw Data and Their Log Transformation

A-1 Index of Data Classification

Table A-1-1: Index of Data Classification

Main	Detailed Classification)
Commodity Flow Study (CFS) (1000tons)	
CFSTP-	CFS-Production by commodity mode by county (CFSTP)
CFSTA-	CFS-Attraction by commodity mode by county (CFSTA)
CFSTI-	CFS-Commodity flow by commodity mode by county within Utah (CFSTI)
2002 CFS (1000tons)	
CFS2P-	Production by commodity mode by county in 2002
CFSB-1-	Attraction by commodity mode by county in 2002
CFS2I-	Commodity flow by commodity mode by county within Utah in 2002
2007 CFS (1000tons)	
CFS7P-	Production by commodity mode by county in 2007
CFS7A-	Attraction by commodity mode by county in 2007
CFS7I-	Commodity flow by commodity mode by county within Utah in 2007
CBP (County Business Pattern)	
CBPE-	Paid employees for paid period including March 12 (number)
CBPFQP-	First-quarter payroll ($1,000)
CBPAP-	Annual payroll ($1,000)
CBPTE-	Total establishments
Land Use (acres)	
IR	Irrigation
NI	Non-Irrigation
RES	Residential area
RIP	Riparian
URB	Urban Area
WATER	Water
Others	
POP	Population
AREA	Area (square Mile)
EMPBI-	Employment by Area and by Industry (people)
NOJ-	Number of Jobs
W-	Non-Agricultural Wages and Salaries by NAICS Industry ($1,000)

*Ex: CFS2P2: Production of commodity 2 (Cereal grains) by commodity mode by county in 2002

** CBPE71: County Business Pattern - Paid employees for paid period including March 12 (number)-Industry Classification 71 (Arts, entertainment & recreation)

Table A-1-2: County ID Designation

ID	County	ID	County	ID	County	ID	County
1	Beaver	9	Garfield	17	Rich	25	Utah
2	Box Elder	10	Grand	18	Salt Lake	26	Wasatch
3	Cache	11	Iron	19	San Juan	27	Washington
4	Carbon	12	Juab	20	Sanpete	28	Wayne
5	Daggett	13	Kane	21	Sevier	29	Weber
6	Davis	14	Millard	22	Summit		
7	Duchesne	15	Morgan	23	Tooele		
8	Emery	16	Piute	24	Uintah		

Table A-1-3: Classification of CBP

CBPET	ID	Detailed
CBP-11	11----	Forestry, fishing, hunting, and agriculture support
CBP-21	21----	Mining
CBP-22	22----	Utilities
CBP-23	23----	Construction
CBP-31	31----	Manufacturing
CBP-42	42----	Wholesale trade
CBP-44	44----	Retail trade
CBP-48	48----	Transportation & warehousing
CBP-51	51----	Information
CBP-52	52----	Finance & insurance
CBP-53	53----	Real estate & rental & leasing
CBP-54	54----	Professional, scientific & technical services
CBP-55	55----	Management of companies & enterprises
CBP-56	56----	Admin, support, waste mgt, remediation services
CBP-61	61----	Educational services
CBP-62	62----	Health care and social assistance
CBP-71	71----	Arts, entertainment & recreation
CBP-72	72----	Accommodation & food services
CBP-81	81----	Other services (except public administration)
CBP-95	95----	Auxiliaries (exc corporate, subsidiary & regional mgt)
CBP-99	99----	Unclassified establishments

Table A-1-4: Classification of NOJ and Wage

NOJ-ID	Classification	Wage- ID	Classification
NOJ1	Natural Res. & Mining	W1	Natural Res. & Mining
NOJ2	Construction	W2	Construction
NOJ3	Manufacturing	W3	Manufacturing
NOJ4	TTU	W4	TTU
NOJ5	Information	W5	Information
NOJ6	Financial Activity	W6	Financial Activity
NOJ7	Prof. & Bus. Services	W7	Prof. & Bus. Services
NOJ8	Ed. & Health Services	W8	Ed. & Health Services
NOJ9	Leisure & Hospitality	W9	Leisure & Hospitality
NOJ10	Other Services	W10	Other Services
NOJ11	Government	W11	Government
NOJT	Total Non-Ag Employment	WT	Total

Table A-1-5: Classification of Employment by Industry

ID	Industry	Industry Classification	ID	Industry	Industry Classification
EMPBIT	0	Total Employment	EMPBI13	13	Management of Companies
EMPBI1	1	Natural Resources	EMPBI14	14	Administrative & Waste Services
EMPBI2	2	Mining	EMPBI15	15	Educational Services
EMPBI3	3	Utilities	EMPBI16	16	Health & Social Services
EMPBI4	4	Construction	EMPBI17	17	Arts, Entertainment & Recreation
EMPBI5	5	Manufacturing	EMPBI18	18	Accommodation & Food Services
EMPBI6	6	Wholesale Trade	EMPBI19	19	Other Services
EMPBI7	7	Retail Trade	EMPBI20	20	State & Local Government
EMPBI8	8	Transportation & Warehousing	EMPBI21	21	Federal Civilian
EMPBI9	9	Information	EMPBI22	22	Federal Military
EMPBI10	10	Finance & Insurance	EMPBI23	23	Farm
EMPBI11	11	Real Estate, Rental & Leasing	EMPBI24	24	State Government
EMPBI12	12	Professional & Technical Services	EMPBI25	25	Local Government

Table A-1-6: Classification of Commodity

ID	All Commodities (2)
1	Live animals and live fish
2	Cereal grains
3	Other agricultural products
4	Animal feed and products of animal origin, nec
5	Meat, fish, seafood, and their preparations
6	Milled grain products and preparations, and bakery products
7	Other prepared foodstuffs and fats and oils
8	Alcoholic beverages
9	Tobacco products
10	Monumental or building stone
11	Natural sands
12	Gravel and crushed stone
13	Nonmetallic minerals nec
14	Metallic ores and concentrates
15	Coal
17	Gasoline and aviation turbine fuel
18	Fuel oils
19	Coal and petroleum products, nec
20	Basic chemicals
21	Pharmaceutical products
22	Fertilizers
23	Chemical products and preparations, nec
24	Plastics and rubber
25	Logs and other wood in the rough
26	Wood products
27	Pulp, newsprint, paper, and paperboard
28	Paper or paperboard articles
29	Printed products
30	Textiles, leather, and articles of textiles or leather
31	Nonmetallic mineral products
32	Base metal in primary or semifinished forms and in finished basic shapes
33	Articles of base metal
34	Machinery
35	Electronic and other electrical equipment and components and office equipment
36	Motorized and other vehicles (including parts)
37	Transportation equipment, nec
38	Precision instruments and apparatus
39	Furniture, mattresses and mattress supports, lamps, lighting fittings
40	Miscellaneous manufactured products
41	Waste and scrap

A-2 Raw Data Needed for Determining Potential Contributing Factors of Commodity Freight Flow

A-2-1 Commodity Flow Data

A-2-1-1 Commodity Flow Study (CFS) - Production Data

Table A-2-1: Production by Commodity Mode by County 2002 (CFS2PT-CFS2P13)

(Unit: 1,000 tons)

County	CFS2PT	CFS2P3	CFS2P6	CFS2P7	CFS2P8	CFS2P12	CFS2P13
1	221.5584	0.2040	3.1333	5.3171	0.5212	6.0606	11.1353
2	1881.7922	1.7330	26.6126	45.1608	4.4269	51.4751	94.5769
3	4396.7972	4.0491	62.1803	105.5180	10.3433	120.2713	220.9784
4	894.6279	0.8239	12.6520	21.4700	2.1046	24.4719	44.9631
5	47.0613	0.0433	0.6655	1.1294	0.1107	1.2873	2.3653
6	10206.0954	9.3991	144.3363	244.9344	24.0095	279.1805	512.9477
7	688.2719	0.6338	9.7337	16.5177	1.6191	18.8272	34.5918
8	462.9460	0.4263	6.5471	11.1102	1.0891	12.6636	23.2672
9	233.7864	0.2153	3.3062	5.6106	0.5500	6.3951	11.7499
10	442.8524	0.4078	6.2629	10.6279	1.0418	12.1139	22.2573
11	1597.3752	1.4711	22.5904	38.3351	3.7578	43.6951	80.2824
12	345.2266	0.3179	4.8823	8.2850	0.8121	9.4434	17.3507
13	302.0650	0.2782	4.2719	7.2492	0.7106	8.2628	15.1815
14	472.7284	0.4353	6.6854	11.3449	1.1121	12.9312	23.7588
15	249.3193	0.2296	3.5259	5.9834	0.5865	6.8200	12.5305
16	47.5240	0.0438	0.6721	1.1405	0.1118	1.3000	2.3885
17	90.4873	0.0833	1.2797	2.1716	0.2129	2.4752	4.5478
18	49660.5426	45.7338	702.3078	1191.7951	116.8249	1358.4290	2495.8869
19	395.8572	0.3646	5.5983	9.5001	0.9312	10.8284	19.8954
20	710.1502	0.6540	10.0431	17.0428	1.6706	19.4257	35.6914
21	746.2393	0.6872	10.5534	17.9089	1.7555	20.4128	37.5052
22	2205.8015	2.0314	31.1948	52.9367	5.1891	60.3381	110.8613
23	1446.6071	1.3322	20.4582	34.7169	3.4031	39.5709	72.7050
24	1293.0629	1.1908	18.2867	31.0320	3.0419	35.3708	64.9880
25	16688.2647	15.3687	236.0083	400.4989	39.2586	456.4957	838.7347
26	710.8772	0.6547	10.0533	17.0602	1.6723	19.4455	35.7279
27	5017.9143	4.6211	70.9642	120.4241	11.8045	137.2615	252.1951
28	114.6128	0.1056	1.6209	2.7506	0.2696	3.1352	5.7603
29	8101.5550	7.4609	114.5736	194.4279	19.0587	221.6123	407.1757
Total	109672.0000	101.0000	1551.0000	2632.0000	258.0000	3000.0000	5512.0000

Table A-2-1: Continued (CFS2P15-CFS2P26)

(Unit: 1,000 tons)

County	CFS2P15	CFS2P17	CFS2P18	CFS2P19	CFS2P23	CFS2P24	CFS2P26
1	60.6441	21.3655	45.1109	1.9454	2.2869	0.5192	3.2323
2	515.0770	181.4669	383.1463	16.5235	19.4233	4.4097	27.4534
3	1203.4745	423.9964	895.2192	38.6071	45.3824	10.3032	64.1447
4	244.8741	86.2717	182.1526	7.8555	9.2341	2.0964	13.0517
5	12.8814	4.5383	9.5820	0.4132	0.4858	0.1103	0.6866
6	2793.5734	984.2044	2078.0337	89.6169	105.3441	23.9165	148.8963
7	188.3912	66.3721	140.1371	6.0435	7.1041	1.6129	10.0412
8	126.7158	44.6433	94.2591	4.0650	4.7784	1.0848	6.7539
9	63.9911	22.5447	47.6006	2.0528	2.4131	0.5478	3.4107
10	121.2159	42.7056	90.1679	3.8886	4.5710	1.0378	6.4608
11	437.2274	154.0397	325.2370	14.0261	16.4876	3.7432	23.3040
12	94.4941	33.2912	70.2906	3.0313	3.5633	0.8090	5.0365
13	82.6801	29.1290	61.5026	2.6524	3.1178	0.7078	4.4068
14	129.3934	45.5866	96.2509	4.1509	4.8794	1.1078	6.8966
15	68.2427	24.0426	50.7632	2.1892	2.5734	0.5842	3.6373
16	13.0081	4.5829	9.6762	0.4173	0.4905	0.1114	0.6933
17	24.7678	8.7260	18.4239	0.7945	0.9340	0.2120	1.3201
18	13592.8936	4788.9151	10111.2400	436.0557	512.5806	116.3721	724.4955
19	108.3525	38.1737	80.5993	3.4759	4.0859	0.9276	5.7751
20	194.3796	68.4819	144.5916	6.2356	7.3299	1.6641	10.3603
21	204.2578	71.9621	151.9396	6.5525	7.7024	1.7487	10.8869
22	603.7636	212.7121	449.1169	19.3685	22.7676	5.1690	32.1803
23	395.9598	139.5007	294.5395	12.7023	14.9314	3.3899	21.1045
24	353.9322	124.6939	263.2768	11.3540	13.3466	3.0301	18.8644
25	4567.8479	1609.2994	3397.8495	146.5351	172.2510	39.1065	243.4644
26	194.5786	68.5520	144.7397	6.2420	7.3375	1.6658	10.3710
27	1373.4843	483.8925	1021.6831	44.0609	51.7933	11.7587	73.2061
28	31.3714	11.0525	23.3360	1.0064	1.1830	0.2686	1.6721
29	2217.5266	781.2573	1649.5343	71.1376	83.6217	18.9848	118.1932
Total	30019.0000	10576.0000	22330.0000	963.0000	1132.0000	257.0000	1600.0000

Table A-2-1: Continued (CFS2P27-CFS2P35)

(Unit: 1,000 tons)

County	CFS2P27	CFS2P28	CFS2P29	CFS2P30	CFS2P32	CFS2P34	CFS2P35
1	0.2000	0.9333	0.2646	0.4848	7.5333	0.6788	0.6242
2	1.6987	7.9272	2.2477	4.1180	63.9835	5.7652	5.3019
3	3.9690	18.5218	5.2518	9.6217	149.4972	13.4704	12.3879
4	0.8076	3.7687	1.0686	1.9578	30.4186	2.7409	2.5206
5	0.0425	0.1982	0.0562	0.1030	1.6002	0.1442	0.1326
6	9.2130	42.9938	12.1909	22.3344	347.0214	31.2682	28.7556
7	0.6213	2.8994	0.8221	1.5062	23.4022	2.1086	1.9392
8	0.4179	1.9502	0.5530	1.0131	15.7408	1.4183	1.3043
9	0.2110	0.9848	0.2793	0.5116	7.9491	0.7162	0.6587
10	0.3998	1.8655	0.5290	0.9691	15.0576	1.3568	1.2477
11	1.4419	6.7290	1.9080	3.4956	54.3130	4.8938	4.5006
12	0.3116	1.4543	0.4124	0.7555	11.7382	1.0577	0.9727
13	0.2727	1.2725	0.3608	0.6610	10.2706	0.9254	0.8511
14	0.4267	1.9914	0.5647	1.0345	16.0734	1.4483	1.3319
15	0.2251	1.0503	0.2978	0.5456	8.4772	0.7638	0.7025
16	0.0429	0.2002	0.0568	0.1040	1.6159	0.1456	0.1339
17	0.0817	0.3812	0.1081	0.1980	3.0767	0.2772	0.2549
18	44.8282	209.1981	59.3181	108.6743	1688.5273	152.1441	139.9182
19	0.3573	1.6676	0.4728	0.8663	13.4597	1.2128	1.1153
20	0.6410	2.9916	0.8483	1.5541	24.1461	2.1757	2.0008
21	0.6736	3.1436	0.8914	1.6330	25.3732	2.2862	2.1025
22	1.9912	9.2921	2.6348	4.8271	75.0003	6.7579	6.2148
23	1.3058	6.0939	1.7279	3.1657	49.1866	4.4319	4.0758
24	1.1672	5.4471	1.5445	2.8297	43.9659	3.9615	3.6432
25	15.0644	70.3003	19.9336	36.5197	567.4241	51.1275	47.0191
26	0.6417	2.9946	0.8491	1.5556	24.1708	2.1779	2.0029
27	4.5296	21.1383	5.9938	10.9809	170.6160	15.3733	14.1379
28	0.1035	0.4828	0.1369	0.2508	3.8970	0.3511	0.3229
29	7.3132	34.1283	9.6771	17.7290	275.4641	24.8206	22.8261
Total	99.0000	462.0000	131.0000	240.0000	3729.0000	336.0000	309.0000

Table A-2-1: Continued (CFS2P39-CFS2P43)

(Unit: 1,000 tons)

County	CFS2P39	CFS2P40	CFS2P43
1	0.1798	1.1192	4.1333
2	1.5271	9.5057	35.1060
3	3.5680	22.2101	82.0250
4	0.7260	4.5191	16.6898
5	0.0382	0.2377	0.8780
6	8.2824	51.5553	190.4011
7	0.5585	3.4768	12.8401
8	0.3757	2.3385	8.6365
9	0.1897	1.1810	4.3614
10	0.3594	2.2370	8.2617
11	1.2963	8.0690	29.8000
12	0.2802	1.7439	6.4404
13	0.2451	1.5259	5.6352
14	0.3836	2.3880	8.8190
15	0.2023	1.2594	4.6512
16	0.0386	0.2401	0.8866
17	0.0734	0.4571	1.6881
18	40.3001	250.8566	926.4486
19	0.3212	1.9996	7.3850
20	0.5763	3.5873	13.2483
21	0.6056	3.7696	13.9216
22	1.7900	11.1424	41.1506
23	1.1739	7.3074	26.9874
24	1.0493	6.5318	24.1229
25	13.5427	84.2995	311.3301
26	0.5769	3.5909	13.2619
27	4.0721	25.3476	93.6123
28	0.0930	0.5790	2.1382
29	6.5745	40.9244	151.1396
Total	89.0000	554.0000	2046.0000

A-2-1-2 Commodity Flow Study (CFS) – Attraction Data

Table A-2-2: Attraction by Commodity Mode by County 2002 (CFSB-1T-CFSB-111)

(Unit: 1,000 tons)

County	CFSB-1T	CFSB-13	CFSB-15	CFSB-16	CFSB-17	CFSB-18	CFSB-111
1	177.8357	1.3442	0.9620	2.6146	6.6928	0.9142	0.4582
2	1419.2794	10.7280	7.6777	20.8667	53.4145	7.2964	3.6569
3	3229.6447	24.4120	17.4710	47.4832	121.5475	16.6033	8.3214
4	669.6443	5.0617	3.6225	9.8453	25.2020	3.4426	1.7254
5	36.7652	0.2779	0.1989	0.5405	1.3837	0.1890	0.0947
6	7529.5927	56.9142	40.7318	110.7023	283.3757	38.7090	19.4005
7	478.7704	3.6189	2.5899	7.0390	18.0185	2.4613	1.2336
8	308.8633	2.3346	1.6708	4.5410	11.6240	1.5878	0.7958
9	179.3040	1.3553	0.9700	2.6362	6.7481	0.9218	0.4620
10	337.2888	2.5495	1.8246	4.9589	12.6938	1.7340	0.8690
11	1151.0576	8.7005	6.2267	16.9232	43.3200	5.9175	2.9658
12	237.5058	1.7952	1.2848	3.4919	8.9385	1.2210	0.6119
13	217.8311	1.6465	1.1784	3.2026	8.1981	1.1199	0.5613
14	366.5953	2.7710	1.9831	5.3898	13.7968	1.8846	0.9446
15	184.0611	1.3913	0.9957	2.7061	6.9271	0.9462	0.4742
16	36.3541	0.2748	0.1967	0.5345	1.3682	0.1869	0.0937
17	68.3622	0.5167	0.3698	1.0051	2.5728	0.3514	0.1761
18	38537.4359	291.2943	208.4707	566.5886	1450.3539	198.1178	99.2942
19	322.4888	2.4376	1.7445	4.7413	12.1368	1.6579	0.8309
20	605.0996	4.5738	3.2733	8.8963	22.7729	3.1108	1.5591
21	596.5249	4.5090	3.2269	8.7703	22.4502	3.0667	1.5370
22	1473.2527	11.1359	7.9697	21.6602	55.4458	7.5739	3.7959
23	971.5187	7.3435	5.2555	14.2836	36.5630	4.9945	2.5032
24	818.3497	6.1857	4.4269	12.0316	30.7985	4.2071	2.1085
25	11952.0524	90.3424	64.6554	175.7226	449.8147	61.4445	30.7952
26	472.7799	3.5736	2.5575	6.9509	17.7930	2.4305	1.2181
27	3050.2233	23.0558	16.5004	44.8453	114.7950	15.6809	7.8591
28	99.7243	0.7538	0.5395	1.4662	3.7531	0.5127	0.2569
29	6363.7938	48.1022	34.4253	93.5623	239.5010	32.7157	16.3967
Total	81892.0000	619.0000	443.0000	1204.0000	3082.0000	421.0000	211.0000

Table A-2-2: Continued (CFSB-112-CFSB-119)

(Unit: 1,000 tons)

County	CFSB-112	CFSB-113	CFSB-114	CFSB-115	CFSB-117	CFSB-118	CFSB-119
1	6.2411	4.9252	0.6515	50.5329	19.2338	31.9397	3.9718
2	49.8096	39.3070	5.1993	403.2950	153.5017	254.9060	31.6986
3	113.3444	89.4451	11.8314	917.7189	349.3011	580.0520	72.1318
4	23.5012	18.5458	2.4531	190.2826	72.4251	120.2697	14.9560
5	1.2903	1.0182	0.1347	10.4470	3.9763	6.6031	0.8211
6	264.2511	208.5322	27.5836	2139.5695	814.3604	1352.3330	168.1681
7	16.8024	13.2596	1.7539	136.0449	51.7812	85.9883	10.6930
8	10.8396	8.5540	1.1315	87.7650	33.4050	55.4726	6.8982
9	6.2927	4.9658	0.6569	50.9501	19.3926	32.2034	4.0046
10	11.8372	9.3412	1.2356	95.8422	36.4794	60.5779	7.5331
11	40.3964	31.8786	4.2167	327.0785	124.4922	206.7327	25.7081
12	8.3353	6.5777	0.8701	67.4884	25.6874	42.6566	5.3045
13	7.6448	6.0328	0.7980	61.8978	23.5594	39.1230	4.8651
14	12.8657	10.1529	1.3430	104.1698	39.6490	65.8414	8.1876
15	6.4596	5.0976	0.6743	52.3018	19.9071	33.0578	4.1109
16	1.2758	1.0068	0.1332	10.3302	3.9319	6.5293	0.8119
17	2.3992	1.8933	0.2504	19.4254	7.3937	12.2780	1.5268
18	1352.4714	1067.2948	141.1766	10950.5951	4168.0026	6921.4161	860.7064
19	11.3177	8.9313	1.1814	91.6367	34.8787	57.9198	7.2026
20	21.2360	16.7582	2.2167	171.9419	65.4443	108.6773	13.5145
21	20.9350	16.5208	2.1853	169.5054	64.5169	107.1373	13.3230
22	51.7038	40.8018	5.3971	418.6317	159.3391	264.5997	32.9041
23	34.0955	26.9062	3.5590	276.0616	105.0743	174.4871	21.6982
24	28.7200	22.6642	2.9979	232.5380	88.5083	146.9776	18.2773
25	419.4573	331.0122	43.7847	3396.2323	1292.6700	2146.6173	266.9407
26	16.5922	13.0936	1.7320	134.3427	51.1333	84.9124	10.5592
27	107.0476	84.4760	11.1741	866.7354	329.8958	547.8274	68.1246
28	3.4998	2.7619	0.3653	28.3371	10.7856	17.9107	2.2273
29	223.3374	176.2454	23.3129	1808.3022	688.2738	1142.9527	142.1308
Total	2874.0000	2268.0000	300.0000	23270.0000	8857.0000	14708.0000	1829.0000

Table A-2-2: Continued (CFSB-121-CFSB-129)

(Unit: 1,000 tons)

County	CFSB-121	CFSB-123	CFSB-124	CFSB-126	CFSB-127	CFSB-128	CFSB-129
1	1.0380	1.6461	1.5939	4.2737	1.2986	0.8317	0.4951
2	8.2843	13.1370	12.7210	34.1076	10.3640	6.6378	3.9515
3	18.8513	29.8939	28.9474	77.6137	23.5838	15.1047	8.9918
4	3.9087	6.1983	6.0020	16.0927	4.8899	3.1319	1.8644
5	0.2146	0.3403	0.3295	0.8835	0.2685	0.1719	0.1024
6	43.9499	69.6946	67.4879	180.9485	54.9833	35.2151	20.9636
7	2.7946	4.4315	4.2912	11.5056	3.4961	2.2392	1.3330
8	1.8028	2.8589	2.7683	7.4225	2.2554	1.4445	0.8599
9	1.0466	1.6597	1.6071	4.3090	1.3093	0.8386	0.4992
10	1.9687	3.1220	3.0231	8.1056	2.4630	1.5775	0.9391
11	6.7187	10.6543	10.3170	27.6618	8.4054	5.3834	3.2047
12	1.3863	2.1984	2.1288	5.7077	1.7343	1.1108	0.6613
13	1.2715	2.0163	1.9524	5.2348	1.5907	1.0188	0.6065
14	2.1398	3.3932	3.2858	8.8099	2.6770	1.7145	1.0207
15	1.0744	1.7037	1.6497	4.4233	1.3441	0.8608	0.5125
16	0.2122	0.3365	0.3258	0.8736	0.2655	0.1700	0.1012
17	0.3990	0.6328	0.6127	1.6429	0.4992	0.3197	0.1903
18	224.9413	356.7061	345.4120	926.1182	281.4119	180.2354	107.2942
19	1.8824	2.9850	2.8905	7.7499	2.3549	1.5082	0.8979
20	3.5319	5.6009	5.4235	14.5415	4.4186	2.8300	1.6847
21	3.4819	5.5215	5.3467	14.3355	4.3560	2.7899	1.6608
22	8.5993	13.6366	13.2048	35.4047	10.7581	6.8902	4.1018
23	5.6707	8.9925	8.7077	23.3472	7.0943	4.5437	2.7049
24	4.7767	7.5747	7.3349	19.6663	5.9758	3.8273	2.2784
25	69.7636	110.6293	107.1265	287.2276	87.2775	55.8985	33.2764
26	2.7596	4.3761	4.2375	11.3617	3.4524	2.2111	1.3163
27	17.8040	28.2332	27.3392	73.3019	22.2736	14.2656	8.4923
28	0.5821	0.9231	0.8938	2.3965	0.7282	0.4664	0.2776
29	37.1452	58.9039	57.0388	152.9325	46.4703	29.7628	17.7178
Total	478.0000	758.0000	734.0000	1968.0000	598.0000	383.0000	228.0000

Table A-2-2: Continued (CFSB-130-CFSB-136)

(Unit: 1,000 tons)

County	CFSB-130	CFSB-131	CFSB-132	CFSB-133	CFSB-134	CFSB-135	CFSB-136
1	0.7579	7.7352	4.6059	1.9696	1.2378	0.3670	1.3464
2	6.0486	61.7334	36.7593	15.7193	9.8787	2.9290	10.7453
3	13.7638	140.4776	83.6477	35.7701	22.4796	6.6650	24.4515
4	2.8538	29.1271	17.3438	7.4167	4.6610	1.3819	5.0698
5	0.1567	1.5992	0.9522	0.4072	0.2559	0.0759	0.2783
6	32.0889	327.5095	195.0162	83.3945	52.4089	15.5388	57.0061
7	2.0404	20.8247	12.4001	5.3027	3.3324	0.9880	3.6247
8	1.3163	13.4344	7.9995	3.4208	2.1498	0.6374	2.3384
9	0.7641	7.7991	4.6440	1.9859	1.2480	0.3700	1.3575
10	1.4374	14.6708	8.7358	3.7357	2.3477	0.6961	2.5536
11	4.9055	50.0668	29.8124	12.7486	8.0118	2.3754	8.7146
12	1.0122	10.3306	6.1514	2.6305	1.6531	0.4901	1.7981
13	0.9283	9.4749	5.6418	2.4126	1.5162	0.4495	1.6492
14	1.5623	15.9455	9.4948	4.0602	2.5516	0.7565	2.7755
15	0.7844	8.0060	4.7672	2.0386	1.2811	0.3798	1.3935
16	0.1549	1.5813	0.9416	0.4026	0.2530	0.0750	0.2752
17	0.2913	2.9735	1.7706	0.7571	0.4758	0.1411	0.5176
18	164.2354	1676.2363	998.1183	426.8238	268.2355	79.5295	291.7649
19	1.3744	14.0271	8.3524	3.5717	2.2446	0.6655	2.4415
20	2.5788	26.3196	15.6721	6.7018	4.2117	1.2487	4.5812
21	2.5422	25.9466	15.4500	6.6068	4.1520	1.2310	4.5163
22	6.2786	64.0811	38.1572	16.3171	10.2544	3.0403	11.1539
23	4.1403	42.2575	25.1623	10.7601	6.7621	2.0049	7.3553
24	3.4876	35.5952	21.1952	9.0637	5.6960	1.6888	6.1957
25	50.9362	519.8702	309.5577	132.3757	83.1909	24.6654	90.4884
26	2.0149	20.5642	12.2450	5.2363	3.2907	0.9757	3.5794
27	12.9992	132.6735	79.0007	33.7829	21.2307	6.2947	23.0931
28	0.4250	4.3376	2.5829	1.1045	0.6941	0.2058	0.7550
29	27.1206	276.8016	164.8220	70.4826	44.2945	13.1329	48.1799
Total	349.0000	3562.0000	2121.0000	907.0000	570.0000	169.0000	620.0000

Table A-2-2: Continued (CFSB-139-CFSB-199)

(Unit: 1,000 tons)

County	CFSB-139	CFSB-140	CFSB-141	CFSB-143	CFSB-199
1	0.2172	1.4854	1.3703	4.5430	0.2367
2	1.7331	11.8545	10.9359	36.2567	1.8891
3	3.9438	26.9755	24.8853	82.5040	4.2987
4	0.8177	5.5932	5.1598	17.1066	0.8913
5	0.0449	0.3071	0.2833	0.9392	0.0489
6	9.1945	62.8907	58.0175	192.3498	10.0220
7	0.5846	3.9989	3.6891	12.2306	0.6373
8	0.3772	2.5798	2.3799	7.8902	0.4111
9	0.2190	1.4976	1.3816	4.5805	0.2387
10	0.4119	2.8172	2.5989	8.6163	0.4489
11	1.4056	9.6142	8.8692	29.4047	1.5321
12	0.2900	1.9838	1.8300	6.0673	0.3161
13	0.2660	1.8194	1.6784	5.5647	0.2899
14	0.4477	3.0620	2.8247	9.3650	0.4879
15	0.2248	1.5374	1.4182	4.7020	0.2450
16	0.0444	0.3036	0.2801	0.9287	0.0484
17	0.0835	0.5710	0.5267	1.7464	0.0910
18	47.0589	321.8826	296.9414	984.4712	51.2941
19	0.3938	2.6936	2.4849	8.2382	0.4292
20	0.7389	5.0541	4.6625	15.4578	0.8054
21	0.7284	4.9825	4.5964	15.2387	0.7940
22	1.7990	12.3053	11.3518	37.6355	1.9609
23	1.1863	8.1146	7.4858	24.8183	1.2931
24	0.9993	6.8352	6.3056	20.9054	1.0892
25	14.5949	99.8291	92.0938	305.3252	15.9084
26	0.5773	3.9489	3.6429	12.0776	0.6293
27	3.7247	25.4769	23.5028	77.9205	4.0599
28	0.1218	0.8329	0.7684	2.5475	0.1327
29	7.7710	53.1534	49.0348	162.5685	8.4703
Total	100.0000	684.0000	631.0000	2092.0000	109.0000

A-2-1-3 Commodity Flow Study (CFS) – Within Utah

Table A-2-3: Commodity Flow Within Utah by Commodity Mode by County 2002 (CFS2IT-CFS2I13)

(Unit: 1,000 tons)

County	CFS2IT	CFS2I3	CFS2I6	CFS2I7	CFS2I8	CFS2I12	CFS2I13
1	133.8263	0.1520	1.0120	3.7851	0.5559	6.0826	1.5570
2	1068.0471	1.2132	8.0763	30.2081	4.4368	48.5444	12.4264
3	2430.3972	2.7606	18.3780	68.7402	10.0961	110.4654	28.2769
4	503.9259	0.5724	3.8106	14.2528	2.0934	22.9042	5.8630
5	27.6669	0.0314	0.2092	0.7825	0.1149	1.2575	0.3219
6	5666.2272	6.4362	42.8466	160.2608	23.5380	257.5391	65.9249
7	360.2880	0.4092	2.7244	10.1902	1.4967	16.3757	4.1918
8	232.4282	0.2640	1.7576	6.5739	0.9655	10.5642	2.7042
9	134.9312	0.1533	1.0203	3.8163	0.5605	6.1328	1.5699
10	253.8192	0.2883	1.9193	7.1789	1.0544	11.5365	2.9531
11	866.2027	0.9839	6.5500	24.4993	3.5983	39.3703	10.0780
12	178.7297	0.2030	1.3515	5.0551	0.7425	8.1236	2.0795
13	163.9240	0.1862	1.2396	4.6363	0.6810	7.4506	1.9072
14	275.8731	0.3134	2.0861	7.8027	1.1460	12.5389	3.2097
15	138.5111	0.1573	1.0474	3.9176	0.5754	6.2956	1.6115
16	27.3575	0.0311	0.2069	0.7738	0.1136	1.2434	0.3183
17	51.4445	0.0584	0.3890	1.4550	0.2137	2.3382	0.5985
18	29000.4888	32.9412	219.2943	820.2358	120.4707	1318.1185	337.4120
19	242.6817	0.2757	1.8351	6.8639	1.0081	11.0303	2.8235
20	455.3542	0.5172	3.4433	12.8790	1.8916	20.6966	5.2979
21	448.9015	0.5099	3.3945	12.6965	1.8648	20.4033	5.2228
22	1108.6635	1.2593	8.3834	31.3569	4.6055	50.3905	12.8990
23	731.0947	0.8304	5.5284	20.6779	3.0370	33.2294	8.5061
24	615.8309	0.6995	4.6568	17.4179	2.5582	27.9905	7.1650
25	8994.2507	10.2164	68.0122	254.3890	37.3629	408.8030	104.6454
26	355.7800	0.4041	2.6903	10.0627	1.4779	16.1708	4.1394
27	2295.3776	2.6073	17.3571	64.9214	9.5352	104.3286	26.7060
28	75.0453	0.0852	0.5675	2.1225	0.3117	3.4109	0.8731
29	4788.9313	5.4397	36.2127	135.4478	19.8937	217.6646	55.7178
Total	61626.0000	70.0000	466.0000	1743.0000	256.0000	2801.0000	717.0000

Table A-2-3: Continued (CFS2I14-CFS2I26)

(Unit: 1,000 tons)

County	CFS2I14	CFS2I15	CFS2I17	CFS2I18	CFS2I19	CFS2I21	CFS2I26
1	0.5255	42.9953	18.2696	31.5575	1.6200	0.4886	1.8415
2	4.1941	343.1387	145.8066	251.8557	12.9290	3.8995	14.6968
3	9.5440	780.8301	331.7907	573.1109	29.4206	8.8735	33.4433
4	1.9789	161.8997	68.7945	118.8305	6.1002	1.8399	6.9342
5	0.1086	8.8887	3.7770	6.5241	0.3349	0.1010	0.3807
6	22.2508	1820.4270	773.5367	1336.1506	68.5913	20.6877	77.9697
7	1.4148	115.7522	49.1855	84.9594	4.3614	1.3154	4.9577
8	0.9127	74.6738	31.7304	54.8088	2.8136	0.8486	3.1983
9	0.5299	43.3503	18.4204	31.8181	1.6334	0.4926	1.8567
10	0.9967	81.5462	34.6506	59.8530	3.0726	0.9267	3.4927
11	3.4015	278.2908	118.2514	204.2589	10.4856	3.1626	11.9193
12	0.7019	57.4217	24.3997	42.1462	2.1636	0.6526	2.4594
13	0.6437	52.6650	22.3784	38.6548	1.9843	0.5985	2.2557
14	1.0833	88.6316	37.6614	65.0535	3.3395	1.0072	3.7961
15	0.5439	44.5004	18.9091	32.6622	1.6767	0.5057	1.9060
16	0.1074	8.7893	3.7348	6.4512	0.3312	0.0999	0.3765
17	0.2020	16.5279	7.0230	12.1311	0.6227	0.1878	0.7079
18	113.8824	9317.1823	3959.0613	6838.5925	351.0590	105.8824	399.0591
19	0.9530	77.9680	33.1302	57.2267	2.9377	0.8860	3.3394
20	1.7881	146.2947	62.1636	107.3769	5.5122	1.6625	6.2659
21	1.7628	144.2216	61.2827	105.8553	5.4341	1.6390	6.1771
22	4.3536	356.1878	151.3515	261.4334	13.4207	4.0478	15.2557
23	2.8709	234.8837	99.8069	172.3991	8.8501	2.6693	10.0602
24	2.4183	197.8521	84.0714	145.2188	7.4548	2.2484	8.4741
25	35.3196	2889.6435	1227.8686	2120.9303	108.8779	32.8385	123.7647
26	1.3971	114.3038	48.5700	83.8963	4.3068	1.2990	4.8957
27	9.0138	737.4514	313.3582	541.2720	27.7862	8.3806	31.5854
28	0.2947	24.1103	10.2450	17.6964	0.9084	0.2740	1.0327
29	18.8057	1538.5722	653.7708	1129.2758	57.9714	17.4847	65.8977
Total	242.0000	19799.0000	8413.0000	14532.0000	746.0000	225.0000	848.0000

Table A-2-3: Continued (CFS2I27-CFS2I34)

(Unit: 1,000 tons)

County	CFS2I27	CFS2I28	CFS2I29	CFS2I31	CFS2I32	CFS2I33	CFS2I34
1	0.1672	0.3236	0.1108	5.1054	3.0728	0.5972	0.4604
2	1.3345	2.5823	0.8839	40.7454	24.5235	4.7661	3.6742
3	3.0367	5.8762	2.0113	92.7184	55.8046	10.8454	8.3608
4	0.6296	1.2184	0.4170	19.2245	11.5707	2.2487	1.7336
5	0.0346	0.0669	0.0229	1.0555	0.6353	0.1235	0.0952
6	7.0798	13.6999	4.6892	216.1636	130.1027	25.2850	19.4924
7	0.4502	0.8711	0.2982	13.7448	8.2726	1.6078	1.2394
8	0.2904	0.5620	0.1924	8.8670	5.3368	1.0372	0.7996
9	0.1686	0.3262	0.1117	5.1476	3.0982	0.6021	0.4642
10	0.3171	0.6137	0.2101	9.6831	5.8280	1.1326	0.8732
11	1.0823	2.0943	0.7168	33.0452	19.8890	3.8653	2.9798
12	0.2233	0.4321	0.1479	6.8184	4.1038	0.7976	0.6148
13	0.2048	0.3963	0.1357	6.2536	3.7639	0.7315	0.5639
14	0.3447	0.6670	0.2283	10.5244	6.3343	1.2311	0.9490
15	0.1731	0.3349	0.1146	5.2841	3.1804	0.6181	0.4765
16	0.0342	0.0661	0.0226	1.0437	0.6282	0.1221	0.0941
17	0.0643	0.1244	0.0426	1.9626	1.1812	0.2296	0.1770
18	36.2353	70.1177	24.0000	1106.3536	665.8828	129.4118	99.7648
19	0.3032	0.5868	0.2008	9.2582	5.5722	1.0829	0.8349
20	0.5690	1.1010	0.3768	17.3715	10.4554	2.0320	1.5665
21	0.5609	1.0854	0.3715	17.1254	10.3073	2.0032	1.5443
22	1.3852	2.6805	0.9175	42.2949	25.4561	4.9473	3.8139
23	0.9135	1.7676	0.6050	27.8909	16.7867	3.2624	2.5150
24	0.7695	1.4890	0.5096	23.4936	14.1401	2.7481	2.1185
25	11.2381	21.7464	7.4434	343.1260	206.5178	40.1360	30.9412
26	0.4445	0.8602	0.2944	13.5728	8.1691	1.5876	1.2239
27	2.8680	5.5498	1.8996	87.5675	52.7044	10.2429	7.8963
28	0.0938	0.1814	0.0621	2.8629	1.7231	0.3349	0.2582
29	5.9836	11.5787	3.9632	182.6952	109.9591	21.3701	16.4744
Total	77.0000	149.0000	51.0000	2351.0000	1415.0000	275.0000	212.0000

Table A-2-3: Continued (CFS2I35-CFS2I43)

(Unit: 1,000 tons)

County	CFS2I35	CFS2I40	CFS2I43
1	0.0478	0.4625	2.5277
2	0.3813	3.6915	20.1734
3	0.8676	8.4003	45.9057
4	0.1799	1.7417	9.5182
5	0.0099	0.0956	0.5226
6	2.0228	19.5844	107.0244
7	0.1286	1.2453	6.8052
8	0.0830	0.8033	4.3901
9	0.0482	0.4664	2.5486
10	0.0906	0.8773	4.7942
11	0.3092	2.9939	16.3610
12	0.0638	0.6177	3.3759
13	0.0585	0.5666	3.0962
14	0.0985	0.9535	5.2107
15	0.0494	0.4787	2.6162
16	0.0098	0.0946	0.5167
17	0.0184	0.1778	0.9717
18	10.3529	100.2354	547.7650
19	0.0866	0.8388	4.5838
20	0.1626	1.5739	8.6008
21	0.1603	1.5516	8.4789
22	0.3958	3.8319	20.9406
23	0.2610	2.5269	13.8090
24	0.2198	2.1285	11.6319
25	3.2109	31.0871	169.8846
26	0.1270	1.2297	6.7200
27	0.8194	7.9336	43.3554
28	0.0268	0.2594	1.4175
29	1.7096	16.5521	90.4540
Total	22.0000	213.0000	1164.0000

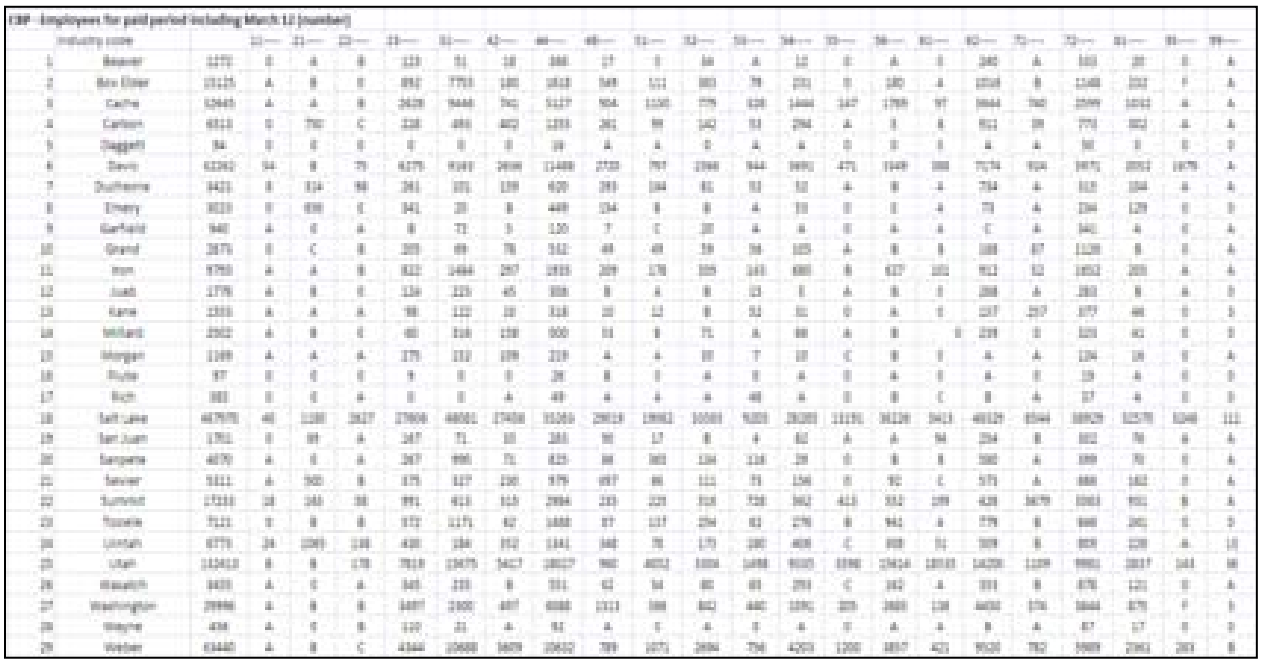
A-2-2 Land Use Data

(Unit: acres)

ID	County	IR	NI	RES	RIP	URB	WATER	Total
1	Beaver	36,161.48	5,471.22	3,462.39	444.44	459.40	1,448.06	47,446.99
2	BoxElder	160,222.38	174,450.76	16,001.12	71,465.10	13,281.77	42,723.34	478,144.47
3	Cache	112,445.48	67,527.61	23,829.80	8,054.45	7,173.24	5,858.90	224,889.48
4	Carbon	12,579.94	2,166.32	6,444.97	3,123.23	3,227.50	4,875.15	32,417.11
5	Daggett	11,200.52	966.60	599.63	919.99	330.11	15,815.30	29,832.15
6	Davis	26,246.18	5,632.83	37,841.49	20,588.51	16,229.43	10,345.13	116,883.57
7	Duchesne	106,611.46	17,166.13	5,250.49	530.13	1,899.41	14,585.56	146,043.18
8	Emery	47,266.54	9,071.77	5,975.34	11,505.88	2,075.61	6,314.85	82,209.99
9	Garfield	30,238.76	3,857.00	3,073.88	1,775.29	957.35	15,660.68	55,562.96
10	Grand	6,525.10	827.66	4,403.64	3,768.82	932.93	3,171.92	19,630.07
11	Iron	66,435.81	40,417.48	11,720.30	2,468.64	1,427.35	544.56	123,014.14
12	Juab	29,453.34	54,214.26	3,425.75	17,633.86	2,387.77	5,830.39	112,945.37
13	Kane	9,930.63	3,968.11	4,635.83	2,571.66	914.90	104,404.48	126,425.61
14	Millard	117,975.17	38,871.34	7,668.11	40,574.09	5,241.48	4,049.35	214,379.54
15	Morgan	15,819.22	2,507.17	600.05	7.01	785.77	5,520.90	25,240.12
16	Piute	22,744.87	2,037.43	1,434.23	908.32	299.79	5,001.71	32,426.35
17	Rich	70,692.26	31,244.65	6,669.85	6,388.76	669.43	38,187.87	153,852.82
18	SaltLake	12,389.85	28,823.15	100,367.85	37,338.20	73,204.97	961.75	253,085.77
19	SanJuan	10,508.92	127,790.17	4,489.09	4,249.44	2,640.39	105,732.73	255,410.74
20	SanPete	96,749.73	19,468.17	13,432.34	14,930.85	2,341.86	3,376.09	150,299.04
21	Sevier	60,399.75	5,754.51	7,098.67	3,192.31	2,208.25	4,930.44	83,583.93
22	Summit	35,542.69	8,326.46	26,211.05	5,592.43	3,044.85	9,040.15	87,757.63
23	Tooele	42,054.55	20,107.39	8,927.53	44,953.22	56,060.17	1,503.53	173,606.39
24	Uinta	86,842.82	20,674.36	7,215.75	923.07	1,674.19	16,495.98	133,826.17
25	Utah	99,223.74	104,296.41	56,956.37	8,262.14	25,342.46	94,247.22	388,328.34
26	Wasatch	17,763.56	5,081.73	10,594.06	1,135.16	2,099.61	19,121.93	55,796.05
27	Washington	17,171.09	29,433.67	25,779.82	3,599.58	2,472.58	3,732.86	82,189.60
28	Wayne	18,840.97	1,607.64	2,023.01	5,021.20	689.57	355.12	28,537.51
29	Weber	39,748.50	20,254.33	35,297.34	40,068.14	20,902.59	4,481.45	160,752.35

Figure A-2-1: Land Use Data by Land Use Type and by County (2002)

A-2-3 County Business Pattern (CBP) Data



CBP - Employees for pay period including March 12 (number)

Industry code		11—	21—	22—	23—	31—	42—	44—	48—	51—	52—	53—	54—	55—	56—	61—	62—	71—	72—	81—	99—	99—
1	Beaver	1172	D	A	B	123	51	18	166	17	I	34	A	12	D	A	I	140	A	103	20	D	A
2	Box Elder	15125	A	B	D	892	7753	180	1618	549	111	303	78	231	D	180	A	1018	B	1148	232	F	A
3	Cache	52445	A	A	B	2628	9448	741	5127	904	1130	779	628	1444	147	1799	97	3944	760	2599	1032	A	A
4	Carbon	6513	D	730	C	228	491	402	1233	261	99	142	53	294	A	I	B	551	39	773	352	A	A
5	Daggett	94	D	D	D	D	D	D	19	A	A	D	A	A	D	D	I	A	A	30	D	D	D
6	Davis	63282	94	B	73	6175	9183	2698	11488	2720	797	2394	944	3691	471	1649	388	7174	924	3971	1032	1679	A
7	Duchesne	9421	B	324	98	261	101	159	620	293	184	81	92	92	A	B	A	784	A	323	104	A	A
8	Emery	8223	D	830	I	341	20	B	449	134	B	B	A	33	D	I	A	73	A	194	129	D	D
9	Garfield	940	A	D	A	B	72	5	120	7	C	20	A	A	D	A	A	C	A	141	A	D	A
10	Grand	2671	D	C	B	203	69	78	512	49	49	59	38	105	A	B	B	188	67	1128	B	D	A
11	Iron	9760	A	A	B	822	1484	297	1935	209	178	335	143	680	B	627	101	952	92	1652	203	A	A
12	Juab	1776	A	B	D	124	225	45	356	B	A	B	13	I	A	B	I	268	A	283	B	A	D
13	Kane	2355	A	A	A	98	122	10	318	10	12	B	32	31	D	A	I	237	257	377	66	D	D
14	Millard	2302	A	B	D	80	316	158	900	31	B	71	A	88	A	B	D	239	D	320	81	D	D
15	Morgan	1189	A	A	A	175	132	109	219	A	A	10	7	10	C	B	I	A	A	124	16	D	A
16	Piute	97	D	D	D	9	D	D	28	B	I	A	D	A	D	A	I	A	D	19	A	D	D
17	Rich	383	D	D	A	D	D	A	49	A	A	A	48	A	D	B	C	B	A	37	A	D	D
18	Salt Lake	467970	46	1130	2627	27808	44691	17408	31263	29819	19982	10283	9203	28203	11191	36128	3413	48329	8544	36929	32570	5248	111
19	San Juan	1761	D	89	A	167	71	10	283	50	17	B	A	82	A	A	94	254	B	102	78	A	A
20	Sanpete	4670	A	D	A	267	995	71	825	88	383	134	118	29	D	B	B	588	A	399	70	D	A
21	Sevier	5311	A	500	B	175	327	150	979	497	86	111	73	156	D	92	C	571	A	888	162	D	A
22	Summit	17211	28	160	38	991	413	113	2984	233	229	318	728	362	413	552	199	428	3679	3393	931	B	A
23	Tooele	7121	I	B	B	572	1171	62	1488	87	137	254	83	276	B	941	A	779	B	848	241	D	D
24	Uintah	6771	24	1093	138	430	184	352	1341	348	78	173	180	408	C	898	31	559	B	859	128	A	13
25	Utah	113413	B	B	178	7819	13475	5417	18027	960	4052	1004	1498	9103	3398	13414	1853	14209	1239	9981	2837	143	38
26	Wasatch	3433	A	D	A	345	233	B	551	62	54	80	83	293	C	262	A	333	B	878	121	D	A
27	Washington	29996	A	B	B	3497	2300	497	4088	1313	588	842	440	1091	203	3693	138	4450	376	3644	879	F	I
28	Wayne	434	A	D	B	110	21	A	91	A	I	A	D	A	D	A	A	B	A	87	17	D	D
29	Weber	63440	A	B	C	4344	10488	3609	10632	789	1071	2694	756	4203	1200	3857	421	9520	782	5909	2361	283	B

Figure A-2-2: Raw Data of CBP-E

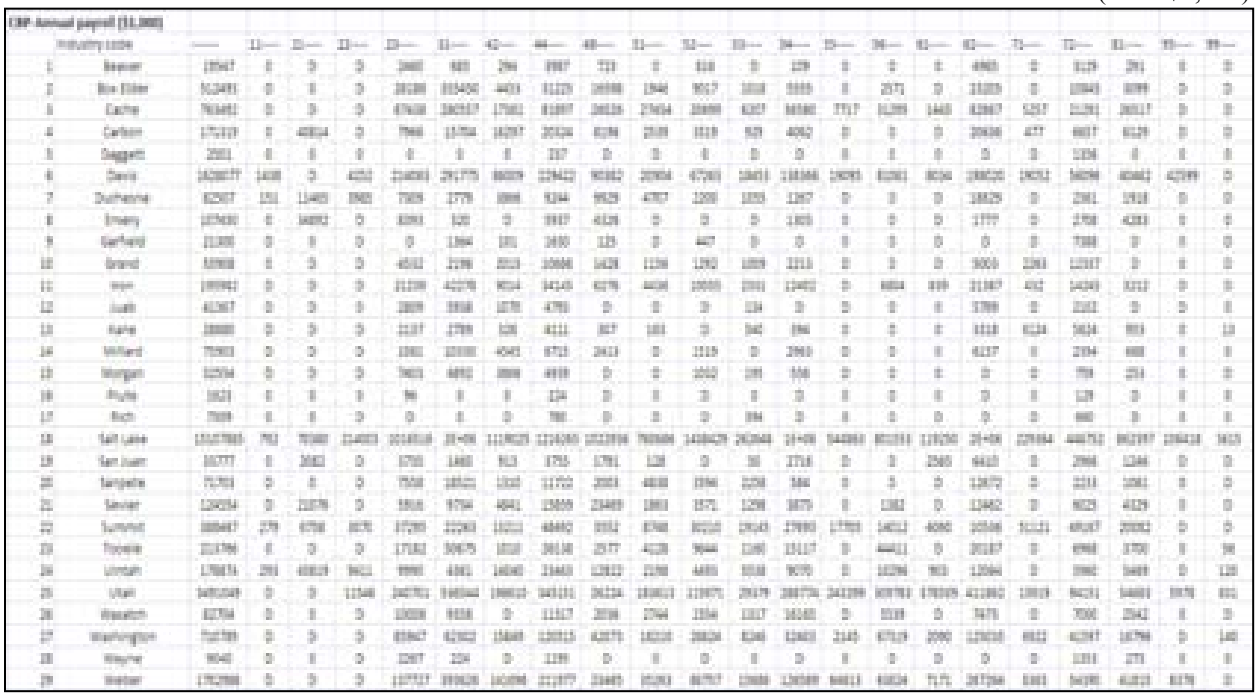
(Unit: $1,000)

CBP - First-quarter payroll ($1,000)

Industry code		11—	21—	22—	23—	31—	42—	44—	48—	51—	52—	53—	54—	55—	56—	61—	62—	71—	72—	81—	99—	99—
1	Beaver	4098	D	D	D	531	198	82	851	165	D	198	D	27	D	D	D	1229	D	818	58	D	D
2	Box Elder	121138	D	D	D	3412	88526	1139	8407	4091	564	2580	214	1141	D	524	D	5303	D	2329	728	D	D
3	Cache	178247	D	D	D	10910	47163	4126	31056	5987	6402	5142	1364	8309	1344	7319	217	19028	1133	6930	6214	D	D
4	Carbon	40907	D	10553	D	1148	1748	4214	4604	2139	608	883	217	951	D	D	D	4951	96	1583	1179	D	D
5	Daggett	361	D	D	D	D	D	D	36	D	D	D	D	D	D	D	D	D	D	186	D	D	D
6	Davis	884175	909	D	965	56282	75753	20309	91257	22328	5022	15376	4656	34918	5958	16983	1916	45567	9012	33779	9682	10575	D
7	Duchesne	35257	23	2850	984	1400	881	849	2158	2507	1024	583	238	284	D	D	D	4166	D	524	429	D	D
8	Emery	29337	D	9050	D	2694	76	D	1318	1153	D	D	D	289	D	D	D	594	D	682	852	D	D
9	Garfield	4231	D	D	D	D	377	12	330	23	D	155	D	D	D	D	D	D	D	959	D	D	D
10	Grand	12021	D	D	D	1032	563	364	2129	412	291	102	218	477	D	D	D	1128	378	2178	D	D	D
11	Iron	46017	D	D	D	4902	10409	2133	8260	1391	1133	2421	595	3007	D	1623	233	9010	101	3728	745	D	D
12	Juab	10179	D	D	D	538	1322	264	2242	D	D	D	80	D	D	D	D	1390	D	803	D	D	D
13	Kane	5655	D	D	D	448	613	88	880	99	88	D	103	149	D	D	D	821	1149	768	154	D	4
14	Millard	13642	D	D	D	333	3030	906	2157	487	D	433	D	675	D	D	D	1366	D	526	133	D	D
15	Morgan	7687	D	D	D	1493	1348	1053	1288	D	D	217	85	89	D	D	D	D	D	1099	98	D	D
16	Piute	418	D	D	D	94	D	D	90	D	D	D	D	D	D	D	D	D	D	12	D	D	D
17	Rich	1451	D	D	D	D	D	D	143	D	D	D	92	D	D	D	D	D	D	63	D	D	D
18	Salt Lake	1742283	179	17521	85294	252251	434009	176179	291124	294952	201179	161975	80999	338352	148448	353878	28958	369536	84673	322848	196337	27934	724
19	San Juan	7327	D	833	D	658	401	228	852	422	88	D	9	432	D	D	837	1315	D	947	299	D	D
20	Sanpete	15150	D	D	D	1277	3427	262	2538	481	1172	829	630	145	D	D	D	2849	D	519	299	D	D
21	Sevier	28912	D	5210	D	1269	2288	1071	3935	5038	498	887	290	942	D	238	D	2983	D	1312	932	D	D
22	Summit	105059	56	1474	763	7291	5486	1108	13190	1378	2250	3040	5148	4529	4598	3033	1516	2443	17522	15755	5897	D	D
23	Tooele	46781	D	D	D	4052	11212	233	6169	530	863	1969	303	3789	D	10781	D	4546	D	1624	833	D	D
24	Uintah	40307	66	12508	1848	2042	927	1209	5628	2933	651	1137	1366	1985	D	2219	101	2794	D	1408	1208	D	29
25	Utah	813960	D	D	2613	50105	129647	50806	79824	3474	44917	29496	8103	96420	54113	79809	52119	91180	2801	92977	12901	1433	382
26	Wasatch	19387	D	D	D	1882	1503	D	2592	398	562	659	284	3553	D	1297	D	1782	D	2393	592	D	D
27	Washington	137728	D	D	D	19413	15132	4679	28784	10238	4220	5900	1884	7490	518	8334	512	29115	1288	9401	6873	D	4
28	Wayne	1964	D	I	D	538	88	D	221	D	I	D	I	D	I	D	D	D	D	150	74	I	D
29	Weber	405819	D	D	D	28990	96877	36503	47559	4927	9599	22605	5648	30181	17681	34148	3892	61255	5859	53288	10093	1971	D

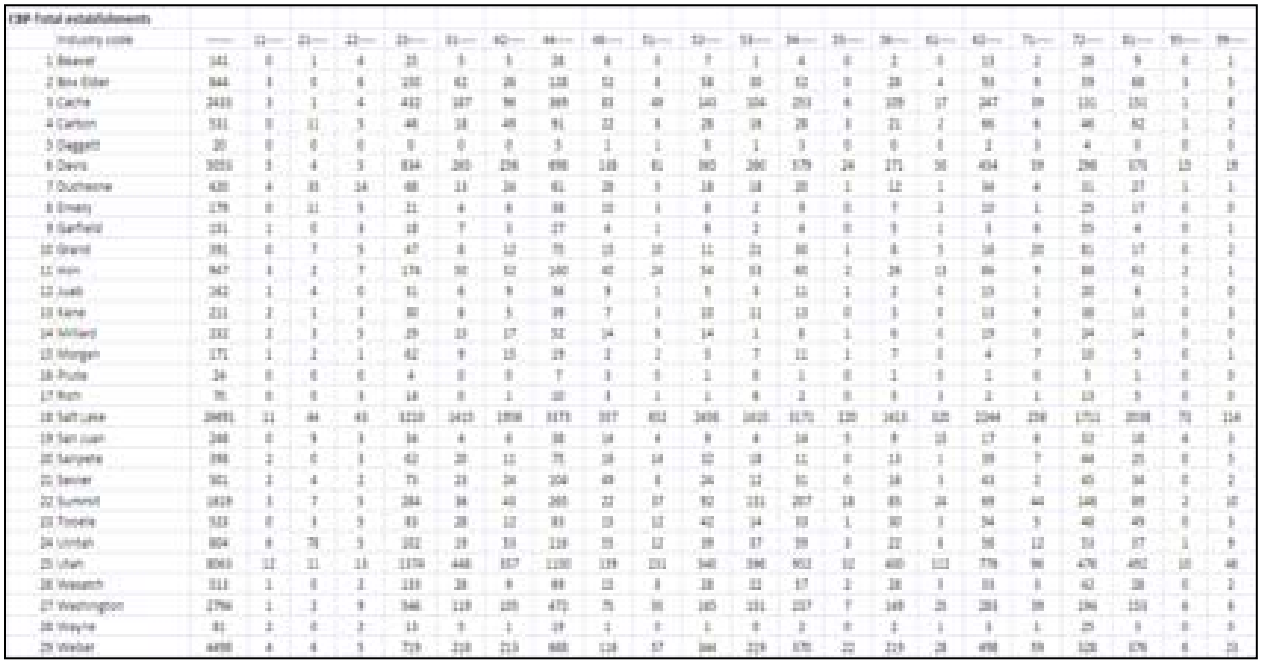
Figure A-2-3: Raw Data of CBP-FQP

(Unit: $1,000)



CBP Annual payroll ($1,000)																							
	Industry code	------	11----	21----	22----	23----	31----	42----	44----	48----	51----	52----	53----	54----	55----	56----	61----	62----	71----	72----	81----	95----	99----
1	Beaver	19547	0	0	0	2460	683	294	3987	723	0	818	0	229	0	0	0	4965	0	3129	291	0	0
2	Box Elder	512491	0	0	0	28180	333400	4431	51229	16598	1946	9017	1018	5555	0	2571	0	21029	0	10845	8099	0	0
3	Cache	783492	0	0	0	67438	280537	17582	81897	26026	27454	20499	6207	36580	7717	11299	1443	42867	5257	21291	26017	0	0
4	Carbon	175219	0	40814	0	7966	11704	16297	20324	8194	2539	1519	925	4092	0	0	0	20436	477	6617	6129	0	0
5	Daggett	2501	0	0	0	0	0	0	237	0	0	0	0	0	0	0	0	0	0	1258	0	0	0
6	Davis	1628077	1408	0	4252	214083	291775	86009	229422	90382	20904	67263	18453	118366	29095	81561	8024	198020	19052	56094	40462	42599	0
7	Duchesne	82507	251	11405	890	7309	1779	1898	9244	9529	4767	1200	1055	1267	0	0	0	18829	0	2361	1918	0	0
8	Emery	107430	0	34892	0	8393	320	0	3937	4328	0	0	0	1403	0	0	0	1777	0	2758	4283	0	0
9	Garfield	21305	0	0	0	0	1364	191	1630	125	0	447	0	0	0	0	0	0	0	7388	0	0	0
10	Grand	55958	0	0	0	4532	2196	3513	10668	1428	1156	1392	1059	2213	0	0	0	5016	1261	12337	0	0	0
11	Iron	195941	0	0	0	21239	42278	9014	34143	6278	4436	10010	3351	12402	0	6854	939	21387	432	14243	3212	0	0
12	Juab	41267	0	0	0	2809	3568	1270	4781	0	0	0	134	0	0	0	0	1789	0	2102	0	0	0
13	Kane	38888	0	0	0	1137	1799	526	4111	857	183	0	560	396	0	0	0	3318	6124	5624	853	0	13
14	Millard	75903	0	0	0	3361	10330	4045	9715	2413	0	1119	0	2993	0	0	0	6137	0	2704	688	0	0
15	Morgan	32534	0	0	0	7403	4892	3898	4939	0	0	1032	195	558	0	0	0	0	0	759	253	0	0
16	Piute	3523	0	0	0	96	0	0	224	0	0	0	0	0	0	0	0	0	0	128	0	0	0
17	Rich	7559	0	0	0	0	0	0	780	0	0	0	394	0	0	0	0	0	0	660	0	0	0
18	Salt Lake	15157865	702	70580	214003	1014518	2149	1119525	1214283	1522938	780684	1438429	262648	2149	544983	851151	119250	2149	229384	448752	862397	239418	3615
19	San Juan	10777	0	2682	0	1731	1460	913	1751	1791	128	0	91	2718	0	0	2565	6410	0	2966	1246	0	0
20	Sanpete	71701	0	0	0	7558	18521	1316	11722	2053	4838	1594	1259	584	0	0	0	12672	0	2233	1081	0	0
21	Sevier	126054	0	21078	0	5916	9794	4841	15659	23469	1863	1572	1298	1873	0	1282	0	12482	0	9025	4329	0	0
22	Summit	388447	279	6758	1670	37293	22263	10211	48492	9332	8768	30216	19143	27893	17703	14012	4080	30508	51121	69107	20082	0	0
23	Tooele	211796	0	0	0	17182	30975	3210	26138	2577	4128	9044	1160	13117	0	44411	0	20187	0	6968	3750	0	98
24	Uintah	178876	293	45819	9411	9990	4381	14040	21443	12812	2158	4493	5558	9070	0	10294	903	12084	0	3982	5469	0	120
25	Utah	1491049	0	0	11548	140751	148544	198610	143131	26224	183813	119971	29179	288774	241299	303781	178305	411892	19919	84231	54691	5978	831
26	Wasatch	82764	0	0	0	10008	9358	0	11317	2038	2744	2354	1317	16140	0	5539	0	7475	0	7050	2542	0	0
27	Washington	710789	0	0	0	85947	42302	15849	120513	42573	18210	20824	8246	32403	2145	67519	2090	125010	6922	41297	16794	0	140
28	Wayne	9040	0	0	0	2287	229	0	1199	0	0	0	0	0	0	0	0	0	0	1331	273	0	0
29	Weber	1752988	0	0	0	107727	393628	161098	211877	23485	35283	36757	12688	126589	64611	93024	7171	287294	3361	54190	61823	8178	0

Figure A-2-4: Raw Data of CBP-AP



CBP Total establishments																							
	Industry code	------	11----	21----	22----	23----	31----	42----	44----	48----	51----	52----	53----	54----	55----	56----	61----	62----	71----	72----	81----	95----	99----
1	Beaver	141	0	1	4	15	3	5	18	6	1	7	1	6	0	2	1	13	2	28	9	0	1
2	Box Elder	944	1	0	6	130	42	26	128	52	8	58	10	52	0	28	4	93	8	59	68	1	1
3	Cache	2433	1	1	4	432	107	90	369	83	49	140	104	293	6	109	17	247	19	131	151	1	8
4	Carbon	531	0	1	1	48	18	49	91	22	8	28	18	28	1	21	2	66	6	46	62	1	2
5	Daggett	20	0	0	0	1	0	0	5	1	1	1	1	1	0	0	1	2	1	4	1	0	0
6	Davis	3031	1	4	1	334	265	256	698	118	61	165	260	379	24	171	16	434	19	298	175	15	18
7	Duchesne	420	4	11	14	48	11	16	61	28	1	18	18	20	1	12	1	38	4	31	27	1	1
8	Emery	179	0	11	1	11	4	6	18	12	1	6	2	9	0	7	1	10	1	25	17	0	0
9	Garfield	131	1	0	1	18	7	1	27	4	1	6	2	6	0	3	1	3	0	15	4	0	1
10	Grand	391	0	7	1	47	6	12	71	13	10	11	21	30	1	6	1	18	20	31	17	0	2
11	Iron	947	1	2	7	174	30	32	160	42	24	54	33	65	2	24	13	86	9	89	61	2	1
12	Juab	242	1	4	0	31	6	9	38	9	1	3	9	11	1	2	0	13	1	20	6	1	0
13	Kane	211	2	1	1	30	9	5	39	7	1	10	11	13	0	3	1	13	9	30	11	0	1
14	Millard	332	2	3	3	29	13	17	52	14	3	14	1	8	1	6	1	19	0	24	14	0	0
15	Morgan	171	1	2	1	42	9	15	29	2	2	3	7	11	1	7	1	4	7	10	5	0	1
16	Piute	24	0	0	0	4	0	0	7	1	1	1	0	1	0	1	1	1	0	3	1	0	0
17	Rich	35	0	0	1	14	0	1	10	1	1	1	6	2	0	1	1	2	1	13	3	0	0
18	Salt Lake	26491	11	44	41	1210	1413	1958	3373	557	651	2436	1410	3171	120	1413	535	3244	258	1751	2018	75	114
19	San Juan	248	0	9	1	34	4	6	38	14	4	9	4	14	1	9	13	17	4	32	18	4	1
20	Sanpete	398	2	6	1	62	20	11	75	19	14	12	18	11	0	13	1	19	7	44	25	0	3
21	Sevier	301	1	4	1	73	23	24	104	49	8	24	12	31	0	16	1	43	1	45	34	0	2
22	Summit	1829	1	7	1	284	34	43	265	22	37	92	111	207	18	89	24	69	44	148	89	2	10
23	Tooele	533	0	1	1	83	28	12	83	13	12	42	14	33	1	30	1	34	1	48	49	0	1
24	Uintah	804	4	78	1	102	29	33	116	35	12	19	37	39	1	22	4	56	12	53	37	1	9
25	Utah	8063	12	11	11	1174	448	557	1130	139	231	340	396	903	32	400	121	778	90	478	492	10	48
26	Wasatch	311	1	0	2	133	28	6	88	12	3	18	22	37	2	28	1	33	1	62	28	0	2
27	Washington	1794	1	2	9	346	119	105	471	75	31	165	131	237	7	169	25	281	39	194	153	6	6
28	Wayne	41	2	0	2	11	3	1	19	1	1	1	4	3	0	2	1	1	1	25	3	0	0
29	Weber	4498	4	4	3	729	218	213	668	114	57	384	219	570	22	219	28	498	59	328	376	6	21

Figure A-2-5: Raw Data of CBP-AP

A-2-4 Other Data

Table A-2-4: Raw Data of Population and Area

ID-C	2001	2002	2003	2004	2005	2006	2007	Area (Square Mile)
1	6,198	6,285	6,285	6,308	6,341	6,428	6466	2590
2	43,245	43,812	44,022	44,654	45,304	45,987	47491	5724
3	93,372	95,460	98,176	100,182	103,564	105,671	109022	1165
4	19,858	19,858	19,558	19,385	19,338	19,504	19730	1479
5	944	916	921	954	963	949	969	698
6	246,744	255,099	262,038	268,916	278,278	286,547	296029	304
7	14,646	14,856	14,698	14,933	15,237	15,585	16163	3238
8	10,473	10,540	10,477	10,493	10,491	10,438	10461	4452
9	4,630	4,599	4,532	4,625	4,703	4,772	4872	5174
10	8,423	8,468	8,464	8,611	8,826	9,024	9125	3682
11	35,541	36,122	37,559	38,925	41,397	43,424	44813	3298
12	8,570	8,643	8,713	8,826	8,974	9,315	9654	3392
13	6,037	5,958	5,937	6,056	6,211	6,294	6440	3992
14	12,486	12,760	13,068	13,127	13,171	13,230	13414	6590
15	7,548	7,639	7,938	8,249	8,516	8,888	9265	609
16	1,404	1,409	1,358	1,366	1,368	1,373	1385	758
17	1,983	2,050	2,079	2,069	2,062	2,121	2162	1029
18	918,279	927,564	940,465	955,166	978,285	996,374	1018904	737
19	14,063	14,216	14,240	14,353	14,571	14,647	14807	7821
20	23,572	24,521	24,787	25,043	25,454	25,799	26464	1588
21	19,180	19,232	19,318	19,415	19,649	19,984	20442	1910
22	31,279	32,236	34,073	35,090	36,283	36,871	38412	1871
23	44,425	47,019	48,956	50,075	52,133	54,375	56536	6946
24	26,049	25,984	26,019	26,224	26,883	27,747	28806	4477
25	390,447	405,977	423,286	437,627	456,073	475,425	501447	1998
26	16,278	17,476	18,515	19,177	19,999	21,053	21951	1181
27	96,902	103,750	109,767	117,316	127,127	134,899	140908	2427
28	2,509	2,504	2,487	2,518	2,504	2,535	2635	2460
29	200,567	203,377	205,882	209,547	213,684	215,870	220781	576

ID-C	NOJ1	NOJ2	NOJ3	NOJ4	NOJ5	NOJ6	NOJ7	NOJ8	NOJ9	NOJ10	NOJ11	NOJT
1	43	89	79	478	0	39	13	40	387	34	691	1893
2	32	923	7067	3318	146	411	733	1050	1194	317	2478	17669
3	26	2201	7913	6394	611	1041	6511	3556	3338	1046	10373	43010
4	786	294	371	2072	100	248	701	896	785	356	2309	8918
5	0	14	2	23	2	1	2	0	151	23	244	462
6	59	6718	10073	18638	915	3197	7648	7630	7881	2647	23488	88894
7	616	367	124	1159	166	129	134	423	330	158	1585	5191
8	660	326	21	895	144	52	87	72	148	168	877	3450
9	9	65	82	206	111	24	14	137	789	29	619	2085
10	76	259	57	833	42	147	160	276	1460	64	849	4223
11	3	885	1446	2490	129	576	1674	1177	1514	323	3890	14107
12	46	323	375	379	0	48	285	218	416	75	572	2737
13	5	134	128	345	6	64	30	37	868	252	745	2614
14	90	229	151	1224	28	72	250	249	369	77	1062	3801
15	7	318	215	384	1	38	87	18	153	37	378	1636
16	0	7	0	51	0	6	1	4	33	4	153	259
17	0	53	3	73	0	36	9	37	132	54	208	605
18	1873	30529	49761	115861	18598	43751	80214	47857	45856	18091	81329	533720
19	179	217	159	487	12	53	74	337	585	86	1772	3961
20	16	439	955	1113	165	190	241	513	468	160	2505	6765
21	396	365	527	2100	76	163	305	742	805	158	1674	7311
22	71	1493	558	2741	223	1373	1129	580	5797	387	2084	16436
23	46	583	1387	1654	194	310	1980	779	1106	296	3552	11887
24	1612	503	194	2172	120	309	483	763	956	257	2589	9958
25	45	10605	16951	24881	6559	5381	17746	31585	11953	3960	22140	151806
26	30	631	263	826	54	203	336	384	969	103	1075	4874
27	154	4323	2356	9520	706	1560	2669	4686	4925	1116	5336	37351
28	0	97	17	128	0	8	2	306	180	22	307	1067
29	0	4848	12638	15587	1896	3922	8394	9344	7395	2670	20362	87056

Figure A-2-6: Raw Data of NOJ

(Unit: $1,000)

ID-C	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	WT
1	1242465	2003178	2517879	12523812	0	822097	213857	1096015	3713690	531757	15567578	40232328
2	1020262	25355887	347104889	70348690	2875012	10635563	17286627	21531298	10363086	6059960	65895158	577476422
3	574678	47103029	238851164	118838734	19483790	28643944	153459599	77079840	27986969	20640256	264718586	997380579
4	46293445	10768687	11372337	55236974	2166785	5553975	14975112	20428263	6770101	8852183	57375104	239792966
5	0	475358	26400	653362	8450	12000	47500	0	1913300	690265	6871797	10698342
6	2419532	213279144	351481975	473847756	22823961	85753132	268806267	191019236	79342163	60075195	915034424	2663882779
7	30881859	9654565	3368287	25569283	4329328	2967461	4115661	9610443	2739512	3102870	39927646	135566915
8	34471936	10831259	574666	39378256	3938312	943335	1909506	1399020	1814033	4730202	22027448	121268017
9	412013	1433962	1560739	3386131	3834759	467886	183663	3020110	10248650	347513	16423659	41319085
10	3440630	6446948	824711	16840443	918750	2689877	3615413	5773608	17654716	1020564	24479922	83745582
11	67030	19335955	40527917	52239840	2824974	14526677	25429523	22321106	14445049	6979796	98144263	295842990
12	1393093	14064880	12113808	6658109	0	1126501	9786300	2897973	3256631	1415383	14247297	66565975
13	133367	2741562	2632597	5498282	37363	1285615	293892	644127	12645577	5764375	18555086	50231762
14	3715688	9545604	4489994	42857527	620667	1599866	6855530	5681688	2614963	1312492	29512756	108806761
15	171667	7810333	7910453	10999622	696	823761	2378784	224757	968337	609022	9336986	41224438
16	0	87560	0	1175046	0	114494	3170	45436	156317	79058	3356784	5017844
17	0	1135620	104161	1175416	0	483748	101412	594966	1099690	604276	4812840	10112027
18	1082896033	1037340483	1907640907	3839037910	706877259	1804524475	3003504459	1498093693	731719635	428090744	2797792422	1786350932
19	5656896	4578487	5965526	7492715	131206	1093026	1123827	6801374	8537963	1361250	44357223	87099492
20	560371	9804981	19445371	16407942	4274824	4482984	3121757	10423042	2468994	2990576	55099583	129080425
21	15744694	6761026	12656909	51602593	1491302	4856629	7273177	13944836	6223511	2886909	44377218	168818804
22	2779377	54065952	24077799	60403815	8643632	46362715	45857079	15978456	113029531	8803294	59220245	439221928
23	4207091	16197120	52799777	32635179	5591522	7540785	97846631	18040141	10390916	5434422	139181016	389864599
24	69557904	11306225	3696207	67915101	2430424	10966403	10277517	13824231	7164577	6199632	70768721	263010942
25	1912212	301979349	558838987	600561559	370868821	174317206	501791487	774725229	121883877	78916525	613688856	4099385107
26	873668	15887503	8627416	18206811	1186104	5320583	12837986	8214040	11606498	2550781	31805619	117167005
27	3520267	103228102	61478052	227023669	19076923	43164816	58658908	127072081	56562347	19645578	133489691	852920434
28	0	2299151	174357	1852879	0	161860	60918	7195194	1475808	315947	7458365	20994479
29	0	141167036	511907969	359654008	54244820	125560888	202037860	272447315	82167875	55900113	611544312	2416632196

Figure A-2-7: Raw Data of Wages

ID-C	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
26	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
29	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Figure A-2-8: Raw Data of EMPBI

A-3 Comparison of Distribution Between Raw Data of Contributing Factors and Their Log Transformation

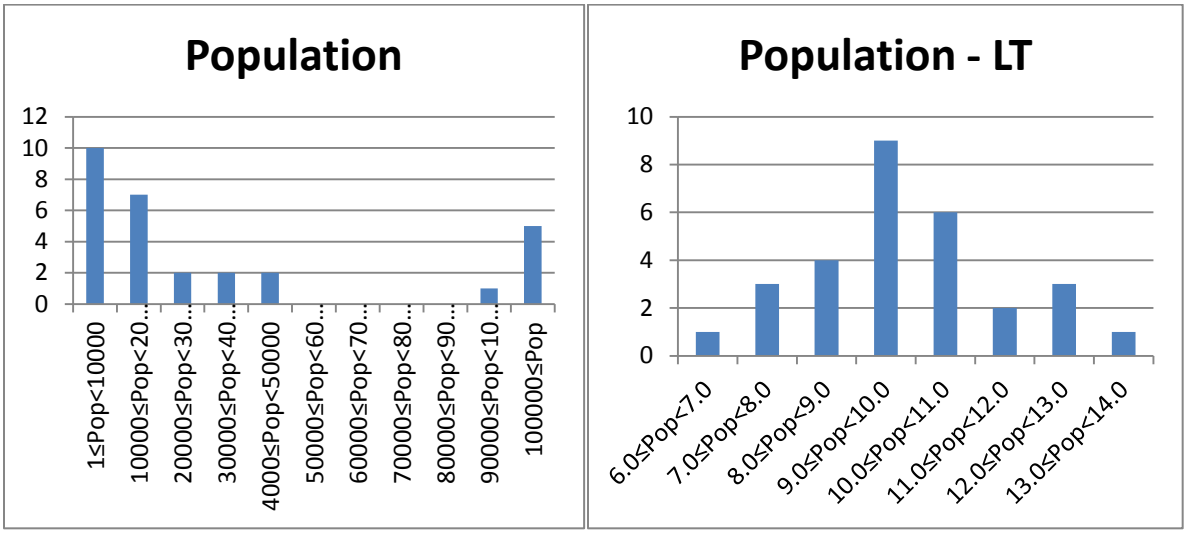


Figure A-3-1: Population (POP)

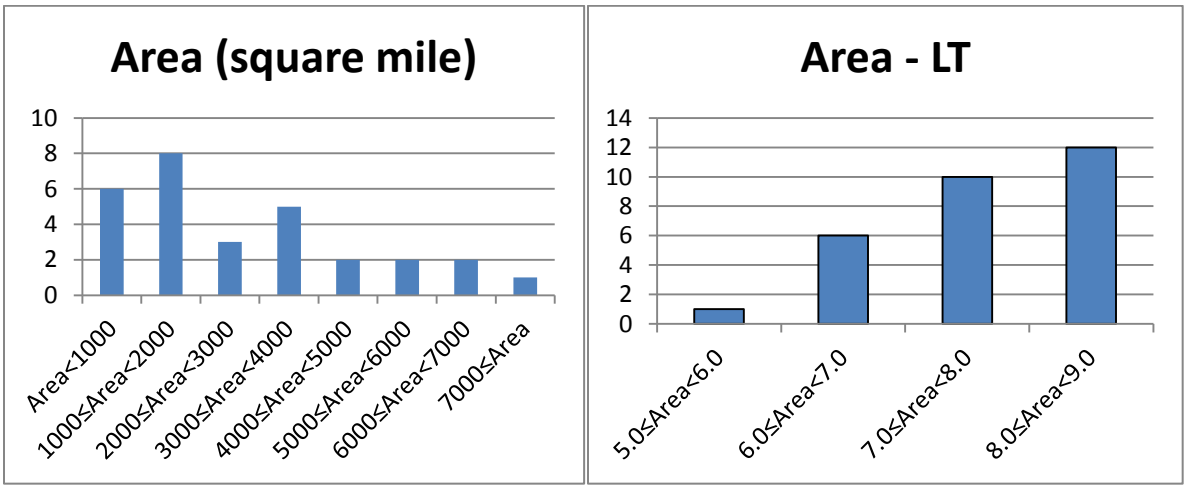


Figure A-3-2: Area

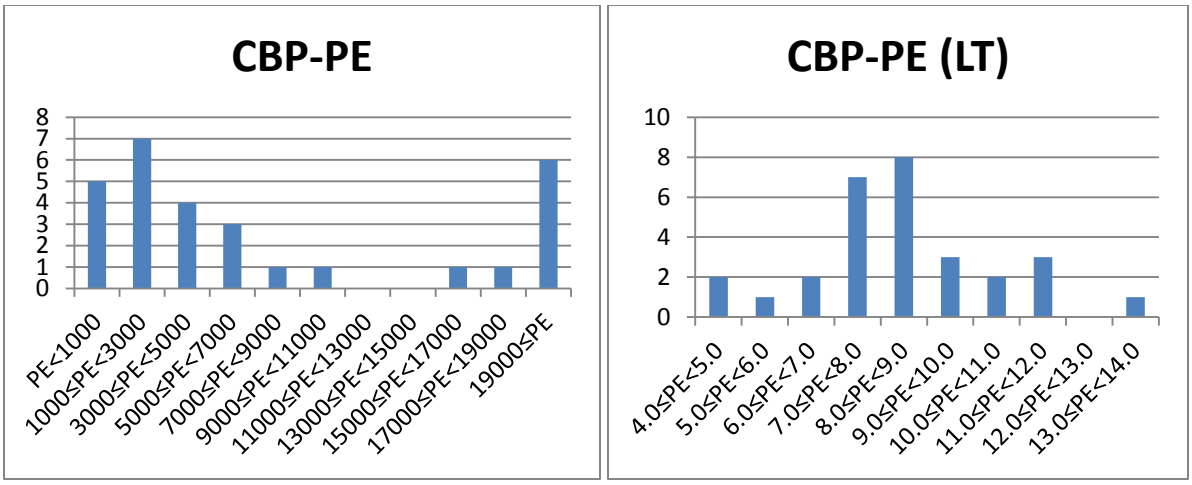


Figure A-3-3: County Business Pattern- Paid Employees (CBP-PE)

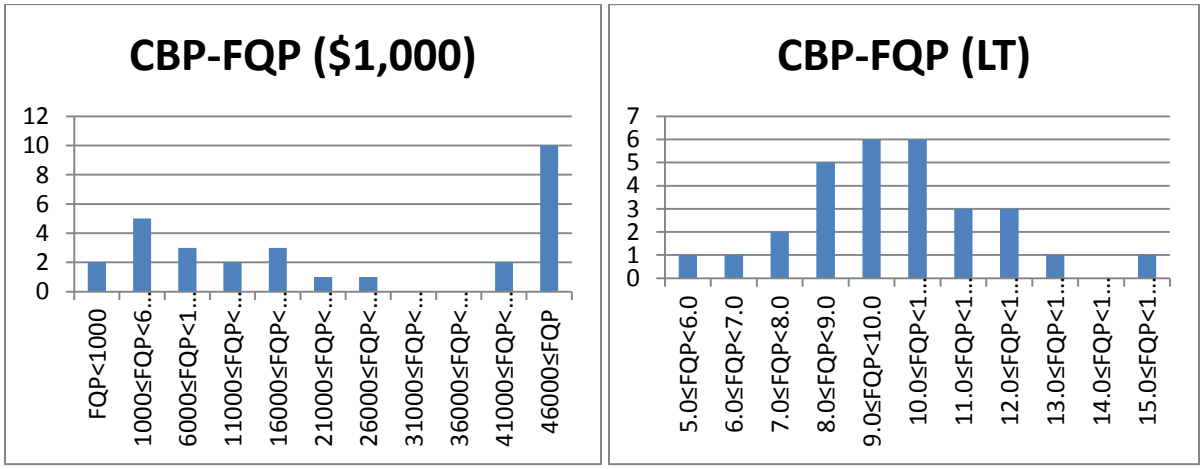


Figure A-3-4: County Business Pattern- First Quarter Payroll (CBP-FQP)

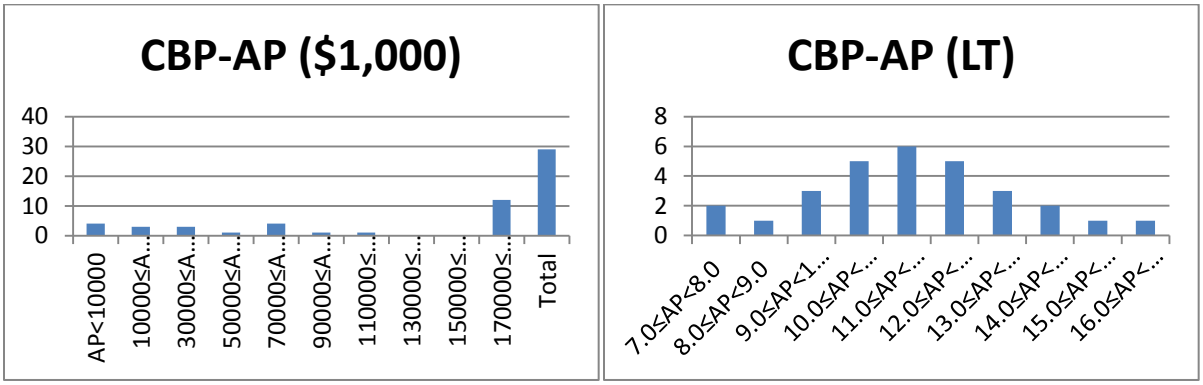


Figure A-3-5: County Business Pattern- Annual Payroll (CBP-AP)

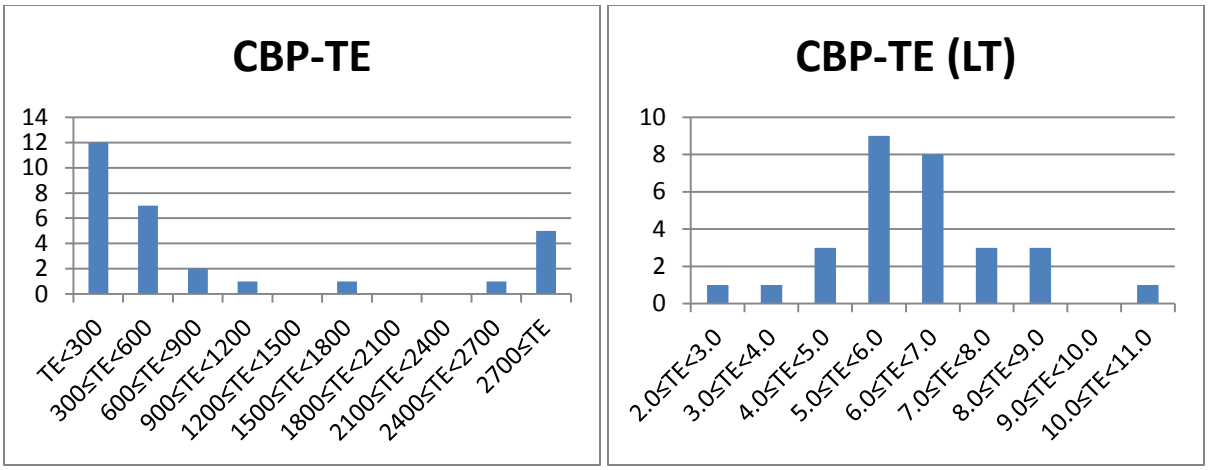


Figure A-3-6: County Business Pattern- Total Equipments (CBP-TE)

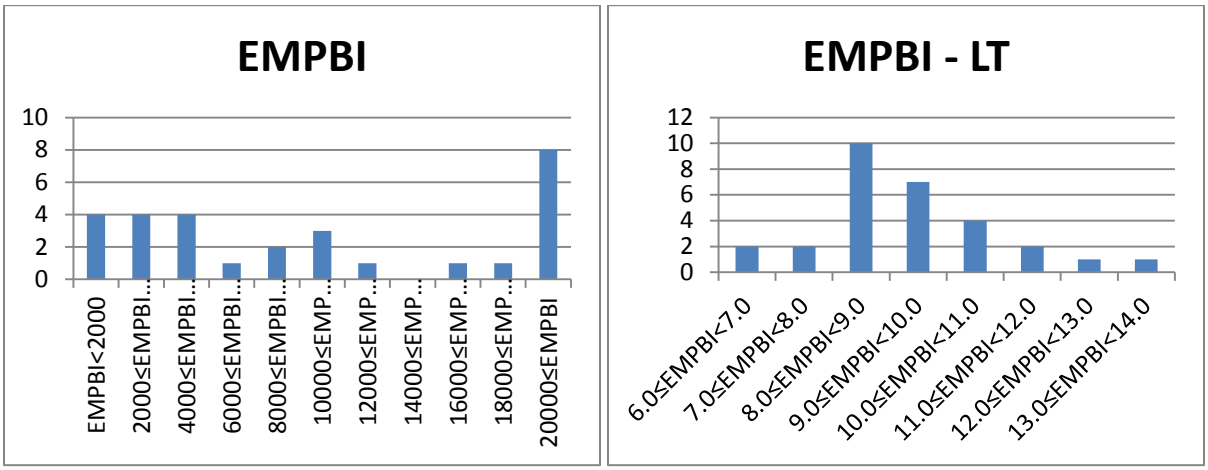


Figure A-3-7: Employment by Industry (EMPBI)

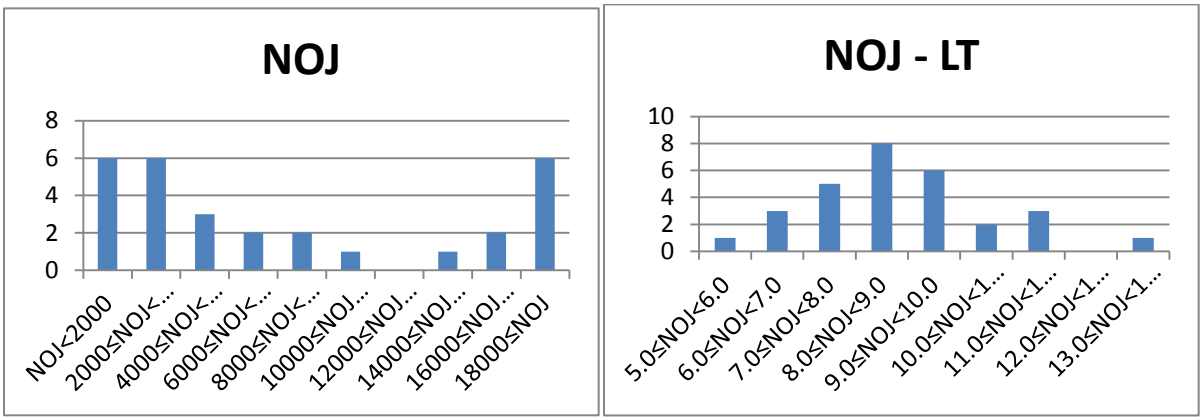


Figure A-3-8: Number of Jobs (NOJ)

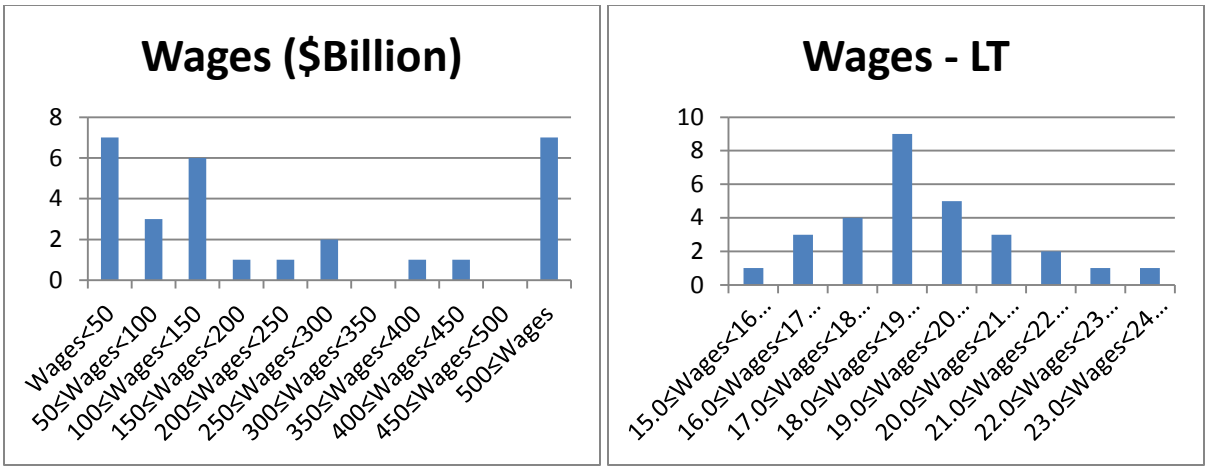


Figure A-3-9: Wages

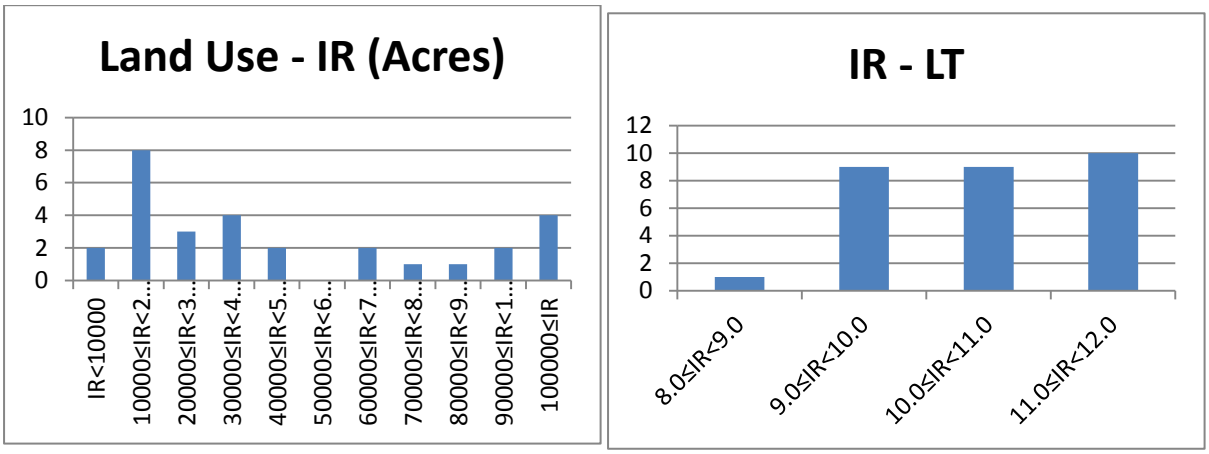


Figure A-3-10: Land Use - Irrigation (IR)

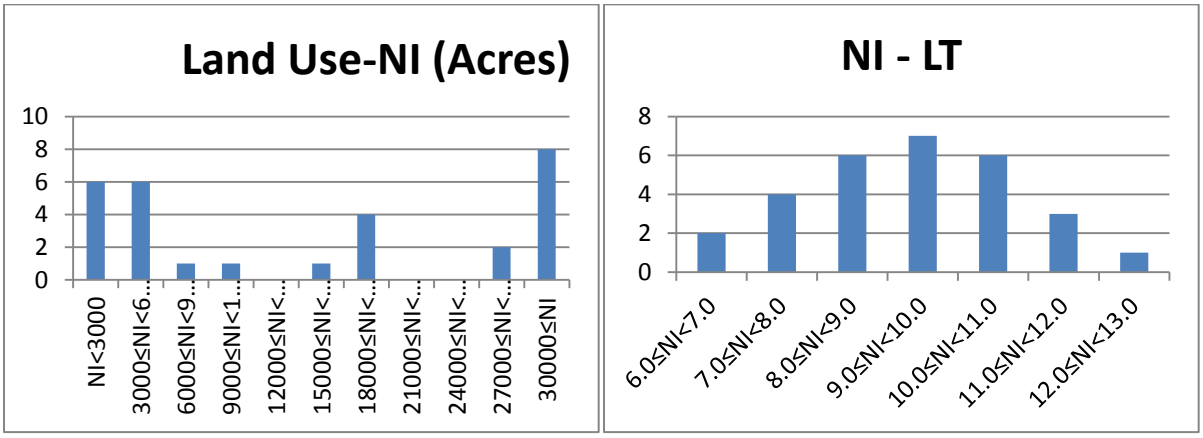


Figure A-3-11: Land Use – Non Irrigation (IR)

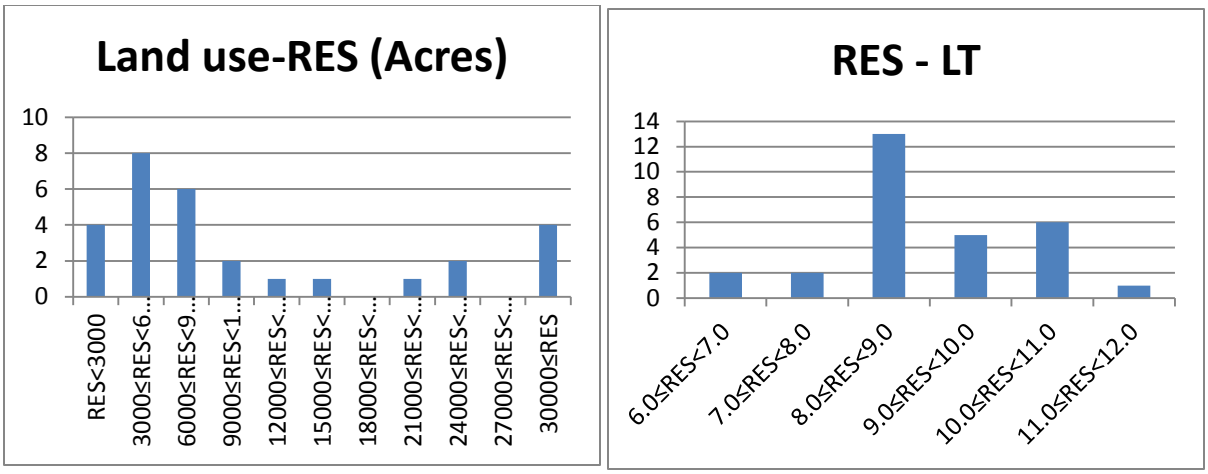


Figure A-3-12: Land Use – Residential (RES)

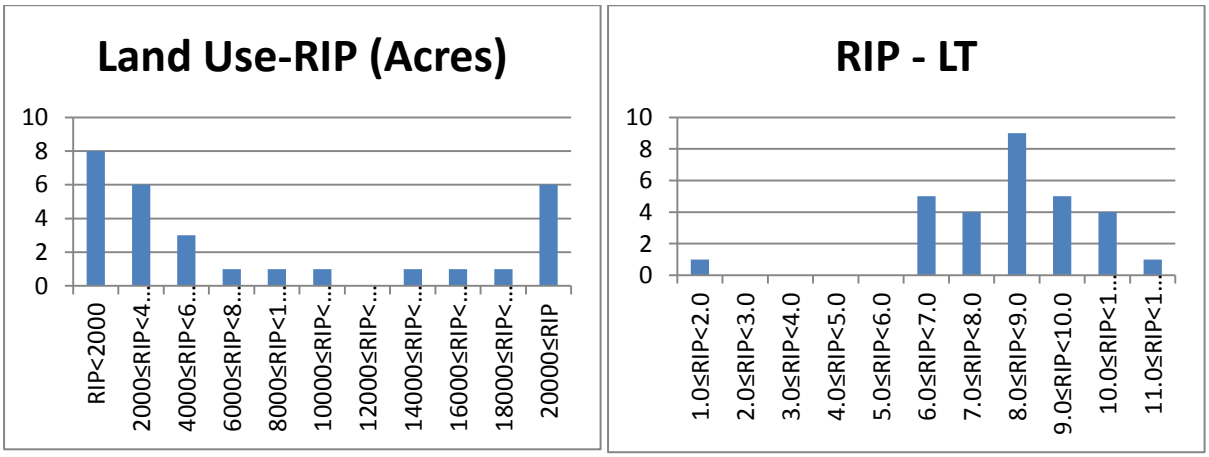


Figure A-3-13: Land Use – Riparian (RIP)

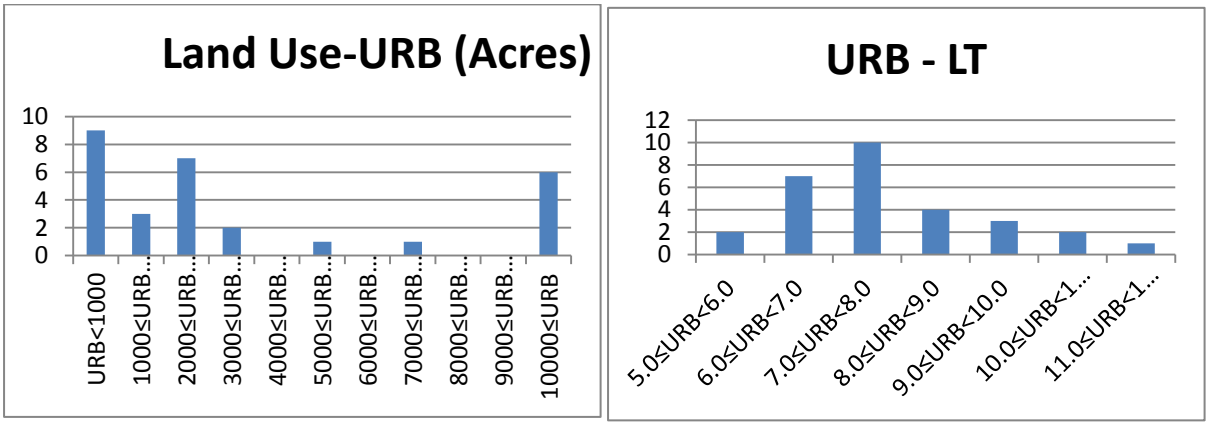


Figure A-3-14: Land Use – Urban (URB)

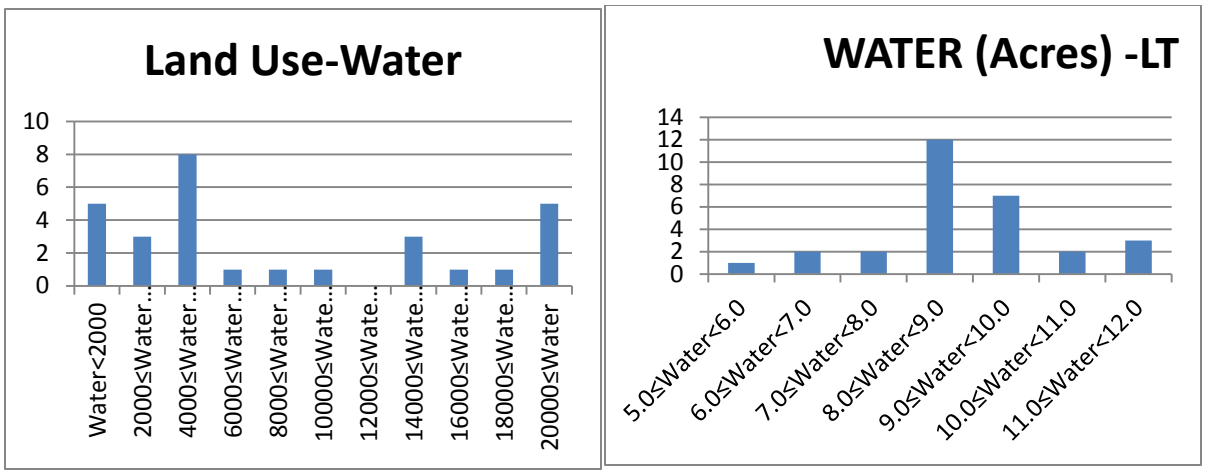


Figure A-3-15: Land Use – Water (URB)

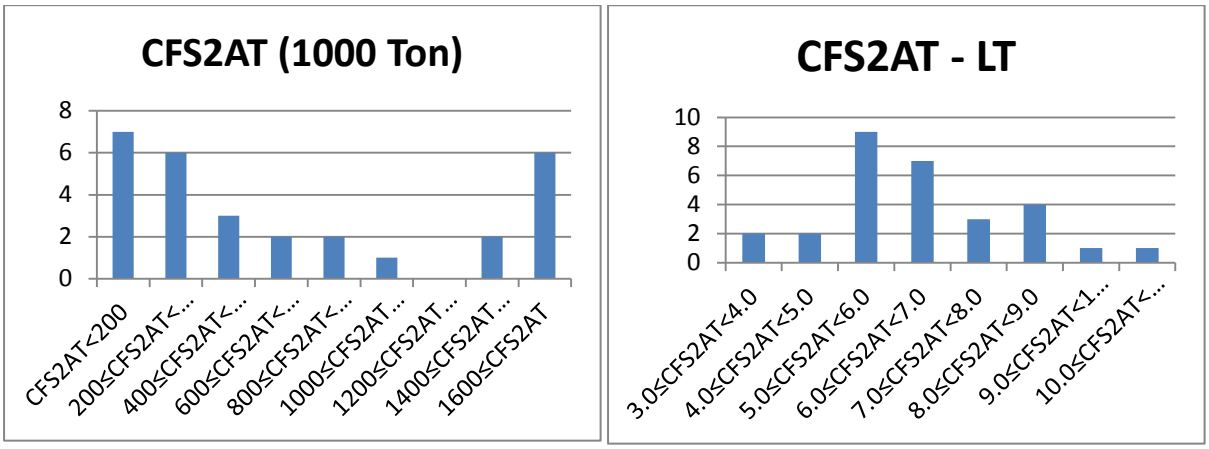


Figure A-3-16: Commodity Flow Study 2002 – Attraction (CFSB-1T)

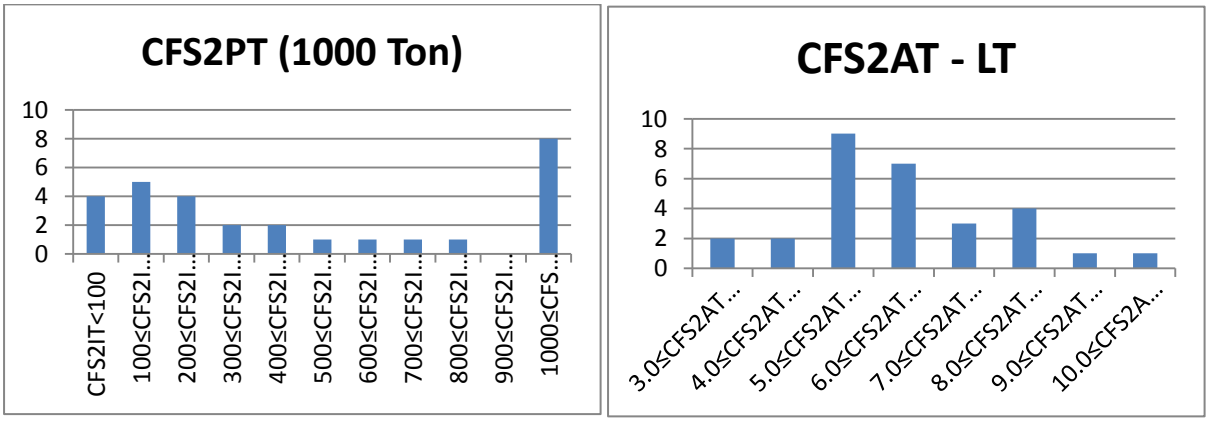


Figure A-3-17: Commodity Flow Study 2002 – Production (CFS2PT)

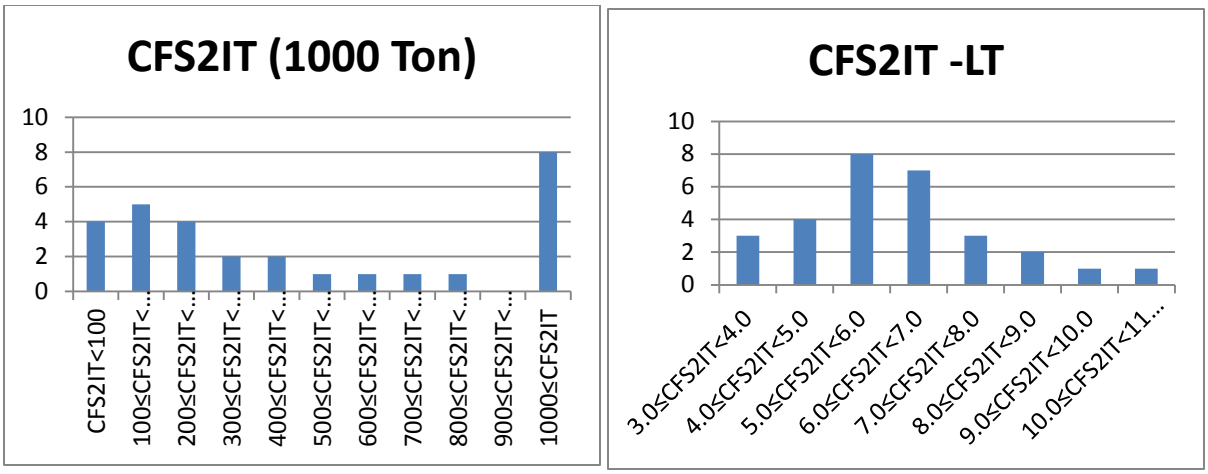


Figure A-3-18: Commodity Flow Study 2002 – Within Utah (CFS2IT)

A-4 Maps, TransCAD Analysis Results

A-4-1 Maps Using Economic and Social Data / CFS Data / Transportation Facility Data

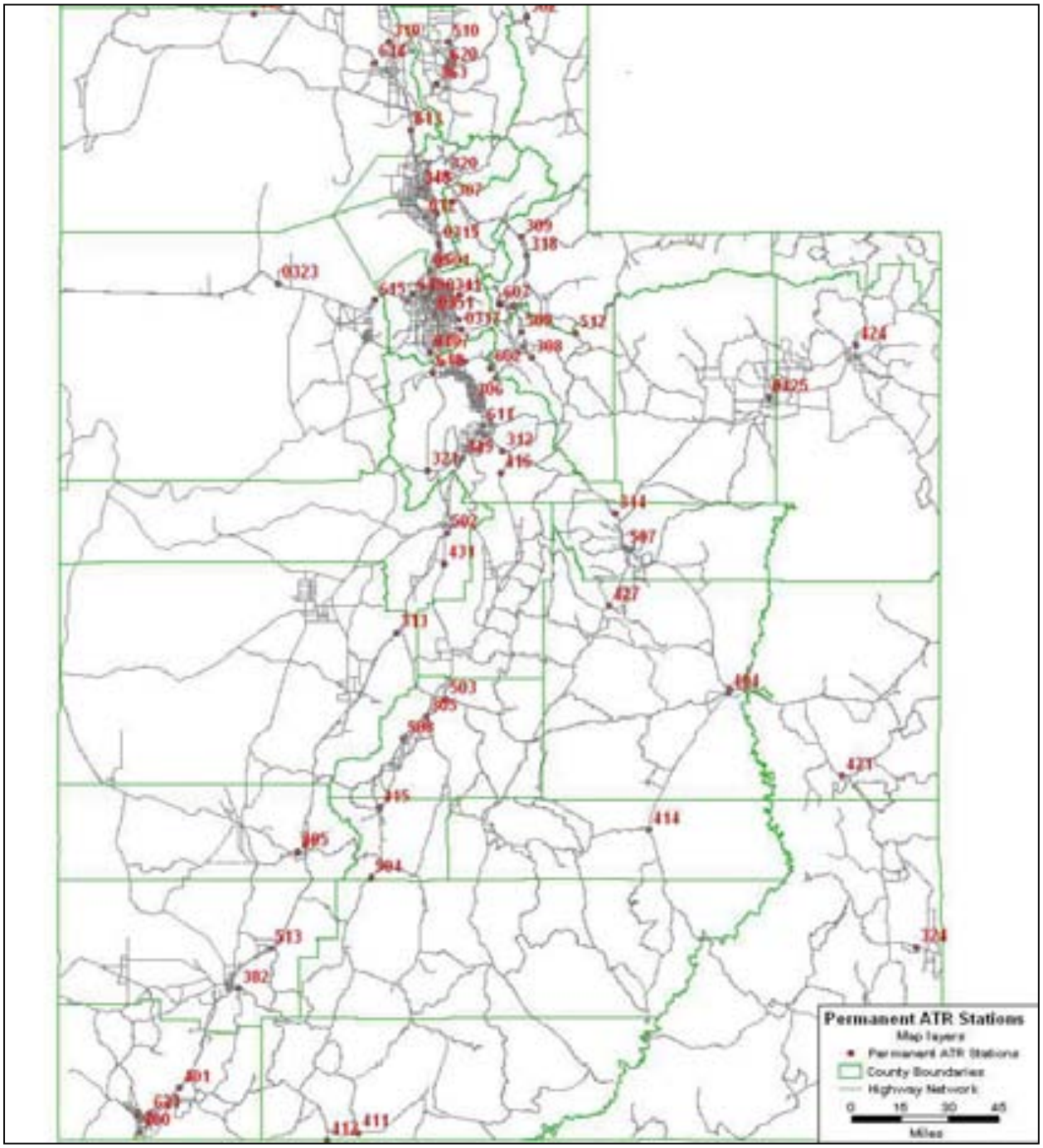


Figure A-4-1 Map of ATRs + Highway (100)

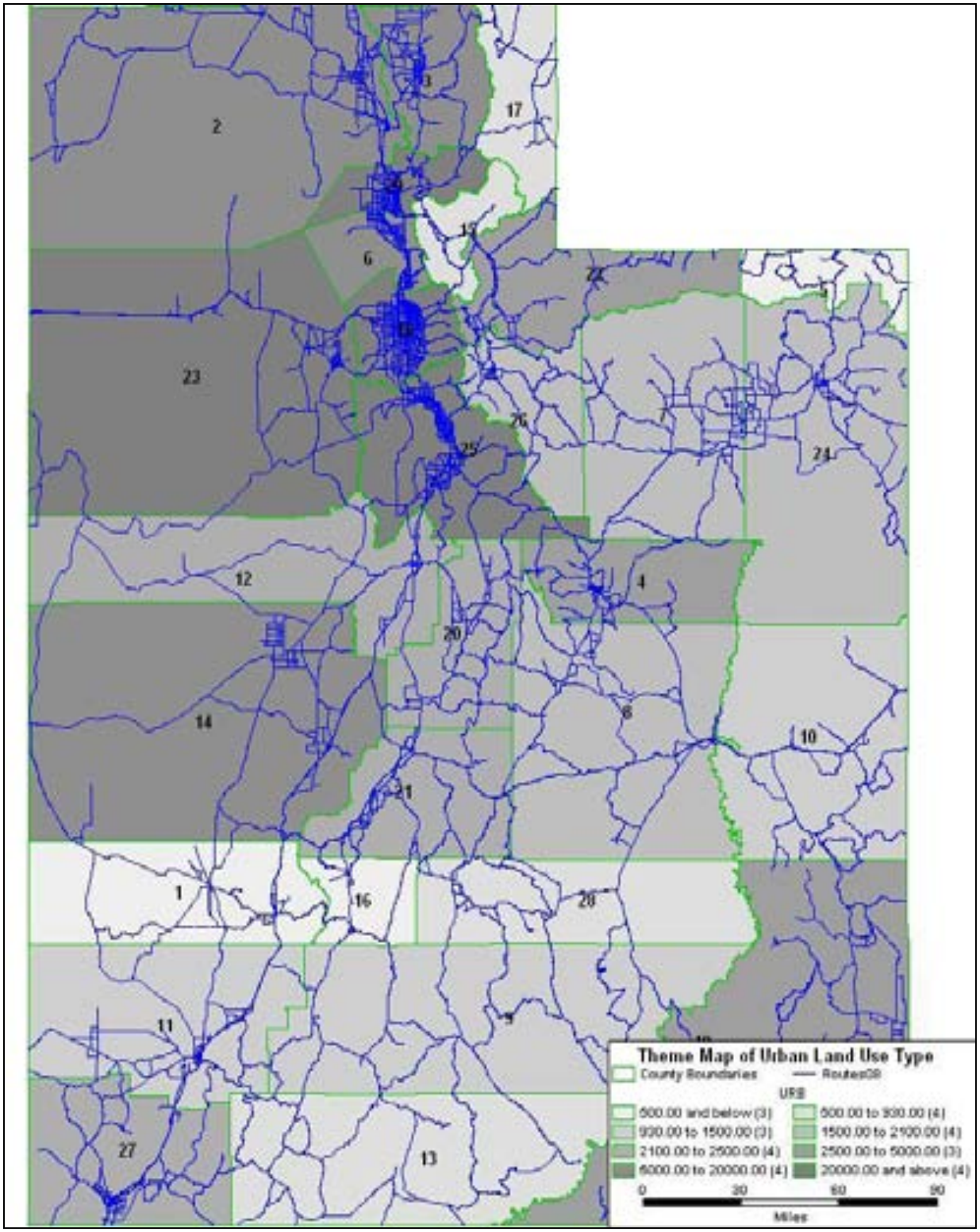


Figure A-4-2 Map of ATRs + Highway+URB (101)

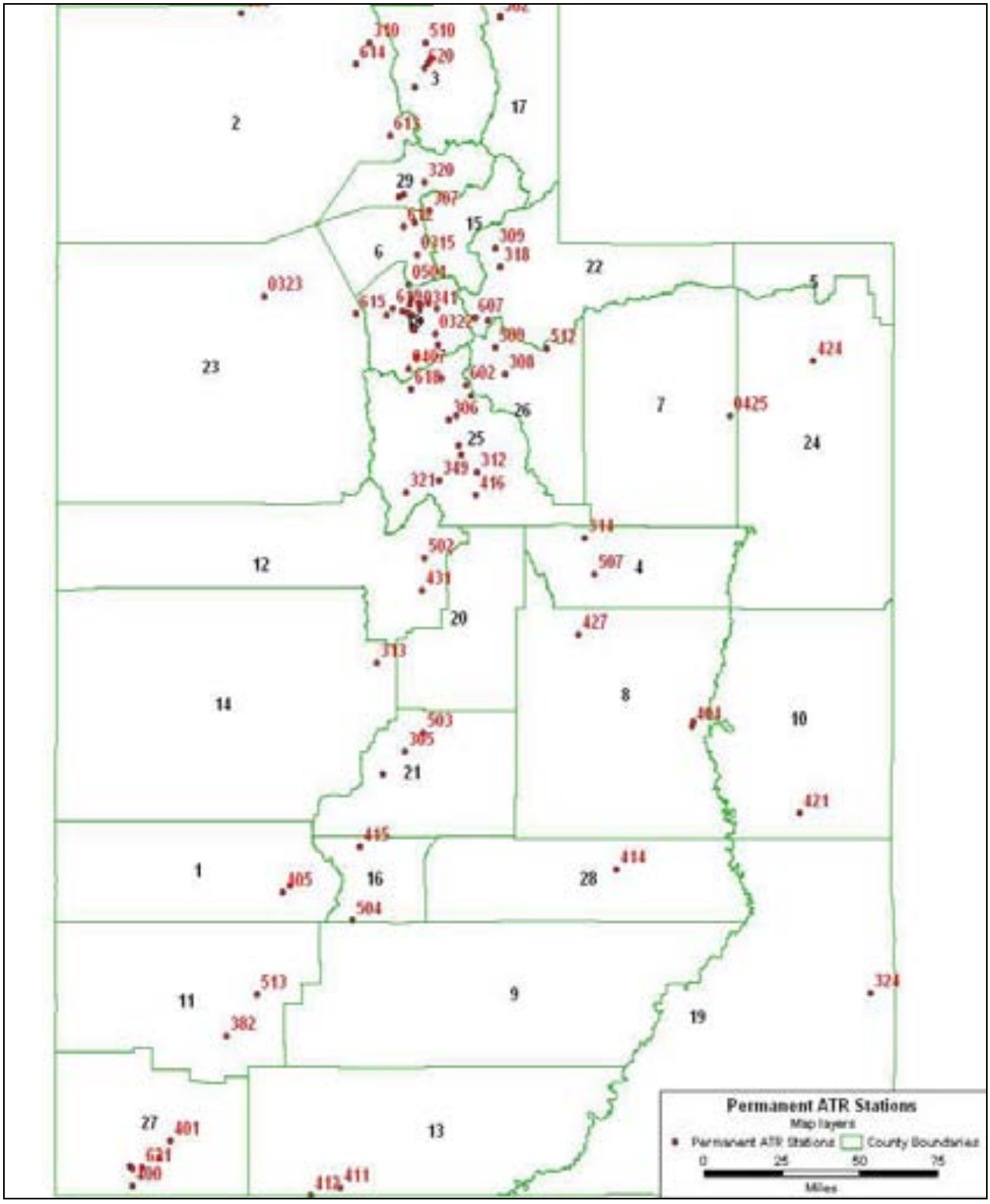


Figure A-4-3 Map of ATRs with County Boundary (102)

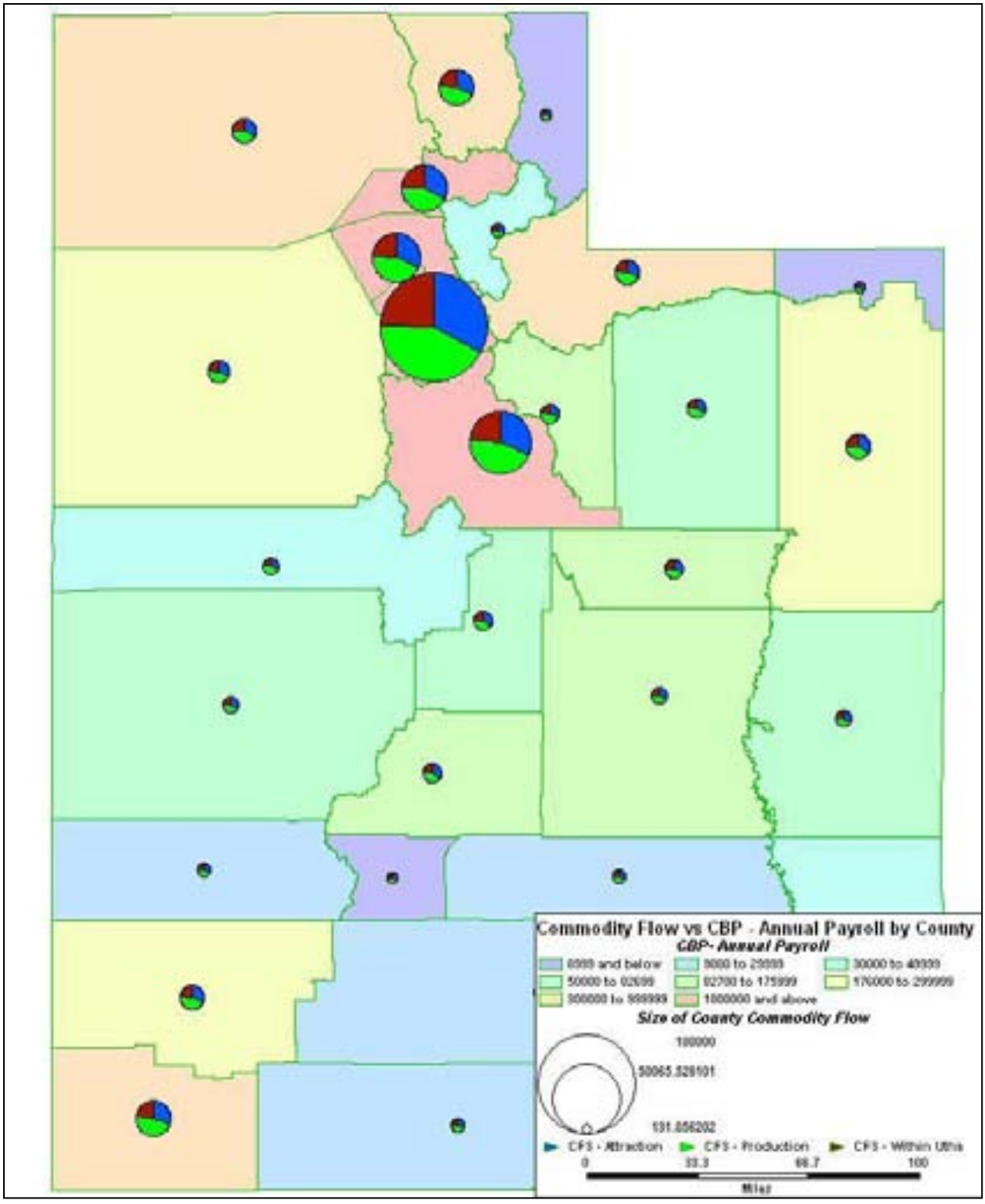


Figure A-4-4 Map of CBPAP + CFS (103)

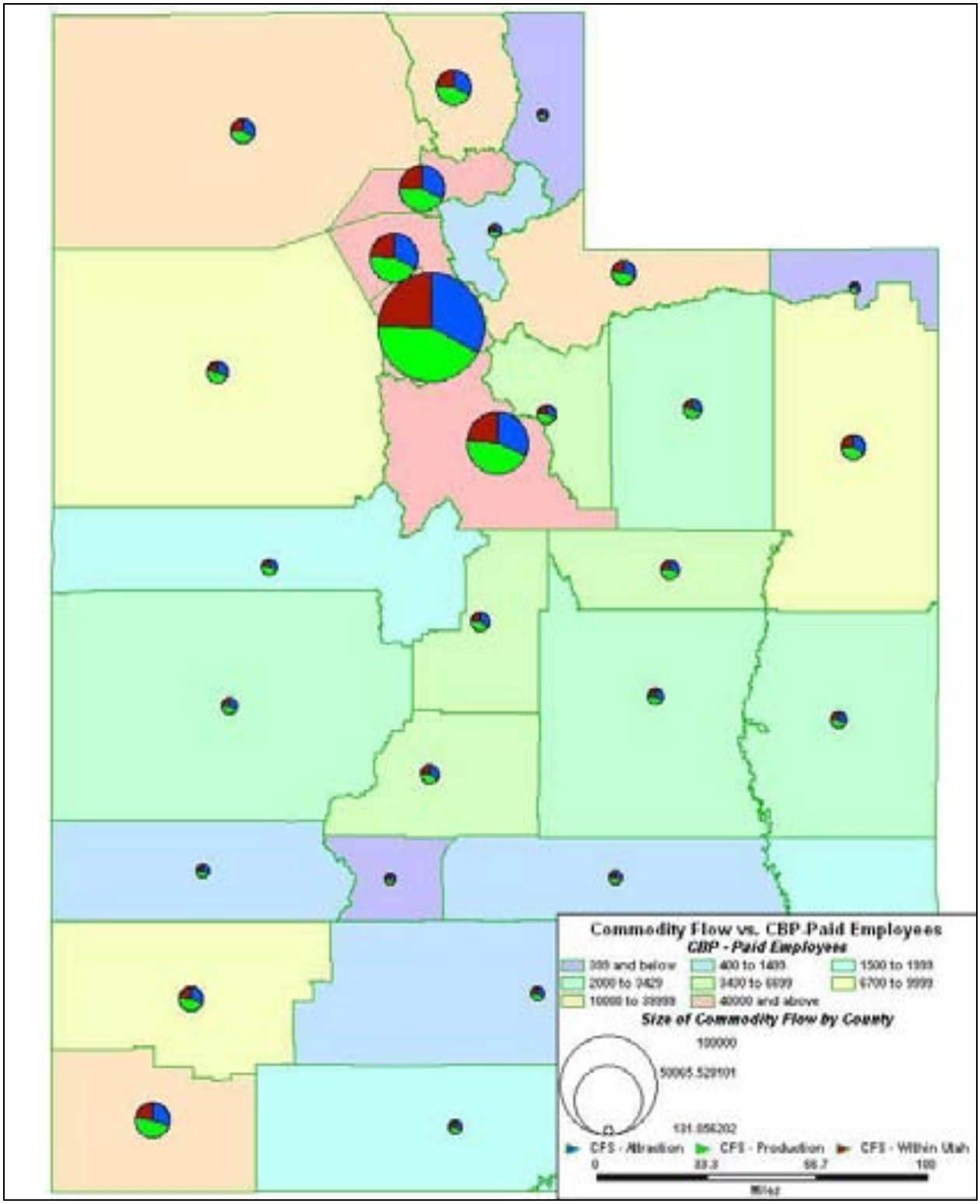


Figure A-4-5 Map of CBPE + CFS (104)

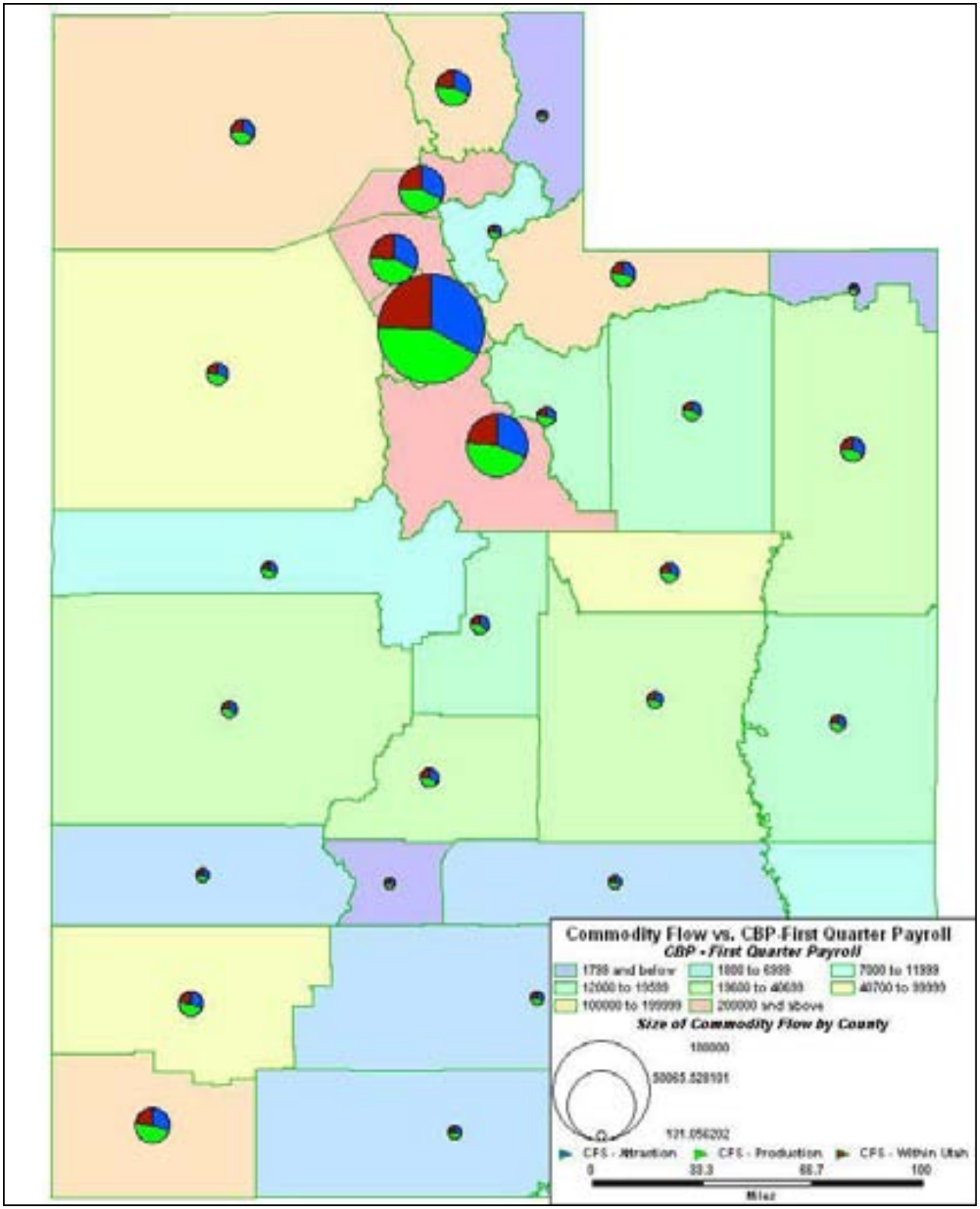


Figure A-4-6 Map of CBPFQP + CFS (105)

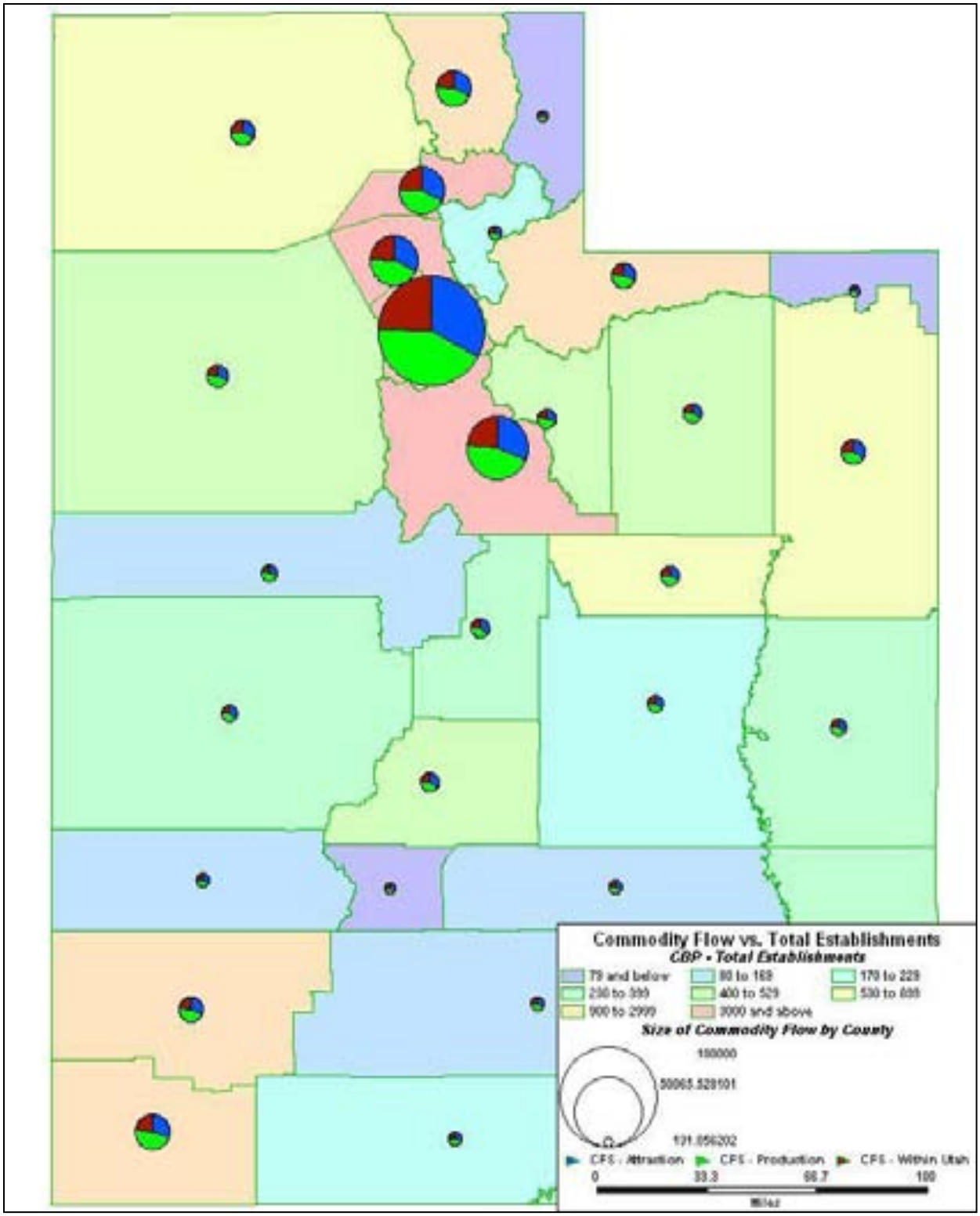


Figure A-4-7 Map of CBPTE + CFS (106)

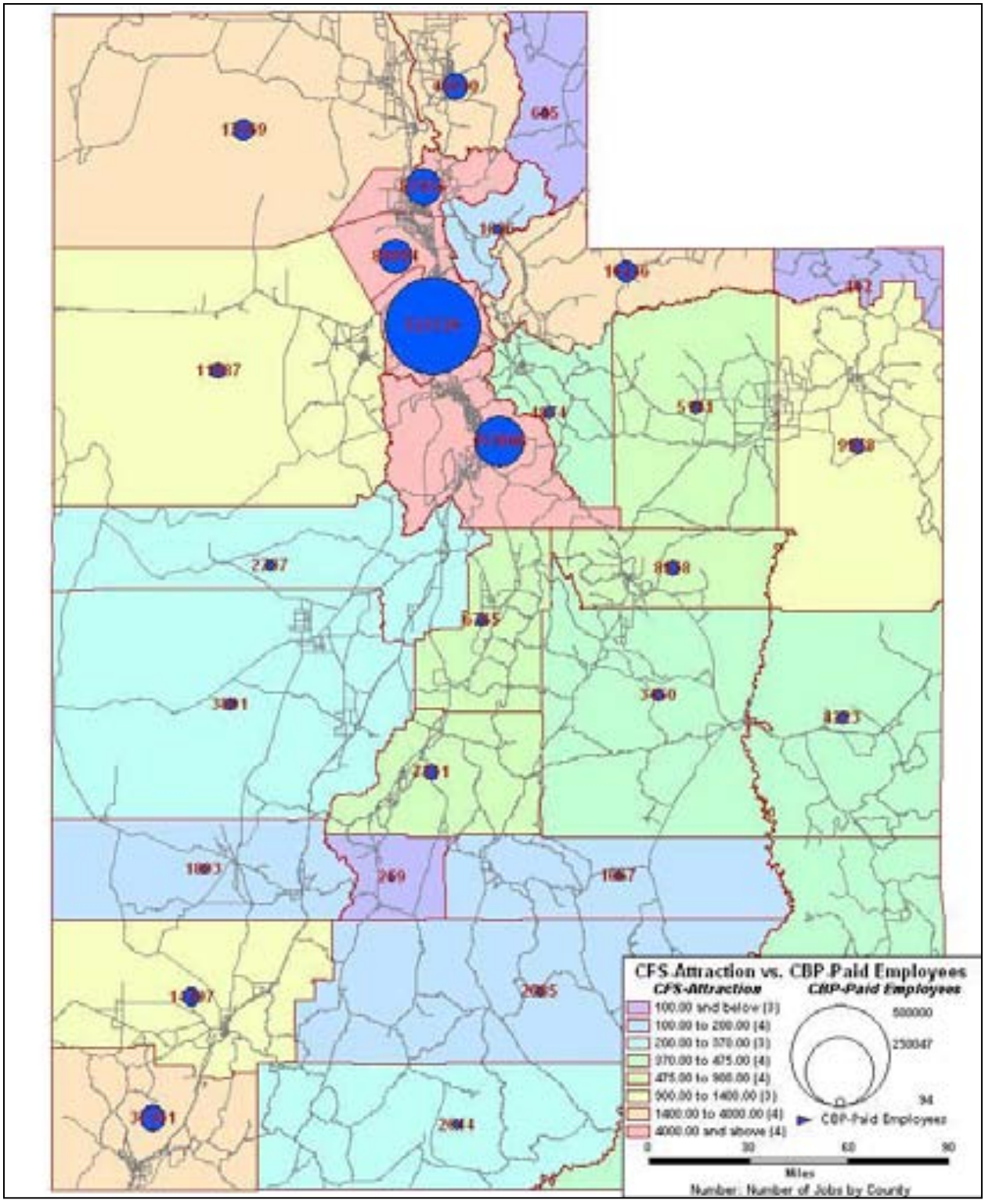


Figure A-4-8 Map of CFSAT+ NOJ (n) + CBPE (107)

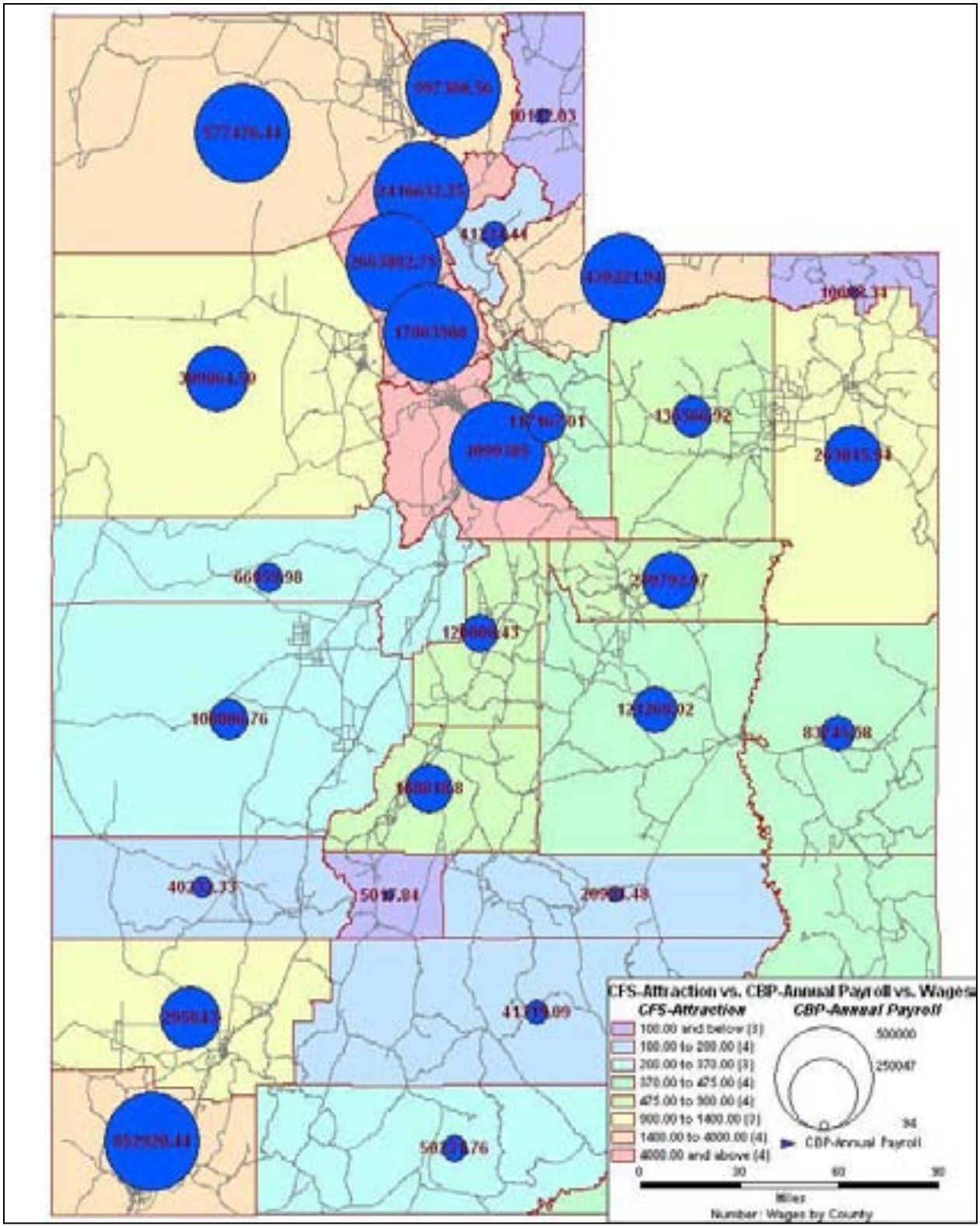


Figure A-4-9 Map of CFSAT+ WT (n) + CBPAP (108)

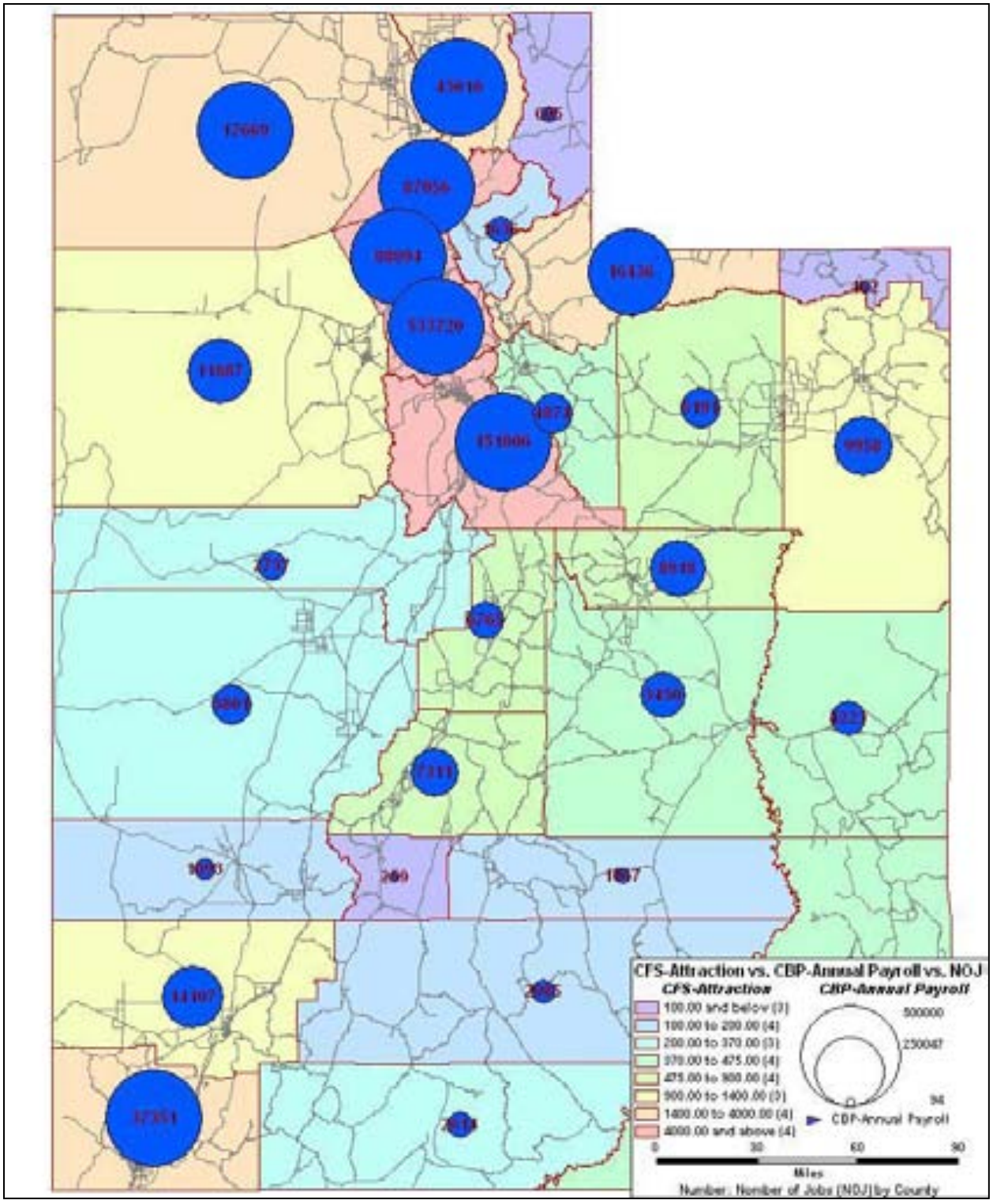


Figure A-4-10 Map of CFSAT+ NOJ (n) + CBPAP (109)

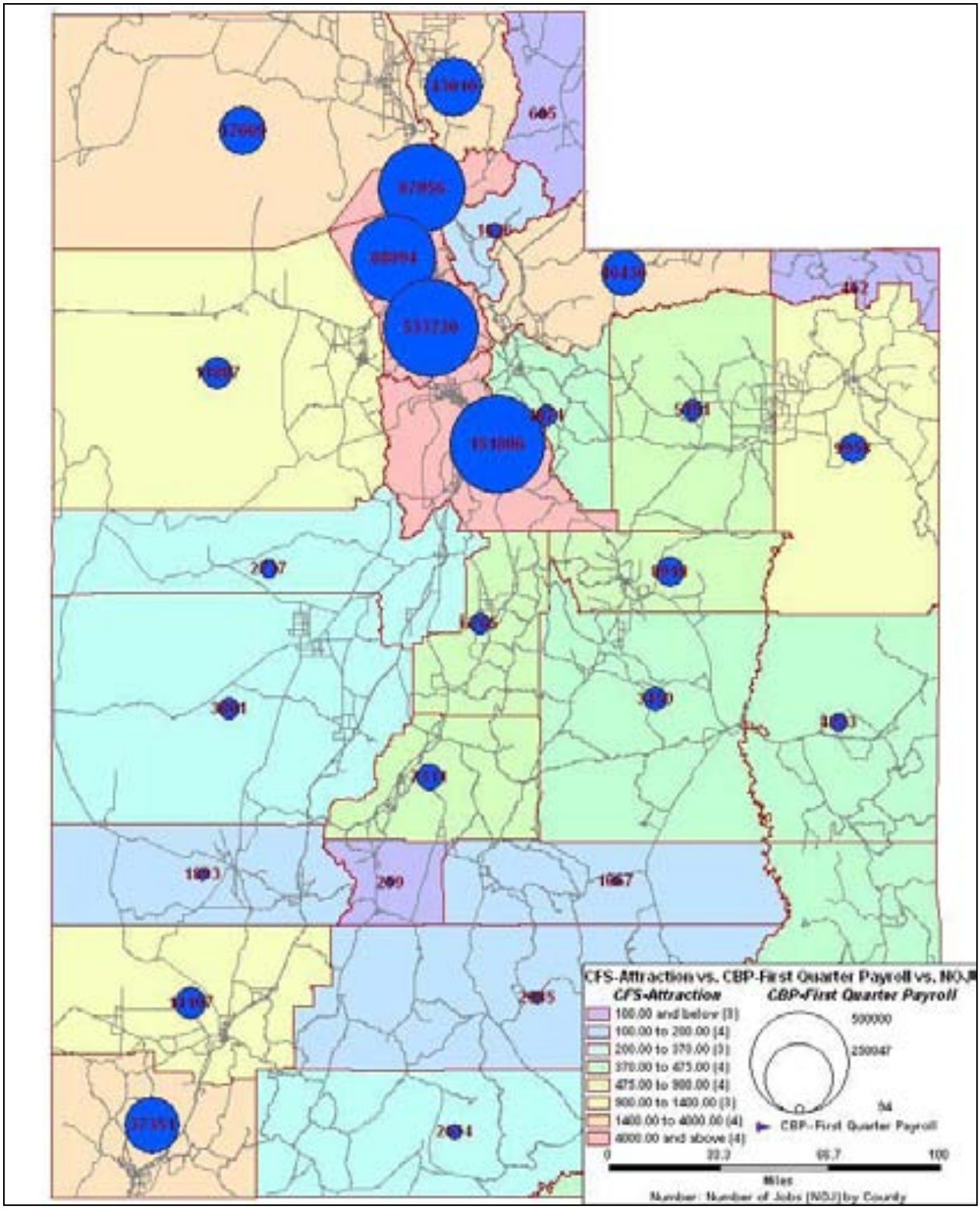


Figure A-4-11 Map of CFSAT+ NOJ (n) + CBPFQP (110)

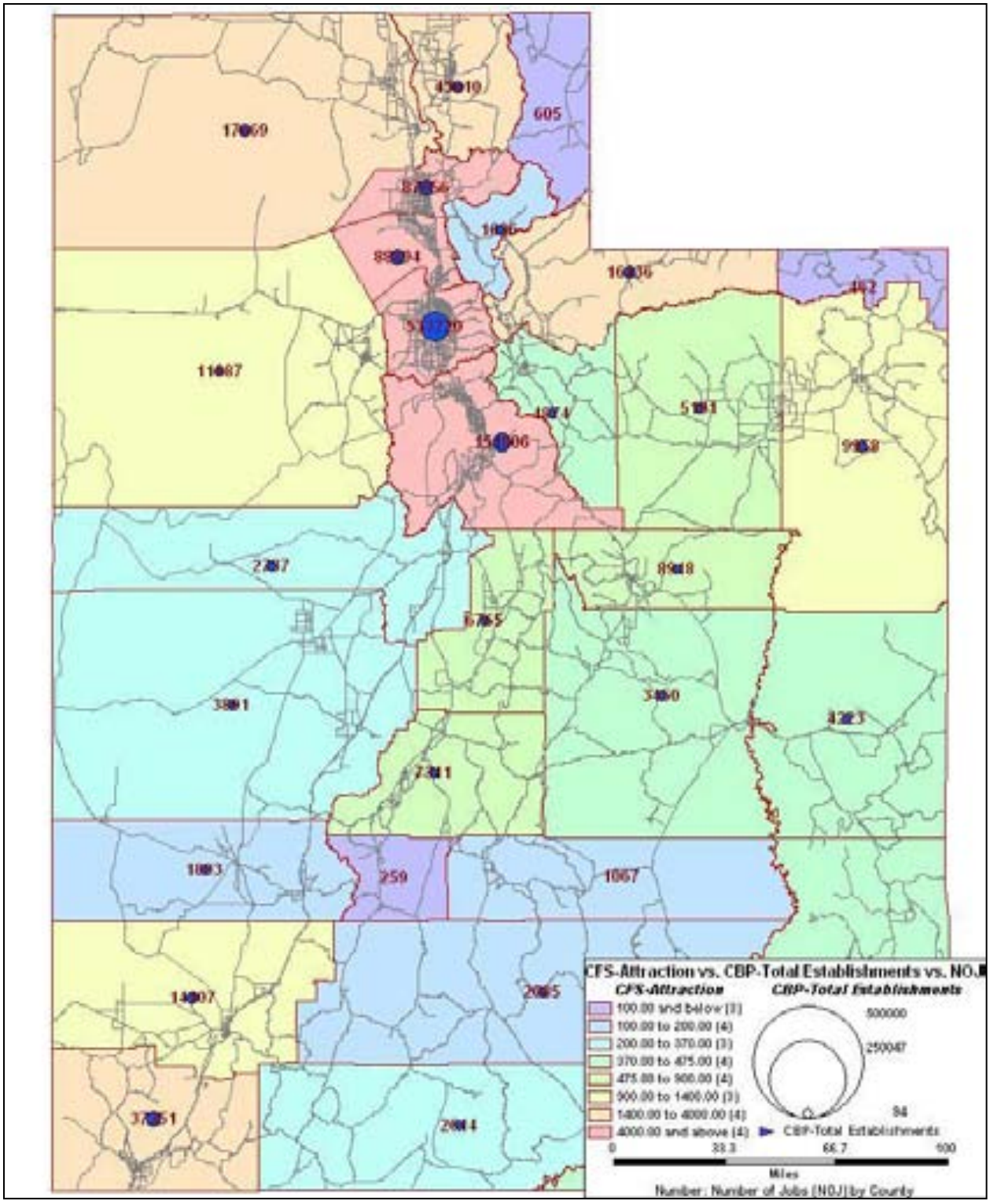


Figure A-4-12 Map of CFSAT+ NOJ (n) + CBPTE (111)

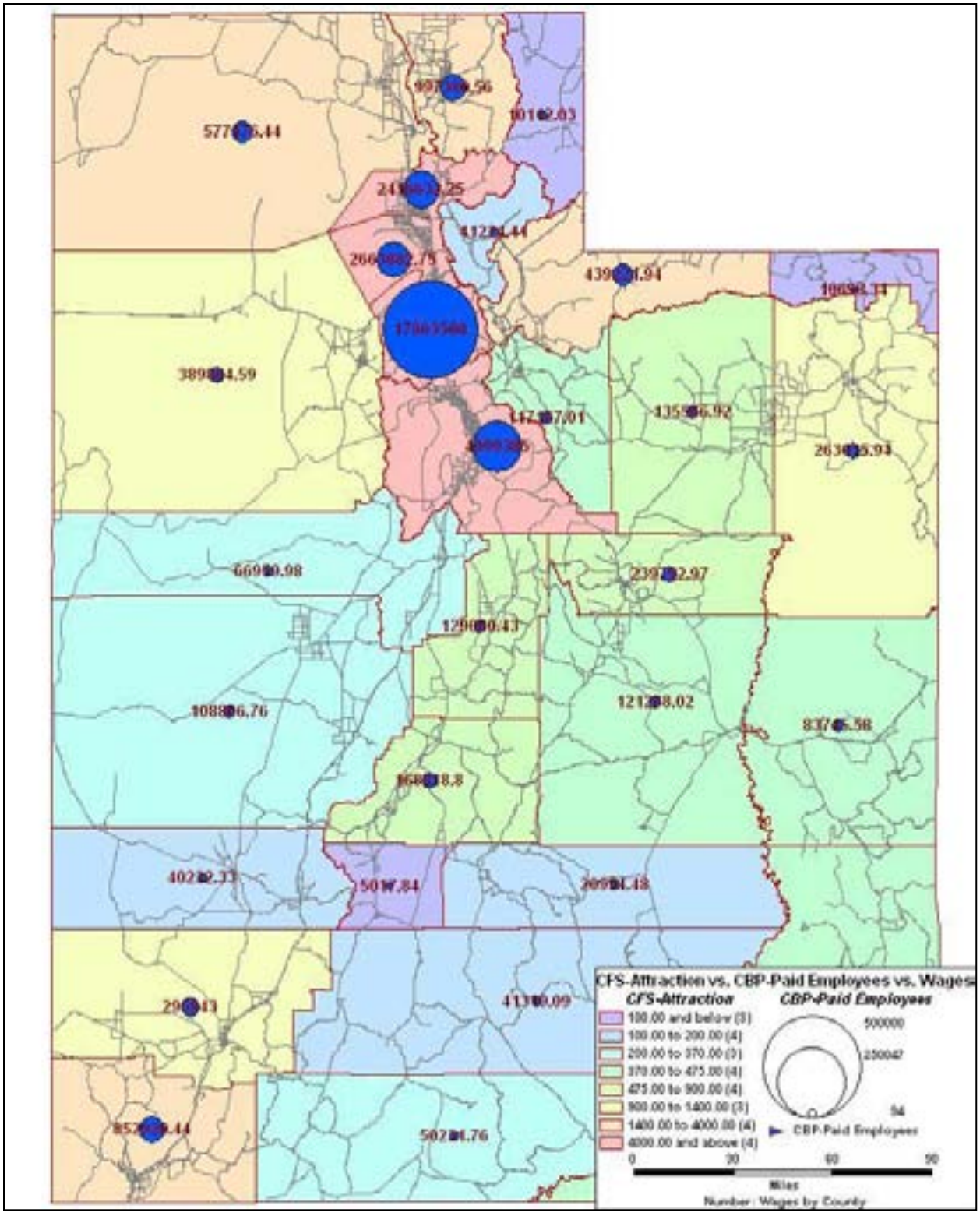


Figure A-4-13 Map of CFSAT+ WT (n) + CBPE (112)

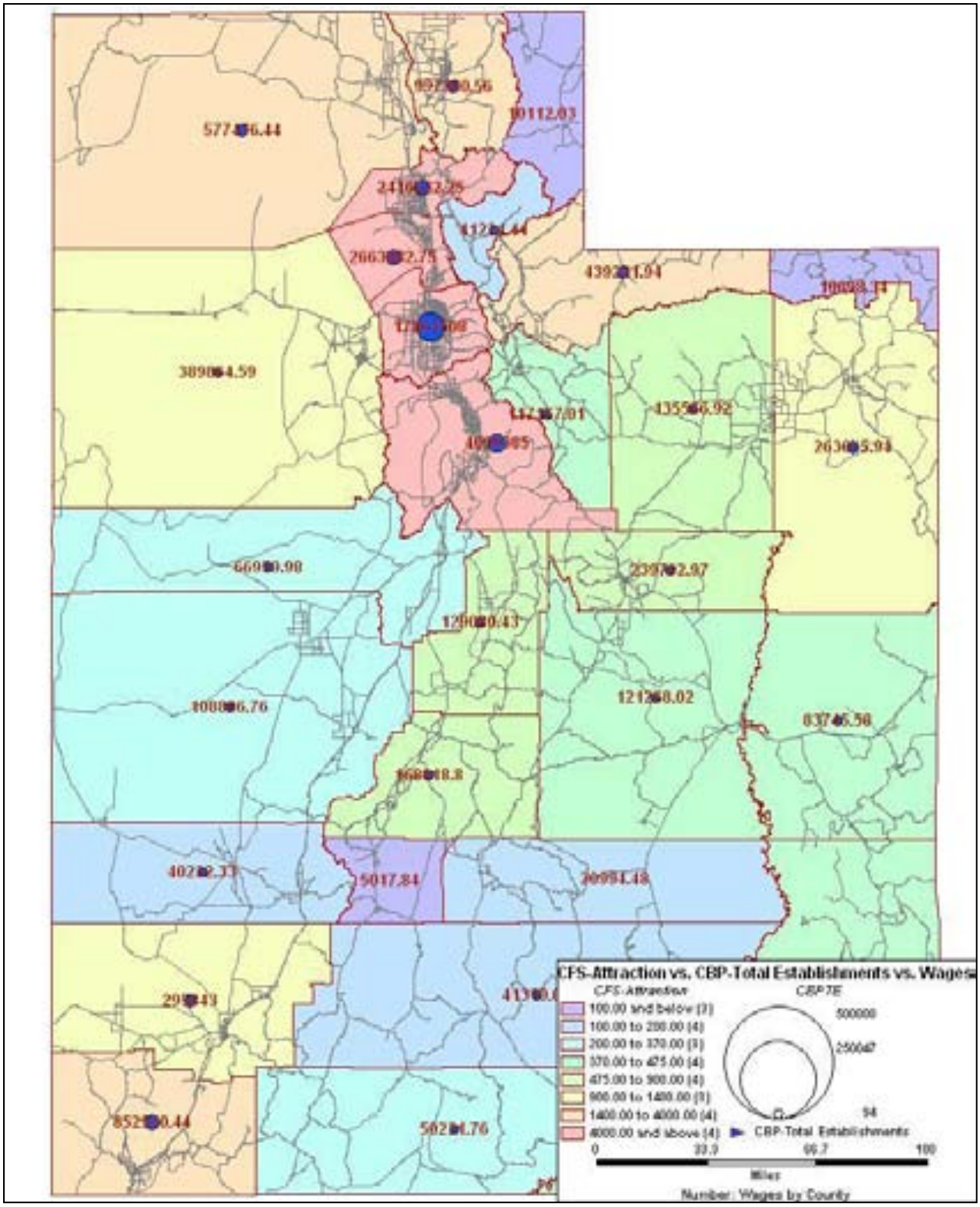


Figure A-4-14 Map of CFSAT+ WT (n) + CBPTE (113)

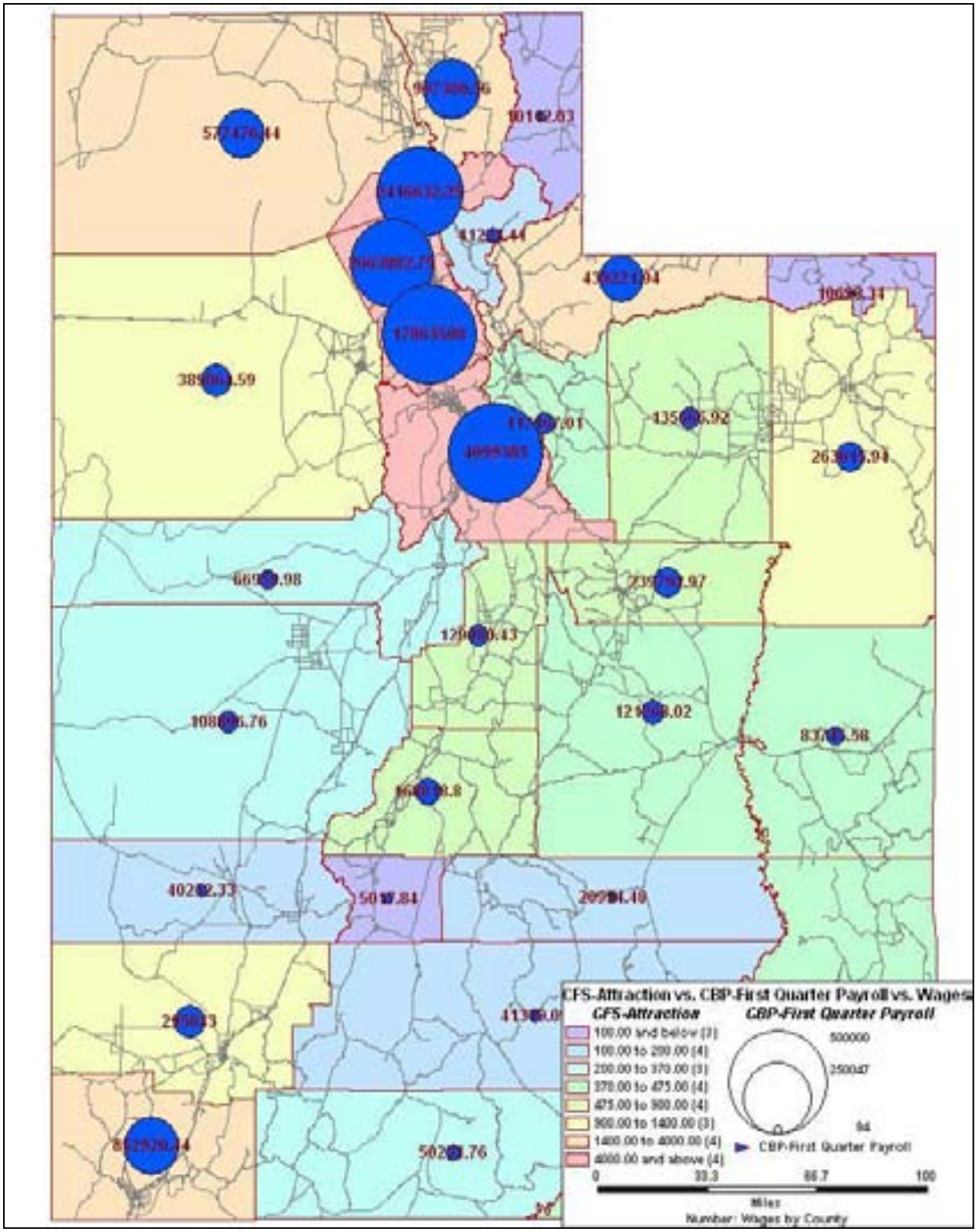


Figure A-4-15 Map of CFSAT+ WT(n) + CBPFQP (114)

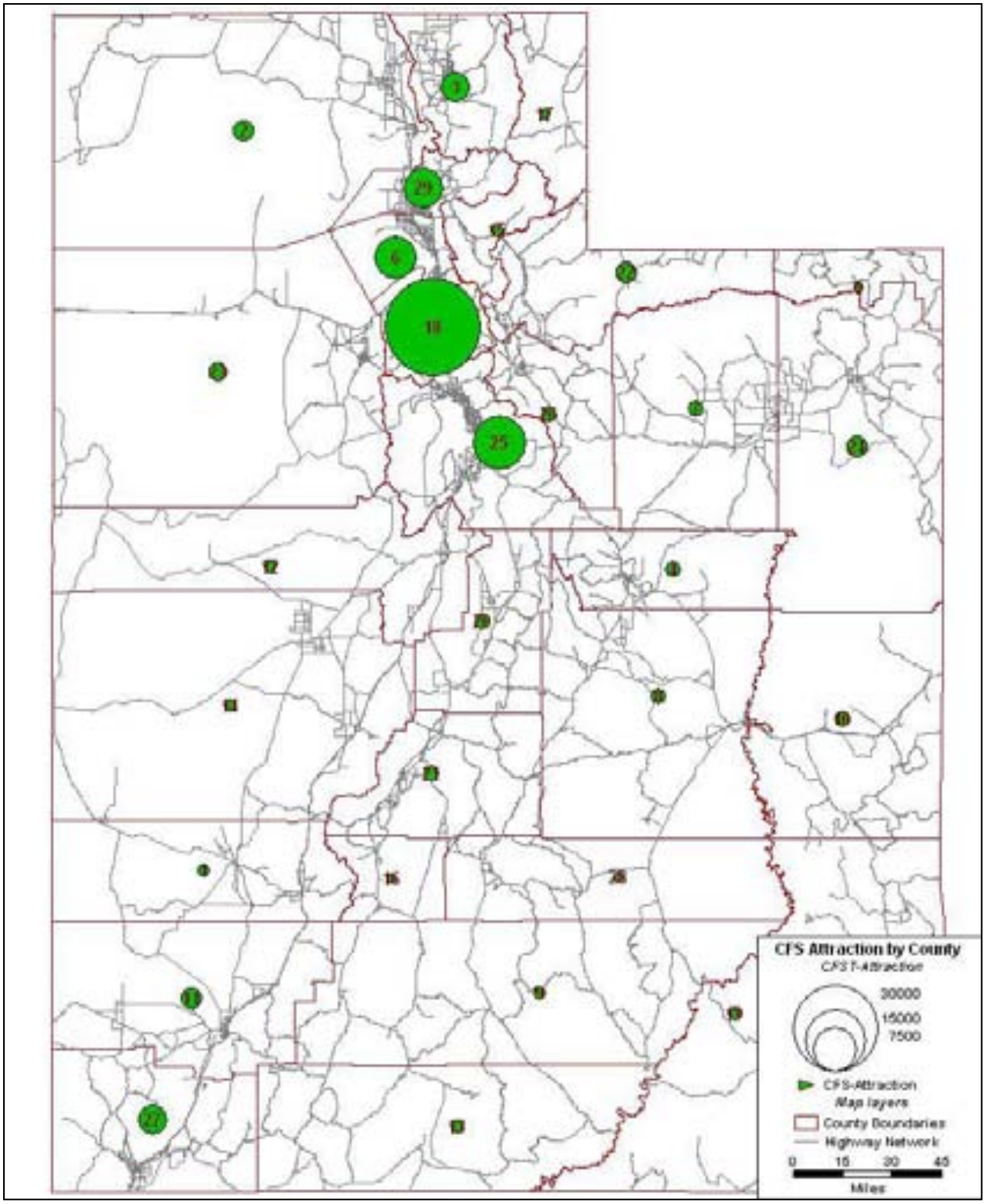


Figure A-4-16 Map of CFS-Attraction (115)

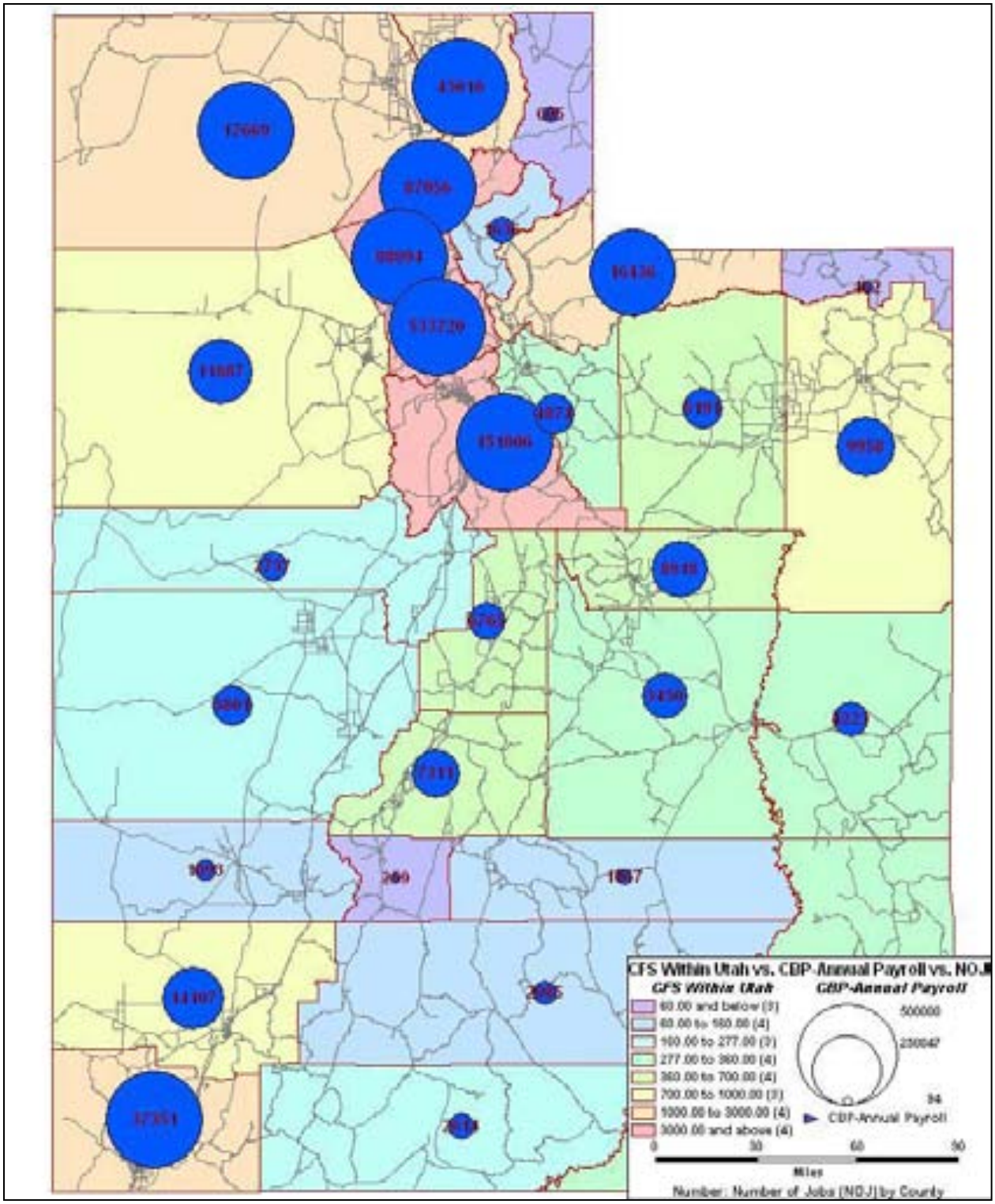


Figure A-4-17 Map of CFSIT+ NOJ (n) + CBPAP (116)

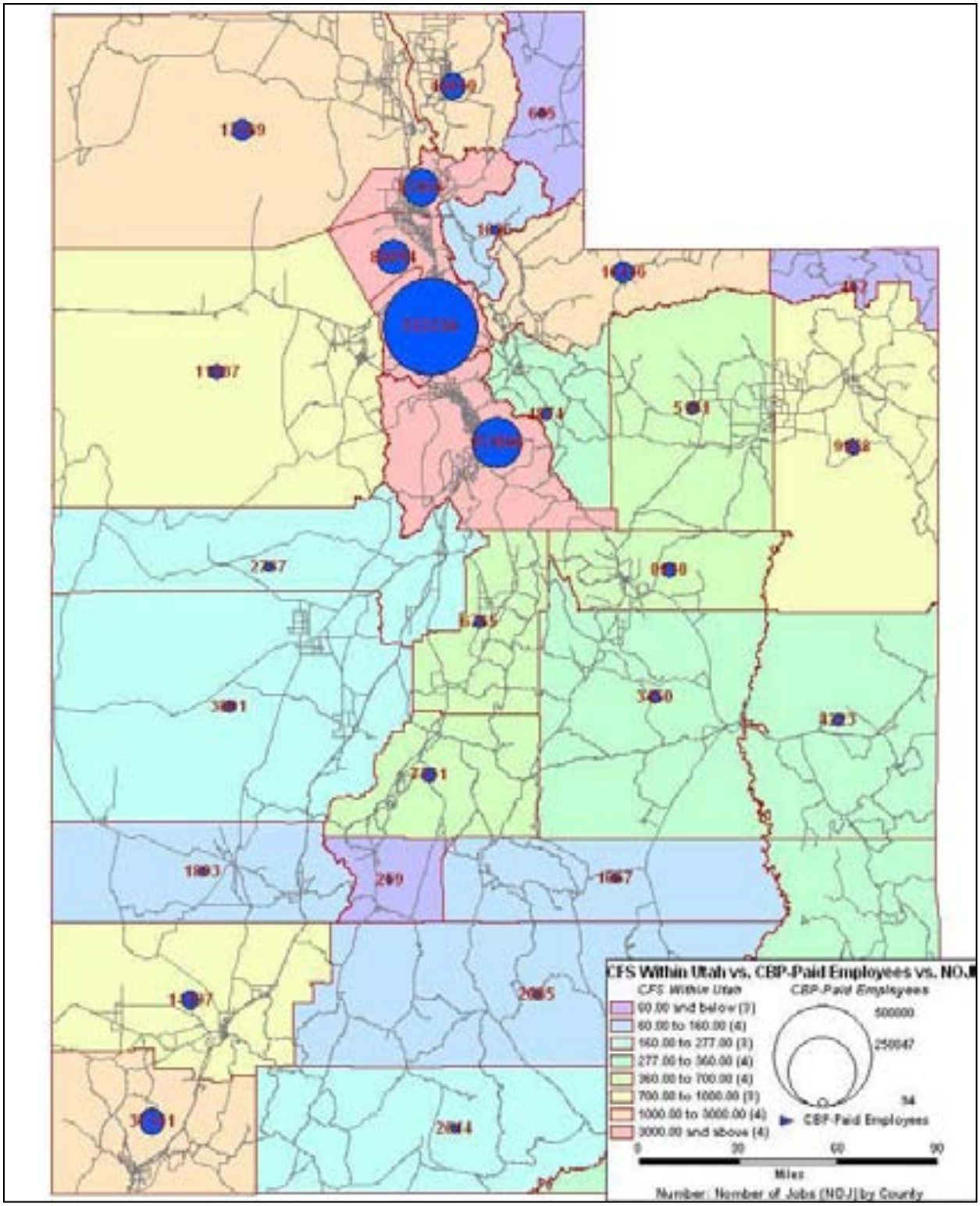


Figure A-4-18 Map of CFSIT+ NOJ (n) + CBPE (117)

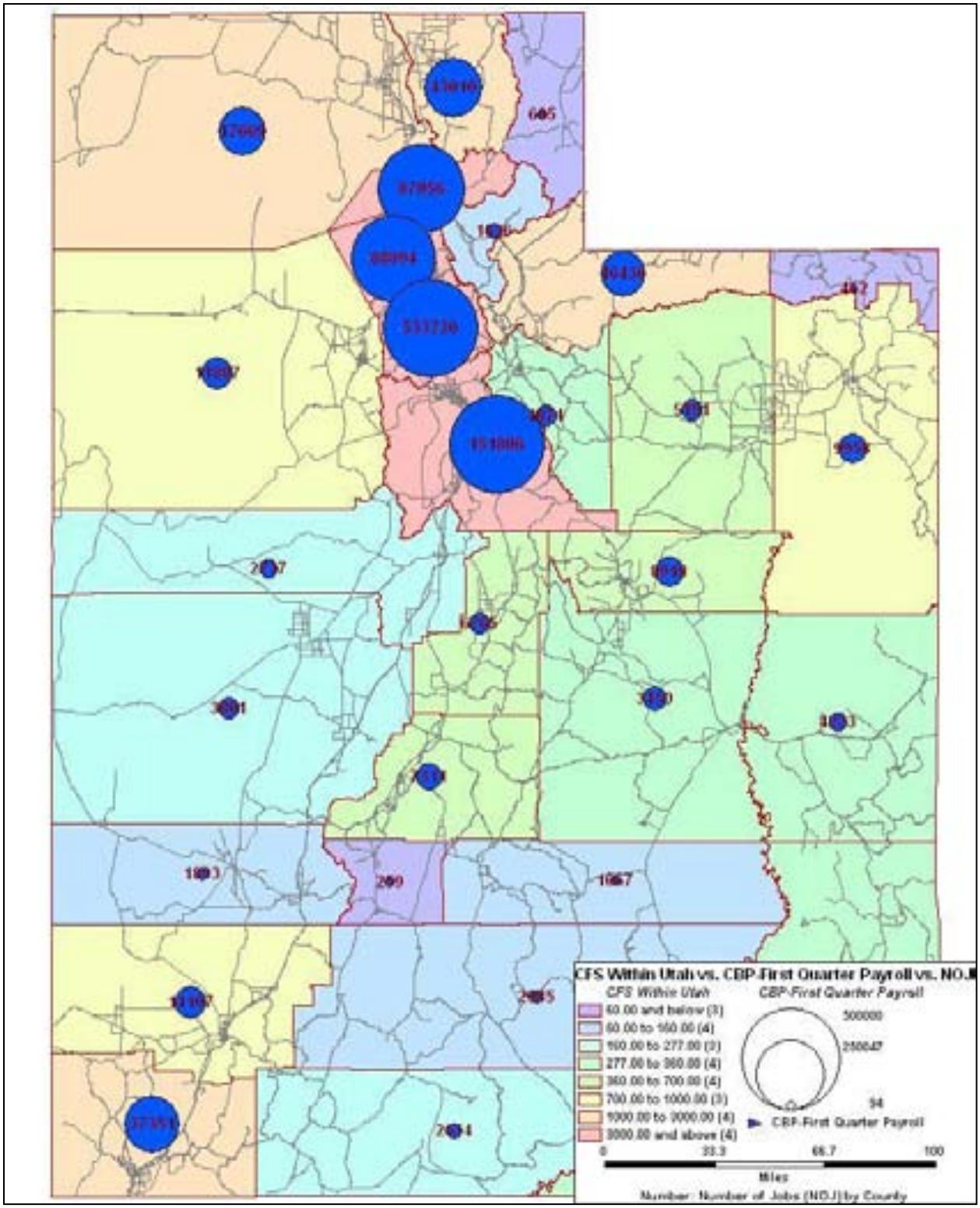


Figure A-4-19 Map of CFSIT+ NOJ (n) + CBPFQP (118)

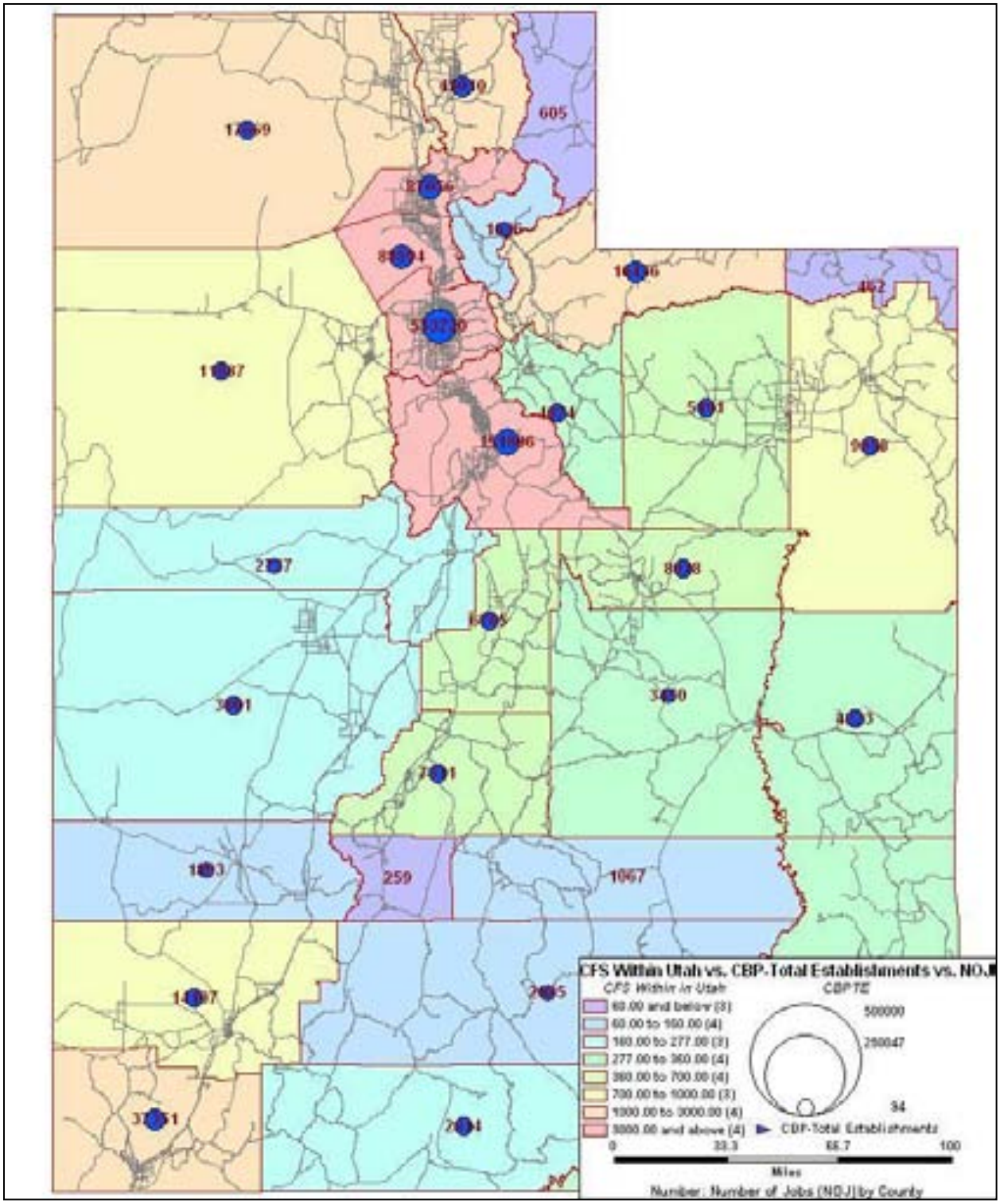


Figure A-4-20 Map of CFSIT+ NOJ (n) + CBPTE (119)

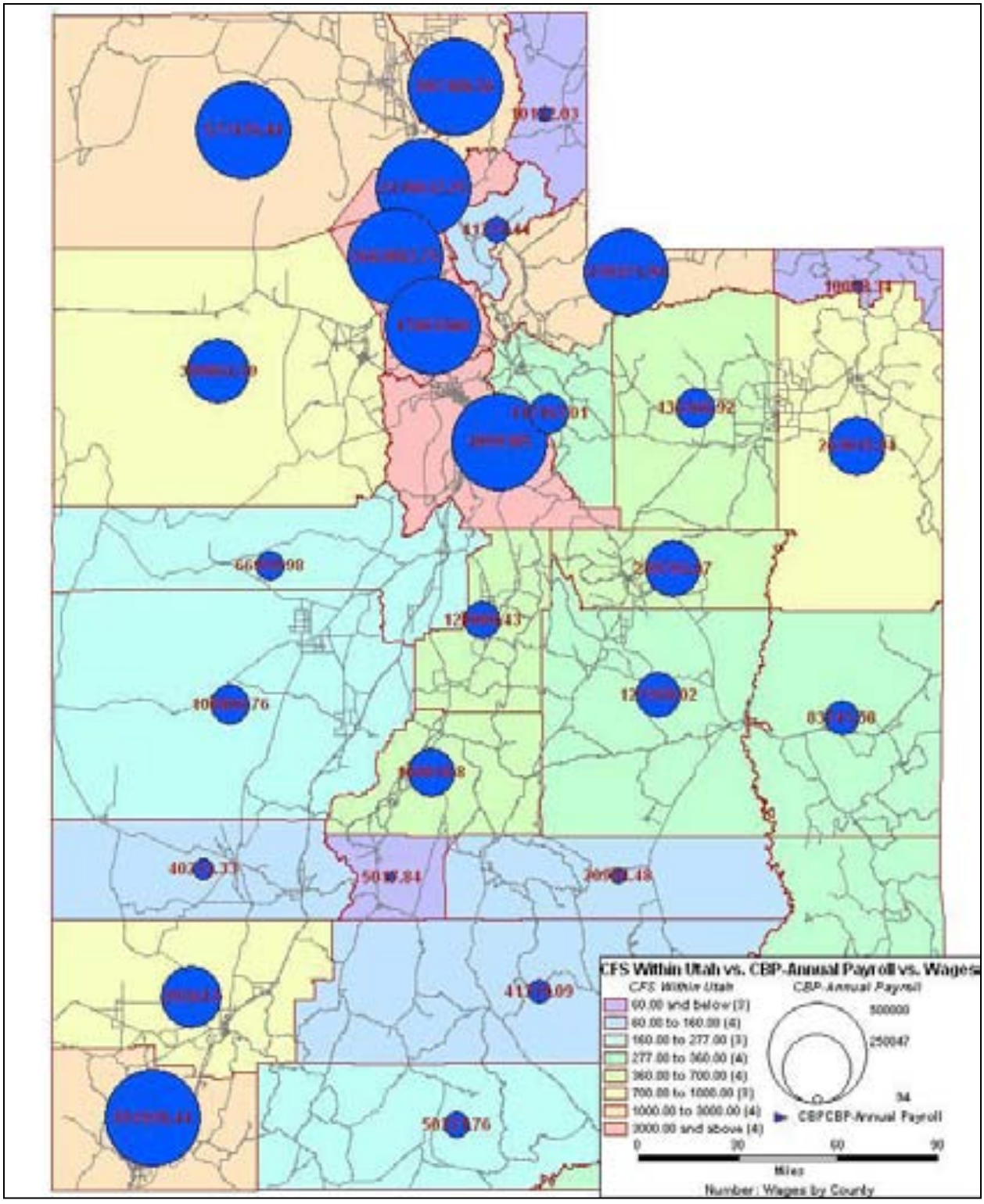


Figure A-4-21 Map of CFSIT+ WT (n) + CBPAP (120)

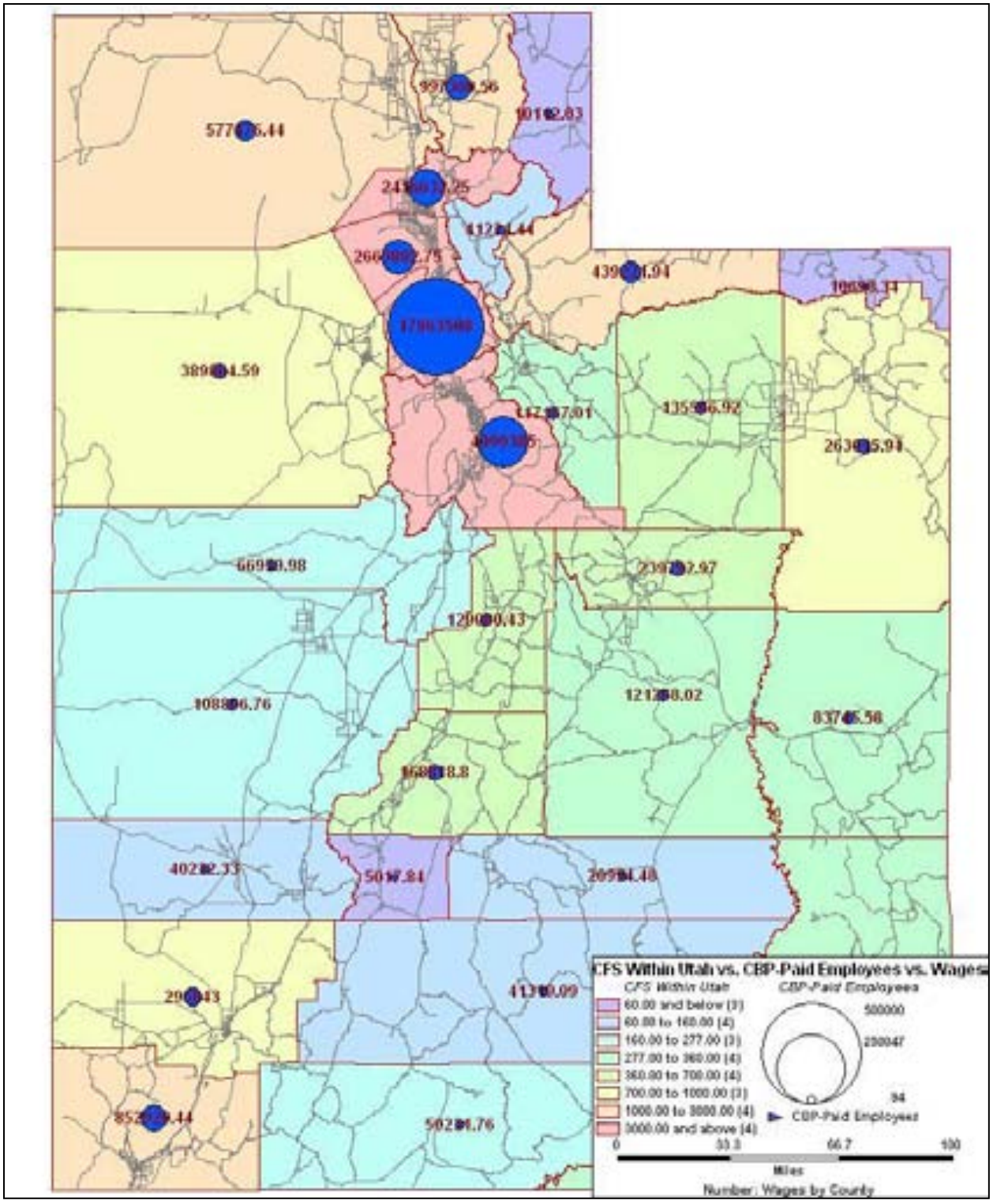


Figure A-4-22 Map of CFSIT+ WT (n) + CBPE (121)

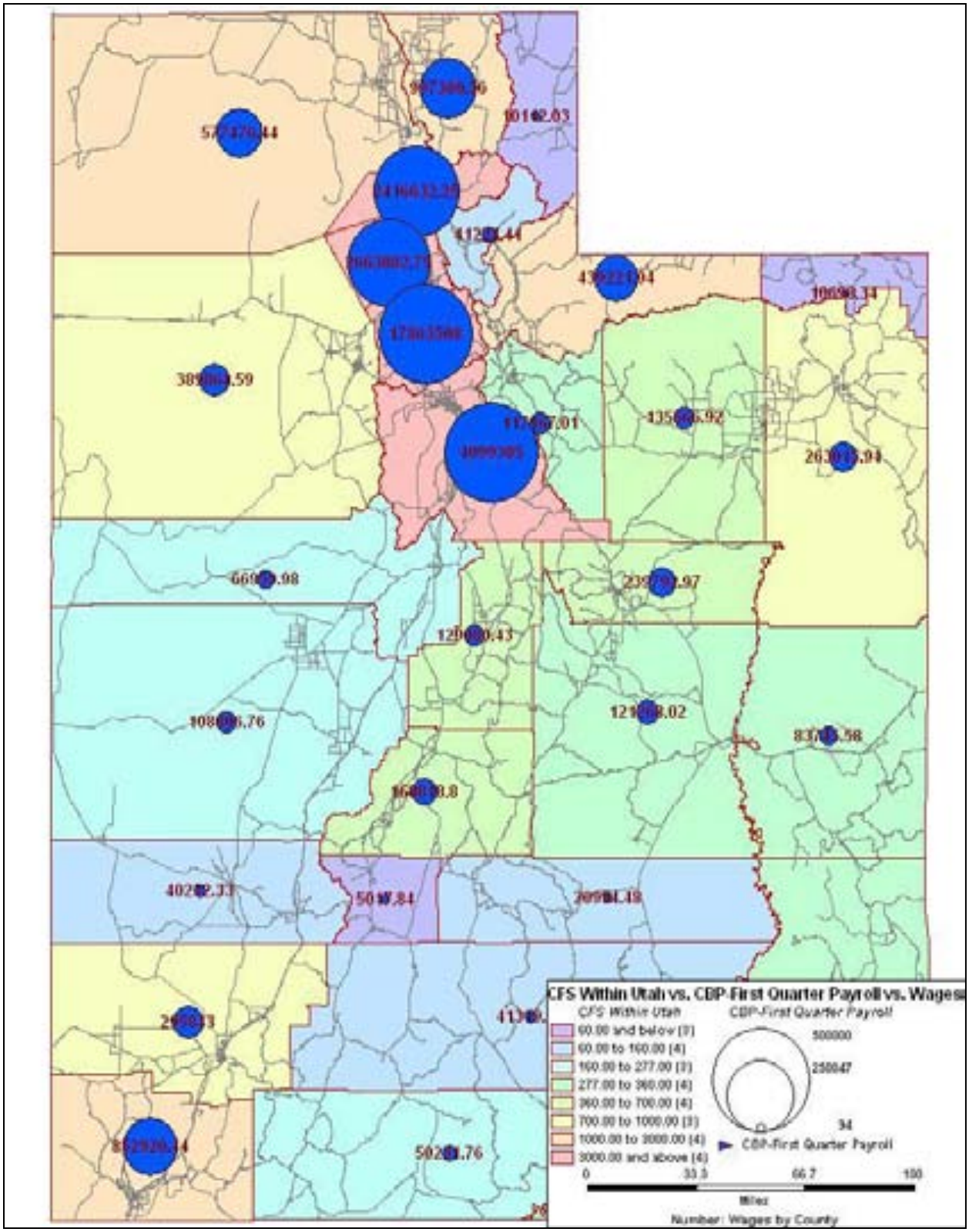


Figure A-4-23 Map of CFSIT+ WT (n) + CBPFQP (122)

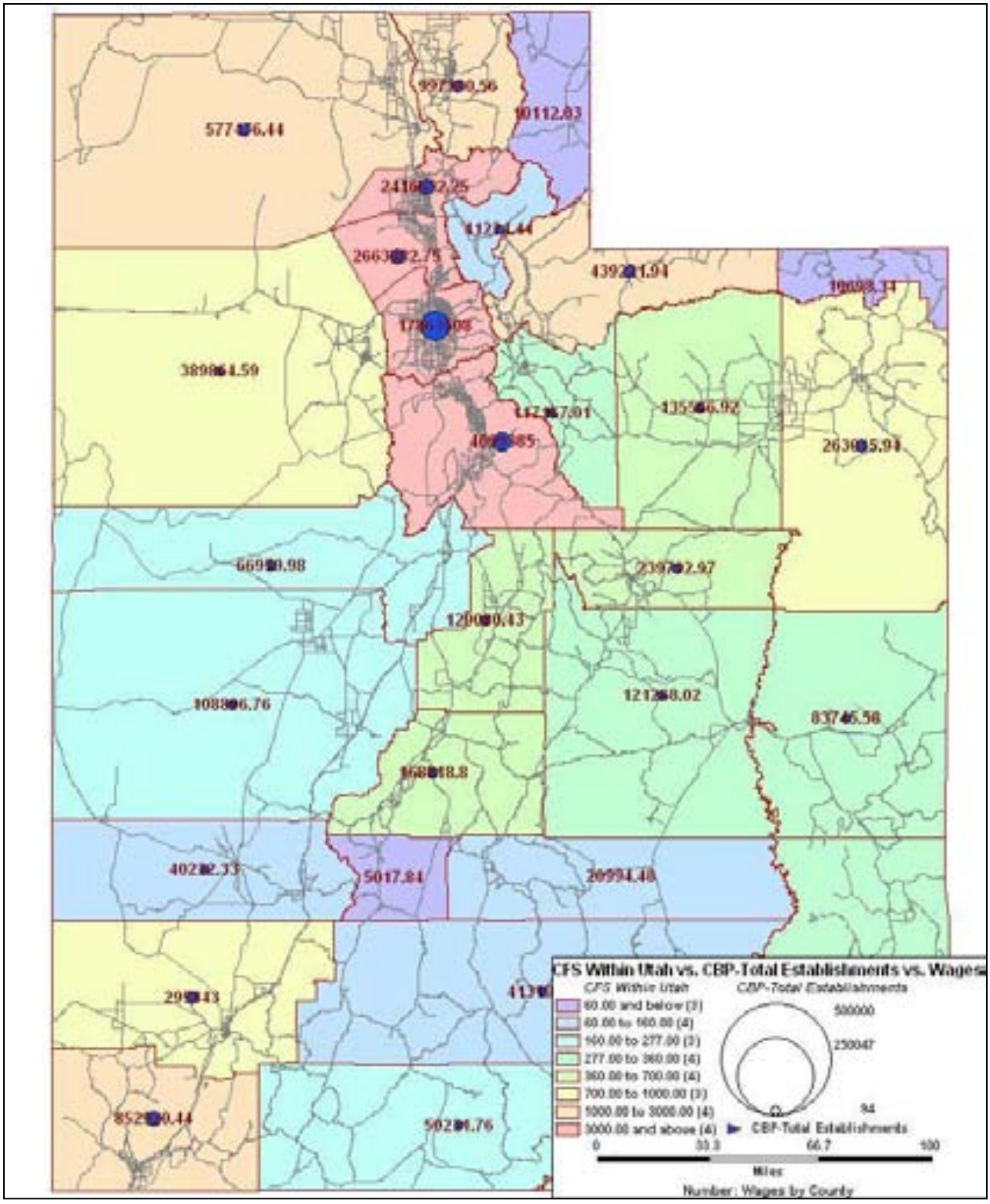


Figure A-4-24 Map of CFSIT+ WT (n) + CBPTE (123)

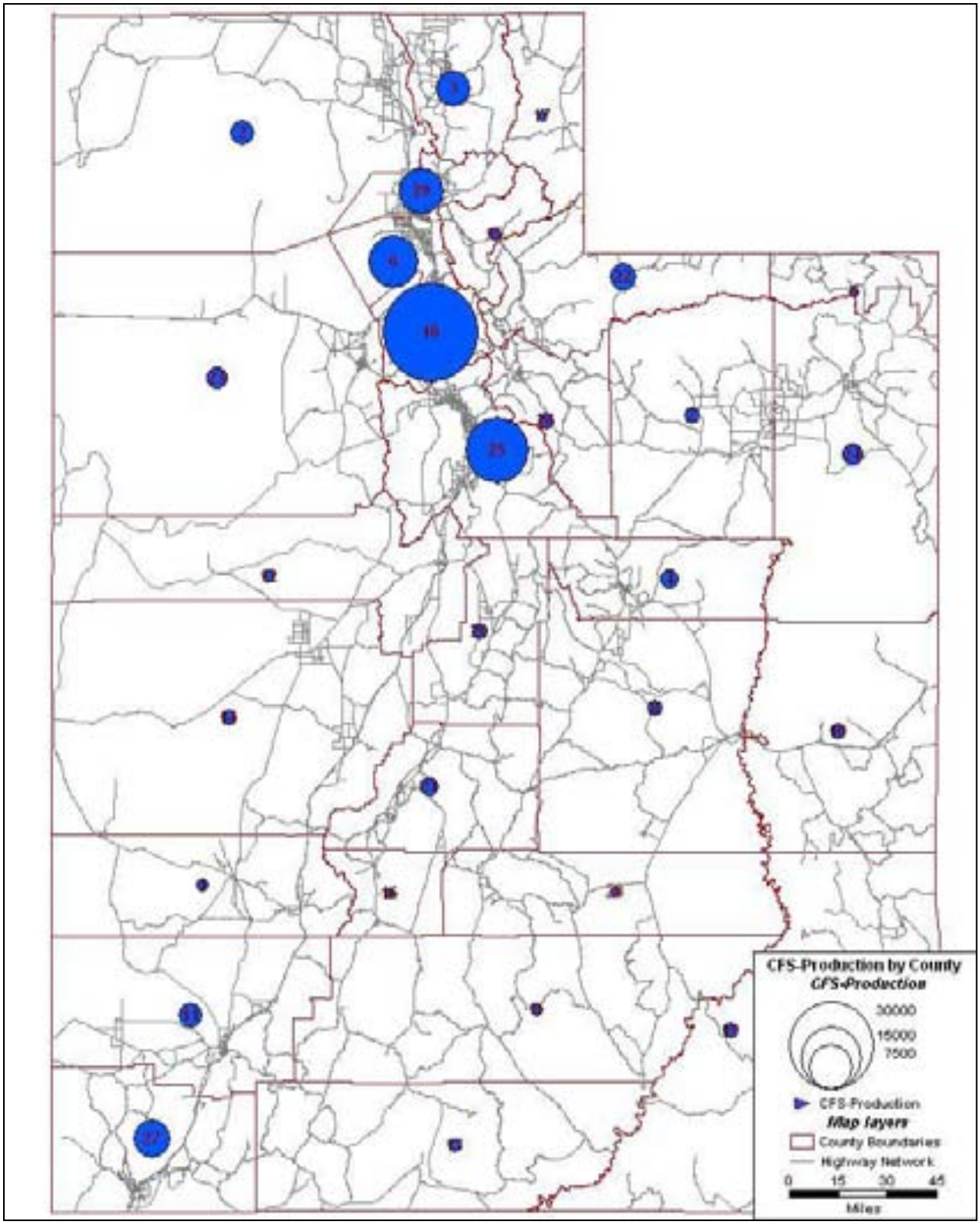


Figure A-4-25 Map of CFS-Production (124)

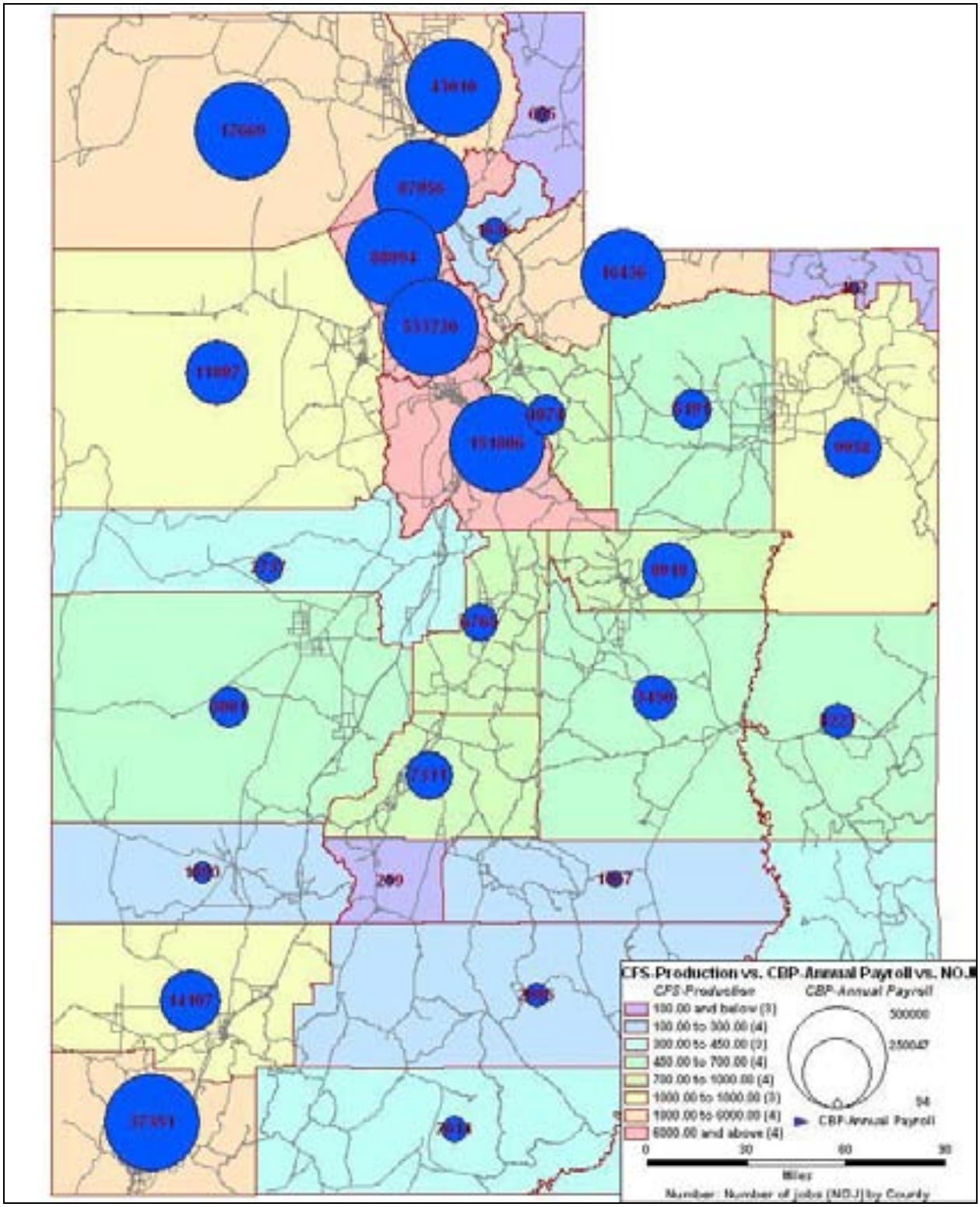


Figure A-4-26 Map of CFSPT+ NOJ (n) + CBPAP (125)

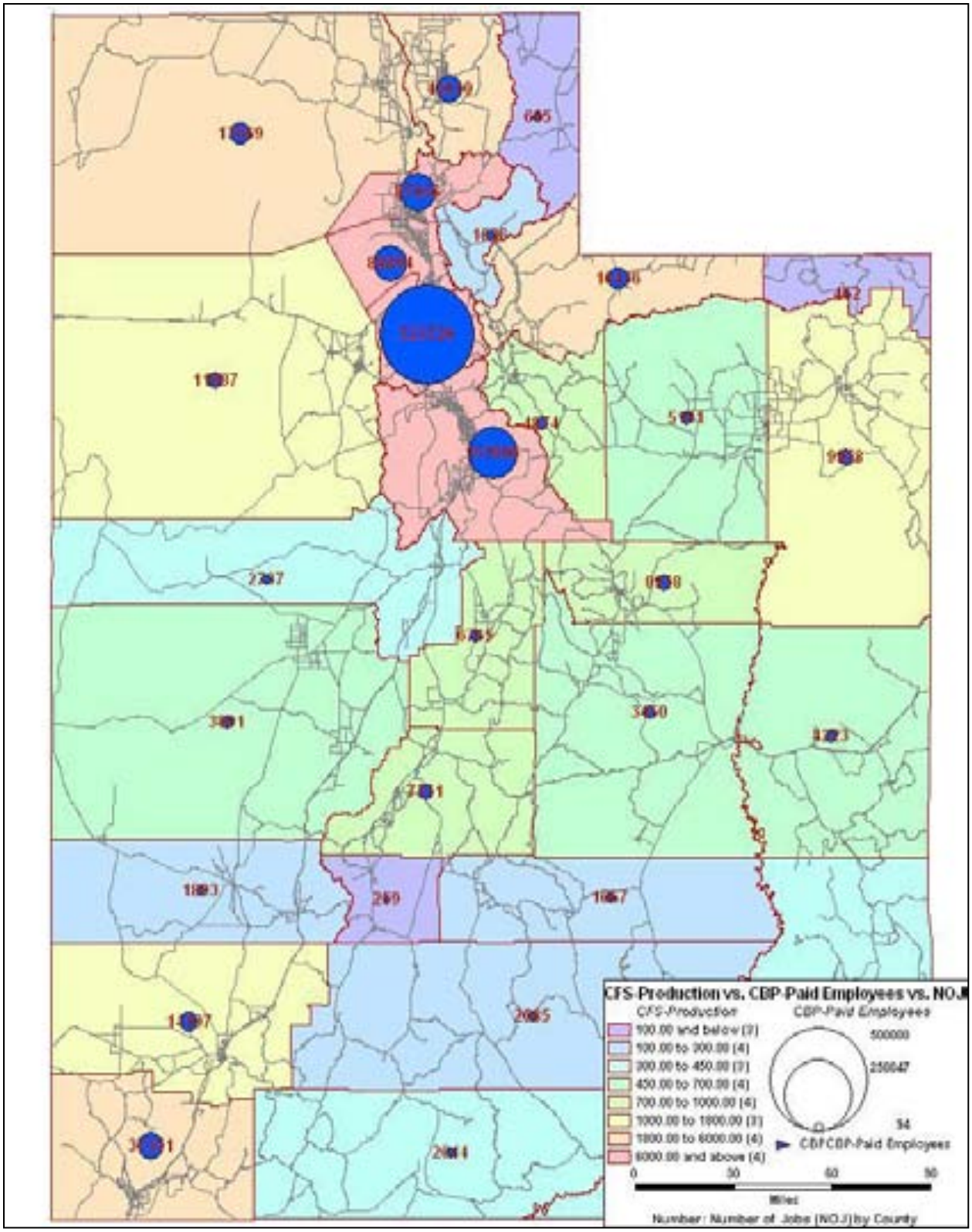


Figure A-4-27 Map of CFSPT+ NOJ (n) + CBPE (126)

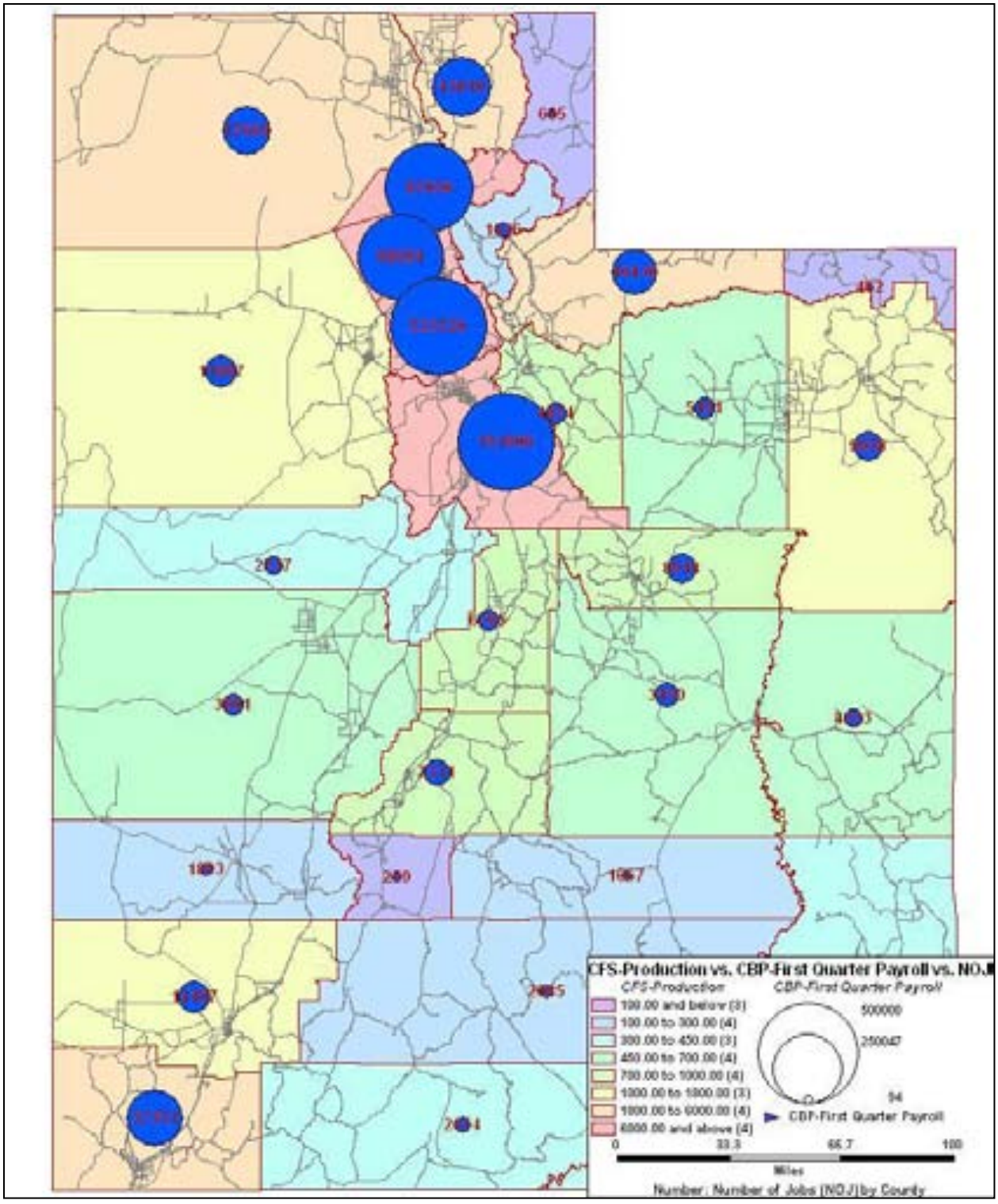


Figure A-4-28 Map of CFSPT+ NOJ (n) + CBPFQP (127)

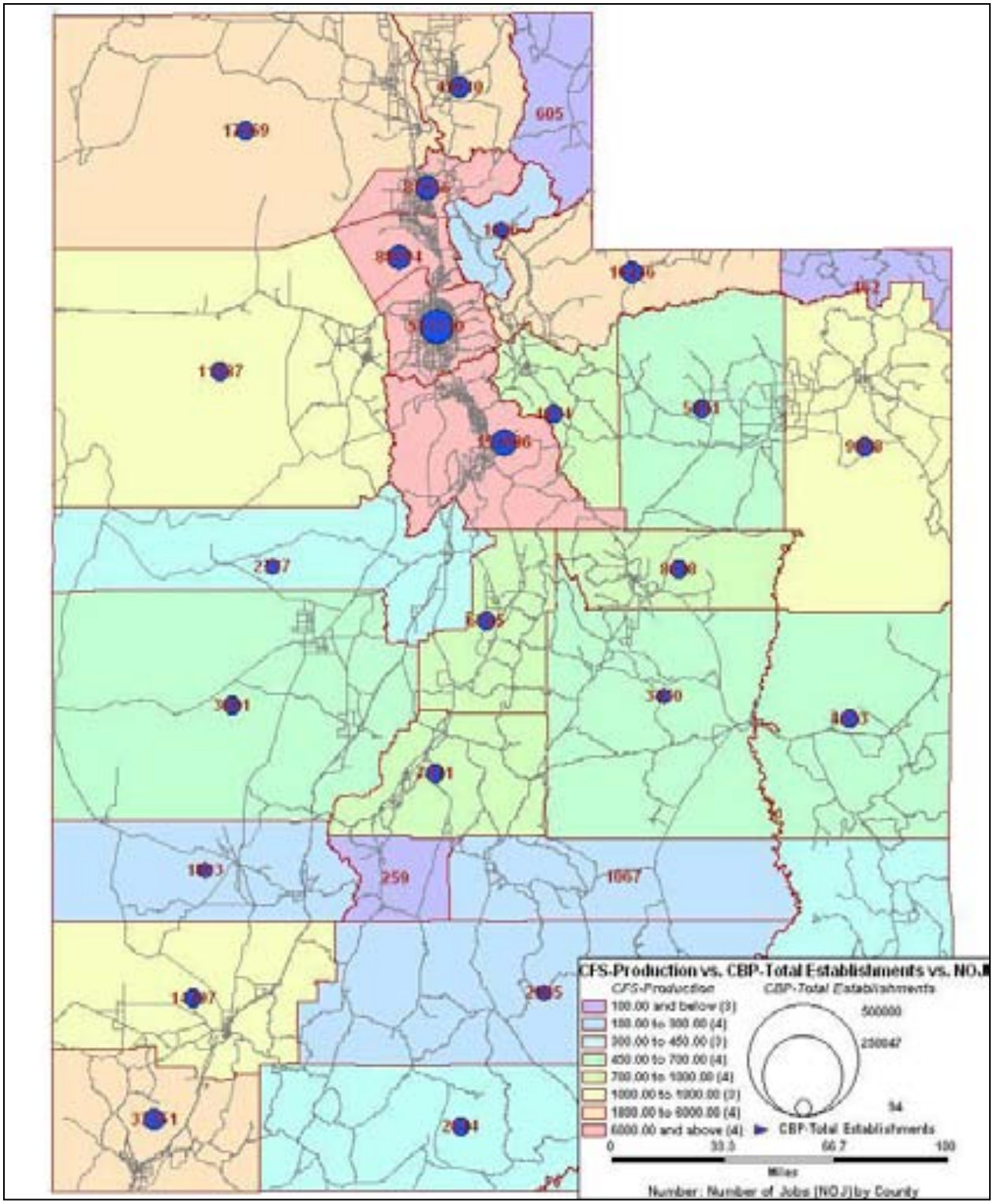


Figure A-4-29 Map of CFSPT+ NOJ (n) + CBPTE (128)

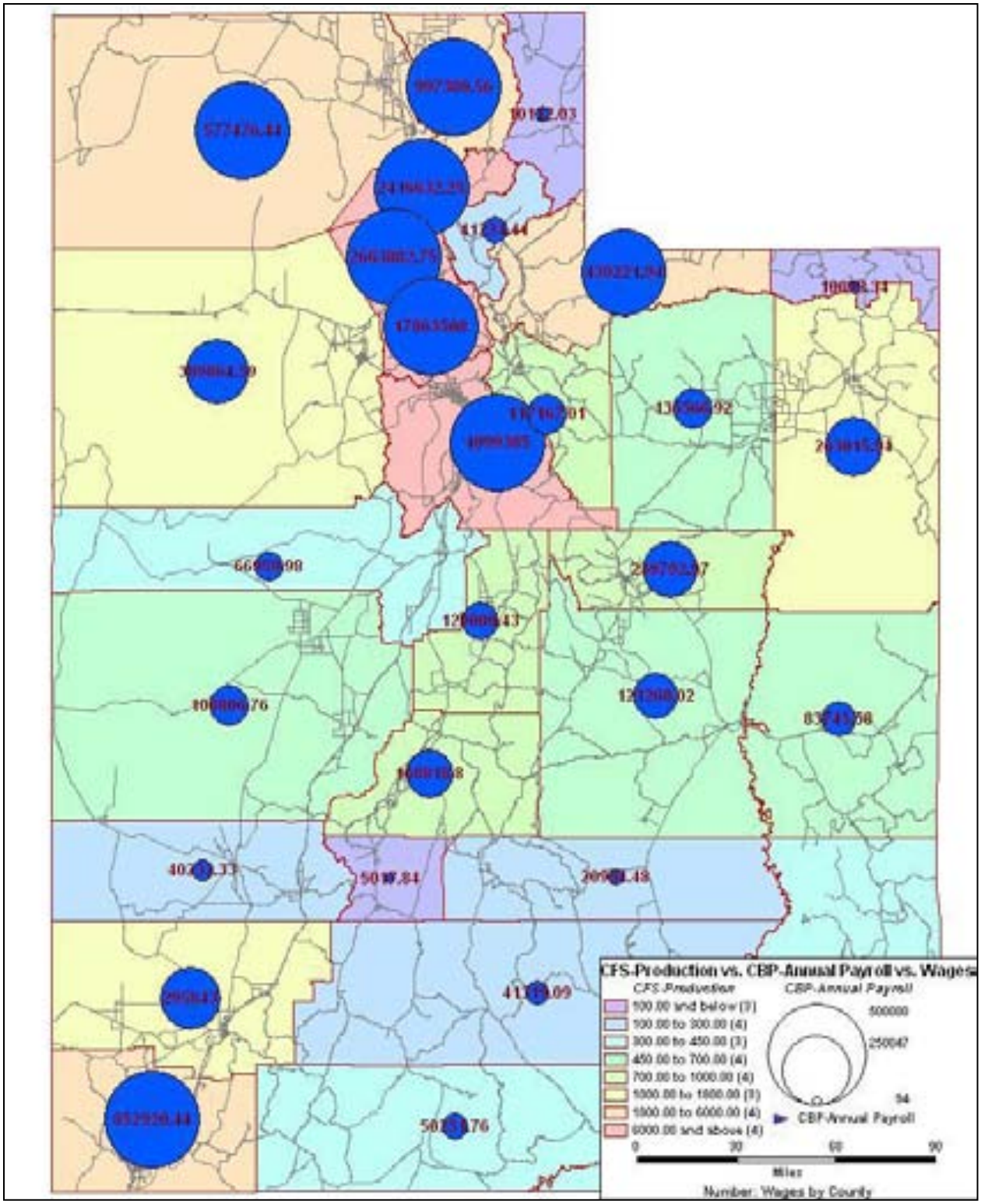


Figure A-4-30 Map of CFSPT+ WT (n) + CBPAP (129)

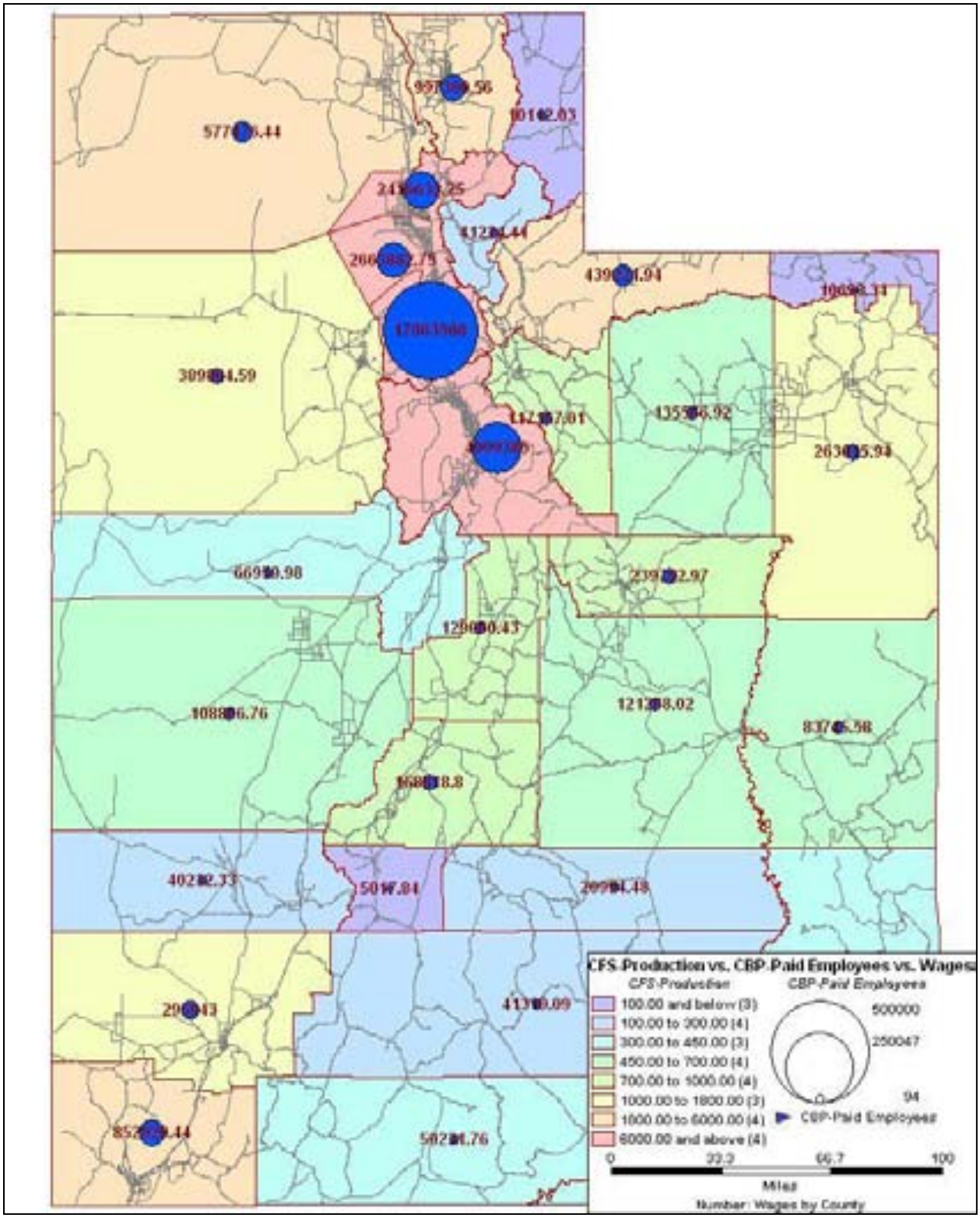


Figure A-4-31 Map of CFSPT+ WT (n) + CBPE (130)

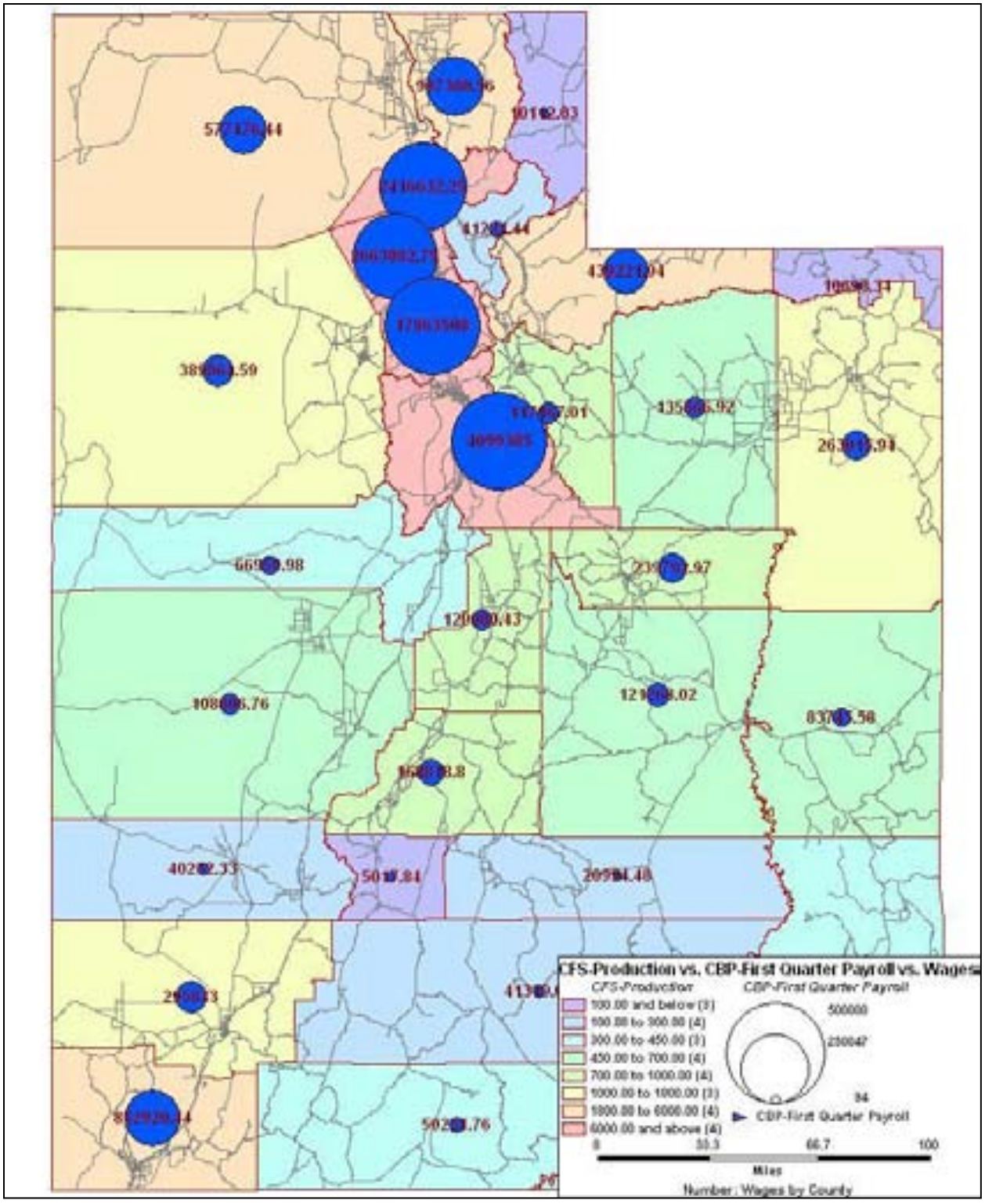


Figure A-4-32 Map of CFSPT+ WT (n) + CBPFQP (131)

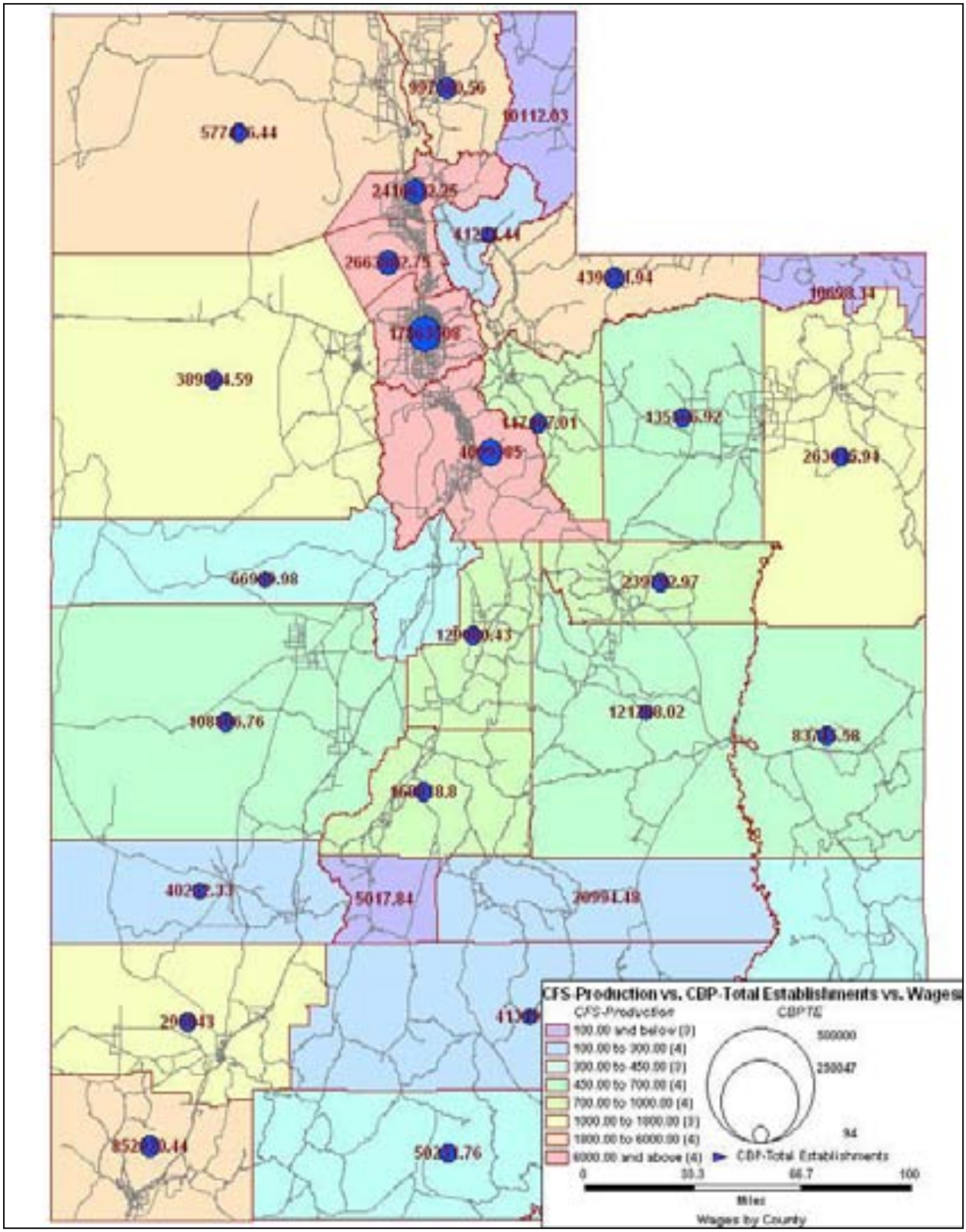


Figure A-4-33 Map of CFSPT+ WT (n) + CBPTE (132)

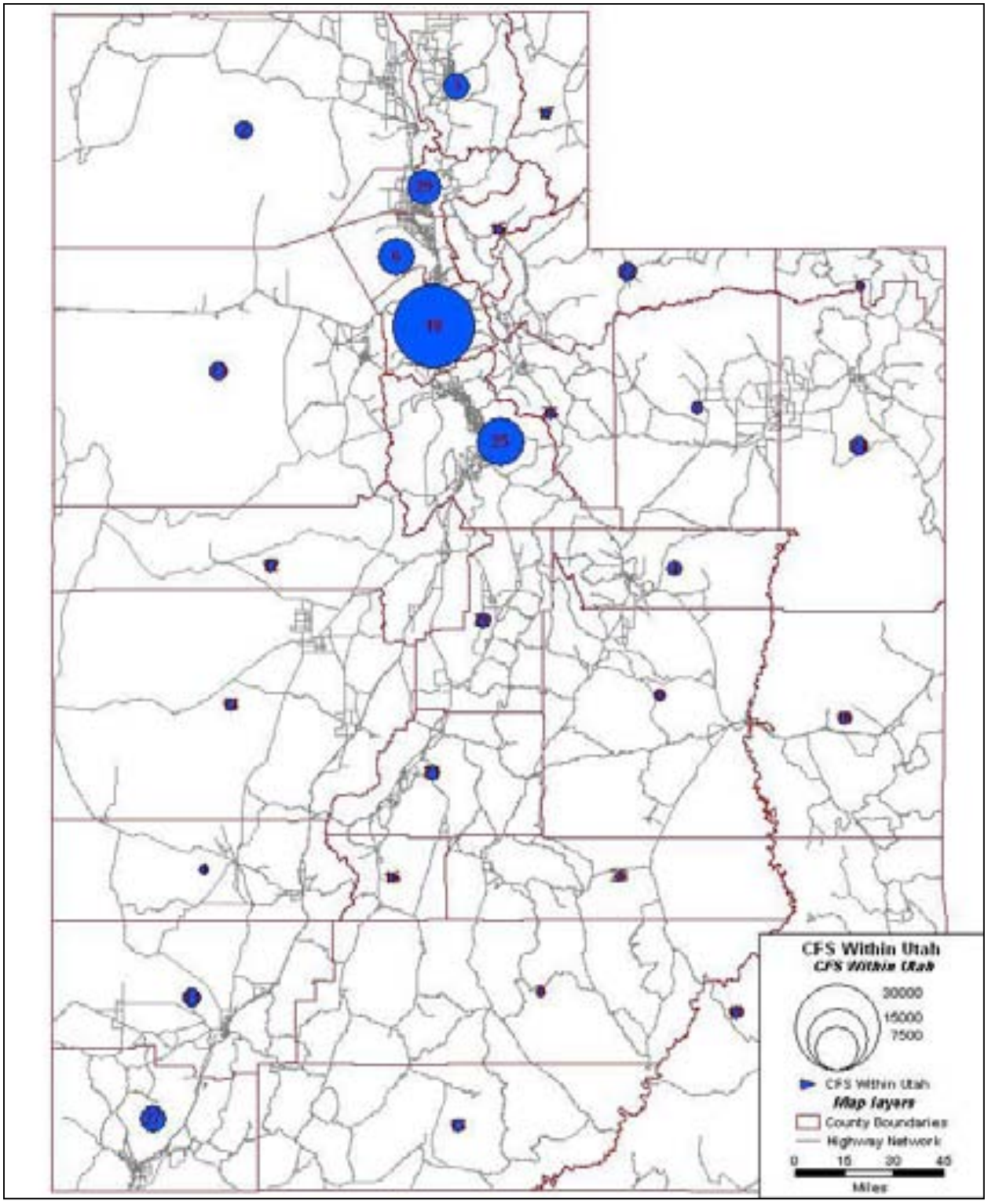


Figure A-4-34 Map of CFS-Within Utah (133)

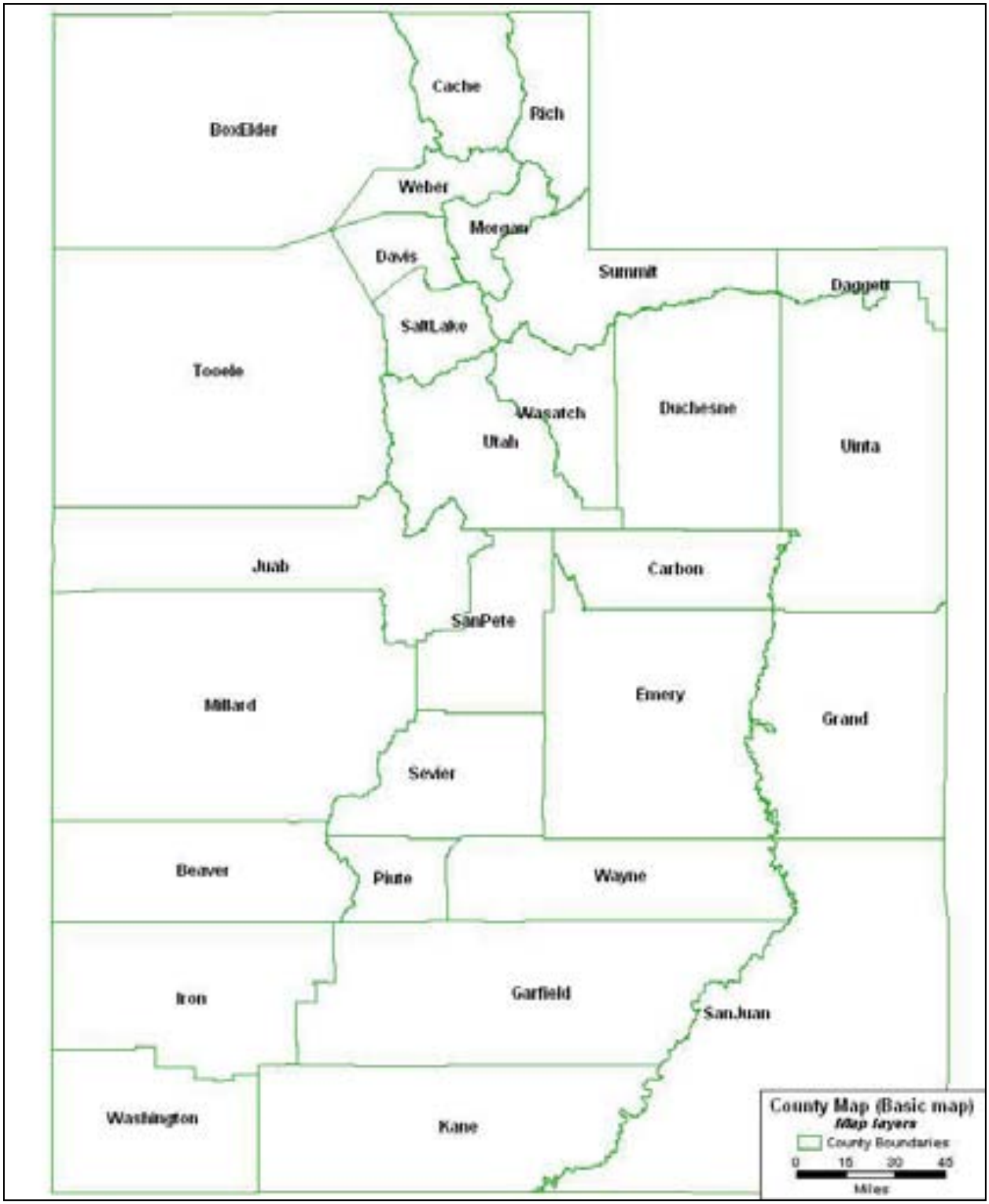


Figure A-4-35 Map of County (134)

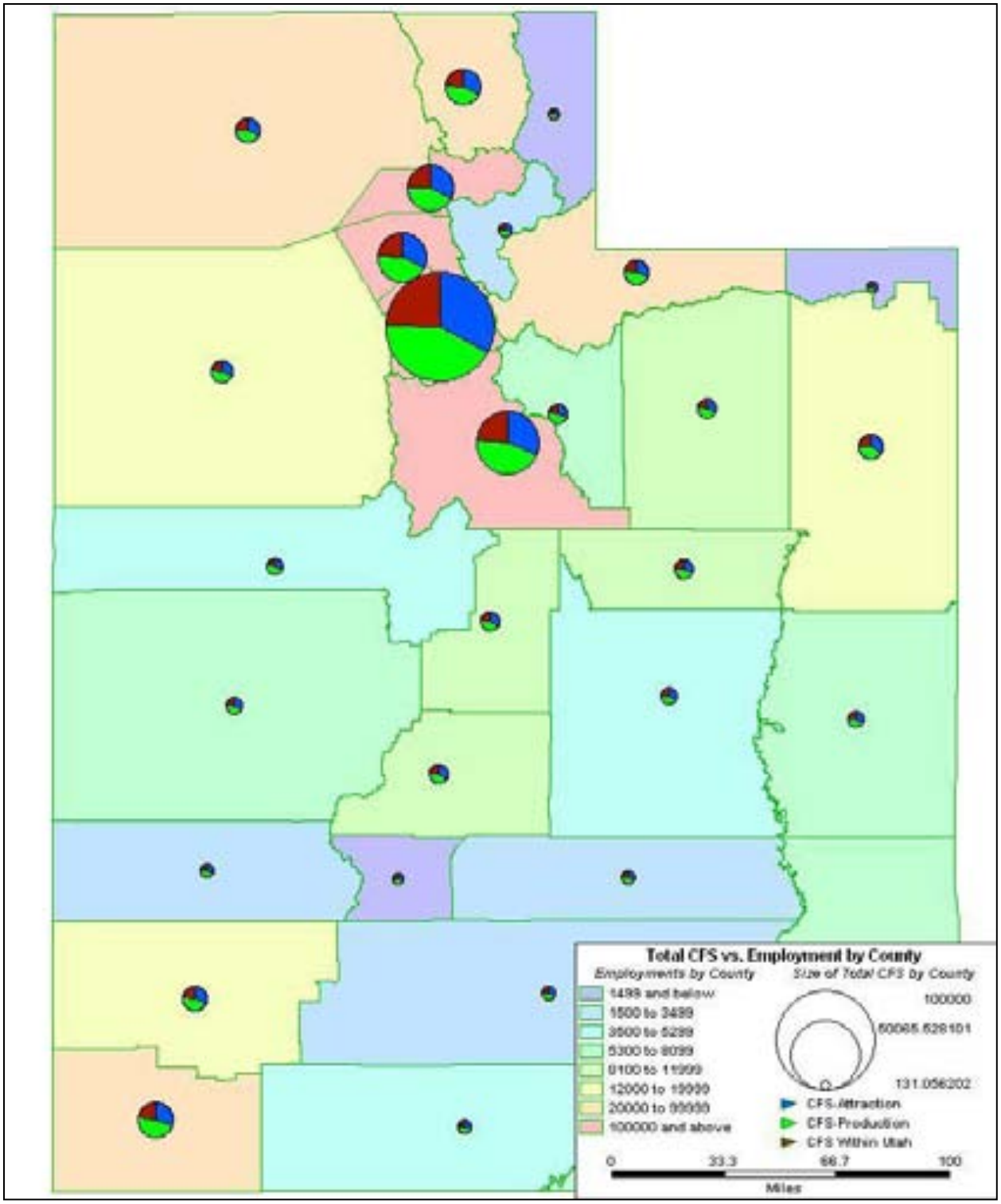


Figure A-4-36 Map of EMPBIT + CFS (135)

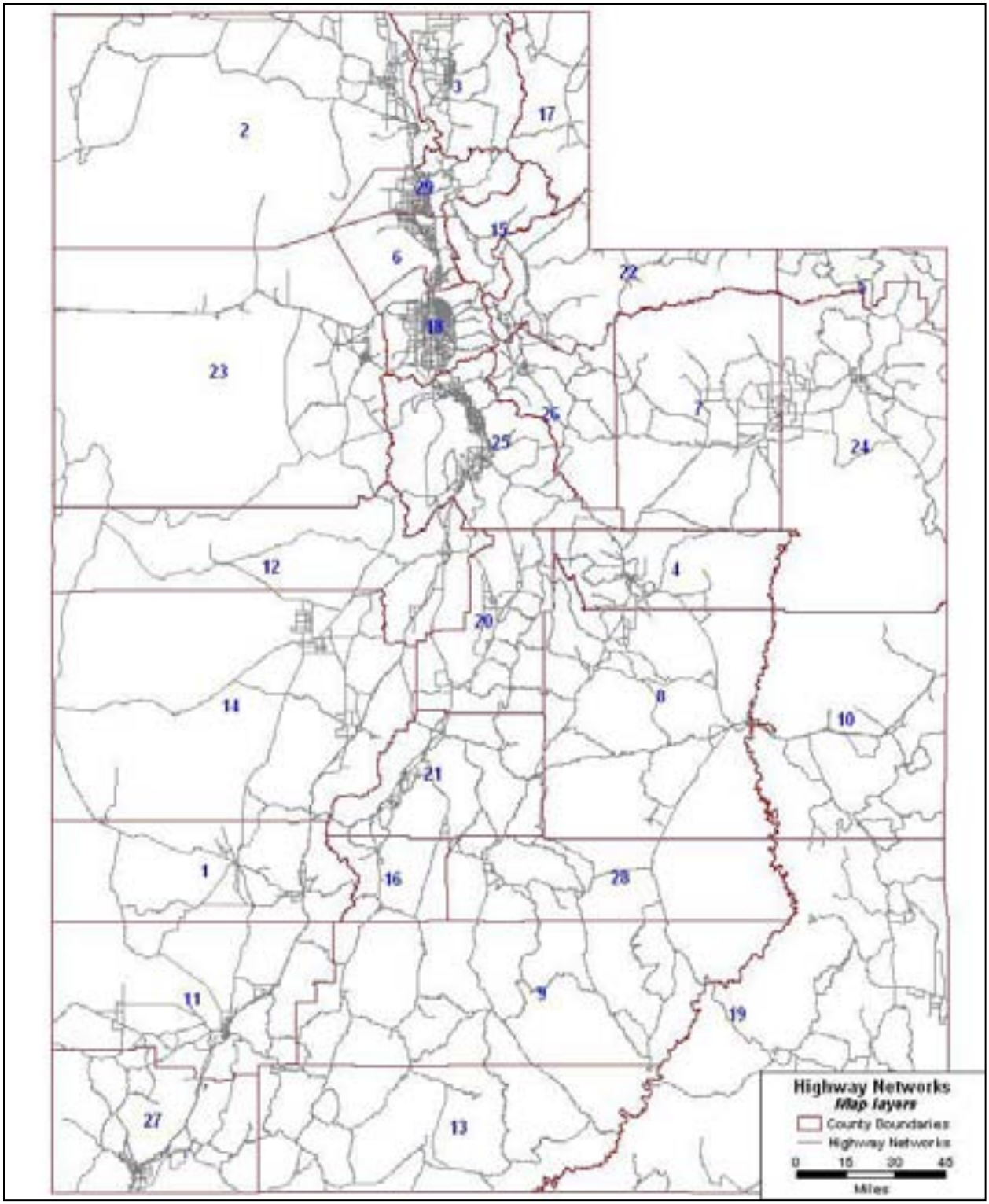


Figure A-4-37 Map of Highways (136)

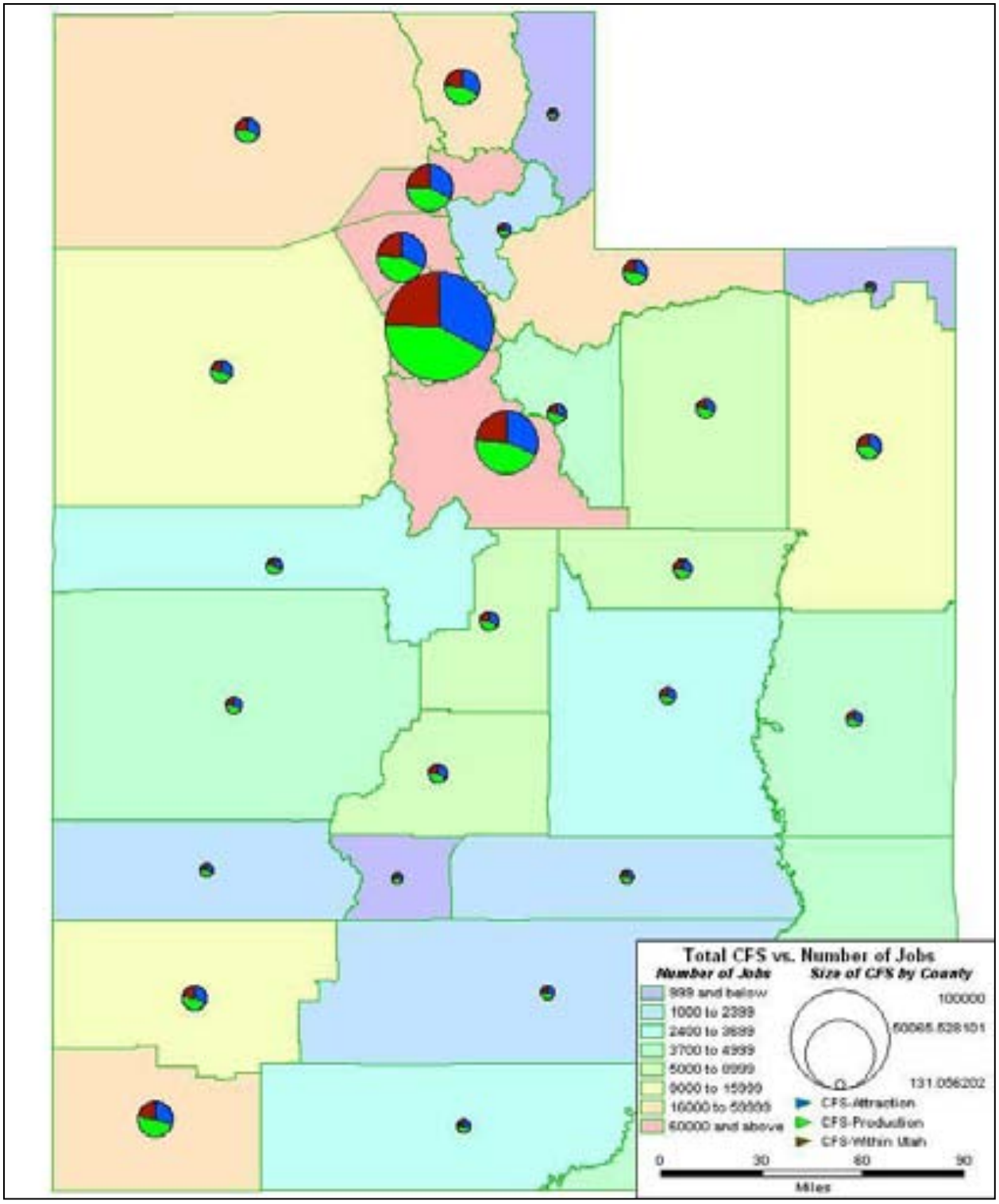


Figure A-4-38 Map of NOJT + CFS (137)

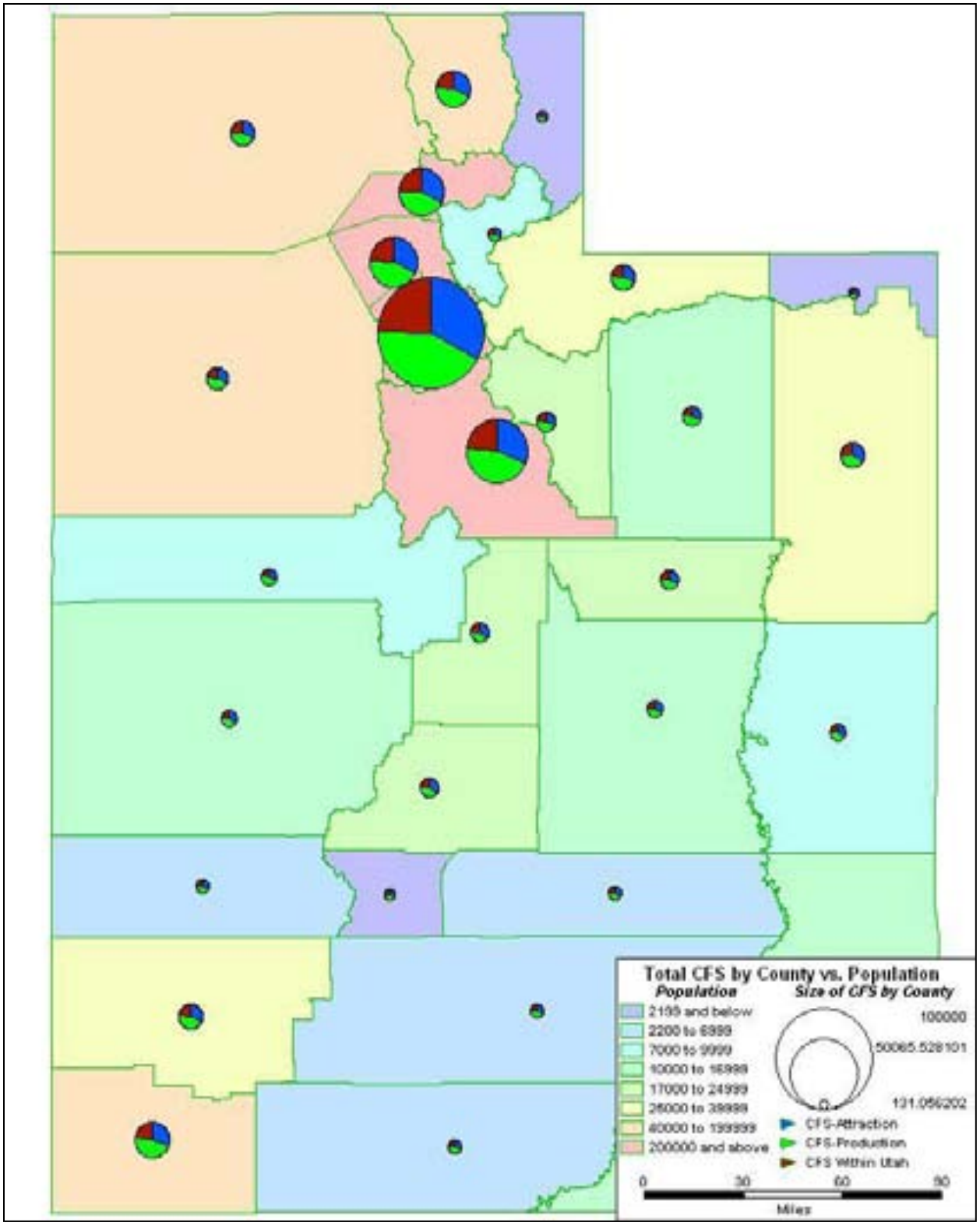


Figure A-4-39 Map of POP + CFS (138)

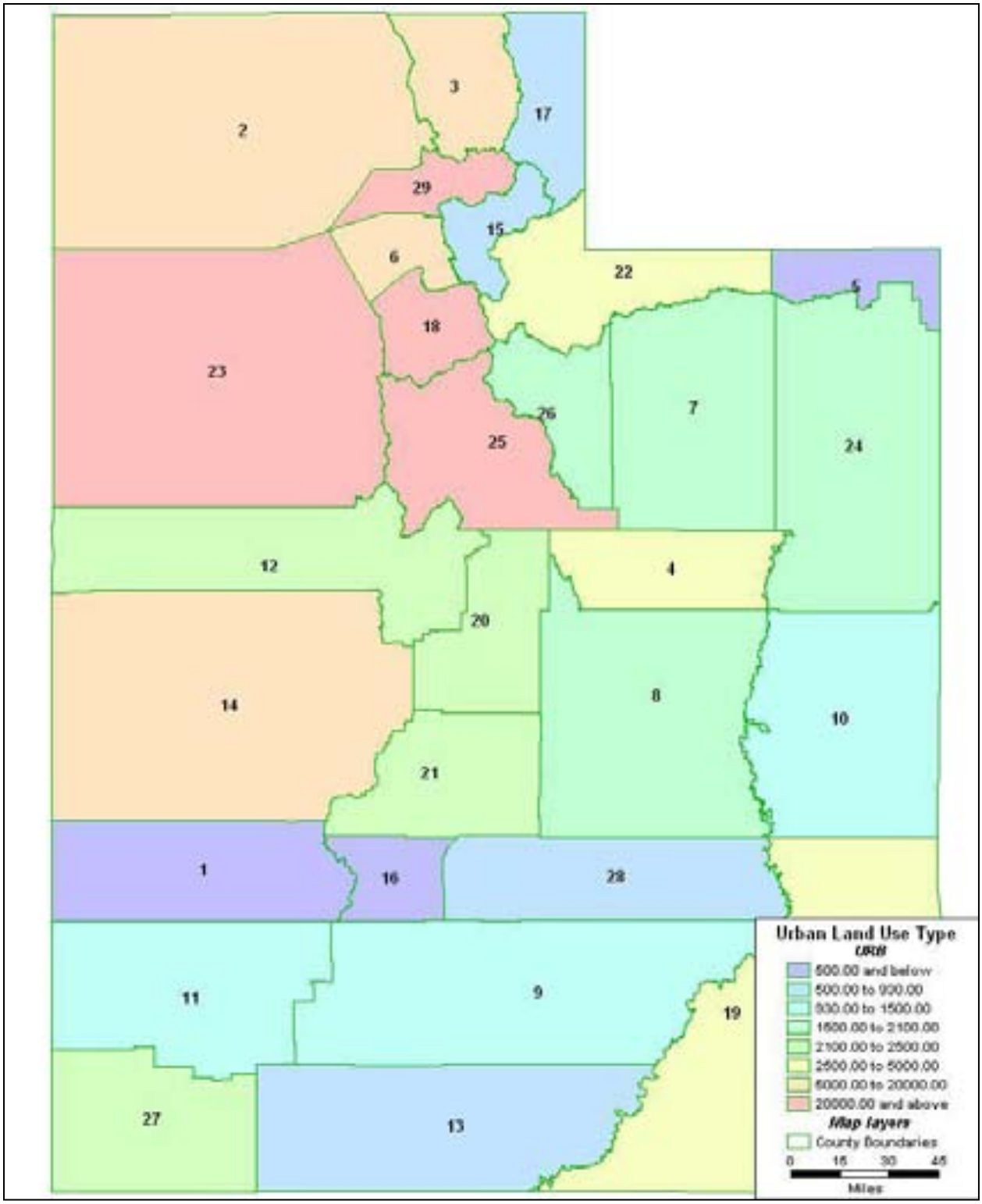


Figure A-4-40 Map of URB (139)

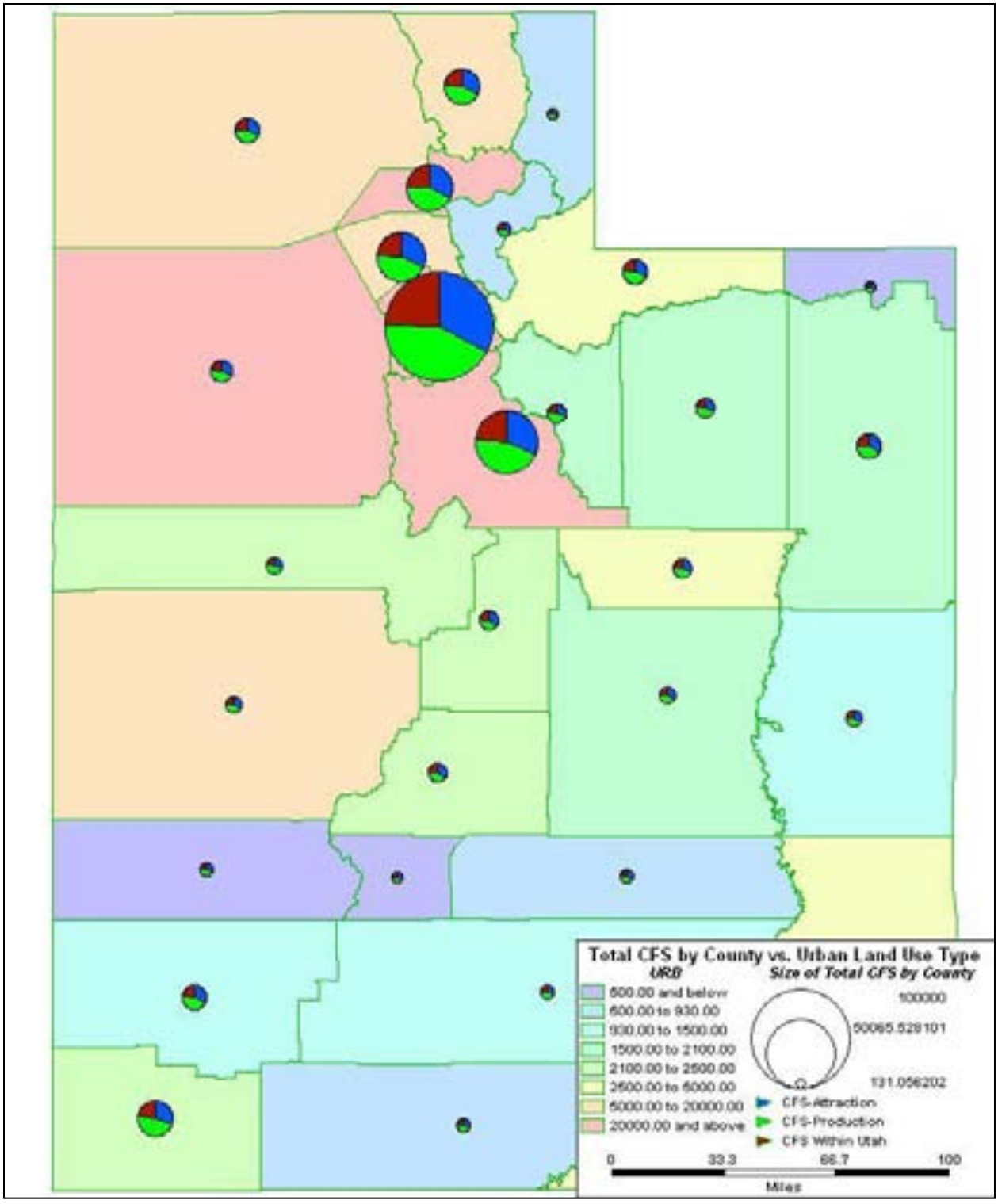


Figure A-4-41 Map of URB +CFS (140)

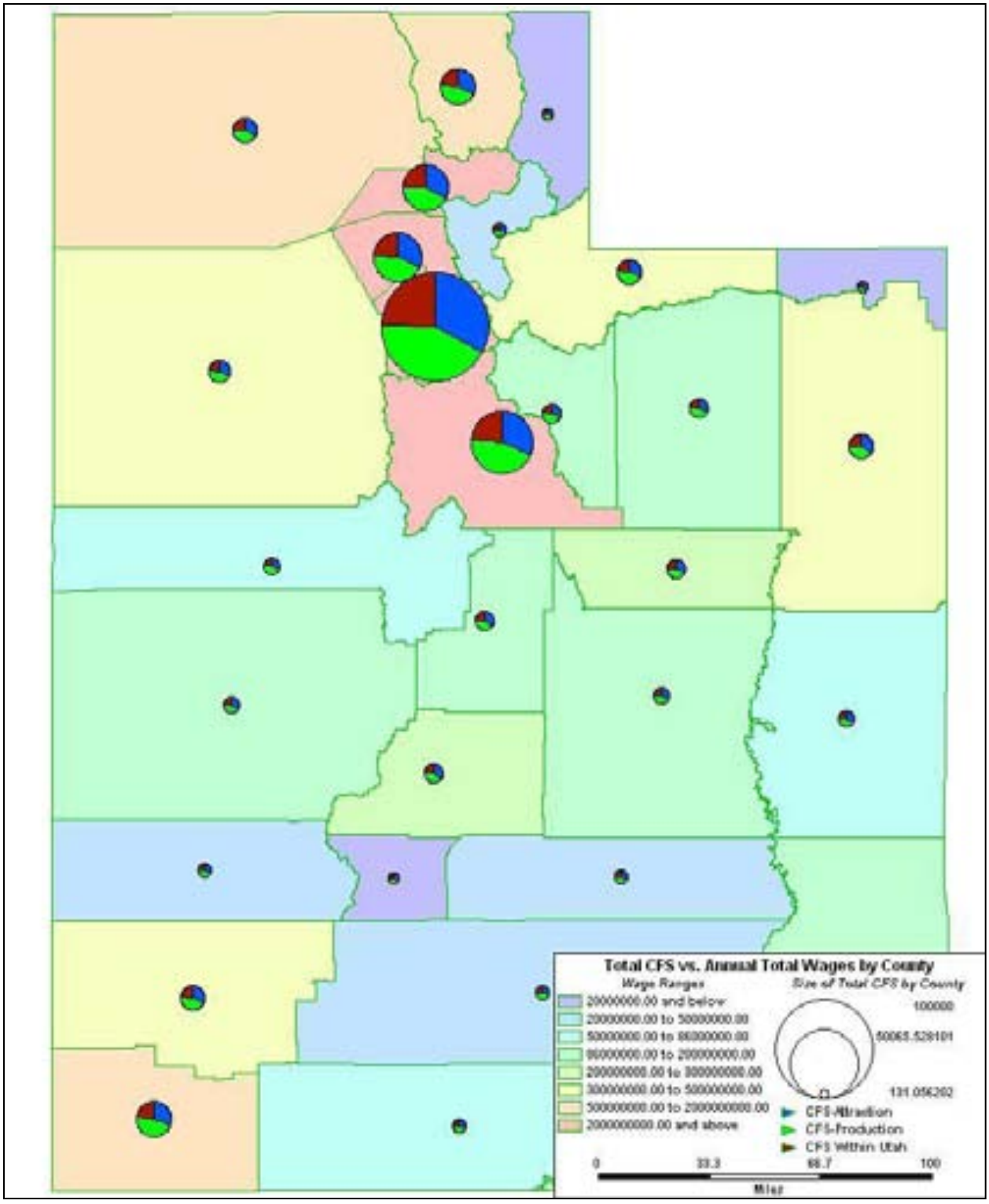


Figure A-4-42 Map of WT + CFS (141)

A-4-2 Maps Using Application Data (City, Port of Entry, Interchanges)

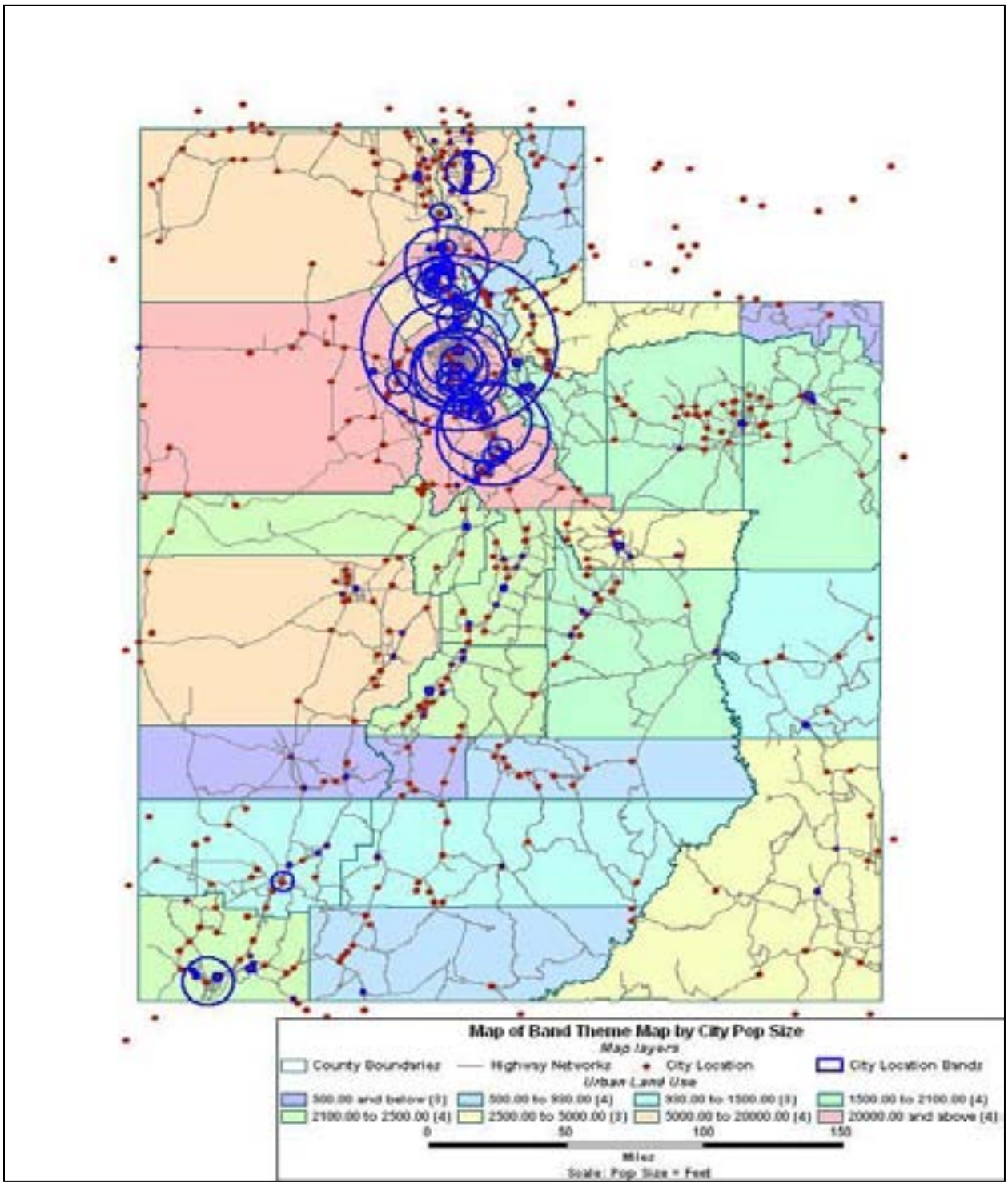


Figure A-4-43 Map of Band Theme Map by City Pop Size + Urban Land Use (200)

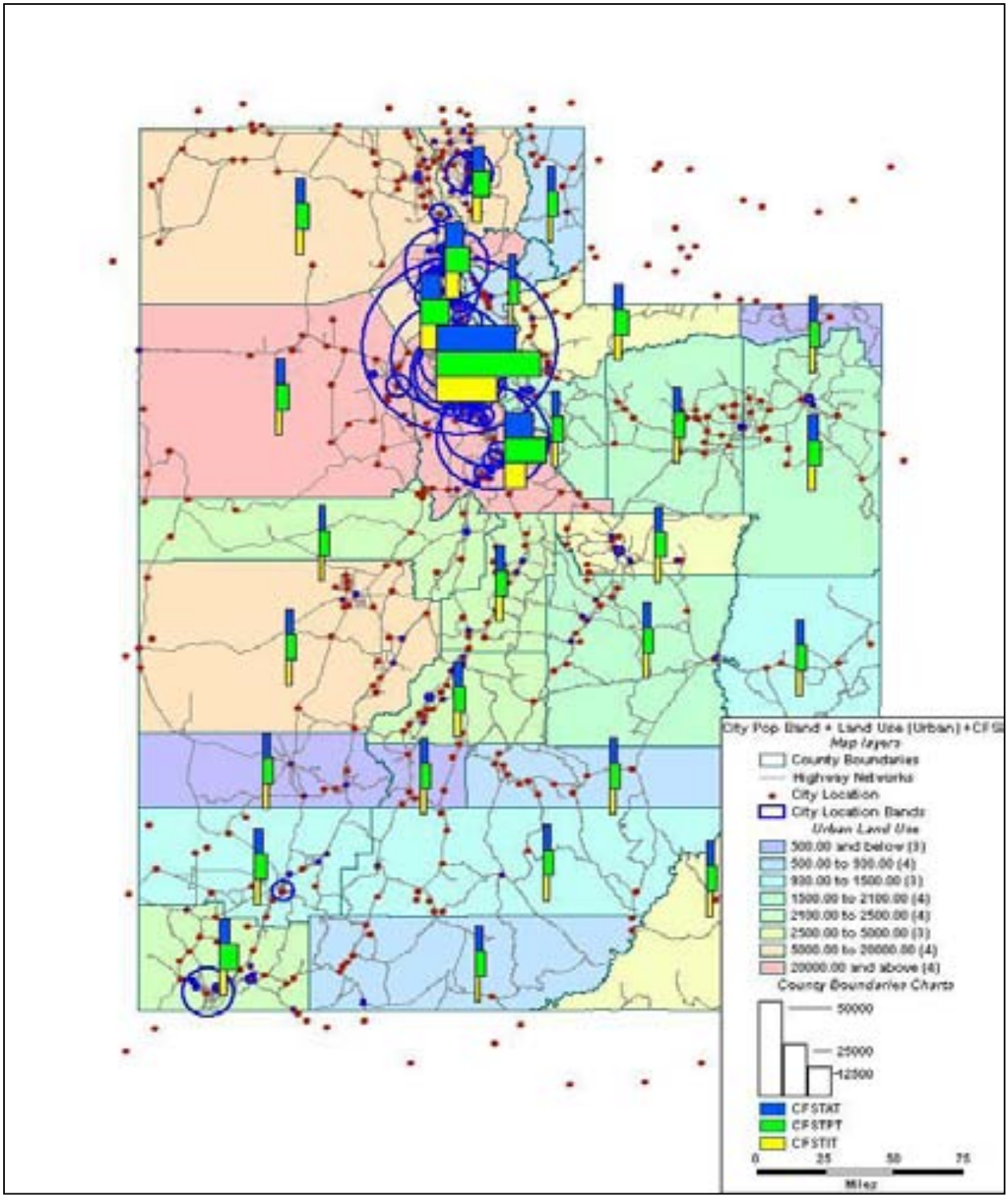


Figure A-4-44 Map of Band Theme Map by City Pop Size + Urban Land Use +CFS (201)

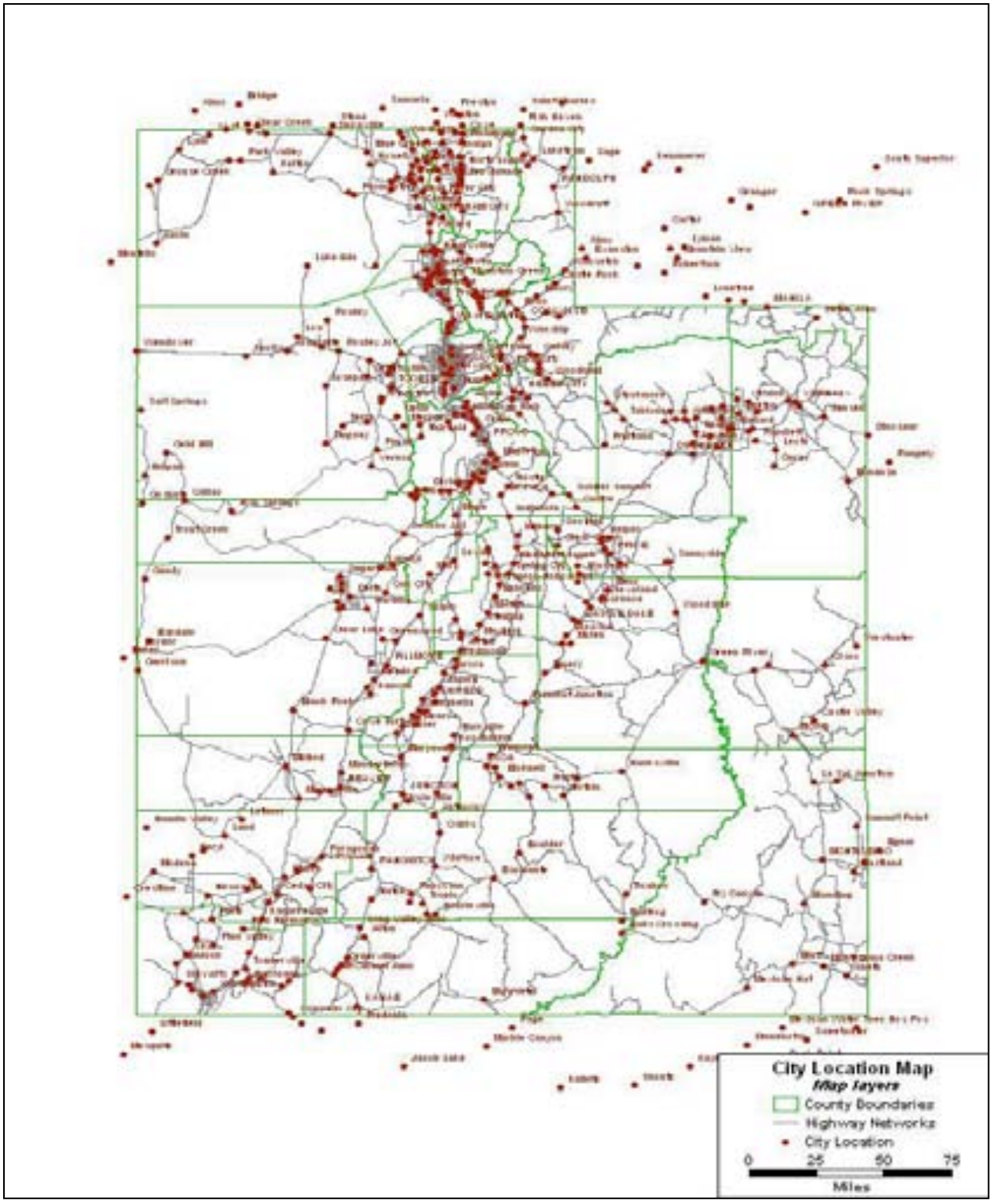


Figure A-4-45 Map of City Location (202)

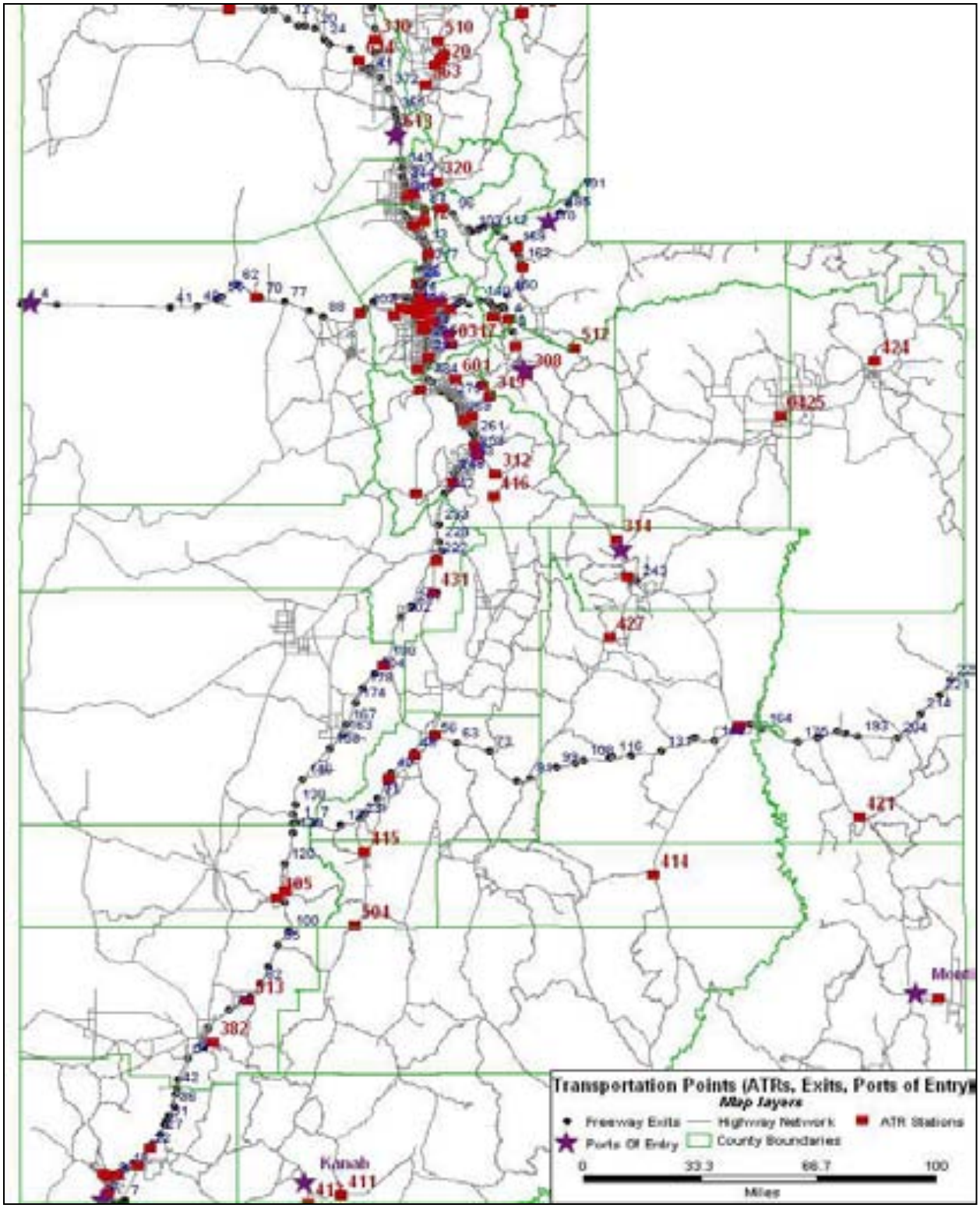


Figure A-4-46 Map of Main Transportation Points (Exits+ATR+Entry of Ports) (203)

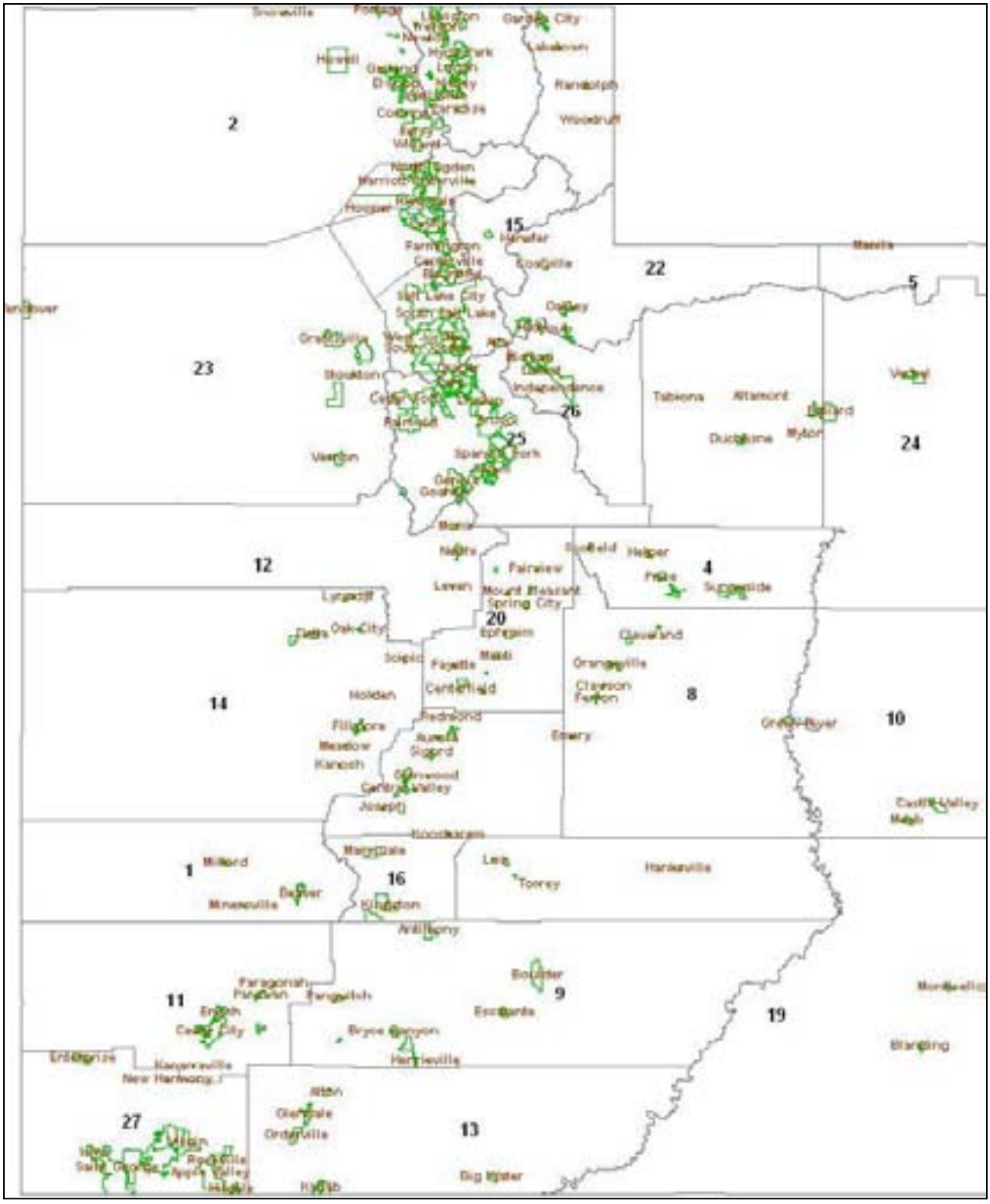


Figure A-4-47 Map of Municipalities (204)

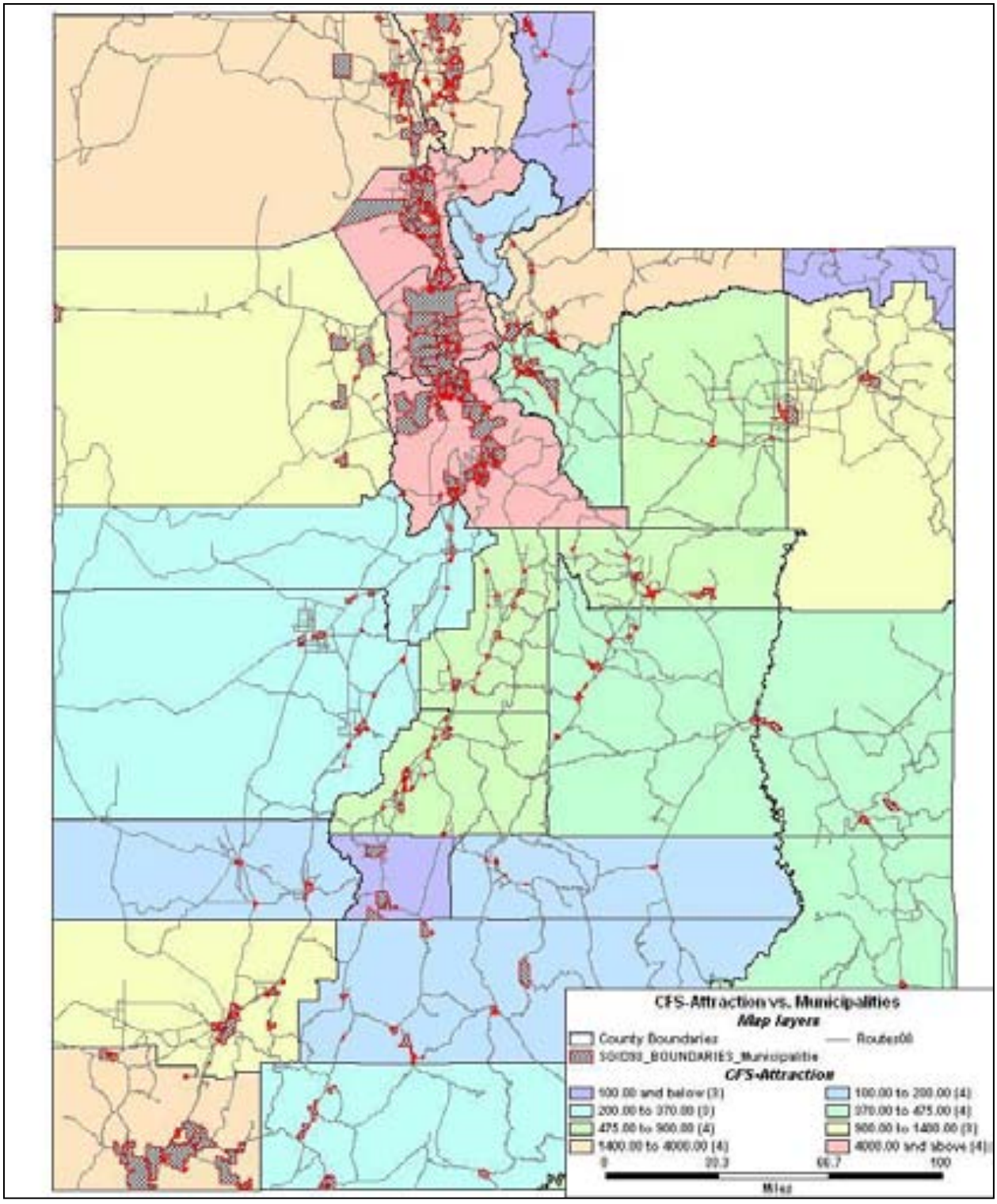


Figure A-4-48 Map of Municipalities + CFS-Attraction (205)

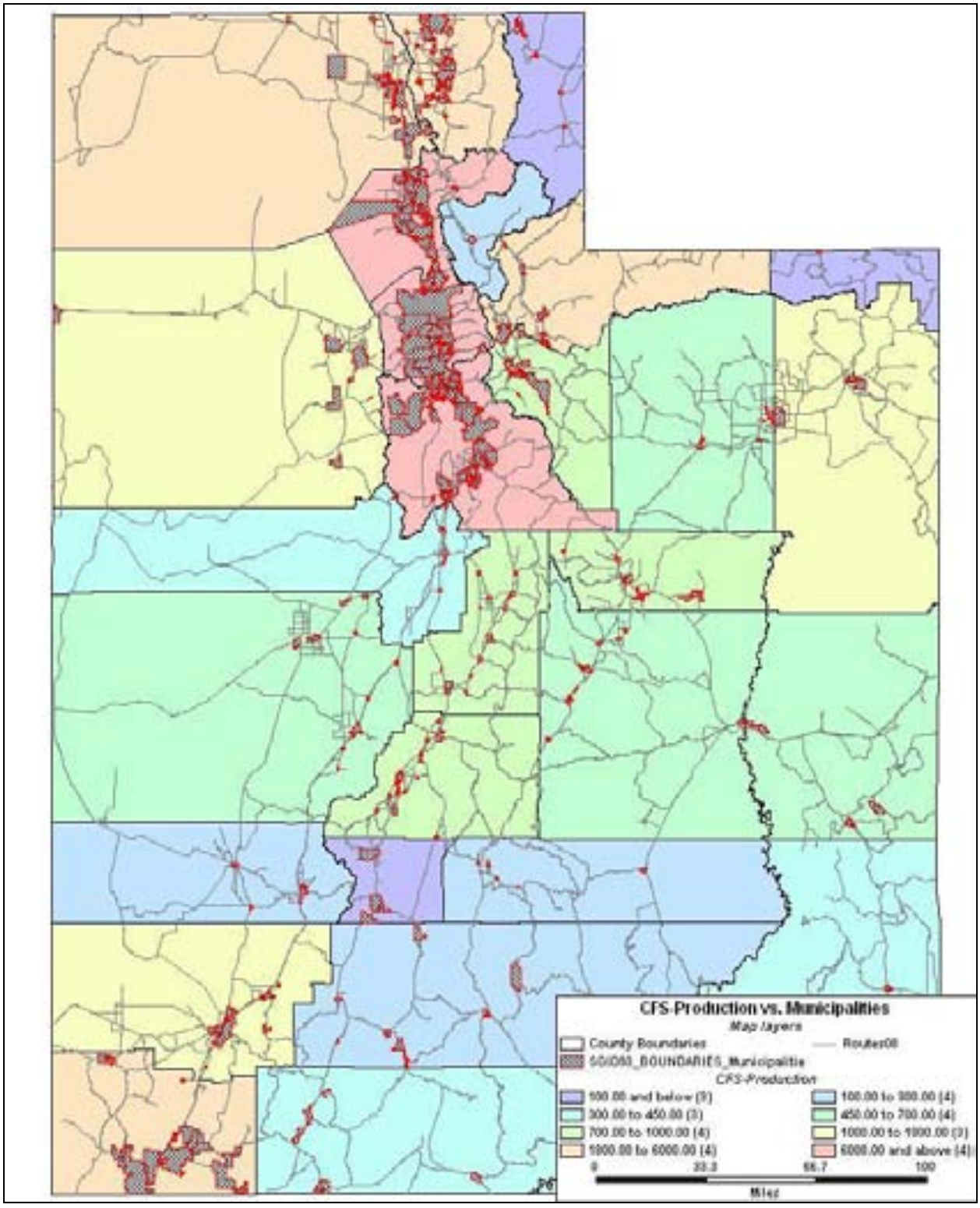


Figure A-4-49 Map of Municipalities + CFS-Production (206)

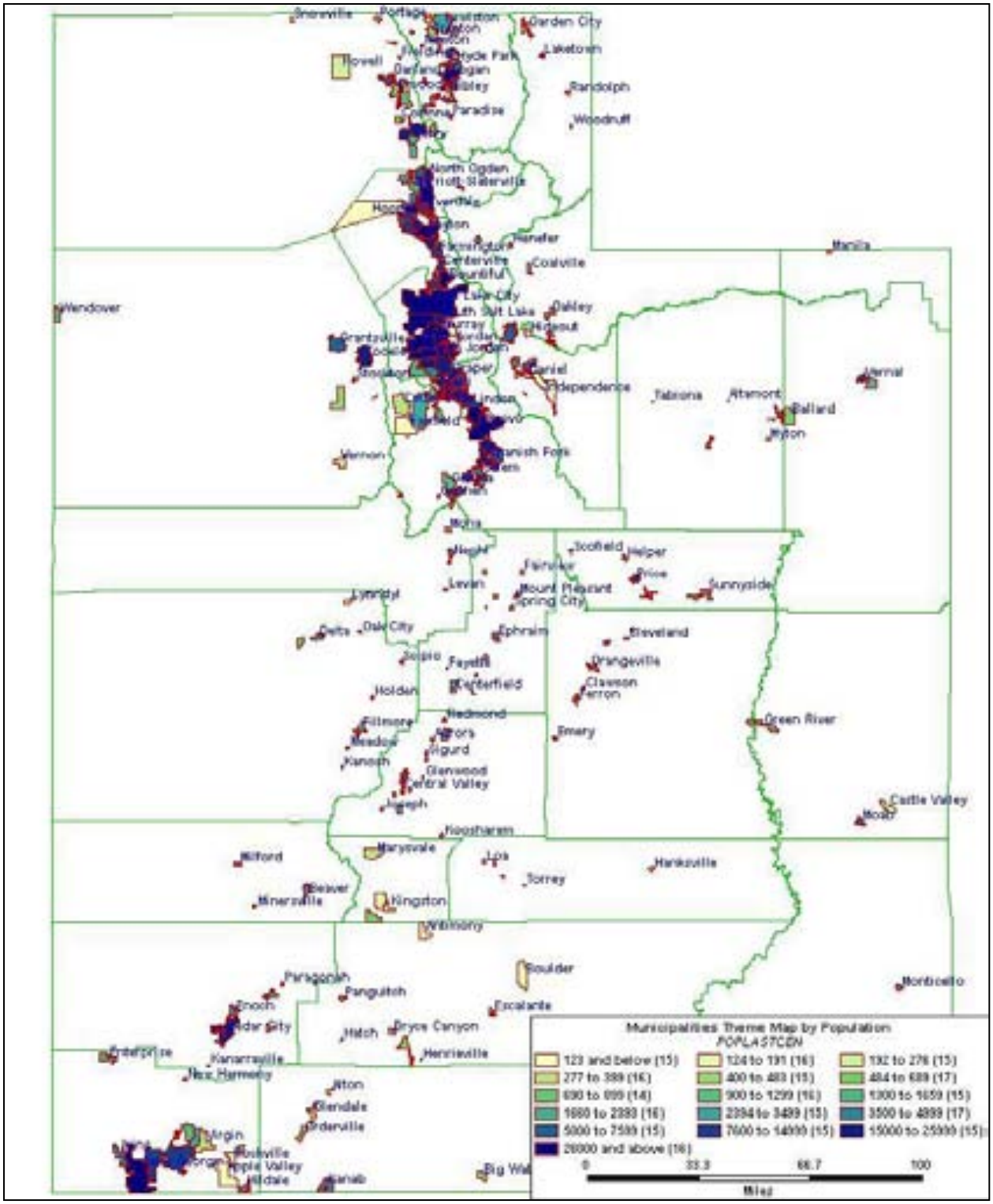


Figure A-4-50 Map of Municipalities by Pop in County Boundary (207)

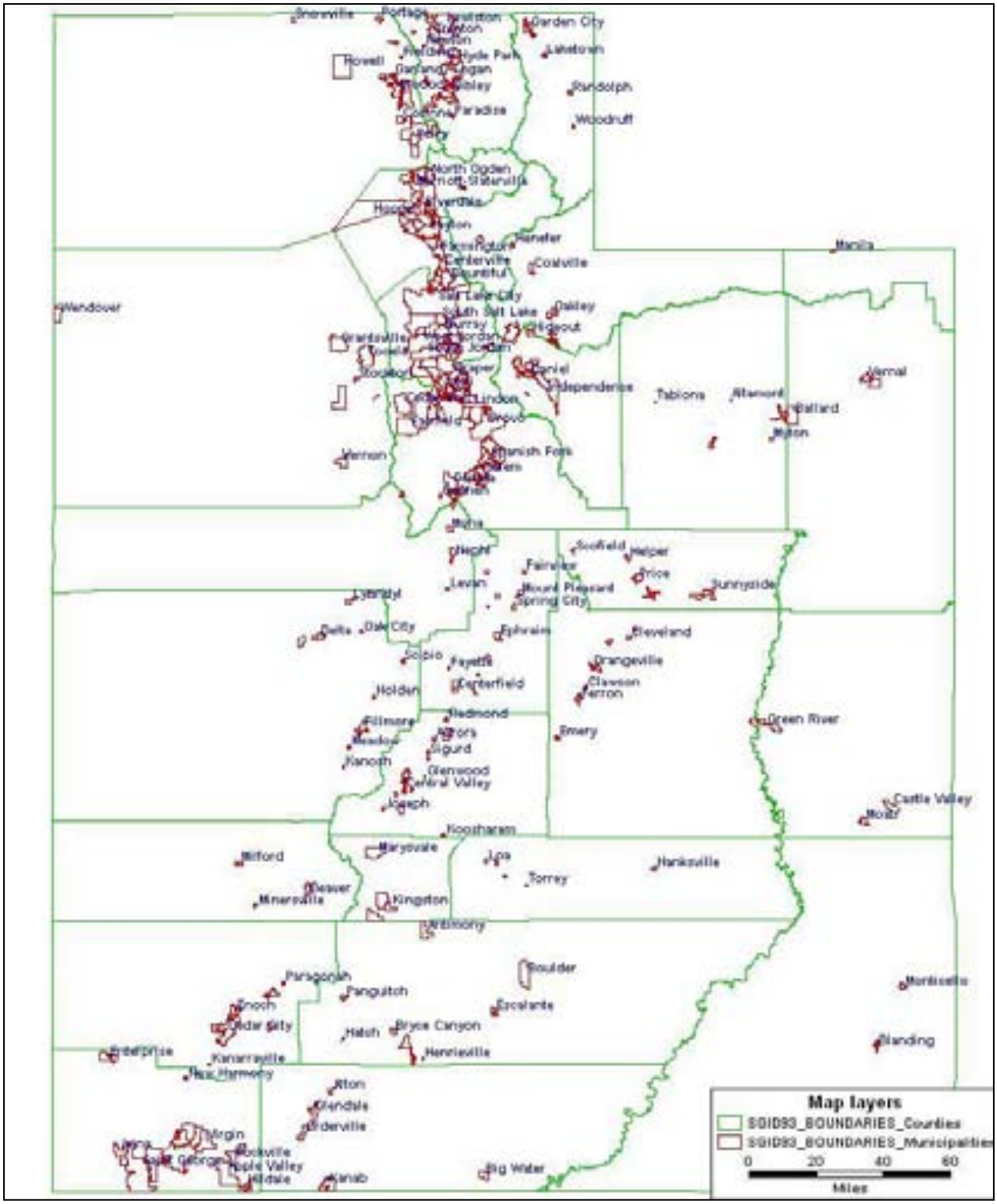


Figure A-4-51 Map of Municipalities With County Boundary (208)

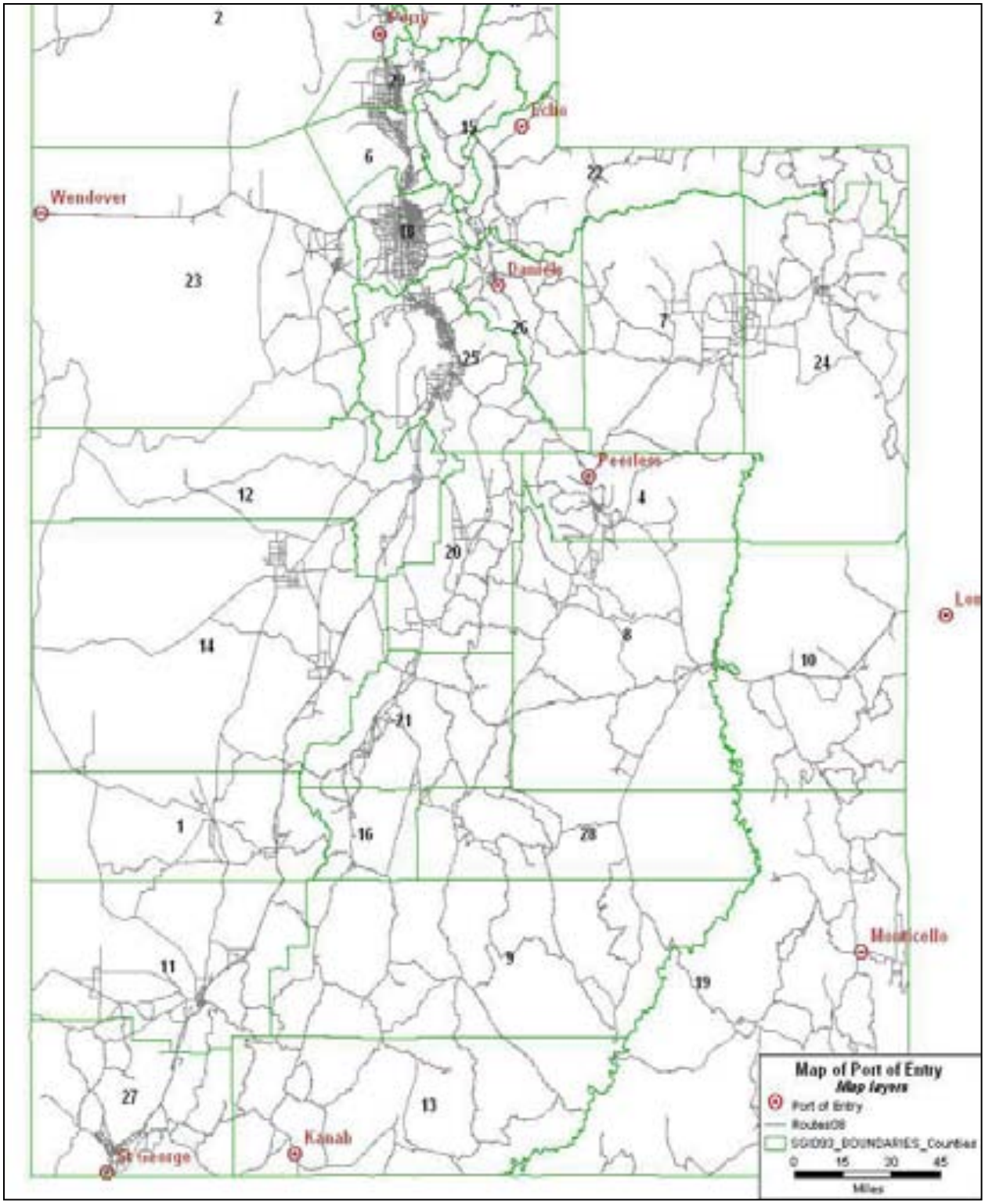


Figure A-4-52 Map of Ports Of Entry (209)

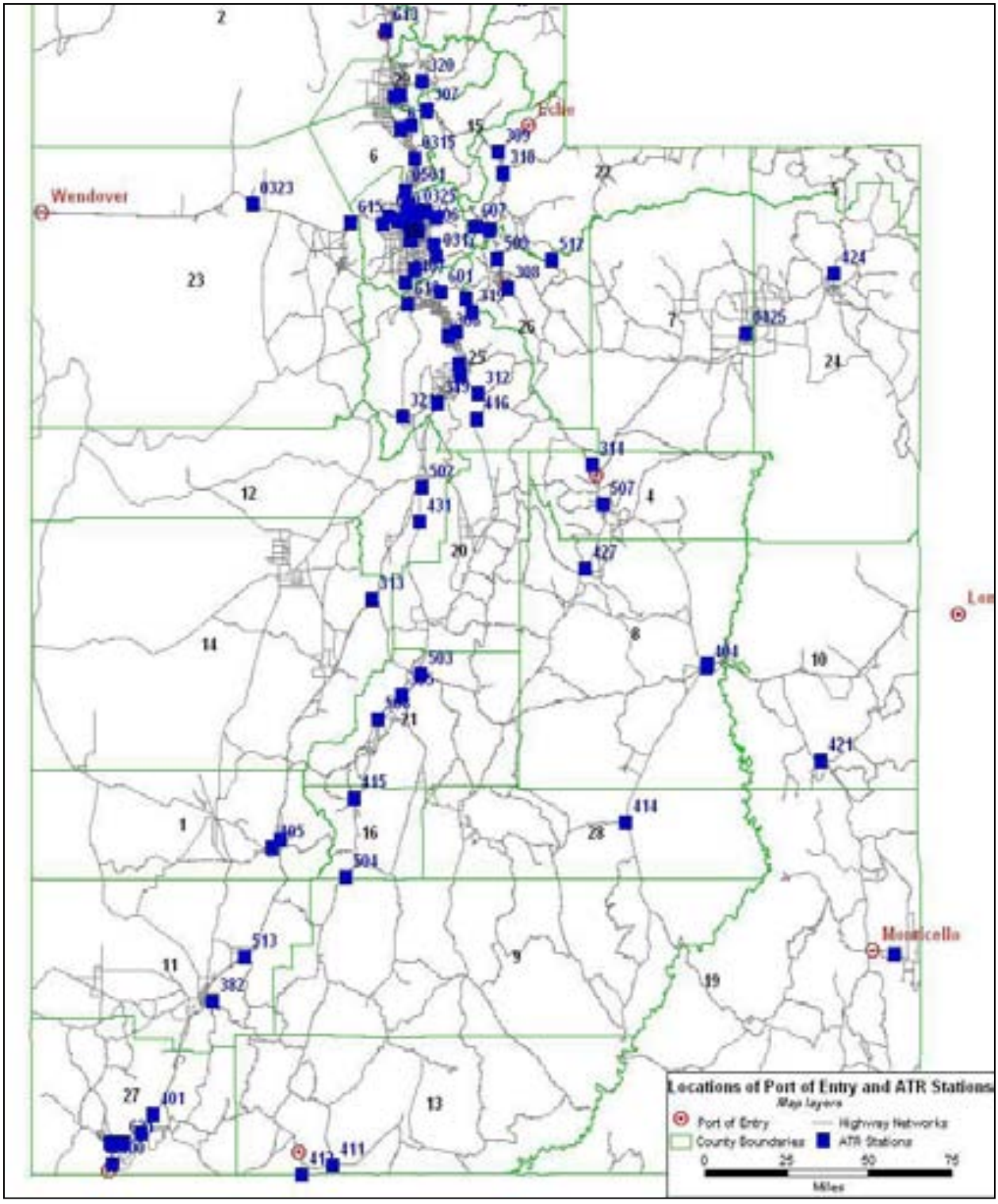


Figure A-4-53 Map of Ports Of Entry + ATR Stations (210)

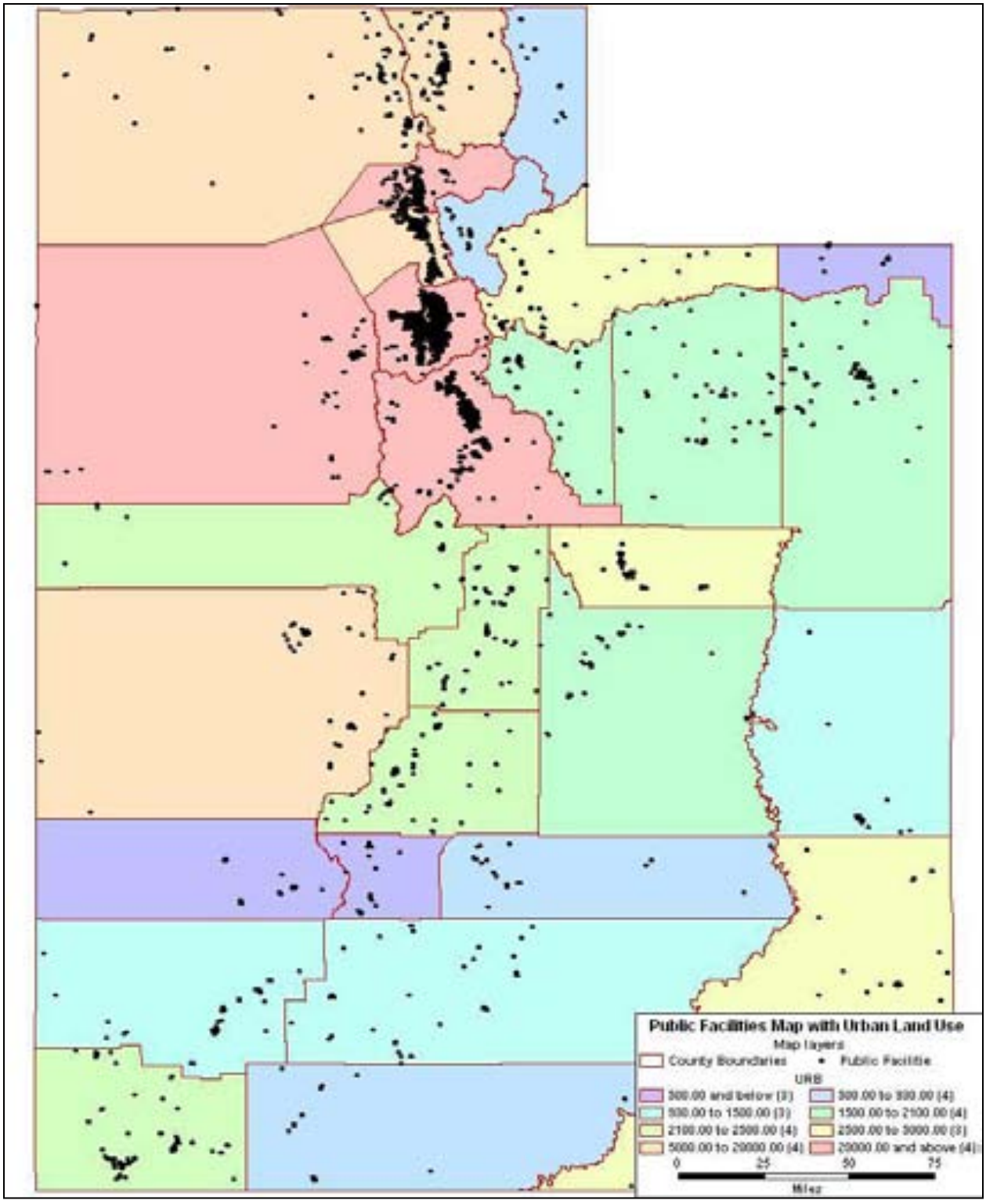


Figure A-4-54 Map of Public Facilities With Urban Land Use (211)

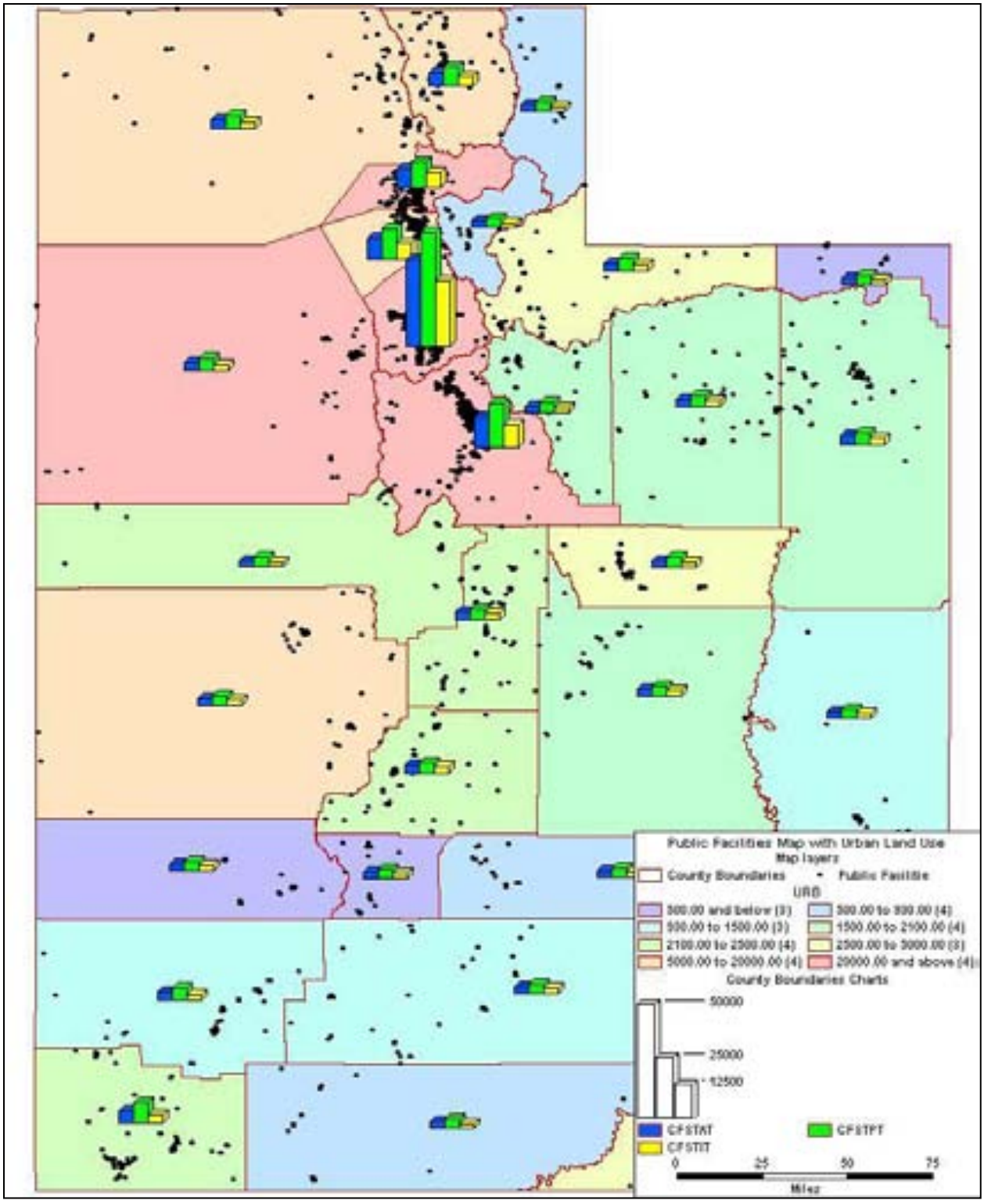


Figure A-4-55 Map of Public Facilities With Urban Land Use + CFS (212)

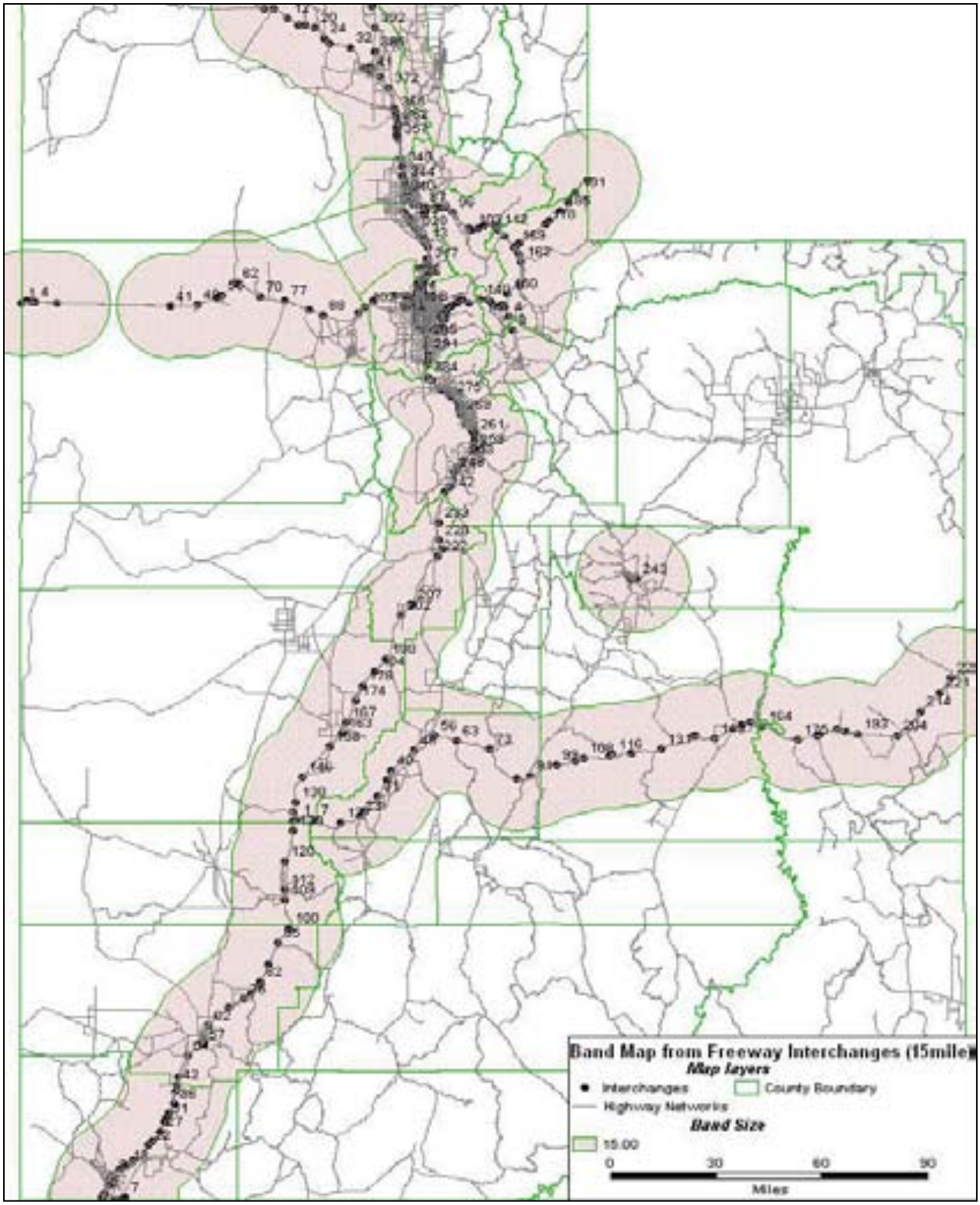


Figure A-4-56 Map of Theme Band Map of 15 Mile Freeway Interchanges (214)

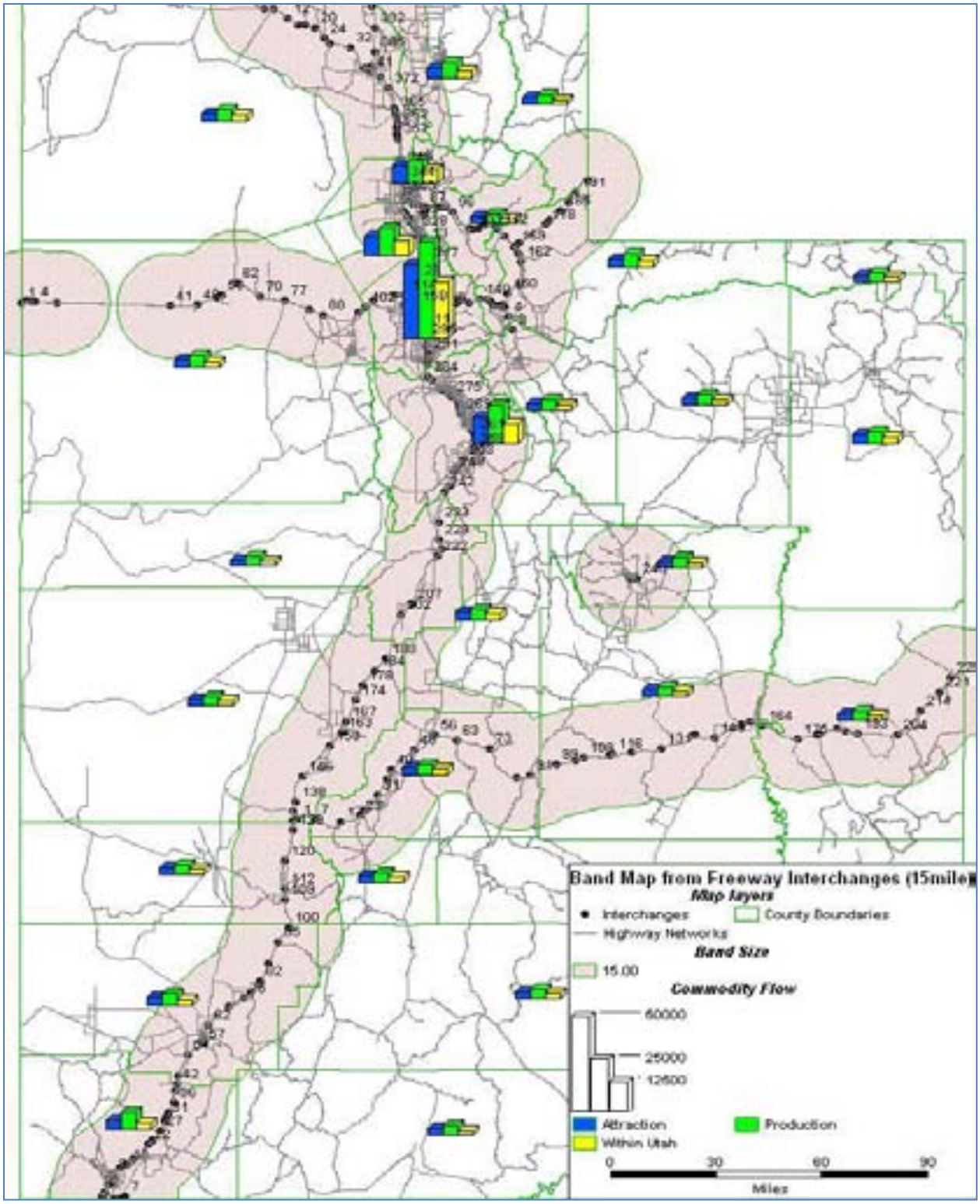


Figure A-4-57 Map of Theme Band Map of 15 Mile Freeway Interchanges +CFS (215)

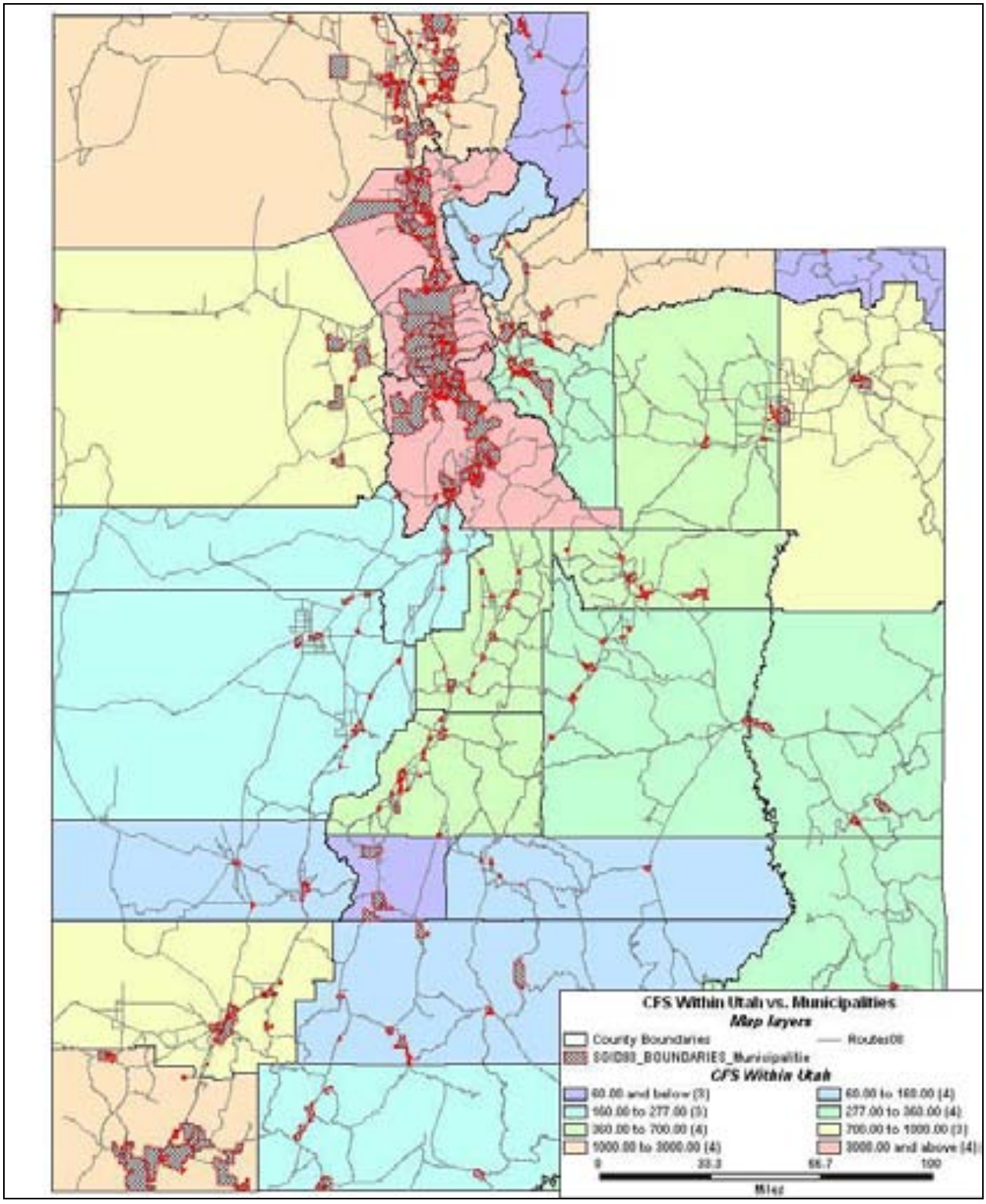


Figure A-4-58 Map of Municipalities + CFS-Within Utah (217)

Appendix B: Analysis Results of Relationship Between Land Use and the Contributing Factors of Commodity Flow

B-1 Correlation Analysis Results

B-1-1 Correlation Land Use and Total Commodity Flow

Table B-1-1: Correlation Among Land Uses

		IR	NI	RES	RIP	URB	WATER
IR	Pearson Correlation	1	0.60829	0.32231	0.29001	0.26436	0.06449
	Sig. (2-tailed)		0.00046	0.08816	0.12699	0.16580	0.73962
	N	29	29	29	29	29	29
NI	Pearson Correlation	0.60829	1	0.57192	0.49549	0.56171	0.25714
	Sig. (2-tailed)	0.00046		0.00119	0.00627	0.00152	0.17811
	N	29	29	29	29	29	29
RES	Pearson Correlation	0.32231	0.57192	1	0.64644	0.79544	0.00462
	Sig. (2-tailed)	0.08816	0.00119		0.00015	0.00000	0.98101
	N	29	29	29	29	29	29
RIP	Pearson Correlation	0.29001	0.49549	0.64644	1	0.67171	-0.05217
	Sig. (2-tailed)	0.12699	0.00627	0.00015		0.00007	0.78811
	N	29	29	29	29	29	29
URB	Pearson Correlation	0.26436	0.56171	0.79544	0.67171	1	-0.02535
	Sig. (2-tailed)	0.16580	0.00152	0.00000	0.00007		0.89615
	N	29	29	29	29	29	29
WATER	Pearson Correlation	0.06449	0.25714	0.00462	-0.05217	-0.02535	1
	Sig. (2-tailed)	0.73962	0.17811	0.98101	0.78811	0.89615	
	N	29	29	29	29	29	29

Table B-1-2: Correlation Between Land Use and CFS

		CFS2PT	CFS2IT	CFSB-1T
IR	Pearson Correlation	0.20660	0.20507	0.20508
	Sig. (2-tailed)	0.28224	0.28589	0.28588
	N	29	29	29
NI	Pearson Correlation	0.50098	0.49788	0.49788
	Sig. (2-tailed)	0.00564	0.00599	0.00599
	N	29	29	29
RES	Pearson Correlation	0.91391	0.91428	0.91428
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
RIP	Pearson Correlation	0.46455	0.47419	0.47419
	Sig. (2-tailed)	0.01112	0.00936	0.00936
	N	29	29	29
URB	Pearson Correlation	0.85691	0.86032	0.86032
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
WATER	Pearson Correlation	-0.05855	-0.06858	-0.06858
	Sig. (2-tailed)	0.76287	0.72372	0.72372
	N	29	29	29

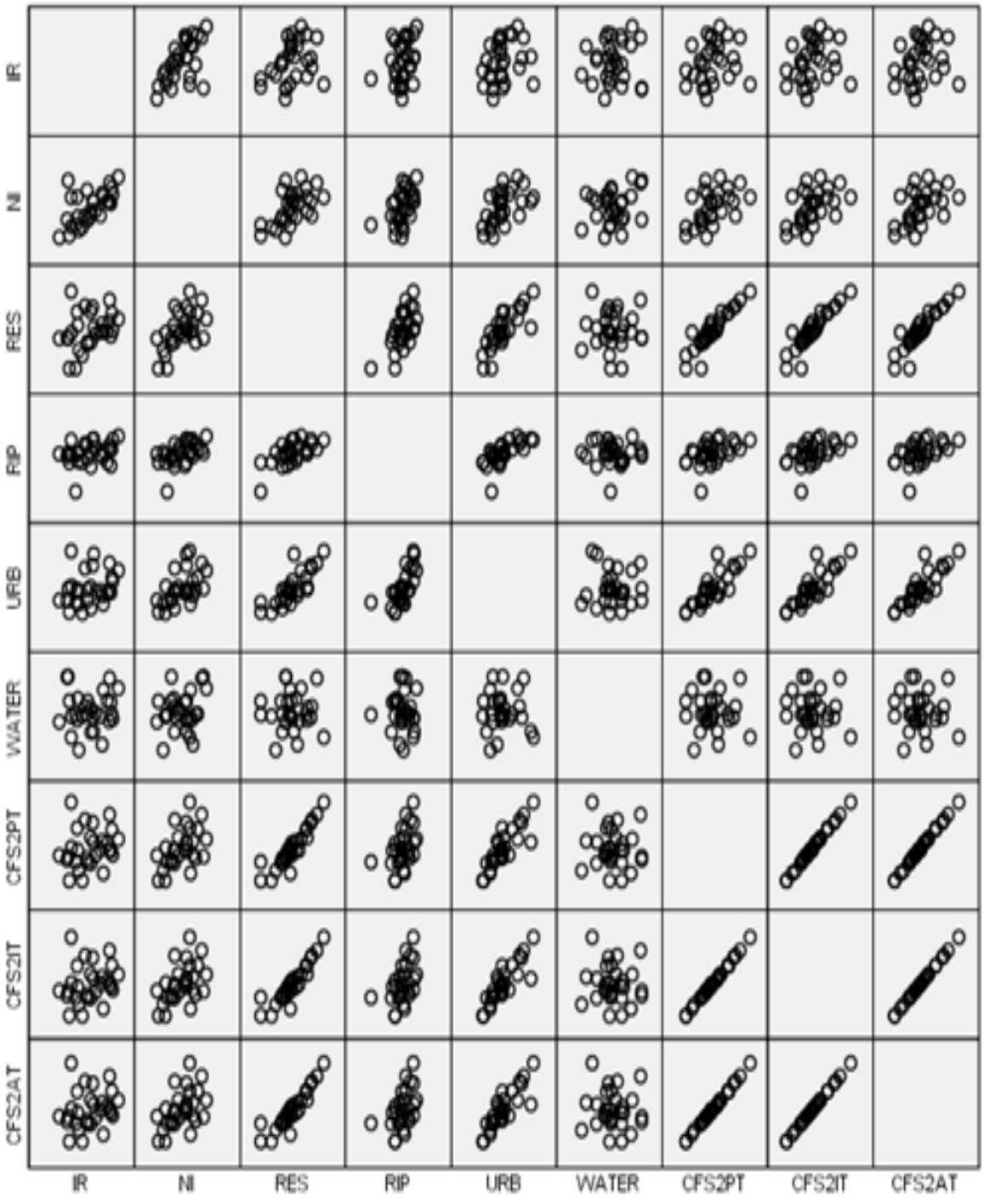


Figure B-1-1: Scatterplot Between Land Use-T and CFS-T

B-1-2 Correlation Land Use and County Business Pattern (CBP) Data

Table B-1-3: Correlation Between Land Use and CBPs

		CBPE	CBPFQP	CBPAP	CBPTE
IR	Pearson Correlation	0.22595	0.24447	0.23540	0.17282
	Sig. (2-tailed)	0.23857	0.20122	0.21898	0.36999
	N	29	29	29	29
NI	Pearson Correlation	0.50584	0.51101	0.50737	0.46745
	Sig. (2-tailed)	0.00512	0.00461	0.00496	0.01056
	N	29	29	29	29
RES	Pearson Correlation	0.91728	0.90007	0.90132	0.91365
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29
RIP	Pearson Correlation	0.47155	0.47595	0.48063	0.41697
	Sig. (2-tailed)	0.0098	0.0091	0.0083	0.0244
	N	29	29	29	29
URB	Pearson Correlation	0.84825	0.86784	0.86882	0.81417
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29
WATER	Pearson Correlation	-0.06657	-0.07093	-0.05714	-0.05406
	Sig. (2-tailed)	0.73151	0.71466	0.76843	0.78061
	N	29	29	29	29

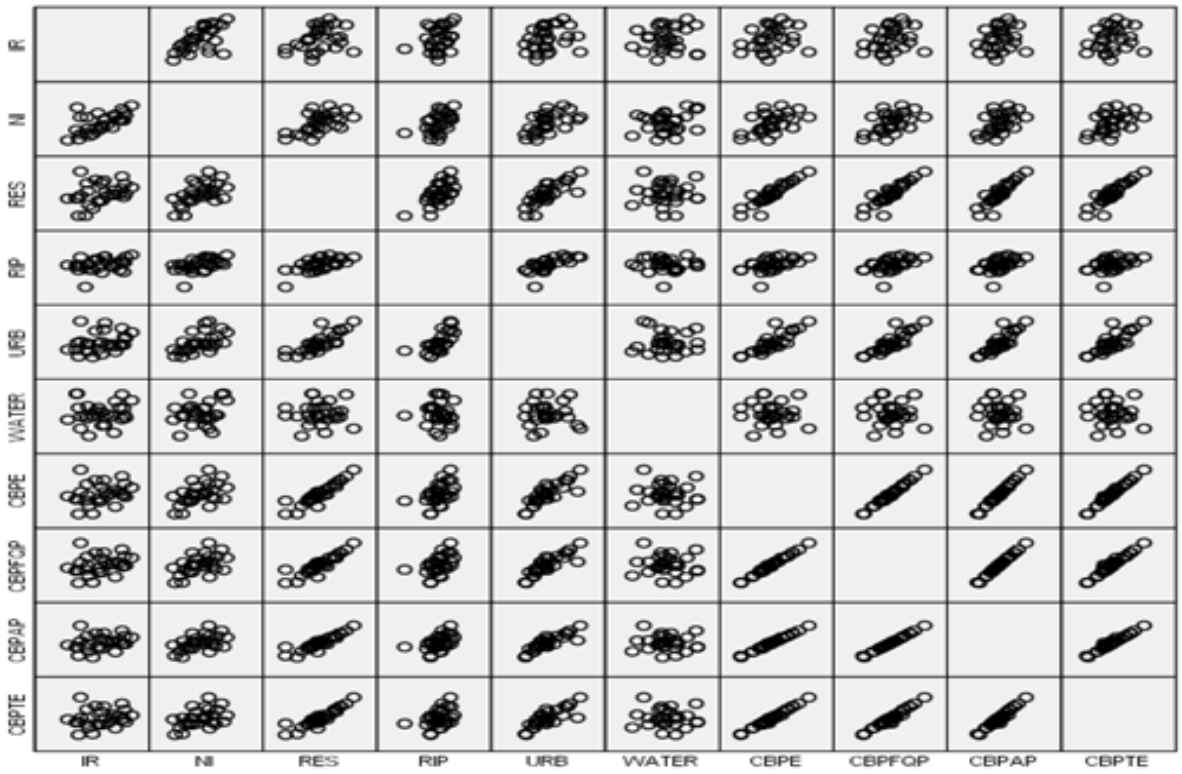


Figure B-1-2: Scatterplot Between Land Use and CBP

Table B-1-4: Correlation Between Land Use and Other Contributing Factors

		POP	AREA	EMPBI	NOJ	W
IR	Pearson Correlation	0.22594	0.20562	0.20508	0.19173	0.20125
	Sig. (2-tailed)	0.23859	0.28459	0.28588	0.31908	0.29518
	N	29	29	29	29	29
NI	Pearson Correlation	0.53433	0.32444	0.49788	0.49381	0.49382
	Sig. (2-tailed)	0.00283	0.08596	0.00599	0.00648	0.00648
	N	29	29	29	29	29
RES	Pearson Correlation	0.90294	-0.10939	0.91428	0.90785	0.89481
	Sig. (2-tailed)	0.00000	0.57215	0.00000	0.00000	0.00000
	N	29	29	29	29	29
RIP	Pearson Correlation	0.46702	0.18957	0.47419	0.48600	0.49462
	Sig. (2-tailed)	0.01064	0.32467	0.00936	0.00752	0.00638
	N	29	29	29	29	29
URB	Pearson Correlation	0.87697	-0.02827	0.86032	0.86028	0.88144
	Sig. (2-tailed)	0.00000	0.88427	0.00000	0.00000	0.00000
	N	29	29	29	29	29
WATER	Pearson Correlation	-0.06203	0.11161	-0.06858	-0.06551	-0.06603
	Sig. (2-tailed)	0.74923	0.56433	0.72372	0.73564	0.73361
	N	29	29	29	29	29

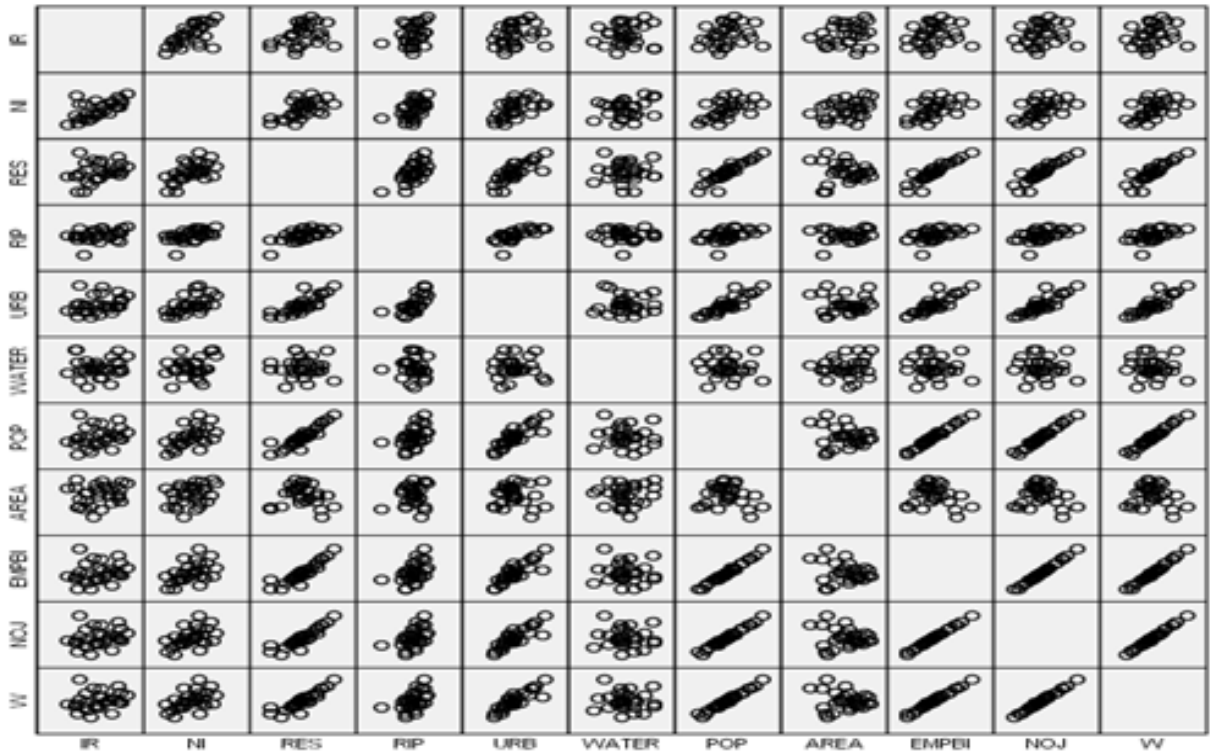


Figure B-1-2: Scatterplot Between Land Use and Other Contribution Factors

B-1-3 Correlation Land Use and Detailed Contribution Factors

Table B-1-5: Correlation Between Land Use and Detailed CBP-APs

		CBPAP 11	CBPAP 23	CBPAP 31	CBPAP 42	CBPAP 44	CBPAP 48	CBPAP 53
IR	Pearson Correlation	0.27586	0.25168	0.23277	0.24293	0.19382	0.13501	0.22584
	Sig. (2-tailed)	0.33975	0.20538	0.22431	0.24196	0.31371	0.53908	0.28863
	N	14	27	29	25	29	23	24
NI	Pearson Correlation	0.25418	0.51144	0.48841	0.48193	0.46468	0.37257	0.36118
	Sig. (2-tailed)	0.38054	0.00640	0.00719	0.01471	0.01110	0.07998	0.08291
	N	14	27	29	25	29	23	24
RES	Pearson Correlation	0.72492	0.84883	0.76987	0.81827	0.89435	0.80630	0.84485
	Sig. (2-tailed)	0.00335	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	14	27	29	25	29	23	24
RIP	Pearson Correlation	0.19478	0.36686	0.41041	0.36576	0.42615	0.39955	0.32882
	Sig. (2-tailed)	0.50458	0.05980	0.02701	0.07217	0.02116	0.05891	0.11667
	N	14	27	29	25	29	23	24
URB	Pearson Correlation	0.49244	0.74218	0.81031	0.73897	0.83097	0.67133	0.68319
	Sig. (2-tailed)	0.07364	0.00001	0.00000	0.00002	0.00000	0.00045	0.00023
	N	14	27	29	25	29	23	24
WATER	Pearson Correlation	-0.04041	-0.07175	-0.10826	-0.12478	-0.10642	-0.22667	0.07461
	Sig. (2-tailed)	0.89089	0.72209	0.57618	0.55232	0.58268	0.29830	0.72899
	N	14	27	29	25	29	23	24

		CBPAP 54	CBPAP 55	CBPAP 56	CBPAP 61	CBPAP 62	CBPAP 81	CBPAP 95
IR	Pearson Correlation	0.02651	-0.00634	0.16542	0.21299	0.05933	0.18725	0.01943
	Sig. (2-tailed)	0.90443	0.98009	0.57198	0.41177	0.78802	0.38094	0.93707
	N	23	18	14	17	23	24	19
NI	Pearson Correlation	0.36710	0.45640	0.60000	0.56494	0.32055	0.49971	0.45049
	Sig. (2-tailed)	0.08487	0.05693	0.02331	0.01813	0.13590	0.01291	0.05292
	N	23	18	14	17	23	24	19
RES	Pearson Correlation	0.85896	0.83780	0.93710	0.86102	0.89364	0.90076	0.78471
	Sig. (2-tailed)	0.00000	0.00001	0.00000	0.00001	0.00000	0.00000	0.00007
	N	23	18	14	17	23	24	19
RIP	Pearson Correlation	0.49145	0.47394	0.52531	0.47535	0.36489	0.46743	0.43485
	Sig. (2-tailed)	0.01724	0.04693	0.05373	0.05380	0.08690	0.02127	0.06280
	N	23	18	14	17	23	24	19
URB	Pearson Correlation	0.79573	0.80186	0.76635	0.79298	0.75086	0.75973	0.73913
	Sig. (2-tailed)	0.00001	0.00006	0.00139	0.00015	0.00004	0.00002	0.00030
	N	23	18	14	17	23	24	19
WATER	Pearson Correlation	-0.06506	-0.04476	-0.20489	0.06335	-0.13307	-0.05157	0.02817
	Sig. (2-tailed)	0.76804	0.86001	0.48226	0.80914	0.54500	0.81085	0.90885
	N	23	18	14	17	23	24	19

Table B-1-6: Correlation Between Land Use and Detailed CBP-Es

		CBPE 11	CBPE 23	CBPE 31	CBPE 42	CBPE 44	CBPE 48	CBPE 53
IR	Pearson Correlation	0.23352	0.12985	0.25920	0.25258	0.21272	0.12018	0.23457
	Sig. (2-tailed)	0.42168	0.51016	0.17454	0.22319	0.26792	0.58491	0.26990
	N	14	28	29	25	29	23	24
NI	Pearson Correlation	0.24832	0.38557	0.52231	0.46886	0.47614	0.38694	0.35542
	Sig. (2-tailed)	0.39198	0.04273	0.00366	0.01807	0.00903	0.06815	0.08830
	N	14	28	29	25	29	23	24
RES	Pearson Correlation	0.74569	0.78214	0.82073	0.84827	0.90632	0.83385	0.91474
	Sig. (2-tailed)	0.00220	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	14	28	29	25	29	23	24
RIP	Pearson Correlation	0.23826	0.31584	0.45639	0.39995	0.44585	0.41622	0.43115
	Sig. (2-tailed)	0.41205	0.10156	0.01283	0.04760	0.01535	0.04821	0.03543
	N	14	28	29	25	29	23	24
URB	Pearson Correlation	0.51240	0.75480	0.84083	0.77733	0.82943	0.68386	0.70565
	Sig. (2-tailed)	0.06101	0.00000	0.00000	0.00000	0.00000	0.00032	0.00012
	N	14	28	29	25	29	23	24
WATER	Pearson Correlation	-0.05985	-0.16635	-0.10616	-0.16819	-0.11560	-0.19408	0.02312
	Sig. (2-tailed)	0.83895	0.39753	0.58363	0.42159	0.55042	0.37488	0.91461
	N	14	28	29	25	29	23	24

		CBPE 54	CBPE 55	CBPE 56	CBPE 61	CBPE 62	CBPE 81	CBPE 95
IR	Pearson Correlation	0.04529	-0.04537	0.12393	0.21718	0.07282	0.15615	-0.01535
	Sig. (2-tailed)	0.83742	0.85813	0.67295	0.40243	0.74124	0.46624	0.95028
	N	23	18	14	17	23	24	19
NI	Pearson Correlation	0.37028	0.45322	0.60914	0.54960	0.32283	0.50448	0.42031
	Sig. (2-tailed)	0.08200	0.05891	0.02076	0.02229	0.13298	0.01194	0.07317
	N	23	18	14	17	23	24	19
RES	Pearson Correlation	0.89459	0.84142	0.95492	0.86960	0.89048	0.93205	0.77653
	Sig. (2-tailed)	0.00000	0.00001	0.00000	0.00001	0.00000	0.00000	0.00009
	N	23	18	14	17	23	24	19
RIP	Pearson Correlation	0.52214	0.47781	0.55343	0.48139	0.35339	0.51172	0.43600
	Sig. (2-tailed)	0.01060	0.04491	0.04007	0.05041	0.09809	0.01059	0.06203
	N	23	18	14	17	23	24	19
URB	Pearson Correlation	0.76104	0.81007	0.77657	0.81807	0.74112	0.81057	0.73288
	Sig. (2-tailed)	0.00002	0.00005	0.00109	0.00006	0.00005	0.00000	0.00036
	N	23	18	14	17	23	24	19
WATER	Pearson Correlation	-0.07326	-0.06256	-0.22046	0.04715	-0.13155	-0.03906	-0.00749
	Sig. (2-tailed)	0.73974	0.80522	0.44883	0.85740	0.54963	0.85621	0.97573
	N	23	18	14	17	23	24	19

Table B-1-7: Correlation Between Land Use and Detailed CBP-FQPs

		CBPFQP 11	CBPFQP 23	CBPFQP 31	CBPFQP 42	CBPFQP 44	CBPFQP 48	CBPFQP 53
IR	Pearson Correlation	0.24991	0.23935	0.23959	0.23385	0.19872	0.11809	0.23842
	Sig. (2-tailed)	0.41025	0.22919	0.21064	0.26056	0.30141	0.59152	0.26189
	N	13	27	29	25	29	23	24
NI	Pearson Correlation	0.29817	0.49780	0.50040	0.47601	0.46662	0.35123	0.33079
	Sig. (2-tailed)	0.32241	0.00824	0.00570	0.01616	0.01072	0.10031	0.11437
	N	13	27	29	25	29	23	24
RES	Pearson Correlation	0.78961	0.86344	0.78669	0.82508	0.88966	0.80459	0.87926
	Sig. (2-tailed)	0.00133	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	13	27	29	25	29	23	24
RIP	Pearson Correlation	0.40401	0.37902	0.43294	0.36503	0.40959	0.38919	0.36831
	Sig. (2-tailed)	0.17096	0.05121	0.01898	0.07278	0.02735	0.06643	0.07658
	N	13	27	29	25	29	23	24
URB	Pearson Correlation	0.76040	0.76085	0.83182	0.75101	0.82609	0.65224	0.69493
	Sig. (2-tailed)	0.00255	0.00000	0.00000	0.00002	0.00000	0.00074	0.00016
	N	13	27	29	25	29	23	24
WATER	Pearson Correlation	-0.16631	-0.07948	-0.10996	-0.13421	-0.10846	-0.23163	0.01034
	Sig. (2-tailed)	0.58712	0.69354	0.57013	0.52244	0.57547	0.28757	0.96177
	N	13	27	29	25	29	23	24

		CBPFQP 54	CBPFQP 55	CBPFQP 56	CBPFQP 61	CBPFQP 62	CBPFQP 81	CBPFQP 95
IR	Pearson Correlation	0.02444	-0.01055	0.12921	0.18405	0.04797	0.17077	0.00917
	Sig. (2-tailed)	0.91186	0.96687	0.65977	0.47949	0.82795	0.42498	0.97029
	N	23	18	14	17	23	24	19
NI	Pearson Correlation	0.34946	0.45177	0.58108	0.55475	0.31222	0.48838	0.44533
	Sig. (2-tailed)	0.10216	0.05982	0.02932	0.02082	0.14695	0.01546	0.05604
	N	23	18	14	17	23	24	19
RES	Pearson Correlation	0.87606	0.83841	0.93387	0.86436	0.88891	0.91688	0.78423
	Sig. (2-tailed)	0.00000	0.00001	0.00000	0.00001	0.00000	0.00000	0.00007
	N	23	18	14	17	23	24	19
RIP	Pearson Correlation	0.51082	0.48107	0.53855	0.48628	0.35453	0.48512	0.43503
	Sig. (2-tailed)	0.01274	0.04327	0.04693	0.04779	0.09694	0.01627	0.06268
	N	23	18	14	17	23	24	19
URB	Pearson Correlation	0.79519	0.80954	0.79361	0.80993	0.74309	0.77674	0.73920
	Sig. (2-tailed)	0.00001	0.00005	0.00070	0.00008	0.00005	0.00001	0.00030
	N	23	18	14	17	23	24	19
WATER	Pearson Correlation	-0.06844	-0.04609	-0.20822	0.06380	-0.13355	-0.05262	0.01757
	Sig. (2-tailed)	0.75635	0.85589	0.47503	0.80780	0.54353	0.80710	0.94310
	N	23	18	14	17	23	24	19

Table B-1-8: Correlation Between Land Use and Detailed CBP-TEs

		CBPTE11	CBPTE22	CBPTE23	CBPTE31	CBPTE42	CBPTE44
IR	Pearson Correlation	0.39794	0.22641	0.20551	0.21551	0.16774	0.17213
	Sig. (2-tailed)	0.03253	0.23759	0.28484	0.26153	0.38442	0.37192
	N	29	29	29	29	29	29
NI	Pearson Correlation	0.41273	0.43192	0.49572	0.44529	0.42412	0.45347
	Sig. (2-tailed)	0.02607	0.01930	0.00625	0.01549	0.02185	0.01349
	N	29	29	29	29	29	29
RES	Pearson Correlation	0.68968	0.76296	0.89043	0.87312	0.82763	0.92291
	Sig. (2-tailed)	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29
RIP	Pearson Correlation	0.30112	0.39605	0.34733	0.41898	0.32762	0.46612
	Sig. (2-tailed)	0.11243	0.03343	0.06488	0.02368	0.08276	0.01082
	N	29	29	29	29	29	29
URB	Pearson Correlation	0.59968	0.64110	0.78200	0.82804	0.78518	0.81103
	Sig. (2-tailed)	0.00059	0.00018	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29
WATER	Pearson Correlation	0.05627	-0.08899	-0.05807	-0.12461	-0.07557	-0.09461
	Sig. (2-tailed)	0.77189	0.64619	0.76479	0.51956	0.69684	0.62542
	N	29	29	29	29	29	29

		CBPTE 48	CBPTE 52	CBPTE 53	CBPTE 54	CBPTE 55	CBPTE 56	CBPTE 61
IR	Pearson Correlation	0.28289	0.20039	0.10794	0.08885	-0.09190	0.16858	0.00167
	Sig. (2-tailed)	0.13703	0.29727	0.57730	0.64672	0.63542	0.38202	0.99316
	N	29	29	29	29	29	29	29
NI	Pearson Correlation	0.54580	0.46839	0.38171	0.41082	0.31270	0.44412	0.43427
	Sig. (2-tailed)	0.00219	0.01039	0.04103	0.02684	0.09862	0.01580	0.01858
	N	29	29	29	29	29	29	29
RES	Pearson Correlation	0.90003	0.91012	0.85925	0.86609	0.77330	0.90605	0.82900
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
RIP	Pearson Correlation	0.48347	0.43829	0.31445	0.36788	0.32811	0.40465	0.37614
	Sig. (2-tailed)	0.00788	0.01740	0.09665	0.04960	0.08227	0.02945	0.04433
	N	29	29	29	29	29	29	29
URB	Pearson Correlation	0.78467	0.83480	0.70720	0.78842	0.67204	0.82109	0.68112
	Sig. (2-tailed)	0.00000	0.00000	0.00002	0.00000	0.00007	0.00000	0.00005
	N	29	29	29	29	29	29	29
WATER	Pearson Correlation	0.00276	-0.04712	0.03330	0.00693	0.00255	-0.02162	0.03878
	Sig. (2-tailed)	0.98865	0.80823	0.86384	0.97154	0.98955	0.91135	0.84170
	N	29	29	29	29	29	29	29

Table B-1-8: Continued

		CBPTE71	CBPTE72	CBPTE81	CBPTE95	CBPTE99
IR	Pearson Correlation	-0.07796	0.07568	0.20453	-0.10784	0.06607
	Sig. (2-tailed)	0.68769	0.69639	0.28719	0.57764	0.73345
	N	29	29	29	29	29
NI	Pearson Correlation	0.24777	0.38390	0.49298	0.37765	0.37972
	Sig. (2-tailed)	0.19501	0.03979	0.00659	0.04341	0.04218
	N	29	29	29	29	29
RES	Pearson Correlation	0.72993	0.90854	0.93022	0.71752	0.82617
	Sig. (2-tailed)	0.00001	0.00000	0.00000	0.00001	0.00000
	N	29	29	29	29	29
RIP	Pearson Correlation	0.22156	0.47817	0.47318	0.39283	0.42896
	Sig. (2-tailed)	0.24807	0.00870	0.00953	0.03503	0.02023
	N	29	29	29	29	29
URB	Pearson Correlation	0.62480	0.76140	0.83958	0.67623	0.75846
	Sig. (2-tailed)	0.00029	0.00000	0.00000	0.00006	0.00000
	N	29	29	29	29	29
WATER	Pearson Correlation	0.06158	-0.10026	-0.03650	0.00780	0.11064
	Sig. (2-tailed)	0.75100	0.60484	0.85091	0.96796	0.56774
	N	29	29	29	29	29

Table B-1-9: Correlation Between Land Use and Detailed CFSB-1s

		CFSB-1T	CFSB-13	CFSB-16	CFSB-17	CFSB-18	CFSB-111	CFSB-112
IR	Pearson Correlation	0.20508	0.20508	0.20508	0.20508	0.20508	0.20508	0.20508
	Sig. (2-tailed)	0.28588	0.28588	0.28588	0.28588	0.28588	0.28588	0.28589
	N	29	29	29	29	29	29	29
NI	Pearson Correlation	0.49788	0.49787	0.49787	0.49787	0.49787	0.49788	0.49788
	Sig. (2-tailed)	0.00599	0.00599	0.00599	0.00599	0.00599	0.00599	0.00599
	N	29	29	29	29	29	29	29
RES	Pearson Correlation	0.91428	0.91429	0.91429	0.91429	0.91429	0.91428	0.91428
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
RIP	Pearson Correlation	0.47419	0.47419	0.47419	0.47420	0.47420	0.47419	0.47419
	Sig. (2-tailed)	0.00936	0.00936	0.00936	0.00935	0.00935	0.00936	0.00936
	N	29	29	29	29	29	29	29
URB	Pearson Correlation	0.86032	0.86032	0.86032	0.86032	0.86032	0.86032	0.86032
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
WATER	Pearson Correlation	-0.06858	-0.06858	-0.06858	-0.06858	-0.06858	-0.06858	-0.06858
	Sig. (2-tailed)	0.72372	0.72372	0.72372	0.72371	0.72371	0.72372	0.72372
	N	29	29	29	29	29	29	29

		CFSB-113	CFSB-115	CFSB-117	CFSB-118	CFSB-119	CFSB-121	CFSB-123
IR	Pearson Correlation	0.20508	0.20508	0.20508	0.20508	0.20508	0.20508	0.20507
	Sig. (2-tailed)	0.28588	0.28587	0.28589	0.28589	0.28588	0.28588	0.28589
	N	29	29	29	29	29	29	29
NI	Pearson Correlation	0.49788	0.49788	0.49788	0.49788	0.49787	0.49787	0.49787
	Sig. (2-tailed)	0.00599	0.00599	0.00599	0.00599	0.00599	0.00599	0.00599
	N	29	29	29	29	29	29	29
RES	Pearson Correlation	0.91428	0.91429	0.91428	0.91428	0.91429	0.91429	0.91428
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
RIP	Pearson Correlation	0.47419	0.47420	0.47419	0.47419	0.47420	0.47420	0.47419
	Sig. (2-tailed)	0.00936	0.00935	0.00936	0.00936	0.00935	0.00935	0.00936
	N	29	29	29	29	29	29	29
URB	Pearson Correlation	0.86032	0.86032	0.86032	0.86032	0.86032	0.86032	0.86032
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
WATER	Pearson Correlation	-0.06858	-0.06858	-0.06858	-0.06858	-0.06858	-0.06858	-0.06858
	Sig. (2-tailed)	0.72372	0.72372	0.72372	0.72371	0.72372	0.72372	0.72371
	N	29	29	29	29	29	29	29

Table B-1-9: Continued

		CFSB-126	CFSB-127	CFSB-128	CFSB-129	CFSB-130	CFSB-131	CFSB-133
IR	Pearson Correlation	0.20507	0.20508	0.20508	0.20507	0.20507	0.20507	0.20507
	Sig. (2-tailed)	0.28589	0.28588	0.28588	0.28589	0.28589	0.28590	0.28589
	N	29	29	29	29	29	29	29
NI	Pearson Correlation	0.49787	0.49787	0.49787	0.49788	0.49787	0.49787	0.49788
	Sig. (2-tailed)	0.00599	0.00599	0.00599	0.00599	0.00599	0.00599	0.00599
	N	29	29	29	29	29	29	29
RES	Pearson Correlation	0.91428	0.91429	0.91429	0.91428	0.91428	0.91428	0.91428
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
RIP	Pearson Correlation	0.47419	0.47419	0.47420	0.47419	0.47419	0.47419	0.47419
	Sig. (2-tailed)	0.00936	0.00936	0.00935	0.00936	0.00936	0.00936	0.00936
	N	29	29	29	29	29	29	29
URB	Pearson Correlation	0.86032	0.86032	0.86032	0.86032	0.86032	0.86032	0.86032
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
WATER	Pearson Correlation	-0.06859	-0.06858	-0.06858	-0.06858	-0.06859	-0.06858	-0.06858
	Sig. (2-tailed)	0.72370	0.72373	0.72371	0.72372	0.72370	0.72371	0.72372
	N	29	29	29	29	29	29	29

		CFSB-134	CFSB-135	CFSB-136	CFSB-139	CFSB-140	CFSB-143	CFSB-199
IR	Pearson Correlation	0.20508	0.20508	0.20508	0.20507	0.20508	0.20507	0.20508
	Sig. (2-tailed)	0.28588	0.28589	0.28587	0.28589	0.28588	0.28589	0.28589
	N	29	29	29	29	29	29	29
NI	Pearson Correlation	0.49787	0.49787	0.49788	0.49787	0.49788	0.49787	0.49788
	Sig. (2-tailed)	0.00599	0.00599	0.00599	0.00599	0.00599	0.00599	0.00599
	N	29	29	29	29	29	29	29
RES	Pearson Correlation	0.91429	0.91429	0.91429	0.91428	0.91428	0.91428	0.91428
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
RIP	Pearson Correlation	0.47420	0.47419	0.47420	0.47419	0.47419	0.47419	0.47419
	Sig. (2-tailed)	0.00935	0.00936	0.00935	0.00936	0.00936	0.00936	0.00936
	N	29	29	29	29	29	29	29
URB	Pearson Correlation	0.86032	0.86032	0.86032	0.86032	0.86032	0.86032	0.86032
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
WATER	Pearson Correlation	-0.06858	-0.06858	-0.06858	-0.06859	-0.06858	-0.06859	-0.06858
	Sig. (2-tailed)	0.72371	0.72371	0.72372	0.72370	0.72372	0.72370	0.72371
	N	29	29	29	29	29	29	29

Table B-1-10: Correlation Between Land Use and Detailed CFS2Is

		CFS2IT	CFS2I3	CFS2I7	CFS2I8	CFS2I12	CFS2I13	CFS2I14
IR	Pearson Correlation	0.20507	0.20508	0.20508	0.20507	0.20508	0.20507	0.20508
	Sig. (2-tailed)	0.28589	0.28588	0.28589	0.28590	0.28588	0.28589	0.28588
	N	29	29	29	29	29	29	29
NI	Pearson Correlation	0.49788	0.49787	0.49788	0.49787	0.49787	0.49787	0.49787
	Sig. (2-tailed)	0.00599	0.00599	0.00599	0.00599	0.00599	0.00599	0.00599
	N	29	29	29	29	29	29	29
RES	Pearson Correlation	0.91428	0.91429	0.91428	0.91428	0.91429	0.91428	0.91429
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
RIP	Pearson Correlation	0.47419	0.47419	0.47419	0.47419	0.47420	0.47419	0.47420
	Sig. (2-tailed)	0.00936	0.00936	0.00936	0.00936	0.00935	0.00936	0.00935
	N	29	29	29	29	29	29	29
URB	Pearson Correlation	0.86032	0.86032	0.86032	0.86032	0.86032	0.86032	0.86032
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
WATER	Pearson Correlation	-0.06858	-0.06858	-0.06858	-0.06858	-0.06858	-0.06859	-0.06858
	Sig. (2-tailed)	0.72372	0.72373	0.72372	0.72371	0.72371	0.72370	0.72371
	N	29	29	29	29	29	29	29

		CFS2I15	CFS2I18	CFS2I19	CFS2I21	CFS2I26	CFS2I27	CFS2I28
IR	Pearson Correlation	0.20508	0.20508	0.20508	0.20508	0.20507	0.20508	0.20507
	Sig. (2-tailed)	0.28588	0.28588	0.28588	0.28589	0.28589	0.28588	0.28589
	N	29	29	29	29	29	29	29
NI	Pearson Correlation	0.49787	0.49787	0.49787	0.49787	0.49787	0.49787	0.49788
	Sig. (2-tailed)	0.00599	0.00599	0.00599	0.00599	0.00599	0.00599	0.00599
	N	29	29	29	29	29	29	29
RES	Pearson Correlation	0.91429	0.91429	0.91429	0.91429	0.91428	0.91429	0.91428
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
RIP	Pearson Correlation	0.47419	0.47420	0.47420	0.47419	0.47419	0.47419	0.47419
	Sig. (2-tailed)	0.00936	0.00935	0.00935	0.00936	0.00936	0.00936	0.00936
	N	29	29	29	29	29	29	29
URB	Pearson Correlation	0.86032	0.86032	0.86032	0.86032	0.86032	0.86032	0.86032
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
WATER	Pearson Correlation	-0.06858	-0.06858	-0.06858	-0.06858	-0.06858	-0.06858	-0.06858
	Sig. (2-tailed)	0.72373	0.72372	0.72372	0.72371	0.72371	0.72372	0.72372
	N	29	29	29	29	29	29	29

Table B-1-10: Continued

		CFS2I31	CFS2I32	CFS2I33	CFS2I34	CFS2I35	CFS2I40	CFS2I43
IR	Pearson Correlation	0.20508	0.20507	0.20507	0.20508	0.20507	0.20508	0.20508
	Sig. (2-tailed)	0.28588	0.28589	0.28589	0.28588	0.28589	0.28588	0.28587
	N	29	29	29	29	29	29	29
NI	Pearson Correlation	0.49787	0.49787	0.49787	0.49787	0.49788	0.49787	0.49788
	Sig. (2-tailed)	0.00599	0.00599	0.00599	0.00599	0.00599	0.00599	0.00599
	N	29	29	29	29	29	29	29
RES	Pearson Correlation	0.91429	0.91428	0.91428	0.91428	0.91428	0.91429	0.91429
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
RIP	Pearson Correlation	0.47419	0.47419	0.47419	0.47419	0.47419	0.47419	0.47420
	Sig. (2-tailed)	0.00936	0.00936	0.00936	0.00936	0.00936	0.00936	0.00935
	N	29	29	29	29	29	29	29
URB	Pearson Correlation	0.86032	0.86032	0.86032	0.86032	0.86032	0.86032	0.86032
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
WATER	Pearson Correlation	-0.06858	-0.06858	-0.06859	-0.06858	-0.06858	-0.06858	-0.06858
	Sig. (2-tailed)	0.72373	0.72371	0.72370	0.72371	0.72372	0.72373	0.72372
	N	29	29	29	29	29	29	29

Table B-1-11: Correlation Between Land Use and Detailed CFS2Ps

		CFS2PT	CFS2P3	CFS2P6	CFS2P7	CFS2P8	CFS2P12
IR	Pearson Correlation	0.20660	0.20661	0.20660	0.20660	0.20660	0.20659
	Sig. (2-tailed)	0.28224	0.28223	0.28224	0.28224	0.28225	0.28226
	N	29	29	29	29	29	29
NI	Pearson Correlation	0.50098	0.50097	0.50097	0.50097	0.50097	0.50097
	Sig. (2-tailed)	0.00564	0.00564	0.00564	0.00564	0.00564	0.00564
	N	29	29	29	29	29	29
RES	Pearson Correlation	0.91391	0.91391	0.91391	0.91391	0.91391	0.91391
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29
RIP	Pearson Correlation	0.46455	0.46455	0.46455	0.46455	0.46455	0.46454
	Sig. (2-tailed)	0.01112	0.01112	0.01112	0.01112	0.01112	0.01112
	N	29	29	29	29	29	29
URB	Pearson Correlation	0.85691	0.85691	0.85691	0.85691	0.85691	0.85691
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29
WATER	Pearson Correlation	-0.05855	-0.05855	-0.05856	-0.05856	-0.05855	-0.05855
	Sig. (2-tailed)	0.76287	0.76287	0.76287	0.76286	0.76289	0.76288
	N	29	29	29	29	29	29

		CFS2P13	CFS2P15	CFS2P17	CFS2P18	CFS2P19	CFS2P23
IR	Pearson Correlation	0.20660	0.20660	0.20661	0.20660	0.20660	0.20661
	Sig. (2-tailed)	0.28224	0.28224	0.28223	0.28224	0.28224	0.28223
	N	29	29	29	29	29	29
NI	Pearson Correlation	0.50097	0.50097	0.50097	0.50097	0.50097	0.50097
	Sig. (2-tailed)	0.00564	0.00564	0.00564	0.00564	0.00564	0.00564
	N	29	29	29	29	29	29
RES	Pearson Correlation	0.91391	0.91391	0.91391	0.91391	0.91391	0.91391
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29
RIP	Pearson Correlation	0.46455	0.46455	0.46455	0.46455	0.46455	0.46455
	Sig. (2-tailed)	0.01112	0.01112	0.01112	0.01112	0.01112	0.01112
	N	29	29	29	29	29	29
URB	Pearson Correlation	0.85691	0.85691	0.85691	0.85691	0.85691	0.85691
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29
WATER	Pearson Correlation	-0.05856	-0.05856	-0.05856	-0.05856	-0.05856	-0.05856
	Sig. (2-tailed)	0.76286	0.76286	0.76285	0.76286	0.76287	0.76285
	N	29	29	29	29	29	29

Table B-1-11: Continued

		CFS2P24	CFS2P26	CFS2P27	CFS2P28	CFS2P29	CFS2P30
IR	Pearson Correlation	0.20660	0.20660	0.20661	0.20660	0.20660	0.20661
	Sig. (2-tailed)	0.28225	0.28224	0.28223	0.28226	0.28224	0.28223
	N	29	29	29	29	29	29
NI	Pearson Correlation	0.50097	0.50097	0.50097	0.50097	0.50097	0.50098
	Sig. (2-tailed)	0.00564	0.00564	0.00564	0.00564	0.00564	0.00564
	N	29	29	29	29	29	29
RES	Pearson Correlation	0.91391	0.91391	0.91391	0.91391	0.91391	0.91391
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29
RIP	Pearson Correlation	0.46454	0.46455	0.46455	0.46455	0.46455	0.46455
	Sig. (2-tailed)	0.01112	0.01112	0.01112	0.01112	0.01112	0.01112
	N	29	29	29	29	29	29
URB	Pearson Correlation	0.85691	0.85691	0.85691	0.85691	0.85691	0.85691
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29
WATER	Pearson Correlation	-0.05855	-0.05855	-0.05855	-0.05855	-0.05856	-0.05856
	Sig. (2-tailed)	0.76287	0.76288	0.76287	0.76288	0.76286	0.76287
	N	29	29	29	29	29	29

		CFS2P32	CFS2P34	CFS2P35	CFS2P39	CFS2P40	CFS2P43
IR	Pearson Correlation	0.20660	0.20660	0.20661	0.20661	0.20660	0.20661
	Sig. (2-tailed)	0.28224	0.28225	0.28223	0.28223	0.28226	0.28223
	N	29	29	29	29	29	29
NI	Pearson Correlation	0.50097	0.50097	0.50097	0.50097	0.50097	0.50097
	Sig. (2-tailed)	0.00564	0.00564	0.00564	0.00564	0.00564	0.00564
	N	29	29	29	29	29	29
RES	Pearson Correlation	0.91391	0.91391	0.91391	0.91391	0.91391	0.91391
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29
RIP	Pearson Correlation	0.46455	0.46455	0.46455	0.46455	0.46455	0.46455
	Sig. (2-tailed)	0.01112	0.01112	0.01112	0.01112	0.01112	0.01112
	N	29	29	29	29	29	29
URB	Pearson Correlation	0.85691	0.85691	0.85691	0.85691	0.85691	0.85691
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29
WATER	Pearson Correlation	-0.05856	-0.05855	-0.05856	-0.05856	-0.05855	-0.05856
	Sig. (2-tailed)	0.76286	0.76287	0.76285	0.76285	0.76288	0.76285
	N	29	29	29	29	29	29

Table B-1-12: Correlation Between Land Use and Detailed EMPBIs

		EMPBIT	EMPBI1	EMPBI2	EMPBI3	EMPBI4	EMPBI5	EMPBI6
IR	Pearson Correlation	0.20508	0.29840	0.19402	0.18532	0.19294	0.26620	0.19993
	Sig. (2-tailed)	0.28588	0.11587	0.31322	0.33581	0.31598	0.16278	0.29840
	N	29	29	29	29	29	29	29
NI	Pearson Correlation	0.49788	0.51144	0.39685	0.19327	0.50605	0.56808	0.48944
	Sig. (2-tailed)	0.00599	0.00457	0.03305	0.31512	0.00510	0.00131	0.00705
	N	29	29	29	29	29	29	29
RES	Pearson Correlation	0.91428	0.80755	0.55494	0.66999	0.89548	0.83591	0.84520
	Sig. (2-tailed)	0.00000	0.00000	0.00178	0.00007	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
RIP	Pearson Correlation	0.47419	0.43238	0.14722	0.37106	0.42055	0.49837	0.36176
	Sig. (2-tailed)	0.00936	0.01916	0.44599	0.04751	0.02311	0.00593	0.05382
	N	29	29	29	29	29	29	29
URB	Pearson Correlation	0.86032	0.75078	0.51787	0.63347	0.82387	0.86185	0.77655
	Sig. (2-tailed)	0.00000	0.00000	0.00401	0.00023	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
WATER	Pearson Correlation	-0.06858	-0.06764	0.01312	-0.23669	-0.07665	-0.06041	-0.06085
	Sig. (2-tailed)	0.72372	0.72736	0.94616	0.21638	0.69270	0.75558	0.75386
	N	29	29	29	29	29	29	29

		EMPBI7	EMPBI8	EMPBI9	EMPBI10	EMPBI11	EMPBI12	EMPBI13
IR	Pearson Correlation	0.21318	0.24489	0.14099	0.23428	0.15112	0.14416	0.24438
	Sig. (2-tailed)	0.26685	0.20042	0.46568	0.22123	0.43389	0.45562	0.20138
	N	29	29	29	29	29	29	29
NI	Pearson Correlation	0.48915	0.47680	0.32821	0.51173	0.43668	0.46847	0.50251
	Sig. (2-tailed)	0.00708	0.00892	0.08216	0.00455	0.01786	0.01037	0.00547
	N	29	29	29	29	29	29	29
RES	Pearson Correlation	0.91136	0.89529	0.77677	0.90898	0.89510	0.88338	0.82325
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
RIP	Pearson Correlation	0.46535	0.47966	0.31134	0.42586	0.38724	0.46315	0.39899
	Sig. (2-tailed)	0.01097	0.00846	0.10018	0.02126	0.03795	0.01140	0.03203
	N	29	29	29	29	29	29	29
URB	Pearson Correlation	0.84521	0.80081	0.75754	0.83506	0.80083	0.82420	0.80097
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
WATER	Pearson Correlation	-0.09428	-0.08857	0.06248	-0.11053	-0.04456	-0.05797	-0.04781
	Sig. (2-tailed)	0.62663	0.64776	0.74745	0.56813	0.81845	0.76517	0.80548
	N	29	29	29	29	29	29	29

Table B-1-12: Continued

		EMPBI14	EMPBI15	EMPBI16	EMPBI17	EMPBI18	EMPBI19	EMPBI20
IR	Pearson Correlation	0.21169	0.22589	0.26232	0.03911	0.04126	0.17685	0.21675
	Sig. (2-tailed)	0.27030	0.23870	0.16922	0.84037	0.83170	0.35875	0.25874
	N	29	29	29	29	29	29	29
NI	Pearson Correlation	0.48220	0.47180	0.55152	0.38220	0.38070	0.47357	0.53355
	Sig. (2-tailed)	0.00807	0.00977	0.00193	0.04075	0.04161	0.00946	0.00288
	N	29	29	29	29	29	29	29
RES	Pearson Correlation	0.88148	0.84970	0.90753	0.81491	0.88889	0.89690	0.89702
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
RIP	Pearson Correlation	0.46150	0.39726	0.51625	0.39504	0.48236	0.43064	0.45970
	Sig. (2-tailed)	0.01174	0.03285	0.00415	0.03393	0.00805	0.01970	0.01211
	N	29	29	29	29	29	29	29
URB	Pearson Correlation	0.86598	0.77620	0.82786	0.71136	0.80313	0.85158	0.83675
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00002	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
WATER	Pearson Correlation	-0.17944	0.02437	-0.12032	-0.02061	-0.05896	-0.02072	-0.04534
	Sig. (2-tailed)	0.35166	0.90013	0.53412	0.91550	0.76129	0.91506	0.81535
	N	29	29	29	29	29	29	29

		EMPBI21	EMPBI22	EMPBI23	EMPBI24	EMPBI25
IR	Pearson Correlation	0.01764	0.19792	0.74360	0.17783	0.21435
	Sig. (2-tailed)	0.92764	0.30341	0.00000	0.35606	0.26418
	N	29	29	29	29	29
NI	Pearson Correlation	0.27018	0.47890	0.68856	0.48153	0.53453
	Sig. (2-tailed)	0.15635	0.00858	0.00004	0.00817	0.00282
	N	29	29	29	29	29
RES	Pearson Correlation	0.74086	0.89184	0.71909	0.83385	0.89158
	Sig. (2-tailed)	0.00000	0.00000	0.00001	0.00000	0.00000
	N	29	29	29	29	29
RIP	Pearson Correlation	0.54519	0.47144	0.36335	0.45806	0.45641
	Sig. (2-tailed)	0.00222	0.00983	0.05270	0.01246	0.01282
	N	29	29	29	29	29
URB	Pearson Correlation	0.80082	0.86917	0.64922	0.74043	0.84937
	Sig. (2-tailed)	0.00000	0.00000	0.00014	0.00000	0.00000
	N	29	29	29	29	29
WATER	Pearson Correlation	-0.12587	-0.05472	0.03010	-0.11706	0.00363
	Sig. (2-tailed)	0.51531	0.77800	0.87680	0.54534	0.98511
	N	29	29	29	29	29

Table B-1-13: Correlation Between Land Use and Detailed NOJs

		NOJT	NOJ1	NOJ2	NOJ3	NOJ4	NOJ5	NOJ6
IR	Pearson Correlation	0.19173	0.07880	0.18033	0.25115	0.22588	0.25743	0.20011
	Sig. (2-tailed)	0.31908	0.68450	0.34923	0.18879	0.23872	0.17760	0.29798
	N	29	29	29	29	29	29	29
NI	Pearson Correlation	0.49381	0.23790	0.50348	0.55497	0.48026	0.40542	0.48892
	Sig. (2-tailed)	0.00648	0.21397	0.00537	0.00178	0.00837	0.02912	0.00712
	N	29	29	29	29	29	29	29
RES	Pearson Correlation	0.90785	0.36870	0.88030	0.82105	0.89711	0.86685	0.93517
	Sig. (2-tailed)	0.00000	0.04905	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
RIP	Pearson Correlation	0.48600	0.12591	0.41776	0.44297	0.44641	0.48451	0.44652
	Sig. (2-tailed)	0.00752	0.51517	0.02413	0.01610	0.01520	0.00773	0.01518
	N	29	29	29	29	29	29	29
URB	Pearson Correlation	0.86028	0.38443	0.82294	0.84597	0.83451	0.79516	0.81554
	Sig. (2-tailed)	0.00000	0.03949	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29	29	29
WATER	Pearson Correlation	-0.06551	0.03111	-0.07461	-0.06469	-0.11227	-0.00542	-0.06595
	Sig. (2-tailed)	0.73564	0.87271	0.70051	0.73884	0.56202	0.97773	0.73393
	N	29	29	29	29	29	29	29

		NOJ7	NOJ8	NOJ9	NOJ10	NOJ11
IR	Pearson Correlation	0.23313	0.25420	0.01192	0.15627	0.18929
	Sig. (2-tailed)	0.22359	0.18330	0.95108	0.41823	0.32538
	N	29	29	29	29	29
NI	Pearson Correlation	0.53731	0.53692	0.36854	0.48259	0.48868
	Sig. (2-tailed)	0.00265	0.00267	0.04916	0.00801	0.00715
	N	29	29	29	29	29
RES	Pearson Correlation	0.86776	0.90007	0.86968	0.89733	0.88918
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29
RIP	Pearson Correlation	0.45976	0.53445	0.44441	0.49429	0.49022
	Sig. (2-tailed)	0.01210	0.00282	0.01572	0.00642	0.00694
	N	29	29	29	29	29
URB	Pearson Correlation	0.86551	0.82081	0.75740	0.83364	0.85823
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29
WATER	Pearson Correlation	-0.06915	-0.11815	-0.01827	0.01970	-0.07399
	Sig. (2-tailed)	0.72153	0.54159	0.92505	0.91920	0.70287
	N	29	29	29	29	29

Table B-1-14: Correlation Between Land Use and Detailed Wages

		WT	W1	W2	W3	W4	W5	W6
IR	Pearson Correlation	0.20125	0.11854	0.16828	0.23487	0.22055	0.18736	0.21031
	Sig. (2-tailed)	0.29518	0.54026	0.38288	0.22003	0.25028	0.33045	0.27350
	N	29	29	29	29	29	29	29
NI	Pearson Correlation	0.49382	0.28769	0.49249	0.53345	0.44387	0.30430	0.49023
	Sig. (2-tailed)	0.00648	0.13021	0.00665	0.00288	0.01586	0.10850	0.00694
	N	29	29	29	29	29	29	29
RES	Pearson Correlation	0.89481	0.36456	0.86241	0.71829	0.86643	0.69208	0.92895
	Sig. (2-tailed)	0.00000	0.05185	0.00000	0.00001	0.00000	0.00003	0.00000
	N	29	29	29	29	29	29	29
RIP	Pearson Correlation	0.49462	0.07398	0.44612	0.39259	0.41585	0.35518	0.43438
	Sig. (2-tailed)	0.00638	0.70290	0.01528	0.03515	0.02486	0.05866	0.01855
	N	29	29	29	29	29	29	29
URB	Pearson Correlation	0.88144	0.38849	0.83336	0.75569	0.81907	0.67624	0.81243
	Sig. (2-tailed)	0.00000	0.03728	0.00000	0.00000	0.00000	0.00006	0.00000
	N	29	29	29	29	29	29	29
WATER	Pearson Correlation	-0.06603	0.06721	-0.08009	-0.00150	-0.12808	0.11791	-0.07612
	Sig. (2-tailed)	0.73361	0.72902	0.67960	0.99382	0.50787	0.54241	0.69472
	N	29	29	29	29	29	29	29

		W7	W8	W9	W10	W11
IR	Pearson Correlation	0.21826	0.28200	-0.07036	0.12559	0.16872
	Sig. (2-tailed)	0.25536	0.13831	0.71685	0.51624	0.38161
	N	29	29	29	29	29
NI	Pearson Correlation	0.50673	0.51273	0.32597	0.43830	0.46515
	Sig. (2-tailed)	0.00503	0.00446	0.08441	0.01740	0.01100
	N	29	29	29	29	29
RES	Pearson Correlation	0.83542	0.81307	0.82613	0.87529	0.88167
	Sig. (2-tailed)	0.00000	0.00000	0.00000	0.00000	0.00000
	N	29	29	29	29	29
RIP	Pearson Correlation	0.45151	0.44598	0.41890	0.47846	0.50043
	Sig. (2-tailed)	0.01395	0.01531	0.02371	0.00865	0.00570
	N	29	29	29	29	29
URB	Pearson Correlation	0.87123	0.69578	0.70841	0.81911	0.87485
	Sig. (2-tailed)	0.00000	0.00003	0.00002	0.00000	0.00000
	N	29	29	29	29	29
WATER	Pearson Correlation	-0.09273	-0.13942	0.02359	0.02278	-0.07687
	Sig. (2-tailed)	0.63233	0.47073	0.90332	0.90661	0.69187
	N	29	29	29	29	29

B-2 Correlation Between Commodity Flow and Contribution Factors

B-2-1 Correlation Between Total Commodity Flow and Total Contribution Factors

Table B-2-1: Correlation Between Commodity Flow and Contributing Factors

		CFS2PT	CFS2IT	CFSB-1T
AREA	Pearson Correlation	-0.17274	-0.18348	-0.18348
	Sig. (2-tailed)	0.37020	0.34072	0.34073
	N	29	29	29
CBPE	Pearson Correlation	0.99394	0.99329	0.99329
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29.0	29.0	29.0
CBPFQP	Pearson Correlation	0.98833	0.98631	0.98631
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPAP	Pearson Correlation	0.99062	0.98884	0.98884
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE	Pearson Correlation	0.99225	0.99182	0.99182
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI	Pearson Correlation	0.99881	1.00000	1.00000
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
NOJ	Pearson Correlation	0.99648	0.99802	0.99802
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
Wages	Pearson Correlation	0.99417	0.99454	0.99454
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29

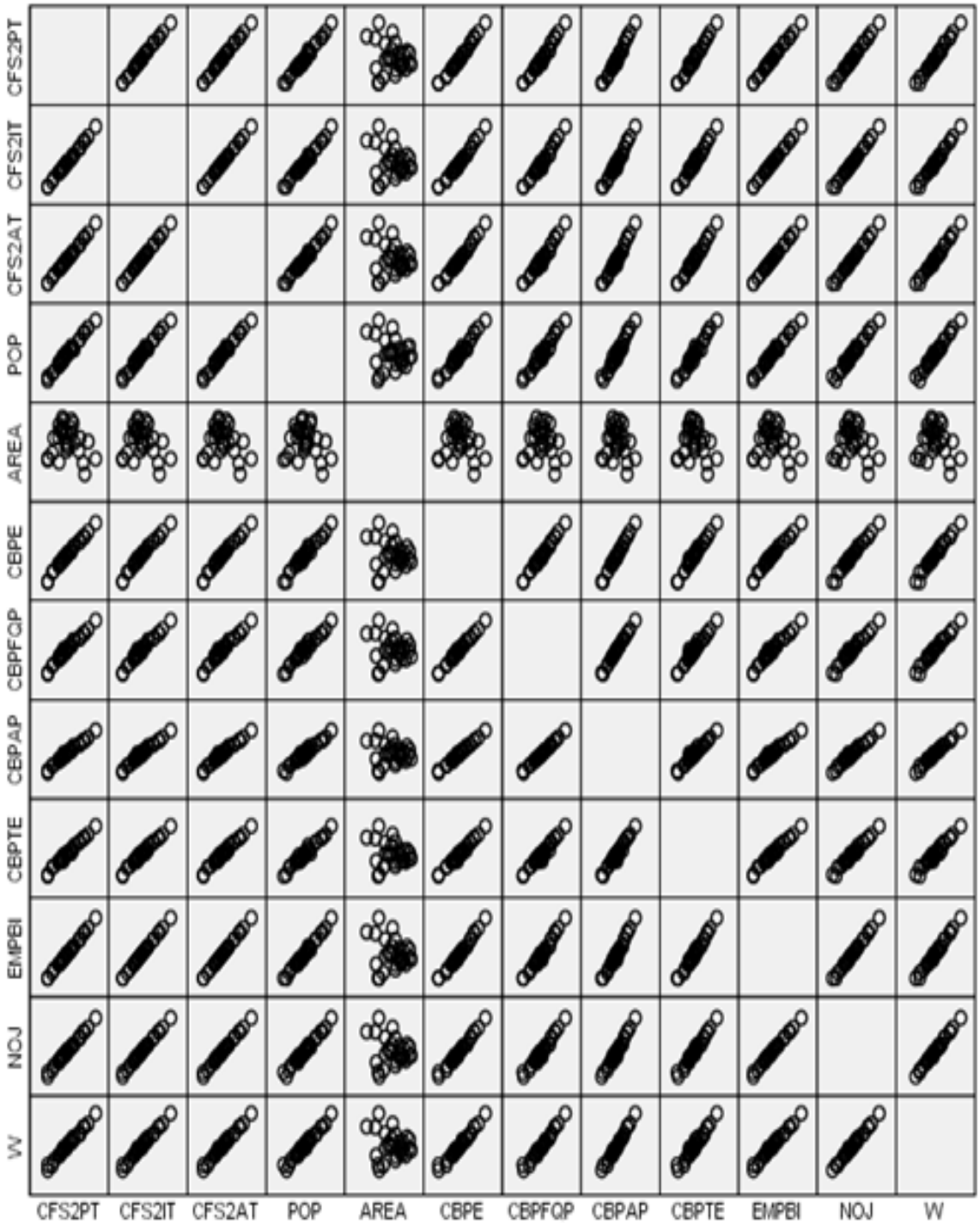


Figure B-2-1: Scatterplot Between Commodity Flow and Contributing Factors

B-2-2 Correlation Between Total Commodity Flow and Detailed Entire Contribution Factors

Table B-2-2: Correlation Between Commodity Flow and CBP-APs

		CFS2PT	CFS2IT	CFSB-1T
CBPAPT	Pearson Correlation	0.99062	0.98884	0.98884
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPAP11	Pearson Correlation	0.76572	0.75766	0.75766
	Sig. (2-tailed)	0.00141	0.00169	0.00170
	N	14	14	14
CBPAP21	Pearson Correlation	0.59529	0.57984	0.57984
	Sig. (2-tailed)	0.01498	0.01855	0.01855
	N	16	16	16
CBPAP22	Pearson Correlation	0.88706	0.88139	0.88139
	Sig. (2-tailed)	0.00142	0.00168	0.00168
	N	9	9	9
CBPAP23	Pearson Correlation	0.90072	0.89857	0.89857
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	27	27	27
CBPAP31	Pearson Correlation	0.89610	0.89781	0.89781
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPAP42	Pearson Correlation	0.91315	0.91250	0.91249
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	25	25	25
CBPAP44	Pearson Correlation	0.98943	0.98764	0.98764
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPAP48	Pearson Correlation	0.87537	0.87463	0.87463
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	23	23	23
CBPAP51	Pearson Correlation	0.90750	0.89917	0.89917
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	22	22	22
CBPAP52	Pearson Correlation	0.94388	0.94298	0.94297
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	22	22	22
CBPAP53	Pearson Correlation	0.88186	0.87240	0.87240
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	24	24	24
CBPAP54	Pearson Correlation	0.94638	0.93926	0.93926
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	23	23	23

Table B-2-2: Continued

		CFS2PT	CFS2IT	CFSB-1T
CBPAP55	Pearson Correlation	0.88369	0.87999	0.87999
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	18	18	18
CBPAP56	Pearson Correlation	0.93542	0.92162	0.92162
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	14	14	14
CBPAP61	Pearson Correlation	0.89030	0.89012	0.89011
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	17	17	17
CBPAP62	Pearson Correlation	0.95896	0.96494	0.96494
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	23	23	23
CBPAP71	Pearson Correlation	0.77184	0.76382	0.76381
	Sig. (2-tailed)	0.00199	0.00237	0.00237
	N	13	13	13
CBPAP72	Pearson Correlation	0.92055	0.92040	0.92040
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPAP81	Pearson Correlation	0.92521	0.92157	0.92157
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	24	24	24
CBPAP95	Pearson Correlation	0.87742	0.88214	0.88214
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	19	19	19
CBPAP99	Pearson Correlation	0.92323	0.92279	0.92279
	Sig. (2-tailed)	0.00001	0.00001	0.00001
	N	13	13	13

Table B-2-3: Correlation Between Commodity Flow and CBP-Es

		CFS2PT	CFS2IT	CFSB-1T
CBPET	Pearson Correlation	0.99394	0.99329	0.99329
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPE11	Pearson Correlation	0.78602	0.77883	0.77882
	Sig. (2-tailed)	0.00086	0.00103	0.00103
	N	14	14	14
CBPE21	Pearson Correlation	0.68510	0.66987	0.66987
	Sig. (2-tailed)	0.00482	0.00629	0.00629
	N	15.0	15.0	15.0
CBPE22	Pearson Correlation	0.80820	0.80237	0.80237
	Sig. (2-tailed)	0.00466	0.00522	0.00522
	N	10	10	10
CBPE23	Pearson Correlation	0.92639	0.92529	0.92529
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	28	28	28
CBPE31	Pearson Correlation	0.93237	0.93638	0.93638
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPE42	Pearson Correlation	0.94690	0.94815	0.94815
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	25	25	25
CBPE44	Pearson Correlation	0.98876	0.98783	0.98783
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPE48	Pearson Correlation	0.89490	0.89434	0.89434
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	23	23	23
CBPE51	Pearson Correlation	0.94330	0.94119	0.94118
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	22	22	22
CBPE52	Pearson Correlation	0.98661	0.98810	0.98809
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	22	22	22
CBPE53	Pearson Correlation	0.91010	0.90355	0.90355
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	24	24	24
CBPE54	Pearson Correlation	0.96081	0.95609	0.95609
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	23	23	23
CBPE55	Pearson Correlation	0.89033	0.88696	0.88696
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	18	18	18
CBPE56	Pearson Correlation	0.97750	0.96993	0.96993
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	14	14	14

Table B-2-3: Continued

		CFS2PT	CFS2IT	CFSB-1T
CBPE61	Pearson Correlation	0.90458	0.90584	0.90584
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	17	17	17
CBPE62	Pearson Correlation	0.95359	0.96004	0.96004
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	23	23	23
CBPE71	Pearson Correlation	0.81520	0.80798	0.80797
	Sig. (2-tailed)	0.00068	0.00083	0.00083
	N	13	13	13
CBPE72	Pearson Correlation	0.96618	0.96554	0.96554
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPE81	Pearson Correlation	0.97252	0.97043	0.97043
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	24	24	24
CBPE95	Pearson Correlation	0.86998	0.87499	0.87498
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	19	19	19
CBPE99	Pearson Correlation	0.84052	0.84883	0.84883
	Sig. (2-tailed)	0.00032	0.00024	0.00024
	N	13	13	13

Table B-2-4: Correlation Between Commodity Flow and CBP-FQPs

		CFS2PT	CFS2IT	CFSB-1T
CBPFQPT	Pearson Correlation	0.98833	0.98631	0.98631
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPFQP11	Pearson Correlation	0.84667	0.83734	0.83734
	Sig. (2-tailed)	0.00026	0.00035	0.00035
	N	13	13	13
CBPFQP21	Pearson Correlation	0.54246	0.53204	0.53203
	Sig. (2-tailed)	0.02446	0.02793	0.02793
	N	17	17	17
CBPFQP22	Pearson Correlation	0.89757	0.89353	0.89353
	Sig. (2-tailed)	0.00102	0.00117	0.00117
	N	9	9	9
CBPFQP23	Pearson Correlation	0.92488	0.92241	0.92240
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	27	27	27
CBPFQP31	Pearson Correlation	0.91095	0.91373	0.91373
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPFQP42	Pearson Correlation	0.92689	0.92651	0.92651
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	25	25	25
CBPFQP44	Pearson Correlation	0.98676	0.98427	0.98427
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPFQP48	Pearson Correlation	0.86931	0.86798	0.86798
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	23	23	23
CBPFQP51	Pearson Correlation	0.93094	0.92487	0.92487
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	22	22	22
CBPFQP52	Pearson Correlation	0.96480	0.96457	0.96457
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	22	22	22
CBPFQP53	Pearson Correlation	0.89999	0.89166	0.89166
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	24	24	24
CBPFQP54	Pearson Correlation	0.94944	0.94197	0.94197
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	23	23	23
CBPFQP55	Pearson Correlation	0.88501	0.88209	0.88209
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	18	18	18
CBPFQP56	Pearson Correlation	0.94458	0.93260	0.93260
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	14	14	14

Table B-2-4: Continued

		CFS2PT	CFS2IT	CFSB-1T
CBPFQP61	Pearson Correlation	0.89351	0.89504	0.89504
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	17	17	17
CBPFQP62	Pearson Correlation	0.95585	0.96200	0.96200
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	23	23	23
CBPFQP71	Pearson Correlation	0.78701	0.77988	0.77987
	Sig. (2-tailed)	0.00141	0.00167	0.00167
	N	13	13	13
CBPFQP72	Pearson Correlation	0.93171	0.92981	0.92981
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPFQP81	Pearson Correlation	0.94753	0.94449	0.94449
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	24	24	24
CBPFQP95	Pearson Correlation	0.87741	0.88221	0.88221
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	19	19	19
CBPFQP99	Pearson Correlation	0.86075	0.87003	0.87003
	Sig. (2-tailed)	0.00016	0.00011	0.00011
	N	13	13	13

Table B-2-5: Correlation Between Commodity Flow and CBP-TEs

		CFS2PT	CFS2IT	CFSB-1T
CBPTET	Pearson Correlation	0.99225	0.99182	0.99182
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE11	Pearson Correlation	0.75000	0.75720	0.75720
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE21	Pearson Correlation	0.47842	0.46842	0.46842
	Sig. (2-tailed)	0.00866	0.01038	0.01038
	N	29	29	29
CBPTE22	Pearson Correlation	0.76656	0.76539	0.76539
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE23	Pearson Correlation	0.96658	0.96436	0.96435
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE31	Pearson Correlation	0.97595	0.97868	0.97868
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE42	Pearson Correlation	0.96622	0.96525	0.96525
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE44	Pearson Correlation	0.99037	0.99091	0.99091
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE48	Pearson Correlation	0.94328	0.94183	0.94183
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE51	Pearson Correlation	0.95639	0.95724	0.95724
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE52	Pearson Correlation	0.98942	0.98861	0.98861
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE53	Pearson Correlation	0.92524	0.92104	0.92104
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE54	Pearson Correlation	0.97269	0.96828	0.96828
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE55	Pearson Correlation	0.84164	0.84623	0.84623
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE56	Pearson Correlation	0.97049	0.96899	0.96899
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29

Table B-2-5: Continued

		CFS2PT	CFS2IT	CFSB-1T
CBPTE61	Pearson Correlation	0.86843	0.86873	0.86873
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE62	Pearson Correlation	0.98133	0.98129	0.98129
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE71	Pearson Correlation	0.85549	0.85715	0.85714
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE72	Pearson Correlation	0.94581	0.94998	0.94998
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE81	Pearson Correlation	0.98506	0.98449	0.98449
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE95	Pearson Correlation	0.79366	0.80305	0.80305
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
CBPTE99	Pearson Correlation	0.88233	0.88810	0.88811
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29

Table B-2-6: Correlation Between Commodity Flow and Land Uses

		CFS2PT	CFS2IT	CFSB-1T
IR	Pearson Correlation	0.20660	0.20507	0.20508
	Sig. (2-tailed)	0.28224	0.28589	0.28588
	N	29	29	29
NI	Pearson Correlation	0.50098	0.49788	0.49788
	Sig. (2-tailed)	0.00564	0.00599	0.00599
	N	29	29	29
RES	Pearson Correlation	0.91391	0.91428	0.91428
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
RIP	Pearson Correlation	0.46455	0.47419	0.47419
	Sig. (2-tailed)	0.01112	0.00936	0.00936
	N	29	29	29
URB	Pearson Correlation	0.85691	0.86032	0.86032
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
WATER	Pearson Correlation	-0.05855	-0.06858	-0.06858
	Sig. (2-tailed)	0.76287	0.72372	0.72372
	N	29	29	29

Table B-2-7: Correlation Between Commodity Flow and EMPBIs

		CFS2PT	CFS2IT	CFSB-1T
EMPBIT	Pearson Correlation	0.99881	1.00000	1.00000
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI1	Pearson Correlation	0.86560	0.86321	0.86321
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI2	Pearson Correlation	0.67892	0.66985	0.66984
	Sig. (2-tailed)	0.00005	0.00007	0.00007
	N	29	29	29
EMPBI3	Pearson Correlation	0.72746	0.73503	0.73504
	Sig. (2-tailed)	0.00001	0.00001	0.00001
	N	29	29	29
EMPBI4	Pearson Correlation	0.98100	0.97855	0.97855
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI5	Pearson Correlation	0.93195	0.93809	0.93809
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI6	Pearson Correlation	0.94571	0.94829	0.94829
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI7	Pearson Correlation	0.99276	0.99288	0.99288
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI8	Pearson Correlation	0.95176	0.95312	0.95311
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI9	Pearson Correlation	0.89966	0.89596	0.89596
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI10	Pearson Correlation	0.97007	0.96995	0.96995
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI11	Pearson Correlation	0.97623	0.97073	0.97072
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI12	Pearson Correlation	0.96458	0.96620	0.96620
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI13	Pearson Correlation	0.93091	0.92899	0.92899
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI14	Pearson Correlation	0.97270	0.97202	0.97202
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29

Table B-2-7: Continued

		CFS2PT	CFS2IT	CFSB-1T
EMPBI15	Pearson Correlation	0.92481	0.92222	0.92221
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI16	Pearson Correlation	0.94541	0.94467	0.94466
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI17	Pearson Correlation	0.89396	0.89502	0.89502
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI18	Pearson Correlation	0.95504	0.95602	0.95602
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI19	Pearson Correlation	0.98704	0.98594	0.98594
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI20	Pearson Correlation	0.97681	0.98098	0.98098
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI21	Pearson Correlation	0.83789	0.84499	0.84499
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI22	Pearson Correlation	0.98184	0.98250	0.98250
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI23	Pearson Correlation	0.71739	0.71908	0.71908
	Sig. (2-tailed)	0.00001	0.00001	0.00001
	N	29	29	29
EMPBI24	Pearson Correlation	0.87583	0.88715	0.88715
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
EMPBI25	Pearson Correlation	0.98025	0.98173	0.98173
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29

Table B-2-8: Correlation Between Commodity Flow and NOJs

		CFS2PT	CFS2IT	CFSB-1T
NOJT	Pearson Correlation	0.99648	0.99802	0.99802
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
NOJ1	Pearson Correlation	0.45441	0.44117	0.44117
	Sig. (2-tailed)	0.01327	0.01659	0.01659
	N	29	29	29
NOJ2	Pearson Correlation	0.97634	0.97396	0.97396
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
NOJ3	Pearson Correlation	0.93514	0.93931	0.93931
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
NOJ4	Pearson Correlation	0.98566	0.98588	0.98588
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
NOJ5	Pearson Correlation	0.91379	0.91200	0.91200
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
NOJ6	Pearson Correlation	0.97643	0.97457	0.97456
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
NOJ7	Pearson Correlation	0.96495	0.96021	0.96022
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
NOJ8	Pearson Correlation	0.93539	0.93930	0.93930
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
NOJ9	Pearson Correlation	0.93368	0.93483	0.93483
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
NOJ10	Pearson Correlation	0.96341	0.96248	0.96248
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
NOJ11	Pearson Correlation	0.97603	0.98101	0.98101
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29

Table B-2-9: Correlation Between Commodity Flow and Wages

		CFS2PT	CFS2IT	CFSB-1T
WT	Pearson Correlation	0.99417	0.99454	0.99454
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
W1	Pearson Correlation	0.46798	0.45361	0.45361
	Sig. (2-tailed)	0.01046	0.01346	0.01346
	N	29	29	29
W2	Pearson Correlation	0.96261	0.95963	0.95963
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
W3	Pearson Correlation	0.82342	0.82562	0.82562
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
W4	Pearson Correlation	0.96981	0.96851	0.96852
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
W5	Pearson Correlation	0.77410	0.76917	0.76917
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
W6	Pearson Correlation	0.97556	0.97347	0.97347
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
W7	Pearson Correlation	0.94811	0.94255	0.94255
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
W8	Pearson Correlation	0.79816	0.80009	0.80008
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
W9	Pearson Correlation	0.88310	0.88359	0.88359
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
W10	Pearson Correlation	0.95013	0.94777	0.94777
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29
W11	Pearson Correlation	0.97380	0.97814	0.97814
	Sig. (2-tailed)	0.00000	0.00000	0.00000
	N	29	29	29

Appendix C: Multiple Regression Model Between Commodity Flow and Land Use

C-1 Summary, ANOVA and Coefficient of Multiple Regression Model Between Commodity Flow and Land Use

C-1-1 Model Summary and Coefficients for CFSTP – Production

Regression
(CFSTP3)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.81163	0.65875	0.64611	0.90201
2	0.84729	0.71791	0.69621	0.83573

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	42.40689	1	42.40689	52.12096	0.00000
	Residual	21.96787	27	0.81362		
	Total	64.37476	28			
2	Regression	46.21515	2	23.10758	33.08425	0.00000
	Residual	18.15961	26	0.69845		
	Total	64.37476	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Dependent Variable: CFSTP3

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.43336	1.34891		-6.99330	0.00000
	RES_T	1.07025	0.14824	0.81163	7.21948	0.00000
2	(Constant)	-9.58772	1.25154		-7.66072	0.00000
	RES_T	0.74140	0.19672	0.56225	3.76878	0.00085
	URB_T	0.38604	0.16532	0.34836	2.33505	0.02753

a Dependent Variable: CFSTP3

Figure C-1-1: Commodity Flow Production for Commodity Item 3 (CFSTP3)

Regression (CFSTP4)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA©

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66930	1	10.66930	221.52020	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95828	7			
2	Regression	10.83566	2	5.41783	220.91420	0.00001
	Residual	0.12262	5	0.02452		
	Total	10.95828182	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTP4

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-12.66311	0.87914		-14.40404	0.00001
	RES_T	1.56134	0.10490	0.98673	14.88355	0.00001
2	(Constant)	-12.84560	0.63123		-20.35010	0.00001
	RES_T	1.46260	0.08391	0.92432	17.43048	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60450	0.04799

a Dependent Variable: CFSTP4

Figure C-1-2: Commodity Flow Production for Commodity Item 4 (CFSTP4)

Regression (CFSTP5)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96924	0.21946
2	0.99439	0.98881	0.98434	0.15659

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66920	1	10.66920	221.53243	0.00001
	Residual	0.28897	6	0.04816		
	Total	10.95817	7			
2	Regression	10.83557	2	5.41778	220.95708	0.00001
	Residual	0.12260	5	0.02452		
	Total	10.95817	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTP5

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-12.97156	0.87911		-14.75537	0.00001
	RES_T	1.56133	0.10490	0.98673	14.88397	0.00001
2	(Constant)	-13.15406	0.63117		-20.84087	0.00000
	RES_T	1.46259	0.08390	0.92432	17.43214	0.00001
	NI_T	0.10941	0.04200	0.13812	2.60482	0.04797

a Dependent Variable: CFSTP5

Figure C-1-3: Commodity Flow Production for Commodity Item 5 (CFSTP5)

Regression (CFSTP6)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91037	0.82877	0.82243	0.71439
2	0.92894	0.86293	0.85239	0.65134
3	0.96226	0.92595	0.91706	0.48823

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	66.69551	1	66.69551	130.68534	0.00000
	Residual	13.77950	27	0.51035		
	Total	80.47501	28			
2	Regression	69.44458	2	34.72229	81.84439	0.00000
	Residual	11.03044	26	0.42425		
	Total	80.47501	28			
3	Regression	74.51579	3	24.83860	104.20229	0.00000
	Residual	5.95923	25	0.23837		
	Total	80.47501	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Predictors: (Constant), RES_T, URB_T, RIP_T

d Dependent Variable: CFSTP6

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.66683	1.06833		-9.04851	0.00000
	RES_T	1.34219	0.11741	0.91037	11.43177	0.00000
2	(Constant)	-9.79798	0.97541		-10.04495	0.00000
	RES_T	1.06279	0.15332	0.72086	6.93194	0.00000
	URB_T	0.32799	0.12885	0.26472	2.54556	0.01718
3	(Constant)	-10.12507	0.73458		-13.78355	0.00000
	RES_T	1.25666	0.12237	0.85235	10.26946	0.00000
	URB_T	0.48404	0.10234	0.39067	4.72997	0.00008
	RIP_T	-0.31491	0.06827	-0.34624	-4.61244	0.00010

a Dependent Variable: CFSTP6

Figure C-1-4: Commodity Flow Production for Commodity Item 6 (CFSTP6)

Regression
(CFSTP7)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91020	0.82846	0.82211	0.71644
2	0.92865	0.86238	0.85180	0.65393
3	0.96220	0.92582	0.91692	0.48961

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	66.93228	1	66.93228	130.39975	0.00000
	Residual	13.85871	27	0.51329		
	Total	80.79099	28			
2	Regression	69.67272	2	34.83636	81.46460	0.00000
	Residual	11.11827	26	0.42763		
	Total	80.79099	28			
3	Regression	74.79800	3	24.93267	104.00757	0.00000
	Residual	5.99299	25	0.23972		
	Total	80.79099	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTP7

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.16395	1.07140		-8.55325	0.00000
	RES_T	1.34457	0.11775	0.91020	11.41927	0.00000
2	(Constant)	-9.29489	0.97929		-9.49147	0.00000
	RES_T	1.06561	0.15393	0.72136	6.92282	0.00000
	URB_T	0.32747	0.12936	0.26378	2.53150	0.01774
3	(Constant)	-9.62372	0.73665		-13.06409	0.00000
	RES_T	1.26051	0.12271	0.85329	10.27186	0.00000
	URB_T	0.48436	0.10263	0.39015	4.71969	0.00008
	RIP_T	-0.31658	0.06847	-0.34740	-4.62388	0.00010

a Dependent Variable: CFSTP7

Figure C-1-5: Commodity Flow Production for Commodity Item 7 (CFSTP7)

Regression (CFSTP8)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90760	0.82375	0.81722	0.74220
2	0.92672	0.85881	0.84795	0.67695
3	0.96072	0.92299	0.91375	0.50984

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, RIP_T

c Predictors: (Constant), RES_T, RIP_T, URB_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	69.51228	1	69.51228	126.18738	0.00000
	Residual	14.87337	27	0.55087		
	Total	84.38565	28			
2	Regression	72.47101	2	36.23550	79.07272	0.00000
	Residual	11.91464	26	0.45826		
	Total	84.38565	28			
3	Regression	77.88720	3	25.96240	99.87922	0.00000
	Residual	6.49845	25	0.25994		
	Total	84.38565	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, RIP_T

c Predictors: (Constant), RES_T, RIP_T, URB_T

d Dependent Variable: CFSTP8

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-11.76635	1.10993		-10.60100	0.00000
	RES_T	1.37024	0.12198	0.90760	11.23332	0.00000
2	(Constant)	-11.95716	1.01512		-11.77905	0.00000
	RES_T	1.60583	0.14482	1.06365	11.08819	0.00000
	RIP_T	-0.22701	0.08934	-0.24375	-2.54097	0.01736
3	(Constant)	-12.24265	0.76709		-15.95984	0.00000
	RES_T	1.30194	0.12778	0.86236	10.18856	0.00000
	RIP_T	-0.33461	0.07130	-0.35927	-4.69322	0.00008
	URB_T	0.48781	0.10687	0.38447	4.56470	0.00012

a Dependent Variable: CFSTP8

Figure C-1-6: Commodity Flow Production for Commodity Item 8 (CFSTP8)

Regression
(CFSTP12)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88103	0.77621	0.76443	0.79194
2	0.91824	0.84316	0.82574	0.68114
3	0.96896	0.93887	0.92809	0.43756

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.33094	1	41.33094	65.90133	0.00000
	Residual	11.91612	19	0.62716		
	Total	53.24706	20			
2	Regression	44.89600	2	22.44800	48.38474	0.00000
	Residual	8.35106	18	0.46395		
	Total	53.24706	20			
3	Regression	49.99227	3	16.66409	87.03788	0.00000
	Residual	3.25478	17	0.19146		
	Total	53.24706	20			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTP12

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-7.80911	1.41277		-5.52750	0.00002
	RES_T	1.22549	0.15096	0.88103	8.11796	0.00000
2	(Constant)	-7.73103	1.21544		-6.36068	0.00001
	RES_T	0.84309	0.18944	0.60611	4.45035	0.00031
	URB_T	0.41985	0.15146	0.37753	2.77203	0.01257
3	(Constant)	-8.71072	0.80355		-10.84029	0.00000
	RES_T	1.09332	0.13101	0.78601	8.34559	0.00000
	URB_T	0.62283	0.10495	0.56006	5.93456	0.00002
	RIP_T	-0.35460	0.06873	-0.45740	-5.15929	0.00008

a Dependent Variable: CFSTP12

Figure C-1-7: Commodity Flow Production for Commodity Item 12 (CFSTP12)

Regression (CFSTP13)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91110	0.83010	0.82381	0.70340
2	0.93044	0.86572	0.85540	0.63724
3	0.96236	0.92614	0.91728	0.48197

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	65.27058	1	65.27058	131.92111	0.00000
	Residual	13.35879	27	0.49477		
	Total	78.62937	28			
2	Regression	68.07133	2	34.03566	83.81550	0.00000
	Residual	10.55804	26	0.40608		
	Total	78.62937	28			
3	Regression	72.82190	3	24.27397	104.49469	0.00000
	Residual	5.80746	25	0.23230		
	Total	78.62937	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Predictors: (Constant), RES_T, URB_T, RIP_T

d Dependent Variable: CFSTP13

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.24164	1.05190		-7.83502	0.00000
	RES_T	1.32778	0.11560	0.91110	11.48569	0.00000
2	(Constant)	-8.37402	0.95430		-8.77506	0.00000
	RES_T	1.04576	0.15000	0.71759	6.97179	0.00000
	URB_T	0.33106	0.12606	0.27031	2.62623	0.01428
3	(Constant)	-8.69060	0.72516		-11.98435	0.00000
	RES_T	1.23340	0.12080	0.84634	10.21025	0.00000
	URB_T	0.48210	0.10102	0.39364	4.77211	0.00007
	RIP_T	-0.30479	0.06740	-0.33903	-4.52220	0.00013

a Dependent Variable: CFSTP13

Figure C-1-8: Commodity Flow Production for Commodity Item 13 (CFSTP13)

Regression
(CFSTP15)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90918	0.82661	0.82019	0.72741
2	0.92716	0.85962	0.84883	0.66697
3	0.96170	0.92486	0.91584	0.49764

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.10846	1	68.10846	128.71980	0.00000
	Residual	14.28629	27	0.52912		
	Total	82.39475	28			
2	Regression	70.82857	2	35.41428	79.60894	0.00000
	Residual	11.56618	26	0.44485		
	Total	82.39475	28			
3	Regression	76.20349	3	25.40116	102.56865	0.00000
	Residual	6.19126	25	0.24765		
	Total	82.39474694	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T
d Dependent Variable: CFSTP15

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.85811	1.08780		-6.30455	0.00000
	RES_T	1.35633	0.11955	0.90918	11.34547	0.00000
2	(Constant)	-7.04106	1.00017		-7.03989	0.00000
	RES_T	1.58222	0.14269	1.06060	11.08854	0.00000
	RIP_T	-0.21766	0.08802	-0.23652	-2.47278	0.02027
3	(Constant)	-7.32546	0.74874		-9.78371	0.00000
	RES_T	1.27949	0.12473	0.85767	10.25830	0.00000
	RIP_T	-0.32485	0.06959	-0.35299	-4.66803	0.00009
	URB_T	0.48595	0.10431	0.38760	4.65872	0.00009

a Dependent Variable: CFSTP15

Figure C-1-9: Commodity Flow Production for Commodity Item 15 (CFSTP15)

Regression
(CFSTP17)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90985	0.82782	0.82144	0.72047
2	0.92806	0.86129	0.85062	0.65898
3	0.96204	0.92552	0.91659	0.49243

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	67.38240	1	67.38240	129.81335	0.00000
	Residual	14.01493	27	0.51907		
	Total	81.39733	28			
2	Regression	70.10678	2	35.05339	80.72137	0.00000
	Residual	11.29054	26	0.43425		
	Total	81.39733	28			
3	Regression	75.33511	3	25.11170	103.55818	0.00000
	Residual	6.06222	25	0.24249		
	Total	81.39733	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTP17

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-7.82231	1.07742		-7.26021	0.00000
	RES_T	1.34909	0.11841	0.90985	11.39357	0.00000
2	(Constant)	-7.95286	0.98685		-8.05887	0.00000
	RES_T	1.07094	0.15512	0.72226	6.90417	0.00000
	URB_T	0.32651	0.13036	0.26203	2.50474	0.01885
3	(Constant)	-8.28498	0.74090		-11.18236	0.00000
	RES_T	1.26779	0.12342	0.85502	10.27204	0.00000
	URB_T	0.48497	0.10322	0.38919	4.69856	0.00008
	RIP_T	-0.31975	0.06886	-0.34957	-4.64339	0.00009

a Dependent Variable: CFSTP17

Figure C-1-10: Commodity Flow Production for Commodity Item 17 (CFSTP17)

Regression
(CFSTP18)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.87134	0.75924	0.75032	1.00457
2	0.90250	0.81451	0.80025	0.89854
3	0.93086	0.86650	0.85048	0.77738

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	85.92480	1	85.92480	85.14538	0.00000
	Residual	27.24716	27	1.00915		
	Total	113.17196	28			
2	Regression	92.18020	2	46.09010	57.08635	0.00000
	Residual	20.99175	26	0.80738		
	Total	113.17196	28			
3	Regression	98.06395	3	32.68798	54.09051	0.00000
	Residual	15.10800	25	0.60432		
	Total	113.17196	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T
d Dependent Variable: CFSTP18

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.97599	1.50228		-5.97491	0.00000
	RES_T	1.52344	0.16510	0.87134	9.22743	0.00000
2	(Constant)	-9.25344	1.34741		-6.86755	0.00000
	RES_T	1.86599	0.19223	1.06727	9.70706	0.00000
	RIP_T	-0.33008	0.11859	-0.30604	-2.78349	0.00989
3	(Constant)	-9.55099	1.16962		-8.16588	0.00000
	RES_T	1.54926	0.19484	0.88611	7.95146	0.00000
	RIP_T	-0.44223	0.10871	-0.41001	-4.06800	0.00042
	URB_T	0.50843	0.16294	0.34603	3.12028	0.00451

a Dependent Variable: CFSTP18

Figure C-1-11: Commodity Flow Production for Commodity Item 18 (CFSTP18)

Regression
(CFSTP19)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88798	0.78851	0.78068	0.72269
2	0.91554	0.83821	0.82577	0.64413
3	0.93369	0.87177	0.85639	0.58480

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	52.57567	1	52.57567	100.66571	0.00000
	Residual	14.10156	27	0.52228		
	Total	66.67722	28			
2	Regression	55.88973	2	27.94486	67.35265	0.00000
	Residual	10.78750	26	0.41490		
	Total	66.67722	28			
3	Regression	58.12743	3	19.37581	56.65578	0.00000
	Residual	8.54979	25	0.34199		
	Total	66.67722	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTP19

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.50235	1.08075		-7.86711	0.00000
	RES_T	1.19168	0.11877	0.88798	10.03323	0.00000
2	(Constant)	-8.64635	0.96461		-8.96356	0.00000
	RES_T	0.88491	0.15162	0.65939	5.83633	0.00000
	URB_T	0.36012	0.12742	0.31931	2.82622	0.00894
3	(Constant)	-8.86363	0.87987		-10.07376	0.00000
	RES_T	1.01368	0.14657	0.75535	6.91594	0.00000
	URB_T	0.46378	0.12258	0.41122	3.78359	0.00086
	RIP_T	-0.20919	0.08178	-0.25268	-2.55796	0.01697

a Dependent Variable: CFSTP19

Figure C-1-12: Commodity Flow Production for Commodity Item 19 (CFSTP19)

Regression
(CFSTP21)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96924	0.21946
2	0.99439	0.98881	0.98434	0.15659

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66920	1	10.66920	221.53243	0.00001
	Residual	0.28897	6	0.04816		
	Total	10.95817	7			
2	Regression	10.83557	2	5.41778	220.95708	0.00001
	Residual	0.12260	5	0.02452		
	Total	10.95817	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTP21

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-14.05916	0.87911		-15.99253	0.00000
	RES_T	1.56133	0.10490	0.98673	14.88397	0.00001
2	(Constant)	-14.24166	0.63117		-22.56402	0.00000
	RES_T	1.46259	0.08390	0.92432	17.43214	0.00001
	NI_T	0.10941	0.04200	0.13812	2.60482	0.04797

a Dependent Variable: CFSTP21

Figure C-1-13: Commodity Flow Production for Commodity Item 21 (CFSTP21)

Regression
(CFSTP22)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66930	1	10.66930	221.52020	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95828	7			
2	Regression	10.83566	2	5.41783	220.91420	0.00001
	Residual	0.12262	5	0.02452		
	Total	10.95828	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTP22

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-12.54211	0.87914		-14.26640	0.00001
	RES_T	1.56134	0.10490	0.98673	14.88355	0.00001
2	(Constant)	-12.72460	0.63123		-20.15841	0.00001
	RES_T	1.46260	0.08391	0.92432	17.43048	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60450	0.04799

a Dependent Variable: CFSTP22

Figure C-1-14: Commodity Flow Production for Commodity Item 22 (CFSTP22)

Regression
(CFSTP23)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90671	0.82213	0.81554	0.74995
2	0.92637	0.85816	0.84725	0.68245
3	0.96012	0.92184	0.91246	0.51664

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	70.18693	1	70.18693	124.79408	0.00000
	Residual	15.18539	27	0.56242		
	Total	85.37232	28			
2	Regression	73.26321	2	36.63161	78.65335	0.00000
	Residual	12.10911	26	0.46573		
	Total	85.37232	28			
3	Regression	78.69939	3	26.23313	98.28191	0.00000
	Residual	6.67293	25	0.26692		
	Total	85.37232	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T
d Dependent Variable: CFSTP23

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.35989	1.12151		-9.23745	0.00000
	RES_T	1.37687	0.12325	0.90671	11.17113	0.00000
2	(Constant)	-10.55446	1.02337		-10.31342	0.00000
	RES_T	1.61709	0.14600	1.06490	11.07598	0.00000
	RIP_T	-0.23148	0.09007	-0.24710	-2.57006	0.01625
3	(Constant)	-10.84047	0.77732		-13.94594	0.00000
	RES_T	1.31265	0.12949	0.86442	10.13716	0.00000
	RIP_T	-0.33927	0.07225	-0.36217	-4.69601	0.00008
	URB_T	0.48871	0.10829	0.38295	4.51293	0.00013

a Dependent Variable: CFSTP23

Figure C-1-15: Commodity Flow Production for Commodity Item 23 (CFSTP23)

Regression
(CFSTP24)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88882	0.79000	0.78222	0.72073
2	0.91624	0.83950	0.82715	0.64210
3	0.93460	0.87348	0.85830	0.58137

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	52.76148	1	52.76148	101.57064	0.00000
	Residual	14.02531	27	0.51946		
	Total	66.78679	28			
2	Regression	56.06727	2	28.03364	67.99510	0.00000
	Residual	10.71952	26	0.41229		
	Total	66.78679	28			
3	Regression	58.33698	3	19.44566	57.53286	0.00000
	Residual	8.44981	25	0.33799		
	Total	66.78679	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTP24

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.846285	1.077821		-9.135365	0.000000
	RES_T	1.193781	0.118451	0.888819	10.07823	0.000000
2	(Constant)	-9.990101	0.961567		-10.38939	0.000000
	RES_T	0.887392	0.151142	0.660700	5.871257	0.000003
	URB_T	0.359670	0.127019	0.318647	2.831634	0.008821
3	(Constant)	-10.208925	0.874713		-11.67118	0.000000
	RES_T	1.017089	0.145713	0.757264	6.98010	0.000000
	URB_T	0.464072	0.121858	0.411141	3.80829	0.000809
	RIP_T	-0.210676	0.081299	-0.254269	-2.59138	0.015731

a Dependent Variable: CFSTP24

Figure C-1-16: Commodity Flow Production for Commodity Item 24 (CFSTP24)

Regression
(CFSTP25)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66930	1	10.66930	221.52020	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95828	7			
2	Regression	10.83566	2	5.41783	220.91420	0.00001
	Residual	0.12262	5	0.02452		
	Total	10.95828	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTP25

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-14.61721	0.87914		-16.62679	0.00000
	RES_T	1.56134	0.10490	0.98673	14.88355	0.00001
2	(Constant)	-14.79970	0.63123		-23.44580	0.00000
	RES_T	1.46260	0.08391	0.92432	17.43048	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60450	0.04799

a Dependent Variable: CFSTP25

Figure C-1-17: Commodity Flow Production for Commodity Item 25 (CFSTP25)

Regression
(CFSTP26)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90950	0.82719	0.82079	0.72418
2	0.92751	0.86027	0.84952	0.66360
3	0.96187	0.92519	0.91621	0.49518

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	67.77839	1	67.77839	129.24130	0.00000
	Residual	14.15969	27	0.52443		
	Total	81.93808	28			
2	Regression	70.48859	2	35.24430	80.03427	0.00000
	Residual	11.44949	26	0.44037		
	Total	81.93808	28			
3	Regression	75.80813	3	25.26938	103.05688	0.00000
	Residual	6.12996	25	0.24520		
	Total	81.93808	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTP26

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.75405	1.08297		-9.00675	0.00000
	RES_T	1.35304	0.11902	0.90950	11.36843	0.00000
2	(Constant)	-9.88427	0.99377		-9.94625	0.00000
	RES_T	1.07563	0.15620	0.72302	6.88606	0.00000
	URB_T	0.32566	0.13127	0.26048	2.48081	0.01990
3	(Constant)	-10.21927	0.74502		-13.71668	0.00000
	RES_T	1.27418	0.12411	0.85649	10.26664	0.00000
	URB_T	0.48549	0.10379	0.38832	4.67759	0.00009
	RIP_T	-0.32253	0.06924	-0.35144	-4.65777	0.00009

a Dependent Variable: CFSTP26

Figure C-1-18: Commodity Flow Production for Commodity Item 26 (CFSTP26)

Regression
(CFSTP27)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91129	0.83046	0.82418	0.69804
2	0.93110	0.86695	0.85671	0.63016
3	0.96219	0.92580	0.91690	0.47990

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	64.44130	1	64.44130	132.25210	0.00000
	Residual	13.15605	27	0.48726		
	Total	77.59734	28			
2	Regression	67.27273	2	33.63636	84.70487	0.00000
	Residual	10.32462	26	0.39710		
	Total	77.59734	28			
3	Regression	71.83986	3	23.94662	103.98031	0.00000
	Residual	5.75749	25	0.23030		
	Total	77.59734	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTP27

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-12.16896	1.04389		-11.65737	0.00000
	RES_T	1.31931	0.11472	0.91129	11.50009	0.00000
2	(Constant)	-12.30206	0.94369		-13.03613	0.00000
	RES_T	1.03576	0.14833	0.71543	6.98272	0.00000
	URB_T	0.33287	0.12466	0.27359	2.67025	0.01289
3	(Constant)	-12.61247	0.72204		-17.46793	0.00000
	RES_T	1.21974	0.12028	0.84251	10.14089	0.00000
	URB_T	0.48096	0.10059	0.39531	4.78148	0.00007
	RIP_T	-0.29885	0.06711	-0.33462	-4.45323	0.00015

a Dependent Variable: CFSTP27

Figure C-1-19: Commodity Flow Production for Commodity Item 27 (CFSTP27)

Regression
(CFSTP28)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91118	0.83025	0.82397	0.69064
2	0.93182	0.86829	0.85816	0.61995
3	0.96142	0.92434	0.91526	0.47920

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	62.99185	1	62.99185	132.06165	0.00000
	Residual	12.87868	27	0.47699		
	Total	75.87053	28			
2	Regression	65.87771	2	32.93886	85.70262	0.00000
	Residual	9.99281	26	0.38434		
	Total	75.87053	28			
3	Regression	70.12981	3	23.37660	101.80171	0.00000
	Residual	5.74072	25	0.22963		
	Total	75.87053	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTP28

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.46580	1.03282		-10.13319	0.00000
	RES_T	1.30439	0.11351	0.91118	11.49181	0.00000
2	(Constant)	-10.60017	0.92840		-11.41765	0.00000
	RES_T	1.01812	0.14593	0.71121	6.97686	0.00000
	URB_T	0.33605	0.12264	0.27933	2.74019	0.01095
3	(Constant)	-10.89968	0.72098		-15.11780	0.00000
	RES_T	1.19564	0.12010	0.83522	9.95508	0.00000
	URB_T	0.47895	0.10044	0.39811	4.76841	0.00007
	RIP_T	-0.28836	0.06701	-0.32653	-4.30317	0.00023

a Dependent Variable: CFSTP28

Figure C-1-20: Commodity Flow Production for Commodity Item 28 (CFSTP28)

Regression
(CFSTP29)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.89589	0.80262	0.79531	0.70468
2	0.92204	0.85015	0.83863	0.62569
3	0.94239	0.88811	0.87468	0.55138

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.51972	1	54.51972	109.79226	0.00000
	Residual	13.40743	27	0.49657		
	Total	67.92715	28			
2	Regression	57.74857	2	28.87428	73.75598	0.00000
	Residual	10.17858	26	0.39148		
	Total	67.92715	28			
3	Regression	60.32655	3	20.10885	66.14228	0.00000
	Residual	7.60060	25	0.30402		
	Total	67.92715	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTP29

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.73526	1.05381		-10.18707	0.00000
	RES_T	1.21351	0.11581	0.89589	10.47818	0.00000
2	(Constant)	-10.87739	0.93699		-11.60884	0.00000
	RES_T	0.91071	0.14728	0.67234	6.18355	0.00000
	URB_T	0.35546	0.12377	0.31226	2.87188	0.00801
3	(Constant)	-11.11060	0.82959		-13.39280	0.00000
	RES_T	1.04893	0.13820	0.77439	7.59013	0.00000
	URB_T	0.46673	0.11557	0.41001	4.03837	0.00045
	RIP_T	-0.22453	0.07711	-0.26870	-2.91196	0.00745

a Dependent Variable: CFSTP29

Figure C-1-21: Commodity Flow Production for Commodity Item 29 (CFSTP29)

Regression
(CFSTP30)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88694	0.78667	0.77876	0.89634
2	0.91405	0.83549	0.82283	0.80212
3	0.94431	0.89172	0.87873	0.66362

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, RIP_T

c Predictors: (Constant), RES_T, RIP_T, URB_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	79.99067	1	79.99067	99.56213	0.00000
	Residual	21.69247	27	0.80342		
	Total	101.68314	28			
2	Regression	84.95502	2	42.47751	66.02152	0.00000
	Residual	16.72811	26	0.64339		
	Total	101.68314	28			
3	Regression	90.67323	3	30.22441	68.63003	0.00000
	Residual	11.00991	25	0.44040		
	Total	101.68314	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, RIP_T

c Predictors: (Constant), RES_T, RIP_T, URB_T

d Dependent Variable: CFSTP30

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-12.92519	1.34043		-9.64256	0.00000
	RES_T	1.46989	0.14731	0.88694	9.97808	0.00000
2	(Constant)	-13.17235	1.20282		-10.95123	0.00000
	RES_T	1.77505	0.17160	1.07108	10.34405	0.00000
	RIP_T	-0.29405	0.10586	-0.28762	-2.77776	0.01002
3	(Constant)	-13.46569	0.99847		-13.48636	0.00000
	RES_T	1.46281	0.16633	0.88267	8.79473	0.00000
	RIP_T	-0.40461	0.09280	-0.39576	-4.35997	0.00020
	URB_T	0.50122422	0.13910	0.35988	3.60336	0.00136

a Dependent Variable: CFSTP30

Figure C-1-22: Commodity Flow Production for Commodity Item 30 (CFSTP30)

Regression
(CFSTP31)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21947
2	0.99439	0.98881	0.98433	0.15661

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66951	1	10.66951	221.51377	0.00001
	Residual	0.28900	6	0.04817		
	Total	10.95850	7			
2	Regression	10.83586	2	5.41793	220.88799	0.00001
	Residual	0.12264	5	0.02453		
	Total	10.95850	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTP31

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.28116	0.87916		-10.55688	0.00004
	RES_T	1.56136	0.10491	0.98673	14.88334	0.00001
2	(Constant)	-9.46365	0.63127		-14.99136	0.00002
	RES_T	1.46261	0.08392	0.92432	17.42948	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60430	0.04800

a Dependent Variable: CFSTP31

Figure C-1-23: Commodity Flow Production for Commodity Item 31 (CFSTP31)

Regression
(CFSTP32)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90406	0.81732	0.81056	0.68869
2	0.92828	0.86171	0.85107	0.61062
3	0.95175	0.90584	0.89454	0.51384

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	57.29437	1	57.29437	120.80056	0.00000
	Residual	12.80580	27	0.47429		
	Total	70.10017	28			
2	Regression	60.40601	2	30.20300	81.00524	0.00000
	Residual	9.69416	26	0.37285		
	Total	70.10017	28			
3	Regression	63.49935	3	21.16645	80.16591	0.00000
	Residual	6.60083	25	0.26403		
	Total	70.10017	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTP32

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-7.71906	1.02990		-7.49499	0.00000
	RES_T	1.24401	0.11318	0.90406	10.99093	0.00000
2	(Constant)	-7.85859	0.91442		-8.59404	0.00000
	RES_T	0.94675	0.14373	0.68803	6.58693	0.00000
	URB_T	0.34895	0.12079	0.30175	2.88886	0.00769
3	(Constant)	-8.11405	0.77311		-10.49534	0.00000
	RES_T	1.09816	0.12879	0.79807	8.52694	0.00000
	URB_T	0.47083	0.10770	0.40715	4.37152	0.00019
	RIP_T	-0.24595	0.07186	-0.28974	-3.42282	0.00214

a Dependent Variable: CFSTP32

Figure C-1-24: Commodity Flow Production for Commodity Item 32 (CFSTP32)

Regression
(CFSTP33)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98434	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66962	1	10.66962	221.52652	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95860	7			
2	Regression	10.83599	2	5.41800	220.93922	0.00001
	Residual	0.12261	5	0.02452		
	Total	10.95860	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTP33

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-12.16860	0.87914		-13.84152	0.00001
	RES_T	1.56137	0.10490	0.98673	14.88377	0.00001
2	(Constant)	-12.35109	0.63120		-19.56750	0.00001
	RES_T	1.46262	0.08391	0.92432	17.43145	0.00001
	NI_T	0.10942	0.04201	0.13812	2.60469	0.04798

a Dependent Variable: CFSTP33

Figure C-1-25: Commodity Flow Production for Commodity Item 33 (CFSTP33)

Regression
(CFSTP34)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90969	0.82754	0.82115	0.68444
2	0.93172	0.86810	0.85795	0.60998
3	0.95890	0.91949	0.90983	0.48599

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	60.69381	1	60.69381	129.55944	0.00000
	Residual	12.64850	27	0.46846		
	Total	73.34231	28			
2	Regression	63.66835	2	31.83417	85.55839	0.00000
	Residual	9.67396	26	0.37208		
	Total	73.34231	28			
3	Regression	67.43759	3	22.47920	95.17473	0.00000
	Residual	5.90472	25	0.23619		
	Total	73.34231	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTP34

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.52244	1.02355		-10.28032	0.00000
	RES_T	1.28038	0.11249	0.90969	11.38242	0.00000
2	(Constant)	-10.65886	0.91347		-11.66854	0.00000
	RES_T	0.98975	0.14358	0.70320	6.89326	0.00000
	URB_T	0.34117	0.12067	0.28844	2.82745	0.00891
3	(Constant)	-10.94085	0.73121		-14.96268	0.00000
	RES_T	1.15688	0.12181	0.82195	9.49764	0.00000
	URB_T	0.47571	0.10187	0.40218	4.66997	0.00009
	RIP_T	-0.27149	0.06796	-0.31268	-3.99482	0.00050

a Dependent Variable: CFSTP34

Figure C-1-26: Commodity Flow Production for Commodity Item 34 (CFSTP34)

Regression
(CFSTP35)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90097	0.81175	0.80478	0.79544
2	0.92337	0.85262	0.84128	0.71723
3	0.95585	0.91364	0.90328	0.55990

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	73.66675	1	73.66675	116.42823	0.00000
	Residual	17.08351	27	0.63272		
	Total	90.75026	28			
2	Regression	77.37551	2	38.68776	75.20751	0.00000
	Residual	13.37475	26	0.51441		
	Total	90.75026	28			
3	Regression	82.91310	3	27.63770	88.16234	0.00000
	Residual	7.83716	25	0.31349		
	Total	90.75026	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T
d Dependent Variable: CFSTP35

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-12.02594	1.18954		-10.10975	0.00000
	RES_T	1.41059	0.13073	0.90097	10.79019	0.00000
2	(Constant)	-12.23957	1.07552		-11.38011	0.00000
	RES_T	1.67435	0.15344	1.06944	10.91207	0.00000
	RIP_T	-0.25416	0.09466	-0.26315	-2.68508	0.01246
3	(Constant)	-12.52824	0.84241		-14.87198	0.00000
	RES_T	1.36708	0.14033	0.87318	9.74185	0.00000
	RIP_T	-0.36296	0.07830	-0.37580	-4.63570	0.00010
	URB_T	0.49324	0.11736	0.37488	4.20292	0.00029

a Dependent Variable: CFSTP35

Figure C-1-27: Commodity Flow Production for Commodity Item 35 (CFSTP35)

Regression
(CFSTP36)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66930	1	10.66930	221.52020	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95828	7			
2	Regression	10.83566	2	5.41783	220.91420	0.00001
	Residual	0.12262	5	0.02452		
	Total	10.95828	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTP36

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-13.06941	0.87914		-14.86619	0.00001
	RES_T	1.56134	0.10490	0.98673	14.88355	0.00001
2	(Constant)	-13.25190	0.63123		-20.99376	0.00000
	RES_T	1.46260	0.08391	0.92432	17.43048	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60450	0.04799

a Dependent Variable: CFSTP36

Figure C-1-28: Commodity Flow Production for Commodity Item 36 (CFSTP36)

Regression
(CFSTP37)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66930	1	10.66930	221.52020	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95828	7			
2	Regression	10.83566	2	5.41783	220.91420	0.00001
	Residual	0.12262	5	0.02452		
	Total	10.95828	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTP37

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-17.69681	0.87914		-20.12977	0.00000
	RES_T	1.56134	0.10490	0.98673	14.88355	0.00001
2	(Constant)	-17.87930	0.63123		-28.32452	0.00000
	RES_T	1.46260	0.08391	0.92432	17.43048	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60450	0.04799

a Dependent Variable: CFSTP37

Figure C-1-29: Commodity Flow Production for Commodity Item 37 (CFSTP37)

Regression
(CFSTP38)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98672	0.97362	0.96922	0.21950
2	0.99439	0.98881	0.98433	0.15664

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66945	1	10.66945	221.45647	0.00001
	Residual	0.28907	6	0.04818		
	Total	10.95853	7			
2	Regression	10.83585	2	5.41793	220.82766	0.00001
	Residual	0.12267	5	0.02453		
	Total	10.95853	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTP38

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-15.23307	0.87927		-17.32469	0.00000
	RES_T	1.56135	0.10492	0.98672	14.88141	0.00001
2	(Constant)	-15.41558	0.63136		-24.41647	0.00000
	RES_T	1.46260	0.08393	0.92431	17.42692	0.00001
	NI_T	0.10942	0.04202	0.13813	2.60426	0.04800

a Dependent Variable: CFSTP38

Figure C-1-30: Commodity Flow Production for Commodity Item 38 (CFSTP38)

Regression
(CFSTP39)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.86409	0.74666	0.73727	0.77985
2	0.89485	0.80076	0.78544	0.70476

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	48.39506	1	48.39506	79.57468	0.00000
	Residual	16.42063	27	0.60817		
	Total	64.81570	28			
2	Regression	51.90192	2	25.95096	52.24848	0.00000
	Residual	12.91377	26	0.49668		
	Total	64.81570	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Dependent Variable: CFSTP39

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.35650	1.16623		-8.88030	0.00000
	RES_T	1.14332	0.12817	0.86409	8.92046	0.00000
2	(Constant)	-10.50462	1.05540		-9.95318	0.00000
	RES_T	0.82775	0.16589	0.62559	4.98970	0.00003
	URB_T	0.37045	0.13941	0.33315	2.65717	0.01329

a Dependent Variable: CFSTP39

Figure C-1-31: Commodity Flow Production for Commodity Item 39 (CFSTP39)

Regression
(CFSTP40)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88103	0.77622	0.76444	0.79192
2	0.91824	0.84317	0.82574	0.68113
3	0.96896	0.93887	0.92809	0.43756

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.33165	1	41.33165	65.90455	0.00000
	Residual	11.91574	19	0.62714		
	Total	53.24739	20			
2	Regression	44.89662	2	22.44831	48.38710	0.00000
	Residual	8.35077	18	0.46393		
	Total	53.24739	20			
3	Regression	49.99264	3	16.66421	87.03946	0.00000
	Residual	3.25475	17	0.19146		
	Total	53.24739	20			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTP40

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.49842	1.41275		-6.72335	0.00000
	RES_T	1.22550	0.15096	0.88103	8.11816	0.00000
2	(Constant)	-9.42033	1.21542		-7.75069	0.00000
	RES_T	0.84310	0.18944	0.60612	4.45051	0.00031
	URB_T	0.41984	0.15145	0.37753	2.77205	0.01257
3	(Constant)	-10.40000	0.80355		-12.94262	0.00000
	RES_T	1.09333	0.13101	0.78602	8.34570	0.00000
	URB_T	0.62282	0.10495	0.56005	5.93449	0.00002
	RIP_T	-0.35460	0.06873	-0.45738	-5.15919	0.00008

a Dependent Variable: CFSTP40

Figure C-1-32: Commodity Flow Production for Commodity Item 40 (CFSTP40)

Regression
(CFSTP42)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96924	0.21946
2	0.99439	0.98881	0.98434	0.15659

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66920	1	10.66920	221.53243	0.00001
	Residual	0.28897	6	0.04816		
	Total	10.95817	7			
2	Regression	10.83557	2	5.41778	220.95708	0.00001
	Residual	0.12260	5	0.02452		
	Total	10.95817	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTP42

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-11.43956	0.87911		-13.01269	0.00001
	RES_T	1.56133	0.10490	0.98673	14.88397	0.00001
2	(Constant)	-11.62206	0.63117		-18.41361	0.00001
	RES_T	1.46259	0.08390	0.92432	17.43214	0.00001
	NI_T	0.10941	0.04200	0.13812	2.60482	0.04797

a Dependent Variable: CFSTP42

Figure C-1-33: Commodity Flow Production for Commodity Item 42 (CFSTP42)

Regression
(CFSTP43)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.89488	0.80081	0.79343	0.70690
2	0.92122	0.84866	0.83701	0.62792
3	0.94127	0.88598	0.87230	0.55580

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.24305	1	54.24305	108.54873	0.00000
	Residual	13.49221	27	0.49971		
	Total	67.73526	28			
2	Regression	57.48389	2	28.74194	72.89663	0.00000
	Residual	10.25137	26	0.39428		
	Total	67.73526	28			
3	Regression	60.01228	3	20.00409	64.75513	0.00000
	Residual	7.72298	25	0.30892		
	Total	67.73526	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Predictors: (Constant), RES_T, URB_T, RIP_T

d Dependent Variable: CFSTP43

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-7.95319	1.05714		-7.52332	0.00000
	RES_T	1.21043	0.11618	0.89488	10.41867	0.00000
2	(Constant)	-8.09558	0.94034		-8.60924	0.00000
	RES_T	0.90706	0.14780	0.67060	6.13690	0.00000
	URB_T	0.35612	0.12421	0.31328	2.86698	0.00811
3	(Constant)	-8.32654	0.83625		-9.95704	0.00000
	RES_T	1.04395	0.13930	0.77180	7.49400	0.00000
	URB_T	0.46631	0.11650	0.41022	4.00267	0.00049
	RIP_T	-0.22236	0.07772	-0.26648	-2.86088	0.00841

a Dependent Variable: CFSTP43

Figure C-1-34: Commodity Flow Production for Commodity Item 43 (CFSTP43)

C-1-2 Model Summary and Coefficients for CFSTA – Attraction

Regression
(CFSTA2)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98434	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66962	1	10.66962	221.52652	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95860	7			
2	Regression	10.83599	2	5.41800	220.93922	0.00001
	Residual	0.12261	5	0.02452		
	Total	10.95860	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTA2

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-11.74640	0.87914		-13.36128	0.00001
	RES_T	1.56137	0.10490	0.98673	14.88377	0.00001
2	(Constant)	-11.92889	0.63120		-18.89862	0.00001
	RES_T	1.46262	0.08391	0.92432	17.43145	0.00001
	NI_T	0.10942	0.04201	0.13812	2.60469	0.04798

a Dependent Variable: CFSTA2

Figure C-1-35: Commodity Flow Attraction for Commodity Item 2 (CFSTA2)

Regression
(CFSTA3)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91219	0.83209	0.82587	0.68644
2	0.93290	0.87031	0.86033	0.61477
3	0.96121	0.92392	0.91479	0.48020

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	63.04781	1	63.04781	133.80220	0.00000
	Residual	12.72244	27	0.47120		
	Total	75.77026	28			
2	Regression	65.94364	2	32.97182	87.23934	0.00000
	Residual	9.82661	26	0.37795		
	Total	75.77026	28			
3	Regression	70.00555	3	23.33518	101.19851	0.00000
	Residual	5.76471	25	0.23059		
	Total	75.77026	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Predictors: (Constant), RES_T, URB_T, RIP_T

d Dependent Variable: CFSTA3

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.20688	1.02654		-9.94300	0.00000
	RES_T	1.30497	0.11282	0.91219	11.56729	0.00000
2	(Constant)	-10.34148	0.92065		-11.23281	0.00000
	RES_T	1.01821	0.14471	0.71174	7.03621	0.00000
	URB_T	0.33663	0.12161	0.28000	2.76803	0.01026
3	(Constant)	-10.63421	0.72249		-14.71888	0.00000
	RES_T	1.19171	0.12035	0.83302	9.90170	0.00000
	URB_T	0.47630	0.10065	0.39617	4.73212	0.00007
	RIP_T	-0.28183	0.06715	-0.31935	-4.19707	0.00030

a Dependent Variable: CFSTA3

Figure C-1-36: Commodity Flow Attraction for Commodity Item 3 (CFSTA3)

Regression
(CFSTA4)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66930	1	10.66930	221.52020	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95828	7			
2	Regression	10.83566	2	5.41783	220.91420	0.00001
	Residual	0.12262	5	0.02452		
	Total	10.95828	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTA4

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-12.55371	0.87914		-14.27960	0.00001
	RES_T	1.56134	0.10490	0.98673	14.88355	0.00001
2	(Constant)	-12.73620	0.63123		-20.17678	0.00001
	RES_T	1.46260	0.08391	0.92432	17.43048	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60450	0.04799

a Dependent Variable: CFSTA4

Figure C-1-37: Commodity Flow Attraction for Commodity Item 4 (CFSTA4)

Regression
(CFSTA5)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91150	0.83084	0.82457	0.68042
2	0.93321	0.87089	0.86096	0.60576
3	0.95981	0.92124	0.91179	0.48248

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.39560	1	61.39560	132.61098	0.00000
	Residual	12.50033	27	0.46298		
	Total	73.89594	28			
2	Regression	64.35525	2	32.17762	87.68950	0.00000
	Residual	9.54069	26	0.36695		
	Total	73.89594	28			
3	Regression	68.07623	3	22.69208	97.47951	0.00000
	Residual	5.81970	25	0.23279		
	Total	73.89594	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA5

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.35375	1.01754		-10.17529	0.00000
	RES_T	1.28776	0.11183	0.91150	11.51568	0.00000
2	(Constant)	-10.48983	0.90716		-11.56342	0.00000
	RES_T	0.99786	0.14259	0.70630	6.99811	0.00000
	URB_T	0.34032	0.11983	0.28663	2.83999	0.00865
3	(Constant)	-10.77001	0.72593		-14.83623	0.00000
	RES_T	1.16392	0.12093	0.82385	9.62495	0.00000
	URB_T	0.47399	0.10113	0.39922	4.68696	0.00008
	RIP_T	-0.26974	0.06747	-0.309508021	-3.99805	0.00049

a Dependent Variable: CFSTA5

Figure C-1-38: Commodity Flow Attraction for Commodity Item 5 (CFSTA5)

Regression
(CFSTA6)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90927	0.82678	0.82036	0.72886
2	0.92702	0.85936	0.84854	0.66926
3	0.96060	0.92275	0.91348	0.50584

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.46013	1	68.46013	128.86929	0.00000
	Residual	14.34340	27	0.53124		
	Total	82.80353	28			
2	Regression	71.15797	2	35.57899	79.43401	0.00000
	Residual	11.64556	26	0.44791		
	Total	82.80353	28			
3	Regression	76.40667	3	25.46889	99.53663	0.00000
	Residual	6.39686	25	0.25587		
	Total	82.80353	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA6

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.13972	1.08997		-9.30271	0.00000
	RES_T	1.35983	0.11979	0.90927	11.35206	0.00000
2	(Constant)	-10.26964	1.00224		-10.24667	0.00000
	RES_T	1.08305	0.15754	0.72420	6.87496	0.00000
	URB_T	0.32492	0.13239	0.25852	2.45423	0.02113
3	(Constant)	-10.60240	0.76107		-13.93088	0.00000
	RES_T	1.28028	0.12678	0.85608	10.09824	0.00000
	URB_T	0.48368	0.10603	0.38484	4.56188	0.00012
	RIP_T	-0.32037	0.07074	-0.34726	-4.52910	0.00013

a Dependent Variable: CFSTA6

Figure C-1-39: Commodity Flow Attraction for Commodity Item 6 (CFSTA6)

Regression
(CFSTA7)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91184	0.83144	0.82520	0.68206
2	0.93320	0.87087	0.86093	0.60837
3	0.96038	0.92234	0.91302	0.48114

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.95845	1	61.95845	133.18420	0.00000
	Residual	12.56063	27	0.46521		
	Total	74.51908	28			
2	Regression	64.89611	2	32.44805	87.67037	0.00000
	Residual	9.62297	26	0.37011		
	Total	74.51908	28			
3	Regression	68.73175	3	22.91058	98.96878	0.00000
	Residual	5.78733	25	0.23149		
	Total	74.51908	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA7

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.47818	1.01999		-8.31202	0.00000
	RES_T	1.29365	0.11210	0.91184	11.54055	0.00000
2	(Constant)	-8.61375	0.91106		-9.45466	0.00000
	RES_T	1.00482	0.14320	0.70826	7.01679	0.00000
	URB_T	0.33905	0.12035	0.28437	2.81730	0.00913
3	(Constant)	-8.89822	0.72390		-12.29199	0.00000
	RES_T	1.17343	0.12059	0.82710	9.73067	0.00000
	URB_T	0.47477	0.10085	0.39820	4.70776	0.00008
	RIP_T	-0.27387	0.06728	-0.31292	-4.07052	0.00041

a Dependent Variable: CFSTA7

Figure C-1-40: Commodity Flow Attraction for Commodity Item 7 (CFSTA7)

Regression
(CFSTA8)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91124	0.83036	0.82408	0.70853
2	0.93009	0.86507	0.85469	0.64393
3	0.96167	0.92481	0.91578	0.49023

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	66.34723	1	66.34723	132.16309	0.00000
	Residual	13.55428	27	0.50201		
	Total	79.90151	28			
2	Regression	69.12068	2	34.56034	83.34872	0.00000
	Residual	10.78083	26	0.41465		
	Total	79.90151	28			
3	Regression	73.89341	3	24.63114	102.49132	0.00000
	Residual	6.00810	25	0.24032		
	Total	79.90151	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA8

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.95989	1.05957		-10.34374	0.00000
	RES_T	1.33868	0.11645	0.91124	11.49622	0.00000
2	(Constant)	-11.09162	0.96431		-11.50208	0.00000
	RES_T	1.05805	0.15157	0.72021	6.98042	0.00000
	URB_T	0.32944	0.12738	0.26684	2.58625	0.01566
3	(Constant)	-11.40893	0.73758		-15.46801	0.00000
	RES_T	1.24612	0.12287	0.84823	10.14185	0.00000
	URB_T	0.48083	0.10275	0.38946	4.67944	0.00009
	RIP_T	-0.30550	0.06855	-0.33710	-4.45641	0.00015

a Dependent Variable: CFSTA8

Figure C-1-41: Commodity Flow Attraction for Commodity Item 8 (CFSTA8)

Regression
(CFSTA11)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88231	0.77847	0.76682	0.78433
2	0.92015	0.84668	0.82964	0.67039
3	0.96801	0.93705	0.92594	0.44201

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.07406	1	41.07406	66.76893	0.00000
	Residual	11.68818	19	0.61517		
	Total	52.76224	20			
2	Regression	44.67270	2	22.33635	49.70053	0.00000
	Residual	8.08954	18	0.44942		
	Total	52.76224	20			
3	Regression	49.44083	3	16.48028	84.35131	0.00000
	Residual	3.32140	17	0.19538		
	Total	52.76224	20			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA11

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.45017	1.39920		-7.46870	0.00000
	RES_T	1.22167	0.14951	0.88231	8.17123	0.00000
2	(Constant)	-10.37172	1.19626		-8.67015	0.00000
	RES_T	0.83747	0.18645	0.60484	4.49162	0.00028
	URB_T	0.42182	0.14907	0.38105	2.82972	0.01111
3	(Constant)	-11.31935	0.81173		-13.94467	0.00000
	RES_T	1.07952	0.13234	0.77965	8.15718	0.00000
	URB_T	0.61816	0.10602	0.55841	5.83069	0.00002
	RIP_T	-0.34300	0.06943	-0.44445	-4.94012	0.00012

a Dependent Variable: CFSTA11

Figure C-1-42: Commodity Flow Attraction for Commodity Item 11 (CFSTA11)

Regression
(CFSTA12)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.84691	0.71726	0.70679	0.81750
2	0.88002	0.77443	0.75708	0.74410

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

ANOVA(c)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	45.77495	1	45.77495	68.49348	0.00000
	Residual	18.04440	27	0.66831		
	Total	63.81935	28			
2	Regression	49.42357	2	24.71179	44.63160	0.00000
	Residual	14.39578	26	0.55368		
	Total	63.81935	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Dependent Variable: CFSTA12

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.56683	1.22254		-5.37149	0.00001
	RES_T	1.11194	0.13436	0.84691	8.27608	0.00000
2	(Constant)	-6.71792	1.11432		-6.02872	0.00000
	RES_T	0.79005	0.17515	0.60175	4.51068	0.00012
	URB_T	0.37786	0.14720	0.34246	2.56705	0.01636

a Dependent Variable: CFSTA12

Figure C-1-43: Commodity Flow Attraction for Commodity Item 12 (CFSTA12)

Regression
(CFSTA13)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.89781	0.80606	0.79888	0.81869
2	0.92029	0.84694	0.83517	0.74116
3	0.95190	0.90611	0.89484	0.59199

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	75.21578	1	75.21578	112.22077	0.00000
	Residual	18.09670	27	0.67025		
	Total	93.31249	28			
2	Regression	79.03013	2	39.51506	71.93432	0.00000
	Residual	14.28236	26	0.54932		
	Total	93.31249	28			
3	Regression	84.55119	3	28.18373	80.42112	0.00000
	Residual	8.76130	25	0.35045		
	Total	93.31249	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T
d Dependent Variable: CFSTA13

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.22078	1.22431		-8.34822	0.00000
	RES_T	1.42535	0.13455	0.89781	10.59343	0.00000
2	(Constant)	-10.43743	1.11142		-9.39110	0.00000
	RES_T	1.69284	0.15856	1.06630	10.67622	0.00000
	RIP_T	-0.25775	0.09782	-0.26318	-2.63510	0.01399
3	(Constant)	-10.72567	0.89069		-12.04199	0.00000
	RES_T	1.38602	0.14837	0.87304	9.34141	0.00000
	RIP_T	-0.36639	0.08278	-0.37410	-4.42584	0.00017
	URB_T	0.49251	0.12408	0.36914	3.96915	0.00054

a Dependent Variable: CFSTA13

Figure C-1-44: Commodity Flow Attraction for Commodity Item 13 (CFSTA13)

Regression
(CFSTA14)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.87629	0.76789	0.75929	0.74728
2	0.90609	0.82100	0.80723	0.66874

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	49.88129	1	49.88129	89.32477	0.00000
	Residual	15.07751	27	0.55843		
	Total	64.95880	28			
2	Regression	53.33141	2	26.66570	59.62715	0.00000
	Residual	11.62739	26	0.44721		
	Total	64.95880	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Dependent Variable: CFSTA14

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.35861	1.11752		-8.37445	0.00000
	RES_T	1.16074	0.12281	0.87629	9.45118	0.00000
2	(Constant)	-9.50553	1.00146		-9.49168	0.00000
	RES_T	0.84773	0.15741	0.63999	5.38545	0.00001
	URB_T	0.36744	0.13229	0.33008	2.77755	0.01003

a Dependent Variable: CFSTA14

Figure C-1-45: Commodity Flow Attraction for Commodity Item 14 (CFSTA14)

Regression
(CFSTA15)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91183	0.83143	0.82518	0.70051
2	0.93122	0.86718	0.85696	0.63366
3	0.96183	0.92511	0.91612	0.48522

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	65.34751	1	65.34751	133.16674	0.00000
	Residual	13.24943	27	0.49072		
	Total	78.59694	28			
2	Regression	68.15744	2	34.07872	84.87442	0.00000
	Residual	10.43950	26	0.40152		
	Total	78.59694	28			
3	Regression	72.71087	3	24.23696	102.94199	0.00000
	Residual	5.88607	25	0.23544		
	Total	78.59694	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA15

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.83723	1.04758		-6.52667	0.00000
	RES_T	1.32856	0.11513	0.91183	11.53979	0.00000
2	(Constant)	-6.96982	0.94893		-7.34497	0.00000
	RES_T	1.04608	0.14915	0.71795	7.01341	0.00000
	URB_T	0.33160	0.12535	0.27081	2.64542	0.01366
3	(Constant)	-7.27976	0.73005		-9.97155	0.00000
	RES_T	1.22978	0.12161	0.84403	10.11212	0.00000
	URB_T	0.47947	0.10171	0.39157	4.71433	0.00008
	RIP_T	-0.29840	0.06785	-0.33199	-4.39771	0.00018

a Dependent Variable: CFSTA15

Figure C-1-46: Commodity Flow Attraction for Commodity Item 15 (CFSTA15)

Regression
(CFSTA17)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91184	0.83145	0.82521	0.70022
2	0.93126	0.86725	0.85704	0.63327
3	0.96183	0.92511	0.91612	0.48507

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	65.30553	1	65.30553	133.19312	0.00000
	Residual	13.23829	27	0.49031		
	Total	78.54382	28			
2	Regression	68.11714	2	34.05857	84.92852	0.00000
	Residual	10.42668	26	0.40103		
	Total	78.54382	28			
3	Regression	72.66158	3	24.22053	102.93931	0.00000
	Residual	5.88223	25	0.23529		
	Total	78.54382	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA17

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-7.79853	1.04714		-7.44743	0.00000
	RES_T	1.32813	0.11508	0.91184	11.54093	0.00000
2	(Constant)	-7.93116	0.94834		-8.36319	0.00000
	RES_T	1.04557	0.14906	0.71785	7.01429	0.00000
	URB_T	0.33170	0.12527	0.27098	2.64784	0.01358
3	(Constant)	-8.24080	0.72982		-11.29162	0.00000
	RES_T	1.22909	0.12158	0.84384	10.10972	0.00000
	URB_T	0.47943	0.10167	0.39167	4.71541	0.00008
	RIP_T	-0.29811	0.06783	-0.33177	-4.39480	0.00018

a Dependent Variable: CFSTA17

Figure C-1-47: Commodity Flow Attraction for Commodity Item 17 (CFSTA17)

Regression
(CFSTA18)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88997	0.79205	0.78435	0.87437
2	0.91496	0.83715	0.82462	0.78851
3	0.94538	0.89374	0.88099	0.64955

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.62212	1	78.62212	102.83821	0.00000
	Residual	20.64211	27	0.76452		
	Total	99.26423	28			
2	Regression	83.09868	2	41.54934	66.82622	0.00000
	Residual	16.16555	26	0.62175		
	Total	99.26423	28			
3	Regression	88.71637	3	29.57212	70.09032	0.00000
	Residual	10.54786	25	0.42191		
	Total	99.26423	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T
d Dependent Variable: CFSTA18

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.69931	1.30758		-6.65300	0.00000
	RES_T	1.45727	0.14370	0.88997	10.14092	0.00000
2	(Constant)	-8.93401	1.18242		-7.55569	0.00000
	RES_T	1.74704	0.16869	1.06694	10.35646	0.00000
	RIP_T	-0.27923	0.10406	-0.27644	-2.68326	0.01251
3	(Constant)	-9.22476	0.97729		-9.43911	0.00000
	RES_T	1.43756	0.16280	0.87794	8.83018	0.00000
	RIP_T	-0.38881	0.09083	-0.38492	-4.28053	0.00024
	URB_T	0.49680	0.13615	0.36102	3.64894	0.00121

a Dependent Variable: CFSTA18

Figure C-1-48: Commodity Flow Attraction for Commodity Item 18 (CFSTA18)

Regression
(CFSTA19)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90654	0.82181	0.81521	0.68057
2	0.93065	0.86610	0.85580	0.60119
3	0.95328	0.90875	0.89780	0.50614

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	57.67699	1	57.67699	124.52588	0.00000
	Residual	12.50566	27	0.46317		
	Total	70.18266	28			
2	Regression	60.78534	2	30.39267	84.08879	0.00000
	Residual	9.39732	26	0.36144		
	Total	70.18266	28			
3	Regression	63.77821	3	21.25940	82.98684	0.00000
	Residual	6.40445	25	0.25618		
	Total	70.18266	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA19

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.50394	1.01776		-8.35558	0.00000
	RES_T	1.24815	0.11185	0.90654	11.15912	0.00000
2	(Constant)	-8.64339	0.90031		-9.60042	0.00000
	RES_T	0.95105	0.14151	0.69076	6.72057	0.00000
	URB_T	0.34876	0.11893	0.30142	2.93258	0.00693
3	(Constant)	-8.89467	0.76152		-11.68011	0.00000
	RES_T	1.09999	0.12686	0.79893	8.67107	0.00000
	URB_T	0.46865	0.10609	0.40503	4.41748	0.00017
	RIP_T	-0.24192	0.07078	-0.28483	-3.41801	0.00217

a Dependent Variable: CFSTA19

Figure C-1-49: Commodity Flow Attraction for Commodity Item 19 (CFSTA19)

Regression
(CFSTA20)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66930	1	10.66930	221.52020	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95828	7			
2	Regression	10.83566	2	5.41783	220.91420	0.00001
	Residual	0.12262	5	0.02452		
	Total	10.95828	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTA20

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-12.09841	0.87914		-13.76170	0.00001
	RES_T	1.56134	0.10490	0.98673	14.88355	0.00001
2	(Constant)	-12.28090	0.63123		-19.45549	0.00001
	RES_T	1.46260	0.08391	0.92432	17.43048	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60450	0.04799

a Dependent Variable: CFSTA20

Figure C-1-50: Commodity Flow Attraction for Commodity Item 20 (CFSTA20)

Regression
(CFSTA21)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.86952	0.75607	0.74704	1.01578
2	0.89977	0.80959	0.79494	0.91456
3	0.92772	0.86066	0.84393	0.79786

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	86.35017	1	86.35017	83.68789	0.00000
	Residual	27.85892	27	1.03181		
	Total	114.20909	28			
2	Regression	92.46240	2	46.23120	55.27329	0.00000
	Residual	21.74669	26	0.83641		
	Total	114.20909	28			
3	Regression	98.29470	3	32.76490	51.47056	0.00000
	Residual	15.91439	25	0.63658		
	Total	114.20909	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T
d Dependent Variable: CFSTA21

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-12.88842	1.51905		-8.48452	0.00000
	RES_T	1.52721	0.16694	0.86952	9.14811	0.00000
2	(Constant)	-13.16267	1.37143		-9.59777	0.00000
	RES_T	1.86581	0.19566	1.06231	9.53618	0.00000
	RIP_T	-0.32628	0.12070	-0.30114	-2.70327	0.01194
3	(Constant)	-13.45892	1.20043		-11.21175	0.00000
	RES_T	1.55047	0.19997	0.88277	7.75345	0.00000
	RIP_T	-0.43794	0.11157	-0.40419	-3.92515	0.00060
	URB_T	0.50620	0.16723	0.34294	3.02688	0.00566

a Dependent Variable: CFSTA21

Figure C-1-51: Commodity Flow Attraction for Commodity Item 21 (CFSTA21)

Regression
(CFSTA22)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66930	1	10.66930	221.52020	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95828	7			
2	Regression	10.83566	2	5.41783	220.91420	0.00001
	Residual	0.12262	5	0.02452		
	Total	10.95828	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTA22

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-13.36281	0.87914		-15.19993	0.00001
	RES_T	1.56134	0.10490	0.98673	14.88355	0.00001
2	(Constant)	-13.54530	0.63123		-21.45857	0.00000
	RES_T	1.46260	0.08391	0.92432	17.43048	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60450	0.04799

a Dependent Variable: CFSTA22

Figure C-1-52: Commodity Flow Attraction for Commodity Item 22 (CFSTA22)

Regression
(CFSTA23)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91006	0.82821	0.82184	0.72134
2	0.92818	0.86151	0.85086	0.65999
3	0.96107	0.92366	0.91450	0.49971

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	67.72962	1	67.72962	130.16599	0.00000
	Residual	14.04898	27	0.52033		
	Total	81.77860	28			
2	Regression	70.45335	2	35.22667	80.87178	0.00000
	Residual	11.32525	26	0.43559		
	Total	81.77860	28			
3	Regression	75.53594	3	25.17865	100.83304	0.00000
	Residual	6.24266	25	0.24971		
	Total	81.77860	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA23

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.52311	1.07873		-9.75510	0.00000
	RES_T	1.35256	0.11855	0.91006	11.40903	0.00000
2	(Constant)	-10.65366	0.98836		-10.77910	0.00000
	RES_T	1.07445	0.15535	0.72293	6.91614	0.00000
	URB_T	0.32647	0.13056	0.26138	2.50060	0.01903
3	(Constant)	-10.98111	0.75184		-14.60560	0.00000
	RES_T	1.26853	0.12524	0.85352	10.12843	0.00000
	URB_T	0.48270	0.10474	0.38647	4.60855	0.00010
	RIP_T	-0.31526	0.06988	-0.34386	-4.51157	0.00013

a Dependent Variable: CFSTA23

Figure C-1-53: Commodity Flow Attraction for Commodity Item 23 (CFSTA23)

Regression
(CFSTA24)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.89800	0.80641	0.79924	0.69643
2	0.92429	0.85431	0.84311	0.61566
3	0.94349	0.89018	0.87700	0.54511

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.54918	1	54.54918	112.47044	0.00000
	Residual	13.09525	27	0.48501		
	Total	67.64443	28			
2	Regression	57.78948	2	28.89474	76.23208	0.00000
	Residual	9.85495	26	0.37904		
	Total	67.64443	28			
3	Regression	60.21576	3	20.07192	67.54886	0.00000
	Residual	7.42867	25	0.29715		
	Total	67.64443	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA24

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.04282	1.04147		-8.68274	0.00000
	RES_T	1.21384	0.11446	0.89800	10.60521	0.00000
2	(Constant)	-9.18520	0.92198		-9.96252	0.00000
	RES_T	0.91050	0.14492	0.67359	6.28283	0.00000
	URB_T	0.35609	0.12179	0.31347	2.92383	0.00708
3	(Constant)	-9.41145	0.82016		-11.47517	0.00000
	RES_T	1.04459	0.13662	0.77280	7.64572	0.00000
	URB_T	0.46403	0.11426	0.40849	4.06126	0.00042
	RIP_T	-0.21782	0.07623	-0.26122	-2.85749	0.00848

a Dependent Variable: CFSTA24

Figure C-1-54: Commodity Flow Attraction for Commodity Item 24 (CFSTA24)

Regression
(CFSTA26)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91223	0.83216	0.82594	0.68847
2	0.93271	0.86994	0.85994	0.61760
3	0.96142	0.92433	0.91525	0.48041

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	63.45237	1	63.45237	133.86689	0.00000
	Residual	12.79789	27	0.47400		
	Total	76.25027	28			
2	Regression	66.33315	2	33.16657	86.95380	0.00000
	Residual	9.91712	26	0.38143		
	Total	76.25027	28			
3	Regression	70.48031	3	23.49344	101.79212	0.00000
	Residual	5.76995	25	0.23080		
	Total	76.25027	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA26

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.09579	1.02958		-8.83448	0.00000
	RES_T	1.30915	0.11315	0.91223	11.57009	0.00000
2	(Constant)	-9.23004	0.92488		-9.97973	0.00000
	RES_T	1.02314	0.14537	0.71293	7.03791	0.00000
	URB_T	0.33575	0.12217	0.27839	2.74820	0.01075
3	(Constant)	-9.52583	0.72282		-13.17877	0.00000
	RES_T	1.19845	0.12041	0.83509	9.95315	0.00000
	URB_T	0.47688	0.10070	0.39540	4.73575	0.00007
	RIP_T	-0.28478	0.06718	-0.32167	-4.23896	0.00027

a Dependent Variable: CFSTA26

Figure C-1-55: Commodity Flow Attraction for Commodity Item 26 (CFSTA26)

Regression
(CFSTA27)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91078	0.82952	0.82321	0.67867
2	0.93304	0.87056	0.86061	0.60263
3	0.95871	0.91913	0.90943	0.48576

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	60.51232	1	60.51232	131.37728	0.00000
	Residual	12.43619	27	0.46060		
	Total	72.94851	28			
2	Regression	63.50629	2	31.75314	87.43512	0.00000
	Residual	9.44222	26	0.36316		
	Total	72.94851	28			
3	Regression	67.04932	3	22.34977	94.71544	0.00000
	Residual	5.89919	25	0.23597		
	Total	72.94851	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA27

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.95235	1.01492		-9.80600	0.00000
	RES_T	1.27846	0.11154	0.91078	11.46199	0.00000
2	(Constant)	-10.08921	0.90246		-11.17965	0.00000
	RES_T	0.98688	0.14185	0.70306	6.95715	0.00000
	URB_T	0.34229	0.11921	0.29016	2.87126	0.00803
3	(Constant)	-10.36261	0.73087		-14.17853	0.00000
	RES_T	1.14893	0.12175	0.81850	9.43674	0.00000
	URB_T	0.47273	0.10182	0.40073	4.64282	0.00009
	RIP_T	-0.26322	0.06793	-0.30397	-3.87491	0.00068

a Dependent Variable: CFSTA27

Figure C-1-56: Commodity Flow Attraction for Commodity Item 27 (CFSTA27)

Regression
(CFSTA28)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90664	0.82199	0.81539	0.68044
2	0.93071	0.86622	0.85593	0.60111
3	0.95340	0.90897	0.89804	0.50568

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	57.72488	1	57.72488	124.67497	0.00000
	Residual	12.50108	27	0.46300		
	Total	70.22596	28			
2	Regression	60.83132	2	30.41566	84.17644	0.00000
	Residual	9.39464	26	0.36133		
	Total	70.22596	28			
3	Regression	63.83307	3	21.27769	83.20839	0.00000
	Residual	6.39289	25	0.25572		
	Total	70.22596	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA28

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.07307	1.01757		-9.89915	0.00000
	RES_T	1.24867	0.11183	0.90664	11.16579	0.00000
2	(Constant)	-10.21248	0.90019		-11.34486	0.00000
	RES_T	0.95166	0.14149	0.69098	6.72584	0.00000
	URB_T	0.34866	0.11891	0.30123	2.93210	0.00694
3	(Constant)	-10.46413	0.76084		-13.75348	0.00000
	RES_T	1.10082	0.12674	0.79928	8.68545	0.00000
	URB_T	0.46872	0.10599	0.40496	4.42214	0.00017
	RIP_T	-0.24228	0.07071	-0.28516	-3.42617	0.00212

a Dependent Variable: CFSTA28

Figure C-1-57: Commodity Flow Attraction for Commodity Item 28 (CFSTA28)

Regression
(CFSTA29)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90615	0.82111	0.81449	0.68111
2	0.93038	0.86561	0.85528	0.60159
3	0.95282	0.90787	0.89681	0.50798

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	57.49340	1	57.49340	123.93259	0.00000
	Residual	12.52553	27	0.46391		
	Total	70.01893	28			
2	Regression	60.60934	2	30.30467	83.73597	0.00000
	Residual	9.40959	26	0.36191		
	Total	70.01893	28			
3	Regression	63.56794	3	21.18931	82.11651	0.00000
	Residual	6.45099	25	0.25804		
	Total	70.01893	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA29

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.56445	1.01856		-10.37190	0.00000
	RES_T	1.24616	0.11194	0.90615	11.13250	0.00000
2	(Constant)	-10.70407	0.90090		-11.88151	0.00000
	RES_T	0.94870	0.14161	0.68985	6.69959	0.00000
	URB_T	0.34919	0.11901	0.30214	2.93424	0.00690
3	(Constant)	-10.95391	0.76428		-14.33223	0.00000
	RES_T	1.09678	0.12732	0.79753	8.61455	0.00000
	URB_T	0.46839	0.10647	0.40527	4.39905	0.00018
	RIP_T	-0.24053	0.07104	-0.28352	-3.38610	0.00235

a Dependent Variable: CFSTA29

Figure C-1-58: Commodity Flow Attraction for Commodity Item 29 (CFSTA29)

Regression
(CFSTA30)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91192	0.83160	0.82537	0.69880
2	0.93145	0.86760	0.85742	0.63142
3	0.96183	0.92511	0.91612	0.48431

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	65.11190	1	65.11190	133.33670	0.00000
	Residual	13.18483	27	0.48833		
	Total	78.29673	28			
2	Regression	67.93061	2	33.96531	85.19083	0.00000
	Residual	10.36612	26	0.39870		
	Total	78.29673	28			
3	Regression	72.43289	3	24.14430	102.93728	0.00000
	Residual	5.86384	25	0.23455		
	Total	78.29673	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA30

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-11.01094	1.04503		-10.53651	0.00000
	RES_T	1.32616	0.11485	0.91192	11.54715	0.00000
2	(Constant)	-11.14374	0.94558		-11.78503	0.00000
	RES_T	1.04324	0.14863	0.71738	7.01909	0.00000
	URB_T	0.33212	0.12491	0.27175	2.65891	0.01324
3	(Constant)	-11.45193	0.72867		-15.71614	0.00000
	RES_T	1.22591	0.12138	0.84299	10.09937	0.00000
	URB_T	0.47916	0.10151	0.39207	4.72016	0.00008
	RIP_T	-0.29672	0.06773	-0.33075	-4.38122	0.00019

a Dependent Variable: CFSTA30

Figure C-1-59: Commodity Flow Attraction for Commodity Item 30 (CFSTA30)

Regression
(CFSTA31)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.82895	0.68717	0.67558	0.85929
2	0.86372	0.74601	0.72647	0.78902

A Predictors: (Constant), RES_T

B Predictors: (Constant), RES_T, URB_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	43.79150	1	43.79150	59.30779	0.00000
	Residual	19.93617	27	0.73838		
	Total	63.72767	28			
2	Regression	47.54118	2	23.77059	38.18215	0.00000
	Residual	16.18650	26	0.62256		
	Total	63.72767	28			

A Predictors: (Constant), RES_T

B Predictors: (Constant), RES_T, URB_T

C Dependent Variable: CFSTA31

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.08665	1.28502		-4.73660	0.00006
	RES_T	1.08758	0.14122	0.82895	7.70116	0.00000
2	(Constant)	-6.23982	1.18159		-5.28084	0.00002
	RES_T	0.76127	0.18573	0.58024	4.09887	0.00036
	URB_T	0.38306	0.15608	0.34742	2.45418	0.02113

A Dependent Variable: CFSTA31

Figure C-1-60: Commodity Flow Attraction for Commodity Item 31 (CFSTA31)

Regression
(CFSTA32)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90956	0.82730	0.82091	0.67804
2	0.93249	0.86954	0.85950	0.60055
3	0.95705	0.91595	0.90586	0.49158

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	59.46439	1	59.46439	129.34325	0.00000
	Residual	12.41301	27	0.45974		
	Total	71.87739	28			
2	Regression	62.50013	2	31.25006	86.64591	0.00000
	Residual	9.37726	26	0.36066		
	Total	71.87739	28			
3	Regression	65.83609	3	21.94536	90.81394	0.00000
	Residual	6.04130	25	0.24165		
	Total	71.87739	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA32

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.56508	1.01398		-8.44701	0.00000
	RES_T	1.26734	0.11144	0.90956	11.37292	0.00000
2	(Constant)	-8.70290	0.89935		-9.67685	0.00000
	RES_T	0.97374	0.14136	0.69884	6.88821	0.00000
	URB_T	0.34467	0.11880	0.29434	2.90122	0.00747
3	(Constant)	-8.96819	0.73962		-12.12544	0.00000
	RES_T	1.13097	0.12321	0.81169	9.17939	0.00000
	URB_T	0.47124	0.10304	0.40243	4.57343	0.00011
	RIP_T	-0.25541	0.06874	-0.29714	-3.71549	0.00102

a Dependent Variable: CFSTA32

Figure C-1-61: Commodity Flow Attraction for Commodity Item 32 (CFSTA32)

Regression
(CFSTA33)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91216	0.83204	0.82582	0.68580
2	0.93296	0.87041	0.86044	0.61386
3	0.96112	0.92375	0.91460	0.48021

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	62.90625	1	62.90625	133.75091	0.00000
	Residual	12.69874	27	0.47032		
	Total	75.60499	28			
2	Regression	65.80751	2	32.90375	87.31810	0.00000
	Residual	9.79748	26	0.37683		
	Total	75.60499	28			
3	Regression	69.83991	3	23.27997	100.95251	0.00000
	Residual	5.76508	25	0.23060		
	Total	75.60499	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA33

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.80886	1.02558		-9.56418	0.00000
	RES_T	1.30351	0.11271	0.91216	11.56507	0.00000
2	(Constant)	-9.94359	0.91928		-10.81667	0.00000
	RES_T	1.01648	0.14450	0.71130	7.03465	0.00000
	URB_T	0.33695	0.12143	0.28057	2.77474	0.01009
3	(Constant)	-10.23526	0.72251		-14.16622	0.00000
	RES_T	1.18935	0.12036	0.83228	9.88172	0.00000
	URB_T	0.47610	0.10065	0.39644	4.73005	0.00008
	RIP_T	-0.28081	0.06715	-0.31854	-4.18167	0.00031

a Dependent Variable: CFSTA33

Figure C-1-62: Commodity Flow Attraction for Commodity Item 33 (CFSTA33)

Regression
(CFSTA34)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91157	0.83096	0.82470	0.70427
2	0.93070	0.86621	0.85592	0.63850
3	0.96178	0.92502	0.91602	0.48745

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	65.83277	1	65.83277	132.72876	0.00000
	Residual	13.39186	27	0.49599		
	Total	79.22462	28			
2	Regression	68.62503	2	34.31252	84.16604	0.00000
	Residual	10.59959	26	0.40768		
	Total	79.22462	28			
3	Regression	73.28448	3	24.42816	102.80955	0.00000
	Residual	5.94015	25	0.23761		
	Total	79.22462	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA34

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.60019	1.05320		-10.06475	0.00000
	RES_T	1.33348	0.11575	0.91157	11.52080	0.00000
2	(Constant)	-10.73237	0.95617		-11.22429	0.00000
	RES_T	1.05189	0.15029	0.71908	6.99892	0.00000
	URB_T	0.33056	0.12631	0.26888	2.61710	0.01458
3	(Constant)	-11.04590	0.73340		-15.06123	0.00000
	RES_T	1.23772	0.12217	0.84611	10.13097	0.00000
	URB_T	0.48014	0.10217	0.39056	4.69936	0.00008
	RIP_T	-0.30185	0.06816	-0.33450	-4.42831	0.00016

a Dependent Variable: CFSTA34

Figure C-1-63: Commodity Flow Attraction for Commodity Item 34 (CFSTA34)

Regression
(CFSTA35)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90840	0.82519	0.81871	0.67856
2	0.93183	0.86831	0.85818	0.60016
3	0.95556	0.91310	0.90267	0.49720

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.68432	1	58.68432	127.45095	0.00000
	Residual	12.43205	27	0.46045		
	Total	71.11637	28			
2	Regression	61.75137	2	30.87569	85.72003	0.00000
	Residual	9.36500	26	0.36019		
	Total	71.11637	28			
3	Regression	64.93608	3	21.64536	87.55805	0.00000
	Residual	6.18029	25	0.24721		
	Total	71.11637	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA35

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-11.00390	1.01476		-10.84388	0.00000
	RES_T	1.25900	0.11152	0.90840	11.28942	0.00000
2	(Constant)	-11.14242	0.89876		-12.39749	0.00000
	RES_T	0.96389	0.14127	0.69546	6.82300	0.00000
	URB_T	0.34644	0.11872	0.29744	2.91805	0.00717
3	(Constant)	-11.40163	0.74808		-15.24125	0.00000
	RES_T	1.11752	0.12462	0.80631	8.96760	0.00000
	URB_T	0.47011	0.10422	0.40361	4.51087	0.00013
	RIP_T	-0.24955	0.06953	-0.29188	-3.58922	0.00141

a Dependent Variable: CFSTA35

Figure C-1-64: Commodity Flow Attraction for Commodity Item 35 (CFSTA35)

Regression
(CFSTA36)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91217	0.83205	0.82583	0.69340
2	0.93215	0.86890	0.85881	0.62429
3	0.96172	0.92491	0.91590	0.48181

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	64.31207	1	64.31207	133.76031	0.00000
	Residual	12.98162	27	0.48080		
	Total	77.29369	28			
2	Regression	67.16036	2	33.58018	86.15973	0.00000
	Residual	10.13333	26	0.38974		
	Total	77.29369	28			
3	Regression	71.49008	3	23.83003	102.65167	0.00000
	Residual	5.80361	25	0.23214		
	Total	77.29369	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA36

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.34721	1.03694		-9.97858	0.00000
	RES_T	1.31799	0.11396	0.91217	11.56548	0.00000
2	(Constant)	-10.48070	0.93491		-11.21043	0.00000
	RES_T	1.03359	0.14695	0.71534	7.03358	0.00000
	URB_T	0.33386	0.12350	0.27494	2.70336	0.01194
3	(Constant)	-10.78294	0.72492		-14.87462	0.00000
	RES_T	1.21272	0.12076	0.83931	10.04244	0.00000
	URB_T	0.47805	0.10099	0.39369	4.73362	0.00007
	RIP_T	-0.29098	0.06738	-0.32645	-4.31867	0.00022

a Dependent Variable: CFSTA36

Figure C-1-65: Commodity Flow Attraction for Commodity Item 36 (CFSTA36)

Regression
(CFSTA37)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15662

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66945	1	10.66945	221.52158	0.00001
	Residual	0.28899	6	0.04816		
	Total	10.95844	7			
2	Regression	10.83579	2	5.41790	220.86714	0.00001
	Residual	0.12265	5	0.02453		
	Total	10.95844	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTA37

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-15.99218	0.87914		-18.19071	0.00000
	RES_T	1.56135	0.10490	0.98673	14.88360	0.00001
2	(Constant)	-16.17466	0.63130		-25.62113	0.00000
	RES_T	1.46262	0.08392	0.92433	17.42875	0.00001
	NI_T	0.10940	0.04201	0.13810	2.60401	0.04802

a Dependent Variable: CFSTA37

Figure C-1-66: Commodity Flow Attraction for Commodity Item 37 (CFSTA37)

Regression
(CFSTA39)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90134	0.81241	0.80547	0.68951
2	0.92688	0.85911	0.84828	0.60893
3	0.94724	0.89726	0.88494	0.53029

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	55.59337	1	55.59337	116.93363	0.00000
	Residual	12.83652	27	0.47543		
	Total	68.42990	28			
2	Regression	58.78907	2	29.39453	79.27305	0.00000
	Residual	9.64083	26	0.37080		
	Total	68.42990	28			
3	Regression	61.39974	3	20.46658	72.78138	0.00000
	Residual	7.03016	25	0.28121		
	Total	68.42990	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA39

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-11.16223	1.03113		-10.82522	0.00000
	RES_T	1.22540	0.11332	0.90134	10.81359	0.00000
2	(Constant)	-11.30363	0.91190		-12.39563	0.00000
	RES_T	0.92416	0.14334	0.67976	6.44750	0.00000
	URB_T	0.35363	0.12046	0.30951	2.93570	0.00688
3	(Constant)	-11.53831	0.79786		-14.46165	0.00000
	RES_T	1.06325	0.13291	0.78207	7.99983	0.00000
	URB_T	0.46560	0.11115	0.40751	4.18888	0.00030
	RIP_T	-0.22595	0.07416	-0.26941	-3.04694	0.00539

a Dependent Variable: CFSTA39

Figure C-1-67: Commodity Flow Attraction for Commodity Item 39 (CFSTA39)

Regression
(CFSTA40)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91167	0.83114	0.82489	0.68114
2	0.93322	0.87090	0.86097	0.60692
3	0.96009	0.92178	0.91239	0.48178

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.65708	1	61.65708	132.89704	0.00000
	Residual	12.52655	27	0.46395		
	Total	74.18363	28			
2	Regression	64.60654	2	32.30327	87.69729	0.00000
	Residual	9.57709	26	0.36835		
	Total	74.18363	28			
3	Regression	68.38082	3	22.79361	98.20082	0.00000
	Residual	5.80281	25	0.23211		
	Total	74.18363	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA40

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.94922	1.01861		-9.76749	0.00000
	RES_T	1.29050	0.11194	0.91167	11.52810	0.00000
2	(Constant)	-10.08507	0.90889		-11.09608	0.00000
	RES_T	1.00109	0.14286	0.70722	7.00747	0.00000
	URB_T	0.33973	0.12006	0.28558	2.82970	0.00886
3	(Constant)	-10.36725	0.72487		-14.30219	0.00000
	RES_T	1.16834	0.12075	0.82537	9.67559	0.00000
	URB_T	0.47436	0.10098	0.39876	4.69742	0.00008
	RIP_T	-0.27167	0.06737	-0.31111	-4.03244	0.00046

a Dependent Variable: CFSTA40

Figure C-1-68: Commodity Flow Attraction for Commodity Item 40 (CFSTA40)

Regression
(CFSTA41)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.87366	0.76328	0.75451	0.75362
2	0.90380	0.81685	0.80276	0.67552

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	49.44517	1	49.44517	87.05900	0.00000
	Residual	15.33465	27	0.56795		
	Total	64.77982	28			
2	Regression	52.91546	2	26.45773	57.98044	0.00000
	Residual	11.86436	26	0.45632		
	Total	64.77982	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Dependent Variable: CFSTA41

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.55966	1.12701		-7.59502	0.00000
	RES_T	1.15565	0.12386	0.87366	9.33054	0.00000
2	(Constant)	-8.70701	1.01161		-8.60705	0.00000
	RES_T	0.84174	0.15901	0.63634	5.29367	0.00002
	URB_T	0.36851	0.13363	0.33150	2.75770	0.01051

a Dependent Variable: CFSTA41

Figure C-1-69: Commodity Flow Attraction for Commodity Item 41 (CFSTA41)

Regression
(CFSTA43)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90727	0.82314	0.81659	0.67967
2	0.93113	0.86700	0.85677	0.60062
3	0.95417	0.91044	0.89969	0.50263

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.04920	1	58.04920	125.66148	0.00000
	Residual	12.47262	27	0.46195		
	Total	70.52183	28			
2	Regression	61.14240	2	30.57120	84.74410	0.00000
	Residual	9.37943	26	0.36075		
	Total	70.52183	28			
3	Regression	64.20579	3	21.40193	84.71263	0.00000
	Residual	6.31604	25	0.25264		
	Total	70.52183	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTA43

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.41344	1.01641		-8.27760	0.00000
	RES_T	1.25217	0.11170	0.90727	11.20988	0.00000
2	(Constant)	-8.55256	0.89946		-9.50858	0.00000
	RES_T	0.95580	0.14138	0.69253	6.76055	0.00000
	URB_T	0.34791	0.11881	0.29996	2.92821	0.00700
3	(Constant)	-8.80678	0.75625		-11.64535	0.00000
	RES_T	1.10648	0.12598	0.80170	8.78306	0.00000
	URB_T	0.46920	0.10535	0.40453	4.45354	0.00015
	RIP_T	-0.24475	0.07029	-0.28747	-3.48216	0.00185

a Dependent Variable: CFSTA43

Figure C-1-70: Commodity Flow Attraction for Commodity Item 43 (CFSTA43)

Regression
(CFSTA99)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88231	0.77847	0.76681	0.78433
2	0.92015	0.84668	0.82964	0.67039
3	0.96801	0.93705	0.92594	0.44202

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.07374	1	41.07374	66.76837	0.00000
	Residual	11.68818	19	0.61517		
	Total	52.76192	20			
2	Regression	44.67230	2	22.33615	49.69955	0.00000
	Residual	8.08962	18	0.44942		
	Total	52.76192	20			
3	Regression	49.44046	3	16.48015	84.34917	0.00000
	Residual	3.32146	17	0.19538		
	Total	52.76192	20			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Predictors: (Constant), RES_T, URB_T, RIP_T

d Dependent Variable: CFSTA99

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-11.11064	1.39920		-7.94072	0.00000
	RES_T	1.22167	0.14951	0.88231	8.17119	0.00000
2	(Constant)	-11.03218	1.19626		-9.22221	0.00000
	RES_T	0.83747	0.18645	0.60484	4.49160	0.00028
	URB_T	0.42181	0.14907	0.38104	2.82967	0.01111
3	(Constant)	-11.97982	0.81174		-14.75819	0.00000
	RES_T	1.07952	0.13234	0.77965	8.15711	0.00000
	URB_T	0.61815	0.10602	0.55840	5.83060	0.00002
	RIP_T	-0.34300	0.06943	-0.44446	-4.94009	0.00012

a Dependent Variable: CFSTA99

Figure C-1-71: Commodity Flow Attraction for Commodity Item 43 (CFSTA99)

C-1-3 Model Summary and Coefficients for CFSTI – Within Utah

Regression (CFSTI2)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66930	1	10.66930	221.52020	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95828	7			
2	Regression	10.83566	2	5.41783	220.91420	0.00001
	Residual	0.12262	5	0.02452		
	Total	10.95828	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTI2

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-14.37361	0.87914		-16.34970	0.00000
	RES_T	1.56134	0.10490	0.98673	14.88355	0.00001
2	(Constant)	-14.55610	0.63123		-23.05988	0.00000
	RES_T	1.46260	0.08391	0.92432	17.43048	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60450	0.04799

a Dependent Variable: CFSTI2

Figure C-1-72: Commodity Flow Within in Utah for Commodity Item 2 (CFSTI2)

Regression (CFSTI3)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.80313	0.64502	0.63187	0.91780
2	0.83999	0.70558	0.68294	0.85177

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.32625	1	41.32625	49.06045	0.00000
	Residual	22.74355	27	0.84235		
	Total	64.06979	28			
2	Regression	45.20658	2	22.60329	31.15511	0.00000
	Residual	18.86321	26	0.72551		
	Total	64.06979	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Dependent Variable: CFSTI3

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.67762	1.37252		-7.05098	0.00000
	RES_T	1.05652	0.15084	0.80313	7.00432	0.00000
2	(Constant)	-9.83343	1.27556		-7.70913	0.00000
	RES_T	0.72458	0.20050	0.55080	3.61393	0.00127
	URB_T	0.38967	0.16850	0.35247	2.31267	0.02892

a Dependent Variable: CFSTI3

Figure C-1-73: Commodity Flow Within in Utah for Commodity Item 3 (CFSTI3)

Regression (CFSTI4)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66930	1	10.66930	221.52020	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95828	7			
2	Regression	10.83566	2	5.41783	220.91420	0.00001
	Residual	0.12262	5	0.02452		
	Total	10.95828	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTI4

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-13.47001	0.87914		-15.32187	0.00000
	RES_T	1.56134	0.10490	0.98673	14.88355	0.00001
2	(Constant)	-13.65250	0.63123		-21.62839	0.00000
	RES_T	1.46260	0.08391	0.92432	17.43048	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60450	0.04799

a Dependent Variable: CFSTI4

Figure C-1-74: Commodity Flow Within in Utah for Commodity Item 4 (CFSTI4)

Regression (CFSTI5)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98672	0.97362	0.96922	0.21950
2	0.99439	0.98881	0.98433	0.15663

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66912	1	10.66912	221.45169	0.00001
	Residual	0.28907	6	0.04818		
	Total	10.95819	7			
2	Regression	10.83551	2	5.41776	220.82366	0.00001
	Residual	0.12267	5	0.02453		
	Total	10.95819	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTI5

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-13.98925	0.87926		-15.91017	0.00000
	RES_T	1.56133	0.10492	0.98672	14.88125	0.00001
2	(Constant)	-14.17176	0.63136		-22.44656	0.00000
	RES_T	1.46257	0.08393	0.92431	17.42674	0.00001
	NI_T	0.10942	0.04202	0.13813	2.60427	0.04800

a Dependent Variable: CFSTI5

Figure C-1-75: Commodity Flow Within in Utah for Commodity Item 5 (CFSTI5)

Regression
(CFSTI6)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91221	0.83213	0.82591	0.69164
2	0.93236	0.86929	0.85923	0.62193
3	0.96164	0.92476	0.91573	0.48120

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	64.02142	1	64.02142	133.83433	0.00000
	Residual	12.91581	27	0.47836		
	Total	76.93723	28			
2	Regression	66.88055	2	33.44027	86.45469	0.00000
	Residual	10.05668	26	0.38680		
	Total	76.93723	28			
3	Regression	71.14846	3	23.71615	102.42324	0.00000
	Residual	5.78876	25	0.23155		
	Total	76.93723	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTI6

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.60023	1.03431		-10.24859	0.00000
	RES_T	1.31501	0.11367	0.91221	11.56868	0.00000
2	(Constant)	-10.73398	0.93136		-11.52501	0.00000
	RES_T	1.03007	0.14639	0.71455	7.03627	0.00000
	URB_T	0.33449	0.12303	0.27610	2.71879	0.01151
3	(Constant)	-11.03404	0.72399		-15.24052	0.00000
	RES_T	1.20792	0.12061	0.83792	10.01547	0.00000
	URB_T	0.47765	0.10086	0.39427	4.73574	0.00007
	RIP_T	-0.28889	0.06729	-0.32486	-4.29324	0.00023

a Dependent Variable: CFSTI6

Figure C-1-76: Commodity Flow Within in Utah for Commodity Item 6 (CFSTI6)

Regression (CFSTI7)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90995	0.82801	0.82164	0.72239
2	0.92802	0.86122	0.85054	0.66129
3	0.96101	0.92354	0.91437	0.50055

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	67.83357	1	67.83357	129.98676	0.00000
	Residual	14.08994	27	0.52185		
	Total	81.92351	28			
2	Regression	70.55376	2	35.27688	80.67011	0.00000
	Residual	11.36975	26	0.43730		
	Total	81.92351	28			
3	Regression	75.65986	3	25.21995	100.65994	0.00000
	Residual	6.26365	25	0.25055		
	Total	81.92351	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Predictors: (Constant), RES_T, URB_T, RIP_T

d Dependent Variable: CFSTI7

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.70175	1.08030		-8.98060	0.00000
	RES_T	1.35359	0.11872	0.90995	11.40117	0.00000
2	(Constant)	-9.83221	0.99030		-9.92850	0.00000
	RES_T	1.07566	0.15566	0.72311	6.91042	0.00000
	URB_T	0.32626	0.13081	0.26098	2.49409	0.01931
3	(Constant)	-10.16042	0.75311		-13.49137	0.00000
	RES_T	1.27020	0.12545	0.85389	10.12472	0.00000
	URB_T	0.48285	0.10492	0.38624	4.60224	0.00010
	RIP_T	-0.31599	0.07000	-0.34434	-4.51441	0.00013

a Dependent Variable: CFSTI7

Figure C-1-77: Commodity Flow Within in Utah for Commodity Item 7 (CFSTI7)

Regression (CFSTI8)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90889	0.82608	0.81964	0.73234
2	0.92647	0.85835	0.84745	0.67351
3	0.96035	0.92227	0.91295	0.50879

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.78112	1	68.78112	128.24628	0.00000
	Residual	14.48065	27	0.53632		
	Total	83.26177	28			
2	Regression	71.46776	2	35.73388	78.77567	0.00000
	Residual	11.79401	26	0.45362		
	Total	83.26177	28			
3	Regression	76.79005	3	25.59668	98.87901	0.00000
	Residual	6.47172	25	0.25887		
	Total	83.26177	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Predictors: (Constant), RES_T, URB_T, RIP_T

d Dependent Variable: CFSTI8

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-11.72267	1.09518		-10.70390	0.00000
	RES_T	1.36302	0.12036	0.90889	11.32459	0.00000
2	(Constant)	-11.85232	1.00861		-11.75115	0.00000
	RES_T	1.08680	0.15854	0.72471	6.85526	0.00000
	URB_T	0.32424	0.13323	0.25728	2.43367	0.02213
3	(Constant)	-12.18740	0.76551		-15.92060	0.00000
	RES_T	1.28541	0.12752	0.85714	10.07995	0.00000
	URB_T	0.48412	0.10665	0.38413	4.53949	0.00012
	RIP_T	-0.32261	0.07115	-0.34872	-4.53429	0.00012

a Dependent Variable: CFSTI8

Figure C-1-78: Commodity Flow Within in Utah for Commodity Item 8 (CFSTI8)

Regression
(CFSTI12)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88232	0.77848	0.76682	0.78431
2	0.92015	0.84668	0.82965	0.67038
3	0.96801	0.93705	0.92594	0.44202

A Predictors: (Constant), RES_T
B Predictors: (Constant), RES_T, URB_T
C Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.07456	1	41.07456	66.77194	0.00000
	Residual	11.68779	19	0.61515		
	Total	52.76235	20			
2	Regression	44.67299	2	22.33649	49.70195	0.00000
	Residual	8.08936	18	0.44941		
	Total	52.76235	20			
3	Regression	49.44088	3	16.48029	84.34981	0.00000
	Residual	3.32147	17	0.19538		
	Total	52.76235	20			

A Predictors: (Constant), RES_T
B Predictors: (Constant), RES_T, URB_T
C Predictors: (Constant), RES_T, URB_T, RIP_T
D Dependent Variable: CFSTI12

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-7.86437	1.39917		-5.62072	0.00002
	RES_T	1.22168	0.14951	0.88232	8.17141	0.00000
2	(Constant)	-7.78592	1.19624		-6.50864	0.00000
	RES_T	0.83749	0.18645	0.60485	4.49177	0.00028
	URB_T	0.42181	0.14907	0.38104	2.82967	0.01111
3	(Constant)	-8.73352	0.81174		-10.75901	0.00000
	RES_T	1.07953	0.13234	0.77966	8.15720	0.00000
	URB_T	0.61814	0.10602	0.55839	5.83047	0.00002
	RIP_T	-0.34299	0.06943	-0.44444	-4.93995	0.00012

A Dependent Variable: CFSTI12

Figure C-1-79: Commodity Flow Within in Utah for Commodity Item 12 (CFSTI12)

Regression
(CFSTI13)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88231	0.77847	0.76681	0.78433
2	0.92015	0.84668	0.82964	0.67039
3	0.96801	0.93705	0.92594	0.44202

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.07395	1	41.07395	66.76833	0.00000
	Residual	11.68825	19	0.61517		
	Total	52.76220	20			
2	Regression	44.67252	2	22.33626	49.69946	0.00000
	Residual	8.08968	18	0.44943		
	Total	52.76220	20			
3	Regression	49.44067	3	16.48022	84.34777	0.00000
	Residual	3.32153	17	0.19538		
	Total	52.76220	20			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTI13

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.22695	1.39920		-6.59444	0.00000
	RES_T	1.22167	0.14951	0.88231	8.17119	0.00000
2	(Constant)	-9.14849	1.19627		-7.64754	0.00000
	RES_T	0.83748	0.18645	0.60484	4.49160	0.00028
	URB_T	0.42181	0.14907	0.38104	2.82967	0.01111
3	(Constant)	-10.09613	0.81175		-12.43750	0.00000
	RES_T	1.07952	0.13234	0.77965	8.15704	0.00000
	URB_T	0.61815	0.10602	0.55840	5.83054	0.00002
	RIP_T	-0.34300	0.06943	-0.44445	-4.94004	0.00012

a Dependent Variable: CFSTI13

Figure C-1-80: Commodity Flow Within in Utah for Commodity Item 13 (CFSTI13)

Regression
(CFSTI14)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88232	0.77848	0.76682	0.78431
2	0.92015	0.84668	0.82965	0.67038
3	0.96801	0.93705	0.92594	0.44202

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.07477	1	41.07477	66.77217	0.00000
	Residual	11.68781	19	0.61515		
	Total	52.76258	20			
2	Regression	44.67310	2	22.33655	49.70129	0.00000
	Residual	8.08949	18	0.44942		
	Total	52.76258	20			
3	Regression	49.44104	3	16.48035	84.34807	0.00000
	Residual	3.32154	17	0.19538		
	Total	52.76258	20			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTI14

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.31319	1.39917		-7.37091	0.00000
	RES_T	1.22168	0.14951	0.88232	8.17142	0.00000
2	(Constant)	-10.23474	1.19625		-8.55567	0.00000
	RES_T	0.83750	0.18645	0.60486	4.49178	0.00028
	URB_T	0.42180	0.14907	0.38103	2.82961	0.01111
3	(Constant)	-11.18236	0.81175		-13.77561	0.00000
	RES_T	1.07954	0.13234	0.77966	8.15718	0.00000
	URB_T	0.61813	0.10602	0.55838	5.83035	0.00002
	RIP_T	-0.34299	0.06943	-0.44444	-4.93992	0.00012

a Dependent Variable: CFSTI14

Figure C-1-81: Commodity Flow Within in Utah for Commodity Item 14 (CFSTI14)

Regression
(CFSTI15)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91152	0.83086	0.82460	0.70501
2	0.93060	0.86601	0.85570	0.63946
3	0.96177	0.92499	0.91599	0.48791

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	65.92544	1	65.92544	132.63458	0.00000
	Residual	13.42023	27	0.49705		
	Total	79.34567	28			
2	Regression	68.71400	2	34.35700	84.02084	0.00000
	Residual	10.63167	26	0.40891		
	Total	79.34567	28			
3	Regression	73.39423	3	24.46474	102.76821	0.00000
	Residual	5.95144	25	0.23806		
	Total	79.34567	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTI15

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-7.06267	1.05431		-6.69882	0.00000
	RES_T	1.33442	0.11587	0.91152	11.51671	0.00000
2	(Constant)	-7.19475	0.95762		-7.51317	0.00000
	RES_T	1.05302	0.15052	0.71930	6.99582	0.00000
	URB_T	0.33034	0.12650	0.26850	2.61141	0.01478
3	(Constant)	-7.50898	0.73410		-10.22888	0.00000
	RES_T	1.23926	0.12229	0.84652	10.13394	0.00000
	URB_T	0.48026	0.10227	0.39036	4.69601	0.00008
	RIP_T	-0.30253	0.06823	-0.33499	-4.43397	0.00016

a Dependent Variable: CFSTI15

Figure C-1-82: Commodity Flow Within in Utah for Commodity Item 15 (CFSTI15)

Regression
(CFSTI17)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91176	0.83130	0.82505	0.70157
2	0.93108	0.86691	0.85667	0.63502
3	0.96182	0.92510	0.91611	0.48583

A Predictors: (Constant), RES_T
B Predictors: (Constant), RES_T, URB_T
C Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	65.48735	1	65.48735	133.04983	0.00000
	Residual	13.28944	27	0.49220		
	Total	78.77679	28			
2	Regression	68.29227	2	34.14613	84.67712	0.00000
	Residual	10.48453	26	0.40325		
	Total	78.77679	28			
3	Regression	72.87606	3	24.29202	102.91946	0.00000
	Residual	5.90074	25	0.23603		
	Total	78.77679	28			

A Predictors: (Constant), RES_T
B Predictors: (Constant), RES_T, URB_T
C Predictors: (Constant), RES_T, URB_T, RIP_T
D Dependent Variable: CFSTI17

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-7.87010	1.04916		-7.50130	0.00000
	RES_T	1.32998	0.11530	0.91176	11.53472	0.00000
2	(Constant)	-8.00257	0.95097		-8.41518	0.00000
	RES_T	1.04775	0.14948	0.71828	7.00952	0.00000
	URB_T	0.33130	0.12562	0.27026	2.63738	0.01392
3	(Constant)	-8.31355	0.73096		-11.37342	0.00000
	RES_T	1.23207	0.12177	0.84464	10.11830	0.00000
	URB_T	0.47967	0.10183	0.39129	4.71040	0.00008
	RIP_T	-0.29939	0.06794	-0.33271	-4.40686	0.00017

A Dependent Variable: CFSTI17

Figure C-1-83: Commodity Flow Within in Utah for Commodity Item 17 (CFSTI17)

Regression
(CFSTI18)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88254	0.77888	0.77069	0.92600
2	0.90959	0.82736	0.81408	0.83381
3	0.93904	0.88180	0.86761	0.70361

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	81.55317	1	81.55317	95.10756	0.00000
	Residual	23.15206	27	0.85748		
	Total	104.70523	28			
2	Regression	86.62907	2	43.31453	62.30185	0.00000
	Residual	18.07616	26	0.69524		
	Total	104.70523	28			
3	Regression	92.32869	3	30.77623	62.16648	0.00000
	Residual	12.37654	25	0.49506		
	Total	104.70523	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T
d Dependent Variable: CFSTI18

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.00481	1.38479		-6.50264	0.00000
	RES_T	1.48418	0.15219	0.88254	9.75231	0.00000
2	(Constant)	-9.25473	1.25035		-7.40174	0.00000
	RES_T	1.79275	0.17838	1.06603	10.05007	0.00000
	RIP_T	-0.29734	0.11004	-0.28661	-2.70203	0.01197
3	(Constant)	-9.54759	1.05862		-9.01887	0.00000
	RES_T	1.48101	0.17635	0.88066	8.39819	0.00000
	RIP_T	-0.40771	0.09839	-0.39300	-4.14378	0.00034
	URB_T	0.50041	0.14748	0.35407	3.39307	0.00231

a Dependent Variable: CFSTI18

Figure C-1-84: Commodity Flow Within in Utah for Commodity Item 18 (CFSTI18)

Regression
(CFSTI19)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88607	0.78511	0.77716	0.72383
2	0.91447	0.83626	0.82367	0.64388
3	0.93050	0.86584	0.84974	0.59437

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	51.68468065	1	51.68468	98.64822	0.00000
	Residual	14.14609	27	0.52393		
	Total	65.83077	28			
2	Regression	55.05174	2	27.52587	66.39493	0.00000
	Residual	10.77903	26	0.41458		
	Total	65.83077	28			
3	Regression	56.99880	3	18.99960	53.78078	0.00000
	Residual	8.83197	25	0.35328		
	Total	65.83077	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTI19

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.67442	1.08245		-8.01368	0.00000
	RES_T	1.18154	0.11896	0.88607	9.93218	0.00000
2	(Constant)	-8.81956	0.96423		-9.14671	0.00000
	RES_T	0.87232	0.15156	0.65418	5.75559	0.00000
	URB_T	0.36299	0.12737	0.32391	2.84985	0.00845
3	(Constant)	-9.02223	0.89427		-10.08889	0.00000
	RES_T	0.99245	0.14897	0.74426	6.66200	0.00000
	URB_T	0.45968	0.12458	0.41020	3.68977	0.00109
	RIP_T	-0.19513	0.08312	-0.23721	-2.34764	0.02711

a Dependent Variable: CFSTI19

Figure C-1-85: Commodity Flow Within in Utah for Commodity Item 19 (CFSTI19)

Regression
(CFSTI20)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98672	0.97362	0.96923	0.21949
2	0.99439	0.98881	0.98433	0.15662

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66935	1	10.66935	221.47220	0.00001
	Residual	0.28905	6	0.04817		
	Total	10.95840	7			
2	Regression	10.83574	2	5.41787	220.85898	0.00001
	Residual	0.12265	5	0.02453		
	Total	10.95840	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTI20

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-12.89078	0.87923		-14.66138	0.00001
	RES_T	1.56135	0.10492	0.98672	14.88194	0.00001
2	(Constant)	-13.07329	0.63131		-20.70813	0.00000
	RES_T	1.46259	0.08392	0.92431	17.42817	0.00001
	NI_T	0.10942	0.04201	0.13813	2.60442	0.04799

a Dependent Variable: CFSTI20

Figure C-1-86: Commodity Flow Within in Utah for Commodity Item 20 (CFSTI20)

Regression
(CFSTI21)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88278	0.77931	0.77114	0.92434
2	0.90977	0.82769	0.81443	0.83233
3	0.93925	0.88219	0.86805	0.70185

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	81.46081	1	81.46081	95.34303	0.00000
	Residual	23.06872	27	0.85440		
	Total	104.52953	28			
2	Regression	86.51757	2	43.25879	62.44344	0.00000
	Residual	18.01195	26	0.69277		
	Total	104.52953	28			
3	Regression	92.21458	3	30.73819	62.40017	0.00000
	Residual	12.31495	25	0.49260		
	Total	104.52953	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, RIP_T
c Predictors: (Constant), RES_T, RIP_T, URB_T
d Dependent Variable: CFSTI21

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-13.16365	1.38230		-9.52301	0.00000
	RES_T	1.48334	0.15191	0.88278	9.76438	0.00000
2	(Constant)	-13.41310	1.24812		-10.74661	0.00000
	RES_T	1.79133	0.17806	1.06608	10.05998	0.00000
	RIP_T	-0.29678	0.10985	-0.28631	-2.70173	0.01198
3	(Constant)	-13.70590	1.05599		-12.97924	0.00000
	RES_T	1.47966	0.17591	0.88060	8.41148	0.00000
	RIP_T	-0.40713	0.09815	-0.39277	-4.14815	0.00034
	URB_T	0.50029	0.14711	0.35429	3.40077	0.00226

a Dependent Variable: CFSTI21

Figure C-1-87: Commodity Flow Within in Utah for Commodity Item 21 (CFSTI21)

Regression
(CFSTI22)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96924	0.21946
2	0.99439	0.98881	0.98434	0.15659

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66920	1	10.66920	221.53243	0.00001
	Residual	0.28897	6	0.04816		
	Total	10.95817	7			
2	Regression	10.83557	2	5.41778	220.95708	0.00001
	Residual	0.12260	5	0.02452		
	Total	10.95817	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTI22

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-14.49806	0.87911		-16.49179	0.00000
	RES_T	1.56133	0.10490	0.98673	14.88397	0.00001
2	(Constant)	-14.68056	0.63117		-23.25940	0.00000
	RES_T	1.46259	0.08390	0.92432	17.43214	0.00001
	NI_T	0.10941	0.04200	0.13812	2.60482	0.04797

a Dependent Variable: CFSTI22

Figure C-1-88: Commodity Flow Within in Utah for Commodity Item 22 (CFSTI22)

Regression
(CFSTI23)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98434	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66962	1	10.66962	221.52652	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95860	7			
2	Regression	10.83599	2	5.41800	220.93922	0.00001
	Residual	0.12261	5	0.02452		
	Total	10.95860	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTI23

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-14.21580	0.87914		-16.17017	0.00000
	RES_T	1.56137	0.10490	0.98673	14.88377	0.00001
2	(Constant)	-14.39829	0.63120		-22.81082	0.00000
	RES_T	1.46262	0.08391	0.92432	17.43145	0.00001
	NI_T	0.10942	0.04201	0.13812	2.60469	0.04798

a Dependent Variable: CFSTI23

Figure C-1-89: Commodity Flow Within in Utah for Commodity Item 23 (CFSTI23)

Regression
(CFSTI24)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96924	0.21946
2	0.99439	0.98881	0.98434	0.15659

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66920	1	10.66920	221.53243	0.00001
	Residual	0.28897	6	0.04816		
	Total	10.95817	7			
2	Regression	10.83557	2	5.41778	220.95708	0.00001
	Residual	0.12260	5	0.02452		
	Total	10.95817	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTI24

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-13.33046	0.87911		-15.16362	0.00001
	RES_T	1.56133	0.10490	0.98673	14.88397	0.00001
2	(Constant)	-13.51296	0.63117		-21.40950	0.00000
	RES_T	1.46259	0.08390	0.92432	17.43214	0.00001
	NI_T	0.10941	0.04200	0.13812	2.60482	0.04797

a Dependent Variable: CFSTI24

Figure C-1-90: Commodity Flow Within in Utah for Commodity Item 24 (CFSTI24)

Regression
(CFSTI25)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66930	1	10.66930	221.52020	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95828	7			
2	Regression	10.83566	2	5.41783	220.91420	0.00001
	Residual	0.12262	5	0.02452		
	Total	10.95828	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTI25

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-14.61721	0.87914		-16.62679	0.00000
	RES_T	1.56134	0.10490	0.98673	14.88355	0.00001
2	(Constant)	-14.79970	0.63123		-23.44580	0.00000
	RES_T	1.46260	0.08391	0.92432	17.43048	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60450	0.04799

a Dependent Variable: CFSTI25

Figure C-1-91: Commodity Flow Within in Utah for Commodity Item 25 (CFSTI25)

Regression
(CFSTI26)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91183	0.83143	0.82518	0.68202
2	0.93320	0.87087	0.86093	0.60830
3	0.96037	0.92231	0.91299	0.48117

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.94183	1	61.94183	133.16675	0.00000
	Residual	12.55891	27	0.46514		
	Total	74.50074	28			
2	Regression	64.88013	2	32.44007	87.67026	0.00000
	Residual	9.62061	26	0.37002		
	Total	74.50074	28			
3	Regression	68.71265	3	22.90422	98.92806	0.00000
	Residual	5.78810	25	0.23152		
	Total	74.50074	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTI26

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-9.76674	1.01992		-9.57598	0.00000
	RES_T	1.29348	0.11209	0.91183	11.53979	0.00000
2	(Constant)	-9.90233	0.91095		-10.87036	0.00000
	RES_T	1.00462	0.14319	0.70820	7.01622	0.00000
	URB_T	0.33909	0.12033	0.28444	2.81795	0.00911
3	(Constant)	-10.18668	0.72395		-14.07092	0.00000
	RES_T	1.17315	0.12060	0.82700	9.72775	0.00000
	URB_T	0.47475	0.10086	0.39823	4.70726	0.00008
	RIP_T	-0.27376	0.06729	-0.31283	-4.06859	0.00042

a Dependent Variable: CFSTI26

Figure C-1-92: Commodity Flow Within in Utah for Commodity Item 26 (CFSTI26)

Regression
(CFSTI27)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91167	0.83114	0.82489	0.68110
2	0.93322	0.87090	0.86097	0.60688
3	0.96009	0.92177	0.91238	0.48179

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.65044	1	61.65044	132.89628	0.00000
	Residual	12.52527	27	0.46390		
	Total	74.17571	28			
2	Regression	64.59990	2	32.29995	87.70002	0.00000
	Residual	9.57581	26	0.36830		
	Total	74.17571	28			
3	Regression	68.37279	3	22.79093	98.18721	0.00000
	Residual	5.80293	25	0.23212		
	Total	74.17571	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTI27

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-12.13262	1.01855		-11.91162	0.00000
	RES_T	1.29043	0.11194	0.91167	11.52806	0.00000
2	(Constant)	-12.26847	0.90882		-13.49927	0.00000
	RES_T	1.00102	0.14285	0.70721	7.00745	0.00000
	URB_T	0.33973	0.12005	0.28560	2.82989	0.00886
3	(Constant)	-12.55059	0.72488		-17.31405	0.00000
	RES_T	1.16824	0.12075	0.82535	9.67465	0.00000
	URB_T	0.47434	0.10098	0.39876	4.69712	0.00008
	RIP_T	-0.27162	0.06737	-0.31107	-4.03165	0.00046

a Dependent Variable: CFSTI27

Figure C-1-93: Commodity Flow Within in Utah for Commodity Item 27 (CFSTI27)

Regression
(CFSTI28)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.89861	0.80750	0.80037	0.69513
2	0.92477	0.85520	0.84407	0.61437
3	0.94418	0.89147	0.87844	0.54243

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.72898	1	54.72898	113.26206	0.00000
	Residual	13.04658	27	0.48321		
	Total	67.77556	28			
2	Regression	57.96191	2	28.98096	76.78132	0.00000
	Residual	9.81365	26	0.37745		
	Total	67.77556	28			
3	Regression	60.41968	3	20.13989	68.44821	0.00000
	Residual	7.35589	25	0.29424		
	Total	67.77556	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTI28

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.65918	1.03953		-10.25380	0.00000
	RES_T	1.21584	0.11424	0.89861	10.64246	0.00000
2	(Constant)	-10.80140	0.92004		-11.74012	0.00000
	RES_T	0.91284	0.14461	0.67467	6.31224	0.00000
	URB_T	0.35568	0.12153	0.31281	2.92664	0.00703
3	(Constant)	-11.02911	0.81613		-13.51390	0.00000
	RES_T	1.04781	0.13595	0.77442	7.70707	0.00000
	URB_T	0.46433	0.11370	0.40835	4.08388	0.00040
	RIP_T	-0.21923	0.07585	-0.26266	-2.89016	0.00785

a Dependent Variable: CFSTI28

Figure C-1-94: Commodity Flow Within in Utah for Commodity Item 28 (CFSTI28)

Regression
(CFSTI29)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.88232	0.77848	0.76682	0.78431
2	0.92015	0.84668	0.82965	0.67038
3	0.96801	0.93705	0.92594	0.44201

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.07427	1	41.07427	66.77199	0.00000
	Residual	11.68770	19	0.61514		
	Total	52.76197	20			
2	Regression	44.67265	2	22.33632	49.70182	0.00000
	Residual	8.08932	18	0.44941		
	Total	52.76197	20			
3	Regression	49.44056	3	16.48019	84.35078	0.00000
	Residual	3.32141	17	0.19538		
	Total	52.76197	20			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTI29

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-11.87023	1.39917		-8.48378	0.00000
	RES_T	1.22168	0.14951	0.88232	8.17141	0.00000
2	(Constant)	-11.79178	1.19624		-9.85737	0.00000
	RES_T	0.83749	0.18645	0.60485	4.49177	0.00028
	URB_T	0.42180	0.14907	0.38103	2.82966	0.01111
3	(Constant)	-12.73939	0.81173		-15.69406	0.00000
	RES_T	1.07953	0.13234	0.77966	8.15726	0.00000
	URB_T	0.61814	0.10602	0.55839	5.83050	0.00002
	RIP_T	-0.34299	0.06943	-0.44444	-4.94001	0.00012

a Dependent Variable: CFSTI29

Figure C-1-95: Commodity Flow Within in Utah for Commodity Item 29 (CFSTI29)

Regression
(CFSTI30)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10.66930	1	10.66930	221.52020	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95828	7			
2	Regression	10.83566	2	5.41783	220.91420	0.00001
	Residual	0.12262	5	0.02452		
	Total	10.95828	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTI30

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-16.59821	0.87914		-18.88013	0.00000
	RES_T	1.56134	0.10490	0.98673	14.88355	0.00001
2	(Constant)	-16.78070	0.63123		-26.58411	0.00000
	RES_T	1.46260	0.08391	0.92432	17.43048	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60450	0.04799

a Dependent Variable: CFSTI30

Figure C-1-96: Commodity Flow Within in Utah for Commodity Item 30 (CFSTI30)

Regression
(CFSTI31)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.80281	0.64451	0.63134	0.91851
2	0.83970	0.70509	0.68241	0.85252

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

ANOVA(c)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	41.29811	1	41.29811	48.95158	0.00000
	Residual	22.77861	27	0.84365		
	Total	64.07672	28			
2	Regression	45.18010	2	22.59005	31.08181	0.00000
	Residual	18.89662	26	0.72679		
	Total	64.07672	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Dependent Variable: CFSTI31

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.15960	1.37358		-4.48434	0.00012
	RES_T	1.05616	0.15096	0.80281	6.99654	0.00000
2	(Constant)	-6.31545	1.27669		-4.94675	0.00004
	RES_T	0.72415	0.20067	0.55044	3.60858	0.00129
	URB_T	0.38976	0.16864	0.35253	2.31112	0.02901

a Dependent Variable: CFSTI31

Figure C-1-97: Commodity Flow Within in Utah for Commodity Item 31 (CFSTI31)

Regression
(CFSTI32)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90810	0.82465	0.81816	0.67881
2	0.93166	0.86798	0.85783	0.60022
3	0.95519	0.91240	0.90188	0.49862

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.51061	1	58.51061	126.97973	0.00000
	Residual	12.44125	27	0.46079		
	Total	70.95186	28			
2	Regression	61.58488	2	30.79244	85.47081	0.00000
	Residual	9.36698	26	0.36027		
	Total	70.95186	28			
3	Regression	64.73623	3	21.57874	86.79223	0.00000
	Residual	6.21563	25	0.24863		
	Total	70.95186	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTI32

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.85857	1.01513		-8.72653	0.00000
	RES_T	1.25714	0.11156	0.90810	11.26853	0.00000
2	(Constant)	-8.99726	0.89886		-10.00963	0.00000
	RES_T	0.96167	0.14129	0.69467	6.80662	0.00000
	URB_T	0.34685	0.11874	0.29813	2.92118	0.00712
3	(Constant)	-9.25510	0.75021		-12.33663	0.00000
	RES_T	1.11450	0.12497	0.80507	8.91791	0.00000
	URB_T	0.46987	0.10451	0.40387	4.49571	0.00014
	RIP_T	-0.24824	0.06973	-0.29068	-3.56021	0.00152

a Dependent Variable: CFSTI32

Figure C-1-98: Commodity Flow Within in Utah for Commodity Item 32 (CFSTI32)

Regression
(CFSTI33)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90539	0.81973	0.81305	0.68224
2	0.92986	0.86464	0.85422	0.60246
3	0.95192	0.90615	0.89488	0.51158

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	57.14653	1	57.14653	122.77630	0.00000
	Residual	12.56722	27	0.46545		
	Total	69.71374	28			
2	Regression	60.27696	2	30.13848	83.03678	0.00000
	Residual	9.43679	26	0.36295		
	Total	69.71374	28			
3	Regression	63.17085	3	21.05695	80.45733	0.00000
	Residual	6.54289	25	0.26172		
	Total	69.71374	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTI33

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.33597	1.02026		-10.13075	0.00000
	RES_T	1.24240	0.11213	0.90539	11.08045	0.00000
2	(Constant)	-10.47592	0.90220		-11.61149	0.00000
	RES_T	0.94425	0.14181	0.68811	6.65851	0.00000
	URB_T	0.35000	0.11918	0.30350	2.93681	0.00686
3	(Constant)	-10.72301	0.76971		-13.93124	0.00000
	RES_T	1.09070	0.12822	0.79484	8.50639	0.00000
	URB_T	0.46789	0.10723	0.40573	4.36339	0.00019
	RIP_T	-0.23789	0.07154	-0.28102	-3.32527	0.00273

a Dependent Variable: CFSTI33

Figure C-1-99: Commodity Flow Within in Utah for Commodity Item 33 (CFSTI33)

Regression
(CFSTI34)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.91090	0.82973	0.82343	0.67887
2	0.93308	0.87064	0.86068	0.60301
3	0.95889	0.91946	0.90980	0.48521

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	60.63799	1	60.63799	131.57588	0.00000
	Residual	12.44321	27	0.46086		
	Total	73.08120	28			
2	Regression	63.62711	2	31.81356	87.49153	0.00000
	Residual	9.45409	26	0.36362		
	Total	73.08120	28			
3	Regression	67.19545	3	22.39848	95.13858	0.00000
	Residual	5.88575	25	0.23543		
	Total	73.08120	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTI34

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-11.00383	1.01521		-10.83895	0.00000
	RES_T	1.27979	0.11157	0.91090	11.47065	0.00000
2	(Constant)	-11.14058	0.90303		-12.33690	0.00000
	RES_T	0.98845	0.14194	0.70353	6.96379	0.00000
	URB_T	0.34201	0.11929	0.28966	2.86714	0.00811
3	(Constant)	-11.41495	0.73003		-15.63620	0.00000
	RES_T	1.15107	0.12161	0.81928	9.46511	0.00000
	URB_T	0.47291	0.10170	0.40053	4.64996	0.00009
	RIP_T	-0.26416	0.06785	-0.30478	-3.89316	0.00065

a Dependent Variable: CFSTI34

Figure C-1-100: Commodity Flow Within in Utah for Commodity Item 34 (CFSTI34)

Regression
(CFSTI35)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.86227	0.74350	0.73400	0.78103
2	0.89377	0.79882	0.78334	0.70488

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	47.74202	1	47.7420	78.2649	0.0000
	Residual	16.47016	27	0.6100		
	Total	64.21218	28			
2	Regression	51.29377	2	25.6469	51.6177	0.0000
	Residual	12.91841	26	0.4969		
	Total	64.21218	28			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, URB_T

c Dependent Variable: CFSTI35

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-11.69701	1.16799		-10.01465	0.00000
	RES_T	1.13558	0.12836	0.86227	8.84674	0.00000
2	(Constant)	-11.84608	1.05559		-11.22220	0.00000
	RES_T	0.81799	0.16592	0.62112	4.93003	0.00004
	URB_T	0.37281	0.13944	0.33684	2.67364	0.01279

a Dependent Variable: CFSTI35

Figure C-1-101: Commodity Flow Within in Utah for Commodity Item 35 (CFSTI35)

Regression
(CFSTI36)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15662

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66945	1	10.66945	221.52158	0.00001
	Residual	0.28899	6	0.04816		
	Total	10.95844	7			
2	Regression	10.83579	2	5.41790	220.86714	0.00001
	Residual	0.12265	5	0.02453		
	Total	10.95844	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTI36

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-14.98888	0.87914		-17.04948	0.00000
	RES_T	1.56135	0.10490	0.98673	14.88360	0.00001
2	(Constant)	-15.17136	0.63130		-24.03187	0.00000
	RES_T	1.46262	0.08392	0.92433	17.42875	0.00001
	NI_T	0.10940	0.04201	0.13810	2.60401	0.04802

a Dependent Variable: CFSTI36

Figure C-1-102: Commodity Flow Within in Utah for Commodity Item 36 (CFSTI36)

Regression
(CFSTI38)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66930	1	10.66930	221.52020	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95828	7			
2	Regression	10.83566	2	5.41783	220.91420	0.00001
	Residual	0.12262	5	0.02452		
	Total	10.95828	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTI38

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-17.13721	0.87914		-19.49323	0.00000
	RES_T	1.56134	0.10490	0.98673	14.88355	0.00001
2	(Constant)	-17.31970	0.63123		-27.43800	0.00000
	RES_T	1.46260	0.08391	0.92432	17.43048	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60450	0.04799

a Dependent Variable: CFSTI38

Figure C-1-103: Commodity Flow Within in Utah for Commodity Item 38 (CFSTI38)

Regression
(CFSTI39)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98672	0.97362	0.96922	0.21950
2	0.99439	0.98881	0.98433	0.15664

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66945	1	10.66945	221.45647	0.00001
	Residual	0.28907	6	0.04818		
	Total	10.95853	7			
2	Regression	10.83585	2	5.41793	220.82766	0.00001
	Residual	0.12267	5	0.02453		
	Total	10.95853	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTI39

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-15.23307	0.87927		-17.32469	0.00000
	RES_T	1.56135	0.10492	0.98672	14.88141	0.00001
2	(Constant)	-15.41558	0.63136		-24.41647	0.00000
	RES_T	1.46260	0.08393	0.92431	17.42692	0.00001
	NI_T	0.10942	0.04202	0.13813	2.60426	0.04800

a Dependent Variable: CFSTI39

Figure C-1-104: Commodity Flow Within in Utah for Commodity Item 39 (CFSTI39)

Regression
(CFSTI40)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.90886	0.82602	0.81958	0.67826
2	0.93210	0.86882	0.85873	0.60018
3	0.95614	0.91420	0.90391	0.49499

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.97290	1	58.97290	128.19048	0.00000
	Residual	12.42111	27	0.46004		
	Total	71.39401	28			
2	Regression	62.02831	2	31.01416	86.09802	0.00000
	Residual	9.36570	26	0.36022		
	Total	71.39401	28			
3	Regression	65.26862	3	21.75621	88.79520	0.00000
	Residual	6.12539	25	0.24502		
	Total	71.39401	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTI40

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.80620	1.01431		-10.65375	0.00000
	RES_T	1.26210	0.11147	0.90886	11.32212	0.00000
2	(Constant)	-10.94446	0.89880		-12.17677	0.00000
	RES_T	0.96754	0.14128	0.69674	6.84859	0.00000
	URB_T	0.34578	0.11873	0.29629	2.91240	0.00727
3	(Constant)	-11.20592	0.74475		-15.04661	0.00000
	RES_T	1.12251	0.12406	0.80833	9.04790	0.00000
	URB_T	0.47052	0.10375	0.40318	4.53506	0.00012
	RIP_T	-0.25172	0.06922	-0.29384	-3.63661	0.00125

a Dependent Variable: CFSTI40

Figure C-1-105: Commodity Flow Within in Utah for Commodity Item 40 (CFSTI40)

Regression
(CFSTI41)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.98673	0.97363	0.96923	0.21946
2	0.99439	0.98881	0.98433	0.15660

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.66930	1	10.66930	221.52020	0.00001
	Residual	0.28898	6	0.04816		
	Total	10.95828	7			
2	Regression	10.83566	2	5.41783	220.91420	0.00001
	Residual	0.12262	5	0.02452		
	Total	10.95828	7			

a Predictors: (Constant), RES_T

b Predictors: (Constant), RES_T, NI_T

c Dependent Variable: CFSTI41

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-11.49681	0.87914		-13.07739	0.00001
	RES_T	1.56134	0.10490	0.98673	14.88355	0.00001
2	(Constant)	-11.67930	0.63123		-18.50244	0.00001
	RES_T	1.46260	0.08391	0.92432	17.43048	0.00001
	NI_T	0.10941	0.04201	0.13811	2.60450	0.04799

a Dependent Variable: CFSTI41

Figure C-1-106: Commodity Flow Within in Utah for Commodity Item 41 (CFSTI41)

Regression
(CFSTI43)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.89268	0.79688	0.78936	0.70832
2	0.91999	0.84639	0.83457	0.62771
3	0.93764	0.87918	0.86468	0.56773

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	53.14579	1	53.14579	105.92902	0.00000
	Residual	13.54621	27	0.50171		
	Total	66.69199	28			
2	Regression	56.44740	2	28.22370	71.62965	0.00000
	Residual	10.24459	26	0.39402		
	Total	66.69199	28			
3	Regression	58.63395	3	19.54465	60.63706	0.00000
	Residual	8.05805	25	0.32232		
	Total	66.69199201	28			

a Predictors: (Constant), RES_T
b Predictors: (Constant), RES_T, URB_T
c Predictors: (Constant), RES_T, URB_T, RIP_T
d Dependent Variable: CFSTI43

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.41035	1.05925		-7.93990	0.00000
	RES_T	1.19812	0.11641	0.89268	10.29218	0.00000
2	(Constant)	-8.55408	0.94002		-9.09984	0.00000
	RES_T	0.89193	0.14776	0.66455	6.03649	0.00000
	URB_T	0.35944	0.12417	0.31867	2.89469	0.00759
3	(Constant)	-8.76886	0.85419		-10.26564	0.00000
	RES_T	1.01922	0.14229	0.75939	7.16277	0.00000
	URB_T	0.46191	0.11900	0.40952	3.88163	0.00067
	RIP_T	-0.20678	0.07939	-0.24974	-2.60456	0.01527

a Dependent Variable: CFSTI43

Figure C-1-107: Commodity Flow Within in Utah for Commodity Item 43 (CFSTI43)

C-2 Best Model Choice Procedure of Multiple Regression Model Between Commodity Flow and Land Uses

C-2-1 Estimation Results of Bayesian Information Criteria (BIC)

C-2-1-1 CFSTP vs. Land Use – Production

Regression (CFSTP3)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.81163	0.65875	0.64611	29	1	0.81362	-2.61413
2	0.84729	0.71791	0.69621	29	2	0.69845	-3.67341

Regression (CFSTP4)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59387
2	0.99439	0.98881	0.98433	29	2	0.02452	-100.79970

Regression (CFSTP5)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96924	29	1	0.04816	-84.59573
2	0.99439	0.98881	0.98434	29	2	0.02452	-100.80558

Regression (CFSTP6)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91037	0.82877	0.82243	29	1	0.51035	-16.13969
2	0.92894	0.86293	0.85239	29	2	0.42425	-18.13111
3	0.96226	0.92595	0.91706	29	3	0.23837	-31.48224

Regression (CFSTP7)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91020	0.82846	0.82211	29	1	0.51329	-15.97348
2	0.92865	0.86238	0.85180	29	2	0.42763	-17.90111
3	0.96220	0.92582	0.91692	29	3	0.23972	-31.31837

Regression (CFSTP8)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90760	0.82375	0.81722	29	1	0.55087	-13.92438
2	0.92672	0.85881	0.84795	29	2	0.45826	-15.89493
3	0.96072	0.92299	0.91375	29	3	0.25994	-28.97017

Figure C-2-1: Estimation of R, R Square, and BIC for CFSTP3-8

Regression (CFSTP12)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.88103	0.77621	0.76443	29	1	0.62716	-10.16257
2	0.91824	0.84316	0.82574	29	2	0.46395	-15.53692
3	0.96896	0.93887	0.92809	29	3	0.19146	-37.83764

Regression (CFSTP13)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91110	0.83010	0.82381	29	1	0.49477	-17.03892
2	0.93044	0.86572	0.85540	29	2	0.40608	-19.40047
3	0.96236	0.92614	0.91728	29	3	0.23230	-32.23033

Regression (CFSTP15)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90918	0.82661	0.82019	29	1	0.52912	-15.09226
2	0.92716	0.85962	0.84883	29	2	0.44485	-16.75573
3	0.96170	0.92486	0.91584	29	3	0.24765	-30.37450

Regression (CFSTP17)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90985	0.82782	0.82144	29	1	0.51907	-15.64840
2	0.92806	0.86129	0.85062	29	2	0.43425	-17.45521
3	0.96204	0.92552	0.91659	29	3	0.24249	-30.98530

Regression (CFSTP18)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.87134	0.75924	0.75032	29	1	1.00915	3.63155
2	0.90250	0.81451	0.80025	29	2	0.80738	0.52955
3	0.93086	0.86650	0.85048	29	3	0.60432	-4.50400

Regression (CFSTP19)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.88798	0.78851	0.78068	29	1	0.52228	-15.46971
2	0.91554	0.83821	0.82577	29	2	0.41490	-18.77696
3	0.93369	0.87177	0.85639	29	3	0.34199	-21.01420

Figure C-2-2: Estimation of R, R Square, and BIC for CFSTP12-19

Regression (CFSTP21)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96924	29	1	0.04816	-84.59573
2	0.99439	0.98881	0.98434	29	2	0.02452	-100.80558

Regression (CFSTP22)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59387
2	0.99439	0.98881	0.98433	29	2	0.02452	-100.79970

Regression (CFSTP23)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90671	0.82213	0.81554	29	1	0.56242	-13.32229
2	0.92637	0.85816	0.84725	29	2	0.46573	-15.42543
3	0.96012	0.92184	0.91246	29	3	0.26692	-28.20180

Regression (CFSTP24)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.88882	0.79000	0.78222	29	1	0.51946	-15.62693
2	0.91624	0.83950	0.82715	29	2	0.41229	-18.96029
3	0.93460	0.87348	0.85830	29	3	0.33799	-21.35535

Regression (CFSTP25)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59387
2	0.99439	0.98881	0.98433	29	2	0.02452	-100.79970

Regression (CFSTP26)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90950	0.82719	0.82079	29	1	0.52443	-15.35040
2	0.92751	0.86027	0.84952	29	2	0.44037	-17.04979
3	0.96187	0.92519	0.91621	29	3	0.24520	-30.66306

Regression (CFSTP27)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91129	0.83046	0.82418	29	1	0.48726	-17.48241
2	0.93110	0.86695	0.85671	29	2	0.39710	-20.04880
3	0.96219	0.92580	0.91690	29	3	0.23030	-32.48097

Figure C-2-3: Estimation of R, R Square, and BIC for CFSTP21-27

Regression (CFSTP28)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91118	0.83025	0.82397	29	1	0.47699	-18.10035
2	0.93182	0.86829	0.85816	29	2	0.38434	-20.99609
3	0.96142	0.92434	0.91526	29	3	0.22963	-32.56556

Regression (CFSTP29)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.89589	0.80262	0.79531	29	1	0.49657	-16.93350
2	0.92204	0.85015	0.83863	29	2	0.39148	-20.46192
3	0.94239	0.88811	0.87468	29	3	0.30402	-24.42691

Regression (CFSTP30)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.88694	0.78667	0.77876	29	1	0.80342	-2.97999
2	0.91405	0.83549	0.82283	29	2	0.64339	-6.05458
3	0.94431	0.89172	0.87873	29	3	0.44040	-13.68044

Regression (CFSTP31)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04817	-84.59246
2	0.99439	0.98881	0.98433	29	2	0.02453	-100.79571

Regression (CFSTP32)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90406	0.81732	0.81056	29	1	0.47429	-18.26492
2	0.92828	0.86171	0.85107	29	2	0.37285	-21.87601
3	0.95175	0.90584	0.89454	29	3	0.26403	-28.51686

Regression (CFSTP33)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59382
2	0.99439	0.98881	0.98434	29	2	0.02452	-100.80210

Regression (CFSTP34)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90969	0.82754	0.82115	29	1	0.46846	-18.62335
2	0.93172	0.86810	0.85795	29	2	0.37208	-21.93651
3	0.95890	0.91949	0.90983	29	3	0.23619	-31.74871

Figure C-2-4: Estimation of R, R Square, and BIC for CFSTP28-34

Regression (CFSTP35)

Model	R	R Square	Adjusted R Square	N	P	$\hat{\sigma}^2$	BIC
1	0.90097	0.81175	0.80478	29	1	0.63272	-9.90668
2	0.92337	0.85262	0.84128	29	2	0.51441	-12.54252
3	0.95585	0.91364	0.90328	29	3	0.31349	-23.53809

Regression (CFSTP36)

Model	R	R Square	Adjusted R Square	N	P	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59387
2	0.99439	0.98881	0.98433	29	2	0.02452	-100.79970

Regression (CFSTP37)

Model	R	R Square	Adjusted R Square	N	P	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59387
2	0.99439	0.98881	0.98433	29	2	0.02452	-100.79970

Regression (CFSTP38)

Model	R	R Square	Adjusted R Square	N	P	$\hat{\sigma}^2$	BIC
1	0.98672	0.97362	0.96922	29	1	0.04818	-84.58510
2	0.99439	0.98881	0.98433	29	2	0.02453	-100.78782

Regression (CFSTP39)

Model	R	R Square	Adjusted R Square	N	P	$\hat{\sigma}^2$	BIC
1	0.86409	0.74666	0.73727	29	1	0.60817	-11.05435
2	0.89485	0.80076	0.78544	29	2	0.49668	-13.55967

Regression (CFSTP40)

Model	R	R Square	Adjusted R Square	N	P	$\hat{\sigma}^2$	BIC
1	0.88103	0.77622	0.76444	29	1	0.62714	-10.16349
2	0.91824	0.84317	0.82574	29	2	0.46393	-15.53793
3	0.96896	0.93887	0.92809	29	3	0.19146	-37.83796

Regression (CFSTP42)

Model	R	R Square	Adjusted R Square	N	P	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96924	29	1	0.04816	-84.59573
2	0.99439	0.98881	0.98434	29	2	0.02452	-100.80558

Regression (CFSTP43)

Model	R	R Square	Adjusted R Square	N	P	$\hat{\sigma}^2$	BIC
1	0.89488	0.80081	0.79343	29	1	0.49971	-16.75071
2	0.92122	0.84866	0.83701	29	2	0.39428	-20.25527
3	0.94127	0.88598	0.87230	29	3	0.30892	-23.96371

Figure C-2-5: Estimation of R, R Square, and BIC for CFSTP35-43

C-2-1-2 CFSTA vs. Land Use – Attraction

Regression (CFSTA2)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59382
2	0.99439	0.98881	0.98434	29	2	0.02452	-100.80210

Regression (CFSTA3)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91219	0.83209	0.82587	29	1	0.47120	-18.45431
2	0.93290	0.87031	0.86033	29	2	0.37795	-21.48247
3	0.96121	0.92392	0.91479	29	3	0.23059	-32.44464

Regression (CFSTA4)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59387
2	0.99439	0.98881	0.98433	29	2	0.02452	-100.79970

Regression (CFSTA5)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91150	0.83084	0.82457	29	1	0.46298	-18.96507
2	0.93321	0.87089	0.86096	29	2	0.36695	-22.33880
3	0.95981	0.92124	0.91179	29	3	0.23279	-32.16928

Regression (CFSTA6)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90927	0.82678	0.82036	29	1	0.53124	-14.97657
2	0.92702	0.85936	0.84854	29	2	0.44791	-16.55738
3	0.96060	0.92275	0.91348	29	3	0.25587	-29.42709

Regression (CFSTA7)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91184	0.83144	0.82520	29	1	0.46521	-18.82551
2	0.93320	0.87087	0.86093	29	2	0.37011	-22.08977
3	0.96038	0.92234	0.91302	29	3	0.23149	-32.33107

Regression (CFSTA8)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91124	0.83036	0.82408	29	1	0.50201	-16.61761
2	0.93009	0.86507	0.85469	29	2	0.41465	-18.79488
3	0.96167	0.92481	0.91578	29	3	0.24032	-31.24535

Figure C-2-6: Estimation of R, R Square, and BIC for CFSTA2-8

Regression (CFSTA11)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.88231	0.77847	0.76682	29	1	0.61517	-10.72268
2	0.92015	0.84668	0.82964	29	2	0.44942	-16.45962
3	0.96801	0.93705	0.92594	29	3	0.19538	-37.25007

Regression (CFSTA12)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.84691	0.71726	0.70679	29	1	0.66831	-8.31975
2	0.88002	0.77443	0.75708	29	2	0.55368	-10.40910

Regression (CFSTA13)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.89781	0.80606	0.79888	29	1	0.67025	-8.23581
2	0.92029	0.84694	0.83517	29	2	0.54932	-10.63848
3	0.95190	0.90611	0.89484	29	3	0.35045	-20.30554

Regression (CFSTA14)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.89781	0.80606	0.79888	29	1	0.55843	-13.52906
2	0.92029	0.84694	0.83517	29	2	0.44721	-16.60266

Regression (CFSTA15)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91183	0.83143	0.82518	29	1	0.49072	-17.27730
2	0.93122	0.86718	0.85696	29	2	0.40152	-19.72790
3	0.96183	0.92511	0.91612	29	3	0.23544	-31.84044

Regression (CFSTA17)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91184	0.83145	0.82521	29	1	0.49031	-17.30168
2	0.93126	0.86725	0.85704	29	2	0.40103	-19.76353
3	0.96183	0.92511	0.91612	29	3	0.23529	-31.85935

Regression (CFSTA18)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.88997	0.79205	0.78435	29	1	0.76452	-4.41932
2	0.91496	0.83715	0.82462	29	2	0.62175	-7.04661
3	0.94538	0.89374	0.88099	29	3	0.42191	-14.92374

Figure C-2-7: Estimation of R, R Square, and BIC for CFSTA11-18

Regression (CFSTA19)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90654	0.82181	0.81521	29	1	0.46317	-18.95270
2	0.93065	0.86610	0.85580	29	2	0.36144	-22.77789
3	0.95328	0.90875	0.89780	29	3	0.25618	-29.39271

Regression (CFSTA20)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59387
2	0.99439	0.98881	0.98433	29	2	0.02452	-100.79970

Regression (CFSTA21)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.86952	0.75607	0.74704	29	1	1.03181	4.27547
2	0.89977	0.80959	0.79494	29	2	0.83641	1.55418
3	0.92772	0.86066	0.84393	29	3	0.63658	-2.99603

Regression (CFSTA22)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59387
2	0.99439	0.98881	0.98433	29	2	0.02452	-100.79970

Regression (CFSTA23)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91006	0.82821	0.82184	29	1	0.52033	-15.57802
2	0.92818	0.86151	0.85086	29	2	0.43559	-17.36619
3	0.96107	0.92366	0.91450	29	3	0.24971	-30.13474

Regression (CFSTA24)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.89800	0.80641	0.79924	29	1	0.48501	-17.61675
2	0.92429	0.85431	0.84311	29	2	0.37904	-21.39897
3	0.94349	0.89018	0.87700	29	3	0.29715	-25.09046

Regression (CFSTA26)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91223	0.83216	0.82594	29	1	0.47400	-18.28284
2	0.93271	0.86994	0.85994	29	2	0.38143	-21.21661
3	0.96142	0.92433	0.91525	29	3	0.23080	-32.41825

Figure C-2-8: Estimation of R, R Square, and BIC for CFSTA19-26

Regression (CFSTA27)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91078	0.82952	0.82321	29	1	0.46060	-19.11427
2	0.93304	0.87056	0.86061	29	2	0.36316	-22.63966
3	0.95871	0.91913	0.90943	29	3	0.23597	-31.77588

Regression (CFSTA28)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90664	0.82199	0.81539	29	1	0.46300	-18.96334
2	0.93071	0.86622	0.85593	29	2	0.36133	-22.78617
3	0.95340	0.90897	0.89804	29	3	0.25572	-29.44510

Regression (CFSTA29)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90615	0.82111	0.81449	29	1	0.46391	-18.90667
2	0.93038	0.86561	0.85528	29	2	0.36191	-22.74005
3	0.95282	0.90787	0.89681	29	3	0.25804	-29.18273

Regression (CFSTA30)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91192	0.83160	0.82537	29	1	0.48833	-17.41904
2	0.93145	0.86760	0.85742	29	2	0.39870	-19.93248
3	0.96183	0.92511	0.91612	29	3	0.23455	-31.95019

Regression (CFSTA31)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.82895	0.68717	0.67558	29	1	0.73838	-5.42843
2	0.86372	0.74601	0.72647	29	2	0.62256	-7.00906

Regression (CFSTA32)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90956	0.82730	0.82091	29	1	0.45974	-19.16838
2	0.93249	0.86954	0.85950	29	2	0.36066	-22.83985
3	0.95705	0.91595	0.90586	29	3	0.24165	-31.08556

Regression (CFSTA33)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91216	0.83204	0.82582	29	1	0.47032	-18.50838
2	0.93296	0.87041	0.86044	29	2	0.37683	-21.56857
3	0.96112	0.92375	0.91460	29	3	0.23060	-32.44276

Figure C-2-9: Estimation of R, R Square, and BIC for CFSTA27-33

Regression (CFSTA34)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91157	0.83096	0.82470	29	1	0.49599	-16.96721
2	0.93070	0.86621	0.85592	29	2	0.40768	-19.28657
3	0.96178	0.92502	0.91602	29	3	0.23761	-31.57522

Regression (CFSTA35)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90840	0.82519	0.81871	29	1	0.46045	-19.12392
2	0.93183	0.86831	0.85818	29	2	0.36019	-22.87781
3	0.95556	0.91310	0.90267	29	3	0.24721	-30.42593

Regression (CFSTA36)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91217	0.83205	0.82583	29	1	0.48080	-17.86947
2	0.93215	0.86890	0.85881	29	2	0.38974	-20.59115
3	0.96172	0.92491	0.91590	29	3	0.23214	-32.24957

Regression (CFSTA37)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59362
2	0.99439	0.98881	0.98433	29	2	0.02453	-100.79317

Regression (CFSTA39)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90134	0.81241	0.80547	29	1	0.47543	-18.19543
2	0.92688	0.85911	0.84828	29	2	0.37080	-22.03600
3	0.94724	0.89726	0.88494	29	3	0.28121	-26.68945

Regression (CFSTA40)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91167	0.83114	0.82489	29	1	0.46395	-18.90432
2	0.93322	0.87090	0.86097	29	2	0.36835	-22.22836
3	0.96009	0.92178	0.91239	29	3	0.23211	-32.25361

Regression (CFSTA41)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.87366	0.76328	0.75451	29	1	0.56795	-13.03863
2	0.90380	0.81685	0.80276	29	2	0.45632	-16.01757

Figure C-2-10: Estimation of R, R Square, and BIC for CFSTA34-41

Regression (CFSTA43)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90727	0.82314	0.81659	29	1	0.46195	-19.02942
2	0.93113	0.86700	0.85677	29	2	0.36075	-22.83316
3	0.95417	0.91044	0.89969	29	3	0.25264	-29.79584

Regression (CFSTA99)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.88231	0.77847	0.76681	29	1	0.61517	-10.72266
2	0.92015	0.84668	0.82964	29	2	0.44942	-16.45930
3	0.96801	0.93705	0.92594	29	3	0.19538	-37.24955

Figure C-2-11: Estimation of R, R Square, and BIC for CFSTA43, 99

C-2-1-3 CFSTI vs. Land Use – Within Utah

Regression (CFSTI2)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59387
2	0.99439	0.98881	0.98433	29	2	0.02452	-100.79970

Regression (CFSTI3)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.80313	0.64502	0.63187	29	1	0.84235	-1.60781
2	0.83999	0.70558	0.68294	29	2	0.72551	-2.57101

Regression (CFSTI4)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59387
2	0.99439	0.98881	0.98433	29	2	0.02452	-100.79970

Regression (CFSTI5)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98672	0.97362	0.96922	29	1	0.04818	-84.58539
2	0.99439	0.98881	0.98433	29	2	0.02453	-100.78820

Regression (CFSTI6)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91221	0.83213	0.82591	29	1	0.47836	-18.01687
2	0.93236	0.86929	0.85923	29	2	0.38680	-20.81133
3	0.96164	0.92476	0.91573	29	3	0.23155	-32.32387

Regression (CFSTI7)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90995	0.82801	0.82164	29	1	0.52185	-15.49359
2	0.92802	0.86122	0.85054	29	2	0.43730	-17.25248
3	0.96101	0.92354	0.91437	29	3	0.25055	-30.03737

Figure C-2-12: Estimation of R, R Square, and BIC for CFSTI2-7

Regression (CFSTI8)

Model	R	R Square	Adjusted R Square	n	p	$\frac{\hat{\sigma}^2}{\sigma^2}$	BIC
1	**0.88254**	**0.77888**	**0.77069**	29	**1**	**0.85748**	**-1.09155**
2	0.90959	0.82736	0.81408	29	2	0.69524	-3.80699
3	0.93904	0.88180	0.86761	29	3	0.49506	-10.28724

Regression (CFSTI12)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.88232	0.77848	0.76682	29	1	0.61515	-10.72363
2	0.92015	0.84668	0.82965	29	2	0.44941	-16.46025
3	0.96801	0.93705	0.92594	29	3	0.19538	-37.24952

Regression (CFSTI13)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.88231	0.77847	0.76681	29	1	0.61517	-10.72249
2	0.92015	0.84668	0.82964	29	2	0.44943	-16.45911
3	0.96801	0.93705	0.92594	29	3	0.19538	-37.24894

Regression (CFSTI14)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.88232	0.77848	0.76682	29	1	0.61515	-10.72358
2	0.92015	0.84668	0.82965	29	2	0.44942	-16.45980
3	0.96801	0.93705	0.92594	29	3	0.19538	-37.24883

Regression (CFSTI15)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91152	0.83086	0.82460	29	1	0.49705	-16.90583
2	0.93060	0.86601	0.85570	29	2	0.40891	-19.19892
3	0.96177	0.92499	0.91599	29	3	0.23806	-31.52016

Regression (CFSTI17)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91176	0.83130	0.82505	29	1	0.49220	-17.18984
2	0.93108	0.86691	0.85667	29	2	0.40325	-19.60310
3	0.96182	0.92510	0.91611	29	3	0.23603	-31.76828

Figure C-2-13: Estimation of R, R Square, and BIC for CFSTI8-17

Regression (CFSTI18)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.88254	0.77888	0.77069	29	1	0.85748	-1.09155
2	0.90959	0.82736	0.81408	29	2	0.69524	-3.80699
3	0.93904	0.88180	0.86761	29	3	0.49506	-10.28724

Regression (CFSTI19)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.88607	0.78511	0.77716	29	1	0.52393	-15.37827
2	0.91447	0.83626	0.82367	29	2	0.41458	-18.79975
3	0.93050	0.86584	0.84974	29	3	0.35328	-20.07256

Regression (CFSTI20)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98672	0.97362	0.96923	29	1	0.04817	-84.58744
2	0.99439	0.98881	0.98433	29	2	0.02453	-100.79223

Regression (CFSTI21)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.88278	0.77931	0.77114	29	1	0.85440	-1.19612
2	0.90977	0.82769	0.81443	29	2	0.69277	-3.91017
3	0.93925	0.88219	0.86805	29	3	0.49260	-10.43191

Regression (CFSTI22)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96924	29	1	0.04816	-84.59573
2	0.99439	0.98881	0.98434	29	2	0.02452	-100.80558

Regression (CFSTI23)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59382
2	0.99439	0.98881	0.98434	29	2	0.02452	-100.80210

Regression (CFSTI24)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96924	29	1	0.04816	-84.59573
2	0.99439	0.98881	0.98434	29	2	0.02452	-100.80558

Figure C-2-14: Estimation of R, R Square, and BIC for CFSTI18-24

Regression (CFSTI25)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59387
2	0.99439	0.98881	0.98433	29	2	0.02452	-100.79970

Regression (CFSTI26)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91183	0.83143	0.82518	29	1	0.46514	-18.82949
2	0.93320	0.87087	0.86093	29	2	0.37002	-22.09687
3	0.96037	0.92231	0.91299	29	3	0.23152	-32.32720

Regression (CFSTI27)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91167	0.83114	0.82489	29	1	0.46390	-18.90727
2	0.93322	0.87090	0.86097	29	2	0.36830	-22.23224
3	0.96009	0.92177	0.91238	29	3	0.23212	-32.25300

Regression (CFSTI28)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.89861	0.80750	0.80037	29	1	0.48321	-17.72472
2	0.92477	0.85520	0.84407	29	2	0.37745	-21.52076
3	0.94418	0.89147	0.87844	29	3	0.29424	-25.37598

Regression (CFSTI29)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.88232	0.77848	0.76682	29	1	0.61514	-10.72386
2	0.92015	0.84668	0.82965	29	2	0.44941	-16.46040
3	0.96801	0.93705	0.92594	29	3	0.19538	-37.25004

Regression (CFSTI30)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59387
2	0.99439	0.98881	0.98433	29	2	0.02452	-100.79970

Regression (CFSTI31)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.80281	0.64451	0.63134	29	1	0.84365	-1.56314
2	0.83970	0.70509	0.68241	29	2	0.72679	-2.51969

Figure C-2-15: Estimation of R, R Square, and BIC for CFSTI25-31

Regression (CFSTI32)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90810	0.82465	0.81816	29	1	0.46079	-19.10247
2	0.93166	0.86798	0.85783	29	2	0.36027	-22.87167
3	0.95519	0.91240	0.90188	29	3	0.24863	-30.26056

Regression (CFSTI33)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90539	0.81973	0.81305	29	1	0.46545	-18.81032
2	0.92986	0.86464	0.85422	29	2	0.36295	-22.65635
3	0.95192	0.90615	0.89488	29	3	0.26172	-28.77250

Regression (CFSTI34)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.91090	0.82973	0.82343	29	1	0.46086	-19.09790
2	0.93308	0.87064	0.86068	29	2	0.36362	-22.60324
3	0.95889	0.91946	0.90980	29	3	0.23543	-31.84201

Regression (CFSTI35)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.86227	0.74350	0.73400	29	1	0.6100	-10.96702
2	0.89377	0.79882	0.78334	29	2	0.4969	-13.54926

Regression (CFSTI36)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59362
2	0.99439	0.98881	0.98433	29	2	0.02453	-100.79317

Regression (CFSTI38)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59387
2	0.99439	0.98881	0.98433	29	2	0.02452	-100.79970

Regression (CFSTI39)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98672	0.97362	0.96922	29	1	0.04818	-84.58510
2	0.99439	0.98881	0.98433	29	2	0.02453	-100.78782

Figure C-2-16: Estimation of R, R Square, and BIC for CFSTI32-39

Regression (CFSTI40)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.90886	0.82602	0.81958	29	1	0.46004	-19.14944
2	0.93210	0.86882	0.85873	29	2	0.36022	-22.87564
3	0.95614	0.91420	0.90391	29	3	0.24502	-30.68468

Regression (CFSTI41)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.98673	0.97363	0.96923	29	1	0.04816	-84.59387
2	0.99439	0.98881	0.98433	29	2	0.02452	-100.79970

Regression (CFSTI43)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.89268	0.79688	0.78936	29	1	0.50171	-16.63489
2	0.91999	0.84639	0.83457	29	2	0.39402	-20.27447
3	0.93764	0.87918	0.86468	29	3	0.32232	-22.73205

Figure C-2-17: Estimation of R, R Square, and BIC for CFSTI40-43

C-2-2 Best Model From Multiple Regression Models Between Commodity Flow and Land Uses

C-2-2-1 CFSTP – Production

Table C-2-1: Final Best Multiple Regression Model With Land Use for CFS-Production (LT)

CFST-LT-P	(Constant)	RES_T	URB_T	RIP_T	NI_T
CFSTPT	-5.56776	1.21490	0.48056	-0.29674	
CFSTP3	-9.43336	1.07025			
CFSTP4	-12.84560	1.46260			0.10941
CFSTP5	-13.15406	1.46259			0.10941
CFSTP6	-10.12507	1.25666	0.48404	-0.31491	
CFSTP7	-9.62372	1.26051	0.48436	-0.31658	
CFSTP8	-12.24265	1.30194	0.48781	-0.33461	
CFSTP12	-8.71072	1.09332	0.62283	-0.35460	
CFSTP13	-8.69060	1.23340	0.48210	-0.30479	
CFSTP15	-7.32546	1.27949	0.48595	-0.32485	
CFSTP17	-8.28498	1.26779	0.48497	-0.31975	
CFSTP18	-8.97599	1.52344			
CFSTP19	-8.50235	1.19168			
CFSTP21	-14.24166	1.46259			0.10941
CFSTP22	-12.72460	1.46260			0.10941
CFSTP23	-10.84047	1.31265	0.48871	-0.33927	
CFSTP24	-9.846285	1.19378			
CFSTP25	-14.79970	1.46260			0.10941
CFSTP26	-10.21927	1.27418	0.48549	-0.32253	
CFSTP27	-12.61247	1.21974	0.48096	-0.29885	
CFSTP28	-10.89968	1.19564	0.47895	-0.28836	
CFSTP29	-10.73526	1.21351			
CFSTP30	-13.46569	1.46281	0.50122	-0.40461	
CFSTP31	-9.46365	1.46261			0.10941
CFSTP32	-7.71906	1.24401			
CFSTP33	-12.35109	1.46262			0.10942
CFSTP34	-10.94085	1.15688	0.47571	-0.27149	
CFSTP35	-12.52824	1.36708	0.49324	-0.36296	
CFSTP36	-13.25190	1.46260			0.10941
CFSTP37	-17.87930	1.46260			0.10941
CFSTP38	-15.41558	1.46260			0.10942
CFSTP39	-10.35650	1.14332			
CFSTP40	-10.40000	1.09333	0.62282	-0.35460	
CFSTP42	-11.62206	1.46259			0.10941
CFSTP43	-7.95319	1.21043			

Table C-2-2: Final Best Multiple Regression Model With Land Use for CFS-Production

CFST-P	(Constant)	RES_T	URB_T	RIP_T	NI_T
CFSTPT	0.0038190325	3.3699513744	1.6169782407	0.7432390436	
CFSTP3	0.0000800101	2.9161024477			
CFSTP4	0.0000026377	4.3171555775			1.1156226357
CFSTP5	0.0000019376	4.3171167062			1.1156249227
CFSTP6	0.0000400626	3.5136541383	1.6226234818	0.7298550148	
CFSTP7	0.0000661411	3.5272066363	1.6231340258	0.7286341549	
CFSTP8	0.0000048204	3.6764269531	1.6287427062	0.7156191128	
CFSTP12	0.0001648088	2.9841752863	1.8641879486	0.7014506154	
CFSTP13	0.0001681593	3.4328755747	1.6194702397	0.7372771678	
CFSTP15	0.0006585555	3.5948237857	1.6257127394	0.7226357548	
CFSTP17	0.0002522777	3.5529824526	1.6241225715	0.7263304432	
CFSTP18	0.0001264083	4.5879820248			
CFSTP19	0.0002029898	3.2925984114			
CFSTP21	0.0000006530	4.3171167062			1.1156249227
CFSTP22	0.0000029770	4.3171555775			1.1156226357
CFSTP23	0.0000195904	3.7160050522	1.6302077627	0.7122890514	
CFSTP24	0.0000529435	3.2995330838			
CFSTP25	0.0000003737	4.3171555775			1.1156226357
CFSTP26	0.0000364609	3.5757698717	1.6249753738	0.7243161942	
CFSTP27	0.0000033302	3.3862980721	1.6176308064	0.7416716474	
CFSTP28	0.0000184642	3.3056860072	1.6143754980	0.7494936965	
CFSTP29	0.0000217639	3.3652724958			
CFSTP30	0.0000014188	4.3180780245	1.6507409043	0.6672380553	
CFSTP31	0.0000776226	4.3172250854			1.1156215921
CFSTP32	0.0004442777	3.4694812411			
CFSTP33	0.0000043250	4.3172435275			1.1156265191
CFSTP34	0.0000177194	3.1800032638	1.6091630033	0.7622415323	
CFSTP35	0.0000036229	3.9238865252	1.6376213472	0.6956169635	
CFSTP36	0.0000017570	4.3171555775			1.1156226357
CFSTP37	0.0000000172	4.3171555775			1.1156226357
CFSTP38	0.0000002019	4.3171574492			1.1156362672
CFSTP39	0.0000317855	3.1371573706			
CFSTP40	0.0000304324	2.9842016186	1.8641689582	0.7014568811	
CFSTP42	0.0000089661	4.3171167062			1.1156249227
CFSTP43	0.0003515399	3.3549133843			

C-2-2-2 CFSTA vs. Land Use – Attraction

Table C-2-3: Final Best Multiple Regression Model With Land Use for CFS-Attraction (LT)

CFST-LT-A	(Constant)	RES_T	URB_T	RIP_T	NI_T
CFSTAT	-5.59213	1.16974	0.47449	-0.27229	
CFSTA2	-11.92889	1.46262			0.10942
CFSTA3	-10.63421	1.19171	0.47630	-0.28183	
CFSTA4	-12.73620	1.46260			0.10941
CFSTA5	-10.77001	1.16392	0.47399	-0.26975	
CFSTA6	-10.60240	1.28028	0.48368	-0.32037	
CFSTA7	-8.89822	1.17343	0.47477	-0.27387	
CFSTA8	-11.40893	1.24612	0.48083	-0.30550	
CFSTA11	-11.31935	1.07952	0.61816	-0.34300	
CFSTA12	-6.56683	1.11194			
CFSTA13	-10.72567	1.38602	0.49251	-0.36639	
CFSTA14	-9.35861	1.16074			
CFSTA15	-7.27976	1.22978	0.47947	-0.29840	
CFSTA17	-8.24080	1.22909	0.47943	-0.29811	
CFSTA18	-8.69931	1.45727			
CFSTA19	-8.50394	1.24815			
CFSTA20	-12.28090	1.46260			0.10941
CFSTA21	-12.88842	1.52721			
CFSTA22	-13.54530	1.46260			0.10941
CFSTA23	-10.98111	1.26853	0.48270	-0.31526	
CFSTA24	-9.04282	1.21384			
CFSTA26	-9.52583	1.19845	0.47688	-0.28478	
CFSTA27	-10.36261	1.14893	0.47273	-0.26322	
CFSTA28	-10.07307	1.24867			
CFSTA29	-10.56445	1.24616			
CFSTA30	-11.45193	1.22591	0.47916	-0.29672	
CFSTA31	-6.08665	1.08758			
CFSTA32	-8.96819	1.13097	0.47124	-0.25541	
CFSTA33	-10.23526	1.18935	0.47610	-0.28081	
CFSTA34	-11.04590	1.23772	0.48014	-0.30185	
CFSTA35	-11.40163	1.11752	0.47011	-0.24955	
CFSTA36	-10.78294	1.21272	0.47805	-0.29098	
CFSTA37	-16.17466	1.46262			0.10940
CFSTA39	-11.16223	1.22540			
CFSTA40	-10.36725	1.16834	0.47436	-0.27167	
CFSTA43	-8.80678	1.10648	0.46920	-0.24475	
CFSTA99	-11.97982	1.07952	0.61815	-0.34300	

Table C-2-4: Final Best Multiple Regression Model With Land Use for CFS-Attraction

CFST-A	(Constant)	RES_T	URB_T	RIP_T	NI_T
CFSTAT	0.003727068	3.221168796	1.607192506	0.761636066	
CFSTA2	0.000006597	4.317243527			1.115626519
CFSTA3	0.000024078	3.292721041	1.610098648	0.754398246	
CFSTA4	0.000002943	4.317155577			1.115622636
CFSTA5	0.000021021	3.202458083	1.606398510	0.763571735	
CFSTA6	0.000024856	3.597629157	1.622034875	0.725878504	
CFSTA7	0.000136632	3.233049032	1.607648515	0.760428826	
CFSTA8	0.000011096	3.476824948	1.617421677	0.736753897	
CFSTA11	0.000012136	2.943271632	1.855501513	0.709639251	
CFSTA12	0.001406241	3.040241081			
CFSTA13	0.000021974	3.998915615	1.636415640	0.693234967	
CFSTA14	0.000086220	3.192295225			
CFSTA15	0.000689348	3.420491664	1.615224213	0.742004363	
CFSTA17	0.000263673	3.418122716	1.615149029	0.742222909	
CFSTA18	0.000166701	4.294199149			
CFSTA19	0.000202669	3.483898762			
CFSTA20	0.000004640	4.317155577			1.115622636
CFSTA21	0.000002527	4.605293874			
CFSTA22	0.000001310	4.317155577			1.115622636
CFSTA23	0.000017020	3.555620999	1.620450919	0.729597234	
CFSTA24	0.000118237	3.366375985			
CFSTA26	0.000072943	3.314981255	1.611036026	0.752181876	
CFSTA27	0.000031592	3.154802910	1.604362942	0.768573597	
CFSTA28	0.000042201	3.485704030			
CFSTA29	0.000025818	3.476979244			
CFSTA30	0.000010629	3.407268552	1.614715750	0.743252593	
CFSTA31	0.002273012	2.967084074			
CFSTA32	0.000127399	3.098673658	1.601975134	0.774597672	
CFSTA33	0.000035883	3.284939402	1.609788556	0.755172275	
CFSTA34	0.000015952	3.447753487	1.616303642	0.739446215	
CFSTA35	0.000011177	3.057255798	1.600166322	0.779148206	
CFSTA36	0.000020751	3.362634846	1.612929000	0.747532583	
CFSTA37	0.000000095	4.317237287			1.115613399
CFSTA39	0.000014201	3.405526230			
CFSTA40	0.000031446	3.216656568	1.606989490	0.762103147	
CFSTA43	0.000149715	3.023685717	1.598718833	0.782896684	
CFSTA99	0.000006269	2.943272307	1.855493816	0.709638533	

C-2-2-3 CFSTI – With In Utah

Table C-2-5: Final Best Multiple Regression Model With Land Use for CFS-With In Utah (LT)

CFST-LT-I	(Constant)	RES_T	URB_T	RIP_T	NI_T
CFSTIT	-5.90201	1.17333	0.47477	-0.27384	
CFSTI2	-14.55610	1.46260			0.10941
CFSTI3	-9.67762	1.05652			
CFSTI4	-13.65250	1.46260			0.10941
CFSTI5	-14.17176	1.46257			0.10942
CFSTI6	-11.03404	1.20792	0.47765	-0.28889	
CFSTI7	-10.16042	1.27020	0.48285	-0.31599	
CFSTI8	-12.18740	1.28541	0.48412	-0.32261	
CFSTI12	-8.73352	1.07953	0.61814	-0.34299	
CFSTI13	-10.09613	1.07952	0.61815	-0.34300	
CFSTI14	-11.18236	1.07954	0.61813	-0.34299	
CFSTI15	-7.50898	1.23926	0.48026	-0.30253	
CFSTI17	-8.31355	1.23207	0.47967	-0.29939	
CFSTI18	-9.00481	1.48418			
CFSTI19	-8.67442	1.18154			
CFSTI20	-13.07329	1.46259			0.10942
CFSTI21	-13.16365	1.48334			
CFSTI22	-14.68056	1.46259			0.10941
CFSTI23	-14.39829	1.46262			0.10942
CFSTI24	-13.51296	1.46259			0.10941
CFSTI25	-14.79970	1.46260			0.10941
CFSTI26	-10.18668	1.17315	0.47475	-0.27376	
CFSTI27	-12.55059	1.16824	0.47434	-0.27162	
CFSTI28	-10.65918	1.21584			
CFSTI29	-12.73939	1.07953	0.61814	-0.34299	
CFSTI30	-16.78070	1.46260			0.10941
CFSTI31	-6.15960	1.05616			
CFSTI32	-9.25510	1.11450	0.46987	-0.24824	
CFSTI33	-10.33597	1.24240			
CFSTI34	-11.41495	1.15107	0.47291	-0.26416	
CFSTI35	-11.69701	1.13558			
CFSTI36	-15.17136	1.46262			0.10940
CFSTI38	-17.31970	1.46260			0.10941
CFSTI39	-15.41558	1.46260			0.10942
CFSTI40	-11.20592	1.12251	0.47052	-0.25172	
CFSTI41	-11.67930	1.46260			0.10941
CFSTI43	-8.41035	1.19812			

Table C-2-6: Final Best Multiple Regression Model With Land Use for CFS-With In Utah

CFST-I	(Constant)	RES_T	URB_T	RIP_T	NI_T
CFSTIT	0.00273395	3.23275326	1.60764115	0.76045261	
CFSTI2	0.00000048	4.31715558			1.11562264
CFSTI3	0.00006267	2.87635384			
CFSTI4	0.00000118	4.31715558			1.11562264
CFSTI5	0.00000070	4.31705237			1.11563579
CFSTI6	0.00001614	3.34651686	1.61228637	0.74909204	
CFSTI7	0.00003867	3.56154965	1.62069245	0.72906630	
CFSTI8	0.00000509	3.61615650	1.62273986	0.72425568	
CFSTI12	0.00016109	2.94330802	1.85546979	0.70964538	
CFSTI13	0.00004124	2.94327869	1.85549463	0.70963890	
CFSTI14	0.00001392	2.94333744	1.85546011	0.70964418	
CFSTI15	0.00054814	3.45306538	1.61648760	0.73894889	
CFSTI17	0.00024517	3.42831213	1.61554196	0.74126784	
CFSTI18	0.00012282	4.41134688			
CFSTI19	0.00017090	3.25937793			
CFSTI20	0.00000210	4.31713017			1.11563453
CFSTI21	0.00000192	4.40763982			
CFSTI22	0.00000042	4.31711671			1.11562492
CFSTI23	0.00000056	4.31724353			1.11562652
CFSTI24	0.00000135	4.31711671			1.11562492
CFSTI25	0.00000037	4.31715558			1.11562264
CFSTI26	0.00003767	3.23216517	1.60761834	0.76051381	
CFSTI27	0.00000354	3.21633243	1.60694965	0.76214165	
CFSTI28	0.00002348	3.37311150			
CFSTI29	0.00000293	2.94330468	1.85546505	0.70964490	
CFSTI30	0.00000005	4.31715558			1.11562264
CFSTI31	0.00211310	2.87531949			
CFSTI32	0.00009562	3.04804132	1.59977894	0.78016995	
CFSTI33	0.00003244	3.46391348			
CFSTI34	0.00001103	3.16156338	1.60466420	0.76785282	
CFSTI35	0.00000832	3.11296919			
CFSTI36	0.00000026	4.31723729			1.11561340
CFSTI38	0.00000003	4.31715558			1.11562264
CFSTI39	0.00000020	4.31715745			1.11563627
CFSTI40	0.00001359	3.07254207	1.60083352	0.77746009	
CFSTI41	0.00000847	4.31715558			1.11562264
CFSTI43	0.00022255	3.31388348			

Appendix D: Multiple Regression Model Betweeen Commodity Flow and Employment

D-1 Summary, ANOVA and Coefficient of Multiple Regression Model Betweeen Commodity Flow and Employment

D-1-1 Model Summary and Coefficients for CFS2P – Production

Regression (CFS2P3)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20590
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7
b Predictors: (Constant), EMPBI7, EMPBI19
c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18
d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23
e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20206	1	78.20206	1844.57011	0.00000
	Residual	1.14469	27	0.04240		
	Total	79.34674	28			
2	Regression	78.77563	2	39.38781	1793.12531	0.00000
	Residual	0.57112	26	0.02197		
	Total	79.34674	28			
3	Regression	78.94633	3	26.31544	1643.00430	0.00000
	Residual	0.40042	25	0.01602		
	Total	79.34674	28			
4	Regression	79.03328	4	19.75832	1512.77506	0.00000
	Residual	0.31346	24	0.01306		
	Total	79.34674	28			
5	Regression	79.09819	5	15.81964	1463.88556	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34674	28			

a Predictors: (Constant), EMPBI7
b Predictors: (Constant), EMPBI7, EMPBI19
c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18
d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23
e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3
f Dependent Variable: CFS2P3

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.65429	0.15363		-43.31317	0.00000
	EMPBI7	0.90855	0.02115	0.99276	42.94846	0.00000
2	(Constant)	-6.87945	0.11904		-57.79104	0.00000
	EMPBI7	0.56479	0.06897	0.61715	8.18864	0.00000
	EMPBI19	0.40835	0.07991	0.38512	5.10996	0.00003
3	(Constant)	-7.08368	0.11936		-59.34828	0.00000
	EMPBI7	0.42849	0.07219	0.46821	5.93527	0.00000
	EMPBI19	0.41906	0.06832	0.39522	6.13413	0.00000
	EMPBI18	0.16188	0.04959	0.14663	3.26460	0.00317
4	(Constant)	-7.62813	0.23695		-32.19360	0.00000
	EMPBI7	0.29392	0.08349	0.32116	3.52049	0.00175
	EMPBI19	0.44631	0.06259	0.42092	7.13078	0.00000
	EMPBI18	0.25144	0.05666	0.22775	4.43803	0.00017
	EMPBI23	0.11484	0.04451	0.06166	2.58021	0.01642
5	(Constant)	-7.65044	0.21572		-35.46451	0.00000
	EMPBI7	0.37925	0.08354	0.41440	4.53959	0.00015
	EMPBI19	0.39793	0.06026	0.37529	6.60386	0.00000
	EMPBI18	0.23807	0.05182	0.21564	4.59394	0.00013
	EMPBI23	0.11403	0.04049	0.06123	2.81650	0.00979
	EMPBI3	-0.04441	0.01812	-0.04788	-2.45085	0.02227

a Dependent Variable: CFS2P3

Figure D-1-1: Commodity Flow Attraction for Commodity Item 3 (CFS2P3)

Regression (CFS2P6)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14822
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99843	0.99687	0.99619	0.10396

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20296	1	78.20296	1844.45341	0.00000
	Residual	1.14477	27	0.04240		
	Total	79.34773	28			
2	Regression	78.77653	2	39.38827	1792.87457	0.00000
	Residual	0.57120	26	0.02197		
	Total	79.34773	28			
3	Regression	78.94729	3	26.31576	1642.93032	0.00000
	Residual	0.40044	25	0.01602		
	Total	79.34773	28			
4	Regression	79.03425	4	19.75856	1512.71347	0.00000
	Residual	0.31348	24	0.01306		
	Total	79.34773	28			
5	Regression	79.09915	5	15.81983	1463.68819	0.00000
	Residual	0.24859	23	0.01081		
	Total	79.34773	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P6

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.92279	0.15364		-25.53271	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94710	0.00000
2	(Constant)	-4.14795	0.11905		-34.84233	0.00000
	EMPBI7	0.56480	0.06898	0.61715	8.18810	0.00000
	EMPBI19	0.40835	0.07992	0.38512	5.10957	0.00003
3	(Constant)	-4.35222	0.11936		-36.46257	0.00000
	EMPBI7	0.42847	0.07220	0.46818	5.93482	0.00000
	EMPBI19	0.41906	0.06832	0.39522	6.13398	0.00000
	EMPBI18	0.16191	0.04959	0.14666	3.26512	0.00317
4	(Constant)	-4.89669	0.23695		-20.66533	0.00000
	EMPBI7	0.29390	0.08349	0.32114	3.52010	0.00175
	EMPBI19	0.44631	0.06259	0.42092	7.13064	0.00000
	EMPBI18	0.25148	0.05666	0.22778	4.43850	0.00017
	EMPBI23	0.11485	0.04451	0.06166	2.58023	0.01642
5	(Constant)	-4.91899	0.21574		-22.80089	0.00000
	EMPBI7	0.37921	0.08355	0.41436	4.53880	0.00015
	EMPBI19	0.39794	0.06026	0.37530	6.60354	0.00000
	EMPBI18	0.23811	0.05183	0.21567	4.59428	0.00013
	EMPBI23	0.11404	0.04049	0.06123	2.81640	0.00979
	EMPBI3	-0.04441	0.01812	-0.04787	-2.45029	0.02230

a Dependent Variable: CFS2P6

Figure D-1-2: Commodity Flow Attraction for Commodity Item 6 (CFS2P6)

Regression (CFS2P7)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20219	1	78.20219	1844.51041	0.00000
	Residual	1.14473	27	0.04240		
	Total	79.34692	28			
2	Regression	78.77580	2	39.38790	1793.14051	0.00000
	Residual	0.57111	26	0.02197		
	Total	79.34692	28			
3	Regression	78.94654	3	26.31551	1643.16841	0.00000
	Residual	0.40038	25	0.01602		
	Total	79.34692	28			
4	Regression	79.03347	4	19.75837	1512.84921	0.00000
	Residual	0.31345	24	0.01306		
	Total	79.34692	28			
5	Regression	79.09837	5	15.81967	1463.91476	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34692	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P7

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.39391	0.15363		-22.09078	0.00000
	EMPBI7	0.90855	0.02115	0.99276	42.94776	0.00000
2	(Constant)	-3.61907	0.11904		-30.40226	0.00000
	EMPBI7	0.56478	0.06897	0.61713	8.18849	0.00000
	EMPBI19	0.40836	0.07991	0.38513	5.11017	0.00003
3	(Constant)	-3.82333	0.11935		-32.03406	0.00000
	EMPBI7	0.42847	0.07219	0.46818	5.93519	0.00000
	EMPBI19	0.41908	0.06831	0.39524	6.13467	0.00000
	EMPBI18	0.16190	0.04958	0.14664	3.26510	0.00317
4	(Constant)	-4.36771	0.23694		-18.43380	0.00000
	EMPBI7	0.29391	0.08349	0.32116	3.52049	0.00175
	EMPBI19	0.44632	0.06259	0.42093	7.13115	0.00000
	EMPBI18	0.25145	0.05666	0.22776	4.43820	0.00017
	EMPBI23	0.11482	0.04451	0.06165	2.57991	0.01643
5	(Constant)	-4.39001	0.21572		-20.35059	0.00000
	EMPBI7	0.37924	0.08354	0.41439	4.53946	0.00015
	EMPBI19	0.39794	0.06026	0.37531	6.60419	0.00000
	EMPBI18	0.23808	0.05182	0.21565	4.59408	0.00013
	EMPBI23	0.11402	0.04049	0.06122	2.81613	0.00980
	EMPBI3	-0.04441	0.01812	-0.04788	-2.45067	0.02228

a Dependent Variable: CFS2P7

Figure D-1-3: Commodity Flow Attraction for Commodity Item 7 (CFS2P7)

Regression (CFS2P8)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.203254	1	78.20325	1844.45222	0.00000
	Residual	1.144778	27	0.04240		
	Total	79.348032	28			
2	Regression	78.776881	2	39.38844	1793.04619	0.00000
	Residual	0.571151	26	0.02197		
	Total	79.348032	28			
3	Regression	78.947656	3	26.31589	1643.19910	0.00000
	Residual	0.400376	25	0.01602		
	Total	79.348032	28			
4	Regression	79.034603	4	19.75865	1512.96745	0.00000
	Residual	0.313429	24	0.01306		
	Total	79.348032	28			
5	Regression	79.099486	5	15.81990	1463.94548	0.00000
	Residual	0.248546	23	0.01081		
	Total	79.34803197	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P8

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.71649	0.15364		-37.20753	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94709	0.00000
2	(Constant)	-5.94166	0.11904		-49.91165	0.00000
	EMPBI7	0.56478	0.06898	0.61713	8.18825	0.00000
	EMPBI19	0.40837	0.07991	0.38513	5.11006	0.00003
3	(Constant)	-6.14594	0.11935		-51.49435	0.00000
	EMPBI7	0.42845	0.07219	0.46816	5.93502	0.00000
	EMPBI19	0.41908	0.06831	0.39524	6.13477	0.00000
	EMPBI18	0.16192	0.04958	0.14666	3.26549	0.00316
4	(Constant)	-6.69037	0.23693		-28.23746	0.00000
	EMPBI7	0.29389	0.08348	0.32112	3.52026	0.00175
	EMPBI19	0.44633	0.06259	0.42093	7.13152	0.00000
	EMPBI18	0.25148	0.05665	0.22778	4.43884	0.00017
	EMPBI23	0.11484	0.04451	0.06166	2.58026	0.01642
5	(Constant)	-6.71268	0.21572		-31.11777	0.00000
	EMPBI7	0.37920	0.08354	0.41434	4.53900	0.00015
	EMPBI19	0.39796	0.06026	0.37532	6.60447	0.00000
	EMPBI18	0.23811	0.05182	0.21567	4.59468	0.00013
	EMPBI23	0.11403	0.04049	0.06122	2.81644	0.00979
	EMPBI3	-0.04440	0.01812	-0.04787	-2.45034	0.02230

a Dependent Variable: CFS2P8

Figure D-1-4: Commodity Flow Attraction for Commodity Item 8 (CFS2P8)

Regression (CFS2P12)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12654
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20231	1	78.20231	1844.42926	0.00000
	Residual	1.14478	27	0.04240		
	Total	79.34709	28			
2	Regression	78.77599	2	39.38800	1793.19460	0.00000
	Residual	0.57110	26	0.02197		
	Total	79.34709	28			
3	Regression	78.94676	3	26.31559	1643.36436	0.00000
	Residual	0.40033	25	0.01601		
	Total	79.34709	28			
4	Regression	79.03368	4	19.75842	1513.03129	0.00000
	Residual	0.31341	24	0.01306		
	Total	79.34709	28			
5	Regression	79.09856	5	15.81971	1464.04010	0.00000
	Residual	0.24853	23	0.01081		
	Total	79.34709	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P12

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.26304	0.15364		-21.23850	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94682	0.00000
2	(Constant)	-3.48822	0.11904		-29.30345	0.00000
	EMPBI7	0.56476	0.06897	0.61711	8.18832	0.00000
	EMPBI19	0.40839	0.07991	0.38515	5.11054	0.00003
3	(Constant)	-3.69250	0.11935		-30.93967	0.00000
	EMPBI7	0.42843	0.07219	0.46814	5.93510	0.00000
	EMPBI19	0.41910	0.06831	0.39526	6.13539	0.00000
	EMPBI18	0.16191	0.04958	0.14666	3.26559	0.00316
4	(Constant)	-4.23684	0.23693		-17.88255	0.00000
	EMPBI7	0.29389	0.08348	0.32113	3.52040	0.00175
	EMPBI19	0.44634	0.06258	0.42095	7.13195	0.00000
	EMPBI18	0.25146	0.05665	0.22777	4.43863	0.00017
	EMPBI23	0.11482	0.04450	0.06165	2.57991	0.01643
5	(Constant)	-4.25914	0.21571		-19.74476	0.00000
	EMPBI7	0.37920	0.08354	0.41435	4.53923	0.00015
	EMPBI19	0.39797	0.06025	0.37533	6.60495	0.00000
	EMPBI18	0.23809	0.05182	0.21566	4.59449	0.00013
	EMPBI23	0.11401	0.04048	0.06121	2.81609	0.00980
	EMPBI3	-0.04441	0.01812	-0.04787	-2.45047	0.02229

a Dependent Variable: CFS2P12

Figure D-1-5: Commodity Flow Attraction for Commodity Item 12 (CFS2P12)

Regression (CFS2P13)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20268	1	78.20268	1844.47288	0.00000
	Residual	1.14476	27	0.04240		
	Total	79.34744	28			
2	Regression	78.77633	2	39.38816	1793.14930	0.00000
	Residual	0.57111	26	0.02197		
	Total	79.34744	28			
3	Regression	78.94707	3	26.31569	1643.20765	0.00000
	Residual	0.40037	25	0.01601		
	Total	79.34744	28			
4	Regression	79.03401	4	19.75850	1512.93924	0.00000
	Residual	0.31343	24	0.01306		
	Total	79.34744	28			
5	Regression	79.09889	5	15.81978	1463.91355	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34744	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P13

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.65475	0.15364		-17.27939	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94733	0.00000
2	(Constant)	-2.87992	0.11904		-24.19293	0.00000
	EMPBI7	0.56478	0.06897	0.61712	8.18839	0.00000
	EMPBI19	0.40837	0.07991	0.38514	5.11030	0.00003
3	(Constant)	-3.08418	0.11935		-25.84126	0.00000
	EMPBI7	0.42846	0.07219	0.46817	5.93512	0.00000
	EMPBI19	0.41909	0.06831	0.39525	6.13488	0.00000
	EMPBI18	0.16190	0.04958	0.14665	3.26520	0.00317
4	(Constant)	-3.62859	0.23693		-15.31477	0.00000
	EMPBI7	0.29390	0.08348	0.32114	3.52038	0.00175
	EMPBI19	0.44633	0.06259	0.42094	7.13153	0.00000
	EMPBI18	0.25146	0.05665	0.22776	4.43847	0.00017
	EMPBI23	0.11483	0.04451	0.06166	2.58012	0.01643
5	(Constant)	-3.65089	0.21572		-16.92421	0.00000
	EMPBI7	0.37921	0.08354	0.41435	4.53910	0.00015
	EMPBI19	0.39796	0.06026	0.37532	6.60448	0.00000
	EMPBI18	0.23809	0.05182	0.21566	4.59427	0.00013
	EMPBI23	0.11402	0.04049	0.06122	2.81628	0.00980
	EMPBI3	-0.04440	0.01812	-0.04787	-2.45032	0.02230

a Dependent Variable: CFS2P13

Figure D-1-6: Commodity Flow Production for Commodity Item 13 (CFS2P13)

Regression (CFS2P15)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20268	1	78.20268	1844.47288	0.00000
	Residual	1.14476	27	0.04240		
	Total	79.34744	28			
2	Regression	78.77633	2	39.38816	1793.14930	0.00000
	Residual	0.57111	26	0.02197		
	Total	79.34744	28			
3	Regression	78.94707	3	26.31569	1643.20765	0.00000
	Residual	0.40037	25	0.01601		
	Total	79.34744	28			
4	Regression	79.03401	4	19.75850	1512.93924	0.00000
	Residual	0.31343	24	0.01306		
	Total	79.34744	28			
5	Regression	79.09889	5	15.81978	1463.91355	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34744	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P15

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.95985	0.15364		-6.24752	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94733	0.00000
2	(Constant)	-1.18502	0.11904		-9.95483	0.00000
	EMPBI7	0.56478	0.06897	0.61712	8.18839	0.00000
	EMPBI19	0.40837	0.07991	0.38514	5.11030	0.00003
3	(Constant)	-1.38928	0.11935		-11.64029	0.00000
	EMPBI7	0.42846	0.07219	0.46817	5.93512	0.00000
	EMPBI19	0.41909	0.06831	0.39525	6.13488	0.00000
	EMPBI18	0.16190	0.04958	0.14665	3.26520	0.00317
4	(Constant)	-1.93369	0.23693		-8.16130	0.00000
	EMPBI7	0.29390	0.08348	0.32114	3.52038	0.00175
	EMPBI19	0.44633	0.06259	0.42094	7.13153	0.00000
	EMPBI18	0.25146	0.05665	0.22776	4.43847	0.00017
	EMPBI23	0.11483	0.04451	0.06166	2.58012	0.01643
5	(Constant)	-1.95599	0.21572		-9.06726	0.00000
	EMPBI7	0.37921	0.08354	0.41435	4.53910	0.00015
	EMPBI19	0.39796	0.06026	0.37532	6.60448	0.00000
	EMPBI18	0.23809	0.05182	0.21566	4.59427	0.00013
	EMPBI23	0.11402	0.04049	0.06122	2.81628	0.00980
	EMPBI3	-0.04440	0.01812	-0.04787	-2.45032	0.02230

a Dependent Variable: CFS2P15

Figure D-1-7: Commodity Flow Production for Commodity Item 15 (CFS2P15)

Regression (CFS2P17)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14822
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99843	0.99687	0.99619	0.10397

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20357	1	78.20357	1844.55524	0.00000
	Residual	1.14472	27	0.04240		
	Total	79.34829	28			
2	Regression	78.77713	2	39.38856	1793.01856	0.00000
	Residual	0.57116	26	0.02197		
	Total	79.34829	28			
3	Regression	78.94783	3	26.31594	1642.88896	0.00000
	Residual	0.40045	25	0.01602		
	Total	79.34829	28			
4	Regression	79.03479	4	19.75870	1512.64503	0.00000
	Residual	0.31350	24	0.01306		
	Total	79.34829	28			
5	Regression	79.09968	5	15.81994	1463.59353	0.00000
	Residual	0.24861	23	0.01081		
	Total	79.34829	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P17

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.00313	0.15363		-13.03829	0.00000
	EMPBI7	0.90856	0.02115	0.99276	42.94829	0.00000
2	(Constant)	-2.22828	0.11904		-18.71802	0.00000
	EMPBI7	0.56481	0.06898	0.61715	8.18850	0.00000
	EMPBI19	0.40834	0.07992	0.38511	5.10970	0.00003
3	(Constant)	-2.43252	0.11936		-20.37916	0.00000
	EMPBI7	0.42850	0.07220	0.46821	5.93513	0.00000
	EMPBI19	0.41906	0.06832	0.39521	6.13379	0.00000
	EMPBI18	0.16188	0.04959	0.14663	3.26455	0.00317
4	(Constant)	-2.97698	0.23696		-12.56333	0.00000
	EMPBI7	0.29393	0.08349	0.32117	3.52039	0.00175
	EMPBI19	0.44630	0.06259	0.42091	7.13034	0.00000
	EMPBI18	0.25145	0.05666	0.22776	4.43789	0.00017
	EMPBI23	0.11484	0.04451	0.06166	2.58011	0.01643
5	(Constant)	-2.99929	0.21574		-13.90202	0.00000
	EMPBI7	0.37924	0.08355	0.41439	4.53901	0.00015
	EMPBI19	0.39793	0.06026	0.37529	6.60320	0.00000
	EMPBI18	0.23808	0.05183	0.21565	4.59359	0.00013
	EMPBI23	0.11403	0.04049	0.06123	2.81625	0.00980
	EMPBI3	-0.04441	0.01812	-0.04787	-2.45018	0.02231

a Dependent Variable: CFS2P17

Figure D-1-8: Commodity Flow Production for Commodity Item 17 (CFS2P17)

Regression (CFS2P18)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20268	1	78.20268	1844.47288	0.00000
	Residual	1.14476	27	0.04240		
	Total	79.34744	28			
2	Regression	78.77633	2	39.38816	1793.14930	0.00000
	Residual	0.57111	26	0.02197		
	Total	79.34744	28			
3	Regression	78.94707	3	26.31569	1643.20765	0.00000
	Residual	0.40037	25	0.01601		
	Total	79.34744	28			
4	Regression	79.03401	4	19.75850	1512.93924	0.00000
	Residual	0.31343	24	0.01306		
	Total	79.34744	28			
5	Regression	79.09889	5	15.81978	1463.91355	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34743947	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P18

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.25575	0.15364		-8.17349	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94733	0.00000
2	(Constant)	-1.48092	0.11904		-12.44055	0.00000
	EMPBI7	0.56478	0.06897	0.61712	8.18839	0.00000
	EMPBI19	0.40837	0.07991	0.38514	5.11030	0.00003
3	(Constant)	-1.68518	0.11935		-14.11953	0.00000
	EMPBI7	0.42846	0.07219	0.46817	5.93512	0.00000
	EMPBI19	0.41909	0.06831	0.39525	6.13488	0.00000
	EMPBI18	0.16190	0.04958	0.14665	3.26520	0.00317
4	(Constant)	-2.22959	0.23693		-9.41017	0.00000
	EMPBI7	0.29390	0.08348	0.32114	3.52038	0.00175
	EMPBI19	0.44633	0.06259	0.42094	7.13153	0.00000
	EMPBI18	0.25146	0.05665	0.22776	4.43847	0.00017
	EMPBI23	0.11483	0.04451	0.06166	2.58012	0.01643
5	(Constant)	-2.25189	0.21572		-10.43895	0.00000
	EMPBI7	0.37921	0.08354	0.41435	4.53910	0.00015
	EMPBI19	0.39796	0.06026	0.37532	6.60448	0.00000
	EMPBI18	0.23809	0.05182	0.21566	4.59427	0.00013
	EMPBI23	0.11402	0.04049	0.06122	2.81628	0.00980
	EMPBI3	-0.04440	0.01812	-0.04787	-2.45032	0.02230

a Dependent Variable: CFS2P18

Figure D-1-9: Commodity Flow Production for Commodity Item 6 (CFS2P6)

Regression (CFS2P19)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14822
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99843	0.99687	0.99619	0.10396

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20296	1	78.20296	1844.45341	0.00000
	Residual	1.14477	27	0.04240		
	Total	79.34773	28			
2	Regression	78.77653	2	39.38827	1792.87457	0.00000
	Residual	0.57120	26	0.02197		
	Total	79.34773	28			
3	Regression	78.94729	3	26.31576	1642.93032	0.00000
	Residual	0.40044	25	0.01602		
	Total	79.34773	28			
4	Regression	79.03425	4	19.75856	1512.71347	0.00000
	Residual	0.31348	24	0.01306		
	Total	79.34773	28			
5	Regression	79.09915	5	15.81983	1463.68819	0.00000
	Residual	0.24859	23	0.01081		
	Total	79.34773	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P19

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.39939	0.15364		-28.63481	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94710	0.00000
2	(Constant)	-4.62455	0.11905		-38.84572	0.00000
	EMPBI7	0.56480	0.06898	0.61715	8.18810	0.00000
	EMPBI19	0.40835	0.07992	0.38512	5.10957	0.00003
3	(Constant)	-4.82882	0.11936		-40.45549	0.00000
	EMPBI7	0.42847	0.07220	0.46818	5.93482	0.00000
	EMPBI19	0.41906	0.06832	0.39522	6.13398	0.00000
	EMPBI18	0.16191	0.04959	0.14666	3.26512	0.00317
4	(Constant)	-5.37329	0.23695		-22.67671	0.00000
	EMPBI7	0.29390	0.08349	0.32114	3.52010	0.00175
	EMPBI19	0.44631	0.06259	0.42092	7.13064	0.00000
	EMPBI18	0.25148	0.05666	0.22778	4.43850	0.00017
	EMPBI23	0.11485	0.04451	0.06166	2.58023	0.01642
5	(Constant)	-5.39559	0.21574		-25.01006	0.00000
	EMPBI7	0.37921	0.08355	0.41436	4.53880	0.00015
	EMPBI19	0.39794	0.06026	0.37530	6.60354	0.00000
	EMPBI18	0.23811	0.05183	0.21567	4.59428	0.00013
	EMPBI23	0.11404	0.04049	0.06123	2.81640	0.00979
	EMPBI3	-0.04441	0.01812	-0.04787	-2.45029	0.02230

a Dependent Variable: CFS2P19

Figure D-1-10: Commodity Flow Production for Commodity Item 19 (CFS2P19)

Regression (CFS2P23)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14822
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99843	0.99687	0.99619	0.10397

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20357	1	78.20357	1844.55524	0.00000
	Residual	1.14472	27	0.04240		
	Total	79.34829	28			
2	Regression	78.77713	2	39.38856	1793.01856	0.00000
	Residual	0.57116	26	0.02197		
	Total	79.34829	28			
3	Regression	78.94783	3	26.31594	1642.88896	0.00000
	Residual	0.40045	25	0.01602		
	Total	79.34829	28			
4	Regression	79.03479	4	19.75870	1512.64503	0.00000
	Residual	0.31350	24	0.01306		
	Total	79.34829	28			
5	Regression	79.09968	5	15.81994	1463.59353	0.00000
	Residual	0.24861	23	0.01081		
	Total	79.34829	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P23

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.23773	0.15363		-27.58324	0.00000
	EMPBI7	0.90856	0.02115	0.99276	42.94829	0.00000
2	(Constant)	-4.46288	0.11904		-37.48913	0.00000
	EMPBI7	0.56481	0.06898	0.61715	8.18850	0.00000
	EMPBI19	0.40834	0.07992	0.38511	5.10970	0.00003
3	(Constant)	-4.66712	0.11936		-39.10018	0.00000
	EMPBI7	0.42850	0.07220	0.46821	5.93513	0.00000
	EMPBI19	0.41906	0.06832	0.39521	6.13379	0.00000
	EMPBI18	0.16188	0.04959	0.14663	3.26455	0.00317
4	(Constant)	-5.21158	0.23696		-21.99369	0.00000
	EMPBI7	0.29393	0.08349	0.32117	3.52039	0.00175
	EMPBI19	0.44630	0.06259	0.42091	7.13034	0.00000
	EMPBI18	0.25145	0.05666	0.22776	4.43789	0.00017
	EMPBI23	0.11484	0.04451	0.06166	2.58011	0.01643
5	(Constant)	-5.23389	0.21574		-24.25964	0.00000
	EMPBI7	0.37924	0.08355	0.41439	4.53901	0.00015
	EMPBI19	0.39793	0.06026	0.37529	6.60320	0.00000
	EMPBI18	0.23808	0.05183	0.21565	4.59359	0.00013
	EMPBI23	0.11403	0.04049	0.06123	2.81625	0.00980
	EMPBI3	-0.04441	0.01812	-0.04787	-2.45018	0.02231

a Dependent Variable: CFS2P23

Figure D-1-11: Commodity Flow Production for Commodity Item 23 (CFS2P23)

Regression (CFS2P24)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.202618	1	78.20262	1844.39354	0.00000
	Residual	1.144805	27	0.04240		
	Total	79.347423	28			
2	Regression	78.776310	2	39.38815	1793.15005	0.00000
	Residual	0.571113	26	0.02197		
	Total	79.347423	28			
3	Regression	78.947072	3	26.31569	1643.28965	0.00000
	Residual	0.400351	25	0.01601		
	Total	79.347423	28			
4	Regression	79.034007	4	19.75850	1513.01617	0.00000
	Residual	0.313416	24	0.01306		
	Total	79.347423	28			
5	Regression	79.098899	5	15.81978	1464.06479	0.00000
	Residual	0.248524	23	0.01081		
	Total	79.347423	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P24

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.72035	0.15364		-37.23221	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94640	0.00000
2	(Constant)	-5.94553	0.11904		-49.94581	0.00000
	EMPBI7	0.56476	0.06897	0.61711	8.18818	0.00000
	EMPBI19	0.40839	0.07991	0.38516	5.11052	0.00003
3	(Constant)	-6.14981	0.11935		-51.52835	0.00000
	EMPBI7	0.42843	0.07219	0.46814	5.93495	0.00000
	EMPBI19	0.41911	0.06831	0.39526	6.13529	0.00000
	EMPBI18	0.16191	0.04958	0.14666	3.26547	0.00316
4	(Constant)	-6.69420	0.23693		-28.25417	0.00000
	EMPBI7	0.29388	0.08348	0.32112	3.52023	0.00175
	EMPBI19	0.44635	0.06258	0.42096	7.13199	0.00000
	EMPBI18	0.25146	0.05665	0.22777	4.43871	0.00017
	EMPBI23	0.11483	0.04451	0.06165	2.58012	0.01643
5	(Constant)	-6.71650	0.21571		-31.13690	0.00000
	EMPBI7	0.37919	0.08354	0.41434	4.53917	0.00015
	EMPBI19	0.39798	0.06025	0.37534	6.60505	0.00000
	EMPBI18	0.23810	0.05182	0.21566	4.59463	0.00013
	EMPBI23	0.11402	0.04048	0.06122	2.81636	0.00979
	EMPBI3	-0.04441	0.01812	-0.04787	-2.45063	0.02229

a Dependent Variable: CFS2P24

Figure D-1-12: Commodity Flow Production for Commodity Item 24 (CFS2P24)

Regression (CFS2P26)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.202777	1	78.20278	1844.47844	0.00000
	Residual	1.144754	27	0.04240		
	Total	79.347531	28			
2	Regression	78.776382	2	39.38819	1793.04026	0.00000
	Residual	0.571149	26	0.02197		
	Total	79.347531	28			
3	Regression	78.947157	3	26.31572	1643.19574	0.00000
	Residual	0.400374	25	0.01601		
	Total	79.347531	28			
4	Regression	79.034109	4	19.75853	1512.99211	0.00000
	Residual	0.313422	24	0.01306		
	Total	79.347531	28			
5	Regression	79.098983	5	15.81980	1463.92523	0.00000
	Residual	0.248548	23	0.01081		
	Total	79.347531	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P26

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.89168	0.15364		-25.33041	0.00000
	EMPBI7	0.90855	0.02115	0.99276	42.94739	0.00000
2	(Constant)	-4.11684	0.11904		-34.58269	0.00000
	EMPBI7	0.56479	0.06897	0.61714	8.18831	0.00000
	EMPBI19	0.40836	0.07991	0.38513	5.10997	0.00003
3	(Constant)	-4.32112	0.11935		-36.20500	0.00000
	EMPBI7	0.42846	0.07219	0.46817	5.93508	0.00000
	EMPBI19	0.41908	0.06831	0.39523	6.13467	0.00000
	EMPBI18	0.16192	0.04958	0.14666	3.26549	0.00316
4	(Constant)	-4.86557	0.23693		-20.53591	0.00000
	EMPBI7	0.29389	0.08348	0.32112	3.52030	0.00175
	EMPBI19	0.44632	0.06258	0.42093	7.13149	0.00000
	EMPBI18	0.25148	0.05665	0.22778	4.43894	0.00017
	EMPBI23	0.11484	0.04451	0.06166	2.58037	0.01642
5	(Constant)	-4.88787	0.21572		-22.65849	0.00000
	EMPBI7	0.37919	0.08354	0.41433	4.53890	0.00015
	EMPBI19	0.39796	0.06026	0.37532	6.60439	0.00000
	EMPBI18	0.23811	0.05182	0.21568	4.59473	0.00013
	EMPBI23	0.11403	0.04049	0.06123	2.81652	0.00979
	EMPBI3	-0.04440	0.01812	-0.04787	-2.45016	0.02231

a Dependent Variable: CFS2P26

Figure D-1-13: Commodity Flow Production for Commodity Item 26 (CFS2P26)

Regression (CFS2P27)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20590
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20206	1	78.20206	1844.57011	0.00000
	Residual	1.14469	27	0.04240		
	Total	79.34674	28			
2	Regression	78.77563	2	39.38781	1793.12531	0.00000
	Residual	0.57112	26	0.02197		
	Total	79.34674	28			
3	Regression	78.94633	3	26.31544	1643.00430	0.00000
	Residual	0.40042	25	0.01602		
	Total	79.34674	28			
4	Regression	79.03328	4	19.75832	1512.77506	0.00000
	Residual	0.31346	24	0.01306		
	Total	79.34674	28			
5	Regression	79.09819	5	15.81964	1463.88556	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34674	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P27

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.67429	0.15363		-43.44335	0.00000
	EMPBI7	0.90855	0.02115	0.99276	42.94846	0.00000
2	(Constant)	-6.89945	0.11904		-57.95905	0.00000
	EMPBI7	0.56479	0.06897	0.61715	8.18864	0.00000
	EMPBI19	0.40835	0.07991	0.38512	5.10996	0.00003
3	(Constant)	-7.10368	0.11936		-59.51584	0.00000
	EMPBI7	0.42849	0.07219	0.46821	5.93527	0.00000
	EMPBI19	0.41906	0.06832	0.39522	6.13413	0.00000
	EMPBI18	0.16188	0.04959	0.14663	3.26460	0.00317
4	(Constant)	-7.64813	0.23695		-32.27801	0.00000
	EMPBI7	0.29392	0.08349	0.32116	3.52049	0.00175
	EMPBI19	0.44631	0.06259	0.42092	7.13078	0.00000
	EMPBI18	0.25144	0.05666	0.22775	4.43803	0.00017
	EMPBI23	0.11484	0.04451	0.06166	2.58021	0.01642
5	(Constant)	-7.67044	0.21572		-35.55722	0.00000
	EMPBI7	0.37925	0.08354	0.41440	4.53959	0.00015
	EMPBI19	0.39793	0.06026	0.37529	6.60386	0.00000
	EMPBI18	0.23807	0.05182	0.21564	4.59394	0.00013
	EMPBI23	0.11403	0.04049	0.06123	2.81650	0.00979
	EMPBI3	-0.04441	0.01812	-0.04788	-2.45085	0.02227

a Dependent Variable: CFS2P27

Figure D-1-14: Commodity Flow Production for Commodity Item 27 (CFS2P27)

Regression (CFS2P28)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20255	1	78.20255	1844.42354	0.00000
	Residual	1.14479	27	0.04240		
	Total	79.34733	28			
2	Regression	78.77620	2	39.38810	1793.08997	0.00000
	Residual	0.57113	26	0.02197		
	Total	79.34733	28			
3	Regression	78.94699	3	26.31566	1643.32665	0.00000
	Residual	0.40034	25	0.01601		
	Total	79.34733	28			
4	Regression	79.03392	4	19.75848	1513.03000	0.00000
	Residual	0.31341	24	0.01306		
	Total	79.34733	28			
5	Regression	79.09880	5	15.81976	1464.01689	0.00000
	Residual	0.24853	23	0.01081		
	Total	79.34733	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P28

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.13386	0.15364		-33.41516	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94675	0.00000
2	(Constant)	-5.35903	0.11904		-45.01813	0.00000
	EMPBI7	0.56477	0.06897	0.61712	8.18821	0.00000
	EMPBI19	0.40838	0.07991	0.38514	5.11026	0.00003
3	(Constant)	-5.56332	0.11935		-46.61481	0.00000
	EMPBI7	0.42843	0.07219	0.46814	5.93502	0.00000
	EMPBI19	0.41909	0.06831	0.39525	6.13518	0.00000
	EMPBI18	0.16192	0.04958	0.14667	3.26578	0.00316
4	(Constant)	-6.10769	0.23693		-25.77884	0.00000
	EMPBI7	0.29388	0.08348	0.32112	3.52031	0.00175
	EMPBI19	0.44634	0.06258	0.42094	7.13181	0.00000
	EMPBI18	0.25147	0.05665	0.22778	4.43891	0.00017
	EMPBI23	0.11482	0.04450	0.06165	2.58005	0.01643
5	(Constant)	-6.13000	0.21571		-28.41747	0.00000
	EMPBI7	0.37919	0.08354	0.41434	4.53907	0.00015
	EMPBI19	0.39797	0.06025	0.37533	6.60479	0.00000
	EMPBI18	0.23811	0.05182	0.21567	4.59477	0.00013
	EMPBI23	0.11401	0.04049	0.06122	2.81622	0.00980
	EMPBI3	-0.04440	0.01812	-0.04787	-2.45038	0.02230

a Dependent Variable: CFS2P28

Figure D-1-15: Commodity Flow Production for Commodity Item 28 (CFS2P28)

Regression (CFS2P29)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20236	1	78.20236	1844.50813	0.00000
	Residual	1.14473	27	0.04240		
	Total	79.34709	28			
2	Regression	78.77600	2	39.38800	1793.19852	0.00000
	Residual	0.57110	26	0.02197		
	Total	79.34709	28			
3	Regression	78.94674	3	26.31558	1643.27368	0.00000
	Residual	0.40035	25	0.01601		
	Total	79.34709	28			
4	Regression	79.03368	4	19.75842	1513.01818	0.00000
	Residual	0.31341	24	0.01306		
	Total	79.34709	28			
5	Regression	79.09855	5	15.81971	1463.94435	0.00000
	Residual	0.24854	23	0.01081		
	Total	79.34709	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P29

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.39422	0.15363		-41.61958	0.00000
	EMPBI7	0.90855	0.02115	0.99276	42.94774	0.00000
2	(Constant)	-6.61939	0.11904		-55.60742	0.00000
	EMPBI7	0.56478	0.06897	0.61712	8.18853	0.00000
	EMPBI19	0.40837	0.07991	0.38514	5.11034	0.00003
3	(Constant)	-6.82365	0.11935		-57.17422	0.00000
	EMPBI7	0.42846	0.07219	0.46817	5.93526	0.00000
	EMPBI19	0.41909	0.06831	0.39524	6.13497	0.00000
	EMPBI18	0.16190	0.04958	0.14665	3.26527	0.00317
4	(Constant)	-7.36806	0.23693		-31.09839	0.00000
	EMPBI7	0.29390	0.08348	0.32114	3.52049	0.00175
	EMPBI19	0.44633	0.06258	0.42094	7.13168	0.00000
	EMPBI18	0.25146	0.05665	0.22777	4.43860	0.00017
	EMPBI23	0.11483	0.04450	0.06166	2.58019	0.01642
5	(Constant)	-7.39035	0.21572		-34.25946	0.00000
	EMPBI7	0.37920	0.08354	0.41435	4.53908	0.00015
	EMPBI19	0.39796	0.06026	0.37532	6.60458	0.00000
	EMPBI18	0.23809	0.05182	0.21566	4.59435	0.00013
	EMPBI23	0.11402	0.04049	0.06122	2.81632	0.00980
	EMPBI3	-0.04440	0.01812	-0.04787	-2.45014	0.02231

a Dependent Variable: CFS2P29

Figure D-1-16: Commodity Flow Production for Commodity Item 29 (CFS2P29)

Regression (CFS2P30)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99843	0.99687	0.99619	0.10396

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.203938	1	78.20394	1844.52063	0.00000
	Residual	1.144745	27	0.04240		
	Total	79.348683	28			
2	Regression	78.777536	2	39.38877	1793.07050	0.00000
	Residual	0.571148	26	0.02197		
	Total	79.348683	28			
3	Regression	78.948237	3	26.31608	1642.92379	0.00000
	Residual	0.400446	25	0.01602		
	Total	79.348683	28			
4	Regression	79.035190	4	19.75880	1512.66635	0.00000
	Residual	0.313494	24	0.01306		
	Total	79.348683	28			
5	Regression	79.100088	5	15.82002	1463.66539	0.00000
	Residual	0.248595	23	0.01081		
	Total	79.348683	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P30

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.78884	0.15364		-37.67899	0.00000
	EMPBI7	0.90856	0.02115	0.99276	42.94788	0.00000
2	(Constant)	-6.01401	0.11904		-50.51951	0.00000
	EMPBI7	0.56480	0.06897	0.61714	8.18845	0.00000
	EMPBI19	0.40836	0.07991	0.38512	5.10994	0.00003
3	(Constant)	-6.21824	0.11936		-52.09559	0.00000
	EMPBI7	0.42849	0.07220	0.46820	5.93508	0.00000
	EMPBI19	0.41907	0.06832	0.39523	6.13405	0.00000
	EMPBI18	0.16188	0.04959	0.14663	3.26450	0.00317
4	(Constant)	-6.76269	0.23696		-28.53975	0.00000
	EMPBI7	0.29392	0.08349	0.32116	3.52035	0.00175
	EMPBI19	0.44632	0.06259	0.42092	7.13059	0.00000
	EMPBI18	0.25144	0.05666	0.22775	4.43782	0.00017
	EMPBI23	0.11484	0.04451	0.06166	2.58007	0.01643
5	(Constant)	-6.78500	0.21574		-31.44991	0.00000
	EMPBI7	0.37924	0.08355	0.41439	4.53912	0.00015
	EMPBI19	0.39794	0.06026	0.37530	6.60352	0.00000
	EMPBI18	0.23808	0.05183	0.21564	4.59358	0.00013
	EMPBI23	0.11403	0.04049	0.06122	2.81625	0.00980
	EMPBI3	-0.04441	0.01812	-0.04788	-2.45038	0.02230

a Dependent Variable: CFS2P30

Figure D-1-17: Commodity Flow Production for Commodity Item 30 (CFS2P30)

Regression (CFS2P32)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20236	1	78.20236	1844.50813	0.00000
	Residual	1.14473	27	0.04240		
	Total	79.34709	28			
2	Regression	78.77600	2	39.38800	1793.19852	0.00000
	Residual	0.57110	26	0.02197		
	Total	79.34709	28			
3	Regression	78.94674	3	26.31558	1643.27368	0.00000
	Residual	0.40035	25	0.01601		
	Total	79.34709	28			
4	Regression	79.03368	4	19.75842	1513.01818	0.00000
	Residual	0.31341	24	0.01306		
	Total	79.34709	28			
5	Regression	79.09855	5	15.81971	1463.94435	0.00000
	Residual	0.24854	23	0.01081		
	Total	79.34709	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P32

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.04552	0.15363		-19.82309	0.00000
	EMPBI7	0.90855	0.02115	0.99276	42.94774	0.00000
2	(Constant)	-3.27069	0.11904		-27.47604	0.00000
	EMPBI7	0.56478	0.06897	0.61712	8.18853	0.00000
	EMPBI19	0.40837	0.07991	0.38514	5.11034	0.00003
3	(Constant)	-3.47495	0.11935		-29.11601	0.00000
	EMPBI7	0.42846	0.07219	0.46817	5.93526	0.00000
	EMPBI19	0.41909	0.06831	0.39524	6.13497	0.00000
	EMPBI18	0.16190	0.04958	0.14665	3.26527	0.00317
4	(Constant)	-4.01936	0.23693		-16.96452	0.00000
	EMPBI7	0.29390	0.08348	0.32114	3.52049	0.00175
	EMPBI19	0.44633	0.06258	0.42094	7.13168	0.00000
	EMPBI18	0.25146	0.05665	0.22777	4.43860	0.00017
	EMPBI23	0.11483	0.04450	0.06166	2.58019	0.01642
5	(Constant)	-4.04165	0.21572		-18.73589	0.00000
	EMPBI7	0.37920	0.08354	0.41435	4.53908	0.00015
	EMPBI19	0.39796	0.06026	0.37532	6.60458	0.00000
	EMPBI18	0.23809	0.05182	0.21566	4.59435	0.00013
	EMPBI23	0.11402	0.04049	0.06122	2.81632	0.00980
	EMPBI3	-0.04440	0.01812	-0.04787	-2.45014	0.02231

a Dependent Variable: CFS2P32

Figure D-1-18: Commodity Flow Production for Commodity Item 32 (CFS2P32)

Regression (CFS2P34)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20214	1	78.20214	1844.48176	0.00000
	Residual	1.14474	27	0.04240		
	Total	79.34688	28			
2	Regression	78.77575	2	39.38788	1793.08852	0.00000
	Residual	0.57113	26	0.02197		
	Total	79.34688	28			
3	Regression	78.94650	3	26.31550	1643.14868	0.00000
	Residual	0.40038	25	0.01602		
	Total	79.34688	28			
4	Regression	79.03343	4	19.75836	1512.84082	0.00000
	Residual	0.31345	24	0.01306		
	Total	79.34688	28			
5	Regression	79.09834	5	15.81967	1463.91905	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34688	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P34

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.45230	0.15364		-35.48850	0.00000
	EMPBI7	0.90855	0.02115	0.99276	42.94743	0.00000
2	(Constant)	-5.67747	0.11904		-47.69326	0.00000
	EMPBI7	0.56478	0.06897	0.61713	8.18836	0.00000
	EMPBI19	0.40836	0.07991	0.38513	5.11010	0.00003
3	(Constant)	-5.88173	0.11935		-49.28025	0.00000
	EMPBI7	0.42846	0.07219	0.46817	5.93509	0.00000
	EMPBI19	0.41908	0.06831	0.39524	6.13464	0.00000
	EMPBI18	0.16190	0.04958	0.14665	3.26519	0.00317
4	(Constant)	-6.42612	0.23694		-27.12120	0.00000
	EMPBI7	0.29391	0.08349	0.32115	3.52039	0.00175
	EMPBI19	0.44632	0.06259	0.42093	7.13115	0.00000
	EMPBI18	0.25145	0.05666	0.22776	4.43832	0.00017
	EMPBI23	0.11483	0.04451	0.06165	2.57995	0.01643
5	(Constant)	-6.44842	0.21572		-29.89273	0.00000
	EMPBI7	0.37923	0.08354	0.41438	4.53939	0.00015
	EMPBI19	0.39794	0.06026	0.37531	6.60420	0.00000
	EMPBI18	0.23809	0.05182	0.21565	4.59422	0.00013
	EMPBI23	0.11402	0.04049	0.06122	2.81619	0.00980
	EMPBI3	-0.04441	0.01812	-0.04788	-2.45072	0.02228

a Dependent Variable: CFS2P34

Figure D-1-19: Commodity Flow Production for Commodity Item 34 (CFS2P34)

Regression (CFS2P35)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14822
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99843	0.99687	0.99619	0.10397

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20357	1	78.20357	1844.55524	0.00000
	Residual	1.14472	27	0.04240		
	Total	79.34829	28			
2	Regression	78.77713	2	39.38856	1793.01856	0.00000
	Residual	0.57116	26	0.02197		
	Total	79.34829	28			
3	Regression	78.94783	3	26.31594	1642.88896	0.00000
	Residual	0.40045	25	0.01602		
	Total	79.34829	28			
4	Regression	79.03479	4	19.75870	1512.64503	0.00000
	Residual	0.31350	24	0.01306		
	Total	79.34829	28			
5	Regression	79.09968	5	15.81994	1463.59353	0.00000
	Residual	0.24861	23	0.01081		
	Total	79.34829	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P35

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.53613	0.15363		-36.03449	0.00000
	EMPBI7	0.90856	0.02115	0.99276	42.94829	0.00000
2	(Constant)	-5.76128	0.11904		-48.39596	0.00000
	EMPBI7	0.56481	0.06898	0.61715	8.18850	0.00000
	EMPBI19	0.40834	0.07992	0.38511	5.10970	0.00003
3	(Constant)	-5.96552	0.11936		-49.97791	0.00000
	EMPBI7	0.42850	0.07220	0.46821	5.93513	0.00000
	EMPBI19	0.41906	0.06832	0.39521	6.13379	0.00000
	EMPBI18	0.16188	0.04959	0.14663	3.26455	0.00317
4	(Constant)	-6.50998	0.23696		-27.47314	0.00000
	EMPBI7	0.29393	0.08349	0.32117	3.52039	0.00175
	EMPBI19	0.44630	0.06259	0.42091	7.13034	0.00000
	EMPBI18	0.25145	0.05666	0.22776	4.43789	0.00017
	EMPBI23	0.11484	0.04451	0.06166	2.58011	0.01643
5	(Constant)	-6.53229	0.21574		-30.27786	0.00000
	EMPBI7	0.37924	0.08355	0.41439	4.53901	0.00015
	EMPBI19	0.39793	0.06026	0.37529	6.60320	0.00000
	EMPBI18	0.23808	0.05183	0.21565	4.59359	0.00013
	EMPBI23	0.11403	0.04049	0.06123	2.81625	0.00980
	EMPBI3	-0.04441	0.01812	-0.04787	-2.45018	0.02231

a Dependent Variable: CFS2P35

Figure D-1-20: Commodity Flow Production for Commodity Item 35 (CFS2P35)

Regression (CFS2P39)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20590
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99843	0.99687	0.99619	0.10397

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20338	1	78.20338	1844.56887	0.00000
	Residual	1.14471	27	0.04240		
	Total	79.34808	28			
2	Regression	78.77695	2	39.38848	1793.10535	0.00000
	Residual	0.57113	26	0.02197		
	Total	79.34808	28			
3	Regression	78.94765	3	26.31588	1642.95636	0.00000
	Residual	0.40043	25	0.01602		
	Total	79.34808	28			
4	Regression	79.03459	4	19.75865	1512.62898	0.00000
	Residual	0.31350	24	0.01306		
	Total	79.34808	28			
5	Regression	79.09948	5	15.81990	1463.60981	0.00000
	Residual	0.24860	23	0.01081		
	Total	79.34808	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P39

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.78082	0.15363		-44.13642	0.00000
	EMPBI7	0.90856	0.02115	0.99276	42.94844	0.00000
2	(Constant)	-7.00598	0.11904		-58.85320	0.00000
	EMPBI7	0.56480	0.06897	0.61715	8.18861	0.00000
	EMPBI19	0.40835	0.07991	0.38512	5.10991	0.00003
3	(Constant)	-7.21022	0.11936		-60.40703	0.00000
	EMPBI7	0.42850	0.07220	0.46821	5.93523	0.00000
	EMPBI19	0.41906	0.06832	0.39522	6.13401	0.00000
	EMPBI18	0.16188	0.04959	0.14663	3.26451	0.00317
4	(Constant)	-7.75462	0.23696		-32.72556	0.00000
	EMPBI7	0.29394	0.08349	0.32118	3.52054	0.00175
	EMPBI19	0.44631	0.06259	0.42091	7.13036	0.00000
	EMPBI18	0.25143	0.05666	0.22774	4.43760	0.00017
	EMPBI23	0.11483	0.04451	0.06165	2.57981	0.01644
5	(Constant)	-7.77692	0.21574		-36.04713	0.00000
	EMPBI7	0.37926	0.08355	0.41441	4.53925	0.00015
	EMPBI19	0.39793	0.06026	0.37529	6.60326	0.00000
	EMPBI18	0.23807	0.05183	0.21563	4.59331	0.00013
	EMPBI23	0.11402	0.04049	0.06122	2.81594	0.00980
	EMPBI3	-0.04441	0.01812	-0.04787	-2.45030	0.02230

a Dependent Variable: CFS2P39

Figure D-1-21: Commodity Flow Production for Commodity Item 39 (CFS2P39)

Regression (CFS2P40)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20255	1	78.20255	1844.42354	0.00000
	Residual	1.14479	27	0.04240		
	Total	79.34733	28			
2	Regression	78.77620	2	39.38810	1793.08997	0.00000
	Residual	0.57113	26	0.02197		
	Total	79.34733	28			
3	Regression	78.94699	3	26.31566	1643.32665	0.00000
	Residual	0.40034	25	0.01601		
	Total	79.34733	28			
4	Regression	79.03392	4	19.75848	1513.03000	0.00000
	Residual	0.31341	24	0.01306		
	Total	79.34733	28			
5	Regression	79.09880	5	15.81976	1464.01689	0.00000
	Residual	0.24853	23	0.01081		
	Total	79.34733227	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P40

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.95226	0.15364		-32.23316	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94675	0.00000
2	(Constant)	-5.17743	0.11904		-43.49261	0.00000
	EMPBI7	0.56477	0.06897	0.61712	8.18821	0.00000
	EMPBI19	0.40838	0.07991	0.38514	5.11026	0.00003
3	(Constant)	-5.38172	0.11935		-45.09319	0.00000
	EMPBI7	0.42843	0.07219	0.46814	5.93502	0.00000
	EMPBI19	0.41909	0.06831	0.39525	6.13518	0.00000
	EMPBI18	0.16192	0.04958	0.14667	3.26578	0.00316
4	(Constant)	-5.92609	0.23693		-25.01236	0.00000
	EMPBI7	0.29388	0.08348	0.32112	3.52031	0.00175
	EMPBI19	0.44634	0.06258	0.42094	7.13181	0.00000
	EMPBI18	0.25147	0.05665	0.22778	4.43891	0.00017
	EMPBI23	0.11482	0.04450	0.06165	2.58005	0.01643
5	(Constant)	-5.94840	0.21571		-27.57561	0.00000
	EMPBI7	0.37919	0.08354	0.41434	4.53907	0.00015
	EMPBI19	0.39797	0.06025	0.37533	6.60479	0.00000
	EMPBI18	0.23811	0.05182	0.21567	4.59477	0.00013
	EMPBI23	0.11401	0.04049	0.06122	2.81622	0.00980
	EMPBI3	-0.04440	0.01812	-0.04787	-2.45038	0.02230

a Dependent Variable: CFS2P40

Figure D-1-22: Commodity Flow Production for Commodity Item 40 (CFS2P40)

Regression (CFS2P43)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14822
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99843	0.99687	0.99619	0.10397

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

ANOVA(f)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20357	1	78.20357	1844.55524	0.00000
	Residual	1.14472	27	0.04240		
	Total	79.34829	28			
2	Regression	78.77713	2	39.38856	1793.01856	0.00000
	Residual	0.57116	26	0.02197		
	Total	79.34829	28			
3	Regression	78.94783	3	26.31594	1642.88896	0.00000
	Residual	0.40045	25	0.01602		
	Total	79.34829	28			
4	Regression	79.03479	4	19.75870	1512.64503	0.00000
	Residual	0.31350	24	0.01306		
	Total	79.34829	28			
5	Regression	79.09968	5	15.81994	1463.59353	0.00000
	Residual	0.24861	23	0.01081		
	Total	79.34829	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Dependent Variable: CFS2P43

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.64583	0.15363		-23.73058	0.00000
	EMPBI7	0.90856	0.02115	0.99276	42.94829	0.00000
2	(Constant)	-3.87098	0.11904		-32.51704	0.00000
	EMPBI7	0.56481	0.06898	0.61715	8.18850	0.00000
	EMPBI19	0.40834	0.07992	0.38511	5.10970	0.00003
3	(Constant)	-4.07522	0.11936		-34.14137	0.00000
	EMPBI7	0.42850	0.07220	0.46821	5.93513	0.00000
	EMPBI19	0.41906	0.06832	0.39521	6.13379	0.00000
	EMPBI18	0.16188	0.04959	0.14663	3.26455	0.00317
4	(Constant)	-4.61968	0.23696		-19.49578	0.00000
	EMPBI7	0.29393	0.08349	0.32117	3.52039	0.00175
	EMPBI19	0.44630	0.06259	0.42091	7.13034	0.00000
	EMPBI18	0.25145	0.05666	0.22776	4.43789	0.00017
	EMPBI23	0.11484	0.04451	0.06166	2.58011	0.01643
5	(Constant)	-4.64199	0.21574		-21.51611	0.00000
	EMPBI7	0.37924	0.08355	0.41439	4.53901	0.00015
	EMPBI19	0.39793	0.06026	0.37529	6.60320	0.00000
	EMPBI18	0.23808	0.05183	0.21565	4.59359	0.00013
	EMPBI23	0.11403	0.04049	0.06123	2.81625	0.00980
	EMPBI3	-0.04441	0.01812	-0.04787	-2.45018	0.02231

a Dependent Variable: CFS2P43

Figure D-1-23: Commodity Flow Production for Commodity Item 43 (CFS2P43)

D-1-2 Model Summary and Coefficients for CFS2A – Attraction

Regression (CFS2A3)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7
b Predictors: (Constant), EMPBI7, EMPBI19
c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18
d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20
e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23
f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5
g Dependent Variable: CFS2A3

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.24977	1	76.24977	1876.52304	0.00000
	Residual	1.09711	27	0.04063		
	Total	77.34688	28			
2	Regression	76.73893	2	38.36947	1640.95966	0.00000
	Residual	0.60794	26	0.02338		
	Total	77.34688	28			
3	Regression	76.92359	3	25.64120	1514.42858	0.00000
	Residual	0.42328	25	0.01693		
	Total	77.34688	28			
4	Regression	77.03439	4	19.25860	1479.12843	0.00000
	Residual	0.31249	24	0.01302		
	Total	77.34688	28			
5	Regression	77.10947	5	15.42189	1494.09766	0.00000
	Residual	0.23740	23	0.01032		
	Total	77.34688	28			
6	Regression	77.16455	6	12.86076	1551.78089	0.00000
	Residual	0.18233	22	0.00829		
	Total	77.34688	28			

a Predictors: (Constant), EMPBI7
b Predictors: (Constant), EMPBI7, EMPBI19
c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18
d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20
e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23
f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5
g Dependent Variable: CFS2A3

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.77283	0.15041		-31.73316	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31885	0.00000
2	(Constant)	-4.98076	0.12282		-40.55406	0.00000
	EMPBI7	0.57968	0.07116	0.64155	8.14595	0.00000
	EMPBI19	0.37711	0.08245	0.36022	4.57387	0.00010
3	(Constant)	-5.19318	0.12272		-42.31787	0.00000
	EMPBI7	0.43791	0.07423	0.48465	5.89968	0.00000
	EMPBI19	0.38825	0.07024	0.37087	5.52749	0.00001
	EMPBI18	0.16837	0.05098	0.15447	3.30248	0.00289
4	(Constant)	-5.44625	0.13823		-39.40043	0.00000
	EMPBI7	0.36938	0.06920	0.40881	5.33780	0.00002
	EMPBI19	0.29168	0.06993	0.27862	4.17117	0.00034
	EMPBI18	0.16133	0.04477	0.14801	3.60329	0.00143
	EMPBI20	0.19336	0.06628	0.17723	2.91711	0.00755
5	(Constant)	-5.92318	0.21545		-27.49248	0.00000
	EMPBI7	0.25237	0.07536	0.27931	3.34906	0.00278
	EMPBI19	0.33145	0.06398	0.31661	5.18025	0.00003
	EMPBI18	0.24687	0.05094	0.22649	4.84610	0.00007
	EMPBI20	0.16520	0.05993	0.15142	2.75642	0.01124
	EMPBI23	0.10837	0.04018	0.05893	2.69705	0.01286
6	(Constant)	-5.72422	0.20791		-27.53224	0.00000
	EMPBI7	0.21746	0.06887	0.24067	3.15753	0.00457
	EMPBI19	0.33960	0.05742	0.32440	5.91426	0.00001
	EMPBI18	0.23102	0.04606	0.21195	5.01569	0.00005
	EMPBI20	0.14311	0.05438	0.13117	2.63140	0.01525
	EMPBI23	0.09594	0.03633	0.05217	2.64101	0.01492
	EMPBI5	0.05507	0.02136	0.07466	2.57781	0.01717

a Dependent Variable: CFS2A3

Figure D-1-24: Commodity Flow Attraction for Commodity Item 3 (CFS2A3)

Regression (CFS2A5)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25070	1	76.25070	1876.62481	0.00000
	Residual	1.09706	27	0.04063		
	Total	77.34776	28			
2	Regression	76.73983	2	38.36991	1640.98981	0.00000
	Residual	0.60794	26	0.02338		
	Total	77.34776	28			
3	Regression	76.92448	3	25.64149	1514.45565	0.00000
	Residual	0.42328	25	0.01693		
	Total	77.34776	28			
4	Regression	77.03531	4	19.25883	1479.28493	0.00000
	Residual	0.31246	24	0.01302		
	Total	77.34776	28			
5	Regression	77.11034	5	15.42207	1493.97823	0.00000
	Residual	0.23742	23	0.01032		
	Total	77.34776	28			
6	Regression	77.16541	6	12.86090	1551.63179	0.00000
	Residual	0.18235	22	0.00829		
	Total	77.34776	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A5

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.10740	0.15040		-33.95838	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32003	0.00000
2	(Constant)	-5.31533	0.12282		-43.27830	0.00000
	EMPBI7	0.57970	0.07116	0.64157	8.14625	0.00000
	EMPBI19	0.37709	0.08245	0.36021	4.57369	0.00010
3	(Constant)	-5.52775	0.12272		-45.04431	0.00000
	EMPBI7	0.43793	0.07423	0.48467	5.89997	0.00000
	EMPBI19	0.38823	0.07024	0.37085	5.52728	0.00001
	EMPBI18	0.16837	0.05098	0.15446	3.30248	0.00289
4	(Constant)	-5.78084	0.13822		-41.82301	0.00000
	EMPBI7	0.36940	0.06920	0.40882	5.33822	0.00002
	EMPBI19	0.29165	0.06992	0.27859	4.17097	0.00034
	EMPBI18	0.16133	0.04477	0.14801	3.60343	0.00143
	EMPBI20	0.19338	0.06628	0.17725	2.91760	0.00754
5	(Constant)	-6.25761	0.21546		-29.04345	0.00000
	EMPBI7	0.25242	0.07536	0.27936	3.34958	0.00278
	EMPBI19	0.33141	0.06399	0.31657	5.17937	0.00003
	EMPBI18	0.24684	0.05094	0.22646	4.84528	0.00007
	EMPBI20	0.16523	0.05994	0.15145	2.75685	0.01123
	EMPBI23	0.10833	0.04018	0.05891	2.69602	0.01289
6	(Constant)	-6.05866	0.20792		-29.13922	0.00000
	EMPBI7	0.21751	0.06887	0.24072	3.15810	0.00456
	EMPBI19	0.33956	0.05742	0.32436	5.91322	0.00001
	EMPBI18	0.23099	0.04606	0.21192	5.01475	0.00005
	EMPBI20	0.14314	0.05439	0.13120	2.63185	0.01523
	EMPBI23	0.09590	0.03633	0.05215	2.63985	0.01496
	EMPBI5	0.05507	0.02136	0.07466	2.57772	0.01717

a Dependent Variable: CFS2A5

Figure D-1-25: Commodity Flow Attraction for Commodity Item 5 (CFS2A5)

Regression (CFS2A6)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A6

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.24977	1	76.24977	1876.52304	0.00000
	Residual	1.09711	27	0.04063		
	Total	77.34688	28			
2	Regression	76.73893	2	38.36947	1640.95966	0.00000
	Residual	0.60794	26	0.02338		
	Total	77.34688	28			
3	Regression	76.92359	3	25.64120	1514.42858	0.00000
	Residual	0.42328	25	0.01693		
	Total	77.34688	28			
4	Regression	77.03439	4	19.25860	1479.12843	0.00000
	Residual	0.31249	24	0.01302		
	Total	77.34688	28			
5	Regression	77.10947	5	15.42189	1494.09766	0.00000
	Residual	0.23740	23	0.01032		
	Total	77.34688	28			
6	Regression	77.16455	6	12.86076	1551.78089	0.00000
	Residual	0.18233	22	0.00829		
	Total	77.34688	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A6

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.10753	0.15041		-27.30977	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31885	0.00000
2	(Constant)	-4.31546	0.12282		-35.13709	0.00000
	EMPBI7	0.57968	0.07116	0.64155	8.14595	0.00000
	EMPBI19	0.37711	0.08245	0.36022	4.57387	0.00010
3	(Constant)	-4.52788	0.12272		-36.89651	0.00000
	EMPBI7	0.43791	0.07423	0.48465	5.89968	0.00000
	EMPBI19	0.38825	0.07024	0.37087	5.52749	0.00001
	EMPBI18	0.16837	0.05098	0.15447	3.30248	0.00289
4	(Constant)	-4.78095	0.13823		-34.58737	0.00000
	EMPBI7	0.36938	0.06920	0.40881	5.33780	0.00002
	EMPBI19	0.29168	0.06993	0.27862	4.17117	0.00034
	EMPBI18	0.16133	0.04477	0.14801	3.60329	0.00143
	EMPBI20	0.19336	0.06628	0.17723	2.91711	0.00755
5	(Constant)	-5.25788	0.21545		-24.40449	0.00000
	EMPBI7	0.25237	0.07536	0.27931	3.34906	0.00278
	EMPBI19	0.33145	0.06398	0.31661	5.18025	0.00003
	EMPBI18	0.24687	0.05094	0.22649	4.84610	0.00007
	EMPBI20	0.16520	0.05993	0.15142	2.75642	0.01124
	EMPBI23	0.10837	0.04018	0.05893	2.69705	0.01286
6	(Constant)	-5.05892	0.20791		-24.33230	0.00000
	EMPBI7	0.21746	0.06887	0.24067	3.15753	0.00457
	EMPBI19	0.33960	0.05742	0.32440	5.91426	0.00001
	EMPBI18	0.23102	0.04606	0.21195	5.01569	0.00005
	EMPBI20	0.14311	0.05438	0.13117	2.63140	0.01525
	EMPBI23	0.09594	0.03633	0.05217	2.64101	0.01492
	EMPBI5	0.05507	0.02136	0.07466	2.57781	0.01717

a Dependent Variable: CFS2A6

Figure D-1-26: Commodity Flow Attraction for Commodity Item 6 (CFS2A6)

Regression (CFS2A7)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99153	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11412
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A7

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25098	1	76.25098	1876.44898	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34815	28			
2	Regression	76.74014	2	38.37007	1640.79793	0.00000
	Residual	0.60801	26	0.02339		
	Total	77.34815	28			
3	Regression	76.92479	3	25.64160	1514.17961	0.00000
	Residual	0.42336	25	0.01693		
	Total	77.34815	28			
4	Regression	77.03561	4	19.25890	1478.90800	0.00000
	Residual	0.31254	24	0.01302		
	Total	77.34815	28			
5	Regression	77.11070	5	15.42214	1493.81205	0.00000
	Residual	0.23745	23	0.01032		
	Total	77.34815	28			
6	Regression	77.16577	6	12.86096	1551.34806	0.00000
	Residual	0.18238	22	0.00829		
	Total	77.34815	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A7

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.16765	0.15041		-21.06021	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31800	0.00000
2	(Constant)	-3.37558	0.12282		-27.48289	0.00000
	EMPBI7	0.57969	0.07117	0.64155	8.14563	0.00000
	EMPBI19	0.37710	0.08245	0.36022	4.57357	0.00010
3	(Constant)	-3.58800	0.12273		-29.23502	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89932	0.00000
	EMPBI19	0.38825	0.07025	0.37086	5.52694	0.00001
	EMPBI18	0.16837	0.05099	0.15446	3.30212	0.00289
4	(Constant)	-3.84109	0.13824		-27.78577	0.00000
	EMPBI7	0.36939	0.06921	0.40881	5.33744	0.00002
	EMPBI19	0.29167	0.06993	0.27861	4.17062	0.00034
	EMPBI18	0.16133	0.04478	0.14800	3.60291	0.00143
	EMPBI20	0.19338	0.06629	0.17725	2.91719	0.00755
5	(Constant)	-4.31803	0.21547		-20.04010	0.00000
	EMPBI7	0.25238	0.07536	0.27931	3.34875	0.00278
	EMPBI19	0.33144	0.06399	0.31660	5.17950	0.00003
	EMPBI18	0.24687	0.05095	0.22648	4.84555	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75649	0.01124
	EMPBI23	0.10837	0.04019	0.05893	2.69682	0.01287
6	(Constant)	-4.11909	0.20794		-19.80896	0.00000
	EMPBI7	0.21746	0.06888	0.24067	3.15713	0.00457
	EMPBI19	0.33959	0.05743	0.32438	5.91314	0.00001
	EMPBI18	0.23102	0.04607	0.21194	5.01491	0.00005
	EMPBI20	0.14313	0.05439	0.13119	2.63141	0.01524
	EMPBI23	0.09594	0.03633	0.05217	2.64069	0.01493
	EMPBI5	0.05506	0.02136	0.07466	2.57732	0.01719

a Dependent Variable: CFS2A7

Figure D-1-27: Commodity Flow Attraction for Commodity Item 7 (CFS2A7)

Regression (CFS2A8)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99153	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11412
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A8

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25098	1	76.25098	1876.44898	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34815	28			
2	Regression	76.74014	2	38.37007	1640.79793	0.00000
	Residual	0.60801	26	0.02339		
	Total	77.34815	28			
3	Regression	76.92479	3	25.64160	1514.17961	0.00000
	Residual	0.42336	25	0.01693		
	Total	77.34815	28			
4	Regression	77.03561	4	19.25890	1478.90800	0.00000
	Residual	0.31254	24	0.01302		
	Total	77.34815	28			
5	Regression	77.11070	5	15.42214	1493.81205	0.00000
	Residual	0.23745	23	0.01032		
	Total	77.34815	28			
6	Regression	77.16577	6	12.86096	1551.34806	0.00000
	Residual	0.18238	22	0.00829		
	Total	77.34815	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A8

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.15835	0.15041		-34.29544	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31800	0.00000
2	(Constant)	-5.36628	0.12282		-43.69053	0.00000
	EMPBI7	0.57969	0.07117	0.64155	8.14563	0.00000
	EMPBI19	0.37710	0.08245	0.36022	4.57357	0.00010
3	(Constant)	-5.57870	0.12273		-45.45526	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89932	0.00000
	EMPBI19	0.38825	0.07025	0.37086	5.52694	0.00001
	EMPBI18	0.16837	0.05099	0.15446	3.30212	0.00289
4	(Constant)	-5.83179	0.13824		-42.18615	0.00000
	EMPBI7	0.36939	0.06921	0.40881	5.33744	0.00002
	EMPBI19	0.29167	0.06993	0.27861	4.17062	0.00034
	EMPBI18	0.16133	0.04478	0.14800	3.60291	0.00143
	EMPBI20	0.19338	0.06629	0.17725	2.91719	0.00755
5	(Constant)	-6.30873	0.21547		-29.27900	0.00000
	EMPBI7	0.25238	0.07536	0.27931	3.34875	0.00278
	EMPBI19	0.33144	0.06399	0.31660	5.17950	0.00003
	EMPBI18	0.24687	0.05095	0.22648	4.84555	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75649	0.01124
	EMPBI23	0.10837	0.04019	0.05893	2.69682	0.01287
6	(Constant)	-6.10979	0.20794		-29.38237	0.00000
	EMPBI7	0.21746	0.06888	0.24067	3.15713	0.00457
	EMPBI19	0.33959	0.05743	0.32438	5.91314	0.00001
	EMPBI18	0.23102	0.04607	0.21194	5.01491	0.00005
	EMPBI20	0.14313	0.05439	0.13119	2.63141	0.01524
	EMPBI23	0.09594	0.03633	0.05217	2.64069	0.01493
	EMPBI5	0.05506	0.02136	0.07466	2.57732	0.01719

a Dependent Variable: CFS2A8

Figure D-1-28: Commodity Flow Attraction for Commodity Item 8 (CFS2A8)

Regression (CFS2A11)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99153	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A11

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25069	1	76.25069	1876.42976	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34787	28			
2	Regression	76.73987	2	38.36993	1640.82082	0.00000
	Residual	0.60800	26	0.02338		
	Total	77.34787	28			
3	Regression	76.92452	3	25.64151	1514.19753	0.00000
	Residual	0.42335	25	0.01693		
	Total	77.34787	28			
4	Regression	77.03535	4	19.25884	1478.99821	0.00000
	Residual	0.31252	24	0.01302		
	Total	77.34787	28			
5	Regression	77.11043	5	15.42209	1493.88187	0.00000
	Residual	0.23744	23	0.01032		
	Total	77.34787	28			
6	Regression	77.16551	6	12.86092	1551.60441	0.00000
	Residual	0.18235	22	0.00829		
	Total	77.34787	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A11

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.84911	0.15041		-38.88786	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31778	0.00000
2	(Constant)	-6.05704	0.12282		-49.31494	0.00000
	EMPBI7	0.57968	0.07117	0.64155	8.14560	0.00000
	EMPBI19	0.37711	0.08245	0.36022	4.57369	0.00010
3	(Constant)	-6.26946	0.12273		-51.08398	0.00000
	EMPBI7	0.43792	0.07423	0.48466	5.89929	0.00000
	EMPBI19	0.38825	0.07025	0.37087	5.52708	0.00001
	EMPBI18	0.16836	0.05099	0.15446	3.30211	0.00289
4	(Constant)	-6.52257	0.13824		-47.18463	0.00000
	EMPBI7	0.36938	0.06920	0.40880	5.33746	0.00002
	EMPBI19	0.29167	0.06993	0.27861	4.17077	0.00034
	EMPBI18	0.16132	0.04478	0.14800	3.60297	0.00143
	EMPBI20	0.19339	0.06629	0.17726	2.91747	0.00754
5	(Constant)	-6.99948	0.21546		-32.48561	0.00000
	EMPBI7	0.25237	0.07536	0.27931	3.34879	0.00278
	EMPBI19	0.33144	0.06399	0.31660	5.17961	0.00003
	EMPBI18	0.24686	0.05095	0.22648	4.84553	0.00007
	EMPBI20	0.16524	0.05994	0.15145	2.75678	0.01123
	EMPBI23	0.10837	0.04018	0.05893	2.69674	0.01287
6	(Constant)	-6.80050	0.20792		-32.70683	0.00000
	EMPBI7	0.21745	0.06887	0.24066	3.15726	0.00457
	EMPBI19	0.33959	0.05742	0.32438	5.91364	0.00001
	EMPBI18	0.23101	0.04606	0.21193	5.01512	0.00005
	EMPBI20	0.14314	0.05439	0.13120	2.63181	0.01523
	EMPBI23	0.09593	0.03633	0.05217	2.64069	0.01493
	EMPBI5	0.05507	0.02136	0.07467	2.57798	0.01716

a Dependent Variable: CFS2A11

Figure D-1-29: Commodity Flow Attraction for Commodity Item 11 (CFS2A11)

Regression (CFS2A12)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A12

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25076	1	76.25076	1876.51967	0.00000
	Residual	1.09712	27	0.04063		
	Total	77.34788	28			
2	Regression	76.73994	2	38.36997	1640.95894	0.00000
	Residual	0.60795	26	0.02338		
	Total	77.34788	28			
3	Regression	76.92457	3	25.64152	1514.33483	0.00000
	Residual	0.42331	25	0.01693		
	Total	77.34788	28			
4	Regression	77.03541	4	19.25885	1479.18911	0.00000
	Residual	0.31248	24	0.01302		
	Total	77.34788	28			
5	Regression	77.11046	5	15.42209	1493.98304	0.00000
	Residual	0.23742	23	0.01032		
	Total	77.34788	28			
6	Regression	77.16554	6	12.86092	1551.71787	0.00000
	Residual	0.18234	22	0.00829		
	Total	77.34788	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A12

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.23751	0.15041		-21.52511	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31881	0.00000
2	(Constant)	-3.44544	0.12282		-28.05311	0.00000
	EMPBI7	0.57968	0.07116	0.64155	8.14594	0.00000
	EMPBI19	0.37711	0.08245	0.36022	4.57388	0.00010
3	(Constant)	-3.65785	0.12272		-29.80576	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89963	0.00000
	EMPBI19	0.38825	0.07024	0.37087	5.52732	0.00001
	EMPBI18	0.16836	0.05098	0.15445	3.30215	0.00289
4	(Constant)	-3.91096	0.13823		-28.29394	0.00000
	EMPBI7	0.36938	0.06920	0.40880	5.33788	0.00002
	EMPBI19	0.29167	0.06993	0.27860	4.17101	0.00034
	EMPBI18	0.16132	0.04477	0.14800	3.60308	0.00143
	EMPBI20	0.19339	0.06628	0.17726	2.91768	0.00754
5	(Constant)	-4.38780	0.21546		-20.36510	0.00000
	EMPBI7	0.25240	0.07536	0.27933	3.34921	0.00278
	EMPBI19	0.33143	0.06399	0.31659	5.17966	0.00003
	EMPBI18	0.24684	0.05094	0.22646	4.84531	0.00007
	EMPBI20	0.16524	0.05994	0.15146	2.75698	0.01122
	EMPBI23	0.10835	0.04018	0.05892	2.69640	0.01288
6	(Constant)	-4.18883	0.20792		-20.14677	0.00000
	EMPBI7	0.21748	0.06887	0.24069	3.15773	0.00456
	EMPBI19	0.33958	0.05742	0.32437	5.91371	0.00001
	EMPBI18	0.23099	0.04606	0.21192	5.01489	0.00005
	EMPBI20	0.14314	0.05439	0.13120	2.63203	0.01522
	EMPBI23	0.09592	0.03633	0.05216	2.64031	0.01495
	EMPBI5	0.05507	0.02136	0.07467	2.57801	0.01716

a Dependent Variable: CFS2A12

Figure D-1-30: Commodity Flow Attraction for Commodity Item 8 (CFS2A8)

Regression (CFS2A13)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99153	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A13

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25069	1	76.25069	1876.42976	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34787	28			
2	Regression	76.73987	2	38.36993	1640.82082	0.00000
	Residual	0.60800	26	0.02338		
	Total	77.34787	28			
3	Regression	76.92452	3	25.64151	1514.19753	0.00000
	Residual	0.42335	25	0.01693		
	Total	77.34787	28			
4	Regression	77.03535	4	19.25884	1478.99821	0.00000
	Residual	0.31252	24	0.01302		
	Total	77.34787	28			
5	Regression	77.11043	5	15.42209	1493.88187	0.00000
	Residual	0.23744	23	0.01032		
	Total	77.34787	28			
6	Regression	77.16551	6	12.86092	1551.60441	0.00000
	Residual	0.18235	22	0.00829		
	Total	77.34787	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A13

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.47431	0.15041		-23.09898	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31778	0.00000
2	(Constant)	-3.68224	0.12282		-29.97991	0.00000
	EMPBI7	0.57968	0.07117	0.64155	8.14560	0.00000
	EMPBI19	0.37711	0.08245	0.36022	4.57369	0.00010
3	(Constant)	-3.89466	0.12273		-31.73395	0.00000
	EMPBI7	0.43792	0.07423	0.48466	5.89929	0.00000
	EMPBI19	0.38825	0.07025	0.37087	5.52708	0.00001
	EMPBI18	0.16836	0.05099	0.15446	3.30211	0.00289
4	(Constant)	-4.14777	0.13824		-30.00519	0.00000
	EMPBI7	0.36938	0.06920	0.40880	5.33746	0.00002
	EMPBI19	0.29167	0.06993	0.27861	4.17077	0.00034
	EMPBI18	0.16132	0.04478	0.14800	3.60297	0.00143
	EMPBI20	0.19339	0.06629	0.17726	2.91747	0.00754
5	(Constant)	-4.62468	0.21546		-21.46382	0.00000
	EMPBI7	0.25237	0.07536	0.27931	3.34879	0.00278
	EMPBI19	0.33144	0.06399	0.31660	5.17961	0.00003
	EMPBI18	0.24686	0.05095	0.22648	4.84553	0.00007
	EMPBI20	0.16524	0.05994	0.15145	2.75678	0.01123
	EMPBI23	0.10837	0.04018	0.05893	2.69674	0.01287
6	(Constant)	-4.42570	0.20792		-21.28530	0.00000
	EMPBI7	0.21745	0.06887	0.24066	3.15726	0.00457
	EMPBI19	0.33959	0.05742	0.32438	5.91364	0.00001
	EMPBI18	0.23101	0.04606	0.21193	5.01512	0.00005
	EMPBI20	0.14314	0.05439	0.13120	2.63181	0.01523
	EMPBI23	0.09593	0.03633	0.05217	2.64069	0.01493
	EMPBI5	0.05507	0.02136	0.07467	2.57798	0.01716

a Dependent Variable: CFS2A13

Figure D-1-31: Commodity Flow Attraction for Commodity Item 13 (CFS2A13)

Regression (CFS2A14)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15292
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A14

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25127	1	76.25127	1876.61228	0.00000
	Residual	1.09707	27	0.04063		
	Total	77.34834	28			
2	Regression	76.74038	2	38.37019	1640.92565	0.00000
	Residual	0.60796	26	0.02338		
	Total	77.34834	28			
3	Regression	76.92506	3	25.64169	1514.46745	0.00000
	Residual	0.42328	25	0.01693		
	Total	77.34834	28			
4	Regression	77.03589	4	19.25897	1479.30604	0.00000
	Residual	0.31245	24	0.01302		
	Total	77.34834	28			
5	Regression	77.11094	5	15.42219	1494.14078	0.00000
	Residual	0.23740	23	0.01032		
	Total	77.34834	28			
6	Regression	77.16602	6	12.86100	1551.84553	0.00000
	Residual	0.18233	22	0.00829		
	Total	77.34834	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A14

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.49721	0.15040		-36.54991	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31988	0.00000
2	(Constant)	-5.70513	0.12282		-46.45110	0.00000
	EMPBI7	0.57971	0.07116	0.64157	8.14617	0.00000
	EMPBI19	0.37709	0.08245	0.36020	4.57352	0.00010
3	(Constant)	-5.91757	0.12272		-48.22089	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89992	0.00000
	EMPBI19	0.38823	0.07024	0.37084	5.52722	0.00001
	EMPBI18	0.16838	0.05098	0.15448	3.30273	0.00289
4	(Constant)	-6.17067	0.13822		-44.64345	0.00000
	EMPBI7	0.36939	0.06920	0.40881	5.33818	0.00002
	EMPBI19	0.29165	0.06992	0.27859	4.17091	0.00034
	EMPBI18	0.16134	0.04477	0.14802	3.60373	0.00142
	EMPBI20	0.19338	0.06628	0.17725	2.91763	0.00754
5	(Constant)	-6.64751	0.21545		-30.85462	0.00000
	EMPBI7	0.25240	0.07536	0.27934	3.34947	0.00278
	EMPBI19	0.33141	0.06398	0.31657	5.17965	0.00003
	EMPBI18	0.24687	0.05094	0.22648	4.84602	0.00007
	EMPBI20	0.16523	0.05993	0.15145	2.75695	0.01122
	EMPBI23	0.10835	0.04018	0.05892	2.69654	0.01288
6	(Constant)	-6.44855	0.20791		-31.01644	0.00000
	EMPBI7	0.21749	0.06887	0.24070	3.15800	0.00456
	EMPBI19	0.33956	0.05742	0.32436	5.91362	0.00001
	EMPBI18	0.23102	0.04606	0.21194	5.01563	0.00005
	EMPBI20	0.14314	0.05438	0.13120	2.63198	0.01523
	EMPBI23	0.09592	0.03633	0.05216	2.64046	0.01494
	EMPBI5	0.05507	0.02136	0.07466	2.57788	0.01717

a Dependent Variable: CFS2A14

Figure D-1-32: Commodity Flow Attraction for Commodity Item 12 (CFS2A12)

Regression (CFS2A15)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A15

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25005	1	76.25005	1876.62996	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34710	28			
2	Regression	76.73920	2	38.36960	1641.07168	0.00000
	Residual	0.60790	26	0.02338		
	Total	77.34710	28			
3	Regression	76.92380	3	25.64127	1514.34437	0.00000
	Residual	0.42331	25	0.01693		
	Total	77.34710	28			
4	Regression	77.03459	4	19.25865	1479.02962	0.00000
	Residual	0.31251	24	0.01302		
	Total	77.34710	28			
5	Regression	77.10967	5	15.42193	1493.91670	0.00000
	Residual	0.23743	23	0.01032		
	Total	77.34710	28			
6	Regression	77.16474	6	12.86079	1551.49896	0.00000
	Residual	0.18236	22	0.00829		
	Total	77.34710	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A15

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.14602	0.15040		-7.61977	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32009	0.00000
2	(Constant)	-1.35395	0.12281		-11.02441	0.00000
	EMPBI7	0.57969	0.07116	0.64156	8.14633	0.00000
	EMPBI19	0.37710	0.08245	0.36022	4.57393	0.00010
3	(Constant)	-1.56633	0.12272		-12.76327	0.00000
	EMPBI7	0.43795	0.07423	0.48469	5.89995	0.00000
	EMPBI19	0.38824	0.07024	0.37086	5.52720	0.00001
	EMPBI18	0.16834	0.05098	0.15444	3.30181	0.00289
4	(Constant)	-1.81940	0.13823		-13.16187	0.00000
	EMPBI7	0.36942	0.06920	0.40884	5.33807	0.00002
	EMPBI19	0.29167	0.06993	0.27861	4.17088	0.00034
	EMPBI18	0.16130	0.04477	0.14798	3.60251	0.00143
	EMPBI20	0.19336	0.06629	0.17723	2.91705	0.00755
5	(Constant)	-2.29631	0.21546		-10.65768	0.00000
	EMPBI7	0.25241	0.07536	0.27935	3.34935	0.00278
	EMPBI19	0.33144	0.06399	0.31660	5.17974	0.00003
	EMPBI18	0.24684	0.05095	0.22646	4.84514	0.00007
	EMPBI20	0.16521	0.05994	0.15143	2.75632	0.01124
	EMPBI23	0.10837	0.04018	0.05893	2.69675	0.01287
6	(Constant)	-2.09736	0.20793		-10.08693	0.00000
	EMPBI7	0.21750	0.06888	0.24071	3.15780	0.00456
	EMPBI19	0.33959	0.05743	0.32438	5.91349	0.00001
	EMPBI18	0.23099	0.04606	0.21192	5.01451	0.00005
	EMPBI20	0.14311	0.05439	0.13117	2.63124	0.01525
	EMPBI23	0.09593	0.03633	0.05217	2.64063	0.01493
	EMPBI5	0.05506	0.02136	0.07466	2.57747	0.01718

a Dependent Variable: CFS2A15

Figure D-1-33: Commodity Flow Attraction for Commodity Item 15 (CFS2A15)

Regression (CFS2A17)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A17

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25076	1	76.25076	1876.51967	0.00000
	Residual	1.09712	27	0.04063		
	Total	77.34788	28			
2	Regression	76.73994	2	38.36997	1640.95894	0.00000
	Residual	0.60795	26	0.02338		
	Total	77.34788	28			
3	Regression	76.92457	3	25.64152	1514.33483	0.00000
	Residual	0.42331	25	0.01693		
	Total	77.34788	28			
4	Regression	77.03541	4	19.25885	1479.18911	0.00000
	Residual	0.31248	24	0.01302		
	Total	77.34788	28			
5	Regression	77.11046	5	15.42209	1493.98304	0.00000
	Residual	0.23742	23	0.01032		
	Total	77.34788	28			
6	Regression	77.16554	6	12.86092	1551.71787	0.00000
	Residual	0.18234	22	0.00829		
	Total	77.34788	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A17

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.11201	0.15041		-14.04204	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31881	0.00000
2	(Constant)	-2.31994	0.12282		-18.88919	0.00000
	EMPBI7	0.57968	0.07116	0.64155	8.14594	0.00000
	EMPBI19	0.37711	0.08245	0.36022	4.57388	0.00010
3	(Constant)	-2.53235	0.12272		-20.63470	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89963	0.00000
	EMPBI19	0.38825	0.07024	0.37087	5.52732	0.00001
	EMPBI18	0.16836	0.05098	0.15445	3.30215	0.00289
4	(Constant)	-2.78546	0.13823		-20.15149	0.00000
	EMPBI7	0.36938	0.06920	0.40880	5.33788	0.00002
	EMPBI19	0.29167	0.06993	0.27860	4.17101	0.00034
	EMPBI18	0.16132	0.04477	0.14800	3.60308	0.00143
	EMPBI20	0.19339	0.06628	0.17726	2.91768	0.00754
5	(Constant)	-3.26230	0.21546		-15.14131	0.00000
	EMPBI7	0.25240	0.07536	0.27933	3.34921	0.00278
	EMPBI19	0.33143	0.06399	0.31659	5.17966	0.00003
	EMPBI18	0.24684	0.05094	0.22646	4.84531	0.00007
	EMPBI20	0.16524	0.05994	0.15146	2.75698	0.01122
	EMPBI23	0.10835	0.04018	0.05892	2.69640	0.01288
6	(Constant)	-3.06333	0.20792		-14.73351	0.00000
	EMPBI7	0.21748	0.06887	0.24069	3.15773	0.00456
	EMPBI19	0.33958	0.05742	0.32437	5.91371	0.00001
	EMPBI18	0.23099	0.04606	0.21192	5.01489	0.00005
	EMPBI20	0.14314	0.05439	0.13120	2.63203	0.01522
	EMPBI23	0.09592	0.03633	0.05216	2.64031	0.01495
	EMPBI5	0.05507	0.02136	0.07467	2.57801	0.01716

a Dependent Variable: CFS2A17

Figure D-1-34: Commodity Flow Attraction for Commodity Item 17 (CFS2A17)

Regression (CFS2A18)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A18

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25087	1	76.25087	1876.61051	0.00000
	Residual	1.09707	27	0.04063		
	Total	77.34794	28			
2	Regression	76.74001	2	38.37001	1641.01608	0.00000
	Residual	0.60793	26	0.02338		
	Total	77.34794	28			
3	Regression	76.92464	3	25.64155	1514.38530	0.00000
	Residual	0.42330	25	0.01693		
	Total	77.34794	28			
4	Regression	77.03545	4	19.25886	1479.13665	0.00000
	Residual	0.31249	24	0.01302		
	Total	77.34794	28			
5	Regression	77.11052	5	15.42210	1493.97682	0.00000
	Residual	0.23743	23	0.01032		
	Total	77.34794	28			
6	Regression	77.16559	6	12.86093	1551.64843	0.00000
	Residual	0.18235	22	0.00829		
	Total	77.34794	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A18

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.60483	0.15040		-10.67021	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31986	0.00000
2	(Constant)	-1.81276	0.12282		-14.75987	0.00000
	EMPBI7	0.57970	0.07116	0.64156	8.14623	0.00000
	EMPBI19	0.37710	0.08245	0.36021	4.57381	0.00010
3	(Constant)	-2.02516	0.12272		-16.50214	0.00000
	EMPBI7	0.43794	0.07423	0.48468	5.89990	0.00000
	EMPBI19	0.38824	0.07024	0.37085	5.52723	0.00001
	EMPBI18	0.16836	0.05098	0.15445	3.30214	0.00289
4	(Constant)	-2.27824	0.13823		-16.48169	0.00000
	EMPBI7	0.36940	0.06920	0.40883	5.33808	0.00002
	EMPBI19	0.29166	0.06993	0.27860	4.17092	0.00034
	EMPBI18	0.16132	0.04477	0.14799	3.60296	0.00143
	EMPBI20	0.19337	0.06628	0.17724	2.91730	0.00755
5	(Constant)	-2.75511	0.21546		-12.78727	0.00000
	EMPBI7	0.25241	0.07536	0.27935	3.34938	0.00278
	EMPBI19	0.33143	0.06399	0.31659	5.17967	0.00003
	EMPBI18	0.24685	0.05095	0.22646	4.84537	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75658	0.01123
	EMPBI23	0.10836	0.04018	0.05893	2.69657	0.01288
6	(Constant)	-2.55615	0.20792		-12.29390	0.00000
	EMPBI7	0.21749	0.06887	0.24070	3.15788	0.00456
	EMPBI19	0.33958	0.05742	0.32437	5.91359	0.00001
	EMPBI18	0.23100	0.04606	0.21192	5.01487	0.00005
	EMPBI20	0.14312	0.05439	0.13118	2.63157	0.01524
	EMPBI23	0.09592	0.03633	0.05216	2.64048	0.01494
	EMPBI5	0.05507	0.02136	0.07466	2.57779	0.01717

a Dependent Variable: CFS2A18

Figure D-1-35: Commodity Flow Attraction for Commodity Item 18 (CFS2A18)

Regression (CFS2A19)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99153	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11412
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A19

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25053	1	76.25053	1876.46565	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34768	28			
2	Regression	76.73967	2	38.36984	1640.79347	0.00000
	Residual	0.60801	26	0.02338		
	Total	77.34768	28			
3	Regression	76.92432	3	25.64144	1514.17241	0.00000
	Residual	0.42336	25	0.01693		
	Total	77.34768	28			
4	Regression	77.03514	4	19.25879	1478.88560	0.00000
	Residual	0.31254	24	0.01302		
	Total	77.34768	28			
5	Regression	77.11022	5	15.42204	1493.76965	0.00000
	Residual	0.23746	23	0.01032		
	Total	77.34768	28			
6	Regression	77.16529	6	12.86088	1551.26255	0.00000
	Residual	0.18239	22	0.00829		
	Total	77.34768	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A19

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.68943	0.15041		-24.52950	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31819	0.00000
2	(Constant)	-3.89736	0.12282		-31.73112	0.00000
	EMPBI7	0.57969	0.07117	0.64156	8.14567	0.00000
	EMPBI19	0.37710	0.08245	0.36021	4.57351	0.00010
3	(Constant)	-4.10978	0.12273		-33.48652	0.00000
	EMPBI7	0.43793	0.07423	0.48467	5.89936	0.00000
	EMPBI19	0.38824	0.07025	0.37086	5.52687	0.00001
	EMPBI18	0.16837	0.05099	0.15446	3.30211	0.00289
4	(Constant)	-4.36287	0.13824		-31.56007	0.00000
	EMPBI7	0.36939	0.06921	0.40881	5.33746	0.00002
	EMPBI19	0.29166	0.06993	0.27860	4.17055	0.00034
	EMPBI18	0.16133	0.04478	0.14800	3.60288	0.00143
	EMPBI20	0.19338	0.06629	0.17725	2.91714	0.00755
5	(Constant)	-4.83980	0.21547		-22.46140	0.00000
	EMPBI7	0.25238	0.07537	0.27932	3.34879	0.00278
	EMPBI19	0.33144	0.06399	0.31659	5.17937	0.00003
	EMPBI18	0.24687	0.05095	0.22648	4.84546	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75642	0.01124
	EMPBI23	0.10837	0.04019	0.05893	2.69674	0.01287
6	(Constant)	-4.64086	0.20795		-22.31767	0.00000
	EMPBI7	0.21747	0.06888	0.24068	3.15715	0.00457
	EMPBI19	0.33958	0.05743	0.32438	5.91291	0.00001
	EMPBI18	0.23102	0.04607	0.21194	5.01476	0.00005
	EMPBI20	0.14313	0.05439	0.13119	2.63132	0.01525
	EMPBI23	0.09594	0.03633	0.05217	2.64058	0.01494
	EMPBI5	0.05506	0.02137	0.07465	2.57717	0.01719

a Dependent Variable: CFS2A19

Figure D-1-36: Commodity Flow Attraction for Commodity Item 19 (CFS2A19)

Regression (CFS2A21)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.091046

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A21

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressio	76.25013	1	76.25013	1876.51813	0.00000
	Residual	1.09711	27	0.04063		
	Total	77.34724	28			
2	Regressio	76.73932	2	38.36966	1641.01599	0.00000
	Residual	0.60792	26	0.02338		
	Total	77.34724	28			
3	Regressio	76.92395	3	25.64132	1514.41403	0.00000
	Residual	0.42329	25	0.01693		
	Total	77.34724	28			
4	Regressio	77.03473	4	19.25868	1479.03643	0.00000
	Residual	0.31251	24	0.01302		
	Total	77.34724	28			
5	Regressio	77.10981	5	15.42196	1493.93328	0.00000
	Residual	0.23743	23	0.01032		
	Total	77.34724	28			
6	Regressio	77.16487	6	12.86081	1551.48168	0.00000
	Residual	0.18237	22	0.00829		
	Total	77.34724	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A21

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant	-5.03134	0.15041		-33.45178	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31880	0.00000
2	(Constant	-5.23927	0.12282		-42.65954	0.00000
	EMPBI7	0.57967	0.07116	0.64154	8.14599	0.00000
	EMPBI19	0.37712	0.08245	0.36023	4.57406	0.00010
3	(Constant	-5.45168	0.12272		-44.42400	0.00000
	EMPBI7	0.43792	0.07423	0.48465	5.89968	0.00000
	EMPBI19	0.38826	0.07024	0.37087	5.52758	0.00001
	EMPBI18	0.16836	0.05098	0.15446	3.30224	0.00289
4	(Constant	-5.70473	0.13823		-41.26903	0.00000
	EMPBI7	0.36939	0.06920	0.40881	5.33773	0.00002
	EMPBI19	0.29170	0.06993	0.27864	4.17126	0.00034
	EMPBI18	0.16132	0.04477	0.14800	3.60294	0.00143
	EMPBI20	0.19334	0.06629	0.17722	2.91682	0.00756
5	(Constant	-6.18164	0.21546		-28.69050	0.00000
	EMPBI7	0.25239	0.07536	0.27932	3.34903	0.00278
	EMPBI19	0.33147	0.06399	0.31663	5.18018	0.00003
	EMPBI18	0.24686	0.05095	0.22647	4.84555	0.00007
	EMPBI20	0.16519	0.05994	0.15141	2.75607	0.01125
	EMPBI23	0.10837	0.04018	0.05893	2.69679	0.01287
6	(Constant	-5.98270	0.20793		-28.77263	0.00000
	EMPBI7	0.21747	0.06888	0.24068	3.15744	0.00457
	EMPBI19	0.33962	0.05743	0.32441	5.91391	0.00001
	EMPBI18	0.23101	0.04606	0.21193	5.01492	0.00005
	EMPBI20	0.14310	0.05439	0.13116	2.63096	0.01526
	EMPBI23	0.09594	0.03633	0.05217	2.64066	0.01493
	EMPBI5	0.05506	0.02136	0.07465	2.57735	0.01719

a Dependent Variable: CFS2A21

Figure D-1-37: Commodity Flow Attraction for Commodity Item 21 (CFS2A21)

Regression (CFS2A23)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15292
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A23

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressio	76.25127	1	76.25127	1876.61228	0.00000
	Residual	1.09707	27	0.04063		
	Total	77.34834	28			
2	Regressio	76.74038	2	38.37019	1640.92565	0.00000
	Residual	0.60796	26	0.02338		
	Total	77.34834	28			
3	Regressio	76.92506	3	25.64169	1514.46745	0.00000
	Residual	0.42328	25	0.01693		
	Total	77.34834	28			
4	Regressio	77.03589	4	19.25897	1479.30604	0.00000
	Residual	0.31245	24	0.01302		
	Total	77.34834	28			
5	Regressio	77.11094	5	15.42219	1494.14078	0.00000
	Residual	0.23740	23	0.01032		
	Total	77.34834	28			
6	Regressio	77.16602	6	12.86100	1551.84553	0.00000
	Residual	0.18233	22	0.00829		
	Total	77.34834	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A23

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant	-4.570313595	0.15040295		-30.387127	2.041E-22
	EMPBI7	0.897144104	0.02070975	0.992882893	43.3198832	1.715E-26
2	(Constant	-4.778234179	0.12282021		-38.904299	1.42E-24
	EMPBI7	0.579707743	0.07116326	0.641571291	8.14616607	1.258E-08
	EMPBI19	0.377086314	0.08244986	0.360198994	4.57352263	0.0001036
3	(Constant	-4.990669911	0.12271796		-40.667802	2.308E-24
	EMPBI7	0.437931063	0.07422659	0.484664903	5.89992184	3.715E-06
	EMPBI19	0.388230005	0.07023966	0.370843628	5.52721923	9.59E-06
	EMPBI18	0.168381492	0.05098248	0.154475354	3.30273238	0.0028857
4	(Constant	-5.243768347	0.13822113		-37.937531	6.156E-23
	EMPBI7	0.369391142	0.06919796	0.408810741	5.33817989	1.769E-05
	EMPBI19	0.291648178	0.06992431	0.278587093	4.17091259	0.0003418
	EMPBI18	0.161342422	0.04477099	0.14801762	3.60372728	0.0014243
	EMPBI20	0.193382517	0.06628058	0.177251129	2.91763476	0.0075407
5	(Constant	-5.720606701	0.21544606		-26.552385	9.288E-19
	EMPBI7	0.252403327	0.07535615	0.279338564	3.34947239	0.0027782
	EMPBI19	0.331413817	0.06398386	0.31657188	5.17964686	2.991E-05
	EMPBI18	0.246868013	0.05094242	0.226479902	4.84602076	6.836E-05
	EMPBI20	0.165232158	0.05993304	0.151448988	2.75694598	0.0112246
	EMPBI23	0.108350107	0.04018109	0.058922252	2.69654464	0.0128795
6	(Constant	-5.521651207	0.20790752		-26.558209	3.307E-18
	EMPBI7	0.217486556	0.06886854	0.240695647	3.15799558	0.0045612
	EMPBI19	0.339561862	0.05742029	0.324355025	5.91362186	5.963E-06
	EMPBI18	0.231017629	0.04605958	0.211938555	5.01562583	5.073E-05
	EMPBI20	0.143135584	0.05438321	0.131195643	2.63198106	0.0152253
	EMPBI23	0.095917726	0.03632613	0.052161354	2.64046079	0.0149407
	EMPBI5	0.055067443	0.02136151	0.074660278	2.57788123	0.0171651

a Dependent Variable: CFS2A23

Figure D-1-38: Commodity Flow Attraction for Commodity Item 19 (CFS2A19)

Regression (CFS2A23)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15292
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A23

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressio	76.25127	1	76.25127	1876.61228	0.00000
	Residual	1.09707	27	0.04063		
	Total	77.34834	28			
2	Regressio	76.74038	2	38.37019	1640.92565	0.00000
	Residual	0.60796	26	0.02338		
	Total	77.34834	28			
3	Regressio	76.92506	3	25.64169	1514.46745	0.00000
	Residual	0.42328	25	0.01693		
	Total	77.34834	28			
4	Regressio	77.03589	4	19.25897	1479.30604	0.00000
	Residual	0.31245	24	0.01302		
	Total	77.34834	28			
5	Regressio	77.11094	5	15.42219	1494.14078	0.00000
	Residual	0.23740	23	0.01032		
	Total	77.34834	28			
6	Regressio	77.16602	6	12.86100	1551.84553	0.00000
	Residual	0.18233	22	0.00829		
	Total	77.34834	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A23

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant	-4.570313595	0.15040295		-30.387127	2.041E-22
	EMPBI7	0.897144104	0.02070975	0.992882893	43.3198832	1.715E-26
2	(Constant	-4.778234179	0.12282021		-38.904299	1.42E-24
	EMPBI7	0.579707743	0.07116326	0.641571291	8.14616607	1.258E-08
	EMPBI19	0.377086314	0.08244986	0.360198994	4.57352263	0.0001036
3	(Constant	-4.990669911	0.12271796		-40.667802	2.308E-24
	EMPBI7	0.437931063	0.07422659	0.484664903	5.89992184	3.715E-06
	EMPBI19	0.388230005	0.07023966	0.370843628	5.52721923	9.59E-06
	EMPBI18	0.168381492	0.05098248	0.154475354	3.30273238	0.0028857
4	(Constant	-5.243768347	0.13822113		-37.937531	6.156E-23
	EMPBI7	0.369391142	0.06919796	0.408810741	5.33817989	1.769E-05
	EMPBI19	0.291648178	0.06992431	0.278587093	4.17091259	0.0003418
	EMPBI18	0.161342422	0.04477099	0.14801762	3.60372728	0.0014243
	EMPBI20	0.193382517	0.06628058	0.177251129	2.91763476	0.0075407
5	(Constant	-5.720606701	0.21544606		-26.552385	9.288E-19
	EMPBI7	0.252403327	0.07535615	0.279338564	3.34947239	0.0027782
	EMPBI19	0.331413817	0.06398386	0.31657188	5.17964686	2.991E-05
	EMPBI18	0.246868013	0.05094242	0.226479902	4.84602076	6.836E-05
	EMPBI20	0.165232158	0.05993304	0.151448988	2.75694598	0.0112246
	EMPBI23	0.108350107	0.04018109	0.058922252	2.69654464	0.0128795
6	(Constant	-5.521651207	0.20790752		-26.558209	3.307E-18
	EMPBI7	0.217486556	0.06886854	0.240695647	3.15799558	0.0045612
	EMPBI19	0.339561862	0.05742029	0.324355025	5.91362186	5.963E-06
	EMPBI18	0.231017629	0.04605958	0.211938555	5.01562583	5.073E-05
	EMPBI20	0.143135584	0.05438321	0.131195643	2.63198106	0.0152253
	EMPBI23	0.095917726	0.03632613	0.052161354	2.64046079	0.0149407
	EMPBI5	0.055067443	0.02136151	0.074660278	2.57788123	0.0171651

a Dependent Variable: CFS2A23

Figure D-1-39: Commodity Flow Attraction for Commodity Item 23 (CFS2A23)

Regression (CFS2A26)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A26

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressio	76.25084	1	76.25084	1876.64862	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34789	28			
2	Regressio	76.73994	2	38.36997	1640.95952	0.00000
	Residual	0.60795	26	0.02338		
	Total	77.34789	28			
3	Regressio	76.92459	3	25.64153	1514.40107	0.00000
	Residual	0.42329	25	0.01693		
	Total	77.34789	28			
4	Regressio	77.03543	4	19.25886	1479.28213	0.00000
	Residual	0.31246	24	0.01302		
	Total	77.34789	28			
5	Regressio	77.11046	5	15.42209	1493.92458	0.00000
	Residual	0.23743	23	0.01032		
	Total	77.34789	28			
6	Regressio	77.16553	6	12.86092	1551.58142	0.00000
	Residual	0.18236	22	0.00829		
	Total	77.34789	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A26

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant	-3.61621	0.15040		-24.04375	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32030	0.00000
2	(Constant	-3.82412	0.12282		-31.13636	0.00000
	EMPBI7	0.57971	0.07116	0.64157	8.14629	0.00000
	EMPBI19	0.37708	0.08245	0.36020	4.57353	0.00010
3	(Constant	-4.03654	0.12272		-32.89221	0.00000
	EMPBI7	0.43794	0.07423	0.48468	5.89999	0.00000
	EMPBI19	0.38822	0.07024	0.37084	5.52704	0.00001
	EMPBI18	0.16837	0.05098	0.15446	3.30238	0.00289
4	(Constant	-4.28965	0.13822		-31.03457	0.00000
	EMPBI7	0.36940	0.06920	0.40882	5.33829	0.00002
	EMPBI19	0.29164	0.06992	0.27858	4.17074	0.00034
	EMPBI18	0.16133	0.04477	0.14800	3.60337	0.00143
	EMPBI20	0.19339	0.06628	0.17726	2.91779	0.00754
5	(Constant	-4.76640	0.21546		-22.12187	0.00000
	EMPBI7	0.25244	0.07536	0.27938	3.34967	0.00278
	EMPBI19	0.33140	0.06399	0.31655	5.17900	0.00003
	EMPBI18	0.24684	0.05095	0.22645	4.84506	0.00007
	EMPBI20	0.16525	0.05994	0.15146	2.75703	0.01122
	EMPBI23	0.10833	0.04018	0.05891	2.69583	0.01290
6	(Constant	-4.56744	0.20792		-21.96680	0.00000
	EMPBI7	0.21752	0.06887	0.24073	3.15820	0.00456
	EMPBI19	0.33954	0.05742	0.32434	5.91281	0.00001
	EMPBI18	0.23099	0.04606	0.21191	5.01451	0.00005
	EMPBI20	0.14315	0.05439	0.13121	2.63206	0.01522
	EMPBI23	0.09590	0.03633	0.05215	2.63965	0.01497
	EMPBI5	0.05507	0.02136	0.07466	2.57774	0.01717

a Dependent Variable: CFS2A26

Figure D-1-40: Commodity Flow Attraction for Commodity Item 26 (CFS2A26)

Regression (CFS2A27)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15290
3	0.99726	0.99453	0.99387	0.13011
4	0.99798	0.99596	0.99529	0.11409
5	0.99846	0.99693	0.99626	0.10158
6	0.99882	0.99764	0.99700	0.09102

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A27

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressio	76.25063	1	76.25063	1876.71164	0.00000
	Residual	1.09701	27	0.04063		
	Total	77.34764	28			
2	Regressio	76.73976	2	38.36988	1641.15767	0.00000
	Residual	0.60787	26	0.02338		
	Total	77.34764	28			
3	Regressio	76.92443	3	25.64148	1514.72013	0.00000
	Residual	0.42320	25	0.01693		
	Total	77.34764	28			
4	Regressio	77.03525	4	19.25881	1479.58624	0.00000
	Residual	0.31239	24	0.01302		
	Total	77.34764	28			
5	Regressio	77.11030	5	15.42206	1494.54373	0.00000
	Residual	0.23733	23	0.01032		
	Total	77.34764	28			
6	Regressio	77.16537	6	12.86089	1552.31869	0.00000
	Residual	0.18227	22	0.00828		
	Total	77.34764	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A27

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant	-4.80737	0.15040		-31.96427	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32103	0.00000
2	(Constant	-5.01530	0.12281		-40.83753	0.00000
	EMPBI7	0.57970	0.07116	0.64156	8.14661	0.00000
	EMPBI19	0.37710	0.08244	0.36021	4.57397	0.00010
3	(Constant	-5.22773	0.12271		-42.60324	0.00000
	EMPBI7	0.43793	0.07422	0.48466	5.90037	0.00000
	EMPBI19	0.38824	0.07023	0.37085	5.52783	0.00001
	EMPBI18	0.16837	0.05098	0.15447	3.30287	0.00288
4	(Constant	-5.48081	0.13821		-39.65639	0.00000
	EMPBI7	0.36939	0.06919	0.40881	5.33869	0.00002
	EMPBI19	0.29166	0.06992	0.27860	4.17152	0.00034
	EMPBI18	0.16134	0.04477	0.14801	3.60392	0.00142
	EMPBI20	0.19337	0.06627	0.17724	2.91776	0.00754
5	(Constant	-5.95766	0.21542		-27.65652	0.00000
	EMPBI7	0.25240	0.07535	0.27933	3.34988	0.00278
	EMPBI19	0.33143	0.06397	0.31659	5.18060	0.00003
	EMPBI18	0.24686	0.05094	0.22648	4.84660	0.00007
	EMPBI20	0.16522	0.05992	0.15144	2.75714	0.01122
	EMPBI23	0.10835	0.04018	0.05892	2.69699	0.01287
6	(Constant	-5.75872	0.20787		-27.70282	0.00000
	EMPBI7	0.21748	0.06886	0.24069	3.15847	0.00456
	EMPBI19	0.33958	0.05741	0.32437	5.91480	0.00001
	EMPBI18	0.23101	0.04605	0.21194	5.01633	0.00005
	EMPBI20	0.14313	0.05437	0.13119	2.63221	0.01522
	EMPBI23	0.09592	0.03632	0.05216	2.64099	0.01492
	EMPBI5	0.05506	0.02136	0.07465	2.57808	0.01716

a Dependent Variable: CFS2A27

Figure D-1-41: Commodity Flow Attraction for Commodity Item 27 (CFS2A27)

Regression (CFS2A28)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99153	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11412
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A28

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressio	76.25098	1	76.25098	1876.44898	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34815	28			
2	Regressio	76.74014	2	38.37007	1640.79793	0.00000
	Residual	0.60801	26	0.02339		
	Total	77.34815	28			
3	Regressio	76.92479	3	25.64160	1514.17961	0.00000
	Residual	0.42336	25	0.01693		
	Total	77.34815	28			
4	Regressio	77.03561	4	19.25890	1478.90800	0.00000
	Residual	0.31254	24	0.01302		
	Total	77.34815	28			
5	Regressio	77.11070	5	15.42214	1493.81205	0.00000
	Residual	0.23745	23	0.01032		
	Total	77.34815	28			
6	Regressio	77.16577	6	12.86096	1551.34806	0.00000
	Residual	0.18238	22	0.00829		
	Total	77.34815	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A28

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant	-5.25295	0.15041		-34.92439	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31800	0.00000
2	(Constant	-5.46088	0.12282		-44.46073	0.00000
	EMPBI7	0.57969	0.07117	0.64155	8.14563	0.00000
	EMPBI19	0.37710	0.08245	0.36022	4.57357	0.00010
3	(Constant	-5.67330	0.12273		-46.22606	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89932	0.00000
	EMPBI19	0.38825	0.07025	0.37086	5.52694	0.00001
	EMPBI18	0.16837	0.05099	0.15446	3.30212	0.00289
4	(Constant	-5.92639	0.13824		-42.87046	0.00000
	EMPBI7	0.36939	0.06921	0.40881	5.33744	0.00002
	EMPBI19	0.29167	0.06993	0.27861	4.17062	0.00034
	EMPBI18	0.16133	0.04478	0.14800	3.60291	0.00143
	EMPBI20	0.19338	0.06629	0.17725	2.91719	0.00755
5	(Constant	-6.40333	0.21547		-29.71804	0.00000
	EMPBI7	0.25238	0.07536	0.27931	3.34875	0.00278
	EMPBI19	0.33144	0.06399	0.31660	5.17950	0.00003
	EMPBI18	0.24687	0.05095	0.22648	4.84555	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75649	0.01124
	EMPBI23	0.10837	0.04019	0.05893	2.69682	0.01287
6	(Constant	-6.20439	0.20794		-29.83731	0.00000
	EMPBI7	0.21746	0.06888	0.24067	3.15713	0.00457
	EMPBI19	0.33959	0.05743	0.32438	5.91314	0.00001
	EMPBI18	0.23102	0.04607	0.21194	5.01491	0.00005
	EMPBI20	0.14313	0.05439	0.13119	2.63141	0.01524
	EMPBI23	0.09594	0.03633	0.05217	2.64069	0.01493
	EMPBI5	0.05506	0.02136	0.07466	2.57732	0.01719

a Dependent Variable: CFS2A28

Figure D-1-42: Commodity Flow Attraction for Commodity Item 28 (CFS2A28)

Regression (CFS2A29)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A29

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressio	76.25095	1	76.25095	1876.48269	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34810	28			
2	Regressio	76.74013	2	38.37006	1640.90420	0.00000
	Residual	0.60797	26	0.02338		
	Total	77.34810	28			
3	Regressio	76.92477	3	25.64159	1514.27213	0.00000
	Residual	0.42333	25	0.01693		
	Total	77.34810	28			
4	Regressio	77.03558	4	19.25890	1478.99639	0.00000
	Residual	0.31252	24	0.01302		
	Total	77.34810	28			
5	Regressio	77.11065	5	15.42213	1493.81411	0.00000
	Residual	0.23745	23	0.01032		
	Total	77.34810	28			
6	Regressio	77.16572	6	12.86095	1551.41754	0.00000
	Residual	0.18238	22	0.00829		
	Total	77.34810	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A29

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant	-5.77164	0.15041		-38.37326	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31839	0.00000
2	(Constant	-5.97957	0.12282		-48.68534	0.00000
	EMPBI7	0.57968	0.07116	0.64155	8.14580	0.00000
	EMPBI19	0.37711	0.08245	0.36022	4.57381	0.00010
3	(Constant	-6.19198	0.12273		-50.45385	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89949	0.00000
	EMPBI19	0.38825	0.07024	0.37087	5.52721	0.00001
	EMPBI18	0.16836	0.05099	0.15446	3.30211	0.00289
4	(Constant	-6.44507	0.13824		-46.62388	0.00000
	EMPBI7	0.36939	0.06921	0.40881	5.33761	0.00002
	EMPBI19	0.29168	0.06993	0.27861	4.17089	0.00034
	EMPBI18	0.16132	0.04478	0.14800	3.60289	0.00143
	EMPBI20	0.19337	0.06629	0.17724	2.91719	0.00755
5	(Constant	-6.92195	0.21547		-32.12500	0.00000
	EMPBI7	0.25239	0.07536	0.27933	3.34896	0.00278
	EMPBI19	0.33145	0.06399	0.31660	5.17959	0.00003
	EMPBI18	0.24685	0.05095	0.22647	4.84523	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75645	0.01124
	EMPBI23	0.10836	0.04019	0.05893	2.69649	0.01288
6	(Constant	-6.72299	0.20794		-32.33204	0.00000
	EMPBI7	0.21747	0.06888	0.24068	3.15739	0.00457
	EMPBI19	0.33959	0.05743	0.32439	5.91338	0.00001
	EMPBI18	0.23100	0.04607	0.21193	5.01464	0.00005
	EMPBI20	0.14312	0.05439	0.13118	2.63139	0.01525
	EMPBI23	0.09593	0.03633	0.05217	2.64036	0.01494
	EMPBI5	0.055068144	0.02136442	0.074661347	2.57756345	0.0171771

a Dependent Variable: CFS2A29

Figure D-1-43: Commodity Flow Attraction for Commodity Item 29 (CFS2A29)

Regression (CFS2A30)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A30

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressio	76.25084	1	76.25084	1876.64862	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34789	28			
2	Regressio	76.73994	2	38.36997	1640.95952	0.00000
	Residual	0.60795	26	0.02338		
	Total	77.34789	28			
3	Regressio	76.92459	3	25.64153	1514.40107	0.00000
	Residual	0.42329	25	0.01693		
	Total	77.34789	28			
4	Regressio	77.03543	4	19.25886	1479.28213	0.00000
	Residual	0.31246	24	0.01302		
	Total	77.34789	28			
5	Regressio	77.11046	5	15.42209	1493.92458	0.00000
	Residual	0.23743	23	0.01032		
	Total	77.34789	28			
6	Regressio	77.16553	6	12.86092	1551.58142	0.00000
	Residual	0.18236	22	0.00829		
	Total	77.34789	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A30

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant	-5.34591	0.15040		-35.54434	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32030	0.00000
2	(Constant	-5.55382	0.12282		-45.21974	0.00000
	EMPBI7	0.57971	0.07116	0.64157	8.14629	0.00000
	EMPBI19	0.37708	0.08245	0.36020	4.57353	0.00010
3	(Constant	-5.76624	0.12272		-46.98687	0.00000
	EMPBI7	0.43794	0.07423	0.48468	5.89999	0.00000
	EMPBI19	0.38822	0.07024	0.37084	5.52704	0.00001
	EMPBI18	0.16837	0.05098	0.15446	3.30238	0.00289
4	(Constant	-6.01935	0.13822		-43.54851	0.00000
	EMPBI7	0.36940	0.06920	0.40882	5.33829	0.00002
	EMPBI19	0.29164	0.06992	0.27858	4.17074	0.00034
	EMPBI18	0.16133	0.04477	0.14800	3.60337	0.00143
	EMPBI20	0.19339	0.06628	0.17726	2.91779	0.00754
5	(Constant	-6.49610	0.21546		-30.14977	0.00000
	EMPBI7	0.25244	0.07536	0.27938	3.34967	0.00278
	EMPBI19	0.33140	0.06399	0.31655	5.17900	0.00003
	EMPBI18	0.24684	0.05095	0.22645	4.84506	0.00007
	EMPBI20	0.16525	0.05994	0.15146	2.75703	0.01122
	EMPBI23	0.10833	0.04018	0.05891	2.69583	0.01290
6	(Constant	-6.29714	0.20792		-30.28569	0.00000
	EMPBI7	0.21752	0.06887	0.24073	3.15820	0.00456
	EMPBI19	0.33954	0.05742	0.32434	5.91281	0.00001
	EMPBI18	0.23099	0.04606	0.21191	5.01451	0.00005
	EMPBI20	0.14315	0.05439	0.13121	2.63206	0.01522
	EMPBI23	0.09590	0.03633	0.05215	2.63965	0.01497
	EMPBI5	0.055068926	0.02136326	0.074662508	2.57773936	0.0171704

a Dependent Variable: CFS2A30

Figure D-1-44: Commodity Flow Attraction for Commodity Item 30 (CFS2A30)

Regression (CFS2A31)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A31

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25079	1	76.25079	1876.65486	0.00000
	Residual	1.09704	27	0.04063		
	Total	77.34784	28			
2	Regression	76.73989	2	38.36995	1640.97235	0.00000
	Residual	0.60794	26	0.02338		
	Total	77.34784	28			
3	Regression	76.92456	3	25.64152	1514.46186	0.00000
	Residual	0.42328	25	0.01693		
	Total	77.34784	28			
4	Regression	77.03539	4	19.25885	1479.32713	0.00000
	Residual	0.31245	24	0.01302		
	Total	77.34784	28			
5	Regression	77.11042	5	15.42208	1494.00950	0.00000
	Residual	0.23742	23	0.01032		
	Total	77.34784	28			
6	Regression	77.16549	6	12.86092	1551.69468	0.00000
	Residual	0.18234	22	0.00829		
	Total	77.34784	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A31

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.02290	0.15040		-20.09897	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32037	0.00000
2	(Constant)	-3.23082	0.12282		-26.30573	0.00000
	EMPBI7	0.57971	0.07116	0.64157	8.14632	0.00000
	EMPBI19	0.37708	0.08245	0.36020	4.57355	0.00010
3	(Constant)	-3.44324	0.12272		-28.05823	0.00000
	EMPBI7	0.43794	0.07423	0.48468	5.90004	0.00000
	EMPBI19	0.38823	0.07024	0.37084	5.52716	0.00001
	EMPBI18	0.16837	0.05098	0.15447	3.30256	0.00289
4	(Constant)	-3.69635	0.13822		-26.74256	0.00000
	EMPBI7	0.36940	0.06920	0.40882	5.33833	0.00002
	EMPBI19	0.29164	0.06992	0.27858	4.17086	0.00034
	EMPBI18	0.16133	0.04477	0.14801	3.60356	0.00142
	EMPBI20	0.19339	0.06628	0.17726	2.91773	0.00754
5	(Constant)	-4.17310	0.21545		-19.36882	0.00000
	EMPBI7	0.25243	0.07536	0.27937	3.34969	0.00278
	EMPBI19	0.33140	0.06399	0.31656	5.17922	0.00003
	EMPBI18	0.24684	0.05094	0.22646	4.84536	0.00007
	EMPBI20	0.16524	0.05994	0.15146	2.75699	0.01122
	EMPBI23	0.10833	0.04018	0.05891	2.69597	0.01290
6	(Constant)	-3.97414	0.20792		-19.11410	0.00000
	EMPBI7	0.21751	0.06887	0.24073	3.15823	0.00456
	EMPBI19	0.33955	0.05742	0.32434	5.91312	0.00001
	EMPBI18	0.23099	0.04606	0.21192	5.01487	0.00005
	EMPBI20	0.14314	0.05439	0.13120	2.63203	0.01522
	EMPBI23	0.09590	0.03633	0.05215	2.63982	0.01496
	EMPBI5	0.05507	0.02136	0.07466	2.57783	0.01717

a Dependent Variable: CFS2A31

Figure D-1-45: Commodity Flow Attraction for Commodity Item 31 (CFS2A31)

Regression (CFS2A32)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A32

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25095	1	76.25095	1876.48269	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34810	28			
2	Regression	76.74013	2	38.37006	1640.90420	0.00000
	Residual	0.60797	26	0.02338		
	Total	77.34810	28			
3	Regression	76.92477	3	25.64159	1514.27213	0.00000
	Residual	0.42333	25	0.01693		
	Total	77.34810	28			
4	Regression	77.03558	4	19.25890	1478.99639	0.00000
	Residual	0.31252	24	0.01302		
	Total	77.34810	28			
5	Regression	77.11065	5	15.42213	1493.81411	0.00000
	Residual	0.23745	23	0.01032		
	Total	77.34810	28			
6	Regression	77.16572	6	12.86095	1551.41754	0.00000
	Residual	0.18238	22	0.00829		
	Total	77.34810	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A32

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.54134	0.15041		-23.54491	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31839	0.00000
2	(Constant)	-3.74927	0.12282		-30.52636	0.00000
	EMPBI7	0.57968	0.07116	0.64155	8.14580	0.00000
	EMPBI19	0.37711	0.08245	0.36022	4.57381	0.00010
3	(Constant)	-3.96168	0.12273		-32.28080	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89949	0.00000
	EMPBI19	0.38825	0.07024	0.37087	5.52721	0.00001
	EMPBI18	0.16836	0.05099	0.15446	3.30211	0.00289
4	(Constant)	-4.21477	0.13824		-30.48980	0.00000
	EMPBI7	0.36939	0.06921	0.40881	5.33761	0.00002
	EMPBI19	0.29168	0.06993	0.27861	4.17089	0.00034
	EMPBI18	0.16132	0.04478	0.14800	3.60289	0.00143
	EMPBI20	0.19337	0.06629	0.17724	2.91719	0.00755
5	(Constant)	-4.69165	0.21547		-21.77410	0.00000
	EMPBI7	0.25239	0.07536	0.27933	3.34896	0.00278
	EMPBI19	0.33145	0.06399	0.31660	5.17959	0.00003
	EMPBI18	0.24685	0.05095	0.22647	4.84523	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75645	0.01124
	EMPBI23	0.10836	0.04019	0.05893	2.69649	0.01288
6	(Constant)	-4.49269	0.20794		-21.60614	0.00000
	EMPBI7	0.21747	0.06888	0.24068	3.15739	0.00457
	EMPBI19	0.33959	0.05743	0.32439	5.91338	0.00001
	EMPBI18	0.23100	0.04607	0.21193	5.01464	0.00005
	EMPBI20	0.14312	0.05439	0.13118	2.63139	0.01525
	EMPBI23	0.09593	0.03633	0.05217	2.64036	0.01494
	EMPBI5	0.05507	0.02136	0.07466	2.57756	0.01718

a Dependent Variable: CFS2A32

Figure D-1-46: Commodity Flow Attraction for Commodity Item 32 (CFS2A32)

Regression (CFS2A33)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A33

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25095	1	76.25095	1876.48269	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34810	28			
2	Regression	76.74013	2	38.37006	1640.90420	0.00000
	Residual	0.60797	26	0.02338		
	Total	77.34810	28			
3	Regression	76.92477	3	25.64159	1514.27213	0.00000
	Residual	0.42333	25	0.01693		
	Total	77.34810	28			
4	Regression	77.03558	4	19.25890	1478.99639	0.00000
	Residual	0.31252	24	0.01302		
	Total	77.34810	28			
5	Regression	77.11065	5	15.42213	1493.81411	0.00000
	Residual	0.23745	23	0.01032		
	Total	77.34810	28			
6	Regression	77.16572	6	12.86095	1551.41754	0.00000
	Residual	0.18238	22	0.00829		
	Total	77.34810	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A33

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.39084	0.15041		-29.19288	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31839	0.00000
2	(Constant)	-4.59877	0.12282		-37.44294	0.00000
	EMPBI7	0.57968	0.07116	0.64155	8.14580	0.00000
	EMPBI19	0.37711	0.08245	0.36022	4.57381	0.00010
3	(Constant)	-4.81118	0.12273		-39.20274	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89949	0.00000
	EMPBI19	0.38825	0.07024	0.37087	5.52721	0.00001
	EMPBI18	0.16836	0.05099	0.15446	3.30211	0.00289
4	(Constant)	-5.06427	0.13824		-36.63512	0.00000
	EMPBI7	0.36939	0.06921	0.40881	5.33761	0.00002
	EMPBI19	0.29168	0.06993	0.27861	4.17089	0.00034
	EMPBI18	0.16132	0.04478	0.14800	3.60289	0.00143
	EMPBI20	0.19337	0.06629	0.17724	2.91719	0.00755
5	(Constant)	-5.54115	0.21547		-25.71666	0.00000
	EMPBI7	0.25239	0.07536	0.27933	3.34896	0.00278
	EMPBI19	0.33145	0.06399	0.31660	5.17959	0.00003
	EMPBI18	0.24685	0.05095	0.22647	4.84523	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75645	0.01124
	EMPBI23	0.10836	0.04019	0.05893	2.69649	0.01288
6	(Constant)	-5.34219	0.20794		-25.69153	0.00000
	EMPBI7	0.21747	0.06888	0.24068	3.15739	0.00457
	EMPBI19	0.33959	0.05743	0.32439	5.91338	0.00001
	EMPBI18	0.23100	0.04607	0.21193	5.01464	0.00005
	EMPBI20	0.14312	0.05439	0.13118	2.63139	0.01525
	EMPBI23	0.09593	0.03633	0.05217	2.64036	0.01494
	EMPBI5	0.05507	0.02136	0.07466	2.57756	0.01718

a Dependent Variable: CFS2A33

Figure D-1-47: Commodity Flow Attraction for Commodity Item 33 (CFS2A33)

Regression (CFS2A34)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99153	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11412
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A34

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25098	1	76.25098	1876.44898	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34815	28			
2	Regression	76.74014	2	38.37007	1640.79793	0.00000
	Residual	0.60801	26	0.02339		
	Total	77.34815	28			
3	Regression	76.92479	3	25.64160	1514.17961	0.00000
	Residual	0.42336	25	0.01693		
	Total	77.34815	28			
4	Regression	77.03561	4	19.25890	1478.90800	0.00000
	Residual	0.31254	24	0.01302		
	Total	77.34815	28			
5	Regression	77.11070	5	15.42214	1493.81205	0.00000
	Residual	0.23745	23	0.01032		
	Total	77.34815	28			
6	Regression	77.16577	6	12.86096	1551.34806	0.00000
	Residual	0.18238	22	0.00829		
	Total	77.34815	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A34

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.85535	0.15041		-32.28094	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31800	0.00000
2	(Constant)	-5.06328	0.12282		-41.22360	0.00000
	EMPBI7	0.57969	0.07117	0.64155	8.14563	0.00000
	EMPBI19	0.37710	0.08245	0.36022	4.57357	0.00010
3	(Constant)	-5.27570	0.12273		-42.98641	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89932	0.00000
	EMPBI19	0.38825	0.07025	0.37086	5.52694	0.00001
	EMPBI18	0.16837	0.05099	0.15446	3.30212	0.00289
4	(Constant)	-5.52879	0.13824		-39.99430	0.00000
	EMPBI7	0.36939	0.06921	0.40881	5.33744	0.00002
	EMPBI19	0.29167	0.06993	0.27861	4.17062	0.00034
	EMPBI18	0.16133	0.04478	0.14800	3.60291	0.00143
	EMPBI20	0.19338	0.06629	0.17725	2.91719	0.00755
5	(Constant)	-6.00573	0.21547		-27.87277	0.00000
	EMPBI7	0.25238	0.07536	0.27931	3.34875	0.00278
	EMPBI19	0.33144	0.06399	0.31660	5.17950	0.00003
	EMPBI18	0.24687	0.05095	0.22648	4.84555	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75649	0.01124
	EMPBI23	0.10837	0.04019	0.05893	2.69682	0.01287
6	(Constant)	-5.80679	0.20794		-27.92522	0.00000
	EMPBI7	0.21746	0.06888	0.24067	3.15713	0.00457
	EMPBI19	0.33959	0.05743	0.32438	5.91314	0.00001
	EMPBI18	0.23102	0.04607	0.21194	5.01491	0.00005
	EMPBI20	0.14313	0.05439	0.13119	2.63141	0.01524
	EMPBI23	0.09594	0.03633	0.05217	2.64069	0.01493
	EMPBI5	0.05506	0.02136	0.07466	2.57732	0.01719

a Dependent Variable: CFS2A34

Figure D-1-48: Commodity Flow Attraction for Commodity Item 34 (CFS2A34)

Regression (CFS2A35)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13011
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10159
6	0.99882	0.99764	0.99700	0.09103

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A35

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.24963	1	76.24963	1876.55725	0.00000
	Residual	1.09708	27	0.04063		
	Total	77.34671	28			
2	Regression	76.73880	2	38.36940	1641.03215	0.00000
	Residual	0.60791	26	0.02338		
	Total	77.34671	28			
3	Regression	76.92347	3	25.64116	1514.56801	0.00000
	Residual	0.42324	25	0.01693		
	Total	77.34671	28			
4	Regression	77.03427	4	19.25857	1479.34767	0.00000
	Residual	0.31244	24	0.01302		
	Total	77.34671	28			
5	Regression	77.10934	5	15.42187	1494.29603	0.00000
	Residual	0.23737	23	0.01032		
	Total	77.34671	28			
6	Regression	77.16439	6	12.86073	1551.88241	0.00000
	Residual	0.18232	22	0.00829		
	Total	77.34671	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A35

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.07102	0.15040		-40.36491	0.00000
	EMPBI7	0.89713	0.02071	0.99288	43.31925	0.00000
2	(Constant)	-6.27896	0.12281		-51.12535	0.00000
	EMPBI7	0.57968	0.07116	0.64155	8.14610	0.00000
	EMPBI19	0.37711	0.08245	0.36023	4.57400	0.00010
3	(Constant)	-6.49139	0.12271		-52.89909	0.00000
	EMPBI7	0.43791	0.07422	0.48464	5.89986	0.00000
	EMPBI19	0.38825	0.07024	0.37087	5.52779	0.00001
	EMPBI18	0.16837	0.05098	0.15447	3.30274	0.00289
4	(Constant)	-6.74446	0.13822		-48.79590	0.00000
	EMPBI7	0.36937	0.06920	0.40880	5.33807	0.00002
	EMPBI19	0.29168	0.06992	0.27862	4.17148	0.00034
	EMPBI18	0.16134	0.04477	0.14801	3.60368	0.00142
	EMPBI20	0.19336	0.06628	0.17724	2.91742	0.00754
5	(Constant)	-7.22134	0.21543		-33.52019	0.00000
	EMPBI7	0.25238	0.07535	0.27931	3.34931	0.00278
	EMPBI19	0.33145	0.06398	0.31661	5.18053	0.00003
	EMPBI18	0.24687	0.05094	0.22648	4.84636	0.00007
	EMPBI20	0.16521	0.05993	0.15143	2.75676	0.01123
	EMPBI23	0.10836	0.04018	0.05893	2.69697	0.01287
6	(Constant)	-7.02243	0.20790		-33.77744	0.00000
	EMPBI7	0.21747	0.06887	0.24067	3.15776	0.00456
	EMPBI19	0.33960	0.05742	0.32439	5.91435	0.00001
	EMPBI18	0.23102	0.04606	0.21195	5.01585	0.00005
	EMPBI20	0.14312	0.05438	0.13118	2.63172	0.01523
	EMPBI23	0.09593	0.03633	0.05217	2.64087	0.01493
	EMPBI5	0.05506	0.02136	0.07465	2.57744	0.01718

a Dependent Variable: CFS2A35

Figure D-1-49: Commodity Flow Attraction for Commodity Item 35 (CFS2A35)

Regression (CFS2A36)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A36

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25005	1	76.25005	1876.62996	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34710	28			
2	Regression	76.73920	2	38.36960	1641.07168	0.00000
	Residual	0.60790	26	0.02338		
	Total	77.34710	28			
3	Regression	76.92380	3	25.64127	1514.34437	0.00000
	Residual	0.42331	25	0.01693		
	Total	77.34710	28			
4	Regression	77.03459	4	19.25865	1479.02962	0.00000
	Residual	0.31251	24	0.01302		
	Total	77.34710	28			
5	Regression	77.10967	5	15.42193	1493.91670	0.00000
	Residual	0.23743	23	0.01032		
	Total	77.34710	28			
6	Regression	77.16474	6	12.86079	1551.49896	0.00000
	Residual	0.18236	22	0.00829		
	Total	77.34710	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A36

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.77122	0.15040		-31.72333	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32009	0.00000
2	(Constant)	-4.97915	0.12281		-40.54227	0.00000
	EMPBI7	0.57969	0.07116	0.64156	8.14633	0.00000
	EMPBI19	0.37710	0.08245	0.36022	4.57393	0.00010
3	(Constant)	-5.19153	0.12272		-42.30322	0.00000
	EMPBI7	0.43795	0.07423	0.48469	5.89995	0.00000
	EMPBI19	0.38824	0.07024	0.37086	5.52720	0.00001
	EMPBI18	0.16834	0.05098	0.15444	3.30181	0.00289
4	(Constant)	-5.44460	0.13823		-39.38717	0.00000
	EMPBI7	0.36942	0.06920	0.40884	5.33807	0.00002
	EMPBI19	0.29167	0.06993	0.27861	4.17088	0.00034
	EMPBI18	0.16130	0.04477	0.14798	3.60251	0.00143
	EMPBI20	0.19336	0.06629	0.17723	2.91705	0.00755
5	(Constant)	-5.92151	0.21546		-27.48305	0.00000
	EMPBI7	0.25241	0.07536	0.27935	3.34935	0.00278
	EMPBI19	0.33144	0.06399	0.31660	5.17974	0.00003
	EMPBI18	0.24684	0.05095	0.22646	4.84514	0.00007
	EMPBI20	0.16521	0.05994	0.15143	2.75632	0.01124
	EMPBI23	0.10837	0.04018	0.05893	2.69675	0.01287
6	(Constant)	-5.72256	0.20793		-27.52172	0.00000
	EMPBI7	0.21750	0.06888	0.24071	3.15780	0.00456
	EMPBI19	0.33959	0.05743	0.32438	5.91349	0.00001
	EMPBI18	0.23099	0.04606	0.21192	5.01451	0.00005
	EMPBI20	0.14311	0.05439	0.13117	2.63124	0.01525
	EMPBI23	0.09593	0.03633	0.05217	2.64063	0.01493
	EMPBI5	0.05506	0.02136	0.07466	2.57747	0.01718

a Dependent Variable: CFS2A36

Figure D-1-50: Commodity Flow Attraction for Commodity Item 36 (CFS2A36)

Regression (CFS2A39)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A39

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25084	1	76.25084	1876.64862	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34789	28			
2	Regression	76.73994	2	38.36997	1640.95952	0.00000
	Residual	0.60795	26	0.02338		
	Total	77.34789	28			
3	Regression	76.92459	3	25.64153	1514.40107	0.00000
	Residual	0.42329	25	0.01693		
	Total	77.34789	28			
4	Regression	77.03543	4	19.25886	1479.28213	0.00000
	Residual	0.31246	24	0.01302		
	Total	77.34789	28			
5	Regression	77.11046	5	15.42209	1493.92458	0.00000
	Residual	0.23743	23	0.01032		
	Total	77.34789	28			
6	Regression	77.16553	6	12.86092	1551.58142	0.00000
	Residual	0.18236	22	0.00829		
	Total	77.34789	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A39

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.59581	0.15040		-43.85478	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32030	0.00000
2	(Constant)	-6.80372	0.12282		-55.39653	0.00000
	EMPBI7	0.57971	0.07116	0.64157	8.14629	0.00000
	EMPBI19	0.37708	0.08245	0.36020	4.57353	0.00010
3	(Constant)	-7.01614	0.12272		-57.17182	0.00000
	EMPBI7	0.43794	0.07423	0.48468	5.89999	0.00000
	EMPBI19	0.38822	0.07024	0.37084	5.52704	0.00001
	EMPBI18	0.16837	0.05098	0.15446	3.30238	0.00289
4	(Constant)	-7.26925	0.13822		-52.59122	0.00000
	EMPBI7	0.36940	0.06920	0.40882	5.33829	0.00002
	EMPBI19	0.29164	0.06992	0.27858	4.17074	0.00034
	EMPBI18	0.16133	0.04477	0.14800	3.60337	0.00143
	EMPBI20	0.19339	0.06628	0.17726	2.91779	0.00754
5	(Constant)	-7.74600	0.21546		-35.95082	0.00000
	EMPBI7	0.25244	0.07536	0.27938	3.34967	0.00278
	EMPBI19	0.33140	0.06399	0.31655	5.17900	0.00003
	EMPBI18	0.24684	0.05095	0.22645	4.84506	0.00007
	EMPBI20	0.16525	0.05994	0.15146	2.75703	0.01122
	EMPBI23	0.10833	0.04018	0.05891	2.69583	0.01290
6	(Constant)	-7.54704	0.20792		-36.29700	0.00000
	EMPBI7	0.21752	0.06887	0.24073	3.15820	0.00456
	EMPBI19	0.33954	0.05742	0.32434	5.91281	0.00001
	EMPBI18	0.23099	0.04606	0.21191	5.01451	0.00005
	EMPBI20	0.14315	0.05439	0.13121	2.63206	0.01522
	EMPBI23	0.09590	0.03633	0.05215	2.63965	0.01497
	EMPBI5	0.05507	0.02136	0.07466	2.57774	0.01717

a Dependent Variable: CFS2A39

Figure D-1-51: Commodity Flow Attraction for Commodity Item 39 (CFS2A39)

Regression (CFS2A40)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99153	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A40

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25069	1	76.25069	1876.42976	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34787	28			
2	Regression	76.73987	2	38.36993	1640.82082	0.00000
	Residual	0.60800	26	0.02338		
	Total	77.34787	28			
3	Regression	76.92452	3	25.64151	1514.19753	0.00000
	Residual	0.42335	25	0.01693		
	Total	77.34787	28			
4	Regression	77.03535	4	19.25884	1478.99821	0.00000
	Residual	0.31252	24	0.01302		
	Total	77.34787	28			
5	Regression	77.11043	5	15.42209	1493.88187	0.00000
	Residual	0.23744	23	0.01032		
	Total	77.34787	28			
6	Regression	77.16551	6	12.86092	1551.60441	0.00000
	Residual	0.18235	22	0.00829		
	Total	77.34787	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A40

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.67301	0.15041		-31.06855	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31778	0.00000
2	(Constant)	-4.88094	0.12282		-39.73943	0.00000
	EMPBI7	0.57968	0.07117	0.64155	8.14560	0.00000
	EMPBI19	0.37711	0.08245	0.36022	4.57369	0.00010
3	(Constant)	-5.09336	0.12273		-41.50104	0.00000
	EMPBI7	0.43792	0.07423	0.48466	5.89929	0.00000
	EMPBI19	0.38825	0.07025	0.37087	5.52708	0.00001
	EMPBI18	0.16836	0.05099	0.15446	3.30211	0.00289
4	(Constant)	-5.34647	0.13824		-38.67665	0.00000
	EMPBI7	0.36938	0.06920	0.40880	5.33746	0.00002
	EMPBI19	0.29167	0.06993	0.27861	4.17077	0.00034
	EMPBI18	0.16132	0.04478	0.14800	3.60297	0.00143
	EMPBI20	0.19339	0.06629	0.17726	2.91747	0.00754
5	(Constant)	-5.82338	0.21546		-27.02716	0.00000
	EMPBI7	0.25237	0.07536	0.27931	3.34879	0.00278
	EMPBI19	0.33144	0.06399	0.31660	5.17961	0.00003
	EMPBI18	0.24686	0.05095	0.22648	4.84553	0.00007
	EMPBI20	0.16524	0.05994	0.15145	2.75678	0.01123
	EMPBI23	0.10837	0.04018	0.05893	2.69674	0.01287
6	(Constant)	-5.62440	0.20792		-27.05041	0.00000
	EMPBI7	0.21745	0.06887	0.24066	3.15726	0.00457
	EMPBI19	0.33959	0.05742	0.32438	5.91364	0.00001
	EMPBI18	0.23101	0.04606	0.21193	5.01512	0.00005
	EMPBI20	0.14314	0.05439	0.13120	2.63181	0.01523
	EMPBI23	0.09593	0.03633	0.05217	2.64069	0.01493
	EMPBI5	0.05507	0.02136	0.07467	2.57798	0.01716

a Dependent Variable: CFS2A40

Figure D-1-52: Commodity Flow Attraction for Commodity Item 40 (CFS2A40)

Regression (CFS2A41)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A41

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.24977	1	76.24977	1876.52304	0.00000
	Residual	1.09711	27	0.04063		
	Total	77.34688	28			
2	Regression	76.73893	2	38.36947	1640.95966	0.00000
	Residual	0.60794	26	0.02338		
	Total	77.34688	28			
3	Regression	76.92359	3	25.64120	1514.42858	0.00000
	Residual	0.42328	25	0.01693		
	Total	77.34688	28			
4	Regression	77.03439	4	19.25860	1479.12843	0.00000
	Residual	0.31249	24	0.01302		
	Total	77.34688	28			
5	Regression	77.10947	5	15.42189	1494.09766	0.00000
	Residual	0.23740	23	0.01032		
	Total	77.34688	28			
6	Regression	77.16455	6	12.86076	1551.78089	0.00000
	Residual	0.18233	22	0.00829		
	Total	77.34688	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A41

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.7536	0.1504		-31.6055	0.0000
	EMPBI7	0.8971	0.0207	0.9929	43.3189	0.0000
2	(Constant)	-4.9616	0.1228		-40.3977	0.0000
	EMPBI7	0.5797	0.0712	0.6415	8.1460	0.0000
	EMPBI19	0.3771	0.0824	0.3602	4.5739	0.0001
3	(Constant)	-5.1740	0.1227		-42.1614	0.0000
	EMPBI7	0.4379	0.0742	0.4847	5.8997	0.0000
	EMPBI19	0.3883	0.0702	0.3709	5.5275	0.0000
	EMPBI18	0.1684	0.0510	0.1545	3.3025	0.0029
4	(Constant)	-5.4270	0.1382		-39.2615	0.0000
	EMPBI7	0.3694	0.0692	0.4088	5.3378	0.0000
	EMPBI19	0.2917	0.0699	0.2786	4.1712	0.0003
	EMPBI18	0.1613	0.0448	0.1480	3.6033	0.0014
	EMPBI20	0.1934	0.0663	0.1772	2.9171	0.0076
5	(Constant)	-5.9040	0.2154		-27.4034	0.0000
	EMPBI7	0.2524	0.0754	0.2793	3.3491	0.0028
	EMPBI19	0.3315	0.0640	0.3166	5.1803	0.0000
	EMPBI18	0.2469	0.0509	0.2265	4.8461	0.0001
	EMPBI20	0.1652	0.0599	0.1514	2.7564	0.0112
	EMPBI23	0.1084	0.0402	0.0589	2.6971	0.0129
6	(Constant)	-5.7050	0.2079		-27.4399	0.0000
	EMPBI7	0.2175	0.0689	0.2407	3.1575	0.0046
	EMPBI19	0.3396	0.0574	0.3244	5.9143	0.0000
	EMPBI18	0.2310	0.0461	0.2119	5.0157	0.0001
	EMPBI20	0.1431	0.0544	0.1312	2.6314	0.0152
	EMPBI23	0.0959	0.0363	0.0522	2.6410	0.0149
	EMPBI5	0.0551	0.0214	0.0747	2.5778	0.0172

a Dependent Variable: CFS2A41

Figure D-1-53: Commodity Flow Attraction for Commodity Item 41 (CFS2A41)

Regression (CFS2A43)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A43

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25084	1	76.25084	1876.64862	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34789	28			
2	Regression	76.73994	2	38.36997	1640.95952	0.00000
	Residual	0.60795	26	0.02338		
	Total	77.34789	28			
3	Regression	76.92459	3	25.64153	1514.40107	0.00000
	Residual	0.42329	25	0.01693		
	Total	77.34789	28			
4	Regression	77.03543	4	19.25886	1479.28213	0.00000
	Residual	0.31246	24	0.01302		
	Total	77.34789	28			
5	Regression	77.11046	5	15.42209	1493.92458	0.00000
	Residual	0.23743	23	0.01032		
	Total	77.34789	28			
6	Regression	77.16553	6	12.86092	1551.58142	0.00000
	Residual	0.18236	22	0.00829		
	Total	77.34789	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A43

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.55511	0.15040		-23.63751	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32030	0.00000
2	(Constant)	-3.76302	0.12282		-30.63888	0.00000
	EMPBI7	0.57971	0.07116	0.64157	8.14629	0.00000
	EMPBI19	0.37708	0.08245	0.36020	4.57353	0.00010
3	(Constant)	-3.97544	0.12272		-32.39433	0.00000
	EMPBI7	0.43794	0.07423	0.48468	5.89999	0.00000
	EMPBI19	0.38822	0.07024	0.37084	5.52704	0.00001
	EMPBI18	0.16837	0.05098	0.15446	3.30238	0.00289
4	(Constant)	-4.22855	0.13822		-30.59252	0.00000
	EMPBI7	0.36940	0.06920	0.40882	5.33829	0.00002
	EMPBI19	0.29164	0.06992	0.27858	4.17074	0.00034
	EMPBI18	0.16133	0.04477	0.14800	3.60337	0.00143
	EMPBI20	0.19339	0.06628	0.17726	2.91779	0.00754
5	(Constant)	-4.70530	0.21546		-21.83829	0.00000
	EMPBI7	0.25244	0.07536	0.27938	3.34967	0.00278
	EMPBI19	0.33140	0.06399	0.31655	5.17900	0.00003
	EMPBI18	0.24684	0.05095	0.22645	4.84506	0.00007
	EMPBI20	0.16525	0.05994	0.15146	2.75703	0.01122
	EMPBI23	0.10833	0.04018	0.05891	2.69583	0.01290
6	(Constant)	-4.50634	0.20792		-21.67295	0.00000
	EMPBI7	0.21752	0.06887	0.24073	3.15820	0.00456
	EMPBI19	0.33954	0.05742	0.32434	5.91281	0.00001
	EMPBI18	0.23099	0.04606	0.21191	5.01451	0.00005
	EMPBI20	0.14315	0.05439	0.13121	2.63206	0.01522
	EMPBI23	0.09590	0.03633	0.05215	2.63965	0.01497
	EMPBI5	0.05507	0.02136	0.07466	2.57774	0.01717

a Dependent Variable: CFS2A43

Figure D-1-54: Commodity Flow Attraction for Commodity Item 43 (CFS2A43)

Regression (CFS2A99)

Model Summary(g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A99

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25087	1	76.25087	1876.61051	0.00000
	Residual	1.09707	27	0.04063		
	Total	77.34794	28			
2	Regression	76.74001	2	38.37001	1641.01608	0.00000
	Residual	0.60793	26	0.02338		
	Total	77.34794	28			
3	Regression	76.92464	3	25.64155	1514.38530	0.00000
	Residual	0.42330	25	0.01693		
	Total	77.34794	28			
4	Regression	77.03545	4	19.25886	1479.13665	0.00000
	Residual	0.31249	24	0.01302		
	Total	77.34794	28			
5	Regression	77.11052	5	15.42210	1493.97682	0.00000
	Residual	0.23743	23	0.01032		
	Total	77.34794	28			
6	Regression	77.16559	6	12.86093	1551.64843	0.00000
	Residual	0.18235	22	0.00829		
	Total	77.34794	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2A99

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.50963	0.15040		-43.28135	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31986	0.00000
2	(Constant)	-6.71756	0.12282		-54.69586	0.00000
	EMPBI7	0.57970	0.07116	0.64156	8.14623	0.00000
	EMPBI19	0.37710	0.08245	0.36021	4.57381	0.00010
3	(Constant)	-6.92996	0.12272		-56.46923	0.00000
	EMPBI7	0.43794	0.07423	0.48468	5.89990	0.00000
	EMPBI19	0.38824	0.07024	0.37085	5.52723	0.00001
	EMPBI18	0.16836	0.05098	0.15445	3.30214	0.00289
4	(Constant)	-7.18304	0.13823		-51.96493	0.00000
	EMPBI7	0.36940	0.06920	0.40883	5.33808	0.00002
	EMPBI19	0.29166	0.06993	0.27860	4.17092	0.00034
	EMPBI18	0.16132	0.04477	0.14799	3.60296	0.00143
	EMPBI20	0.19337	0.06628	0.17724	2.91730	0.00755
5	(Constant)	-7.65991	0.21546		-35.55187	0.00000
	EMPBI7	0.25241	0.07536	0.27935	3.34938	0.00278
	EMPBI19	0.33143	0.06399	0.31659	5.17967	0.00003
	EMPBI18	0.24685	0.05095	0.22646	4.84537	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75658	0.01123
	EMPBI23	0.10836	0.04018	0.05893	2.69657	0.01288
6	(Constant)	-7.46095	0.20792		-35.88372	0.00000
	EMPBI7	0.21749	0.06887	0.24070	3.15788	0.00456
	EMPBI19	0.33958	0.05742	0.32437	5.91359	0.00001
	EMPBI18	0.23100	0.04606	0.21192	5.01487	0.00005
	EMPBI20	0.14312	0.05439	0.13118	2.63157	0.01524
	EMPBI23	0.09592	0.03633	0.05216	2.64048	0.01494
	EMPBI5	0.05507	0.02136	0.07466	2.57779	0.01717

a Dependent Variable: CFS2A99

Figure D-1-55: Commodity Flow Attraction for Commodity Item 99 (CFS2A99)

D-1-3 Model Summary and Coefficients for CFS2I – Within Utah

Regression (CFS2I3)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15290
3	0.99726	0.99453	0.99387	0.13011
4	0.99798	0.99596	0.99529	0.11409
5	0.99846	0.99693	0.99626	0.10158
6	0.99882	0.99764	0.99700	0.09102

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25063	1	76.25063	1876.71164	0.00000
	Residual	1.09701	27	0.04063		
	Total	77.34764	28			
2	Regression	76.73976	2	38.36988	1641.15767	0.00000
	Residual	0.60787	26	0.02338		
	Total	77.34764	28			
3	Regression	76.92443	3	25.64148	1514.72013	0.00000
	Residual	0.42320	25	0.01693		
	Total	77.34764	28			
4	Regression	77.03525	4	19.25881	1479.58624	0.00000
	Residual	0.31239	24	0.01302		
	Total	77.34764	28			
5	Regression	77.11030	5	15.42206	1494.54373	0.00000
	Residual	0.23733	23	0.01032		
	Total	77.34764	28			
6	Regression	77.16537	6	12.86089	1552.31869	0.00000
	Residual	0.18227	22	0.00828		
	Total	77.34764	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I3

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.95247	0.15040		-46.22706	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32103	0.00000
2	(Constant)	-7.16040	0.12281		-58.30420	0.00000
	EMPBI7	0.57970	0.07116	0.64156	8.14661	0.00000
	EMPBI19	0.37710	0.08244	0.36021	4.57397	0.00010
3	(Constant)	-7.37283	0.12271		-60.08469	0.00000
	EMPBI7	0.43793	0.07422	0.48466	5.90037	0.00000
	EMPBI19	0.38824	0.07023	0.37085	5.52783	0.00001
	EMPBI18	0.16837	0.05098	0.15447	3.30287	0.00288
4	(Constant)	-7.62591	0.13821		-55.17726	0.00000
	EMPBI7	0.36939	0.06919	0.40881	5.33869	0.00002
	EMPBI19	0.29166	0.06992	0.27860	4.17152	0.00034
	EMPBI18	0.16134	0.04477	0.14801	3.60392	0.00142
	EMPBI20	0.19337	0.06627	0.17724	2.91776	0.00754
5	(Constant)	-8.10276	0.21542		-37.61446	0.00000
	EMPBI7	0.25240	0.07535	0.27933	3.34988	0.00278
	EMPBI19	0.33143	0.06397	0.31659	5.18060	0.00003
	EMPBI18	0.24686	0.05094	0.22648	4.84660	0.00007
	EMPBI20	0.16522	0.05992	0.15144	2.75714	0.01122
	EMPBI23	0.10835	0.04018	0.05892	2.69699	0.01287
6	(Constant)	-7.90382	0.20787		-38.02200	0.00000
	EMPBI7	0.21748	0.06886	0.24069	3.15847	0.00456
	EMPBI19	0.33958	0.05741	0.32437	5.91480	0.00001
	EMPBI18	0.23101	0.04605	0.21194	5.01633	0.00005
	EMPBI20	0.14313	0.05437	0.13119	2.63221	0.01522
	EMPBI23	0.09592	0.03632	0.05216	2.64099	0.01492
	EMPBI5	0.05506	0.02136	0.07465	2.57808	0.01716

a Dependent Variable: CFS2I3

Figure D-1-56: Commodity Flow Production for Commodity Item 3 (CFS2I3)

Regression (CFS2I6)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10159
6	0.99882	0.99764	0.99700	0.09103

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25127	1	76.25127	1876.70671	0.00000
	Residual	1.09702	27	0.04063		
	Total	77.34829	28			
2	Regression	76.74036	2	38.37018	1641.01828	0.00000
	Residual	0.60793	26	0.02338		
	Total	77.34829	28			
3	Regression	76.92501	3	25.64167	1514.48817	0.00000
	Residual	0.42327	25	0.01693		
	Total	77.34829	28			
4	Regression	77.03584	4	19.25896	1479.35904	0.00000
	Residual	0.31244	24	0.01302		
	Total	77.34829	28			
5	Regression	77.11090	5	15.42218	1494.24147	0.00000
	Residual	0.23738	23	0.01032		
	Total	77.34829	28			
6	Regression	77.16596	6	12.86099	1551.88225	0.00000
	Residual	0.18232	22	0.00829		
	Total	77.34829	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I6

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.05681	0.15040		-33.62257	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32097	0.00000
2	(Constant)	-5.26472	0.12282		-42.86650	0.00000
	EMPBI7	0.57971	0.07116	0.64158	8.14649	0.00000
	EMPBI19	0.37708	0.08245	0.36019	4.57356	0.00010
3	(Constant)	-5.47714	0.12272		-44.63227	0.00000
	EMPBI7	0.43795	0.07423	0.48468	5.90020	0.00000
	EMPBI19	0.38822	0.07024	0.37084	5.52713	0.00001
	EMPBI18	0.16837	0.05098	0.15446	3.30250	0.00289
4	(Constant)	-5.73025	0.13822		-41.45785	0.00000
	EMPBI7	0.36941	0.06920	0.40883	5.33851	0.00002
	EMPBI19	0.29164	0.06992	0.27858	4.17083	0.00034
	EMPBI18	0.16133	0.04477	0.14801	3.60350	0.00143
	EMPBI20	0.19339	0.06628	0.17726	2.91776	0.00754
5	(Constant)	-6.20710	0.21544		-28.81144	0.00000
	EMPBI7	0.25242	0.07535	0.27935	3.34975	0.00278
	EMPBI19	0.33140	0.06398	0.31656	5.17967	0.00003
	EMPBI18	0.24686	0.05094	0.22647	4.84598	0.00007
	EMPBI20	0.16524	0.05993	0.15145	2.75710	0.01122
	EMPBI23	0.10835	0.04018	0.05892	2.69672	0.01287
6	(Constant)	-6.00817	0.20790		-28.89861	0.00000
	EMPBI7	0.21750	0.06887	0.24071	3.15827	0.00456
	EMPBI19	0.33955	0.05742	0.32434	5.91351	0.00001
	EMPBI18	0.23101	0.04606	0.21193	5.01550	0.00005
	EMPBI20	0.14314	0.05438	0.13120	2.63212	0.01522
	EMPBI23	0.09592	0.03633	0.05216	2.64062	0.01494
	EMPBI5	0.05506	0.02136	0.07465	2.57764	0.01717

a Dependent Variable: CFS2I6

Figure D-1-57: Commodity Flow Production for Commodity Item 6 (CFS2I6)

Regression (CFS2I7)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25076	1	76.25076	1876.51967	0.00000
	Residual	1.09712	27	0.04063		
	Total	77.34788	28			
2	Regression	76.73994	2	38.36997	1640.95894	0.00000
	Residual	0.60795	26	0.02338		
	Total	77.34788	28			
3	Regression	76.92457	3	25.64152	1514.33483	0.00000
	Residual	0.42331	25	0.01693		
	Total	77.34788	28			
4	Regression	77.03541	4	19.25885	1479.18911	0.00000
	Residual	0.31248	24	0.01302		
	Total	77.34788	28			
5	Regression	77.11046	5	15.42209	1493.98304	0.00000
	Residual	0.23742	23	0.01032		
	Total	77.34788	28			
6	Regression	77.16554	6	12.86092	1551.71787	0.00000
	Residual	0.18234	22	0.00829		
	Total	77.34788	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I7

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.73761	0.15041		-24.85011	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31881	0.00000
2	(Constant)	-3.94554	0.12282		-32.12497	0.00000
	EMPBI7	0.57968	0.07116	0.64155	8.14594	0.00000
	EMPBI19	0.37711	0.08245	0.36022	4.57388	0.00010
3	(Constant)	-4.15795	0.12272		-33.88079	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89963	0.00000
	EMPBI19	0.38825	0.07024	0.37087	5.52732	0.00001
	EMPBI18	0.16836	0.05098	0.15445	3.30215	0.00289
4	(Constant)	-4.41106	0.13823		-31.91192	0.00000
	EMPBI7	0.36938	0.06920	0.40880	5.33788	0.00002
	EMPBI19	0.29167	0.06993	0.27860	4.17101	0.00034
	EMPBI18	0.16132	0.04477	0.14800	3.60308	0.00143
	EMPBI20	0.19339	0.06628	0.17726	2.91768	0.00754
5	(Constant)	-4.88790	0.21546		-22.68621	0.00000
	EMPBI7	0.25240	0.07536	0.27933	3.34921	0.00278
	EMPBI19	0.33143	0.06399	0.31659	5.17966	0.00003
	EMPBI18	0.24684	0.05094	0.22646	4.84531	0.00007
	EMPBI20	0.16524	0.05994	0.15146	2.75698	0.01122
	EMPBI23	0.10835	0.04018	0.05892	2.69640	0.01288
6	(Constant)	-4.68893	0.20792		-22.55208	0.00000
	EMPBI7	0.21748	0.06887	0.24069	3.15773	0.00456
	EMPBI19	0.33958	0.05742	0.32437	5.91371	0.00001
	EMPBI18	0.23099	0.04606	0.21192	5.01489	0.00005
	EMPBI20	0.14314	0.05439	0.13120	2.63203	0.01522
	EMPBI23	0.09592	0.03633	0.05216	2.64031	0.01495
	EMPBI5	0.05507	0.02136	0.07467	2.57801	0.01716

a Dependent Variable: CFS2I7

Figure D-1-58: Commodity Flow Production for Commodity Item 7 (CFS2I7)

Regression (CFS2I8)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25079	1	76.25079	1876.65486	0.00000
	Residual	1.09704	27	0.04063		
	Total	77.34784	28			
2	Regression	76.73989	2	38.36995	1640.97235	0.00000
	Residual	0.60794	26	0.02338		
	Total	77.34784	28			
3	Regression	76.92456	3	25.64152	1514.46186	0.00000
	Residual	0.42328	25	0.01693		
	Total	77.34784	28			
4	Regression	77.03539	4	19.25885	1479.32713	0.00000
	Residual	0.31245	24	0.01302		
	Total	77.34784	28			
5	Regression	77.11042	5	15.42208	1494.00950	0.00000
	Residual	0.23742	23	0.01032		
	Total	77.34784	28			
6	Regression	77.16549	6	12.86092	1551.69468	0.00000
	Residual	0.18234	22	0.00829		
	Total	77.34784	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I8

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.65580	0.15040		-37.60487	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32037	0.00000
2	(Constant)	-5.86372	0.12282		-47.74313	0.00000
	EMPBI7	0.57971	0.07116	0.64157	8.14632	0.00000
	EMPBI19	0.37708	0.08245	0.36020	4.57355	0.00010
3	(Constant)	-6.07614	0.12272		-49.51314	0.00000
	EMPBI7	0.43794	0.07423	0.48468	5.90004	0.00000
	EMPBI19	0.38823	0.07024	0.37084	5.52716	0.00001
	EMPBI18	0.16837	0.05098	0.15447	3.30256	0.00289
4	(Constant)	-6.32925	0.13822		-45.79122	0.00000
	EMPBI7	0.36940	0.06920	0.40882	5.33833	0.00002
	EMPBI19	0.29164	0.06992	0.27858	4.17086	0.00034
	EMPBI18	0.16133	0.04477	0.14801	3.60356	0.00142
	EMPBI20	0.19339	0.06628	0.17726	2.91773	0.00754
5	(Constant)	-6.80600	0.21545		-31.58901	0.00000
	EMPBI7	0.25243	0.07536	0.27937	3.34969	0.00278
	EMPBI19	0.33140	0.06399	0.31656	5.17922	0.00003
	EMPBI18	0.24684	0.05094	0.22646	4.84536	0.00007
	EMPBI20	0.16524	0.05994	0.15146	2.75699	0.01122
	EMPBI23	0.10833	0.04018	0.05891	2.69597	0.01290
6	(Constant)	-6.60704	0.20792		-31.77733	0.00000
	EMPBI7	0.21751	0.06887	0.24073	3.15823	0.00456
	EMPBI19	0.33955	0.05742	0.32434	5.91312	0.00001
	EMPBI18	0.23099	0.04606	0.21192	5.01487	0.00005
	EMPBI20	0.14314	0.05439	0.13120	2.63203	0.01522
	EMPBI23	0.09590	0.03633	0.05215	2.63982	0.01496
	EMPBI5	0.05507	0.02136	0.07466	2.57783	0.01717

a Dependent Variable: CFS2I8

Figure D-1-59: Commodity Flow Production for Commodity Item 8 (CFS2I8)

Regression (CFS2I12)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99153	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11412
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25098	1	76.25098	1876.44898	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34815	28			
2	Regression	76.74014	2	38.37007	1640.79793	0.00000
	Residual	0.60801	26	0.02339		
	Total	77.34815	28			
3	Regression	76.92479	3	25.64160	1514.17961	0.00000
	Residual	0.42336	25	0.01693		
	Total	77.34815	28			
4	Regression	77.03561	4	19.25890	1478.90800	0.00000
	Residual	0.31254	24	0.01302		
	Total	77.34815	28			
5	Regression	77.11070	5	15.42214	1493.81205	0.00000
	Residual	0.23745	23	0.01032		
	Total	77.34815	28			
6	Regression	77.16577	6	12.86096	1551.34806	0.00000
	Residual	0.18238	22	0.00829		
	Total	77.34815	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I12

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.26325	0.15041		-21.69581	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31800	0.00000
2	(Constant)	-3.47118	0.12282		-28.26123	0.00000
	EMPBI7	0.57969	0.07117	0.64155	8.14563	0.00000
	EMPBI19	0.37710	0.08245	0.36022	4.57357	0.00010
3	(Constant)	-3.68360	0.12273		-30.01397	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89932	0.00000
	EMPBI19	0.38825	0.07025	0.37086	5.52694	0.00001
	EMPBI18	0.16837	0.05099	0.15446	3.30212	0.00289
4	(Constant)	-3.93669	0.13824		-28.47733	0.00000
	EMPBI7	0.36939	0.06921	0.40881	5.33744	0.00002
	EMPBI19	0.29167	0.06993	0.27861	4.17062	0.00034
	EMPBI18	0.16133	0.04478	0.14800	3.60291	0.00143
	EMPBI20	0.19338	0.06629	0.17725	2.91719	0.00755
5	(Constant)	-4.41363	0.21547		-20.48378	0.00000
	EMPBI7	0.25238	0.07536	0.27931	3.34875	0.00278
	EMPBI19	0.33144	0.06399	0.31660	5.17950	0.00003
	EMPBI18	0.24687	0.05095	0.22648	4.84555	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75649	0.01124
	EMPBI23	0.10837	0.04019	0.05893	2.69682	0.01287
6	(Constant)	-4.21469	0.20794		-20.26871	0.00000
	EMPBI7	0.21746	0.06888	0.24067	3.15713	0.00457
	EMPBI19	0.33959	0.05743	0.32438	5.91314	0.00001
	EMPBI18	0.23102	0.04607	0.21194	5.01491	0.00005
	EMPBI20	0.14313	0.05439	0.13119	2.63141	0.01524
	EMPBI23	0.09594	0.03633	0.05217	2.64069	0.01493
	EMPBI5	0.05506	0.02136	0.07466	2.57732	0.01719

a Dependent Variable: CFS2I12

Figure D-1-60: Commodity Flow Production for Commodity Item 12 (CFS2I12)

Regression (CFS2I13)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25084	1	76.25084	1876.64862	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34789	28			
2	Regression	76.73994	2	38.36997	1640.95952	0.00000
	Residual	0.60795	26	0.02338		
	Total	77.34789	28			
3	Regression	76.92459	3	25.64153	1514.40107	0.00000
	Residual	0.42329	25	0.01693		
	Total	77.34789	28			
4	Regression	77.03543	4	19.25886	1479.28213	0.00000
	Residual	0.31246	24	0.01302		
	Total	77.34789	28			
5	Regression	77.11046	5	15.42209	1493.92458	0.00000
	Residual	0.23743	23	0.01032		
	Total	77.34789	28			
6	Regression	77.16553	6	12.86092	1551.58142	0.00000
	Residual	0.18236	22	0.00829		
	Total	77.34789	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I13

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.62591	0.15040		-30.75714	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32030	0.00000
2	(Constant)	-4.83382	0.12282		-39.35743	0.00000
	EMPBI7	0.57971	0.07116	0.64157	8.14629	0.00000
	EMPBI19	0.37708	0.08245	0.36020	4.57353	0.00010
3	(Constant)	-5.04624	0.12272		-41.11987	0.00000
	EMPBI7	0.43794	0.07423	0.48468	5.89999	0.00000
	EMPBI19	0.38822	0.07024	0.37084	5.52704	0.00001
	EMPBI18	0.16837	0.05098	0.15446	3.30238	0.00289
4	(Constant)	-5.29935	0.13822		-38.33949	0.00000
	EMPBI7	0.36940	0.06920	0.40882	5.33829	0.00002
	EMPBI19	0.29164	0.06992	0.27858	4.17074	0.00034
	EMPBI18	0.16133	0.04477	0.14800	3.60337	0.00143
	EMPBI20	0.19339	0.06628	0.17726	2.91779	0.00754
5	(Constant)	-5.77610	0.21546		-26.80810	0.00000
	EMPBI7	0.25244	0.07536	0.27938	3.34967	0.00278
	EMPBI19	0.33140	0.06399	0.31655	5.17900	0.00003
	EMPBI18	0.24684	0.05095	0.22645	4.84506	0.00007
	EMPBI20	0.16525	0.05994	0.15146	2.75703	0.01122
	EMPBI23	0.10833	0.04018	0.05891	2.69583	0.01290
6	(Constant)	-5.57714	0.20792		-26.82289	0.00000
	EMPBI7	0.21752	0.06887	0.24073	3.15820	0.00456
	EMPBI19	0.33954	0.05742	0.32434	5.91281	0.00001
	EMPBI18	0.23099	0.04606	0.21191	5.01451	0.00005
	EMPBI20	0.14315	0.05439	0.13121	2.63206	0.01522
	EMPBI23	0.09590	0.03633	0.05215	2.63965	0.01497
	EMPBI5	0.05507	0.02136	0.07466	2.57774	0.01717

a Dependent Variable: CFS2I13

Figure D-1-61: Commodity Flow Production for Commodity Item 13 (CFS2I13)

Regression (CFS2I14)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25134	1	76.25134	1876.51430	0.00000
	Residual	1.09713	27	0.04063		
	Total	77.34847	28			
2	Regression	76.74049	2	38.37024	1640.87876	0.00000
	Residual	0.60798	26	0.02338		
	Total	77.34847	28			
3	Regression	76.92514	3	25.64171	1514.30056	0.00000
	Residual	0.42333	25	0.01693		
	Total	77.34847	28			
4	Regression	77.03595	4	19.25899	1478.99064	0.00000
	Residual	0.31252	24	0.01302		
	Total	77.34847	28			
5	Regression	77.11102	5	15.42220	1493.86469	0.00000
	Residual	0.23745	23	0.01032		
	Total	77.34847	28			
6	Regression	77.16609	6	12.86101	1551.38685	0.00000
	Residual	0.18238	22	0.00829		
	Total	77.34846945	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I14

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.71206	0.15041		-37.97738	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31875	0.00000
2	(Constant)	-5.91999	0.12282		-48.19973	0.00000
	EMPBI7	0.57970	0.07116	0.64156	8.14587	0.00000
	EMPBI19	0.37710	0.08245	0.36021	4.57364	0.00010
3	(Constant)	-6.13241	0.12272		-49.96879	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89957	0.00000
	EMPBI19	0.38824	0.07024	0.37086	5.52712	0.00001
	EMPBI18	0.16837	0.05099	0.15446	3.30229	0.00289
4	(Constant)	-6.38549	0.13824		-46.19266	0.00000
	EMPBI7	0.36940	0.06921	0.40882	5.33768	0.00002
	EMPBI19	0.29167	0.06993	0.27861	4.17080	0.00034
	EMPBI18	0.16133	0.04478	0.14801	3.60306	0.00143
	EMPBI20	0.19337	0.06629	0.17724	2.91706	0.00755
5	(Constant)	-6.86240	0.21547		-31.84908	0.00000
	EMPBI7	0.25239	0.07536	0.27932	3.34899	0.00278
	EMPBI19	0.33144	0.06399	0.31660	5.17962	0.00003
	EMPBI18	0.24687	0.05095	0.22648	4.84558	0.00007
	EMPBI20	0.16521	0.05994	0.15143	2.75633	0.01124
	EMPBI23	0.10837	0.04018	0.05893	2.69670	0.01287
6	(Constant)	-6.66346	0.20794		-32.04536	0.00000
	EMPBI7	0.21748	0.06888	0.24068	3.15738	0.00457
	EMPBI19	0.33959	0.05743	0.32438	5.91324	0.00001
	EMPBI18	0.23102	0.04607	0.21194	5.01492	0.00005
	EMPBI20	0.14312	0.05439	0.13118	2.63123	0.01525
	EMPBI23	0.09594	0.03633	0.05217	2.64055	0.01494
	EMPBI5	0.05506	0.02136	0.07465	2.57727	0.01719

a Dependent Variable: CFS2I14

Figure D-1-62: Commodity Flow Production for Commodity Item 14 (CFS2I14)

Regression (CFS2I15)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15290
3	0.99726	0.99453	0.99387	0.13011
4	0.99798	0.99596	0.99529	0.11409
5	0.99846	0.99693	0.99626	0.10158
6	0.99882	0.99764	0.99700	0.09102

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25063	1	76.25063	1876.71164	0.00000
	Residual	1.09701	27	0.04063		
	Total	77.34764	28			
2	Regression	76.73976	2	38.36988	1641.15767	0.00000
	Residual	0.60787	26	0.02338		
	Total	77.34764	28			
3	Regression	76.92443	3	25.64148	1514.72013	0.00000
	Residual	0.42320	25	0.01693		
	Total	77.34764	28			
4	Regression	77.03525	4	19.25881	1479.58624	0.00000
	Residual	0.31239	24	0.01302		
	Total	77.34764	28			
5	Regression	77.11030	5	15.42206	1494.54373	0.00000
	Residual	0.23733	23	0.01032		
	Total	77.34764	28			
6	Regression	77.16537	6	12.86089	1552.31869	0.00000
	Residual	0.18227	22	0.00828		
	Total	77.34764	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I15

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.30757	0.15040		-8.69407	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32103	0.00000
2	(Constant)	-1.51550	0.12281		-12.34009	0.00000
	EMPBI7	0.57970	0.07116	0.64156	8.14661	0.00000
	EMPBI19	0.37710	0.08244	0.36021	4.57397	0.00010
3	(Constant)	-1.72793	0.12271		-14.08169	0.00000
	EMPBI7	0.43793	0.07422	0.48466	5.90037	0.00000
	EMPBI19	0.38824	0.07023	0.37085	5.52783	0.00001
	EMPBI18	0.16837	0.05098	0.15447	3.30287	0.00288
4	(Constant)	-1.98101	0.13821		-14.33359	0.00000
	EMPBI7	0.36939	0.06919	0.40881	5.33869	0.00002
	EMPBI19	0.29166	0.06992	0.27860	4.17152	0.00034
	EMPBI18	0.16134	0.04477	0.14801	3.60392	0.00142
	EMPBI20	0.19337	0.06627	0.17724	2.91776	0.00754
5	(Constant)	-2.45786	0.21542		-11.40983	0.00000
	EMPBI7	0.25240	0.07535	0.27933	3.34988	0.00278
	EMPBI19	0.33143	0.06397	0.31659	5.18060	0.00003
	EMPBI18	0.24686	0.05094	0.22648	4.84660	0.00007
	EMPBI20	0.16522	0.05992	0.15144	2.75714	0.01122
	EMPBI23	0.10835	0.04018	0.05892	2.69699	0.01287
6	(Constant)	-2.25892	0.20787		-10.86673	0.00000
	EMPBI7	0.21748	0.06886	0.24069	3.15847	0.00456
	EMPBI19	0.33958	0.05741	0.32437	5.91480	0.00001
	EMPBI18	0.23101	0.04605	0.21194	5.01633	0.00005
	EMPBI20	0.14313	0.05437	0.13119	2.63221	0.01522
	EMPBI23	0.09592	0.03632	0.05216	2.64099	0.01492
	EMPBI5	0.05506	0.02136	0.07465	2.57808	0.01716

a Dependent Variable: CFS2I15

Figure D-1-63: Commodity Flow Production for Commodity Item 15 (CFS2I15)

Regression (CFS2I17)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99153	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11412
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25098	1	76.25098	1876.44898	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34815	28			
2	Regression	76.74014	2	38.37007	1640.79793	0.00000
	Residual	0.60801	26	0.02339		
	Total	77.34815	28			
3	Regression	76.92479	3	25.64160	1514.17961	0.00000
	Residual	0.42336	25	0.01693		
	Total	77.34815	28			
4	Regression	77.03561	4	19.25890	1478.90800	0.00000
	Residual	0.31254	24	0.01302		
	Total	77.34815	28			
5	Regression	77.11070	5	15.42214	1493.81205	0.00000
	Residual	0.23745	23	0.01032		
	Total	77.34815	28			
6	Regression	77.16577	6	12.86096	1551.34806	0.00000
	Residual	0.18238	22	0.00829		
	Total	77.34815	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I17

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.16345	0.15041		-14.38376	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31800	0.00000
2	(Constant)	-2.37138	0.12282		-19.30702	0.00000
	EMPBI7	0.57969	0.07117	0.64155	8.14563	0.00000
	EMPBI19	0.37710	0.08245	0.36022	4.57357	0.00010
3	(Constant)	-2.58380	0.12273		-21.05279	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89932	0.00000
	EMPBI19	0.38825	0.07025	0.37086	5.52694	0.00001
	EMPBI18	0.16837	0.05099	0.15446	3.30212	0.00289
4	(Constant)	-2.83689	0.13824		-20.52157	0.00000
	EMPBI7	0.36939	0.06921	0.40881	5.33744	0.00002
	EMPBI19	0.29167	0.06993	0.27861	4.17062	0.00034
	EMPBI18	0.16133	0.04478	0.14800	3.60291	0.00143
	EMPBI20	0.19338	0.06629	0.17725	2.91719	0.00755
5	(Constant)	-3.31383	0.21547		-15.37958	0.00000
	EMPBI7	0.25238	0.07536	0.27931	3.34875	0.00278
	EMPBI19	0.33144	0.06399	0.31660	5.17950	0.00003
	EMPBI18	0.24687	0.05095	0.22648	4.84555	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75649	0.01124
	EMPBI23	0.10837	0.04019	0.05893	2.69682	0.01287
6	(Constant)	-3.11489	0.20794		-14.97969	0.00000
	EMPBI7	0.21746	0.06888	0.24067	3.15713	0.00457
	EMPBI19	0.33959	0.05743	0.32438	5.91314	0.00001
	EMPBI18	0.23102	0.04607	0.21194	5.01491	0.00005
	EMPBI20	0.14313	0.05439	0.13119	2.63141	0.01524
	EMPBI23	0.09594	0.03633	0.05217	2.64069	0.01493
	EMPBI5	0.05506	0.02136	0.07466	2.57732	0.01719

a Dependent Variable: CFS2I17

Figure D-1-64: Commodity Flow Production for Commodity Item 17 (CFS2I17)

Regression (CFS2I18)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.24965	1	76.24965	1876.55650	0.00000
	Residual	1.09708	27	0.04063		
	Total	77.34674	28			
2	Regression	76.73882	2	38.36941	1641.03066	0.00000
	Residual	0.60791	26	0.02338		
	Total	77.34674	28			
3	Regression	76.92346	3	25.64115	1514.43767	0.00000
	Residual	0.42328	25	0.01693		
	Total	77.34674	28			
4	Regression	77.03425	4	19.25856	1479.12011	0.00000
	Residual	0.31249	24	0.01302		
	Total	77.34674	28			
5	Regression	77.10933	5	15.42187	1494.06991	0.00000
	Residual	0.23741	23	0.01032		
	Total	77.34674	28			
6	Regression	77.16439	6	12.86073	1551.64150	0.00000
	Residual	0.18235	22	0.00829		
	Total	77.34674	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I18

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.61682	0.15040		-10.74987	0.00000
	EMPBI7	0.89713	0.02071	0.99288	43.31924	0.00000
2	(Constant)	-1.82475	0.12282		-14.85773	0.00000
	EMPBI7	0.57968	0.07116	0.64155	8.14610	0.00000
	EMPBI19	0.37711	0.08245	0.36023	4.57400	0.00010
3	(Constant)	-2.03716	0.12272		-16.60034	0.00000
	EMPBI7	0.43792	0.07423	0.48466	5.89979	0.00000
	EMPBI19	0.38825	0.07024	0.37087	5.52753	0.00001
	EMPBI18	0.16836	0.05098	0.15446	3.30228	0.00289
4	(Constant)	-2.29022	0.13823		-16.56838	0.00000
	EMPBI7	0.36939	0.06920	0.40882	5.33791	0.00002
	EMPBI19	0.29168	0.06993	0.27862	4.17121	0.00034
	EMPBI18	0.16132	0.04477	0.14800	3.60305	0.00143
	EMPBI20	0.19335	0.06628	0.17723	2.91705	0.00755
5	(Constant)	-2.76714	0.21545		-12.84361	0.00000
	EMPBI7	0.25238	0.07536	0.27932	3.34916	0.00278
	EMPBI19	0.33146	0.06398	0.31662	5.18025	0.00003
	EMPBI18	0.24686	0.05094	0.22648	4.84582	0.00007
	EMPBI20	0.16520	0.05993	0.15142	2.75634	0.01124
	EMPBI23	0.10837	0.04018	0.05893	2.69698	0.01287
6	(Constant)	-2.56821	0.20792		-12.35198	0.00000
	EMPBI7	0.21747	0.06887	0.24068	3.15759	0.00457
	EMPBI19	0.33960	0.05742	0.32440	5.91403	0.00001
	EMPBI18	0.23101	0.04606	0.21194	5.01524	0.00005
	EMPBI20	0.14310	0.05439	0.13117	2.63126	0.01525
	EMPBI23	0.09594	0.03633	0.05217	2.64088	0.01493
	EMPBI5	0.05506	0.02136	0.07465	2.57742	0.01718

a Dependent Variable: CFS2I18

Figure D-1-65: Commodity Flow Production for Commodity Item 18 (CFS2I18)

Regression (CFS2I19)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99153	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11412
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25053	1	76.25053	1876.46565	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34768	28			
2	Regression	76.73967	2	38.36984	1640.79347	0.00000
	Residual	0.60801	26	0.02338		
	Total	77.34768	28			
3	Regression	76.92432	3	25.64144	1514.17241	0.00000
	Residual	0.42336	25	0.01693		
	Total	77.34768	28			
4	Regression	77.03514	4	19.25879	1478.88560	0.00000
	Residual	0.31254	24	0.01302		
	Total	77.34768	28			
5	Regression	77.11022	5	15.42204	1493.76965	0.00000
	Residual	0.23746	23	0.01032		
	Total	77.34768	28			
6	Regression	77.16529	6	12.86088	1551.26255	0.00000
	Residual	0.18239	22	0.00829		
	Total	77.34768	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I19

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.58623	0.15041		-30.49194	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31819	0.00000
2	(Constant)	-4.79416	0.12282		-39.03259	0.00000
	EMPBI7	0.57969	0.07117	0.64156	8.14567	0.00000
	EMPBI19	0.37710	0.08245	0.36021	4.57351	0.00010
3	(Constant)	-5.00658	0.12273		-40.79365	0.00000
	EMPBI7	0.43793	0.07423	0.48467	5.89936	0.00000
	EMPBI19	0.38824	0.07025	0.37086	5.52687	0.00001
	EMPBI18	0.16837	0.05099	0.15446	3.30211	0.00289
4	(Constant)	-5.25967	0.13824		-38.04734	0.00000
	EMPBI7	0.36939	0.06921	0.40881	5.33746	0.00002
	EMPBI19	0.29166	0.06993	0.27860	4.17055	0.00034
	EMPBI18	0.16133	0.04478	0.14800	3.60288	0.00143
	EMPBI20	0.19338	0.06629	0.17725	2.91714	0.00755
5	(Constant)	-5.73660	0.21547		-26.62343	0.00000
	EMPBI7	0.25238	0.07537	0.27932	3.34879	0.00278
	EMPBI19	0.33144	0.06399	0.31659	5.17937	0.00003
	EMPBI18	0.24687	0.05095	0.22648	4.84546	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75642	0.01124
	EMPBI23	0.10837	0.04019	0.05893	2.69674	0.01287
6	(Constant)	-5.53766	0.20795		-26.63034	0.00000
	EMPBI7	0.21747	0.06888	0.24068	3.15715	0.00457
	EMPBI19	0.33958	0.05743	0.32438	5.91291	0.00001
	EMPBI18	0.23102	0.04607	0.21194	5.01476	0.00005
	EMPBI20	0.14313	0.05439	0.13119	2.63132	0.01525
	EMPBI23	0.09594	0.03633	0.05217	2.64058	0.01494
	EMPBI5	0.05506	0.02137	0.07465	2.57717	0.01719

a Dependent Variable: CFS2I19

Figure D-1-66: Commodity Flow Production for Commodity Item 19 (CFS2I19)

Regression (CFS2I21)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13011
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10159
6	0.99882	0.99764	0.99700	0.09103

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressio	76.24963	1	76.24963	1876.55725	0.00000
	Residual	1.09708	27	0.04063		
	Total	77.34671	28			
2	Regressio	76.73880	2	38.36940	1641.03215	0.00000
	Residual	0.60791	26	0.02338		
	Total	77.34671	28			
3	Regressio	76.92347	3	25.64116	1514.56801	0.00000
	Residual	0.42324	25	0.01693		
	Total	77.34671	28			
4	Regressio	77.03427	4	19.25857	1479.34767	0.00000
	Residual	0.31244	24	0.01302		
	Total	77.34671	28			
5	Regressio	77.10934	5	15.42187	1494.29603	0.00000
	Residual	0.23737	23	0.01032		
	Total	77.34671	28			
6	Regressio	77.16439	6	12.86073	1551.88241	0.00000
	Residual	0.18232	22	0.00829		
	Total	77.34671	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I21

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant	-5.78482	0.15040		-38.46203	0.00000
	EMPBI7	0.89713	0.02071	0.99288	43.31925	0.00000
2	(Constant	-5.99276	0.12281		-48.79502	0.00000
	EMPBI7	0.57968	0.07116	0.64155	8.14610	0.00000
	EMPBI19	0.37711	0.08245	0.36023	4.57400	0.00010
3	(Constant	-6.20519	0.12271		-50.56681	0.00000
	EMPBI7	0.43791	0.07422	0.48464	5.89986	0.00000
	EMPBI19	0.38825	0.07024	0.37087	5.52779	0.00001
	EMPBI18	0.16837	0.05098	0.15447	3.30274	0.00289
4	(Constant	-6.45826	0.13822		-46.72526	0.00000
	EMPBI7	0.36937	0.06920	0.40880	5.33807	0.00002
	EMPBI19	0.29168	0.06992	0.27862	4.17148	0.00034
	EMPBI18	0.16134	0.04477	0.14801	3.60368	0.00142
	EMPBI20	0.19336	0.06628	0.17724	2.91742	0.00754
5	(Constant	-6.93514	0.21543		-32.19170	0.00000
	EMPBI7	0.25238	0.07535	0.27931	3.34931	0.00278
	EMPBI19	0.33145	0.06398	0.31661	5.18053	0.00003
	EMPBI18	0.24687	0.05094	0.22648	4.84636	0.00007
	EMPBI20	0.16521	0.05993	0.15143	2.75676	0.01123
	EMPBI23	0.10836	0.04018	0.05893	2.69697	0.01287
6	(Constant	-6.73623	0.20790		-32.40084	0.00000
	EMPBI7	0.21747	0.06887	0.24067	3.15776	0.00456
	EMPBI19	0.33960	0.05742	0.32439	5.91435	0.00001
	EMPBI18	0.23102	0.04606	0.21195	5.01585	0.00005
	EMPBI20	0.14312	0.05438	0.13118	2.63172	0.01523
	EMPBI23	0.09593	0.03633	0.05217	2.64087	0.01493
	EMPBI5	0.05506	0.02136	0.07465	2.57744	0.01718

a Dependent Variable: CFS2I21

Figure D-1-67: Commodity Flow Production for Commodity Item 21 (CFS2I21)

Regression (CFS2I26)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15292
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressio	76.25127	1	76.25127	1876.61228	0.00000
	Residual	1.09707	27	0.04063		
	Total	77.34834	28			
2	Regressio	76.74038	2	38.37019	1640.92565	0.00000
	Residual	0.60796	26	0.02338		
	Total	77.34834	28			
3	Regressio	76.92506	3	25.64169	1514.46745	0.00000
	Residual	0.42328	25	0.01693		
	Total	77.34834	28			
4	Regressio	77.03589	4	19.25897	1479.30604	0.00000
	Residual	0.31245	24	0.01302		
	Total	77.34834	28			
5	Regressio	77.11094	5	15.42219	1494.14078	0.00000
	Residual	0.23740	23	0.01032		
	Total	77.34834	28			
6	Regressio	77.16602	6	12.86100	1551.84553	0.00000
	Residual	0.18233	22	0.00829		
	Total	77.34834	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I26

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant	-4.45811	0.15040		-29.64113	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31988	0.00000
2	(Constant	-4.66603	0.12282		-37.99077	0.00000
	EMPBI7	0.57971	0.07116	0.64157	8.14617	0.00000
	EMPBI19	0.37709	0.08245	0.36020	4.57352	0.00010
3	(Constant	-4.87847	0.12272		-39.75351	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89992	0.00000
	EMPBI19	0.38823	0.07024	0.37084	5.52722	0.00001
	EMPBI18	0.16838	0.05098	0.15448	3.30273	0.00289
4	(Constant	-5.13157	0.13822		-37.12579	0.00000
	EMPBI7	0.36939	0.06920	0.40881	5.33818	0.00002
	EMPBI19	0.29165	0.06992	0.27859	4.17091	0.00034
	EMPBI18	0.16134	0.04477	0.14802	3.60373	0.00142
	EMPBI20	0.19338	0.06628	0.17725	2.91763	0.00754
5	(Constant	-5.60841	0.21545		-26.03161	0.00000
	EMPBI7	0.25240	0.07536	0.27934	3.34947	0.00278
	EMPBI19	0.33141	0.06398	0.31657	5.17965	0.00003
	EMPBI18	0.24687	0.05094	0.22648	4.84602	0.00007
	EMPBI20	0.16523	0.05993	0.15145	2.75695	0.01122
	EMPBI23	0.10835	0.04018	0.05892	2.69654	0.01288
6	(Constant	-5.40945	0.20791		-26.01855	0.00000
	EMPBI7	0.21749	0.06887	0.24070	3.15800	0.00456
	EMPBI19	0.33956	0.05742	0.32436	5.91362	0.00001
	EMPBI18	0.23102	0.04606	0.21194	5.01563	0.00005
	EMPBI20	0.14314	0.05438	0.13120	2.63198	0.01523
	EMPBI23	0.09592	0.03633	0.05216	2.64046	0.01494
	EMPBI5	0.05507	0.02136	0.07466	2.57788	0.01717

a Dependent Variable: CFS2I26

Figure D-1-68: Commodity Flow Production for Commodity Item 26 (CFS2I26)

Regression (CFS2I27)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressio	76.24977	1	76.24977	1876.52304	0.00000
	Residual	1.09711	27	0.04063		
	Total	77.34688	28			
2	Regressio	76.73893	2	38.36947	1640.95966	0.00000
	Residual	0.60794	26	0.02338		
	Total	77.34688	28			
3	Regressio	76.92359	3	25.64120	1514.42858	0.00000
	Residual	0.42328	25	0.01693		
	Total	77.34688	28			
4	Regressio	77.03439	4	19.25860	1479.12843	0.00000
	Residual	0.31249	24	0.01302		
	Total	77.34688	28			
5	Regressio	77.10947	5	15.42189	1494.09766	0.00000
	Residual	0.23740	23	0.01032		
	Total	77.34688	28			
6	Regressio	77.16455	6	12.86076	1551.78089	0.00000
	Residual	0.18233	22	0.00829		
	Total	77.34688	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I27

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant	-6.85713	0.15041		-45.59107	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31885	0.00000
2	(Constant	-7.06506	0.12282		-57.52473	0.00000
	EMPBI7	0.57968	0.07116	0.64155	8.14595	0.00000
	EMPBI19	0.37711	0.08245	0.36022	4.57387	0.00010
3	(Constant	-7.27748	0.12272		-59.30229	0.00000
	EMPBI7	0.43791	0.07423	0.48465	5.89968	0.00000
	EMPBI19	0.38825	0.07024	0.37087	5.52749	0.00001
	EMPBI18	0.16837	0.05098	0.15447	3.30248	0.00289
4	(Constant	-7.53055	0.13823		-54.47913	0.00000
	EMPBI7	0.36938	0.06920	0.40881	5.33780	0.00002
	EMPBI19	0.29168	0.06993	0.27862	4.17117	0.00034
	EMPBI18	0.16133	0.04477	0.14801	3.60329	0.00143
	EMPBI20	0.19336	0.06628	0.17723	2.91711	0.00755
5	(Constant	-8.00748	0.21545		-37.16678	0.00000
	EMPBI7	0.25237	0.07536	0.27931	3.34906	0.00278
	EMPBI19	0.33145	0.06398	0.31661	5.18025	0.00003
	EMPBI18	0.24687	0.05094	0.22649	4.84610	0.00007
	EMPBI20	0.16520	0.05993	0.15142	2.75642	0.01124
	EMPBI23	0.10837	0.04018	0.05893	2.69705	0.01286
6	(Constant	-7.80852	0.20791		-37.55726	0.00000
	EMPBI7	0.21746	0.06887	0.24067	3.15753	0.00457
	EMPBI19	0.33960	0.05742	0.32440	5.91426	0.00001
	EMPBI18	0.23102	0.04606	0.21195	5.01569	0.00005
	EMPBI20	0.14311	0.05438	0.13117	2.63140	0.01525
	EMPBI23	0.09594	0.03633	0.05217	2.64101	0.01492
	EMPBI5	0.05507	0.02136	0.07466	2.57781	0.01717

a Dependent Variable: CFS2I27

Figure D-1-69: Commodity Flow Production for Commodity Item 27 (CFS2I27)

Regression (CFS2I28)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressio	76.25106	1	76.25106	1876.51261	0.00000
	Residual	1.09713	27	0.04063		
	Total	77.34819	28			
2	Regressio	76.74024	2	38.37012	1640.95123	0.00000
	Residual	0.60795	26	0.02338		
	Total	77.34819	28			
3	Regressio	76.92488	3	25.64163	1514.34865	0.00000
	Residual	0.42331	25	0.01693		
	Total	77.34819	28			
4	Regressio	77.03568	4	19.25892	1479.04069	0.00000
	Residual	0.31251	24	0.01302		
	Total	77.34819	28			
5	Regressio	77.11074	5	15.42215	1493.85233	0.00000
	Residual	0.23745	23	0.01032		
	Total	77.34819	28			
6	Regressio	77.16583	6	12.86097	1551.52789	0.00000
	Residual	0.18236	22	0.00829		
	Total	77.34819	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I28

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant	-6.19704	0.15041		-41.20187	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31873	0.00000
2	(Constant	-6.40497	0.12282		-52.14964	0.00000
	EMPBI7	0.57969	0.07116	0.64155	8.14592	0.00000
	EMPBI19	0.37711	0.08245	0.36022	4.57387	0.00010
3	(Constant	-6.61739	0.12272		-53.92147	0.00000
	EMPBI7	0.43792	0.07423	0.48466	5.89961	0.00000
	EMPBI19	0.38825	0.07024	0.37087	5.52735	0.00001
	EMPBI18	0.16836	0.05098	0.15446	3.30222	0.00289
4	(Constant	-6.87046	0.13823		-49.70188	0.00000
	EMPBI7	0.36939	0.06920	0.40881	5.33772	0.00002
	EMPBI19	0.29168	0.06993	0.27862	4.17103	0.00034
	EMPBI18	0.16132	0.04477	0.14800	3.60299	0.00143
	EMPBI20	0.19336	0.06629	0.17723	2.91707	0.00755
5	(Constant	-7.34733	0.21547		-34.09961	0.00000
	EMPBI7	0.25240	0.07536	0.27933	3.34906	0.00278
	EMPBI19	0.33145	0.06399	0.31661	5.17973	0.00003
	EMPBI18	0.24685	0.05095	0.22647	4.84530	0.00007
	EMPBI20	0.16521	0.05994	0.15143	2.75632	0.01124
	EMPBI23	0.10836	0.04018	0.05893	2.69647	0.01288
6	(Constant	-7.14836	0.20793		-34.37891	0.00000
	EMPBI7	0.21748	0.06888	0.24069	3.15754	0.00457
	EMPBI19	0.33960	0.05743	0.32439	5.91368	0.00001
	EMPBI18	0.23100	0.04606	0.21193	5.01481	0.00005
	EMPBI20	0.14311	0.05439	0.13117	2.63128	0.01525
	EMPBI23	0.09592	0.03633	0.05216	2.64037	0.01494
	EMPBI5	0.05507	0.02136	0.07467	2.57782	0.01717

a Dependent Variable: CFS2I28

Figure D-1-70: Commodity Flow Production for Commodity Item 28 (CFS2I28)

Regression (CFS2I29)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99153	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11412
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressio	76.25053	1	76.25053	1876.46565	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34768	28			
2	Regressio	76.73967	2	38.36984	1640.79347	0.00000
	Residual	0.60801	26	0.02338		
	Total	77.34768	28			
3	Regressio	76.92432	3	25.64144	1514.17241	0.00000
	Residual	0.42336	25	0.01693		
	Total	77.34768	28			
4	Regressio	77.03514	4	19.25879	1478.88560	0.00000
	Residual	0.31254	24	0.01302		
	Total	77.34768	28			
5	Regressio	77.11022	5	15.42204	1493.76965	0.00000
	Residual	0.23746	23	0.01032		
	Total	77.34768	28			
6	Regressio	77.16529	6	12.86088	1551.26255	0.00000
	Residual	0.18239	22	0.00829		
	Total	77.34768	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I29

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant	-7.26913	0.15041		-48.32941	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31819	0.00000
2	(Constant	-7.47706	0.12282		-60.87594	0.00000
	EMPBI7	0.57969	0.07117	0.64156	8.14567	0.00000
	EMPBI19	0.37710	0.08245	0.36021	4.57351	0.00010
3	(Constant	-7.68948	0.12273		-62.65395	0.00000
	EMPBI7	0.43793	0.07423	0.48467	5.89936	0.00000
	EMPBI19	0.38824	0.07025	0.37086	5.52687	0.00001
	EMPBI18	0.16837	0.05099	0.15446	3.30211	0.00289
4	(Constant	-7.94257	0.13824		-57.45487	0.00000
	EMPBI7	0.36939	0.06921	0.40881	5.33746	0.00002
	EMPBI19	0.29166	0.06993	0.27860	4.17055	0.00034
	EMPBI18	0.16133	0.04478	0.14800	3.60288	0.00143
	EMPBI20	0.19338	0.06629	0.17725	2.91714	0.00755
5	(Constant	-8.41950	0.21547		-39.07471	0.00000
	EMPBI7	0.25238	0.07537	0.27932	3.34879	0.00278
	EMPBI19	0.33144	0.06399	0.31659	5.17937	0.00003
	EMPBI18	0.24687	0.05095	0.22648	4.84546	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75642	0.01124
	EMPBI23	0.10837	0.04019	0.05893	2.69674	0.01287
6	(Constant	-8.22056	0.20795		-39.53227	0.00000
	EMPBI7	0.21747	0.06888	0.24068	3.15715	0.00457
	EMPBI19	0.33958	0.05743	0.32438	5.91291	0.00001
	EMPBI18	0.23102	0.04607	0.21194	5.01476	0.00005
	EMPBI20	0.14313	0.05439	0.13119	2.63132	0.01525
	EMPBI23	0.09594	0.03633	0.05217	2.64058	0.01494
	EMPBI5	0.05506	0.02137	0.07465	2.57717	0.01719

a Dependent Variable: CFS2I29

Figure D-1-71: Commodity Flow Production for Commodity Item 29 (CFS2I29)

Regression (CFS2I31)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15290
3	0.99726	0.99453	0.99387	0.13011
4	0.99798	0.99596	0.99529	0.11409
5	0.99846	0.99693	0.99626	0.10158
6	0.99882	0.99764	0.99700	0.09102

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25063	1	76.25063	1876.71164	0.00000
	Residual	1.09701	27	0.04063		
	Total	77.34764	28			
2	Regression	76.73976	2	38.36988	1641.15767	0.00000
	Residual	0.60787	26	0.02338		
	Total	77.34764	28			
3	Regression	76.92443	3	25.64148	1514.72013	0.00000
	Residual	0.42320	25	0.01693		
	Total	77.34764	28			
4	Regression	77.03525	4	19.25881	1479.58624	0.00000
	Residual	0.31239	24	0.01302		
	Total	77.34764	28			
5	Regression	77.11030	5	15.42206	1494.54373	0.00000
	Residual	0.23733	23	0.01032		
	Total	77.34764	28			
6	Regression	77.16537	6	12.86089	1552.31869	0.00000
	Residual	0.18227	22	0.00828		
	Total	77.34764	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I31

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.43837	0.15040		-22.86178	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32103	0.00000
2	(Constant)	-3.64630	0.12281		-29.69032	0.00000
	EMPBI7	0.57970	0.07116	0.64156	8.14661	0.00000
	EMPBI19	0.37710	0.08244	0.36021	4.57397	0.00010
3	(Constant)	-3.85873	0.12271		-31.44660	0.00000
	EMPBI7	0.43793	0.07422	0.48466	5.90037	0.00000
	EMPBI19	0.38824	0.07023	0.37085	5.52783	0.00001
	EMPBI18	0.16837	0.05098	0.15447	3.30287	0.00288
4	(Constant)	-4.11181	0.13821		-29.75099	0.00000
	EMPBI7	0.36939	0.06919	0.40881	5.33869	0.00002
	EMPBI19	0.29166	0.06992	0.27860	4.17152	0.00034
	EMPBI18	0.16134	0.04477	0.14801	3.60392	0.00142
	EMPBI20	0.19337	0.06627	0.17724	2.91776	0.00754
5	(Constant)	-4.58866	0.21542		-21.30138	0.00000
	EMPBI7	0.25240	0.07535	0.27933	3.34988	0.00278
	EMPBI19	0.33143	0.06397	0.31659	5.18060	0.00003
	EMPBI18	0.24686	0.05094	0.22648	4.84660	0.00007
	EMPBI20	0.16522	0.05992	0.15144	2.75714	0.01122
	EMPBI23	0.10835	0.04018	0.05892	2.69699	0.01287
6	(Constant)	-4.38972	0.20787		-21.11713	0.00000
	EMPBI7	0.21748	0.06886	0.24069	3.15847	0.00456
	EMPBI19	0.33958	0.05741	0.32437	5.91480	0.00001
	EMPBI18	0.23101	0.04605	0.21194	5.01633	0.00005
	EMPBI20	0.14313	0.05437	0.13119	2.63221	0.01522
	EMPBI23	0.09592	0.03632	0.05216	2.64099	0.01492
	EMPBI5	0.05506	0.02136	0.07465	2.57808	0.01716

a Dependent Variable: CFS2I31

Figure D-1-72: Commodity Flow Within in Utah for Commodity Item 31 (CFS2I31)

Regression (CFS2I32)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15292
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25127	1	76.25127	1876.61228	0.00000
	Residual	1.09707	27	0.04063		
	Total	77.34834	28			
2	Regression	76.74038	2	38.37019	1640.92565	0.00000
	Residual	0.60796	26	0.02338		
	Total	77.34834	28			
3	Regression	76.92506	3	25.64169	1514.46745	0.00000
	Residual	0.42328	25	0.01693		
	Total	77.34834	28			
4	Regression	77.03589	4	19.25897	1479.30604	0.00000
	Residual	0.31245	24	0.01302		
	Total	77.34834	28			
5	Regression	77.11094	5	15.42219	1494.14078	0.00000
	Residual	0.23740	23	0.01032		
	Total	77.34834	28			
6	Regression	77.16602	6	12.86100	1551.84553	0.00000
	Residual	0.18233	22	0.00829		
	Total	77.34834	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I32

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.94611	0.15040		-26.23694	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31988	0.00000
2	(Constant)	-4.15403	0.12282		-33.82207	0.00000
	EMPBI7	0.57971	0.07116	0.64157	8.14617	0.00000
	EMPBI19	0.37709	0.08245	0.36020	4.57352	0.00010
3	(Constant)	-4.36647	0.12272		-35.58134	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89992	0.00000
	EMPBI19	0.38823	0.07024	0.37084	5.52722	0.00001
	EMPBI18	0.16838	0.05098	0.15448	3.30273	0.00289
4	(Constant)	-4.61957	0.13822		-33.42158	0.00000
	EMPBI7	0.36939	0.06920	0.40881	5.33818	0.00002
	EMPBI19	0.29165	0.06992	0.27859	4.17091	0.00034
	EMPBI18	0.16134	0.04477	0.14802	3.60373	0.00142
	EMPBI20	0.19338	0.06628	0.17725	2.91763	0.00754
5	(Constant)	-5.09641	0.21545		-23.65514	0.00000
	EMPBI7	0.25240	0.07536	0.27934	3.34947	0.00278
	EMPBI19	0.33141	0.06398	0.31657	5.17965	0.00003
	EMPBI18	0.24687	0.05094	0.22648	4.84602	0.00007
	EMPBI20	0.16523	0.05993	0.15145	2.75695	0.01122
	EMPBI23	0.10835	0.04018	0.05892	2.69654	0.01288
6	(Constant)	-4.89745	0.20791		-23.55591	0.00000
	EMPBI7	0.21749	0.06887	0.24070	3.15800	0.00456
	EMPBI19	0.33956	0.05742	0.32436	5.91362	0.00001
	EMPBI18	0.23102	0.04606	0.21194	5.01563	0.00005
	EMPBI20	0.14314	0.05438	0.13120	2.63198	0.01523
	EMPBI23	0.09592	0.03633	0.05216	2.64046	0.01494
	EMPBI5	0.05507	0.02136	0.07466	2.57788	0.01717

a Dependent Variable: CFS2I32

Figure D-1-73: Commodity Flow Within in Utah for Commodity Item 32 (CFS2I32)

Regression (CFS2I33)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09104

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25084	1	76.25084	1876.64862	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34789	28			
2	Regression	76.73994	2	38.36997	1640.95952	0.00000
	Residual	0.60795	26	0.02338		
	Total	77.34789	28			
3	Regression	76.92459	3	25.64153	1514.40107	0.00000
	Residual	0.42329	25	0.01693		
	Total	77.34789	28			
4	Regression	77.03543	4	19.25886	1479.28213	0.00000
	Residual	0.31246	24	0.01302		
	Total	77.34789	28			
5	Regression	77.11046	5	15.42209	1493.92458	0.00000
	Residual	0.23743	23	0.01032		
	Total	77.34789	28			
6	Regression	77.16553	6	12.86092	1551.58142	0.00000
	Residual	0.18236	22	0.00829		
	Total	77.34789	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I33

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.58421	0.15040		-37.12877	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32030	0.00000
2	(Constant)	-5.79212	0.12282		-47.16000	0.00000
	EMPBI7	0.57971	0.07116	0.64157	8.14629	0.00000
	EMPBI19	0.37708	0.08245	0.36020	4.57353	0.00010
3	(Constant)	-6.00454	0.12272		-48.92868	0.00000
	EMPBI7	0.43794	0.07423	0.48468	5.89999	0.00000
	EMPBI19	0.38822	0.07024	0.37084	5.52704	0.00001
	EMPBI18	0.16837	0.05098	0.15446	3.30238	0.00289
4	(Constant)	-6.25765	0.13822		-45.27255	0.00000
	EMPBI7	0.36940	0.06920	0.40882	5.33829	0.00002
	EMPBI19	0.29164	0.06992	0.27858	4.17074	0.00034
	EMPBI18	0.16133	0.04477	0.14800	3.60337	0.00143
	EMPBI20	0.19339	0.06628	0.17726	2.91779	0.00754
5	(Constant)	-6.73440	0.21546		-31.25577	0.00000
	EMPBI7	0.25244	0.07536	0.27938	3.34967	0.00278
	EMPBI19	0.33140	0.06399	0.31655	5.17900	0.00003
	EMPBI18	0.24684	0.05095	0.22645	4.84506	0.00007
	EMPBI20	0.16525	0.05994	0.15146	2.75703	0.01122
	EMPBI23	0.10833	0.04018	0.05891	2.69583	0.01290
6	(Constant)	-6.53544	0.20792		-31.43178	0.00000
	EMPBI7	0.21752	0.06887	0.24073	3.15820	0.00456
	EMPBI19	0.33954	0.05742	0.32434	5.91281	0.00001
	EMPBI18	0.23099	0.04606	0.21191	5.01451	0.00005
	EMPBI20	0.14315	0.05439	0.13121	2.63206	0.01522
	EMPBI23	0.09590	0.03633	0.05215	2.63965	0.01497
	EMPBI5	0.05507	0.02136	0.07466	2.57774	0.01717

a Dependent Variable: CFS2I33

Figure D-1-74: Commodity Flow Within in Utah for Commodity Item 33 (CFS2I33)

Regression (CFS2I34)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11410
5	0.99846	0.99693	0.99626	0.10159
6	0.99882	0.99764	0.99700	0.09103

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25127	1	76.25127	1876.70671	0.00000
	Residual	1.09702	27	0.04063		
	Total	77.34829	28			
2	Regression	76.74036	2	38.37018	1641.01828	0.00000
	Residual	0.60793	26	0.02338		
	Total	77.34829	28			
3	Regression	76.92501	3	25.64167	1514.48817	0.00000
	Residual	0.42327	25	0.01693		
	Total	77.34829	28			
4	Regression	77.03584	4	19.25896	1479.35904	0.00000
	Residual	0.31244	24	0.01302		
	Total	77.34829	28			
5	Regression	77.11090	5	15.42218	1494.24147	0.00000
	Residual	0.23738	23	0.01032		
	Total	77.34829	28			
6	Regression	77.16596	6	12.86099	1551.88225	0.00000
	Residual	0.18232	22	0.00829		
	Total	77.34829	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I34

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.84441	0.15040		-38.85930	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32097	0.00000
2	(Constant)	-6.05232	0.12282		-49.27930	0.00000
	EMPBI7	0.57971	0.07116	0.64158	8.14649	0.00000
	EMPBI19	0.37708	0.08245	0.36019	4.57356	0.00010
3	(Constant)	-6.26474	0.12272		-51.05029	0.00000
	EMPBI7	0.43795	0.07423	0.48468	5.90020	0.00000
	EMPBI19	0.38822	0.07024	0.37084	5.52713	0.00001
	EMPBI18	0.16837	0.05098	0.15446	3.30250	0.00289
4	(Constant)	-6.51785	0.13822		-47.15607	0.00000
	EMPBI7	0.36941	0.06920	0.40883	5.33851	0.00002
	EMPBI19	0.29164	0.06992	0.27858	4.17083	0.00034
	EMPBI18	0.16133	0.04477	0.14801	3.60350	0.00143
	EMPBI20	0.19339	0.06628	0.17726	2.91776	0.00754
5	(Constant)	-6.99470	0.21544		-32.46723	0.00000
	EMPBI7	0.25242	0.07535	0.27935	3.34975	0.00278
	EMPBI19	0.33140	0.06398	0.31656	5.17967	0.00003
	EMPBI18	0.24686	0.05094	0.22647	4.84598	0.00007
	EMPBI20	0.16524	0.05993	0.15145	2.75710	0.01122
	EMPBI23	0.10835	0.04018	0.05892	2.69672	0.01287
6	(Constant)	-6.79577	0.20790		-32.68688	0.00000
	EMPBI7	0.21750	0.06887	0.24071	3.15827	0.00456
	EMPBI19	0.33955	0.05742	0.32434	5.91351	0.00001
	EMPBI18	0.23101	0.04606	0.21193	5.01550	0.00005
	EMPBI20	0.14314	0.05438	0.13120	2.63212	0.01522
	EMPBI23	0.09592	0.03633	0.05216	2.64062	0.01494
	EMPBI5	0.05506	0.02136	0.07465	2.57764	0.01717

a Dependent Variable: CFS2I34

Figure D-1-75: Commodity Flow Within in Utah for Commodity Item 34 (CFS2I34)

Regression (CFS2I35)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99606	0.99214	0.99154	0.15292
3	0.99726	0.99453	0.99387	0.13013
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10161
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25095	1	76.25095	1876.48269	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34810	28			
2	Regression	76.74013	2	38.37006	1640.90420	0.00000
	Residual	0.60797	26	0.02338		
	Total	77.34810	28			
3	Regression	76.92477	3	25.64159	1514.27213	0.00000
	Residual	0.42333	25	0.01693		
	Total	77.34810	28			
4	Regression	77.03558	4	19.25890	1478.99639	0.00000
	Residual	0.31252	24	0.01302		
	Total	77.34810	28			
5	Regression	77.11065	5	15.42213	1493.81411	0.00000
	Residual	0.23745	23	0.01032		
	Total	77.34810	28			
6	Regression	77.16572	6	12.86095	1551.41754	0.00000
	Residual	0.18238	22	0.00829		
	Total	77.34810	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I35

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.10994	0.15041		-53.91966	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31839	0.00000
2	(Constant)	-8.31787	0.12282		-67.72364	0.00000
	EMPBI7	0.57968	0.07116	0.64155	8.14580	0.00000
	EMPBI19	0.37711	0.08245	0.36022	4.57381	0.00010
3	(Constant)	-8.53028	0.12273		-69.50692	0.00000
	EMPBI7	0.43793	0.07423	0.48466	5.89949	0.00000
	EMPBI19	0.38825	0.07024	0.37087	5.52721	0.00001
	EMPBI18	0.16836	0.05099	0.15446	3.30211	0.00289
4	(Constant)	-8.78337	0.13824		-63.53924	0.00000
	EMPBI7	0.36939	0.06921	0.40881	5.33761	0.00002
	EMPBI19	0.29168	0.06993	0.27861	4.17089	0.00034
	EMPBI18	0.16132	0.04478	0.14800	3.60289	0.00143
	EMPBI20	0.19337	0.06629	0.17724	2.91719	0.00755
5	(Constant)	-9.26025	0.21547		-42.97713	0.00000
	EMPBI7	0.25239	0.07536	0.27933	3.34896	0.00278
	EMPBI19	0.33145	0.06399	0.31660	5.17959	0.00003
	EMPBI18	0.24685	0.05095	0.22647	4.84523	0.00007
	EMPBI20	0.16522	0.05994	0.15144	2.75645	0.01124
	EMPBI23	0.10836	0.04019	0.05893	2.69649	0.01288
6	(Constant)	-9.06129	0.20794		-43.57734	0.00000
	EMPBI7	0.21747	0.06888	0.24068	3.15739	0.00457
	EMPBI19	0.33959	0.05743	0.32439	5.91338	0.00001
	EMPBI18	0.23100	0.04607	0.21193	5.01464	0.00005
	EMPBI20	0.14312	0.05439	0.13118	2.63139	0.01525
	EMPBI23	0.09593	0.03633	0.05217	2.64036	0.01494
	EMPBI5	0.05507	0.02136	0.07466	2.57756	0.01718

a Dependent Variable: CFS2I35

Figure D-1-76: Commodity Flow Within in Utah for Commodity Item 35 (CFS2I35)

Regression (CFS2I40)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15290
3	0.99726	0.99453	0.99387	0.13011
4	0.99798	0.99596	0.99529	0.11409
5	0.99846	0.99693	0.99626	0.10158
6	0.99882	0.99764	0.99700	0.09102

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25063	1	76.25063	1876.71164	0.00000
	Residual	1.09701	27	0.04063		
	Total	77.34764	28			
2	Regression	76.73976	2	38.36988	1641.15767	0.00000
	Residual	0.60787	26	0.02338		
	Total	77.34764	28			
3	Regression	76.92443	3	25.64148	1514.72013	0.00000
	Residual	0.42320	25	0.01693		
	Total	77.34764	28			
4	Regression	77.03525	4	19.25881	1479.58624	0.00000
	Residual	0.31239	24	0.01302		
	Total	77.34764	28			
5	Regression	77.11030	5	15.42206	1494.54373	0.00000
	Residual	0.23733	23	0.01032		
	Total	77.34764	28			
6	Regression	77.16537	6	12.86089	1552.31869	0.00000
	Residual	0.18227	22	0.00828		
	Total	77.34764	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I40

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.83967	0.15040		-38.82804	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32103	0.00000
2	(Constant)	-6.04760	0.12281		-49.24312	0.00000
	EMPBI7	0.57970	0.07116	0.64156	8.14661	0.00000
	EMPBI19	0.37710	0.08244	0.36021	4.57397	0.00010
3	(Constant)	-6.26003	0.12271		-51.01595	0.00000
	EMPBI7	0.43793	0.07422	0.48466	5.90037	0.00000
	EMPBI19	0.38824	0.07023	0.37085	5.52783	0.00001
	EMPBI18	0.16837	0.05098	0.15447	3.30287	0.00288
4	(Constant)	-6.51311	0.13821		-47.12560	0.00000
	EMPBI7	0.36939	0.06919	0.40881	5.33869	0.00002
	EMPBI19	0.29166	0.06992	0.27860	4.17152	0.00034
	EMPBI18	0.16134	0.04477	0.14801	3.60392	0.00142
	EMPBI20	0.19337	0.06627	0.17724	2.91776	0.00754
5	(Constant)	-6.98996	0.21542		-32.44864	0.00000
	EMPBI7	0.25240	0.07535	0.27933	3.34988	0.00278
	EMPBI19	0.33143	0.06397	0.31659	5.18060	0.00003
	EMPBI18	0.24686	0.05094	0.22648	4.84660	0.00007
	EMPBI20	0.16522	0.05992	0.15144	2.75714	0.01122
	EMPBI23	0.10835	0.04018	0.05892	2.69699	0.01287
6	(Constant)	-6.79102	0.20787		-32.66878	0.00000
	EMPBI7	0.21748	0.06886	0.24069	3.15847	0.00456
	EMPBI19	0.33958	0.05741	0.32437	5.91480	0.00001
	EMPBI18	0.23101	0.04605	0.21194	5.01633	0.00005
	EMPBI20	0.14313	0.05437	0.13119	2.63221	0.01522
	EMPBI23	0.09592	0.03632	0.05216	2.64099	0.01492
	EMPBI5	0.05506	0.02136	0.07465	2.57808	0.01716

a Dependent Variable: CFS2I40

Figure D-1-77: Commodity Flow Within in Utah for Commodity Item 40 (CFS2I40)

Regression (CFS2I43)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99606	0.99214	0.99154	0.15291
3	0.99726	0.99453	0.99387	0.13012
4	0.99798	0.99596	0.99529	0.11411
5	0.99846	0.99693	0.99626	0.10160
6	0.99882	0.99764	0.99700	0.09105

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

ANOVA(g)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.250054	1	76.25005	1876.62996	0.00000
	Residual	1.097047	27	0.04063		
	Total	77.347102	28			
2	Regression	76.739200	2	38.36960	1641.07168	0.00000
	Residual	0.607901	26	0.02338		
	Total	77.347102	28			
3	Regression	76.923795	3	25.64127	1514.34437	0.00000
	Residual	0.423306	25	0.01693		
	Total	77.347102	28			
4	Regression	77.034594	4	19.25865	1479.02962	0.00000
	Residual	0.312507	24	0.01302		
	Total	77.347102	28			
5	Regression	77.109669	5	15.42193	1493.91670	0.00000
	Residual	0.237433	23	0.01032		
	Total	77.347102	28			
6	Regression	77.164738	6	12.86079	1551.49896	0.00000
	Residual	0.182364	22	0.00829		
	Total	77.347102	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI20, EMPBI23, EMPBI5

g Dependent Variable: CFS2I43

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.14132	0.15040		-27.53519	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32009	0.00000
2	(Constant)	-4.34925	0.12281		-35.41337	0.00000
	EMPBI7	0.57969	0.07116	0.64156	8.14633	0.00000
	EMPBI19	0.37710	0.08245	0.36022	4.57393	0.00010
3	(Constant)	-4.56163	0.12272		-37.17048	0.00000
	EMPBI7	0.43795	0.07423	0.48469	5.89995	0.00000
	EMPBI19	0.38824	0.07024	0.37086	5.52720	0.00001
	EMPBI18	0.16834	0.05098	0.15444	3.30181	0.00289
4	(Constant)	-4.81470	0.13823		-34.83037	0.00000
	EMPBI7	0.36942	0.06920	0.40884	5.33807	0.00002
	EMPBI19	0.29167	0.06993	0.27861	4.17088	0.00034
	EMPBI18	0.16130	0.04477	0.14798	3.60251	0.00143
	EMPBI20	0.19336	0.06629	0.17723	2.91705	0.00755
5	(Constant)	-5.29161	0.21546		-24.55954	0.00000
	EMPBI7	0.25241	0.07536	0.27935	3.34935	0.00278
	EMPBI19	0.33144	0.06399	0.31660	5.17974	0.00003
	EMPBI18	0.24684	0.05095	0.22646	4.84514	0.00007
	EMPBI20	0.16521	0.05994	0.15143	2.75632	0.01124
	EMPBI23	0.10837	0.04018	0.05893	2.69675	0.01287
6	(Constant)	-5.09266	0.20793		-24.49232	0.00000
	EMPBI7	0.21750	0.06888	0.24071	3.15780	0.00456
	EMPBI19	0.33959	0.05743	0.32438	5.91349	0.00001
	EMPBI18	0.23099	0.04606	0.21192	5.01451	0.00005
	EMPBI20	0.14311	0.05439	0.13117	2.63124	0.01525
	EMPBI23	0.09593	0.03633	0.05217	2.64063	0.01493
	EMPBI5	0.05506	0.02136	0.07466	2.57747	0.01718

a Dependent Variable: CFS2I43

Figure D-1-78: Commodity Flow Within in Utah for Commodity Item 43 (CFS2I43)

D-2 Best Model Choice Procedure of Multiple Regression Model Betweeen Commodity Flow and Employment

D-2-1 Estimation Results of Bayesian Information Criteria (BIC)

D-2-1-1 CFS2P vs. Employment – Production

Regression (CFS2P3)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29317
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99492
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78776
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33648
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46385

Regression (CFS2P6)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29100
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99053
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78610
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33494
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45959

Regression (CFS2P7)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29218
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99510
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.79058
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33783
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46436

Regression (CFS2P8)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29087
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99317
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.79071
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33968
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46456

Figure D-2-1: Estimation of R, R Square, and BIC for CFS2P 3-8

Regression (CFS2P12)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29086
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99590
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79396
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.34125
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46677

Regression (CFS2P13)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29141
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99505
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79108
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33936
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46414

Regression (CFS2P15)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29141
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99505
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79108
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33936
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46414

Regression (CFS2P17)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29237
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99264
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78517
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33343
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45751

Figure D-2-2: Estimation of R, R Square, and BIC for CFS2P 12-17

Regression (CFS2P18)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29141
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99505
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79108
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33936
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46414

Regression (CFS2P19)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29100
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99053
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78610
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33494
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45959

Regression (CFS2P23)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29237
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99264
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78517
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33343
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45751

Regression (CFS2P24)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29018
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99506
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79252
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.34084
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46714

Regression (CFS2P26)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29146
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99326
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79083
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.34034
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46434

Figure D-2-3: Estimation of R, R Square, and BIC for CFS2P 18-26

Regression (CFS2P27)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29317
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99492
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78776
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33648
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46385

Regression (CFS2P28)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29068
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99413
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79321
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.34113
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46622

Regression (CFS2P29)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29208
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99596
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79236
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.34100
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46488

Regression (CFS2P30)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29169
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99333
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78564
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33370
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45879

Regression (CFS2P32)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29208
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99596
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79236
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.34100
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46488

Figure D-2-4: Estimation of R, R Square, and BIC for CFS2P 27-32

Regression (CFS2P34)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29175
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99427
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.79025
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33769
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46446

Regression (CFS2P35)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29237
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99264
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78517
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33343
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45751

Regression (CFS2P39)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29266
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99411
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78643
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33320
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45791

Regression (CFS2P40)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29068
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99413
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79321
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.34113
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46622

Regression (CFS2P43)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29237
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99264
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78517
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33343
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45751

Figure D-2-5: Estimation of R, R Square, and BIC for CFS2P 34-43

D-2-1-1 CFS2A vs. Employment – Attraction

Regression (CFS2A3)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52439
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18287
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17731
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42709
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79472
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79258

Regression (CFS2A5)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52560
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18306
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17750
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42981
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79207
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78947

Regression (CFS2A6)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52439
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18287
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17731
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42709
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79472
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79258

Regression (CFS2A7)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52278
2	0.99606	0.99214	0.99153	29	2	0.02339	-102.17955
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17209
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42231
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78871
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78404

Figure D-2-6: Estimation of R, R Square, and BIC for CFS2A 3-7

Regression (CFS2A8)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52278
2	0.99606	0.99214	0.99153	29	2	0.02339	-102.17955
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17209
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42231
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78871
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78404

Regression (CFS2A11)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52259
2	0.99606	0.99214	0.99153	29	2	0.02338	-102.18006
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17254
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42417
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79017
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78892

Regression (CFS2A12)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52396
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18248
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17515
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42789
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79212
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79103

Regression (CFS2A13)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52259
2	0.99606	0.99214	0.99153	29	2	0.02338	-102.18006
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17254
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42417
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79017
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78892

Figure D-2-7: Estimation of R, R Square, and BIC for CFS2A 8-13

Regression (CFS2A14)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52520
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18172
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17750
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43001
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79500
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79324

Regression (CFS2A15)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52593
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18475
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17562
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42507
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79113
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78724

Regression (CFS2A17)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52396
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18248
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17515
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42789
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79212
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79103

Regression (CFS2A18)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52532
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18346
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17609
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42685
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79198
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78971

Figure D-2-8: Estimation of R, R Square, and BIC for CFS2A 14-18

Regression (CFS2A19)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52321
2	0.99606	0.99214	0.99153	29	2	0.02338	-102.17965
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17213
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42204
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78807
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78262

Regression (CFS2A21)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52418
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18372
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17690
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42515
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79140
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78687

Regression (CFS2A23)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52520
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18172
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17750
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43001
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79500
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79324

Regression (CFS2A24)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52495
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18416
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17754
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42698
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79423
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79004

Figure D-2-9: Estimation of R, R Square, and BIC for CFS2A 19-24

Regression (CFS2A26)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52592
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18249
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17641
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42971
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79099
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78848

Regression (CFS2A27)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52697
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18605
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.18258
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43574
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.80306
6	0.99882	0.99764	0.99700	29	6	0.00828	-118.80232

Regression (CFS2A28)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52278
2	0.99606	0.99214	0.99153	29	2	0.02339	-102.17955
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17209
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42231
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78871
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78404

Regression (CFS2A29)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52331
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18144
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17387
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42405
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78877
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78535

Figure D-2-10: Estimation of R, R Square, and BIC for CFS2A 26-29

Regression (CFS2A30)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52592
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18249
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17641
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42971
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79099
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78848

Regression (CFS2A31)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52604
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18273
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17759
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43061
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79265
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79062

Regression (CFS2A32)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52331
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18144
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17387
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42405
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78877
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78535

Regression (CFS2A33)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52331
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18144
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17387
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42405
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78877
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78535

Figure D-2-11: Estimation of R, R Square, and BIC for CFS2A 30-33

Regression (CFS2A34)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52278
2	0.99606	0.99214	0.99153	29	2	0.02339	-102.17955
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17209
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42231
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78871
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78404

Regression (CFS2A35)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52497
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18420
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.18003
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43143
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79862
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79454

Regression (CFS2A36)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52593
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18475
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17562
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42507
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79113
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78724

Regression (CFS2A39)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52592
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18249
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17641
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42971
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79099
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78848

Figure D-2-12: Estimation of R, R Square, and BIC for CFS2A 34-39

Regression (CFS2A40)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52259
2	0.99606	0.99214	0.99153	29	2	0.02338	-102.18006
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17254
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42417
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79017
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78892

Regression (CFS2A41)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52439
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18287
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17731
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42709
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79472
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79258

Regression (CFS2A43)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52592
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18249
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17641
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42971
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79099
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78848

Regression (CFS2A99)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52532
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18346
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17609
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42685
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79198
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78971

Figure D-2-13: Estimation of R, R Square, and BIC for CFS2A 40-43, 99

D-2-1-3 CFS2I vs. Employment – With In Utah

Regression (CFS2I3)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52697
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18605
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.18258
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43574
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.80306
6	0.99882	0.99764	0.99700	29	6	0.00828	-118.80232

Regression (CFS2I6)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52666
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18337
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17792
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43106
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79697
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79394

Regression (CFS2I7)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52396
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18248
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17515
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42789
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79212
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79103

Regression (CFS2I8)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52604
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18273
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17759
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43061
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79265
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79062

Figure D-2-14: Estimation of R, R Square, and BIC for CFS2I 3-8

Regression (CFS2I12)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52278
2	0.99606	0.99214	0.99153	29	2	0.02339	-102.17955
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17209
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42231
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78871
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78404

Regression (CFS2I13)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52592
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18249
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17641
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42971
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79099
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78848

Regression (CFS2I14)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52366
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18085
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17428
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42380
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78961
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78464

Regression (CFS2I15)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52697
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18605
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.18258
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43574
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.80306
6	0.99882	0.99764	0.99700	29	6	0.00828	-118.80232

Figure D-2-15: Estimation of R, R Square, and BIC for CFS2I 12-15

Regression (CFS2I17)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52278
2	0.99606	0.99214	0.99153	29	2	0.02339	-102.17955
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17209
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42231
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78871
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78404

Regression (CFS2I18)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52495
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18416
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17754
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42698
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79423
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79004

Regression (CFS2I19)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52321
2	0.99606	0.99214	0.99153	29	2	0.02338	-102.17965
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17213
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42204
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78807
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78262

Regression (CFS2I21)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52497
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18420
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.18003
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43143
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79862
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79454

Figure D-2-16: Estimation of R, R Square, and BIC for CFS2I 17-21

Regression (CFS2I26)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52520
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18172
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17750
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43001
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79500
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79324

Regression (CFS2I27)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52439
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18287
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17731
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42709
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79472
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79258

Regression (CFS2I28)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52374
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18223
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17530
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42488
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78948
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78737

Regression (CFS2I29)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52321
2	0.99606	0.99214	0.99153	29	2	0.02338	-102.17965
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17213
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42204
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78807
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78262

Figure D-2-17: Estimation of R, R Square, and BIC for CFS2I 26-29

Regression (CFS2I31)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52697
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18605
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.18258
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43574
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.80306
6	0.99882	0.99764	0.99700	29	6	0.00828	-118.80232

Regression (CFS2I32)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52520
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18172
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17750
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43001
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79500
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79324

Regression (CFS2I33)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52592
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18249
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17641
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42971
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79099
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78848

Regression (CFS2I34)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52666
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18337
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17792
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43106
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79697
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.79394

Figure D-2-18: Estimation of R, R Square, and BIC for CFS2I 31-34

Regression (CFS2I35)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52331
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18144
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17387
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42405
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.78877
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78535

Regression (CFS2I40)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52697
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18605
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.18258
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.43574
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.80306
6	0.99882	0.99764	0.99700	29	6	0.00828	-118.80232

Regression (CFS2I43)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52593
2	0.99606	0.99214	0.99154	29	2	0.02338	-102.18475
3	0.99726	0.99453	0.99387	29	3	0.01693	-108.17562
4	0.99798	0.99596	0.99529	29	4	0.01302	-112.42507
5	0.99846	0.99693	0.99626	29	5	0.01032	-115.79113
6	0.99882	0.99764	0.99700	29	6	0.00829	-118.78724

Figure D-2-19: Estimation of R, R Square, and BIC for CFS2I 35-43

D-2-2 Best Model from Multiple Regression Models Betweeen Commodity Flow and Employment

D-2-2-1 CFSTP vs. Employment – Production

Table D-2-1: Best Multiple Regression Model With Employment for CFS2P-Production (LT)

CFS-LT-P	(Constant)	EMPBI7	EMPBI19	EMPBI18	EMPBI23	EMPBI3
CFS2PT	-0.66035	0.37922	0.39794	0.23810	0.11403	-0.04441
CFS2P3	-7.65044	0.37925	0.39793	0.23807	0.11403	-0.04441
CFS2P6	-4.91899	0.37921	0.39794	0.23811	0.11404	-0.04441
CFS2P7	-4.39001	0.37924	0.39794	0.23808	0.11402	-0.04441
CFS2P8	-6.71268	0.37920	0.39796	0.23811	0.11403	-0.04440
CFS2P12	-4.25914	0.37920	0.39797	0.23809	0.11401	-0.04441
CFS2P13	-3.65089	0.37921	0.39796	0.23809	0.11402	-0.04440
CFS2P15	-1.95599	0.37921	0.39796	0.23809	0.11402	-0.04440
CFS2P17	-2.99929	0.37924	0.39793	0.23808	0.11403	-0.04441
CFS2P18	-2.25189	0.37921	0.39796	0.23809	0.11402	-0.04440
CFS2P19	-5.39559	0.37921	0.39794	0.23811	0.11404	-0.04441
CFS2P23	-5.23389	0.37924	0.39793	0.23808	0.11403	-0.04441
CFS2P24	-6.71650	0.37919	0.39798	0.23810	0.11402	-0.04441
CFS2P26	-4.88787	0.37919	0.39796	0.23811	0.11403	-0.04440
CFS2P27	-7.67044	0.37925	0.39793	0.23807	0.11403	-0.04441
CFS2P28	-6.13000	0.37919	0.39797	0.23811	0.11401	-0.04440
CFS2P29	-7.39035	0.37920	0.39796	0.23809	0.11402	-0.04440
CFS2P30	-6.78500	0.37924	0.39794	0.23808	0.11403	-0.04441
CFS2P32	-4.04165	0.37920	0.39796	0.23809	0.11402	-0.04440
CFS2P34	-6.44842	0.37923	0.39794	0.23809	0.11402	-0.04441
CFS2P35	-6.53229	0.37924	0.39793	0.23808	0.11403	-0.04441
CFS2P39	-7.77692	0.37926	0.39793	0.23807	0.11402	-0.04441
CFS2P40	-5.94840	0.37919	0.39797	0.23811	0.11401	-0.04440
CFS2P43	-4.64199	0.37924	0.39793	0.23808	0.11403	-0.04441

Table D-2-2: Best Multiple Regression Model With Employment for CFS2P-Production

CFS-P	(Constant)	EMPBI7	EMPBI19	EMPBI18	EMPBI23	EMPBI3
CFS2PT	0.51666993	1.46114909	1.48875708	1.26882974	1.12078369	0.95656209
CFS2P3	0.00047583	1.46118774	1.48873720	1.26880305	1.12078710	0.95655734
CFS2P6	0.00730649	1.46113248	1.48875227	1.26884797	1.12079191	0.95656385
CFS2P7	0.01240060	1.46116727	1.48876141	1.26880978	1.12076918	0.95656068
CFS2P8	0.00121541	1.46110899	1.48878499	1.26884792	1.12078277	0.95656667
CFS2P12	0.01413438	1.46111602	1.48880562	1.26882405	1.12076209	0.95656599
CFS2P13	0.02596804	1.46112541	1.48878986	1.26882321	1.12077645	0.95656669
CFS2P15	0.14142457	1.46112541	1.48878986	1.26882321	1.12077645	0.95656669
CFS2P17	0.04982268	1.46117749	1.48874296	1.26881316	1.12078933	0.95656432
CFS2P18	0.10520034	1.46112541	1.48878986	1.26882321	1.12077645	0.95656669
CFS2P19	0.00453653	1.46113248	1.48875227	1.26884797	1.12079191	0.95656385
CFS2P23	0.00533277	1.46117749	1.48874296	1.26881316	1.12078933	0.95656432
CFS2P24	0.00121076	1.46110600	1.48881023	1.26883110	1.12077340	0.95656351
CFS2P26	0.00753746	1.46109974	1.48877978	1.26885257	1.12078680	0.95656959
CFS2P27	0.00046641	1.46118774	1.48873720	1.26880305	1.12078710	0.95655734
CFS2P28	0.00217659	1.46110227	1.48879606	1.26884519	1.12076888	0.95656713
CFS2P29	0.00061718	1.46111580	1.48879161	1.26882444	1.12077645	0.95657041
CFS2P30	0.00113061	1.46117892	1.48875874	1.26880546	1.12078661	0.95656167
CFS2P32	0.01756839	1.46111580	1.48879161	1.26882444	1.12077645	0.95657041
CFS2P34	0.00158302	1.46115864	1.48876176	1.26881840	1.12077140	0.95655989
CFS2P35	0.00145568	1.46117749	1.48874296	1.26881316	1.12078933	0.95656432
CFS2P39	0.00041930	1.46120302	1.48874386	1.26879246	1.12077458	0.95656239
CFS2P40	0.00261003	1.46110227	1.48879606	1.26884519	1.12076888	0.95656713
CFS2P43	0.00963855	1.46117749	1.48874296	1.26881316	1.12078933	0.95656432

D-2-2-2 CFSTA vs. Employment – Attraction

Table D-2-3: Best Multiple Regression Model With Employment for CFS2A-Attraction (LT)

CFS-LT-A	(Constant)	EMPBI7	EMPBI19	EMPBI18	EMPBI20	EMPBI23	EMPBI5
CFS2AT	-0.83920	0.21745	0.33959	0.23101	0.14314	0.09593	0.05507
CFS2A3	-5.72422	0.21746	0.33960	0.23102	0.14311	0.09594	0.05507
CFS2A5	-6.05866	0.21751	0.33956	0.23099	0.14314	0.09590	0.05507
CFS2A6	-5.05892	0.21746	0.33960	0.23102	0.14311	0.09594	0.05507
CFS2A7	-4.11909	0.21746	0.33959	0.23102	0.14313	0.09594	0.05506
CFS2A8	-6.10979	0.21746	0.33959	0.23102	0.14313	0.09594	0.05506
CFS2A11	-6.80050	0.21745	0.33959	0.23101	0.14314	0.09593	0.05507
CFS2A12	-4.18883	0.21748	0.33958	0.23099	0.14314	0.09592	0.05507
CFS2A13	-4.42570	0.21745	0.33959	0.23101	0.14314	0.09593	0.05507
CFS2A14	-6.44855	0.21749	0.33956	0.23102	0.14314	0.09592	0.05507
CFS2A15	-2.09736	0.21750	0.33959	0.23099	0.14311	0.09593	0.05506
CFS2A17	-3.06333	0.21748	0.33958	0.23099	0.14314	0.09592	0.05507
CFS2A18	-2.55615	0.21749	0.33958	0.23100	0.14312	0.09592	0.05507
CFS2A19	-4.64086	0.21747	0.33958	0.23102	0.14313	0.09594	0.05506
CFS2A21	-5.98270	0.21747	0.33962	0.23101	0.14310	0.09594	0.05506
CFS2A23	-5.52165	0.21749	0.33956	0.23102	0.14314	0.09592	0.05507
CFS2A24	-5.55381	0.21747	0.33960	0.23101	0.14310	0.09594	0.05506
CFS2A26	-4.56744	0.21752	0.33954	0.23099	0.14315	0.09590	0.05507
CFS2A27	-5.75872	0.21748	0.33958	0.23101	0.14313	0.09592	0.05506
CFS2A28	-6.20439	0.21746	0.33959	0.23102	0.14313	0.09594	0.05506
CFS2A29	-6.72299	0.21747	0.33959	0.23100	0.14312	0.09593	0.05507
CFS2A30	-6.29714	0.21752	0.33954	0.23099	0.14315	0.09590	0.05507
CFS2A31	-3.97414	0.21751	0.33955	0.23099	0.14314	0.09590	0.05507
CFS2A32	-4.49269	0.21747	0.33959	0.23100	0.14312	0.09593	0.05507
CFS2A33	-5.34219	0.21747	0.33959	0.23100	0.14312	0.09593	0.05507
CFS2A34	-5.80679	0.21746	0.33959	0.23102	0.14313	0.09594	0.05506
CFS2A35	-7.02243	0.21747	0.33960	0.23102	0.14312	0.09593	0.05506
CFS2A36	-5.72256	0.21750	0.33959	0.23099	0.14311	0.09593	0.05506
CFS2A39	-7.54704	0.21752	0.33954	0.23099	0.14315	0.09590	0.05507
CFS2A40	-5.62440	0.21745	0.33959	0.23101	0.14314	0.09593	0.05507
CFS2A41	-5.70502	0.21745	0.33959	0.23101	0.14314	0.09594	0.05507
CFS2A43	-4.50634	0.21752	0.33954	0.23099	0.14315	0.09590	0.05507
CFS2A99	-7.46095	0.21749	0.33958	0.23100	0.14312	0.09592	0.05507

Table D-2-4: Best Multiple Regression Model With Employment for CFS2A-Attraction

CFS-A	(Constant)	EMPBI7	EMPBI19	EMPBI18	EMPBI20	EMPBI23	EMPBI5
CFS2AT	0.432055	1.242906	1.404369	1.259874	1.153888	1.100685	1.056618
CFS2A3	0.003266	1.242912	1.404389	1.259888	1.153851	1.100692	1.056611
CFS2A5	0.002338	1.242975	1.404331	1.259850	1.153889	1.100651	1.056612
CFS2A6	0.006352	1.242912	1.404389	1.259888	1.153851	1.100692	1.056611
CFS2A7	0.016259	1.242918	1.404369	1.259886	1.153877	1.100694	1.056609
CFS2A8	0.002221	1.242918	1.404369	1.259886	1.153877	1.100694	1.056609
CFS2A11	0.001113	1.242906	1.404369	1.259874	1.153888	1.100685	1.056618
CFS2A12	0.015164	1.242936	1.404358	1.259850	1.153896	1.100667	1.056617
CFS2A13	0.011966	1.242906	1.404369	1.259874	1.153888	1.100685	1.056618
CFS2A14	0.001583	1.242949	1.404332	1.259881	1.153886	1.100669	1.056612
CFS2A15	0.122780	1.242960	1.404371	1.259847	1.153857	1.100686	1.056609
CFS2A17	0.046732	1.242936	1.404358	1.259850	1.153896	1.100667	1.056617
CFS2A18	0.077603	1.242955	1.404359	1.259855	1.153870	1.100676	1.056613
CFS2A19	0.009649	1.242926	1.404362	1.259884	1.153875	1.100693	1.056607
CFS2A21	0.002522	1.242931	1.404408	1.259872	1.153840	1.100688	1.056606
CFS2A23	0.003999	1.242949	1.404332	1.259881	1.153886	1.100669	1.056612
CFS2A24	0.003873	1.242929	1.404391	1.259875	1.153850	1.100691	1.056605
CFS2A26	0.010385	1.242988	1.404306	1.259841	1.153905	1.100645	1.056613
CFS2A27	0.003155	1.242947	1.404352	1.259877	1.153875	1.100673	1.056607
CFS2A28	0.002021	1.242918	1.404369	1.259886	1.153877	1.100694	1.056609
CFS2A29	0.001203	1.242934	1.404377	1.259864	1.153872	1.100679	1.056613
CFS2A30	0.001842	1.242988	1.404306	1.259841	1.153905	1.100645	1.056613
CFS2A31	0.018795	1.242981	1.404313	1.259851	1.153896	1.100648	1.056613
CFS2A32	0.011191	1.242934	1.404377	1.259864	1.153872	1.100679	1.056613
CFS2A33	0.004785	1.242934	1.404377	1.259864	1.153872	1.100679	1.056613
CFS2A34	0.003007	1.242918	1.404369	1.259886	1.153877	1.100694	1.056609
CFS2A35	0.000892	1.242922	1.404381	1.259888	1.153866	1.100682	1.056601
CFS2A36	0.003271	1.242960	1.404371	1.259847	1.153857	1.100686	1.056609
CFS2A39	0.000528	1.242988	1.404306	1.259841	1.153905	1.100645	1.056613
CFS2A40	0.003609	1.242906	1.404369	1.259874	1.153888	1.100685	1.056618
CFS2A41	0.003329	1.242912	1.404389	1.259888	1.153851	1.100692	1.056611
CFS2A43	0.011039	1.242988	1.404306	1.259841	1.153905	1.100645	1.056613
CFS2A99	0.000575	1.242955	1.404359	1.259855	1.153870	1.100676	1.056613

D-2-2-3 CFSTI vs. Employment – With In Utah

Table D-2-5: Best Multiple Regression Model With Employment for CFS2I- Within Utah (LT)

CFS-I-LT	(Constant)	EMPBI7	EMPBI19	EMPBI18	EMPBI20	EMPBI23	EMPBI5
CFS2IT	-1.12349	0.21747	0.33959	0.23100	0.14312	0.09593	0.05507
CFS2I3	-7.90382	0.21748	0.33958	0.23101	0.14313	0.09592	0.05506
CFS2I6	-6.00817	0.21750	0.33955	0.23101	0.14314	0.09592	0.05506
CFS2I7	-4.68893	0.21748	0.33958	0.23099	0.14314	0.09592	0.05507
CFS2I8	-6.60704	0.21751	0.33955	0.23099	0.14314	0.09590	0.05507
CFS2I12	-4.21469	0.21746	0.33959	0.23102	0.14313	0.09594	0.05506
CFS2I13	-5.57714	0.21752	0.33954	0.23099	0.14315	0.09590	0.05507
CFS2I14	-6.66346	0.21748	0.33959	0.23102	0.14312	0.09594	0.05506
CFS2I15	-2.25892	0.21748	0.33958	0.23101	0.14313	0.09592	0.05506
CFS2I17	-3.11489	0.21746	0.33959	0.23102	0.14313	0.09594	0.05506
CFS2I18	-2.56821	0.21747	0.33960	0.23101	0.14310	0.09594	0.05506
CFS2I19	-5.53766	0.21747	0.33958	0.23102	0.14313	0.09594	0.05506
CFS2I21	-6.73623	0.21747	0.33960	0.23102	0.14312	0.09593	0.05506
CFS2I26	-5.40945	0.21749	0.33956	0.23102	0.14314	0.09592	0.05507
CFS2I27	-7.80852	0.21746	0.33960	0.23102	0.14311	0.09594	0.05507
CFS2I28	-7.14836	0.21748	0.33960	0.23100	0.14311	0.09592	0.05507
CFS2I29	-8.22056	0.21747	0.33958	0.23102	0.14313	0.09594	0.05506
CFS2I31	-4.38972	0.21748	0.33958	0.23101	0.14313	0.09592	0.05506
CFS2I32	-4.89745	0.21749	0.33956	0.23102	0.14314	0.09592	0.05507
CFS2I33	-6.53544	0.21752	0.33954	0.23099	0.14315	0.09590	0.05507
CFS2I34	-6.79577	0.21750	0.33955	0.23101	0.14314	0.09592	0.05506
CFS2I35	-9.06129	0.21747	0.33959	0.23100	0.14312	0.09593	0.05507
CFS2I40	-6.79102	0.21748	0.33958	0.23101	0.14313	0.09592	0.05506
CFS2I43	-5.09266	0.21750	0.33959	0.23099	0.14311	0.09593	0.05506

Table D-2-6: Best Multiple Regression Model With Employment for CFS2I- Within Utah

CFS-I	(Constant)	EMPBI7	EMPBI19	EMPBI18	EMPBI20	EMPBI23	EMPBI5
CFS2IT	0.325143	1.242934	1.404377	1.259864	1.153872	1.100679	1.056613
CFS2I3	0.000369	1.242947	1.404352	1.259877	1.153875	1.100673	1.056607
CFS2I6	0.002459	1.242969	1.404317	1.259870	1.153893	1.100674	1.056606
CFS2I7	0.009197	1.242936	1.404358	1.259850	1.153896	1.100667	1.056617
CFS2I8	0.001351	1.242981	1.404313	1.259851	1.153896	1.100648	1.056613
CFS2I12	0.014777	1.242918	1.404369	1.259886	1.153877	1.100694	1.056609
CFS2I13	0.003783	1.242988	1.404306	1.259841	1.153905	1.100645	1.056613
CFS2I14	0.001277	1.242936	1.404372	1.259884	1.153864	1.100688	1.056607
CFS2I15	0.104463	1.242947	1.404352	1.259877	1.153875	1.100673	1.056607
CFS2I17	0.044384	1.242918	1.404369	1.259886	1.153877	1.100694	1.056609
CFS2I18	0.076673	1.242929	1.404391	1.259875	1.153850	1.100691	1.056605
CFS2I19	0.003936	1.242926	1.404362	1.259884	1.153875	1.100693	1.056607
CFS2I21	0.001187	1.242922	1.404381	1.259888	1.153866	1.100682	1.056601
CFS2I26	0.004474	1.242949	1.404332	1.259881	1.153886	1.100669	1.056612
CFS2I27	0.000406	1.242912	1.404389	1.259888	1.153851	1.100692	1.056611
CFS2I28	0.000786	1.242937	1.404385	1.259863	1.153859	1.100675	1.056616
CFS2I29	0.000269	1.242926	1.404362	1.259884	1.153875	1.100693	1.056607
CFS2I31	0.012404	1.242947	1.404352	1.259877	1.153875	1.100673	1.056607
CFS2I32	0.007466	1.242949	1.404332	1.259881	1.153886	1.100669	1.056612
CFS2I33	0.001451	1.242988	1.404306	1.259841	1.153905	1.100645	1.056613
CFS2I34	0.001119	1.242969	1.404317	1.259870	1.153893	1.100674	1.056606
CFS2I35	0.000116	1.242934	1.404377	1.259864	1.153872	1.100679	1.056613
CFS2I40	0.001124	1.242947	1.404352	1.259877	1.153875	1.100673	1.056607
CFS2I43	0.006142	1.242960	1.404371	1.259847	1.153857	1.100686	1.056609

D-2-3 Estimated Attraction Commodity Flow With Multiple Regression Models Using Employment (2007)

D-2-3-1 CFS7P vs. Employment – Production

Table D-2-7: 2007 Estimated Production Commodity Flow by Each County and Commodity Type (CFS7P 3-15)

CFS7P-E	CFS7P3	CFS7P6	CFS7P7	CFS7P8	CFS7P12	CFS7P13	CFS7P15
1	0.26038	3.99843	6.78526	0.66511	7.73385	14.20971	77.38750
2	2.03237	31.20992	52.96182	5.19156	60.36606	110.91352	604.04629
3	5.19294	79.74582	135.32442	13.26526	154.24441	283.39995	1543.42486
4	0.98459	15.11977	25.65845	2.51512	29.24626	53.73432	292.64256
5	0.03334	0.51191	0.86872	0.08515	0.99018	1.81924	9.90779
6	11.67271	179.25379	304.18868	29.81822	346.72224	637.03993	3469.38400
7	0.75480	11.59092	19.66948	1.92808	22.41950	41.19226	224.33721
8	0.45517	6.98974	11.86146	1.16271	13.51994	24.84062	135.28452
9	0.25742	3.95320	6.70824	0.65758	7.64617	14.04855	76.50984
10	0.49795	7.64692	12.97666	1.27203	14.79110	27.17570	148.00163
11	1.86664	28.66520	48.64407	4.76831	55.44530	101.87108	554.80024
12	0.35320	5.42397	9.20436	0.90225	10.49127	19.27587	104.97832
13	0.48470	7.44347	12.63149	1.23821	14.39803	26.45338	144.06781
14	0.58918	9.04789	15.35359	1.50506	17.50037	32.15432	175.11567
15	0.23851	3.66263	6.21552	0.60926	7.08448	13.01648	70.88908
16	0.03635	0.55815	0.94718	0.09284	1.07959	1.98356	10.80265
17	0.09257	1.42155	2.41237	0.23647	2.74969	5.05205	27.51399
18	47.04669	722.50725	1226.05918	120.18857	1397.53154	2567.69320	13983.91733
19	0.40884	6.27827	10.65414	1.04436	12.14379	22.31197	121.51327
20	0.80666	12.38750	21.02113	2.06059	23.96013	44.02307	239.75409
21	0.92844	14.25767	24.19477	2.37168	27.57753	50.66920	275.94962
22	2.87008	44.07584	74.79363	7.33180	85.25192	156.63536	853.05204
23	1.69184	25.98065	44.08897	4.32177	50.25359	92.33173	502.84798
24	1.38945	21.33716	36.20831	3.54932	41.27089	75.82860	412.97025
25	20.16210	309.62701	525.41545	51.50513	598.88222	1100.35141	5992.62530
26	0.84734	13.01223	22.08138	2.16452	25.16886	46.24317	251.84498
27	6.34628	97.45786	165.38339	16.21171	188.50782	346.34816	1886.24719
28	0.09944	1.52699	2.59125	0.25400	2.95355	5.42663	29.55399
29	9.84227	151.14586	256.48707	25.14253	292.35141	537.14600	2925.35157
100	155.74986	2391.95264	4058.74398	397.89230	4626.33996	8500.32889	46293.65246
Sum	118.24223	1815.83757	3081.39043	302.05919	3512.28169	6453.18907	35144.72157

Table D-2-7: Continued (CFS7P 17-27)

CFS7P-E	CFS7P17	CFS7P18	CFS7P19	CFS7P23	CFS7P24	CFS7P26	CFS7P27
1	27.26479	57.56561	2.48259	2.91829	0.66253	4.12473	0.25522
2	212.81645	449.32696	19.37795	22.77880	5.17139	32.19555	1.99213
3	543.77428	1148.09481	49.51345	58.20285	13.21371	82.26438	5.09011
4	103.10014	217.68563	9.38773	11.03532	2.50539	15.59758	0.96509
5	3.49054	7.37002	0.31784	0.37361	0.08482	0.52808	0.03268
6	1222.30693	2580.74226	111.29703	130.82954	29.70256	184.91626	11.44157
7	79.03712	166.87589	7.19670	8.45973	1.92060	11.95708	0.73985
8	47.66227	100.63299	4.33986	5.10153	1.15820	7.21061	0.44615
9	26.95529	56.91275	2.45450	2.88516	0.65502	4.07808	0.25232
10	52.14222	110.09276	4.74790	5.58104	1.26708	7.88853	0.48809
11	195.46352	412.69471	17.79796	20.92142	4.74979	29.57071	1.82968
12	36.98513	78.08936	3.36770	3.95870	0.89874	5.59534	0.34621
13	50.75480	107.16654	4.62158	5.43254	1.23342	7.67878	0.47511
14	61.69566	130.26186	5.61775	6.60359	1.49919	9.33381	0.57751
15	24.97508	52.73168	2.27409	2.67321	0.60690	3.77832	0.23379
16	3.80588	8.03568	0.34655	0.40736	0.09248	0.57577	0.03563
17	9.69328	20.46661	0.88263	1.03752	0.23555	1.46648	0.09074
18	4926.63081	10402.10206	448.59813	527.32161	119.72130	745.34313	46.11511
19	42.81013	90.38908	3.89812	4.58218	1.04031	6.47662	0.40074
20	84.46911	178.34391	7.69128	9.04115	2.05258	12.77885	0.79069
21	97.22120	205.26839	8.85246	10.40607	2.36245	14.70811	0.91006
22	300.53905	634.55284	27.36629	32.16818	7.30326	45.46827	2.81325
23	177.15860	374.04941	16.13115	18.96216	4.30502	26.80147	1.65834
24	145.49508	307.19280	13.24805	15.57306	3.53553	22.01127	1.36194
25	2111.29544	4457.68511	192.24457	225.98237	51.30472	319.40768	19.76286
26	88.72728	187.33786	8.07917	9.49692	2.15612	13.42332	0.83056
27	664.54774	1403.10725	60.51069	71.12982	16.14877	100.53637	6.22061
28	10.41217	21.98409	0.94809	1.11447	0.25302	1.57523	0.09747
29	1030.63897	2176.05731	93.84508	110.31438	25.04482	155.92098	9.64738
100	16310.08879	34436.08013	1485.14147	1745.74930	396.33394	2467.53150	152.66580
Sum	12381.86897	26142.81622	1127.43691	1325.29254	300.88528	1873.21140	115.90088

Table D-2-7: Continued (CFS7P 28-39)

CFS7P-E	CFS7P28	CFS7P29	CFS7P30	CFS7P32	CFS7P34	CFS7P35	CFS7P39
1	1.19101	0.33771	0.61871	9.61328	0.86619	0.79660	0.22944
2	9.29639	2.63600	4.82943	75.03563	6.76103	6.21789	1.79090
3	23.75373	6.73534	12.33990	191.72625	17.27534	15.88753	4.57597
4	4.50388	1.27707	2.33965	36.35281	3.27550	3.01229	0.86763
5	0.15249	0.04324	0.07921	1.23077	0.11090	0.10198	0.02937
6	53.39518	15.14000	27.73803	430.97077	38.83227	35.71230	10.28607
7	3.45259	0.97899	1.79358	27.86770	2.51097	2.30924	0.66512
8	2.08206	0.59038	1.08159	16.80547	1.51421	1.39255	0.40109
9	1.17753	0.33389	0.61168	9.50428	0.85637	0.78756	0.22683
10	2.27785	0.64587	1.18325	18.38517	1.65658	1.52345	0.43879
11	8.53858	2.42110	4.43564	68.91838	6.20983	5.71088	1.64488
12	1.61566	0.45812	0.83929	13.04073	1.17501	1.08060	0.31124
13	2.21729	0.62870	1.15178	17.89651	1.61252	1.48291	0.42712
14	2.69509	0.76420	1.40003	21.75349	1.96002	1.80257	0.51918
15	1.09100	0.30936	0.56676	8.80601	0.79346	0.72970	0.21017
16	0.16626	0.04714	0.08637	1.34193	0.12092	0.11120	0.03203
17	0.42345	0.12007	0.21997	3.41788	0.30796	0.28321	0.08157
18	215.22137	61.02449	111.80080	1737.10503	156.51700	143.94203	41.45889
19	1.87014	0.53028	0.97149	15.09465	1.36009	1.25079	0.36026
20	3.68986	1.04627	1.91684	29.78292	2.68352	2.46795	0.71083
21	4.24695	1.20423	2.20622	34.27923	3.08866	2.84052	0.81814
22	13.12898	3.72264	6.82009	105.96770	9.54810	8.78089	2.52909
23	7.73902	2.19439	4.02026	62.46479	5.62832	5.17607	1.49085
24	6.35572	1.80217	3.30170	51.30018	4.62229	4.25095	1.22437
25	92.22858	26.15117	47.91185	744.41152	67.07389	61.68600	17.76692
26	3.87601	1.09903	2.01348	31.28472	2.81888	2.59236	0.74666
27	29.03027	8.23138	15.08062	234.31212	21.11261	19.41618	5.59237
28	0.45485	0.12897	0.23628	3.67130	0.33080	0.30421	0.08762
29	45.02231	12.76595	23.38836	363.39186	32.74278	30.11232	8.67306
100	712.47665	202.02112	370.12524	5750.67353	518.13698	476.53403	137.24770
Sum	540.89410	153.36817	280.98285	4365.73307	393.36604	361.76271	104.19646

Table D-2-7: Continued (CFS7P 40-43)

CFS7P-E	CFS7P40	CFS7P43	Total
1	1.42818	5.27456	226.66969
2	11.14762	41.17083	1769.26649
3	28.48392	105.19694	4520.72617
4	5.40076	19.94544	857.15299
5	0.18285	0.67527	29.02002
6	64.02800	236.46384	10161.88219
7	4.14012	15.29028	657.08782
8	2.49667	9.22060	396.25038
9	1.41202	5.21469	224.09898
10	2.73145	10.08728	433.49929
11	10.23891	37.81379	1625.02060
12	1.93739	7.15503	307.48350
13	2.65883	9.81887	421.97440
14	3.23177	11.93546	512.91728
15	1.30825	4.83160	207.63534
16	0.19936	0.73627	31.64116
17	0.50777	1.87523	80.58863
18	258.07936	953.09123	40959.01608
19	2.24255	8.28192	355.91398
20	4.42464	16.34114	702.24471
21	5.09266	18.80812	808.26239
22	15.74342	58.14138	2498.60410
23	9.28012	34.27257	1472.84905
24	7.62137	28.14704	1209.59751
25	110.59447	408.44489	17552.52065
26	4.64786	17.16491	737.65761
27	34.81120	128.56141	5524.85182
28	0.54542	2.01431	86.56414
29	53.98780	199.38433	8568.40439
100	854.35529	3155.30089	135595.12245
Sum	648.60475	2395.35926	102939.40137

Table D-2-8: 2035 Estimated Production Commodity Flow by Each County and Commodity Type (CFS35P 3-15)

CFS35P-E	CFS35P3	CFS35P6	CFS35P7	CFS35P8	CFS35P12	CFS35P13	CFS35P15
1	0.67596	10.38062	17.61555	1.72678	20.07895	36.89135	200.91405
2	3.07674	47.24888	80.17873	7.85964	91.39004	167.91389	914.47605
3	8.92931	137.12674	232.69573	22.81057	265.23529	487.32360	2654.01371
4	1.05991	16.27672	27.62172	2.70761	31.48457	57.84635	315.03710
5	0.03666	0.56303	0.95546	0.09366	1.08906	2.00090	10.89711
6	14.62246	224.55605	381.06403	37.35449	434.35421	798.04181	4346.21656
7	0.89685	13.77262	23.37173	2.29102	26.63984	48.94606	266.56520
8	0.49928	7.66728	13.01120	1.27542	14.83066	27.24865	148.39893
9	0.34599	5.31349	9.01655	0.88387	10.27743	18.88287	102.83804
10	0.56436	8.66689	14.70753	1.44171	16.76424	30.80071	167.74377
11	3.63875	55.87991	94.82626	9.29546	108.08689	198.58892	1081.53537
12	0.41740	6.40995	10.87747	1.06627	12.39858	22.78008	124.06262
13	0.72992	11.20950	19.02233	1.86470	21.68313	39.83785	216.96095
14	0.79637	12.23001	20.75335	2.03442	23.65573	43.46338	236.70599
15	0.82041	12.59871	21.37997	2.09576	24.36970	44.77453	243.84662
16	0.04515	0.69339	1.17669	0.11534	1.34119	2.46418	13.42017
17	0.10492	1.61123	2.73425	0.26802	3.11665	5.72621	31.18550
18	58.15458	893.11070	1515.55722	148.56989	1727.54823	3174.01160	17285.98879
19	0.53604	8.23174	13.96918	1.36932	15.92261	29.25459	159.32347
20	1.12453	17.26922	29.30494	2.87267	33.40292	61.37221	334.23927
21	1.19491	18.35007	31.13931	3.05247	35.49374	65.21339	355.15873
22	4.49611	69.04805	117.16949	11.48595	133.55580	245.38303	1336.38083
23	4.40805	67.69392	114.87541	11.26079	130.94088	240.57721	1310.20784
24	1.62842	25.00727	42.43626	4.15986	48.37028	88.87194	484.00557
25	34.21806	525.49427	891.72267	87.41483	1016.42901	1867.51110	10170.65469
26	2.40472	36.92942	62.66787	6.14313	71.43205	131.24195	714.75695
27	17.37542	266.83621	452.81174	44.38784	516.13812	948.29797	5164.52684
28	0.12192	1.87226	3.17717	0.31144	3.62145	6.65374	36.23694
29	14.27327	219.19582	371.96336	36.46281	423.98249	778.98888	4242.45238
100	232.02145	3563.37679	6046.42827	592.76136	6892.12375	12663.32108	68965.72976
Sum	177.19651	2721.24398	4617.80317	452.67575	5263.63374	9670.90895	52668.75007

Table D-2-8: Continued (CFS35P 17-27)

CFS35P-E	CFS35P17	CFS35P18	CFS35P19	CFS35P23	CFS35P24	CFS35P26	CFS35P27
1	70.78284	149.45229	6.44523	7.57624	1.72008	10.70874	0.66258
2	322.17973	680.24381	29.33640	34.48449	7.82912	48.74168	3.01582
3	935.03372	1974.21945	85.14073	100.08127	22.72199	141.45929	8.75249
4	110.98795	234.34407	10.10607	11.87959	2.69713	16.79125	1.03893
5	3.83903	8.10594	0.34958	0.41091	0.09329	0.58082	0.03594
6	1531.19982	3232.98452	139.42480	163.89187	37.20966	231.65194	14.33292
7	93.91291	198.28767	8.55130	10.05196	2.28214	14.20785	0.87910
8	52.28178	110.38829	4.76054	5.59598	1.27048	7.90963	0.48939
9	36.23023	76.49729	3.29910	3.87790	0.88043	5.48142	0.33914
10	59.09661	124.77819	5.38119	6.32540	1.43611	8.94081	0.55319
11	381.03174	804.51286	34.69532	40.78371	9.25938	57.64581	3.56670
12	43.70796	92.28545	3.97988	4.67828	1.06212	6.61259	0.40913
13	76.43326	161.38896	6.95988	8.18103	1.85750	11.56402	0.71547
14	83.39256	176.07655	7.59350	8.92592	2.02650	12.61667	0.78060
15	85.90815	181.38819	7.82242	9.19517	2.08765	12.99689	0.80417
16	4.72803	9.98275	0.43052	0.50606	0.11489	0.71529	0.04426
17	10.98652	23.19770	1.00040	1.17594	0.26699	1.66218	0.10284
18	6089.87050	12858.38692	554.52425	651.82889	147.99239	921.34872	57.00304
19	56.12996	118.51464	5.11101	6.00787	1.36403	8.49188	0.52542
20	117.75508	248.62783	10.72230	12.60391	2.86150	17.81506	1.10226
21	125.12524	264.18902	11.39339	13.39277	3.04060	18.93004	1.17125
22	470.81199	994.08267	42.87130	50.39333	11.44128	71.23023	4.40708
23	461.59000	974.61358	42.03054	49.40626	11.21716	69.83360	4.32076
24	170.51926	360.03326	15.52678	18.25152	4.14371	25.79752	1.59618
25	3583.21462	7565.56161	326.27458	383.52914	87.07480	542.09996	33.54050
26	251.81041	531.68040	22.92914	26.95251	6.11930	38.09668	2.35711
27	1819.48808	3841.69428	165.67616	194.74879	44.21555	275.26891	17.03136
28	12.76639	26.95528	1.16247	1.36645	0.31023	1.93144	0.11950
29	1494.64282	3155.79831	136.09668	159.97900	36.32122	226.12314	13.99064
100	24297.43397	51300.97260	2212.46799	2600.67427	590.44064	3676.01009	227.42712
Sum	18555.45718	39178.27178	1689.59545	1986.08216	450.91725	2807.25405	173.68778

Table D-2-8: Continued (CFS35P 28-39)

CFS35P-E	CFS35P28	CFS35P29	CFS35P30	CFS35P32	CFS35P34	CFS35P35	CFS35P39
1	3.09216	0.87678	1.60626	24.95815	2.24878	2.06807	0.59565
2	14.07414	3.99070	7.31122	113.59799	10.23552	9.41317	2.71120
3	40.84652	11.58185	21.21883	329.68545	29.70570	27.31900	7.86848
4	4.84859	1.37480	2.51865	39.13477	3.52614	3.24275	0.93400
5	0.16772	0.04755	0.08712	1.35367	0.12197	0.11217	0.03231
6	66.89067	18.96643	34.74783	539.89277	48.64615	44.73727	12.88547
7	4.10253	1.16327	2.13116	33.11341	2.98360	2.74387	0.79030
8	2.28392	0.64761	1.18642	18.43461	1.66099	1.52752	0.43996
9	1.58276	0.44878	0.82216	12.77486	1.15105	1.05854	0.30488
10	2.58171	0.73203	1.34106	20.83761	1.87755	1.72663	0.49732
11	16.64545	4.71974	8.64675	134.35059	12.10540	11.13266	3.20648
12	1.90939	0.54141	0.99185	15.41154	1.38860	1.27702	0.36781
13	3.33920	0.94681	1.73450	26.95155	2.42837	2.23316	0.64321
14	3.64303	1.03298	1.89240	29.40449	2.64935	2.43649	0.70176
15	3.75291	1.06413	1.94951	30.29126	2.72933	2.50999	0.72295
16	0.20654	0.05856	0.10729	1.66709	0.15021	0.13814	0.03979
17	0.47996	0.13609	0.24932	3.87398	0.34905	0.32099	0.09245
18	266.04520	75.43459	138.19843	2147.29860	193.47426	177.92856	51.24771
19	2.45208	0.69528	1.27376	19.79153	1.78329	1.63996	0.47235
20	5.14408	1.45861	2.67219	41.52027	3.74103	3.44047	0.99093
21	5.46606	1.54990	2.83944	44.11890	3.97520	3.65580	1.05296
22	20.56792	5.83186	10.68410	166.00794	14.95779	13.75578	3.96196
23	20.16488	5.71765	10.47490	162.75683	14.66482	13.48634	3.88443
24	7.44905	2.11217	3.86958	60.12438	5.41735	4.98208	1.43496
25	156.53185	44.38369	81.31443	1263.41310	113.83644	104.69126	30.15330
26	11.00060	3.11915	5.71432	88.78879	8.00011	7.35718	2.11905
27	79.48573	22.53747	41.28989	641.54502	57.80541	53.16022	15.31153
28	0.55771	0.15814	0.28970	4.50149	0.40559	0.37300	0.10743
29	65.29373	18.51367	33.91812	527.00461	47.48441	43.66918	12.57774
100	1061.42065	300.96039	551.38313	8567.04940	771.88504	709.90136	204.45995
Sum	810.60609	229.84168	421.08120	6542.60525	589.50345	542.13726	156.14839

Table D-2-8: Continued (CFS35P 40-43)

CFS35P-E	CFS35P40	CFS35P43	Total
1	3.70792	13.69344	588.47848
2	16.87679	62.32792	2678.51368
3	48.98047	180.88882	7773.63901
4	5.81411	21.47140	922.74420
5	0.20111	0.74269	31.91768
6	80.21091	296.22133	12730.10397
7	4.91948	18.16811	780.77200
8	2.73872	10.11428	434.66155
9	1.89794	7.00899	301.21373
10	3.09582	11.43265	491.32308
11	19.96013	73.71326	3167.82755
12	2.28962	8.45561	363.38065
13	4.00415	14.78655	635.47600
14	4.36848	16.13287	693.31340
15	4.50025	16.61953	714.22820
16	0.24767	0.91467	39.30788
17	0.57554	2.12542	91.34214
18	319.02396	1178.12809	50630.67511
19	2.94037	10.85873	466.65910
20	6.16844	22.78054	978.99026
21	6.55454	24.20635	1040.26408
22	24.66370	91.08188	3914.27008
23	24.18040	89.29782	3837.60405
24	8.93241	32.98814	1417.65794
25	187.70273	693.19796	29789.96460
26	13.19120	48.71449	2093.52653
27	95.31408	351.99271	15126.93934
28	0.66876	2.46975	106.13826
29	78.29596	289.14912	12426.17736
100	1272.78606	4700.50875	202001.54388
Sum	972.02568	3589.68313	154267.10993

D-2-3-2 CFS7A vs. Employment – Attraction

Table D-2-9: 2007 Estimated Attraction Commodity Flow by Each County and Commodity Type (CFS7A 3-12)

CFS7A-E	CFS7A3	CFS7A5	CFS7A6	CFS7A7	CFS7A8	CFS7A11	CFS7A12
1	1.5922	1.1395	3.0970	7.9276	1.0829	0.5427	7.3926
2	12.2154	8.7419	23.7598	60.8202	8.3080	4.1639	56.7154
3	31.6909	22.6801	61.6411	157.7918	21.5543	10.8028	147.1423
4	5.9860	4.2841	11.6431	29.8041	4.0712	2.0405	27.7934
5	0.2390	0.1710	0.4648	1.1898	0.1625	0.0815	1.1096
6	62.5200	44.7440	121.6060	311.2903	42.5222	21.3115	290.2823
7	4.4242	3.1662	8.6054	22.0283	3.0091	1.5081	20.5415
8	2.6827	1.9199	5.2180	13.3570	1.8246	0.9144	12.4556
9	1.5764	1.1282	3.0663	7.8490	1.0722	0.5374	7.3191
10	2.7856	1.9937	5.4183	13.8695	1.8946	0.9495	12.9335
11	11.6395	8.3302	22.6396	57.9536	7.9164	3.9676	54.0431
12	2.3367	1.6723	4.5451	11.6344	1.5893	0.7965	10.8494
13	2.8709	2.0545	5.5840	14.2937	1.9525	0.9786	13.3291
14	3.7262	2.6666	7.2477	18.5525	2.5343	1.2701	17.2999
15	1.4378	1.0290	2.7966	7.1586	0.9779	0.4901	6.6756
16	0.2406	0.1722	0.4680	1.1980	0.1636	0.0820	1.1171
17	0.5893	0.4217	1.1462	2.9341	0.4008	0.2009	2.7361
18	293.0413	209.7297	569.9869	1459.0994	199.3127	99.8931	1360.6434
19	2.6485	1.8955	5.1516	13.1871	1.8014	0.9028	12.2973
20	5.5636	3.9817	10.8215	27.7013	3.7840	1.8965	25.8320
21	5.6275	4.0274	10.9459	28.0192	3.8274	1.9182	26.1282
22	14.7562	10.5602	28.7018	73.4708	10.0361	5.0299	68.5100
23	9.8170	7.0258	19.0947	48.8785	6.6768	3.3463	45.5805
24	7.9794	5.7105	15.5205	39.7297	5.4271	2.7199	37.0479
25	113.5049	81.2309	220.7754	565.1539	77.1999	38.6913	527.0030
26	4.8598	3.4780	9.4528	24.1970	3.3053	1.6566	22.5639
27	33.2461	23.7937	64.6662	165.5336	22.6119	11.3327	154.3620
28	0.5889	0.4215	1.1455	2.9321	0.4005	0.2007	2.7342
29	58.3944	41.7912	113.5814	290.7507	39.7165	19.9054	271.1279
100	922.6203	660.2447	1794.5647	4593.9332	627.5302	314.5022	4283.5993
Total	698.5808	499.9614	1358.7913	3478.3058	475.1358	238.1317	3243.5658

Table D-2-9: Continued (CFS7A 13-21)

CFS7A-E	CFS7A13	CFS7A14	CFS7A15	CFS7A17	CFS7A18	CFS7A19	CFS7A21
1	5.8338	0.7717	59.8567	22.7822	37.8325	4.7046	1.2295
2	44.7574	5.9201	459.2124	174.7831	290.2491	36.0935	9.4329
3	116.1180	15.3592	1191.3525	453.4569	753.0125	93.6407	24.4721
4	21.9326	2.9012	225.0332	85.6526	142.2350	17.6872	4.6225
5	0.8756	0.1158	8.9834	3.4194	5.6781	0.7061	0.1845
6	229.0747	30.3009	2350.3125	894.5796	1485.5554	184.7335	48.2794
7	16.2102	2.1442	166.3210	63.3038	105.1234	13.0727	3.4165
8	9.8292	1.3002	100.8517	38.3850	63.7432	7.9268	2.0716
9	5.7760	0.7640	59.2612	22.5556	37.4566	4.6580	1.2173
10	10.2063	1.3501	104.7192	39.8580	66.1894	8.2309	2.1511
11	42.6477	5.6412	437.5641	166.5476	276.5694	34.3924	8.9882
12	8.5617	1.1325	87.8444	33.4352	55.5230	6.9045	1.8044
13	10.5186	1.3913	107.9217	41.0769	68.2129	8.4826	2.2169
14	13.6524	1.8059	140.0763	53.3142	88.5355	11.0100	2.8774
15	5.2680	0.6968	54.0514	20.5726	34.1633	4.2483	1.1103
16	0.8816	0.1166	9.0452	3.4428	5.7170	0.7109	0.1858
17	2.1592	0.2856	22.1538	8.4320	14.0023	1.7412	0.4551
18	1073.7376	142.0311	11016.1646	4193.1729	6963.1306	865.8897	226.2920
19	9.7043	1.2836	99.5656	37.8973	62.9316	7.8259	2.0452
20	20.3852	2.6964	209.1534	79.6079	132.1971	16.4393	4.2962
21	20.6190	2.7274	211.5555	80.5209	133.7152	16.6280	4.3456
22	54.0652	7.1516	554.7131	211.1311	350.6128	43.6011	11.3949
23	35.9694	4.7578	369.0511	140.4679	233.2633	29.0069	7.5809
24	29.2363	3.8672	299.9710	114.1727	189.5979	23.5776	6.1618
25	415.8875	55.0110	4266.9579	1624.0954	2697.0022	335.3864	87.6505
26	17.8063	2.3553	182.6943	69.5366	115.4738	14.3597	3.7528
27	121.8135	16.1132	1249.8171	475.7061	789.9691	98.2354	25.6734
28	2.1577	0.2854	22.1388	8.4261	13.9928	1.7401	0.4548
29	213.9604	28.3015	2195.2097	835.5504	1387.5227	172.5442	45.0932
100	3380.5407	447.1486	34682.9284	13201.0137	21921.9571	2726.2093	712.4581
Total	2559.6453	338.5789	26261.5528	9995.8828	16599.2079	2064.1783	539.4569

Table D-2-9: Continued (CFS7A 23-30)

CFS7A-E	CFS7A23	CFS7A24	CFS7A26	CFS7A27	CFS7A28	CFS7A29	CFS7A30
1	1.9497	1.8880	5.0622	1.5382	0.9852	0.5865	0.8977
2	14.9582	14.4847	38.8354	11.8008	7.5581	4.4993	6.8870
3	38.8076	37.5783	100.7549	30.6159	19.6088	11.6730	17.8676
4	7.3303	7.0981	19.0321	5.7830	3.7038	2.2049	3.3751
5	0.2926	0.2834	0.7598	0.2309	0.1479	0.0880	0.1347
6	76.5602	74.1351	198.7717	60.3998	38.6840	23.0287	35.2497
7	5.4176	5.2462	14.0658	4.2741	2.7374	1.6296	2.4944
8	3.2850	3.1811	8.5290	2.5917	1.6599	0.9881	1.5125
9	1.9304	1.8693	5.0118	1.5230	0.9754	0.5806	0.8888
10	3.4113	3.3032	8.8567	2.6912	1.7236	1.0260	1.5706
11	14.2535	13.8019	37.0067	11.2448	7.2019	4.2873	6.5627
12	2.8615	2.7708	7.4293	2.2575	1.4458	0.8607	1.3175
13	3.5154	3.4042	9.1270	2.7734	1.7763	1.0574	1.6186
14	4.5628	4.4184	11.8461	3.5997	2.3055	1.3724	2.1008
15	1.7606	1.7049	4.5712	1.3890	0.8896	0.5296	0.8106
16	0.2946	0.2853	0.7650	0.2324	0.1489	0.0886	0.1357
17	0.7216	0.6988	1.8735	0.5693	0.3646	0.2171	0.3322
18	358.8649	347.4807	931.7161	283.1109	181.3220	107.9413	165.2283
19	3.2433	3.1406	8.4207	2.5587	1.6388	0.9755	1.4933
20	6.8129	6.5972	17.6885	5.3748	3.4424	2.0493	3.1368
21	6.8912	6.6730	17.8917	5.4366	3.4819	2.0728	3.1729
22	18.0696	17.4975	46.9125	14.2555	9.1302	5.4351	8.3193
23	12.0215	11.6408	31.2116	9.4840	6.0741	3.6160	5.5350
24	9.7712	9.4619	25.3687	7.7087	4.9372	2.9391	4.4988
25	138.9944	134.5917	360.8619	109.6550	70.2316	41.8084	63.9944
26	5.9511	5.7627	15.4508	4.6950	3.0070	1.7900	2.7400
27	40.7126	39.4227	105.7017	32.1189	20.5708	12.2459	18.7449
28	0.7211	0.6983	1.8723	0.5689	0.3644	0.2169	0.3320
29	71.5083	69.2428	185.6549	56.4140	36.1315	21.5091	32.9236
100	1129.7943	1094.0155	2933.0538	891.3110	570.8873	339.8349	520.1407
Total	855.4752	828.3615	2221.0497	674.8959	432.2485	257.3173	393.8756

Table D-2-9: Continued (CFS7A 31-39)

CFS7A-E	CFS7A31	CFS7A32	CFS7A33	CFS7A34	CFS7A35	CFS7A36	CFS7A39
1	9.1623	5.4557	2.3330	1.4662	0.4347	1.5948	0.2572
2	70.2906	41.8559	17.8988	11.2484	3.3350	12.2351	1.9733
3	182.3620	108.5900	46.4362	29.1827	8.6522	31.7421	5.1197
4	34.4471	20.5112	8.7712	5.5121	1.6343	5.9957	0.9671
5	1.3752	0.8188	0.3502	0.2200	0.0652	0.2394	0.0386
6	359.7690	214.2281	91.6101	57.5714	17.0693	62.6212	10.1002
7	25.4584	15.1595	6.4826	4.0740	1.2079	4.4314	0.7147
8	15.4372	9.1922	3.9308	2.4703	0.7324	2.6871	0.4334
9	9.0713	5.4015	2.3098	1.4516	0.4304	1.5789	0.2547
10	16.0303	9.5449	4.0817	2.5651	0.7606	2.7901	0.4500
11	66.9803	39.8831	17.0552	10.7182	3.1778	11.6584	1.8804
12	13.4468	8.0067	3.4239	2.1517	0.6380	2.3405	0.3775
13	16.5197	9.8368	4.2065	2.6435	0.7838	2.8754	0.4638
14	21.4411	12.7674	5.4597	3.4312	1.0173	3.7322	0.6019
15	8.2736	4.9266	2.1067	1.3239	0.3925	1.4401	0.2323
16	1.3846	0.8244	0.3526	0.2216	0.0657	0.2410	0.0389
17	3.3910	2.0192	0.8635	0.5426	0.1609	0.5903	0.0952
18	1686.3651	1004.1410	429.3995	269.8523	80.0077	293.5121	47.3434
19	15.2411	9.0752	3.8808	2.4389	0.7231	2.6528	0.4279
20	32.0153	19.0637	8.1522	5.1232	1.5190	5.5726	0.8988
21	32.3831	19.2825	8.2458	5.1820	1.5364	5.6366	0.9091
22	84.9104	50.5611	21.6214	13.5880	4.0288	14.7796	2.3838
23	56.4917	33.6381	14.3846	9.0398	2.6802	9.8329	1.5860
24	45.9163	27.3413	11.6919	7.3478	2.1786	7.9924	1.2891
25	653.1462	388.9294	166.3174	104.5220	30.9892	113.6878	18.3365
26	27.9654	16.6521	7.1209	4.4751	1.3268	4.8677	0.7851
27	191.3161	113.9190	48.7150	30.6145	9.0770	33.2998	5.3710
28	3.3888	2.0178	0.8629	0.5423	0.1608	0.5899	0.0951
29	336.0278	200.0913	85.5648	53.7727	15.9429	58.4887	9.4337
100	5308.7496	3161.3672	1351.8913	849.6222	251.8924	924.0839	149.0377
Total	4020.0077	2393.7348	1023.6297	643.2932	190.7285	699.7067	112.8585

Table D-2-9: Continued (CFS7A 40-99)

CFS7A-E	CFS7A40	CFS7A41	CFS7A43	CFS7A99	Sum
1	1.7594	1.6231	5.3811	0.2804	198.4406
2	13.4982	12.4522	41.2822	2.1510	1522.4173
3	35.0196	32.3052	107.1030	5.5805	3949.7146
4	6.6146	6.1020	20.2312	1.0541	746.0543
5	0.2641	0.2436	0.8077	0.0421	29.7833
6	69.0857	63.7320	211.2954	11.0093	7792.0333
7	4.8888	4.5100	14.9520	0.7791	551.3980
8	2.9644	2.7347	9.0664	0.4724	334.3485
9	1.7419	1.6070	5.3276	0.2776	196.4690
10	3.0781	2.8396	9.4147	0.4905	347.1779
11	12.8619	11.8651	39.3383	2.0496	1450.6679
12	2.5821	2.3820	7.8974	0.4115	291.2307
13	3.1723	2.9265	9.7021	0.5055	357.7925
14	4.1174	3.7984	12.5925	0.6561	464.3899
15	1.5888	1.4657	4.8592	0.2532	179.1944
16	0.2659	0.2453	0.8132	0.0424	29.9874
17	0.6512	0.6007	1.9916	0.1038	73.4456
18	323.8242	298.7220	990.4191	51.6032	36522.9791
19	2.9267	2.6999	8.9513	0.4664	330.0924
20	6.1479	5.6714	18.8030	0.9797	693.4050
21	6.2184	5.7366	19.0189	0.9910	701.3661
22	16.3053	15.0422	49.8682	2.5984	1839.0419
23	10.8479	10.0073	33.1781	1.7287	1223.5153
24	8.8173	8.1341	26.9671	1.4051	994.4860
25	125.4258	115.7052	383.5980	19.9873	14146.3325
26	5.3701	4.9541	16.4243	0.8558	605.6865
27	36.7372	33.8906	112.3615	5.8544	4143.5476
28	0.6507	0.6003	1.9902	0.1037	73.3956
29	64.5275	59.5264	197.3521	10.2828	7277.8445
100	1019.5238	940.5058	3117.8515	162.4620	114985.2755
Total	771.9532	712.1231	2360.9874	123.0155	87066.2376

Table D-2-10: 2035 Estimated Attraction Commodity Flow by Each County and Commodity Type (CFS35A 3-12)

CFS35A-E	CFS35A3	CFS35A5	CFS35A6	CFS35A7	CFS35A8	CFS35A11	CFS35A12
1	4.45566	3.18876	8.66659	22.18479	3.03044	1.51882	20.68760
2	19.20806	13.74618	37.36110	95.63675	13.06396	6.54756	89.18192
3	57.41429	41.08937	111.67504	285.87170	39.05001	19.57156	266.57853
4	6.86512	4.91332	13.35317	34.18145	4.66918	2.34016	31.87556
5	0.27131	0.19418	0.52772	1.35084	0.18452	0.09248	1.25973
6	82.86076	59.30145	161.17030	412.56900	56.35683	28.24537	384.72696
7	5.48856	3.92793	10.67565	27.32766	3.73295	1.87090	25.48324
8	3.10832	2.22450	6.04592	15.47620	2.11405	1.05953	14.43173
9	2.27080	1.62508	4.41687	11.30617	1.54442	0.77404	10.54288
10	3.24772	2.32437	6.31705	16.17023	2.20885	1.10704	15.07899
11	23.95120	17.14162	46.58686	119.25499	16.29020	8.16452	111.20841
12	3.63729	2.60324	7.07480	18.11037	2.47387	1.23990	16.88878
13	4.58633	3.28221	8.92076	22.83485	3.11923	1.56334	21.29389
14	5.50103	3.93675	10.69991	27.38961	3.74141	1.87514	25.54056
15	5.32337	3.80981	10.35434	26.50478	3.62055	1.81460	24.71663
16	0.30285	0.21675	0.58907	1.50788	0.20598	0.10324	1.40616
17	0.69730	0.49902	1.35630	3.47177	0.47424	0.23769	3.23749
18	382.54036	273.78400	744.06929	1904.73202	260.18596	130.40248	1776.20716
19	3.51820	2.51791	6.84316	17.51724	2.39285	1.19928	16.33532
20	8.17516	5.85072	15.90130	40.70482	5.56027	2.78675	37.95784
21	7.60107	5.43985	14.78465	37.84569	5.16971	2.59099	35.29153
22	24.90707	17.82484	48.44610	124.01295	16.94014	8.49005	115.64028
23	26.07182	18.65905	50.71162	129.81142	17.73221	8.88720	121.05225
24	9.79820	7.01221	19.05823	48.78567	6.66411	3.33994	45.49278
25	204.45603	146.32168	397.68211	1018.01460	139.06056	69.69512	949.29619
26	14.98894	10.72724	29.15461	74.63030	10.19448	5.10936	69.59399
27	98.93721	70.80884	192.44018	492.61774	67.29147	33.72552	459.37523
28	0.75140	0.53774	1.46154	3.74116	0.51104	0.25613	3.48865
29	88.40670	63.27018	171.95756	440.18522	60.12920	30.13612	410.47802
100	1448.04770	1036.25229	2816.55987	7210.17377	984.90809	493.61245	6723.11803
Total	1099.34216	786.77880	2138.30180	5473.74783	747.71271	374.74483	5104.34831

Table D-2-10: Continued (CFS35A 13-21)

CFS35A-E	CFS35A13	CFS35A14	CFS35A15	CFS35A17	CFS35A18	CFS35A19	CFS35A21
1	16.32559	2.15944	167.49975	63.75417	105.86999	13.16553	3.44072
2	70.37880	9.30910	722.07618	274.83703	456.39813	56.75506	14.83267
3	210.37202	27.82638	2158.33462	821.53035	1364.22323	169.64820	44.33584
4	25.15405	3.32726	258.08048	98.23274	163.12413	20.28492	5.30138
5	0.99410	0.13150	10.19910	3.88218	6.44658	0.80166	0.20950
6	303.60563	40.15945	3114.94116	1185.63512	1968.86891	244.83617	63.98681
7	20.11009	2.66001	206.33097	78.53316	130.41258	16.21755	4.23836
8	11.38875	1.50643	116.85100	44.47510	73.85613	9.18435	2.40031
9	8.32007	1.10054	85.36197	32.49059	53.95432	6.70964	1.75350
10	11.89938	1.57406	122.08889	46.46980	77.16861	9.59628	2.50793
11	87.75928	11.60840	900.38660	342.71733	569.11101	70.77132	18.49538
12	13.32756	1.76291	136.73593	52.04712	86.42738	10.74758	2.80871
13	16.80409	2.22273	172.40726	65.62260	108.97264	13.55127	3.54164
14	20.15566	2.66603	206.79466	78.70982	130.70638	16.25429	4.24794
15	19.50491	2.57999	200.12024	76.17067	126.48891	15.72920	4.11079
16	1.10966	0.14678	11.38520	4.33346	7.19610	0.89486	0.23387
17	2.55487	0.33793	26.21329	9.97716	16.56812	2.06032	0.53847
18	1401.67839	185.41011	14380.46209	5473.83945	9089.71906	1130.34367	295.40388
19	12.89089	1.70513	132.25825	50.34150	83.59587	10.39558	2.71679
20	29.95443	3.96215	307.32686	116.97684	194.25014	24.15614	6.31293
21	27.85021	3.68389	285.74477	108.75992	180.60847	22.45947	5.86966
22	91.25839	12.07134	936.29562	356.37528	591.80318	73.59503	19.23356
23	95.52733	12.63594	980.10534	373.05367	619.49515	77.03602	20.13322
24	35.90061	4.74872	368.34161	140.19770	232.81376	28.95175	7.56634
25	749.14334	99.09215	7685.94267	2925.50050	4858.08720	604.13100	157.88407
26	54.91979	7.26457	563.46623	214.47178	356.15090	44.28910	11.57465
27	362.51098	47.95230	3719.28127	1415.68300	2350.87952	292.34109	76.40124
28	2.75307	0.36416	28.24711	10.75117	17.85365	2.22021	0.58024
29	323.92900	42.84742	3323.40818	1264.99365	2100.64068	261.22438	68.26898
100	5305.77270	701.80158	54433.89344	20719.01836	34406.24343	4278.76953	1118.19581
Total	4028.08092	532.81680	41326.68730	15730.36287	26121.69074	3248.35162	848.92938

Table D-2-10: Continued (CFS35A 23-30)

CFS35A-E	CFS35A23	CFS35A24	CFS35A26	CFS35A27	CFS35A28	CFS35A29	CFS35A30
1	5.45618	5.28345	14.16584	4.30452	2.75690	1.64117	2.51214
2	23.52097	22.77629	61.06610	18.55613	11.88476	7.07499	10.82932
3	70.30792	68.08004	182.53694	55.46680	35.52523	21.14801	32.37066
4	8.40687	8.14056	21.82721	6.63236	4.24772	2.52871	3.87078
5	0.33225	0.32171	0.86264	0.26211	0.16787	0.09993	0.15298
6	101.46945	98.25433	263.44191	80.05088	51.26988	30.52109	46.71816
7	6.72095	6.50827	17.44952	5.30235	3.39600	2.02163	3.09446
8	3.80624	3.68582	9.88215	3.00286	1.92322	1.14490	1.75248
9	2.78069	2.69263	7.21926	2.19374	1.40502	0.83639	1.28025
10	3.97713	3.85109	10.32587	3.13763	2.00947	1.19624	1.83116
11	29.33052	28.40072	76.15106	23.13921	14.81980	8.82223	13.50445
12	4.45428	4.31299	11.56496	3.51401	2.25057	1.33977	2.05090
13	5.61609	5.43835	14.58081	4.43069	2.83768	1.68929	2.58573
14	6.73617	6.52299	17.48862	5.31433	3.40370	2.02619	3.10139
15	6.51876	6.31232	16.92483	5.14279	3.29374	1.96079	3.00141
16	0.37086	0.35912	0.96289	0.29258	0.18738	0.11155	0.17076
17	0.85384	0.82685	2.21683	0.67363	0.43144	0.25684	0.39313
18	468.46913	453.60434	1216.27288	369.57748	236.70073	140.90818	215.69092
19	4.30828	4.17182	11.18571	3.39890	2.17686	1.29589	1.98365
20	10.01103	9.69395	25.99159	7.89789	5.05838	3.01122	4.60929
21	9.30796	9.01321	24.16613	7.34325	4.70308	2.79974	4.28556
22	30.50023	29.53418	79.18491	24.06225	15.41107	9.17406	14.04246
23	31.92677	30.91538	82.89128	25.18764	16.13164	9.60328	14.69974
24	11.99842	11.61859	31.15120	9.46585	6.06259	3.60903	5.52428
25	250.37260	242.43817	650.02201	197.52212	126.50850	75.30967	115.27334
26	18.35512	17.77351	47.65505	14.48067	9.27429	5.52099	8.45103
27	121.15938	117.31746	314.56432	95.58406	61.21752	36.44291	55.78408
28	0.92011	0.89101	2.38888	0.72591	0.46491	0.27676	0.42364
29	108.26105	104.83015	281.07320	85.40859	54.70174	32.56387	49.84485
100	1773.21704	1717.04315	4603.41494	1398.91175	896.00709	533.37018	816.35857
Total	1346.24922	1303.56927	3495.21459	1062.07124	680.22173	404.93531	619.83298

Table D-2-10: Continued (CFS35A 31-39)

CFS35A-E	CFS35A31	CFS35A32	CFS35A33	CFS35A34	CFS35A35	CFS35A36	CFS35A39
1	25.63958	15.26728	6.52873	4.10295	1.21650	4.46282	0.71981
2	110.52758	65.81617	28.14488	17.68748	5.24409	19.23883	3.10296
3	330.38441	196.73270	84.12855	52.87037	15.67524	57.50617	9.27528
4	39.50621	23.52369	10.05940	6.32167	1.87435	6.87624	1.10911
5	1.56133	0.92964	0.39754	0.24983	0.07408	0.27174	0.04383
6	476.81982	283.92723	121.41543	76.30233	22.62284	82.99377	13.38631
7	31.58287	18.80651	8.04221	5.05410	1.49851	5.49743	0.88667
8	17.88629	10.65059	4.55450	2.86224	0.84864	3.11335	0.50214
9	13.06669	7.78064	3.32722	2.09101	0.61998	2.27436	0.36683
10	18.68947	11.12822	4.75874	2.99059	0.88672	3.25291	0.52469
11	137.82997	82.07020	35.09557	22.05554	6.53926	23.98969	3.86948
12	20.93194	12.46340	5.32971	3.34941	0.99307	3.64316	0.58765
13	26.39086	15.71485	6.72012	4.22318	1.25217	4.59358	0.74090
14	31.65384	18.84895	8.06035	5.06555	1.50190	5.50979	0.88865
15	30.63323	18.24060	7.80020	4.90191	1.45339	5.33196	0.86000
16	1.74279	1.03772	0.44376	0.27887	0.08269	0.30334	0.04893
17	4.01239	2.38926	1.02171	0.64208	0.19038	0.69842	0.11264
18	2201.40356	1310.82039	560.54441	352.26953	104.44354	383.14970	61.80266
19	20.24561	12.05519	5.15514	3.23972	0.96056	3.52386	0.56838
20	47.04355	28.01238	11.97890	7.52813	2.23201	8.18835	1.32071
21	43.73977	26.04502	11.13760	6.99935	2.07526	7.61332	1.22796
22	143.32264	85.34317	36.49519	22.93550	6.80026	24.94644	4.02364
23	150.03013	89.33601	38.20264	24.00790	7.11819	26.11370	4.21197
24	56.38240	33.57355	14.35701	9.02264	2.67515	9.81401	1.58289
25	1176.51626	700.58001	299.58811	188.27611	55.82094	204.78247	33.02967
26	86.25388	51.35983	21.96294	13.80246	4.09235	15.01286	2.42150
27	569.34904	339.01584	144.97290	91.10690	27.01248	99.09567	15.98401
28	4.32379	2.57462	1.10098	0.69191	0.20515	0.75261	0.12139
29	508.73161	302.93049	129.54177	81.40979	24.13696	88.54812	14.28222
100	8332.06924	4961.75953	2121.79074	1333.48131	395.34561	1450.32403	233.91404
Total	6326.20152	3766.97411	1610.86622	1012.33905	300.14667	1101.09867	177.60288

Table D-2-10: Continued (CFS35A 40-99)

CFS35A-E	CFS35A40	CFS35A41	CFS35A43	CFS35A99	Total
1	4.92357	4.54204	15.05836	0.78459	555.31430
2	21.22526	19.58042	64.91358	3.38233	2393.90465
3	63.44526	58.52729	194.03772	10.11016	7155.64983
4	7.58611	6.99821	23.20244	1.20890	855.62347
5	0.29981	0.27657	0.91699	0.04778	33.81402
6	91.56321	84.46706	280.04013	14.59114	10327.11888
7	6.06492	5.59495	18.54893	0.96648	684.04635
8	3.43469	3.16858	10.50477	0.54734	387.39310
9	2.50922	2.31482	7.67411	0.39985	283.00359
10	3.58869	3.31068	10.97645	0.57189	404.76685
11	26.46697	24.41551	80.94897	4.21764	2985.11393
12	4.01941	3.70780	12.29362	0.64051	453.33259
13	5.06788	4.67524	15.49947	0.80759	571.58727
14	6.07867	5.60767	18.59049	0.96866	685.58712
15	5.88241	5.42656	17.99118	0.93740	663.46227
16	0.33466	0.30873	1.02356	0.05333	37.74538
17	0.77051	0.71082	2.35651	0.12279	86.90404
18	422.72661	389.95610	1292.90441	67.36323	47677.38572
19	3.88771	3.58640	11.89047	0.61952	438.48167
20	9.03384	8.33364	27.62920	1.43957	1018.88998
21	8.39924	7.74842	25.68872	1.33848	947.33194
22	27.52225	25.38991	84.17397	4.38581	3104.14178
23	28.80971	26.57724	88.11386	4.59103	3249.38032
24	10.82712	9.98815	33.11389	1.72537	1221.16374
25	225.93116	208.41952	690.97678	36.00292	25481.67757
26	16.56304	15.27951	50.65757	2.63941	1868.09195
27	109.32824	100.85515	334.38351	17.42219	12330.84125
28	0.83029	0.76597	2.53939	0.13231	93.64689
29	97.69246	90.12050	298.78227	15.56769	11018.30262
100	1600.14687	1476.11884	4893.45407	254.98209	180468.07615
Total	1214.81289	1120.65346	3715.43132	193.58589	137013.70308

D-2-3-3 CFS7I vs. Employment – Within Utah

Table D-2-11: 2007 Estimated Within Utah Commodity Flow by Each County and Commodity Type (CFS7I 3-14)

CFS7I-E	CFS7I3	CFS7I6	CFS7I7	CFS7I8	CFS7I12	CFS7I13	CFS7I14
1	0.18006	1.19867	4.48338	0.65849	7.20481	1.84428	0.62248
2	1.38136	9.19592	34.39619	5.05177	55.27510	14.14884	4.77562
3	3.58378	23.85806	89.23740	13.10631	143.40556	36.70787	12.38981
4	0.67694	4.50650	16.85587	2.47570	27.08678	6.93392	2.34025
5	0.02702	0.17991	0.67291	0.09884	1.08133	0.27682	0.09342
6	7.07018	47.06731	176.04750	25.85650	282.90918	72.41817	24.44290
7	0.50031	3.33068	12.45778	1.82969	20.01989	5.12456	1.72966
8	0.30337	2.01960	7.55392	1.10946	12.13924	3.10737	1.04880
9	0.17827	1.18678	4.43881	0.65195	7.13341	1.82595	0.61631
10	0.31502	2.09716	7.84379	1.15210	12.60500	3.22675	1.08906
11	1.31628	8.76275	32.77550	4.81386	52.66982	13.48258	4.55054
12	0.26425	1.75916	6.57984	0.96641	10.57367	2.70671	0.91354
13	0.32465	2.16118	8.08367	1.18726	12.99048	3.32524	1.12235
14	0.42137	2.80513	10.49189	1.54097	16.86101	4.31588	1.45675
15	0.16259	1.08239	4.04856	0.59462	6.50594	1.66541	0.56210
16	0.02721	0.18113	0.67752	0.09951	1.08874	0.27870	0.09406
17	0.06664	0.44363	1.65936	0.24371	2.66658	0.68258	0.23039
18	33.13992	220.61998	825.18943	121.19862	1326.06966	339.45052	114.57017
19	0.29951	1.99392	7.45794	1.09537	11.98478	3.06790	1.03545
20	0.62916	4.18847	15.66633	2.30093	25.17567	6.44443	2.17510
21	0.63639	4.23658	15.84599	2.32737	25.46465	6.51844	2.20009
22	1.66870	11.10876	41.54925	6.10249	66.77227	17.09155	5.76901
23	1.11016	7.39052	27.64318	4.06005	44.42216	11.37128	3.83799
24	0.90236	6.00716	22.46844	3.29999	36.10744	9.24253	3.11960
25	12.83581	85.45070	319.61152	46.94145	513.62736	131.47217	44.37623
26	0.54958	3.65861	13.68435	2.00987	21.99092	5.62917	1.89997
27	3.75972	25.02913	93.61591	13.74984	150.44148	38.51012	12.99795
28	0.06660	0.44334	1.65821	0.24355	2.66479	0.68213	0.23023
29	6.60362	43.96161	164.43094	24.15023	264.24219	67.63933	22.82994
100	104.33359	694.57401	2597.87453	381.53844	4175.09268	1068.59440	360.71489
Sum	79.00084	525.92474	1967.12539	288.91690	3161.17991	809.19119	273.11977

Table D-2-11: Continued (CFS7I 15-27)

CFS7I-E	CFS7I15	CFS7I17	CFS7I18	CFS7I19	CFS7I21	CFS7I26	CFS7I27
1	50.92792	21.64011	37.37986	1.91890	0.57875	2.18124	0.19806
2	390.71048	166.02236	286.77266	14.72156	4.44004	16.73425	1.51952
3	1013.65633	430.72795	743.98860	38.19347	11.51920	43.41546	3.94216
4	191.46893	81.35692	140.53087	7.21415	2.17586	8.20063	0.74462
5	7.64373	3.24785	5.61011	0.28800	0.08686	0.32739	0.02973
6	1999.76566	849.73619	1467.75402	75.34777	22.72533	85.65073	7.77712
7	141.51110	60.13103	103.86624	5.33199	1.60817	6.06089	0.55034
8	85.80755	36.46101	62.98116	3.23311	0.97514	3.67510	0.33371
9	50.42319	21.42568	37.00911	1.89988	0.57302	2.15964	0.19610
10	89.10271	37.85993	65.39722	3.35717	1.01257	3.81629	0.34652
11	372.30268	158.19723	273.25447	14.02774	4.23084	15.94591	1.44788
12	74.74199	31.75872	54.85793	2.81614	0.84937	3.20123	0.29067
13	91.82506	39.01774	67.39769	3.45981	1.04353	3.93284	0.35712
14	119.18222	50.64314	87.47753	4.49067	1.35442	5.10456	0.46351
15	45.98818	19.54103	33.75438	1.73276	0.52262	1.96967	0.17885
16	7.69595	3.27011	5.64864	0.28997	0.08746	0.32962	0.02993
17	18.84906	8.00926	13.83502	0.71021	0.21421	0.80730	0.07331
18	9373.47089	3982.93675	6879.55466	353.17283	106.51888	401.47531	36.45262
19	84.71586	35.99706	62.17819	3.19196	0.96272	3.62840	0.32946
20	177.95484	75.61677	130.61341	6.70513	2.02229	7.62186	0.69207
21	180.00006	76.48475	132.11447	6.78212	2.04554	7.70943	0.70003
22	471.98445	200.55486	346.42307	17.78371	5.36374	20.21513	1.83558
23	314.00464	133.42485	230.46905	11.83112	3.56836	13.44888	1.22117
24	255.22710	108.45107	187.33043	9.61665	2.90045	10.93135	0.99259
25	3630.54857	1542.71330	2664.69635	136.79498	41.25768	155.49815	14.11935
26	155.44550	66.05115	114.09240	5.85694	1.76651	6.65774	0.60454
27	1063.41974	451.86079	780.50555	40.06756	12.08471	45.54669	4.13563
28	18.83651	8.00387	13.82566	0.70973	0.21406	0.80676	0.07326
29	1867.80263	793.66865	1370.89432	70.37609	21.22570	79.99899	7.26392
100	29510.26365	12540.16330	21659.73132	1111.94655	335.35917	1263.94225	114.76858
Sum	22345.01355	9494.81013	16400.21304	841.92211	253.92805	957.05144	86.89937

Table D-2-11: Continued (CFS7I 28-35)

CFS7I-E	CFS7I28	CFS7I29	CFS7I31	CFS7I32	CFS7I33	CFS7I34	CFS7I35
1	0.38326	0.13118	6.04730	3.63967	0.70737	0.54532	0.05659
2	2.94039	1.00643	46.39385	27.92320	5.42671	4.18355	0.43415
3	7.62842	2.61108	120.36385	72.44413	14.07910	10.85387	1.12635
4	1.44091	0.49319	22.73545	13.68378	2.65946	2.05016	0.21275
5	0.05752	0.01969	0.90763	0.54628	0.10617	0.08185	0.00849
6	15.04959	5.15112	237.45670	142.91896	27.77558	21.41258	2.22207
7	1.06495	0.36452	16.80335	10.11335	1.96550	1.51525	0.15724
8	0.64575	0.22103	10.18898	6.13237	1.19181	0.91879	0.09535
9	0.37945	0.12988	5.98736	3.60362	0.70033	0.53991	0.05603
10	0.67053	0.22951	10.58026	6.36796	1.23760	0.95407	0.09900
11	2.80178	0.95900	44.20806	26.60775	5.17117	3.98649	0.41369
12	0.56248	0.19252	8.87503	5.34165	1.03814	0.80030	0.08305
13	0.69104	0.23653	10.90352	6.56244	1.27538	0.98320	0.10203
14	0.89691	0.30700	14.15197	8.51760	1.65533	1.27615	0.13243
15	0.34609	0.11846	5.46074	3.28664	0.63876	0.49242	0.05110
16	0.05792	0.01982	0.91383	0.55001	0.10689	0.08240	0.00855
17	0.14185	0.04855	2.23818	1.34707	0.26180	0.20182	0.02094
18	70.54088	24.14452	1113.02714	669.91179	130.19433	100.36782	10.41542
19	0.63752	0.21822	10.05935	6.05444	1.17668	0.90711	0.09413
20	1.33921	0.45839	21.13076	12.71802	2.47172	1.90548	0.19774
21	1.35460	0.46366	21.37361	12.86415	2.50011	1.92737	0.20001
22	3.55192	1.21578	56.04450	33.73148	6.55537	5.05377	0.52444
23	2.36309	0.80883	37.28562	22.44114	4.36139	3.36221	0.34891
24	1.92072	0.65744	30.30624	18.24032	3.54492	2.73287	0.28360
25	27.32224	9.35194	431.09955	259.46813	50.42541	38.87454	4.03416
26	1.16981	0.40041	18.45795	11.10928	2.15904	1.66443	0.17272
27	8.00284	2.73920	126.27287	76.00034	14.77034	11.38664	1.18162
28	0.14175	0.04852	2.23669	1.34618	0.26163	0.20169	0.02093
29	14.05642	4.81123	221.78711	133.48832	25.94268	19.99969	2.07544
100	222.08385	76.01779	3504.11546	2109.04577	409.85335	315.98626	32.79119
Sum	168.15983	57.55768	2653.29745	1596.96007	310.36072	239.26174	24.82894

Table D-2-11: Continued (CFS7I 40-43)

CFS7I-E	CFS7I40	CFS7I43	Total
1	0.54789	2.99413	146.06968
2	4.20329	22.97055	1120.62779
3	10.90498	59.59338	2907.33712
4	2.05983	11.25652	549.16002
5	0.08223	0.44936	21.92316
6	21.51360	117.56643	5735.63521
7	1.52239	8.31965	405.87851
8	0.92312	5.04476	246.11052
9	0.54246	2.96434	144.62149
10	0.95857	5.23822	255.55703
11	4.00525	21.88766	1067.81895
12	0.80408	4.39412	214.37102
13	0.98786	5.39842	263.36903
14	1.28217	7.00685	341.83545
15	0.49474	2.70374	131.90178
16	0.08279	0.45245	22.07323
17	0.20278	1.10817	54.06243
18	100.84037	551.04638	26884.30889
19	0.91138	4.98043	242.97778
20	1.91445	10.46219	510.40444
21	1.93645	10.58235	516.26819
22	5.07764	27.74765	1353.72511
23	3.37808	18.46054	900.61322
24	2.74575	15.00503	732.03405
25	39.05766	213.44014	10413.01738
26	1.67229	9.13867	445.84185
27	11.44033	62.51788	3050.03686
28	0.20264	1.10742	54.02614
29	20.09393	109.80794	5357.15092
100	317.47320	1734.89621	84641.16045
Sum	240.38901	1313.64537	64088.75724

Table D-2-12: 2035 Estimated Within Utah Commodity Flow by Each County and Commodity Type (CFS35I 3-14)

CFS35I-E	CFS35I3	CFS35I6	CFS35I7	CFS35I8	CFS35I12	CFS35I13	CFS35I14
1	0.50387	3.35434	12.54641	1.84271	20.16214	5.16102	1.74195
2	2.17211	14.45999	54.08616	7.94359	86.91730	22.24811	7.50942
3	6.49274	43.22335	161.67188	23.74464	259.80805	66.50337	22.44662
4	0.77636	5.16833	19.33157	2.83930	31.06504	7.95227	2.68396
5	0.03068	0.20425	0.76399	0.11221	1.22768	0.31428	0.10607
6	9.37046	62.38045	233.32536	34.26892	374.95404	95.97933	32.39536
7	0.62067	4.13192	15.45482	2.26985	24.83612	6.35735	2.14577
8	0.35150	2.34000	8.75241	1.28548	14.06519	3.60034	1.21520
9	0.25679	1.70948	6.39394	0.93910	10.27535	2.63018	0.88776
10	0.36728	2.44503	9.14496	1.34321	14.69595	3.76201	1.26971
11	2.70859	18.03163	67.44457	9.90580	108.38221	27.74398	9.36395
12	0.41134	2.73838	10.24254	1.50437	16.45920	4.21344	1.42202
13	0.51864	3.45256	12.91411	1.89670	20.75294	5.31220	1.79301
14	0.62208	4.14123	15.48959	2.27495	24.89243	6.37160	2.15063
15	0.60200	4.00754	14.98990	2.20160	24.08827	6.16619	2.08117
16	0.03425	0.22800	0.85280	0.12525	1.37041	0.35081	0.11840
17	0.07885	0.52492	1.96344	0.28837	3.15524	0.80766	0.27260
18	43.26138	287.99945	1077.21637	158.21430	1731.07279	443.12259	149.56153
19	0.39786	2.64863	9.90688	1.45505	15.92015	4.07527	1.37545
20	0.92450	6.15458	23.02029	3.38101	36.99365	9.46947	3.19612
21	0.85957	5.72231	21.40325	3.14357	34.39520	8.80440	2.97167
22	2.81664	18.75068	70.13236	10.30056	112.70638	28.84930	9.73761
23	2.94837	19.62759	73.41456	10.78263	117.97618	30.19964	10.19296
24	1.10804	7.37640	27.59000	4.05219	44.33775	11.34926	3.83067
25	23.12121	153.92223	575.71967	84.55592	925.19964	236.82139	79.93502
26	1.69505	11.28419	42.20666	6.19904	67.82607	17.36208	5.86002
27	11.18872	74.48529	278.59730	40.91897	447.70454	114.60467	38.68103
28	0.08497	0.56567	2.11576	0.31075	3.40007	0.87034	0.29376
29	9.99762	66.55573	248.94261	36.56241	400.05242	102.40291	34.56359
100	163.75148	1090.12834	4077.36946	598.82363	6552.80402	1677.15416	566.14102
Sum	124.32216	827.63414	3095.63417	454.66244	4974.69242	1273.40546	429.80305

Table D-2-12: Continued (CFS35I 15-27)

CFS35I-E	CFS35I15	CFS35I17	CFS35I18	CFS35I19	CFS35I21	CFS35I26	CFS35I27
1	142.51751	60.55832	104.60367	5.36986	1.61960	6.10403	0.55426
2	614.37183	261.06179	450.93358	23.14884	6.98177	26.31377	2.38937
3	1836.44068	780.35043	1347.87428	69.19488	20.86937	78.65604	7.14200
4	219.58972	93.30587	161.16989	8.27367	2.49544	9.40507	0.85398
5	8.67824	3.68742	6.36935	0.32698	0.09862	0.37170	0.03375
6	2650.39101	1126.19894	1945.27624	99.86200	30.11911	113.51758	10.30739
7	175.55462	74.59692	128.85327	6.61470	1.99505	7.51897	0.68274
8	99.42122	42.24573	72.97317	3.74605	1.12985	4.25818	0.38666
9	72.63211	30.86270	53.30966	2.73668	0.82541	3.11086	0.28247
10	103.88335	44.14025	76.24526	3.91406	1.18054	4.44936	0.40400
11	766.11230	325.53305	562.28818	28.86570	8.70610	32.81313	2.97939
12	116.34481	49.43628	85.39023	4.38364	1.32213	4.98316	0.45246
13	146.69483	62.33280	107.67044	5.52719	1.66709	6.28292	0.57051
14	175.95138	74.76603	129.14456	6.62968	1.99957	7.53600	0.68430
15	170.27162	72.35069	124.97375	6.41551	1.93498	7.29277	0.66220
16	9.68700	4.11611	7.10996	0.36499	0.11008	0.41490	0.03767
17	22.30308	9.47696	16.37029	0.84035	0.25346	0.95523	0.08674
18	12236.27771	5199.39009	8980.62999	461.03640	139.05181	524.09355	47.58579
19	112.53352	47.81720	82.59526	4.24007	1.27885	4.81983	0.43764
20	261.49000	111.11286	191.92439	9.85263	2.97161	11.19971	1.01694
21	243.12639	103.30823	178.44687	9.16061	2.76292	10.41315	0.94553
22	796.67297	338.52096	584.72888	30.01741	9.05359	34.12172	3.09829
23	833.93331	354.34916	612.07437	31.42089	9.47687	35.71764	3.24318
24	313.40336	133.17134	230.02915	11.80863	3.56159	13.42307	1.21884
25	6539.72628	2778.89747	4799.88251	246.40858	74.31769	280.10099	25.43314
26	479.43807	203.72002	351.88673	18.06432	5.44839	20.53454	1.86454
27	3164.67634	1344.70979	2322.69535	119.23797	35.96330	135.54543	12.30721
28	24.03393	10.21234	17.64046	0.90556	0.27313	1.02936	0.09347
29	2827.77855	1201.58356	2075.46697	106.54631	32.13495	121.11559	10.99728
100	46316.33060	19681.77444	33994.66887	1745.19357	526.34682	1983.76277	180.12869
Sum	35163.93576	14941.81328	25808.55672	1324.91416	399.60287	1506.09826	136.75175

Table D-2-12: Continued (CFS35I 28-35)

CFS35I-E	CFS35I28	CFS35I29	CFS35I31	CFS35I32	CFS35I33	CFS35I34	CFS35I35
1	1.07252	0.36711	16.92285	10.18534	1.97948	1.52601	0.15836
2	4.62361	1.58256	72.95190	43.90782	8.53314	6.57836	0.68268
3	13.82043	4.73048	218.06312	131.24744	25.50699	19.66383	2.04060
4	1.65254	0.56563	26.07458	15.69354	3.05005	2.35125	0.24400
5	0.06531	0.02235	1.03047	0.62022	0.12054	0.09292	0.00964
6	19.94595	6.82703	314.71342	189.41829	36.81233	28.37907	2.94503
7	1.32115	0.45221	20.84575	12.54635	2.43833	1.87976	0.19507
8	0.74820	0.25610	11.80550	7.10531	1.38089	1.06455	0.11047
9	0.54659	0.18709	8.62450	5.19085	1.00879	0.77770	0.08070
10	0.78176	0.26758	12.33534	7.42431	1.44290	1.11233	0.11543
11	5.76541	1.97339	90.96991	54.75281	10.64105	8.20323	0.85127
12	0.87555	0.29969	13.81505	8.31503	1.61604	1.24579	0.12928
13	1.10398	0.37786	17.41888	10.48384	2.03746	1.57069	0.16300
14	1.32413	0.45324	20.89286	12.57476	2.44379	1.88399	0.19551
15	1.28141	0.43859	20.21844	12.16890	2.36501	1.82317	0.18920
16	0.07290	0.02495	1.15026	0.69230	0.13455	0.10372	0.01076
17	0.16785	0.05745	2.64832	1.59392	0.30977	0.23880	0.02478
18	92.08505	31.51857	1452.96329	874.51566	169.95717	131.02113	13.59645
19	0.84687	0.28987	13.36248	8.04250	1.56305	1.20496	0.12504
20	1.96785	0.67357	31.04991	18.68811	3.63196	2.79994	0.29056
21	1.82966	0.62626	28.86938	17.37564	3.37688	2.60328	0.27015
22	5.99534	2.05213	94.59875	56.93636	11.06499	8.53035	0.88522
23	6.27590	2.14808	99.02313	59.59936	11.58290	8.92928	0.92664
24	2.35853	0.80729	37.21422	22.39807	4.35295	3.35578	0.34824
25	49.21562	16.84563	776.54189	467.38354	90.83151	70.02466	7.26675
26	3.60803	1.23496	56.92956	34.26445	6.65913	5.13358	0.53273
27	23.81588	8.15166	375.78083	226.17450	43.95597	33.88599	3.51643
28	0.18087	0.06191	2.85384	1.71762	0.33381	0.25734	0.02671
29	21.28086	7.28400	335.77682	202.09652	39.27606	30.27855	3.14214
100	348.56000	119.30948	5499.70586	3310.15638	643.26302	495.93789	51.46571
Sum	264.62974	90.57724	4175.44527	2513.11338	488.40748	376.52001	39.07283

Table D-2-12: Continued (CFS35I 40-43)

CFS35I-E	CFS35I40	CFS35I43	Total
1	1.53321	8.37861	408.76318
2	6.60945	36.11942	1762.12658
3	19.75654	107.96339	5267.21116
4	2.36236	12.90960	629.81400
5	0.09336	0.51018	24.89022
6	28.51307	155.81440	7601.71479
7	1.88863	10.32101	503.52103
8	1.06958	5.84508	285.15667
9	0.78138	4.26994	208.32006
10	1.11758	6.10708	297.94927
11	8.24188	45.03880	2197.31633
12	1.25164	6.83975	333.69183
13	1.57815	8.62409	420.74389
14	1.89290	10.34420	504.65940
15	1.83179	10.01034	488.36505
16	0.10421	0.56951	27.78378
17	0.23994	1.31123	63.96924
18	131.63861	719.33399	35095.14367
19	1.21064	6.61577	322.76287
20	2.81313	15.37299	749.99578
21	2.61557	14.29342	697.32391
22	8.57066	46.83502	2284.97615
23	8.97150	49.02646	2391.84059
24	3.37161	18.42504	898.89201
25	70.35477	384.46329	18756.96940
26	5.15782	28.18549	1375.09548
27	34.04578	186.04447	9076.68742
28	0.25856	1.41297	68.93319
29	30.42141	166.24226	8110.49912
100	498.27388	2722.87144	132843.92152
Sum	378.29575	2067.22778	100855.11612

Appendix E: Multiple Regression Model Between Commodity Flow and Other Contributing Factors

E-1 Summary, ANOVA and Coefficient of Multiple Regression Model Between Commodity Flow and Employment

E-1-1 Model Summary and Coefficients for CFS2P – Production

Regression (CFS2P3)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99226	0.98552	0.98504	0.20580
2	0.99639	0.99280	0.99225	0.14821
3	0.99787	0.99575	0.99515	0.12056
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10195
6	0.99880	0.99761	0.99695	0.09292
7	0.99914	0.99826	0.99768	0.08152
8	0.99937	0.99874	0.99824	0.07062
9	0.99949	0.99898	0.99850	0.06518
10	0.99952	0.99904	0.99862	0.05791

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI10

c Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18, EMPBI23, EMPBI31

f Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18, EMPBI23, EMPBI31, NOI9

g Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18, EMPBI23, EMPBI31, NOI9, WB

h Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18, EMPBI23, EMPBI31, NOI9, WB, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18, EMPBI23, EMPBI31, NOI9, WB, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18, EMPBI23, EMPBI31, NOI9, WB, CBPTE21, CBPTE31, CBPTE2P

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20206	1	78.20206	1844.57011	0.00000
	Residual	1.14469	27	0.04240		
	Total	79.34674	28			
2	Regression	78.77503	2	39.38751	1791.12531	0.00000
	Residual	0.57172	26	0.02199		
	Total	79.34674	28			
3	Regression	78.94833	3	26.31594	1811.08430	0.00000
	Residual	0.39842	25	0.01602		
	Total	79.34674	28			
4	Regression	79.01328	4	19.75332	1512.77506	0.00000
	Residual	0.33346	24	0.01306		
	Total	79.34674	28			
5	Regression	79.09810	5	15.81964	1401.88556	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34674	28			
6	Regression	79.15077	6	13.19180	1527.84597	0.00000
	Residual	0.18597	22	0.00863		
	Total	79.34674	28			
7	Regression	79.20858	7	11.31551	1719.62541	0.00000
	Residual	0.13816	21	0.00658		
	Total	79.34674	28			
8	Regression	79.24885	8	9.90586	1981.13846	0.00000
	Residual	0.09789	20	0.00499		
	Total	79.34674	28			
9	Regression	79.26618	9	8.80735	2077.20030	0.00000
	Residual	0.08056	19	0.00424		
	Total	79.34674	28			
10	Regression	79.28038	10	7.92804	2364.16917	0.00000
	Residual	0.06637	18	0.00335		
	Total	79.34674	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI10

c Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18, EMPBI23, EMPBI31

f Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18, EMPBI23, EMPBI31, NOI9

g Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18, EMPBI23, EMPBI31, NOI9, WB

h Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18, EMPBI23, EMPBI31, NOI9, WB, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18, EMPBI23, EMPBI31, NOI9, WB, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI10, EMPBI18, EMPBI23, EMPBI31, NOI9, WB, CBPTE21, CBPTE31, CBPTE2P

k Dependent Variable: CFS2P3

Figure E-1-1: Commodity Flow Attraction for Commodity Item 3 (CFS2P3)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.65420	0.15363		-43.31117	0.00000
	EMPBI7	0.90855	0.02115	0.99276	42.94846	0.00000
2	(Constant)	-0.87945	0.11904		-57.79104	0.00000
	EMPBI7	0.56479	0.06897	0.61715	8.18864	0.00000
	EMPBI10	0.40835	0.07991	0.38513	5.10906	0.00005
3	(Constant)	-7.08368	0.11936		-59.34828	0.00000
	EMPBI7	0.42840	0.07219	0.46821	5.93527	0.00000
	EMPBI10	0.41906	0.06832	0.39522	6.13413	0.00000
	EMPBI18	0.16188	0.04959	0.14663	3.26460	0.00117
4	(Constant)	-7.62811	0.23695		-32.19360	0.00000
	EMPBI7	0.29392	0.08349	0.32116	3.52049	0.00175
	EMPBI10	0.44631	0.06259	0.42092	7.13078	0.00000
	EMPBI18	0.25144	0.05066	0.22775	4.41801	0.00017
	EMPBI23	0.11484	0.04451	0.06166	2.58021	0.01642
5	(Constant)	-7.65048	0.21572		-35.46451	0.00000
	EMPBI7	0.37925	0.08354	0.41440	4.53959	0.00015
	EMPBI10	0.39793	0.06026	0.37529	6.60386	0.00000
	EMPBI18	0.23807	0.05182	0.21564	4.59304	0.00013
	EMPBI23	0.11403	0.04040	0.06123	2.81650	0.00979
	EMPBI1	-0.04441	0.01812	-0.04788	-2.45085	0.02227
6	(Constant)	-7.71067	0.19421		-39.70227	0.00000
	EMPBI7	0.37564	0.07469	0.41046	5.02928	0.00005
	EMPBI10	0.38006	0.05395	0.36787	7.23024	0.00000
	EMPBI18	0.50978	0.11414	0.46175	4.46641	0.00019
	EMPBI23	0.11162	0.03620	0.05991	3.08127	0.00548
	EMPBI1	-0.05001	0.01714	-0.06362	-3.44271	0.00212
	NOI9	-0.23929	0.09187	-0.22565	-2.60472	0.01618
7	(Constant)	-7.67827	0.16993		-45.18454	0.00000
	EMPBI7	0.46279	0.07222	0.50568	6.40766	0.00000
	EMPBI10	0.33406	0.05115	0.31506	6.53110	0.00000
	EMPBI18	0.56207	0.10136	0.50912	5.54507	0.00002
	EMPBI23	0.13433	0.03262	0.07213	4.11766	0.00049
	EMPBI1	-0.06201	0.01500	-0.06685	-4.13333	0.00047
	NOI9	-0.29464	0.08259	-0.27784	-3.56757	0.00182
	WI8	-0.02492	0.00888	-0.05596	-2.80527	0.01060
8	(Constant)	-7.73173	0.14930		-51.78620	0.00000
	EMPBI7	0.44195	0.06337	0.48292	6.97400	0.00000
	EMPBI10	0.32546	0.04467	0.30695	7.28588	0.00000
	EMPBI18	0.57160	0.08838	0.51775	6.46772	0.00000
	EMPBI23	0.15176	0.02911	0.08148	5.21119	0.00004
	EMPBI1	-0.06849	0.01328	-0.07384	-5.15831	0.00005
	NOI9	-0.28389	0.07206	-0.26771	-3.93989	0.00081
	WI8	-0.02541	0.00774	-0.05707	-3.28304	0.00372
	CBPTE21	0.03510	0.01268	0.02644	2.76896	0.01184
9	(Constant)	-7.29119	0.24706		-29.40457	0.00000
	EMPBI7	0.40612	0.06075	0.44176	6.68483	0.00000
	EMPBI10	0.29560	0.04347	0.27878	6.80017	0.00000
	EMPBI18	0.53043	0.08368	0.48045	6.33876	0.00000
	EMPBI23	0.13279	0.02825	0.07130	4.70000	0.00016
	EMPBI1	-0.07061	0.01227	-0.07612	-5.75288	0.00002
	NOI9	-0.26997	0.06671	-0.25458	-4.04699	0.00069
	WI8	-0.02251	0.00726	-0.05054	-3.09945	0.00590
	CBPTE21	0.05127	0.01392	0.01862	3.68135	0.00158
	CBPTE31	0.08389	0.03929	0.09038	2.13536	0.04597
10	(Constant)	-7.14090	0.22888		-31.19966	0.00000
	EMPBI7	0.40751	0.05401	0.44328	7.54171	0.00000
	EMPBI10	0.28712	0.03881	0.27078	7.39716	0.00000
	EMPBI18	0.50752	0.07501	0.45970	6.76641	0.00000
	EMPBI23	0.12435	0.02536	0.06677	4.90304	0.00011
	EMPBI1	-0.07896	0.01141	-0.08513	-6.90559	0.00000
	NOI9	-0.26523	0.05936	-0.25012	-4.46816	0.00030
	WI8	-0.02302	0.00646	-0.05169	-3.56262	0.00222
	CBPTE21	0.04124	0.01281	0.01257	3.17646	0.00316
	CBPTE31	0.09660	0.03532	0.10407	2.73479	0.01361
	CBPTE22	0.05934	0.02419	0.02939	2.45174	0.02455

a Dependent Variable: CFS2P1

Figure E-1-1: Continued

Regression (CFS2P6)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14822
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99843	0.99687	0.99619	0.10386
6	0.99880	0.99761	0.99695	0.09291
7	0.99913	0.99826	0.99768	0.08112
8	0.99937	0.99874	0.99824	0.07066
9	0.99949	0.99899	0.99850	0.06511
10	0.99962	0.99924	0.99882	0.05791

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20296	1	78.20296	1844.45341	0.00000
	Residual	1.14477	27	0.04240		
	Total	79.34773	28			
2	Regression	78.77653	2	39.38827	1792.87457	0.00000
	Residual	0.57120	26	0.02197		
	Total	79.34773	28			
3	Regression	78.94729	3	26.31576	1642.93012	0.00000
	Residual	0.40044	25	0.01602		
	Total	79.34773	28			
4	Regression	79.01425	4	19.75356	1512.71147	0.00000
	Residual	0.33348	24	0.01306		
	Total	79.34773	28			
5	Regression	79.09915	5	15.81983	1461.68819	0.00000
	Residual	0.24859	23	0.01081		
	Total	79.34773	28			
6	Regression	79.15775	6	13.19296	1527.72077	0.00000
	Residual	0.18998	22	0.00864		
	Total	79.34773	28			
7	Regression	79.20956	7	11.11565	1719.73509	0.00000
	Residual	0.13818	21	0.00658		
	Total	79.34773	28			
8	Regression	79.24787	8	9.90598	1983.91952	0.00000
	Residual	0.09986	20	0.00499		
	Total	79.34773	28			
9	Regression	79.26720	9	8.80747	2077.86701	0.00000
	Residual	0.08054	19	0.00424		
	Total	79.34773	28			
10	Regression	79.28738	10	7.92874	2364.63563	0.00000
	Residual	0.06035	18	0.00335		
	Total	79.34773	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P6

Figure E-1-2: Commodity Flow Attraction for Commodity Item 6 (CFS2P6)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.92279	0.15364		-25.53271	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94710	0.00000
2	(Constant)	-4.14795	0.11905		-34.84213	0.00000
	EMPBI7	0.56480	0.06898	0.6171%	8.18810	0.00000
	EMPBI9	0.40835	0.07992	0.38512	5.10957	0.00003
3	(Constant)	-4.35222	0.11936		-36.46257	0.00000
	EMPBI7	0.42847	0.07220	0.46818	5.91482	0.00000
	EMPBI9	0.41906	0.06832	0.39522	6.13398	0.00000
	EMPBI8	0.16191	0.04959	0.14666	3.26512	0.00117
4	(Constant)	-4.89669	0.23695		-20.66513	0.00000
	EMPBI7	0.29190	0.08349	0.32114	3.52010	0.00175
	EMPBI9	0.44631	0.06259	0.42092	7.13064	0.00000
	EMPBI8	0.25148	0.05666	0.22778	4.43850	0.00017
	EMPBI23	0.11485	0.04451	0.09166	2.58023	0.01042
5	(Constant)	-4.91899	0.21574		-22.80089	0.00000
	EMPBI7	0.17921	0.08155	0.41436	4.53880	0.00015
	EMPBI9	0.19794	0.06026	0.17530	6.60154	0.00000
	EMPBI8	0.21811	0.05181	0.21567	4.50428	0.00013
	EMPBI23	0.11404	0.04049	0.09123	2.81640	0.00979
	EMPBI3	-0.04441	0.01812	-0.04787	-2.45029	0.02150
6	(Constant)	-4.97923	0.10422		-25.63693	0.00000
	EMPBI7	0.17560	0.07469	0.41041	5.02854	0.00005
	EMPBI9	0.19006	0.05195	0.16787	7.23008	0.00000
	EMPBI8	0.50986	0.11414	0.46182	4.46692	0.00019
	EMPBI23	0.11161	0.03620	0.05991	3.08124	0.00548
	EMPBI3	-0.05001	0.01714	-0.06361	-1.44230	0.00232
	NOI9	-0.23931	0.09187	-0.22569	-2.60504	0.01616
7	(Constant)	-4.94683	0.16991		-29.11148	0.00000
	EMPBI7	0.46277	0.07222	0.50566	6.40758	0.00000
	EMPBI9	0.11406	0.05115	0.11505	6.51119	0.00000
	EMPBI8	0.56217	0.10136	0.50920	5.54612	0.00002
	EMPBI23	0.13434	0.01262	0.07211	4.11805	0.00040
	EMPBI3	-0.06200	0.01500	-0.06584	-4.11318	0.00047
	NOI9	-0.29469	0.08259	-0.27789	-3.56830	0.00181
	WI8	-0.02492	0.00888	-0.05597	-2.80660	0.01059
8	(Constant)	-5.00030	0.14928		-33.49610	0.00000
	EMPBI7	0.44193	0.06336	0.48289	6.97460	0.00000
	EMPBI9	0.12546	0.04466	0.10694	7.28675	0.00000
	EMPBI8	0.57170	0.08837	0.51783	6.46970	0.00000
	EMPBI23	0.15177	0.02911	0.08149	5.21440	0.00004
	EMPBI3	-0.06849	0.01328	-0.07383	-5.15888	0.00005
	NOI9	-0.28394	0.07205	-0.26776	-3.94113	0.00081
	WI8	-0.02542	0.00774	-0.05708	-3.28427	0.00171
	CBPTE21	0.03511	0.01267	0.02644	2.77010	0.01181
9	(Constant)	-4.55083	0.24791		-18.19184	0.00000
	EMPBI7	0.40610	0.06074	0.44173	6.68546	0.00000
	EMPBI9	0.29559	0.04146	0.27878	6.80106	0.00000
	EMPBI8	0.53053	0.08367	0.48054	6.34085	0.00000
	EMPBI23	0.11281	0.02825	0.07111	4.70124	0.00016
	EMPBI3	-0.07063	0.01227	-0.07612	-5.75351	0.00002
	NOI9	-0.27002	0.06670	-0.25461	-4.04811	0.00060
	WI8	-0.02251	0.00726	-0.05055	-3.10076	0.00580
	CBPTE21	0.05128	0.01392	0.03862	3.68439	0.00157
	CBPTE31	0.08188	0.01928	0.09017	2.11515	0.04597
10	(Constant)	-4.40957	0.22886		-19.26787	0.00000
	EMPBI7	0.40748	0.05401	0.44526	7.54207	0.00000
	EMPBI9	0.28712	0.03881	0.27078	7.39785	0.00000
	EMPBI8	0.50763	0.07500	0.45980	6.76849	0.00000
	EMPBI23	0.12417	0.02536	0.06678	4.90424	0.00011
	EMPBI3	-0.07895	0.01143	-0.08511	-6.90563	0.00000
	NOI9	-0.26520	0.05936	-0.25016	-4.46946	0.00030
	WI8	-0.02303	0.00646	-0.05171	-3.56391	0.00222
	CBPTE21	0.04125	0.01280	0.03257	3.37752	0.00315
	CBPTE31	0.09658	0.01512	0.10406	2.73461	0.01361
	CBPTE22	0.05933	0.02418	0.02938	2.45328	0.02458

a Dependent Variable: CFS2P6

Figure E-1-2: Continued

Regression (CFS2P7)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14823
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395
6	0.99880	0.99761	0.99695	0.09292
7	0.99911	0.99826	0.99768	0.08112
8	0.99937	0.99874	0.99824	0.07067
9	0.99949	0.99898	0.99850	0.06511
10	0.99962	0.99924	0.99882	0.05792

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20219	1	78.20219	1844.51041	0.00000
	Residual	1.14473	27	0.04240		
	Total	79.34692	28			
2	Regression	78.77580	2	39.38790	1791.14051	0.00000
	Residual	0.57111	26	0.02197		
	Total	79.34692	28			
3	Regression	78.94654	3	26.31551	1643.16841	0.00000
	Residual	0.40038	25	0.01602		
	Total	79.34692	28			
4	Regression	79.01347	4	19.75837	1512.84921	0.00000
	Residual	0.33345	24	0.01306		
	Total	79.34692	28			
5	Regression	79.09847	5	15.81967	1461.91476	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34692	28			
6	Regression	79.15090	6	13.19283	1527.98990	0.00000
	Residual	0.18995	22	0.00863		
	Total	79.34692	28			
7	Regression	79.20874	7	11.31553	1719.77525	0.00000
	Residual	0.13817	21	0.00658		
	Total	79.34692	28			
8	Regression	79.24704	8	9.90588	1981.61355	0.00000
	Residual	0.09988	20	0.00499		
	Total	79.34692	28			
9	Regression	79.26637	9	8.80737	2077.47192	0.00000
	Residual	0.08055	19	0.00424		
	Total	79.34692	28			
10	Regression	79.28654	10	7.92865	2363.72041	0.00000
	Residual	0.06038	18	0.00335		
	Total	79.34692	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P7

Figure E-1-3: Commodity Flow Attraction for Commodity Item 7 (CFS2P7)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.19391	0.15361		-22.09078	0.00000
	EMPBI7	0.90855	0.02115	0.99276	42.94776	0.00000
2	(Constant)	-1.61907	0.11904		-30.40226	0.00000
	EMPBI7	0.56478	0.06897	0.61713	8.18849	0.00000
	EMPBI19	0.40836	0.07991	0.38513	5.11017	0.00003
3	(Constant)	-1.82333	0.11935		-32.01406	0.00000
	EMPBI7	0.42847	0.07219	0.46818	5.93519	0.00000
	EMPBI19	0.41908	0.06831	0.39524	6.13467	0.00000
	EMPBI18	0.16190	0.04958	0.14664	3.26510	0.00117
4	(Constant)	-4.16771	0.21694		-18.43180	0.00000
	EMPBI7	0.29391	0.08349	0.32116	3.52049	0.00175
	EMPBI19	0.44612	0.06259	0.42091	7.13115	0.00000
	EMPBI18	0.25145	0.05666	0.22776	4.43820	0.00017
	EMPBI21	0.11482	0.04451	0.08165	2.57991	0.01041
5	(Constant)	-4.39001	0.21572		-20.35059	0.00000
	EMPBI7	0.17924	0.08154	0.19439	4.53936	0.00015
	EMPBI19	0.39794	0.06026	0.37511	6.60419	0.00000
	EMPBI18	0.23808	0.05182	0.21565	4.59408	0.00013
	EMPBI21	0.11402	0.04040	0.08122	2.81613	0.00980
	EMPBI3	-0.04441	0.01812	-0.04788	-2.45067	0.02228
6	(Constant)	-4.45025	0.19420		-22.91540	0.00000
	EMPBI7	0.17561	0.07469	0.19044	5.02912	0.00005
	EMPBI19	0.39007	0.05395	0.36788	7.23086	0.00000
	EMPBI18	0.50981	0.11411	0.46178	4.46693	0.00019
	EMPBI21	0.11161	0.03620	0.05992	3.08296	0.00544
	EMPBI3	-0.05901	0.01714	-0.06362	-3.44276	0.00232
	NOI9	-0.23932	0.09186	-0.22568	-2.60511	0.01616
7	(Constant)	-4.41785	0.16992		-25.99896	0.00000
	EMPBI7	0.46277	0.07222	0.50566	6.40767	0.00000
	EMPBI19	0.33408	0.05115	0.31507	6.53174	0.00000
	EMPBI18	0.56211	0.10136	0.50915	5.54562	0.00002
	EMPBI21	0.13432	0.03262	0.07212	4.11730	0.00049
	EMPBI3	-0.06200	0.01500	-0.06684	-4.13136	0.00047
	NOI9	-0.29466	0.08258	-0.27786	-3.56801	0.00182
	WI8	-0.02492	0.00888	-0.05596	-2.80523	0.01060
8	(Constant)	-4.47131	0.14929		-29.95050	0.00000
	EMPBI7	0.44193	0.06337	0.48289	6.97419	0.00000
	EMPBI19	0.32548	0.04467	0.30696	7.28682	0.00000
	EMPBI18	0.57164	0.08837	0.51778	6.46857	0.00000
	EMPBI21	0.15174	0.02911	0.08147	5.21299	0.00004
	EMPBI3	-0.06840	0.01328	-0.07383	-5.15855	0.00005
	NOI9	-0.28392	0.07205	-0.26771	-3.94050	0.00081
	WI8	-0.02541	0.00774	-0.05707	-3.28110	0.00372
	CBPTE21	0.03510	0.01268	0.02644	2.76927	0.01181
9	(Constant)	-4.03085	0.24795		-16.25678	0.00000
	EMPBI7	0.40610	0.06075	0.44174	6.68494	0.00000
	EMPBI19	0.29562	0.04347	0.27880	6.80104	0.00000
	EMPBI18	0.53047	0.08368	0.48049	6.33955	0.00000
	EMPBI21	0.13278	0.02825	0.07129	4.69975	0.00016
	EMPBI3	-0.07061	0.01227	-0.07612	-5.75299	0.00002
	NOI9	-0.27000	0.06671	-0.25461	-4.04758	0.00069
	WI8	-0.02250	0.00726	-0.05054	-3.09949	0.00590
	CBPTE21	0.05127	0.01192	0.01862	1.68144	0.00158
	CBPTE31	0.08388	0.03929	0.09037	2.13510	0.04599
10	(Constant)	-3.88061	0.22890		-16.95142	0.00000
	EMPBI7	0.40749	0.05404	0.44526	7.54074	0.00000
	EMPBI19	0.28714	0.03882	0.27081	7.39716	0.00000
	EMPBI18	0.50757	0.07501	0.45975	6.76647	0.00000
	EMPBI21	0.12434	0.02537	0.06676	4.90219	0.00011
	EMPBI3	-0.07895	0.01141	-0.08511	-6.90439	0.00000
	NOI9	-0.26526	0.05937	-0.25014	-4.46820	0.00030
	WI8	-0.02302	0.00646	-0.05169	-3.56211	0.00225
	CBPTE21	0.04324	0.01281	0.01257	3.37611	0.00316
	CBPTE31	0.09658	0.03531	0.10405	2.73395	0.01361
	CBPTE22	0.05932	0.02419	0.02918	2.45231	0.02463

a Dependent Variable: CFS2P7

Figure E-1-3: Continued

Regression (CFS2P8)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99841	0.99687	0.99619	0.10395
6	0.99880	0.99761	0.99695	0.09292
7	0.99913	0.99826	0.99768	0.08111
8	0.99937	0.99874	0.99824	0.07066
9	0.99949	0.99898	0.99850	0.06511
10	0.99962	0.99924	0.99882	0.05791

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20125	1	78.20125	1844.45222	0.00000
	Residual	1.14478	27	0.04240		
	Total	79.34803	28			
2	Regression	78.77688	2	39.38844	1793.04619	0.00000
	Residual	0.57115	26	0.02197		
	Total	79.34803	28			
3	Regression	78.94766	3	26.31589	1643.19910	0.00000
	Residual	0.40038	25	0.01602		
	Total	79.34803	28			
4	Regression	79.01460	4	19.75365	1512.96745	0.00000
	Residual	0.33343	24	0.01306		
	Total	79.34803	28			
5	Regression	79.09949	5	15.81990	1463.94548	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34803	28			
6	Regression	79.15807	6	13.19301	1527.87969	0.00000
	Residual	0.18997	22	0.00863		
	Total	79.34803	28			
7	Regression	79.20986	7	11.31569	1719.83436	0.00000
	Residual	0.13817	21	0.00658		
	Total	79.34803	28			
8	Regression	79.24810	8	9.90602	1983.82372	0.00000
	Residual	0.09987	20	0.00499		
	Total	79.34803	28			
9	Regression	79.26740	9	8.80750	2077.65575	0.00000
	Residual	0.08054	19	0.00424		
	Total	79.34803	28			
10	Regression	79.28766	10	7.92877	2364.13548	0.00000
	Residual	0.06037	18	0.00335		
	Total	79.34803	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P8

Figure E-1-4: Commodity Flow Attraction for Commodity Item 8 (CFS2P8)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.71649	0.15504		-17.20751	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94709	0.00000
2	(Constant)	-5.94166	0.11904		-49.91165	0.00000
	EMPBI7	0.56478	0.06898	0.61713	8.1882%	0.00000
	EMPBI19	0.40817	0.07991	0.38513	5.11006	0.00000
3	(Constant)	-6.14594	0.11935		-51.49415	0.00000
	EMPBI7	0.42845	0.07219	0.46816	5.93502	0.00000
	EMPBI19	0.41908	0.06811	0.39524	6.15477	0.00000
	EMPBI18	0.16192	0.08958	0.14666	1.80549	0.00316
4	(Constant)	-6.69017	0.23691		-28.23746	0.00000
	EMPBI7	0.29189	0.08348	0.32112	3.49526	0.00175
	EMPBI19	0.44611	0.06259	0.42091	7.11552	0.00000
	EMPBI18	0.25148	0.05665	0.22778	4.43884	0.00017
	EMPBI23	0.11484	0.04851	0.06165	2.58026	0.01642
5	(Constant)	-6.71268	0.21572		-31.11777	0.00000
	EMPBI7	0.37920	0.08354	0.41434	4.53900	0.00015
	EMPBI19	0.39796	0.06026	0.37512	6.60447	0.00000
	EMPBI18	0.23811	0.05182	0.21567	4.59468	0.0001
	EMPBI23	0.11401	0.04049	0.06122	2.81644	0.00979
	EMPBI1	-0.04440	0.01812	-0.04787	-2.45014	0.02230
6	(Constant)	-6.77290	0.19421		-34.87381	0.00000
	EMPBI7	0.37559	0.07469	0.41040	5.02857	0.00005
	EMPBI19	0.39009	0.05595	0.36789	7.23086	0.00000
	EMPBI18	0.50980	0.11414	0.46177	4.46661	0.00019
	EMPBI23	0.11162	0.03620	0.05993	3.08117	0.00548
	EMPBI1	-0.05900	0.01718	-0.06161	-3.44212	0.00233
	NOJ9	-0.23928	0.09187	-0.22568	-2.60462	0.01618
7	(Constant)	-6.74050	0.16992		-39.66810	0.00000
	EMPBI7	0.46274	0.07222	0.50561	6.40741	0.00000
	EMPBI19	0.33409	0.05115	0.31508	6.53194	0.00000
	EMPBI18	0.56210	0.10136	0.50914	5.54566	0.00002
	EMPBI23	0.13433	0.03262	0.07213	4.11785	0.00049
	EMPBI1	-0.06200	0.01500	-0.06681	-4.11288	0.00047
	NOJ9	-0.29461	0.08258	-0.27784	-3.56772	0.00182
	W8	-0.02492	0.00888	-0.05597	-2.80578	0.01059
8	(Constant)	-6.79196	0.14928		-45.51015	0.00000
	EMPBI7	0.44191	0.06336	0.48286	6.97409	0.00000
	EMPBI19	0.32549	0.04467	0.30697	7.28725	0.00000
	EMPBI18	0.57163	0.08837	0.51777	6.46882	0.00000
	EMPBI23	0.15176	0.02911	0.08148	5.21182	0.00004
	EMPBI1	-0.06848	0.01328	-0.07381	-5.15819	0.00005
	NOJ9	-0.28189	0.07205	-0.26771	-3.94028	0.00081
	W8	-0.02542	0.00734	-0.05708	-3.28184	0.00171
	CBPTE21	0.03510	0.01267	0.02644	2.76958	0.01188
9	(Constant)	-6.15151	0.24794		-25.02510	0.00000
	EMPBI7	0.40608	0.06075	0.44171	6.68481	0.00000
	EMPBI19	0.29561	0.04547	0.27881	6.80147	0.00000
	EMPBI18	0.53047	0.08567	0.48049	6.19380	0.00000
	EMPBI23	0.11280	0.02825	0.07130	4.70060	0.00016
	EMPBI1	-0.07060	0.01227	-0.07611	-5.75259	0.00002
	NOJ9	-0.26997	0.06670	-0.25458	-4.04711	0.00009
	W8	-0.02251	0.00726	-0.05055	-3.10026	0.00589
	CBPTE21	0.05127	0.01392	0.03862	3.68368	0.00158
	CBPTE11	0.08187	0.03928	0.09036	2.13506	0.04600
10	(Constant)	-6.20129	0.22888		-27.10270	0.00000
	EMPBI7	0.40747	0.05403	0.44524	7.54093	0.00000
	EMPBI19	0.28715	0.03881	0.27081	7.39791	0.00000
	EMPBI18	0.50757	0.07501	0.45975	6.76700	0.00000
	EMPBI23	0.12416	0.02536	0.06677	4.90130	0.00011
	EMPBI1	-0.07894	0.01141	-0.08510	-6.90415	0.00000
	NOJ9	-0.26523	0.05936	-0.25011	-4.46810	0.00030
	W8	-0.02102	0.00646	-0.05170	-3.25111	0.00222
	CBPTE21	0.04124	0.01281	0.03257	3.17667	0.00336
	CBPTE11	0.09658	0.03512	0.10805	2.71807	0.01103
	CBPTE22	0.05912	0.02419	0.02938	2.45274	0.02460

a Dependent Variable: CFS2P8

Figure E-1-4: Continued

Regression (CFS2P12)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12654
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395
6	0.99880	0.99761	0.99695	0.09292
7	0.99911	0.99826	0.99768	0.08111
8	0.99937	0.99874	0.99824	0.07066
9	0.99949	0.99899	0.99850	0.06510
10	0.99962	0.99924	0.99882	0.05790

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20231	1	78.20231	1844.42926	0.00000
	Residual	1.14478	27	0.04240		
	Total	79.34709	28			
2	Regression	78.77599	2	39.38800	1793.19460	0.00000
	Residual	0.57110	26	0.02197		
	Total	79.34709	28			
3	Regression	78.94676	3	26.31559	1643.36436	0.00000
	Residual	0.40033	25	0.01601		
	Total	79.34709	28			
4	Regression	79.03368	4	19.75842	1513.03129	0.00000
	Residual	0.31341	24	0.01306		
	Total	79.34709	28			
5	Regression	79.09856	5	15.81971	1464.04010	0.00000
	Residual	0.24853	23	0.01081		
	Total	79.34709	28			
6	Regression	79.15715	6	13.19286	1528.06680	0.00000
	Residual	0.18994	22	0.00863		
	Total	79.34709	28			
7	Regression	79.20893	7	11.31556	1719.95744	0.00000
	Residual	0.13816	21	0.00658		
	Total	79.34709	28			
8	Regression	79.24723	8	9.90590	1984.01032	0.00000
	Residual	0.09986	20	0.00499		
	Total	79.34709	28			
9	Regression	79.26657	9	8.80740	2078.17718	0.00000
	Residual	0.08052	19	0.00424		
	Total	79.34709	28			
10	Regression	79.28674	10	7.92867	2364.70945	0.00000
	Residual	0.06035	18	0.00335		
	Total	79.34709	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P12

Figure E-1-5: Commodity Flow Attraction for Commodity Item 12 (CFS2P12)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.26304	0.15364		-21.23850	0.00000
	EMPBI7	0.90855	0.02116	0.59276	42.94682	0.00000
2	(Constant)	-1.48823	0.11004		-29.30145	0.00000
	EMPBI7	0.56476	0.06897	0.61711	8.18832	0.00000
	EMPBI19	0.40839	0.07991	0.38515	5.11054	0.00003
3	(Constant)	-3.09250	0.11935		-30.91967	0.00000
	EMPBI7	0.42843	0.07219	0.46814	5.93510	0.00000
	EMPBI19	0.41910	0.06811	0.39526	6.15139	0.00000
	EMPBI18	0.16191	0.04958	0.14666	3.26559	0.00116
4	(Constant)	-4.21684	0.21691		-17.88255	0.00000
	EMPBI7	0.29189	0.08348	0.32113	3.52040	0.00176
	EMPBI19	0.44614	0.06258	0.42095	7.13195	0.00000
	EMPBI18	0.25146	0.05665	0.22777	4.43863	0.00017
	EMPBI23	0.11482	0.04450	0.06165	2.57991	0.01049
5	(Constant)	-4.25914	0.21571		-19.74476	0.00000
	EMPBI7	0.37920	0.08354	0.41435	4.53923	0.00015
	EMPBI19	0.39797	0.06025	0.37533	6.60495	0.00000
	EMPBI18	0.23809	0.05182	0.21566	4.59449	0.00013
	EMPBI23	0.11401	0.04048	0.06121	2.81609	0.00980
	EMPBI3	-0.04441	0.01812	-0.04787	-2.45047	0.02229
6	(Constant)	-4.31938	0.19420		-22.24204	0.00000
	EMPBI7	0.37559	0.07469	0.41040	5.02897	0.00005
	EMPBI19	0.39010	0.05394	0.36791	7.23159	0.00000
	EMPBI18	0.50980	0.11411	0.46177	4.46690	0.00019
	EMPBI23	0.11160	0.03620	0.05992	3.08287	0.00544
	EMPBI3	-0.05900	0.01714	-0.06161	-3.44244	0.00232
	NOI9	-0.23929	0.09186	-0.22565	-2.60494	0.01617
7	(Constant)	-4.28698	0.16992		-25.23008	0.00000
	EMPBI7	0.46274	0.07222	0.50561	6.40758	0.00000
	EMPBI19	0.33411	0.05114	0.31510	6.53262	0.00000
	EMPBI18	0.56200	0.10135	0.50911	5.54578	0.00002
	EMPBI23	0.13431	0.03262	0.07211	4.11736	0.00049
	EMPBI3	-0.06200	0.01500	-0.06684	-4.13312	0.00047
	NOI9	-0.29464	0.08258	-0.27785	-3.56794	0.00182
	WB	-0.02492	0.00888	-0.05596	-2.80552	0.01068
8	(Constant)	-4.14044	0.14028		-29.07661	0.00000
	EMPBI7	0.44190	0.06336	0.48286	6.97435	0.00000
	EMPBI19	0.32551	0.04466	0.30699	7.28811	0.00000
	EMPBI18	0.57162	0.08830	0.51777	6.46901	0.00000
	EMPBI23	0.15174	0.02911	0.08147	5.21135	0.00004
	EMPBI3	-0.06848	0.01328	-0.07381	-5.15854	0.00005
	NOI9	-0.28390	0.07204	-0.26771	-3.94057	0.00081
	WB	-0.02543	0.00774	-0.05707	-3.28358	0.00171
	CBPTE21	0.01510	0.01267	0.02644	2.76969	0.01182
9	(Constant)	-3.89988	0.24791		-15.73123	0.00000
	EMPBI7	0.40600	0.06074	0.44170	6.68541	0.00000
	EMPBI19	0.29564	0.04146	0.27882	6.80266	0.00000
	EMPBI18	0.53045	0.08366	0.48047	6.34037	0.00000
	EMPBI23	0.13277	0.02825	0.07129	4.70026	0.00010
	EMPBI3	-0.07060	0.01227	-0.07611	-5.75347	0.00002
	NOI9	-0.26997	0.06669	-0.25458	-4.04789	0.00069
	WB	-0.02251	0.00726	-0.05054	-3.10010	0.00589
	CBPTE21	0.05128	0.01192	0.08862	3.68445	0.00157
	CBPTE31	0.08390	0.01928	0.09039	2.13592	0.04592
10	(Constant)	-3.74867	0.22885		-16.38489	0.00000
	EMPBI7	0.40745	0.05403	0.44522	7.54167	0.00000
	EMPBI19	0.28716	0.03881	0.27083	7.39931	0.00000
	EMPBI18	0.50755	0.07500	0.45971	6.76768	0.00000
	EMPBI23	0.12434	0.02536	0.06676	4.90296	0.00011
	EMPBI3	-0.07894	0.01141	-0.08511	-6.90538	0.00000
	NOI9	-0.26528	0.05935	-0.25012	-4.46877	0.00030
	WB	-0.02102	0.00646	-0.05169	-3.56299	0.00222
	CBPTE21	0.04325	0.01280	0.03257	3.37752	0.00335
	CBPTE31	0.09660	0.01512	0.10407	2.71507	0.01360
	CBPTE22	0.05931	0.02418	0.02918	2.45282	0.02460

a Dependent Variable: CFS2P12

Figure E-1-5: Continued

Regression (CFS2P13)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99841	0.99687	0.99619	0.10395
6	0.99880	0.99761	0.99695	0.09282
7	0.99913	0.99826	0.99768	0.08112
8	0.99937	0.99874	0.99824	0.07067
9	0.99949	0.99898	0.99850	0.06511
10	0.99962	0.99924	0.99882	0.05791

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20268	1	78.20268	1844.47288	0.00000
	Residual	1.14476	27	0.04240		
	Total	79.34744	28			
2	Regression	78.77633	2	39.38816	1793.14930	0.00000
	Residual	0.57111	26	0.02197		
	Total	79.34744	28			
3	Regression	78.94707	3	26.31569	1641.20765	0.00000
	Residual	0.40037	25	0.01601		
	Total	79.34744	28			
4	Regression	79.01401	4	19.75350	1512.91924	0.00000
	Residual	0.33343	24	0.01306		
	Total	79.34744	28			
5	Regression	79.09889	5	15.81978	1463.91355	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34744	28			
6	Regression	79.15747	6	13.19291	1527.84427	0.00000
	Residual	0.18997	22	0.00863		
	Total	79.34744	28			
7	Regression	79.20926	7	11.31561	1719.71884	0.00000
	Residual	0.13818	21	0.00658		
	Total	79.34744	28			
8	Regression	79.24755	8	9.90594	1983.35444	0.00000
	Residual	0.09989	20	0.00499		
	Total	79.34744	28			
9	Regression	79.26689	9	8.80743	2077.57471	0.00000
	Residual	0.08055	19	0.00424		
	Total	79.34744	28			
10	Regression	79.28707	10	7.92871	2364.12505	0.00000
	Residual	0.06037	18	0.00335		
	Total	79.34744	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P13

Figure E-1-6: Commodity Flow Production for Commodity Item 13 (CFS2P13)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.65475	0.15504		-17.27939	0.00000
	EMPBI7	0.90855	0.02136	0.99276	42.54733	0.00000
2	(Constant)	-2.87992	0.11904		-24.19291	0.00000
	EMPBI7	0.56478	0.06897	0.61712	8.18819	0.00000
	EMPBI19	0.40817	0.07991	0.38514	5.11030	0.00003
3	(Constant)	-3.08418	0.11935		-25.84126	0.00000
	EMPBI7	0.42846	0.07219	0.46817	5.93512	0.00000
	EMPBI19	0.41909	0.06811	0.39525	6.15488	0.00000
	EMPBI18	0.16190	0.04958	0.14665	3.26520	0.00137
4	(Constant)	-3.62859	0.23691		-15.31477	0.00000
	EMPBI7	0.29190	0.08348	0.32114	3.52038	0.00175
	EMPBI19	0.44611	0.06259	0.42094	7.13151	0.00000
	EMPBI18	0.25146	0.05665	0.22776	4.43847	0.00017
	EMPBI21	0.11481	0.04851	0.06165	2.36812	0.01845
5	(Constant)	-3.65089	0.21572		-16.92421	0.00000
	EMPBI7	0.37921	0.08358	0.41435	4.53910	0.00015
	EMPBI19	0.39796	0.06026	0.37512	6.60448	0.00000
	EMPBI18	0.23809	0.05182	0.21566	4.59427	0.00013
	EMPBI21	0.11402	0.04049	0.06122	2.81628	0.00980
	EMPBI1	-0.04440	0.01812	-0.04787	-2.45012	0.02230
6	(Constant)	-3.71112	0.19421		-19.10846	0.00000
	EMPBI7	0.37560	0.07469	0.41041	5.02868	0.00005
	EMPBI19	0.39009	0.05595	0.36790	7.23086	0.00000
	EMPBI18	0.50978	0.11414	0.46137	4.46644	0.00010
	EMPBI21	0.11161	0.03620	0.05993	3.08299	0.00544
	EMPBI1	-0.05900	0.01718	-0.06161	-3.44209	0.00238
	NOJ0	-0.23828	0.09187	-0.22564	-2.60461	0.01618
7	(Constant)	-3.67872	0.16993		-21.65886	0.00000
	EMPBI7	0.46275	0.07222	0.50564	6.40717	0.00000
	EMPBI19	0.33409	0.05415	0.31508	6.51188	0.00000
	EMPBI18	0.56208	0.10136	0.50911	5.54511	0.00002
	EMPBI21	0.13433	0.03262	0.07212	4.11755	0.00049
	EMPBI1	-0.06200	0.01500	-0.06683	-4.13277	0.00047
	NOJ0	-0.29463	0.08259	-0.27784	-3.56761	0.00182
	WB	-0.02492	0.00888	-0.05596	-2.80561	0.01060
8	(Constant)	-3.71217	0.14990		-24.99700	0.00000
	EMPBI7	0.44192	0.06337	0.48288	6.97149	0.00000
	EMPBI19	0.32549	0.04467	0.30698	7.28658	0.00000
	EMPBI18	0.57161	0.08838	0.51776	6.46783	0.00000
	EMPBI21	0.15175	0.02911	0.08148	5.21288	0.00004
	EMPBI1	-0.06848	0.01328	-0.07382	-5.15750	0.00005
	NOJ0	-0.28389	0.07206	-0.26771	-3.93985	0.00081
	WB	-0.02542	0.00774	-0.05708	-3.28333	0.00197
	CBPTE21	0.01510	0.01268	0.02681	2.76867	0.01185
9	(Constant)	-3.29150	0.24794		-13.27520	0.00000
	EMPBI7	0.40607	0.06075	0.44171	6.68460	0.00000
	EMPBI19	0.29562	0.04347	0.27880	6.80117	0.00000
	EMPBI18	0.53042	0.08567	0.48045	6.31918	0.00000
	EMPBI21	0.11278	0.02825	0.07129	4.69981	0.00016
	EMPBI1	-0.07060	0.01227	-0.07611	-5.75247	0.00002
	NOJ0	-0.26997	0.06670	-0.25458	-4.04718	0.00009
	WB	-0.02251	0.00726	-0.05054	-3.09987	0.00590
	CBPTE21	0.05127	0.01892	0.01862	1.68170	0.00158
	CBPTE11	0.08192	0.01928	0.09041	2.13615	0.04590
10	(Constant)	-3.14120	0.22888		-13.72442	0.00000
	EMPBI7	0.40747	0.05403	0.44521	7.54081	0.00000
	EMPBI19	0.28714	0.03881	0.27080	7.39771	0.00000
	EMPBI18	0.50752	0.07501	0.45971	6.76640	0.00000
	EMPBI21	0.12414	0.02536	0.06676	4.89250	0.00011
	EMPBI1	-0.07894	0.01141	-0.08510	-6.90418	0.00000
	NOJ0	-0.26523	0.05936	-0.25011	-4.46801	0.00030
	WB	-0.02102	0.00646	-0.05169	-3.25277	0.00222
	CBPTE21	0.04124	0.01281	0.01257	3.17671	0.00186
	CBPTE11	0.09662	0.01512	0.10809	2.71515	0.01558
	CBPTE22	0.05911	0.02419	0.02938	2.45291	0.02460

a Dependent Variable: CFS2P11

Figure E-1-6: Continued

Regression (CFS2P15)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395
6	0.99880	0.99761	0.99695	0.09292
7	0.99913	0.99826	0.99768	0.08112
8	0.99937	0.99874	0.99824	0.07067
9	0.99949	0.99898	0.99850	0.06511
10	0.99962	0.99924	0.99882	0.05791

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20268	1	78.20268	1844.47288	0.00000
	Residual	1.14476	27	0.04240		
	Total	79.34744	28			
2	Regression	78.77633	2	39.38816	1791.14930	0.00000
	Residual	0.57111	26	0.02197		
	Total	79.34744	28			
3	Regression	78.94707	3	26.31569	1641.20765	0.00000
	Residual	0.40037	25	0.01601		
	Total	79.34744	28			
4	Regression	79.01401	4	19.75350	1512.91924	0.00000
	Residual	0.33343	24	0.01306		
	Total	79.34744	28			
5	Regression	79.09889	5	15.81978	1463.91355	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34744	28			
6	Regression	79.15747	6	13.19291	1527.84427	0.00000
	Residual	0.18997	22	0.00863		
	Total	79.34744	28			
7	Regression	79.20926	7	11.11561	1719.71884	0.00000
	Residual	0.13818	21	0.00658		
	Total	79.34744	28			
8	Regression	79.24755	8	9.90594	1983.15444	0.00000
	Residual	0.09989	20	0.00499		
	Total	79.34744	28			
9	Regression	79.26689	9	8.80741	2077.57471	0.00000
	Residual	0.08055	19	0.00424		
	Total	79.34744	28			
10	Regression	79.28707	10	7.92871	2364.12505	0.00000
	Residual	0.06037	18	0.00335		
	Total	79.34744	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P15

Figure E-1-7: Commodity Flow Production for Commodity Item 15 (CFS2P15)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.9588	0.15504		-6.2487	0.00000
	EMPBI7	0.9085	0.02116	0.99276	42.9473	0.00000
2	(Constant)	-1.1850	0.11904		-9.9548	0.00000
	EMPBI7	0.5647	0.06897	0.61712	8.1883	0.00000
	EMPBI19	0.4081	0.07991	0.38514	5.1103	0.00000
3	(Constant)	-1.1892	0.11935		-11.6402	0.00000
	EMPBI7	0.4284	0.07219	0.46817	5.9351	0.00000
	EMPBI19	0.4190	0.06811	0.39525	6.1148	0.00000
	EMPBI18	0.1619	0.04958	0.14665	3.2652	0.00117
4	(Constant)	-1.9316	0.23691		-8.1613	0.00000
	EMPBI7	0.2919	0.08348	0.32114	3.4963	0.00175
	EMPBI19	0.4461	0.06259	0.42094	7.1115	0.00000
	EMPBI18	0.2514	0.05665	0.22776	4.4384	0.00017
	EMPBI21	0.1148	0.04851	0.06166	2.3681	0.01849
5	(Constant)	-1.9559	0.21572		-9.0672	0.00000
	EMPBI7	0.3792	0.08354	0.41435	4.5391	0.00015
	EMPBI19	0.3979	0.06026	0.37512	6.6044	0.00000
	EMPBI18	0.2380	0.05182	0.21566	4.5942	0.00013
	EMPBI21	0.1140	0.04049	0.06122	2.8162	0.00580
	EMPBI1	-0.0444	0.01812	-0.04787	-2.4501	0.02230
6	(Constant)	-2.0162	0.19421		-10.3814	0.00000
	EMPBI7	0.3756	0.07469	0.41041	5.0286	0.00005
	EMPBI19	0.3900	0.0595	0.36790	7.2308	0.00000
	EMPBI18	0.5097	0.11414	0.46174	4.4664	0.00019
	EMPBI21	0.1116	0.03620	0.05993	3.0829	0.00548
	EMPBI1	-0.0590	0.01718	-0.06161	-3.4420	0.00233
	NOJ9	-0.2392	0.09187	-0.22568	-2.6046	0.01618
7	(Constant)	-1.9818	0.16993		-11.6745	0.00000
	EMPBI7	0.4627	0.07222	0.50564	6.4071	0.00000
	EMPBI19	0.3340	0.05115	0.31508	6.5318	0.00000
	EMPBI18	0.5620	0.10136	0.50911	5.5451	0.00002
	EMPBI21	0.1343	0.03262	0.07212	4.1175	0.00049
	EMPBI1	-0.0620	0.01500	-0.06681	-4.1327	0.00047
	NOJ9	-0.2946	0.08259	-0.27784	-3.5676	0.00182
	W8	-0.0249	0.00888	-0.05596	-2.8056	0.01060
8	(Constant)	-2.0172	0.14930		-13.5157	0.00000
	EMPBI7	0.4419	0.06337	0.48288	6.9749	0.00000
	EMPBI19	0.3254	0.04467	0.30998	7.2865	0.00000
	EMPBI18	0.5716	0.08858	0.51776	6.4578	0.00000
	EMPBI21	0.1517	0.02911	0.08148	5.2128	0.00004
	EMPBI1	-0.0684	0.01328	-0.07182	-5.1575	0.00005
	NOJ9	-0.2818	0.07206	-0.26771	-3.9198	0.00081
	W8	-0.0254	0.00734	-0.05708	-3.4511	0.00172
	CBPTE21	0.0351	0.01268	0.02681	2.7686	0.01185
9	(Constant)	-1.5966	0.24794		-6.4393	0.00000
	EMPBI7	0.4060	0.06075	0.44171	6.6846	0.00000
	EMPBI19	0.2956	0.04547	0.27880	6.5011	0.00000
	EMPBI18	0.5304	0.08367	0.48045	6.3391	0.00000
	EMPBI21	0.1127	0.02825	0.07129	4.0998	0.00016
	EMPBI1	-0.0706	0.01227	-0.07611	-5.7524	0.00002
	NOJ9	-0.2699	0.06670	-0.25458	-4.0471	0.00009
	W8	-0.0225	0.00726	-0.05054	-3.0998	0.00590
	CBPTE21	0.0512	0.01192	0.03862	1.6817	0.00158
	CBPTE11	0.0819	0.01928	0.09041	2.1615	0.04590
10	(Constant)	-1.4461	0.22888		-6.3192	0.00001
	EMPBI7	0.4074	0.05403	0.44523	7.5403	0.00000
	EMPBI19	0.2871	0.04881	0.27080	7.1977	0.00000
	EMPBI18	0.5075	0.07501	0.45971	6.7664	0.00000
	EMPBI21	0.1243	0.02536	0.06676	4.9025	0.00011
	EMPBI1	-0.0789	0.01141	-0.08510	-6.9041	0.00000
	NOJ9	-0.2652	0.05936	-0.25011	-4.4680	0.00030
	W8	-0.0210	0.00646	-0.05169	-3.2577	0.00222
	CBPTE21	0.0412	0.01281	0.03257	3.1767	0.00186
	CBPTE11	0.0966	0.01512	0.10809	2.7151	0.01158
	CBPTE22	0.0593	0.02419	0.02938	2.4529	0.02408

a Dependent Variable: CFS2P15

Figure E-1-7: Continued

Regression (CFS2P17)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14822
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99841	0.99687	0.99619	0.10397
6	0.99880	0.99761	0.99695	0.09291
7	0.99913	0.99826	0.99768	0.08113
8	0.99937	0.99874	0.99824	0.07068
9	0.99949	0.99898	0.99850	0.06512
10	0.99962	0.99924	0.99882	0.05792

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20157	1	78.20157	1844.55524	0.00000
	Residual	1.14472	27	0.04240		
	Total	79.34829	28			
2	Regression	78.77711	2	39.38856	1793.01856	0.00000
	Residual	0.57116	26	0.02197		
	Total	79.34829	28			
3	Regression	78.94783	3	26.31594	1642.88896	0.00000
	Residual	0.40045	25	0.01602		
	Total	79.34829	28			
4	Regression	79.03479	4	19.75870	1512.64503	0.00000
	Residual	0.31350	24	0.01306		
	Total	79.34829	28			
5	Regression	79.09968	5	15.81994	1463.59353	0.00000
	Residual	0.24861	23	0.01081		
	Total	79.34829	28			
6	Regression	79.15830	6	13.19305	1527.68715	0.00000
	Residual	0.18999	22	0.00864		
	Total	79.34829	28			
7	Regression	79.21008	7	11.31573	1719.14819	0.00000
	Residual	0.13821	21	0.00658		
	Total	79.34829	28			
8	Regression	79.24837	8	9.90605	1982.94997	0.00000
	Residual	0.09991	20	0.00500		
	Total	79.34829	28			
9	Regression	79.26771	9	8.80752	2076.91033	0.00000
	Residual	0.08057	19	0.00424		
	Total	79.34829	28			
10	Regression	79.28791	10	7.92879	2163.81780	0.00000
	Residual	0.06038	18	0.00335		
	Total	79.34829	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P17

Figure E-1-8: Commodity Flow Production for Commodity Item 17 (CFS2P17)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.00113	0.15363		-13.03829	0.00000
	EMPBI7	0.90856	0.02115	0.99276	42.94829	0.00000
2	(Constant)	-2.22828	0.11904		-18.71802	0.00000
	EMPBI7	0.56481	0.06898	0.61715	8.18850	0.00000
	EMPBI19	0.40834	0.07992	0.38511	5.10970	0.00000
3	(Constant)	-2.41252	0.11936		-20.37916	0.00000
	EMPBI7	0.42850	0.07220	0.46821	5.93511	0.00000
	EMPBI19	0.41906	0.06832	0.39521	6.13379	0.00000
	EMPBI18	0.16188	0.04959	0.14663	3.26455	0.00117
4	(Constant)	-2.07098	0.23696		-12.50333	0.00000
	EMPBI7	0.29393	0.08349	0.32117	3.52039	0.00175
	EMPBI19	0.44630	0.06250	0.42091	7.13934	0.00000
	EMPBI18	0.25185	0.05666	0.22776	4.44389	0.00017
	EMPBI21	0.11484	0.04451	0.06166	2.58011	0.01043
5	(Constant)	-2.99929	0.21574		-13.90202	0.00000
	EMPBI7	0.37924	0.08355	0.41439	4.53901	0.00015
	EMPBI19	0.39791	0.06026	0.37529	6.60320	0.00000
	EMPBI18	0.23808	0.05183	0.21565	4.59159	0.00013
	EMPBI21	0.11403	0.04049	0.06123	2.81625	0.00580
	EMPBI1	-0.04481	0.01812	-0.04287	-2.45018	0.02231
6	(Constant)	-3.05953	0.19422		-15.75257	0.00000
	EMPBI7	0.37561	0.07470	0.41045	5.02886	0.00005
	EMPBI19	0.39006	0.05395	0.36786	7.22981	0.00000
	EMPBI18	0.50986	0.11414	0.46182	4.46684	0.00019
	EMPBI21	0.11162	0.03620	0.05991	3.08112	0.00548
	EMPBI1	-0.05901	0.01714	-0.06361	-3.44230	0.00232
	NOI9	-0.23935	0.09187	-0.22571	-2.60525	0.01616
7	(Constant)	-3.02713	0.16995		-17.81225	0.00000
	EMPBI7	0.46278	0.07223	0.50567	6.40696	0.00000
	EMPBI19	0.33406	0.05115	0.31506	6.53056	0.00000
	EMPBI18	0.56215	0.10137	0.50918	5.54534	0.00002
	EMPBI21	0.13431	0.01263	0.07213	4.11732	0.00040
	EMPBI1	-0.06200	0.01500	-0.06684	-4.13272	0.00047
	NOI9	-0.29470	0.08260	-0.27790	-3.56860	0.00182
	W8	-0.02492	0.00888	-0.05596	-2.80497	0.01061
8	(Constant)	-3.08059	0.14912		-20.63121	0.00000
	EMPBI7	0.44194	0.06338	0.48290	6.97309	0.00000
	EMPBI19	0.32546	0.04468	0.30695	7.28515	0.00000
	EMPBI18	0.57168	0.08839	0.51782	6.46792	0.00000
	EMPBI21	0.15176	0.02911	0.08148	5.21269	0.00004
	EMPBI1	-0.06849	0.01328	-0.07383	-5.15751	0.00005
	NOI9	-0.28396	0.07206	-0.26777	-3.94033	0.00081
	W8	-0.02541	0.00774	-0.05707	-3.28264	0.00372
	CBPTE21	0.03510	0.01268	0.02644	2.76879	0.01185
9	(Constant)	-2.63999	0.24798		-10.64577	0.00000
	EMPBI7	0.40610	0.06076	0.44174	6.68394	0.00000
	EMPBI19	0.29559	0.04447	0.27878	6.79947	0.00000
	EMPBI18	0.53050	0.08369	0.48051	6.33903	0.00000
	EMPBI21	0.13279	0.02826	0.07130	4.69951	0.00016
	EMPBI1	-0.07061	0.01227	-0.07612	-5.75211	0.00002
	NOI9	-0.27003	0.06672	-0.25464	-4.04750	0.00069
	W8	-0.02250	0.00726	-0.05054	-3.09985	0.00501
	CBPTE21	0.05128	0.01392	0.03862	3.68331	0.00158
	CBPTE11	0.08191	0.01929	0.09040	2.11551	0.04595
10	(Constant)	-2.48967	0.22890		-10.87688	0.00000
	EMPBI7	0.40749	0.05404	0.44526	7.54083	0.00000
	EMPBI19	0.28711	0.03882	0.27078	7.39647	0.00000
	EMPBI18	0.50759	0.07501	0.45976	6.76682	0.00000
	EMPBI21	0.12435	0.02536	0.06677	4.90255	0.00011
	EMPBI1	-0.07895	0.01143	-0.08512	-6.90489	0.00000
	NOI9	-0.26529	0.05917	-0.25017	-4.46879	0.00010
	W8	-0.02302	0.00646	-0.05169	-3.56222	0.00229
	CBPTE21	0.04124	0.01281	0.03257	3.37648	0.00136
	CBPTE11	0.09662	0.01513	0.10409	2.73501	0.01368
	CBPTE22	0.05935	0.02410	0.02040	2.45388	0.02455

a Dependent Variable: CFS2P17

Figure E-1-8: Continued

Regression (CFS2P18)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395
6	0.99880	0.99761	0.99695	0.09292
7	0.99913	0.99826	0.99768	0.08112
8	0.99937	0.99874	0.99824	0.07067
9	0.99949	0.99898	0.99850	0.06511
10	0.99962	0.99924	0.99882	0.05793

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20268	1	78.20268	1844.47288	0.00000
	Residual	1.14476	27	0.04240		
	Total	79.34744	28			
2	Regression	78.77633	2	39.38816	1791.14930	0.00000
	Residual	0.57111	26	0.02197		
	Total	79.34744	28			
3	Regression	78.94707	3	26.31569	1641.20765	0.00000
	Residual	0.40037	25	0.01601		
	Total	79.34744	28			
4	Regression	79.03401	4	19.75850	1512.93924	0.00000
	Residual	0.31343	24	0.01306		
	Total	79.34744	28			
5	Regression	79.09889	5	15.81978	1463.91355	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34744	28			
6	Regression	79.15747	6	13.19291	1527.84427	0.00000
	Residual	0.18997	22	0.00863		
	Total	79.34744	28			
7	Regression	79.20920	7	11.31561	1719.73884	0.00000
	Residual	0.13818	21	0.00658		
	Total	79.34744	28			
8	Regression	79.24755	8	9.90594	1981.15444	0.00000
	Residual	0.09989	20	0.00499		
	Total	79.34744	28			
9	Regression	79.26689	9	8.80743	2077.57471	0.00000
	Residual	0.08055	19	0.00424		
	Total	79.34744	28			
10	Regression	79.28707	10	7.92871	2364.12505	0.00000
	Residual	0.06037	18	0.00335		
	Total	79.34744	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P18

Figure E-1-9: Commodity Flow Production for Commodity Item 18 (CFS2P18)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1,25575	0,15364		-8,17349	0,00000
	EMPBI7	0,90855	0,02110	0,99276	42,94711	0,00000
2	(Constant)	-1,48092	0,11904		-12,44055	0,00000
	EMPBI7	0,56478	0,06897	0,61712	8,18839	0,00000
	EMPBI19	0,40837	0,07991	0,38514	5,11030	0,00003
3	(Constant)	-1,68518	0,11935		-14,11953	0,00000
	EMPBI7	0,42846	0,07219	0,46817	5,93512	0,00000
	EMPBI19	0,41909	0,06831	0,39525	6,13488	0,00000
	EMPBI18	0,16190	0,04958	0,14665	3,26520	0,00137
4	(Constant)	-2,22050	0,21691		-0,41017	0,00000
	EMPBI7	0,29390	0,08348	0,32114	3,52038	0,00175
	EMPBI19	0,44611	0,06259	0,42094	7,13153	0,00000
	EMPBI18	0,25146	0,05665	0,22776	4,43847	0,00017
	EMPBI21	0,11483	0,04451	0,06166	2,58012	0,01643
5	(Constant)	-2,25189	0,21572		-10,43895	0,00000
	EMPBI7	0,17921	0,08354	0,41435	4,53910	0,00015
	EMPBI19	0,39796	0,06026	0,37512	6,60448	0,00000
	EMPBI18	0,23809	0,05182	0,21566	4,59427	0,00013
	EMPBI21	0,11402	0,04040	0,06122	2,81628	0,00980
	EMPBI3	-0,04440	0,01812	-0,04787	-2,45012	0,02330
6	(Constant)	-2,31212	0,19421		-11,90505	0,00000
	EMPBI7	0,17560	0,07460	0,41041	5,02868	0,00005
	EMPBI19	0,39009	0,05395	0,36790	7,23086	0,00000
	EMPBI18	0,50978	0,11414	0,46175	4,46644	0,00019
	EMPBI21	0,11161	0,03620	0,05991	3,08209	0,00544
	EMPBI3	-0,05900	0,01714	-0,06361	-3,44209	0,00231
	NOI9	-0,21928	0,09187	-0,22564	-2,60461	0,01618
7	(Constant)	-2,27972	0,16993		-13,41589	0,00000
	EMPBI7	0,46275	0,07222	0,50564	6,40717	0,00000
	EMPBI19	0,33409	0,05115	0,31508	6,53188	0,00000
	EMPBI18	0,56208	0,10136	0,50911	5,54533	0,00002
	EMPBI21	0,13433	0,03262	0,07212	4,11755	0,00049
	EMPBI3	-0,06200	0,01500	-0,06683	-4,13277	0,00047
	NOI9	-0,20463	0,08259	-0,21784	-2,56761	0,00182
	W8	-0,02492	0,00888	-0,05596	-2,80561	0,01060
8	(Constant)	-2,31317	0,14930		-15,62727	0,00000
	EMPBI7	0,44192	0,06337	0,48288	6,97349	0,00000
	EMPBI19	0,32549	0,04467	0,30698	7,28658	0,00000
	EMPBI18	0,57161	0,08838	0,51776	6,46781	0,00000
	EMPBI21	0,15175	0,02911	0,08148	5,21288	0,00004
	EMPBI3	-0,06848	0,01328	-0,07382	-5,15750	0,00005
	NOI9	-0,28389	0,07206	-0,26771	-3,93985	0,00081
	W8	-0,02543	0,00774	-0,05708	-3,28333	0,00172
	CBPTE21	0,03510	0,01268	0,02643	2,76867	0,01185
9	(Constant)	-1,89250	0,24794		-7,63279	0,00000
	EMPBI7	0,40607	0,06075	0,44171	6,68460	0,00000
	EMPBI19	0,29562	0,04347	0,27880	6,80117	0,00000
	EMPBI18	0,53042	0,08367	0,48045	6,33918	0,00000
	EMPBI21	0,13278	0,02825	0,07129	4,69981	0,00016
	EMPBI3	-0,07060	0,01227	-0,07611	-5,75247	0,00002
	NOI9	-0,26997	0,06670	-0,25458	-4,04718	0,00069
	W8	-0,02251	0,00726	-0,05054	-3,09987	0,00590
	CBPTE21	0,05127	0,01392	0,03862	3,68170	0,00158
	CBPTE31	0,08392	0,03928	0,09041	2,13615	0,04590
10	(Constant)	-1,74226	0,22888		-7,61207	0,00000
	EMPBI7	0,40747	0,05403	0,44523	7,54083	0,00000
	EMPBI19	0,28714	0,03881	0,27080	7,39771	0,00000
	EMPBI18	0,50752	0,07501	0,45971	6,76640	0,00000
	EMPBI23	0,12434	0,02530	0,06676	4,90250	0,00011
	EMPBI3	-0,07894	0,01141	-0,08510	-6,90438	0,00000
	NOI9	-0,26523	0,05936	-0,25011	-4,46801	0,00030
	W8	-0,02302	0,00646	-0,05169	-3,56277	0,00227
	CBPTE21	0,04324	0,01281	0,03257	3,37671	0,00336
	CBPTE31	0,09662	0,03532	0,10409	2,73535	0,01359
	CBPTE22	0,05933	0,02419	0,02918	2,45291	0,02460

a Dependent Variable: CFS2P18

Figure E-1-9: Continued

Regression (CFS2P19)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99619	0.99280	0.99225	0.14827
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99841	0.99687	0.99619	0.10396
6	0.99880	0.99761	0.99695	0.09293
7	0.99913	0.99826	0.99768	0.08112
8	0.99937	0.99874	0.99824	0.07056
9	0.99949	0.99899	0.99850	0.06511
10	0.99962	0.99924	0.99882	0.05791

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOI9, WI8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOI9, WI8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOI9, WI8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOI9, WI8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20296	1	78.20296	1844.45341	0.00000
	Residual	1.14477	27	0.04240		
	Total	79.34773	28			
2	Regression	78.77053	2	39.38827	1792.87457	0.00000
	Residual	0.57720	26	0.02197		
	Total	79.34773	28			
3	Regression	78.94720	3	26.31576	1642.93032	0.00000
	Residual	0.40044	25	0.01602		
	Total	79.34773	28			
4	Regression	79.01425	4	19.75356	1512.71347	0.00000
	Residual	0.31348	24	0.01306		
	Total	79.34773	28			
5	Regression	79.09915	5	15.81983	1463.68819	0.00000
	Residual	0.24859	23	0.01081		
	Total	79.34773	28			
6	Regression	79.15775	6	13.19296	1527.72077	0.00000
	Residual	0.18998	22	0.00864		
	Total	79.34773	28			
7	Regression	79.20956	7	11.31565	1719.73509	0.00000
	Residual	0.13818	21	0.00658		
	Total	79.34773	28			
8	Regression	79.24787	8	9.90598	1983.91952	0.00000
	Residual	0.09986	20	0.00499		
	Total	79.34773	28			
9	Regression	79.26720	9	8.80747	2077.86701	0.00000
	Residual	0.08054	19	0.00424		
	Total	79.34773	28			
10	Regression	79.28738	10	7.92874	2364.63563	0.00000
	Residual	0.06035	18	0.00335		
	Total	79.34773	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOI9, WI8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOI9, WI8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOI9, WI8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOI9, WI8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P19

Figure E-1-10: Commodity Flow Production for Commodity Item 19 (CFS2P19)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.39939	0.15364		-28.63481	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94710	0.00000
2	(Constant)	-4.02455	0.11905		-33.84572	0.00000
	EMPBI7	0.56480	0.06898	0.61715	8.18810	0.00000
	EMPBI19	0.40815	0.07993	0.38513	5.10957	0.00000
3	(Constant)	-4.82882	0.11936		-40.45549	0.00000
	EMPBI7	0.42847	0.07220	0.46818	5.93482	0.00000
	EMPBI19	0.41906	0.06812	0.39522	6.15198	0.00000
	EMPBI18	0.16191	0.04959	0.14666	3.26512	0.00117
4	(Constant)	-5.17129	0.21605		-23.67671	0.00000
	EMPBI7	0.29390	0.08340	0.32114	3.52010	0.00175
	EMPBI19	0.44631	0.06259	0.42093	7.13064	0.00000
	EMPBI18	0.25148	0.05666	0.22778	4.43850	0.00017
	EMPBI23	0.11485	0.04451	0.06165	2.58023	0.01042
5	(Constant)	-5.39559	0.21574		-25.01006	0.00000
	EMPBI7	0.17921	0.08155	0.41436	4.53880	0.00015
	EMPBI19	0.39794	0.06026	0.37530	6.60354	0.00000
	EMPBI18	0.23811	0.05183	0.21567	4.59428	0.00013
	EMPBI23	0.11404	0.04049	0.06123	2.81640	0.00579
	EMPBI1	-0.04441	0.01812	-0.04787	-2.45029	0.02238
6	(Constant)	-5.45583	0.19422		-28.09084	0.00000
	EMPBI7	0.17560	0.07469	0.41041	5.02854	0.00005
	EMPBI19	0.39006	0.05395	0.36787	7.23008	0.00000
	EMPBI18	0.50986	0.11414	0.46182	4.46692	0.00019
	EMPBI23	0.11161	0.03620	0.05993	3.08324	0.00548
	EMPBI1	-0.05901	0.01714	-0.06361	-3.44230	0.00232
	NOJ9	-0.23933	0.09187	-0.22569	-2.60504	0.01616
7	(Constant)	-5.42383	0.16993		-31.91621	0.00000
	EMPBI7	0.46277	0.07222	0.50566	6.40758	0.00000
	EMPBI19	0.33806	0.05115	0.31505	6.51119	0.00000
	EMPBI18	0.56217	0.10136	0.50920	5.54612	0.00002
	EMPBI23	0.13434	0.01262	0.07215	4.11805	0.00049
	EMPBI1	-0.06200	0.01500	-0.06684	-4.13318	0.00047
	NOJ9	-0.29469	0.08259	-0.27789	-3.56850	0.00181
	W8	-0.02492	0.00888	-0.05597	-2.80600	0.01059
8	(Constant)	-5.47690	0.14928		-36.68875	0.00000
	EMPBI7	0.44193	0.06336	0.48289	6.97460	0.00000
	EMPBI19	0.32546	0.04460	0.30094	7.29575	0.00000
	EMPBI18	0.57170	0.08837	0.51783	6.46970	0.00000
	EMPBI23	0.15177	0.02011	0.08149	5.21440	0.00004
	EMPBI1	-0.06849	0.01328	-0.07383	-5.15888	0.00005
	NOJ9	-0.28394	0.07205	-0.26776	-3.94113	0.00081
	W8	-0.02542	0.00774	-0.05708	-3.28427	0.00171
	CBPTE21	0.03511	0.01267	0.02648	2.77010	0.01181
9	(Constant)	-5.03681	0.24791		-20.31418	0.00000
	EMPBI7	0.40610	0.06074	0.44373	6.68546	0.00000
	EMPBI19	0.29559	0.04346	0.27878	6.80106	0.00000
	EMPBI18	0.53053	0.08167	0.48054	6.34085	0.00000
	EMPBI23	0.13281	0.02825	0.07131	4.70124	0.00016
	EMPBI1	-0.07061	0.01227	-0.07612	-5.75351	0.00002
	NOJ9	-0.27002	0.06670	-0.25461	-4.04831	0.00069
	W8	-0.02251	0.00726	-0.05055	-3.10076	0.00589
	CBPTE21	0.05128	0.01102	0.03862	5.68439	0.00157
	CBPTE31	0.08388	0.01928	0.09037	2.13535	0.04597
10	(Constant)	-4.88617	0.22886		-21.35040	0.00000
	EMPBI7	0.40749	0.05403	0.44526	7.54207	0.00000
	EMPBI19	0.28712	0.03881	0.27078	7.39785	0.00000
	EMPBI18	0.50761	0.07500	0.45980	6.76849	0.00000
	EMPBI23	0.12437	0.02536	0.06678	4.90424	0.00011
	EMPBI1	-0.07895	0.01143	-0.08511	-6.90583	0.00000
	NOJ9	-0.26529	0.05936	-0.25016	-4.46946	0.00030
	W8	-0.02303	0.00646	-0.05171	-3.56391	0.00222
	CBPTE21	0.04312	0.01280	0.01257	3.37752	0.00335
	CBPTE31	0.09658	0.01512	0.10406	2.73461	0.01361
	CBPTE22	0.05933	0.02418	0.02938	2.45328	0.02458

a Dependent Variable: CFS2P19

Figure E-1-10: Continued

Regression (CFS2P23)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99610	0.99280	0.99225	0.14822
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99843	0.99687	0.99619	0.10397
6	0.99880	0.99761	0.99695	0.09293
7	0.99913	0.99826	0.99768	0.08113
8	0.99937	0.99874	0.99824	0.07068
9	0.99949	0.99898	0.99850	0.06512
10	0.99962	0.99924	0.99882	0.05792

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20157	1	78.20157	1844.55524	0.00000
	Residual	1.14472	27	0.04240		
	Total	79.34829	28			
2	Regression	78.77713	2	39.38856	1793.01856	0.00000
	Residual	0.57116	26	0.02197		
	Total	79.34829	28			
3	Regression	78.94783	3	26.31594	1642.88896	0.00000
	Residual	0.40045	25	0.01602		
	Total	79.34829	28			
4	Regression	79.03479	4	19.75870	1512.64503	0.00000
	Residual	0.31350	24	0.01306		
	Total	79.34829	28			
5	Regression	79.09968	5	15.81994	1463.59353	0.00000
	Residual	0.24861	23	0.01081		
	Total	79.34829	28			
6	Regression	79.15830	6	13.19305	1527.68715	0.00000
	Residual	0.18999	22	0.00864		
	Total	79.34829	28			
7	Regression	79.21008	7	11.31573	1719.34819	0.00000
	Residual	0.13821	21	0.00658		
	Total	79.34829	28			
8	Regression	79.24817	8	9.90605	1982.04997	0.00000
	Residual	0.09991	20	0.00500		
	Total	79.34829	28			
9	Regression	79.26771	9	8.80752	2076.91011	0.00000
	Residual	0.08057	19	0.00424		
	Total	79.34829	28			
10	Regression	79.28791	10	7.92879	2361.83780	0.00000
	Residual	0.06038	18	0.00335		
	Total	79.34829	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P23

Figure E-1-11: Commodity Flow Production for Commodity Item 23 (CFS2P23)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.21771	0.15361		-27.58324	0.00000
	EMPB87	0.90856	0.02115	0.99276	42.94829	0.00000
2	(Constant)	-4.46288	0.11904		-37.48911	0.00000
	EMPB87	0.56481	0.06898	0.61715	8.18850	0.00000
	EMPB819	0.40834	0.07992	0.38511	5.10970	0.00001
3	(Constant)	-4.66712	0.11936		-39.10018	0.00000
	EMPB87	0.42850	0.07220	0.46821	5.93513	0.00000
	EMPB819	0.41906	0.06832	0.39571	6.13379	0.00000
	EMPB818	0.16188	0.04959	0.14661	3.26455	0.00117
4	(Constant)	-5.21158	0.23696		-21.99169	0.00000
	EMPB87	0.29393	0.08349	0.32117	3.52039	0.00175
	EMPB819	0.44630	0.06259	0.42091	7.13014	0.00000
	EMPB818	0.25145	0.05666	0.22776	4.43789	0.00017
	EMPB823	0.11484	0.04451	0.06166	2.58011	0.01643
5	(Constant)	-5.23389	0.21574		-24.25964	0.00000
	EMPB87	0.17926	0.08155	0.41439	4.53901	0.00015
	EMPB819	0.39793	0.06026	0.37529	6.60120	0.00000
	EMPB818	0.21808	0.05183	0.21565	4.59159	0.00013
	EMPB823	0.11403	0.04049	0.06121	2.81625	0.00980
	EMPB81	-0.04441	0.01812	-0.04787	-2.45018	0.02211
6	(Constant)	-5.29413	0.19422		-27.25783	0.00000
	EMPB87	0.17561	0.07470	0.41045	5.02886	0.00005
	EMPB819	0.39006	0.05395	0.36786	7.22983	0.00000
	EMPB818	0.50986	0.11414	0.46182	4.46684	0.00019
	EMPB823	0.11167	0.03620	0.05993	3.08312	0.00544
	EMPB81	-0.05901	0.01714	-0.06361	-3.44210	0.00232
	NOI9	-0.23935	0.09187	-0.22571	-2.60525	0.01616
7	(Constant)	-5.26173	0.16995		-30.96108	0.00000
	EMPB87	0.46278	0.07221	0.50567	6.40696	0.00000
	EMPB819	0.33406	0.05115	0.31506	6.53056	0.00000
	EMPB818	0.56215	0.10137	0.50918	5.54514	0.00002
	EMPB823	0.13411	0.03263	0.07213	4.11132	0.00049
	EMPB81	-0.06200	0.01500	-0.06684	-4.13272	0.00047
	NOI9	-0.39470	0.08260	-0.27790	-3.56800	0.00182
	W8	-0.02492	0.00888	-0.05596	-2.80497	0.01061
8	(Constant)	-5.31519	0.14812		-35.59670	0.00000
	EMPB87	0.44194	0.06338	0.48290	6.97309	0.00000
	EMPB819	0.32546	0.04468	0.30695	7.28515	0.00000
	EMPB818	0.57168	0.08839	0.51782	6.46792	0.00000
	EMPB823	0.15176	0.02911	0.08148	5.21269	0.00004
	EMPB81	-0.06849	0.01328	-0.07381	-5.15751	0.00005
	NOI9	-0.28396	0.07206	-0.26777	-3.94033	0.00081
	W8	-0.02543	0.00774	-0.05707	-3.28264	0.00372
	CBPTE21	0.01510	0.01268	0.02664	2.76879	0.01185
9	(Constant)	-4.87459	0.24798		-19.65681	0.00000
	EMPB87	0.40610	0.06076	0.44374	6.68394	0.00000
	EMPB819	0.29559	0.04147	0.27878	6.79947	0.00000
	EMPB818	0.53050	0.08369	0.48051	6.33901	0.00000
	EMPB823	0.13279	0.02826	0.07130	4.69951	0.00016
	EMPB81	-0.07061	0.01227	-0.07612	-5.75211	0.00002
	NOI9	-0.27001	0.06572	-0.25464	-4.04750	0.00059
	W8	-0.02250	0.00726	-0.05054	-3.09905	0.00591
	CBPTE21	0.05128	0.01392	0.03862	3.68311	0.00158
	CBPTE31	0.08391	0.03929	0.09040	2.13551	0.04595
10	(Constant)	-4.72427	0.22890		-20.63940	0.00000
	EMPB87	0.40749	0.05404	0.44526	7.54083	0.00000
	EMPB819	0.28711	0.03682	0.27078	7.79647	0.00000
	EMPB818	0.50759	0.07501	0.45970	6.76682	0.00000
	EMPB823	0.12435	0.02536	0.06677	4.90255	0.00011
	EMPB81	-0.07895	0.01141	-0.08512	-6.90489	0.00000
	NOI9	-0.26529	0.05937	-0.25017	-4.46879	0.00030
	W8	-0.02302	0.00646	-0.05169	-3.56222	0.00223
	CBPTE21	0.04126	0.01281	0.03257	3.37644	0.00336
	CBPTE31	0.09662	0.03531	0.10409	2.73501	0.01360
	CBPTE22	0.05935	0.02419	0.02940	2.45388	0.02455

a Dependent Variable: CFS2P21

Figure E-1-11: Continued

Regression (CFS2P24)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.9922%	0.14821
3	0.99747	0.9949%	0.9943%	0.1265%
4	0.99802	0.9960%	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.1039%
6	0.99880	0.99761	0.9969%	0.09292
7	0.99913	0.99826	0.99768	0.08111
8	0.99937	0.99874	0.99824	0.07066
9	0.99948	0.99899	0.99850	0.06510
10	0.99962	0.99924	0.99882	0.05790

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20262	1	78.20262	1844.39154	0.00000
	Residual	1.14480	27	0.04240		
	Total	79.34742	28			
2	Regression	78.77631	2	39.38815	1791.15005	0.00000
	Residual	0.57111	26	0.02197		
	Total	79.34742	28			
3	Regression	78.94707	3	26.31569	1643.28965	0.00000
	Residual	0.40035	25	0.01601		
	Total	79.34742	28			
4	Regression	79.03401	4	19.75850	1511.01617	0.00000
	Residual	0.31342	24	0.01306		
	Total	79.34742	28			
5	Regression	79.09890	5	15.81978	1464.06479	0.00000
	Residual	0.24852	23	0.01081		
	Total	79.34742	28			
6	Regression	79.15748	6	13.19291	1528.08343	0.00000
	Residual	0.18994	22	0.00863		
	Total	79.34742	28			
7	Regression	79.20927	7	11.31561	1720.02185	0.00000
	Residual	0.13815	21	0.00658		
	Total	79.34742	28			
8	Regression	79.24756	8	9.9059%	1983.94092	0.00000
	Residual	0.09986	20	0.00499		
	Total	79.34742	28			
9	Regression	79.26690	9	8.80741	2078.16625	0.00000
	Residual	0.08052	19	0.00424		
	Total	79.34742	28			
10	Regression	79.28707	10	7.92871	2364.68082	0.00000
	Residual	0.06035	18	0.00335		
	Total	79.34742	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P24

Figure E-1-12: Commodity Flow Production for Commodity Item 24 (CFS2P24)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.72035	0.15304		-37.23221	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94680	0.00000
2	(Constant)	-5.94553	0.11904		-49.94581	0.00000
	EMPBI7	0.56476	0.06897	0.61711	8.18818	0.00000
	EMPBI19	0.40839	0.07991	0.38516	5.11052	0.00001
3	(Constant)	-6.14981	0.11935		-51.52835	0.00000
	EMPBI7	0.42843	0.07219	0.46814	5.93495	0.00000
	EMPBI19	0.41911	0.06831	0.39526	6.13529	0.00000
	EMPBI18	0.16191	0.06858	0.14666	1.26547	0.00116
4	(Constant)	-6.09420	0.21693		-28.25417	0.00000
	EMPBI7	0.29188	0.08348	0.32112	1.52023	0.00175
	EMPBI19	0.44615	0.06258	0.42096	7.13199	0.00000
	EMPBI18	0.25146	0.05665	0.22777	4.43871	0.00017
	EMPBI21	0.11483	0.04451	0.06165	2.58012	0.01043
5	(Constant)	-6.71650	0.21571		-31.13690	0.00000
	EMPBI7	0.17819	0.08154	0.41414	4.53917	0.00015
	EMPBI19	0.39798	0.06025	0.37534	6.60505	0.00000
	EMPBI18	0.21810	0.05182	0.21566	4.59461	0.00013
	EMPBI21	0.11402	0.04048	0.06122	2.81636	0.00979
	EMPBI3	-0.04441	0.01812	-0.04787	-2.45061	0.02229
6	(Constant)	-6.77674	0.19420		-34.89598	0.00000
	EMPBI7	0.37559	0.07469	0.41040	5.02890	0.00005
	EMPBI19	0.39010	0.05594	0.36791	7.23168	0.00000
	EMPBI18	0.50980	0.11413	0.46177	4.46693	0.00019
	EMPBI21	0.11161	0.01620	0.05993	1.08316	0.00543
	EMPBI3	-0.05901	0.01714	-0.06161	-3.44259	0.00232
	NOJ9	-0.23929	0.09186	-0.22565	-2.60491	0.01617
7	(Constant)	-6.74414	0.16991		-39.69297	0.00000
	EMPBI7	0.46273	0.07222	0.50562	6.40761	0.00000
	EMPBI19	0.13411	0.05114	0.13510	6.51276	0.00000
	EMPBI18	0.56210	0.10135	0.50914	5.54590	0.00002
	EMPBI21	0.13412	0.01262	0.07212	4.11776	0.00049
	EMPBI3	-0.06200	0.01500	-0.06684	-4.13335	0.00047
	NOJ9	-0.29464	0.08258	-0.27784	-3.56797	0.00182
	W8	-0.02492	0.00888	-0.05596	-2.80565	0.01059
8	(Constant)	-6.79779	0.14928		-45.53750	0.00000
	EMPBI7	0.48190	0.06136	0.48280	6.97419	0.00000
	EMPBI19	0.12551	0.04466	0.10609	7.28802	0.00000
	EMPBI18	0.57103	0.08836	0.51777	6.46893	0.00000
	EMPBI21	0.15175	0.02911	0.08148	5.21155	0.00004
	EMPBI3	-0.06848	0.01328	-0.07183	-5.15857	0.00005
	NOJ9	-0.28190	0.07205	-0.26771	-3.94049	0.00081
	W8	-0.02541	0.00774	-0.05707	-3.28361	0.00171
	CBPTE21	0.03510	0.01267	0.02644	2.76933	0.01183
9	(Constant)	-6.15720	0.24791		-25.64135	0.00000
	EMPBI7	0.40606	0.06074	0.44169	6.68531	0.00000
	EMPBI19	0.29564	0.04146	0.27882	6.80263	0.00000
	EMPBI18	0.53044	0.08166	0.48047	6.34032	0.00000
	EMPBI21	0.11278	0.02825	0.07129	4.70050	0.00016
	EMPBI3	-0.07060	0.01227	-0.07611	-5.75360	0.00002
	NOJ9	-0.26997	0.06670	-0.25458	-4.04784	0.00069
	W8	-0.02251	0.00726	-0.05054	-3.10015	0.00589
	CBPTE21	0.05127	0.01392	0.03862	3.68425	0.00158
	CBPTE31	0.08190	0.01928	0.09039	2.13609	0.04500
10	(Constant)	-6.20699	0.22885		-27.12207	0.00000
	EMPBI7	0.40745	0.05403	0.44521	7.54141	0.00000
	EMPBI19	0.28716	0.03881	0.27083	7.39918	0.00000
	EMPBI18	0.50755	0.07500	0.45973	6.76753	0.00000
	EMPBI21	0.12414	0.02536	0.08670	4.90316	0.00011
	EMPBI3	-0.07895	0.01143	-0.08511	-6.90537	0.00000
	NOJ9	-0.26521	0.05935	-0.25012	-4.46865	0.00030
	W8	-0.02302	0.00646	-0.05169	-3.56299	0.00222
	CBPTE21	0.04124	0.01280	0.03257	3.17227	0.00336
	CBPTE31	0.09660	0.01532	0.10408	2.73519	0.01360
	CBPTE22	0.05911	0.02418	0.02938	2.45267	0.02461

a Dependent Variable: CFS2P24

Figure E-1-12: Continued

Regression (CFS2P26)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.9922%	0.14821
3	0.99747	0.9949%	0.9941%	0.1265%
4	0.99802	0.9960%	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395
6	0.99880	0.99761	0.9969%	0.09292
7	0.99911	0.99826	0.99768	0.08111
8	0.99937	0.99874	0.99824	0.07066
9	0.99949	0.99898	0.99850	0.06511
10	0.99962	0.99924	0.99882	0.05791

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20278	1	78.20278	1844.47844	0.00000
	Residual	1.14475	27	0.04240		
	Total	79.34753	28			
2	Regression	78.77688	2	19.38819	1791.04026	0.00000
	Residual	0.5711%	26	0.02197		
	Total	79.34753	28			
3	Regression	78.94716	3	26.31572	1643.19574	0.00000
	Residual	0.40037	25	0.01601		
	Total	79.34753	28			
4	Regression	79.03411	4	19.75853	1512.99211	0.00000
	Residual	0.31342	24	0.01306		
	Total	79.34753	28			
5	Regression	79.09898	5	15.81980	1463.92521	0.00000
	Residual	0.2485%	23	0.01081		
	Total	79.34753	28			
6	Regression	79.15756	6	13.19293	1527.85912	0.00000
	Residual	0.18997	22	0.00863		
	Total	79.34753	28			
7	Regression	79.20936	7	11.31562	1719.79715	0.00000
	Residual	0.13817	21	0.00658		
	Total	79.34753	28			
8	Regression	79.24767	8	9.90596	1983.85864	0.00000
	Residual	0.09987	20	0.00499		
	Total	79.34753	28			
9	Regression	79.26699	9	8.80744	2077.72487	0.00000
	Residual	0.08054	19	0.00424		
	Total	79.34753	28			
10	Regression	79.28717	10	7.92872	2364.41303	0.00000
	Residual	0.06036	18	0.00335		
	Total	79.34753	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P26

Figure E-1-13: Commodity Flow Production for Commodity Item 26 (CFS2P26)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.89168	0.15364		-25.13041	0.00000
	EMPBI7	0.90855	0.02115	0.99276	42.94739	0.00000
2	(Constant)	-4.11684	0.11904		-34.58269	0.00000
	EMPBI7	0.56479	0.06897	0.61714	8.18831	0.00000
	EMPBI19	0.40836	0.07991	0.38513	5.10997	0.00003
3	(Constant)	-4.32112	0.11935		-36.20500	0.00000
	EMPBI7	0.42846	0.07219	0.46817	5.93508	0.00000
	EMPBI19	0.41908	0.06831	0.39523	6.13467	0.00000
	EMPBI18	0.16192	0.04958	0.14666	3.26549	0.00116
4	(Constant)	-4.86557	0.23693		-20.53591	0.00000
	EMPBI7	0.29389	0.08348	0.32112	3.52030	0.00175
	EMPBI19	0.44632	0.06258	0.42093	7.13149	0.00000
	EMPBI18	0.25148	0.05665	0.22778	4.43894	0.00017
	EMPBI21	0.11484	0.04451	0.06166	2.58037	0.01042
5	(Constant)	-4.88787	0.21572		-22.65849	0.00000
	EMPBI7	0.17919	0.08154	0.41433	4.53880	0.00015
	EMPBI19	0.39796	0.06026	0.37512	6.60439	0.00000
	EMPBI18	0.23811	0.05382	0.21568	4.50471	0.00013
	EMPBI21	0.11403	0.04049	0.06123	2.81652	0.00579
	EMPBI3	-0.04440	0.01812	-0.04787	-2.45016	0.02231
6	(Constant)	-4.94810	0.19421		-25.47777	0.00000
	EMPBI7	0.37558	0.07469	0.41039	5.02947	0.00005
	EMPBI19	0.39808	0.05395	0.36789	7.23077	0.00000
	EMPBI18	0.50981	0.11414	0.46177	4.46666	0.00019
	EMPBI21	0.11162	0.01620	0.05993	1.08126	0.00548
	EMPBI3	-0.05900	0.01714	-0.06100	-3.44193	0.00233
	NOJ0	-0.23928	0.09187	-0.22564	-2.60462	0.01618
7	(Constant)	-4.91570	0.16992		-28.92884	0.00000
	EMPBI7	0.46274	0.07222	0.50563	6.40727	0.00000
	EMPBI19	0.13408	0.05115	0.13508	6.53183	0.00000
	EMPBI18	0.56211	0.10136	0.50915	5.54566	0.00002
	EMPBI21	0.13434	0.01262	0.07211	4.11792	0.00049
	EMPBI3	-0.06199	0.01500	-0.06683	-4.13264	0.00047
	NOJ0	-0.29463	0.08258	-0.27784	-3.56770	0.00182
	W8	-0.02492	0.00888	-0.05596	-2.80574	0.01059
8	(Constant)	-4.96916	0.14928		-33.28705	0.00000
	EMPBI7	0.48190	0.06136	0.48280	0.97804	0.00000
	EMPBI19	0.13548	0.04466	0.30697	7.28726	0.00000
	EMPBI18	0.57104	0.08837	0.51778	6.46895	0.00000
	EMPBI21	0.15177	0.02911	0.08149	5.21404	0.00004
	EMPBI3	-0.06848	0.01328	-0.07182	-5.15806	0.00005
	NOJ0	-0.28189	0.07205	-0.26771	-3.94033	0.00081
	W8	-0.02542	0.00774	-0.05708	-3.28586	0.00171
	CBPTE21	0.03511	0.01267	0.02644	2.76977	0.01182
9	(Constant)	-4.52872	0.24791		-18.26576	0.00000
	EMPBI7	0.40607	0.06075	0.44171	6.68480	0.00000
	EMPBI19	0.29562	0.04146	0.27880	6.80151	0.00000
	EMPBI18	0.53047	0.08167	0.48049	6.33998	0.00000
	EMPBI21	0.11280	0.02825	0.07130	4.70081	0.00016
	EMPBI3	-0.07060	0.01227	-0.07611	-5.75249	0.00002
	NOJ0	-0.26997	0.06670	-0.25458	-4.04740	0.00069
	W8	-0.02251	0.00726	-0.05055	-3.10030	0.00580
	CBPTE21	0.05128	0.01392	0.03862	3.68393	0.00158
	CBPTE31	0.08187	0.03928	0.09036	2.13514	0.04509
10	(Constant)	-4.37847	0.22887		-19.13107	0.00000
	EMPBI7	0.46746	0.05403	0.44523	7.54121	0.00000
	EMPBI19	0.28714	0.01881	0.27081	7.19826	0.00000
	EMPBI18	0.50757	0.07500	0.45975	6.76744	0.00000
	EMPBI21	0.12417	0.02536	0.06677	4.90171	0.00011
	EMPBI3	-0.07894	0.01143	-0.08510	-6.90462	0.00000
	NOJ0	-0.26521	0.05936	-0.25011	-4.46817	0.00030
	W8	-0.02102	0.00646	-0.05170	-3.56334	0.00222
	CBPTE21	0.04124	0.01281	0.03257	3.17700	0.00336
	CBPTE31	0.09658	0.03532	0.10405	2.73431	0.01162
	CBPTE22	0.05933	0.02418	0.02938	2.45315	0.02458

a Dependent Variable: CFS2P26

Figure E-1-13: Continued

Regression (CFS2P27)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20590
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11428
5	0.99841	0.99687	0.99619	0.10495
6	0.99880	0.99761	0.99695	0.09292
7	0.99913	0.99826	0.99768	0.08112
8	0.99937	0.99874	0.99824	0.07067
9	0.99949	0.99898	0.99850	0.06511
10	0.99962	0.99924	0.99882	0.05791

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB, CBPTE21, CBPTE31, CBPTE22

ANOVA[k]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20206	1	78.20206	1844.57011	0.00000
	Residual	1.14469	27	0.04240		
	Total	79.34674	28			
2	Regression	78.77561	2	39.38781	1791.12531	0.00000
	Residual	0.57112	26	0.02197		
	Total	79.34674	28			
3	Regression	78.94631	3	26.31544	1641.00480	0.00000
	Residual	0.40042	25	0.01602		
	Total	79.34674	28			
4	Regression	79.01928	4	19.75482	1512.77506	0.00000
	Residual	0.31346	24	0.01306		
	Total	79.34674	28			
5	Regression	79.09819	5	15.81964	1461.88556	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34674	28			
6	Regression	79.15077	6	13.19280	1527.84597	0.00000
	Residual	0.18997	22	0.00863		
	Total	79.34674	28			
7	Regression	79.20856	7	11.31551	1719.62541	0.00000
	Residual	0.13818	21	0.00658		
	Total	79.34674	28			
8	Regression	79.24685	8	9.90586	1981.33846	0.00000
	Residual	0.09989	20	0.00499		
	Total	79.34674	28			
9	Regression	79.26618	9	8.80735	2077.26030	0.00000
	Residual	0.08056	19	0.00424		
	Total	79.34674	28			
10	Regression	79.28658	10	7.92864	2364.16917	0.00000
	Residual	0.06017	18	0.00335		
	Total	79.34674	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P27

Figure E-1-14: Commodity Flow Production for Commodity Item 27 (CFS2P27)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.67429	0.15461		-43.44135	0.00000
	EMPBI7	0.9085%	0.0211%	0.9276	42.94846	0.00000
2	(Constant)	-6.8994%	0.11904		-57.9505	0.00000
	EMPBI7	0.5647%	0.0689%	0.61715	8.18864	0.00000
	EMPBI19	0.4083%	0.0799%	0.3851%	5.10996	0.00001
3	(Constant)	-7.10368	0.11936		-59.51584	0.00000
	EMPBI7	0.4284%	0.0721%	0.4682%	5.93527	0.00000
	EMPBI19	0.4190%	0.0683%	0.3952%	6.13411	0.00000
	EMPBI18	0.1618%	0.0495%	0.1466%	3.26460	0.00117
4	(Constant)	-7.64811	0.2369%		-32.27801	0.00000
	EMPBI7	0.2992	0.0834%	0.3211%	3.52049	0.00175
	EMPBI19	0.4461%	0.0625%	0.4209%	7.13078	0.00000
	EMPBI18	0.2514%	0.0566%	0.2277%	4.43801	0.00017
	EMPBI23	0.1148%	0.0445%	0.0616%	2.58021	0.01642
5	(Constant)	-7.67044	0.21572		-35.55727	0.00000
	EMPBI7	0.1792%	0.0835%	0.1148%	4.51959	0.00015
	EMPBI19	0.3979%	0.0602%	0.3752%	6.60386	0.00000
	EMPBI18	0.2380%	0.0518%	0.2156%	4.59194	0.00011
	EMPBI23	0.1140%	0.0404%	0.0612%	2.81650	0.00979
	EMPBI3	-0.0484%	0.0181%	-0.0478%	-2.4508%	0.02227
6	(Constant)	-7.73067	0.19421		-39.80525	0.00000
	EMPBI7	0.1756%	0.0746%	0.1104%	5.02928	0.00005
	EMPBI19	0.3900%	0.0539%	0.3678%	7.23024	0.00000
	EMPBI18	0.5097%	0.1141%	0.4617%	4.46643	0.00019
	EMPBI23	0.1116%	0.0362%	0.0599%	3.08127	0.00541
	EMPBI3	-0.0590%	0.0171%	-0.0616%	-3.44271	0.00232
	NOI9	-0.2392%	0.0918%	-0.2256%	-2.60472	0.01618
7	(Constant)	-7.69827	0.16991		-45.30221	0.00000
	EMPBI7	0.4627%	0.0722%	0.5056%	6.40766	0.00000
	EMPBI19	0.3480%	0.0511%	0.3150%	6.53110	0.00000
	EMPBI18	0.5620%	0.1013%	0.5091%	5.54507	0.00002
	EMPBI23	0.1343%	0.0326%	0.0721%	4.11766	0.00049
	EMPBI3	-0.0620%	0.0150%	-0.0648%	-4.1333%	0.00047
	NOI9	-0.2946%	0.0825%	-0.2778%	-3.5675%	0.00182
	WI8	-0.0248%	0.0088%	-0.0596%	-2.8052%	0.01060
8	(Constant)	-7.7517%	0.1493%		-51.92015	0.00000
	EMPBI7	0.4419%	0.0611%	0.4829%	6.97400	0.00000
	EMPBI19	0.3254%	0.0446%	0.3059%	7.2958%	0.00000
	EMPBI18	0.5716%	0.0881%	0.5177%	6.4677%	0.00000
	EMPBI23	0.1517%	0.0291%	0.0814%	5.2111%	0.00004
	EMPBI3	-0.0684%	0.0132%	-0.0718%	-5.1583%	0.0005%
	NOI9	-0.2818%	0.0720%	-0.2677%	-3.9198%	0.00081
	WI8	-0.0254%	0.0077%	-0.0570%	-3.2830%	0.00372
	CBPTE21	0.0351%	0.0126%	0.0264%	2.76896	0.01184
9	(Constant)	-7.1111%	0.2479%		-28.6852%	0.00000
	EMPBI7	0.4061%	0.0607%	0.4437%	6.6848%	0.00000
	EMPBI19	0.2956%	0.0434%	0.2787%	6.8001%	0.00000
	EMPBI18	0.5304%	0.0856%	0.4804%	6.1987%	0.00000
	EMPBI23	0.1327%	0.0282%	0.0713%	4.70000	0.00010
	EMPBI3	-0.0706%	0.0122%	-0.0761%	-5.7528%	0.00002
	NOI9	-0.2699%	0.0667%	-0.2545%	-4.0409%	0.00069
	WI8	-0.0225%	0.0071%	-0.0505%	-3.0994%	0.00590
	CBPTE21	0.0512%	0.0119%	0.0386%	4.6881%	0.00158
	CBPTE31	0.0838%	0.0392%	0.0903%	2.1356%	0.0459%
10	(Constant)	-7.16090	0.22888		-31.28704	0.00000
	EMPBI7	0.4075%	0.0540%	0.4452%	7.5417%	0.00000
	EMPBI19	0.2871%	0.0388%	0.2707%	7.3971%	0.00000
	EMPBI18	0.5075%	0.0750%	0.4597%	6.7664%	0.00000
	EMPBI23	0.1243%	0.0256%	0.0667%	4.9030%	0.00011
	EMPBI3	-0.0789%	0.0114%	-0.0851%	-6.9059%	0.00000
	NOI9	-0.2652%	0.0591%	-0.2503%	-4.4881%	0.00030
	WI8	-0.0230%	0.0064%	-0.0516%	-3.5626%	0.00222
	CBPTE21	0.0412%	0.0128%	0.0312%	3.1768%	0.0030%
	CBPTE31	0.0966%	0.0351%	0.1040%	2.7347%	0.0136%
	CBPTE22	0.0594%	0.0241%	0.0291%	2.4517%	0.0245%

a Dependent Variable: CFS2P22

Figure E-1-14: Continued

Regression (CFS2P28)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99699	0.99280	0.9922%	0.14821
3	0.99747	0.9949%	0.9941%	0.12655
4	0.99802	0.9960%	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395
6	0.99880	0.99761	0.9969%	0.09282
7	0.99913	0.99826	0.99768	0.08111
8	0.99917	0.99874	0.99824	0.07066
9	0.99949	0.99899	0.99850	0.06510
10	0.99952	0.99924	0.99882	0.05790

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, WB

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, WB, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, WB, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, WB, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.2025%	1	78.2025%	1844.42354	0.00000
	Residual	1.14479	27	0.04240		
	Total	79.34711	28			
2	Regression	78.77620	2	39.38810	1791.08097	0.00000
	Residual	0.57113	26	0.02197		
	Total	79.34711	28			
3	Regression	78.94699	3	26.31566	1641.12665	0.00000
	Residual	0.40014	25	0.01601		
	Total	79.34711	28			
4	Regression	79.01392	4	19.75848	1511.03000	0.00000
	Residual	0.33341	24	0.01306		
	Total	79.34711	28			
5	Regression	79.09880	5	15.81976	1464.01689	0.00000
	Residual	0.24853	23	0.01081		
	Total	79.34711	28			
6	Regression	79.15719	6	13.19290	1528.08052	0.00000
	Residual	0.18994	22	0.00863		
	Total	79.34711	28			
7	Regression	79.20917	7	11.31560	1719.94661	0.00000
	Residual	0.13816	21	0.00658		
	Total	79.34711	28			
8	Regression	79.24748	8	9.90593	1984.05397	0.00000
	Residual	0.09986	20	0.00499		
	Total	79.34711	28			
9	Regression	79.26680	9	8.80742	2077.99961	0.00000
	Residual	0.08051	19	0.00424		
	Total	79.34711	28			
10	Regression	79.28098	10	7.92870	2364.70892	0.00000
	Residual	0.06615	18	0.00335		
	Total	79.34711	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, WB

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, WB, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, WB, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI1, NOJ9, WB, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P28

Figure E-1-15: Commodity Flow Production for Commodity Item 28 (CFS2P28)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.13386	0.15364		-33.41516	0.00000
	EMPB87	0.90855	0.02116	0.99276	42.94675	0.00000
2	(Constant)	-5.35903	0.11904		-45.01811	0.00000
	EMPB87	0.56477	0.06897	0.61712	8.18821	0.00000
	EMPB819	0.40858	0.07991	0.38514	5.11026	0.00001
3	(Constant)	-5.56332	0.11935		-46.61481	0.00000
	EMPB87	0.42843	0.07219	0.46814	5.93502	0.00000
	EMPB819	0.41909	0.06831	0.39525	6.13518	0.00000
	EMPB818	0.16192	0.04958	0.14667	3.26578	0.00116
4	(Constant)	-6.10709	0.21691		-25.77884	0.00000
	EMPB87	0.29388	0.08348	0.32112	3.52011	0.00175
	EMPB819	0.44614	0.06258	0.42094	7.13181	0.00000
	EMPB818	0.25147	0.05665	0.22778	4.43891	0.00017
	EMPB823	0.11482	0.04450	0.06165	2.58005	0.01643
5	(Constant)	-6.13000	0.21571		-28.41747	0.00000
	EMPB87	0.37919	0.08154	0.41434	4.59907	0.00015
	EMPB819	0.39797	0.06025	0.37511	6.60479	0.00000
	EMPB818	0.23811	0.05182	0.21567	4.59477	0.00011
	EMPB823	0.11401	0.04049	0.06122	2.81622	0.00980
	EMPB81	-0.04480	0.01812	-0.04787	-2.45018	0.02230
6	(Constant)	-6.19023	0.19420		-31.87584	0.00000
	EMPB87	0.37558	0.07469	0.41039	5.02886	0.00005
	EMPB819	0.39009	0.05394	0.36790	7.23149	0.00000
	EMPB818	0.50981	0.11413	0.46179	4.46718	0.00019
	EMPB823	0.11161	0.03620	0.05992	3.08304	0.00544
	EMPB81	-0.05900	0.01714	-0.06361	-3.44242	0.00212
	NOI9	-0.23931	0.09186	-0.22566	-2.60508	0.01616
7	(Constant)	-6.15783	0.16992		-36.24041	0.00000
	EMPB87	0.46273	0.07222	0.50561	6.40719	0.00000
	EMPB819	0.33410	0.05114	0.31509	6.53248	0.00000
	EMPB818	0.56212	0.10136	0.50916	5.54604	0.00002
	EMPB823	0.13432	0.01262	0.07212	4.11750	0.00049
	EMPB81	-0.06200	0.01500	-0.06684	-4.13307	0.00047
	NOI9	-0.29465	0.08258	-0.27785	-3.56805	0.00182
	W8	-0.02492	0.00888	-0.05596	-2.80544	0.01060
8	(Constant)	-6.21130	0.14927		-41.60986	0.00000
	EMPB87	0.44189	0.06136	0.48284	6.97422	0.00000
	EMPB819	0.32550	0.04466	0.30698	7.28805	0.00000
	EMPB818	0.57165	0.08836	0.51779	6.46943	0.00000
	EMPB823	0.15175	0.02911	0.08148	5.21361	0.00004
	EMPB81	-0.06848	0.01328	-0.07381	-5.15857	0.00005
	NOI9	-0.28391	0.07204	-0.26772	-3.94075	0.00081
	W8	-0.02541	0.00774	-0.05707	-3.28353	0.00171
	CBPTE21	0.03510	0.01267	0.02644	2.76981	0.01182
9	(Constant)	-5.77088	0.24792		-23.27722	0.00000
	EMPB87	0.40606	0.06074	0.44369	6.68505	0.00000
	EMPB819	0.29564	0.04146	0.27882	6.80239	0.00000
	EMPB818	0.53048	0.08167	0.48050	6.14855	0.00000
	EMPB823	0.13278	0.02825	0.07129	4.70042	0.00016
	EMPB81	-0.07060	0.01227	-0.07611	-5.75116	0.00002
	NOI9	-0.26999	0.06670	-0.25460	-4.04791	0.00069
	W8	-0.02251	0.00726	-0.05054	-3.09998	0.00590
	CBPTE21	0.05127	0.01302	0.03862	3.68412	0.00158
	CBPTE31	0.08388	0.03928	0.09036	2.13533	0.04597
10	(Constant)	-5.62060	0.22885		-24.55997	0.00000
	EMPB87	0.40745	0.05403	0.44522	7.54149	0.00000
	EMPB819	0.28716	0.03881	0.27083	7.39922	0.00000
	EMPB818	0.50759	0.07500	0.45976	6.76806	0.00000
	EMPB823	0.12435	0.02536	0.06676	4.90326	0.00011
	EMPB81	-0.07894	0.01141	-0.08511	-6.90511	0.00000
	NOI9	-0.26525	0.05931	-0.25011	-4.46892	0.00030
	W8	-0.02302	0.00646	-0.05169	-3.56297	0.00222
	CBPTE21	0.04124	0.01280	0.03257	3.37721	0.00336
	CBPTE31	0.09658	0.03532	0.10405	2.73452	0.01361
	CBPTE22	0.05912	0.02418	0.02918	2.45112	0.02458

a Dependent Variable: CFS2P28

Figure E-1-15: Continued

Regression (CFS2P29)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395
6	0.99880	0.99761	0.99695	0.09292
7	0.99913	0.99826	0.99768	0.08111
8	0.99937	0.99874	0.99824	0.07067
9	0.99949	0.99898	0.99850	0.06511
10	0.99962	0.99924	0.99882	0.05791

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20236	1	78.20236	1844.50813	0.00000
	Residual	1.14473	27	0.04240		
	Total	79.34709	28			
2	Regression	78.77600	2	39.38800	1793.19852	0.00000
	Residual	0.57110	26	0.02197		
	Total	79.34709	28			
3	Regression	78.94674	3	26.31558	1648.27368	0.00000
	Residual	0.40035	25	0.01601		
	Total	79.34709	28			
4	Regression	79.01368	4	19.75342	1511.01818	0.00000
	Residual	0.33341	24	0.01306		
	Total	79.34709	28			
5	Regression	79.09854	5	15.81971	1463.94435	0.00000
	Residual	0.24854	23	0.01081		
	Total	79.34709	28			
6	Regression	79.15715	6	13.19286	1528.04371	0.00000
	Residual	0.18994	22	0.00863		
	Total	79.34709	28			
7	Regression	79.20893	7	11.31556	1719.89226	0.00000
	Residual	0.13816	21	0.00658		
	Total	79.34709	28			
8	Regression	79.24722	8	9.90590	1983.68974	0.00000
	Residual	0.09987	20	0.00499		
	Total	79.34709	28			
9	Regression	79.26654	9	8.80739	2077.46751	0.00000
	Residual	0.08055	19	0.00424		
	Total	79.34709	28			
10	Regression	79.28672	10	7.92867	2163.99232	0.00000
	Residual	0.06037	18	0.00335		
	Total	79.34709	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P29

Figure E-1-16: Commodity Flow Production for Commodity Item 29 (CFS2P29)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.39422	0.15461		-41.61958	0.00000
	EMPBI7	0.9085%	0.0211%	0.99276	42.94774	0.00000
2	(Constant)	-6.61919	0.11904		-55.60742	0.00000
	EMPBI7	0.56478	0.06897	0.61712	8.18853	0.00000
	EMPBI19	0.40817	0.07901	0.38514	5.11018	0.00001
3	(Constant)	-6.82365	0.11935		-57.17422	0.00000
	EMPBI7	0.42846	0.07219	0.46817	5.93526	0.00000
	EMPBI19	0.41909	0.06831	0.39524	6.13497	0.00000
	EMPBI18	0.16190	0.04958	0.14665	3.26527	0.00117
4	(Constant)	-7.16806	0.23691		-30.25889	0.00000
	EMPBI7	0.2930	0.08348	0.32114	3.52049	0.00175
	EMPBI19	0.44611	0.06258	0.42094	7.13168	0.00000
	EMPBI18	0.25146	0.0566%	0.22777	4.41860	0.00017
	EMPBI23	0.11481	0.04450	0.06166	2.58019	0.01642
5	(Constant)	-7.39035	0.21572		-34.25946	0.00000
	EMPBI7	0.17920	0.08354	0.41435	4.53908	0.00015
	EMPBI19	0.39796	0.06026	0.37512	6.60458	0.00000
	EMPBI18	0.23809	0.05182	0.21566	4.59435	0.00011
	EMPBI23	0.11402	0.04049	0.06122	2.81032	0.00980
	EMPBI3	-0.04480	0.01812	-0.04787	-2.45014	0.02731
6	(Constant)	-7.45059	0.19420		-38.36552	0.00000
	EMPBI7	0.17559	0.07469	0.41040	5.02893	0.00005
	EMPBI19	0.39009	0.05394	0.36780	7.23135	0.00000
	EMPBI18	0.50981	0.11413	0.46380	4.46714	0.00019
	EMPBI23	0.11161	0.03620	0.05991	3.08319	0.00541
	EMPBI3	-0.05900	0.01714	-0.06161	-3.44224	0.00212
	NOI9	-0.23932	0.09186	-0.22568	-2.60522	0.01616
7	(Constant)	-7.41820	0.16992		-43.65734	0.00000
	EMPBI7	0.46274	0.07222	0.50562	6.40743	0.00000
	EMPBI19	0.13410	0.05115	0.11509	6.51232	0.00000
	EMPBI18	0.56213	0.10116	0.50916	5.54598	0.00002
	EMPBI23	0.13432	0.01262	0.07212	4.11765	0.00049
	EMPBI3	-0.06199	0.01500	-0.06681	-4.13284	0.00047
	NOI9	-0.29467	0.08258	-0.27787	-3.56819	0.00182
	WB	-0.02492	0.00888	-0.05596	-2.80540	0.01060
8	(Constant)	-7.47165	0.14929		-50.04853	0.00000
	EMPBI7	0.44190	0.06317	0.48286	6.97179	0.00000
	EMPBI19	0.32550	0.04467	0.30698	7.28735	0.00000
	EMPBI18	0.57165	0.08817	0.51779	6.46884	0.00000
	EMPBI23	0.1517%	0.02911	0.08148	5.21125	0.00004
	EMPBI3	-0.06848	0.01328	-0.07382	-5.15783	0.00005
	NOI9	-0.28192	0.07205	-0.26774	-3.94064	0.00081
	WB	-0.02541	0.00774	-0.05707	-3.28323	0.00172
	CBPTE21	0.01510	0.01267	0.02644	2.76907	0.01184
9	(Constant)	-7.01122	0.24795		-28.35789	0.00000
	EMPBI7	0.40607	0.0607%	0.44171	6.68485	0.00000
	EMPBI19	0.29564	0.04347	0.27882	6.80152	0.00000
	EMPBI18	0.53089	0.08368	0.48051	6.33977	0.00000
	EMPBI23	0.13279	0.02825	0.07130	4.69999	0.00010
	EMPBI3	-0.07060	0.01227	-0.07611	-5.75212	0.00002
	NOI9	-0.27000	0.06671	-0.25461	-4.04767	0.00069
	WB	-0.02251	0.00726	-0.05054	-3.09960	0.00540
	CBPTE21	0.05127	0.01192	0.01861	1.68115	0.00158
	CBPTE31	0.08387	0.03929	0.09036	2.13493	0.04601
10	(Constant)	-6.88098	0.22889		-30.06282	0.00000
	EMPBI7	0.40747	0.05404	0.44521	7.54064	0.00000
	EMPBI19	0.28716	0.03882	0.27083	7.39809	0.00000
	EMPBI18	0.50759	0.07501	0.45976	6.76705	0.00000
	EMPBI23	0.12435	0.02536	0.06677	4.90269	0.00011
	EMPBI3	-0.07894	0.01141	-0.08510	-6.90198	0.00000
	NOI9	-0.26527	0.05916	-0.25015	-4.48856	0.00030
	WB	-0.02302	0.00646	-0.05169	-3.56246	0.00223
	CBPTE21	0.04124	0.01281	0.01256	1.17608	0.00117
	CBPTE31	0.09658	0.03512	0.10405	2.71399	0.01363
	CBPTE22	0.05931	0.02419	0.02938	2.45289	0.02460

a Dependent Variable: CFS2P29

Figure E-1-16: Continued

Regression (CFS2P30)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99619	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99841	0.99683	0.99619	0.10396
6	0.99880	0.99761	0.99695	0.09293
7	0.99913	0.99826	0.99768	0.08112
8	0.99937	0.99874	0.99824	0.07067
9	0.99949	0.99898	0.99850	0.06512
10	0.99962	0.99924	0.99882	0.05791

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20394	1	78.20394	1844.52063	0.00000
	Residual	1.14475	27	0.04240		
	Total	79.34868	28			
2	Regression	78.77754	2	39.38877	1793.07050	0.00000
	Residual	0.57115	26	0.02197		
	Total	79.34868	28			
3	Regression	78.94824	3	26.31608	1642.92379	0.00000
	Residual	0.40045	25	0.01602		
	Total	79.34868	28			
4	Regression	79.03519	4	19.75880	1512.66635	0.00000
	Residual	0.31349	24	0.01306		
	Total	79.34868	28			
5	Regression	79.10009	5	15.82002	1463.66539	0.00000
	Residual	0.24860	23	0.01081		
	Total	79.34868	28			
6	Regression	79.15869	6	13.19312	1527.70498	0.00000
	Residual	0.18999	22	0.00864		
	Total	79.34868	28			
7	Regression	79.21049	7	11.31578	1719.50788	0.00000
	Residual	0.13820	21	0.00658		
	Total	79.34868	28			
8	Regression	79.24870	8	9.90610	1981.28840	0.00000
	Residual	0.09998	20	0.00499		
	Total	79.34868	28			
9	Regression	79.26812	9	8.80757	3077.07768	0.00000
	Residual	0.08057	19	0.00424		
	Total	79.34868	28			
10	Regression	79.28831	10	7.92883	2368.10100	0.00000
	Residual	0.06037	18	0.00335		
	Total	79.34868	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P30

Figure E-1-17: Commodity Flow Production for Commodity Item 30 (CFS2P30)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.78884	0.15364		-37.67899	0.00000
	EMPBI7	0.90856	0.02115	0.99276	42.94788	0.00000
2	(Constant)	-6.01401	0.11904		-50.51951	0.00000
	EMPBI7	0.56480	0.06897	0.61714	8.18845	0.00000
	EMPBI19	0.40816	0.07991	0.38512	5.10994	0.00001
3	(Constant)	-6.21824	0.11936		-52.09559	0.00000
	EMPBI7	0.42849	0.07220	0.46820	5.93508	0.00000
	EMPBI19	0.41907	0.06812	0.39521	6.15405	0.00000
	EMPBI18	0.16188	0.04959	0.14661	3.26450	0.00117
4	(Constant)	-6.76269	0.23696		-28.53975	0.00000
	EMPBI7	0.29392	0.08348	0.32116	3.52035	0.00175
	EMPBI19	0.44612	0.06259	0.42092	7.13059	0.00000
	EMPBI18	0.25144	0.05666	0.22775	4.43782	0.00017
	EMPBI23	0.11484	0.04451	0.06166	2.58007	0.01643
5	(Constant)	-6.78500	0.21574		-31.44991	0.00000
	EMPBI7	0.17924	0.08355	0.41439	4.51912	0.00015
	EMPBI19	0.39794	0.06026	0.37530	6.60352	0.00000
	EMPBI18	0.21808	0.05181	0.21564	4.59158	0.00011
	EMPBI23	0.11403	0.04049	0.06122	2.81625	0.00980
	EMPBI3	-0.04441	0.01812	-0.04788	-2.45038	0.02230
6	(Constant)	-6.84524	0.19422		-35.24411	0.00000
	EMPBI7	0.17561	0.07470	0.41045	5.02890	0.00005
	EMPBI19	0.39007	0.05395	0.36787	7.23006	0.00000
	EMPBI18	0.50981	0.11414	0.46179	4.46660	0.00019
	EMPBI23	0.11162	0.03620	0.05991	3.08307	0.00544
	EMPBI3	-0.05901	0.01714	-0.06362	-3.44240	0.00212
	NOI9	-0.23933	0.09187	-0.22569	-2.60504	0.01616
7	(Constant)	-6.81284	0.16994		-80.08084	0.00000
	EMPBI7	0.46279	0.07223	0.50568	6.40758	0.00000
	EMPBI19	0.33407	0.05115	0.31506	6.53096	0.00000
	EMPBI18	0.56211	0.10117	0.50916	5.54516	0.00002
	EMPBI23	0.13433	0.01263	0.07211	4.11750	0.00049
	EMPBI3	-0.06200	0.01500	-0.06684	-4.13303	0.00047
	NOI9	-0.29409	0.08259	-0.27789	-3.56799	0.00182
	WB	-0.02492	0.00888	-0.05596	-2.80559	0.01060
8	(Constant)	-6.86630	0.14930		-85.98852	0.00000
	EMPBI7	0.44195	0.06317	0.48291	6.97181	0.00000
	EMPBI19	0.32547	0.04467	0.30695	7.28586	0.00000
	EMPBI18	0.57166	0.08818	0.51779	6.46820	0.00000
	EMPBI23	0.15176	0.02911	0.08148	5.21316	0.00004
	EMPBI3	-0.06849	0.01328	-0.07383	-5.15811	0.00005
	NOI9	-0.28194	0.07206	-0.26775	-3.94045	0.00081
	WB	-0.02542	0.00774	-0.05707	-3.28325	0.00172
	CBPTE21	0.03510	0.01268	0.02644	2.76918	0.01184
9	(Constant)	-6.42581	0.24798		-25.91313	0.00000
	EMPBI7	0.40612	0.06076	0.44376	6.68450	0.00000
	EMPBI19	0.29561	0.04347	0.27879	6.80002	0.00000
	EMPBI18	0.53049	0.08368	0.48050	6.33918	0.00000
	EMPBI23	0.13280	0.02826	0.07130	4.69991	0.00016
	EMPBI3	-0.07061	0.01227	-0.07612	-5.75246	0.00002
	NOI9	-0.27002	0.06671	-0.25463	-4.04749	0.00069
	WB	-0.02251	0.00726	-0.05054	-3.09968	0.00590
	CBPTE21	0.05127	0.01192	0.03862	3.68328	0.00158
	CBPTE31	0.08388	0.03929	0.09037	2.13501	0.04600
10	(Constant)	-6.27550	0.22888		-27.41785	0.00000
	EMPBI7	0.40753	0.05404	0.44528	7.54159	0.00000
	EMPBI19	0.28712	0.03882	0.27079	7.39720	0.00000
	EMPBI18	0.50758	0.07501	0.45975	6.76702	0.00000
	EMPBI23	0.12436	0.02516	0.06677	4.94305	0.00011
	EMPBI3	-0.07896	0.01141	-0.08512	-6.92541	0.00000
	NOI9	-0.26528	0.05916	-0.25016	-4.48885	0.00030
	WB	-0.02502	0.00646	-0.05170	-3.56294	0.00222
	CBPTE21	0.04124	0.01281	0.03257	3.17641	0.00336
	CBPTE31	0.09659	0.03512	0.10406	2.73452	0.01161
	CBPTE22	0.05935	0.02410	0.02940	2.45403	0.02454

a. Dependent Variable: CFS2P10

Figure E-1-17: Continued

Regression (CFS2P32)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99619	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11429
5	0.99843	0.99687	0.99619	0.10395
6	0.99880	0.99761	0.99695	0.09292
7	0.99913	0.99826	0.99768	0.08111
8	0.99937	0.99874	0.99824	0.07067
9	0.99949	0.99898	0.99850	0.06511
10	0.99962	0.99924	0.99882	0.05791

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB, CBPTE21, CBPTE31, CBPTE22

ANOVA[k]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20236	1	78.20236	1844.50813	0.00000
	Residual	1.14471	27	0.04240		
	Total	79.34709	28			
2	Regression	78.77600	2	39.38800	1793.19852	0.00000
	Residual	0.57110	26	0.02197		
	Total	79.34709	28			
3	Regression	78.94674	3	26.31558	1643.27368	0.00000
	Residual	0.40035	25	0.01601		
	Total	79.34709	28			
4	Regression	79.01868	4	19.75842	1513.01818	0.00000
	Residual	0.31341	24	0.01306		
	Total	79.34709	28			
5	Regression	79.09855	5	15.81971	1463.94435	0.00000
	Residual	0.24854	23	0.01081		
	Total	79.34709	28			
6	Regression	79.15715	6	13.19286	1528.04371	0.00000
	Residual	0.18994	22	0.00863		
	Total	79.34709	28			
7	Regression	79.20893	7	11.31556	1719.89226	0.00000
	Residual	0.13816	21	0.00658		
	Total	79.34709	28			
8	Regression	79.24727	8	9.90590	1983.68974	0.00000
	Residual	0.09982	20	0.00499		
	Total	79.34709	28			
9	Regression	79.26654	9	8.80739	2077.46751	0.00000
	Residual	0.08055	19	0.00424		
	Total	79.34709	28			
10	Regression	79.28672	10	7.92867	2363.99232	0.00000
	Residual	0.06037	18	0.00335		
	Total	79.34709	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, WB, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P32

Figure E-1-18: Commodity Flow Production for Commodity Item 32 (CFS2P32)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.04552	0.15861		-19.82309	0.00000
	EMPBI7	0.9085%	0.0211%	0.99276	42.94774	0.00000
2	(Constant)	-1.27069	0.11904		-27.47604	0.00000
	EMPBI7	0.56478	0.06897	0.61712	8.18851	0.00000
	EMPBI9	0.40837	0.07991	0.38514	5.11058	0.00001
3	(Constant)	-1.47495	0.11935		-29.11601	0.00000
	EMPBI7	0.42846	0.07219	0.46817	5.93526	0.00000
	EMPBI9	0.41909	0.06811	0.39524	6.13497	0.00000
	EMPBI8	0.16190	0.04958	0.14665	3.26527	0.00117
4	(Constant)	-4.01936	0.23693		-16.96452	0.00000
	EMPBI7	0.2990	0.0864	0.32114	3.52089	0.0017%
	EMPBI9	0.44631	0.0625%	0.42094	7.13168	0.00000
	EMPBI8	0.25160	0.0566%	0.22777	4.43860	0.00017
	EMPBI21	0.11481	0.04450	0.06166	2.58019	0.01042
5	(Constant)	-4.04165	0.21572		-18.73589	0.00000
	EMPBI7	0.37020	0.08154	0.41435	4.53908	0.0001%
	EMPBI9	0.39796	0.06026	0.37532	6.60458	0.00000
	EMPBI8	0.23809	0.05182	0.21566	4.59435	0.00011
	EMPBI21	0.11402	0.04049	0.06122	2.81632	0.00980
	EMPBI3	-0.04480	0.01813	-0.04787	-2.45014	0.02731
6	(Constant)	-4.10189	0.19420		-21.12198	0.00000
	EMPBI7	0.3755%	0.0746%	0.41040	5.02893	0.0000%
	EMPBI9	0.39009	0.0594%	0.36790	7.21135	0.00000
	EMPBI8	0.50981	0.11411	0.46180	4.46714	0.00019
	EMPBI21	0.11161	0.03620	0.05991	3.08119	0.00431
	EMPBI3	-0.05900	0.01714	-0.06361	-3.44224	0.00232
	NOI9	-0.23912	0.09186	-0.22568	-2.60522	0.01616
7	(Constant)	-4.06950	0.16992		-23.94968	0.00000
	EMPBI7	0.46274	0.07222	0.50562	6.40743	0.00000
	EMPBI9	0.33410	0.0511%	0.31509	6.53232	0.00000
	EMPBI8	0.56212	0.10136	0.50916	5.54598	0.00002
	EMPBI21	0.13412	0.01262	0.07212	8.11765	0.00049
	EMPBI3	-0.06199	0.01500	-0.06681	-4.11284	0.00047
	NOI9	-0.29467	0.08258	-0.27787	-3.56819	0.00182
	W8	-0.02492	0.00888	-0.05596	-2.80540	0.01060
8	(Constant)	-4.12295	0.14929		-27.61741	0.00000
	EMPBI7	0.44190	0.06317	0.48286	6.97179	0.00000
	EMPBI9	0.3250	0.04867	0.30698	7.28735	0.00000
	EMPBI8	0.57165	0.08817	0.51779	6.46884	0.00000
	EMPBI21	0.1517%	0.0281%	0.08148	5.2112%	0.00004
	EMPBI3	-0.06848	0.01328	-0.07382	-5.15783	0.0000%
	NOI9	-0.28192	0.0720%	-0.26774	-3.94064	0.00081
	W8	-0.02543	0.00774	-0.05707	-3.28323	0.00372
	CBPTE21	0.03510	0.01267	0.02644	2.76907	0.01184
9	(Constant)	-4.68252	0.2479%		-18.85101	0.00000
	EMPBI7	0.40607	0.0607%	0.44171	6.68485	0.00000
	EMPBI9	0.29564	0.04187	0.27882	6.80152	0.00000
	EMPBI8	0.53049	0.08468	0.48051	6.33977	0.00000
	EMPBI21	0.13279	0.0282%	0.07130	4.69999	0.00016
	EMPBI3	-0.07060	0.01227	-0.07611	-5.75212	0.00002
	NOI9	-0.27000	0.06671	-0.25461	-4.04767	0.00069
	W8	-0.02251	0.00726	-0.05054	-3.09960	0.00590
	CBPTE21	0.05127	0.01392	0.03861	3.68313	0.00158
	CBPTE11	0.08387	0.01929	0.09016	2.11491	0.04601
10	(Constant)	-1.51228	0.22889		-15.41243	0.00000
	EMPBI7	0.40747	0.05404	0.44521	7.54064	0.00000
	EMPBI9	0.28716	0.03882	0.27081	7.39809	0.00000
	EMPBI8	0.50759	0.07501	0.45976	6.76705	0.00000
	EMPBI21	0.1241%	0.0251%	0.06677	4.90269	0.00011
	EMPBI3	-0.07894	0.01141	-0.08510	-6.90398	0.00000
	NOI9	-0.26527	0.05916	-0.25015	-4.48856	0.00030
	W8	-0.02902	0.00646	-0.05169	-3.56246	0.00223
	CBPTE21	0.04124	0.01281	0.03256	3.17608	0.00337
	CBPTE31	0.09058	0.03512	0.10405	2.71399	0.01363
	CBPTE22	0.05911	0.02419	0.02918	2.45289	0.02460

a Dependent Variable: CFS2P12

Figure E-1-18: Continued

Regression (CFS2P34)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99226	0.98557	0.98504	0.20591
2	0.99619	0.99280	0.9922%	0.14821
3	0.99747	0.9949%	0.9943%	0.12655
4	0.99802	0.9960%	0.9953%	0.11428
5	0.99841	0.99687	0.99619	0.10395
6	0.99880	0.99761	0.9969%	0.09292
7	0.99913	0.99826	0.99768	0.08111
8	0.99937	0.99874	0.99824	0.07067
9	0.99949	0.99898	0.99850	0.06511
10	0.99962	0.99924	0.99882	0.05792

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20214	1	78.20214	1844.48176	0.00000
	Residual	1.14474	27	0.04240		
	Total	79.34688	28			
2	Regression	78.77575	2	39.38788	1793.08852	0.00000
	Residual	0.57113	26	0.02197		
	Total	79.34688	28			
3	Regression	78.94650	3	26.31550	1641.14868	0.00000
	Residual	0.40038	25	0.01602		
	Total	79.34688	28			
4	Regression	79.01581	4	19.75836	1512.84082	0.00000
	Residual	0.33105	24	0.01306		
	Total	79.34688	28			
5	Regression	79.09834	5	15.81967	1463.91905	0.00000
	Residual	0.24855	23	0.01081		
	Total	79.34688	28			
6	Regression	79.15694	6	13.19282	1528.05143	0.00000
	Residual	0.18994	22	0.00863		
	Total	79.34688	28			
7	Regression	79.20871	7	11.31553	1719.82114	0.00000
	Residual	0.13817	21	0.00658		
	Total	79.34688	28			
8	Regression	79.24700	8	9.90588	1983.57211	0.00000
	Residual	0.09988	20	0.00499		
	Total	79.34688	28			
9	Regression	79.26611	9	8.80717	2077.51217	0.00000
	Residual	0.0805%	19	0.00424		
	Total	79.34688	28			
10	Regression	79.28650	10	7.92865	2363.61428	0.00000
	Residual	0.06038	18	0.00335		
	Total	79.34688	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P34

Figure E-1-19: Commodity Flow Production for Commodity Item 34 (CFS2P34)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.45230	0.15304		-35.48850	0.00000
	EMPBI7	0.90855	0.02115	0.99270	42.94741	0.00000
2	(Constant)	-5.07747	0.11904		-42.66326	0.00000
	EMPBI7	0.56478	0.06897	0.61713	8.18836	0.00000
	EMPBI19	0.40816	0.07901	0.38511	5.11010	0.00001
3	(Constant)	-5.88173	0.11935		-49.28025	0.00000
	EMPBI7	0.42846	0.07219	0.46817	5.93509	0.00000
	EMPBI19	0.41908	0.06831	0.39524	6.13464	0.00000
	EMPBI18	0.16190	0.04958	0.14665	3.26519	0.00117
4	(Constant)	-6.42612	0.23694		-27.12120	0.00000
	EMPBI7	0.29391	0.08340	0.32115	3.52239	0.00175
	EMPBI19	0.44612	0.06259	0.42093	7.13115	0.00000
	EMPBI18	0.25145	0.05666	0.22776	4.43832	0.00017
	EMPBI23	0.11483	0.04451	0.06165	2.57995	0.01043
5	(Constant)	-6.48842	0.21572		-29.89273	0.00000
	EMPBI7	0.17923	0.08354	0.41438	4.53939	0.00015
	EMPBI19	0.39794	0.06026	0.37531	6.60420	0.00000
	EMPBI18	0.23800	0.05182	0.21565	4.59433	0.00013
	EMPBI23	0.11402	0.04040	0.06122	2.81619	0.00580
	EMPBI3	-0.04841	0.01812	-0.04788	-2.45072	0.02228
6	(Constant)	-6.50806	0.19420		-33.51535	0.00000
	EMPBI7	0.17562	0.07469	0.41044	5.02934	0.00005
	EMPBI19	0.39007	0.05394	0.36788	7.23100	0.00000
	EMPBI18	0.20984	0.11413	0.46180	4.46722	0.00019
	EMPBI23	0.11161	0.01620	0.05992	1.08307	0.00544
	EMPBI3	-0.05901	0.01714	-0.06162	-3.44291	0.00232
	NOI0	-0.23933	0.09186	-0.22569	-2.60534	0.01615
7	(Constant)	-6.47627	0.16002		-38.11320	0.00000
	EMPBI7	0.46276	0.07222	0.50565	6.40763	0.00000
	EMPBI19	0.33408	0.05115	0.31508	6.53187	0.00000
	EMPBI18	0.56213	0.10136	0.50917	5.54590	0.00002
	EMPBI23	0.13432	0.01262	0.07212	4.11738	0.00049
	EMPBI3	-0.06201	0.01500	-0.06685	-4.13353	0.00047
	NOI0	-0.29467	0.08258	-0.27788	-3.56820	0.00182
	WB	-0.02482	0.00888	-0.05595	-2.80516	0.01061
8	(Constant)	-6.52972	0.14929		-43.73783	0.00000
	EMPBI7	0.44192	0.06337	0.48288	6.97197	0.00000
	EMPBI19	0.32548	0.04467	0.30697	7.28877	0.00000
	EMPBI18	0.57166	0.08837	0.51780	6.46869	0.00000
	EMPBI23	0.15174	0.02911	0.08147	5.21289	0.00004
	EMPBI3	-0.06849	0.01328	-0.07384	-5.15854	0.00005
	NOI0	-0.28193	0.07205	-0.26775	-3.94062	0.00081
	WB	-0.02541	0.00774	-0.05706	-3.28292	0.00172
	CBPTE21	0.01510	0.01268	0.02643	2.76898	0.01184
9	(Constant)	-6.08921	0.24795		-24.55857	0.00000
	EMPBI7	0.40609	0.06075	0.44173	6.68481	0.00000
	EMPBI19	0.29562	0.04347	0.27880	6.80109	0.00000
	EMPBI18	0.53048	0.08167	0.48050	6.13980	0.00000
	EMPBI23	0.13278	0.02825	0.07129	4.69970	0.00016
	EMPBI3	-0.07061	0.01227	-0.07612	-5.75315	0.00002
	NOI0	-0.27001	0.06671	-0.25462	-4.04778	0.00069
	WB	-0.02250	0.00726	-0.05053	-3.09933	0.00590
	CBPTE21	0.05127	0.01302	0.01862	3.68199	0.00158
	CBPTE31	0.08389	0.01928	0.09038	2.13538	0.04597
10	(Constant)	-5.91800	0.22890		-25.94533	0.00000
	EMPBI7	0.40748	0.05404	0.44525	7.54035	0.00000
	EMPBI19	0.28714	0.03882	0.27081	7.39699	0.00000
	EMPBI18	0.50750	0.07501	0.45977	6.76655	0.00000
	EMPBI23	0.12434	0.02537	0.06676	4.90200	0.00011
	EMPBI3	-0.07805	0.01144	-0.08511	-6.90427	0.00000
	NOI0	-0.26527	0.05937	-0.25015	-4.46830	0.00030
	WB	-0.02302	0.00646	-0.05169	-3.56181	0.00223
	CBPTE21	0.04124	0.01281	0.01257	3.17021	0.00316
	CBPTE31	0.09659	0.01533	0.10400	2.73414	0.01363
	CBPTE22	0.05911	0.02419	0.02938	2.45200	0.02464

a Dependent Variable: CFS2P34

Figure E-1-19: Continued

Regression (CFS2P35)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99639	0.99280	0.99225	0.14822
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99843	0.99687	0.99619	0.10997
6	0.99880	0.99761	0.99695	0.09293
7	0.99913	0.99826	0.99768	0.08113
8	0.99937	0.99874	0.99824	0.07068
9	0.99949	0.99898	0.99850	0.06512
10	0.99962	0.99924	0.99882	0.05792

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20357	1	78.20357	1844.55524	0.00000
	Residual	1.14472	27	0.04240		
	Total	79.34829	28			
2	Regression	78.77713	2	39.38856	1791.01856	0.00000
	Residual	0.57116	26	0.02197		
	Total	79.34829	28			
3	Regression	78.94783	3	26.31594	1642.88896	0.00000
	Residual	0.40045	25	0.01602		
	Total	79.34829	28			
4	Regression	79.01479	4	19.75370	1512.64501	0.00000
	Residual	0.33350	24	0.01306		
	Total	79.34829	28			
5	Regression	79.09968	5	15.81994	1463.59353	0.00000
	Residual	0.24861	23	0.01081		
	Total	79.34829	28			
6	Regression	79.15890	6	13.19305	1527.68715	0.00000
	Residual	0.18999	22	0.00864		
	Total	79.34829	28			
7	Regression	79.21008	7	11.31573	1719.34819	0.00000
	Residual	0.13821	21	0.00658		
	Total	79.34829	28			
8	Regression	79.24837	8	9.90605	1982.94997	0.00000
	Residual	0.09991	20	0.00500		
	Total	79.34829	28			
9	Regression	79.26771	9	8.80752	2076.91033	0.00000
	Residual	0.08057	19	0.00424		
	Total	79.34829	28			
10	Regression	79.28791	10	7.92879	2363.83780	0.00000
	Residual	0.06038	18	0.00335		
	Total	79.34829	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOJ9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P35

Figure E-1-20: Commodity Flow Production for Commodity Item 35 (CFS2P35)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.53611	0.15361		-36.03489	0.00000
	EMPBI7	0.90856	0.02115	0.99276	42.94829	0.00000
2	(Constant)	-5.76128	0.11904		-48.39596	0.00000
	EMPBI7	0.56481	0.06898	0.61715	8.18850	0.00000
	EMPBI19	0.40814	0.07992	0.38511	5.10970	0.00003
3	(Constant)	-5.96552	0.11936		-49.97791	0.00000
	EMPBI7	0.42850	0.07220	0.46821	5.93513	0.00000
	EMPBI19	0.41906	0.06832	0.39521	6.13379	0.00000
	EMPBI18	0.16188	0.04950	0.14661	3.26455	0.00117
4	(Constant)	-6.50998	0.23696		-27.47114	0.00000
	EMPBI7	0.29393	0.08349	0.32117	3.52039	0.00175
	EMPBI19	0.44630	0.06259	0.42091	7.13034	0.00000
	EMPBI18	0.25145	0.05666	0.22776	4.43789	0.00017
	EMPBI21	0.11484	0.04451	0.06166	2.58011	0.01643
5	(Constant)	-6.51229	0.21574		-30.27786	0.00000
	EMPBI7	0.37024	0.08155	0.41439	4.53901	0.00015
	EMPBI19	0.39793	0.06026	0.37529	6.60320	0.00000
	EMPBI18	0.21808	0.05183	0.21565	4.50359	0.00013
	EMPBI21	0.11403	0.04040	0.06123	2.81625	0.00980
	EMPBI3	-0.04441	0.01812	-0.04787	-2.45018	0.02231
6	(Constant)	-6.59253	0.19422		-33.94288	0.00000
	EMPBI7	0.37503	0.07470	0.41045	5.02886	0.00005
	EMPBI19	0.39006	0.05395	0.36786	7.22981	0.00000
	EMPBI18	0.26986	0.05414	0.26182	4.46684	0.00010
	EMPBI21	0.11102	0.03620	0.05993	3.08312	0.00544
	EMPBI3	-0.05901	0.01718	-0.06161	-3.44230	0.00232
	NOJ9	-0.23935	0.09187	-0.22571	-2.60525	0.01610
7	(Constant)	-6.58011	0.16095		-38.60112	0.00000
	EMPBI7	0.46278	0.07223	0.50567	6.40696	0.00000
	EMPBI19	0.31406	0.05115	0.31506	6.53056	0.00000
	EMPBI18	0.56215	0.10157	0.50918	5.54534	0.00002
	EMPBI21	0.11411	0.01263	0.07213	4.11732	0.00049
	EMPBI3	-0.06200	0.01500	-0.06684	-4.13272	0.00047
	NOJ9	-0.29470	0.08260	-0.27790	-3.56800	0.00182
	WB	-0.02402	0.00888	-0.05596	-2.80497	0.01061
8	(Constant)	-6.61359	0.14932		-44.29229	0.00000
	EMPBI7	0.44194	0.06138	0.48290	6.97309	0.00000
	EMPBI19	0.32546	0.04468	0.30695	7.28515	0.00000
	EMPBI18	0.57168	0.08830	0.51782	6.46792	0.00000
	EMPBI21	0.15576	0.02911	0.08148	5.21269	0.00004
	EMPBI3	-0.06840	0.01138	-0.07183	-5.15751	0.00005
	NOJ9	-0.28196	0.07206	-0.26777	-3.94033	0.00081
	WB	-0.02541	0.00774	-0.05707	-3.28264	0.00172
	CBPTE21	0.01510	0.01268	0.02644	2.76879	0.01185
9	(Constant)	-6.17299	0.24798		-24.89262	0.00000
	EMPBI7	0.46610	0.06076	0.44174	6.68194	0.00000
	EMPBI19	0.29559	0.04147	0.27878	6.79947	0.00000
	EMPBI18	0.51050	0.08169	0.48051	6.13901	0.00000
	EMPBI21	0.13279	0.02826	0.07130	4.69951	0.00010
	EMPBI3	-0.07061	0.01227	-0.07612	-5.75211	0.00002
	NOJ9	-0.27003	0.06672	-0.25464	-4.04750	0.00069
	WB	-0.02250	0.00726	-0.05054	-3.09905	0.00501
	CBPTE21	0.05128	0.01392	0.01862	3.68331	0.00158
	CBPTE31	0.08191	0.01929	0.09040	2.13551	0.04505
10	(Constant)	-6.02267	0.22890		-26.31185	0.00000
	EMPBI7	0.40749	0.05404	0.44526	7.54081	0.00000
	EMPBI19	0.28711	0.03882	0.27078	7.39647	0.00000
	EMPBI18	0.59759	0.07501	0.45976	6.76682	0.00000
	EMPBI21	0.12435	0.02536	0.06677	4.90255	0.00011
	EMPBI3	-0.07805	0.01141	-0.08512	-6.90489	0.00000
	NOJ9	-0.26529	0.05937	-0.25017	-4.46879	0.00030
	WB	-0.02102	0.00646	-0.05169	-3.56222	0.00221
	CBPTE21	0.04324	0.01281	0.01257	3.37644	0.00330
	CBPTE31	0.09862	0.01531	0.10409	2.71501	0.01160
	CBPTE22	0.05915	0.02410	0.02940	2.45388	0.02455

a Dependent Variable: CFS2P95

Figure E-1-20: Continued

Regression (CFS2P39)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20590
2	0.99639	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99539	0.11429
5	0.99843	0.99687	0.99619	0.10397
6	0.99880	0.99761	0.99695	0.09291
7	0.99911	0.99826	0.99768	0.08111
8	0.99937	0.99874	0.99824	0.07068
9	0.99949	0.99898	0.99850	0.06512
10	0.99962	0.99924	0.99882	0.05793

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20138	1	78.20138	1844.56887	0.00000
	Residual	1.14471	27	0.04240		
	Total	79.34808	28			
2	Regression	78.77095	2	39.38548	1793.10535	0.00000
	Residual	0.57713	26	0.02197		
	Total	79.34808	28			
3	Regression	78.94765	3	26.31588	1842.95636	0.00000
	Residual	0.40043	25	0.01602		
	Total	79.34808	28			
4	Regression	79.03459	4	19.75865	1512.62898	0.00000
	Residual	0.31350	24	0.01306		
	Total	79.34808	28			
5	Regression	79.09948	5	15.81990	1463.60981	0.00000
	Residual	0.24860	23	0.01081		
	Total	79.34808	28			
6	Regression	79.15808	6	13.19301	1527.61650	0.00000
	Residual	0.19000	22	0.00864		
	Total	79.34808	28			
7	Regression	79.20988	7	11.31570	1719.35379	0.00000
	Residual	0.13821	21	0.00658		
	Total	79.34808	28			
8	Regression	79.24817	8	9.90602	1982.97190	0.00000
	Residual	0.09991	20	0.00500		
	Total	79.34808	28			
9	Regression	79.26750	9	8.80750	2076.68976	0.00000
	Residual	0.08058	19	0.00424		
	Total	79.34808	28			
10	Regression	79.28770	10	7.92877	2161.48720	0.00000
	Residual	0.06038	18	0.00335		
	Total	79.34808	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P39

Figure E-1-21: Commodity Flow Production for Commodity Item 39 (CFS2P39)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.78082	0.15651		-44.13642	0.00000
	EMPBI7	0.90856	0.02115	0.99276	42.94844	0.00000
2	(Constant)	-7.00598	0.11904		-58.85320	0.00000
	EMPBI7	0.56480	0.06897	0.61715	8.18861	0.00000
	EMPBI19	0.40835	0.07991	0.38512	5.10991	0.00003
3	(Constant)	-7.21022	0.11936		-60.40703	0.00000
	EMPBI7	0.42850	0.07220	0.46821	5.93523	0.00000
	EMPBI19	0.41906	0.06812	0.39522	6.15401	0.00000
	EMPBI18	0.16188	0.04958	0.14661	3.26451	0.00117
4	(Constant)	-7.75462	0.23696		-32.72556	0.00000
	EMPBI7	0.29194	0.08348	0.32118	3.52058	0.00175
	EMPBI19	0.44631	0.06259	0.42091	7.13056	0.00000
	EMPBI18	0.25141	0.05666	0.22774	4.43760	0.00017
	EMPBI21	0.11481	0.04451	0.06165	2.57981	0.01044
5	(Constant)	-7.77092	0.21574		-36.04713	0.00000
	EMPBI7	0.37026	0.08354	0.41441	4.43124	0.00015
	EMPBI19	0.39793	0.06026	0.37529	6.60326	0.00000
	EMPBI18	0.23807	0.05383	0.21563	4.59181	0.00011
	EMPBI21	0.11402	0.04049	0.06122	2.81594	0.00580
	EMPBI3	-0.04441	0.01812	-0.04787	-2.45050	0.02230
6	(Constant)	-7.83716	0.19421		-40.35020	0.00000
	EMPBI7	0.37565	0.07470	0.41047	5.02899	0.00005
	EMPBI19	0.39006	0.05995	0.36787	7.22969	0.00000
	EMPBI18	0.50982	0.11415	0.46178	4.46636	0.00019
	EMPBI21	0.11161	0.03621	0.05991	3.08269	0.00544
	EMPBI3	-0.05901	0.01714	-0.06361	-3.44226	0.00232
	NOI9	-0.23911	0.09188	-0.22569	-2.60193	0.01617
7	(Constant)	-7.80476	0.16994		-45.92487	0.00000
	EMPBI7	0.46280	0.07221	0.50570	6.40711	0.00000
	EMPBI19	0.33406	0.05115	0.31505	6.53051	0.00000
	EMPBI18	0.56211	0.10117	0.50915	5.54498	0.00002
	EMPBI21	0.13432	0.01261	0.07212	8.11699	0.00049
	EMPBI3	-0.06200	0.01500	-0.06684	-4.11279	0.00047
	NOI9	-0.29468	0.08259	-0.27788	-3.56778	0.00182
	W8	-0.02492	0.00888	-0.05596	-2.80523	0.01060
8	(Constant)	-7.85822	0.14912		-52.62811	0.00000
	EMPBI7	0.44197	0.06338	0.48293	6.97354	0.00000
	EMPBI19	0.32586	0.04867	0.30694	7.28512	0.00000
	EMPBI18	0.57164	0.08839	0.51778	6.46753	0.00000
	EMPBI21	0.15175	0.02811	0.08148	5.21256	0.00004
	EMPBI3	-0.06849	0.01328	-0.07381	-5.15701	0.00005
	NOI9	-0.28194	0.07206	-0.26775	-3.94009	0.00081
	W8	-0.02542	0.00774	-0.05707	-3.28294	0.00172
	CBPTE21	0.03510	0.01268	0.02644	2.76883	0.01184
9	(Constant)	-7.41772	0.24800		-29.91049	0.00000
	EMPBI7	0.40613	0.06076	0.44377	6.68416	0.00000
	EMPBI19	0.29560	0.04348	0.27878	6.79921	0.00000
	EMPBI18	0.53047	0.08369	0.48049	6.33836	0.00000
	EMPBI21	0.13279	0.02826	0.07130	4.69905	0.00016
	EMPBI3	-0.07061	0.01228	-0.07612	-5.75184	0.00002
	NOI9	-0.27002	0.06672	-0.25462	-4.04706	0.00069
	W8	-0.02251	0.00726	-0.05054	-3.09929	0.00540
	CBPTE21	0.05127	0.01392	0.03862	3.68285	0.00158
	CBPTE11	0.08188	0.03929	0.09017	2.13486	0.04601
10	(Constant)	-7.26741	0.22991		-31.74755	0.00000
	EMPBI7	0.40751	0.05404	0.44530	7.54092	0.00000
	EMPBI19	0.28712	0.03882	0.27078	7.39604	0.00000
	EMPBI18	0.50756	0.07502	0.45974	6.76595	0.00000
	EMPBI21	0.12435	0.02517	0.06670	4.94196	0.00011
	EMPBI3	-0.07895	0.01144	-0.08512	-6.90481	0.00000
	NOI9	-0.26528	0.05917	-0.25015	-4.46821	0.00030
	W8	-0.02302	0.00646	-0.05170	-3.56241	0.00223
	CBPTE21	0.04124	0.01281	0.03257	3.37590	0.00317
	CBPTE11	0.09659	0.03511	0.10407	2.71421	0.01362
	CBPTE22	0.05935	0.02419	0.02940	2.45367	0.02456

a Dependent Variable: CFS2P19

Figure E-1-21: Continued

Regression (CFS2P40)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99619	0.99280	0.99225	0.14821
3	0.99747	0.99495	0.99435	0.12655
4	0.99802	0.99605	0.99539	0.11428
5	0.99843	0.99687	0.99619	0.10395
6	0.99880	0.99761	0.99695	0.09292
7	0.99913	0.99826	0.99768	0.08111
8	0.99937	0.99874	0.99824	0.07066
9	0.99949	0.99899	0.99850	0.06510
10	0.99962	0.99924	0.99882	0.05790

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31, CBPTE22

ANOVA[k]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20255	1	78.20255	1844.42354	0.00000
	Residual	1.14479	27	0.04240		
	Total	79.34733	28			
2	Regression	78.77620	2	39.38810	1793.08997	0.00000
	Residual	0.57113	26	0.02197		
	Total	79.34733	28			
3	Regression	78.94699	3	26.31566	1643.32665	0.00000
	Residual	0.40034	25	0.01601		
	Total	79.34733	28			
4	Regression	79.01392	4	19.75348	1513.03000	0.00000
	Residual	0.33341	24	0.01306		
	Total	79.34733	28			
5	Regression	79.09880	5	15.81976	1464.01689	0.00000
	Residual	0.24853	23	0.01081		
	Total	79.34733	28			
6	Regression	79.15739	6	13.19290	1528.08052	0.00000
	Residual	0.18994	22	0.00863		
	Total	79.34733	28			
7	Regression	79.20917	7	11.31560	1719.94661	0.00000
	Residual	0.13816	21	0.00658		
	Total	79.34733	28			
8	Regression	79.24748	8	9.90593	1984.05397	0.00000
	Residual	0.09986	20	0.00499		
	Total	79.34733	28			
9	Regression	79.26680	9	8.80742	2077.99961	0.00000
	Residual	0.08053	19	0.00424		
	Total	79.34733	28			
10	Regression	79.28698	10	7.92870	2368.70892	0.00000
	Residual	0.06035	18	0.00335		
	Total	79.34733	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI23, EMPBI3, NOI9, W8, CBPTE21, CBPTE31, CBPTE22

k Dependent Variable: CFS2P40

Figure E-1-22: Commodity Flow Production for Commodity Item 40 (CFS2P40)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.95226	0.15364		-32.23316	0.00000
	EMPBI7	0.90855	0.02116	0.99276	42.94675	0.00000
2	(Constant)	-5.17743	0.11904		-43.49261	0.00000
	EMPBI7	0.56477	0.06897	0.61712	8.18821	0.00000
	EMPBI19	0.46838	0.07991	0.38514	5.11026	0.00003
3	(Constant)	-5.38172	0.11935		-45.09319	0.00000
	EMPBI7	0.42843	0.07219	0.46814	5.93502	0.00000
	EMPBI19	0.41909	0.06831	0.34525	6.13518	0.00000
	EMPBI18	0.16192	0.04958	0.14667	3.26578	0.00116
4	(Constant)	-5.92609	0.23691		-25.01236	0.00000
	EMPBI7	0.29188	0.08148	0.31212	3.52031	0.00175
	EMPBI19	0.48634	0.06258	0.42094	7.13181	0.00000
	EMPBI18	0.25147	0.05665	0.22778	4.43891	0.00017
	EMPBI23	0.11482	0.04450	0.06165	2.58005	0.01043
5	(Constant)	-5.94880	0.21571		-27.57561	0.00000
	EMPBI7	0.37919	0.08154	0.41434	4.53907	0.00015
	EMPBI19	0.39707	0.06025	0.37533	6.60479	0.00000
	EMPBI18	0.21811	0.05182	0.21567	4.59477	0.00013
	EMPBI23	0.11401	0.04049	0.06122	2.81622	0.00580
	EMPBI3	-0.04440	0.01812	-0.04787	-2.45038	0.02210
6	(Constant)	-6.00863	0.19420		-30.94071	0.00000
	EMPBI7	0.37558	0.07469	0.41039	5.02886	0.00005
	EMPBI19	0.39000	0.05394	0.36790	7.23149	0.00000
	EMPBI18	0.50983	0.11413	0.46179	4.46718	0.00019
	EMPBI23	0.11161	0.01620	0.05992	1.08804	0.00544
	EMPBI3	-0.05900	0.01714	-0.06161	-1.44242	0.00212
	NOJ9	-0.23931	0.09186	-0.22566	-2.60508	0.01010
7	(Constant)	-5.97623	0.16992		-35.17165	0.00000
	EMPBI7	0.46273	0.07222	0.50561	6.40739	0.00000
	EMPBI19	0.31410	0.05114	0.31509	6.53248	0.00000
	EMPBI18	0.56212	0.10136	0.50916	5.54604	0.00002
	EMPBI23	0.13432	0.01262	0.07212	4.11750	0.00049
	EMPBI3	-0.06200	0.01500	-0.06684	-4.13307	0.00047
	NOJ9	-0.29465	0.08258	-0.27785	-3.56805	0.00182
	WB	-0.02402	0.00888	-0.05506	-2.80544	0.01060
8	(Constant)	-6.02970	0.14927		-40.39311	0.00000
	EMPBI7	0.44189	0.06136	0.48284	6.97422	0.00000
	EMPBI19	0.32550	0.04466	0.30698	7.28805	0.00000
	EMPBI18	0.57165	0.08836	0.51779	6.46943	0.00000
	EMPBI23	0.15175	0.02911	0.08148	5.21361	0.00004
	EMPBI3	-0.06848	0.01328	-0.07383	-5.15857	0.00005
	NOJ9	-0.28391	0.07204	-0.26772	-3.94075	0.00081
	WB	-0.02541	0.00774	-0.05707	-3.28353	0.00171
	CBPTE21	0.01510	0.01267	0.02644	2.70981	0.01182
9	(Constant)	-5.58924	0.24792		-22.54472	0.00000
	EMPBI7	0.40606	0.06074	0.44169	6.68505	0.00000
	EMPBI19	0.29564	0.04146	0.27882	6.80239	0.00000
	EMPBI18	0.51048	0.08167	0.48050	6.34055	0.00000
	EMPBI23	0.11278	0.02825	0.07129	4.70042	0.00016
	EMPBI3	-0.07060	0.01227	-0.07611	-5.75516	0.00002
	NOJ9	-0.26999	0.06670	-0.25460	-4.04791	0.00069
	WB	-0.02251	0.00726	-0.05054	-3.09998	0.00590
	CBPTE21	0.05127	0.01392	0.03862	3.68412	0.00158
	CBPTE31	0.08388	0.03928	0.09030	2.13533	0.04597
10	(Constant)	-5.41900	0.22885		-23.70644	0.00000
	EMPBI7	0.40745	0.05401	0.44522	7.54149	0.00000
	EMPBI19	0.28716	0.03881	0.27083	7.39922	0.00000
	EMPBI18	0.50759	0.07500	0.45976	6.76806	0.00000
	EMPBI23	0.12435	0.02536	0.08676	4.90326	0.00011
	EMPBI3	-0.07894	0.01143	-0.08511	-6.90511	0.00000
	NOJ9	-0.26525	0.05935	-0.25013	-4.46892	0.00010
	WB	-0.02302	0.00646	-0.05169	-3.56297	0.00222
	CBPTE21	0.04124	0.01280	0.03257	3.37721	0.00316
	CBPTE31	0.09658	0.01532	0.10405	2.73452	0.01361
	CBPTE22	0.05932	0.02418	0.02938	2.45512	0.02458

a Dependent Variable: CFS2P40

Figure E-1-22: Continued

Regression (CFS2P43)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99276	0.98557	0.98504	0.20591
2	0.99630	0.99280	0.99225	0.14822
3	0.99747	0.99495	0.99435	0.12656
4	0.99802	0.99605	0.99530	0.11429
5	0.99843	0.99687	0.99619	0.10397
6	0.99880	0.99761	0.99695	0.09293
7	0.99913	0.99826	0.99768	0.08113
8	0.99937	0.99874	0.99824	0.07068
9	0.99949	0.99898	0.99850	0.06512
10	0.99962	0.99924	0.99882	0.05792

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI21

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI21, EMPBI1

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI21, EMPBI1, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI21, EMPBI1, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI21, EMPBI1, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI21, EMPBI1, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI21, EMPBI1, NOJ9, W8, CBPTE21, CBPTE31, CBPTE23

ANOVA(k)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.20157	1	78.20157	1844.55524	0.00000
	Residual	1.14672	27	0.04240		
	Total	79.34829	28			
2	Regression	78.77713	2	39.38856	1793.01856	0.00000
	Residual	0.57116	26	0.02197		
	Total	79.34829	28			
3	Regression	78.94783	3	26.31594	1642.88896	0.00000
	Residual	0.40045	25	0.01602		
	Total	79.34829	28			
4	Regression	79.01479	4	19.75870	1512.64503	0.00000
	Residual	0.33350	24	0.01306		
	Total	79.34829	28			
5	Regression	79.09968	5	15.81994	1463.59353	0.00000
	Residual	0.24861	23	0.01081		
	Total	79.34829	28			
6	Regression	79.15830	6	13.19305	1527.68715	0.00000
	Residual	0.18999	22	0.00864		
	Total	79.34829	28			
7	Regression	79.21008	7	11.31573	1719.34819	0.00000
	Residual	0.13821	21	0.00658		
	Total	79.34829	28			
8	Regression	79.24837	8	9.90605	1982.04997	0.00000
	Residual	0.09991	20	0.00500		
	Total	79.34829	28			
9	Regression	79.26771	9	8.80752	2076.91033	0.00000
	Residual	0.08057	19	0.00424		
	Total	79.34829	28			
10	Regression	79.28791	10	7.92879	2161.83780	0.00000
	Residual	0.06038	18	0.00335		
	Total	79.34829	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, EMPBI19

c Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18

d Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI21

e Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI21, EMPBI1

f Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI21, EMPBI1, NOJ9

g Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI21, EMPBI1, NOJ9, W8

h Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI21, EMPBI1, NOJ9, W8, CBPTE21

i Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI21, EMPBI1, NOJ9, W8, CBPTE21, CBPTE31

j Predictors: (Constant), EMPBI7, EMPBI19, EMPBI18, EMPBI21, EMPBI1, NOJ9, W8, CBPTE21, CBPTE31, CBPTE23

k Dependent Variable: CFS2P43

Figure E-1-23: Commodity Flow Production for Commodity Item 43 (CFS2P43)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.64583	0.15363		-23.73058	0.00000
	EMPB87	0.90856	0.02115	0.99276	42.94829	0.00000
2	(Constant)	-1.87098	0.11904		-12.51704	0.00000
	EMPB87	0.56481	0.06898	0.61715	8.18850	0.00000
	EMPB819	0.40814	0.07992	0.38511	5.10970	0.00001
3	(Constant)	-4.07522	0.11936		-34.14337	0.00000
	EMPB87	0.42850	0.07220	0.46821	5.93511	0.00000
	EMPB819	0.41906	0.06832	0.39521	6.13379	0.00000
	EMPB818	0.16188	0.04959	0.14661	3.26455	0.00117
4	(Constant)	-4.61968	0.21696		-10.49578	0.00000
	EMPB87	0.29393	0.08340	0.32117	3.52039	0.00175
	EMPB819	0.44630	0.06259	0.42091	7.13014	0.00000
	EMPB818	0.25145	0.05666	0.22776	4.43789	0.00017
	EMPB823	0.11484	0.04451	0.06166	2.58011	0.01643
5	(Constant)	-4.68199	0.21574		-21.51611	0.00000
	EMPB87	0.37924	0.08355	0.41419	4.53901	0.00015
	EMPB819	0.39791	0.06026	0.37529	6.60120	0.00000
	EMPB818	0.21808	0.05183	0.21565	4.59159	0.00013
	EMPB823	0.11403	0.04049	0.06123	2.81625	0.00980
	EMPB81	-0.04481	0.01812	-0.04787	-2.45018	0.02231
6	(Constant)	-4.70223	0.19422		-24.21012	0.00000
	EMPB87	0.37563	0.07470	0.41045	5.02886	0.00005
	EMPB819	0.38006	0.05395	0.36786	7.22883	0.00000
	EMPB818	0.50986	0.11414	0.46182	4.46684	0.00019
	EMPB823	0.11167	0.01620	0.05991	3.08112	0.00544
	EMPB81	-0.05901	0.01714	-0.06361	-3.44210	0.00212
	NOI9	-0.23935	0.09187	-0.22571	-2.60525	0.01616
7	(Constant)	-4.66983	0.16995		-27.47822	0.00000
	EMPB87	0.46278	0.07223	0.50567	6.40696	0.00000
	EMPB819	0.33406	0.05115	0.31506	6.53056	0.00000
	EMPB818	0.56215	0.10137	0.50918	5.58534	0.00002
	EMPB823	0.11433	0.01263	0.07213	4.11732	0.00049
	EMPB81	-0.06200	0.01500	-0.06684	-4.13272	0.00047
	NOI9	-0.29470	0.08260	-0.27790	-3.56800	0.00182
	W8	-0.02492	0.00888	-0.05596	-2.80497	0.01061
8	(Constant)	-4.72329	0.14932		-31.63265	0.00000
	EMPB87	0.44194	0.06138	0.48290	6.97309	0.00000
	EMPB819	0.32546	0.04468	0.30695	7.28515	0.00000
	EMPB818	0.57168	0.08839	0.51782	6.46792	0.00000
	EMPB823	0.15176	0.02911	0.08148	5.21269	0.00004
	EMPB81	-0.06849	0.01328	-0.07381	-5.15751	0.00005
	NOI9	-0.28396	0.07206	-0.26777	-3.94011	0.00081
	W8	-0.02541	0.00774	-0.05707	-3.28264	0.00172
	CBPTE21	0.03510	0.01268	0.02644	2.76879	0.01185
9	(Constant)	-4.28269	0.24798		-17.26997	0.00000
	EMPB87	0.40610	0.06076	0.44374	6.68194	0.00000
	EMPB819	0.29559	0.04347	0.27878	6.79947	0.00000
	EMPB818	0.53050	0.08369	0.48051	6.33901	0.00000
	EMPB823	0.13279	0.02826	0.07130	4.69951	0.00016
	EMPB81	-0.07061	0.01227	-0.07612	-5.75211	0.00002
	NOI9	-0.27003	0.06672	-0.25464	-4.04750	0.00069
	W8	-0.02250	0.00726	-0.05054	-3.09905	0.00591
	CBPTE21	0.05128	0.01302	0.03862	3.68111	0.00158
	CBPTE31	0.08391	0.03929	0.09040	2.13551	0.04595
10	(Constant)	-4.11237	0.22890		-18.05151	0.00000
	EMPB87	0.40749	0.05404	0.44526	7.54081	0.00000
	EMPB819	0.28711	0.03882	0.27078	7.39647	0.00000
	EMPB818	0.50759	0.07501	0.45976	6.76682	0.00000
	EMPB823	0.12435	0.02536	0.06677	4.90255	0.00011
	EMPB81	-0.07895	0.01141	-0.08512	-6.90489	0.00000
	NOI9	-0.26529	0.05937	-0.25017	-4.46879	0.00030
	W8	-0.02302	0.00646	-0.05169	-3.56222	0.00223
	CBPTE21	0.04328	0.01281	0.03257	3.37644	0.00336
	CBPTE31	0.09662	0.01531	0.10409	2.73501	0.01360
	CBPTE22	0.05935	0.02419	0.02940	2.45388	0.02455

a Dependent Variable: CFS2P43

Figure E-1-23: Continued

E-1-2 Model Summary and Coefficients for CFS2A – Attraction

Regression (CFS2A3)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.10000
5	0.99877	0.99754	0.99700	0.09100
6	0.99904	0.99808	0.99756	0.08217
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7
b Predictors: (Constant), EMPBI7, CBPTE55
c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31
d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11
e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15
f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95
g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.24977	1	76.24977	1876.52304	0.00000
	Residual	1.09711	27	0.04063		
	Total	77.34688	28			
2	Regression	76.79011	2	38.39505	1792.96812	0.00000
	Residual	0.55677	26	0.02141		
	Total	77.34688	28			
3	Regression	76.98439	3	25.66146	1769.80824	0.00000
	Residual	0.36249	25	0.01450		
	Total	77.34688	28			
4	Regression	77.10685	4	19.27671	1927.48370	0.00000
	Residual	0.24002	24	0.01000		
	Total	77.34688	28			
5	Regression	77.15640	5	15.43128	1863.30563	0.00000
	Residual	0.19048	23	0.00828		
	Total	77.34688	28			
6	Regression	77.19832	6	12.86639	1905.36227	0.00000
	Residual	0.14856	22	0.00675		
	Total	77.34688	28			
7	Regression	77.23040	7	11.03291	1989.24789	0.00000
	Residual	0.11647	21	0.00555		
	Total	77.34688	28			
8	Regression	77.22245	6	12.87041	2275.70934	0.00000
	Residual	0.12442	22	0.00566		
	Total	77.34688	28			

a Predictors: (Constant), EMPBI7
b Predictors: (Constant), EMPBI7, CBPTE55
c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31
d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11
e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15
f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95
g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
i Dependent Variable: CFS2A3

Figure E-1-24: Commodity Flow Attraction for Commodity Item 3 (CFS2A3)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.77283	0.15041		-31.73316	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31885	0.00000
2	(Constant)	-4.21562	0.15565		-27.08416	0.00000
	EMPBI7	0.79573	0.02517	0.88066	31.61384	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02320	0.00003
3	(Constant)	-3.52259	0.22858		-15.41072	0.00000
	EMPBI7	0.61694	0.05305	0.68278	11.62832	0.00000
	CBPTE55	0.15214	0.02715	0.12947	5.60464	0.00001
	CBPTE31	0.19462	0.05317	0.21236	3.66048	0.00118
4	(Constant)	-5.78864	0.67482		-8.57808	0.00000
	EMPBI7	0.51975	0.05208	0.57522	9.97904	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69198	0.00009
	CBPTE31	0.16640	0.04489	0.18158	3.70724	0.00110
	W11	0.17329	0.04952	0.16804	3.49934	0.00185
5	(Constant)	-5.63775	0.61717		-9.13485	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03124	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36344	0.00023
	CBPTE31	0.18669	0.04168	0.20371	4.47918	0.00017
	W11	0.18056	0.04516	0.17509	3.99809	0.00057
	EMPBI15	0.04301	0.01758	0.06670	2.44591	0.02252
6	(Constant)	-5.34346	0.56968		-9.37983	0.00000
	EMPBI7	0.45253	0.05039	0.50083	8.98039	0.00000
	CBPTE55	0.05255	0.02885	0.04472	1.82168	0.08213
	CBPTE31	0.18475	0.03764	0.20160	4.90797	0.00007
	W11	0.16088	0.04154	0.15601	3.87304	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02450	0.00623
	CBPTE95	0.08552	0.03432	0.05446	2.49151	0.02075
7	(Constant)	-5.35655	0.51631		-10.37463	0.00000
	EMPBI7	0.39588	0.05138	0.43813	7.70418	0.00000
	CBPTE55	0.03281	0.02740	0.02792	1.19729	0.24454
	CBPTE31	0.16851	0.03478	0.18388	4.84536	0.00009
	W11	0.14400	0.03829	0.13964	3.76048	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26265	0.00372
	CBPTE95	0.08090	0.03117	0.05151	2.59564	0.01688
	EMPBI19	0.12118	0.05038	0.11575	2.40531	0.02546
8	(Constant)	-5.45567	0.51463		-10.60116	0.00000
	EMPBI7	0.38148	0.05045	0.42219	7.56189	0.00000
	CBPTE31	0.16796	0.03512	0.18327	4.78302	0.00009
	W11	0.14872	0.03846	0.14422	3.86666	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65572	0.00139
	CBPTE95	0.10451	0.02437	0.06655	4.28840	0.00030
	EMPBI19	0.13925	0.04854	0.13301	2.86884	0.00892
a	Dependent Variable: CFS2A3					

Figure E-1-24: Continued

Regression (CFS2A5)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09099
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25070	1	76.25070	1876.62481	0.00000
	Residual	1.09706	27	0.04063		
	Total	77.34776	28			
2	Regression	76.79107	2	38.39554	1793.25179	0.00000
	Residual	0.55669	26	0.02141		
	Total	77.34776	28			
3	Regression	76.98528	3	25.66176	1769.84753	0.00000
	Residual	0.36249	25	0.01450		
	Total	77.34776	28			
4	Regression	77.10779	4	19.27695	1927.91033	0.00000
	Residual	0.23997	24	0.01000		
	Total	77.34776	28			
5	Regression	77.15734	5	15.43147	1863.85424	0.00000
	Residual	0.19042	23	0.00828		
	Total	77.34776	28			
6	Regression	77.19927	6	12.86655	1906.26000	0.00000
	Residual	0.14849	22	0.00675		
	Total	77.34776	28			
7	Regression	77.23134	7	11.03305	1990.13788	0.00000
	Residual	0.11642	21	0.00554		
	Total	77.34776	28			
8	Regression	77.22339	6	12.87057	2276.68737	0.00000
	Residual	0.12437	22	0.00565		
	Total	77.34776	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A5

Figure E-1-25: Commodity Flow Attraction for Commodity Item 5 (CFS2A5)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.10740	0.15040		-33.95838	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32003	0.00000
2	(Constant)	-4.55018	0.15564		-29.23573	0.00000
	EMPBI7	0.79573	0.02517	0.88065	31.61622	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02373	0.00003
3	(Constant)	-3.85728	0.22858		-16.87505	0.00000
	EMPBI7	0.61697	0.05305	0.68282	11.62910	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60496	0.00001
	CBPTE31	0.19458	0.05317	0.21232	3.65977	0.00118
4	(Constant)	-6.12377	0.67475		-9.07565	0.00000
	EMPBI7	0.51977	0.05208	0.57524	9.98046	0.00000
	CBPTE55	0.11623	0.02477	0.09890	4.69251	0.00009
	CBPTE31	0.16636	0.04488	0.18153	3.70665	0.00110
	W11	0.17332	0.04952	0.16807	3.50037	0.00184
5	(Constant)	-5.97287	0.61708		-9.67921	0.00000
	EMPBI7	0.44789	0.05576	0.49569	8.03267	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36407	0.00023
	CBPTE31	0.18664	0.04167	0.20366	4.47878	0.00017
	W11	0.18059	0.04516	0.17512	3.99939	0.00056
	EMPBI15	0.04301	0.01758	0.06670	2.44635	0.02249
6	(Constant)	-5.67853	0.56954		-9.97029	0.00000
	EMPBI7	0.45255	0.05038	0.50085	8.98280	0.00000
	CBPTE55	0.05255	0.02884	0.04471	1.82183	0.08211
	CBPTE31	0.18471	0.03763	0.20155	4.90794	0.00007
	W11	0.16091	0.04153	0.15603	3.87464	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02535	0.00622
	CBPTE95	0.08554	0.03432	0.05446	2.49251	0.02070
7	(Constant)	-5.69162	0.51620		-11.02598	0.00000
	EMPBI7	0.39591	0.05137	0.43816	7.70649	0.00000
	CBPTE55	0.03281	0.02740	0.02792	1.19745	0.24447
	CBPTE31	0.16847	0.03477	0.18383	4.84528	0.00009
	W11	0.14404	0.03829	0.13967	3.76220	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26355	0.00371
	CBPTE95	0.08091	0.03116	0.05152	2.59672	0.01684
	EMPBI19	0.12115	0.05037	0.11572	2.40518	0.02547
8	(Constant)	-5.79073	0.51452		-11.25458	0.00000
	EMPBI7	0.38152	0.05044	0.42223	7.56415	0.00000
	CBPTE31	0.16792	0.03511	0.18323	4.78291	0.00009
	W11	0.14876	0.03846	0.14425	3.86835	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65665	0.00139
	CBPTE95	0.10452	0.02437	0.06656	4.28987	0.00030
	EMPBI19	0.13921	0.04853	0.13298	2.86874	0.00892
a	Dependent Variable: CFS2A5					

Figure E-1-25: Continued

Regression (CFS2A6)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.10000
5	0.99877	0.99754	0.99700	0.09100
6	0.99904	0.99808	0.99756	0.08217
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.24977	1	76.24977	1876.52304	0.00000
	Residual	1.09711	27	0.04063		
	Total	77.34688	28			
2	Regression	76.79011	2	38.39505	1792.96812	0.00000
	Residual	0.55677	26	0.02141		
	Total	77.34688	28			
3	Regression	76.98439	3	25.66146	1769.80824	0.00000
	Residual	0.36249	25	0.01450		
	Total	77.34688	28			
4	Regression	77.10685	4	19.27671	1927.48370	0.00000
	Residual	0.24002	24	0.01000		
	Total	77.34688	28			
5	Regression	77.15640	5	15.43128	1863.30563	0.00000
	Residual	0.19048	23	0.00828		
	Total	77.34688	28			
6	Regression	77.19832	6	12.86639	1905.36227	0.00000
	Residual	0.14856	22	0.00675		
	Total	77.34688	28			
7	Regression	77.23040	7	11.03291	1989.24789	0.00000
	Residual	0.11647	21	0.00555		
	Total	77.34688	28			
8	Regression	77.22245	6	12.87041	2275.70934	0.00000
	Residual	0.12442	22	0.00566		
	Total	77.34688	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A6

Figure E-1-26: Commodity Flow Attraction for Commodity Item 6 (CFS2A6)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.10753	0.15041		-27.30977	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31885	0.00000
2	(Constant)	-3.55032	0.15565		-22.80980	0.00000
	EMPBI7	0.79573	0.02517	0.88066	31.61384	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02320	0.00003
3	(Constant)	-2.85729	0.22858		-12.50015	0.00000
	EMPBI7	0.61694	0.05305	0.68278	11.62832	0.00000
	CBPTE55	0.15214	0.02715	0.12947	5.60464	0.00001
	CBPTE31	0.19462	0.05317	0.21236	3.66048	0.00118
4	(Constant)	-5.12334	0.67482		-7.59219	0.00000
	EMPBI7	0.51975	0.05208	0.57522	9.97904	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69198	0.00009
	CBPTE31	0.16640	0.04489	0.18158	3.70724	0.00110
	W11	0.17329	0.04952	0.16804	3.49934	0.00185
5	(Constant)	-4.97245	0.61717		-8.05686	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03124	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36344	0.00023
	CBPTE31	0.18669	0.04168	0.20371	4.47918	0.00017
	W11	0.18056	0.04516	0.17509	3.99809	0.00057
	EMPBI15	0.04301	0.01758	0.06670	2.44591	0.02252
6	(Constant)	-4.67816	0.56968		-8.21197	0.00000
	EMPBI7	0.45253	0.05039	0.50083	8.98039	0.00000
	CBPTE55	0.05255	0.02885	0.04472	1.82168	0.08213
	CBPTE31	0.18475	0.03764	0.20160	4.90797	0.00007
	W11	0.16088	0.04154	0.15601	3.87304	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02450	0.00623
	CBPTE95	0.08552	0.03432	0.05446	2.49151	0.02075
7	(Constant)	-4.69125	0.51631		-9.08607	0.00000
	EMPBI7	0.39588	0.05138	0.43813	7.70418	0.00000
	CBPTE55	0.03281	0.02740	0.02792	1.19729	0.24454
	CBPTE31	0.16851	0.03478	0.18388	4.84536	0.00009
	W11	0.14400	0.03829	0.13964	3.76048	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26265	0.00372
	CBPTE95	0.08090	0.03117	0.05151	2.59564	0.01688
	EMPBI19	0.12118	0.05038	0.11575	2.40531	0.02546
8	(Constant)	-4.79037	0.51463		-9.30839	0.00000
	EMPBI7	0.38148	0.05045	0.42219	7.56189	0.00000
	CBPTE31	0.16796	0.03512	0.18327	4.78302	0.00009
	W11	0.14872	0.03846	0.14422	3.86666	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65572	0.00139
	CBPTE95	0.10451	0.02437	0.06655	4.28840	0.00030
	EMPBI19	0.13925	0.04854	0.13301	2.86884	0.00892
a	Dependent Variable: CFS2A6					

Figure E-1-26:Continued

Regression (CFS2A7)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25098	1	76.25098	1876.44898	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34815	28			
2	Regression	76.79135	2	38.39568	1792.91770	0.00000
	Residual	0.55679	26	0.02142		
	Total	77.34815	28			
3	Regression	76.98560	3	25.66187	1769.53525	0.00000
	Residual	0.36255	25	0.01450		
	Total	77.34815	28			
4	Regression	77.10810	4	19.27703	1927.33098	0.00000
	Residual	0.24005	24	0.01000		
	Total	77.34815	28			
5	Regression	77.15765	5	15.43153	1863.14573	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34815	28			
6	Regression	77.19958	6	12.86660	1905.24743	0.00000
	Residual	0.14857	22	0.00675		
	Total	77.34815	28			
7	Regression	77.23166	7	11.03309	1988.91961	0.00000
	Residual	0.11649	21	0.00555		
	Total	77.34815	28			
8	Regression	77.22371	6	12.87062	2275.37137	0.00000
	Residual	0.12444	22	0.00566		
	Total	77.34815	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A7

Figure E-1-27: Commodity Flow Attraction for Commodity Item 7 (CFS2A7)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.16765	0.15041		-21.06021	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31800	0.00000
2	(Constant)	-2.61042	0.15565		-16.77086	0.00000
	EMPBI7	0.79574	0.02517	0.88065	31.61328	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02325	0.00003
3	(Constant)	-1.91746	0.22860		-8.38784	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62773	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60441	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65982	0.00118
4	(Constant)	-4.18387	0.67485		-6.19970	0.00000
	EMPBI7	0.51976	0.05209	0.57522	9.97867	0.00000
	CBPTE55	0.11623	0.02477	0.09890	4.69179	0.00009
	CBPTE31	0.16638	0.04489	0.18155	3.70656	0.00110
	W11	0.17332	0.04952	0.16807	3.49973	0.00184
5	(Constant)	-4.03298	0.61720		-6.53430	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03088	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36324	0.00023
	CBPTE31	0.18667	0.04168	0.20369	4.47842	0.00017
	W11	0.18059	0.04516	0.17512	3.99850	0.00056
	EMPBI15	0.04301	0.01758	0.06670	2.44587	0.02252
6	(Constant)	-3.73865	0.56970		-6.56252	0.00000
	EMPBI7	0.45254	0.05039	0.50083	8.98012	0.00000
	CBPTE55	0.05255	0.02885	0.04472	1.82147	0.08216
	CBPTE31	0.18473	0.03764	0.20158	4.90719	0.00007
	W11	0.16090	0.04154	0.15603	3.87351	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02451	0.00623
	CBPTE95	0.08553	0.03433	0.05446	2.49166	0.02074
7	(Constant)	-3.75175	0.51636		-7.26576	0.00000
	EMPBI7	0.39589	0.05139	0.43814	7.70371	0.00000
	CBPTE55	0.03281	0.02741	0.02792	1.19713	0.24460
	CBPTE31	0.16849	0.03478	0.18385	4.84434	0.00009
	W11	0.14403	0.03830	0.13967	3.76088	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26250	0.00372
	CBPTE95	0.08091	0.03117	0.05152	2.59569	0.01687
	EMPBI19	0.12116	0.05038	0.11574	2.40473	0.02549
8	(Constant)	-3.85086	0.51467		-7.48216	0.00000
	EMPBI7	0.38149	0.05045	0.42221	7.56152	0.00000
	CBPTE31	0.16794	0.03512	0.18325	4.78206	0.00009
	W11	0.14875	0.03847	0.14425	3.86707	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65556	0.00139
	CBPTE95	0.10452	0.02437	0.06655	4.28837	0.00030
	EMPBI19	0.13923	0.04854	0.13299	2.86822	0.00893
a	Dependent Variable: CFS2A7					

Figure E-1-27: Continued

Regression (CFS2A8)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25098	1	76.25098	1876.44898	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34815	28			
2	Regression	76.79135	2	38.39568	1792.91770	0.00000
	Residual	0.55679	26	0.02142		
	Total	77.34815	28			
3	Regression	76.98560	3	25.66187	1769.53525	0.00000
	Residual	0.36255	25	0.01450		
	Total	77.34815	28			
4	Regression	77.10810	4	19.27703	1927.33098	0.00000
	Residual	0.24005	24	0.01000		
	Total	77.34815	28			
5	Regression	77.15765	5	15.43153	1863.14573	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34815	28			
6	Regression	77.19958	6	12.86660	1905.24743	0.00000
	Residual	0.14857	22	0.00675		
	Total	77.34815	28			
7	Regression	77.23166	7	11.03309	1988.91961	0.00000
	Residual	0.11649	21	0.00555		
	Total	77.34815	28			
8	Regression	77.22371	6	12.87062	2275.37137	0.00000
	Residual	0.12444	22	0.00566		
	Total	77.34815	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A8

Figure E-1-28: Commodity Flow Attraction for Commodity Item 8 (CFS2A8)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.15835	0.15041		-34.29544	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31800	0.00000
2	(Constant)	-4.60112	0.15565		-29.56026	0.00000
	EMPBI7	0.79574	0.02517	0.88065	31.61328	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02325	0.00003
3	(Constant)	-3.90816	0.22860		-17.09607	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62773	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60441	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65982	0.00118
4	(Constant)	-6.17457	0.67485		-9.14954	0.00000
	EMPBI7	0.51976	0.05209	0.57522	9.97867	0.00000
	CBPTE55	0.11623	0.02477	0.09890	4.69179	0.00009
	CBPTE31	0.16638	0.04489	0.18155	3.70656	0.00110
	W11	0.17332	0.04952	0.16807	3.49973	0.00184
5	(Constant)	-6.02368	0.61720		-9.75966	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03088	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36324	0.00023
	CBPTE31	0.18667	0.04168	0.20369	4.47842	0.00017
	W11	0.18059	0.04516	0.17512	3.99850	0.00056
	EMPBI15	0.04301	0.01758	0.06670	2.44587	0.02252
6	(Constant)	-5.72935	0.56970		-10.05683	0.00000
	EMPBI7	0.45254	0.05039	0.50083	8.98012	0.00000
	CBPTE55	0.05255	0.02885	0.04472	1.82147	0.08216
	CBPTE31	0.18473	0.03764	0.20158	4.90719	0.00007
	W11	0.16090	0.04154	0.15603	3.87351	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02451	0.00623
	CBPTE95	0.08553	0.03433	0.05446	2.49166	0.02074
7	(Constant)	-5.74245	0.51636		-11.12102	0.00000
	EMPBI7	0.39589	0.05139	0.43814	7.70371	0.00000
	CBPTE55	0.03281	0.02741	0.02792	1.19713	0.24460
	CBPTE31	0.16849	0.03478	0.18385	4.84434	0.00009
	W11	0.14403	0.03830	0.13967	3.76088	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26250	0.00372
	CBPTE95	0.08091	0.03117	0.05152	2.59569	0.01687
	EMPBI19	0.12116	0.05038	0.11574	2.40473	0.02549
8	(Constant)	-5.84156	0.51467		-11.35006	0.00000
	EMPBI7	0.38149	0.05045	0.42221	7.56152	0.00000
	CBPTE31	0.16794	0.03512	0.18325	4.78206	0.00009
	W11	0.14875	0.03847	0.14425	3.86707	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65556	0.00139
	CBPTE95	0.10452	0.02437	0.06655	4.28837	0.00030
	EMPBI19	0.13923	0.04854	0.13299	2.86822	0.00893
a	Dependent Variable: CFS2A8					

Figure E-1-28: Continued

Regression (CFS2A11)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10000
5	0.99877	0.99754	0.99700	0.09100
6	0.99904	0.99808	0.99756	0.08217
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25069	1	76.25069	1876.42976	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34787	28			
2	Regression	76.79109	2	38.39554	1792.96368	0.00000
	Residual	0.55678	26	0.02141		
	Total	77.34787	28			
3	Regression	76.98533	3	25.66178	1769.59410	0.00000
	Residual	0.36254	25	0.01450		
	Total	77.34787	28			
4	Regression	77.10785	4	19.27696	1927.56346	0.00000
	Residual	0.24002	24	0.01000		
	Total	77.34787	28			
5	Regression	77.15739	5	15.43148	1863.30393	0.00000
	Residual	0.19048	23	0.00828		
	Total	77.34787	28			
6	Regression	77.19933	6	12.86655	1905.63068	0.00000
	Residual	0.14854	22	0.00675		
	Total	77.34787	28			
7	Regression	77.23140	7	11.03306	1989.42968	0.00000
	Residual	0.11646	21	0.00555		
	Total	77.34787	28			
8	Regression	77.22346	6	12.87058	2275.95958	0.00000
	Residual	0.12441	22	0.00566		
	Total	77.34787	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A11

Figure E-1-29: Commodity Flow Attraction for Commodity Item 11 (CFS2A11)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.84911	0.15041		-38.88786	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31778	0.00000
2	(Constant)	-5.29187	0.15565		-33.99851	0.00000
	EMPBI7	0.79573	0.02517	0.88065	31.61359	0.00000
	CBPTE55	0.16445	0.03274	0.13994	5.02344	0.00003
3	(Constant)	-4.59891	0.22860		-20.11811	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62789	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60465	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65986	0.00118
4	(Constant)	-6.86547	0.67481		-10.17397	0.00000
	EMPBI7	0.51975	0.05208	0.57522	9.97911	0.00000
	CBPTE55	0.11623	0.02477	0.09890	4.69214	0.00009
	CBPTE31	0.16637	0.04488	0.18155	3.70671	0.00110
	W11	0.17333	0.04952	0.16808	3.50018	0.00184
5	(Constant)	-6.71460	0.61717		-10.87959	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03124	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36356	0.00023
	CBPTE31	0.18666	0.04168	0.20368	4.47848	0.00017
	W11	0.18060	0.04516	0.17513	3.99891	0.00056
	EMPBI15	0.04300	0.01758	0.06669	2.44566	0.02253
6	(Constant)	-6.42023	0.56964		-11.27070	0.00000
	EMPBI7	0.45254	0.05039	0.50083	8.98105	0.00000
	CBPTE55	0.05254	0.02885	0.04471	1.82149	0.08216
	CBPTE31	0.18472	0.03764	0.20157	4.90752	0.00007
	W11	0.16091	0.04154	0.15604	3.87408	0.00082
	EMPBI15	0.04848	0.01603	0.07518	3.02453	0.00623
	CBPTE95	0.08554	0.03432	0.05447	2.49231	0.02071
7	(Constant)	-6.43332	0.51629		-12.46061	0.00000
	EMPBI7	0.39589	0.05138	0.43814	7.70473	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19711	0.24460
	CBPTE31	0.16848	0.03478	0.18385	4.84479	0.00009
	W11	0.14404	0.03829	0.13967	3.76157	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26260	0.00372
	CBPTE95	0.08092	0.03117	0.05153	2.59647	0.01685
	EMPBI19	0.12116	0.05038	0.11574	2.40504	0.02547
8	(Constant)	-6.53242	0.51460		-12.69406	0.00000
	EMPBI7	0.38150	0.05045	0.42221	7.56257	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78251	0.00009
	W11	0.14876	0.03846	0.14425	3.86776	0.00083
	EMPBI15	0.05186	0.01419	0.08044	3.65566	0.00139
	CBPTE95	0.10453	0.02437	0.06656	4.28936	0.00030
	EMPBI19	0.13923	0.04854	0.13299	2.86853	0.00893
a	Dependent Variable: CFS2A11					

Figure E-1-29: Continued

Regression (CFS2A12)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10000
5	0.99877	0.99754	0.99700	0.09100
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.2508	1	76.25076	1876.51967	0.00000
	Residual	1.0971	27	0.04063		
	Total	77.3479	28			
2	Regression	76.7912	2	38.39558	1793.12228	0.00000
	Residual	0.5567	26	0.02141		
	Total	77.3479	28			
3	Regression	76.9854	3	25.66179	1769.75153	0.00000
	Residual	0.3625	25	0.01450		
	Total	77.3479	28			
4	Regression	77.1079	4	19.27697	1927.80275	0.00000
	Residual	0.2400	24	0.01000		
	Total	77.3479	28			
5	Regression	77.1574	5	15.43149	1863.62128	0.00000
	Residual	0.1904	23	0.00828		
	Total	77.3479	28			
6	Regression	77.1994	6	12.86656	1905.92858	0.00000
	Residual	0.1485	22	0.00675		
	Total	77.3479	28			
7	Regression	77.2314	7	11.03306	1989.86861	0.00000
	Residual	0.1164	21	0.00554		
	Total	77.3479	28			
8	Regression	77.2235	6	12.87058	2276.38823	0.00000
	Residual	0.1244	22	0.00565		
	Total	77.3479	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A12

Figure E-1-30: Commodity Flow Attraction for Commodity Item 12 (CFS2A12)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.23751	0.15041		-21.52511	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31881	0.00000
2	(Constant)	-2.68027	0.15564		-17.22062	0.00000
	EMPBI7	0.79573	0.02517	0.88065	31.61500	0.00000
	CBPTE55	0.16445	0.03273	0.13994	5.02364	0.00003
3	(Constant)	-1.98734	0.22859		-8.69409	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62856	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60490	0.00001
	CBPTE31	0.19459	0.05317	0.21233	3.65986	0.00118
4	(Constant)	-4.25388	0.67477		-6.30423	0.00000
	EMPBI7	0.51976	0.05208	0.57523	9.97991	0.00000
	CBPTE55	0.11623	0.02477	0.09890	4.69244	0.00009
	CBPTE31	0.16637	0.04488	0.18154	3.70676	0.00110
	W11	0.17333	0.04952	0.16808	3.50036	0.00184
5	(Constant)	-4.10301	0.61712		-6.64862	0.00000
	EMPBI7	0.44789	0.05576	0.49569	8.03205	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36394	0.00023
	CBPTE31	0.18665	0.04168	0.20367	4.47867	0.00017
	W11	0.18060	0.04516	0.17513	3.99922	0.00056
	EMPBI15	0.04301	0.01758	0.06670	2.44594	0.02252
6	(Constant)	-3.80867	0.56959		-6.68662	0.00000
	EMPBI7	0.45255	0.05038	0.50084	8.98189	0.00000
	CBPTE55	0.05255	0.02884	0.04472	1.82182	0.08211
	CBPTE31	0.18472	0.03764	0.20156	4.90771	0.00007
	W11	0.16091	0.04153	0.15604	3.87440	0.00082
	EMPBI15	0.04848	0.01603	0.07518	3.02480	0.00623
	CBPTE95	0.08553	0.03432	0.05446	2.49223	0.02072
7	(Constant)	-3.82176	0.51624		-7.40313	0.00000
	EMPBI7	0.39590	0.05138	0.43815	7.70567	0.00000
	CBPTE55	0.03281	0.02740	0.02792	1.19741	0.24449
	CBPTE31	0.16848	0.03477	0.18384	4.84510	0.00009
	W11	0.14404	0.03829	0.13967	3.76198	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26300	0.00372
	CBPTE95	0.08091	0.03116	0.05152	2.59645	0.01685
	EMPBI19	0.12117	0.05037	0.11574	2.40540	0.02545
8	(Constant)	-3.92087	0.51456		-7.61991	0.00000
	EMPBI7	0.38150	0.05044	0.42221	7.56333	0.00000
	CBPTE31	0.16792	0.03511	0.18324	4.78273	0.00009
	W11	0.14876	0.03846	0.14425	3.86814	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65608	0.00139
	CBPTE95	0.10452	0.02437	0.06655	4.28951	0.00030
	EMPBI19	0.13923	0.04853	0.13300	2.86895	0.00892
a	Dependent Variable: CFS2A12					

Figure E-1-30: Continued

Regression (CFS2A13)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10000
5	0.99877	0.99754	0.99700	0.09100
6	0.99904	0.99808	0.99756	0.08217
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25069	1	76.25069	1876.42976	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34787	28			
2	Regression	76.79109	2	38.39554	1792.96368	0.00000
	Residual	0.55678	26	0.02141		
	Total	77.34787	28			
3	Regression	76.98533	3	25.66178	1769.59410	0.00000
	Residual	0.36254	25	0.01450		
	Total	77.34787	28			
4	Regression	77.10785	4	19.27696	1927.56346	0.00000
	Residual	0.24002	24	0.01000		
	Total	77.34787	28			
5	Regression	77.15739	5	15.43148	1863.30393	0.00000
	Residual	0.19048	23	0.00828		
	Total	77.34787	28			
6	Regression	77.19933	6	12.86655	1905.63068	0.00000
	Residual	0.14854	22	0.00675		
	Total	77.34787	28			
7	Regression	77.23140	7	11.03306	1989.42968	0.00000
	Residual	0.11646	21	0.00555		
	Total	77.34787	28			
8	Regression	77.22346	6	12.87058	2275.95958	0.00000
	Residual	0.12441	22	0.00566		
	Total	77.34787	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A13

Figure E-1-31: Commodity Flow Attraction for Commodity Item 13 (CFS2A13)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.47431	0.15041		-23.09898	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31778	0.00000
2	(Constant)	-2.91707	0.15565		-18.74122	0.00000
	EMPBI7	0.79573	0.02517	0.88065	31.61359	0.00000
	CBPTE55	0.16445	0.03274	0.13994	5.02344	0.00003
3	(Constant)	-2.22411	0.22860		-9.72946	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62789	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60465	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65986	0.00118
4	(Constant)	-4.49067	0.67481		-6.65474	0.00000
	EMPBI7	0.51975	0.05208	0.57522	9.97911	0.00000
	CBPTE55	0.11623	0.02477	0.09890	4.69214	0.00009
	CBPTE31	0.16637	0.04488	0.18155	3.70671	0.00110
	W11	0.17333	0.04952	0.16808	3.50018	0.00184
5	(Constant)	-4.33980	0.61717		-7.03173	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03124	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36356	0.00023
	CBPTE31	0.18666	0.04168	0.20368	4.47848	0.00017
	W11	0.18060	0.04516	0.17513	3.99891	0.00056
	EMPBI15	0.04300	0.01758	0.06669	2.44566	0.02253
6	(Constant)	-4.04543	0.56964		-7.10174	0.00000
	EMPBI7	0.45254	0.05039	0.50083	8.98105	0.00000
	CBPTE55	0.05254	0.02885	0.04471	1.82149	0.08216
	CBPTE31	0.18472	0.03764	0.20157	4.90752	0.00007
	W11	0.16091	0.04154	0.15604	3.87408	0.00082
	EMPBI15	0.04848	0.01603	0.07518	3.02453	0.00623
	CBPTE95	0.08554	0.03432	0.05447	2.49231	0.02071
7	(Constant)	-4.05852	0.51629		-7.86090	0.00000
	EMPBI7	0.39589	0.05138	0.43814	7.70473	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19711	0.24460
	CBPTE31	0.16848	0.03478	0.18385	4.84479	0.00009
	W11	0.14404	0.03829	0.13967	3.76157	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26260	0.00372
	CBPTE95	0.08092	0.03117	0.05153	2.59647	0.01685
	EMPBI19	0.12116	0.05038	0.11574	2.40504	0.02547
8	(Constant)	-4.15762	0.51460		-8.07926	0.00000
	EMPBI7	0.38150	0.05045	0.42221	7.56257	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78251	0.00009
	W11	0.14876	0.03846	0.14425	3.86776	0.00083
	EMPBI15	0.05186	0.01419	0.08044	3.65566	0.00139
	CBPTE95	0.10453	0.02437	0.06656	4.28936	0.00030
	EMPBI19	0.13923	0.04854	0.13299	2.86853	0.00893
a	Dependent Variable: CFS2A13					

Figure E-1-31: Continued

Regression (CFS2A14)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09098
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25127	1	76.25127	1876.61228	0.00000
	Residual	1.09707	27	0.04063		
	Total	77.34834	28			
2	Regression	76.79165	2	38.39582	1793.25126	0.00000
	Residual	0.55669	26	0.02141		
	Total	77.34834	28			
3	Regression	76.98590	3	25.66197	1770.05235	0.00000
	Residual	0.36245	25	0.01450		
	Total	77.34834	28			
4	Regression	77.10838	4	19.27710	1928.03382	0.00000
	Residual	0.23996	24	0.01000		
	Total	77.34834	28			
5	Regression	77.15794	5	15.43159	1864.12712	0.00000
	Residual	0.19040	23	0.00828		
	Total	77.34834	28			
6	Regression	77.19984	6	12.86664	1906.10950	0.00000
	Residual	0.14850	22	0.00675		
	Total	77.34834	28			
7	Regression	77.23190	7	11.03313	1989.83697	0.00000
	Residual	0.11644	21	0.00554		
	Total	77.34834	28			
8	Regression	77.22394	6	12.87066	2276.12725	0.00000
	Residual	0.12440	22	0.00565		
	Total	77.34834	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A14

Figure E-1-32: Commodity Flow Attraction for Commodity Item 14 (CFS2A14)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.49721	0.15040		-36.54991	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31988	0.00000
2	(Constant)	-4.93998	0.15564		-31.74017	0.00000
	EMPBI7	0.79574	0.02517	0.88065	31.61619	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02376	0.00003
3	(Constant)	-4.24701	0.22857		-18.58105	0.00000
	EMPBI7	0.61696	0.05305	0.68280	11.62939	0.00000
	CBPTE55	0.15215	0.02714	0.12947	5.60527	0.00001
	CBPTE31	0.19460	0.05316	0.21234	3.66037	0.00118
4	(Constant)	-6.51326	0.67473		-9.65316	0.00000
	EMPBI7	0.51976	0.05208	0.57523	9.98059	0.00000
	CBPTE55	0.11623	0.02477	0.09891	4.69281	0.00009
	CBPTE31	0.16638	0.04488	0.18155	3.70730	0.00110
	W11	0.17330	0.04951	0.16806	3.50011	0.00184
5	(Constant)	-6.36234	0.61704		-10.31107	0.00000
	EMPBI7	0.44788	0.05576	0.49567	8.03293	0.00000
	CBPTE55	0.10171	0.02330	0.08655	4.36447	0.00023
	CBPTE31	0.18667	0.04167	0.20369	4.47974	0.00017
	W11	0.18058	0.04515	0.17511	3.99928	0.00056
	EMPBI15	0.04302	0.01758	0.06671	2.44683	0.02247
6	(Constant)	-6.06814	0.56957		-10.65390	0.00000
	EMPBI7	0.45253	0.05038	0.50082	8.98204	0.00000
	CBPTE55	0.05257	0.02884	0.04474	1.82262	0.08198
	CBPTE31	0.18474	0.03764	0.20158	4.90848	0.00007
	W11	0.16090	0.04153	0.15603	3.87428	0.00082
	EMPBI15	0.04849	0.01603	0.07520	3.02541	0.00622
	CBPTE95	0.08550	0.03432	0.05444	2.49124	0.02076
7	(Constant)	-6.08123	0.51624		-11.77981	0.00000
	EMPBI7	0.39590	0.05138	0.43815	7.70561	0.00000
	CBPTE55	0.03283	0.02740	0.02794	1.19834	0.24414
	CBPTE31	0.16850	0.03477	0.18386	4.84575	0.00009
	W11	0.14403	0.03829	0.13967	3.76173	0.00115
	EMPBI15	0.04742	0.01453	0.07355	3.26350	0.00371
	CBPTE95	0.08087	0.03116	0.05150	2.59524	0.01689
	EMPBI19	0.12114	0.05037	0.11571	2.40478	0.02549
8	(Constant)	-6.18042	0.51459		-12.01044	0.00000
	EMPBI7	0.38149	0.05044	0.42220	7.56268	0.00000
	CBPTE31	0.16795	0.03511	0.18326	4.78313	0.00009
	W11	0.14876	0.03846	0.14425	3.86779	0.00083
	EMPBI15	0.05188	0.01419	0.08045	3.65666	0.00139
	CBPTE95	0.10450	0.02437	0.06654	4.28850	0.00030
	EMPBI19	0.13922	0.04853	0.13298	2.86846	0.00893
a	Dependent Variable: CFS2A14					

Figure E-1-32: Continued

Regression (CFS2A15)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25005	1	76.25005	1876.62996	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34710	28			
2	Regression	76.79035	2	38.39517	1793.01885	0.00000
	Residual	0.55676	26	0.02141		
	Total	77.34710	28			
3	Regression	76.98457	3	25.66152	1769.58828	0.00000
	Residual	0.36254	25	0.01450		
	Total	77.34710	28			
4	Regression	77.10705	4	19.27676	1927.29247	0.00000
	Residual	0.24005	24	0.01000		
	Total	77.34710	28			
5	Regression	77.15660	5	15.43132	1863.11243	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34710	28			
6	Regression	77.19852	6	12.86642	1905.12643	0.00000
	Residual	0.14858	22	0.00675		
	Total	77.34710	28			
7	Regression	77.23062	7	11.03295	1989.01414	0.00000
	Residual	0.11649	21	0.00555		
	Total	77.34710	28			
8	Regression	77.22267	6	12.87045	2275.55662	0.00000
	Residual	0.12443	22	0.00566		
	Total	77.34710	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A15

Figure E-1-33: Commodity Flow Attraction for Commodity Item 15 (CFS2A15)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.14602	0.15040		-7.61977	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32009	0.00000
2	(Constant)	-0.58884	0.15565		-3.78316	0.00082
	EMPBI7	0.79574	0.02517	0.88066	31.61446	0.00000
	CBPTE55	0.16443	0.03274	0.13992	5.02305	0.00003
3	(Constant)	0.10409	0.22859		0.45533	0.65280
	EMPBI7	0.61697	0.05306	0.68282	11.62822	0.00000
	CBPTE55	0.15214	0.02715	0.12946	5.60411	0.00001
	CBPTE31	0.19459	0.05317	0.21233	3.65968	0.00118
4	(Constant)	-2.16216	0.67485		-3.20391	0.00380
	EMPBI7	0.51978	0.05209	0.57525	9.97901	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69142	0.00009
	CBPTE31	0.16637	0.04489	0.18154	3.70633	0.00110
	W11	0.17331	0.04952	0.16806	3.49947	0.00184
5	(Constant)	-2.01127	0.61720		-3.25869	0.00346
	EMPBI7	0.44790	0.05577	0.49570	8.03120	0.00000
	CBPTE55	0.10170	0.02331	0.08654	4.36284	0.00023
	CBPTE31	0.18666	0.04168	0.20368	4.47819	0.00017
	W11	0.18057	0.04516	0.17511	3.99822	0.00057
	EMPBI15	0.04301	0.01758	0.06670	2.44589	0.02252
6	(Constant)	-1.71697	0.56971		-3.01375	0.00639
	EMPBI7	0.45256	0.05039	0.50085	8.98026	0.00000
	CBPTE55	0.05254	0.02885	0.04471	1.82124	0.08220
	CBPTE31	0.18472	0.03765	0.20157	4.90682	0.00007
	W11	0.16089	0.04154	0.15602	3.87315	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02443	0.00623
	CBPTE95	0.08552	0.03433	0.05446	2.49140	0.02075
7	(Constant)	-1.73006	0.51634		-3.35061	0.00303
	EMPBI7	0.39590	0.05139	0.43815	7.70406	0.00000
	CBPTE55	0.03280	0.02741	0.02791	1.19681	0.24472
	CBPTE31	0.16848	0.03478	0.18384	4.84412	0.00009
	W11	0.14402	0.03830	0.13965	3.76062	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26258	0.00372
	CBPTE95	0.08090	0.03117	0.05151	2.59552	0.01688
	EMPBI19	0.12119	0.05038	0.11576	2.40535	0.02546
8	(Constant)	-1.82915	0.51465		-3.55418	0.00178
	EMPBI7	0.38150	0.05045	0.42222	7.56207	0.00000
	CBPTE31	0.16792	0.03512	0.18324	4.78193	0.00009
	W11	0.14874	0.03846	0.14423	3.86685	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65561	0.00139
	CBPTE95	0.10450	0.02437	0.06654	4.28797	0.00030
	EMPBI19	0.13925	0.04854	0.13302	2.86881	0.00892
a	Dependent Variable: CFS2A15					

Figure E-1-33: Continued

Regression (CFS2A17)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10000
5	0.99877	0.99754	0.99700	0.09100
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25076	1	76.25076	1876.51967	0.00000
	Residual	1.09712	27	0.04063		
	Total	77.34788	28			
2	Regression	76.79115	2	38.39558	1793.12228	0.00000
	Residual	0.55673	26	0.02141		
	Total	77.34788	28			
3	Regression	76.98538	3	25.66179	1769.75153	0.00000
	Residual	0.36251	25	0.01450		
	Total	77.34788	28			
4	Regression	77.10790	4	19.27697	1927.80275	0.00000
	Residual	0.23999	24	0.01000		
	Total	77.34788	28			
5	Regression	77.15744	5	15.43149	1863.62128	0.00000
	Residual	0.19045	23	0.00828		
	Total	77.34788	28			
6	Regression	77.19937	6	12.86656	1905.92858	0.00000
	Residual	0.14852	22	0.00675		
	Total	77.34788	28			
7	Regression	77.23145	7	11.03306	1989.86861	0.00000
	Residual	0.11644	21	0.00554		
	Total	77.34788	28			
8	Regression	77.22350	6	12.87058	2276.38823	0.00000
	Residual	0.12439	22	0.00565		
	Total	77.34788	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A17

Figure E-1-34: Commodity Flow Attraction for Commodity Item 17 (CFS2A17)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.11201	0.15041		-14.04204	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31881	0.00000
2	(Constant)	-1.55477	0.15564		-9.98934	0.00000
	EMPBI7	0.79573	0.02517	0.88065	31.61500	0.00000
	CBPTE55	0.16445	0.03273	0.13994	5.02364	0.00003
3	(Constant)	-0.86184	0.22859		-3.77033	0.00089
	EMPBI7	0.61696	0.05306	0.68280	11.62856	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60490	0.00001
	CBPTE31	0.19459	0.05317	0.21233	3.65986	0.00118
4	(Constant)	-3.12838	0.67477		-4.63625	0.00010
	EMPBI7	0.51976	0.05208	0.57523	9.97991	0.00000
	CBPTE55	0.11623	0.02477	0.09890	4.69244	0.00009
	CBPTE31	0.16637	0.04488	0.18154	3.70676	0.00110
	W11	0.17333	0.04952	0.16808	3.50036	0.00184
5	(Constant)	-2.97751	0.61712		-4.82483	0.00007
	EMPBI7	0.44789	0.05576	0.49569	8.03205	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36394	0.00023
	CBPTE31	0.18665	0.04168	0.20367	4.47867	0.00017
	W11	0.18060	0.04516	0.17513	3.99922	0.00056
	EMPBI15	0.04301	0.01758	0.06670	2.44594	0.02252
6	(Constant)	-2.68317	0.56959		-4.71066	0.00011
	EMPBI7	0.45255	0.05038	0.50084	8.98189	0.00000
	CBPTE55	0.05255	0.02884	0.04472	1.82182	0.08211
	CBPTE31	0.18472	0.03764	0.20156	4.90771	0.00007
	W11	0.16091	0.04153	0.15604	3.87440	0.00082
	EMPBI15	0.04848	0.01603	0.07518	3.02480	0.00623
	CBPTE95	0.08553	0.03432	0.05446	2.49223	0.02072
7	(Constant)	-2.69626	0.51624		-5.22292	0.00004
	EMPBI7	0.39590	0.05138	0.43815	7.70567	0.00000
	CBPTE55	0.03281	0.02740	0.02792	1.19741	0.24449
	CBPTE31	0.16848	0.03477	0.18384	4.84510	0.00009
	W11	0.14404	0.03829	0.13967	3.76198	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26300	0.00372
	CBPTE95	0.08091	0.03116	0.05152	2.59645	0.01685
	EMPBI19	0.12117	0.05037	0.11574	2.40540	0.02545
8	(Constant)	-2.79537	0.51456		-5.43259	0.00002
	EMPBI7	0.38150	0.05044	0.42221	7.56333	0.00000
	CBPTE31	0.16792	0.03511	0.18324	4.78273	0.00009
	W11	0.14876	0.03846	0.14425	3.86814	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65608	0.00139
	CBPTE95	0.10452	0.02437	0.06655	4.28951	0.00030
	EMPBI19	0.13923	0.04853	0.13300	2.86895	0.00892
a	Dependent Variable: CFS2A17					

Figure E-1-34: Continued

Regression (CFS2A18)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10000
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08217
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7
b Predictors: (Constant), EMPBI7, CBPTE55
c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31
d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11
e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15
f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95
g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25087	1	76.25087	1876.61051	0.00000
	Residual	1.09707	27	0.04063		
	Total	77.34794	28			
2	Regression	76.79122	2	38.39561	1793.15880	0.00000
	Residual	0.55672	26	0.02141		
	Total	77.34794	28			
3	Regression	76.98543	3	25.66181	1769.73705	0.00000
	Residual	0.36251	25	0.01450		
	Total	77.34794	28			
4	Regression	77.10794	4	19.27698	1927.65911	0.00000
	Residual	0.24000	24	0.01000		
	Total	77.34794	28			
5	Regression	77.15746	5	15.43149	1863.27408	0.00000
	Residual	0.19048	23	0.00828		
	Total	77.34794	28			
6	Regression	77.19940	6	12.86657	1905.57756	0.00000
	Residual	0.14855	22	0.00675		
	Total	77.34794	28			
7	Regression	77.23148	7	11.03307	1989.39440	0.00000
	Residual	0.11646	21	0.00555		
	Total	77.34794	28			
8	Regression	77.22353	6	12.87059	2275.93068	0.00000
	Residual	0.12441	22	0.00566		
	Total	77.34794	28			

a Predictors: (Constant), EMPBI7
b Predictors: (Constant), EMPBI7, CBPTE55
c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31
d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11
e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15
f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95
g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
i Dependent Variable: CFS2A18

Figure E-1-35: Commodity Flow Attraction for Commodity Item 18 (CFS2A18)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.60483	0.15040		-10.67021	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31986	0.00000
2	(Constant)	-1.04761	0.15564		-6.73092	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61548	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02350	0.00003
3	(Constant)	-0.35471	0.22859		-1.55174	0.13329
	EMPBI7	0.61697	0.05306	0.68282	11.62872	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60466	0.00001
	CBPTE31	0.19458	0.05317	0.21232	3.65971	0.00118
4	(Constant)	-2.62111	0.67479		-3.88433	0.00071
	EMPBI7	0.51977	0.05208	0.57524	9.97986	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69212	0.00009
	CBPTE31	0.16636	0.04488	0.18153	3.70650	0.00110
	W11	0.17332	0.04952	0.16807	3.50002	0.00184
5	(Constant)	-2.47026	0.61718		-4.00250	0.00056
	EMPBI7	0.44792	0.05577	0.49572	8.03183	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36348	0.00023
	CBPTE31	0.18664	0.04168	0.20366	4.47804	0.00017
	W11	0.18058	0.04516	0.17512	3.99858	0.00056
	EMPBI15	0.04300	0.01758	0.06668	2.44527	0.02255
6	(Constant)	-2.17589	0.56965		-3.81972	0.00094
	EMPBI7	0.45258	0.05039	0.50087	8.98166	0.00000
	CBPTE55	0.05254	0.02885	0.04471	1.82145	0.08217
	CBPTE31	0.18471	0.03764	0.20155	4.90701	0.00007
	W11	0.16090	0.04154	0.15603	3.87371	0.00082
	EMPBI15	0.04847	0.01603	0.07517	3.02408	0.00624
	CBPTE95	0.08554	0.03432	0.05447	2.49225	0.02071
7	(Constant)	-2.18899	0.51630		-4.23978	0.00037
	EMPBI7	0.39593	0.05138	0.43818	7.70534	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19706	0.24462
	CBPTE31	0.16847	0.03478	0.18383	4.84426	0.00009
	W11	0.14402	0.03829	0.13966	3.76118	0.00115
	EMPBI15	0.04741	0.01453	0.07353	3.26212	0.00372
	CBPTE95	0.08092	0.03117	0.05153	2.59641	0.01685
	EMPBI19	0.12117	0.05038	0.11574	2.40510	0.02547
8	(Constant)	-2.28808	0.51461		-4.44626	0.00020
	EMPBI7	0.38153	0.05045	0.42225	7.56322	0.00000
	CBPTE31	0.16791	0.03511	0.18323	4.78200	0.00009
	W11	0.14875	0.03846	0.14424	3.86738	0.00083
	EMPBI15	0.05186	0.01419	0.08042	3.65516	0.00139
	CBPTE95	0.10453	0.02437	0.06656	4.28925	0.00030
	EMPBI19	0.13923	0.04854	0.13299	2.86858	0.00893
a	Dependent Variable: CFS2A18					

Figure E-1-35: Continued

Regression (CFS2A19)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25053	1	76.25053	1876.46565	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34768	28			
2	Regression	76.79088	2	38.39544	1792.89628	0.00000
	Residual	0.55680	26	0.02142		
	Total	77.34768	28			
3	Regression	76.98513	3	25.66171	1769.51257	0.00000
	Residual	0.36255	25	0.01450		
	Total	77.34768	28			
4	Regression	77.10762	4	19.27691	1927.22058	0.00000
	Residual	0.24006	24	0.01000		
	Total	77.34768	28			
5	Regression	77.15718	5	15.43144	1863.06543	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34768	28			
6	Regression	77.19911	6	12.86652	1905.22425	0.00000
	Residual	0.14857	22	0.00675		
	Total	77.34768	28			
7	Regression	77.23119	7	11.03303	1988.87848	0.00000
	Residual	0.11649	21	0.00555		
	Total	77.34768	28			
8	Regression	77.22324	6	12.87054	2275.37671	0.00000
	Residual	0.12444	22	0.00566		
	Total	77.34768	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A19

Figure E-1-36: Commodity Flow Attraction for Commodity Item 19 (CFS2A19)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.68943	0.15041		-24.52950	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31819	0.00000
2	(Constant)	-3.13222	0.15565		-20.12311	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61316	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02315	0.00003
3	(Constant)	-2.43925	0.22860		-10.67037	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62767	0.00000
	CBPTE55	0.15214	0.02715	0.12947	5.60428	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65981	0.00118
4	(Constant)	-4.70557	0.67487		-6.97259	0.00000
	EMPBI7	0.51976	0.05209	0.57523	9.97847	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69161	0.00009
	CBPTE31	0.16638	0.04489	0.18155	3.70649	0.00110
	W11	0.17331	0.04952	0.16806	3.49950	0.00184
5	(Constant)	-4.55467	0.61721		-7.37942	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03071	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36306	0.00023
	CBPTE31	0.18667	0.04168	0.20369	4.47840	0.00017
	W11	0.18058	0.04516	0.17511	3.99828	0.00056
	EMPBI15	0.04301	0.01759	0.06671	2.44596	0.02251
6	(Constant)	-4.26032	0.56970		-7.47820	0.00000
	EMPBI7	0.45254	0.05039	0.50083	8.98007	0.00000
	CBPTE55	0.05254	0.02885	0.04471	1.82126	0.08220
	CBPTE31	0.18473	0.03765	0.20158	4.90724	0.00007
	W11	0.16090	0.04154	0.15602	3.87330	0.00082
	EMPBI15	0.04849	0.01603	0.07519	3.02467	0.00623
	CBPTE95	0.08553	0.03433	0.05446	2.49183	0.02073
7	(Constant)	-4.27342	0.51636		-8.27599	0.00000
	EMPBI7	0.39589	0.05139	0.43814	7.70365	0.00000
	CBPTE55	0.03280	0.02741	0.02791	1.19692	0.24468
	CBPTE31	0.16849	0.03478	0.18386	4.84439	0.00009
	W11	0.14402	0.03830	0.13966	3.76065	0.00115
	EMPBI15	0.04742	0.01454	0.07355	3.26266	0.00372
	CBPTE95	0.08091	0.03117	0.05152	2.59587	0.01687
	EMPBI19	0.12116	0.05038	0.11573	2.40468	0.02549
8	(Constant)	-4.37251	0.51467		-8.49577	0.00000
	EMPBI7	0.38150	0.05045	0.42221	7.56160	0.00000
	CBPTE31	0.16794	0.03512	0.18325	4.78216	0.00009
	W11	0.14874	0.03847	0.14424	3.86687	0.00083
	EMPBI15	0.05187	0.01419	0.08045	3.65571	0.00139
	CBPTE95	0.10452	0.02437	0.06655	4.28848	0.00030
	EMPBI19	0.13922	0.04854	0.13299	2.86813	0.00893
a	Dependent Variable: CFS2A19					

Figure E-1-36: Continued

Regression (CFS2A21)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25013	1	76.25013	1876.51813	0.00000
	Residual	1.09711	27	0.04063		
	Total	77.34724	28			
2	Regression	76.79046	2	38.39523	1792.95717	0.00000
	Residual	0.55678	26	0.02141		
	Total	77.34724	28			
3	Regression	76.98471	3	25.66157	1769.62415	0.00000
	Residual	0.36253	25	0.01450		
	Total	77.34724	28			
4	Regression	77.10720	4	19.27680	1927.34353	0.00000
	Residual	0.24004	24	0.01000		
	Total	77.34724	28			
5	Regression	77.15675	5	15.43135	1863.16766	0.00000
	Residual	0.19049	23	0.00828		
	Total	77.34724	28			
6	Regression	77.19867	6	12.86645	1905.30775	0.00000
	Residual	0.14856	22	0.00675		
	Total	77.34724	28			
7	Regression	77.23077	7	11.03297	1989.31745	0.00000
	Residual	0.11647	21	0.00555		
	Total	77.34724	28			
8	Regression	77.22282	6	12.87047	2275.87937	0.00000
	Residual	0.12441	22	0.00566		
	Total	77.34724	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A21

Figure E-1-37: Commodity Flow Attraction for Commodity Item 21 (CFS2A21)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.03134	0.15041		-33.45178	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31880	0.00000
2	(Constant)	-4.47413	0.15565		-28.74484	0.00000
	EMPBI7	0.79573	0.02517	0.88066	31.61374	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02318	0.00003
3	(Constant)	-3.78115	0.22859		-16.54101	0.00000
	EMPBI7	0.61695	0.05306	0.68280	11.62802	0.00000
	CBPTE55	0.15214	0.02715	0.12947	5.60439	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65996	0.00118
4	(Constant)	-6.04740	0.67484		-8.96118	0.00000
	EMPBI7	0.51976	0.05209	0.57523	9.97883	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69173	0.00009
	CBPTE31	0.16638	0.04489	0.18155	3.70668	0.00110
	W11	0.17330	0.04952	0.16806	3.49950	0.00184
5	(Constant)	-5.89651	0.61719		-9.55373	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03104	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36317	0.00023
	CBPTE31	0.18667	0.04168	0.20369	4.47857	0.00017
	W11	0.18057	0.04516	0.17511	3.99826	0.00056
	EMPBI15	0.04301	0.01758	0.06670	2.44590	0.02252
6	(Constant)	-5.60217	0.56969		-9.83381	0.00000
	EMPBI7	0.45254	0.05039	0.50084	8.98038	0.00000
	CBPTE55	0.05255	0.02885	0.04471	1.82137	0.08218
	CBPTE31	0.18473	0.03764	0.20158	4.90740	0.00007
	W11	0.16089	0.04154	0.15602	3.87327	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02459	0.00623
	CBPTE95	0.08553	0.03433	0.05446	2.49177	0.02074
7	(Constant)	-5.61527	0.51631		-10.87588	0.00000
	EMPBI7	0.39588	0.05138	0.43813	7.70428	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19691	0.24468
	CBPTE31	0.16849	0.03478	0.18385	4.84484	0.00009
	W11	0.14401	0.03829	0.13965	3.76081	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26284	0.00372
	CBPTE95	0.08091	0.03117	0.05152	2.59599	0.01686
	EMPBI19	0.12120	0.05038	0.11577	2.40567	0.02544
8	(Constant)	-5.71436	0.51461		-11.10422	0.00000
	EMPBI7	0.38149	0.05045	0.42220	7.56224	0.00000
	CBPTE31	0.16794	0.03511	0.18325	4.78261	0.00009
	W11	0.14873	0.03846	0.14423	3.86703	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65589	0.00139
	CBPTE95	0.10451	0.02437	0.06655	4.28863	0.00030
	EMPBI19	0.13926	0.04854	0.13302	2.86915	0.00891
a	Dependent Variable: CFS2A21					

Figure E-1-37: Continued

Regression (CFS2A23)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09098
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25127	1	76.25127	1876.61228	0.00000
	Residual	1.09707	27	0.04063		
	Total	77.34834	28			
2	Regression	76.79165	2	38.39582	1793.25126	0.00000
	Residual	0.55669	26	0.02141		
	Total	77.34834	28			
3	Regression	76.98590	3	25.66197	1770.05235	0.00000
	Residual	0.36245	25	0.01450		
	Total	77.34834	28			
4	Regression	77.10838	4	19.27710	1928.03382	0.00000
	Residual	0.23996	24	0.01000		
	Total	77.34834	28			
5	Regression	77.15794	5	15.43159	1864.12712	0.00000
	Residual	0.19040	23	0.00828		
	Total	77.34834	28			
6	Regression	77.19984	6	12.86664	1906.10950	0.00000
	Residual	0.14850	22	0.00675		
	Total	77.34834	28			
7	Regression	77.23190	7	11.03313	1989.83697	0.00000
	Residual	0.11644	21	0.00554		
	Total	77.34834	28			
8	Regression	77.22394	6	12.87066	2276.12725	0.00000
	Residual	0.12440	22	0.00565		
	Total	77.34834	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A23

Figure E-1-38: Commodity Flow Attraction for Commodity Item 23 (CFS2A23)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.57031	0.15040		-30.38713	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31988	0.00000
2	(Constant)	-4.01308	0.15564		-25.78469	0.00000
	EMPBI7	0.79574	0.02517	0.88065	31.61619	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02376	0.00003
3	(Constant)	-3.32011	0.22857		-14.52578	0.00000
	EMPBI7	0.61696	0.05305	0.68280	11.62939	0.00000
	CBPTE55	0.15215	0.02714	0.12947	5.60527	0.00001
	CBPTE31	0.19460	0.05316	0.21234	3.66037	0.00118
4	(Constant)	-5.58636	0.67473		-8.27942	0.00000
	EMPBI7	0.51976	0.05208	0.57523	9.98059	0.00000
	CBPTE55	0.11623	0.02477	0.09891	4.69281	0.00009
	CBPTE31	0.16638	0.04488	0.18155	3.70730	0.00110
	W11	0.17330	0.04951	0.16806	3.50011	0.00184
5	(Constant)	-5.43544	0.61704		-8.80890	0.00000
	EMPBI7	0.44788	0.05576	0.49567	8.03293	0.00000
	CBPTE55	0.10171	0.02330	0.08655	4.36447	0.00023
	CBPTE31	0.18667	0.04167	0.20369	4.47974	0.00017
	W11	0.18058	0.04515	0.17511	3.99928	0.00056
	EMPBI15	0.04302	0.01758	0.06671	2.44683	0.02247
6	(Constant)	-5.14124	0.56957		-9.02653	0.00000
	EMPBI7	0.45253	0.05038	0.50082	8.98204	0.00000
	CBPTE55	0.05257	0.02884	0.04474	1.82262	0.08198
	CBPTE31	0.18474	0.03764	0.20158	4.90848	0.00007
	W11	0.16090	0.04153	0.15603	3.87428	0.00082
	EMPBI15	0.04849	0.01603	0.07520	3.02541	0.00622
	CBPTE95	0.08550	0.03432	0.05444	2.49124	0.02076
7	(Constant)	-5.15433	0.51624		-9.98433	0.00000
	EMPBI7	0.39590	0.05138	0.43815	7.70561	0.00000
	CBPTE55	0.03283	0.02740	0.02794	1.19834	0.24414
	CBPTE31	0.16850	0.03477	0.18386	4.84575	0.00009
	W11	0.14403	0.03829	0.13967	3.76173	0.00115
	EMPBI15	0.04742	0.01453	0.07355	3.26350	0.00371
	CBPTE95	0.08087	0.03116	0.05150	2.59524	0.01689
	EMPBI19	0.12114	0.05037	0.11571	2.40478	0.02549
8	(Constant)	-5.25352	0.51459		-10.20919	0.00000
	EMPBI7	0.38149	0.05044	0.42220	7.56268	0.00000
	CBPTE31	0.16795	0.03511	0.18326	4.78313	0.00009
	W11	0.14876	0.03846	0.14425	3.86779	0.00083
	EMPBI15	0.05188	0.01419	0.08045	3.65666	0.00139
	CBPTE95	0.10450	0.02437	0.06654	4.28850	0.00030
	EMPBI19	0.13922	0.04853	0.13298	2.86846	0.00893
a	Dependent Variable: CFS2A23					

Figure E-1-38: Continued

Regression (CFS2A24)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.24965	1	76.24965	1876.55650	0.00000
	Residual	1.09708	27	0.04063		
	Total	77.34674	28			
2	Regression	76.78997	2	38.39499	1792.97534	0.00000
	Residual	0.55677	26	0.02141		
	Total	77.34674	28			
3	Regression	76.98422	3	25.66141	1769.64575	0.00000
	Residual	0.36252	25	0.01450		
	Total	77.34674	28			
4	Regression	77.10668	4	19.27667	1927.22573	0.00000
	Residual	0.24005	24	0.01000		
	Total	77.34674	28			
5	Regression	77.15623	5	15.43125	1863.06239	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34674	28			
6	Regression	77.19816	6	12.86636	1905.07811	0.00000
	Residual	0.14858	22	0.00675		
	Total	77.34674	28			
7	Regression	77.23025	7	11.03289	1989.00802	0.00000
	Residual	0.11649	21	0.00555		
	Total	77.34674	28			
8	Regression	77.22230	6	12.87038	2275.51246	0.00000
	Residual	0.12443	22	0.00566		
	Total	77.34674	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A24

Figure E-1-39: Commodity Flow Attraction for Commodity Item 24 (CFS2A24)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.60242	0.15040		-30.60046	0.00000
	EMPBI7	0.89713	0.02071	0.99288	43.31924	0.00000
2	(Constant)	-4.04522	0.15565		-25.98947	0.00000
	EMPBI7	0.79573	0.02517	0.88066	31.61397	0.00000
	CBPTE55	0.16443	0.03274	0.13993	5.02313	0.00003
3	(Constant)	-3.35225	0.22859		-14.66488	0.00000
	EMPBI7	0.61695	0.05306	0.68280	11.62813	0.00000
	CBPTE55	0.15214	0.02715	0.12946	5.60433	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65998	0.00118
4	(Constant)	-5.61831	0.67486		-8.32513	0.00000
	EMPBI7	0.51977	0.05209	0.57524	9.97871	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69160	0.00009
	CBPTE31	0.16638	0.04489	0.18156	3.70660	0.00110
	W11	0.17329	0.04952	0.16804	3.49913	0.00185
5	(Constant)	-5.46742	0.61721		-8.85828	0.00000
	EMPBI7	0.44789	0.05577	0.49569	8.03094	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36304	0.00023
	CBPTE31	0.18667	0.04168	0.20369	4.47850	0.00017
	W11	0.18056	0.04516	0.17509	3.99786	0.00057
	EMPBI15	0.04301	0.01759	0.06671	2.44593	0.02252
6	(Constant)	-5.17311	0.56972		-9.08013	0.00000
	EMPBI7	0.45255	0.05040	0.50084	8.97997	0.00000
	CBPTE55	0.05255	0.02885	0.04472	1.82140	0.08217
	CBPTE31	0.18474	0.03765	0.20158	4.90717	0.00007
	W11	0.16088	0.04154	0.15601	3.87276	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02448	0.00623
	CBPTE95	0.08552	0.03433	0.05446	2.49141	0.02075
7	(Constant)	-5.18621	0.51634		-10.04410	0.00000
	EMPBI7	0.39588	0.05139	0.43814	7.70382	0.00000
	CBPTE55	0.03280	0.02741	0.02791	1.19697	0.24466
	CBPTE31	0.16849	0.03478	0.18386	4.84453	0.00009
	W11	0.14400	0.03830	0.13964	3.76022	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26267	0.00372
	CBPTE95	0.08090	0.03117	0.05151	2.59555	0.01688
	EMPBI19	0.12119	0.05038	0.11577	2.40547	0.02545
8	(Constant)	-5.28530	0.51465		-10.26968	0.00000
	EMPBI7	0.38149	0.05045	0.42220	7.56173	0.00000
	CBPTE31	0.16794	0.03512	0.18325	4.78229	0.00009
	W11	0.14872	0.03846	0.14422	3.86643	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65572	0.00139
	CBPTE95	0.10451	0.02437	0.06655	4.28810	0.00030
	EMPBI19	0.13926	0.04854	0.13302	2.86896	0.00892
a	Dependent Variable: CFS2A24					

Figure E-1-39: Continued

Regression (CFS2A26)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09099
6	0.99904	0.99808	0.99756	0.08215
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25084	1	76.25084	1876.64862	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34789	28			
2	Regression	76.79119	2	38.39559	1793.21588	0.00000
	Residual	0.55670	26	0.02141		
	Total	77.34789	28			
3	Regression	76.98540	3	25.66180	1769.84230	0.00000
	Residual	0.36249	25	0.01450		
	Total	77.34789	28			
4	Regression	77.10792	4	19.27698	1927.94801	0.00000
	Residual	0.23997	24	0.01000		
	Total	77.34789	28			
5	Regression	77.15747	5	15.43149	1863.92800	0.00000
	Residual	0.19042	23	0.00828		
	Total	77.34789	28			
6	Regression	77.19941	6	12.86657	1906.39239	0.00000
	Residual	0.14848	22	0.00675		
	Total	77.34789	28			
7	Regression	77.23147	7	11.03307	1990.21829	0.00000
	Residual	0.11642	21	0.00554		
	Total	77.34789	28			
8	Regression	77.22353	6	12.87059	2276.82014	0.00000
	Residual	0.12436	22	0.00565		
	Total	77.34789	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A26

Figure E-1-40: Commodity Flow Attraction for Commodity Item 26 (CFS2A26)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.61621	0.15040		-24.04375	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32030	0.00000
2	(Constant)	-3.05899	0.15564		-19.65438	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61601	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02356	0.00003
3	(Constant)	-2.36608	0.22858		-10.35123	0.00000
	EMPBI7	0.61697	0.05305	0.68282	11.62904	0.00000
	CBPTE55	0.15214	0.02715	0.12947	5.60480	0.00001
	CBPTE31	0.19458	0.05317	0.21233	3.65986	0.00118
4	(Constant)	-4.63262	0.67474		-6.86577	0.00000
	EMPBI7	0.51977	0.05208	0.57524	9.98047	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69236	0.00009
	CBPTE31	0.16636	0.04488	0.18153	3.70678	0.00110
	W11	0.17333	0.04952	0.16808	3.50049	0.00184
5	(Constant)	-4.48172	0.61707		-7.26289	0.00000
	EMPBI7	0.44789	0.05576	0.49569	8.03271	0.00000
	CBPTE55	0.10170	0.02331	0.08655	4.36393	0.00023
	CBPTE31	0.18665	0.04167	0.20367	4.47898	0.00017
	W11	0.18060	0.04515	0.17513	3.99956	0.00056
	EMPBI15	0.04301	0.01758	0.06671	2.44646	0.02249
6	(Constant)	-4.18736	0.56953		-7.35237	0.00000
	EMPBI7	0.45255	0.05038	0.50084	8.98299	0.00000
	CBPTE55	0.05254	0.02884	0.04471	1.82165	0.08213
	CBPTE31	0.18471	0.03763	0.20156	4.90824	0.00007
	W11	0.16091	0.04153	0.15604	3.87486	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02554	0.00622
	CBPTE95	0.08554	0.03432	0.05447	2.49268	0.02070
7	(Constant)	-4.20045	0.51619		-8.13741	0.00000
	EMPBI7	0.39591	0.05137	0.43816	7.70662	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19728	0.24454
	CBPTE31	0.16848	0.03477	0.18384	4.84556	0.00009
	W11	0.14404	0.03828	0.13968	3.76241	0.00114
	EMPBI15	0.04742	0.01453	0.07355	3.26372	0.00371
	CBPTE95	0.08092	0.03116	0.05152	2.59687	0.01683
	EMPBI19	0.12114	0.05037	0.11571	2.40502	0.02547
8	(Constant)	-4.29955	0.51451		-8.35663	0.00000
	EMPBI7	0.38152	0.05044	0.42223	7.56438	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78323	0.00009
	W11	0.14876	0.03845	0.14426	3.86858	0.00083
	EMPBI15	0.05187	0.01418	0.08045	3.65681	0.00139
	CBPTE95	0.10452	0.02436	0.06656	4.28997	0.00030
	EMPBI19	0.13920	0.04853	0.13297	2.86854	0.00893
a	Dependent Variable: CFS2A26					

Figure E-1-40: Continued

Regression (CFS2A27)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14632
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09099
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25063	1	76.25063	1876.71164	0.00000
	Residual	1.09701	27	0.04063		
	Total	77.34764	28			
2	Regression	76.79096	2	38.39548	1793.29159	0.00000
	Residual	0.55668	26	0.02141		
	Total	77.34764	28			
3	Regression	76.98519	3	25.66173	1770.01301	0.00000
	Residual	0.36245	25	0.01450		
	Total	77.34764	28			
4	Regression	77.10767	4	19.27692	1927.93679	0.00000
	Residual	0.23997	24	0.01000		
	Total	77.34764	28			
5	Regression	77.15722	5	15.43144	1863.92791	0.00000
	Residual	0.19042	23	0.00828		
	Total	77.34764	28			
6	Regression	77.19912	6	12.86652	1905.89786	0.00000
	Residual	0.14852	22	0.00675		
	Total	77.34764	28			
7	Regression	77.23120	7	11.03303	1989.87781	0.00000
	Residual	0.11644	21	0.00554		
	Total	77.34764	28			
8	Regression	77.22325	6	12.87054	2276.28141	0.00000
	Residual	0.12439	22	0.00565		
	Total	77.34764	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A27

Figure E-1-41: Commodity Flow Attraction for Commodity Item 27 (CFS2A27)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.80737	0.15040		-31.96427	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32103	0.00000
2	(Constant)	-4.25017	0.15564		-27.30843	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61673	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02361	0.00003
3	(Constant)	-3.55724	0.22857		-15.56312	0.00000
	EMPBI7	0.61697	0.05305	0.68281	11.62952	0.00000
	CBPTE55	0.15214	0.02714	0.12947	5.60498	0.00001
	CBPTE31	0.19459	0.05316	0.21233	3.66014	0.00118
4	(Constant)	-5.82343	0.67474		-8.63061	0.00000
	EMPBI7	0.51978	0.05208	0.57525	9.98064	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69246	0.00009
	CBPTE31	0.16637	0.04488	0.18154	3.70699	0.00110
	W11	0.17330	0.04952	0.16805	3.49996	0.00184
5	(Constant)	-5.67254	0.61707		-9.19269	0.00000
	EMPBI7	0.44790	0.05576	0.49570	8.03288	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36405	0.00023
	CBPTE31	0.18666	0.04167	0.20368	4.47923	0.00017
	W11	0.18057	0.04515	0.17510	3.99899	0.00056
	EMPBI15	0.04301	0.01758	0.06671	2.44650	0.02249
6	(Constant)	-5.37831	0.56960		-9.44229	0.00000
	EMPBI7	0.45255	0.05038	0.50085	8.98197	0.00000
	CBPTE55	0.05256	0.02885	0.04473	1.82229	0.08203
	CBPTE31	0.18473	0.03764	0.20157	4.90790	0.00007
	W11	0.16090	0.04153	0.15602	3.87396	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02503	0.00622
	CBPTE95	0.08550	0.03432	0.05444	2.49121	0.02076
7	(Constant)	-5.39141	0.51623		-10.44373	0.00000
	EMPBI7	0.39590	0.05138	0.43815	7.70579	0.00000
	CBPTE55	0.03282	0.02740	0.02793	1.19790	0.24430
	CBPTE31	0.16848	0.03477	0.18385	4.84533	0.00009
	W11	0.14402	0.03829	0.13966	3.76153	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26329	0.00371
	CBPTE95	0.08088	0.03116	0.05150	2.59535	0.01689
	EMPBI19	0.12117	0.05037	0.11575	2.40551	0.02545
8	(Constant)	-5.49056	0.51457		-10.67025	0.00000
	EMPBI7	0.38150	0.05044	0.42221	7.56314	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78284	0.00009
	W11	0.14874	0.03846	0.14424	3.86764	0.00083
	EMPBI15	0.05187	0.01419	0.08045	3.65641	0.00139
	CBPTE95	0.10450	0.02437	0.06654	4.28838	0.00030
	EMPBI19	0.13925	0.04853	0.13301	2.86915	0.00891
a	Dependent Variable: CFS2A27					

Figure E-1-41: Continued

Regression (CFS2A28)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25098	1	76.25098	1876.44898	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34815	28			
2	Regression	76.79135	2	38.39568	1792.91770	0.00000
	Residual	0.55679	26	0.02142		
	Total	77.34815	28			
3	Regression	76.98560	3	25.66187	1769.53525	0.00000
	Residual	0.36255	25	0.01450		
	Total	77.34815	28			
4	Regression	77.10810	4	19.27703	1927.33098	0.00000
	Residual	0.24005	24	0.01000		
	Total	77.34815	28			
5	Regression	77.15765	5	15.43153	1863.14573	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34815	28			
6	Regression	77.19958	6	12.86660	1905.24743	0.00000
	Residual	0.14857	22	0.00675		
	Total	77.34815	28			
7	Regression	77.23166	7	11.03309	1988.91961	0.00000
	Residual	0.11649	21	0.00555		
	Total	77.34815	28			
8	Regression	77.22371	6	12.87062	2275.37137	0.00000
	Residual	0.12444	22	0.00566		
	Total	77.34815	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A28

Figure E-1-42: Commodity Flow Attraction for Commodity Item 28 (CFS2A28)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.25295	0.15041		-34.92439	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31800	0.00000
2	(Constant)	-4.69572	0.15565		-30.16802	0.00000
	EMPBI7	0.79574	0.02517	0.88065	31.61328	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02325	0.00003
3	(Constant)	-4.00276	0.22860		-17.50989	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62773	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60441	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65982	0.00118
4	(Constant)	-6.26917	0.67485		-9.28972	0.00000
	EMPBI7	0.51976	0.05209	0.57522	9.97867	0.00000
	CBPTE55	0.11623	0.02477	0.09890	4.69179	0.00009
	CBPTE31	0.16638	0.04489	0.18155	3.70656	0.00110
	W11	0.17332	0.04952	0.16807	3.49973	0.00184
5	(Constant)	-6.11828	0.61720		-9.91293	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03088	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36324	0.00023
	CBPTE31	0.18667	0.04168	0.20369	4.47842	0.00017
	W11	0.18059	0.04516	0.17512	3.99850	0.00056
	EMPBI15	0.04301	0.01758	0.06670	2.44587	0.02252
6	(Constant)	-5.82395	0.56970		-10.22289	0.00000
	EMPBI7	0.45254	0.05039	0.50083	8.98012	0.00000
	CBPTE55	0.05255	0.02885	0.04472	1.82147	0.08216
	CBPTE31	0.18473	0.03764	0.20158	4.90719	0.00007
	W11	0.16090	0.04154	0.15603	3.87351	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02451	0.00623
	CBPTE95	0.08553	0.03433	0.05446	2.49166	0.02074
7	(Constant)	-5.83705	0.51636		-11.30422	0.00000
	EMPBI7	0.39589	0.05139	0.43814	7.70371	0.00000
	CBPTE55	0.03281	0.02741	0.02792	1.19713	0.24460
	CBPTE31	0.16849	0.03478	0.18385	4.84434	0.00009
	W11	0.14403	0.03830	0.13967	3.76088	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26250	0.00372
	CBPTE95	0.08091	0.03117	0.05152	2.59569	0.01687
	EMPBI19	0.12116	0.05038	0.11574	2.40473	0.02549
8	(Constant)	-5.93616	0.51467		-11.53387	0.00000
	EMPBI7	0.38149	0.05045	0.42221	7.56152	0.00000
	CBPTE31	0.16794	0.03512	0.18325	4.78206	0.00009
	W11	0.14875	0.03847	0.14425	3.86707	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65556	0.00139
	CBPTE95	0.10452	0.02437	0.06655	4.28837	0.00030
	EMPBI19	0.13923	0.04854	0.13299	2.86822	0.00893
a	Dependent Variable: CFS2A28					

Figure E-1-42: Continued

Regression (CFS2A29)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08217
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25095	1	76.25095	1876.48269	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34810	28			
2	Regression	76.79135	2	38.39568	1793.07881	0.00000
	Residual	0.55674	26	0.02141		
	Total	77.34810	28			
3	Regression	76.98558	3	25.66186	1769.70025	0.00000
	Residual	0.36252	25	0.01450		
	Total	77.34810	28			
4	Regression	77.10806	4	19.27702	1927.40157	0.00000
	Residual	0.24004	24	0.01000		
	Total	77.34810	28			
5	Regression	77.15761	5	15.43152	1863.24832	0.00000
	Residual	0.19049	23	0.00828		
	Total	77.34810	28			
6	Regression	77.19956	6	12.86659	1905.63292	0.00000
	Residual	0.14854	22	0.00675		
	Total	77.34810	28			
7	Regression	77.23164	7	11.03309	1989.50573	0.00000
	Residual	0.11646	21	0.00555		
	Total	77.34810	28			
8	Regression	77.22369	6	12.87062	2276.03693	0.00000
	Residual	0.12441	22	0.00565		
	Total	77.34810	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A29

Figure E-1-43: Commodity Flow Attraction for Commodity Item 29 (CFS2A29)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.77164	0.15041		-38.37326	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31839	0.00000
2	(Constant)	-5.21440	0.15565		-33.50178	0.00000
	EMPBI7	0.79573	0.02517	0.88065	31.61458	0.00000
	CBPTE55	0.16445	0.03273	0.13994	5.02362	0.00003
3	(Constant)	-4.52146	0.22859		-19.77986	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62835	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60486	0.00001
	CBPTE31	0.19459	0.05317	0.21233	3.65984	0.00118
4	(Constant)	-6.78764	0.67484		-10.05819	0.00000
	EMPBI7	0.51977	0.05209	0.57524	9.97913	0.00000
	CBPTE55	0.11623	0.02477	0.09891	4.69223	0.00009
	CBPTE31	0.16637	0.04489	0.18154	3.70651	0.00110
	W11	0.17330	0.04952	0.16805	3.49944	0.00184
5	(Constant)	-6.63674	0.61718		-10.75326	0.00000
	EMPBI7	0.44789	0.05577	0.49569	8.03134	0.00000
	CBPTE55	0.10172	0.02331	0.08656	4.36372	0.00023
	CBPTE31	0.18666	0.04168	0.20368	4.47843	0.00017
	W11	0.18057	0.04516	0.17510	3.99822	0.00057
	EMPBI15	0.04301	0.01758	0.06670	2.44598	0.02251
6	(Constant)	-6.34235	0.56964		-11.13397	0.00000
	EMPBI7	0.45255	0.05039	0.50085	8.98131	0.00000
	CBPTE55	0.05255	0.02885	0.04471	1.82155	0.08215
	CBPTE31	0.18473	0.03764	0.20157	4.90754	0.00007
	W11	0.16088	0.04154	0.15601	3.87337	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02494	0.00622
	CBPTE95	0.08555	0.03432	0.05447	2.49249	0.02070
7	(Constant)	-6.35545	0.51628		-12.30999	0.00000
	EMPBI7	0.39590	0.05138	0.43815	7.70505	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19715	0.24459
	CBPTE31	0.16848	0.03478	0.18385	4.84487	0.00009
	W11	0.14401	0.03829	0.13964	3.76083	0.00115
	EMPBI15	0.04742	0.01453	0.07355	3.26312	0.00372
	CBPTE95	0.08093	0.03117	0.05153	2.59670	0.01684
	EMPBI19	0.12117	0.05038	0.11574	2.40525	0.02546
8	(Constant)	-6.45455	0.51460		-12.54293	0.00000
	EMPBI7	0.38151	0.05044	0.42222	7.56287	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78258	0.00009
	W11	0.14873	0.03846	0.14422	3.86702	0.00083
	EMPBI15	0.05187	0.01419	0.08045	3.65619	0.00139
	CBPTE95	0.10454	0.02437	0.06656	4.28968	0.00030
	EMPBI19	0.13923	0.04853	0.13300	2.86875	0.00892
a	Dependent Variable: CFS2A29					

Figure E-1-43: Continued

Regression (CFS2A30)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09099
6	0.99904	0.99808	0.99756	0.08215
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25084	1	76.25084	1876.64862	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34789	28			
2	Regression	76.79119	2	38.39559	1793.21588	0.00000
	Residual	0.55670	26	0.02141		
	Total	77.34789	28			
3	Regression	76.98540	3	25.66180	1769.84230	0.00000
	Residual	0.36249	25	0.01450		
	Total	77.34789	28			
4	Regression	77.10792	4	19.27698	1927.94801	0.00000
	Residual	0.23997	24	0.01000		
	Total	77.34789	28			
5	Regression	77.15747	5	15.43149	1863.92800	0.00000
	Residual	0.19042	23	0.00828		
	Total	77.34789	28			
6	Regression	77.19941	6	12.86657	1906.39239	0.00000
	Residual	0.14848	22	0.00675		
	Total	77.34789	28			
7	Regression	77.23147	7	11.03307	1990.21829	0.00000
	Residual	0.11642	21	0.00554		
	Total	77.34789	28			
8	Regression	77.22353	6	12.87059	2276.82014	0.00000
	Residual	0.12436	22	0.00565		
	Total	77.34789	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A30

Figure E-1-44: Commodity Flow Attraction for Commodity Item 30 (CFS2A30)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.34591	0.15040		-35.54434	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32030	0.00000
2	(Constant)	-4.78869	0.15564		-30.76790	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61601	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02356	0.00003
3	(Constant)	-4.09578	0.22858		-17.91839	0.00000
	EMPBI7	0.61697	0.05305	0.68282	11.62904	0.00000
	CBPTE55	0.15214	0.02715	0.12947	5.60480	0.00001
	CBPTE31	0.19458	0.05317	0.21233	3.65986	0.00118
4	(Constant)	-6.36232	0.67474		-9.42927	0.00000
	EMPBI7	0.51977	0.05208	0.57524	9.98047	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69236	0.00009
	CBPTE31	0.16636	0.04488	0.18153	3.70678	0.00110
	W11	0.17333	0.04952	0.16808	3.50049	0.00184
5	(Constant)	-6.21142	0.61707		-10.06597	0.00000
	EMPBI7	0.44789	0.05576	0.49569	8.03271	0.00000
	CBPTE55	0.10170	0.02331	0.08655	4.36393	0.00023
	CBPTE31	0.18665	0.04167	0.20367	4.47898	0.00017
	W11	0.18060	0.04515	0.17513	3.99956	0.00056
	EMPBI15	0.04301	0.01758	0.06671	2.44646	0.02249
6	(Constant)	-5.91706	0.56953		-10.38946	0.00000
	EMPBI7	0.45255	0.05038	0.50084	8.98299	0.00000
	CBPTE55	0.05254	0.02884	0.04471	1.82165	0.08213
	CBPTE31	0.18471	0.03763	0.20156	4.90824	0.00007
	W11	0.16091	0.04153	0.15604	3.87486	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02554	0.00622
	CBPTE95	0.08554	0.03432	0.05447	2.49268	0.02070
7	(Constant)	-5.93015	0.51619		-11.48830	0.00000
	EMPBI7	0.39591	0.05137	0.43816	7.70662	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19728	0.24454
	CBPTE31	0.16848	0.03477	0.18384	4.84556	0.00009
	W11	0.14404	0.03828	0.13968	3.76241	0.00114
	EMPBI15	0.04742	0.01453	0.07355	3.26372	0.00371
	CBPTE95	0.08092	0.03116	0.05152	2.59687	0.01683
	EMPBI19	0.12114	0.05037	0.11571	2.40502	0.02547
8	(Constant)	-6.02925	0.51451		-11.71848	0.00000
	EMPBI7	0.38152	0.05044	0.42223	7.56438	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78323	0.00009
	W11	0.14876	0.03845	0.14426	3.86858	0.00083
	EMPBI15	0.05187	0.01418	0.08045	3.65681	0.00139
	CBPTE95	0.10452	0.02436	0.06656	4.28997	0.00030
	EMPBI19	0.13920	0.04853	0.13297	2.86854	0.00893
a	Dependent Variable: CFS2A30					

Figure E-1-44: Continued

Regression (CFS2A31)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09098
6	0.99904	0.99808	0.99756	0.08215
7	0.99925	0.99850	0.99799	0.07445
8	0.99920	0.99839	0.99795	0.07518

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25079	1	76.25079	1876.65486	0.00000
	Residual	1.09704	27	0.04063		
	Total	77.34784	28			
2	Regression	76.79114	2	38.39557	1793.21921	0.00000
	Residual	0.55670	26	0.02141		
	Total	77.34784	28			
3	Regression	76.98537	3	25.66179	1769.95513	0.00000
	Residual	0.36246	25	0.01450		
	Total	77.34784	28			
4	Regression	77.10788	4	19.27697	1928.05935	0.00000
	Residual	0.23995	24	0.01000		
	Total	77.34784	28			
5	Regression	77.15744	5	15.43149	1864.11342	0.00000
	Residual	0.19040	23	0.00828		
	Total	77.34784	28			
6	Regression	77.19937	6	12.86656	1906.55388	0.00000
	Residual	0.14847	22	0.00675		
	Total	77.34784	28			
7	Regression	77.23143	7	11.03306	1990.43074	0.00000
	Residual	0.11640	21	0.00554		
	Total	77.34784	28			
8	Regression	77.22348	6	12.87058	2277.01855	0.00000
	Residual	0.12435	22	0.00565		
	Total	77.34784	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A31

Figure E-1-45: Commodity Flow Attraction for Commodity Item 31 (CFS2A31)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.02290	0.15040		-20.09897	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32037	0.00000
2	(Constant)	-2.46569	0.15564		-15.84235	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61605	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02355	0.00003
3	(Constant)	-1.77274	0.22857		-7.75570	0.00000
	EMPBI7	0.61696	0.05305	0.68280	11.62922	0.00000
	CBPTE55	0.15214	0.02714	0.12947	5.60494	0.00001
	CBPTE31	0.19459	0.05316	0.21234	3.66018	0.00118
4	(Constant)	-4.03919	0.67472		-5.98645	0.00000
	EMPBI7	0.51976	0.05208	0.57523	9.98064	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69250	0.00009
	CBPTE31	0.16637	0.04488	0.18154	3.70716	0.00110
	W11	0.17332	0.04951	0.16807	3.50046	0.00184
5	(Constant)	-3.88828	0.61704		-6.30151	0.00000
	EMPBI7	0.44788	0.05576	0.49567	8.03294	0.00000
	CBPTE55	0.10170	0.02330	0.08655	4.36413	0.00023
	CBPTE31	0.18666	0.04167	0.20368	4.47952	0.00017
	W11	0.18059	0.04515	0.17512	3.99962	0.00056
	EMPBI15	0.04301	0.01758	0.06671	2.44671	0.02248
6	(Constant)	-3.59395	0.56950		-6.31069	0.00000
	EMPBI7	0.45254	0.05038	0.50083	8.98316	0.00000
	CBPTE55	0.05254	0.02884	0.04471	1.82184	0.08210
	CBPTE31	0.18473	0.03763	0.20157	4.90880	0.00007
	W11	0.16091	0.04153	0.15603	3.87491	0.00082
	EMPBI15	0.04849	0.01602	0.07520	3.02578	0.00621
	CBPTE95	0.08553	0.03431	0.05446	2.49260	0.02070
7	(Constant)	-3.60704	0.51616		-6.98818	0.00000
	EMPBI7	0.39590	0.05137	0.43815	7.70684	0.00000
	CBPTE55	0.03281	0.02740	0.02792	1.19747	0.24447
	CBPTE31	0.16849	0.03477	0.18385	4.84620	0.00009
	W11	0.14404	0.03828	0.13967	3.76249	0.00114
	EMPBI15	0.04742	0.01453	0.07355	3.26401	0.00371
	CBPTE95	0.08091	0.03116	0.05152	2.59680	0.01683
	EMPBI19	0.12114	0.05037	0.11571	2.40514	0.02547
8	(Constant)	-3.70614	0.51448		-7.20360	0.00000
	EMPBI7	0.38150	0.05043	0.42222	7.56448	0.00000
	CBPTE31	0.16794	0.03511	0.18325	4.78381	0.00009
	W11	0.14876	0.03845	0.14425	3.86864	0.00083
	EMPBI15	0.05187	0.01418	0.08045	3.65713	0.00139
	CBPTE95	0.10452	0.02436	0.06655	4.28999	0.00030
	EMPBI19	0.13920	0.04852	0.13297	2.86870	0.00892
a	Dependent Variable: CFS2A31					

Figure E-1-45: Continued

Regression (CFS2A32)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08217
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25095	1	76.25095	1876.48269	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34810	28			
2	Regression	76.79135	2	38.39568	1793.07881	0.00000
	Residual	0.55674	26	0.02141		
	Total	77.34810	28			
3	Regression	76.98558	3	25.66186	1769.70025	0.00000
	Residual	0.36252	25	0.01450		
	Total	77.34810	28			
4	Regression	77.10806	4	19.27702	1927.40157	0.00000
	Residual	0.24004	24	0.01000		
	Total	77.34810	28			
5	Regression	77.15761	5	15.43152	1863.24832	0.00000
	Residual	0.19049	23	0.00828		
	Total	77.34810	28			
6	Regression	77.19956	6	12.86659	1905.63292	0.00000
	Residual	0.14854	22	0.00675		
	Total	77.34810	28			
7	Regression	77.23164	7	11.03309	1989.50573	0.00000
	Residual	0.11646	21	0.00555		
	Total	77.34810	28			
8	Regression	77.22369	6	12.87062	2276.03693	0.00000
	Residual	0.12441	22	0.00565		
	Total	77.34810	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A32

Figure E-1-46: Commodity Flow Attraction for Commodity Item 32 (CFS2A32)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.54134	0.15041		-23.54491	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31839	0.00000
2	(Constant)	-2.98410	0.15565		-19.17241	0.00000
	EMPBI7	0.79573	0.02517	0.88065	31.61458	0.00000
	CBPTE55	0.16445	0.03273	0.13994	5.02362	0.00003
3	(Constant)	-2.29116	0.22859		-10.02305	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62835	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60486	0.00001
	CBPTE31	0.19459	0.05317	0.21233	3.65984	0.00118
4	(Constant)	-4.55734	0.67484		-6.75324	0.00000
	EMPBI7	0.51977	0.05209	0.57524	9.97913	0.00000
	CBPTE55	0.11623	0.02477	0.09891	4.69223	0.00009
	CBPTE31	0.16637	0.04489	0.18154	3.70651	0.00110
	W11	0.17330	0.04952	0.16805	3.49944	0.00184
5	(Constant)	-4.40644	0.61718		-7.13959	0.00000
	EMPBI7	0.44789	0.05577	0.49569	8.03134	0.00000
	CBPTE55	0.10172	0.02331	0.08656	4.36372	0.00023
	CBPTE31	0.18666	0.04168	0.20368	4.47843	0.00017
	W11	0.18057	0.04516	0.17510	3.99822	0.00057
	EMPBI15	0.04301	0.01758	0.06670	2.44598	0.02251
6	(Constant)	-4.11205	0.56964		-7.21869	0.00000
	EMPBI7	0.45255	0.05039	0.50085	8.98131	0.00000
	CBPTE55	0.05255	0.02885	0.04471	1.82155	0.08215
	CBPTE31	0.18473	0.03764	0.20157	4.90754	0.00007
	W11	0.16088	0.04154	0.15601	3.87337	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02494	0.00622
	CBPTE95	0.08555	0.03432	0.05447	2.49249	0.02070
7	(Constant)	-4.12515	0.51628		-7.99008	0.00000
	EMPBI7	0.39590	0.05138	0.43815	7.70505	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19715	0.24459
	CBPTE31	0.16848	0.03478	0.18385	4.84487	0.00009
	W11	0.14401	0.03829	0.13964	3.76083	0.00115
	EMPBI15	0.04742	0.01453	0.07355	3.26312	0.00372
	CBPTE95	0.08093	0.03117	0.05153	2.59670	0.01684
	EMPBI19	0.12117	0.05038	0.11574	2.40525	0.02546
8	(Constant)	-4.22425	0.51460		-8.20885	0.00000
	EMPBI7	0.38151	0.05044	0.42222	7.56287	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78258	0.00009
	W11	0.14873	0.03846	0.14422	3.86702	0.00083
	EMPBI15	0.05187	0.01419	0.08045	3.65619	0.00139
	CBPTE95	0.10454	0.02437	0.06656	4.28968	0.00030
	EMPBI19	0.13923	0.04853	0.13300	2.86875	0.00892
a	Dependent Variable: CFS2A32					

Figure E-1-46: Continued

Regression (CFS2A33)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08217
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25095	1	76.25095	1876.48269	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34810	28			
2	Regression	76.79135	2	38.39568	1793.07881	0.00000
	Residual	0.55674	26	0.02141		
	Total	77.34810	28			
3	Regression	76.98558	3	25.66186	1769.70025	0.00000
	Residual	0.36252	25	0.01450		
	Total	77.34810	28			
4	Regression	77.10806	4	19.27702	1927.40157	0.00000
	Residual	0.24004	24	0.01000		
	Total	77.34810	28			
5	Regression	77.15761	5	15.43152	1863.24832	0.00000
	Residual	0.19049	23	0.00828		
	Total	77.34810	28			
6	Regression	77.19956	6	12.86659	1905.63292	0.00000
	Residual	0.14854	22	0.00675		
	Total	77.34810	28			
7	Regression	77.23164	7	11.03309	1989.50573	0.00000
	Residual	0.11646	21	0.00555		
	Total	77.34810	28			
8	Regression	77.22369	6	12.87062	2276.03693	0.00000
	Residual	0.12441	22	0.00565		
	Total	77.34810	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A33

Figure E-1-47: Commodity Flow Attraction for Commodity Item 33 (CFS2A33)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.39084	0.15041		-29.19288	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31839	0.00000
2	(Constant)	-3.83360	0.15565		-24.63033	0.00000
	EMPBI7	0.79573	0.02517	0.88065	31.61458	0.00000
	CBPTE55	0.16445	0.03273	0.13994	5.02362	0.00003
3	(Constant)	-3.14066	0.22859		-13.73932	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62835	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60486	0.00001
	CBPTE31	0.19459	0.05317	0.21233	3.65984	0.00118
4	(Constant)	-5.40684	0.67484		-8.01206	0.00000
	EMPBI7	0.51977	0.05209	0.57524	9.97913	0.00000
	CBPTE55	0.11623	0.02477	0.09891	4.69223	0.00009
	CBPTE31	0.16637	0.04489	0.18154	3.70651	0.00110
	W11	0.17330	0.04952	0.16805	3.49944	0.00184
5	(Constant)	-5.25594	0.61718		-8.51601	0.00000
	EMPBI7	0.44789	0.05577	0.49569	8.03134	0.00000
	CBPTE55	0.10172	0.02331	0.08656	4.36372	0.00023
	CBPTE31	0.18666	0.04168	0.20368	4.47843	0.00017
	W11	0.18057	0.04516	0.17510	3.99822	0.00057
	EMPBI15	0.04301	0.01758	0.06670	2.44598	0.02251
6	(Constant)	-4.96155	0.56964		-8.70998	0.00000
	EMPBI7	0.45255	0.05039	0.50085	8.98131	0.00000
	CBPTE55	0.05255	0.02885	0.04471	1.82155	0.08215
	CBPTE31	0.18473	0.03764	0.20157	4.90754	0.00007
	W11	0.16088	0.04154	0.15601	3.87337	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02494	0.00622
	CBPTE95	0.08555	0.03432	0.05447	2.49249	0.02070
7	(Constant)	-4.97465	0.51628		-9.63549	0.00000
	EMPBI7	0.39590	0.05138	0.43815	7.70505	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19715	0.24459
	CBPTE31	0.16848	0.03478	0.18385	4.84487	0.00009
	W11	0.14401	0.03829	0.13964	3.76083	0.00115
	EMPBI15	0.04742	0.01453	0.07355	3.26312	0.00372
	CBPTE95	0.08093	0.03117	0.05153	2.59670	0.01684
	EMPBI19	0.12117	0.05038	0.11574	2.40525	0.02546
8	(Constant)	-5.07375	0.51460		-9.85966	0.00000
	EMPBI7	0.38151	0.05044	0.42222	7.56287	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78258	0.00009
	W11	0.14873	0.03846	0.14422	3.86702	0.00083
	EMPBI15	0.05187	0.01419	0.08045	3.65619	0.00139
	CBPTE95	0.10454	0.02437	0.06656	4.28968	0.00030
	EMPBI19	0.13923	0.04853	0.13300	2.86875	0.00892
a	Dependent Variable: CFS2A33					

Figure E-1-47: Continued

Regression (CFS2A34)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25098	1	76.25098	1876.44898	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34815	28			
2	Regression	76.79135	2	38.39568	1792.91770	0.00000
	Residual	0.55679	26	0.02142		
	Total	77.34815	28			
3	Regression	76.98560	3	25.66187	1769.53525	0.00000
	Residual	0.36255	25	0.01450		
	Total	77.34815	28			
4	Regression	77.10810	4	19.27703	1927.33098	0.00000
	Residual	0.24005	24	0.01000		
	Total	77.34815	28			
5	Regression	77.15765	5	15.43153	1863.14573	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34815	28			
6	Regression	77.19958	6	12.86660	1905.24743	0.00000
	Residual	0.14857	22	0.00675		
	Total	77.34815	28			
7	Regression	77.23166	7	11.03309	1988.91961	0.00000
	Residual	0.11649	21	0.00555		
	Total	77.34815	28			
8	Regression	77.22371	6	12.87062	2275.37137	0.00000
	Residual	0.12444	22	0.00566		
	Total	77.34815	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A34

Figure E-1-48: Commodity Flow Attraction for Commodity Item 34 (CFS2A34)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.85535	0.15041		-32.28094	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31800	0.00000
2	(Constant)	-4.29812	0.15565		-27.61361	0.00000
	EMPBI7	0.79574	0.02517	0.88065	31.61328	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02325	0.00003
3	(Constant)	-3.60516	0.22860		-15.77061	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62773	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60441	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65982	0.00118
4	(Constant)	-5.87157	0.67485		-8.70056	0.00000
	EMPBI7	0.51976	0.05209	0.57522	9.97867	0.00000
	CBPTE55	0.11623	0.02477	0.09890	4.69179	0.00009
	CBPTE31	0.16638	0.04489	0.18155	3.70656	0.00110
	W11	0.17332	0.04952	0.16807	3.49973	0.00184
5	(Constant)	-5.72068	0.61720		-9.26873	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03088	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36324	0.00023
	CBPTE31	0.18667	0.04168	0.20369	4.47842	0.00017
	W11	0.18059	0.04516	0.17512	3.99850	0.00056
	EMPBI15	0.04301	0.01758	0.06670	2.44587	0.02252
6	(Constant)	-5.42635	0.56970		-9.52497	0.00000
	EMPBI7	0.45254	0.05039	0.50083	8.98012	0.00000
	CBPTE55	0.05255	0.02885	0.04472	1.82147	0.08216
	CBPTE31	0.18473	0.03764	0.20158	4.90719	0.00007
	W11	0.16090	0.04154	0.15603	3.87351	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02451	0.00623
	CBPTE95	0.08553	0.03433	0.05446	2.49166	0.02074
7	(Constant)	-5.43945	0.51636		-10.53422	0.00000
	EMPBI7	0.39589	0.05139	0.43814	7.70371	0.00000
	CBPTE55	0.03281	0.02741	0.02792	1.19713	0.24460
	CBPTE31	0.16849	0.03478	0.18385	4.84434	0.00009
	W11	0.14403	0.03830	0.13967	3.76088	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26250	0.00372
	CBPTE95	0.08091	0.03117	0.05152	2.59569	0.01687
	EMPBI19	0.12116	0.05038	0.11574	2.40473	0.02549
8	(Constant)	-5.53856	0.51467		-10.76134	0.00000
	EMPBI7	0.38149	0.05045	0.42221	7.56152	0.00000
	CBPTE31	0.16794	0.03512	0.18325	4.78206	0.00009
	W11	0.14875	0.03847	0.14425	3.86707	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65556	0.00139
	CBPTE95	0.10452	0.02437	0.06655	4.28837	0.00030
	EMPBI19	0.13923	0.04854	0.13299	2.86822	0.00893
a	Dependent Variable: CFS2A34					

Figure E-1-48: Continued

Regression (CFS2A35)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09099
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.24963	1	76.24963	1876.55725	0.00000
	Residual	1.09708	27	0.04063		
	Total	77.34671	28			
2	Regression	76.79001	2	38.39500	1793.19028	0.00000
	Residual	0.55670	26	0.02141		
	Total	77.34671	28			
3	Regression	76.98427	3	25.66142	1770.05392	0.00000
	Residual	0.36244	25	0.01450		
	Total	77.34671	28			
4	Regression	77.10674	4	19.27669	1927.92920	0.00000
	Residual	0.23997	24	0.01000		
	Total	77.34671	28			
5	Regression	77.15628	5	15.43126	1863.83526	0.00000
	Residual	0.19042	23	0.00828		
	Total	77.34671	28			
6	Regression	77.19819	6	12.86636	1905.82980	0.00000
	Residual	0.14852	22	0.00675		
	Total	77.34671	28			
7	Regression	77.23027	7	11.03290	1989.80663	0.00000
	Residual	0.11644	21	0.00554		
	Total	77.34671	28			
8	Regression	77.22231	6	12.87039	2276.13980	0.00000
	Residual	0.12440	22	0.00565		
	Total	77.34671	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A35

Figure E-1-49: Commodity Flow Attraction for Commodity Item 35 (CFS2A35)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.07102	0.15040		-40.36491	0.00000
	EMPBI7	0.89713	0.02071	0.99288	43.31925	0.00000
2	(Constant)	-5.51379	0.15564		-35.42677	0.00000
	EMPBI7	0.79573	0.02517	0.88065	31.61560	0.00000
	CBPTE55	0.16444	0.03273	0.13994	5.02373	0.00003
3	(Constant)	-4.82080	0.22856		-21.09163	0.00000
	EMPBI7	0.61694	0.05305	0.68278	11.62920	0.00000
	CBPTE55	0.15215	0.02714	0.12947	5.60532	0.00001
	CBPTE31	0.19461	0.05316	0.21235	3.66056	0.00118
4	(Constant)	-7.08689	0.67474		-10.50316	0.00000
	EMPBI7	0.51975	0.05208	0.57523	9.98023	0.00000
	CBPTE55	0.11623	0.02477	0.09891	4.69281	0.00009
	CBPTE31	0.16639	0.04488	0.18157	3.70745	0.00110
	W11	0.17329	0.04952	0.16805	3.49982	0.00184
5	(Constant)	-6.93601	0.61708		-11.24001	0.00000
	EMPBI7	0.44788	0.05576	0.49568	8.03243	0.00000
	CBPTE55	0.10172	0.02331	0.08656	4.36438	0.00023
	CBPTE31	0.18668	0.04167	0.20370	4.47958	0.00017
	W11	0.18056	0.04515	0.17510	3.99874	0.00056
	EMPBI15	0.04301	0.01758	0.06670	2.44623	0.02250
6	(Constant)	-6.64177	0.56961		-11.66031	0.00000
	EMPBI7	0.45254	0.05039	0.50083	8.98153	0.00000
	CBPTE55	0.05257	0.02885	0.04474	1.82252	0.08200
	CBPTE31	0.18474	0.03764	0.20159	4.90831	0.00007
	W11	0.16089	0.04153	0.15601	3.87370	0.00082
	EMPBI15	0.04848	0.01603	0.07518	3.02477	0.00623
	CBPTE95	0.08550	0.03432	0.05444	2.49129	0.02076
7	(Constant)	-6.65487	0.51624		-12.89104	0.00000
	EMPBI7	0.39588	0.05138	0.43813	7.70536	0.00000
	CBPTE55	0.03283	0.02740	0.02794	1.19814	0.24421
	CBPTE31	0.16850	0.03477	0.18387	4.84579	0.00009
	W11	0.14401	0.03829	0.13965	3.76124	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26299	0.00372
	CBPTE95	0.08088	0.03116	0.05150	2.59544	0.01688
	EMPBI19	0.12117	0.05037	0.11575	2.40551	0.02545
8	(Constant)	-6.75404	0.51458		-13.12534	0.00000
	EMPBI7	0.38148	0.05044	0.42219	7.56254	0.00000
	CBPTE31	0.16795	0.03511	0.18326	4.78322	0.00009
	W11	0.14874	0.03846	0.14423	3.86732	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65613	0.00139
	CBPTE95	0.10451	0.02437	0.06654	4.28864	0.00030
	EMPBI19	0.13925	0.04853	0.13302	2.86919	0.00891
a	Dependent Variable: CFS2A35					

Figure E-1-49: Continued

Regression (CFS2A36)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25005	1	76.25005	1876.62996	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34710	28			
2	Regression	76.79035	2	38.39517	1793.01885	0.00000
	Residual	0.55676	26	0.02141		
	Total	77.34710	28			
3	Regression	76.98457	3	25.66152	1769.58828	0.00000
	Residual	0.36254	25	0.01450		
	Total	77.34710	28			
4	Regression	77.10705	4	19.27676	1927.29247	0.00000
	Residual	0.24005	24	0.01000		
	Total	77.34710	28			
5	Regression	77.15660	5	15.43132	1863.11243	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34710	28			
6	Regression	77.19852	6	12.86642	1905.12643	0.00000
	Residual	0.14858	22	0.00675		
	Total	77.34710	28			
7	Regression	77.23062	7	11.03295	1989.01414	0.00000
	Residual	0.11649	21	0.00555		
	Total	77.34710	28			
8	Regression	77.22267	6	12.87045	2275.55662	0.00000
	Residual	0.12443	22	0.00566		
	Total	77.34710	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A36

Figure E-1-50: Commodity Flow Attraction for Commodity Item 36 (CFS2A3)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.77122	0.15040		-31.72333	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32009	0.00000
2	(Constant)	-4.21404	0.15565		-27.07433	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61446	0.00000
	CBPTE55	0.16443	0.03274	0.13992	5.02305	0.00003
3	(Constant)	-3.52111	0.22859		-15.40329	0.00000
	EMPBI7	0.61697	0.05306	0.68282	11.62822	0.00000
	CBPTE55	0.15214	0.02715	0.12946	5.60411	0.00001
	CBPTE31	0.19459	0.05317	0.21233	3.65968	0.00118
4	(Constant)	-5.78736	0.67485		-8.57575	0.00000
	EMPBI7	0.51978	0.05209	0.57525	9.97901	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69142	0.00009
	CBPTE31	0.16637	0.04489	0.18154	3.70633	0.00110
	W11	0.17331	0.04952	0.16806	3.49947	0.00184
5	(Constant)	-5.63647	0.61720		-9.13228	0.00000
	EMPBI7	0.44790	0.05577	0.49570	8.03120	0.00000
	CBPTE55	0.10170	0.02331	0.08654	4.36284	0.00023
	CBPTE31	0.18666	0.04168	0.20368	4.47819	0.00017
	W11	0.18057	0.04516	0.17511	3.99822	0.00057
	EMPBI15	0.04301	0.01758	0.06670	2.44589	0.02252
6	(Constant)	-5.34217	0.56971		-9.37697	0.00000
	EMPBI7	0.45256	0.05039	0.50085	8.98026	0.00000
	CBPTE55	0.05254	0.02885	0.04471	1.82124	0.08220
	CBPTE31	0.18472	0.03765	0.20157	4.90682	0.00007
	W11	0.16089	0.04154	0.15602	3.87315	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02443	0.00623
	CBPTE95	0.08552	0.03433	0.05446	2.49140	0.02075
7	(Constant)	-5.35526	0.51634		-10.37151	0.00000
	EMPBI7	0.39590	0.05139	0.43815	7.70406	0.00000
	CBPTE55	0.03280	0.02741	0.02791	1.19681	0.24472
	CBPTE31	0.16848	0.03478	0.18384	4.84412	0.00009
	W11	0.14402	0.03830	0.13965	3.76062	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26258	0.00372
	CBPTE95	0.08090	0.03117	0.05151	2.59552	0.01688
	EMPBI19	0.12119	0.05038	0.11576	2.40535	0.02546
8	(Constant)	-5.45435	0.51465		-10.59822	0.00000
	EMPBI7	0.38150	0.05045	0.42222	7.56207	0.00000
	CBPTE31	0.16792	0.03512	0.18324	4.78193	0.00009
	W11	0.14874	0.03846	0.14423	3.86685	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65561	0.00139
	CBPTE95	0.10450	0.02437	0.06654	4.28797	0.00030
	EMPBI19	0.13925	0.04854	0.13302	2.86881	0.00892
a	Dependent Variable: CFS2A36					

Figure E-1-50: Continued

Regression (CFS2A39)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09099
6	0.99904	0.99808	0.99756	0.08215
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25084	1	76.25084	1876.64862	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34789	28			
2	Regression	76.79119	2	38.39559	1793.21588	0.00000
	Residual	0.55670	26	0.02141		
	Total	77.34789	28			
3	Regression	76.98540	3	25.66180	1769.84230	0.00000
	Residual	0.36249	25	0.01450		
	Total	77.34789	28			
4	Regression	77.10792	4	19.27698	1927.94801	0.00000
	Residual	0.23997	24	0.01000		
	Total	77.34789	28			
5	Regression	77.15747	5	15.43149	1863.92800	0.00000
	Residual	0.19042	23	0.00828		
	Total	77.34789	28			
6	Regression	77.19941	6	12.86657	1906.39239	0.00000
	Residual	0.14848	22	0.00675		
	Total	77.34789	28			
7	Regression	77.23147	7	11.03307	1990.21829	0.00000
	Residual	0.11642	21	0.00554		
	Total	77.34789	28			
8	Regression	77.22353	6	12.87059	2276.82014	0.00000
	Residual	0.12436	22	0.00565		
	Total	77.34789	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A39

Figure E-1-51: Commodity Flow Attraction for Commodity Item 39 (CFS2A39)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.59581	0.15040		-43.85478	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32030	0.00000
2	(Constant)	-6.03859	0.15564		-38.79865	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61601	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02356	0.00003
3	(Constant)	-5.34568	0.22858		-23.38651	0.00000
	EMPBI7	0.61697	0.05305	0.68282	11.62904	0.00000
	CBPTE55	0.15214	0.02715	0.12947	5.60480	0.00001
	CBPTE31	0.19458	0.05317	0.21233	3.65986	0.00118
4	(Constant)	-7.61222	0.67474		-11.28169	0.00000
	EMPBI7	0.51977	0.05208	0.57524	9.98047	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69236	0.00009
	CBPTE31	0.16636	0.04488	0.18153	3.70678	0.00110
	W11	0.17333	0.04952	0.16808	3.50049	0.00184
5	(Constant)	-7.46132	0.61707		-12.09151	0.00000
	EMPBI7	0.44789	0.05576	0.49569	8.03271	0.00000
	CBPTE55	0.10170	0.02331	0.08655	4.36393	0.00023
	CBPTE31	0.18665	0.04167	0.20367	4.47898	0.00017
	W11	0.18060	0.04515	0.17513	3.99956	0.00056
	EMPBI15	0.04301	0.01758	0.06671	2.44646	0.02249
6	(Constant)	-7.16696	0.56953		-12.58409	0.00000
	EMPBI7	0.45255	0.05038	0.50084	8.98299	0.00000
	CBPTE55	0.05254	0.02884	0.04471	1.82165	0.08213
	CBPTE31	0.18471	0.03763	0.20156	4.90824	0.00007
	W11	0.16091	0.04153	0.15604	3.87486	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02554	0.00622
	CBPTE95	0.08554	0.03432	0.05447	2.49268	0.02070
7	(Constant)	-7.18005	0.51619		-13.90970	0.00000
	EMPBI7	0.39591	0.05137	0.43816	7.70662	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19728	0.24454
	CBPTE31	0.16848	0.03477	0.18384	4.84556	0.00009
	W11	0.14404	0.03828	0.13968	3.76241	0.00114
	EMPBI15	0.04742	0.01453	0.07355	3.26372	0.00371
	CBPTE95	0.08092	0.03116	0.05152	2.59687	0.01683
	EMPBI19	0.12114	0.05037	0.11571	2.40502	0.02547
8	(Constant)	-7.27915	0.51451		-14.14780	0.00000
	EMPBI7	0.38152	0.05044	0.42223	7.56438	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78323	0.00009
	W11	0.14876	0.03845	0.14426	3.86858	0.00083
	EMPBI15	0.05187	0.01418	0.08045	3.65681	0.00139
	CBPTE95	0.10452	0.02436	0.06656	4.28997	0.00030
	EMPBI19	0.13920	0.04853	0.13297	2.86854	0.00893
a	Dependent Variable: CFS2A39					

Figure E-1-51: Continued

Regression (CFS2A40)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10000
5	0.99877	0.99754	0.99700	0.09100
6	0.99904	0.99808	0.99756	0.08217
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25069	1	76.25069	1876.42976	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34787	28			
2	Regression	76.79109	2	38.39554	1792.96368	0.00000
	Residual	0.55678	26	0.02141		
	Total	77.34787	28			
3	Regression	76.98533	3	25.66178	1769.59410	0.00000
	Residual	0.36254	25	0.01450		
	Total	77.34787	28			
4	Regression	77.10785	4	19.27696	1927.56346	0.00000
	Residual	0.24002	24	0.01000		
	Total	77.34787	28			
5	Regression	77.15739	5	15.43148	1863.30393	0.00000
	Residual	0.19048	23	0.00828		
	Total	77.34787	28			
6	Regression	77.19933	6	12.86655	1905.63068	0.00000
	Residual	0.14854	22	0.00675		
	Total	77.34787	28			
7	Regression	77.23140	7	11.03306	1989.42968	0.00000
	Residual	0.11646	21	0.00555		
	Total	77.34787	28			
8	Regression	77.22346	6	12.87058	2275.95958	0.00000
	Residual	0.12441	22	0.00566		
	Total	77.34787	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A40

Figure E-1-52: Commodity Flow Attraction for Commodity Item 40 (CFS2A40)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.67301	0.15041		-31.06855	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31778	0.00000
2	(Constant)	-4.11577	0.15565		-26.44246	0.00000
	EMPBI7	0.79573	0.02517	0.88065	31.61359	0.00000
	CBPTE55	0.16445	0.03274	0.13994	5.02344	0.00003
3	(Constant)	-3.42281	0.22860		-14.97322	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62789	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60465	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65986	0.00118
4	(Constant)	-5.68937	0.67481		-8.43110	0.00000
	EMPBI7	0.51975	0.05208	0.57522	9.97911	0.00000
	CBPTE55	0.11623	0.02477	0.09890	4.69214	0.00009
	CBPTE31	0.16637	0.04488	0.18155	3.70671	0.00110
	W11	0.17333	0.04952	0.16808	3.50018	0.00184
5	(Constant)	-5.53850	0.61717		-8.97397	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03124	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36356	0.00023
	CBPTE31	0.18666	0.04168	0.20368	4.47848	0.00017
	W11	0.18060	0.04516	0.17513	3.99891	0.00056
	EMPBI15	0.04300	0.01758	0.06669	2.44566	0.02253
6	(Constant)	-5.24413	0.56964		-9.20605	0.00000
	EMPBI7	0.45254	0.05039	0.50083	8.98105	0.00000
	CBPTE55	0.05254	0.02885	0.04471	1.82149	0.08216
	CBPTE31	0.18472	0.03764	0.20157	4.90752	0.00007
	W11	0.16091	0.04154	0.15604	3.87408	0.00082
	EMPBI15	0.04848	0.01603	0.07518	3.02453	0.00623
	CBPTE95	0.08554	0.03432	0.05447	2.49231	0.02071
7	(Constant)	-5.25722	0.51629		-10.18264	0.00000
	EMPBI7	0.39589	0.05138	0.43814	7.70473	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19711	0.24460
	CBPTE31	0.16848	0.03478	0.18385	4.84479	0.00009
	W11	0.14404	0.03829	0.13967	3.76157	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26260	0.00372
	CBPTE95	0.08092	0.03117	0.05153	2.59647	0.01685
	EMPBI19	0.12116	0.05038	0.11574	2.40504	0.02547
8	(Constant)	-5.35632	0.51460		-10.40862	0.00000
	EMPBI7	0.38150	0.05045	0.42221	7.56257	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78251	0.00009
	W11	0.14876	0.03846	0.14425	3.86776	0.00083
	EMPBI15	0.05186	0.01419	0.08044	3.65566	0.00139
	CBPTE95	0.10453	0.02437	0.06656	4.28936	0.00030
	EMPBI19	0.13923	0.04854	0.13299	2.86853	0.00893
a	Dependent Variable: CFS2A40					

Figure E-1-52: Continued

Regression (CFS2A41)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.10000
5	0.99877	0.99754	0.99700	0.09100
6	0.99904	0.99808	0.99756	0.08217
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.24977	1	76.24977	1876.52304	0.00000
	Residual	1.09711	27	0.04063		
	Total	77.34688	28			
2	Regression	76.79011	2	38.39505	1792.96812	0.00000
	Residual	0.55677	26	0.02141		
	Total	77.34688	28			
3	Regression	76.98439	3	25.66146	1769.80824	0.00000
	Residual	0.36249	25	0.01450		
	Total	77.34688	28			
4	Regression	77.10685	4	19.27671	1927.48370	0.00000
	Residual	0.24002	24	0.01000		
	Total	77.34688	28			
5	Regression	77.15640	5	15.43128	1863.30563	0.00000
	Residual	0.19048	23	0.00828		
	Total	77.34688	28			
6	Regression	77.19832	6	12.86639	1905.36227	0.00000
	Residual	0.14856	22	0.00675		
	Total	77.34688	28			
7	Regression	77.23040	7	11.03291	1989.24789	0.00000
	Residual	0.11647	21	0.00555		
	Total	77.34688	28			
8	Regression	77.22245	6	12.87041	2275.70934	0.00000
	Residual	0.12442	22	0.00566		
	Total	77.34688	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A41

Figure E-1-53: Commodity Flow Attraction for Commodity Item 41 (CFS2A41)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.75363	0.15041		-31.60550	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31885	0.00000
2	(Constant)	-4.19642	0.15565		-26.96080	0.00000
	EMPBI7	0.79573	0.02517	0.88066	31.61384	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02320	0.00003
3	(Constant)	-3.50339	0.22858		-15.32672	0.00000
	EMPBI7	0.61694	0.05305	0.68278	11.62832	0.00000
	CBPTE55	0.15214	0.02715	0.12947	5.60464	0.00001
	CBPTE31	0.19462	0.05317	0.21236	3.66048	0.00118
4	(Constant)	-5.76944	0.67482		-8.54963	0.00000
	EMPBI7	0.51975	0.05208	0.57522	9.97904	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69198	0.00009
	CBPTE31	0.16640	0.04489	0.18158	3.70724	0.00110
	W11	0.17329	0.04952	0.16804	3.49934	0.00185
5	(Constant)	-5.61855	0.61717		-9.10374	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03124	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36344	0.00023
	CBPTE31	0.18669	0.04168	0.20371	4.47918	0.00017
	W11	0.18056	0.04516	0.17509	3.99809	0.00057
	EMPBI15	0.04301	0.01758	0.06670	2.44591	0.02252
6	(Constant)	-5.32426	0.56968		-9.34612	0.00000
	EMPBI7	0.45253	0.05039	0.50083	8.98039	0.00000
	CBPTE55	0.05255	0.02885	0.04472	1.82168	0.08213
	CBPTE31	0.18475	0.03764	0.20160	4.90797	0.00007
	W11	0.16088	0.04154	0.15601	3.87304	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02450	0.00623
	CBPTE95	0.08552	0.03432	0.05446	2.49151	0.02075
7	(Constant)	-5.33735	0.51631		-10.33744	0.00000
	EMPBI7	0.39588	0.05138	0.43813	7.70418	0.00000
	CBPTE55	0.03281	0.02740	0.02792	1.19729	0.24454
	CBPTE31	0.16851	0.03478	0.18388	4.84536	0.00009
	W11	0.14400	0.03829	0.13964	3.76048	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26265	0.00372
	CBPTE95	0.08090	0.03117	0.05151	2.59564	0.01688
	EMPBI19	0.12118	0.05038	0.11575	2.40531	0.02546
8	(Constant)	-5.43647	0.51463		-10.56385	0.00000
	EMPBI7	0.38148	0.05045	0.42219	7.56189	0.00000
	CBPTE31	0.16796	0.03512	0.18327	4.78302	0.00009
	W11	0.14872	0.03846	0.14422	3.86666	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65572	0.00139
	CBPTE95	0.10451	0.02437	0.06655	4.28840	0.00030
	EMPBI19	0.13925	0.04854	0.13301	2.86884	0.00892
a	Dependent Variable: CFS2A41					

Figure E-1-53: Continued

Regression (CFS2A43)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09099
6	0.99904	0.99808	0.99756	0.08215
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25084	1	76.25084	1876.64862	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34789	28			
2	Regression	76.79119	2	38.39559	1793.21588	0.00000
	Residual	0.55670	26	0.02141		
	Total	77.34789	28			
3	Regression	76.98540	3	25.66180	1769.84230	0.00000
	Residual	0.36249	25	0.01450		
	Total	77.34789	28			
4	Regression	77.10792	4	19.27698	1927.94801	0.00000
	Residual	0.23997	24	0.01000		
	Total	77.34789	28			
5	Regression	77.15747	5	15.43149	1863.92800	0.00000
	Residual	0.19042	23	0.00828		
	Total	77.34789	28			
6	Regression	77.19941	6	12.86657	1906.39239	0.00000
	Residual	0.14848	22	0.00675		
	Total	77.34789	28			
7	Regression	77.23147	7	11.03307	1990.21829	0.00000
	Residual	0.11642	21	0.00554		
	Total	77.34789	28			
8	Regression	77.22353	6	12.87059	2276.82014	0.00000
	Residual	0.12436	22	0.00565		
	Total	77.34789	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A43

Figure E-1-54: Commodity Flow Attraction for Commodity Item 43 (CFS2A43)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.55511	0.15040		-23.63751	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32030	0.00000
2	(Constant)	-2.99789	0.15564		-19.26181	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61601	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02356	0.00003
3	(Constant)	-2.30498	0.22858		-10.08393	0.00000
	EMPBI7	0.61697	0.05305	0.68282	11.62904	0.00000
	CBPTE55	0.15214	0.02715	0.12947	5.60480	0.00001
	CBPTE31	0.19458	0.05317	0.21233	3.65986	0.00118
4	(Constant)	-4.57152	0.67474		-6.77522	0.00000
	EMPBI7	0.51977	0.05208	0.57524	9.98047	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69236	0.00009
	CBPTE31	0.16636	0.04488	0.18153	3.70678	0.00110
	W11	0.17333	0.04952	0.16808	3.50049	0.00184
5	(Constant)	-4.42062	0.61707		-7.16387	0.00000
	EMPBI7	0.44789	0.05576	0.49569	8.03271	0.00000
	CBPTE55	0.10170	0.02331	0.08655	4.36393	0.00023
	CBPTE31	0.18665	0.04167	0.20367	4.47898	0.00017
	W11	0.18060	0.04515	0.17513	3.99956	0.00056
	EMPBI15	0.04301	0.01758	0.06671	2.44646	0.02249
6	(Constant)	-4.12626	0.56953		-7.24509	0.00000
	EMPBI7	0.45255	0.05038	0.50084	8.98299	0.00000
	CBPTE55	0.05254	0.02884	0.04471	1.82165	0.08213
	CBPTE31	0.18471	0.03763	0.20156	4.90824	0.00007
	W11	0.16091	0.04153	0.15604	3.87486	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02554	0.00622
	CBPTE95	0.08554	0.03432	0.05447	2.49268	0.02070
7	(Constant)	-4.13935	0.51619		-8.01904	0.00000
	EMPBI7	0.39591	0.05137	0.43816	7.70662	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19728	0.24454
	CBPTE31	0.16848	0.03477	0.18384	4.84556	0.00009
	W11	0.14404	0.03828	0.13968	3.76241	0.00114
	EMPBI15	0.04742	0.01453	0.07355	3.26372	0.00371
	CBPTE95	0.08092	0.03116	0.05152	2.59687	0.01683
	EMPBI19	0.12114	0.05037	0.11571	2.40502	0.02547
8	(Constant)	-4.23845	0.51451		-8.23787	0.00000
	EMPBI7	0.38152	0.05044	0.42223	7.56438	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78323	0.00009
	W11	0.14876	0.03845	0.14426	3.86858	0.00083
	EMPBI15	0.05187	0.01418	0.08045	3.65681	0.00139
	CBPTE95	0.10452	0.02436	0.06656	4.28997	0.00030
	EMPBI19	0.13920	0.04853	0.13297	2.86854	0.00893
a	Dependent Variable: CFS2A43					

Figure E-1-54: Continued

Regression (CFS2A99)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10000
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08217
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25087	1	76.25087	1876.61051	0.00000
	Residual	1.09707	27	0.04063		
	Total	77.34794	28			
2	Regression	76.79122	2	38.39561	1793.15880	0.00000
	Residual	0.55672	26	0.02141		
	Total	77.34794	28			
3	Regression	76.98543	3	25.66181	1769.73705	0.00000
	Residual	0.36251	25	0.01450		
	Total	77.34794	28			
4	Regression	77.10794	4	19.27698	1927.65911	0.00000
	Residual	0.24000	24	0.01000		
	Total	77.34794	28			
5	Regression	77.15746	5	15.43149	1863.27408	0.00000
	Residual	0.19048	23	0.00828		
	Total	77.34794	28			
6	Regression	77.19940	6	12.86657	1905.57756	0.00000
	Residual	0.14855	22	0.00675		
	Total	77.34794	28			
7	Regression	77.23148	7	11.03307	1989.39440	0.00000
	Residual	0.11646	21	0.00555		
	Total	77.34794	28			
8	Regression	77.22353	6	12.87059	2275.93068	0.00000
	Residual	0.12441	22	0.00566		
	Total	77.34794	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2A99

Figure E-1-55: Commodity Flow Attraction for Commodity Item 99 (CFS2A99)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.50963	0.15040		-43.28135	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31986	0.00000
2	(Constant)	-5.95241	0.15564		-38.24431	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61548	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02350	0.00003
3	(Constant)	-5.25951	0.22859		-23.00882	0.00000
	EMPBI7	0.61697	0.05306	0.68282	11.62872	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60466	0.00001
	CBPTE31	0.19458	0.05317	0.21232	3.65971	0.00118
4	(Constant)	-7.52591	0.67479		-11.15294	0.00000
	EMPBI7	0.51977	0.05208	0.57524	9.97986	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69212	0.00009
	CBPTE31	0.16636	0.04488	0.18153	3.70650	0.00110
	W11	0.17332	0.04952	0.16807	3.50002	0.00184
5	(Constant)	-7.37506	0.61718		-11.94962	0.00000
	EMPBI7	0.44792	0.05577	0.49572	8.03183	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36348	0.00023
	CBPTE31	0.18664	0.04168	0.20366	4.47804	0.00017
	W11	0.18058	0.04516	0.17512	3.99858	0.00056
	EMPBI15	0.04300	0.01758	0.06668	2.44527	0.02255
6	(Constant)	-7.08069	0.56965		-12.42996	0.00000
	EMPBI7	0.45258	0.05039	0.50087	8.98166	0.00000
	CBPTE55	0.05254	0.02885	0.04471	1.82145	0.08217
	CBPTE31	0.18471	0.03764	0.20155	4.90701	0.00007
	W11	0.16090	0.04154	0.15603	3.87371	0.00082
	EMPBI15	0.04847	0.01603	0.07517	3.02408	0.00624
	CBPTE95	0.08554	0.03432	0.05447	2.49225	0.02071
7	(Constant)	-7.09379	0.51630		-13.73973	0.00000
	EMPBI7	0.39593	0.05138	0.43818	7.70534	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19706	0.24462
	CBPTE31	0.16847	0.03478	0.18383	4.84426	0.00009
	W11	0.14402	0.03829	0.13966	3.76118	0.00115
	EMPBI15	0.04741	0.01453	0.07353	3.26212	0.00372
	CBPTE95	0.08092	0.03117	0.05153	2.59641	0.01685
	EMPBI19	0.12117	0.05038	0.11574	2.40510	0.02547
8	(Constant)	-7.19288	0.51461		-13.97740	0.00000
	EMPBI7	0.38153	0.05045	0.42225	7.56322	0.00000
	CBPTE31	0.16791	0.03511	0.18323	4.78200	0.00009
	W11	0.14875	0.03846	0.14424	3.86738	0.00083
	EMPBI15	0.05186	0.01419	0.08042	3.65516	0.00139
	CBPTE95	0.10453	0.02437	0.06656	4.28925	0.00030
	EMPBI19	0.13923	0.04854	0.13299	2.86858	0.00893
a	Dependent Variable: CFS2A99					

Figure E-1-55Continued

E-1-3 Model Summary and Coefficients for CFS2I – Within Utah

Regression (CFS2I3)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14632
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09099
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7
b Predictors: (Constant), EMPBI7, CBPTE55
c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31
d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11
e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15
f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95
g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25063	1	76.25063	1876.71164	0.00000
	Residual	1.09701	27	0.04063		
	Total	77.34764	28			
2	Regression	76.79096	2	38.39548	1793.29159	0.00000
	Residual	0.55668	26	0.02141		
	Total	77.34764	28			
3	Regression	76.98519	3	25.66173	1770.01301	0.00000
	Residual	0.36245	25	0.01450		
	Total	77.34764	28			
4	Regression	77.10767	4	19.27692	1927.93679	0.00000
	Residual	0.23997	24	0.01000		
	Total	77.34764	28			
5	Regression	77.15722	5	15.43144	1863.92791	0.00000
	Residual	0.19042	23	0.00828		
	Total	77.34764	28			
6	Regression	77.19912	6	12.86652	1905.89786	0.00000
	Residual	0.14852	22	0.00675		
	Total	77.34764	28			
7	Regression	77.23120	7	11.03303	1989.87781	0.00000
	Residual	0.11644	21	0.00554		
	Total	77.34764	28			
8	Regression	77.22325	6	12.87054	2276.28141	0.00000
	Residual	0.12439	22	0.00565		
	Total	77.34764	28			

a Predictors: (Constant), EMPBI7
b Predictors: (Constant), EMPBI7, CBPTE55
c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31
d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11
e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15
f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95
g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
i Dependent Variable: CFS2I3

Figure E-1-56: Commodity Flow Production for Commodity Item 3 (CFS2I3)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.95247	0.15040		-46.22706	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32103	0.00000
2	(Constant)	-6.39527	0.15564		-41.09125	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61673	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02361	0.00003
3	(Constant)	-5.70234	0.22857		-24.94806	0.00000
	EMPBI7	0.61697	0.05305	0.68281	11.62952	0.00000
	CBPTE55	0.15214	0.02714	0.12947	5.60498	0.00001
	CBPTE31	0.19459	0.05316	0.21233	3.66014	0.00118
4	(Constant)	-7.96853	0.67474		-11.80975	0.00000
	EMPBI7	0.51978	0.05208	0.57525	9.98064	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69246	0.00009
	CBPTE31	0.16637	0.04488	0.18154	3.70699	0.00110
	W11	0.17330	0.04952	0.16805	3.49996	0.00184
5	(Constant)	-7.81764	0.61707		-12.66896	0.00000
	EMPBI7	0.44790	0.05576	0.49570	8.03288	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36405	0.00023
	CBPTE31	0.18666	0.04167	0.20368	4.47923	0.00017
	W11	0.18057	0.04515	0.17510	3.99899	0.00056
	EMPBI15	0.04301	0.01758	0.06671	2.44650	0.02249
6	(Constant)	-7.52341	0.56960		-13.20828	0.00000
	EMPBI7	0.45255	0.05038	0.50085	8.98197	0.00000
	CBPTE55	0.05256	0.02885	0.04473	1.82229	0.08203
	CBPTE31	0.18473	0.03764	0.20157	4.90790	0.00007
	W11	0.16090	0.04153	0.15602	3.87396	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02503	0.00622
	CBPTE95	0.08550	0.03432	0.05444	2.49121	0.02076
7	(Constant)	-7.53651	0.51623		-14.59902	0.00000
	EMPBI7	0.39590	0.05138	0.43815	7.70579	0.00000
	CBPTE55	0.03282	0.02740	0.02793	1.19790	0.24430
	CBPTE31	0.16848	0.03477	0.18385	4.84533	0.00009
	W11	0.14402	0.03829	0.13966	3.76153	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26329	0.00371
	CBPTE95	0.08088	0.03116	0.05150	2.59535	0.01689
	EMPBI19	0.12117	0.05037	0.11575	2.40551	0.02545
8	(Constant)	-7.63566	0.51457		-14.83899	0.00000
	EMPBI7	0.38150	0.05044	0.42221	7.56314	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78284	0.00009
	W11	0.14874	0.03846	0.14424	3.86764	0.00083
	EMPBI15	0.05187	0.01419	0.08045	3.65641	0.00139
	CBPTE95	0.10450	0.02437	0.06654	4.28838	0.00030
	EMPBI19	0.13925	0.04853	0.13301	2.86915	0.00891
a	Dependent Variable: CFS2I3					

Figure E-1-56: Continued

Regression (CFS2I6)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09098
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25127	1	76.25127	1876.70671	0.00000
	Residual	1.09702	27	0.04063		
	Total	77.34829	28			
2	Regression	76.79159	2	38.39579	1793.23723	0.00000
	Residual	0.55670	26	0.02141		
	Total	77.34829	28			
3	Regression	76.98583	3	25.66194	1770.01256	0.00000
	Residual	0.36245	25	0.01450		
	Total	77.34829	28			
4	Regression	77.10832	4	19.27708	1928.00393	0.00000
	Residual	0.23996	24	0.01000		
	Total	77.34829	28			
5	Regression	77.15789	5	15.43158	1864.16376	0.00000
	Residual	0.19039	23	0.00828		
	Total	77.34829	28			
6	Regression	77.19979	6	12.86663	1906.16657	0.00000
	Residual	0.14850	22	0.00675		
	Total	77.34829	28			
7	Regression	77.23185	7	11.03312	1989.96491	0.00000
	Residual	0.11643	21	0.00554		
	Total	77.34829	28			
8	Regression	77.22390	6	12.87065	2276.37002	0.00000
	Residual	0.12439	22	0.00565		
	Total	77.34829	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I6

Figure E-1-57: Commodity Flow Production for Commodity Item 6 (CFS2I6)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.05681	0.15040		-33.62257	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32097	0.00000
2	(Constant)	-4.49961	0.15564		-28.91058	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61630	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02347	0.00003
3	(Constant)	-3.80664	0.22857		-16.65421	0.00000
	EMPBI7	0.61696	0.05305	0.68280	11.62940	0.00000
	CBPTE55	0.15214	0.02714	0.12946	5.60488	0.00001
	CBPTE31	0.19460	0.05316	0.21234	3.66030	0.00118
4	(Constant)	-6.07293	0.67473		-9.00049	0.00000
	EMPBI7	0.51977	0.05208	0.57524	9.98063	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69239	0.00009
	CBPTE31	0.16638	0.04488	0.18155	3.70722	0.00110
	W11	0.17331	0.04951	0.16806	3.50014	0.00184
5	(Constant)	-5.92200	0.61703		-9.59753	0.00000
	EMPBI7	0.44788	0.05575	0.49567	8.03301	0.00000
	CBPTE55	0.10170	0.02330	0.08654	4.36406	0.00023
	CBPTE31	0.18667	0.04167	0.20369	4.47976	0.00017
	W11	0.18058	0.04515	0.17511	3.99940	0.00056
	EMPBI15	0.04302	0.01758	0.06672	2.44704	0.02246
6	(Constant)	-5.62779	0.56956		-9.88093	0.00000
	EMPBI7	0.45253	0.05038	0.50083	8.98218	0.00000
	CBPTE55	0.05256	0.02884	0.04473	1.82227	0.08204
	CBPTE31	0.18474	0.03764	0.20158	4.90852	0.00007
	W11	0.16090	0.04153	0.15603	3.87442	0.00082
	EMPBI15	0.04849	0.01603	0.07520	3.02566	0.00621
	CBPTE95	0.08550	0.03432	0.05444	2.49130	0.02076
7	(Constant)	-5.64088	0.51622		-10.92719	0.00000
	EMPBI7	0.39590	0.05138	0.43814	7.70581	0.00000
	CBPTE55	0.03282	0.02740	0.02793	1.19794	0.24429
	CBPTE31	0.16850	0.03477	0.18386	4.84586	0.00009
	W11	0.14403	0.03829	0.13967	3.76192	0.00115
	EMPBI15	0.04743	0.01453	0.07355	3.26383	0.00371
	CBPTE95	0.08088	0.03116	0.05150	2.59534	0.01689
	EMPBI19	0.12114	0.05037	0.11572	2.40497	0.02548
8	(Constant)	-5.74004	0.51456		-11.15524	0.00000
	EMPBI7	0.38149	0.05044	0.42220	7.56314	0.00000
	CBPTE31	0.16795	0.03511	0.18326	4.78335	0.00009
	W11	0.14876	0.03846	0.14425	3.86803	0.00083
	EMPBI15	0.05188	0.01419	0.08046	3.65697	0.00139
	CBPTE95	0.10450	0.02437	0.06654	4.28840	0.00030
	EMPBI19	0.13922	0.04853	0.13298	2.86859	0.00893
a	Dependent Variable: CFS2I6					

Figure E-1-57: Continued

Regression (CFS2I7)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10000
5	0.99877	0.99754	0.99700	0.09100
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25076	1	76.25076	1876.51967	0.00000
	Residual	1.09712	27	0.04063		
	Total	77.34788	28			
2	Regression	76.79115	2	38.39558	1793.12228	0.00000
	Residual	0.55673	26	0.02141		
	Total	77.34788	28			
3	Regression	76.98538	3	25.66179	1769.75153	0.00000
	Residual	0.36251	25	0.01450		
	Total	77.34788	28			
4	Regression	77.10790	4	19.27697	1927.80275	0.00000
	Residual	0.23999	24	0.01000		
	Total	77.34788	28			
5	Regression	77.15744	5	15.43149	1863.62128	0.00000
	Residual	0.19045	23	0.00828		
	Total	77.34788	28			
6	Regression	77.19937	6	12.86656	1905.92858	0.00000
	Residual	0.14852	22	0.00675		
	Total	77.34788	28			
7	Regression	77.23145	7	11.03306	1989.86861	0.00000
	Residual	0.11644	21	0.00554		
	Total	77.34788	28			
8	Regression	77.22350	6	12.87058	2276.38823	0.00000
	Residual	0.12439	22	0.00565		
	Total	77.34788	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I7

Figure E-1-58: Commodity Flow Production for Commodity Item 7 (CFS2I7)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.73761	0.15041		-24.85011	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31881	0.00000
2	(Constant)	-3.18037	0.15564		-20.43373	0.00000
	EMPBI7	0.79573	0.02517	0.88065	31.61500	0.00000
	CBPTE55	0.16445	0.03273	0.13994	5.02364	0.00003
3	(Constant)	-2.48744	0.22859		-10.88189	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62856	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60490	0.00001
	CBPTE31	0.19459	0.05317	0.21233	3.65986	0.00118
4	(Constant)	-4.75398	0.67477		-7.04538	0.00000
	EMPBI7	0.51976	0.05208	0.57523	9.97991	0.00000
	CBPTE55	0.11623	0.02477	0.09890	4.69244	0.00009
	CBPTE31	0.16637	0.04488	0.18154	3.70676	0.00110
	W11	0.17333	0.04952	0.16808	3.50036	0.00184
5	(Constant)	-4.60311	0.61712		-7.45899	0.00000
	EMPBI7	0.44789	0.05576	0.49569	8.03205	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36394	0.00023
	CBPTE31	0.18665	0.04168	0.20367	4.47867	0.00017
	W11	0.18060	0.04516	0.17513	3.99922	0.00056
	EMPBI15	0.04301	0.01758	0.06670	2.44594	0.02252
6	(Constant)	-4.30877	0.56959		-7.56462	0.00000
	EMPBI7	0.45255	0.05038	0.50084	8.98189	0.00000
	CBPTE55	0.05255	0.02884	0.04472	1.82182	0.08211
	CBPTE31	0.18472	0.03764	0.20156	4.90771	0.00007
	W11	0.16091	0.04153	0.15604	3.87440	0.00082
	EMPBI15	0.04848	0.01603	0.07518	3.02480	0.00623
	CBPTE95	0.08553	0.03432	0.05446	2.49223	0.02072
7	(Constant)	-4.32186	0.51624		-8.37187	0.00000
	EMPBI7	0.39590	0.05138	0.43815	7.70567	0.00000
	CBPTE55	0.03281	0.02740	0.02792	1.19741	0.24449
	CBPTE31	0.16848	0.03477	0.18384	4.84510	0.00009
	W11	0.14404	0.03829	0.13967	3.76198	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26300	0.00372
	CBPTE95	0.08091	0.03116	0.05152	2.59645	0.01685
	EMPBI19	0.12117	0.05037	0.11574	2.40540	0.02545
8	(Constant)	-4.42097	0.51456		-8.59182	0.00000
	EMPBI7	0.38150	0.05044	0.42221	7.56333	0.00000
	CBPTE31	0.16792	0.03511	0.18324	4.78273	0.00009
	W11	0.14876	0.03846	0.14425	3.86814	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65608	0.00139
	CBPTE95	0.10452	0.02437	0.06655	4.28951	0.00030
	EMPBI19	0.13923	0.04853	0.13300	2.86895	0.00892
a	Dependent Variable: CFS2I7					

Figure E-1-58: Continued

Regression (CFS2I8)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09098
6	0.99904	0.99808	0.99756	0.08215
7	0.99925	0.99850	0.99799	0.07445
8	0.99920	0.99839	0.99795	0.07518

a Predictors: (Constant), EMPBI7
b Predictors: (Constant), EMPBI7, CBPTE55
c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31
d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11
e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15
f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95
g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25079	1	76.25079	1876.65486	0.00000
	Residual	1.09704	27	0.04063		
	Total	77.34784	28			
2	Regression	76.79114	2	38.39557	1793.21921	0.00000
	Residual	0.55670	26	0.02141		
	Total	77.34784	28			
3	Regression	76.98537	3	25.66179	1769.95513	0.00000
	Residual	0.36246	25	0.01450		
	Total	77.34784	28			
4	Regression	77.10788	4	19.27697	1928.05935	0.00000
	Residual	0.23995	24	0.01000		
	Total	77.34784	28			
5	Regression	77.15744	5	15.43149	1864.11342	0.00000
	Residual	0.19040	23	0.00828		
	Total	77.34784	28			
6	Regression	77.19937	6	12.86656	1906.55388	0.00000
	Residual	0.14847	22	0.00675		
	Total	77.34784	28			
7	Regression	77.23143	7	11.03306	1990.43074	0.00000
	Residual	0.11640	21	0.00554		
	Total	77.34784	28			
8	Regression	77.22348	6	12.87058	2277.01855	0.00000
	Residual	0.12435	22	0.00565		
	Total	77.34784	28			

a Predictors: (Constant), EMPBI7
b Predictors: (Constant), EMPBI7, CBPTE55
c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31
d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11
e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15
f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95
g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
i Dependent Variable: CFS2I8

Figure E-1-59: Commodity Flow Production for Commodity Item 8 (CFS2I8)

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.65580	0.15040		-37.60487	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32037	0.00000
2	(Constant)	-5.09859	0.15564		-32.75906	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61605	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02355	0.00003
3	(Constant)	-4.40564	0.22857		-19.27459	0.00000
	EMPBI7	0.61696	0.05305	0.68280	11.62922	0.00000
	CBPTE55	0.15214	0.02714	0.12947	5.60494	0.00001
	CBPTE31	0.19459	0.05316	0.21234	3.66018	0.00118
4	(Constant)	-6.67209	0.67472		-9.88866	0.00000
	EMPBI7	0.51976	0.05208	0.57523	9.98064	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69250	0.00009
	CBPTE31	0.16637	0.04488	0.18154	3.70716	0.00110
	W11	0.17332	0.04951	0.16807	3.50046	0.00184
5	(Constant)	-6.52118	0.61704		-10.56849	0.00000
	EMPBI7	0.44788	0.05576	0.49567	8.03294	0.00000
	CBPTE55	0.10170	0.02330	0.08655	4.36413	0.00023
	CBPTE31	0.18666	0.04167	0.20368	4.47952	0.00017
	W11	0.18059	0.04515	0.17512	3.99962	0.00056
	EMPBI15	0.04301	0.01758	0.06671	2.44671	0.02248
6	(Constant)	-6.22685	0.56950		-10.93386	0.00000
	EMPBI7	0.45254	0.05038	0.50083	8.98316	0.00000
	CBPTE55	0.05254	0.02884	0.04471	1.82184	0.08210
	CBPTE31	0.18473	0.03763	0.20157	4.90880	0.00007
	W11	0.16091	0.04153	0.15603	3.87491	0.00082
	EMPBI15	0.04849	0.01602	0.07520	3.02578	0.00621
	CBPTE95	0.08553	0.03431	0.05446	2.49260	0.02070
7	(Constant)	-6.23994	0.51616		-12.08909	0.00000
	EMPBI7	0.39590	0.05137	0.43815	7.70684	0.00000
	CBPTE55	0.03281	0.02740	0.02792	1.19747	0.24447
	CBPTE31	0.16849	0.03477	0.18385	4.84620	0.00009
	W11	0.14404	0.03828	0.13967	3.76249	0.00114
	EMPBI15	0.04742	0.01453	0.07355	3.26401	0.00371
	CBPTE95	0.08091	0.03116	0.05152	2.59680	0.01683
	EMPBI19	0.12114	0.05037	0.11571	2.40514	0.02547
8	(Constant)	-6.33904	0.51448		-12.32115	0.00000
	EMPBI7	0.38150	0.05043	0.42222	7.56448	0.00000
	CBPTE31	0.16794	0.03511	0.18325	4.78381	0.00009
	W11	0.14876	0.03845	0.14425	3.86864	0.00083
	EMPBI15	0.05187	0.01418	0.08045	3.65713	0.00139
	CBPTE95	0.10452	0.02436	0.06655	4.28999	0.00030
	EMPBI19	0.13920	0.04852	0.13297	2.86870	0.00892

a Dependent Variable: CFS2I8

Figure E-1-59: Continued

Regression (CFS2I12)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25098	1	76.25098	1876.44898	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34815	28			
2	Regression	76.79135	2	38.39568	1792.91770	0.00000
	Residual	0.55679	26	0.02142		
	Total	77.34815	28			
3	Regression	76.98560	3	25.66187	1769.53525	0.00000
	Residual	0.36255	25	0.01450		
	Total	77.34815	28			
4	Regression	77.10810	4	19.27703	1927.33098	0.00000
	Residual	0.24005	24	0.01000		
	Total	77.34815	28			
5	Regression	77.15765	5	15.43153	1863.14573	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34815	28			
6	Regression	77.19958	6	12.86660	1905.24743	0.00000
	Residual	0.14857	22	0.00675		
	Total	77.34815	28			
7	Regression	77.23166	7	11.03309	1988.91961	0.00000
	Residual	0.11649	21	0.00555		
	Total	77.34815	28			
8	Regression	77.22371	6	12.87062	2275.37137	0.00000
	Residual	0.12444	22	0.00566		
	Total	77.34815	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I12

Figure E-1-60: Commodity Flow Production for Commodity Item 12 (CFS2I12)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.26325	0.15041		-21.69581	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31800	0.00000
2	(Constant)	-2.70602	0.15565		-17.38505	0.00000
	EMPBI7	0.79574	0.02517	0.88065	31.61328	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02325	0.00003
3	(Constant)	-2.01306	0.22860		-8.80604	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62773	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60441	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65982	0.00118
4	(Constant)	-4.27947	0.67485		-6.34136	0.00000
	EMPBI7	0.51976	0.05209	0.57522	9.97867	0.00000
	CBPTE55	0.11623	0.02477	0.09890	4.69179	0.00009
	CBPTE31	0.16638	0.04489	0.18155	3.70656	0.00110
	W11	0.17332	0.04952	0.16807	3.49973	0.00184
5	(Constant)	-4.12858	0.61720		-6.68919	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03088	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36324	0.00023
	CBPTE31	0.18667	0.04168	0.20369	4.47842	0.00017
	W11	0.18059	0.04516	0.17512	3.99850	0.00056
	EMPBI15	0.04301	0.01758	0.06670	2.44587	0.02252
6	(Constant)	-3.83425	0.56970		-6.73033	0.00000
	EMPBI7	0.45254	0.05039	0.50083	8.98012	0.00000
	CBPTE55	0.05255	0.02885	0.04472	1.82147	0.08216
	CBPTE31	0.18473	0.03764	0.20158	4.90719	0.00007
	W11	0.16090	0.04154	0.15603	3.87351	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02451	0.00623
	CBPTE95	0.08553	0.03433	0.05446	2.49166	0.02074
7	(Constant)	-3.84735	0.51636		-7.45090	0.00000
	EMPBI7	0.39589	0.05139	0.43814	7.70371	0.00000
	CBPTE55	0.03281	0.02741	0.02792	1.19713	0.24460
	CBPTE31	0.16849	0.03478	0.18385	4.84434	0.00009
	W11	0.14403	0.03830	0.13967	3.76088	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26250	0.00372
	CBPTE95	0.08091	0.03117	0.05152	2.59569	0.01687
	EMPBI19	0.12116	0.05038	0.11574	2.40473	0.02549
8	(Constant)	-3.94646	0.51467		-7.66791	0.00000
	EMPBI7	0.38149	0.05045	0.42221	7.56152	0.00000
	CBPTE31	0.16794	0.03512	0.18325	4.78206	0.00009
	W11	0.14875	0.03847	0.14425	3.86707	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65556	0.00139
	CBPTE95	0.10452	0.02437	0.06655	4.28837	0.00030
	EMPBI19	0.13923	0.04854	0.13299	2.86822	0.00893
a	Dependent Variable: CFS2I12					

Figure E-1-60: Continued

Regression (CFS2I13)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09099
6	0.99904	0.99808	0.99756	0.08215
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25084	1	76.25084	1876.64862	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34789	28			
2	Regression	76.79119	2	38.39559	1793.21588	0.00000
	Residual	0.55670	26	0.02141		
	Total	77.34789	28			
3	Regression	76.98540	3	25.66180	1769.84230	0.00000
	Residual	0.36249	25	0.01450		
	Total	77.34789	28			
4	Regression	77.10792	4	19.27698	1927.94801	0.00000
	Residual	0.23997	24	0.01000		
	Total	77.34789	28			
5	Regression	77.15747	5	15.43149	1863.92800	0.00000
	Residual	0.19042	23	0.00828		
	Total	77.34789	28			
6	Regression	77.19941	6	12.86657	1906.39239	0.00000
	Residual	0.14848	22	0.00675		
	Total	77.34789	28			
7	Regression	77.23147	7	11.03307	1990.21829	0.00000
	Residual	0.11642	21	0.00554		
	Total	77.34789	28			
8	Regression	77.22353	6	12.87059	2276.82014	0.00000
	Residual	0.12436	22	0.00565		
	Total	77.34789	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I13

Figure E-1-61: Commodity Flow Production for Commodity Item 13 (CFS2I13)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.62591	0.15040		-30.75714	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32030	0.00000
2	(Constant)	-4.06869	0.15564		-26.14182	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61601	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02356	0.00003
3	(Constant)	-3.37578	0.22858		-14.76851	0.00000
	EMPBI7	0.61697	0.05305	0.68282	11.62904	0.00000
	CBPTE55	0.15214	0.02715	0.12947	5.60480	0.00001
	CBPTE31	0.19458	0.05317	0.21233	3.65986	0.00118
4	(Constant)	-5.64232	0.67474		-8.36220	0.00000
	EMPBI7	0.51977	0.05208	0.57524	9.98047	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69236	0.00009
	CBPTE31	0.16636	0.04488	0.18153	3.70678	0.00110
	W11	0.17333	0.04952	0.16808	3.50049	0.00184
5	(Constant)	-5.49142	0.61707		-8.89917	0.00000
	EMPBI7	0.44789	0.05576	0.49569	8.03271	0.00000
	CBPTE55	0.10170	0.02331	0.08655	4.36393	0.00023
	CBPTE31	0.18665	0.04167	0.20367	4.47898	0.00017
	W11	0.18060	0.04515	0.17513	3.99956	0.00056
	EMPBI15	0.04301	0.01758	0.06671	2.44646	0.02249
6	(Constant)	-5.19706	0.56953		-9.12525	0.00000
	EMPBI7	0.45255	0.05038	0.50084	8.98299	0.00000
	CBPTE55	0.05254	0.02884	0.04471	1.82165	0.08213
	CBPTE31	0.18471	0.03763	0.20156	4.90824	0.00007
	W11	0.16091	0.04153	0.15604	3.87486	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02554	0.00622
	CBPTE95	0.08554	0.03432	0.05447	2.49268	0.02070
7	(Constant)	-5.21015	0.51619		-10.09347	0.00000
	EMPBI7	0.39591	0.05137	0.43816	7.70662	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19728	0.24454
	CBPTE31	0.16848	0.03477	0.18384	4.84556	0.00009
	W11	0.14404	0.03828	0.13968	3.76241	0.00114
	EMPBI15	0.04742	0.01453	0.07355	3.26372	0.00371
	CBPTE95	0.08092	0.03116	0.05152	2.59687	0.01683
	EMPBI19	0.12114	0.05037	0.11571	2.40502	0.02547
8	(Constant)	-5.30925	0.51451		-10.31909	0.00000
	EMPBI7	0.38152	0.05044	0.42223	7.56438	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78323	0.00009
	W11	0.14876	0.03845	0.14426	3.86858	0.00083
	EMPBI15	0.05187	0.01418	0.08045	3.65681	0.00139
	CBPTE95	0.10452	0.02436	0.06656	4.28997	0.00030
	EMPBI19	0.13920	0.04853	0.13297	2.86854	0.00893
a	Dependent Variable: CFS2I13					

Figure E-1-61: Continued

Regression (CFS2I14)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7
b Predictors: (Constant), EMPBI7, CBPTE55
c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31
d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11
e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15
f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95
g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25134	1	76.25134	1876.51430	0.00000
	Residual	1.09713	27	0.04063		
	Total	77.34847	28			
2	Regression	76.79170	2	38.39585	1793.00943	0.00000
	Residual	0.55677	26	0.02141		
	Total	77.34847	28			
3	Regression	76.98594	3	25.66198	1769.65981	0.00000
	Residual	0.36253	25	0.01450		
	Total	77.34847	28			
4	Regression	77.10843	4	19.27711	1927.36474	0.00000
	Residual	0.24004	24	0.01000		
	Total	77.34847	28			
5	Regression	77.15797	5	15.43159	1863.13910	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34847	28			
6	Regression	77.19991	6	12.86665	1905.36619	0.00000
	Residual	0.14856	22	0.00675		
	Total	77.34847	28			
7	Regression	77.23199	7	11.03314	1989.09528	0.00000
	Residual	0.11648	21	0.00555		
	Total	77.34847	28			
8	Regression	77.22404	6	12.87067	2275.59186	0.00000
	Residual	0.12443	22	0.00566		
	Total	77.34847	28			

a Predictors: (Constant), EMPBI7
b Predictors: (Constant), EMPBI7, CBPTE55
c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31
d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11
e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15
f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95
g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19
i Dependent Variable: CFS2I14

Figure E-1-62: Commodity Flow Production for Commodity Item 14 (CFS2I14)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.71206	0.15041		-37.97738	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31875	0.00000
2	(Constant)	-5.15484	0.15565		-33.11841	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61413	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02334	0.00003
3	(Constant)	-4.46188	0.22859		-19.51893	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62818	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60456	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65992	0.00118
4	(Constant)	-6.72810	0.67485		-9.96983	0.00000
	EMPBI7	0.51977	0.05209	0.57524	9.97896	0.00000
	CBPTE55	0.11623	0.02477	0.09890	4.69191	0.00009
	CBPTE31	0.16638	0.04489	0.18155	3.70661	0.00110
	W11	0.17330	0.04952	0.16805	3.49946	0.00184
5	(Constant)	-6.57721	0.61720		-10.65646	0.00000
	EMPBI7	0.44790	0.05577	0.49569	8.03112	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36334	0.00023
	CBPTE31	0.18667	0.04168	0.20369	4.47841	0.00017
	W11	0.18057	0.04516	0.17510	3.99815	0.00057
	EMPBI15	0.04301	0.01758	0.06670	2.44575	0.02252
6	(Constant)	-6.28285	0.56968		-11.02872	0.00000
	EMPBI7	0.45255	0.05039	0.50085	8.98069	0.00000
	CBPTE55	0.05255	0.02885	0.04471	1.82141	0.08217
	CBPTE31	0.18473	0.03764	0.20158	4.90733	0.00007
	W11	0.16089	0.04154	0.15601	3.87320	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02452	0.00623
	CBPTE95	0.08554	0.03433	0.05447	2.49203	0.02072
7	(Constant)	-6.29594	0.51634		-12.19346	0.00000
	EMPBI7	0.39591	0.05139	0.43815	7.70432	0.00000
	CBPTE55	0.03280	0.02740	0.02792	1.19705	0.24463
	CBPTE31	0.16849	0.03478	0.18385	4.84454	0.00009
	W11	0.14401	0.03830	0.13965	3.76058	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26254	0.00372
	CBPTE95	0.08092	0.03117	0.05152	2.59613	0.01686
	EMPBI19	0.12116	0.05038	0.11574	2.40488	0.02548
8	(Constant)	-6.39505	0.51465		-12.42606	0.00000
	EMPBI7	0.38151	0.05045	0.42222	7.56219	0.00000
	CBPTE31	0.16794	0.03512	0.18325	4.78228	0.00009
	W11	0.14873	0.03846	0.14423	3.86678	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65560	0.00139
	CBPTE95	0.10453	0.02437	0.06656	4.28889	0.00030
	EMPBI19	0.13923	0.04854	0.13299	2.86835	0.00893
a	Dependent Variable: CFS2I14					

Figure E-1-62: Continued

Regression (CFS2I15)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14632
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09099
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25063	1	76.25063	1876.71164	0.00000
	Residual	1.09701	27	0.04063		
	Total	77.34764	28			
2	Regression	76.79096	2	38.39548	1793.29159	0.00000
	Residual	0.55668	26	0.02141		
	Total	77.34764	28			
3	Regression	76.98519	3	25.66173	1770.01301	0.00000
	Residual	0.36245	25	0.01450		
	Total	77.34764	28			
4	Regression	77.10767	4	19.27692	1927.93679	0.00000
	Residual	0.23997	24	0.01000		
	Total	77.34764	28			
5	Regression	77.15722	5	15.43144	1863.92791	0.00000
	Residual	0.19042	23	0.00828		
	Total	77.34764	28			
6	Regression	77.19912	6	12.86652	1905.89786	0.00000
	Residual	0.14852	22	0.00675		
	Total	77.34764	28			
7	Regression	77.23120	7	11.03303	1989.87781	0.00000
	Residual	0.11644	21	0.00554		
	Total	77.34764	28			
8	Regression	77.22325	6	12.87054	2276.28141	0.00000
	Residual	0.12439	22	0.00565		
	Total	77.34764	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I15

Figure E-1-63: Commodity Flow Production for Commodity Item 15 (CFS2I15)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.30757	0.15040		-8.69407	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32103	0.00000
2	(Constant)	-0.75037	0.15564		-4.82131	0.00005
	EMPBI7	0.79574	0.02517	0.88066	31.61673	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02361	0.00003
3	(Constant)	-0.05744	0.22857		-0.25129	0.80365
	EMPBI7	0.61697	0.05305	0.68281	11.62952	0.00000
	CBPTE55	0.15214	0.02714	0.12947	5.60498	0.00001
	CBPTE31	0.19459	0.05316	0.21233	3.66014	0.00118
4	(Constant)	-2.32363	0.67474		-3.44374	0.00212
	EMPBI7	0.51978	0.05208	0.57525	9.98064	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69246	0.00009
	CBPTE31	0.16637	0.04488	0.18154	3.70699	0.00110
	W11	0.17330	0.04952	0.16805	3.49996	0.00184
5	(Constant)	-2.17274	0.61707		-3.52105	0.00183
	EMPBI7	0.44790	0.05576	0.49570	8.03288	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36405	0.00023
	CBPTE31	0.18666	0.04167	0.20368	4.47923	0.00017
	W11	0.18057	0.04515	0.17510	3.99899	0.00056
	EMPBI15	0.04301	0.01758	0.06671	2.44650	0.02249
6	(Constant)	-1.87851	0.56960		-3.29796	0.00328
	EMPBI7	0.45255	0.05038	0.50085	8.98197	0.00000
	CBPTE55	0.05256	0.02885	0.04473	1.82229	0.08203
	CBPTE31	0.18473	0.03764	0.20157	4.90790	0.00007
	W11	0.16090	0.04153	0.15602	3.87396	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02503	0.00622
	CBPTE95	0.08550	0.03432	0.05444	2.49121	0.02076
7	(Constant)	-1.89161	0.51623		-3.66425	0.00145
	EMPBI7	0.39590	0.05138	0.43815	7.70579	0.00000
	CBPTE55	0.03282	0.02740	0.02793	1.19790	0.24430
	CBPTE31	0.16848	0.03477	0.18385	4.84533	0.00009
	W11	0.14402	0.03829	0.13966	3.76153	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26329	0.00371
	CBPTE95	0.08088	0.03116	0.05150	2.59535	0.01689
	EMPBI19	0.12117	0.05037	0.11575	2.40551	0.02545
8	(Constant)	-1.99076	0.51457		-3.86880	0.00083
	EMPBI7	0.38150	0.05044	0.42221	7.56314	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78284	0.00009
	W11	0.14874	0.03846	0.14424	3.86764	0.00083
	EMPBI15	0.05187	0.01419	0.08045	3.65641	0.00139
	CBPTE95	0.10450	0.02437	0.06654	4.28838	0.00030
	EMPBI19	0.13925	0.04853	0.13301	2.86915	0.00891
a	Dependent Variable: CFS2I15					

Figure E-1-63: Continued

Regression (CFS2I17)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25098	1	76.25098	1876.44898	0.00000
	Residual	1.09717	27	0.04064		
	Total	77.34815	28			
2	Regression	76.79135	2	38.39568	1792.91770	0.00000
	Residual	0.55679	26	0.02142		
	Total	77.34815	28			
3	Regression	76.98560	3	25.66187	1769.53525	0.00000
	Residual	0.36255	25	0.01450		
	Total	77.34815	28			
4	Regression	77.10810	4	19.27703	1927.33098	0.00000
	Residual	0.24005	24	0.01000		
	Total	77.34815	28			
5	Regression	77.15765	5	15.43153	1863.14573	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34815	28			
6	Regression	77.19958	6	12.86660	1905.24743	0.00000
	Residual	0.14857	22	0.00675		
	Total	77.34815	28			
7	Regression	77.23166	7	11.03309	1988.91961	0.00000
	Residual	0.11649	21	0.00555		
	Total	77.34815	28			
8	Regression	77.22371	6	12.87062	2275.37137	0.00000
	Residual	0.12444	22	0.00566		
	Total	77.34815	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I17

Figure E-1-64: Commodity Flow Production for Commodity Item 17 (CFS2I17)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.16345	0.15041		-14.38376	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31800	0.00000
2	(Constant)	-1.60622	0.15565		-10.31930	0.00000
	EMPBI7	0.79574	0.02517	0.88065	31.61328	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02325	0.00003
3	(Constant)	-0.91326	0.22860		-3.99501	0.00050
	EMPBI7	0.61696	0.05306	0.68280	11.62773	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60441	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65982	0.00118
4	(Constant)	-3.17967	0.67485		-4.71167	0.00009
	EMPBI7	0.51976	0.05209	0.57522	9.97867	0.00000
	CBPTE55	0.11623	0.02477	0.09890	4.69179	0.00009
	CBPTE31	0.16638	0.04489	0.18155	3.70656	0.00110
	W11	0.17332	0.04952	0.16807	3.49973	0.00184
5	(Constant)	-3.02878	0.61720		-4.90727	0.00006
	EMPBI7	0.44788	0.05577	0.49568	8.03088	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36324	0.00023
	CBPTE31	0.18667	0.04168	0.20369	4.47842	0.00017
	W11	0.18059	0.04516	0.17512	3.99850	0.00056
	EMPBI15	0.04301	0.01758	0.06670	2.44587	0.02252
6	(Constant)	-2.73445	0.56970		-4.79983	0.00009
	EMPBI7	0.45254	0.05039	0.50083	8.98012	0.00000
	CBPTE55	0.05255	0.02885	0.04472	1.82147	0.08216
	CBPTE31	0.18473	0.03764	0.20158	4.90719	0.00007
	W11	0.16090	0.04154	0.15603	3.87351	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02451	0.00623
	CBPTE95	0.08553	0.03433	0.05446	2.49166	0.02074
7	(Constant)	-2.74755	0.51636		-5.32099	0.00003
	EMPBI7	0.39589	0.05139	0.43814	7.70371	0.00000
	CBPTE55	0.03281	0.02741	0.02792	1.19713	0.24460
	CBPTE31	0.16849	0.03478	0.18385	4.84434	0.00009
	W11	0.14403	0.03830	0.13967	3.76088	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26250	0.00372
	CBPTE95	0.08091	0.03117	0.05152	2.59569	0.01687
	EMPBI19	0.12116	0.05038	0.11574	2.40473	0.02549
8	(Constant)	-2.84666	0.51467		-5.53102	0.00001
	EMPBI7	0.38149	0.05045	0.42221	7.56152	0.00000
	CBPTE31	0.16794	0.03512	0.18325	4.78206	0.00009
	W11	0.14875	0.03847	0.14425	3.86707	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65556	0.00139
	CBPTE95	0.10452	0.02437	0.06655	4.28837	0.00030
	EMPBI19	0.13923	0.04854	0.13299	2.86822	0.00893
a	Dependent Variable: CFS2I17					

Figure E-1-64: Continued

Regression (CFS2I18)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.24965	1	76.24965	1876.55650	0.00000
	Residual	1.09708	27	0.04063		
	Total	77.34674	28			
2	Regression	76.78997	2	38.39499	1792.97534	0.00000
	Residual	0.55677	26	0.02141		
	Total	77.34674	28			
3	Regression	76.98422	3	25.66141	1769.64575	0.00000
	Residual	0.36252	25	0.01450		
	Total	77.34674	28			
4	Regression	77.10668	4	19.27667	1927.22573	0.00000
	Residual	0.24005	24	0.01000		
	Total	77.34674	28			
5	Regression	77.15623	5	15.43125	1863.06239	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34674	28			
6	Regression	77.19816	6	12.86636	1905.07811	0.00000
	Residual	0.14858	22	0.00675		
	Total	77.34674	28			
7	Regression	77.23025	7	11.03289	1989.00802	0.00000
	Residual	0.11649	21	0.00555		
	Total	77.34674	28			
8	Regression	77.22230	6	12.87038	2275.51246	0.00000
	Residual	0.12443	22	0.00566		
	Total	77.34674	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I18

Figure E-1-65: Commodity Flow Production for Commodity Item 18 (CFS2I18)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.61682	0.15040		-10.74987	0.00000
	EMPBI7	0.89713	0.02071	0.99288	43.31924	0.00000
2	(Constant)	-1.05962	0.15565		-6.80778	0.00000
	EMPBI7	0.79573	0.02517	0.88066	31.61397	0.00000
	CBPTE55	0.16443	0.03274	0.13993	5.02313	0.00003
3	(Constant)	-0.36665	0.22859		-1.60397	0.12128
	EMPBI7	0.61695	0.05306	0.68280	11.62813	0.00000
	CBPTE55	0.15214	0.02715	0.12946	5.60433	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65998	0.00118
4	(Constant)	-2.63271	0.67486		-3.90111	0.00068
	EMPBI7	0.51977	0.05209	0.57524	9.97871	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69160	0.00009
	CBPTE31	0.16638	0.04489	0.18156	3.70660	0.00110
	W11	0.17329	0.04952	0.16804	3.49913	0.00185
5	(Constant)	-2.48182	0.61721		-4.02103	0.00053
	EMPBI7	0.44789	0.05577	0.49569	8.03094	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36304	0.00023
	CBPTE31	0.18667	0.04168	0.20369	4.47850	0.00017
	W11	0.18056	0.04516	0.17509	3.99786	0.00057
	EMPBI15	0.04301	0.01759	0.06671	2.44593	0.02252
6	(Constant)	-2.18751	0.56972		-3.83964	0.00089
	EMPBI7	0.45255	0.05040	0.50084	8.97997	0.00000
	CBPTE55	0.05255	0.02885	0.04472	1.82140	0.08217
	CBPTE31	0.18474	0.03765	0.20158	4.90717	0.00007
	W11	0.16088	0.04154	0.15601	3.87276	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02448	0.00623
	CBPTE95	0.08552	0.03433	0.05446	2.49141	0.02075
7	(Constant)	-2.20061	0.51634		-4.26191	0.00035
	EMPBI7	0.39588	0.05139	0.43814	7.70382	0.00000
	CBPTE55	0.03280	0.02741	0.02791	1.19697	0.24466
	CBPTE31	0.16849	0.03478	0.18386	4.84453	0.00009
	W11	0.14400	0.03830	0.13964	3.76022	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26267	0.00372
	CBPTE95	0.08090	0.03117	0.05151	2.59555	0.01688
	EMPBI19	0.12119	0.05038	0.11577	2.40547	0.02545
8	(Constant)	-2.29970	0.51465		-4.46847	0.00019
	EMPBI7	0.38149	0.05045	0.42220	7.56173	0.00000
	CBPTE31	0.16794	0.03512	0.18325	4.78229	0.00009
	W11	0.14872	0.03846	0.14422	3.86643	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65572	0.00139
	CBPTE95	0.10451	0.02437	0.06655	4.28810	0.00030
	EMPBI19	0.13926	0.04854	0.13302	2.86896	0.00892
a	Dependent Variable: CFS2I18					

Figure E-1-65: Continued

Regression (CFS2I19)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25053	1	76.25053	1876.46565	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34768	28			
2	Regression	76.79088	2	38.39544	1792.89628	0.00000
	Residual	0.55680	26	0.02142		
	Total	77.34768	28			
3	Regression	76.98513	3	25.66171	1769.51257	0.00000
	Residual	0.36255	25	0.01450		
	Total	77.34768	28			
4	Regression	77.10762	4	19.27691	1927.22058	0.00000
	Residual	0.24006	24	0.01000		
	Total	77.34768	28			
5	Regression	77.15718	5	15.43144	1863.06543	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34768	28			
6	Regression	77.19911	6	12.86652	1905.22425	0.00000
	Residual	0.14857	22	0.00675		
	Total	77.34768	28			
7	Regression	77.23119	7	11.03303	1988.87848	0.00000
	Residual	0.11649	21	0.00555		
	Total	77.34768	28			
8	Regression	77.22324	6	12.87054	2275.37671	0.00000
	Residual	0.12444	22	0.00566		
	Total	77.34768	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I19

Figure E-1-66: Commodity Flow Production for Commodity Item 19 (CFS2I19)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.58623	0.15041		-30.49194	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31819	0.00000
2	(Constant)	-4.02902	0.15565		-25.88465	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61316	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02315	0.00003
3	(Constant)	-3.33605	0.22860		-14.59337	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62767	0.00000
	CBPTE55	0.15214	0.02715	0.12947	5.60428	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65981	0.00118
4	(Constant)	-5.60237	0.67487		-8.30144	0.00000
	EMPBI7	0.51976	0.05209	0.57523	9.97847	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69161	0.00009
	CBPTE31	0.16638	0.04489	0.18155	3.70649	0.00110
	W11	0.17331	0.04952	0.16806	3.49950	0.00184
5	(Constant)	-5.45147	0.61721		-8.83240	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03071	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36306	0.00023
	CBPTE31	0.18667	0.04168	0.20369	4.47840	0.00017
	W11	0.18058	0.04516	0.17511	3.99828	0.00056
	EMPBI15	0.04301	0.01759	0.06671	2.44596	0.02251
6	(Constant)	-5.15712	0.56970		-9.05237	0.00000
	EMPBI7	0.45254	0.05039	0.50083	8.98007	0.00000
	CBPTE55	0.05254	0.02885	0.04471	1.82126	0.08220
	CBPTE31	0.18473	0.03765	0.20158	4.90724	0.00007
	W11	0.16090	0.04154	0.15602	3.87330	0.00082
	EMPBI15	0.04849	0.01603	0.07519	3.02467	0.00623
	CBPTE95	0.08553	0.03433	0.05446	2.49183	0.02073
7	(Constant)	-5.17022	0.51636		-10.01275	0.00000
	EMPBI7	0.39589	0.05139	0.43814	7.70365	0.00000
	CBPTE55	0.03280	0.02741	0.02791	1.19692	0.24468
	CBPTE31	0.16849	0.03478	0.18386	4.84439	0.00009
	W11	0.14402	0.03830	0.13966	3.76065	0.00115
	EMPBI15	0.04742	0.01454	0.07355	3.26266	0.00372
	CBPTE95	0.08091	0.03117	0.05152	2.59587	0.01687
	EMPBI19	0.12116	0.05038	0.11573	2.40468	0.02549
8	(Constant)	-5.26931	0.51467		-10.23825	0.00000
	EMPBI7	0.38150	0.05045	0.42221	7.56160	0.00000
	CBPTE31	0.16794	0.03512	0.18325	4.78216	0.00009
	W11	0.14874	0.03847	0.14424	3.86687	0.00083
	EMPBI15	0.05187	0.01419	0.08045	3.65571	0.00139
	CBPTE95	0.10452	0.02437	0.06655	4.28848	0.00030
	EMPBI19	0.13922	0.04854	0.13299	2.86813	0.00893
a	Dependent Variable: CFS2I19					

Figure E-1-66: Continued

Regression (CFS2I21)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09099
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.24963	1	76.24963	1876.55725	0.00000
	Residual	1.09708	27	0.04063		
	Total	77.34671	28			
2	Regression	76.79001	2	38.39500	1793.19028	0.00000
	Residual	0.55670	26	0.02141		
	Total	77.34671	28			
3	Regression	76.98427	3	25.66142	1770.05392	0.00000
	Residual	0.36244	25	0.01450		
	Total	77.34671	28			
4	Regression	77.10674	4	19.27669	1927.92920	0.00000
	Residual	0.23997	24	0.01000		
	Total	77.34671	28			
5	Regression	77.15628	5	15.43126	1863.83526	0.00000
	Residual	0.19042	23	0.00828		
	Total	77.34671	28			
6	Regression	77.19819	6	12.86636	1905.82980	0.00000
	Residual	0.14852	22	0.00675		
	Total	77.34671	28			
7	Regression	77.23027	7	11.03290	1989.80663	0.00000
	Residual	0.11644	21	0.00554		
	Total	77.34671	28			
8	Regression	77.22231	6	12.87039	2276.13980	0.00000
	Residual	0.12440	22	0.00565		
	Total	77.34671	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I21

Figure E-1-67: Commodity Flow Production for Commodity Item 21 (CFS2I21)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.78482	0.15040		-38.46203	0.00000
	EMPBI7	0.89713	0.02071	0.99288	43.31925	0.00000
2	(Constant)	-5.22759	0.15564		-33.58790	0.00000
	EMPBI7	0.79573	0.02517	0.88065	31.61560	0.00000
	CBPTE55	0.16444	0.03273	0.13994	5.02373	0.00003
3	(Constant)	-4.53460	0.22856		-19.83947	0.00000
	EMPBI7	0.61694	0.05305	0.68278	11.62920	0.00000
	CBPTE55	0.15215	0.02714	0.12947	5.60532	0.00001
	CBPTE31	0.19461	0.05316	0.21235	3.66056	0.00118
4	(Constant)	-6.80069	0.67474		-10.07899	0.00000
	EMPBI7	0.51975	0.05208	0.57523	9.98023	0.00000
	CBPTE55	0.11623	0.02477	0.09891	4.69281	0.00009
	CBPTE31	0.16639	0.04488	0.18157	3.70745	0.00110
	W11	0.17329	0.04952	0.16805	3.49982	0.00184
5	(Constant)	-6.64981	0.61708		-10.77622	0.00000
	EMPBI7	0.44788	0.05576	0.49568	8.03243	0.00000
	CBPTE55	0.10172	0.02331	0.08656	4.36438	0.00023
	CBPTE31	0.18668	0.04167	0.20370	4.47958	0.00017
	W11	0.18056	0.04515	0.17510	3.99874	0.00056
	EMPBI15	0.04301	0.01758	0.06670	2.44623	0.02250
6	(Constant)	-6.35557	0.56961		-11.15786	0.00000
	EMPBI7	0.45254	0.05039	0.50083	8.98153	0.00000
	CBPTE55	0.05257	0.02885	0.04474	1.82252	0.08200
	CBPTE31	0.18474	0.03764	0.20159	4.90831	0.00007
	W11	0.16089	0.04153	0.15601	3.87370	0.00082
	EMPBI15	0.04848	0.01603	0.07518	3.02477	0.00623
	CBPTE95	0.08550	0.03432	0.05444	2.49129	0.02076
7	(Constant)	-6.36867	0.51624		-12.33665	0.00000
	EMPBI7	0.39588	0.05138	0.43813	7.70536	0.00000
	CBPTE55	0.03283	0.02740	0.02794	1.19814	0.24421
	CBPTE31	0.16850	0.03477	0.18387	4.84579	0.00009
	W11	0.14401	0.03829	0.13965	3.76124	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26299	0.00372
	CBPTE95	0.08088	0.03116	0.05150	2.59544	0.01688
	EMPBI19	0.12117	0.05037	0.11575	2.40551	0.02545
8	(Constant)	-6.46784	0.51458		-12.56916	0.00000
	EMPBI7	0.38148	0.05044	0.42219	7.56254	0.00000
	CBPTE31	0.16795	0.03511	0.18326	4.78322	0.00009
	W11	0.14874	0.03846	0.14423	3.86732	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65613	0.00139
	CBPTE95	0.10451	0.02437	0.06654	4.28864	0.00030
	EMPBI19	0.13925	0.04853	0.13302	2.86919	0.00891
a	Dependent Variable: CFS2I21					

Figure E-1-67: Continued

Regression (CFS2I26)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09098
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25127	1	76.25127	1876.61228	0.00000
	Residual	1.09707	27	0.04063		
	Total	77.34834	28			
2	Regression	76.79165	2	38.39582	1793.25126	0.00000
	Residual	0.55669	26	0.02141		
	Total	77.34834	28			
3	Regression	76.98590	3	25.66197	1770.05235	0.00000
	Residual	0.36245	25	0.01450		
	Total	77.34834	28			
4	Regression	77.10838	4	19.27710	1928.03382	0.00000
	Residual	0.23996	24	0.01000		
	Total	77.34834	28			
5	Regression	77.15794	5	15.43159	1864.12712	0.00000
	Residual	0.19040	23	0.00828		
	Total	77.34834	28			
6	Regression	77.19984	6	12.86664	1906.10950	0.00000
	Residual	0.14850	22	0.00675		
	Total	77.34834	28			
7	Regression	77.23190	7	11.03313	1989.83697	0.00000
	Residual	0.11644	21	0.00554		
	Total	77.34834	28			
8	Regression	77.22394	6	12.87066	2276.12725	0.00000
	Residual	0.12440	22	0.00565		
	Total	77.34834	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I26

Figure E-1-68: Commodity Flow Production for Commodity Item 26 (CFS2I26)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.45811	0.15040		-29.64113	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31988	0.00000
2	(Constant)	-3.90088	0.15564		-25.06379	0.00000
	EMPBI7	0.79574	0.02517	0.88065	31.61619	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02376	0.00003
3	(Constant)	-3.20791	0.22857		-14.03489	0.00000
	EMPBI7	0.61696	0.05305	0.68280	11.62939	0.00000
	CBPTE55	0.15215	0.02714	0.12947	5.60527	0.00001
	CBPTE31	0.19460	0.05316	0.21234	3.66037	0.00118
4	(Constant)	-5.47416	0.67473		-8.11313	0.00000
	EMPBI7	0.51976	0.05208	0.57523	9.98059	0.00000
	CBPTE55	0.11623	0.02477	0.09891	4.69281	0.00009
	CBPTE31	0.16638	0.04488	0.18155	3.70730	0.00110
	W11	0.17330	0.04951	0.16806	3.50011	0.00184
5	(Constant)	-5.32324	0.61704		-8.62706	0.00000
	EMPBI7	0.44788	0.05576	0.49567	8.03293	0.00000
	CBPTE55	0.10171	0.02330	0.08655	4.36447	0.00023
	CBPTE31	0.18667	0.04167	0.20369	4.47974	0.00017
	W11	0.18058	0.04515	0.17511	3.99928	0.00056
	EMPBI15	0.04302	0.01758	0.06671	2.44683	0.02247
6	(Constant)	-5.02904	0.56957		-8.82954	0.00000
	EMPBI7	0.45253	0.05038	0.50082	8.98204	0.00000
	CBPTE55	0.05257	0.02884	0.04474	1.82262	0.08198
	CBPTE31	0.18474	0.03764	0.20158	4.90848	0.00007
	W11	0.16090	0.04153	0.15603	3.87428	0.00082
	EMPBI15	0.04849	0.01603	0.07520	3.02541	0.00622
	CBPTE95	0.08550	0.03432	0.05444	2.49124	0.02076
7	(Constant)	-5.04213	0.51624		-9.76699	0.00000
	EMPBI7	0.39590	0.05138	0.43815	7.70561	0.00000
	CBPTE55	0.03283	0.02740	0.02794	1.19834	0.24414
	CBPTE31	0.16850	0.03477	0.18386	4.84575	0.00009
	W11	0.14403	0.03829	0.13967	3.76173	0.00115
	EMPBI15	0.04742	0.01453	0.07355	3.26350	0.00371
	CBPTE95	0.08087	0.03116	0.05150	2.59524	0.01689
	EMPBI19	0.12114	0.05037	0.11571	2.40478	0.02549
8	(Constant)	-5.14132	0.51459		-9.99115	0.00000
	EMPBI7	0.38149	0.05044	0.42220	7.56268	0.00000
	CBPTE31	0.16795	0.03511	0.18326	4.78313	0.00009
	W11	0.14876	0.03846	0.14425	3.86779	0.00083
	EMPBI15	0.05188	0.01419	0.08045	3.65666	0.00139
	CBPTE95	0.10450	0.02437	0.06654	4.28850	0.00030
	EMPBI19	0.13922	0.04853	0.13298	2.86846	0.00893
a	Dependent Variable: CFS2I26					

Figure E-1-68: Continued

Regression (CFS2I27)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.10000
5	0.99877	0.99754	0.99700	0.09100
6	0.99904	0.99808	0.99756	0.08217
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.24977	1	76.24977	1876.52304	0.00000
	Residual	1.09711	27	0.04063		
	Total	77.34688	28			
2	Regression	76.79011	2	38.39505	1792.96812	0.00000
	Residual	0.55677	26	0.02141		
	Total	77.34688	28			
3	Regression	76.98439	3	25.66146	1769.80824	0.00000
	Residual	0.36249	25	0.01450		
	Total	77.34688	28			
4	Regression	77.10685	4	19.27671	1927.48370	0.00000
	Residual	0.24002	24	0.01000		
	Total	77.34688	28			
5	Regression	77.15640	5	15.43128	1863.30563	0.00000
	Residual	0.19048	23	0.00828		
	Total	77.34688	28			
6	Regression	77.19832	6	12.86639	1905.36227	0.00000
	Residual	0.14856	22	0.00675		
	Total	77.34688	28			
7	Regression	77.23040	7	11.03291	1989.24789	0.00000
	Residual	0.11647	21	0.00555		
	Total	77.34688	28			
8	Regression	77.22245	6	12.87041	2275.70934	0.00000
	Residual	0.12442	22	0.00566		
	Total	77.34688	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I27

Figure E-1-69: Commodity Flow Production for Commodity Item 27 (CFS2I27)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.85713	0.15041		-45.59107	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31885	0.00000
2	(Constant)	-6.29992	0.15565		-40.47519	0.00000
	EMPBI7	0.79573	0.02517	0.88066	31.61384	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02320	0.00003
3	(Constant)	-5.60689	0.22858		-24.52918	0.00000
	EMPBI7	0.61694	0.05305	0.68278	11.62832	0.00000
	CBPTE55	0.15214	0.02715	0.12947	5.60464	0.00001
	CBPTE31	0.19462	0.05317	0.21236	3.66048	0.00118
4	(Constant)	-7.87294	0.67482		-11.66677	0.00000
	EMPBI7	0.51975	0.05208	0.57522	9.97904	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69198	0.00009
	CBPTE31	0.16640	0.04489	0.18158	3.70724	0.00110
	W11	0.17329	0.04952	0.16804	3.49934	0.00185
5	(Constant)	-7.72205	0.61717		-12.51204	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03124	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36344	0.00023
	CBPTE31	0.18669	0.04168	0.20371	4.47918	0.00017
	W11	0.18056	0.04516	0.17509	3.99809	0.00057
	EMPBI15	0.04301	0.01758	0.06670	2.44591	0.02252
6	(Constant)	-7.42776	0.56968		-13.03857	0.00000
	EMPBI7	0.45253	0.05039	0.50083	8.98039	0.00000
	CBPTE55	0.05255	0.02885	0.04472	1.82168	0.08213
	CBPTE31	0.18475	0.03764	0.20160	4.90797	0.00007
	W11	0.16088	0.04154	0.15601	3.87304	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02450	0.00623
	CBPTE95	0.08552	0.03432	0.05446	2.49151	0.02075
7	(Constant)	-7.44085	0.51631		-14.41152	0.00000
	EMPBI7	0.39588	0.05138	0.43813	7.70418	0.00000
	CBPTE55	0.03281	0.02740	0.02792	1.19729	0.24454
	CBPTE31	0.16851	0.03478	0.18388	4.84536	0.00009
	W11	0.14400	0.03829	0.13964	3.76048	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26265	0.00372
	CBPTE95	0.08090	0.03117	0.05151	2.59564	0.01688
	EMPBI19	0.12118	0.05038	0.11575	2.40531	0.02546
8	(Constant)	-7.53997	0.51463		-14.65126	0.00000
	EMPBI7	0.38148	0.05045	0.42219	7.56189	0.00000
	CBPTE31	0.16796	0.03512	0.18327	4.78302	0.00009
	W11	0.14872	0.03846	0.14422	3.86666	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65572	0.00139
	CBPTE95	0.10451	0.02437	0.06655	4.28840	0.00030
	EMPBI19	0.13925	0.04854	0.13301	2.86884	0.00892
a	Dependent Variable: CFS2I27					

Figure E-1-69: Continued

Regression (CFS2I28)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08217
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25106	1	76.25106	1876.51261	0.00000
	Residual	1.09713	27	0.04063		
	Total	77.34819	28			
2	Regression	76.79142	2	38.39571	1793.00230	0.00000
	Residual	0.55677	26	0.02141		
	Total	77.34819	28			
3	Regression	76.98564	3	25.66188	1769.55982	0.00000
	Residual	0.36255	25	0.01450		
	Total	77.34819	28			
4	Regression	77.10815	4	19.27704	1927.40220	0.00000
	Residual	0.24004	24	0.01000		
	Total	77.34819	28			
5	Regression	77.15770	5	15.43154	1863.19918	0.00000
	Residual	0.19049	23	0.00828		
	Total	77.34819	28			
6	Regression	77.19964	6	12.86661	1905.49401	0.00000
	Residual	0.14855	22	0.00675		
	Total	77.34819	28			
7	Regression	77.23173	7	11.03310	1989.40288	0.00000
	Residual	0.11646	21	0.00555		
	Total	77.34819	28			
8	Regression	77.22378	6	12.87063	2275.99421	0.00000
	Residual	0.12441	22	0.00565		
	Total	77.34819	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I28

Figure E-1-70: Commodity Flow Production for Commodity Item 28 (CFS2I28)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.19704	0.15041		-41.20187	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31873	0.00000
2	(Constant)	-5.63982	0.15565		-36.23426	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61407	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02332	0.00003
3	(Constant)	-4.94689	0.22860		-21.64010	0.00000
	EMPBI7	0.61697	0.05306	0.68281	11.62801	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60441	0.00001
	CBPTE31	0.19459	0.05317	0.21233	3.65964	0.00118
4	(Constant)	-7.21334	0.67484		-10.68900	0.00000
	EMPBI7	0.51977	0.05209	0.57523	9.97903	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69182	0.00009
	CBPTE31	0.16637	0.04489	0.18154	3.70638	0.00110
	W11	0.17332	0.04952	0.16807	3.49985	0.00184
5	(Constant)	-7.06245	0.61719		-11.44286	0.00000
	EMPBI7	0.44789	0.05577	0.49569	8.03121	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36326	0.00023
	CBPTE31	0.18665	0.04168	0.20367	4.47820	0.00017
	W11	0.18059	0.04516	0.17512	3.99861	0.00056
	EMPBI15	0.04301	0.01758	0.06670	2.44582	0.02252
6	(Constant)	-6.76808	0.56966		-11.88089	0.00000
	EMPBI7	0.45255	0.05039	0.50084	8.98095	0.00000
	CBPTE55	0.05254	0.02885	0.04471	1.82127	0.08219
	CBPTE31	0.18472	0.03764	0.20156	4.90719	0.00007
	W11	0.16090	0.04154	0.15603	3.87374	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02467	0.00623
	CBPTE95	0.08554	0.03432	0.05447	2.49223	0.02072
7	(Constant)	-6.78117	0.51630		-13.13424	0.00000
	EMPBI7	0.39590	0.05138	0.43814	7.70473	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19684	0.24470
	CBPTE31	0.16848	0.03478	0.18384	4.84452	0.00009
	W11	0.14403	0.03829	0.13966	3.76126	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26285	0.00372
	CBPTE95	0.08092	0.03117	0.05153	2.59643	0.01685
	EMPBI19	0.12118	0.05038	0.11575	2.40536	0.02546
8	(Constant)	-6.88025	0.51460		-13.37005	0.00000
	EMPBI7	0.38150	0.05045	0.42222	7.56274	0.00000
	CBPTE31	0.16792	0.03511	0.18324	4.78231	0.00009
	W11	0.14875	0.03846	0.14424	3.86748	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65589	0.00139
	CBPTE95	0.10452	0.02437	0.06655	4.28916	0.00030
	EMPBI19	0.13924	0.04854	0.13300	2.86883	0.00892
a	Dependent Variable: CFS2I28					

Figure E-1-70: Continued

Regression (CFS2I29)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14634
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25053	1	76.25053	1876.46565	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34768	28			
2	Regression	76.79088	2	38.39544	1792.89628	0.00000
	Residual	0.55680	26	0.02142		
	Total	77.34768	28			
3	Regression	76.98513	3	25.66171	1769.51257	0.00000
	Residual	0.36255	25	0.01450		
	Total	77.34768	28			
4	Regression	77.10762	4	19.27691	1927.22058	0.00000
	Residual	0.24006	24	0.01000		
	Total	77.34768	28			
5	Regression	77.15718	5	15.43144	1863.06543	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34768	28			
6	Regression	77.19911	6	12.86652	1905.22425	0.00000
	Residual	0.14857	22	0.00675		
	Total	77.34768	28			
7	Regression	77.23119	7	11.03303	1988.87848	0.00000
	Residual	0.11649	21	0.00555		
	Total	77.34768	28			
8	Regression	77.22324	6	12.87054	2275.37671	0.00000
	Residual	0.12444	22	0.00566		
	Total	77.34768	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I29

Figure E-1-71: Commodity Flow Production for Commodity Item 29 (CFS2I29)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-7.26913	0.15041		-48.32941	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31819	0.00000
2	(Constant)	-6.71192	0.15565		-43.12109	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61316	0.00000
	CBPTE55	0.16444	0.03274	0.13993	5.02315	0.00003
3	(Constant)	-6.01895	0.22860		-26.32956	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62767	0.00000
	CBPTE55	0.15214	0.02715	0.12947	5.60428	0.00001
	CBPTE31	0.19460	0.05317	0.21234	3.65981	0.00118
4	(Constant)	-8.28527	0.67487		-12.27689	0.00000
	EMPBI7	0.51976	0.05209	0.57523	9.97847	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69161	0.00009
	CBPTE31	0.16638	0.04489	0.18155	3.70649	0.00110
	W11	0.17331	0.04952	0.16806	3.49950	0.00184
5	(Constant)	-8.13437	0.61721		-13.17920	0.00000
	EMPBI7	0.44788	0.05577	0.49568	8.03071	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36306	0.00023
	CBPTE31	0.18667	0.04168	0.20369	4.47840	0.00017
	W11	0.18058	0.04516	0.17511	3.99828	0.00056
	EMPBI15	0.04301	0.01759	0.06671	2.44596	0.02251
6	(Constant)	-7.84002	0.56970		-13.76169	0.00000
	EMPBI7	0.45254	0.05039	0.50083	8.98007	0.00000
	CBPTE55	0.05254	0.02885	0.04471	1.82126	0.08220
	CBPTE31	0.18473	0.03765	0.20158	4.90724	0.00007
	W11	0.16090	0.04154	0.15602	3.87330	0.00082
	EMPBI15	0.04849	0.01603	0.07519	3.02467	0.00623
	CBPTE95	0.08553	0.03433	0.05446	2.49183	0.02073
7	(Constant)	-7.85312	0.51636		-15.20851	0.00000
	EMPBI7	0.39589	0.05139	0.43814	7.70365	0.00000
	CBPTE55	0.03280	0.02741	0.02791	1.19692	0.24468
	CBPTE31	0.16849	0.03478	0.18386	4.84439	0.00009
	W11	0.14402	0.03830	0.13966	3.76065	0.00115
	EMPBI15	0.04742	0.01454	0.07355	3.26266	0.00372
	CBPTE95	0.08091	0.03117	0.05152	2.59587	0.01687
	EMPBI19	0.12116	0.05038	0.11573	2.40468	0.02549
8	(Constant)	-7.95221	0.51467		-15.45110	0.00000
	EMPBI7	0.38150	0.05045	0.42221	7.56160	0.00000
	CBPTE31	0.16794	0.03512	0.18325	4.78216	0.00009
	W11	0.14874	0.03847	0.14424	3.86687	0.00083
	EMPBI15	0.05187	0.01419	0.08045	3.65571	0.00139
	CBPTE95	0.10452	0.02437	0.06655	4.28848	0.00030
	EMPBI19	0.13922	0.04854	0.13299	2.86813	0.00893
a	Dependent Variable: CFS2I29					

Figure E-1-71: Continued

Regression (CFS2I31)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14632
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09099
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25063	1	76.25063	1876.71164	0.00000
	Residual	1.09701	27	0.04063		
	Total	77.34764	28			
2	Regression	76.79096	2	38.39548	1793.29159	0.00000
	Residual	0.55668	26	0.02141		
	Total	77.34764	28			
3	Regression	76.98519	3	25.66173	1770.01301	0.00000
	Residual	0.36245	25	0.01450		
	Total	77.34764	28			
4	Regression	77.10767	4	19.27692	1927.93679	0.00000
	Residual	0.23997	24	0.01000		
	Total	77.34764	28			
5	Regression	77.15722	5	15.43144	1863.92791	0.00000
	Residual	0.19042	23	0.00828		
	Total	77.34764	28			
6	Regression	77.19912	6	12.86652	1905.89786	0.00000
	Residual	0.14852	22	0.00675		
	Total	77.34764	28			
7	Regression	77.23120	7	11.03303	1989.87781	0.00000
	Residual	0.11644	21	0.00554		
	Total	77.34764	28			
8	Regression	77.22325	6	12.87054	2276.28141	0.00000
	Residual	0.12439	22	0.00565		
	Total	77.34764	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I31

Figure E-1-72: Commodity Flow Within in Utah for Commodity Item 31 (CFS2I31)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.43837	0.15040		-22.86178	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32103	0.00000
2	(Constant)	-2.88117	0.15564		-18.51225	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61673	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02361	0.00003
3	(Constant)	-2.18824	0.22857		-9.57366	0.00000
	EMPBI7	0.61697	0.05305	0.68281	11.62952	0.00000
	CBPTE55	0.15214	0.02714	0.12947	5.60498	0.00001
	CBPTE31	0.19459	0.05316	0.21233	3.66014	0.00118
4	(Constant)	-4.45443	0.67474		-6.60169	0.00000
	EMPBI7	0.51978	0.05208	0.57525	9.98064	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69246	0.00009
	CBPTE31	0.16637	0.04488	0.18154	3.70699	0.00110
	W11	0.17330	0.04952	0.16805	3.49996	0.00184
5	(Constant)	-4.30354	0.61707		-6.97414	0.00000
	EMPBI7	0.44790	0.05576	0.49570	8.03288	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36405	0.00023
	CBPTE31	0.18666	0.04167	0.20368	4.47923	0.00017
	W11	0.18057	0.04515	0.17510	3.99899	0.00056
	EMPBI15	0.04301	0.01758	0.06671	2.44650	0.02249
6	(Constant)	-4.00931	0.56960		-7.03884	0.00000
	EMPBI7	0.45255	0.05038	0.50085	8.98197	0.00000
	CBPTE55	0.05256	0.02885	0.04473	1.82229	0.08203
	CBPTE31	0.18473	0.03764	0.20157	4.90790	0.00007
	W11	0.16090	0.04153	0.15602	3.87396	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02503	0.00622
	CBPTE95	0.08550	0.03432	0.05444	2.49121	0.02076
7	(Constant)	-4.02241	0.51623		-7.79183	0.00000
	EMPBI7	0.39590	0.05138	0.43815	7.70579	0.00000
	CBPTE55	0.03282	0.02740	0.02793	1.19790	0.24430
	CBPTE31	0.16848	0.03477	0.18385	4.84533	0.00009
	W11	0.14402	0.03829	0.13966	3.76153	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26329	0.00371
	CBPTE95	0.08088	0.03116	0.05150	2.59535	0.01689
	EMPBI19	0.12117	0.05037	0.11575	2.40551	0.02545
8	(Constant)	-4.12156	0.51457		-8.00976	0.00000
	EMPBI7	0.38150	0.05044	0.42221	7.56314	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78284	0.00009
	W11	0.14874	0.03846	0.14424	3.86764	0.00083
	EMPBI15	0.05187	0.01419	0.08045	3.65641	0.00139
	CBPTE95	0.10450	0.02437	0.06654	4.28838	0.00030
	EMPBI19	0.13925	0.04853	0.13301	2.86915	0.00891
a	Dependent Variable: CFS2I31					

Figure E-1-72: Continued

Regression (CFS2I32)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09098
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25127	1	76.25127	1876.61228	0.00000
	Residual	1.09707	27	0.04063		
	Total	77.34834	28			
2	Regression	76.79165	2	38.39582	1793.25126	0.00000
	Residual	0.55669	26	0.02141		
	Total	77.34834	28			
3	Regression	76.98590	3	25.66197	1770.05235	0.00000
	Residual	0.36245	25	0.01450		
	Total	77.34834	28			
4	Regression	77.10838	4	19.27710	1928.03382	0.00000
	Residual	0.23996	24	0.01000		
	Total	77.34834	28			
5	Regression	77.15794	5	15.43159	1864.12712	0.00000
	Residual	0.19040	23	0.00828		
	Total	77.34834	28			
6	Regression	77.19984	6	12.86664	1906.10950	0.00000
	Residual	0.14850	22	0.00675		
	Total	77.34834	28			
7	Regression	77.23190	7	11.03313	1989.83697	0.00000
	Residual	0.11644	21	0.00554		
	Total	77.34834	28			
8	Regression	77.22394	6	12.87066	2276.12725	0.00000
	Residual	0.12440	22	0.00565		
	Total	77.34834	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I32

Figure E-1-73: Commodity Flow Within in Utah for Commodity Item 32 (CFS2I32)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.94611	0.15040		-26.23694	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31988	0.00000
2	(Constant)	-3.38888	0.15564		-21.77410	0.00000
	EMPBI7	0.79574	0.02517	0.88065	31.61619	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02376	0.00003
3	(Constant)	-2.69591	0.22857		-11.79485	0.00000
	EMPBI7	0.61696	0.05305	0.68280	11.62939	0.00000
	CBPTE55	0.15215	0.02714	0.12947	5.60527	0.00001
	CBPTE31	0.19460	0.05316	0.21234	3.66037	0.00118
4	(Constant)	-4.96216	0.67473		-7.35430	0.00000
	EMPBI7	0.51976	0.05208	0.57523	9.98059	0.00000
	CBPTE55	0.11623	0.02477	0.09891	4.69281	0.00009
	CBPTE31	0.16638	0.04488	0.18155	3.70730	0.00110
	W11	0.17330	0.04951	0.16806	3.50011	0.00184
5	(Constant)	-4.81124	0.61704		-7.79730	0.00000
	EMPBI7	0.44788	0.05576	0.49567	8.03293	0.00000
	CBPTE55	0.10171	0.02330	0.08655	4.36447	0.00023
	CBPTE31	0.18667	0.04167	0.20369	4.47974	0.00017
	W11	0.18058	0.04515	0.17511	3.99928	0.00056
	EMPBI15	0.04302	0.01758	0.06671	2.44683	0.02247
6	(Constant)	-4.51704	0.56957		-7.93061	0.00000
	EMPBI7	0.45253	0.05038	0.50082	8.98204	0.00000
	CBPTE55	0.05257	0.02884	0.04474	1.82262	0.08198
	CBPTE31	0.18474	0.03764	0.20158	4.90848	0.00007
	W11	0.16090	0.04153	0.15603	3.87428	0.00082
	EMPBI15	0.04849	0.01603	0.07520	3.02541	0.00622
	CBPTE95	0.08550	0.03432	0.05444	2.49124	0.02076
7	(Constant)	-4.53013	0.51624		-8.77521	0.00000
	EMPBI7	0.39590	0.05138	0.43815	7.70561	0.00000
	CBPTE55	0.03283	0.02740	0.02794	1.19834	0.24414
	CBPTE31	0.16850	0.03477	0.18386	4.84575	0.00009
	W11	0.14403	0.03829	0.13967	3.76173	0.00115
	EMPBI15	0.04742	0.01453	0.07355	3.26350	0.00371
	CBPTE95	0.08087	0.03116	0.05150	2.59524	0.01689
	EMPBI19	0.12114	0.05037	0.11571	2.40478	0.02549
8	(Constant)	-4.62932	0.51459		-8.99617	0.00000
	EMPBI7	0.38149	0.05044	0.42220	7.56268	0.00000
	CBPTE31	0.16795	0.03511	0.18326	4.78313	0.00009
	W11	0.14876	0.03846	0.14425	3.86779	0.00083
	EMPBI15	0.05188	0.01419	0.08045	3.65666	0.00139
	CBPTE95	0.10450	0.02437	0.06654	4.28850	0.00030
	EMPBI19	0.13922	0.04853	0.13298	2.86846	0.00893
a	Dependent Variable: CFS2I32					

Figure E-1-73: Continued

Regression (CFS2I33)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09099
6	0.99904	0.99808	0.99756	0.08215
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25084	1	76.25084	1876.64862	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34789	28			
2	Regression	76.79119	2	38.39559	1793.21588	0.00000
	Residual	0.55670	26	0.02141		
	Total	77.34789	28			
3	Regression	76.98540	3	25.66180	1769.84230	0.00000
	Residual	0.36249	25	0.01450		
	Total	77.34789	28			
4	Regression	77.10792	4	19.27698	1927.94801	0.00000
	Residual	0.23997	24	0.01000		
	Total	77.34789	28			
5	Regression	77.15747	5	15.43149	1863.92800	0.00000
	Residual	0.19042	23	0.00828		
	Total	77.34789	28			
6	Regression	77.19941	6	12.86657	1906.39239	0.00000
	Residual	0.14848	22	0.00675		
	Total	77.34789	28			
7	Regression	77.23147	7	11.03307	1990.21829	0.00000
	Residual	0.11642	21	0.00554		
	Total	77.34789	28			
8	Regression	77.22353	6	12.87059	2276.82014	0.00000
	Residual	0.12436	22	0.00565		
	Total	77.34789	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I33

Figure E-1-74: Commodity Flow Within in Utah for Commodity Item 33 (CFS2I33)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.58421	0.15040		-37.12877	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32030	0.00000
2	(Constant)	-5.02699	0.15564		-32.29900	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61601	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02356	0.00003
3	(Constant)	-4.33408	0.22858		-18.96092	0.00000
	EMPBI7	0.61697	0.05305	0.68282	11.62904	0.00000
	CBPTE55	0.15214	0.02715	0.12947	5.60480	0.00001
	CBPTE31	0.19458	0.05317	0.21233	3.65986	0.00118
4	(Constant)	-6.60062	0.67474		-9.78244	0.00000
	EMPBI7	0.51977	0.05208	0.57524	9.98047	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69236	0.00009
	CBPTE31	0.16636	0.04488	0.18153	3.70678	0.00110
	W11	0.17333	0.04952	0.16808	3.50049	0.00184
5	(Constant)	-6.44972	0.61707		-10.45215	0.00000
	EMPBI7	0.44789	0.05576	0.49569	8.03271	0.00000
	CBPTE55	0.10170	0.02331	0.08655	4.36393	0.00023
	CBPTE31	0.18665	0.04167	0.20367	4.47898	0.00017
	W11	0.18060	0.04515	0.17513	3.99956	0.00056
	EMPBI15	0.04301	0.01758	0.06671	2.44646	0.02249
6	(Constant)	-6.15536	0.56953		-10.80788	0.00000
	EMPBI7	0.45255	0.05038	0.50084	8.98299	0.00000
	CBPTE55	0.05254	0.02884	0.04471	1.82165	0.08213
	CBPTE31	0.18471	0.03763	0.20156	4.90824	0.00007
	W11	0.16091	0.04153	0.15604	3.87486	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02554	0.00622
	CBPTE95	0.08554	0.03432	0.05447	2.49268	0.02070
7	(Constant)	-6.16845	0.51619		-11.94996	0.00000
	EMPBI7	0.39591	0.05137	0.43816	7.70662	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19728	0.24454
	CBPTE31	0.16848	0.03477	0.18384	4.84556	0.00009
	W11	0.14404	0.03828	0.13968	3.76241	0.00114
	EMPBI15	0.04742	0.01453	0.07355	3.26372	0.00371
	CBPTE95	0.08092	0.03116	0.05152	2.59687	0.01683
	EMPBI19	0.12114	0.05037	0.11571	2.40502	0.02547
8	(Constant)	-6.26755	0.51451		-12.18165	0.00000
	EMPBI7	0.38152	0.05044	0.42223	7.56438	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78323	0.00009
	W11	0.14876	0.03845	0.14426	3.86858	0.00083
	EMPBI15	0.05187	0.01418	0.08045	3.65681	0.00139
	CBPTE95	0.10452	0.02436	0.06656	4.28997	0.00030
	EMPBI19	0.13920	0.04853	0.13297	2.86854	0.00893
a	Dependent Variable: CFS2I33					

Figure E-1-74: Continued

Regression (CFS2I34)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09098
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25127	1	76.25127	1876.70671	0.00000
	Residual	1.09702	27	0.04063		
	Total	77.34829	28			
2	Regression	76.79159	2	38.39579	1793.23723	0.00000
	Residual	0.55670	26	0.02141		
	Total	77.34829	28			
3	Regression	76.98583	3	25.66194	1770.01256	0.00000
	Residual	0.36245	25	0.01450		
	Total	77.34829	28			
4	Regression	77.10832	4	19.27708	1928.00393	0.00000
	Residual	0.23996	24	0.01000		
	Total	77.34829	28			
5	Regression	77.15789	5	15.43158	1864.16376	0.00000
	Residual	0.19039	23	0.00828		
	Total	77.34829	28			
6	Regression	77.19979	6	12.86663	1906.16657	0.00000
	Residual	0.14850	22	0.00675		
	Total	77.34829	28			
7	Regression	77.23185	7	11.03312	1989.96491	0.00000
	Residual	0.11643	21	0.00554		
	Total	77.34829	28			
8	Regression	77.22390	6	12.87065	2276.37002	0.00000
	Residual	0.12439	22	0.00565		
	Total	77.34829	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I34

Figure E-1-75: Commodity Flow Within in Utah for Commodity Item 34 (CFS2I34)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.84441	0.15040		-38.85930	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32097	0.00000
2	(Constant)	-5.28721	0.15564		-33.97101	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61630	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02347	0.00003
3	(Constant)	-4.59424	0.22857		-20.09999	0.00000
	EMPBI7	0.61696	0.05305	0.68280	11.62940	0.00000
	CBPTE55	0.15214	0.02714	0.12946	5.60488	0.00001
	CBPTE31	0.19460	0.05316	0.21234	3.66030	0.00118
4	(Constant)	-6.86053	0.67473		-10.16776	0.00000
	EMPBI7	0.51977	0.05208	0.57524	9.98063	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69239	0.00009
	CBPTE31	0.16638	0.04488	0.18155	3.70722	0.00110
	W11	0.17331	0.04951	0.16806	3.50014	0.00184
5	(Constant)	-6.70960	0.61703		-10.87396	0.00000
	EMPBI7	0.44788	0.05575	0.49567	8.03301	0.00000
	CBPTE55	0.10170	0.02330	0.08654	4.36406	0.00023
	CBPTE31	0.18667	0.04167	0.20369	4.47976	0.00017
	W11	0.18058	0.04515	0.17511	3.99940	0.00056
	EMPBI15	0.04302	0.01758	0.06672	2.44704	0.02246
6	(Constant)	-6.41539	0.56956		-11.26375	0.00000
	EMPBI7	0.45253	0.05038	0.50083	8.98218	0.00000
	CBPTE55	0.05256	0.02884	0.04473	1.82227	0.08204
	CBPTE31	0.18474	0.03764	0.20158	4.90852	0.00007
	W11	0.16090	0.04153	0.15603	3.87442	0.00082
	EMPBI15	0.04849	0.01603	0.07520	3.02566	0.00621
	CBPTE95	0.08550	0.03432	0.05444	2.49130	0.02076
7	(Constant)	-6.42848	0.51622		-12.45288	0.00000
	EMPBI7	0.39590	0.05138	0.43814	7.70581	0.00000
	CBPTE55	0.03282	0.02740	0.02793	1.19794	0.24429
	CBPTE31	0.16850	0.03477	0.18386	4.84586	0.00009
	W11	0.14403	0.03829	0.13967	3.76192	0.00115
	EMPBI15	0.04743	0.01453	0.07355	3.26383	0.00371
	CBPTE95	0.08088	0.03116	0.05150	2.59534	0.01689
	EMPBI19	0.12114	0.05037	0.11572	2.40497	0.02548
8	(Constant)	-6.52764	0.51456		-12.68587	0.00000
	EMPBI7	0.38149	0.05044	0.42220	7.56314	0.00000
	CBPTE31	0.16795	0.03511	0.18326	4.78335	0.00009
	W11	0.14876	0.03846	0.14425	3.86803	0.00083
	EMPBI15	0.05188	0.01419	0.08046	3.65697	0.00139
	CBPTE95	0.10450	0.02437	0.06654	4.28840	0.00030
	EMPBI19	0.13922	0.04853	0.13298	2.86859	0.00893
a	Dependent Variable: CFS2I34					

Figure E-1-75: Continued

Regression (CFS2I35)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20158
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08217
7	0.99925	0.99849	0.99799	0.07447
8	0.99920	0.99839	0.99795	0.07520

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25095	1	76.25095	1876.48269	0.00000
	Residual	1.09715	27	0.04064		
	Total	77.34810	28			
2	Regression	76.79135	2	38.39568	1793.07881	0.00000
	Residual	0.55674	26	0.02141		
	Total	77.34810	28			
3	Regression	76.98558	3	25.66186	1769.70025	0.00000
	Residual	0.36252	25	0.01450		
	Total	77.34810	28			
4	Regression	77.10806	4	19.27702	1927.40157	0.00000
	Residual	0.24004	24	0.01000		
	Total	77.34810	28			
5	Regression	77.15761	5	15.43152	1863.24832	0.00000
	Residual	0.19049	23	0.00828		
	Total	77.34810	28			
6	Regression	77.19956	6	12.86659	1905.63292	0.00000
	Residual	0.14854	22	0.00675		
	Total	77.34810	28			
7	Regression	77.23164	7	11.03309	1989.50573	0.00000
	Residual	0.11646	21	0.00555		
	Total	77.34810	28			
8	Regression	77.22369	6	12.87062	2276.03693	0.00000
	Residual	0.12441	22	0.00565		
	Total	77.34810	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I35

Figure E-1-76: Commodity Flow Within in Utah for Commodity Item 35 (CFS2I35)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.10994	0.15041		-53.91966	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.31839	0.00000
2	(Constant)	-7.55270	0.15565		-48.52503	0.00000
	EMPBI7	0.79573	0.02517	0.88065	31.61458	0.00000
	CBPTE55	0.16445	0.03273	0.13994	5.02362	0.00003
3	(Constant)	-6.85976	0.22859		-30.00913	0.00000
	EMPBI7	0.61696	0.05306	0.68280	11.62835	0.00000
	CBPTE55	0.15215	0.02715	0.12947	5.60486	0.00001
	CBPTE31	0.19459	0.05317	0.21233	3.65984	0.00118
4	(Constant)	-9.12594	0.67484		-13.52317	0.00000
	EMPBI7	0.51977	0.05209	0.57524	9.97913	0.00000
	CBPTE55	0.11623	0.02477	0.09891	4.69223	0.00009
	CBPTE31	0.16637	0.04489	0.18154	3.70651	0.00110
	W11	0.17330	0.04952	0.16805	3.49944	0.00184
5	(Constant)	-8.97504	0.61718		-14.54192	0.00000
	EMPBI7	0.44789	0.05577	0.49569	8.03134	0.00000
	CBPTE55	0.10172	0.02331	0.08656	4.36372	0.00023
	CBPTE31	0.18666	0.04168	0.20368	4.47843	0.00017
	W11	0.18057	0.04516	0.17510	3.99822	0.00057
	EMPBI15	0.04301	0.01758	0.06670	2.44598	0.02251
6	(Constant)	-8.68065	0.56964		-15.23885	0.00000
	EMPBI7	0.45255	0.05039	0.50085	8.98131	0.00000
	CBPTE55	0.05255	0.02885	0.04471	1.82155	0.08215
	CBPTE31	0.18473	0.03764	0.20157	4.90754	0.00007
	W11	0.16088	0.04154	0.15601	3.87337	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02494	0.00622
	CBPTE95	0.08555	0.03432	0.05447	2.49249	0.02070
7	(Constant)	-8.69375	0.51628		-16.83909	0.00000
	EMPBI7	0.39590	0.05138	0.43815	7.70505	0.00000
	CBPTE55	0.03280	0.02740	0.02791	1.19715	0.24459
	CBPTE31	0.16848	0.03478	0.18385	4.84487	0.00009
	W11	0.14401	0.03829	0.13964	3.76083	0.00115
	EMPBI15	0.04742	0.01453	0.07355	3.26312	0.00372
	CBPTE95	0.08093	0.03117	0.05153	2.59670	0.01684
	EMPBI19	0.12117	0.05038	0.11574	2.40525	0.02546
8	(Constant)	-8.79285	0.51460		-17.08688	0.00000
	EMPBI7	0.38151	0.05044	0.42222	7.56287	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78258	0.00009
	W11	0.14873	0.03846	0.14422	3.86702	0.00083
	EMPBI15	0.05187	0.01419	0.08045	3.65619	0.00139
	CBPTE95	0.10454	0.02437	0.06656	4.28968	0.00030
	EMPBI19	0.13923	0.04853	0.13300	2.86875	0.00892
a	Dependent Variable: CFS2I35					

Figure E-1-76: Continued

Regression (CFS2I40)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14632
3	0.99765	0.99531	0.99475	0.12041
4	0.99845	0.99690	0.99638	0.09999
5	0.99877	0.99754	0.99700	0.09099
6	0.99904	0.99808	0.99756	0.08216
7	0.99925	0.99849	0.99799	0.07446
8	0.99920	0.99839	0.99795	0.07519

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25063	1	76.25063	1876.71164	0.00000
	Residual	1.09701	27	0.04063		
	Total	77.34764	28			
2	Regression	76.79096	2	38.39548	1793.29159	0.00000
	Residual	0.55668	26	0.02141		
	Total	77.34764	28			
3	Regression	76.98519	3	25.66173	1770.01301	0.00000
	Residual	0.36245	25	0.01450		
	Total	77.34764	28			
4	Regression	77.10767	4	19.27692	1927.93679	0.00000
	Residual	0.23997	24	0.01000		
	Total	77.34764	28			
5	Regression	77.15722	5	15.43144	1863.92791	0.00000
	Residual	0.19042	23	0.00828		
	Total	77.34764	28			
6	Regression	77.19912	6	12.86652	1905.89786	0.00000
	Residual	0.14852	22	0.00675		
	Total	77.34764	28			
7	Regression	77.23120	7	11.03303	1989.87781	0.00000
	Residual	0.11644	21	0.00554		
	Total	77.34764	28			
8	Regression	77.22325	6	12.87054	2276.28141	0.00000
	Residual	0.12439	22	0.00565		
	Total	77.34764	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I40

Figure E-1-77: Commodity Flow Within in Utah for Commodity Item 40 (CFS2I40)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.83967	0.15040		-38.82804	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32103	0.00000
2	(Constant)	-5.28247	0.15564		-33.94122	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61673	0.00000
	CBPTE55	0.16444	0.03273	0.13993	5.02361	0.00003
3	(Constant)	-4.58954	0.22857		-20.07949	0.00000
	EMPBI7	0.61697	0.05305	0.68281	11.62952	0.00000
	CBPTE55	0.15214	0.02714	0.12947	5.60498	0.00001
	CBPTE31	0.19459	0.05316	0.21233	3.66014	0.00118
4	(Constant)	-6.85573	0.67474		-10.16053	0.00000
	EMPBI7	0.51978	0.05208	0.57525	9.98064	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69246	0.00009
	CBPTE31	0.16637	0.04488	0.18154	3.70699	0.00110
	W11	0.17330	0.04952	0.16805	3.49996	0.00184
5	(Constant)	-6.70484	0.61707		-10.86560	0.00000
	EMPBI7	0.44790	0.05576	0.49570	8.03288	0.00000
	CBPTE55	0.10171	0.02331	0.08655	4.36405	0.00023
	CBPTE31	0.18666	0.04167	0.20368	4.47923	0.00017
	W11	0.18057	0.04515	0.17510	3.99899	0.00056
	EMPBI15	0.04301	0.01758	0.06671	2.44650	0.02249
6	(Constant)	-6.41061	0.56960		-11.25462	0.00000
	EMPBI7	0.45255	0.05038	0.50085	8.98197	0.00000
	CBPTE55	0.05256	0.02885	0.04473	1.82229	0.08203
	CBPTE31	0.18473	0.03764	0.20157	4.90790	0.00007
	W11	0.16090	0.04153	0.15602	3.87396	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02503	0.00622
	CBPTE95	0.08550	0.03432	0.05444	2.49121	0.02076
7	(Constant)	-6.42371	0.51623		-12.44341	0.00000
	EMPBI7	0.39590	0.05138	0.43815	7.70579	0.00000
	CBPTE55	0.03282	0.02740	0.02793	1.19790	0.24430
	CBPTE31	0.16848	0.03477	0.18385	4.84533	0.00009
	W11	0.14402	0.03829	0.13966	3.76153	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26329	0.00371
	CBPTE95	0.08088	0.03116	0.05150	2.59535	0.01689
	EMPBI19	0.12117	0.05037	0.11575	2.40551	0.02545
8	(Constant)	-6.52286	0.51457		-12.67640	0.00000
	EMPBI7	0.38150	0.05044	0.42221	7.56314	0.00000
	CBPTE31	0.16793	0.03511	0.18324	4.78284	0.00009
	W11	0.14874	0.03846	0.14424	3.86764	0.00083
	EMPBI15	0.05187	0.01419	0.08045	3.65641	0.00139
	CBPTE95	0.10450	0.02437	0.06654	4.28838	0.00030
	EMPBI19	0.13925	0.04853	0.13301	2.86915	0.00891
a	Dependent Variable: CFS2I40					

Figure E-1-77: Continued

Regression (CFS2I43)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.99288	0.98582	0.98529	0.20157
2	0.99639	0.99280	0.99225	0.14633
3	0.99765	0.99531	0.99475	0.12042
4	0.99845	0.99690	0.99638	0.10001
5	0.99877	0.99754	0.99700	0.09101
6	0.99904	0.99808	0.99756	0.08218
7	0.99925	0.99849	0.99799	0.07448
8	0.99920	0.99839	0.99795	0.07521

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

ANOVA(i)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.25005	1	76.25005	1876.62996	0.00000
	Residual	1.09705	27	0.04063		
	Total	77.34710	28			
2	Regression	76.79035	2	38.39517	1793.01885	0.00000
	Residual	0.55676	26	0.02141		
	Total	77.34710	28			
3	Regression	76.98457	3	25.66152	1769.58828	0.00000
	Residual	0.36254	25	0.01450		
	Total	77.34710	28			
4	Regression	77.10705	4	19.27676	1927.29247	0.00000
	Residual	0.24005	24	0.01000		
	Total	77.34710	28			
5	Regression	77.15660	5	15.43132	1863.11243	0.00000
	Residual	0.19050	23	0.00828		
	Total	77.34710	28			
6	Regression	77.19852	6	12.86642	1905.12643	0.00000
	Residual	0.14858	22	0.00675		
	Total	77.34710	28			
7	Regression	77.23062	7	11.03295	1989.01414	0.00000
	Residual	0.11649	21	0.00555		
	Total	77.34710	28			
8	Regression	77.22267	6	12.87045	2275.55662	0.00000
	Residual	0.12443	22	0.00566		
	Total	77.34710157	28			

a Predictors: (Constant), EMPBI7

b Predictors: (Constant), EMPBI7, CBPTE55

c Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31

d Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11

e Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15

f Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95

g Predictors: (Constant), EMPBI7, CBPTE55, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

h Predictors: (Constant), EMPBI7, CBPTE31, W11, EMPBI15, CBPTE95, EMPBI19

i Dependent Variable: CFS2I43

Figure E-1-78: Commodity Flow Within in Utah for Commodity Item 43 (CFS2I43)

Coefficients(a)						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.14132	0.15040		-27.53519	0.00000
	EMPBI7	0.89714	0.02071	0.99288	43.32009	0.00000
2	(Constant)	-3.58414	0.15565		-23.02735	0.00000
	EMPBI7	0.79574	0.02517	0.88066	31.61446	0.00000
	CBPTE55	0.16443	0.03274	0.13992	5.02305	0.00003
3	(Constant)	-2.89121	0.22859		-12.64776	0.00000
	EMPBI7	0.61697	0.05306	0.68282	11.62822	0.00000
	CBPTE55	0.15214	0.02715	0.12946	5.60411	0.00001
	CBPTE31	0.19459	0.05317	0.21233	3.65968	0.00118
4	(Constant)	-5.15746	0.67485		-7.64236	0.00000
	EMPBI7	0.51978	0.05209	0.57525	9.97901	0.00000
	CBPTE55	0.11622	0.02477	0.09890	4.69142	0.00009
	CBPTE31	0.16637	0.04489	0.18154	3.70633	0.00110
	W11	0.17331	0.04952	0.16806	3.49947	0.00184
5	(Constant)	-5.00657	0.61720		-8.11171	0.00000
	EMPBI7	0.44790	0.05577	0.49570	8.03120	0.00000
	CBPTE55	0.10170	0.02331	0.08654	4.36284	0.00023
	CBPTE31	0.18666	0.04168	0.20368	4.47819	0.00017
	W11	0.18057	0.04516	0.17511	3.99822	0.00057
	EMPBI15	0.04301	0.01758	0.06670	2.44589	0.02252
6	(Constant)	-4.71227	0.56971		-8.27132	0.00000
	EMPBI7	0.45256	0.05039	0.50085	8.98026	0.00000
	CBPTE55	0.05254	0.02885	0.04471	1.82124	0.08220
	CBPTE31	0.18472	0.03765	0.20157	4.90682	0.00007
	W11	0.16089	0.04154	0.15602	3.87315	0.00082
	EMPBI15	0.04848	0.01603	0.07519	3.02443	0.00623
	CBPTE95	0.08552	0.03433	0.05446	2.49140	0.02075
7	(Constant)	-4.72536	0.51634		-9.15159	0.00000
	EMPBI7	0.39590	0.05139	0.43815	7.70406	0.00000
	CBPTE55	0.03280	0.02741	0.02791	1.19681	0.24472
	CBPTE31	0.16848	0.03478	0.18384	4.84412	0.00009
	W11	0.14402	0.03830	0.13965	3.76062	0.00115
	EMPBI15	0.04742	0.01453	0.07354	3.26258	0.00372
	CBPTE95	0.08090	0.03117	0.05151	2.59552	0.01688
	EMPBI19	0.12119	0.05038	0.11576	2.40535	0.02546
8	(Constant)	-4.82445	0.51465		-9.37428	0.00000
	EMPBI7	0.38150	0.05045	0.42222	7.56207	0.00000
	CBPTE31	0.16792	0.03512	0.18324	4.78193	0.00009
	W11	0.14874	0.03846	0.14423	3.86685	0.00083
	EMPBI15	0.05187	0.01419	0.08044	3.65561	0.00139
	CBPTE95	0.10450	0.02437	0.06654	4.28797	0.00030
	EMPBI19	0.13925	0.04854	0.13302	2.86881	0.00892
a	Dependent Variable: CFS2I43					

Figure E-1-78: Continued

E-2 Best Model Choice Procedure of Multiple Regression Model Between Commodity Flow and CF-Entire Entries

E-2-1 Estimation Results of Bayesian Information Criteria (BIC)

E-2-1-1 CFS2P vs. EF-Entire Entries – Production

Regression (CFS2P3)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29317
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99492
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78776
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33648
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46385
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60258
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11587
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.74454
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.12766
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.56036

Regression (CFS2P6)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29100
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99053
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78610
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33494
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45959
6	0.99880	0.99761	0.99695	29	6	0.00864	-117.59996
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11735
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.75266
9	0.99949	0.99899	0.99850	29	9	0.00424	-128.13576
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.56572

Figure E-2-1: Estimation of R, R Square, and BIC for CFS2P 3 and 6

Regression (CFS2P7)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29218
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99510
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.79058
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33783
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46436
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60524
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11833
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.74879
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.13055
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.55480

Regression (CFS2P8)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29087
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99317
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.79071
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33968
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46456
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60275
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11891
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.75116
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.13271
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.55948

Regression (CFS2P12)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29086
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99590
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79396
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.34125
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46677
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60663
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.12133
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.75422
9	0.99949	0.99899	0.99850	29	9	0.00424	-128.14032
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.56759

Figure E-2-2: Estimation of R, R Square, and BIC for CFS2P 7-12

Regression (CFS2P13)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29141
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99505
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79108
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33936
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46414
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60229
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11752
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.74452
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.13179
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.55957

Regression (CFS2P15)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29141
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99505
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79108
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33936
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46414
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60229
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11752
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.74452
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.13179
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.55957

Regression (CFS2P17)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29237
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99264
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78517
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33343
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45751
6	0.99880	0.99761	0.99695	29	6	0.00864	-117.59901
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11064
8	0.99937	0.99874	0.99824	29	8	0.00500	-126.73830
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.12222
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.55574

Figure E-2-3: Estimation of R, R Square, and BIC for CFS2P 13-17

Regression (CFS2P18)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29141
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99505
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79108
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33936
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46414
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60229
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11752
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.74452
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.13179
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.55957

Regression (CFS2P19)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29100
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99053
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78610
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33494
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45959
6	0.99880	0.99761	0.99695	29	6	0.00864	-117.59996
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11735
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.75266
9	0.99949	0.99899	0.99850	29	9	0.00424	-128.13576
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.56572

Regression (CFS2P23)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29237
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99264
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78517
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33343
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45751
6	0.99880	0.99761	0.99695	29	6	0.00864	-117.59901
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11064
8	0.99937	0.99874	0.99824	29	8	0.00500	-126.73830
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.12222
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.55574

Figure E-2-4: Estimation of R, R Square, and BIC for CFS2P 18-23

Regression (CFS2P24)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29018
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99506
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79252
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.34084
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46714
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60683
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.12229
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.75309
9	0.99949	0.99899	0.99850	29	9	0.00424	-128.14005
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.56638

Regression (CFS2P26)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29146
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99326
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79083
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.34034
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46434
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60254
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11847
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.75185
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.13385
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.56306

Regression (CFS2P27)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29317
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99492
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78776
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33648
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46385
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60258
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11587
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.74454
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.12766
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.56036

Figure E-2-5: Estimation of R, R Square, and BIC for CFS2P 24-27

Regression (CFS2P28)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29068
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99413
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79321
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.34113
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46622
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60680
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.12106
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.75477
9	0.99949	0.99899	0.99850	29	9	0.00424	-128.13776
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.56676

Regression (CFS2P29)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29208
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99596
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79236
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.34100
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46488
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60620
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.12023
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.74954
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.13042
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.55807

Regression (CFS2P30)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29169
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99333
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78564
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33370
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45879
6	0.99880	0.99761	0.99695	29	6	0.00864	-117.59920
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11318
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.74310
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.12441
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.55882

Figure E-2-6: Estimation of R, R Square, and BIC for CFS2P 28-30

Regression (CFS2P32)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29208
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99596
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79236
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.34100
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46488
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60620
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.12023
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.74954
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.13042
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.55807

Regression (CFS2P34)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29175
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99427
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.79025
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33769
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46446
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60642
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11911
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.74790
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.13112
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.55351

Regression (CFS2P35)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29237
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99264
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78517
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33343
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45751
6	0.99880	0.99761	0.99695	29	6	0.00864	-117.59901
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11064
8	0.99937	0.99874	0.99824	29	8	0.00500	-126.73830
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.12222
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.55574

Figure E-2-7: Estimation of R, R Square, and BIC for CFS2P 32-35

Regression (CFS2P39)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29266
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99411
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78643
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33320
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45791
6	0.99880	0.99761	0.99695	29	6	0.00864	-117.59774
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11081
8	0.99937	0.99874	0.99824	29	8	0.00500	-126.73870
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.11921
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.55151

Regression (CFS2P40)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29068
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99413
3	0.99747	0.99495	0.99435	29	3	0.01601	-109.79321
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.34113
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.46622
6	0.99880	0.99761	0.99695	29	6	0.00863	-117.60680
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.12106
8	0.99937	0.99874	0.99824	29	8	0.00499	-126.75477
9	0.99949	0.99899	0.99850	29	9	0.00424	-128.13776
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.56676

Regression (CFS2P43)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99276	0.98557	0.98504	29	1	0.04240	-88.29237
2	0.99639	0.99280	0.99225	29	2	0.02197	-103.99264
3	0.99747	0.99495	0.99435	29	3	0.01602	-109.78517
4	0.99802	0.99605	0.99539	29	4	0.01306	-112.33343
5	0.99843	0.99687	0.99619	29	5	0.01081	-114.45751
6	0.99880	0.99761	0.99695	29	6	0.00864	-117.59901
7	0.99913	0.99826	0.99768	29	7	0.00658	-122.11064
8	0.99937	0.99874	0.99824	29	8	0.00500	-126.73830
9	0.99949	0.99898	0.99850	29	9	0.00424	-128.12222
10	0.99962	0.99924	0.99882	29	10	0.00335	-131.55574

Figure E-2-8: Estimation of R, R Square, and BIC for CFS2P 39-43

E-2-1-2 CFS2A vs. EF-Entire Entries – Attraction

Regression (CFS2A3)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52439
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73268
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67356
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07793
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18113
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73269
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07317
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87460

Regression (CFS2A5)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52560
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73690
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67387
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08399
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18932
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74599
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08578
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88670

Regression (CFS2A6)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52439
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73268
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67356
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07793
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18113
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73269
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07317
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87460

Figure E-2-9: Estimation of R, R Square, and BIC for CFS2A 3-6

Regression (CFS2A7)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52278
2	0.99639	0.99280	0.99225	29	2	0.02142	-104.73139
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66863
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07516
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17817
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73047
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.06791
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.86982

Regression (CFS2A8)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52278
2	0.99639	0.99280	0.99225	29	2	0.02142	-104.73139
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66863
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07516
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17817
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73047
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.06791
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.86982

Regression (CFS2A11)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52259
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73224
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66970
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07875
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18074
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73640
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07544
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87741

Figure E-2-10: Estimation of R, R Square, and BIC for CFS2A 7-11

Regression (CFS2A12)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52396
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73478
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67226
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08234
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18566
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74092
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08182
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88286

Regression (CFS2A13)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52259
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73224
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66970
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07875
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18074
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73640
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07544
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87741

Regression (CFS2A14)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52520
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73668
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67699
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08563
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19334
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74349
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08119
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.87936

Figure E-2-11: Estimation of R, R Square, and BIC for CFS2A 12-14

Regression (CFS2A15)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52593
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73341
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66989
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07498
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17805
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.72903
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.06968
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87257

Regression (CFS2A17)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52396
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73478
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67226
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08234
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18566
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74092
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08182
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88286

Regression (CFS2A18)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52532
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73534
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67200
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08016
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18025
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73556
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07490
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87701

Figure E-2-12: Estimation of R, R Square, and BIC for CFS2A 15-18

Regression (CFS2A19)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52321
2	0.99639	0.99280	0.99225	29	2	0.02142	-104.73123
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66844
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07368
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17710
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73029
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.06749
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87006

Regression (CFS2A21)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52418
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73237
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67042
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07569
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17886
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73173
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07404
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87662

Regression (CFS2A23)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52520
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73668
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67699
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08563
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19334
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74349
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08119
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.87936

Figure E-2-13: Estimation of R, R Square, and BIC for CFS2A 19-23

Regression (CFS2A24)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52495
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73285
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67096
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07411
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17741
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.72843
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.06973
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87214

Regression (CFS2A26)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52592
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73628
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67374
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08451
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19042
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74796
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08691
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88835

Regression (CFS2A27)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52697
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73759
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67661
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08444
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19051
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74054
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08205
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88159

Figure E-2-14: Estimation of R, R Square, and BIC for CFS2A 24-27

Regression (CFS2A28)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52278
2	0.99639	0.99280	0.99225	29	2	0.02142	-104.73139
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66863
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07516
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17817
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73047
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.06791
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.86982

Regression (CFS2A29)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52331
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73400
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67134
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07624
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17979
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73635
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07646
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.87831

Regression (CFS2A30)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52592
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73628
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67374
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08451
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19042
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74796
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08691
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88835

Figure E-2-15: Estimation of R, R Square, and BIC for CFS2A 28-30

Regression (CFS2A31)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52604
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73635
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67560
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08620
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19331
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.75043
7	0.99925	0.99850	0.99799	29	7	0.00554	-127.09002
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.89089

Regression (CFS2A32)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52331
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73400
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67134
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07624
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17979
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73635
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07646
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.87831

Regression (CFS2A33)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52331
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73400
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67134
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07624
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17979
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73635
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07646
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.87831

Figure E-2-16: Estimation of R, R Square, and BIC for CFS2A 31-33

Regression (CFS2A34)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52278
2	0.99639	0.99280	0.99225	29	2	0.02142	-104.73139
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66863
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07516
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17817
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73047
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.06791
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.86982

Regression (CFS2A35)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52497
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73631
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67763
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08467
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18942
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73986
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08136
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88014

Regression (CFS2A36)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52593
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73341
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66989
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07498
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17805
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.72903
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.06968
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87257

Figure E-2-17: Estimation of R, R Square, and BIC for CFS2A 34-36

Regression (CFS2A39)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52592
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73628
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67374
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08451
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19042
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74796
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08691
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88835

Regression (CFS2A40)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52259
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73224
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66970
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07875
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18074
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73640
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07544
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87741

Regression (CFS2A41)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52439
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73268
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67356
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07793
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18113
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73269
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07317
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87460

Figure E-2-18: Estimation of R, R Square, and BIC for CFS2A 39-41

Regression (CFS2A43)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52592
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73628
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67374
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08451
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19042
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74796
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08691
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88835

Regression (CFS2A99)

Model	R	R Square	Adjusted R Square	n	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52532
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73534
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67200
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08016
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18025
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73556
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07490
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87701

Figure E-2-19: Estimation of R, R Square, and BIC for CFS2A 43 and 99

E-2-1-3 CFS2I vs. EF-Entire Entries – Within Utah

Regression (CFS2I3)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52697
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73759
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67661
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08444
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19051
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74054
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08205
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88159

Regression (CFS2I6)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52666
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73647
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67636
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08520
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19393
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74438
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08307
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88247

Regression (CFS2I7)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52396
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73478
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67226
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08234
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18566
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74092
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08182
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88286

Figure E-2-20: Estimation of R, R Square, and BIC for CFS2I 3-7

Regression (CFS2I8)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52604
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73635
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67560
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08620
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19331
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.75043
7	0.99925	0.99850	0.99799	29	7	0.00554	-127.09002
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.89089

Regression (CFS2I12)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52278
2	0.99639	0.99280	0.99225	29	2	0.02142	-104.73139
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66863
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07516
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17817
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73047
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.06791
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.86982

Regression (CFS2I13)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52592
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73628
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67374
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08451
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19042
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74796
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08691
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88835

Figure E-2-21: Estimation of R, R Square, and BIC for CFS2I 8-13

Regression (CFS2I14)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52366
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73275
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67054
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07555
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17795
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73216
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07035
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87251

Regression (CFS2I17)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52278
2	0.99639	0.99280	0.99225	29	2	0.02142	-104.73139
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66863
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07516
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17817
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73047
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.06791
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.86982

Regression (CFS2I18)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52495
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73285
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67096
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07411
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17741
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.72843
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.06973
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87214

Figure E-2-22: Estimation of R, R Square, and BIC for CFS2I 14-18

Regression (CFS2I19)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52321
2	0.99639	0.99280	0.99225	29	2	0.02142	-104.73123
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66844
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07368
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17710
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73029
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.06749
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87006

Regression (CFS2I21)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52497
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73631
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67763
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08467
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18942
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73986
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08136
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88014

Regression (CFS2I26)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52520
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73668
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67699
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08563
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19334
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74349
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08119
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.87936

Figure E-2-23: Estimation of R, R Square, and BIC for CFS2I 19-26

Regression (CFS2I27)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52439
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73268
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67356
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07793
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.18113
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73269
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07317
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87460

Regression (CFS2I28)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52374
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73274
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66902
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07621
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17899
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73420
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07493
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.87773

Regression (CFS2I29)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52321
2	0.99639	0.99280	0.99225	29	2	0.02142	-104.73123
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66844
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07368
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17710
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73029
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.06749
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87006

Figure E-2-24: Estimation of R, R Square, and BIC for CFS2I 27-29

Regression (CFS2I31)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52697
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73759
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67661
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08444
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19051
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74054
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08205
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88159

Regression (CFS2I32)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52520
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73668
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67699
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08563
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19334
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74349
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08119
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.87936

Regression (CFS2I33)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52592
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73628
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67374
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08451
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19042
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74796
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08691
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88835

Figure E-2-25: Estimation of R, R Square, and BIC for CFS2I 31-33

Regression (CFS2I34)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52666
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73647
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67636
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08520
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19393
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74438
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08307
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88247

Regression (CFS2I35)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04064	-89.52331
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73400
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67134
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07624
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17979
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.73635
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.07646
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.87831

Regression (CFS2I40)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52697
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73759
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.67661
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.08444
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.19051
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.74054
7	0.99925	0.99849	0.99799	29	7	0.00554	-127.08205
8	0.99920	0.99839	0.99795	29	6	0.00565	-129.88159

Figure E-2-26: Estimation of R, R Square, and BIC for CFS2I 34-40

Regression (CFS2I43)

Model	R	R Square	Adjusted R Square	N	p	$\hat{\sigma}^2$	BIC
1	0.99288	0.98582	0.98529	29	1	0.04063	-89.52593
2	0.99639	0.99280	0.99225	29	2	0.02141	-104.73341
3	0.99765	0.99531	0.99475	29	3	0.01450	-112.66989
4	0.99845	0.99690	0.99638	29	4	0.01000	-120.07498
5	0.99877	0.99754	0.99700	29	5	0.00828	-122.17805
6	0.99904	0.99808	0.99756	29	6	0.00675	-124.72903
7	0.99925	0.99849	0.99799	29	7	0.00555	-127.06968
8	0.99920	0.99839	0.99795	29	6	0.00566	-129.87257

Figure E-2-27: Estimation of R, R Square, and BIC for CFS2I 43

E-2-2 Best Model From Multiple Regression Models Between Commodity Flow and Entire Detailed Contribution Factors

E-2-2-1 CFSTP vs. Entire Detailed Contribution Factors – Production

Table E-2-1: Best Multiple Regression Model With Entire Detailed Contribution Factors for CFS2P- Production (LT)

CFS-LT-P	(Constant)	EMPBI7	EMPBI19	EMPBI18	EMPBI23	EMPBI3
CFS7P3	-7.14090	0.40751	0.28712	0.50752	0.12435	-0.07896
CFS7P6	-4.40957	0.40749	0.28712	0.50763	0.12437	-0.07895
CFS7P7	-3.88063	0.40749	0.28714	0.50757	0.12434	-0.07895
CFS7P8	-6.20329	0.40747	0.28715	0.50757	0.12436	-0.07894
CFS7P12	-3.74967	0.40745	0.28716	0.50755	0.12434	-0.07894
CFS7P13	-3.14126	0.40747	0.28714	0.50752	0.12434	-0.07894
CFS7P15	-1.44636	0.40747	0.28714	0.50752	0.12434	-0.07894
CFS7P17	-2.48967	0.40749	0.28711	0.50759	0.12435	-0.07895
CFS7P18	-1.74226	0.40747	0.28714	0.50752	0.12434	-0.07894
CFS7P19	-4.88617	0.40749	0.28712	0.50763	0.12437	-0.07895
CFS7P23	-4.72427	0.40749	0.28711	0.50759	0.12435	-0.07895
CFS7P24	-6.20699	0.40745	0.28716	0.50755	0.12434	-0.07895
CFS7P26	-4.37847	0.40746	0.28714	0.50757	0.12437	-0.07894
CFS7P27	-7.16090	0.40751	0.28712	0.50752	0.12435	-0.07896
CFS7P28	-5.62060	0.40745	0.28716	0.50759	0.12435	-0.07894
CFS7P29	-6.88098	0.40747	0.28716	0.50759	0.12435	-0.07894
CFS7P30	-6.27550	0.40751	0.28712	0.50758	0.12436	-0.07896
CFS7P32	-3.53228	0.40747	0.28716	0.50759	0.12435	-0.07894
CFS7P34	-5.93900	0.40748	0.28714	0.50759	0.12434	-0.07895
CFS7P35	-6.02267	0.40749	0.28711	0.50759	0.12435	-0.07895
CFS7P39	-7.26741	0.40753	0.28712	0.50756	0.12435	-0.07895
CFS7P40	-5.43900	0.40745	0.28716	0.50759	0.12435	-0.07894
CFS7P43	-4.13237	0.40749	0.28711	0.50759	0.12435	-0.07895

Table E-2-1: Continued

CFS-LT-P	NOJ9	W8	CBPTE-21	CBPTE-31	CBPTE-22
CFS7P3	-0.26523	-0.02302	0.04324	0.09660	0.05934
CFS7P6	-0.26529	-0.02303	0.04325	0.09658	0.05933
CFS7P7	-0.26526	-0.02302	0.04324	0.09658	0.05932
CFS7P8	-0.26523	-0.02302	0.04324	0.09658	0.05932
CFS7P12	-0.26524	-0.02302	0.04325	0.09660	0.05931
CFS7P13	-0.26523	-0.02302	0.04324	0.09662	0.05933
CFS7P15	-0.26523	-0.02302	0.04324	0.09662	0.05933
CFS7P17	-0.26529	-0.02302	0.04324	0.09662	0.05935
CFS7P18	-0.26523	-0.02302	0.04324	0.09662	0.05933
CFS7P19	-0.26529	-0.02303	0.04325	0.09658	0.05933
CFS7P23	-0.26529	-0.02302	0.04324	0.09662	0.05935
CFS7P24	-0.26523	-0.02302	0.04324	0.09660	0.05931
CFS7P26	-0.26523	-0.02302	0.04324	0.09658	0.05933
CFS7P27	-0.26523	-0.02302	0.04324	0.09660	0.05934
CFS7P28	-0.26525	-0.02302	0.04324	0.09658	0.05932
CFS7P29	-0.26527	-0.02302	0.04324	0.09658	0.05933
CFS7P30	-0.26528	-0.02302	0.04324	0.09659	0.05935
CFS7P32	-0.26527	-0.02302	0.04324	0.09658	0.05933
CFS7P34	-0.26527	-0.02302	0.04324	0.09659	0.05931
CFS7P35	-0.26529	-0.02302	0.04324	0.09662	0.05935
CFS7P39	-0.26528	-0.02302	0.04324	0.09659	0.05935
CFS7P40	-0.26525	-0.02302	0.04324	0.09658	0.05932
CFS7P43	-0.26529	-0.02302	0.04324	0.09662	0.05935

Table E-2-2: Best Multiple Regression Model With Entire Detailed Contribution Factors for CFS2P- Production

CFS-P	(Constant)	EMPBI7	EMPBI19	EMPBI18	EMPBI23	EMPBI3
CFS7P3	0.00079	1.50307	1.33258	1.66117	1.13242	0.92408
CFS7P6	0.01216	1.50304	1.33258	1.66135	1.13244	0.92408
CFS7P7	0.02064	1.50305	1.33261	1.66125	1.13241	0.92409
CFS7P8	0.00202	1.50301	1.33262	1.66125	1.13243	0.92409
CFS7P12	0.02353	1.50299	1.33264	1.66122	1.13240	0.92409
CFS7P13	0.04323	1.50300	1.33261	1.66117	1.13240	0.92409
CFS7P15	0.23543	1.50300	1.33261	1.66117	1.13240	0.92409
CFS7P17	0.08294	1.50304	1.33257	1.66128	1.13241	0.92408
CFS7P18	0.17513	1.50300	1.33261	1.66117	1.13240	0.92409
CFS7P19	0.00755	1.50304	1.33258	1.66135	1.13244	0.92408
CFS7P23	0.00888	1.50304	1.33257	1.66128	1.13241	0.92408
CFS7P24	0.00202	1.50298	1.33264	1.66122	1.13241	0.92409
CFS7P26	0.01254	1.50300	1.33262	1.66125	1.13243	0.92409
CFS7P27	0.00078	1.50307	1.33258	1.66117	1.13242	0.92408
CFS7P28	0.00362	1.50298	1.33264	1.66128	1.13241	0.92409
CFS7P29	0.00103	1.50300	1.33264	1.66128	1.13241	0.92409
CFS7P30	0.00188	1.50307	1.33259	1.66126	1.13242	0.92408
CFS7P32	0.02924	1.50300	1.33264	1.66128	1.13241	0.92409
CFS7P34	0.00263	1.50303	1.33261	1.66128	1.13240	0.92409
CFS7P35	0.00242	1.50304	1.33257	1.66128	1.13241	0.92408
CFS7P39	0.00070	1.50310	1.33258	1.66124	1.13241	0.92408
CFS7P40	0.00434	1.50298	1.33264	1.66128	1.13241	0.92409
CFS7P43	0.01604	1.50304	1.33257	1.66128	1.13241	0.92408

Table E-2-2: Continued

CFS-P	NOJ9	W8	CBPTE-21	CBPTE-31	CBPTE-22
CFS7P3	0.76703	0.97724	1.04419	1.10142	1.06114
CFS7P6	0.76699	0.97724	1.04420	1.10140	1.06112
CFS7P7	0.76701	0.97725	1.04419	1.10140	1.06111
CFS7P8	0.76703	0.97724	1.04419	1.10139	1.06112
CFS7P12	0.76702	0.97724	1.04420	1.10142	1.06111
CFS7P13	0.76703	0.97724	1.04419	1.10144	1.06112
CFS7P15	0.76703	0.97724	1.04419	1.10144	1.06112
CFS7P17	0.76698	0.97724	1.04419	1.10144	1.06115
CFS7P18	0.76703	0.97724	1.04419	1.10144	1.06112
CFS7P19	0.76699	0.97724	1.04420	1.10140	1.06112
CFS7P23	0.76698	0.97724	1.04419	1.10144	1.06115
CFS7P24	0.76703	0.97724	1.04419	1.10142	1.06111
CFS7P26	0.76703	0.97724	1.04419	1.10140	1.06112
CFS7P27	0.76703	0.97724	1.04419	1.10142	1.06114
CFS7P28	0.76701	0.97724	1.04419	1.10140	1.06112
CFS7P29	0.76700	0.97724	1.04418	1.10139	1.06112
CFS7P30	0.76699	0.97724	1.04419	1.10141	1.06115
CFS7P32	0.76700	0.97724	1.04418	1.10139	1.06112
CFS7P34	0.76700	0.97725	1.04419	1.10141	1.06110
CFS7P35	0.76698	0.97724	1.04419	1.10144	1.06115
CFS7P39	0.76699	0.97724	1.04419	1.10141	1.06115
CFS7P40	0.76701	0.97724	1.04419	1.10140	1.06112
CFS7P43	0.76698	0.97724	1.04419	1.10144	1.06115

E-2-2-2 CFSTA vs. Entire Detailed Contribution Factors – Attraction

Table E-2-3: Best Multiple Regression Model With Entire Detailed Contribution Factors for CFS2A-Attraction (LT)

CFS-LT-A	(Constant)	EMPBI7	CBPTE-31	W11	EMPBI15	CBPTE95	EMPBI19
CFS7A3	-5.455669	0.38148	0.16796	0.14872	0.05187	0.10451	0.13925
CFS7A5	-5.790727	0.38152	0.16792	0.14876	0.05187	0.10452	0.13921
CFS7A6	-4.790369	0.38148	0.16796	0.14872	0.05187	0.10451	0.13925
CFS7A7	-3.850858	0.38149	0.16794	0.14875	0.05187	0.10452	0.13923
CFS7A8	-5.841558	0.38149	0.16794	0.14875	0.05187	0.10452	0.13923
CFS7A11	-6.532421	0.38150	0.16793	0.14876	0.05186	0.10453	0.13923
CFS7A12	-3.920872	0.38150	0.16792	0.14876	0.05187	0.10452	0.13923
CFS7A13	-4.157621	0.38150	0.16793	0.14876	0.05186	0.10453	0.13923
CFS7A14	-6.180415	0.38149	0.16795	0.14876	0.05188	0.10450	0.13922
CFS7A15	-1.829148	0.38150	0.16792	0.14874	0.05187	0.10450	0.13925
CFS7A17	-2.795372	0.38150	0.16792	0.14876	0.05187	0.10452	0.13923
CFS7A18	-2.288081	0.38153	0.16791	0.14875	0.05186	0.10453	0.13923
CFS7A19	-4.372513	0.38150	0.16794	0.14874	0.05187	0.10452	0.13922
CFS7A21	-5.714355	0.38149	0.16794	0.14873	0.05187	0.10451	0.13926
CFS7A23	-5.253515	0.38149	0.16795	0.14876	0.05188	0.10450	0.13922
CFS7A24	-5.285303	0.38149	0.16794	0.14872	0.05187	0.10451	0.13926
CFS7A26	-4.299546	0.38152	0.16793	0.14876	0.05187	0.10452	0.13920
CFS7A27	-5.490560	0.38150	0.16793	0.14874	0.05187	0.10450	0.13925
CFS7A28	-5.936158	0.38149	0.16794	0.14875	0.05187	0.10452	0.13923
CFS7A29	-6.454545	0.38151	0.16793	0.14873	0.05187	0.10454	0.13923
CFS7A30	-6.029246	0.38152	0.16793	0.14876	0.05187	0.10452	0.13920
CFS7A31	-3.706142	0.38150	0.16794	0.14876	0.05187	0.10452	0.13920
CFS7A32	-4.224245	0.38151	0.16793	0.14873	0.05187	0.10454	0.13923
CFS7A33	-5.073745	0.38151	0.16793	0.14873	0.05187	0.10454	0.13923
CFS7A34	-5.538558	0.38149	0.16794	0.14875	0.05187	0.10452	0.13923
CFS7A35	-6.754042	0.38148	0.16795	0.14874	0.05187	0.10451	0.13925
CFS7A36	-5.454348	0.38150	0.16792	0.14874	0.05187	0.10450	0.13925
CFS7A39	-7.279146	0.38152	0.16793	0.14876	0.05187	0.10452	0.13920
CFS7A40	-5.356321	0.38150	0.16793	0.14876	0.05186	0.10453	0.13923
CFS7A41	-5.436469	0.38148	0.16796	0.14872	0.05187	0.10451	0.13925
CFS7A43	-4.238446	0.38152	0.16793	0.14876	0.05187	0.10452	0.13920
CFS7A99	-7.192881	0.38153	0.16791	0.14875	0.05186	0.10453	0.13923

Table E-2-4: Best Multiple Regression Model With Entire Detailed Contribution Factors for CFS2A-Attraction

CFSA	(Constant)	EMPBI7	CBPTE-31	W11	EMPBI15	CBPTE95	EMPBI19
CFS7A3	0.004272018	1.46445	1.18289	1.16035	1.05324	1.11017	1.14941
CFS7A5	0.003055761	1.46450	1.18284	1.16039	1.05324	1.11018	1.14937
CFS7A6	0.008309391	1.46445	1.18289	1.16035	1.05324	1.11017	1.14941
CFS7A7	0.021261495	1.46447	1.18286	1.16039	1.05324	1.11018	1.14939
CFS7A8	0.002904315	1.46447	1.18286	1.16039	1.05324	1.11018	1.14939
CFS7A11	0.001455478	1.46448	1.18286	1.16039	1.05323	1.11019	1.14938
CFS7A12	0.019823796	1.46448	1.18285	1.16039	1.05323	1.11018	1.14939
CFS7A13	0.015644737	1.46448	1.18286	1.16039	1.05323	1.11019	1.14938
CFS7A14	0.002069568	1.46446	1.18287	1.16039	1.05325	1.11016	1.14937
CFS7A15	0.160550278	1.46449	1.18285	1.16037	1.05324	1.11016	1.14941
CFS7A17	0.061092130	1.46448	1.18285	1.16039	1.05323	1.11018	1.14939
CFS7A18	0.101460993	1.46453	1.18284	1.16038	1.05323	1.11019	1.14939
CFS7A19	0.012619483	1.46447	1.18287	1.16038	1.05324	1.11018	1.14938
CFS7A21	0.003298276	1.46446	1.18286	1.16036	1.05324	1.11017	1.14942
CFS7A23	0.005229105	1.46446	1.18287	1.16039	1.05325	1.11016	1.14937
CFS7A24	0.005065498	1.46446	1.18286	1.16035	1.05324	1.11016	1.14942
CFS7A26	0.013574715	1.46450	1.18285	1.16040	1.05324	1.11018	1.14935
CFS7A27	0.004125534	1.46448	1.18285	1.16038	1.05324	1.11015	1.14941
CFS7A28	0.002642162	1.46447	1.18286	1.16039	1.05324	1.11018	1.14939
CFS7A29	0.001573354	1.46449	1.18286	1.16036	1.05324	1.11019	1.14939
CFS7A30	0.002407308	1.46450	1.18285	1.16040	1.05324	1.11018	1.14935
CFS7A31	0.024572134	1.46449	1.18286	1.16039	1.05324	1.11018	1.14936
CFS7A32	0.014636374	1.46449	1.18286	1.16036	1.05324	1.11019	1.14939
CFS7A33	0.006258934	1.46449	1.18286	1.16036	1.05324	1.11019	1.14939
CFS7A34	0.003932195	1.46447	1.18286	1.16039	1.05324	1.11018	1.14939
CFS7A35	0.001166157	1.46445	1.18288	1.16037	1.05324	1.11016	1.14941
CFS7A36	0.004277664	1.46449	1.18285	1.16037	1.05324	1.11016	1.14941
CFS7A39	0.000689774	1.46450	1.18285	1.16040	1.05324	1.11018	1.14935
CFS7A40	0.004718234	1.46448	1.18286	1.16039	1.05323	1.11019	1.14938
CFS7A41	0.004354833	1.46445	1.18289	1.16035	1.05324	1.11017	1.14941
CFS7A43	0.014429993	1.46450	1.18285	1.16040	1.05324	1.11018	1.14935
CFS7A99	0.000751920	1.46453	1.18284	1.16038	1.05323	1.11019	1.14939

E-2-2-3 CFSTI vs. Entire Detailed Contribution Factors – Within

Table E-2-5: Best Multiple Regression Model With Entire Detailed Contribution Factors for CFS2I- Within (LT)

CFS-LT-I	(Constant)	EMPBI7	CBPTE-31	W11	EMPBI15	CBPTE95	EMPBI19
CFS7I3	-7.63566	0.38150	0.16793	0.14874	0.05187	0.10450	0.13925
CFS7I6	-5.74004	0.38149	0.16795	0.14876	0.05188	0.10450	0.13922
CFS7I7	-4.42097	0.38150	0.16792	0.14876	0.05187	0.10452	0.13923
CFS7I8	-6.33904	0.38150	0.16794	0.14876	0.05187	0.10452	0.13920
CFS7I12	-3.94646	0.38149	0.16794	0.14875	0.05187	0.10452	0.13923
CFS7I13	-5.30925	0.38152	0.16793	0.14876	0.05187	0.10452	0.13920
CFS7I14	-6.39505	0.38151	0.16794	0.14873	0.05187	0.10453	0.13923
CFS2I15	-1.99076	0.38150	0.16793	0.14874	0.05187	0.10450	0.13925
CFS7I17	-2.84666	0.38149	0.16794	0.14875	0.05187	0.10452	0.13923
CFS7I18	-2.29970	0.38149	0.16794	0.14872	0.05187	0.10451	0.13926
CFS7I19	-5.26931	0.38150	0.16794	0.14874	0.05187	0.10452	0.13922
CFS7I21	-6.46784	0.38148	0.16795	0.14874	0.05187	0.10451	0.13925
CFS7I26	-5.14132	0.38149	0.16795	0.14876	0.05188	0.10450	0.13922
CFS7I27	-7.53997	0.38148	0.16796	0.14872	0.05187	0.10451	0.13925
CFS7I28	-6.88025	0.38150	0.16792	0.14875	0.05187	0.10452	0.13924
CFS7I29	-7.95221	0.38150	0.16794	0.14874	0.05187	0.10452	0.13922
CFS7I31	-4.12156	0.38150	0.16793	0.14874	0.05187	0.10450	0.13925
CFS7I32	-4.62932	0.38149	0.16795	0.14876	0.05188	0.10450	0.13922
CFS7I33	-6.26755	0.38152	0.16793	0.14876	0.05187	0.10452	0.13920
CFS7I34	-6.52764	0.38149	0.16795	0.14876	0.05188	0.10450	0.13922
CFS7I35	-8.79285	0.38151	0.16793	0.14873	0.05187	0.10454	0.13923
CFS7I40	-6.52286	0.38150	0.16793	0.14874	0.05187	0.10450	0.13925
CFS7I43	-4.82445	0.38150	0.16792	0.14874	0.05187	0.10450	0.13925

Table E-2-6: Best Multiple Regression Model with Entire Detailed Contribution Factors for CFS2I-Within

CFS-I	(Constant)	EMPBI7	CBPTE-31	W11	EMPBI15	CBPTE95	EMPBI19
CFS7I3	0.00048	1.46448	1.18285	1.16038	1.05324	1.11015	1.14941
CFS7I6	0.00321	1.46447	1.18287	1.16039	1.05325	1.11015	1.14937
CFS7I7	0.01202	1.46448	1.18285	1.16039	1.05323	1.11018	1.14939
CFS7I8	0.00177	1.46449	1.18286	1.16039	1.05324	1.11018	1.14936
CFS7I12	0.01932	1.46447	1.18286	1.16039	1.05324	1.11018	1.14939
CFS7I13	0.00495	1.46450	1.18285	1.16040	1.05324	1.11018	1.14935
CFS7I14	0.00167	1.46449	1.18286	1.16036	1.05324	1.11018	1.14939
CFS7I15	0.13659	1.46448	1.18285	1.16038	1.05324	1.11015	1.14941
CFS7I17	0.05804	1.46447	1.18286	1.16039	1.05324	1.11018	1.14939
CFS7I18	0.10029	1.46446	1.18286	1.16035	1.05324	1.11016	1.14942
CFS7I19	0.00515	1.46447	1.18287	1.16038	1.05324	1.11018	1.14938
CFS7I21	0.00155	1.46445	1.18288	1.16037	1.05324	1.11016	1.14941
CFS7I26	0.00585	1.46446	1.18287	1.16039	1.05325	1.11016	1.14937
CFS7I27	0.00053	1.46445	1.18289	1.16035	1.05324	1.11017	1.14941
CFS7I28	0.00103	1.46448	1.18285	1.16038	1.05324	1.11018	1.14940
CFS7I29	0.00035	1.46447	1.18287	1.16038	1.05324	1.11018	1.14938
CFS7I31	0.01622	1.46448	1.18285	1.16038	1.05324	1.11015	1.14941
CFS7I32	0.00976	1.46446	1.18287	1.16039	1.05325	1.11016	1.14937
CFS7I33	0.00190	1.46450	1.18285	1.16040	1.05324	1.11018	1.14935
CFS7I34	0.00146	1.46447	1.18287	1.16039	1.05325	1.11015	1.14937
CFS7I35	0.00015	1.46449	1.18286	1.16036	1.05324	1.11019	1.14939
CFS7I40	0.00147	1.46448	1.18285	1.16038	1.05324	1.11015	1.14941
CFS7I43	0.00803	1.46449	1.18285	1.16037	1.05324	1.11016	1.14941

E-2-3 Estimated Attraction Commodity Flow with Multiple Regression Models Using Entire Detailed Contribution Factors (2007)

E-2-3-1 CFS7P vs. Entire Detailed Contribution Factors – Production

Table E-2-7: 2007 Estimated Attraction Commodity Flow by Each County and Commodity Type (CFS7P 3-15)

CFS7P-cfEs	CFS7P3	CFS7P6	CFS7P7	CFS7P8	CFS7P12	CFS7P13	CFS7P15
1	0.23091	3.54584	6.01727	0.58984	6.85850	12.60146	68.62882
2	2.14959	33.00981	56.01570	5.49092	63.84664	117.31027	638.88363
3	5.27175	80.95647	137.37935	13.46659	156.58586	287.70410	1566.86567
4	0.97215	14.92871	25.33443	2.48334	28.87676	53.05496	288.94271
5	0.04372	0.67148	1.13942	0.11169	1.29875	2.38623	12.99564
6	11.08268	170.19452	288.81833	28.31137	329.20004	604.84211	3294.03144
7	0.92150	14.15114	24.01327	2.35388	27.37055	50.28850	273.87628
8	0.46083	7.07691	12.00920	1.17720	13.68809	25.14893	136.96364
9	0.25926	3.98148	6.75628	0.66229	7.70085	14.14893	77.05648
10	0.50296	7.72398	13.10747	1.28484	14.94006	27.44903	149.49020
11	1.95807	30.06882	51.02586	5.00176	58.16006	106.86059	581.97360
12	0.34744	5.33580	9.05485	0.88757	10.32067	18.96188	103.26833
13	0.40922	6.28418	10.66450	1.04538	12.15581	22.33358	121.63095
14	0.70246	10.78810	18.30624	1.79447	20.86539	38.33653	208.78464
15	0.25186	3.86758	6.56334	0.64334	7.48095	13.74501	74.85670
16	0.04220	0.64810	1.09982	0.10780	1.25356	2.30318	12.54336
17	0.07304	1.12152	1.90329	0.18657	2.16939	3.98580	21.70709
18	52.84664	811.57822	1377.18949	135.00298	1569.79847	2884.20642	15707.68044
19	0.37576	5.77035	9.79233	0.95987	11.16137	20.50635	111.67967
20	0.77638	11.92262	20.23241	1.98326	23.06081	42.37057	230.75443
21	0.89160	13.69229	23.23553	2.27764	26.48406	48.65956	265.00490
22	2.65314	40.74515	69.14185	6.77780	78.80917	144.79420	788.56387
23	1.72565	26.50006	44.97052	4.40814	51.25785	94.17677	512.89626
24	1.55214	23.83688	40.44930	3.96505	46.10478	84.70742	461.32521
25	21.39425	328.55508	557.52980	54.65306	635.48319	1167.59031	6358.81511
26	0.81877	12.57363	21.33746	2.09156	24.32072	44.68481	243.35801
27	6.50239	99.85516	169.45199	16.61036	193.14224	354.86393	1932.62494
28	0.09611	1.47583	2.50451	0.24550	2.85470	5.24507	28.56519
29	9.38162	144.07403	244.48898	23.96624	278.67401	512.01029	2788.45994
Sum	124.69410	1914.93375	3249.53278	318.54031	3703.92331	6805.27683	37062.22717

Table E-2-7: Continued (CFS7P 17-27)

CFS7P-cfEs	CFS7P17	CFS7P18	CFS7P19	CFS7P23	CFS7P24	CFS7P26	CFS7P27
1	24.17862	51.05036	2.20158	2.58796	0.58754	3.65793	0.22634
2	225.09284	475.24114	20.49549	24.09280	5.46958	34.05204	2.10702
3	552.03138	1165.53153	50.26513	59.08664	13.41438	83.51261	5.16736
4	101.79778	214.93345	9.26910	10.89592	2.47373	15.40045	0.95290
5	4.57832	9.66696	0.41691	0.49004	0.11126	0.69267	0.04286
6	1160.51799	2450.30419	105.67222	124.21597	28.20155	175.57069	10.86322
7	96.49550	203.72611	8.78631	10.32839	2.34471	14.59785	0.90325
8	48.25456	101.88202	4.39399	5.16492	1.17259	7.30047	0.45170
9	27.14829	57.31937	2.47207	2.90582	0.65970	4.10723	0.25413
10	52.66766	111.20005	4.79575	5.63728	1.27983	7.96798	0.49300
11	205.03956	432.90794	18.66945	21.94640	4.98237	31.01853	1.91930
12	36.38250	76.81737	3.31295	3.89420	0.88412	5.50427	0.34056
13	42.85019	90.47662	3.90179	4.58647	1.04134	6.48295	0.40112
14	73.56095	155.30692	6.69823	7.87359	1.78746	11.12857	0.68855
15	26.37261	55.68304	2.40135	2.82279	0.64087	3.98970	0.24687
16	4.41935	9.33053	0.40240	0.47303	0.10739	0.66854	0.04137
17	7.64749	16.14708	0.69634	0.81855	0.18584	1.15701	0.07159
18	5534.10683	11684.34361	503.90148	592.34277	134.47822	837.21896	51.80020
19	39.34606	83.07424	3.58276	4.21140	0.95614	5.95268	0.36832
20	81.29832	171.64941	7.40264	8.70176	1.97554	12.29923	0.76101
21	93.36315	197.12703	8.50142	9.99312	2.26879	14.12480	0.87395
22	277.81751	586.58255	25.29829	29.73618	6.75128	42.03256	2.60060
23	180.70164	381.52394	16.45364	19.34139	4.39106	27.33705	1.69148
24	162.53302	343.16221	14.80010	17.39671	3.94959	24.58944	1.52141
25	2240.34407	4730.07972	203.99684	239.79508	54.44006	338.92968	20.97062
26	85.73707	181.02473	7.80685	9.17686	2.08347	12.97081	0.80256
27	680.90544	1437.60589	61.99916	72.88067	16.54580	103.00846	6.37363
28	10.06380	21.24855	0.91633	1.07718	0.24455	1.52247	0.09420
29	982.39880	2074.22886	89.45425	105.15099	23.87314	148.62546	9.19586
Sum	13057.65128	27569.17540	1188.96482	1397.62486	317.30192	1975.42108	122.22499

Table E-2-7: Continued (CFS7P 28-39)

CFS7P-cfEs	CFS7P28	CFS7P29	CFS7P30	CFS7P32	CFS7P34	CFS7P35	CFS7P39
1	1.05621	0.29949	0.54869	8.52528	0.76815	0.70643	0.20347
2	9.83242	2.78802	5.10801	79.36306	7.15090	6.57657	1.89420
3	24.11425	6.83764	12.52721	194.63810	17.53781	16.12877	4.64544
4	4.44699	1.26094	2.31009	35.89367	3.23415	2.97424	0.85666
5	0.20001	0.05671	0.10390	1.61430	0.14546	0.13377	0.03853
6	50.69683	14.37498	26.33593	409.19386	36.87026	33.90701	9.76614
7	4.21511	1.19520	2.18977	34.02209	3.06547	2.81932	0.81203
8	2.10800	0.59773	1.09506	17.01484	1.53305	1.40986	0.40608
9	1.18596	0.33628	0.61606	9.57234	0.86251	0.79320	0.22845
10	2.30081	0.65238	1.19517	18.57049	1.67328	1.53880	0.44321
11	8.95665	2.53967	4.65291	72.29336	6.51391	5.99067	1.72545
12	1.58939	0.45067	0.82562	12.82875	1.15594	1.06299	0.30617
13	1.87200	0.53080	0.97240	15.10970	1.36142	1.25196	0.36060
14	3.21335	0.91117	1.66929	25.93702	2.33696	2.14924	0.61902
15	1.15204	0.32666	0.59846	9.29873	0.83787	0.77053	0.22193
16	0.19305	0.05474	0.10028	1.55819	0.14040	0.12912	0.03719
17	0.33409	0.09473	0.17354	2.69662	0.24297	0.22344	0.06436
18	241.75166	68.54689	125.58535	1951.23552	175.80993	161.69073	46.57048
19	1.71887	0.48738	0.89288	13.87358	1.25007	1.14958	0.33111
20	3.55138	1.00702	1.84490	28.66559	2.58284	2.37530	0.68415
21	4.07854	1.15648	2.11867	32.91991	2.96623	2.72780	0.78568
22	12.13691	3.44133	6.30459	97.95985	8.82653	8.11703	2.33792
23	7.89372	2.23827	4.10065	63.71406	5.74088	5.27958	1.52066
24	7.10018	2.01323	3.68837	57.30810	5.16367	4.74875	1.36776
25	97.86572	27.74959	50.84049	789.91158	71.17352	65.45643	18.85289
26	3.74539	1.06200	1.94561	30.23071	2.72394	2.50499	0.72150
27	29.74428	8.43397	15.45181	240.07896	21.63208	19.89410	5.73002
28	0.43962	0.12466	0.22837	3.54840	0.31973	0.29404	0.08469
29	42.91595	12.16872	22.29369	346.39115	31.21125	28.70288	8.26713
Sum	570.40935	161.73736	296.31778	4603.96782	414.83116	381.50713	109.88294

Table E-2-7: Continued (CFS7P 40-43)

CFS7P-cfEs	CFS7P40	CFS7P43	Total
1	1.26654	4.67752	201.01474
2	11.79039	43.54579	1871.30681
3	28.91622	106.79434	4589.37860
4	5.33254	19.69349	846.31917
5	0.23983	0.88571	38.06414
6	60.79231	224.51033	9648.27398
7	5.05448	18.66773	802.19842
8	2.52777	9.33518	401.17263
9	1.42213	5.25203	225.70111
10	2.75898	10.18893	437.86215
11	10.74023	39.66634	1704.61148
12	1.90589	7.03845	302.47639
13	2.24479	8.28967	356.25742
14	3.85324	14.23088	611.54227
15	1.38145	5.10197	219.25567
16	0.23149	0.85495	36.74006
17	0.40062	1.47946	63.58043
18	289.89274	1070.61172	46008.18976
19	2.06115	7.61177	327.11371
20	4.25858	15.72773	675.88590
21	4.89071	18.06175	776.20359
22	14.55378	53.74574	2309.72786
23	9.46563	34.95800	1502.28690
24	8.51407	31.44315	1351.24054
25	117.35416	433.41025	18625.19151
26	4.49123	16.58644	712.79912
27	35.66739	131.72592	5660.72860
28	0.52716	1.94691	83.66756
29	51.46199	190.05193	8167.44717
Sum	683.99750	2526.09408	108556.23770

E-2-3-2 CFS7A vs. Entire Detailed Contribution Factors – Attraction

Table E-2-8: 2007 Estimated Attraction Commodity Flow by Each County and Commodity Type (CFS7A 3-12)

CFS7A-cfEs	CFS7A3	CFS7A5	CFS7A6	CFS7A7	CFS7A8	CFS7A11	CFS7A12
1	1.46133	1.04584	2.84240	7.27595	0.99389	0.49814	6.78506
2	11.77906	8.42975	22.91114	58.64739	8.01122	4.01512	54.68915
3	27.09541	19.39093	52.70257	134.90792	18.42839	9.23592	125.80203
4	6.12076	4.38048	11.90533	30.47543	4.16294	2.08640	28.41892
5	0.29779	0.21313	0.57922	1.48272	0.20254	0.10151	1.38268
6	74.73888	53.49090	145.37265	372.14163	50.83446	25.47795	347.03144
7	4.51477	3.23113	8.78157	22.47925	3.07066	1.53897	20.96227
8	2.53580	1.81485	4.93233	12.62589	1.72469	0.86440	11.77397
9	1.56034	1.11670	3.03497	7.76895	1.06124	0.53188	7.24463
10	3.08976	2.21133	6.00982	15.38416	2.10147	1.05323	14.34598
11	12.07851	8.64418	23.49359	60.13904	8.21498	4.11723	56.08021
12	2.15158	1.53985	4.18498	10.71272	1.46336	0.73342	9.98982
13	2.14797	1.53719	4.17796	10.69451	1.46087	0.73218	9.97293
14	3.41498	2.44399	6.64238	17.00312	2.32262	1.16407	15.85567
15	1.76009	1.25961	3.42350	8.76327	1.19706	0.59995	8.17178
16	0.27602	0.19754	0.53687	1.37428	0.18773	0.09409	1.28154
17	0.60977	0.43640	1.18604	3.03602	0.41472	0.20785	2.83116
18	330.48357	236.52846	642.81498	1645.56149	224.78332	112.66049	1534.52283
19	2.90332	2.07797	5.64717	14.45628	1.97472	0.98972	13.48094
20	5.15750	3.69111	10.03172	25.67940	3.50780	1.75806	23.94647
21	5.65201	4.04499	10.99357	28.14135	3.84410	1.92660	26.24215
22	11.65580	8.34175	22.67138	58.03435	7.92748	3.97312	54.11782
23	10.23194	7.32282	19.90188	50.94577	6.95918	3.48785	47.50795
24	7.07133	5.06083	13.75426	35.20857	4.80948	2.41045	32.83275
25	108.47229	77.63117	210.98662	540.09447	73.77678	36.97564	503.64181
26	4.69970	3.36335	9.14126	23.39942	3.19636	1.60196	21.82014
27	32.68107	23.38886	63.56711	162.71963	22.22746	11.14014	151.73835
28	0.91998	0.65840	1.78943	4.58053	0.62570	0.31359	4.27136
29	55.14731	39.46819	107.26559	274.58618	37.50841	18.79882	256.05693
Sum	730.70861	522.96169	1421.28229	3638.31970	496.99364	249.08875	3392.79873

Table E-2-8: Continued (CFS7A 13-21)

CFS7A-cfEs	CFS7A13	CFS7A14	CFS7A15	CFS7A17	CFS7A18	CFS7A19	CFS7A21
1	5.35441	0.70822	54.93638	20.90989	34.72414	4.31790	1.12846
2	43.15793	5.70872	442.80267	168.53870	279.87820	34.80429	9.09587
3	99.27564	13.13224	1018.59548	387.69132	643.79347	80.06024	20.92334
4	22.42648	2.96648	230.10275	87.58022	145.43680	18.08554	4.72659
5	1.09115	0.14433	11.19474	4.26108	7.07587	0.87992	0.22996
6	273.85901	36.22363	2809.69134	1069.46668	1775.96129	220.84393	57.71554
7	16.54217	2.18814	169.72696	64.60063	107.27546	13.34027	3.48641
8	9.29127	1.22899	95.33203	36.28451	60.25490	7.49284	1.95822
9	5.71710	0.75623	58.65741	22.32620	37.07478	4.61051	1.20490
10	11.32102	1.49750	116.15603	44.21084	73.41729	9.12975	2.38597
11	44.25553	5.85397	454.06465	172.82560	286.99474	35.68937	9.32715
12	7.88341	1.04277	80.88544	30.78622	51.12468	6.35749	1.66148
13	7.87007	1.04098	80.74913	30.73416	51.03825	6.34662	1.65870
14	12.51243	1.65508	128.37963	48.86333	81.14329	10.09049	2.63709
15	6.44874	0.85302	66.16585	25.18343	41.81957	5.20061	1.35915
16	1.01134	0.13377	10.37617	3.94941	6.55841	0.81557	0.21314
17	2.23418	0.29552	22.92332	8.72493	14.48860	1.80174	0.47088
18	1210.97222	160.17472	12423.83974	4729.02701	7853.05940	976.54258	255.20901
19	10.63841	1.40715	109.14775	41.54498	68.98913	8.57906	2.24205
20	18.89718	2.49964	193.88833	73.79720	122.54791	15.23936	3.98271
21	20.70881	2.73930	212.47795	80.87195	134.29744	16.70047	4.36456
22	42.70654	5.64906	438.18337	166.77798	276.95479	34.44044	9.00085
23	37.49041	4.95909	384.65783	146.40798	243.12459	30.23336	7.90133
24	25.90957	3.42720	265.83993	101.18255	168.02530	20.89438	5.46066
25	397.44610	52.57301	4077.80294	1552.10185	2577.41118	320.51663	83.76461
26	17.21925	2.27772	176.67444	67.24437	111.66623	13.88639	3.62914
27	119.74383	15.83894	1228.57853	467.62077	776.54857	96.56562	25.23686
28	3.37076	0.44587	34.58400	13.16330	21.85867	2.71835	0.71041
29	202.06594	26.72805	2073.17506	789.10533	1310.39287	162.95079	42.58607
Sum	2677.42086	354.14936	27469.58989	10455.78239	17362.93580	2159.13450	564.27112

Table E-2-8: Continued (CFS7A 23-30)

CFS7A-cfEs	CFS7A23	CFS7A24	CFS7A26	CFS7A27	CFS7A28	CFS7A29	CFS7A30
1	1.78944	1.73282	4.64608	1.41176	0.90418	0.53826	0.82392
2	14.42402	13.96728	37.44877	11.37934	7.28810	4.33863	6.64108
3	33.18077	32.12904	86.14356	26.17681	16.76499	9.97986	15.27649
4	7.49529	7.25798	19.45996	5.91328	3.78718	2.25449	3.45098
5	0.36466	0.35311	0.94681	0.28769	0.18426	0.10969	0.16791
6	91.52496	88.62386	237.63034	72.20503	46.24598	27.53012	42.14079
7	5.52870	5.35360	14.35409	4.36173	2.79349	1.66295	2.54552
8	3.10526	3.00699	8.06231	2.44987	1.56902	0.93404	1.42975
9	1.91075	1.85021	4.96091	1.50741	0.96545	0.57473	0.87976
10	3.78369	3.66383	9.82371	2.98503	1.91179	1.13809	1.74211
11	14.79101	14.32239	38.40145	11.66883	7.47347	4.44891	6.81002
12	2.63472	2.55133	6.84067	2.07861	1.33127	0.79251	1.21311
13	2.63020	2.54704	6.82880	2.07510	1.32900	0.79116	1.21100
14	4.18184	4.04942	10.85732	3.29915	2.11298	1.25784	1.92541
15	2.15530	2.08708	5.59573	1.70036	1.08901	0.64829	0.99233
16	0.33799	0.32729	0.87755	0.26665	0.17078	0.10167	0.15562
17	0.74669	0.72307	1.93865	0.58909	0.37729	0.22460	0.34380
18	404.70776	391.87844	1050.76424	319.27466	204.49365	121.73675	186.34001
19	3.55540	3.44276	9.23125	2.80491	1.79648	1.06945	1.63705
20	6.31576	6.11569	16.39755	4.98265	3.19118	1.89967	2.90790
21	6.92128	6.70208	17.96965	5.46037	3.49712	2.08182	3.18669
22	14.27329	13.82143	37.05756	11.26063	7.21192	4.29329	6.57170
23	12.52996	12.13290	32.53123	9.88520	6.33102	3.76874	5.76901
24	8.65939	8.38518	22.48237	6.83168	4.37536	2.60463	3.98697
25	132.83436	128.62479	344.87200	104.79435	67.11745	39.95528	61.15877
26	5.75502	5.57281	14.94148	4.54027	2.90784	1.73103	2.64969
27	40.01968	38.75267	103.90342	31.57248	20.22114	12.03783	18.42598
28	1.12657	1.09089	2.92491	0.88876	0.56922	0.33886	0.51870
29	67.53281	65.39264	175.33524	53.27777	34.12278	20.31305	31.09353
Sum	894.81658	866.45862	2323.22761	705.92944	452.13338	269.15621	411.99562

Table E-2-8: Continued (CFS7A 31-39)

CFS7A-cfEs	CFS7A31	CFS7A32	CFS7A33	CFS7A34	CFS7A35	CFS7A36	CFS7A39
1	8.40911	5.00722	2.14123	1.34565	0.39898	1.46371	0.23608
2	67.78108	40.36075	17.25941	10.84651	3.21591	11.79793	1.90289
3	155.91802	92.83919	39.70070	24.95047	7.39766	27.13922	4.37723
4	35.22157	20.97273	8.96854	5.63626	1.67111	6.13080	0.98882
5	1.71368	1.02038	0.43634	0.27422	0.08130	0.29827	0.04811
6	430.09690	256.10322	109.51709	68.82551	20.40544	74.86076	12.07475
7	25.98026	15.46988	6.61536	4.15741	1.23264	4.52217	0.72938
8	14.59228	8.68910	3.71571	2.33509	0.69234	2.54000	0.40967
9	8.97907	5.34647	2.28631	1.43682	0.42601	1.56285	0.25208
10	17.78041	10.58722	4.52740	2.84521	0.84358	3.09483	0.49917
11	69.50533	41.38664	17.69812	11.12238	3.29769	12.09799	1.95130
12	12.38124	7.37245	3.15267	1.98126	0.58743	2.15509	0.34760
13	12.35979	7.35985	3.14728	1.97789	0.58644	2.15146	0.34699
14	19.65129	11.70128	5.00380	3.14463	0.93236	3.42052	0.55169
15	10.12813	6.03085	2.57896	1.62072	0.48054	1.76291	0.28434
16	1.58833	0.94577	0.40444	0.25417	0.07536	0.27646	0.04459
17	3.50886	2.08939	0.89348	0.56149	0.16648	0.61076	0.09851
18	1901.82253	1132.47519	484.27889	304.33739	90.22888	331.01790	53.39265
19	16.70791	9.94875	4.25437	2.67361	0.79268	2.90811	0.46907
20	29.67886	17.67201	7.55706	4.74926	1.40812	5.16592	0.83321
21	32.52431	19.36647	8.28166	5.20458	1.54312	5.66121	0.91309
22	67.07248	39.93903	17.07907	10.73313	3.18229	11.67486	1.88301
23	58.88002	35.05926	14.99235	9.42214	2.79358	10.24873	1.65301
24	40.69190	24.22994	10.36142	6.51163	1.93065	7.08298	1.14240
25	624.20565	371.69022	158.94540	99.88745	29.61523	108.64804	17.52403
26	27.04364	16.10314	6.88617	4.32759	1.28312	4.70727	0.75922
27	188.06039	111.98381	47.88749	30.09409	8.92257	32.73396	5.27966
28	5.29402	3.15228	1.34800	0.84714	0.25117	0.92145	0.14862
29	317.34816	188.96530	80.80699	50.78318	15.05648	55.23720	8.90934
Sum	4204.92522	2503.86779	1070.72571	672.88688	199.49918	731.89338	118.05052

Table E-2-8: Continued (CFS7A 40-43, 99)

CFS7A-cfEs	CFS7A40	CFS7A41	CFS7A43	CFS7A99	Total
1	1.61482	1.48966	4.93880	0.25734	182.13106
2	13.01583	12.00740	39.80824	2.07416	1468.02654
3	29.94014	27.62066	91.57105	4.77111	3376.91187
4	6.76351	6.23941	20.68603	1.07782	762.85090
5	0.32907	0.30356	1.00647	0.05244	37.11460
6	82.59205	76.18773	252.60229	13.16152	9315.17765
7	4.98889	4.60229	15.25847	0.79501	562.69052
8	2.80212	2.58496	8.57028	0.44654	316.05000
9	1.72420	1.59059	5.27348	0.27476	194.46770
10	3.41426	3.14966	10.44266	0.54409	385.09091
11	13.34685	12.31265	40.82094	2.12690	1505.36161
12	2.37753	2.19329	7.27166	0.37888	268.15852
13	2.37350	2.18961	7.25905	0.37824	267.70394
14	3.77357	3.48118	11.54138	0.60135	425.61521
15	1.94485	1.79421	5.94829	0.30992	219.35742
16	0.30500	0.28137	0.93284	0.04860	34.40036
17	0.67380	0.62159	2.06080	0.10737	75.99684
18	365.21229	336.89016	1116.96786	58.19844	41190.19751
19	3.20839	2.95960	9.81286	0.51127	361.86259
20	5.69912	5.25748	17.43068	0.90819	642.79473
21	6.24549	5.76157	19.10183	0.99527	704.42287
22	12.87969	11.88175	39.39238	2.05249	1452.69472
23	11.30658	10.43029	34.58087	1.80178	1275.24866
24	7.81396	7.20841	23.89888	1.24522	881.33022
25	119.86419	110.57508	366.60073	19.10100	13519.20913
26	5.19308	4.79080	15.88287	0.82755	585.72229
27	36.11306	33.31461	110.44988	5.75494	4073.12340
28	1.01657	0.93781	3.10920	0.16199	114.65653
29	60.94026	56.21637	186.38228	9.71122	6873.26014
Sum	807.47270	744.87377	2469.60305	128.67542	91071.62842

E-2-3-3 CFS7I vs. Entire Detailed Contribution Factors – Within

Table E-2-9: 2007 Estimated Attraction Commodity Flow by Each County and Commodity Type (CFS7I 3-14)

CFS7I-cfsEs	CFS7I3	CFS7I6	CFS7I7	CFS7I8	CFS7I12	CFS7I13	CFS7I14
1	0.16526	1.10011	4.11493	0.60436	6.61258	1.69270	0.57131
2	1.33202	8.86756	33.16733	4.87141	53.30036	13.64365	4.60505
3	3.06416	20.39904	76.29516	11.20579	122.60803	31.38453	10.59288
4	0.69219	4.60797	17.23522	2.53137	27.69690	7.08981	2.39293
5	0.03368	0.22419	0.83855	0.12316	1.34754	0.34495	0.11642
6	8.45206	56.26719	210.46416	30.91095	338.21254	86.57545	29.22066
7	0.51057	3.39895	12.71299	1.86719	20.42976	5.22960	1.76506
8	0.28677	1.90906	7.14056	1.04874	11.47476	2.93733	0.99139
9	0.17645	1.17469	4.39365	0.64532	7.06064	1.80740	0.61002
10	0.34942	2.32614	8.70041	1.27787	13.98155	3.57906	1.20797
11	1.36591	9.09322	34.01097	4.99533	54.65601	13.99073	4.72213
12	0.24331	1.61978	6.05853	0.88984	9.73601	2.49225	0.84117
13	0.24290	1.61699	6.04828	0.88830	9.71946	2.48793	0.83974
14	0.38619	2.57091	9.61599	1.41233	15.45290	3.95563	1.33509
15	0.19904	1.32504	4.95594	0.72791	7.96430	2.03868	0.68810
16	0.03121	0.20779	0.77722	0.11415	1.24898	0.31972	0.10791
17	0.06896	0.45905	1.71701	0.25218	2.75922	0.70631	0.23839
18	37.37312	248.80194	930.64208	136.68349	1495.53149	382.82311	129.21152
19	0.32833	2.18577	8.17579	1.20079	13.13827	3.36320	1.13510
20	0.58325	3.88282	14.52281	2.13301	23.33815	5.97409	2.01634
21	0.63917	4.25509	15.91508	2.33751	25.57563	6.54685	2.20967
22	1.31813	8.77496	32.82083	4.82048	52.74321	13.50112	4.55691
23	1.15713	7.70322	28.81215	4.23169	46.30091	11.85205	4.00021
24	0.79969	5.32364	19.91208	2.92452	31.99852	8.19096	2.76458
25	12.26684	81.66370	305.44365	44.86150	490.85270	125.64661	42.40870
26	0.53147	3.53808	13.23326	1.94362	21.26604	5.44360	1.83733
27	3.69576	24.60317	92.02476	13.51585	147.88407	37.85495	12.77703
28	0.10403	0.69259	2.59045	0.38048	4.16292	1.06563	0.35966
29	6.23650	41.51769	155.29085	22.80773	249.55147	63.87958	21.56055
Sum	82.63351	550.11036	2057.63068	302.20687	3306.60491	846.41748	285.68382

Table E-2-9: Continued (CFS7I 15-27)

CFS7I-cfsEs	CFS7I15	CFS7I17	CFS7I18	CFS7I19	CFS7I21	CFS7I26	CFS7I27
1	46.74165	19.86133	34.30703	1.76115	0.53118	2.00191	0.18178
2	376.75678	160.09111	276.52953	14.19572	4.28153	16.13668	1.46525
3	866.68339	368.26121	636.10293	32.65439	9.84894	37.12054	3.37051
4	195.78194	83.18946	143.69628	7.37660	2.22485	8.38525	0.76139
5	9.52493	4.04742	6.99100	0.35890	0.10824	0.40796	0.03704
6	2390.62390	1015.84343	1754.60868	90.07622	27.16696	102.39233	9.29708
7	144.41182	61.36213	105.99263	5.44113	1.64109	6.18516	0.56161
8	81.11219	34.46519	59.53355	3.05612	0.92175	3.47397	0.31544
9	49.90846	21.20708	36.63117	1.88050	0.56717	2.13763	0.19410
10	98.83082	41.99449	72.53785	3.72378	1.12310	4.23295	0.38435
11	386.34135	164.16290	283.56000	14.55672	4.39041	16.54725	1.50250
12	68.82043	29.24275	50.51214	2.59305	0.78208	2.94756	0.26764
13	68.70402	29.19304	50.42736	2.58861	0.78077	2.94250	0.26720
14	109.23111	46.41381	80.17193	4.11564	1.24131	4.67838	0.42480
15	56.29679	23.92129	41.32079	2.12119	0.63977	2.41121	0.21894
16	8.82839	3.75140	6.47990	0.33265	0.10033	0.37812	0.03433
17	19.50396	8.28748	14.31552	0.73488	0.22165	0.83534	0.07585
18	10570.81041	4491.92641	7758.55743	398.30512	120.12700	452.76138	41.11023
19	92.86733	39.46164	68.16111	3.49916	1.05534	3.97755	0.36116
20	164.96967	70.09765	121.08079	6.21572	1.87471	7.06568	0.64156
21	180.78632	76.81807	132.69026	6.81167	2.05445	7.74309	0.70308
22	372.82628	158.41767	273.64186	14.04732	4.23677	15.96805	1.44991
23	327.28734	139.06782	240.21181	12.33137	3.71926	14.01773	1.27279
24	226.18895	96.10963	166.01289	8.52225	2.57038	9.68757	0.87963
25	3469.61830	1474.30810	2546.56215	130.73001	39.42849	148.60666	13.49332
26	150.32303	63.87393	110.33259	5.66388	1.70829	6.43835	0.58461
27	1045.32782	444.17945	767.23992	39.38649	11.87915	44.77147	4.06533
28	29.42567	12.50359	21.59778	1.10874	0.33440	1.26034	0.11444
29	1763.96462	749.54412	1294.66815	66.46319	20.04558	75.55143	6.86000
Sum	23372.49764	9931.60360	17154.47503	880.65216	265.60497	1001.06404	90.89589

Table E-2-9: Continued (CFS7I 28-35)

CFS7I-cfsEs	CFS7I28	CFS7I29	CFS7I31	CFS7I32	CFS7I33	CFS7I34	CFS7I35
1	0.35176	0.12040	5.55021	3.34044	0.64922	0.50048	0.05194
2	2.83531	0.97048	44.73695	26.92607	5.23294	4.03417	0.41864
3	6.52207	2.23240	102.91195	61.94027	12.03736	9.28025	0.96297
4	1.47335	0.50430	23.24759	13.99185	2.71926	2.09633	0.21754
5	0.07168	0.02454	1.13101	0.68074	0.13230	0.10199	0.01058
6	17.99141	6.15803	283.86809	170.85441	33.20552	25.59793	2.65642
7	1.08677	0.37198	17.14779	10.32071	2.00578	1.54630	0.16046
8	0.61041	0.20893	9.63144	5.79675	1.12660	0.86850	0.09013
9	0.37559	0.12856	5.92624	3.56690	0.69322	0.53441	0.05546
10	0.74375	0.25457	11.73539	7.06320	1.37273	1.05825	0.10982
11	2.90742	0.99516	45.87505	27.61115	5.36607	4.13683	0.42928
12	0.51791	0.17727	8.17189	4.91838	0.95589	0.73689	0.07647
13	0.51704	0.17697	8.15807	4.90992	0.95423	0.73562	0.07634
14	0.82202	0.28136	12.97035	7.80646	1.51716	1.16960	0.12137
15	0.42366	0.14501	6.68481	4.02341	0.78193	0.60281	0.06255
16	0.06644	0.02274	1.04830	0.63095	0.12263	0.09453	0.00981
17	0.14678	0.05024	2.31594	1.39388	0.27090	0.20884	0.02167
18	79.55593	27.22997	1255.20194	755.48901	146.82964	113.18879	11.74657
19	0.69890	0.23922	11.02728	6.63704	1.28994	0.99439	0.10319
20	1.24147	0.42494	19.58887	11.78996	2.29133	1.76643	0.18330
21	1.36050	0.46568	21.46698	12.92032	2.51101	1.93579	0.20088
22	2.80571	0.96034	44.27024	26.64469	5.17828	3.99204	0.41427
23	2.46298	0.84303	38.86284	23.39033	4.54579	3.50447	0.36365
24	1.70218	0.58262	26.85819	16.16492	3.14160	2.42191	0.25132
25	26.11105	8.93731	411.99032	247.96880	48.19105	37.15170	3.85535
26	1.13124	0.38721	17.84970	10.74320	2.08786	1.60960	0.16703
27	7.86679	2.69264	124.12459	74.70681	14.51905	11.19285	1.16155
28	0.22144	0.07580	3.49407	2.10304	0.40872	0.31509	0.03270
29	13.27498	4.54373	209.45715	126.06701	24.50065	18.88787	1.96004
Sum	175.89653	60.20544	2775.30324	1670.40060	324.63865	250.26464	25.97130

Table E-2-9: Continued (CFS7I 43)

CFS7I-cfsEs	CFS7I40	CFS7I43	Total
1	0.50285	2.74801	134.06260
2	4.05317	22.14971	1080.60143
3	9.32383	50.95179	2485.75441
4	2.10623	11.51011	561.52873
5	0.10247	0.55998	27.31928
6	25.71848	140.54531	6856.70721
7	1.55359	8.49002	414.19309
8	0.87261	4.76866	232.64084
9	0.53692	2.93414	143.14571
10	1.06323	5.81031	283.46100
11	4.15628	22.71305	1108.08572
12	0.74037	4.04602	197.38765
13	0.73912	4.03920	197.05360
14	1.17511	6.42176	313.29120
15	0.60564	3.30972	161.46851
16	0.09498	0.51903	25.32151
17	0.20982	1.14666	55.94052
18	113.72142	621.46057	30319.08856
19	0.99907	5.45975	266.35932
20	1.77475	9.69861	473.15593
21	1.94491	10.62849	518.52050
22	4.01089	21.91864	1069.31858
23	3.52098	19.24121	938.70074
24	2.43335	13.29774	648.73913
25	37.32636	203.97830	9951.40097
26	1.61718	8.83754	431.14864
27	11.24570	61.45549	2998.17069
28	0.31656	1.72995	84.39808
29	18.97684	103.70357	5059.31328
Sum	251.44274	1374.07334	67036.27743

Appendix F: Developing County Level Freight Flow Distribution Model

F-1 Raw Data of Each Factor in the Model

F-1-1 Physical Friction Factor

Table F-1-1: Raw Data of Physical Distance Between Zones *i* and *j* (Miles)

PFF	1	2	3	4	5	6	7	8
1	0	218.7586	245.5460	167.7865	264.4127	191.4969	201.3345	143.7021
2	218.7586	0	70.5190	183.9970	190.9607	62.3517	162.4023	214.8886
3	245.5460	70.5190	0	155.5651	129.6834	54.0742	120.0195	196.1671
4	167.7865	183.9970	155.5651	0	102.8503	122.5953	45.7374	45.4029
5	264.4127	190.9607	129.6834	102.8503	0	136.1467	63.0796	145.0910
6	191.4969	62.3517	54.0742	122.5953	136.1467	0	100.4730	156.6654
7	201.3345	162.4023	120.0195	45.7374	63.0796	100.4730	0	91.1040
8	143.7021	214.8886	196.1671	45.4029	145.0910	156.6654	91.1040	0
9	103.4412	267.8529	267.6940	132.1730	233.6041	219.5329	177.4119	88.5392
10	202.4009	255.0628	221.2372	71.3127	131.6406	193.2549	101.7049	60.7357
11	34.5220	253.2452	279.2432	190.9114	290.7710	225.2725	227.9913	160.6559
12	96.0731	126.5981	149.8229	116.8328	191.1340	95.7593	131.4580	121.5600
13	104.3875	299.5238	306.6843	177.7417	279.6670	256.2685	222.5645	134.7074
14	50.0188	169.1227	196.4705	139.9428	227.8123	142.4073	165.5038	128.9218
15	208.4220	83.8026	44.6282	112.2502	108.6969	28.8716	81.2489	151.7695
16	60.0925	225.7633	234.8211	122.6176	224.7016	183.3465	163.2133	89.4543
17	249.6204	95.2875	26.5000	141.3358	103.9418	63.1873	101.5952	184.3400
18	174.2675	84.3670	73.5025	99.6303	127.3723	24.3692	82.7463	132.4107
19	193.5230	320.7057	301.2119	145.9833	225.8497	263.0985	187.6194	106.4365
20	113.5975	168.1425	162.5034	55.9485	151.2566	115.1812	88.3460	53.6567
21	81.8990	203.1441	205.5619	90.0488	191.6002	155.7881	129.9122	61.8312
22	211.7085	119.3853	71.8039	86.4906	75.7367	60.9002	48.2197	130.0102
23	144.6319	74.1273	113.8613	145.3887	192.3381	65.1944	142.7792	163.5356
24	233.3560	209.7589	160.2127	65.5740	52.6431	148.6207	49.3073	100.1710
25	147.8099	121.7363	110.8000	65.9598	125.4279	64.4343	66.8300	93.2197
26	175.4729	129.3764	100.7175	56.2751	95.2777	67.2031	39.2124	95.4753
27	75.8283	293.8666	320.9391	227.2402	328.6597	266.9661	266.3724	193.0769
28	126.3988	249.1873	238.9495	93.0114	192.0139	195.0607	138.7485	47.7277
29	213.1357	63.0136	32.4796	131.9201	128.1233	21.9055	102.7809	169.6165

Table F-1-1: Continued

PFF	9	10	11	12	13	14	15	16
1	103.4412	202.4009	34.5220	96.0731	104.3875	50.0188	208.4220	60.0925
2	267.8529	255.0628	253.2452	126.5981	299.5238	169.1227	83.8026	225.7633
3	267.6940	221.2372	279.2432	149.8229	306.6843	196.4705	44.6282	234.8211
4	132.1730	71.3127	190.9114	116.8328	177.7417	139.9428	112.2502	122.6176
5	233.6041	131.6406	290.7710	191.1340	279.6670	227.8123	108.6969	224.7016
6	219.5329	193.2549	225.2725	95.7593	256.2685	142.4073	28.8716	183.3465
7	177.4119	101.7049	227.9913	131.4580	222.5645	165.5038	81.2489	163.2133
8	88.5392	60.7357	160.6559	121.5600	134.7074	128.9218	151.7695	89.4543
9	0	127.8565	100.7175	146.6894	46.2885	122.9912	223.5810	49.8972
10	127.8565	0	215.7611	178.8450	172.0760	189.6182	180.0772	144.9916
11	100.7175	215.7611	0	130.2408	86.4017	84.5040	241.2084	71.2938
12	146.6894	178.8450	130.2408	0	173.9308	46.6482	115.0762	100.7752
13	46.2885	172.0760	86.4017	173.9308	0	140.0136	263.3816	73.8086
14	122.9912	189.6182	84.5040	46.6482	140.0136	0	161.0057	73.1294
15	223.5810	180.0772	241.2084	115.0762	263.3816	161.0057	0	192.4620
16	49.8972	144.9916	71.2938	100.7752	73.8086	73.1294	192.4620	0
17	261.2036	203.2601	282.4039	155.8481	302.3106	202.0162	41.2071	232.4552
18	196.0055	170.7497	207.3159	80.6711	233.6916	126.5943	34.4293	161.4043
19	90.9139	94.5491	191.0700	215.4627	116.6542	204.6729	257.2523	135.6659
20	105.1988	110.8296	139.6601	68.2712	145.3052	84.1978	118.5209	77.5594
21	64.7205	121.3110	101.2409	84.2916	101.1527	73.2271	162.2554	33.3243
22	209.8146	149.5899	242.3847	125.5954	252.5541	168.1526	35.6388	185.6928
23	200.7290	214.6741	179.1231	54.7062	228.5810	95.0501	92.7568	155.4727
24	187.7947	79.0050	255.8828	175.4843	234.0786	204.0301	126.6822	186.3856
25	156.9599	136.7590	178.7523	65.7062	196.2039	105.0073	67.1829	125.6092
26	171.6934	126.1649	205.1534	95.8877	213.9598	134.5199	56.5303	146.9936
27	119.6750	244.0122	41.6959	171.8351	88.8920	125.8076	282.7539	104.7906
28	43.7394	85.1078	133.6582	138.7987	89.6786	129.2827	194.3233	66.3150
29	237.2730	200.7750	246.7827	117.5655	275.3217	164.2047	21.6452	202.9913

Table F-1-1: Continued

PFF	17	18	19	20	21	22	23	24
1	249.6204	174.2675	193.5230	113.5975	81.8990	211.7085	144.6319	233.3560
2	95.2875	84.3670	320.7057	168.1425	203.1441	119.3853	74.1273	209.7589
3	26.5000	73.5025	301.2119	162.5034	205.5619	71.8039	113.8613	160.2127
4	141.3358	99.6303	145.9833	55.9485	90.0488	86.4906	145.3887	65.5740
5	103.9418	127.3723	225.8497	151.2566	191.6002	75.7367	192.3381	52.6431
6	63.1873	24.3692	263.0985	115.1812	155.7881	60.9002	65.1944	148.6207
7	101.5952	82.7463	187.6194	88.3460	129.9122	48.2197	142.7792	49.3073
8	184.3400	132.4107	106.4365	53.6567	61.8312	130.0102	163.5356	100.1710
9	261.2036	196.0055	90.9139	105.1988	64.7205	209.8146	200.7290	187.7947
10	203.2601	170.7497	94.5491	110.8296	121.3110	149.5899	214.6741	79.0050
11	282.4039	207.3159	191.0700	139.6601	101.2409	242.3847	179.1231	255.8828
12	155.8481	80.6711	215.4627	68.2712	84.2916	125.5954	54.7062	175.4843
13	302.3106	233.6916	116.6542	145.3052	101.1527	252.5541	228.5810	234.0786
14	202.0162	126.5943	204.6729	84.1978	73.2271	168.1526	95.0501	204.0301
15	41.2071	34.4293	257.2523	118.5209	162.2554	35.6388	92.7568	126.6822
16	232.4552	161.4043	135.6659	77.5594	33.3243	185.6928	155.4727	186.3856
17	0	75.4577	287.2047	157.0083	201.4875	54.8827	127.8722	137.7377
18	75.4577	0	238.8263	91.2304	132.7828	52.5049	65.1562	131.9513
19	287.2047	238.8263	0	154.1479	133.4238	232.3220	264.3564	173.3281
20	157.0083	91.2304	154.1479	0	44.9701	108.3205	110.9175	120.9656
21	201.4875	132.7828	133.4238	44.9701	0	153.2791	137.1110	154.6727
22	54.8827	52.5049	232.3220	108.3205	153.2791	0	117.6303	91.3043
23	127.8722	65.1562	264.3564	110.9175	137.1110	117.6303	0	191.6624
24	137.7377	131.9513	173.3281	120.9656	154.6727	91.3043	191.6624	0
25	106.8484	40.1060	199.3911	51.7738	95.0725	63.9023	80.2675	113.6576
26	90.0155	45.9737	200.7220	69.5548	114.5064	38.7751	103.5860	88.1708
27	323.9333	248.9387	204.3361	178.4539	137.2659	283.0628	219.8374	291.1567
28	229.2657	170.7661	76.8815	81.0510	56.8051	175.7811	188.9109	144.7855
29	42.7400	41.6381	275.7372	132.1929	174.3617	57.0740	85.2509	148.2769

Table F-1-1: Continued

PFF	25	26	27	28	29
1	147.8099	175.4729	75.8283	126.3988	213.1357
2	121.7363	129.3764	293.8666	249.1873	63.0136
3	110.8000	100.7175	320.9391	238.9495	32.4796
4	65.9598	56.2751	227.2402	93.0114	131.9201
5	125.4279	95.2777	328.6597	192.0139	128.1233
6	64.4343	67.2031	266.9661	195.0607	21.9055
7	66.8300	39.2124	266.3724	138.7485	102.7809
8	93.2197	95.4753	193.0769	47.7277	169.6165
9	156.9599	171.6934	119.6750	43.7394	237.2730
10	136.7590	126.1649	244.0122	85.1078	200.7750
11	178.7523	205.1534	41.6959	133.6582	246.7827
12	65.7062	95.8877	171.8351	138.7987	117.5655
13	196.2039	213.9598	88.8920	89.6786	275.3217
14	105.0073	134.5199	125.8076	129.2827	164.2047
15	67.1829	56.5303	282.7539	194.3233	21.6452
16	125.6092	146.9936	104.7906	66.3150	202.9913
17	106.8484	90.0155	323.9333	229.2657	42.7400
18	40.1060	45.9737	248.9387	170.7661	41.6381
19	199.3911	200.7220	204.3361	76.8815	275.7372
20	51.7738	69.5548	178.4539	81.0510	132.1929
21	95.0725	114.5064	137.2659	56.8051	174.3617
22	63.9023	38.7751	283.0628	175.7811	57.0740
23	80.2675	103.5860	219.8374	188.9109	85.2509
24	113.6576	88.1708	291.1567	144.7855	148.2769
25	0	30.2169	219.6945	130.6628	80.4761
26	30.2169	0	245.4162	139.3483	75.6762
27	219.6945	245.4162	0	159.2669	288.4779
28	130.6628	139.3483	159.2669	0	210.4493
29	80.4761	75.6762	288.4779	210.4493	0

F-1-2 Statistical Friction Factor – Euclidean Distance

Table F-1-2: Raw Data of Euclidean Distance Between Zones *i* and *j*

County	1	2	3	4	5	6	7	8
1	0	7.1401	9.0178	4.7524	5.5893	11.2797	3.2418	2.9550
2	7.1401	0	2.0930	2.4021	12.6357	4.3210	3.9277	4.4086
3	9.0178	2.0930	0	4.3315	14.5332	2.2998	5.7996	6.4296
4	4.7524	2.4021	4.3315	0	10.2604	6.6118	1.5447	2.1441
5	5.5893	12.6357	14.5332	10.2604	0	16.7770	8.7680	8.3304
6	11.2797	4.3210	2.2998	6.6118	16.7770	0	8.0667	8.6954
7	3.2418	3.9277	5.7996	1.5447	8.7680	8.0667	0	1.1708
8	2.9550	4.4086	6.4296	2.1441	8.3304	8.6954	1.1708	0
9	0.4707	7.2917	9.1710	4.8977	5.3995	11.4343	3.3890	3.1042
10	2.3263	4.9211	6.7713	2.5258	7.8399	9.0485	1.0595	1.3460
11	5.7466	1.6289	3.2745	1.2006	11.2769	5.5436	2.5418	3.3058
12	1.3802	5.8147	7.7442	3.4409	6.8619	10.0120	1.9778	1.5901
13	0.7713	6.4789	8.3441	4.0807	6.2482	10.6130	2.5714	2.3899
14	2.6749	4.5193	6.4725	2.1708	8.1513	8.7369	0.8352	0.6081
15	0.8189	6.6361	8.5532	4.2681	6.1356	10.8165	2.7761	2.3934
16	5.8948	13.0083	14.8921	10.6288	1.1561	17.1363	9.1126	8.6989
17	3.0885	10.1757	12.0697	7.7881	2.7955	14.3375	6.2829	5.8711
18	16.5648	9.5091	7.5492	11.8576	22.0591	5.3057	13.3408	13.9172
19	1.7555	5.5597	7.3769	3.2104	7.1980	9.6116	1.7100	1.8725
20	3.4459	3.8441	5.6159	1.6013	8.9680	7.8575	0.6991	1.6630
21	4.1301	3.0314	4.9098	0.6665	9.6645	7.1876	0.9163	1.6993
22	7.0001	0.8481	2.1687	2.3119	12.5284	4.4407	3.7797	4.4012
23	5.6081	1.6967	3.5302	1.1350	11.0880	5.7464	2.4467	3.0406
24	5.1055	2.1277	3.9384	0.5558	10.6258	6.2094	1.8697	2.6231
25	12.9350	5.9171	3.9256	8.2467	18.4436	1.6838	9.7187	10.3167
26	3.2950	3.9280	5.7647	1.5832	8.8388	8.0268	0.3032	1.3483
27	8.8588	2.0275	0.3177	4.1987	14.3833	2.4574	5.6434	6.3029
28	2.1474	9.2354	11.1240	6.8436	3.4832	13.3851	5.3371	4.9608
29	11.1164	4.1119	2.1080	6.4245	16.6185	0.3286	7.8970	8.5038

Table F-1-2: Continued

County	9	10	11	12	13	14	15	16
1	0.4707	2.3263	5.7466	1.3802	0.7713	2.6749	0.8189	5.8948
2	7.2917	4.9211	1.6289	5.8147	6.4789	4.5193	6.6361	13.0083
3	9.1710	6.7713	3.2745	7.7442	8.3441	6.4725	8.5532	14.8921
4	4.8977	2.5258	1.2006	3.4409	4.0807	2.1708	4.2681	10.6288
5	5.3995	7.8399	11.2769	6.8619	6.2482	8.1513	6.1356	1.1561
6	11.4343	9.0485	5.5436	10.0120	10.6130	8.7369	10.8165	17.1363
7	3.3890	1.0595	2.5418	1.9778	2.5714	0.8352	2.7761	9.1126
8	3.1042	1.3460	3.3058	1.5901	2.3899	0.6081	2.3934	8.6989
9	0	2.4460	5.9043	1.5617	0.8638	2.8324	0.9938	5.7604
10	2.4460	0	3.5142	1.2193	1.6031	0.9386	1.9316	8.1837
11	5.9043	3.5142	0	4.4935	5.0752	3.2551	5.2985	11.6211
12	1.5617	1.2193	4.4935	0	0.8904	1.3155	0.9355	7.2019
13	0.8638	1.6031	5.0752	0.8904	0	2.0758	0.7792	6.5898
14	2.8324	0.9386	3.2551	1.3155	2.0758	0	2.1422	8.4967
15	0.9938	1.9316	5.2985	0.9355	0.7792	2.1422	0	6.4084
16	5.7604	8.1837	11.6211	7.2019	6.5898	8.4967	6.4084	0
17	2.9450	5.3196	8.7996	4.3838	3.7438	5.6795	3.5726	2.9488
18	16.7125	14.3098	10.8215	15.2841	15.8884	13.9992	16.0899	22.4320
19	1.9284	1.1212	4.1187	0.9377	1.2296	1.3640	1.5263	7.5343
20	3.6330	1.4555	2.3629	2.2730	2.8230	1.2799	3.0656	9.2925
21	4.2857	1.9082	1.6696	2.8436	3.4602	1.6063	3.6559	10.0110
22	7.1435	4.7156	1.4112	5.7217	6.3104	4.4564	6.5113	12.8780
23	5.7756	3.4876	0.8170	4.3089	4.9789	3.0388	5.1363	11.4505
24	5.2501	2.8565	0.7428	3.8309	4.4262	2.5778	4.6288	10.9786
25	13.0918	10.6943	7.1931	11.6599	12.2662	10.3803	12.4636	18.8004
26	3.4546	1.1234	2.5055	2.0692	2.6302	0.9861	2.8097	9.1530
27	9.0150	6.6126	3.1155	7.5955	8.1854	6.3284	8.3899	14.7274
28	1.9565	4.3868	7.8552	3.4455	2.7950	4.7437	2.7041	3.8237
29	11.2688	8.8748	5.3756	9.8393	10.4456	8.5609	10.6482	16.9836

Table F-1-2: Continued

County	17	18	19	20	21	22	23	24
1	3.0885	16.5648	1.7555	3.4459	4.1301	7.0001	5.6081	5.1055
2	10.1757	9.5091	5.5597	3.8441	3.0314	0.8481	1.6967	2.1277
3	12.0697	7.5492	7.3769	5.6159	4.9098	2.1687	3.5302	3.9384
4	7.7881	11.8576	3.2104	1.6013	0.6665	2.3119	1.1350	0.5558
5	2.7955	22.0591	7.1980	8.9680	9.6645	12.5284	11.0880	10.6258
6	14.3375	5.3057	9.6116	7.8575	7.1876	4.4407	5.7464	6.2094
7	6.2829	13.3408	1.7100	0.6991	0.9163	3.7797	2.4467	1.8697
8	5.8711	13.9172	1.8725	1.6630	1.6993	4.4012	3.0406	2.6231
9	2.9450	16.7125	1.9284	3.6330	4.2857	7.1435	5.7756	5.2501
10	5.3196	14.3098	1.1212	1.4555	1.9082	4.7156	3.4876	2.8565
11	8.7996	10.8215	4.1187	2.3629	1.6696	1.4112	0.8170	0.7428
12	4.3838	15.2841	0.9377	2.2730	2.8436	5.7217	4.3089	3.8309
13	3.7438	15.8884	1.2296	2.8230	3.4602	6.3104	4.9789	4.4262
14	5.6795	13.9992	1.3640	1.2799	1.6063	4.4564	3.0388	2.5778
15	3.5726	16.0899	1.5263	3.0656	3.6559	6.5113	5.1363	4.6288
16	2.9488	22.4320	7.5343	9.2925	10.0110	12.8780	11.4505	10.9786
17	0	19.6149	4.7969	6.5114	7.1716	10.0177	8.6707	8.1456
18	19.6149	0	14.9096	13.1537	12.4529	9.6286	11.0223	11.4753
19	4.7969	14.9096	0	1.7927	2.5809	5.4366	3.9631	3.5043
20	6.5114	13.1537	1.7927	0	0.9918	3.7160	2.2662	1.8159
21	7.1716	12.4529	2.5809	0.9918	0	2.8937	1.6209	1.0034
22	10.0177	9.6286	5.4366	3.7160	2.8937	0	1.8541	1.9459
23	8.6707	11.0223	3.9631	2.2662	1.6209	1.8541	0	0.9072
24	8.1456	11.4753	3.5043	1.8159	1.0034	1.9459	0.9072	0
25	15.9885	3.6470	11.2783	9.5163	8.8304	6.0400	7.3973	7.8566
26	6.3197	13.3038	1.7605	0.6818	0.9347	3.7471	2.4525	1.8461
27	11.9050	7.7181	7.2141	5.4516	4.7593	2.0361	3.3993	3.7829
28	1.1016	18.6658	3.8202	5.5637	6.2342	9.0908	7.7128	7.2022
29	14.1719	5.4518	9.4606	7.7043	7.0105	4.2381	5.5819	6.0348

Table F-1-2: Continued

County	25	26	27	28	29
1	12.9350	3.2950	8.8588	2.1474	11.1164
2	5.9171	3.9280	2.0275	9.2354	4.1119
3	3.9256	5.7647	0.3177	11.1240	2.1080
4	8.2467	1.5832	4.1987	6.8436	6.4245
5	18.4436	8.8388	14.3833	3.4832	16.6185
6	1.6838	8.0268	2.4574	13.3851	0.3286
7	9.7187	0.3032	5.6434	5.3371	7.8970
8	10.3167	1.3483	6.3029	4.9608	8.5038
9	13.0918	3.4546	9.0150	1.9565	11.2688
10	10.6943	1.1234	6.6126	4.3868	8.8748
11	7.1931	2.5055	3.1155	7.8552	5.3756
12	11.6599	2.0692	7.5955	3.4455	9.8393
13	12.2662	2.6302	8.1854	2.7950	10.4456
14	10.3803	0.9861	6.3284	4.7437	8.5609
15	12.4636	2.8097	8.3899	2.7041	10.6482
16	18.8004	9.1530	14.7274	3.8237	16.9836
17	15.9885	6.3197	11.9050	1.1016	14.1719
18	3.6470	13.3038	7.7181	18.6658	5.4518
19	11.2783	1.7605	7.2141	3.8202	9.4606
20	9.5163	0.6818	5.4516	5.5637	7.7043
21	8.8304	0.9347	4.7593	6.2342	7.0105
22	6.0400	3.7471	2.0361	9.0908	4.2381
23	7.3973	2.4525	3.3993	7.7128	5.5819
24	7.8566	1.8461	3.7829	7.2022	6.0348
25	0	9.6772	4.0881	15.0443	1.8310
26	9.6772	0	5.5947	5.3955	7.8615
27	4.0881	5.5947	0	10.9673	2.2868
28	15.0443	5.3955	10.9673	0	13.2215
29	1.8310	7.8615	2.2868	13.2215	0

F-1-3 Production Factor – Difference of Employment

Table F-1-3: Raw Data of Difference of Employment Between Zones *i* and *j* (Number of People)

County	1	2	3	4	5	6	7	8	9	10
1	0	21138	51963	8374	2402	125178	5124	2231	25	2715
2	21138	0	30825	12764	23540	104040	16014	18907	21113	18423
3	51963	30825	0	43589	54365	73215	46839	49732	51938	49248
4	8374	12764	43589	0	10776	116804	3250	6143	8349	5659
5	2402	23540	54365	10776	0	127580	7526	4633	2427	5117
6	125178	104040	73215	116804	127580	0	120054	122947	125153	122463
7	5124	16014	46839	3250	7526	120054	0	2893	5099	2409
8	2231	18907	49732	6143	4633	122947	2893	0	2206	484
9	25	21113	51938	8349	2427	125153	5099	2206	0	2690
10	2715	18423	49248	5659	5117	122463	2409	484	2690	0
11	16571	4567	35392	8197	18973	108607	11447	14340	16546	13856
12	1016	20122	50947	7358	3418	124162	4108	1215	991	1699
13	681	20457	51282	7693	3083	124497	4443	1550	656	2034
14	3214	17924	48749	5160	5616	121964	1910	983	3189	499
15	106	21032	51857	8268	2508	125072	5018	2125	81	2609
16	2409	23547	54372	10783	7	127587	7533	4640	2434	5124
17	1864	23002	53827	10238	538	127042	6988	4095	1889	4579
18	653147	632009	601184	644773	655549	527969	648023	650916	653122	650432
19	2463	18675	49500	5911	4865	122715	2661	232	2438	252
20	7275	13863	44688	1099	9677	117903	2151	5044	7250	4560
21	7129	14009	44834	1245	9531	118049	2005	4898	7104	4414
22	22057	919	29906	13683	24459	103121	16933	19826	22032	19342
23	13514	7624	38449	5140	15916	111664	8390	11283	13489	10799
24	10906	10232	41057	2532	13308	114272	5782	8675	10881	8191
25	200479	179341	148516	192105	202881	75301	195355	198248	200454	197764
26	5022	16116	46941	3352	7424	120156	102	2791	4997	2307
27	48908	27770	3055	40534	51310	76270	43784	46677	48883	46193
28	1330	22468	53293	9704	1072	126508	6454	3561	1355	4045
29	105328	84190	53365	96954	107730	19850	100204	103097	105303	102613

Table F-1-3: Continued

11	12	13	14	15	16	17	18	19	20
16571	1016	681	3214	106	2409	1864	653147	2463	7275
4567	20122	20457	17924	21032	23547	23002	632009	18675	13863
35392	50947	51282	48749	51857	54372	53827	601184	49500	44688
8197	7358	7693	5160	8268	10783	10238	644773	5911	1099
18973	3418	3083	5616	2508	7	538	655549	4865	9677
108607	124162	124497	121964	125072	127587	127042	527969	122715	117903
11447	4108	4443	1910	5018	7533	6988	648023	2661	2151
14340	1215	1550	983	2125	4640	4095	650916	232	5044
16546	991	656	3189	81	2434	1889	653122	2438	7250
13856	1699	2034	499	2609	5124	4579	650432	252	4560
0	15555	15890	13357	16465	18980	18435	636576	14108	9296
15555	0	335	2198	910	3425	2880	652131	1447	6259
15890	335	0	2533	575	3090	2545	652466	1782	6594
13357	2198	2533	0	3108	5623	5078	649933	751	4061
16465	910	575	3108	0	2515	1970	653041	2357	7169
18980	3425	3090	5623	2515	0	545	655556	4872	9684
18435	2880	2545	5078	1970	545	0	655011	4327	9139
636576	652131	652466	649933	653041	655556	655011	0	650684	645872
14108	1447	1782	751	2357	4872	4327	650684	0	4812
9296	6259	6594	4061	7169	9684	9139	645872	4812	0
9442	6113	6448	3915	7023	9538	8993	646018	4666	146
5486	21041	21376	18843	21951	24466	23921	631090	19594	14782
3057	12498	12833	10300	13408	15923	15378	639633	11051	6239
5665	9890	10225	7692	10800	13315	12770	642241	8443	3631
183908	199463	199798	197265	200373	202888	202343	452668	198016	193204
11549	4006	4341	1808	4916	7431	6886	648125	2559	2253
32337	47892	48227	45694	48802	51317	50772	604239	46445	41633
17901	2346	2011	4544	1436	1079	534	654477	3793	8605
88757	104312	104647	102114	105222	107737	107192	547819	102865	98053

Table F-1-3: Continued

County	21	22	23	24	25	26	27	28	29
1	7129	22057	13514	10906	200479	5022	48908	1330	105328
2	14009	919	7624	10232	179341	16116	27770	22468	84190
3	44834	29906	38449	41057	148516	46941	3055	53293	53365
4	1245	13683	5140	2532	192105	3352	40534	9704	96954
5	9531	24459	15916	13308	202881	7424	51310	1072	107730
6	118049	103121	111664	114272	75301	120156	76270	126508	19850
7	2005	16933	8390	5782	195355	102	43784	6454	100204
8	4898	19826	11283	8675	198248	2791	46677	3561	103097
9	7104	22032	13489	10881	200454	4997	48883	1355	105303
10	4414	19342	10799	8191	197764	2307	46193	4045	102613
11	9442	5486	3057	5665	183908	11549	32337	17901	88757
12	6113	21041	12498	9890	199463	4006	47892	2346	104312
13	6448	21376	12833	10225	199798	4341	48227	2011	104647
14	3915	18843	10300	7692	197265	1808	45694	4544	102114
15	7023	21951	13408	10800	200373	4916	48802	1436	105222
16	9538	24466	15923	13315	202888	7431	51317	1079	107737
17	8993	23921	15378	12770	202343	6886	50772	534	107192
18	646018	631090	639633	642241	452668	648125	604239	654477	547819
19	4666	19594	11051	8443	198016	2559	46445	3793	102865
20	146	14782	6239	3631	193204	2253	41633	8605	98053
21	0	14928	6385	3777	193350	2107	41779	8459	98199
22	14928	0	8543	11151	178422	17035	26851	23387	83271
23	6385	8543	0	2608	186965	8492	35394	14844	91814
24	3777	11151	2608	0	189573	5884	38002	12236	94422
25	193350	178422	186965	189573	0	195457	151571	201809	95151
26	2107	17035	8492	5884	195457	0	43886	6352	100306
27	41779	26851	35394	38002	151571	43886	0	50238	56420
28	8459	23387	14844	12236	201809	6352	50238	0	106658
29	98199	83271	91814	94422	95151	100306	56420	106658	0

F-1-4 Attraction Factor – Difference of Population

Table F-1-4: Raw Data of Difference of Population Between Zones *i* and *j* (Number of People)

County	1	2	3	4	5	6	7	8	9	10
1	0	37527	89175	13573	5369	248814	8571	4255	1686	2183
2	37527	0	51648	23954	42896	211287	28956	33272	39213	35344
3	89175	51648	0	75602	94544	159639	80604	84920	90861	86992
4	13573	23954	75602	0	18942	235241	5002	9318	15259	11390
5	5369	42896	94544	18942	0	254183	13940	9624	3683	7552
6	248814	211287	159639	235241	254183	0	240243	244559	250500	246631
7	8571	28956	80604	5002	13940	240243	0	4316	10257	6388
8	4255	33272	84920	9318	9624	244559	4316	0	5941	2072
9	1686	39213	90861	15259	3683	250500	10257	5941	0	3869
10	2183	35344	86992	11390	7552	246631	6388	2072	3869	0
11	29837	7690	59338	16264	35206	218977	21266	25582	31523	27654
12	2358	35169	86817	11215	7727	246456	6213	1897	4044	175
13	327	37854	89502	13900	5042	249141	8898	4582	1359	2510
14	6475	31052	82700	7098	11844	242339	2096	2220	8161	4292
15	1354	36173	87821	12219	6723	247460	7217	2901	3040	829
16	4876	42403	94051	18449	493	253690	13447	9131	3190	7059
17	4235	41762	93410	17808	1134	253049	12806	8490	2549	6418
18	921279	883752	832104	907706	926648	672465	912708	917024	922965	919096
19	7931	29596	81244	5642	13300	240883	640	3676	9617	5748
20	18236	19291	70939	4663	23605	230578	9665	13981	19922	16053
21	12947	24580	76228	626	18316	235867	4376	8692	14633	10764
22	25951	11576	63224	12378	31320	222863	17380	21696	27637	23768
23	40734	3207	48441	27161	46103	208080	32163	36479	42420	38551
24	19699	17828	69476	6126	25068	229115	11128	15444	21385	17516
25	399692	362165	310517	386119	405061	150878	391121	395437	401378	397509
26	11191	26336	77984	2382	16560	237623	2620	6936	12877	9008
27	97465	59938	8290	83892	102834	151349	88894	93210	99151	95282
28	3781	41308	92956	17354	1588	252595	12352	8036	2095	5964
29	197092	159565	107917	183519	202461	51722	188521	192837	198778	194909

Table F-1-4: Continued

County	11	12	13	14	15	16	17	18	19	20
1	29837	2358	327	6475	1354	4876	4235	921279	7931	18236
2	7690	35169	37854	31052	36173	42403	41762	883752	29596	19291
3	59338	86817	89502	82700	87821	94051	93410	832104	81244	70939
4	16264	11215	13900	7098	12219	18449	17808	907706	5642	4663
5	35206	7727	5042	11844	6723	493	1134	926648	13300	23605
6	218977	246456	249141	242339	247460	253690	253049	672465	240883	230578
7	21266	6213	8898	2096	7217	13447	12806	912708	640	9665
8	25582	1897	4582	2220	2901	9131	8490	917024	3676	13981
9	31523	4044	1359	8161	3040	3190	2549	922965	9617	19922
10	27654	175	2510	4292	829	7059	6418	919096	5748	16053
11	0	27479	30164	23362	28483	34713	34072	891442	21906	11601
12	27479	0	2685	4117	1004	7234	6593	918921	5573	15878
13	30164	2685	0	6802	1681	4549	3908	921606	8258	18563
14	23362	4117	6802	0	5121	11351	10710	914804	1456	11761
15	28483	1004	1681	5121	0	6230	5589	919925	6577	16882
16	34713	7234	4549	11351	6230	0	641	926155	12807	23112
17	34072	6593	3908	10710	5589	641	0	925514	12166	22471
18	891442	918921	921606	914804	919925	926155	925514	0	913348	903043
19	21906	5573	8258	1456	6577	12807	12166	913348	0	10305
20	11601	15878	18563	11761	16882	23112	22471	903043	10305	0
21	16890	10589	13274	6472	11593	17823	17182	908332	5016	5289
22	3886	23593	26278	19476	24597	30827	30186	895328	18020	7715
23	10897	38376	41061	34259	39380	45610	44969	880545	32803	22498
24	10138	17341	20026	13224	18345	24575	23934	901580	11768	1463
25	369855	397334	400019	393217	398338	404568	403927	521587	391761	381456
26	18646	8833	11518	4716	9837	16067	15426	910088	3260	7045
27	67628	95107	97792	90990	96111	102341	101700	823814	89534	79229
28	33618	6139	3454	10256	5135	1095	454	925060	11712	22017
29	167255	194734	197419	190617	195738	201968	201327	724187	189161	178856

Table F-1-4: Continued

County	21	22	23	24	25	26	27	28	29
1	12947	25951	40734	19699	399692	11191	97465	3781	197092
2	24580	11576	3207	17828	362165	26336	59938	41308	159565
3	76228	63224	48441	69476	310517	77984	8290	92956	107917
4	626	12378	27161	6126	386119	2382	83892	17354	183519
5	18316	31320	46103	25068	405061	16560	102834	1588	202461
6	235867	222863	208080	229115	150878	237623	151349	252595	51722
7	4376	17380	32163	11128	391121	2620	88894	12352	188521
8	8692	21696	36479	15444	395437	6936	93210	8036	192837
9	14633	27637	42420	21385	401378	12877	99151	2095	198778
10	10764	23768	38551	17516	397509	9008	95282	5964	194909
11	16890	3886	10897	10138	369855	18646	67628	33618	167255
12	10589	23593	38376	17341	397334	8833	95107	6139	194734
13	13274	26278	41061	20026	400019	11518	97792	3454	197419
14	6472	19476	34259	13224	393217	4716	90990	10256	190617
15	11593	24597	39380	18345	398338	9837	96111	5135	195738
16	17823	30827	45610	24575	404568	16067	102341	1095	201968
17	17182	30186	44969	23934	403927	15426	101700	454	201327
18	908332	895328	880545	901580	521587	910088	823814	925060	724187
19	5016	18020	32803	11768	391761	3260	89534	11712	189161
20	5289	7715	22498	1463	381456	7045	79229	22017	178856
21	0	13004	27787	6752	386745	1756	84518	16728	184145
22	13004	0	14783	6252	373741	14760	71514	29732	171141
23	27787	14783	0	21035	358958	29543	56731	44515	156358
24	6752	6252	21035	0	379993	8508	77766	23480	177393
25	386745	373741	358958	379993	0	388501	302227	403473	202600
26	1756	14760	29543	8508	388501	0	86274	14972	185901
27	84518	71514	56731	77766	302227	86274	0	101246	99627
28	16728	29732	44515	23480	403473	14972	101246	0	200873
29	184145	171141	156358	177393	202600	185901	99627	200873	0

F-2 Commodity Flow Data

F-2-1 Commodity Flow Within a County

Table F-1-5: Commodity Flow Within a County

County	Ci or Cj	County	Ci or Cj	County	Ci or Cj
1	133.8263	11	866.2027	21	448.9015
2	1068.0471	12	178.7297	22	1108.6635
3	2430.3972	13	163.9240	23	731.0947
4	503.9259	14	275.8731	24	615.8309
5	27.6669	15	138.5111	25	8994.2507
6	5666.2272	16	27.3575	26	355.7800
7	360.2880	17	51.4445	27	2295.3776
8	232.4282	18	29000.4888	28	75.0453
9	134.9312	19	242.6817	29	4788.9313
10	253.8192	20	455.3542		

F-3 Results of the Model

F-3-1 Results of the Model (a=1, b=1, c=1, and d=1)

F-3-1-1 Ratio of the Commodity Flow Between Zones *i* and *j*

Table F-3-1: Ratio of the Commodity Flow Between Zones *i* and *j*

County	1	2	3	4	5	6	7	8
1	0	0.0155	0.0120	0.0289	0.0079	0.0174	0.0203	0.0318
2	0.0142	0	0.0696	0.0199	0.0173	0.0610	0.0253	0.0153
3	0.0111	0.0700	0	0.0283	0.0330	0.0633	0.0400	0.0187
4	0.0172	0.0130	0.0183	0	0.0288	0.0214	0.0635	0.0642
5	0.0097	0.0232	0.0441	0.0595	0	0.0352	0.0853	0.0336
6	0.0144	0.0551	0.0569	0.0297	0.0237	0	0.0368	0.0210
7	0.0144	0.0196	0.0308	0.0755	0.0491	0.0315	0	0.0497
8	0.0283	0.0148	0.0181	0.0959	0.0243	0.0225	0.0623	0
9	0.0015	0.0101	0.0106	0.0410	0.0178	0.0146	0.0241	0.0438
10	0.0317	0.0076	0.0114	0.0468	0.0331	0.0129	0.0266	0.0248
11	0.1117	0.0140	0.0106	0.0222	0.0079	0.0148	0.0161	0.0327
12	0.0275	0.0258	0.0206	0.0334	0.0103	0.0296	0.0295	0.0317
13	0.2226	0.0078	0.0075	0.0275	0.0107	0.0106	0.0161	0.0263
14	0.0749	0.0260	0.0198	0.0448	0.0114	0.0284	0.0441	0.0310
15	0.0018	0.0427	0.0629	0.0383	0.0215	0.0616	0.0544	0.0284
16	0.0579	0.0116	0.0108	0.0350	0.0003	0.0154	0.0227	0.0432
17	0.0091	0.0496	0.1012	0.0334	0.0422	0.0597	0.0479	0.0186
18	0.0158	0.0420	0.0482	0.0350	0.0238	0.0876	0.0408	0.0247
19	0.0170	0.0093	0.0107	0.0907	0.0137	0.0128	0.2409	0.0082
20	0.0254	0.0264	0.0241	0.0272	0.0170	0.0307	0.0188	0.0426
21	0.0429	0.0134	0.0132	0.1479	0.0128	0.0181	0.0228	0.0550
22	0.0123	0.0031	0.0290	0.0585	0.0416	0.0310	0.0745	0.0307
23	0.0185	0.2787	0.0614	0.0109	0.0113	0.0661	0.0153	0.0146
24	0.0107	0.0144	0.0239	0.0446	0.0589	0.0222	0.0651	0.0420
25	0.0200	0.0275	0.0302	0.0471	0.0236	0.0512	0.0462	0.0354
26	0.0130	0.0280	0.0360	0.1369	0.0275	0.0414	0.0046	0.0265
27	0.0984	0.0110	0.0068	0.0218	0.0074	0.0156	0.0148	0.0312
28	0.0233	0.0098	0.0113	0.0494	0.0229	0.0149	0.0297	0.0628
29	0.0125	0.0592	0.0769	0.0291	0.0275	0.0675	0.0386	0.0198
Total	0.957633	0.9289	0.8769	1.3593	0.6273	0.9590	1.2271	0.9082

Table F-3-1: Continued

County	9	10	11	12	13	14	15	16
1	0.0014	0.0422	0.0977	0.0428	0.1915	0.0771	0.0025	0.0672
2	0.0083	0.0093	0.0112	0.0367	0.0061	0.0245	0.0568	0.0123
3	0.0087	0.0140	0.0086	0.0294	0.0060	0.0188	0.0841	0.0115
4	0.0218	0.0372	0.0116	0.0309	0.0141	0.0275	0.0331	0.0242
5	0.0196	0.0544	0.0085	0.0198	0.0114	0.0145	0.0383	0.0005
6	0.0108	0.0143	0.0107	0.0381	0.0076	0.0242	0.0741	0.0148
7	0.0152	0.0252	0.0100	0.0325	0.0098	0.0322	0.0560	0.0187
8	0.0347	0.0294	0.0255	0.0437	0.0201	0.0284	0.0367	0.0446
9	0	0.0557	0.0533	0.0164	0.0889	0.0328	0.0008	0.1290
10	0.0372	0	0.0110	0.3162	0.0281	0.0034	0.1005	0.0309
11	0.0543	0.0168	0	0.0442	0.0635	0.0715	0.0148	0.0718
12	0.0094	0.2717	0.0249	0	0.0037	0.0560	0.0481	0.0272
13	0.0922	0.0437	0.0646	0.0066	0	0.0275	0.0075	0.0930
14	0.0284	0.0044	0.0607	0.0844	0.0230	0	0.0303	0.0559
15	0.0005	0.0925	0.0089	0.0515	0.0044	0.0215	0	0.0100
16	0.0991	0.0356	0.0541	0.0365	0.0689	0.0496	0.0125	0
17	0.0136	0.0229	0.0076	0.0227	0.0079	0.0154	0.0582	0.0209
18	0.0127	0.0167	0.0121	0.0408	0.0088	0.0261	0.0643	0.0169
19	0.0386	0.0065	0.0352	0.0115	0.0255	0.0253	0.0104	0.0350
20	0.0252	0.0190	0.0398	0.0400	0.0166	0.0302	0.0259	0.0361
21	0.0449	0.0220	0.0368	0.0445	0.0314	0.0527	0.0212	0.0639
22	0.0117	0.0224	0.0159	0.0309	0.0079	0.0221	0.0753	0.0140
23	0.0101	0.0079	0.0116	0.0452	0.0076	0.0282	0.0320	0.0165
24	0.0154	0.0431	0.0090	0.0198	0.0098	0.0154	0.0331	0.0157
25	0.0181	0.0226	0.0154	0.0460	0.0123	0.0315	0.0451	0.0235
26	0.0117	0.0124	0.0135	0.0295	0.0075	0.0172	0.0479	0.0168
27	0.0622	0.0181	0.1397	0.0383	0.0854	0.0612	0.0126	0.0694
28	0.0983	0.0665	0.0310	0.0221	0.0554	0.0278	0.0094	0.1173
29	0.0097	0.0142	0.0094	0.0329	0.0067	0.0209	0.0855	0.0130
Total	0.8138	1.0408	0.8382	1.2541	0.8297	0.8836	1.1170	1.0706

Table F-3-1: Continued

County	17	18	19	20	21	22	23	24
1	0.0093	0.0277	0.0116	0.0326	0.0613	0.0251	0.0194	0.0134
2	0.0463	0.0675	0.0058	0.0310	0.0175	0.0058	0.2687	0.0166
3	0.0950	0.0779	0.0068	0.0284	0.0174	0.0547	0.0595	0.0278
4	0.0203	0.0365	0.0369	0.0208	0.1259	0.0713	0.0069	0.0334
5	0.0529	0.0514	0.0115	0.0268	0.0225	0.1047	0.0146	0.0914
6	0.0504	0.1272	0.0073	0.0326	0.0214	0.0525	0.0575	0.0231
7	0.0346	0.0507	0.1168	0.0170	0.0231	0.1081	0.0114	0.0581
8	0.0168	0.0384	0.0050	0.0485	0.0698	0.0558	0.0137	0.0470
9	0.0156	0.0249	0.0296	0.0362	0.0718	0.0269	0.0119	0.0218
10	0.0175	0.0219	0.0033	0.0182	0.0236	0.0343	0.0062	0.0407
11	0.0088	0.0242	0.0275	0.0582	0.0601	0.0371	0.0140	0.0129
12	0.0149	0.0461	0.0051	0.0330	0.0409	0.0406	0.0306	0.0161
13	0.0093	0.0179	0.0203	0.0247	0.0522	0.0187	0.0093	0.0144
14	0.0152	0.0445	0.0168	0.0375	0.0731	0.0440	0.0288	0.0188
15	0.0408	0.0777	0.0049	0.0228	0.0209	0.1062	0.0232	0.0287
16	0.0183	0.0255	0.0206	0.0398	0.0786	0.0247	0.0149	0.0171
17	0	0.0707	0.0050	0.0205	0.0168	0.1070	0.0226	0.0321
18	0.0410	0	0.0085	0.0378	0.0250	0.0568	0.0509	0.0255
19	0.0074	0.0217	0	0.0378	0.0919	0.0388	0.0089	0.0471
20	0.0163	0.0517	0.0202	0	0.0036	0.1283	0.0184	0.1493
21	0.0120	0.0307	0.0440	0.0032	0	0.0444	0.0106	0.0217
22	0.0533	0.0487	0.0130	0.0804	0.0310	0	0.0225	0.0903
23	0.0218	0.0848	0.0058	0.0224	0.0144	0.0438	0	0.0045
24	0.0259	0.0355	0.0256	0.1520	0.0247	0.1467	0.0038	0
25	0.0292	0.1114	0.0122	0.0546	0.0352	0.0472	0.0431	0.0294
26	0.0296	0.0683	0.0180	0.0275	0.0656	0.1309	0.0173	0.0488
27	0.0079	0.0258	0.0286	0.0382	0.0546	0.0099	0.0306	0.0117
28	0.0282	0.0255	0.0347	0.0394	0.0646	0.0297	0.0112	0.0274
29	0.0662	0.1038	0.0069	0.0297	0.0191	0.0579	0.0520	0.0250
Total	0.8048	1.4385	0.5520	1.0516	1.2265	1.6517	0.8822	0.9940

Table F-3-1: Continued

County	25	26	27	28	29
1	0.0264	0.0198	0.0566	0.0256	0.0149
2	0.0333	0.0389	0.0058	0.0099	0.0650
3	0.0368	0.0503	0.0036	0.0114	0.0848
4	0.0371	0.1237	0.0075	0.0323	0.0208
5	0.0385	0.0513	0.0052	0.0310	0.0405
6	0.0561	0.0519	0.0074	0.0136	0.0670
7	0.0433	0.0049	0.0061	0.0231	0.0328
8	0.0417	0.0358	0.0160	0.0612	0.0211
9	0.0269	0.0199	0.0402	0.1208	0.0130
10	0.0225	0.0141	0.0078	0.0546	0.0128
11	0.0233	0.0233	0.0919	0.0389	0.0128
12	0.0392	0.0288	0.0142	0.0156	0.0254
13	0.0190	0.0132	0.0571	0.0706	0.0093
14	0.0404	0.0253	0.0342	0.0296	0.0243
15	0.0411	0.0501	0.0050	0.0071	0.0706
16	0.0268	0.0220	0.0344	0.1108	0.0134
17	0.0379	0.0440	0.0045	0.0304	0.0779
18	0.0841	0.0591	0.0085	0.0160	0.0709
19	0.0237	0.0399	0.0241	0.0556	0.0121
20	0.0563	0.0325	0.0172	0.0338	0.0278
21	0.0326	0.0697	0.0220	0.0496	0.0160
22	0.0305	0.0970	0.0028	0.0159	0.0339
23	0.0542	0.0249	0.0167	0.0117	0.0592
24	0.0309	0.0588	0.0053	0.0238	0.0238
25	0	0.0671	0.0106	0.0232	0.0410
26	0.0586	0	0.0072	0.0173	0.0406
27	0.0245	0.0189	0	0.0413	0.0141
28	0.0280	0.0239	0.0217	0	0.0136
29	0.0453	0.0514	0.0068	0.0125	0
Total	1.0592	1.1606	0.5403	0.9871	0.9594

F-3-1-2 Commodity Flow Between Zones *i* and *j*

Table F-3-2: Commodity Flow Between Zones *i* and *j*

County	1	2	3	4	5	6	7	8
1	0	2.0718	1.6092	3.8693	1.0587	2.3319	2.7216	4.2597
2	15.1582	0	74.3865	21.2854	18.4576	65.1278	27.0019	16.3359
3	26.9315	170.1630	0	68.6732	80.1173	153.8146	97.3176	45.5119
4	8.6805	6.5268	9.2053	0	14.5015	10.7751	31.9897	32.3726
5	0.2695	0.6423	1.2188	1.6457	0	0.9751	2.3595	0.9306
6	81.7697	312.1467	322.2691	168.4194	134.3023	0	208.4157	118.7869
7	5.1945	7.0442	11.0983	27.2161	17.6889	11.3442	0	17.9041
8	6.5786	3.4483	4.1997	22.2853	5.6450	5.2316	14.4870	0
9	0.2089	1.3684	1.4280	5.5317	2.4040	1.9751	3.2456	5.9126
10	8.0349	1.9379	2.8978	11.8829	8.4058	3.2866	6.7539	6.2838
11	96.7163	12.0946	9.2131	19.2259	6.8475	12.8478	13.9831	28.3354
12	4.9233	4.6088	3.6758	5.9671	1.8493	5.2970	5.2719	5.6600
13	36.4867	1.2706	1.2309	4.5047	1.7575	1.7374	2.6355	4.3063
14	20.6513	7.1650	5.4585	12.3683	3.1560	7.8232	12.1683	8.5437
15	0.2426	5.9116	8.7141	5.3004	2.9719	8.5363	7.5377	3.9379
16	1.5837	0.3163	0.2951	0.9562	0.0092	0.4200	0.6200	1.1809
17	0.4674	2.5499	5.2079	1.7200	2.1686	3.0734	2.4660	0.9568
18	457.6683	1217.3048	1398.0809	1013.8679	690.9133	2539.6142	1182.1233	715.0822
19	4.1149	2.2562	2.5998	22.0087	3.3222	3.1119	58.4688	1.9954
20	11.5723	12.0338	10.9648	12.3944	7.7218	13.9696	8.5418	19.4006
21	19.2646	5.9970	5.9285	66.3963	5.7510	8.1119	10.2418	24.6894
22	13.6052	3.4021	32.1936	64.8662	46.0722	34.3312	82.6049	33.9834
23	13.5084	203.7250	44.8856	7.9971	8.2584	48.2893	11.1675	10.6957
24	6.5653	8.8778	14.7337	27.4629	36.2976	13.6498	40.0922	25.8666
25	179.7587	247.0780	271.5775	423.6380	212.4946	460.7659	415.4506	318.3694
26	4.6362	9.9612	12.8126	48.7107	9.7711	14.7121	1.6189	9.4339
27	225.7826	25.2216	15.5671	50.1099	16.9511	35.7465	34.0442	71.5641
28	1.7517	0.7391	0.8469	3.7099	1.7210	1.1218	2.2275	4.7118
29	59.7094	283.7158	368.1603	139.3621	131.6656	323.3005	184.9014	94.7484
Attraction	1311.8353	2559.5786	2640.4593	2261.3757	1472.2811	3791.3219	2470.4580	1631.7599

Table F-3-2: Continued

County	9	10	11	12	13	14	15	16
1	0.1847	5.6533	13.0741	5.7256	25.6215	10.3196	0.3401	8.9928
2	8.8548	9.9757	11.9618	39.2143	6.5279	26.1952	60.6346	13.1390
3	21.1380	34.1230	20.8439	71.5442	14.4660	45.6516	204.4612	28.0470
4	10.9757	18.7566	5.8306	15.5680	7.0966	13.8655	16.6704	12.1815
5	0.5413	1.5057	0.2357	0.5476	0.3142	0.4015	1.0607	0.0133
6	61.2552	81.0870	60.9010	216.0117	42.7808	137.0832	419.6417	83.6381
7	5.4788	9.0699	3.6078	11.7019	3.5323	11.6057	20.1692	6.7200
8	8.0760	6.8280	5.9155	10.1655	4.6701	6.5935	8.5260	10.3557
9	0	7.5213	7.1953	2.2154	11.9934	4.4208	0.1123	17.4120
10	9.4545	0	2.7987	80.2655	7.1414	0.8655	25.5181	7.8527
11	47.0764	14.5670	0	38.3280	54.9726	61.9236	12.7997	62.1584
12	1.6848	48.5610	4.4552	0	0.6577	10.0066	8.6024	4.8695
13	15.1056	7.1554	10.5825	1.0892	0	4.5097	1.2221	15.2444
14	7.8244	1.2186	16.7515	23.2879	6.3372	0	8.3670	15.4320
15	0.0708	12.8069	1.2342	7.1360	0.6121	2.9824	0	1.3879
16	2.7120	0.9730	1.4797	0.9973	1.8852	1.3580	0.3426	0
17	0.7019	1.1778	0.3910	1.1695	0.4056	0.7897	2.9938	1.0734
18	367.0218	483.9978	350.8356	1183.1339	253.9837	757.9774	1864.1966	490.0501
19	9.3560	1.5729	8.5411	2.7853	6.1998	6.1373	2.5164	8.4851
20	11.4600	8.6415	18.1064	18.2041	7.5512	13.7339	11.7712	16.4381
21	20.1372	9.8911	16.5204	19.9754	14.1129	23.6710	9.5346	28.6942
22	12.9861	24.8039	17.5838	34.2084	8.7147	24.5568	83.4965	15.5382
23	7.3762	5.7829	8.4875	33.0173	5.5312	20.6219	23.3993	12.0306
24	9.5024	26.5485	5.5258	12.2187	6.0522	9.4852	20.3839	9.6909
25	163.0754	203.6437	138.5068	414.1547	111.0680	282.9752	405.6390	211.6191
26	4.1569	4.4274	4.7934	10.5128	2.6675	6.1047	17.0442	5.9912
27	142.8623	41.5017	320.5605	87.8504	196.0357	140.5907	28.9863	159.2582
28	7.3753	4.9910	2.3292	1.6594	4.1587	2.0887	0.7021	8.7999
29	46.4250	68.0700	44.8535	157.6388	32.0147	100.1601	409.5107	62.2051
Attraction	1002.8697	1144.8526	1103.9024	2500.3265	837.1048	1726.6750	3668.6429	1317.3184

Table F-3-2: Continued

County	17	18	19	20	21	22	23	24
1	1.2382	3.7030	1.5515	4.3581	8.2024	3.3594	2.6004	1.7960
2	49.4262	72.0590	6.2240	33.1565	18.6815	6.1459	286.9319	17.7681
3	230.9227	189.3183	16.4057	69.1096	42.2466	133.0403	144.6148	67.4557
4	10.2230	18.4031	18.6167	10.4715	63.4217	35.9320	3.4537	16.8540
5	1.4627	1.4232	0.3189	0.7404	0.6234	2.8963	0.4048	2.5280
6	285.5247	720.5250	41.1446	184.4775	121.1120	297.2513	325.9699	130.9346
7	12.4698	18.2553	42.0773	6.1398	8.3231	38.9300	4.1032	20.9330
8	3.9149	8.9352	1.1619	11.2834	16.2347	12.9589	3.1798	10.9279
9	2.1024	3.3576	3.9886	4.8797	9.6943	3.6255	1.6055	2.9391
10	4.4351	5.5657	0.8429	4.6253	5.9856	8.7046	1.5822	10.3220
11	7.6622	20.9985	23.8231	50.4421	52.0343	32.1182	12.0867	11.1822
12	2.6642	8.2313	0.9030	5.8950	7.3134	7.2631	5.4654	2.8741
13	1.5303	2.9264	3.3289	4.0497	8.5572	3.0643	1.5163	2.3577
14	4.1868	12.2726	4.6308	10.3503	20.1689	12.1341	7.9443	5.1925
15	5.6576	10.7588	0.6768	3.1621	2.8957	14.7060	3.2131	3.9775
16	0.5008	0.6983	0.5634	1.0902	2.1515	0.6757	0.4079	0.4669
17	0	3.6353	0.2550	1.0536	0.8634	5.5040	1.1603	1.6488
18	1190.3536	0	245.1762	1095.9959	724.3606	1648.0569	1475.8618	738.7630
19	1.7914	5.2611	0	9.1694	22.2963	9.4211	2.1503	11.4321
20	7.4122	23.5468	9.1805	0	1.6300	58.4329	8.3608	67.9795
21	5.3723	13.7648	19.7445	1.4418	0	19.9157	4.7461	9.7531
22	59.0564	54.0031	14.3862	89.1211	34.3421	0	24.9509	100.1074
23	15.9679	62.0298	4.2116	16.3561	10.4972	32.0032	0	3.3060
24	15.9687	21.8503	15.7572	93.5852	15.1803	90.3592	2.3265	0
25	262.2794	1002.0486	109.9527	490.7321	316.3205	424.2037	387.6556	264.6819
26	10.5165	24.3038	6.3976	9.7810	23.3520	46.5717	6.1457	17.3558
27	18.2275	59.1131	65.6373	87.6622	125.3580	22.7694	70.2352	26.8572
28	2.1159	1.9165	2.6022	2.9601	4.8482	2.2302	0.8406	2.0528
29	317.0866	497.0042	33.0309	142.3883	91.4830	277.2984	249.1091	119.6885
Attraction	2530.0703	2865.9086	692.5904	2444.4779	1758.1779	3249.5718	3038.6230	1672.1354

Table F-3-2: Continued

County	25	26	27	28	29	Production
1	3.5395	2.6444	7.5761	3.4251	1.9983	133.8263
2	35.5939	41.5689	6.1918	10.5733	69.4697	1068.0471
3	89.4967	122.3113	8.7422	27.7142	206.2149	2430.3972
4	18.7136	62.3306	3.7721	16.2742	10.4635	503.9259
5	1.0652	1.4189	0.1448	0.8568	1.1219	27.6669
6	318.1372	294.2552	42.0600	76.9151	379.4114	5666.2272
7	15.6134	1.7624	2.1803	8.3132	11.8110	360.2880
8	9.6813	8.3101	3.7085	14.2286	4.8972	232.4282
9	3.6306	2.6809	5.4201	16.3056	1.7567	134.9312
10	5.6990	3.5892	1.9792	13.8705	3.2378	253.8192
11	20.1748	20.2255	79.5701	33.6908	11.1046	866.2027
12	7.0122	5.1561	2.5348	2.7901	4.5365	178.7297
13	3.1144	2.1667	9.3674	11.5802	1.5258	163.9240
14	11.1502	6.9681	9.4405	8.1729	6.7081	275.8731
15	5.6972	6.9345	0.6938	0.9793	9.7760	138.5111
16	0.7338	0.6018	0.9411	3.0302	0.3666	27.3575
17	1.9493	2.2641	0.2309	1.5616	4.0055	51.4445
18	2438.6059	1713.3333	245.1537	463.1668	2055.8093	29000.4888
19	5.7419	9.6781	5.8413	13.4951	2.9319	242.6817
20	25.6579	14.8141	7.8107	15.3695	12.6538	455.3542
21	14.6283	31.2828	9.8792	22.2648	7.1908	448.9015
22	33.8278	107.5811	3.0942	17.6609	37.5852	1108.6635
23	39.6509	18.2094	12.2423	8.5384	43.3079	731.0947
24	19.0515	36.1880	3.2943	14.6732	14.6429	615.8309
25	0	603.7456	95.6885	208.3439	368.7836	8994.2507
26	20.8420	0	2.5519	6.1596	14.4472	355.7800
27	56.1510	43.3780	0	94.9045	32.4512	2295.3776
28	2.0980	1.7968	1.6286	0	1.0213	75.0453
29	216.9710	246.2228	32.5359	59.6712	0	4788.9313
Attraction	3424.2286	3411.4190	604.2744	1174.5298	3319.2306	

F-3-2 Results of the Model (a=0.0001, b=0050, c=0.0001, d=0.0010)

F-3-2-1 Ratio of the Commodity Flow Between Zones *i* and *j*

Table F-3-3: Ratio of the Commodity Flow Between Zones *i* and *j*

County	1	2	3	4	5	6	7	8
1	0.0000	0.0357	0.0356	0.0357	0.0357	0.0356	0.0357	0.0358
2	0.0357	0.0000	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
3	0.0357	0.0357	0.0000	0.0357	0.0357	0.0357	0.0357	0.0357
4	0.0357	0.0357	0.0357	0.0000	0.0357	0.0356	0.0358	0.0357
5	0.0358	0.0357	0.0357	0.0357	0.0000	0.0356	0.0357	0.0357
6	0.0357	0.0357	0.0357	0.0357	0.0357	0.0000	0.0357	0.0357
7	0.0357	0.0357	0.0357	0.0358	0.0357	0.0356	0.0000	0.0358
8	0.0358	0.0357	0.0357	0.0357	0.0357	0.0356	0.0358	0.0000
9	0.0358	0.0357	0.0356	0.0357	0.0358	0.0356	0.0357	0.0358
10	0.0358	0.0357	0.0356	0.0357	0.0357	0.0356	0.0357	0.0358
11	0.0357	0.0358	0.0357	0.0357	0.0357	0.0356	0.0357	0.0357
12	0.0358	0.0357	0.0356	0.0357	0.0357	0.0356	0.0357	0.0358
13	0.0359	0.0357	0.0356	0.0357	0.0357	0.0356	0.0357	0.0358
14	0.0357	0.0357	0.0357	0.0357	0.0357	0.0356	0.0358	0.0358
15	0.0358	0.0357	0.0357	0.0357	0.0357	0.0356	0.0357	0.0358
16	0.0358	0.0357	0.0357	0.0357	0.0358	0.0356	0.0357	0.0357
17	0.0358	0.0357	0.0357	0.0357	0.0358	0.0356	0.0357	0.0357
18	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
19	0.0357	0.0357	0.0357	0.0358	0.0357	0.0356	0.0358	0.0358
20	0.0357	0.0357	0.0357	0.0358	0.0357	0.0356	0.0357	0.0357
21	0.0357	0.0357	0.0357	0.0358	0.0357	0.0356	0.0358	0.0357
22	0.0357	0.0357	0.0357	0.0358	0.0357	0.0357	0.0357	0.0357
23	0.0357	0.0358	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
24	0.0357	0.0357	0.0357	0.0358	0.0357	0.0356	0.0357	0.0357
25	0.0357	0.0357	0.0357	0.0357	0.0357	0.0358	0.0357	0.0357
26	0.0357	0.0357	0.0357	0.0358	0.0357	0.0356	0.0358	0.0357
27	0.0357	0.0357	0.0358	0.0357	0.0357	0.0357	0.0357	0.0357
28	0.0358	0.0357	0.0356	0.0357	0.0358	0.0356	0.0357	0.0357
29	0.0357	0.0357	0.0357	0.0357	0.0357	0.0358	0.0357	0.0357
Total	1.0007	0.9998	0.9990	1.0006	1.0002	0.9981	1.0007	1.0008

Table F-3-3: Continued

County	9	10	11	12	13	14	15	16
1	0.0358	0.0358	0.0357	0.0358	0.0359	0.0357	0.0358	0.0358
2	0.0357	0.0357	0.0358	0.0357	0.0357	0.0357	0.0357	0.0357
3	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
4	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
5	0.0358	0.0358	0.0357	0.0357	0.0358	0.0357	0.0358	0.0358
6	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
7	0.0357	0.0357	0.0357	0.0357	0.0357	0.0358	0.0357	0.0357
8	0.0357	0.0358	0.0357	0.0358	0.0358	0.0358	0.0358	0.0357
9	0.0000	0.0358	0.0357	0.0358	0.0358	0.0357	0.0358	0.0358
10	0.0358	0.0000	0.0357	0.0359	0.0358	0.0358	0.0358	0.0357
11	0.0357	0.0357	0.0000	0.0357	0.0357	0.0357	0.0357	0.0357
12	0.0358	0.0359	0.0357	0.0000	0.0358	0.0358	0.0358	0.0357
13	0.0358	0.0358	0.0357	0.0358	0.0000	0.0357	0.0358	0.0358
14	0.0357	0.0358	0.0357	0.0358	0.0357	0.0000	0.0358	0.0357
15	0.0358	0.0358	0.0357	0.0358	0.0358	0.0358	0.0000	0.0357
16	0.0358	0.0357	0.0357	0.0358	0.0358	0.0357	0.0358	0.0000
17	0.0358	0.0357	0.0357	0.0358	0.0358	0.0357	0.0358	0.0358
18	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
19	0.0357	0.0357	0.0357	0.0358	0.0357	0.0358	0.0357	0.0357
20	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
21	0.0357	0.0357	0.0357	0.0357	0.0357	0.0358	0.0357	0.0357
22	0.0357	0.0357	0.0358	0.0357	0.0357	0.0357	0.0357	0.0357
23	0.0357	0.0357	0.0358	0.0357	0.0357	0.0357	0.0357	0.0357
24	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
25	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
26	0.0357	0.0357	0.0357	0.0357	0.0357	0.0358	0.0357	0.0357
27	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
28	0.0358	0.0358	0.0357	0.0358	0.0358	0.0357	0.0358	0.0358
29	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
Total	1.0006	1.0009	1.0000	1.0009	1.0007	1.0007	1.0008	1.0003

Table F-3-3: Continued

County	17	18	19	20	21	22	23	24
1	0.0358	0.0356	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
2	0.0357	0.0356	0.0357	0.0357	0.0357	0.0358	0.0358	0.0357
3	0.0357	0.0356	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
4	0.0357	0.0356	0.0358	0.0358	0.0358	0.0357	0.0357	0.0358
5	0.0358	0.0356	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
6	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
7	0.0357	0.0356	0.0358	0.0357	0.0358	0.0357	0.0357	0.0357
8	0.0357	0.0356	0.0358	0.0357	0.0357	0.0357	0.0357	0.0357
9	0.0358	0.0356	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
10	0.0357	0.0356	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
11	0.0357	0.0356	0.0357	0.0358	0.0357	0.0358	0.0358	0.0358
12	0.0357	0.0356	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
13	0.0358	0.0356	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
14	0.0357	0.0356	0.0358	0.0357	0.0358	0.0357	0.0357	0.0357
15	0.0357	0.0356	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
16	0.0358	0.0356	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
17	0.0000	0.0356	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
18	0.0357	0.0000	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
19	0.0357	0.0356	0.0000	0.0357	0.0358	0.0357	0.0357	0.0357
20	0.0357	0.0356	0.0357	0.0000	0.0358	0.0358	0.0357	0.0358
21	0.0357	0.0356	0.0358	0.0358	0.0000	0.0357	0.0357	0.0358
22	0.0357	0.0356	0.0357	0.0358	0.0357	0.0000	0.0357	0.0358
23	0.0357	0.0356	0.0357	0.0357	0.0357	0.0358	0.0000	0.0357
24	0.0357	0.0356	0.0357	0.0358	0.0358	0.0358	0.0357	0.0000
25	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
26	0.0357	0.0356	0.0358	0.0358	0.0358	0.0357	0.0357	0.0357
27	0.0357	0.0356	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
28	0.0358	0.0356	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
29	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357	0.0357
Total	1.0005	0.9966	1.0006	1.0004	1.0006	1.0002	0.9998	1.0004

Table F-3-3: Continued

County	25	26	27	28	29	Total
1	0.0356	0.0357	0.0357	0.0358	0.0356	1.0000
2	0.0356	0.0357	0.0357	0.0357	0.0357	1.0000
3	0.0357	0.0357	0.0358	0.0357	0.0357	1.0000
4	0.0356	0.0358	0.0357	0.0357	0.0356	1.0000
5	0.0356	0.0357	0.0356	0.0358	0.0356	1.0000
6	0.0357	0.0357	0.0357	0.0357	0.0358	1.0000
7	0.0356	0.0358	0.0357	0.0357	0.0356	1.0000
8	0.0356	0.0357	0.0357	0.0357	0.0356	1.0000
9	0.0356	0.0357	0.0357	0.0358	0.0356	1.0000
10	0.0356	0.0357	0.0356	0.0357	0.0356	1.0000
11	0.0356	0.0357	0.0357	0.0357	0.0357	1.0000
12	0.0356	0.0357	0.0356	0.0357	0.0356	1.0000
13	0.0356	0.0357	0.0357	0.0358	0.0356	1.0000
14	0.0356	0.0358	0.0357	0.0357	0.0356	1.0000
15	0.0356	0.0357	0.0356	0.0357	0.0356	1.0000
16	0.0356	0.0357	0.0357	0.0358	0.0356	1.0000
17	0.0356	0.0357	0.0356	0.0358	0.0356	1.0000
18	0.0358	0.0357	0.0357	0.0357	0.0357	1.0000
19	0.0356	0.0358	0.0357	0.0357	0.0356	1.0000
20	0.0356	0.0358	0.0357	0.0357	0.0356	1.0000
21	0.0356	0.0358	0.0357	0.0357	0.0356	1.0000
22	0.0356	0.0357	0.0357	0.0357	0.0357	1.0000
23	0.0356	0.0357	0.0357	0.0357	0.0357	1.0000
24	0.0356	0.0358	0.0357	0.0357	0.0356	1.0000
25	0.0000	0.0357	0.0357	0.0357	0.0357	1.0000
26	0.0356	0.0000	0.0357	0.0357	0.0356	1.0000
27	0.0357	0.0357	0.0000	0.0357	0.0357	1.0000
28	0.0356	0.0357	0.0356	0.0000	0.0356	1.0000
29	0.0357	0.0357	0.0357	0.0357	0.0000	1.0000
Total	0.9976	1.0007	0.9989	1.0005	0.9983	29.0000

F-3-2-2 Commodity Flow Between Zones *i* and *j*

Table F-3-4: Commodity Flow Between Zones *i* and *j*

County	1	2	3	4	5	6	7	8
1	0.0000	2.3807	2.3785	2.3833	2.3849	2.3762	2.3844	2.3860
2	19.0843	0.0000	19.0866	19.0971	19.0773	19.0601	19.0929	19.0891
3	43.5479	43.5922	0.0000	43.5685	43.5386	43.5470	43.5644	43.5577
4	8.9821	8.9783	8.9685	0.0000	8.9775	8.9585	8.9928	8.9875
5	0.4938	0.4928	0.4924	0.4932	0.0000	0.4919	0.4934	0.4936
6	101.8996	101.9630	101.9991	101.9354	101.8752	0.0000	101.9284	101.9179
7	6.4209	6.4138	6.4076	6.4256	6.4171	6.4006	0.0000	6.4263
8	4.1451	4.1368	4.1330	4.1428	4.1409	4.1287	4.1457	0.0000
9	2.4085	2.4013	2.3993	2.4040	2.4068	2.3969	2.4049	2.4063
10	4.5263	4.5138	4.5099	4.5197	4.5201	4.5052	4.5222	4.5266
11	15.4711	15.4899	15.4597	15.4805	15.4605	15.4404	15.4752	15.4732
12	3.1871	3.1787	3.1757	3.1824	3.1826	3.1725	3.1843	3.1878
13	2.9301	2.9158	2.9133	2.9192	2.9213	2.9104	2.9204	2.9223
14	4.9188	4.9109	4.9060	4.9183	4.9139	4.9009	4.9240	4.9236
15	2.4714	2.4642	2.4621	2.4669	2.4678	2.4595	2.4683	2.4702
16	0.4883	0.4871	0.4867	0.4876	0.4892	0.4863	0.4878	0.4880
17	0.9179	0.9158	0.9151	0.9166	0.9191	0.9142	0.9170	0.9172
18	524.2148	524.4670	524.5530	524.3844	524.0925	524.7426	524.3517	524.3084
19	4.3258	4.3196	4.3153	4.3275	4.3225	4.3107	4.3367	4.3284
20	8.1225	8.1219	8.1117	8.1332	8.1181	8.1024	8.1280	8.1256
21	8.0022	7.9971	7.9882	8.0264	7.9966	7.9794	8.0108	8.0062
22	19.7902	19.8078	19.7807	19.8110	19.7839	19.7562	19.8040	19.7977
23	13.0687	13.1047	13.0696	13.0757	13.0631	13.0512	13.0733	13.0714
24	10.9852	10.9881	10.9743	11.0008	10.9817	10.9612	10.9946	10.9905
25	162.0504	162.1256	162.1654	162.1065	162.0074	162.2972	162.0926	162.0820
26	6.3418	6.3372	6.3306	6.3527	6.3383	6.3237	6.3504	6.3456
27	41.1509	41.1736	41.2485	41.1596	41.1271	41.1399	41.1530	41.1530
28	1.3391	1.3357	1.3346	1.3371	1.3401	1.3333	1.3375	1.3382
29	86.0478	86.1071	86.1481	86.0804	86.0293	86.2116	86.0745	86.0645
Sum	1107.3326	1091.1206	1066.7137	1101.1364	1108.8932	1008.3585	1103.6130	1105.7844
TV (A)	66.93771	533.97587	1214.61899	252.04103	13.83501	2830.39848	180.21057	116.25778
Fj	0.0604	0.4894	1.1387	0.2289	0.0125	2.8069	0.1633	0.1051

Table F-3-4: Continued

County	9	10	11	12	13	14	15	16
1	2.3875	2.3876	2.3818	2.3875	2.3922	2.3853	2.3881	2.3855
2	19.0824	19.0866	19.1163	19.0885	19.0832	19.0911	19.0881	19.0765
3	43.5458	43.5547	43.5751	43.5560	43.5465	43.5586	43.5584	43.5335
4	8.9813	8.9852	8.9819	8.9848	8.9820	8.9889	8.9838	8.9774
5	0.4940	0.4937	0.4928	0.4937	0.4938	0.4934	0.4938	0.4948
6	101.8952	101.9114	101.9369	101.9167	101.8962	101.9200	101.9191	101.8688
7	6.4198	6.4236	6.4156	6.4237	6.4206	6.4303	6.4229	6.4166
8	4.1439	4.1481	4.1383	4.1485	4.1448	4.1480	4.1467	4.1412
9	0.0000	2.4073	2.4024	2.4070	2.4099	2.4055	2.4070	2.4076
10	4.5240	0.0000	4.5152	4.5379	4.5259	4.5229	4.5309	4.5202
11	15.4691	15.4709	0.0000	15.4717	15.4706	15.4757	15.4689	15.4638
12	3.1852	3.1953	3.1796	0.0000	3.1862	3.1858	3.1898	3.1830
13	2.9261	2.9242	2.9173	2.9235	0.0000	2.9213	2.9248	2.9221
14	4.9173	4.9196	4.9129	4.9212	4.9181	0.0000	4.9195	4.9148
15	2.4693	2.4734	2.4645	2.4729	2.4712	2.4689	0.0000	2.4678
16	0.4886	0.4881	0.4873	0.4881	0.4884	0.4879	0.4881	0.0000
17	0.9183	0.9175	0.9159	0.9175	0.9179	0.9170	0.9178	0.9195
18	524.1985	524.2767	524.3639	524.2987	524.2011	524.3104	524.3013	524.0652
19	4.3253	4.3267	4.3216	4.3272	4.3259	4.3326	4.3263	4.3230
20	8.1218	8.1240	8.1266	8.1243	8.1223	8.1267	8.1232	8.1187
21	8.0013	8.0039	8.0011	8.0042	8.0020	8.0083	8.0026	7.9979
22	19.7888	19.7951	19.8299	19.7949	19.7897	19.7989	19.7952	19.7817
23	13.0674	13.0696	13.0867	13.0714	13.0679	13.0730	13.0702	13.0635
24	10.9847	10.9891	10.9939	10.9878	10.9853	10.9909	10.9874	10.9803
25	162.0469	162.0710	162.1031	162.0749	162.0478	162.0804	162.0678	162.0047
26	6.3409	6.3437	6.3392	6.3441	6.3415	6.3476	6.3435	6.3381
27	41.1480	41.1493	41.1774	41.1504	41.1515	41.1566	41.1439	41.1358
28	1.3400	1.3386	1.3361	1.3384	1.3393	1.3378	1.3386	1.3407
29	86.0443	86.0592	86.0822	86.0625	86.0451	86.0656	86.0669	86.0215
Sum	1107.2560	1105.3343	1094.5956	1106.7181	1106.7669	1105.0296	1107.4145	1108.8642
TV (A)	67.48626	126.96386	433.10639	89.40363	81.99164	137.98654	69.28277	13.68088
Fj	0.0609	0.1149	0.3957	0.0808	0.0741	0.1249	0.0626	0.0123

Table F-3-4: Continued

County	17	18	19	20	21	22	23	24
1	2.3857	2.3729	2.3846	2.3828	2.3836	2.3816	2.3807	2.3823
2	19.0819	19.0309	19.0882	19.1003	19.0958	19.1087	19.1374	19.1021
3	43.5490	43.4721	43.5529	43.5683	43.5648	43.5830	43.5909	43.5726
4	8.9787	8.9458	8.9906	8.9923	9.0106	8.9852	8.9773	8.9910
5	0.4947	0.4912	0.4934	0.4931	0.4932	0.4930	0.4928	0.4931
6	101.8955	101.8604	101.9039	101.9319	101.9289	101.9570	101.9577	101.9373
7	6.4182	6.3916	6.4377	6.4211	6.4258	6.4179	6.4134	6.4207
8	4.1417	4.1230	4.1451	4.1411	4.1430	4.1390	4.1367	4.1405
9	2.4079	2.3936	2.4053	2.4035	2.4043	2.4023	2.4014	2.4031
10	4.5210	4.4990	4.5216	4.5181	4.5198	4.5161	4.5136	4.5178
11	15.4630	15.4177	15.4744	15.4858	15.4811	15.5011	15.4856	15.4866
12	3.1835	3.1681	3.1842	3.1816	3.1827	3.1800	3.1787	3.1809
13	2.9223	2.9064	2.9209	2.9186	2.9196	2.9171	2.9159	2.9180
14	4.9151	4.8940	4.9250	4.9162	4.9191	4.9132	4.9109	4.9150
15	2.4687	2.4560	2.4681	2.4662	2.4669	2.4653	2.4640	2.4659
16	0.4892	0.4856	0.4878	0.4876	0.4877	0.4873	0.4872	0.4874
17	0.0000	0.9129	0.9169	0.9164	0.9166	0.9162	0.9158	0.9163
18	524.1844	0.0000	524.2286	524.3576	524.3511	524.4736	524.4399	524.3808
19	4.3231	4.3047	0.0000	4.3251	4.3281	4.3222	4.3195	4.3243
20	8.1194	8.0907	8.1271	0.0000	8.1309	8.1300	8.1212	8.1430
21	7.9979	7.9681	8.0096	8.0078	0.0000	8.0027	7.9966	8.0076
22	19.7874	19.7274	19.7983	19.8187	19.8083	0.0000	19.8064	19.8244
23	13.0658	13.0312	13.0708	13.0781	13.0755	13.0842	0.0000	13.0777
24	10.9826	10.9454	10.9921	11.0157	10.9989	11.0012	10.9857	0.0000
25	162.0307	162.1131	162.0585	162.1006	162.0969	162.1288	162.1225	162.1043
26	6.3396	6.3147	6.3495	6.3457	6.3542	6.3416	6.3367	6.3447
27	41.1328	41.0687	41.1523	41.1615	41.1620	41.1667	41.1771	41.1607
28	1.3418	1.3314	1.3377	1.3368	1.3372	1.3362	1.3357	1.3366
29	86.0476	85.9891	86.0529	86.0772	86.0740	86.1009	86.1014	86.0834
Sum	1108.6691	584.7056	1105.4780	1101.9498	1102.0608	1090.4520	1097.1024	1099.1180
TV (A)	25.72836	14475.66701	121.37996	227.72498	224.52208	554.37889	365.50626	307.96962
Fj	0.0232	24.7572	0.1098	0.2067	0.2037	0.5084	0.3332	0.2802

Table F-3-4: Continued

County	25	26	27	28	29	Sum	Target Value (TV) (P)	Fi
1	2.3751	2.3838	2.3787	2.3863	2.3766	66.7240	66.72401	1.0000
2	19.0482	19.0953	19.0794	19.0800	19.0652	534.4137	534.41370	1.0000
3	43.5151	43.5667	43.6548	43.5419	43.5641	1219.6412	1219.64116	1.0000
4	8.9542	8.9994	8.9669	8.9798	8.9605	251.4425	251.44253	1.0000
5	0.4917	0.4933	0.4923	0.4945	0.4920	13.8095	13.80954	1.0000
6	102.0073	101.9331	101.9825	101.8871	102.1142	2854.0797	2854.07966	1.0000
7	6.3975	6.4280	6.4061	6.4184	6.4021	179.6838	179.68378	1.0000
8	4.1269	4.1437	4.1326	4.1426	4.1296	115.9178	115.91783	1.0000
9	2.3959	2.4044	2.3995	2.4089	2.3974	67.3020	67.30205	1.0000
10	4.5032	4.5205	4.5094	4.5220	4.5062	126.5091	126.50914	1.0000
11	15.4326	15.4777	15.4614	15.4662	15.4440	433.1183	433.11832	1.0000
12	3.1710	3.1832	3.1754	3.1839	3.1731	89.0820	89.08201	1.0000
13	2.9091	2.9197	2.9137	2.9233	2.9110	81.7276	81.72763	1.0000
14	4.8985	4.9201	4.9059	4.9158	4.9019	137.5902	137.59020	1.0000
15	2.4582	2.4676	2.4613	2.4686	2.4601	69.0552	69.05517	1.0000
16	0.4861	0.4877	0.4868	0.4891	0.4864	13.6533	13.65325	1.0000
17	0.9137	0.9168	0.9148	0.9199	0.9144	25.6651	25.66509	1.0000
18	524.9031	524.3735	524.4621	524.1595	524.6928	14682.1372	14682.13720	1.0000
19	4.3088	4.3296	4.3153	4.3243	4.3117	121.0321	121.03206	1.0000
20	8.0985	8.1307	8.1106	8.1205	8.1042	227.3777	227.37772	1.0000
21	7.9757	8.0182	7.9879	7.9996	7.9812	223.9810	223.98100	1.0000
22	19.7454	19.8075	19.7740	19.7862	19.7613	554.1509	554.15087	1.0000
23	13.0434	13.0749	13.0661	13.0658	13.0545	365.9356	365.93564	1.0000
24	10.9557	10.9972	10.9716	10.9832	10.9639	307.5692	307.56925	1.0000
25	0.0000	162.1000	162.1512	162.0346	162.2494	4538.7144	4538.71438	1.0000
26	6.3206	0.0000	6.3291	6.3397	6.3251	177.4999	177.49988	1.0000
27	41.1129	41.1552	0.0000	41.1416	41.1553	1152.2654	1152.26536	1.0000
28	1.3327	1.3372	1.3346	0.0000	1.3335	37.4364	37.43640	1.0000
29	86.0959	86.0782	86.1327	86.0374	0.0000	2410.0813	2410.08133	1.0000
Sum	947.9767	1103.7431	1068.9565	1108.2208	1024.2317	31077.5962		
TV (A)	4491.67217	177.94819	1147.06595	37.53275	2392.41683	30777.69		
Fj	4.7382	0.1612	1.0731	0.0339	2.3358			

F-3-3 Results of Iteration Processes Using the Growth Factor Methods (0.0003, b=0075, c=0.0003, d=0.0075)

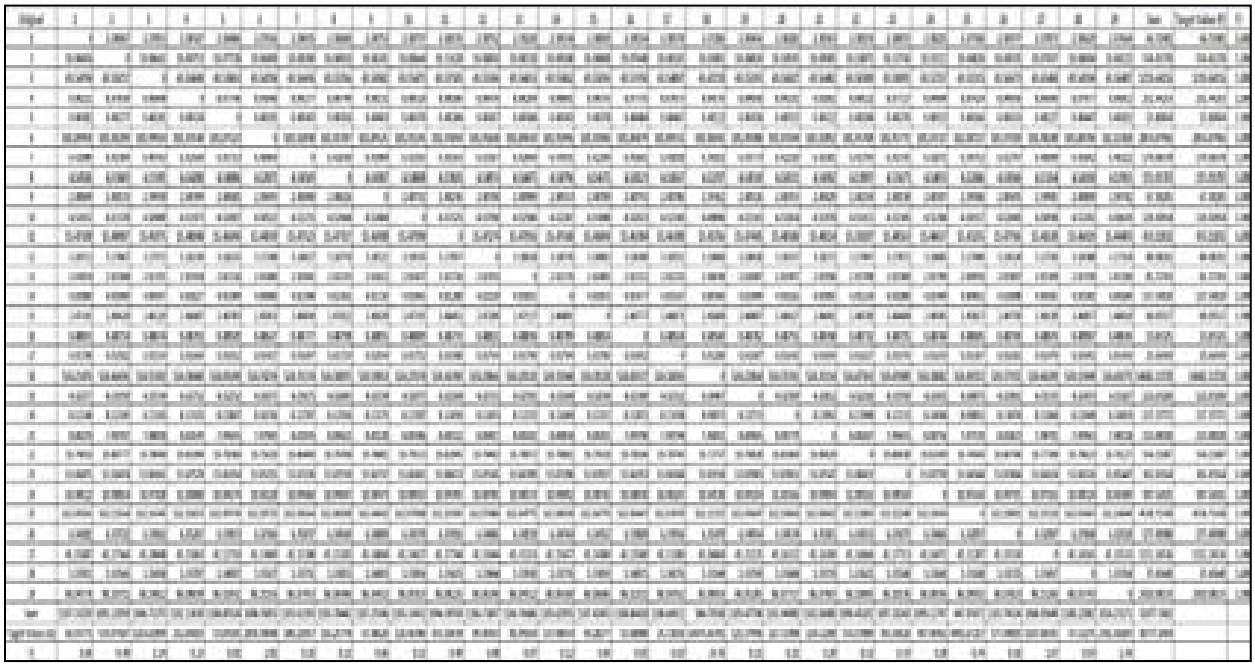


Figure F-3-1: 0th Iteration Result Using the Growth Factor Methods

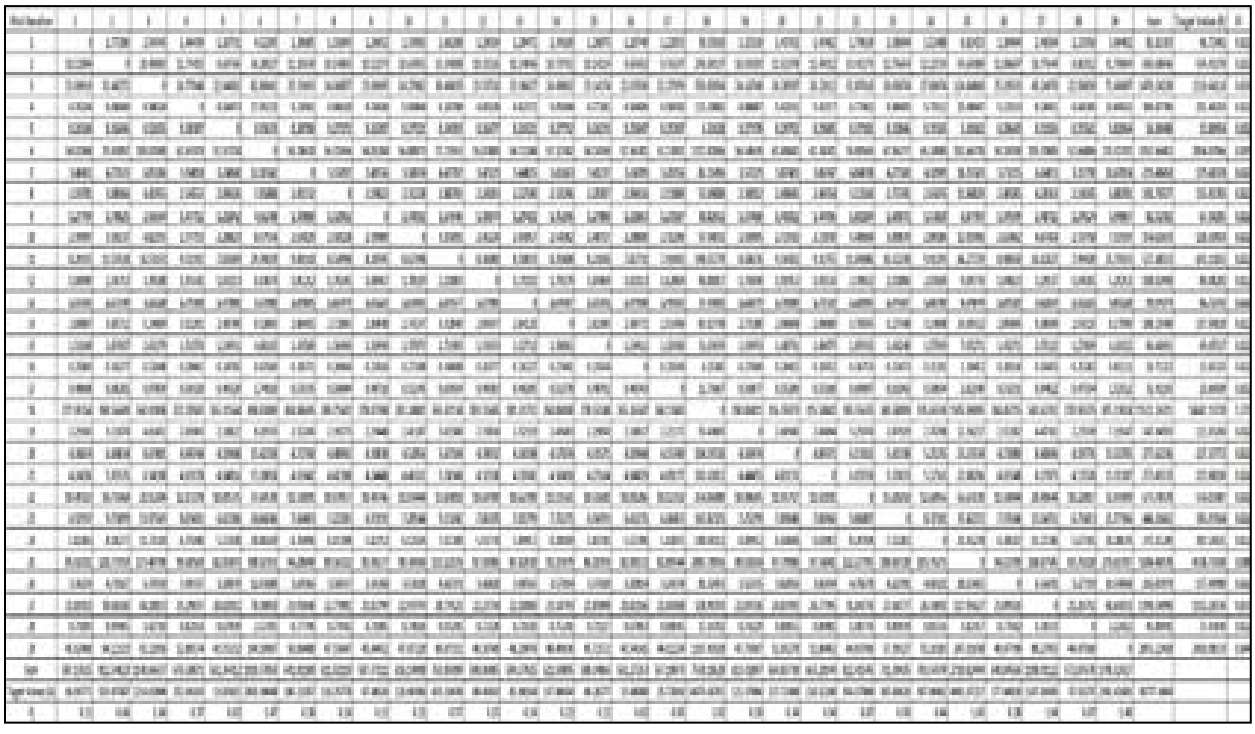


Figure F-3-2: 1st Iteration Result Using the Growth Factor Methods

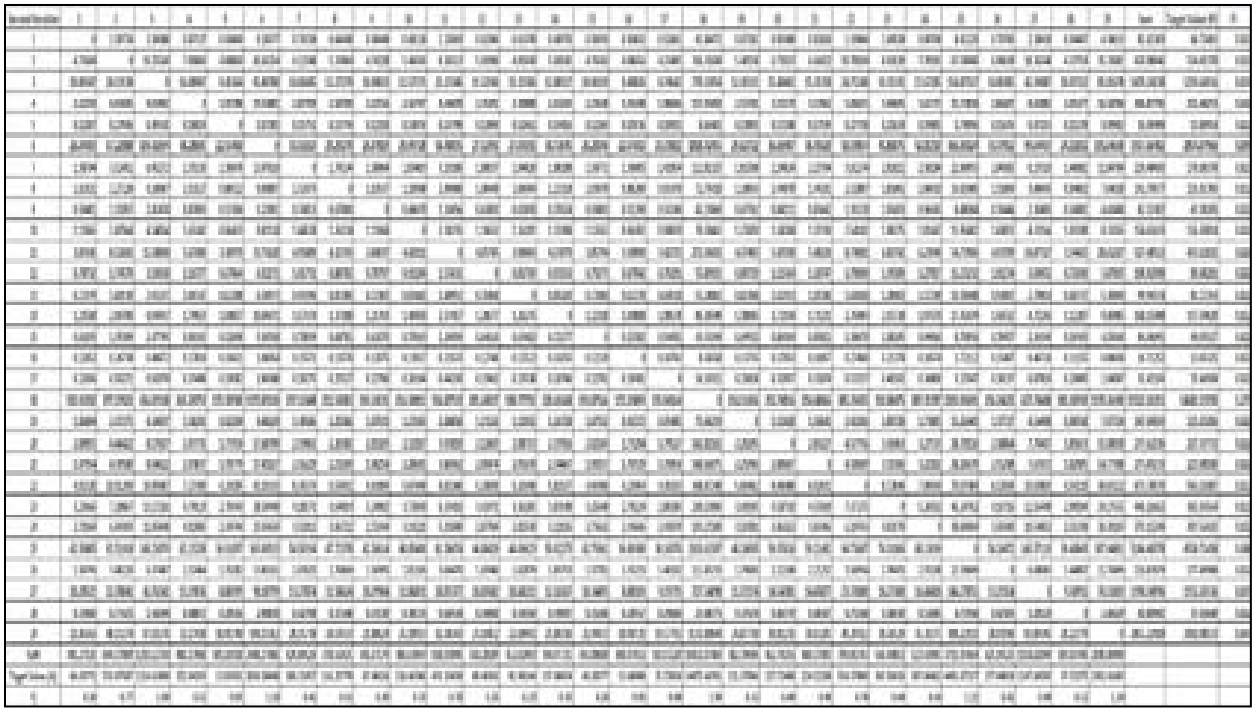


Figure F-3-3: 2nd Iteration Result Using the Growth Factor Methods

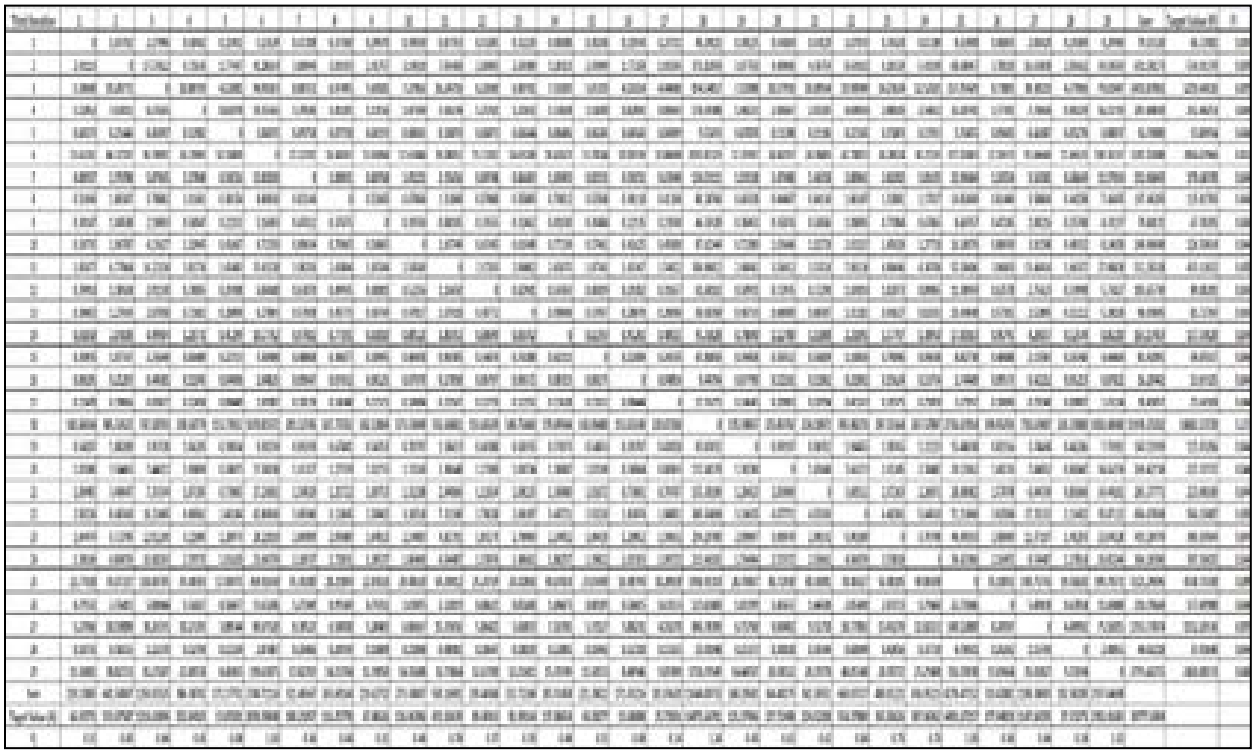


Figure F-3-4: 3rd Iteration Result Using the Growth Factor Methods

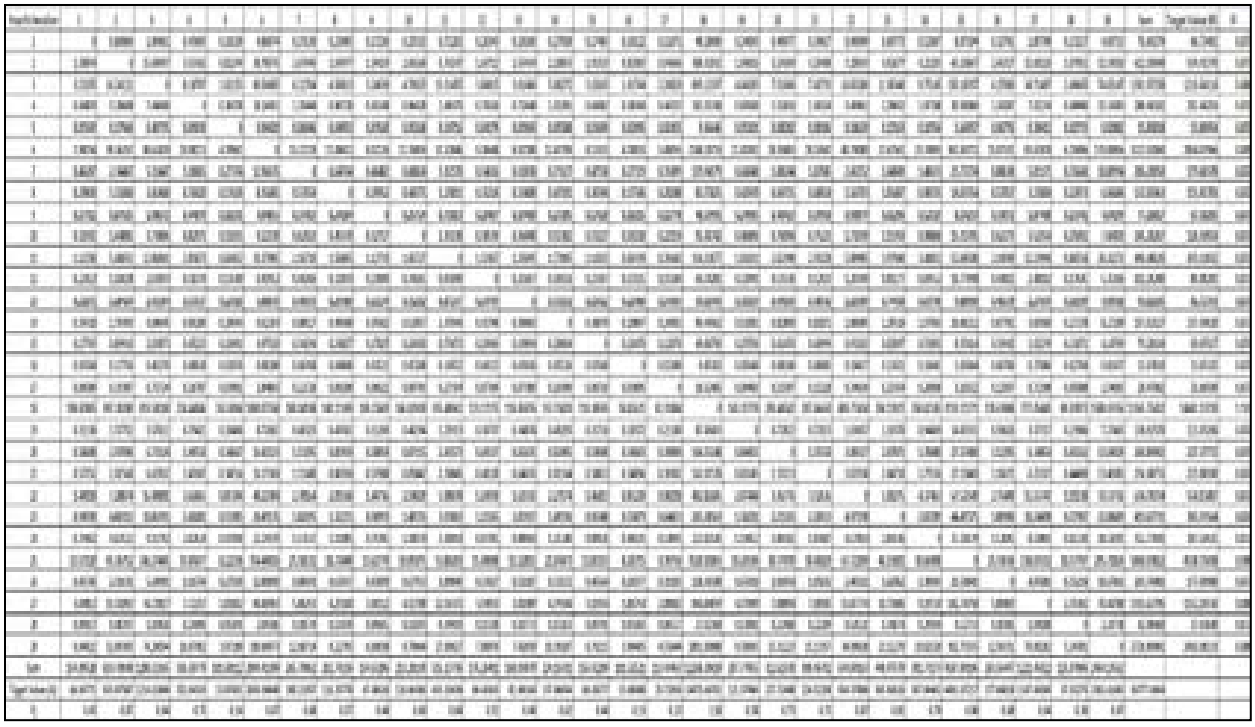


Figure F-3-5: 4th Iteration Result Using the Growth Factor Methods

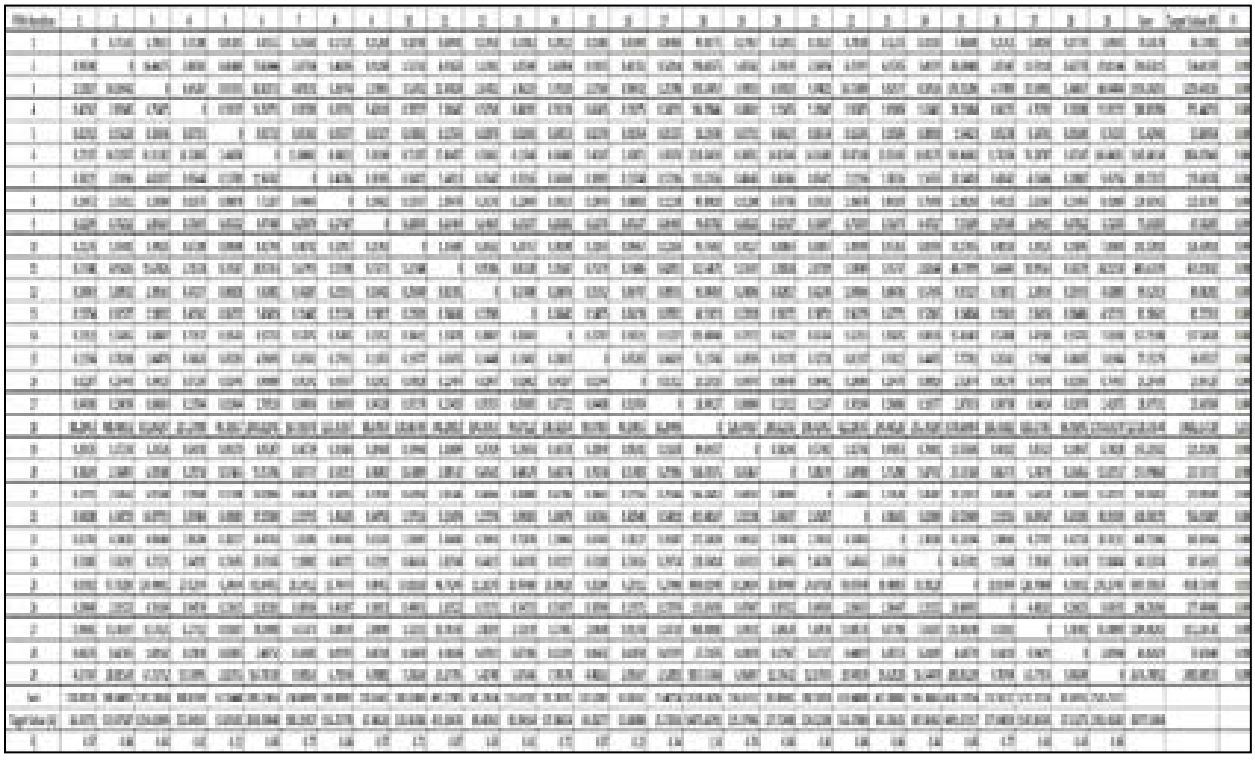


Figure F-3-6: 5th Iteration Result Using the Growth Factor Methods

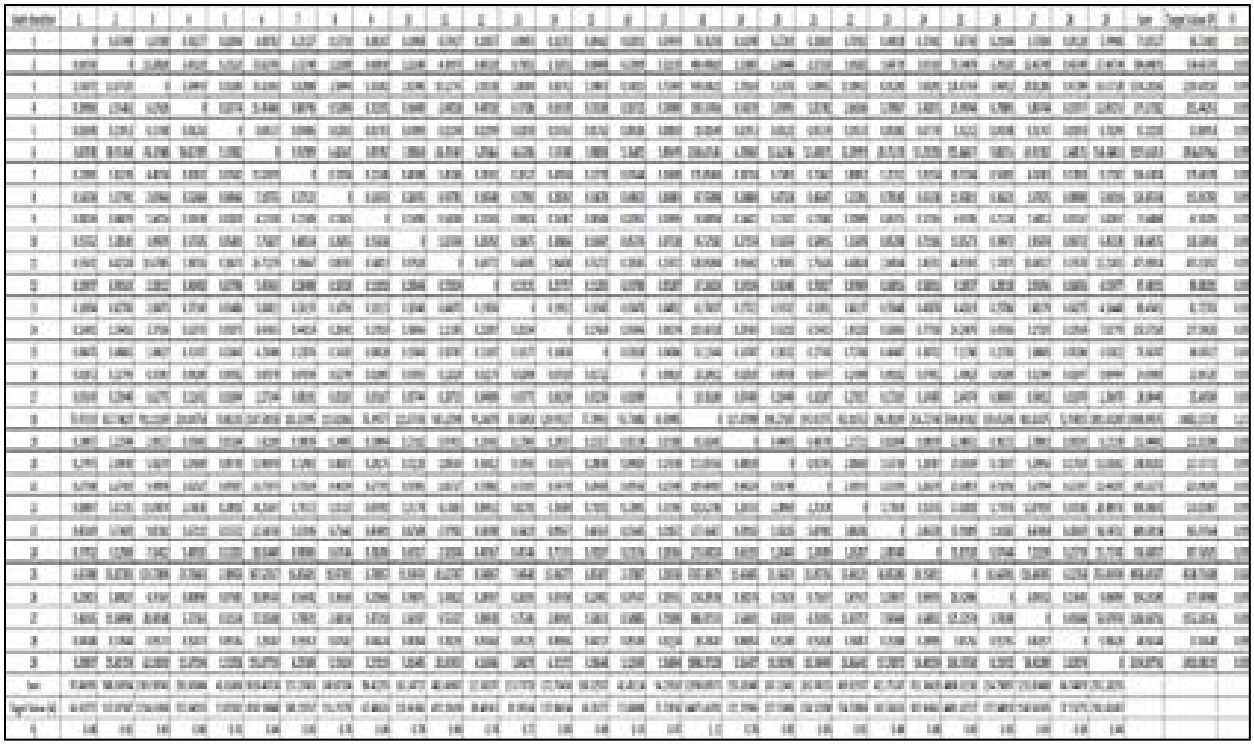


Figure F-3-7: 6th Iteration Result Using the Growth Factor Methods

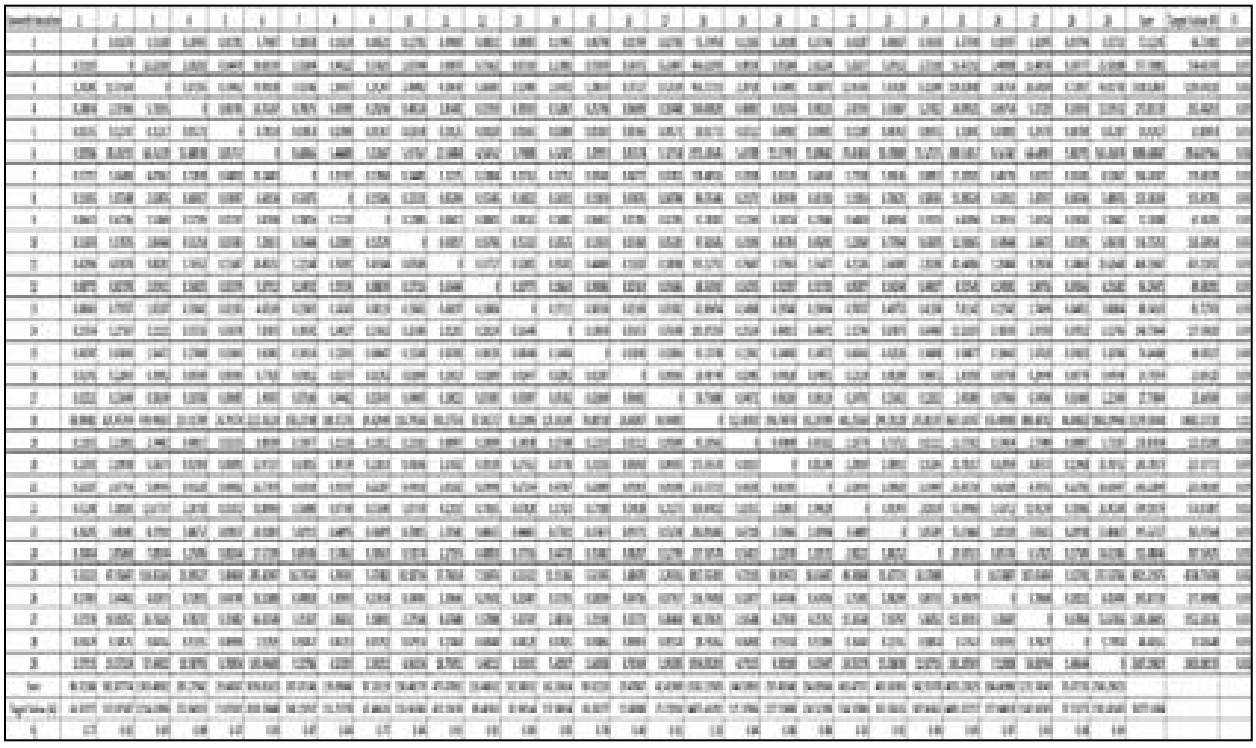


Figure F-3-8: 7th Iteration Result Using the Growth Factor Methods

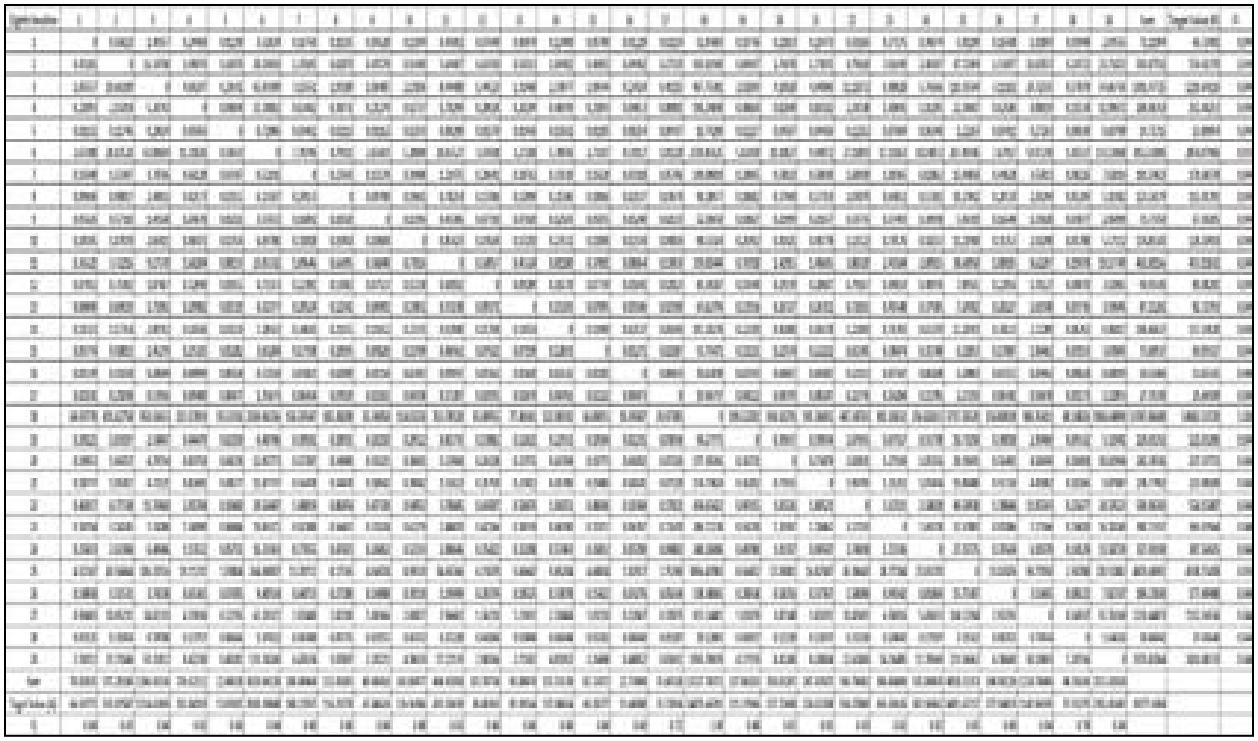


Figure F-3-9: 8th Iteration Result Using the Growth Factor Methods

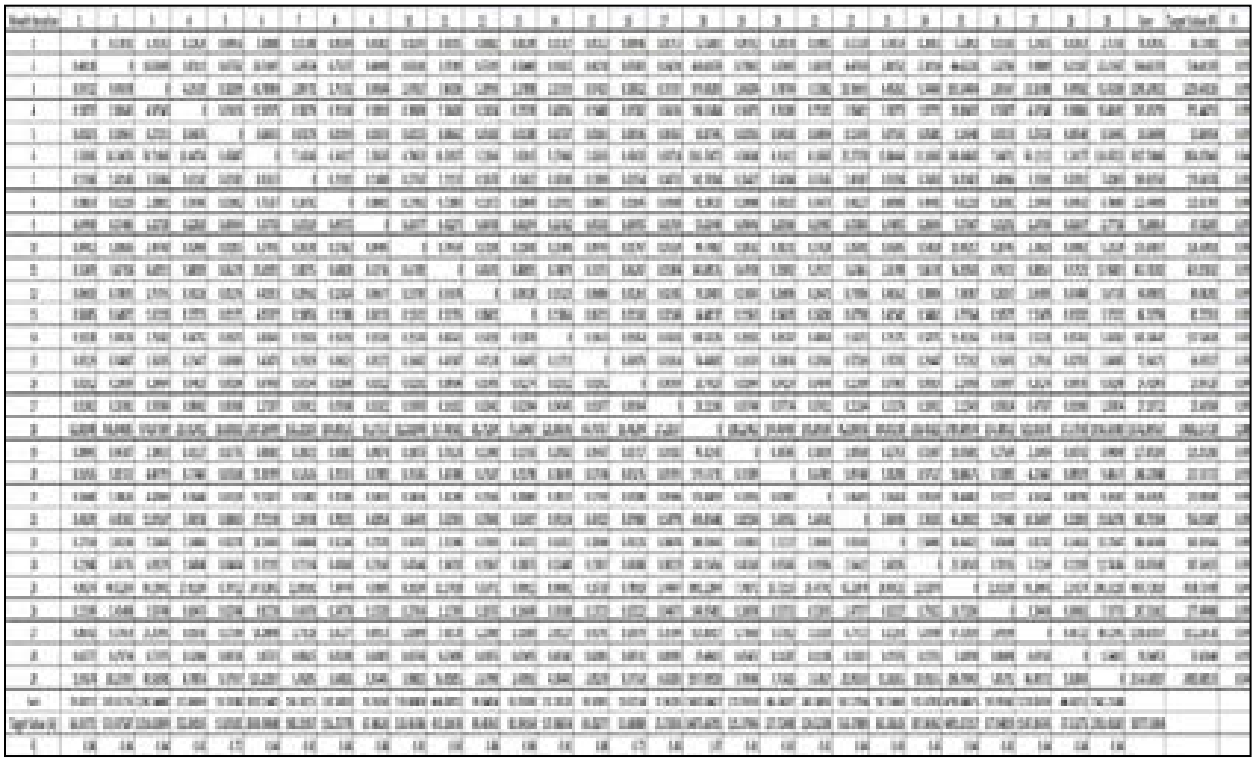


Figure F-3-10: 9th Iteration Result Using the Growth Factor Methods

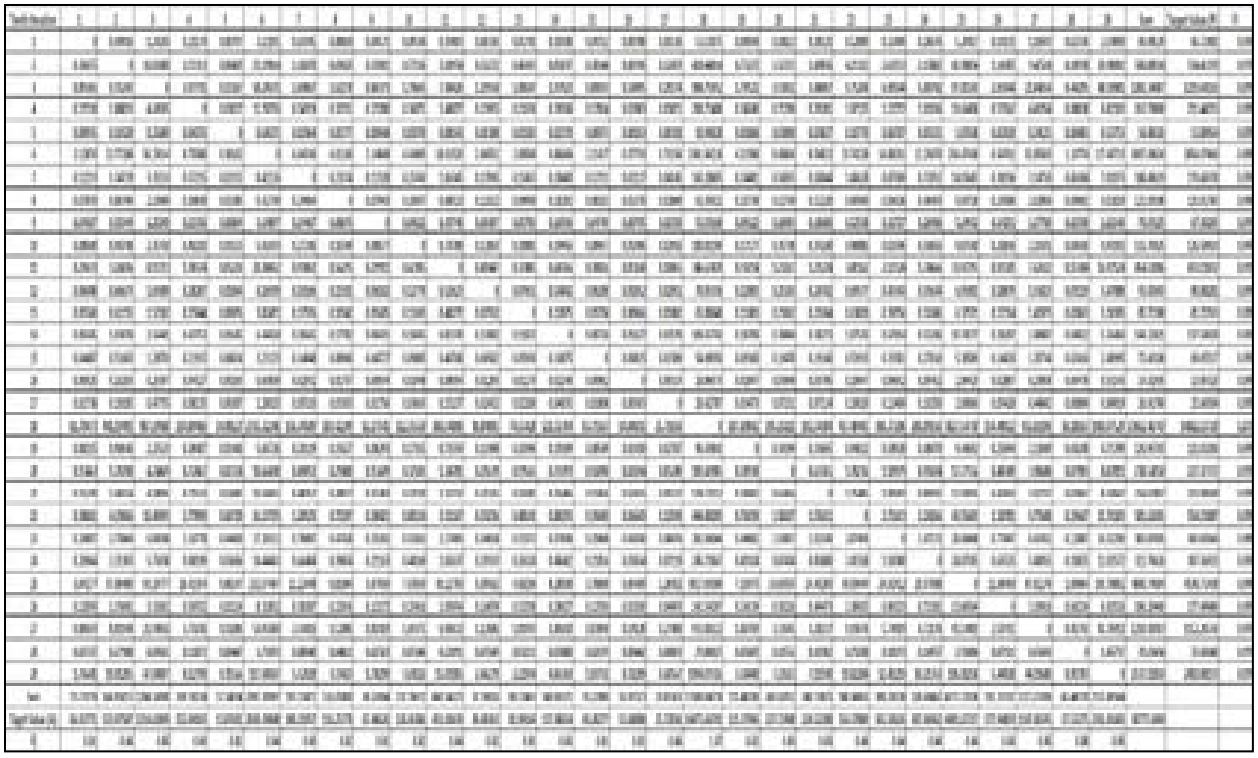


Figure F-3-11: 10th Iteration Result Using the Growth Factor Methods

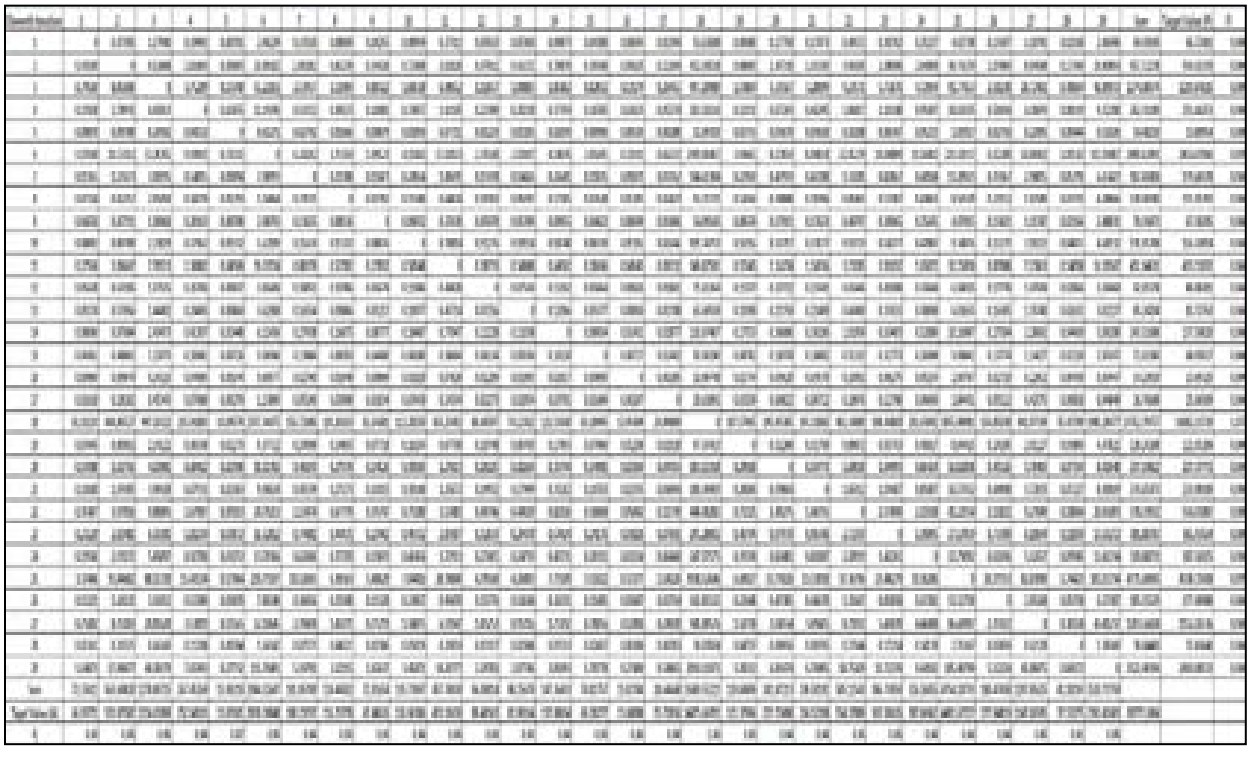


Figure F-3-12: 11th Iteration Result Using the Growth Factor Methods

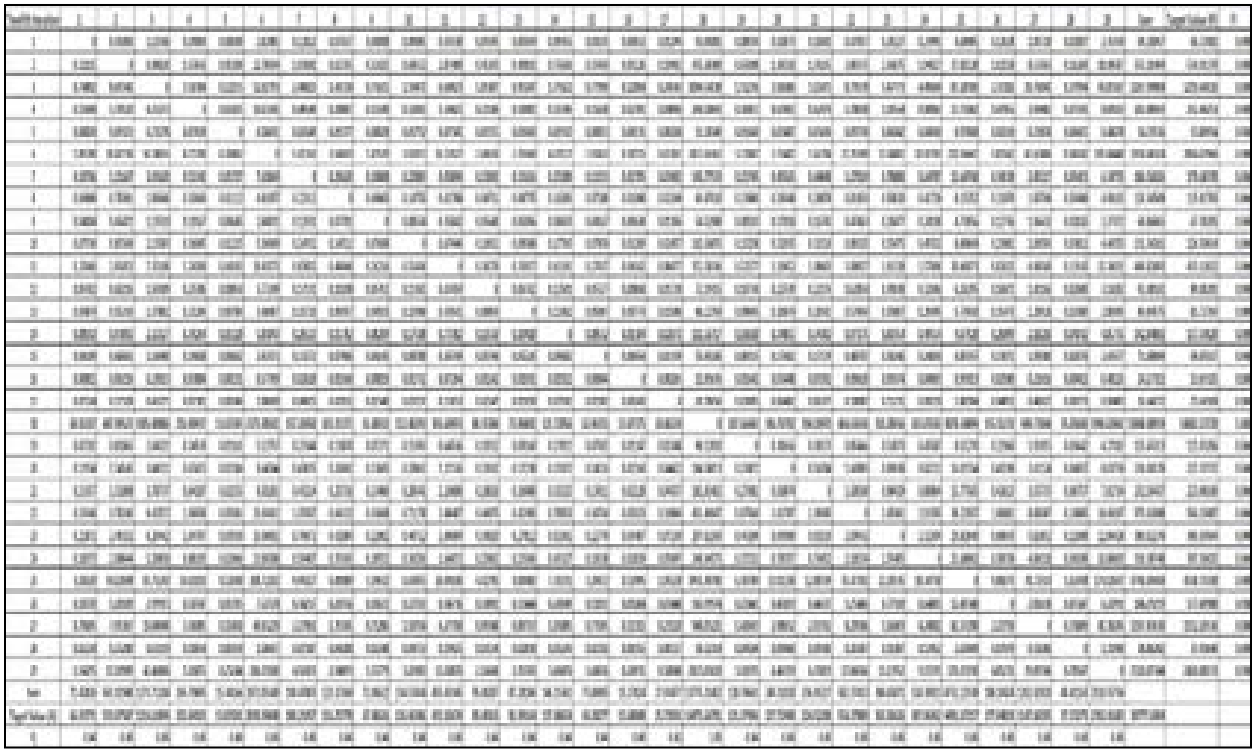


Figure F-3-13: 12th Iteration Result Using the Growth Factor Methods

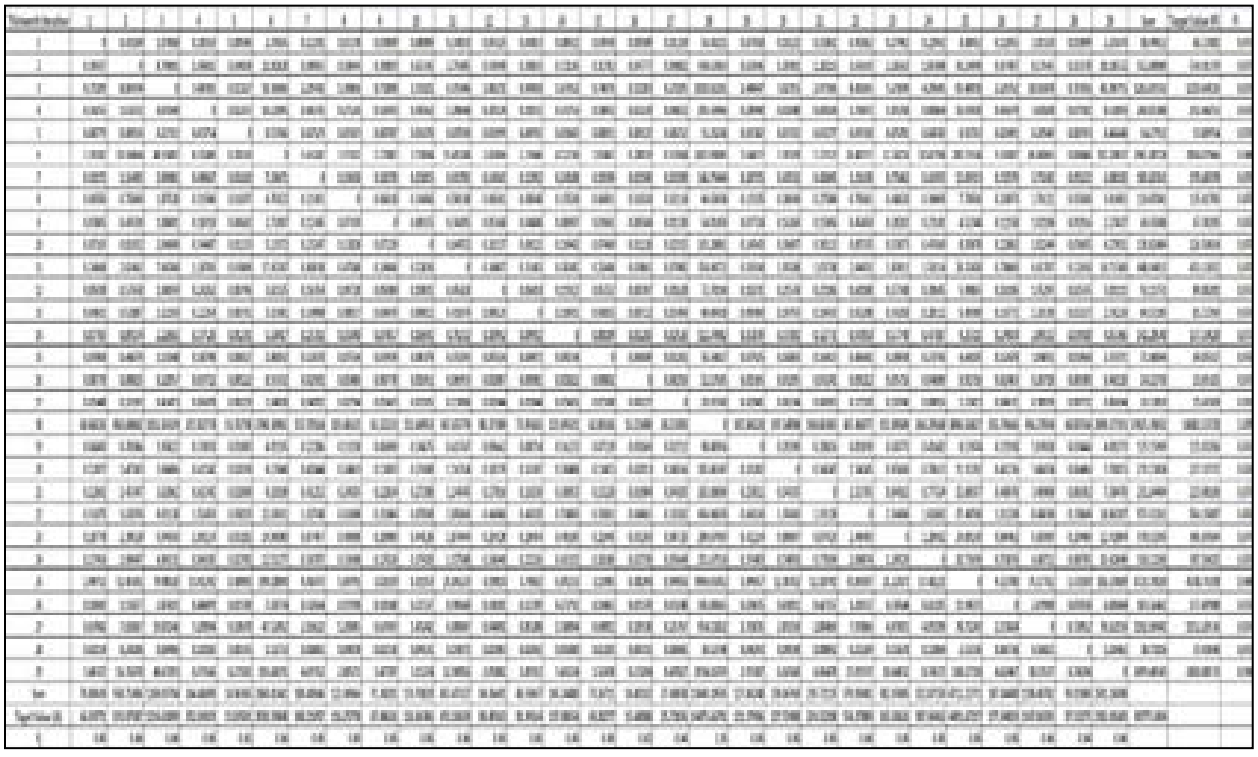


Figure F-3-14: 13th Iteration Result Using the Growth Factor Methods

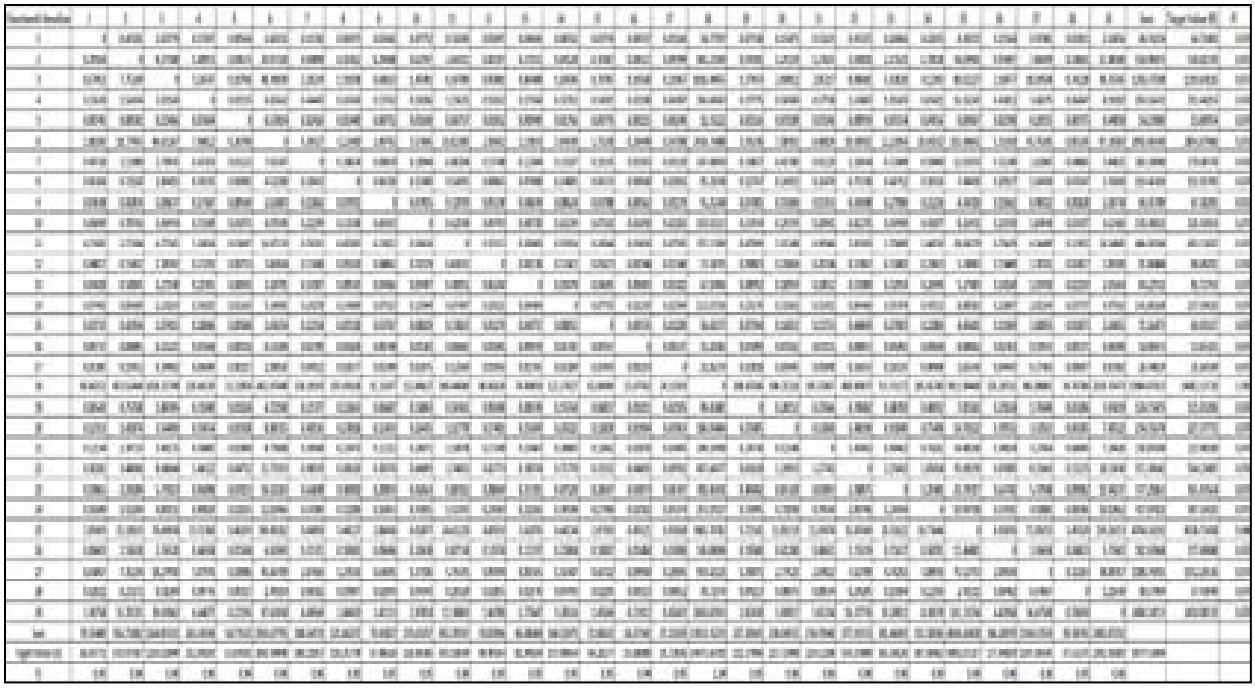


Figure F-3-15: 14th Iteration Result Using the Growth Factor Methods

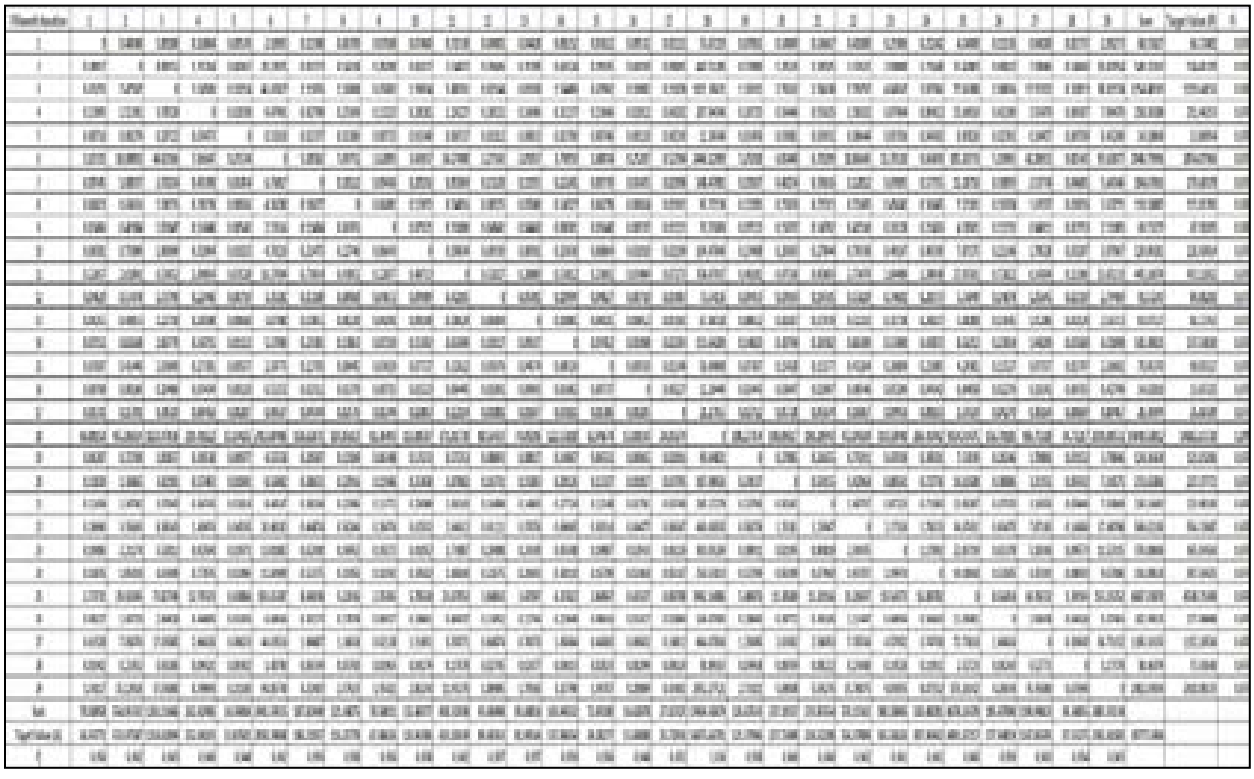


Figure F-3-16: 15th Iteration Result Using the Growth Factor Methods

16th Iteration	Beaver	Box Elder	Cache	Carbon	Daggett	Davis	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Millard	Morgan	Piute	Rich	Salt Lake	San Juan	Sanpete	Sevier	Summit	Tooele	Uintah	Utah	Wasatch	Washington	Wayne	Weber	Sum	Target Value (P)	Fi
Beaver	0	0.38747	0.96994	0.16246	0.00517	2.42892	0.10928	0.06479	0.03376	0.07205	0.30506	0.04731	0.04273	0.07951	0.03485	0.00511	0.01069	55.33319	0.06819	0.14412	0.14178	0.40452	0.25059	0.20543	4.01075	0.10761	0.91105	0.01674	2.02561	68.37808	66.72401	0.976
Box Elder	0.27022	0	7.82480	1.31234	0.04194	19.57343	0.88280	0.52345	0.27286	0.58155	2.46541	0.38221	0.34454	0.64244	0.28160	0.04140	0.08663	445.52885	0.55121	1.16487	1.14532	3.26670	2.02401	1.65987	32.30851	0.86972	7.34688	0.13545	16.32617	547.86021	534.41370	0.975
Cache	0.62917	7.22999	0	3.03908	0.09808	45.12944	2.04733	1.21615	0.63533	1.35075	5.69332	0.88891	0.80163	1.49146	0.65561	0.09681	0.20232	1025.71692	1.28035	2.69817	2.65343	7.54219	4.68481	3.84032	74.45690	2.01696	16.98601	0.31600	37.65356	1251.05101	1219.64116	0.975
Carbon	0.12632	1.46494	3.66460	0	0.01958	9.17324	0.41354	0.24496	0.12756	0.27215	1.15344	0.17875	0.16111	0.30073	0.13164	0.01933	0.04045	208.91402	0.25807	0.54562	0.53767	1.52993	0.94755	0.77761	15.14594	0.40766	3.44133	0.06327	7.65060	257.71159	251.44253	0.976
Daggett	0.00690	0.08012	0.20063	0.03358	0	0.50245	0.02258	0.01338	0.00697	0.01488	0.06306	0.00977	0.00881	0.01642	0.00719	0.00106	0.00221	11.44768	0.01409	0.02979	0.02930	0.08365	0.05181	0.04247	0.82968	0.02224	0.18838	0.00346	0.41903	14.15159	13.80954	0.976
Davis	1.55414	17.48032	43.43315	7.40070	0.24496	0	5.00418	2.98686	1.56023	3.31431	13.79159	2.18928	1.97611	3.65624	1.61881	0.24182	0.50366	2454.37810	3.14299	6.57817	6.47040	18.23237	11.36446	9.33342	178.68656	4.93059	40.80576	0.78459	90.48808	2932.16187	2854.07966	0.973
Duchesne	0.09015	1.04545	2.61606	0.43883	0.01397	6.54942	0	0.17489	0.09102	0.19427	0.82301	0.12759	0.11498	0.21482	0.09396	0.01378	0.02886	149.17532	0.18451	0.38911	0.38294	1.09170	0.67617	0.55466	10.81393	0.29078	2.45649	0.04514	5.46221	184.15401	179.68378	0.976
Emery	0.05810	0.67368	1.68612	0.28260	0.00899	4.22190	0.19015	0	0.05866	0.12528	0.53034	0.08228	0.07411	0.13839	0.06057	0.00888	0.01859	96.17329	0.11864	0.25065	0.24661	0.70340	0.43569	0.35729	6.97138	0.18721	1.58350	0.02909	3.52097	118.79632	115.91783	0.976
Garfield	0.03372	0.39080	0.97832	0.16386	0.00522	2.44994	0.11020	0.06533	0	0.07264	0.30767	0.04769	0.04304	0.08018	0.03512	0.00516	0.01079	55.81333	0.06877	0.14536	0.14299	0.40801	0.25274	0.20721	4.04556	0.10853	0.91891	0.01689	2.04314	68.97111	67.30205	0.976
Grand	0.06349	0.73534	1.84048	0.30845	0.00983	4.60829	0.20751	0.12308	0.06408	0	0.57889	0.09005	0.08097	0.15097	0.06622	0.00970	0.02030	104.97124	0.12948	0.27360	0.26916	0.76779	0.47559	0.39002	7.60929	0.20433	1.72843	0.03177	3.84323	129.65157	126.50914	0.976
Iron	0.21853	2.53399	6.33051	1.06194	0.03389	15.84008	0.71415	0.42338	0.22066	0.47039	0	0.30908	0.27867	0.51970	0.22766	0.03346	0.07001	360.62731	0.44591	0.94272	0.92683	2.64621	1.63924	1.34346	26.15040	0.70359	5.94665	0.10950	13.21145	443.97939	433.11832	0.976
Juab	0.04465	0.51751	1.29532	0.21702	0.00691	3.24359	0.14600	0.08660	0.04507	0.09647	0.40737	0	0.05695	0.10624	0.04657	0.00682	0.01428	73.88930	0.09110	0.19251	0.18938	0.54029	0.33469	0.27440	5.35584	0.14376	1.21646	0.02234	2.70503	91.29246	89.08201	0.976
Kane	0.04105	0.47470	1.18825	0.19905	0.00634	2.97554	0.13389	0.07938	0.04140	0.08827	0.37374	0.05795	0	0.09742	0.04269	0.00626	0.01311	67.78455	0.08356	0.17658	0.17371	0.49560	0.30700	0.25171	4.91341	0.13185	1.11617	0.02051	2.48148	83.75518	81.72763	0.976
Millard	0.06898	0.79998	2.00195	0.33563	0.01068	5.01256	0.22594	0.13387	0.06964	0.14865	0.62982	0.09765	0.08798	0	0.07189	0.01054	0.02207	114.17849	0.14102	0.29768	0.29291	0.83524	0.51740	0.42427	8.27661	0.22238	1.88024	0.03453	4.18034	141.00895	137.59020	0.976
Morgan	0.03460	0.40003	1.00391	0.16814	0.00535	2.51390	0.11311	0.06706	0.03492	0.07463	0.31562	0.04899	0.04414	0.08229	0	0.00528	0.01106	57.26813	0.07057	0.14914	0.14671	0.41869	0.25933	0.21262	4.15074	0.11138	0.94258	0.01731	2.09654	70.76780	69.05517	0.976
Piute	0.00683	0.07922	0.19835	0.03320	0.00106	0.49676	0.02233	0.01323	0.00690	0.01471	0.06236	0.00966	0.00871	0.01624	0.00711	0	0.00219	11.31797	0.01393	0.02946	0.02898	0.08270	0.05123	0.04199	0.82032	0.02199	0.18630	0.00342	0.41427	13.99142	13.65325	0.976
Rich	0.01284	0.14894	0.37284	0.06242	0.00199	0.93393	0.04198	0.02488	0.01297	0.02766	0.11721	0.01816	0.01638	0.03053	0.01337	0.00197	0	21.27718	0.02619	0.05537	0.05446	0.15549	0.09631	0.07895	1.54206	0.04134	0.35013	0.00644	0.77887	26.30095	25.66509	0.976
Salt Lake	60.93718	456.86198	1027.99420	220.08040	13.10445	2423.41957	159.03359	104.05034	61.42195	113.31284	372.40249	80.67931	74.18758	122.82149	63.00822	12.96151	24.08003	0	108.48374	199.47520	196.75660	473.92535	315.70224	267.30001	3936.33327	157.10075	971.00784	34.72429	2038.43019	14089.54660	14682.13720	1.042
San Juan	0.06065	0.70352	1.76069	0.29525	0.00939	4.40944	0.19894	0.11765	0.06124	0.13070	0.55391	0.08584	0.07736	0.14457	0.06320	0.00927	0.01941	100.41995	0	0.26182	0.25766	0.73462	0.45500	0.37320	7.27933	0.19564	1.65368	0.03037	3.67655	124.03786	121.03206	0.976
Sanpete	0.11412	1.32499	3.31274	0.55573	0.01768	8.29268	0.37347	0.22127	0.11523	0.24585	1.04293	0.16148	0.14555	0.27166	0.11892	0.01746	0.03653	188.86867	0.23308	0	0.48481	1.38345	0.85660	0.70377	13.69223	0.36801	3.11106	0.05716	6.91612	233.04255	227.37772	0.976
Sevier	0.11246	1.30433	3.26301	0.54867	0.01742	8.16848	0.36819	0.21809	0.11356	0.24229	1.02708	0.15914	0.14344	0.26778	0.11719	0.01720	0.03600	186.03920	0.22978	0.48564	0	1.36210	0.84467	0.69224	13.48722	0.36302	3.06463	0.05633	6.81251	229.56057	223.98100	0.976
Summit	0.28057	3.24761	8.11505	1.36269	0.04356	20.30129	0.91661	0.54349	0.28331	0.60380	2.55961	0.39682	0.35772	0.66698	0.29239	0.04300	0.08996	462.09234	0.57235	1.20985	1.18920	0	2.10178	1.72420	33.51195	0.90308	7.61975	0.14065	16.93321	568.10283	554.15087	0.975
Tooele	0.18410	2.14008	5.34985	0.89512	0.02854	13.37111	0.60196	0.35678	0.18589	0.39642	1.68217	0.26045	0.23477	0.43798	0.19183	0.02818	0.05897	304.45240	0.37573	0.79447	0.78114	2.22978	0	1.13225	22.07351	0.59303	5.01789	0.09223	11.15216	375.09280	365.93564	0.976
Uintah	0.15467	1.79408	4.48662	0.75286	0.02398	11.22921	0.50607	0.29986	0.15619	0.33318	1.41285	0.21894	0.19727	0.36808	0.16119	0.02367	0.04954	255.71228	0.31585	0.66897	0.65688	1.87443	1.16041	0	18.53952	0.49862	4.21302	0.07749	9.36556	315.25118	307.56925	0.976
Utah	2.63396	28.88780	71.29837	12.33760	0.42054	177.27675	8.37662	5.02825	2.65935	5.57318	22.84358	3.69760	3.34118	6.14143	2.74226	0.41518	0.86140	4001.30702	5.28813	10.97875	10.80088	30.12196	18.85712	15.51920	0	8.25477	67.01450	1.33779	147.96332	4671.97852	4538.71438	0.971
Wasatch	0.08901	1.03275	2.58415	0.43375	0.01379	6.46958	0.29156	0.17264	0.08988	0.19180	0.81303	0.12597	0.11353	0.21200	0.09277	0.01361	0.02849	147.35899	0.18194	0.38445	0.37858	1.07849	0.66794	0.54796	10.68214	0	2.42652	0.04457	5.39560	181.91549	177.49988	0.976
Washington	0.59326	6.81982	17.06643	2.86646	0.09240	42.59282	1.93063	1.14679	0.59905	1.27374	5.37255	0.83810	0.75596	1.40660	0.61794	0.09124	0.19062	968.18811	1.20747	2.54493	2.50295	7.11468	4.41895	3.62223	70.27983	1.90198	0	0.29788	35.53590	1181.86932	1152.26536	0.975
Wayne	0.01874	0.21728	0.54399	0.09109	0.00290	1.36237	0.06126	0.03631	0.01893	0.04036	0.17104	0.02650	0.02390	0.04456	0.01952	0.00287	0.00601	31.03833	0.03822	0.08080	0.07948	0.22684	0.14051	0.11519	2.24971	0.06033	0.51092	0	1.13615	38.36413	37.43640	0.976
Weber	1.29231	14.62401	36.39743	6.17954	0.20306	90.92590	4.17365	2.48774	1.30490	2.78122	11.53172	1.82197	1.64415	3.04684	1.34626	0.20044	0.41789	2059.70662	2.61813	5.49030	5.40009	15.25430	9.49823	7.79695	149.81798	4.11210	34.19218	0.65147	0	2474.89737	2410.08133	0.974
Sum	69.73073	553.40112	1257.77185	261.61936	14.49169	2933.47158	187.21752	120.92049	70.30053	132.02405	449.03087	93.05734	85.36327	143.45355	72.16654	14.33101	26.88207	14018.97865	126.23300	236.49808	233.12083	574.51049	379.07609	319.52291	4664.03457	184.87328	1187.83727	39.16670	2478.61787	30927.64330	30927.64330	
Taget Value (A)	66.93771	533.97537	1214.61899	252.04103	13.83501	2830.39948	180.22057	116.25778	67.48626	126.96586	433.10639	89.40363	81.90164	137.98654	69.28277	13.68088	25.72836	14475.66701	121.37996	227.72498	224.52208	554.37899	365.50626	307.96962	4491.67217	177.94819	1147.06595	37.53275	2392.41683	30777.6904		
Fj	0.960	0.965	0.966	0.963	0.955	0.965	0.963	0.961	0.960	0.962	0.965	0.961	0.961	0.962	0.960	0.955	0.957	1.033	0.962	0.963	0.963	0.965	0.964	0.964	0.963	0.963	0.966	0.958	0.965			

Figure F-3-17: 16th Iteration Result Using the Growth Factor Methods

F-3-4 Final Results of Commodity Flow of the Model After 16th iterations With 0.0001, b=0050, c=0.0001, d=0.0010)

Table F-3-5: Final Results of Commodity Flow of the Model

County	Beaver	Box Elder	Cache	Carbon	Daggett	Davis	Duchesne	Emery
Beaver	0.0000	0.3875	0.9699	0.1625	0.0052	2.4289	0.1093	0.0648
Box Elder	0.2702	0.0000	7.8248	1.3123	0.0419	19.5734	0.8828	0.5234
Cache	0.6292	7.2300	0.0000	3.0391	0.0981	45.1294	2.0473	1.2162
Carbon	0.1263	1.4649	3.6646	0.0000	0.0196	9.1732	0.4135	0.2450
Daggett	0.0069	0.0801	0.2006	0.0336	0.0000	0.5025	0.0226	0.0134
Davis	1.5541	17.4803	43.4332	7.4017	0.2450	0.0000	5.0042	2.9869
Duchesne	0.0901	1.0455	2.6161	0.4388	0.0140	6.5494	0.0000	0.1749
Emery	0.0581	0.6737	1.6861	0.2826	0.0090	4.2219	0.1901	0.0000
Garfield	0.0337	0.3908	0.9783	0.1639	0.0052	2.4499	0.1102	0.0653
Grand	0.0635	0.7353	1.8405	0.3085	0.0098	4.6083	0.2075	0.1231
Iron	0.2185	2.5340	6.3305	1.0619	0.0339	15.8401	0.7141	0.4234
Juab	0.0447	0.5175	1.2953	0.2170	0.0069	3.2436	0.1460	0.0866
Kane	0.0410	0.4747	1.1882	0.1991	0.0063	2.9755	0.1339	0.0794
Millard	0.0690	0.8000	2.0020	0.3356	0.0107	5.0126	0.2259	0.1339
Morgan	0.0346	0.4010	1.0039	0.1681	0.0054	2.5139	0.1131	0.0671
Piute	0.0068	0.0792	0.1983	0.0332	0.0011	0.4968	0.0223	0.0132
Rich	0.0128	0.1489	0.3729	0.0624	0.0020	0.9339	0.0420	0.0249
Salt Lake	60.9372	456.8620	1027.9942	220.0804	13.1044	2423.4196	159.0336	104.0503
San Juan	0.0606	0.7035	1.7607	0.2952	0.0094	4.4084	0.1989	0.1176
Sanpete	0.1141	1.3244	3.3127	0.5557	0.0177	8.2927	0.3735	0.2213
Sevier	0.1125	1.3043	3.2630	0.5486	0.0174	8.1685	0.3682	0.2181
Summit	0.2806	3.2476	8.1150	1.3627	0.0436	20.3013	0.9166	0.5435
Tooele	0.1841	2.1401	5.3439	0.8951	0.0285	13.3711	0.6020	0.3568
Uintah	0.1547	1.7941	4.4866	0.7529	0.0240	11.2292	0.5061	0.2999
Utah	2.6340	28.8878	71.2984	12.3376	0.4205	177.2768	8.3766	5.0283
Wasatch	0.0890	1.0328	2.5842	0.4337	0.0138	6.4696	0.2916	0.1726
Washington	0.5933	6.8198	17.0664	2.8665	0.0924	42.5928	1.9306	1.1468
Wayne	0.0187	0.2173	0.5440	0.0911	0.0029	1.3624	0.0613	0.0363
Weber	1.2923	14.6240	36.3974	6.1795	0.2031	90.9259	4.1736	2.4877
Sum	69.7307	553.4011	1257.7719	261.6194	14.4917	2933.4716	187.2175	120.9205
TV (A)	66.93771	533.97587	1214.61899	252.04103	13.83501	2830.39848	180.21057	116.25778
Fj	0.9599	0.9649	0.9657	0.9634	0.9547	0.9649	0.9626	0.9614

Table F-3-5: Continued

County	Garfield	Grand	Iron	Juab	Kane	Millard	Morgan	Piute
Beaver	0.0338	0.0720	0.3051	0.0473	0.0427	0.0795	0.0348	0.0051
Box Elder	0.2729	0.5816	2.4654	0.3822	0.3445	0.6424	0.2816	0.0414
Cache	0.6353	1.3508	5.6933	0.8889	0.8016	1.4915	0.6556	0.0968
Carbon	0.1276	0.2722	1.1534	0.1787	0.1611	0.3007	0.1316	0.0193
Daggett	0.0070	0.0149	0.0631	0.0098	0.0088	0.0164	0.0072	0.0011
Davis	1.5692	3.3143	13.7916	2.1893	1.9761	3.6562	1.6188	0.2418
Duchesne	0.0910	0.1943	0.8230	0.1276	0.1150	0.2148	0.0940	0.0138
Emery	0.0587	0.1253	0.5303	0.0823	0.0741	0.1384	0.0606	0.0089
Garfield	0.0000	0.0726	0.3077	0.0477	0.0430	0.0802	0.0351	0.0052
Grand	0.0641	0.0000	0.5789	0.0901	0.0810	0.1510	0.0662	0.0097
Iron	0.2207	0.4704	0.0000	0.3091	0.2787	0.5197	0.2277	0.0335
Juab	0.0451	0.0965	0.4074	0.0000	0.0569	0.1062	0.0466	0.0068
Kane	0.0414	0.0883	0.3737	0.0580	0.0000	0.0974	0.0427	0.0063
Millard	0.0696	0.1487	0.6298	0.0976	0.0880	0.0000	0.0719	0.0105
Morgan	0.0349	0.0746	0.3156	0.0490	0.0441	0.0823	0.0000	0.0053
Piute	0.0069	0.0147	0.0624	0.0097	0.0087	0.0162	0.0071	0.0000
Rich	0.0130	0.0277	0.1172	0.0182	0.0164	0.0305	0.0134	0.0020
Salt Lake	61.4219	113.3128	372.4025	80.6793	74.1876	122.8215	63.0082	12.9615
San Juan	0.0612	0.1307	0.5539	0.0858	0.0774	0.1446	0.0632	0.0093
Sanpete	0.1152	0.2459	1.0429	0.1615	0.1456	0.2717	0.1189	0.0175
Sevier	0.1136	0.2423	1.0271	0.1591	0.1434	0.2678	0.1172	0.0172
Summit	0.2833	0.6038	2.5596	0.3968	0.3577	0.6670	0.2924	0.0430
Tooele	0.1859	0.3964	1.6822	0.2605	0.2348	0.4380	0.1918	0.0282
Uintah	0.1562	0.3332	1.4128	0.2188	0.1973	0.3681	0.1612	0.0237
Utah	2.6593	5.5732	22.8436	3.6976	3.3412	6.1414	2.7423	0.4152
Wasatch	0.0899	0.1918	0.8130	0.1260	0.1135	0.2120	0.0928	0.0136
Washington	0.5991	1.2737	5.3726	0.8381	0.7560	1.4066	0.6179	0.0912
Wayne	0.0189	0.0404	0.1710	0.0265	0.0239	0.0446	0.0195	0.0029
Weber	1.3049	2.7612	11.5317	1.8220	1.6441	3.0468	1.3463	0.2004
Sum	70.3005	132.0240	449.0309	93.0573	85.3633	143.4535	72.1665	14.3310
TV (A)	67.48626	126.96386	433.10639	89.40363	81.99164	137.98654	69.28277	13.68088
Fj	0.9600	0.9617	0.9645	0.9607	0.9605	0.9619	0.9600	0.9546

Table F-3-5: Continued

County	Rich	Salt Lake	San Juan	Sanpete	Sevier	Summit	Tooele	Uintah
Beaver	0.0107	55.3332	0.0682	0.1441	0.1418	0.4045	0.2506	0.2054
Box Elder	0.0866	445.5289	0.5512	1.1649	1.1453	3.2667	2.0290	1.6599
Cache	0.2023	1025.7169	1.2804	2.6982	2.6534	7.5422	4.6848	3.8403
Carbon	0.0404	208.9140	0.2581	0.5456	0.5377	1.5299	0.9475	0.7776
Daggett	0.0022	11.4477	0.0141	0.0298	0.0293	0.0837	0.0518	0.0425
Davis	0.5037	2454.3781	3.1430	6.5782	6.4704	18.2324	11.3645	9.3334
Duchesne	0.0289	149.1753	0.1845	0.3891	0.3829	1.0917	0.6762	0.5547
Emery	0.0186	96.1733	0.1186	0.2506	0.2466	0.7034	0.4357	0.3573
Garfield	0.0108	55.8133	0.0688	0.1454	0.1430	0.4080	0.2527	0.2072
Grand	0.0203	104.9712	0.1295	0.2736	0.2692	0.7678	0.4756	0.3900
Iron	0.0700	360.6273	0.4459	0.9427	0.9268	2.6462	1.6392	1.3435
Juab	0.0143	73.8893	0.0911	0.1925	0.1894	0.5403	0.3347	0.2744
Kane	0.0131	67.7846	0.0836	0.1766	0.1737	0.4956	0.3070	0.2517
Millard	0.0221	114.1785	0.1410	0.2977	0.2929	0.8352	0.5174	0.4243
Morgan	0.0111	57.2681	0.0706	0.1491	0.1467	0.4187	0.2593	0.2126
Piute	0.0022	11.3180	0.0139	0.0295	0.0290	0.0827	0.0512	0.0420
Rich	0.0000	21.2772	0.0262	0.0554	0.0545	0.1555	0.0963	0.0789
Salt Lake	24.0300	0.0000	108.4837	199.4752	196.7566	473.9254	315.7022	267.3000
San Juan	0.0194	100.4199	0.0000	0.2618	0.2577	0.7346	0.4550	0.3732
Sanpete	0.0365	188.8686	0.2331	0.0000	0.4848	1.3835	0.8566	0.7038
Sevier	0.0360	186.0392	0.2298	0.4856	0.0000	1.3621	0.8437	0.6922
Summit	0.0900	462.0923	0.5724	1.2099	1.1892	0.0000	2.1018	1.7242
Tooele	0.0590	304.4524	0.3757	0.7945	0.7811	2.2298	0.0000	1.1323
Uintah	0.0495	255.7123	0.3158	0.6690	0.6569	1.8744	1.1604	0.0000
Utah	0.8614	4001.3070	5.2881	10.9787	10.8009	30.1220	18.8571	15.5192
Wasatch	0.0285	147.3590	0.1819	0.3844	0.3786	1.0785	0.6679	0.5480
Washington	0.1906	968.1881	1.2075	2.5449	2.5029	7.1147	4.4190	3.6222
Wayne	0.0060	31.0383	0.0382	0.0808	0.0795	0.2268	0.1405	0.1152
Weber	0.4179	2059.7066	2.6181	5.4903	5.4001	15.2543	9.4982	7.7969
Sum	26.8821	14018.9786	126.2330	236.4381	233.1208	574.5105	379.0761	319.5229
TV (A)	25.72836	14475.66701	121.37996	227.72498	224.52208	554.37889	365.50626	307.96962
Fj	0.9571	1.0326	0.9616	0.9631	0.9631	0.9650	0.9642	0.9638

Table F-3-5: Continued

County	Utah	Wasatch	Washington	Wayne	Weber	Sum	Target Value (TV) (P)	Fi
Beaver	4.0108	0.1076	0.9111	0.0167	2.0256	68.3787	66.72401	0.9758
Box Elder	32.3085	0.8697	7.3469	0.1354	16.3262	547.8602	534.41370	0.9755
Cache	74.4569	2.0170	16.9860	0.3160	37.6536	1251.0510	1219.64116	0.9749
Carbon	15.1459	0.4077	3.4413	0.0633	7.6506	257.7116	251.44253	0.9757
Daggett	0.8297	0.0222	0.1884	0.0035	0.4190	14.1516	13.80954	0.9758
Davis	178.6866	4.9306	40.8058	0.7846	90.4881	2932.1619	2854.07966	0.9734
Duchesne	10.8139	0.2908	2.4565	0.0451	5.4622	184.1540	179.68378	0.9757
Emery	6.9714	0.1872	1.5835	0.0291	3.5210	118.7963	115.91783	0.9758
Garfield	4.0456	0.1085	0.9189	0.0169	2.0431	68.9711	67.30205	0.9758
Grand	7.6093	0.2043	1.7284	0.0318	3.8432	129.6516	126.50914	0.9758
Iron	26.1504	0.7036	5.9467	0.1095	13.2115	443.9794	433.11832	0.9755
Juab	5.3558	0.1438	1.2165	0.0223	2.7050	91.2925	89.08201	0.9758
Kane	4.9134	0.1319	1.1162	0.0205	2.4815	83.7552	81.72763	0.9758
Millard	8.2766	0.2224	1.8802	0.0345	4.1803	141.0089	137.59020	0.9758
Morgan	4.1507	0.1114	0.9426	0.0173	2.0965	70.7678	69.05517	0.9758
Piute	0.8203	0.0220	0.1863	0.0034	0.4143	13.9914	13.65325	0.9758
Rich	1.5421	0.0413	0.3501	0.0064	0.7789	26.3010	25.66509	0.9758
Salt Lake	3936.3333	157.1007	971.0078	34.7243	2038.4302	14089.5466	14682.13720	1.0421
San Juan	7.2793	0.1956	1.6537	0.0304	3.6766	124.0379	121.03206	0.9758
Sanpete	13.6922	0.3680	3.1111	0.0572	6.9161	233.0426	227.37772	0.9757
Sevier	13.4872	0.3630	3.0646	0.0563	6.8125	229.5606	223.98100	0.9757
Summit	33.5120	0.9031	7.6197	0.1407	16.9332	568.1028	554.15087	0.9754
Tooele	22.0735	0.5930	5.0179	0.0922	11.1522	375.0928	365.93564	0.9756
Uintah	18.5395	0.4986	4.2130	0.0775	9.3656	315.2512	307.56925	0.9756
Utah	0.0000	8.2548	67.0145	1.3378	147.9633	4671.9785	4538.71438	0.9715
Wasatch	10.6821	0.0000	2.4265	0.0446	5.3956	181.9155	177.49988	0.9757
Washington	70.2798	1.9020	0.0000	0.2979	35.5359	1181.8693	1152.26536	0.9750
Wayne	2.2497	0.0603	0.5109	0.0000	1.1361	38.3641	37.43640	0.9758
Weber	149.8180	4.1121	34.1922	0.6515	0.0000	2474.8974	2410.08133	0.9738
Sum	4664.0346	184.8733	1187.8373	39.1667	2478.6179	30927.6433	30927.64330	
TV (A)	4491.67217	177.94819	1147.06595	37.53275	2392.41683	30777.69		
Fj	0.9630	0.9625	0.9657	0.9583	0.9652			

Appendix G: Information of ATR Station in Utah

Table G-1-1: Information About Currently Operating Permanent Traffic Stations

ATR Station Number	Description	Type of Data	Collecting Method
427	SR-10, 1 mile North of SR-155, Huntington	Class	Loops
512	SR-35, 0.7 mile East of Summit County Line, Woodland	Class	Loops
301	I-80, 1 mile East of I-215, Parleys Canyon	Length	Loops
303	US-91, 1.5 miles North of SR 61, Webster Jct.	Length	Loops
304	US-89, 0.6 mile North of SR 30, Garden City	Length	Loops
305	SR-24, 0.1 mile North of SR 118, Sigurd	Length	Loops
306	I-15, 2 miles North of Center Street Int., Provo	Length	Loops
307	I-84, 0.5 mile East of West Mr. Green Int., Mt. Green	Length	Loops
308	US-40, 1 mile East of POE, Daniels Canyon	Length	Loops
309	I-80, 1 mile East of Echo Jct., Echo	Length	Loops
310	I-15, 3 miles South of Plymouth Int., Plymouth	Length	Loops
313	I-15, 1 mile South of Scipio Int., Scipio	Length	Loops
314	US-6, 2 miles West of US-191, Helper	Length	Loops
315	I-15, 1.8 miles South of Lagoon Drive Int., Farmington	Length	Loops
316	US-89, 2 miles South of SR 193, Hillfield Road, Layton	Length	Loops
317	SR-210, Mouth of Little Cottonwood Canyon, SLC	Length	Loops
318	I-80, 1 mile West of Coalville Int., Coalville	Length	Loops
320	SR-39, 0.5 mile West of SR 158, Ogden Canyon	Length	Loops
321	US-6, 0.25 mile West of SR 68, Elberta Jct.	Length	Loops
322	SR-190, Mouth of Big Cottonwood Canyon, SLC	Length	Loops
323	I-80, 1 mile West of Delle Interchange, Delle	Length	Loops
324	US-491 9 miles East of US-191, Monticello	Length	Loops
335	SR-173, 950 West 5400 South	Length	Loops
340	I-80, 1325 West, SLC	Length	Loops
349	I-15, 2 miles North of Santaquin Int., Santaquin	Length	Loops
350	US-189, 3710 North University Avenue, Provo	Length	Loops
351	I-215, 700 West, SLC	Length	Loops
353	I-215, 2800 South, SLC	Length	Loops
362	US-89, 0.2 mile West of SR 30, Garden City	Length	Loops
363	US-91, 0.8 mile North of SR 101, Wellsville	Length	Loops
382	SR-14, 1.7 miles East of SR-130, Cedar City	Length	Loops
400	I-15, 1 mile South of Bloomington Int., Bloomington	Length	Loops
401	I-15, 1 mile South of Leeds Int., Leeds	Length	Loops
402	SR-9, 1.3 miles West of SR 318, Hurricane	Length	Loops
403	I-15, 0.5 mile North of North Beaver Int., Beaver	Length	Loops

Table A7-1 Continued

ATR Station Number	Description	Type of Data	Collecting Method
404	I-70, 1 mile West of US-6 Int., Green River	Length	Loops
405	SR-21, 3 miles West of Main Street, Beaver	Length	Loops
407	SR-68, 2 miles North of Utah County Line, Bluffdale	Length	Loops
408	SR-68, 1200 South Redwood Road, SLC	Length	Loops
411	US-89, 10 miles East of Kanab, Kanab	Length	Loops
412	SR-11, 2 miles South of Kanab, Kanab	Length	Loops
414	SR-95, 0.2 mile South of SR 24, Hanksville	Length	Loops
415	US-89, 1 mile North of Marysvale, Marysvale	Length	Loops
416	US-89, 5.5 miles South of US-6, Birdseye	Length	Loops
418	US-6, 0.7 mile North of I-70, Green River	Length	Loops
420	US-191, 6 miles North of US-491, Monticello	Length	Loops
421	US-191, 0.2 mile North of SR-279, Moab	Length	Loops
424	US-191, 3.5 miles North of US-40, Vernal	Length	Loops
425	US-40, 3 miles West of SR-121, Roosevelt	Length	Loops
430	SR-30, 6.01 miles East of SR-42, Curlew Jct.	Length	Loops
431	SR-28, 1.5 miles South of SR-78, Levan	Length	Loops
502	I-15, 0.5 mile South of South Nephi Int., Nephi	Length	Loops
503	US-89, 0.5 mile South of US-50, Salina	Length	Loops
504	US-89, 1 mile South of Circleville, Circleville	Length	Loops
506	US-191, 1.2 miles West of US-163, Bluff	Length	Loops
507	US-6, 1 mile North of SR-55 Int., Price	Length	Loops
508	I-70, 1.5 miles NorTheast of West Richfield Int., Richfield	Length	Loops
509	US-40, 0.5 mile West of SR-32, Heber/Midway	Length	Loops
510	SR-218, 100 North 319 West, Smithfield	Length	Loops
511	SR-237, 800 East 2416 North, North Logan	Length	Loops
513	I-15, 1 mile North of South Parowan Int., Parowan	Length	Loops
601	SR-92, American Fork Canyon West Toll Booth	Length	Loops
606	SR-248, 0.5 mile West of US-40, Park City	Length	Loops
609	SR-167, 1.2 miles East of Mountain Greet Int.	Length	Loops
612	I-15, North of SR-126., Layton	Length	Loops
613	I-15, 2 miles South of South Brigham Int.	Length	Loops
616	I-15, 0.7 mile North of I-215 on-ramp, Woods Cross	Length	Loops
617	I-215, 5800 South Knudsen's Corner	Length	Loops
618	SR-73, West of SR-68 Redwood Road, Lehi	Length	Loops
619	SR-201, 6174 West, SLC	Length	Loops
621	I-15, 0.43 mile South of Washington City Int., St. George	Length	Loops

Table A7-1 Continued

ATR Station Number	Description	Type of Data	Collecting Method
704	Federal Route 3196, 2250 East Redcliff Drive, St. George	Length	Loops
611	I-15, 1 mile South of SR-77 Springville Int., Springville	Length	Microwave
614	I-84, 3.2 miles West of Bothwell Int., Bothwell	Length	Microwave
615	I-80, 0.5 mile East of SR-36 Mills Jct., Tooele	Length	Microwave
319	US-189, 1 mile West of SR 92, Provo Canyon	Volume	Loops
325	US-89, 1087 South State Street, SLC	Volume	Loops
327	US-6, 0.2 mile West of Center Street, Spanish Fork	Volume	Loops
329	US-89, 3450 South Washington Blvd., So Ogden	Volume	Loops
332	SR-186, 950 South Foothill Blvd., SLC	Volume	Loops
333	SR-71, 1190 South 700 East, SLC	Volume	Loops
354	SR-171, 3300 South 1176 West, SLC	Volume	Loops
355	SR-171, 3500 South 7658 West, Magna	Volume	Loops
406	SR-71, 4550 South 700 East, SLC	Volume	Loops
409	SR-186, 1200 West North Temple	Volume	Loops
602	SR-92, American Fork Canyon East Toll Booth	Volume	Loops
605	SR-224, 0.1 mile North of Canyons Resort Drive, Park City	Volume	Loops
620	SR-30 West of 600 West, Logan	Volume	Loops
703	SR-8, 1313 West Sunset Blvd., St. George	Volume	Loops
711	SR-154, 2500 South Bangerter Hwy, SLC	Volume	Loops

Appendix H: Data for Traffic Assignment

H-1 Commodity Flow by Truck and by Industry Crossing Utah Boundary

H-1-1 Commodity Flow Between Utah and the Other States

Table H-1-1: Commodity Flow From Utah to Other States (Total - All Modes) (Production)

State of Origin	State of Destination	Mode of transportation (1)	Value		Tons		Ton-miles (2)		Average miles per shipment
			2002 (million $)	Percent of total	2002 (thousands)	Percent of total	2002 (millions)	Percent of total	
Utah	Total	All modes	61,515	100.0	109,672	100.0	38,046	100.0	823
Utah	Alabama	All modes	167	100.0	S	S	S	S	1,883
Utah	Alaska	All modes	S	S	S	S	S	S	1,268
Utah	Arizona	All modes	1,504	100.0	2,209	100.0	1,295	100.0	663
Utah	Arkansas	All modes	146	100.0	50	100.0	76	100.0	1,483
Utah	California	All modes	8,698	100.0	11,497	100.0	9,647	100.0	747
Utah	Colorado	All modes	3,117	100.0	3,270	100.0	1,593	100.0	442
Utah	Connecticut	All modes	215	100.0	18	100.0	41	100.0	2,284
Utah	Delaware	All modes	22	100.0	S	S	S	S	2,200
Utah	District of Columbia	All modes	23	100.0	S	S	S	S	2,095
Utah	Florida	All modes	1,048	100.0	154	100.0	368	100.0	2,377
Utah	Georgia	All modes	538	100.0	149	100.0	303	100.0	1,944
Utah	Hawaii	All modes	48	100.0	10	100.0	31	100.0	3,353
Utah	Idaho	All modes	2,530	100.0	6,044	100.0	1,825	100.0	289
Utah	Illinois	All modes	1,103	100.0	S	S	S	S	1,414
Utah	Indiana	All modes	1,058	100.0	S	S	S	S	1,523
Utah	Iowa	All modes	147	100.0	S	S	S	S	1,158
Utah	Kansas	All modes	330	100.0	S	S	S	S	1,119
Utah	Kentucky	All modes	S	S	S	S	S	S	1,671
Utah	Louisiana	All modes	89	100.0	S	S	S	S	1,700
Utah	Maine	All modes	23	100.0	S	S	S	S	2,510
Utah	Maryland	All modes	346	100.0	S	S	S	S	2,113
Utah	Massachusetts	All modes	177	100.0	11	100.0	25	100.0	2,179
Utah	Michigan	All modes	731	100.0	101	100.0	169	100.0	1,674
Utah	Minnesota	All modes	302	100.0	S	S	S	S	1,169
Utah	Mississippi	All modes	38	100.0	S	S	S	S	1,723
Utah	Missouri	All modes	241	100.0	639	100.0	844	100.0	1,258
Utah	Nebraska	All modes	151	100.0	229	100.0	165	100.0	881
Utah	Nevada	All modes	1,667	100.0	5,659	100.0	2,251	100.0	382
Utah	New Hampshire	All modes	81	100.0	S	S	S	S	2,359
Utah	New Jersey	All modes	279	100.0	45	100.0	100	100.0	2,207
Utah	New Mexico	All modes	507	100.0	S	S	S	S	630
Utah	New York	All modes	521	100.0	S	S	S	S	2,183
Utah	North Carolina	All modes	264	100.0	94	100.0	196	100.0	2,093
Utah	North Dakota	All modes	40	100.0	S	S	S	S	1,072
Utah	Ohio	All modes	597	100.0	S	S	S	S	1,742
Utah	Oklahoma	All modes	298	100.0	206	100.0	281	100.0	1,403
Utah	Oregon	All modes	994	100.0	947	100.0	741	100.0	785
Utah	Pennsylvania	All modes	469	100.0	93	100.0	190	100.0	2,053
Utah	Rhode Island	All modes	21	100.0	S	S	S	S	2,161
Utah	South Carolina	All modes	315	100.0	58	100.0	118	100.0	2,080
Utah	South Dakota	All modes	67	100.0	145	100.0	134	100.0	927
Utah	Tennessee	All modes	299	100.0	S	S	S	S	1,736
Utah	Texas	All modes	1,356	100.0	1,302	100.0	1,935	100.0	1,181
Utah	**Utah**	**All modes**	**25,803**	**100.0**	**61,626**	**100.0**	**2,822**	**100.0**	**36**
Utah	Vermont	All modes	S	S	S	S	S	S	2,117
Utah	Virginia	All modes	356	100.0	74	100.0	150	100.0	2,125
Utah	Washington	All modes	1,384	100.0	2,770	100.0	2,651	100.0	853
Utah	West Virginia	All modes	S	S	S	S	S	S	1,930
Utah	Wisconsin	All modes	165	100.0	S	S	S	S	1,448
Utah	Wyoming	All modes	1,287	100.0	5,699	100.0	1,183	100.0	330

Table H-1-2: Commodity Flow From Other States to Utah (Total- All Modes) (Attraction)

State of Destination	State of Origin	Mode of transportation (1)	Value		Tons		Ton-miles (2)		Average miles per shipment
			2002 (million $)	Percent of total	2002 (thousands)	Percent of total	2002 (millions)	Percent of total	
Utah	Total	All modes	62,354	100.0	81,952	100.0	20,439	100.0	819
Utah	Alaska	All modes	S	S	S	S	S	S	1,533
Utah	Arizona	All modes	678	100.0	234	100.0	151	100.0	597
Utah	Arkansas	All modes	S	S	102	100.0	140	100.0	1,417
Utah	California	All modes	8,125	100.0	2,780	100.0	1,957	100.0	1,085
Utah	Colorado	All modes	3,081	100.0	2,160	100.0	1,078	100.0	504
Utah	Connecticut	All modes	296	100.0	S	S	S	S	2,269
Utah	Delaware	All modes	S	S	S	S	S	S	2,162
Utah	District of Columbia	All modes	—	100.0	S	S	S	S	2,097
Utah	Florida	All modes	384	100.0	S	S	S	S	2,423
Utah	Georgia	All modes	369	100.0	S	S	S	S	1,933
Utah	Hawaii	All modes	S	S	S	S	S	S	3,513
Utah	Idaho	All modes	1,199	100.0	1,521	100.0	459	100.0	317
Utah	Illinois	All modes	936	100.0	332	100.0	467	100.0	1,441
Utah	Indiana	All modes	755	100.0	138	100.0	216	100.0	1,501
Utah	Iowa	All modes	208	100.0	98	100.0	121	100.0	1,132
Utah	Kansas	All modes	641	100.0	94	100.0	102	100.0	1,312
Utah	Kentucky	All modes	473	100.0	133	100.0	214	100.0	1,627
Utah	Louisiana	All modes	110	100.0	S	S	S	S	1,759
Utah	Maine	All modes	35	100.0	S	S	S	S	2,469
Utah	Maryland	All modes	68	100.0	S	100.0	10	100.0	2,059
Utah	Massachusetts	All modes	258	100.0	34	100.0	57	100.0	2,375
Utah	Michigan	All modes	765	100.0	118	100.0	200	100.0	1,674
Utah	Minnesota	All modes	789	100.0	202	100.0	266	100.0	1,310
Utah	Mississippi	All modes	307	100.0	94	100.0	160	100.0	1,750
Utah	Missouri	All modes	S	S	564	100.0	667	100.0	1,249
Utah	Montana	All modes	195	100.0	565	100.0	361	100.0	595
Utah	Nebraska	All modes	263	100.0	317	100.0	310	100.0	874
Utah	Nevada	All modes	1,159	100.0	883	100.0	S	S	479
Utah	New Hampshire	All modes	72	100.0	S	100.0	12	100.0	2,376
Utah	New Jersey	All modes	S	S	143	100.0	311	100.0	2,163
Utah	New Mexico	All modes	S	S	38	100.0	30	100.0	670
Utah	New York	All modes	707	100.0	S	S	S	S	2,136
Utah	North Carolina	All modes	595	100.0	119	100.0	249	100.0	2,106
Utah	North Dakota	All modes	22	100.0	S	S	S	S	1,161
Utah	Ohio	All modes	1,059	100.0	266	100.0	466	100.0	1,757
Utah	Oklahoma	All modes	296	100.0	110	100.0	131	100.0	1,392
Utah	Oregon	All modes	1,479	100.0	715	100.0	622	100.0	870
Utah	Pennsylvania	All modes	433	100.0	S	S	S	S	2,045
Utah	Rhode Island	All modes	S	S	S	S	S	S	2,362
Utah	South Carolina	All modes	458	100.0	78	100.0	161	100.0	2,064
Utah	South Dakota	All modes	S	S	S	S	S	S	1,009
Utah	Tennessee	All modes	805	100.0	144	100.0	238	100.0	1,657
Utah	Texas	All modes	1,794	100.0	770	100.0	1,078	100.0	1,412
Utah	Utah	All modes	25,803	100.0	61,626	100.0	2,822	100.0	36
Utah	Vermont	All modes	23	100.0	S	S	S	S	2,329
Utah	Virginia	All modes	288	100.0	45	100.0	92	100.0	2,144
Utah	Washington	All modes	753	100.0	556	100.0	490	100.0	899
Utah	West Virginia	All modes	S	S	16	100.0	30	100.0	1,912
Utah	Wisconsin	All modes	1,232	100.0	232	100.0	350	100.0	1,339
Utah	Wyoming	All modes	375	100.0	5,082	100.0	S	S	319

H-1-2 Commodity Flow by Transportation Mode From Utah

Table H-1-3: Commodity Flow by Transportation Mode From Utah to Other States (Production)

State of Origin	State of Destination	Mode of transportation (1)	Value		Tons		Ton–miles (2)		Average miles per shipment
			2002 (million $)	Percent of total	2002 (thousands)	Percent of total	2002 (millions)	Percent of total	
Utah	Total	All modes	61,515	100.0	109,672	100.0	38,046	100.0	823
Utah	Total	Single modes	51,301	83.4	99,372	90.6	36,517	96.0	329
Utah	Total	Truck	45,211	73.5	72,361	66.0	17,857	46.9	192
Utah	Total	For-hire truck	28,715	46.7	34,609	31.6	10,664	28.0	608
Utah	Total	Private truck	16,478	26.8	37,723	34.4	7,177	18.9	63
Utah	Total	Rail	3,366	5.5	21,829	19.9	17,995	47.3	995
Utah	Total	Water	—	—	—	—	—	—	—
Utah	Total	Shallow draft	—	—	—	—	—	—	—
Utah	Total	Great Lakes	—	—	—	—	—	—	—
Utah	Total	Deep draft	—	—	—	—	—	—	—
Utah	Total	Air (including truck and air)	1,659	2.7	5	5	5	5	2,027
Utah	Total	Pipeline (3)	1,044	1.7	5,020	4.6	5	5	5
Utah	Total	Multiple modes	8,458	13.7	980	0.9	944	2.5	1,241
Utah	Total	Parcel, USPS or courier	8,239	13.4	211	0.2	224	0.6	1,242
Utah	Total	Truck and rail	187	0.3	5	5	5	5	765
Utah	Total	Truck and water	28	—	9	—	10	—	3,190
Utah	Total	Rail and water	—	—	—	—	—	—	—
Utah	Total	Other multiple modes	5	5	5	5	5	5	9
Utah	Total	Other and unknown modes	1,756	2.9	9,320	8.5	585	1.5	164

Table H-1-4: Commodity Flow by Transportation Mode From Other States to Utah (Attraction)

State of Destination	State of Origin	Mode of transportation (1)	Value		Tons		Ton–miles (2)		Average miles per shipment
			2002 (million $)	Percent of total	2002 (thousands)	Percent of total	2002 (millions)	Percent of total	
Utah	Total	All modes	62354	100	81952	100	20439	100	819
Utah	Total	Single modes	50598	81.1	72285	88.2	19277	94.3	466
Utah	Total	Truck	45147	72.4	58581	71.5	12719	62.2	281
Utah	Total	For–hire truck	28207	45.2	30469	37.2	9791	47.9	856
Utah	Total	Private truck	16837	27	28067	34.2	2901	14.2	66
Utah	Total	Rail	3035	4.9	9606	11.7	6522	31.9	771
Utah	Total	Water	—	—	—	—	—	—	—
Utah	Total	Shallow draft	—	—	—	—	—	—	—
Utah	Total	Great Lakes	—	—	—	—	—	—	—
Utah	Total	Deep draft	—	—	—	—	—	—	—
Utah	Total	Air (including truck and air)	1436	2.3	12	—	24	0.1	2397
Utah	Total	Pipeline (3)	980	1.6	4086	5	S	S	S
Utah	Total	Multiple modes	9699	15.6	960	1.2	877	4.3	1211
Utah	Total	Parcel, USPS or courier	8648	13.9	173	0.2	187	0.9	1211
Utah	Total	Truck and Rail	1047	1.7	S	S	S	S	1025
Utah	Total	Truck and water	—	—	—	—	—	—	—
Utah	Total	Rail and water	—	—	—	—	—	—	—
Utah	Total	Other multiple modes	S	S	S	S	S	S	9
Utah	Total	Other and unknown modes	2058	3.3	8706	10.6	285	1.4	S

Table H-1-5: Commodity Flow by Transportation Within Utah (Within)

State of Origin	State of Destination	Mode of transportation (1)	Value		Tons		Ton-miles (2)		Average miles per shipment
			2002 (million $)	Percent of total	2002 (thousands)	Percent of total	2002 (millions)	Percent of total	
Utah	Utah	All modes	25,803	100.0	61,626	100.0	2,822	100.0	36
Utah	Utah	Single modes	23,311	90.3	52,937	85.9	2,689	95.3	29
Utah	Utah	Truck	20,747	80.4	46,630	75.7	2,352	83.4	29
Utah	Utah	For-hire truck	8,764	34.0	21,247	34.5	1,037	36.7	61
Utah	Utah	Private truck	11,966	46.4	25,367	41.2	1,315	46.6	25
Utah	Utah	Rail	S	S	2,221	3.6	325	11.5	S
Utah	Utah	Water	–	–	–	–	–	–	–
Utah	Utah	Shallow draft	–	–	–	–	–	–	–
Utah	Utah	Great Lakes	–	–	–	–	–	–	–
Utah	Utah	Deep draft	–	–	–	–	–	–	–
Utah	Utah	Air (including truck and air)	S	S	S	S	S	S	280
Utah	Utah	Pipeline (3)	979	3.8	4,086	6.6	S	S	S
Utah	Utah	Multiple modes	1,177	4.6	S	S	S	S	88
Utah	Utah	Parcel, USPS or courier	1,146	4.4	30	–	2	–	85
Utah	Utah	Truck and rail	S	S	S	S	S	S	418
Utah	Utah	Truck and water	–	–	–	–	–	–	–
Utah	Utah	Rail and water	–	–	–	–	–	–	–
Utah	Utah	Other multiple modes	S	S	S	S	S	S	9
Utah	Utah	Other and unknown modes	1,315	5.1	8,517	13.8	104	3.7	S

H-1-3 Commodity Flow by Truck From Utah

Table H-1-6: Commodity Flow by Truck From Utah to Other States (Production)

State of Origin	State of Destination	Mode of transportation (1)	Value		Tons		Ton-miles (2)		Average miles per shipment
			2002 (million $)	Percent of total	2002 (thousands)	Percent of total	2002 (millions)	Percent of total	
Utah	Total	Truck	45,233	73.5	72,361	66.0	17,857	46.9	192
Utah	Alabama	Truck	93	55.9	5	5	5	5	1,868
Utah	Alaska	Truck	5	5	5	5	5	5	887
Utah	Arizona	Truck	1,317	87.5	2,204	99.7	1,291	99.7	586
Utah	Arkansas	Truck	87	59.6	37	75.1	55	72.1	1,447
Utah	California	Truck	6,751	77.6	4,336	37.7	3,082	31.9	709
Utah	Colorado	Truck	2,606	83.6	2,237	68.4	959	60.2	437
Utah	Connecticut	Truck	5	5	15	81.9	34	81.7	2,282
Utah	Delaware	Truck	5	5	5	5	5	5	2,141
Utah	District of Columbia	Truck	—	—	—	—	—	—	—
Utah	Florida	Truck	599	56.7	143	93.4	342	93.1	2,385
Utah	Georgia	Truck	137	25.4	87	58.1	172	56.6	1,942
Utah	Hawaii	Truck	—	—	—	—	—	—	—
Utah	Idaho.	Truck	1,862	73.6	1,794	62.8	1,036	56.8	245
Utah	Illinois	Truck	5	5	185	27.7	258	25.9	1,383
Utah	Indiana	Truck	472	44.6	5	5	5	5	1,524
Utah	Iowa	Truck	80	54.3	178	37.0	195	33.5	1,120
Utah	Kansas	Truck	82	24.7	5	5	5	5	1,078
Utah	Kentucky	Truck	5	5	5	5	5	5	1,397
Utah	Louisiana.	Truck	5	5	5	5	5	5	1,596
Utah	Maine.	Truck	8	36.6	5	5	5	5	2,568
Utah	Maryland	Truck	5	5	5	5	5	5	2,090
Utah	Massachusetts.	Truck	10	5.7	8	74.7	19	74.7	2,337
Utah	Michigan	Truck	256	35.1	59	58.8	97	57.3	1,644
Utah	Minnesota.	Truck	90	29.7	146	24.3	179	21.4	1,311
Utah	Mississippi.	Truck	18	47.5	40	42.5	67	39.2	1,703
Utah	Missouri	Truck	125	51.9	5	5	5	5	1,248
Utah	Montana	Truck	712	77.1	634	89.3	412	87.6	562
Utah	Nebraska	Truck	120	79.3	140	61.2	95	57.8	758
Utah	Nevada	Truck	1,372	82.3	2,494	44.1	768	34.1	332
Utah	New Hampshire.	Truck	5	5	5	5	5	5	2,374
Utah	New Jersey	Truck	152	54.5	40	88.8	89	88.4	2,180
Utah	New Mexico	Truck	406	80.0	5	5	5	5	565
Utah	New York	Truck	233	43.2	5	5	5	5	2,092
Utah	North Carolina	Truck	88	33.3	5	5	5	5	2,115
Utah	North Dakota	Truck	22	54.5	5	5	5	5	1,080
Utah	Ohio	Truck	371	62.2	225	49.9	387	48.8	1,715
Utah	Oklahoma	Truck	236	79.3	160	77.7	189	72.6	1,236
Utah	Oregon	Truck	841	84.6	501	53.0	378	51.1	758
Utah	Pennsylvania	Truck	213	45.4	82	88.4	167	88.0	1,985
Utah	Rhode Island	Truck	5	5	5	5	5	5	2,364
Utah	South Carolina	Truck	159	47.5	55	95.1	112	95.1	2,071
Utah	South Dakota	Truck	46	68.4	144	99.4	134	99.4	937
Utah	Tennessee.	Truck	106	35.6	51	38.5	87	34.1	1,665
Utah	Texas.	Truck	773	57.0	844	64.8	1,178	60.9	1,332
Utah	**Utah**	**Truck**	**20,747**	**80.4**	**46,650**	**75.7**	**2,352**	**83.4**	**29**
Utah	Vermont	Truck	5	5	5	5	5	5	2,292
Utah	Virginia	Truck	113	31.9	67	90.9	135	90.2	2,126
Utah	Washington	Truck	1,082	78.2	960	34.6	784	29.6	827
Utah	West Virginia.	Truck	5	5	5	5	5	5	1,891
Utah	Wisconsin.	Truck	99	59.9	5	5	5	5	1,427
Utah	Wyoming	Truck	1,109	86.2	4,236	74.3	928	78.4	227

Table H-1-7: Commodity Flow by Truck From Other States to Utah (Attraction)

State of Destination	State of Origin	Mode of transportation (1)	Value		Tons		Ton-miles (2)		Average miles per shipment
			2002 (million $)	Percent of total	2002 (thousands)	Percent of total	2002 (millions)	Percent of total	
Utah	Total	Truck	45,147	72.4	58,581	71.5	12,719	62.2	281
Utah	Alaska	Truck	S	S	S	S	S	S	1,484
Utah	Arizona	Truck	316	46.6	225	96.1	143	94.3	658
Utah	Arkansas	Truck	S	S	101	99.3	139	99.3	1,338
Utah	California	Truck	5,196	63.9	2,377	85.5	1,635	83.5	692
Utah	Colorado	Truck	2,709	87.9	932	43.2	461	42.8	510
Utah	Connecticut	Truck	55	18.6	S	S	S	S	2,270
Utah	Delaware	Truck	S	S	S	S	S	S	2,162
Utah	District of Columbia	Truck	—	—	—	—	—	—	—
Utah	Florida	Truck	177	46.1	S	S	S	S	2,440
Utah	Georgia	Truck	288	78.0	S	S	S	S	1,893
Utah	Hawaii	Truck	—	—	—	—	—	—	—
Utah	Idaho	Truck	1,024	85.5	1,131	74.4	279	60.7	265
Utah	Illinois	Truck	663	70.8	308	92.2	423	90.6	1,387
Utah	Indiana	Truck	S	S	80	57.6	124	57.4	1,554
Utah	Iowa	Truck	187	89.8	52	51.1	59	49.1	1,120
Utah	Kansas	Truck	S	S	81	85.7	86	84.5	1,076
Utah	Kentucky	Truck	453	95.7	132	99.5	213	99.5	1,632
Utah	Louisiana	Truck	64	57.5	S	S	S	S	1,736
Utah	Maine	Truck	S	S	S	S	S	S	2,534
Utah	Maryland	Truck	S	S	4	73.2	8	73.0	2,022
Utah	Massachusetts	Truck	106	41.0	11	46.1	27	46.5	2,361
Utah	Michigan	Truck	159	20.8	77	64.9	126	63.1	1,624
Utah	Minnesota	Truck	512	64.9	186	92.1	244	91.9	1,344
Utah	Mississippi	Truck	289	94.3	87	92.2	145	90.6	1,668
Utah	Missouri	Truck	S	S	S	S	637	95.6	1,136
Utah	Montana	Truck	177	90.7	528	93.5	332	91.8	603
Utah	Nebraska	Truck	198	75.3	97	30.6	84	27.1	927
Utah	Nevada	Truck	840	72.5	424	48.0	175	42.4	480
Utah	New Hampshire	Truck	11	15.8	4	74.1	9	73.0	2,355
Utah	New Jersey	Truck	413	27.6	138	96.6	301	96.6	2,220
Utah	New Mexico	Truck	S	S	37	99.0	30	99.2	701
Utah	New York	Truck	205	29.0	S	S	S	S	2,107
Utah	North Carolina	Truck	519	87.2	117	98.1	244	98.1	2,088
Utah	North Dakota	Truck	20	88.3	S	S	S	S	1,146
Utah	Ohio	Truck	737	69.6	256	96.0	445	95.5	1,722
Utah	Oklahoma	Truck	156	52.7	58	52.2	68	51.4	1,178
Utah	Oregon	Truck	387	39.7	405	56.6	298	48.0	791
Utah	Pennsylvania	Truck	328	75.4	124	37.8	251	37.0	2,018
Utah	Rhode Island	Truck	S	S	S	S	S	S	2,348
Utah	South Carolina	Truck	S	S	77	99.1	159	99.2	2,069
Utah	South Dakota	Truck	S	S	S	S	S	S	991
Utah	Tennessee	Truck	421	52.3	111	77.5	184	77.4	1,646
Utah	Texas	Truck	1,298	72.3	557	72.4	733	68.0	1,363
Utah	Utah	Truck	20,747	80.4	46,630	75.7	2,352	83.4	29
Utah	Vermont	Truck	14	59.2	S	S	S	S	2,353
Utah	Virginia	Truck	192	66.6	42	94.2	87	94.0	2,069
Utah	Washington	Truck	468	62.2	358	64.5	285	58.1	820
Utah	West Virginia	Truck	S	S	16	97.6	30	97.4	1,855
Utah	Wisconsin	Truck	771	62.6	199	85.9	291	83.3	1,454
Utah	Wyoming	Truck	264	70.3	1,424	28.0	S	S	351

H-1-4 Main Exit/Entrance From Google Map (Shortest Path Algorithm)

Table H-1-8: Main Exit/Entrance From Google Map (Shortest Path Algorithm)

State	North (Logan)	Center (SLC)	South (St. George)
Alaska	91	I-15	I-15
Arizona		89 / I-15 / 191 / 163	
Arkansas	30	I-80	59
California	30	I-15 / I-80	
Colorado	30	40 / I-70 / 491	
Connecticut	30	I-80	I-70
Delaware	30	I-80	I-70
District of Columbia	30	I-80	I-70
Florida	30	I-80	59
Georgia	30	I-80	59
Hawaii			
Idaho		I-84 / I-15 / 91	
Illinois	30	I-80	I-70
Indiana	30	I-80	I-70
Iowa	30	I-80	I-70
Kansas	30	I-80	I-70
Kentucky	30	I-80	I-70
Louisiana	30	491	59
Maine	30	I-80	I-70
Maryland	30	I-80	I-70
Massachusetts	30	I-80	I-70
Michigan	30	I-80	I-70
Minnesota	91	I-80	I-80
Mississippi	30	I-80	59
Missouri	30	I-80	I-70
Montana	91	I-15	I-15
Nebraska	30	I-80	I-70
Nevada		I-80 / 6 / I-15	
New Hampshire	30	I-80	I-70
New Jersey	30	I-80	I-70
New Mexico	491	491	I-70
New York	30	I-80	I-70
North Carolina	30	I-80	I-70
North Dakota	91	I-80	I-80
Ohio	30	I-80	I-70
Oklahoma	30	I-80	59
Oregon	I-84	I-84 / I-15 / 91	56
Pennsylvania	30	I-80	I-70
Rhode Island	30	I-80	I-70
South Carolina	30	I-80	59
South Dakota	30	I-80	I-70
Tennessee	30	I-80	I-70
Texas	491	491	59
Utah			
Vermont	30	I-80	I-70
Virginia	30	I-80	I-70
Washington	30	I-84	I-84
West Virginia	30	I-80	I-70
Wisconsin	30	I-80	I-70
Wyoming		I-80 / 89 / I-15	

H-1-5 Commodity Flow Using Main Entrances/Exits From Utah

Table H-1-9: Commodity Flow Using Main Entrances/Exits From Utah to Other States (Production)

State	Region	Exit	Commodity	State	Region	Exit	Commodity
Arizona		89	826.50	Nebraska	N	30	5.64
2204		I-15	826.50	140	C	I-80	122.55
		191	275.50		S	I-70	11.81
		163	275.50	Nevada		I-80	1122.30
Arkansas	N	30	1.49	2494		6	166.27
37	C	I-80	33.61			I-15	1122.30
	S	59	1.90			56	83.13
California	N	30	174.62	New Jersey	N	30	1.61
4336	C	I-15	2080.69	40	C	I-80	35.01
		I-80	2080.69		S	I-70	3.37
Colorado	N	30	90.09	Ohio	N	30	9.06
2237		40	805.09	225	C	I-80	196.96
		I-70	805.09		S	I-70	18.98
		491	536.73	Oklahoma	N	30	6.44
Conneticut	N	30	0.60	160	C-N	I-80	140.06
15	C	I-80	13.13		C-S	I-70	5.29
	S	I-70	1.27		S	59	8.21
Florida	N	30	5.76	Oregon	N	91	20.18
143	C-N	I-80	125.18	501	C-N	I-84	219.28
	C-S	I-70	4.73			I-15	219.28
	S	59	7.34		C-S	6	16.56
Georgia	N	30	3.50		S	56	25.70
87	C-N	I-80	76.16	Pennsylvania	N	30	3.30
	C-S	I-70	2.88	82	C	I-80	71.78
	S	59	4.46		S	I-70	6.92
Idaho		I-84	1820.60	South Carolina	N	30	2.21
3794		I-15	1820.60	55	C-N	I-80	48.14
		91	152.79		C-S	I-70	1.82
Illinois	N	30	7.45		S	59	2.82
185	C	I-80	161.94	South Dakota	N	30	5.80
	S	I-70	15.61	144	C	I-80	126.05
Iowa	N	30	7.17		S	I-70	12.15
178	C	I-80	155.81	Tennessee	N	30	2.05
	S	I-70	15.02	51	C	I-80	44.64
Massachusetts	N	30	0.32		S	I-70	4.30
8	C	I-80	7.00	Texas	N	491	33.99
	S	I-70	0.67	844	C	491	766.71
Michigan	N	30	2.38		S	59	43.30
59	C	I-80	51.65	Virginia	N	30	2.70
	S	I-70	4.98	67	C	I-80	58.65
Minnesota	N	91	5.88		S	I-70	5.65
146		I-80	140.12	Washington	N	30	38.66
Mississippi	N	30	1.61	960	C	I-84	872.09
40	C-N	I-80	35.01		S	I-84	49.25
	C-S	I-70	1.32	Wyoming		I-80	1588.50
	S	59	2.05	4236		I-15	1588.50
Montana	N	91	25.53			89	1059.00
634		I-15	608.47				

Table H-1-10: Commodity Flow Using Main Entrances/Exits From Other States to Utah (Attraction)

State	Region	Entrance	Commodity	State	Region	Entrance	Commodity
Arizona		89	84.38	Nevada		I-80	190.80
225		I-15	84.38	424		6	28.27
		191	28.13			I-15	190.80
		163	28.13			56	14.13
Arkansas	N	30	4.07	New Hampshire	N	30	0.16
101	C	I-80	91.75	4	C	I-80	3.50
	S	59	5.18		S	I-70	0.34
California	N	30	95.73	New Jersey	N	30	5.56
2,377	C	I-15	1,140.64	138	C	I-80	120.80
		I-80	1,140.64		S	I-70	11.64
Colorado	N	30	16.15	New Mexico		491	35.10
932		40	343.44	37	S	I-70	1.90
		I-70	343.44	North Carolina	N	30	4.71
		491	228.96	117	C	I-80	102.42
Idaho		I-84	542.73		S	I-70	9.87
1,131		I-15	542.73	Ohio	N	30	10.31
	N	91	45.55	256	C	I-80	224.09
Illinois	N	30	12.32		S	I-70	21.60
306	C	I-80	267.86	Oklahoma	N	30	2.34
	S	I-70	25.82	58	C-N	I-80	50.77
Indiana	N	30	3.22		C-S	I-70	1.92
80	C	I-80	70.03		S	59	2.98
	S	I-70	6.75	Oregon	N	91	16.31
Iowa	N	30	2.09	405	C-N	I-84	177.26
52	C	I-80	45.52			I-15	177.26
	S	I-70	4.39		C-S	6	13.39
Kansas	N	30	3.26		S	56	20.78
81	C	I-80	70.90	Pennsylvania	N	30	4.99
	S	I-70	6.83	124	C	I-80	108.54
Kentucky	N	30	5.32		S	I-70	10.46
132	C	I-80	115.55	South Carolina	N	30	3.10
	S	I-70	11.14	77	C-N	I-80	67.40
Maryland	N	30	0.16		C-S	I-70	2.55
4	C	I-80	3.50		S	59	3.95
	S	I-70	0.34	Tennessee	N	30	4.47
Massachusetts	N	30	0.44	111	C	I-80	97.17
11	C	I-80	9.63		S	I-70	9.36
	S	I-70	0.93	Texas	N	491	22.43
Michigan	N	30	3.10	557	C	491	505.99
77	C	I-80	67.40		S	59	28.58
	S	I-70	6.50	Virginia	N	30	1.69
Minnesota	N	91	7.49	42	C	I-80	36.77
186		I-80	178.51		S	I-70	3.54
Mississippi	N	30	3.50	Washington	N	30	14.42
87	C-N	I-80	76.16	358	C	I-84	325.22
	C-S	I-70	2.88		S	I-84	18.37
	S	59	4.46	West Virginia	N	30	0.64
Montana	N	91	21.26	16	C	I-80	14.01
528		I-15	506.74		S	I-70	1.35
Nebraska	N	30	3.91	Wisconsin	N	30	8.01
97	C	I-80	84.91	199	C	I-80	174.20
	S	I-70	8.18		S	I-70	16.79
				Wyoming		I-80	534.00
				1,424		I-15	534.00
						89	356.00

Table H-1-11: Exit/ Entrance of Commodity Flow by Direction From Outside Utah

Production			Attraction		
Direction	Route	Commodity	Direction	Route	Commodity
E	30	159.20	E	30	103.54
E	40	805.09	E	40	343.44
E	491	1337.43	E	491	792.49
E	I-70	921.86	E	I-70	508.50
E	I-80	3231.96	E	I-80	2615.38
N	89	1059.00	N	89	356.00
N	91	204.38	N	91	90.61
N	I-15	4236.85	N	I-15	1760.72
N	I-84	2961.22	N	I-84	1063.57
S	59	70.08	S	59	45.15
S	89	826.50	S	89	84.38
S	163	275.50	S	163	28.13
S	191	275.50	S	191	28.13
S	I-15	4029.49	S	I-15	1415.81
W	6	182.83	W	6	41.66
W	30	213.28	W	30	110.15
W	56	108.84	W	56	34.91
W	I-80	3202.99	W	I-80	1331.44
Total		24102.00	Total		10754.00

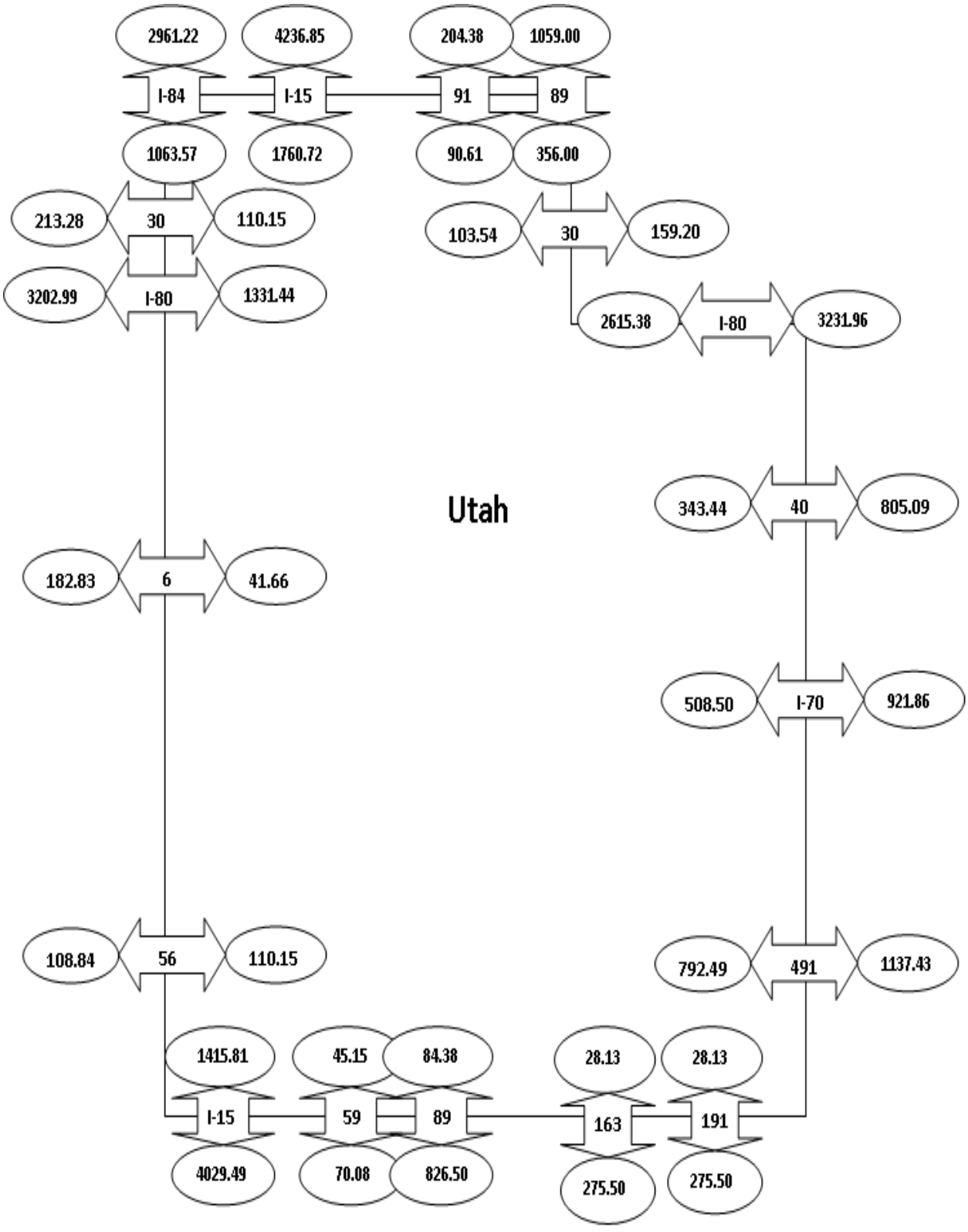


Figure H-1-1: Exit/ Entrance of Commodity Flow by Direction From Outside Utah

H-1-6 Commodity Flow by Truck and by Industry From Utah

Table H-1-12: Commodity Flow by Truck and by Industry From Utah to Other States (Production)

Geographic Area Name	Meaning of Destination geography	Commodity	Meaning of Commodity	Meaning of Mode category	Year	Value ($mil)	Value %	Tons (thous)	Tons %	Ton-miles (mil)	Ton-miles %	Avg miles
Utah	United States	0	All Commodities	Truck	2012	45,210	71.5	72,302	66	17,857	46.9	152
Utah	United States	1	Live animals and live fish	Truck	2012	S	S	S	S	S		73
Utah	United States	2	Cereal grains	Truck	2012	S	S	S	S	S		122
Utah	United States	3	Other agricultural products	Truck	2012	137	100	272	100	17	100	170
Utah	United States	4	Animal feed and products of animal origin, nec	Truck	2012	S	S	S	S	S		166
Utah	United States	5	Meat, fish, seafood, and their preparations	Truck	2012	S	S	S	S	S	S	
Utah	United States	6	Alcohol, alcohol, and tobacco products	Truck	2012	1,142	42.8	1,142	70	485	37.8	349
Utah	United States	7	Other prepared foodstuffs and fats and oils	Truck	2012	1,445	98.9	1,455	99.9	650	99.9	172
Utah	United States	8	Alcoholic beverages	Truck	2012	249	99.5	253	92.6	5	74.8	18
Utah	United States	9	Tobacco products	Truck	2012	-	-	-	-	-	-	-
Utah	United States	10	Calcareous monumental or building stone	Truck	2012	S	S	S	S	S	S	
Utah	United States	11	Natural sands	Truck	2012	S	S	S	S	S		8
Utah	United States	12	Gravel and crushed stone	Truck	2012	S		3,704	85.89	S		28
Utah	United States	13	Nonmetallic minerals, nec	Truck	2012	S		1,463	47.2	1,179	28.1	488
Utah	United States	14	Metallic ores and concentrates	Truck	2012	S	S	S	S	S		1,712
Utah	United States	15	Coal, not elsewhere classified, bituminous coal	Truck	2012	255	43.5	11,299	37.5	845	9.3	88
Utah	United States	17	Gasoline and aviation turbine fuel	Truck	2012	1,892	77.2	1,897	82.2	1,058	85.2	139
Utah	United States	18	Fuel oils	Truck	2012	2,720	85.6	31,930	86.2	4,542	90.5	164
Utah	United States	19	Coal and petroleum products, nec	Truck	2012	51	31.3	663	70.8	58	25.16	
Utah	United States	20	Basic chemicals	Truck	2012	S	S	S	S	S		154
Utah	United States	21	Pharmaceutical products	Truck	2012	2,261	42.29	S	S	S	S	
Utah	United States	22	Fertilizers	Truck	2012	S	S	S	S	S		126
Utah	United States	23	Chemical products and preparations, nec	Truck	2012	707	81.7	1,076	95	1,013	99.85	
Utah	United States	24	Plastics and rubber	Truck	2012	952	42.8	185	72.1	80	88.7	254
Utah	United States	25	Logs and other wood in the rough	Truck	2012	S	S	S	S	S		67
Utah	United States	30	Wood products	Truck	2012	801	96.9	1,513	94.45	S		140
Utah	United States	31	Pulp, newsprint, paper, and paperboard	Truck	2012	180	81.1	97	87.75	S	S	
Utah	United States	32	Paper or paperboard articles	Truck	2012	1,153	98.7	455	98.4	208	97.85	
Utah	United States	33	Printed products	Truck	2012	S		75	57.6	10	27.3	139
Utah	United States	34	Textiles, leather, and articles of textiles or leather	Truck	2012	1,298	98.05	S	S	S		512
Utah	United States	35	Nonmetallic mineral products	Truck	2012	214	37.6	1,467	47.75	S		128
Utah	United States	36	Base metal in ores, or semi-fin. forms & in finished basic shapes	Truck	2012	1,703	48.2	2,186	62.6	967	45.9	144
Utah	United States	37	Articles of base metal	Truck	2012	1,778	78.7	1,033	94.45	S		156
Utah	United States	38	Machinery	Truck	2012	1,467	72.8	531	92.4	148	95.4	264
Utah	United States	39	Electronics & other electrical equip & components & office equip	Truck	2012	1,888	91.8	202	96.7	261	91.6	167
Utah	United States	40	Motorized and other vehicles (including parts)	Truck	2012	S	S	S	S	S	S	
Utah	United States	41	Transportation equipment, nec	Truck	2012	377	37.55	S	S	S		703
Utah	United States	42	Precision instruments and apparatus	Truck	2012	1,279	42.59	S	S	S	S	
Utah	United States	43	Furniture, mattresses & mattress supports, lamps, lighting	Truck	2012	460	94.6	86	97.55	S		301
Utah	United States	44	Miscellaneous manufactured products	Truck	2012	1,101	37.6	485	87.5	259	81.5	533
Utah	United States	45	Waste and scrap	Truck	2012	S	S	S	S	S		833
Utah	United States	46	Mixed freight	Truck	2012	5,557	96.2	1,845	99.7	574	99.7	309
Utah	United States	99	Commodity unknown	Truck	2012	S	S	S	S	S		833

Table H-1-13: Commodity Flow by Truck and by Industry From Other States to Utah (Attraction)

Origin	Destination	Commodity	Meaning of Commodity	Mode	Year	Value ($mil)	Value %	Tons (thous)	Tons %	Ton-miles (mil)	Ton-miles %	Avg miles
United States	Utah	0	All Commodities	Truck	2002	19931	12208.8	10704	2598.8	8753	2960.1	722
United States	Utah	1	Live animals and live fish	Truck	2002	0	0	0	0	0	0	0
United States	Utah	2	Cereal grains	Truck	2002	0	0	0	0	0	0	211
United States	Utah	3	Other agricultural products	Truck	2002	52	100	0	0	33	100	108
United States	Utah	4	Animal feed and products of animal origin, nec	Truck	2002	0	0	0	0	0	0	457
United States	Utah	5	Meat, fish, seafood, and their preparations	Truck	2002	292	499.9	114	300	139	300	412
United States	Utah	6	Grains, alcohol, and tobacco products	Truck	2002	0	0	24	189	19	189.4	1111
United States	Utah	7	Other prepared foodstuffs and fats and oils	Truck	2002	1113	748.2	718	871.1	436	848.4	607
United States	Utah	8	Alcoholic beverages	Truck	2002	48	100	60	100	27	100	118
United States	Utah	9	Tobacco products	Truck	2002	0	0	0	0	0	0	574
United States	Utah	10	Calcareous monumental or building stone	Truck	2002	0	0	0	0	0	0	117
United States	Utah	11	Natural sands	Truck	2002	0	0	0	0	0	0	458
United States	Utah	12	Gravel and crushed stone	Truck	2002	0	0	0	0	0	0	185
United States	Utah	13	Nonmetallic minerals nec	Truck	2002	1	100	21	100	9	100	1014
United States	Utah	14	Metallic ores and concentrates	Truck	2002	68	45	18	32.7	9	71.8	500
United States	Utah	15	Nonagglomerated bituminous coal	Truck	2002	0	0	0	0	0	0	0
United States	Utah	17	Gasoline and aviation turbine fuel	Truck	2002	0	0	0	0	0	0	280
United States	Utah	18	Fuel oils	Truck	2002	0	0	0	0	0	0	1199
United States	Utah	19	Coal and petroleum products, nec	Truck	2002	0	0	0	0	0	0	638
United States	Utah	20	Basic chemicals	Truck	2002	10	176.2	6	0	0	0	1075
United States	Utah	21	Pharmaceutical products	Truck	2002	0	0	4	74.7	3	71.3	2686
United States	Utah	22	Fertilizers	Truck	2002	0	0	0	0	0	0	655
United States	Utah	23	Chemical products and preparations, nec	Truck	2002	90	185	2	83	7	174.1	520
United States	Utah	24	Plastics and rubber	Truck	2002	27	120.2	75	180.4	74	175.7	985
United States	Utah	25	Logs and other wood in the rough	Truck	2002	0	0	0	0	0	0	226
United States	Utah	26	Wood products	Truck	2002	161	801.4	271	453	176	425.9	649
United States	Utah	27	Pulp, newsprint, paper, and paperboard	Truck	2002	39	55.2	77	51.8	80	47.4	1038
United States	Utah	28	Paper or paperboard articles	Truck	2002	325	498.8	130	399.7	121	399.7	929
United States	Utah	29	Printed products	Truck	2002	13	74.1	9	98.4	13	98.3	1458
United States	Utah	30	Textiles, leather, and articles of textiles or leather	Truck	2002	1419	558.7	93	489.6	105	574.9	1129
United States	Utah	31	Nonmetallic mineral products	Truck	2002	72	184.9	89	100	32	100	362
United States	Utah	32	Base metal in prims. or semifin. forms & in finished basic shapes	Truck	2002	101	384.7	128	188.4	89	174.7	692
United States	Utah	33	Articles of base metal	Truck	2002	358	487	90	394.4	29	394.4	1986
United States	Utah	34	Machinery	Truck	2002	878	742	91	502.3	83	488.4	1029
United States	Utah	35	Electronic & other electrical equip & components & office equip	Truck	2002	350	177	20	130.3	10	36.5	1705
United States	Utah	36	Motorized and other vehicles (including parts)	Truck	2002	1117	251.5	17	196	18	99.7	1042
United States	Utah	37	Transportation equipment, nec	Truck	2002	0	0	0	0	0	0	1599
United States	Utah	38	Precision instruments and apparatus	Truck	2002	31	100	0	0	0	0	2645
United States	Utah	39	Furniture, mattresses & mattress supports, lamps, lighting	Truck	2002	129	284.5	26	199.7	28	199.7	1011
United States	Utah	40	Miscellaneous manufactured products	Truck	2002	1091	474.5	29	307.7	33	384.2	1234
United States	Utah	41	Waste and scrap	Truck	2002	0	0	0	0	0	0	1897
United States	Utah	43	Mixed freight	Truck	2002	2022	491.1	171	298.6	180	298.9	1173
United States	Utah	99	Commodity Unknown	Truck	2002	0	0	0	0	0	0	4722

H-1-7 Commodity Flow Ratio by Truck and by Industry From Utah

Table H-1-14: Ratio of Commodity Flow by Industry Code (Production)

Total (All Modes)				Truck		
County	Industry	Total	Ratio	Industry	Commodity	Ratio
CFS2PT	0	109672	1	0	61809	1
CFS2P3	3	101	0.000921	3	101	0.00163407
CFS2P6	6	1551	0.014142	7	2630	0.04255044
CFS2P7	7	2632	0.023999	8	213	0.0034461
CFS2P8	8	258	0.002352	12	2756	0.04458898
CFS2P12	12	3000	0.027354	13	2602	0.04209743
CFS2P13	13	5512	0.050259	15	11269	0.18231973
CFS2P15	15	30019	0.273716	17	8680	0.14043262
CFS2P17	17	10576	0.096433	18	19928	0.32241259
CFS2P18	18	22330	0.203607	19	682	0.01103399
CFS2P19	19	963	0.008781	23	1076	0.01740847
CFS2P23	23	1132	0.010322	24	185	0.00299309
CFS2P24	24	257	0.002343	26	1511	0.02444628
CFS2P26	26	1600	0.014589	27	97	0.00156935
CFS2P27	27	99	0.000903	28	455	0.00736139
CFS2P28	28	462	0.004213	29	75	0.00121342
CFS2P29	29	131	0.001194	31	2667	0.04314906
CFS2P30	30	240	0.002188	32	2336	0.03779385
CFS2P32	32	3729	0.034001	33	1333	0.02156644
CFS2P34	34	336	0.003064	34	310	0.00501545
CFS2P35	35	309	0.002817	35	292	0.00472423
CFS2P39	39	89	0.000812	39	86	0.00139138
CFS2P40	40	554	0.005051	40	485	0.00784675
CFS2P43	43	2046	0.018656	43	2040	0.0330049

Table H-1-15: Ratio of Commodity Flow by Industry Code (Attraction)

Total (All Modes)				Truck		
ID	Industry Code	Commodity	Ratio	Industry Code	Commodity	Ratio
CFS2AT	0	81892	1	0	2376	1
CFS2A3	3	619	0.007559	5	114	0.047980
CFS2A5	5	443	0.005410	6	24	0.010101
CFS2A6	6	1204	0.014702	7	713	0.300084
CFS2A7	7	3082	0.037635	8	60	0.025253
CFS2A8	8	421	0.005141	13	21	0.008838
CFS2A11	11	211	0.002577	14	18	0.007576
CFS2A12	12	2874	0.035095	21	4	0.001684
CFS2A13	13	2268	0.027695	23	2	0.000842
CFS2A14	14	300	0.003663	24	75	0.031566
CFS2A15	15	23270	0.284155	26	273	0.114899
CFS2A17	17	8857	0.108155	27	77	0.032407
CFS2A18	18	14708	0.179602	28	130	0.054714
CFS2A19	19	1829	0.022334	29	9	0.003788
CFS2A21	21	478	0.005837	30	93	0.039141
CFS2A23	23	758	0.009256	31	89	0.037458
CFS2A24	24	734	0.008963	32	128	0.053872
CFS2A26	26	1968	0.024032	33	30	0.012626
CFS2A27	27	598	0.007302	34	51	0.021465
CFS2A28	28	383	0.004677	35	20	0.008418
CFS2A29	29	228	0.002784	36	17	0.007155
CFS2A30	30	349	0.004262	39	26	0.010943
CFS2A31	31	3562	0.043496	40	29	0.012205
CFS2A32	32	2121	0.0259	43	373	0.156987
CFS2A33	33	907	0.011076			
CFS2A34	34	570	0.00696			
CFS2A35	35	169	0.002064			
CFS2A36	36	620	0.007571			
CFS2A39	39	100	0.001221			
CFS2A40	40	684	0.008352			
CFS2A41	41	631	0.007705			
CFS2A43	43	2092	0.025546			
CFS2A99	99	109	0.001331			

H-1-8 Commodity Flow by Truck of Each Exit/Entrance From Utah

Table H-1-16: Commodity by Truck and by Industry of Each Exit (Production)

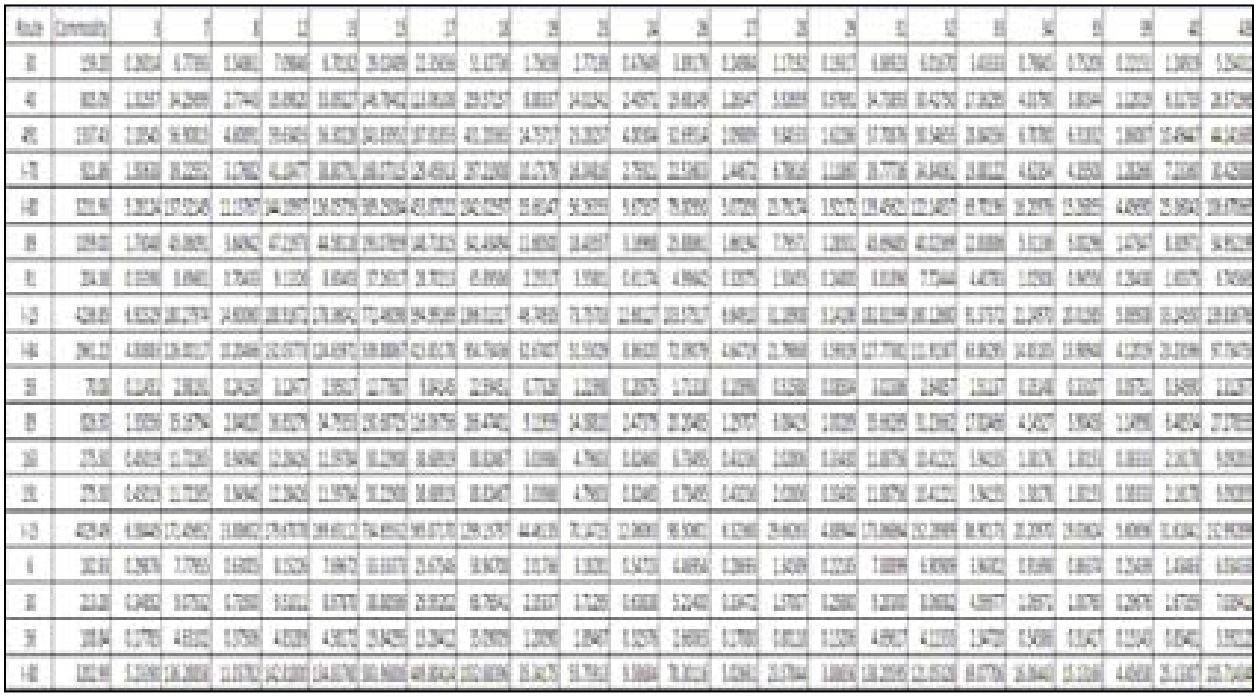
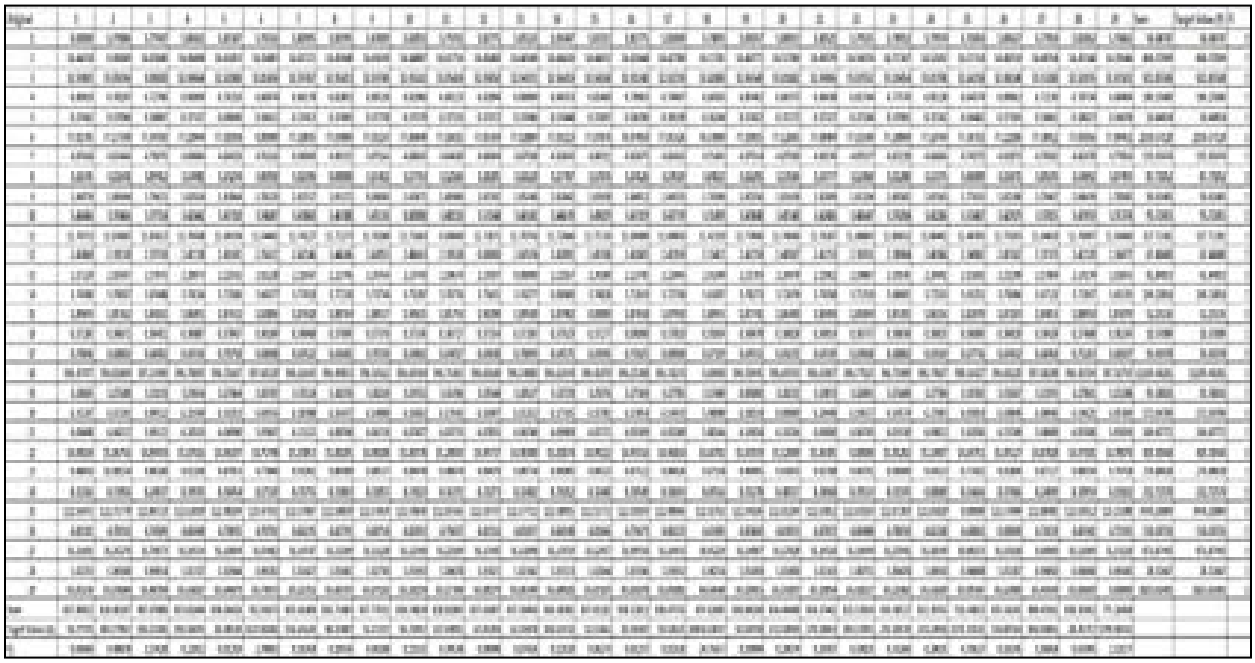


Table H-1-17: Commodity by Truck and by Industry of Each Entrance (Attraction)

Route	Commodity	5	6	7	8	13	14	21	23	23	26	27	28	29	30	31	32	33	34	35	36	39	40	43
30	103.54	4.96803	1.04590	31.07198	2.61475	0.91516	0.78443	0.17432	0.08716	3.26844	11.89713	3.35560	5.66530	0.39221	4.05287	3.87855	5.57814	1.30738	2.22254	0.87158	0.74085	1.13366	1.26380	16.25505
40	343.44	16.47832	3.46912	103.06174	8.67280	3.03548	2.60184	0.57819	0.28909	10.84100	39.46123	11.13009	18.79106	1.30092	13.44284	12.86465	18.50197	4.33640	7.37188	2.89093	2.45729	3.75821	4.19185	53.91589
491	792.49	38.02342	8.00493	237.81312	20.01232	7.00431	6.00370	1.33415	0.66708	25.01541	91.05608	25.68248	43.36004	3.00185	31.01910	29.68495	42.69296	10.00616	17.01048	6.67077	5.67016	8.67201	9.67262	124.40995
I-70	508.50	24.39793	5.13641	152.59409	12.84102	4.49436	3.85231	0.85607	0.42803	16.05127	58.42663	16.47931	27.82220	1.92615	19.90358	19.04751	27.39417	6.42051	10.91486	4.28034	3.63829	5.56444	6.20649	79.82832
I-80	2615.38	125.48558	26.41802	784.83523	66.04504	23.11576	19.81351	4.40300	2.20150	82.55630	300.50493	84.75780	143.09759	9.90676	102.36981	97.96681	140.89609	33.02252	56.13828	22.01501	18.71276	28.61952	31.92177	410.58000
89	356.00	17.08081	3.59596	106.82987	8.98990	3.14646	2.69697	0.59933	0.29966	11.23737	40.90404	11.53704	19.47811	1.34848	13.93434	13.33502	19.17845	4.49495	7.64141	2.99663	2.54714	3.89562	4.34512	55.88721
91	90.61	4.34761	0.91529	27.19166	2.28822	0.80088	0.68647	0.15255	0.07627	2.86027	10.41139	2.93655	4.95781	0.34323	3.54674	3.39419	4.88153	1.14411	1.94499	0.76274	0.64833	0.99156	1.10597	14.22509
I-15	1760.72	84.47912	17.78508	528.36499	44.46269	15.56194	13.33881	2.96418	1.48209	55.57837	202.30525	57.06046	96.33583	6.66940	68.91717	65.95299	94.85374	22.23135	37.79329	14.82090	12.59776	19.26717	21.49030	276.40974
I-84	1063.57	51.02982	10.74312	319.16022	26.85780	9.40023	8.05734	1.79052	0.89526	33.57225	122.20300	34.46751	58.19190	4.02867	41.62959	39.83907	57.29664	13.42890	22.82913	8.95260	7.60971	11.63838	12.98127	166.96600
59	45.15	2.16611	0.45602	13.54771	1.14006	0.39902	0.34202	0.07600	0.03800	1.42508	5.18727	1.46308	2.47013	0.17101	1.76709	1.69109	2.43213	0.57003	0.96905	0.38002	0.32302	0.49403	0.55103	7.08737
89	84.38	4.04830	0.85227	25.31960	2.13068	0.74574	0.63920	0.14205	0.07102	2.66335	9.69460	2.73438	4.61648	0.31960	3.30256	3.16051	4.54545	1.06534	1.81108	0.71023	0.60369	0.92330	1.02983	13.24574
163	28.13	1.34943	0.28409	8.43987	0.71023	0.24858	0.21307	0.04735	0.02367	0.88778	3.23153	0.91146	1.53883	0.10653	1.10085	1.05350	1.51515	0.35511	0.60369	0.23674	0.20123	0.30777	0.34328	4.41525
191	28.13	1.34943	0.28409	8.43987	0.71023	0.24858	0.21307	0.04735	0.02367	0.88778	3.23153	0.91146	1.53883	0.10653	1.10085	1.05350	1.51515	0.35511	0.60369	0.23674	0.20123	0.30777	0.34328	4.41525
I-15	1415.81	67.93032	14.30112	424.86247	35.75280	12.51348	10.72584	2.38352	1.19176	44.69100	162.67525	45.88276	77.46440	5.36292	55.41684	53.03332	76.27264	17.87640	30.38988	11.91760	10.12996	15.49288	17.28052	222.26325
6	41.66	1.99870	0.42078	12.50065	1.05195	0.36818	0.31558	0.07013	0.03506	1.31494	4.78637	1.35000	2.27922	0.15779	1.63052	1.56039	2.24416	0.52597	0.89416	0.35065	0.29805	0.45584	0.50844	6.53961
30	110.15	5.28477	1.11258	33.05297	2.78146	0.97351	0.83444	0.18543	0.09272	3.47682	12.65563	3.56954	6.02649	0.41722	4.31126	4.12583	5.93377	1.39073	2.36424	0.92715	0.78808	1.20530	1.34437	17.29139
56	34.91	1.67502	0.35264	10.47622	0.88159	0.30856	0.26448	0.05877	0.02939	1.10199	4.01123	1.13137	1.91011	0.13224	1.36646	1.30769	1.88072	0.44079	0.74935	0.29386	0.24978	0.38202	0.42610	5.48055
I-80	1331.44	63.88203	13.44885	399.54286	33.62212	11.76774	10.08664	2.24147	1.12074	42.02765	152.98065	43.14839	72.84793	5.04332	52.11429	49.87281	71.72719	16.81106	28.57880	11.20737	9.52627	14.56959	16.25069	209.01752

H-2 Conversion of Commodity Flow From Tonnage to Number of Truck Vehicles

H-2-1 Commodity Flow Distribution Within Utah by Industry Code (1000 tons)



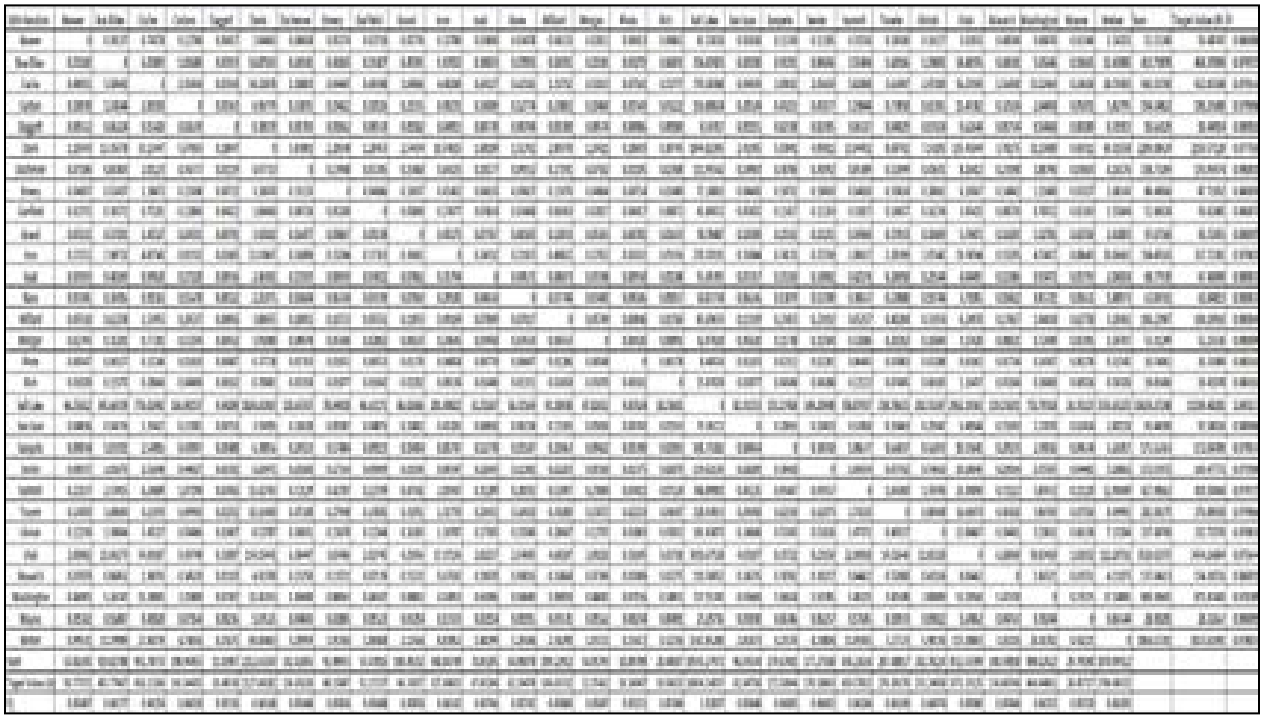


Figure H-2-1: Total Commodity Flow Matrix Distributed by County

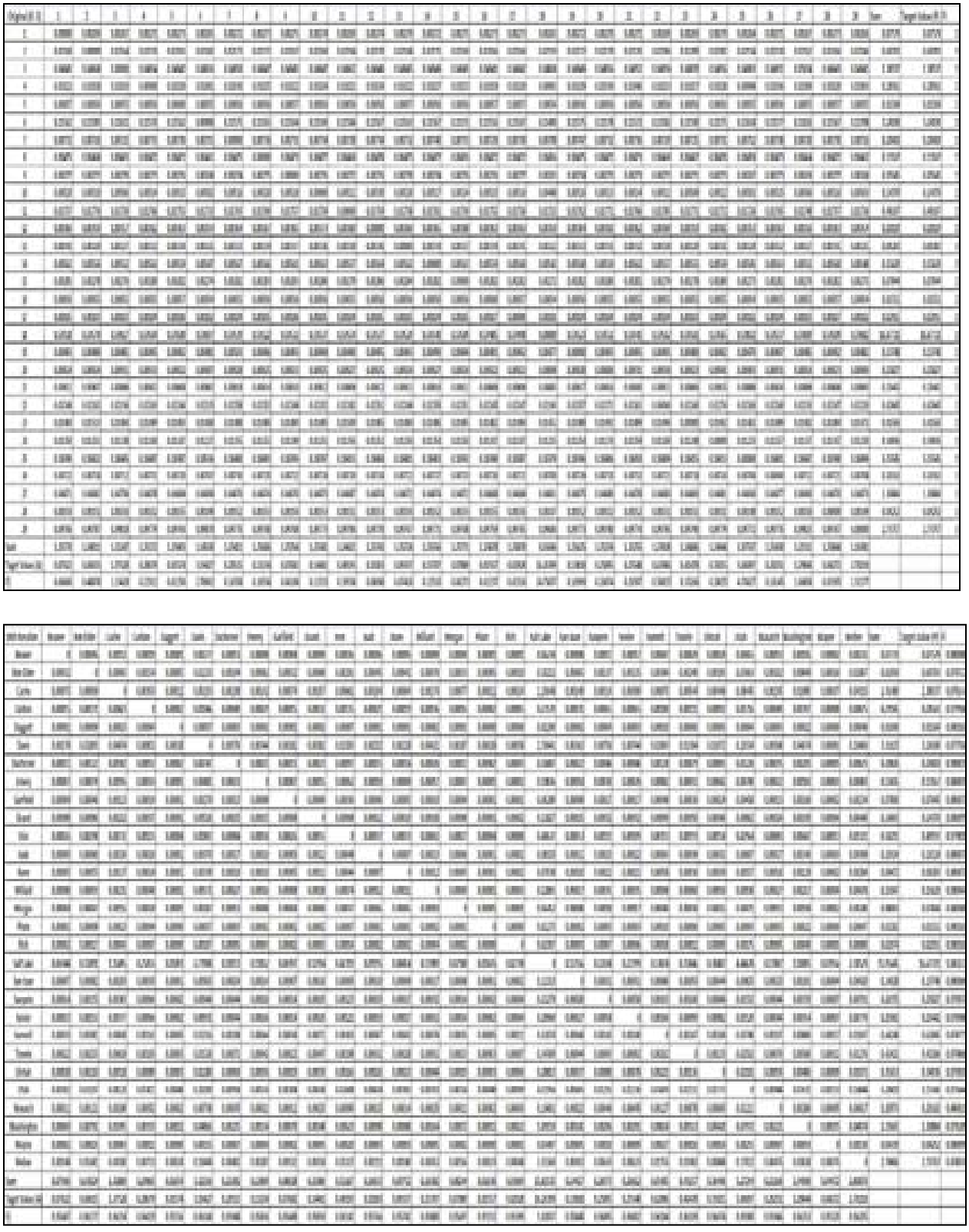


Figure H-2-2: Commodity Flow Matrix Distributed by County (Industry Code 3)

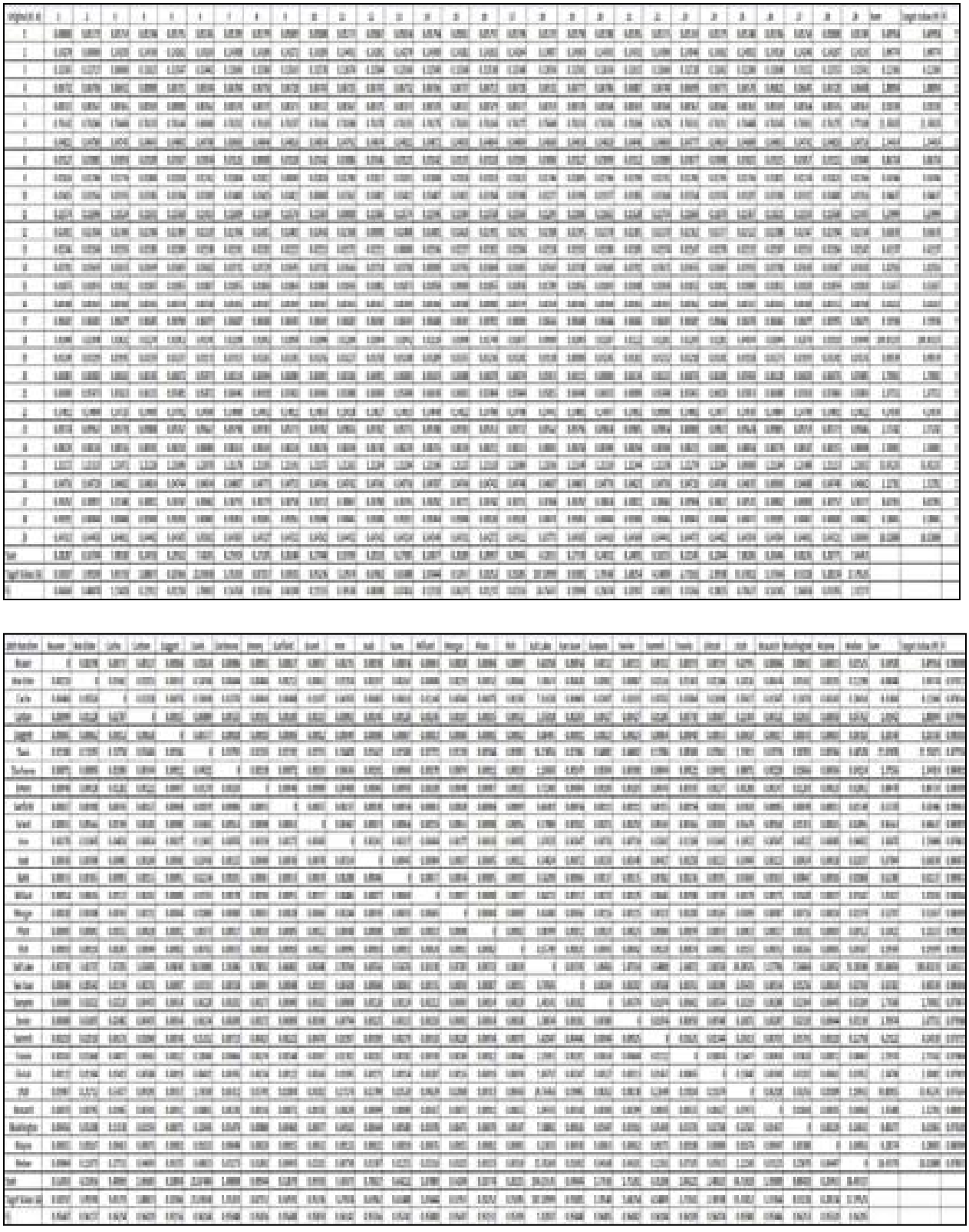
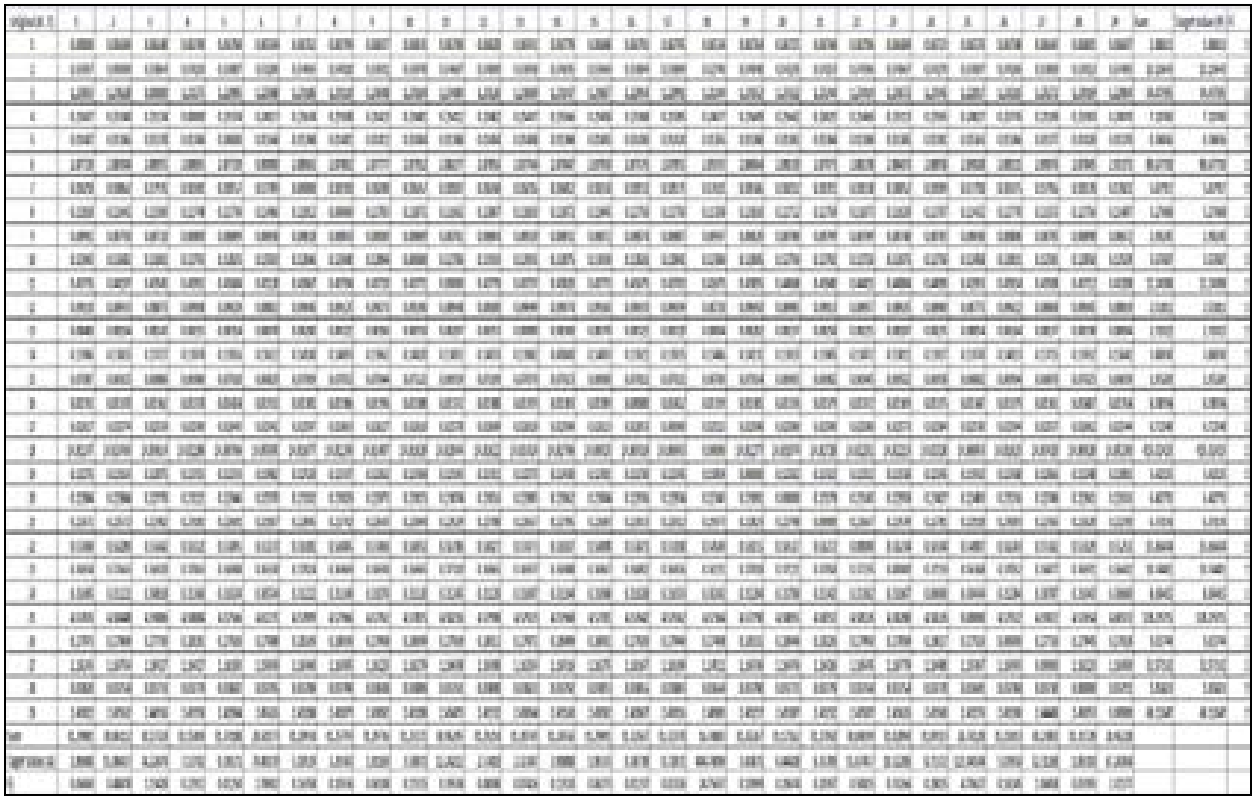


Figure H-2-3: Commodity Flow Matrix Distributed by County (Industry Code 6)



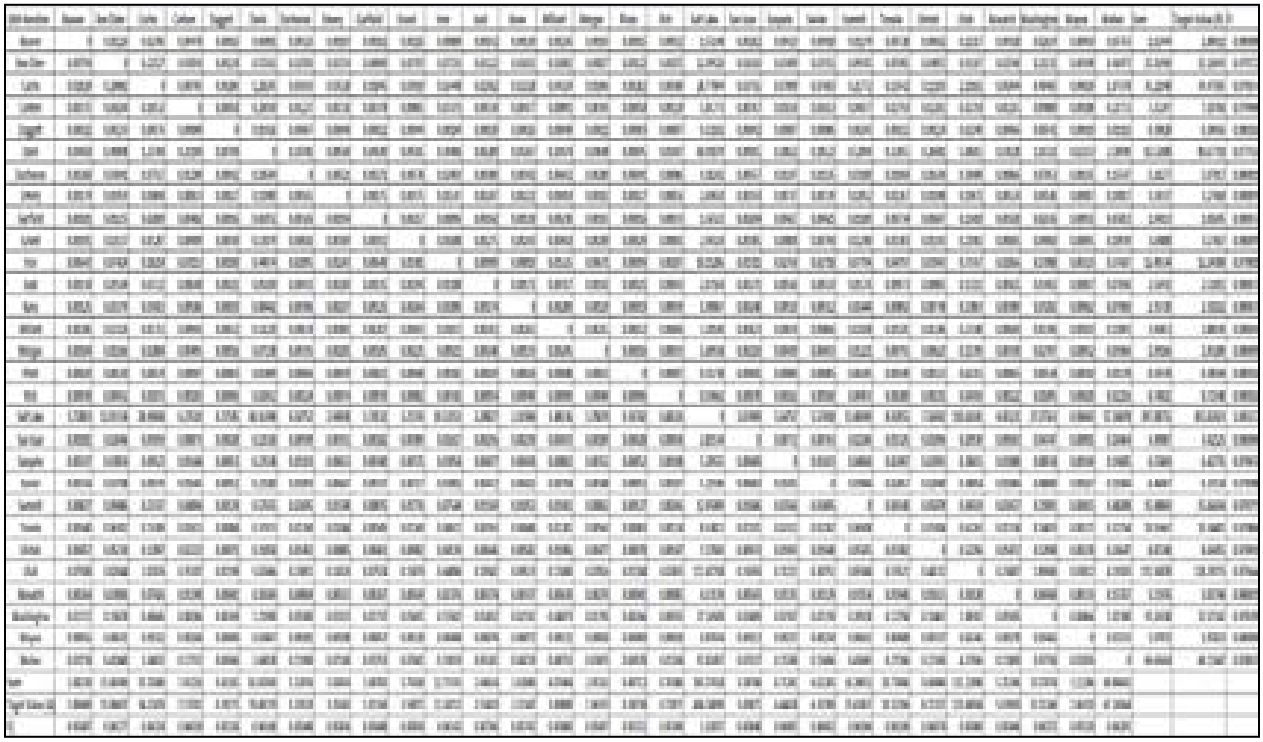
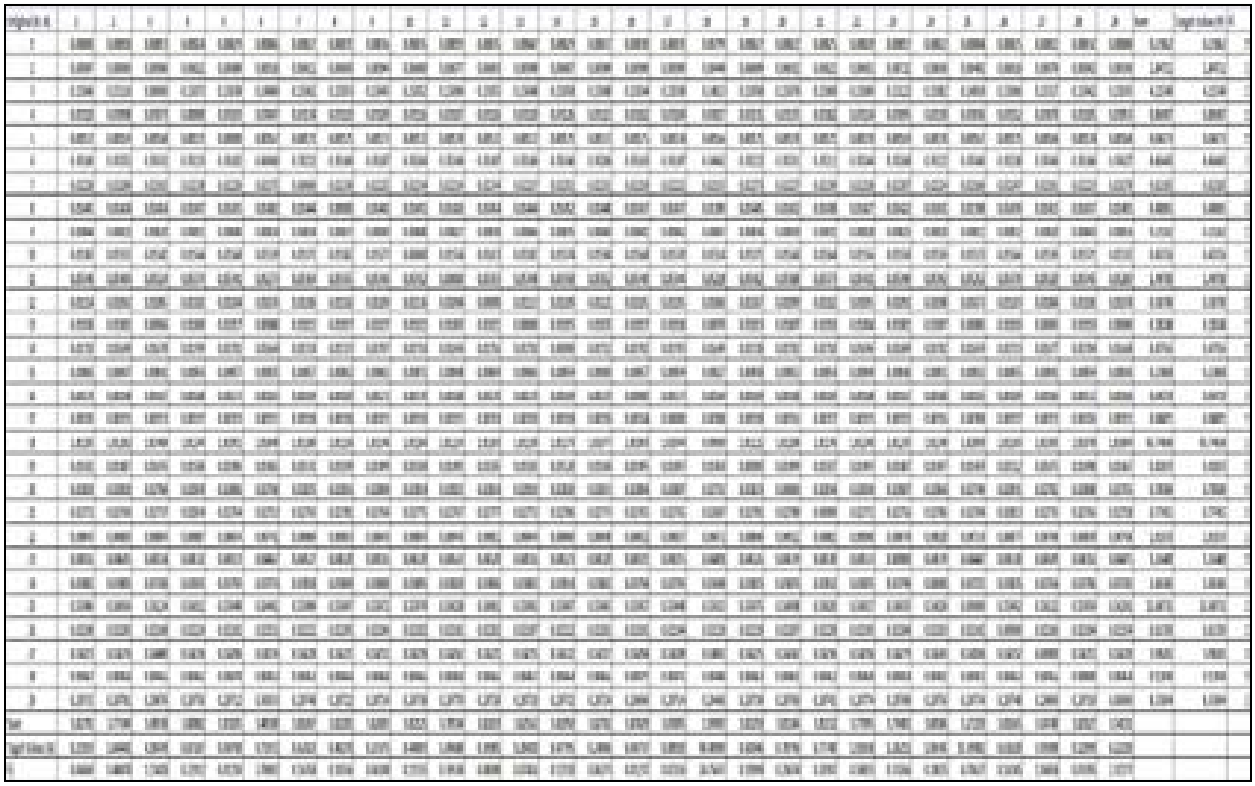


Figure H-2-4: Commodity Flow Matrix Distributed by County (Industry Code 7)



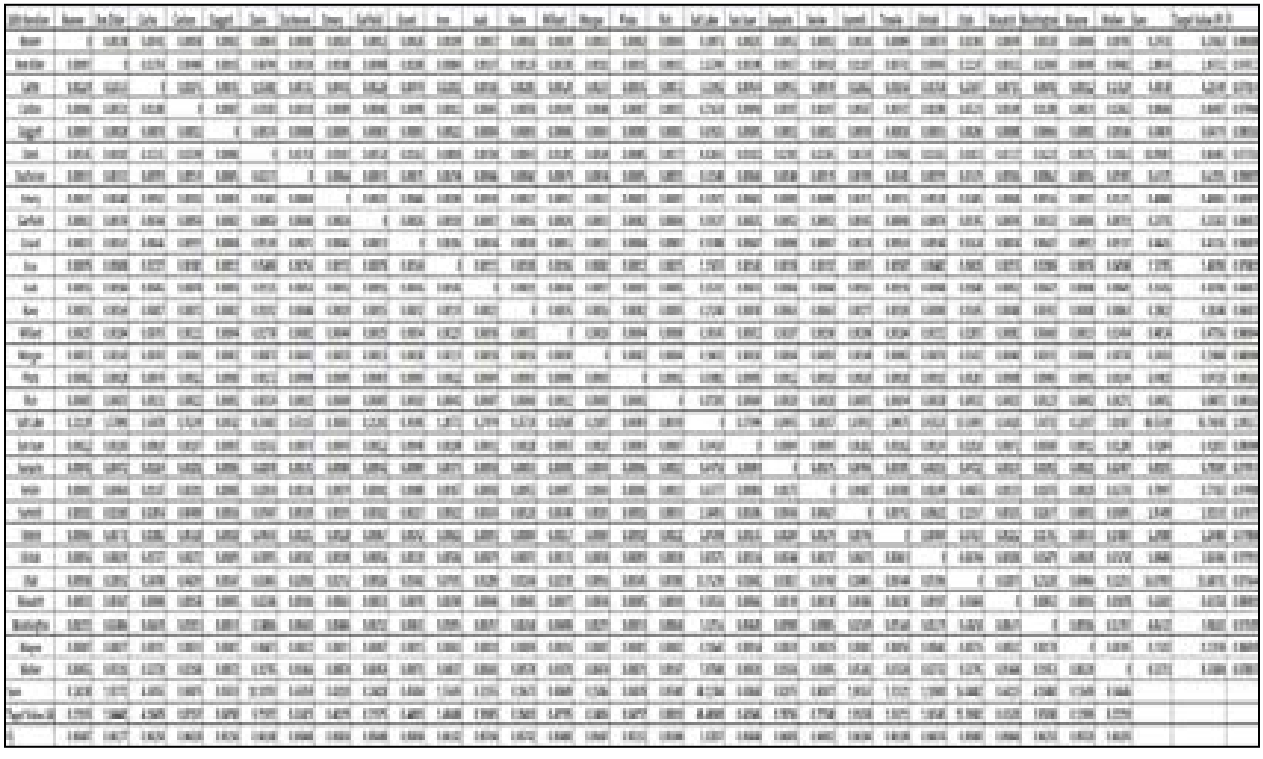
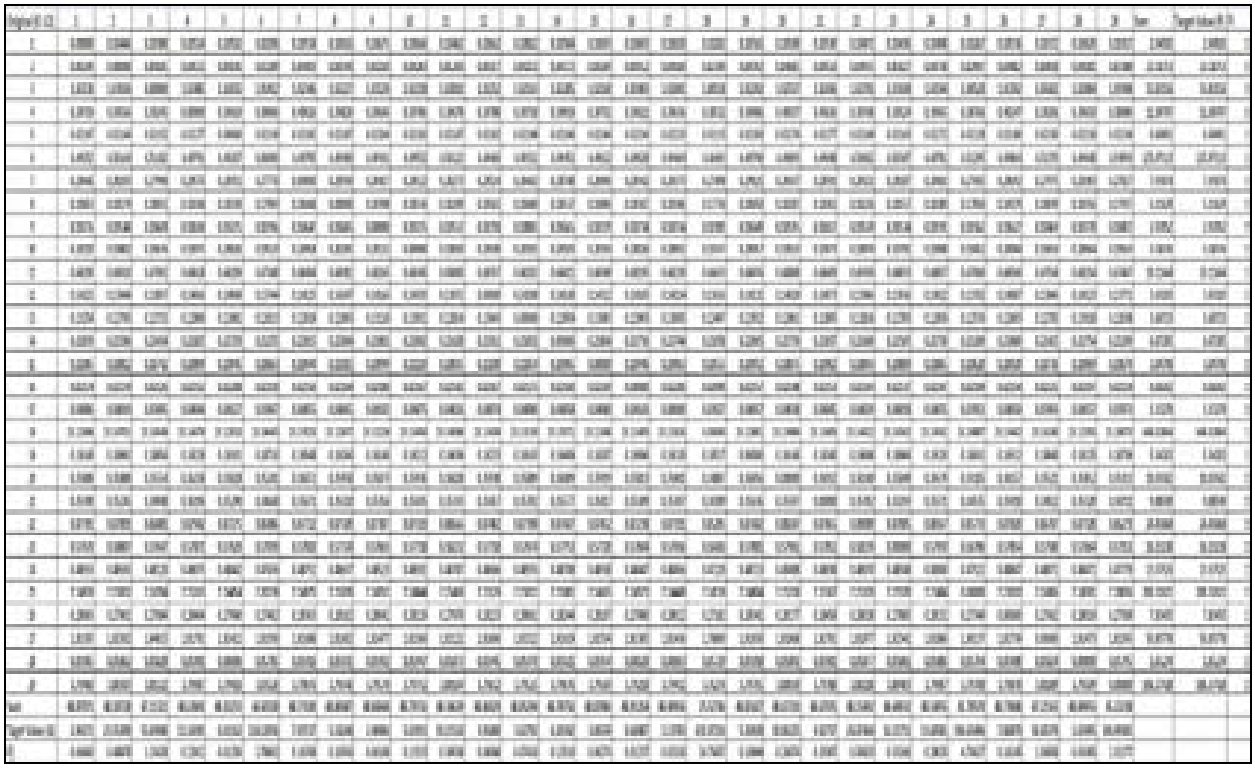


Figure H-2-5: Commodity Flow Matrix Distributed by County (Industry Code 8)



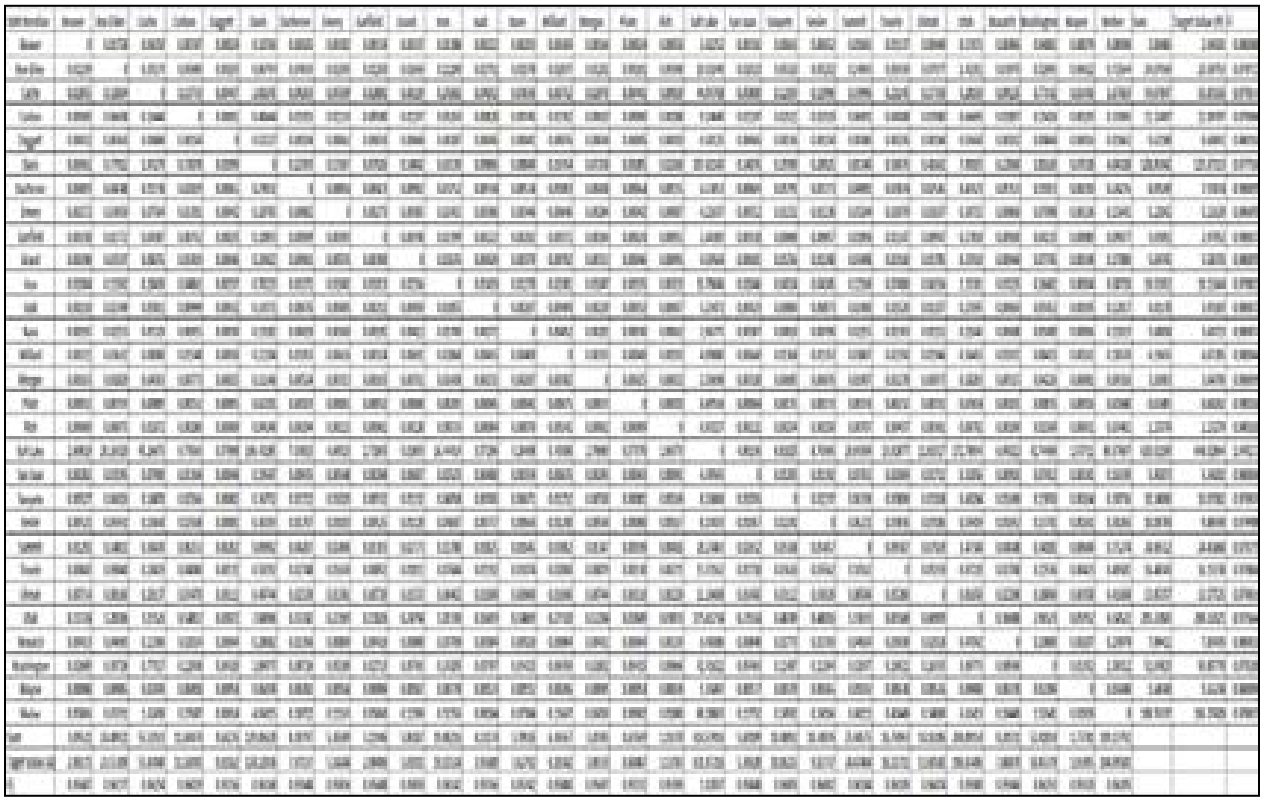
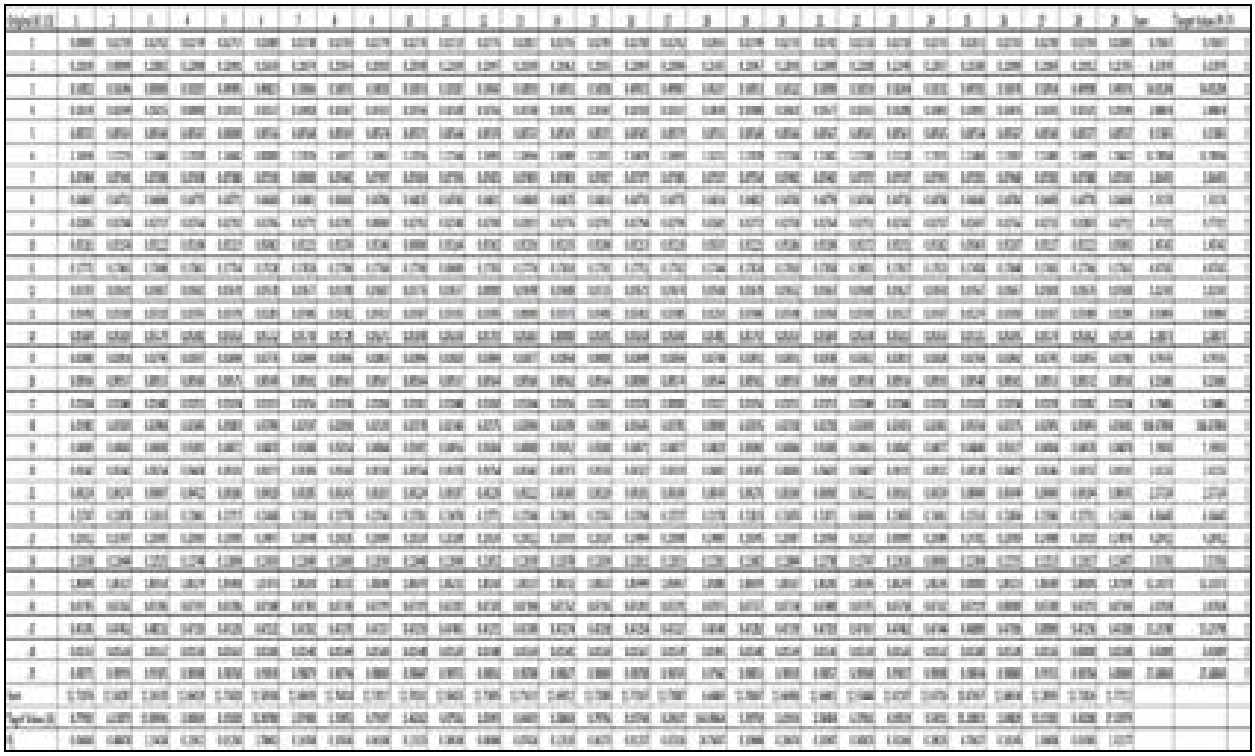


Figure H-2-6: Commodity Flow Matrix Distributed by County (Industry Code 12)



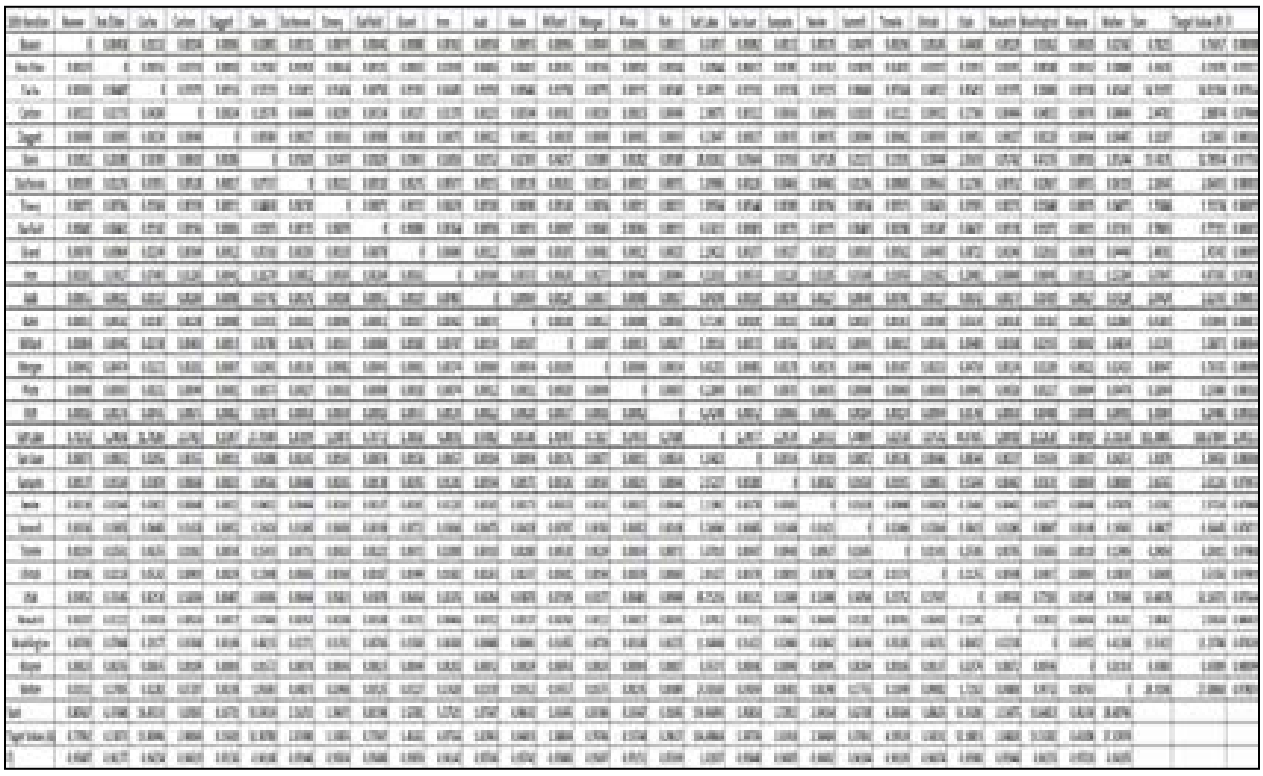
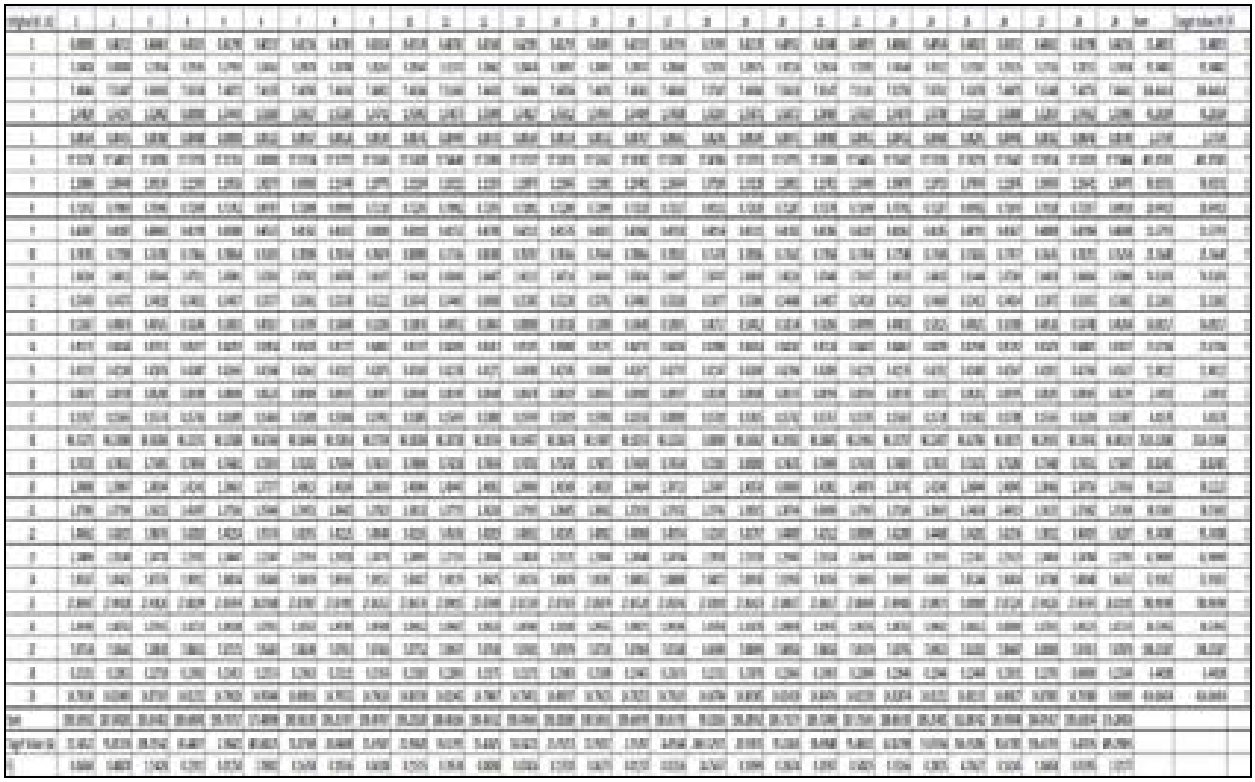


Figure H-2-7: Commodity Flow Matrix Distributed by County (Industry Code 13)



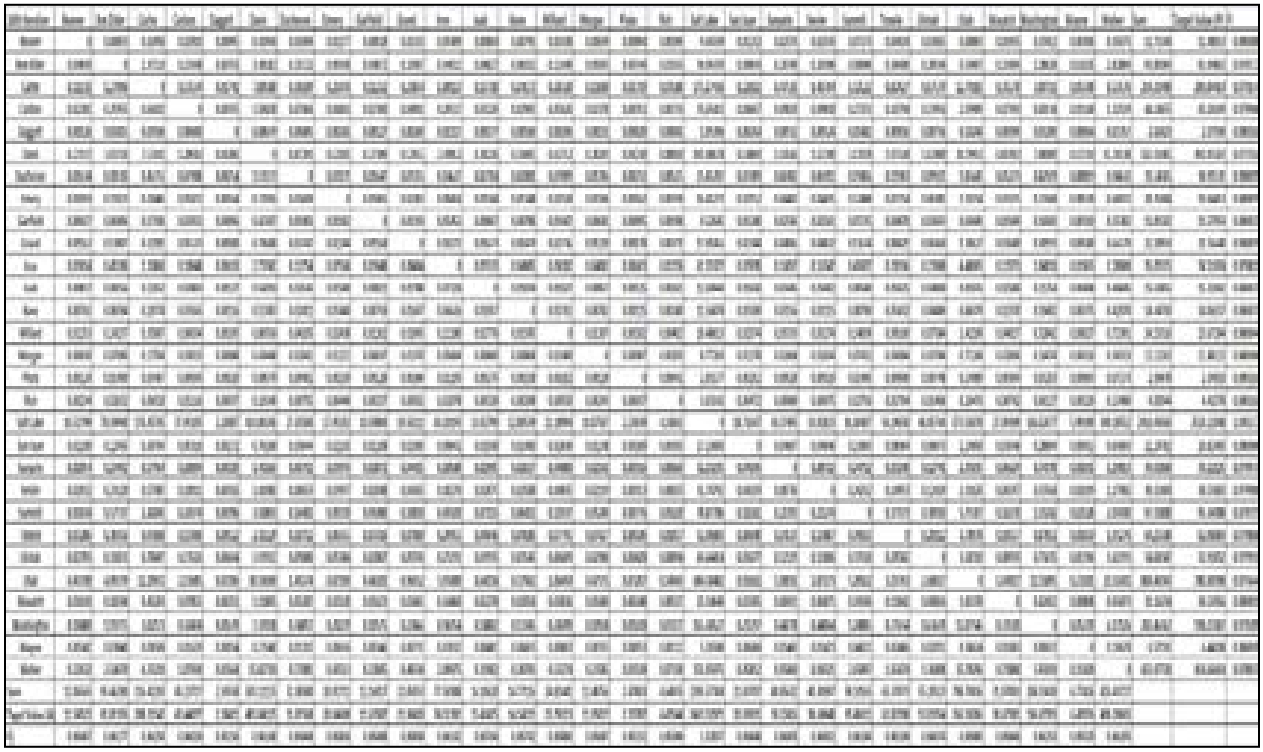
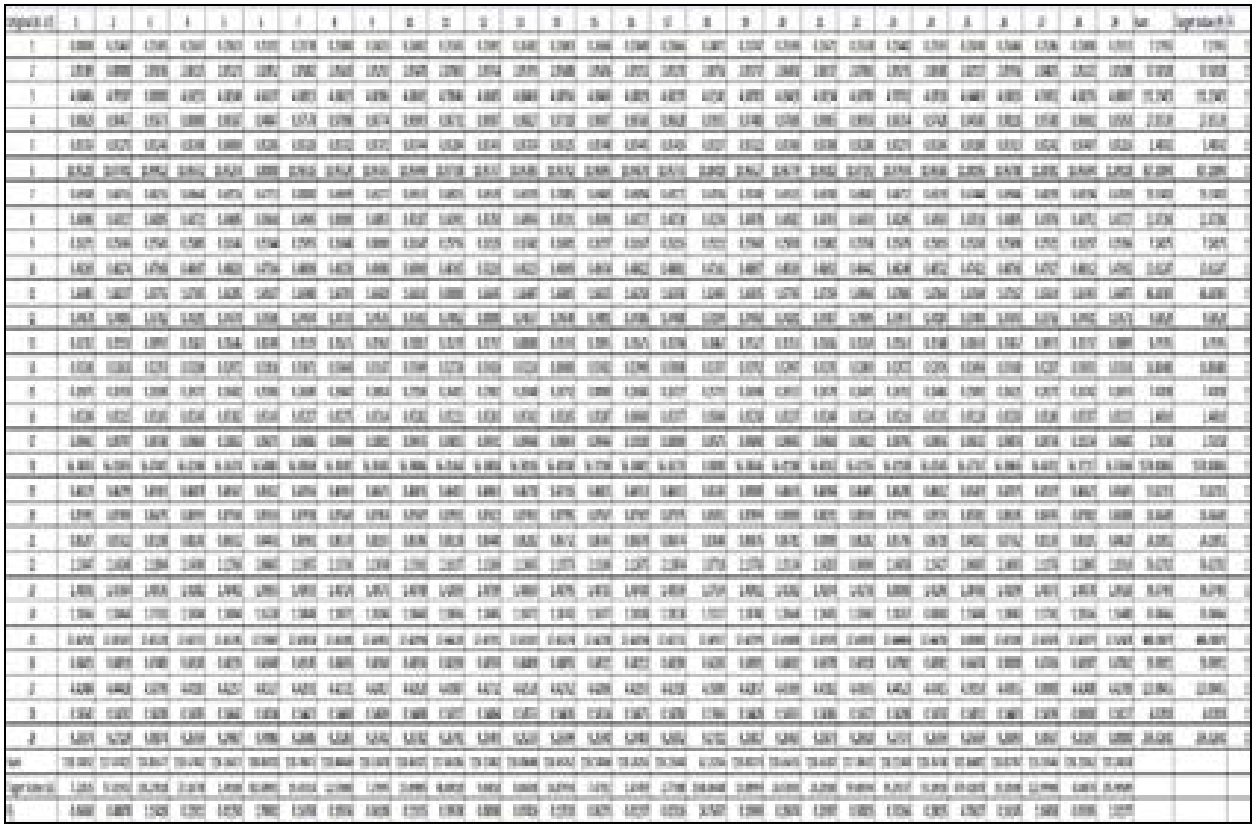


Figure H-2-8: Commodity Flow Matrix Distributed by County (Industry Code 15)



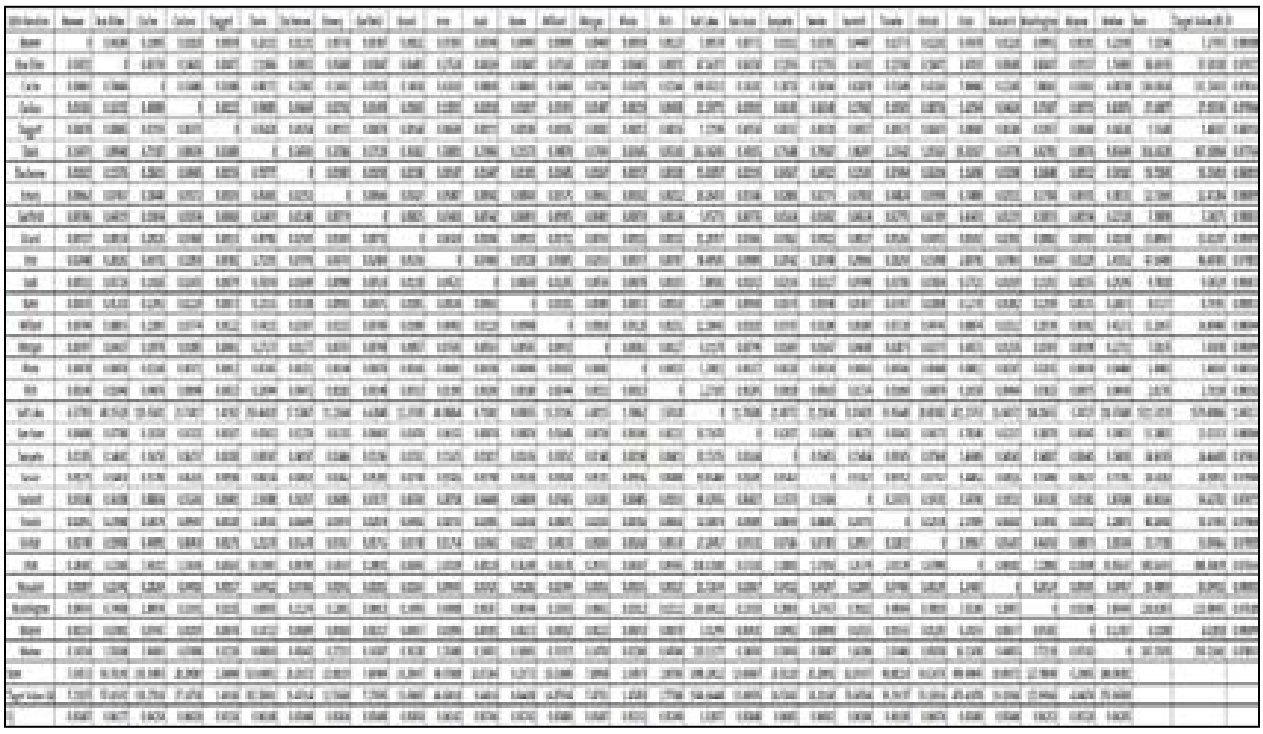
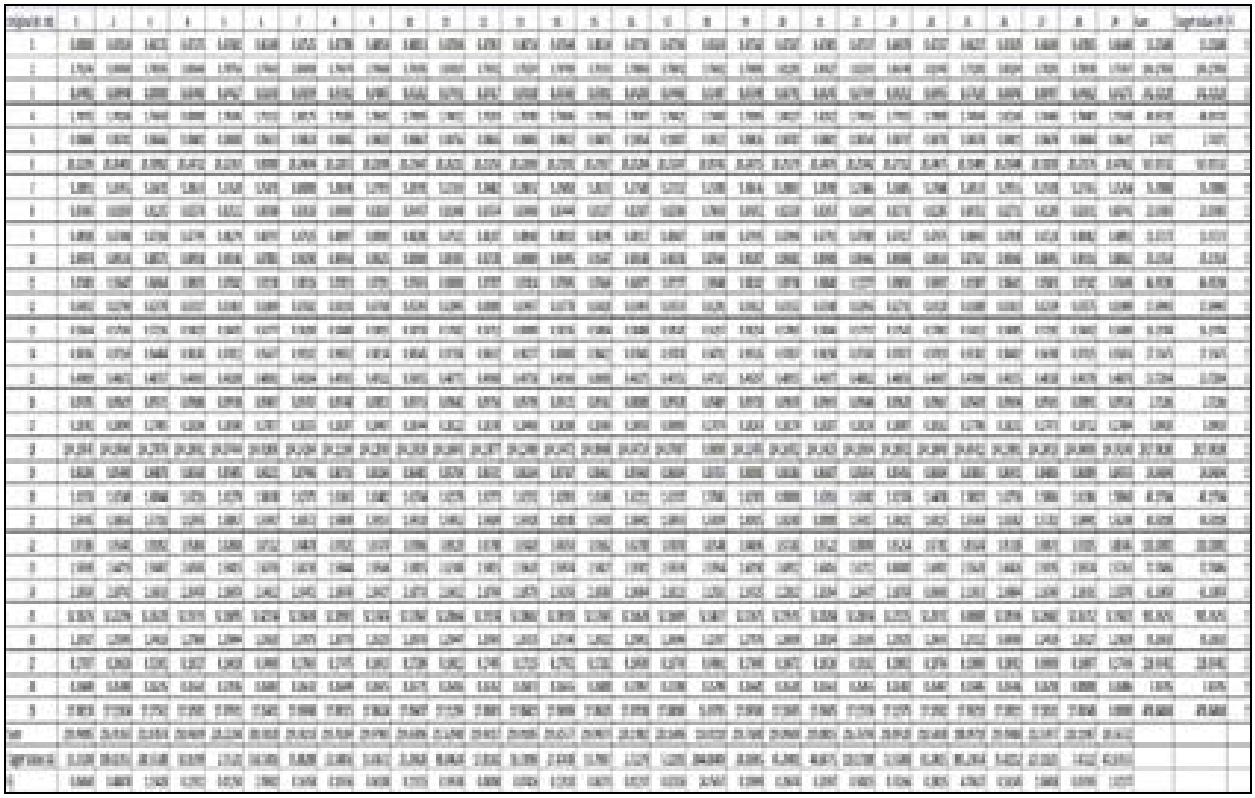


Figure H-2-9: Commodity Flow Matrix Distributed by County (Industry Code 17)



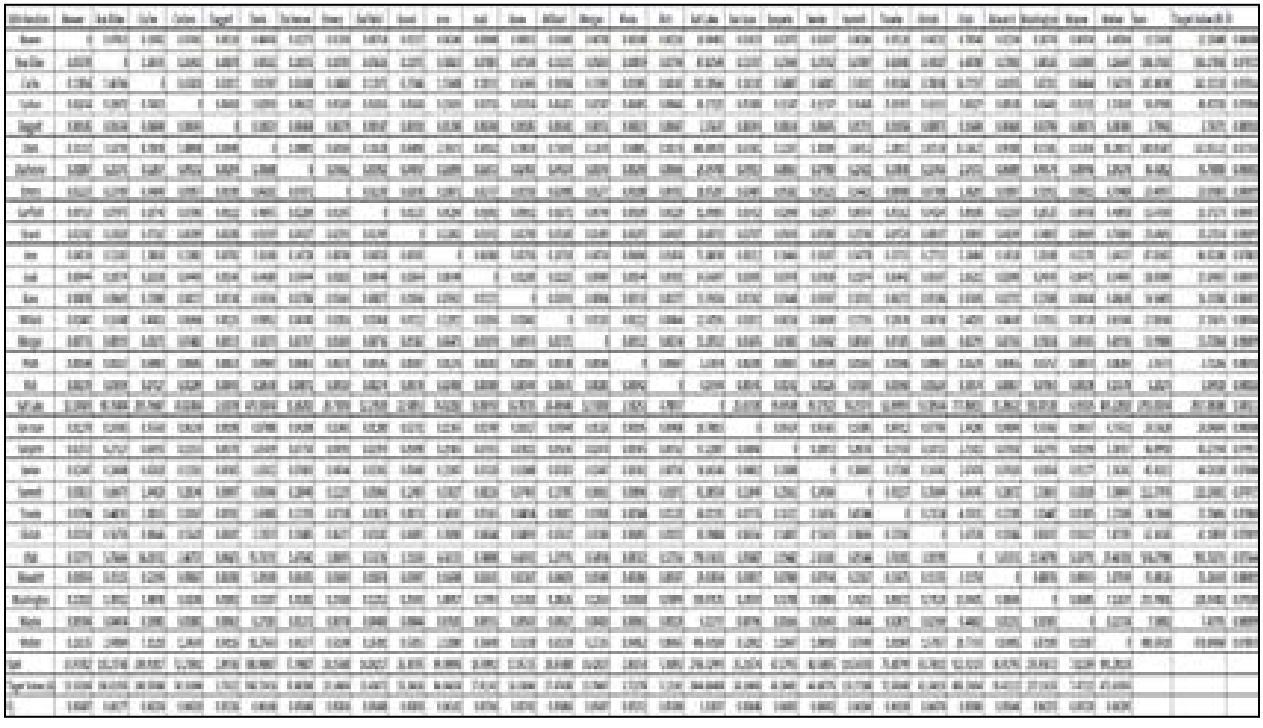
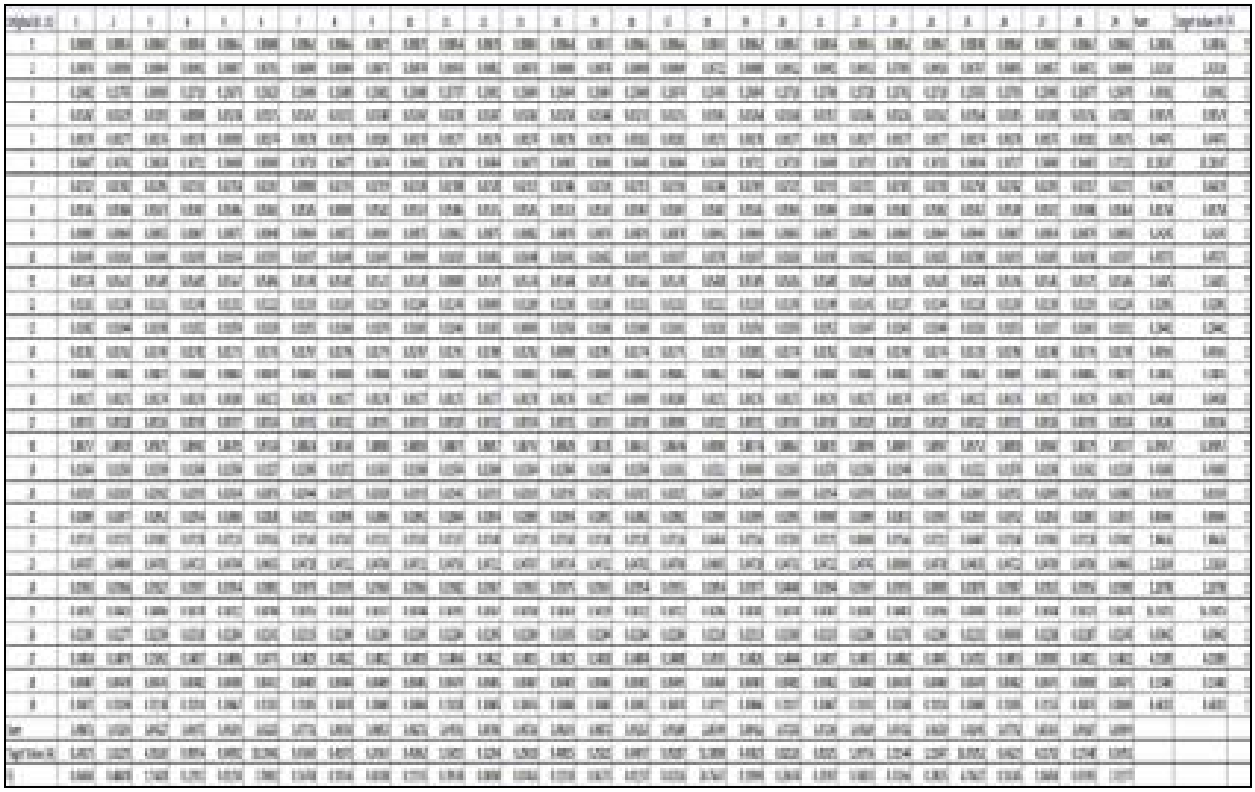


Figure H-2-10: Commodity Flow Matrix Distributed by County (Industry Code 18)



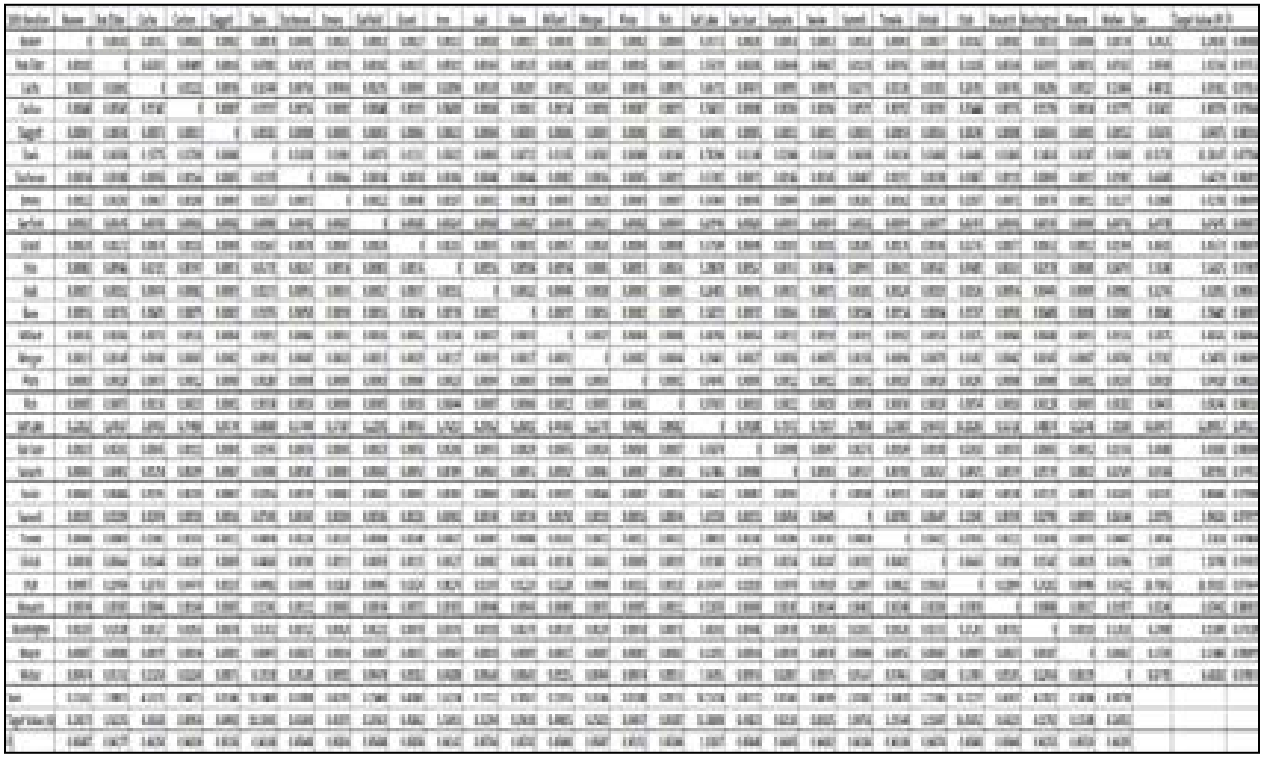
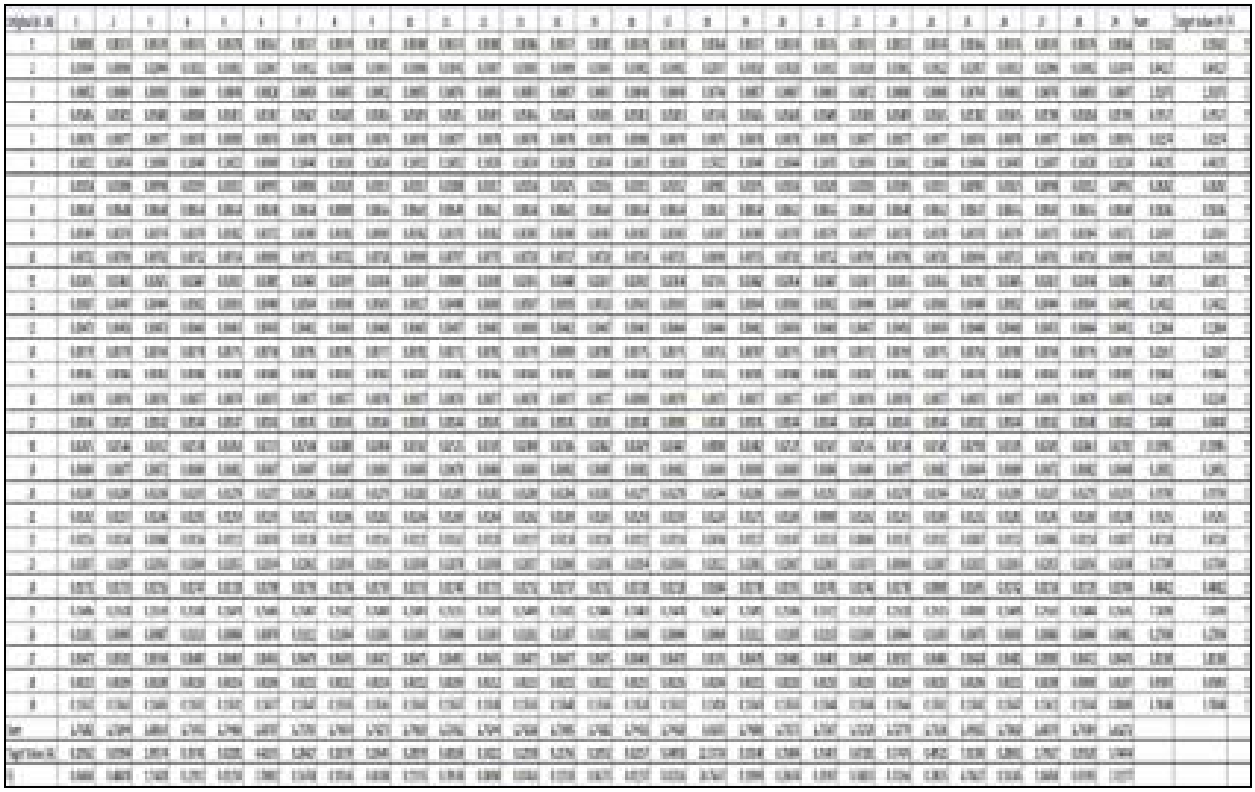


Figure H-2-11: Commodity Flow Matrix Distributed by County (Industry Code 21)



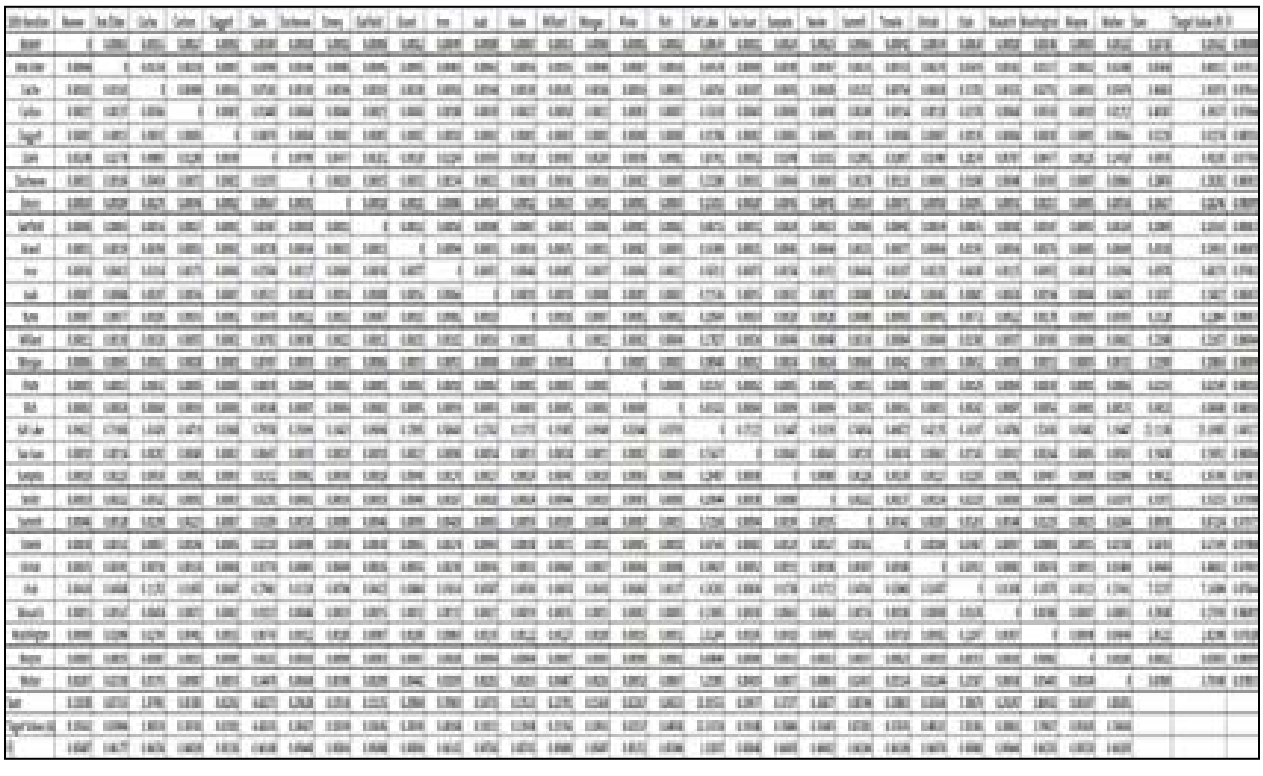
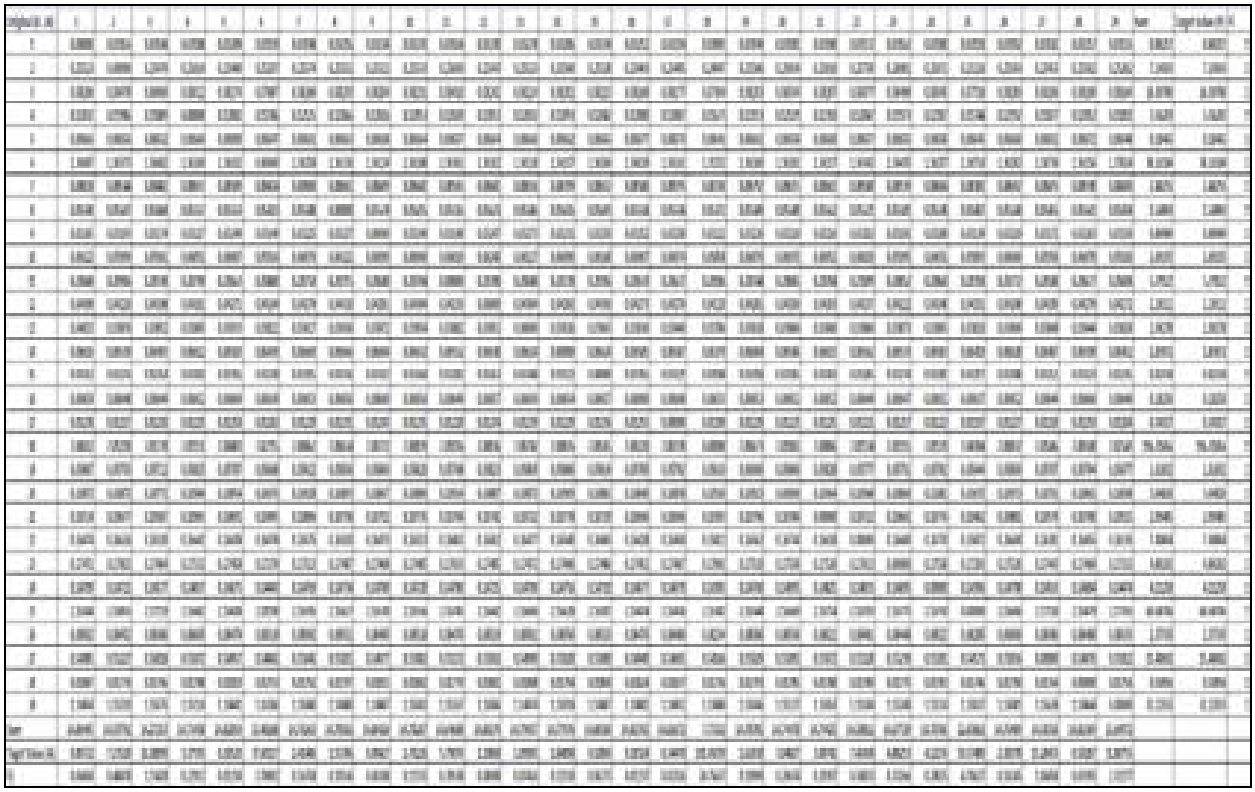


Figure H-2-12: Commodity Flow Matrix Distributed by County (Industry Code 24)



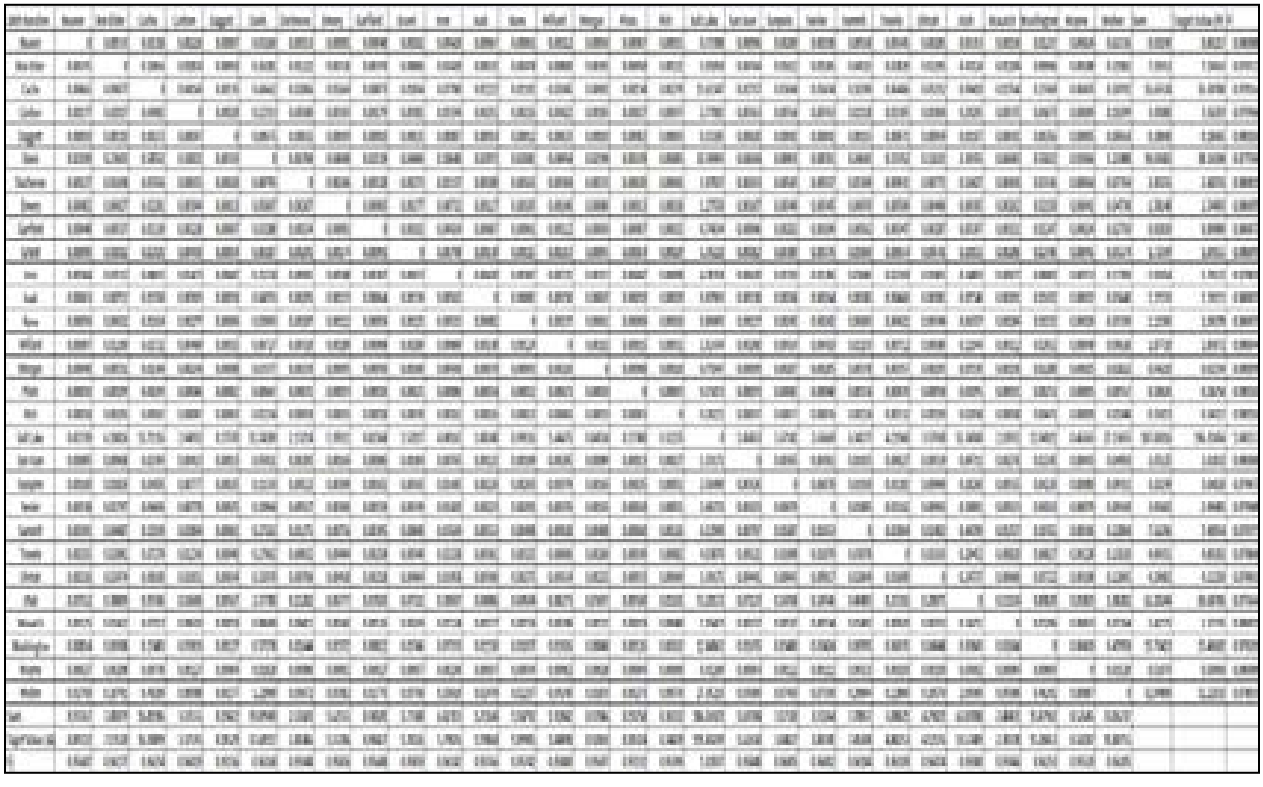
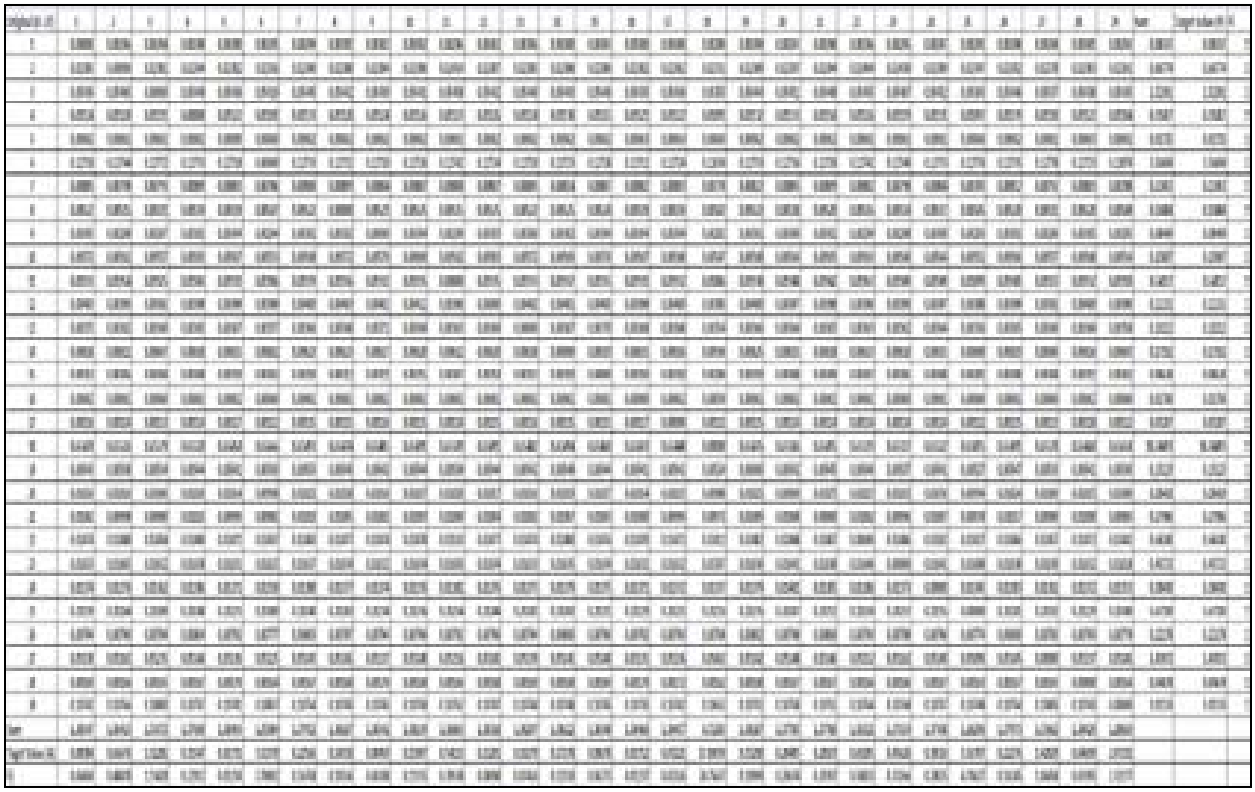


Figure H-2-13: Commodity Flow Matrix Distributed by County (Industry Code 26)



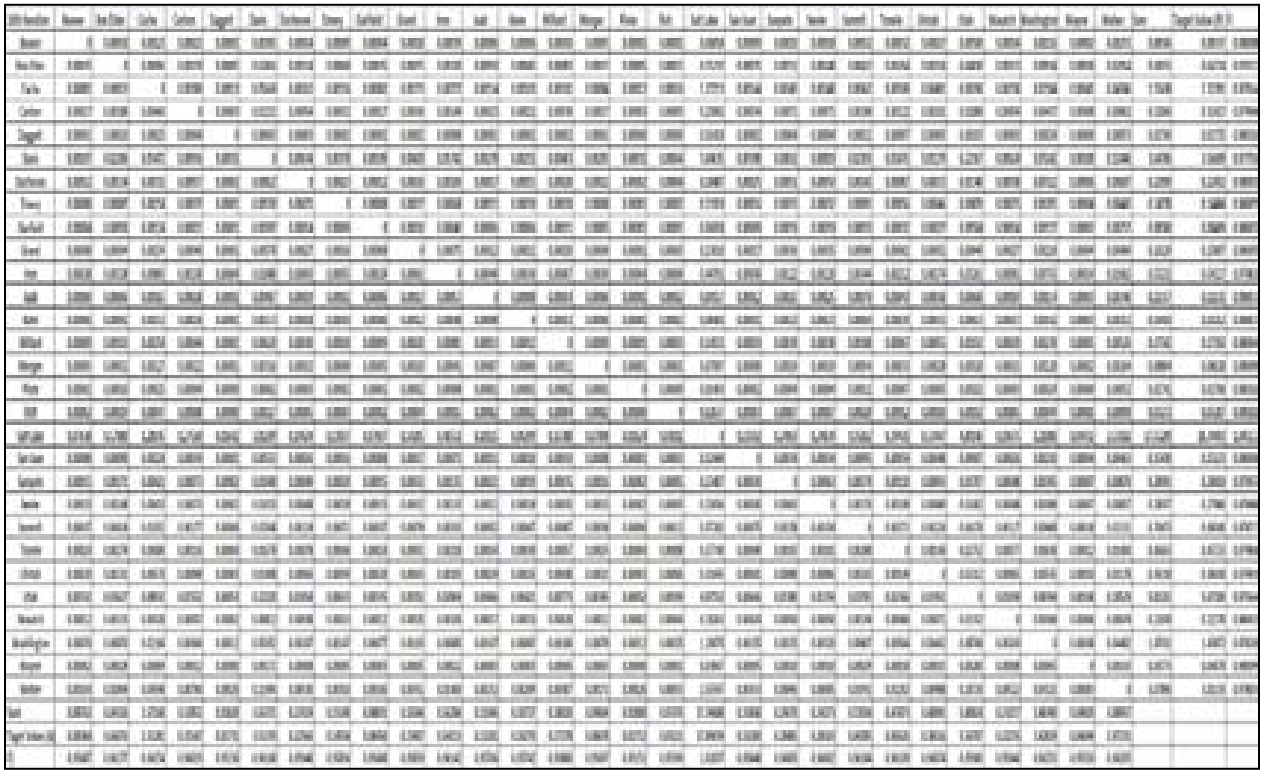
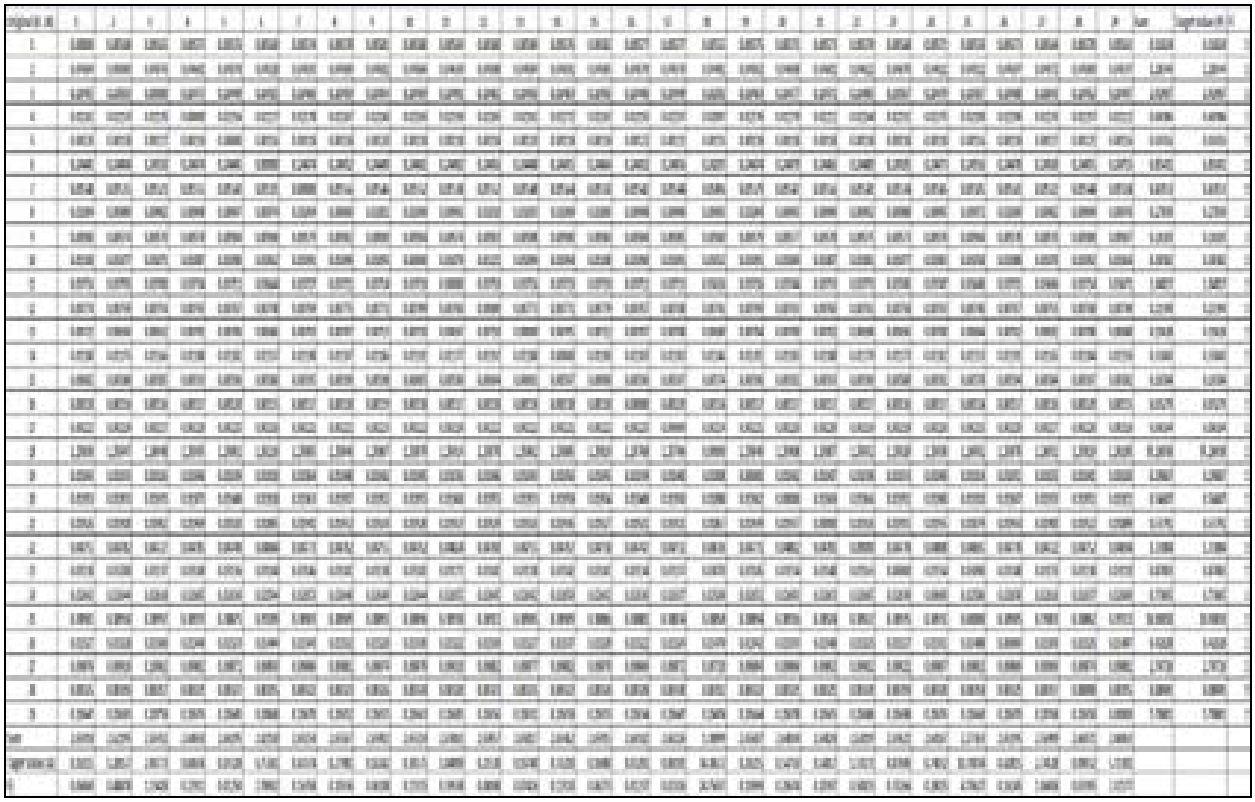


Figure H-2-14: Commodity Flow Matrix Distributed by County (Industry Code 27)



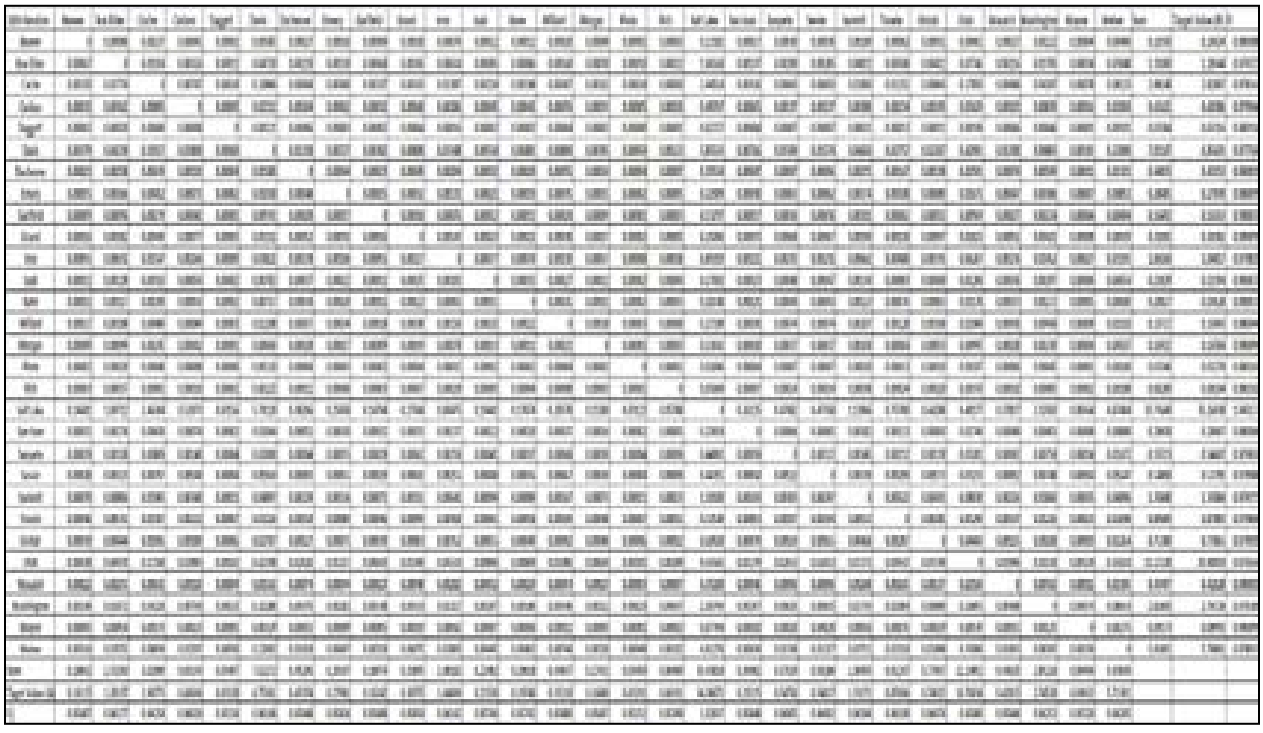
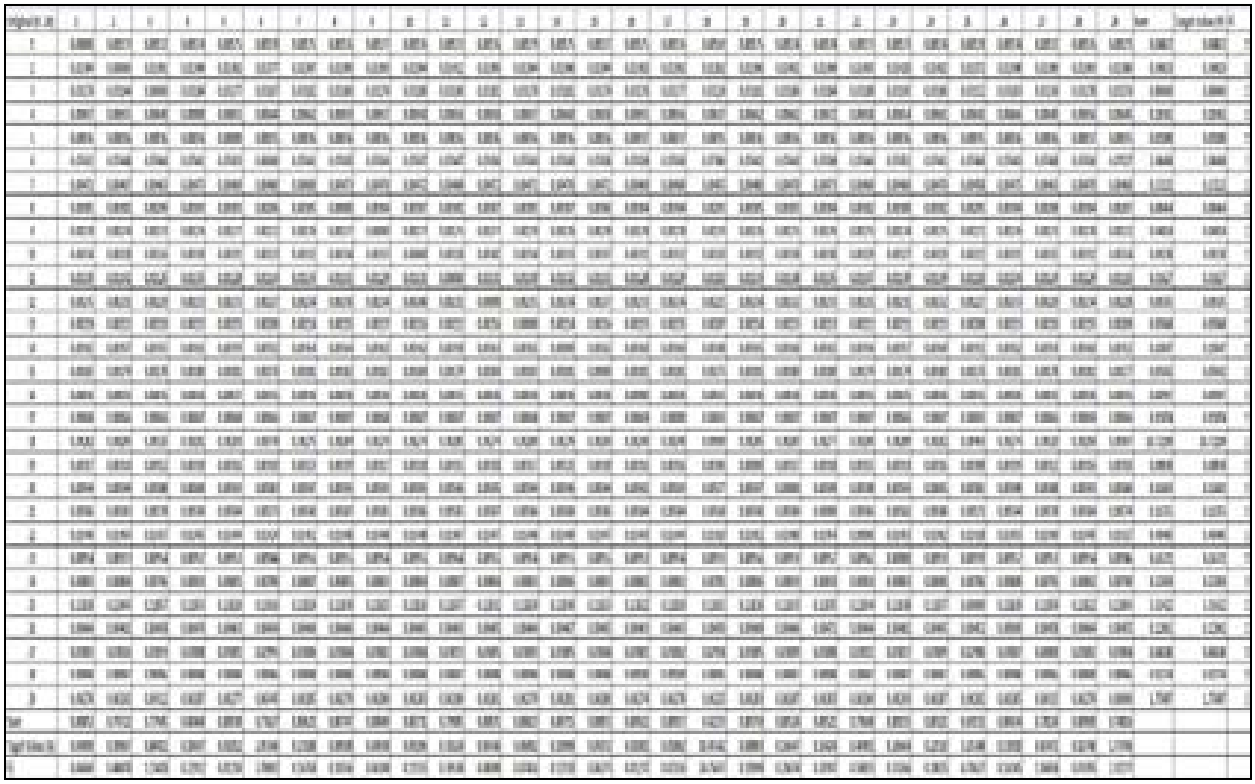


Figure H-2-15: Commodity Flow Matrix Distributed by County (Industry Code 28)



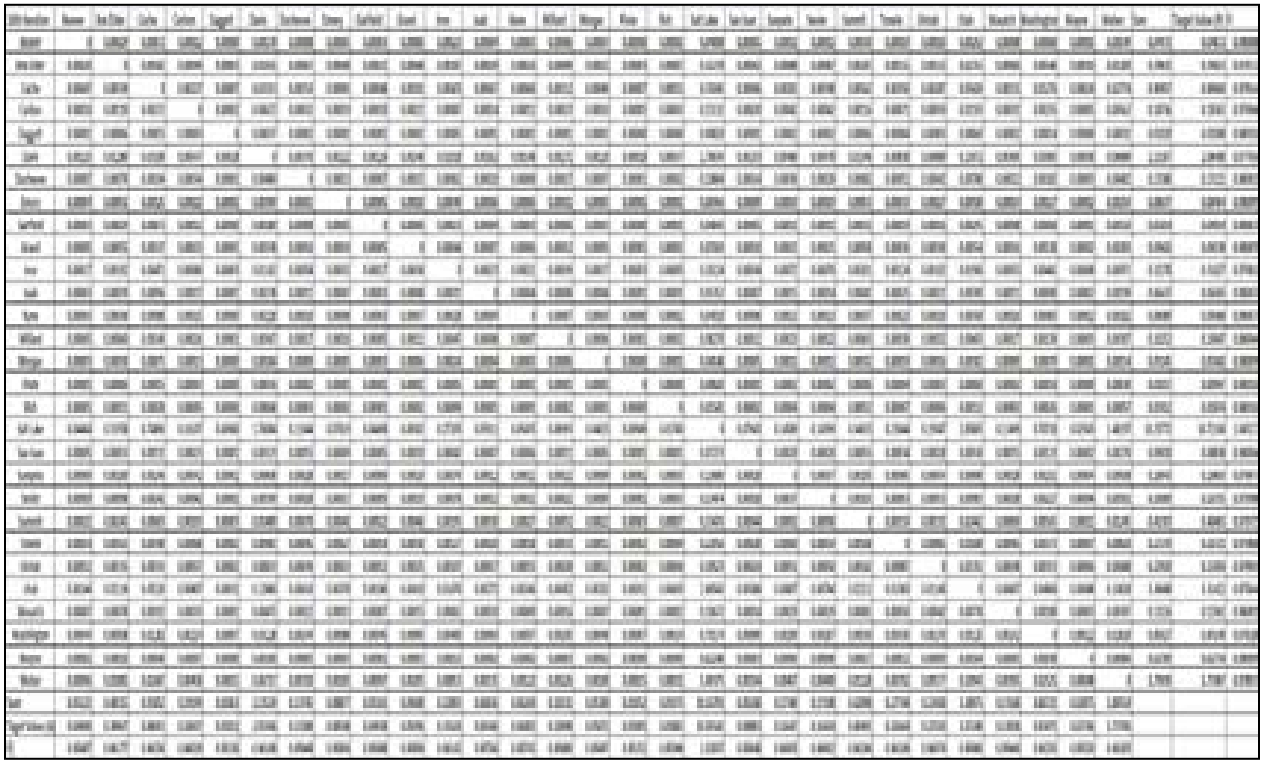
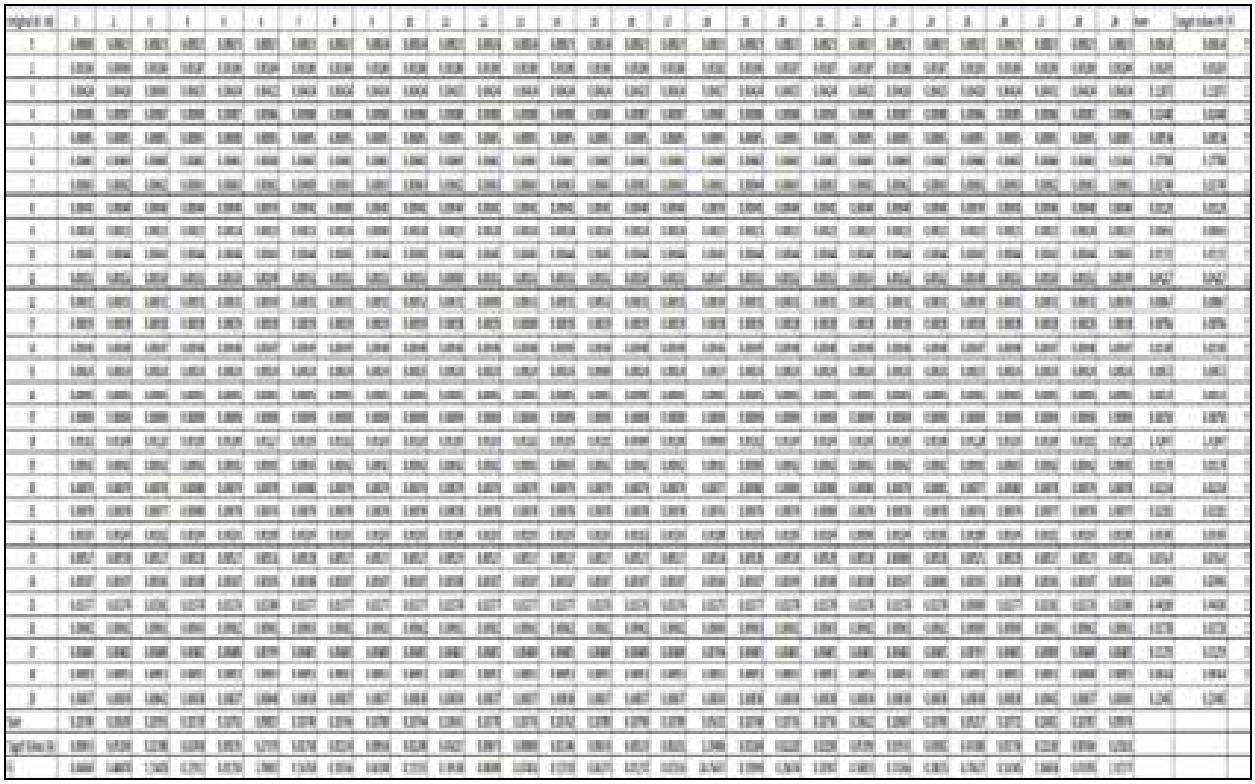


Figure H-2-16: Commodity Flow Matrix Distributed by County (Industry Code 29)



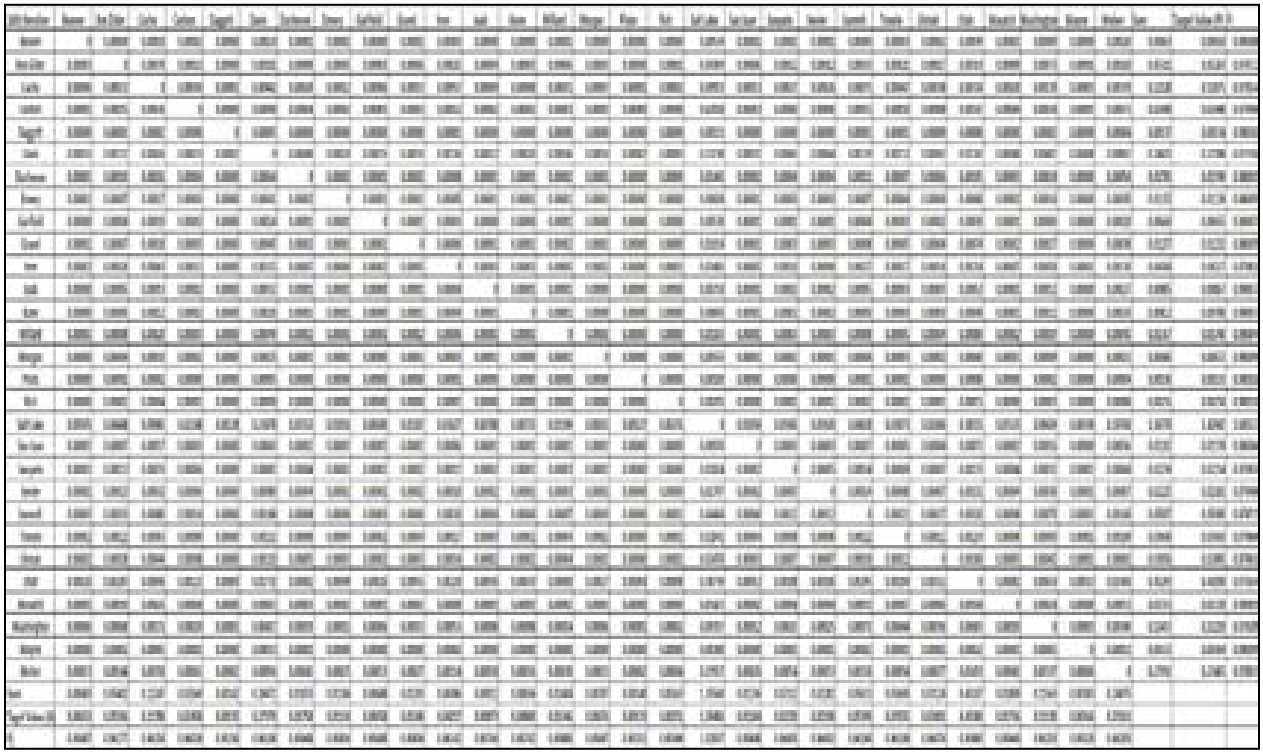
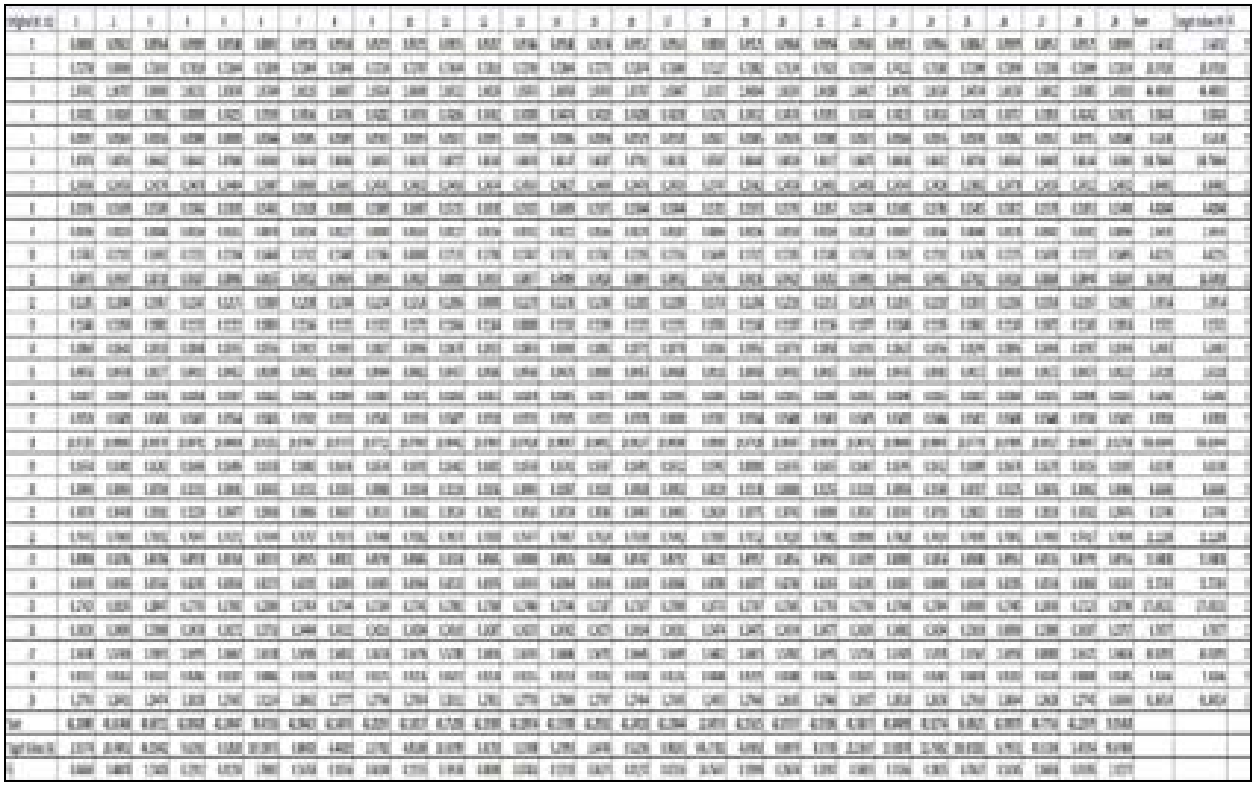


Figure H-2-17: Commodity Flow Matrix Distributed by County (Industry Code 30)



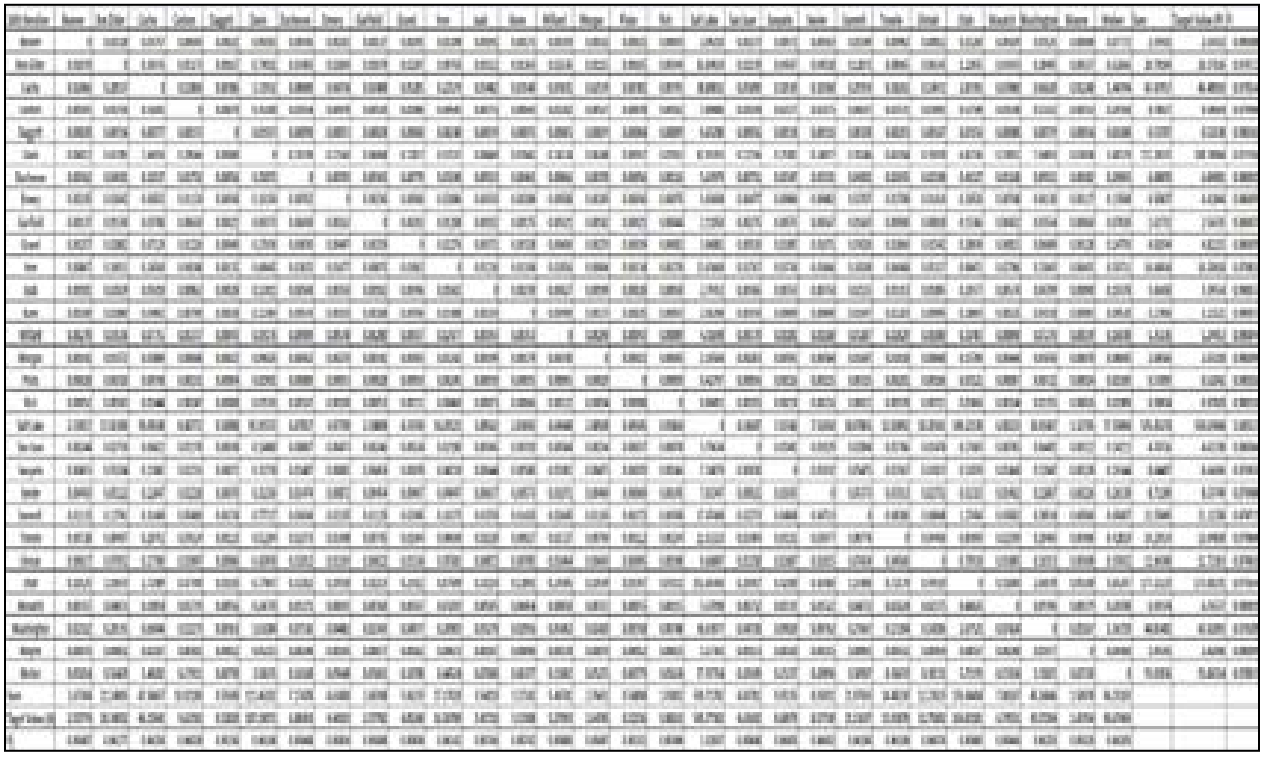
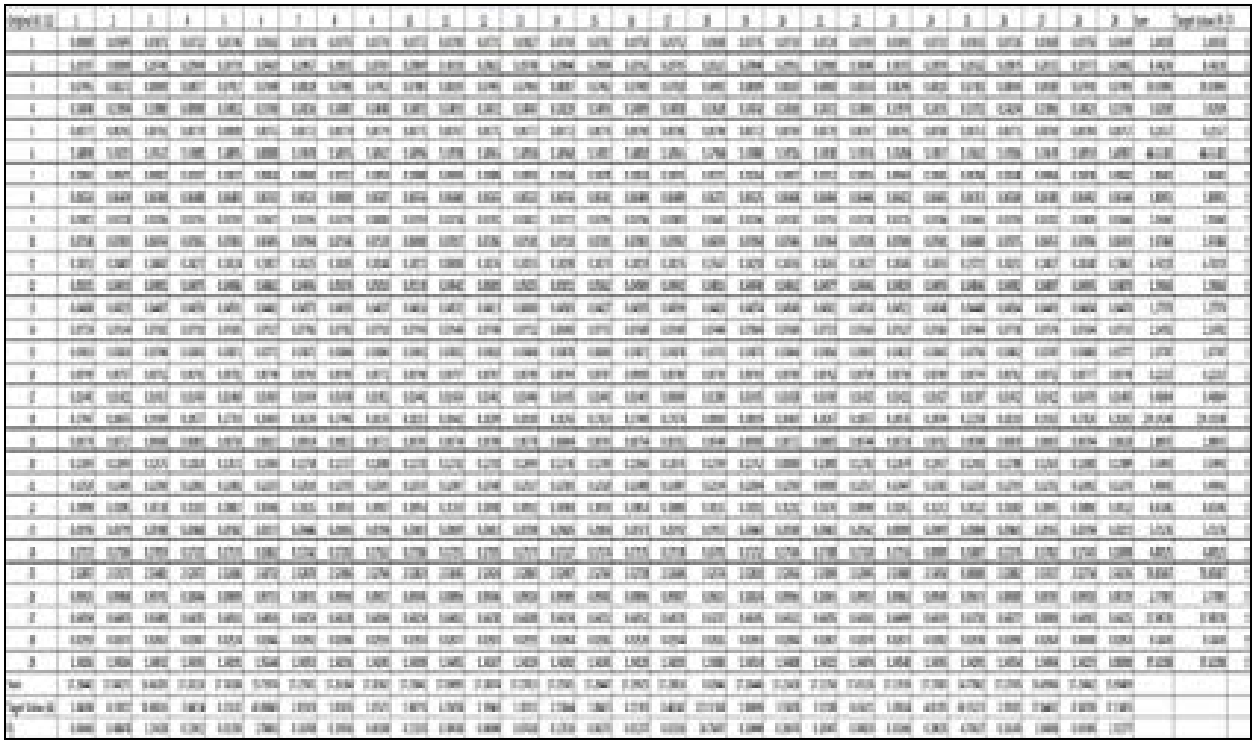


Figure H-2-18: Commodity Flow Matrix Distributed by County (Industry Code 31)



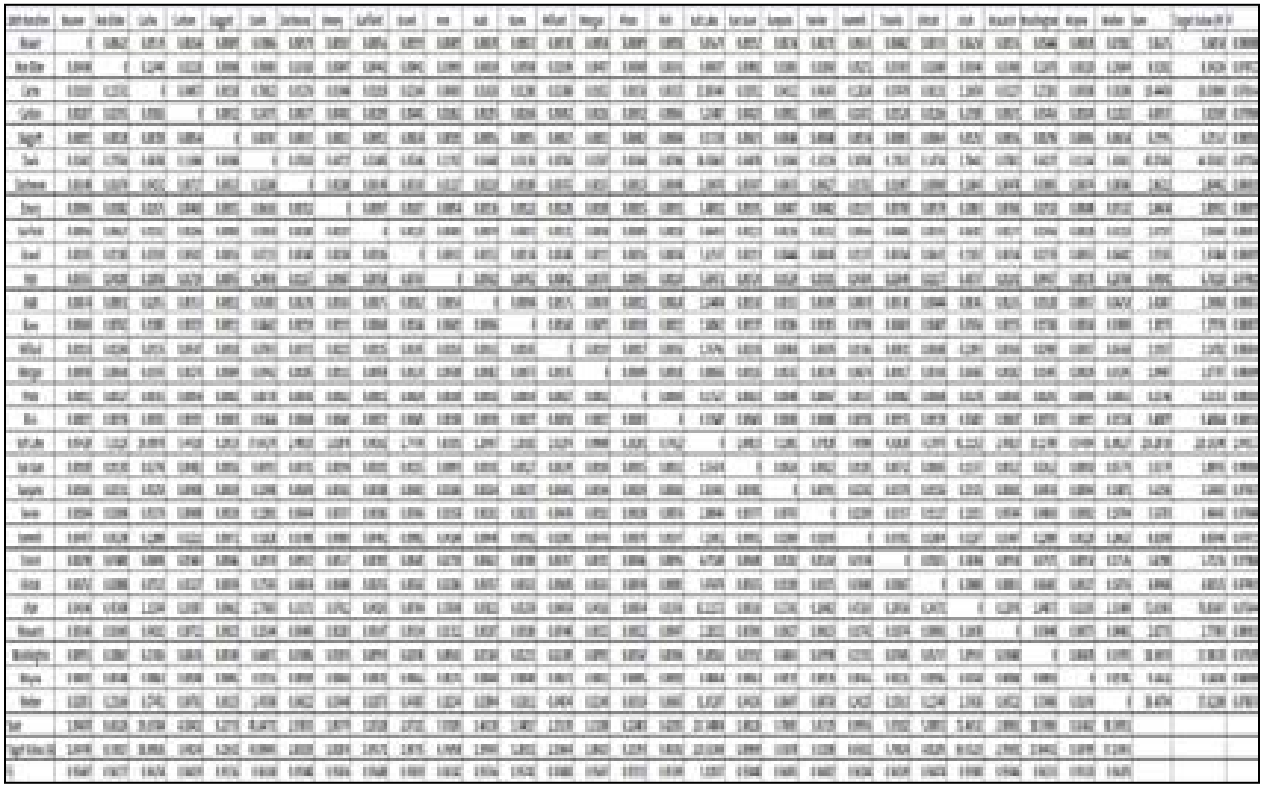


Figure H-2-19: Commodity Flow Matrix Distributed by County (Industry Code 32)

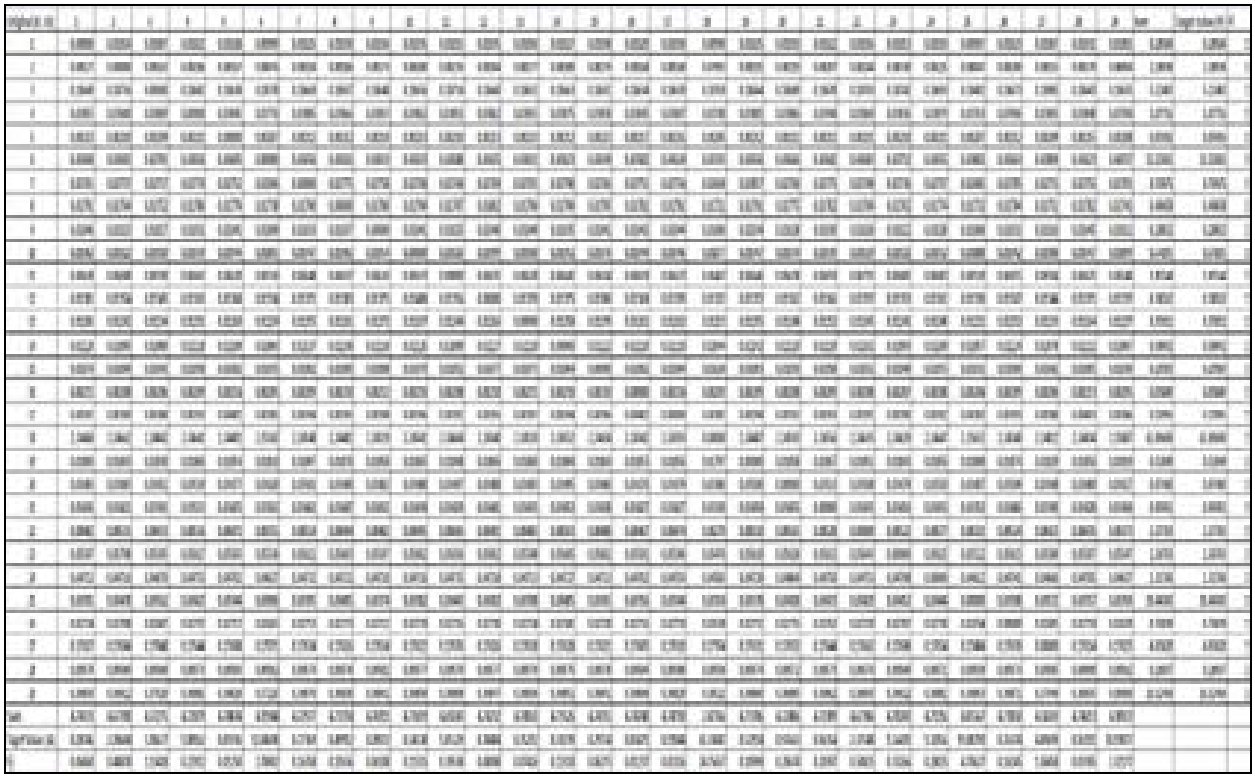
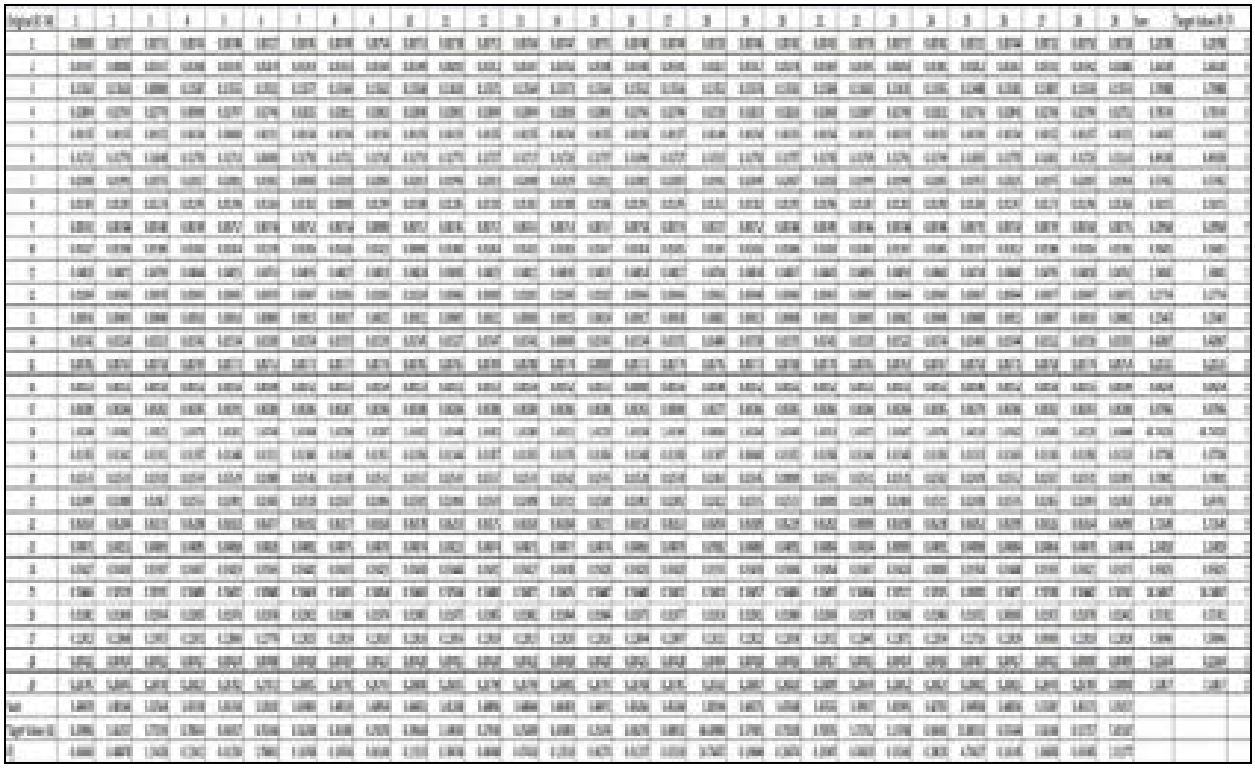


Figure H-2-20: Commodity Flow Matrix Distributed by County (Industry Code 33)



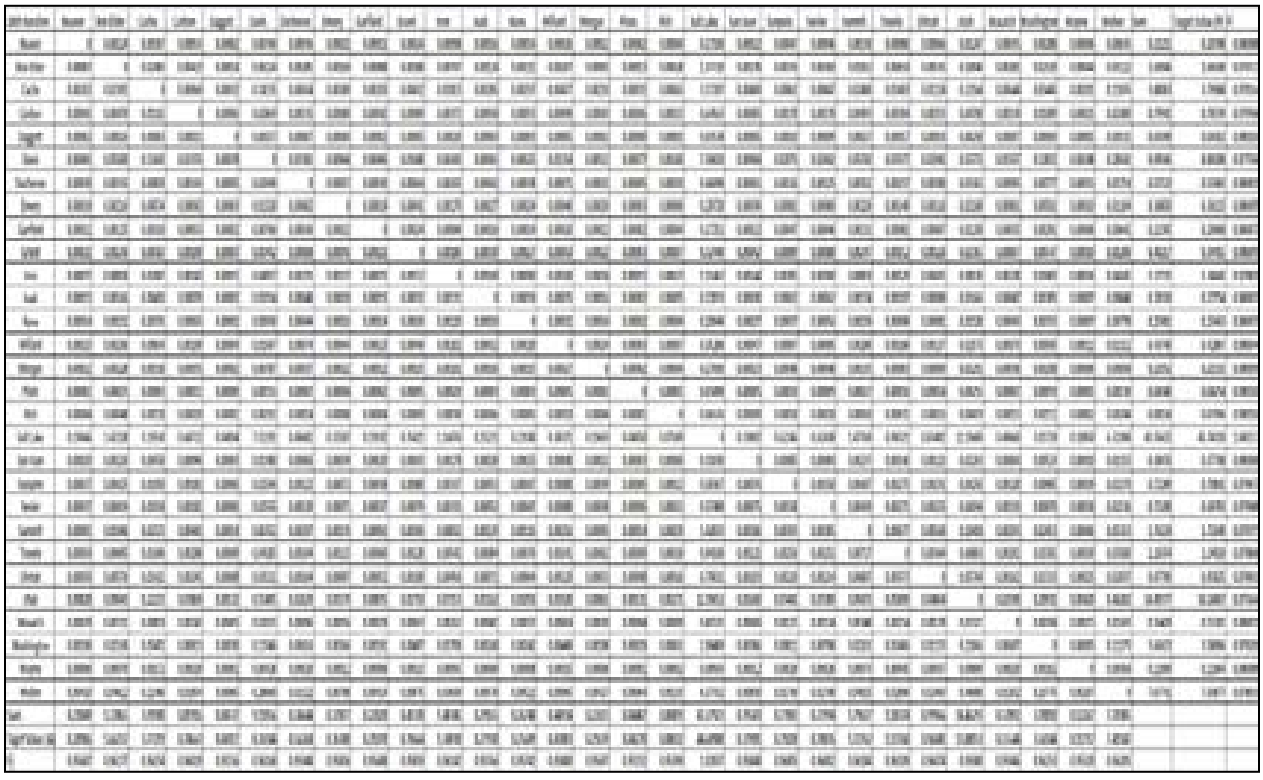
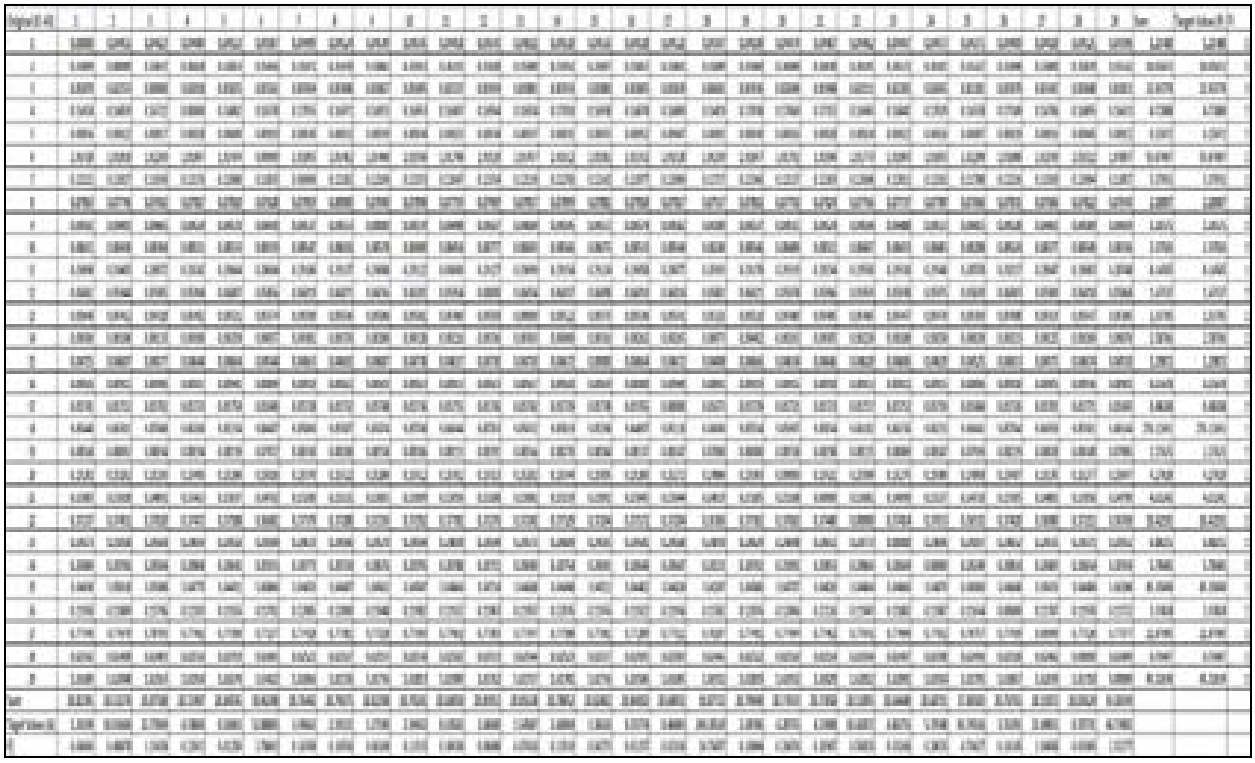


Figure H-2-21: Commodity Flow Matrix Distributed by County (Industry Code 34)



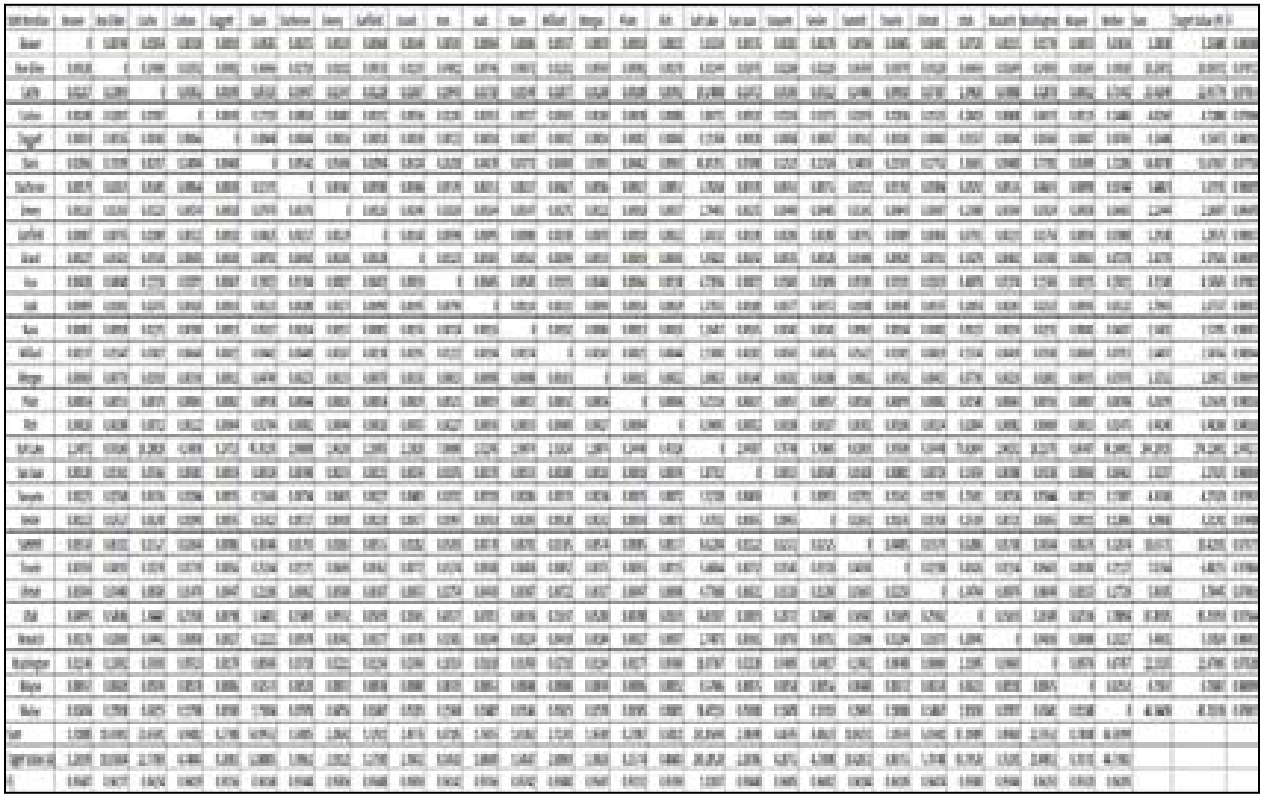
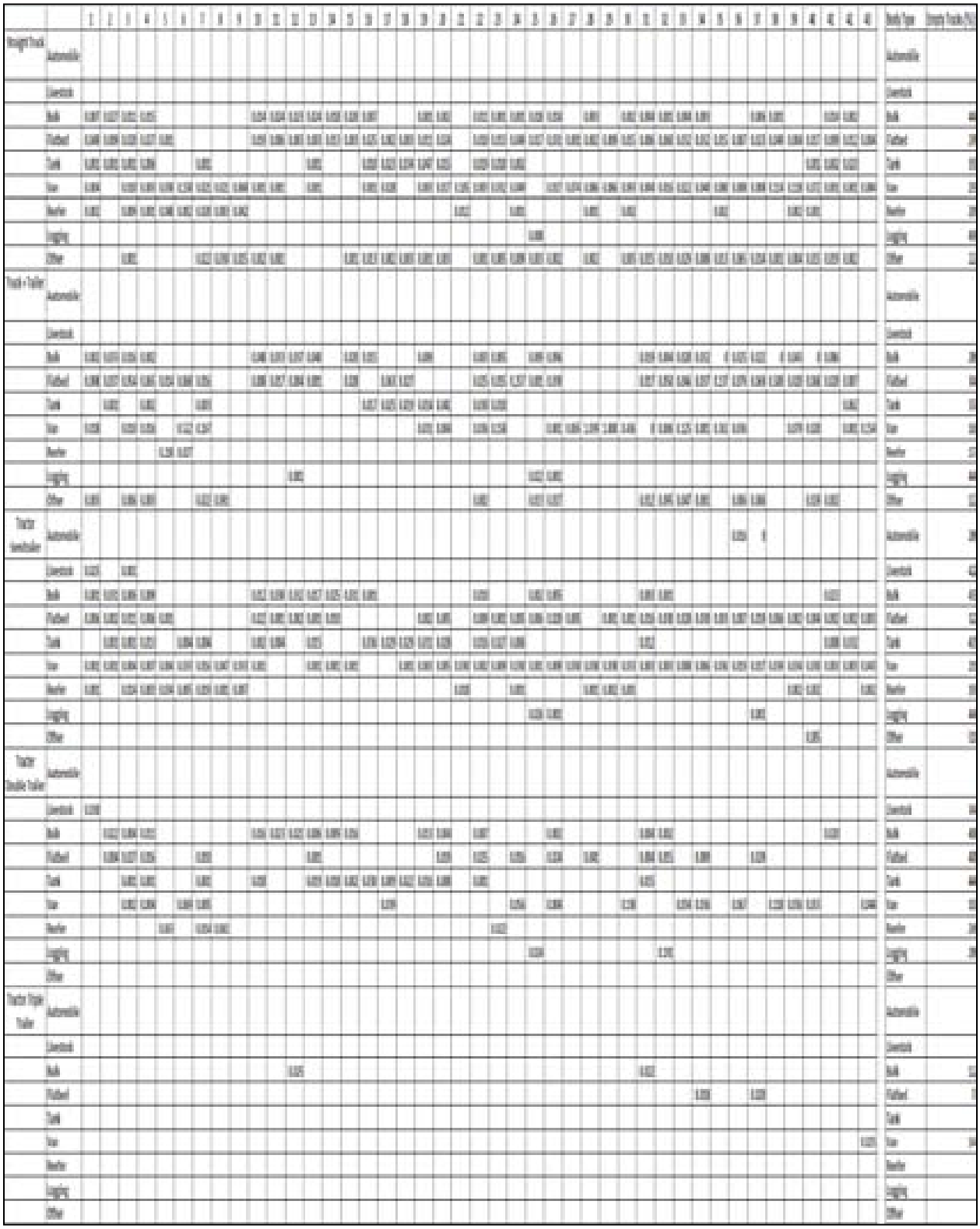


Figure H-2-22: Commodity Flow Matrix Distributed by County (Industry Code 43)

H-2-2 Truck Equivalent Factors Used in FAF-2 Tonnage to Truck

Table H-2-1: Truck Equivalent Factors Used in FAF-2 Tonnage to Truck



H-2-3 Converted Commodity Flow to Number of Truck Vehicles

H-2-3-1 Total Converted Number of Trucks Within Utah

Table H-2-2: Total Converted Daily Number of Trucks Excluded Empty Trucks

All	Beaver	Box Elder	Cache	Carbon	Daggett	Davis	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Millard	Morgan	Piute	Rich	Salt Lake	San Juan	Sanpete	Sevier	Summit	Tooele	Uintah	Utah	Wasatch	Washingt	Wayne	Weber	Productio
Beaver	0.00	0.14	0.35	0.06	0.00	0.86	0.04	0.02	0.01	0.03	0.11	0.02	0.02	0.03	0.01	0.00	0.00	19.46	0.03	0.05	0.05	0.15	0.09	0.08	1.42	0.04	0.33	0.01	0.72	24.14
Box Elder	0.10	0.00	2.83	0.48	0.02	6.97	0.32	0.19	0.10	0.21	0.91	0.14	0.13	0.24	0.10	0.02	0.03	156.76	0.20	0.43	0.42	1.20	0.75	0.61	11.44	0.32	2.65	0.05	5.83	193.44
Cache	0.23	2.62	0.00	1.10	0.04	16.09	0.74	0.44	0.23	0.49	2.06	0.32	0.29	0.54	0.24	0.04	0.07	361.06	0.47	0.98	0.96	2.73	1.70	1.39	26.37	0.73	6.20	0.12	13.47	441.74
Carbon	0.05	0.53	1.32	0.00	0.01	3.27	0.15	0.09	0.05	0.10	0.42	0.07	0.06	0.11	0.05	0.01	0.02	73.49	0.10	0.20	0.20	0.56	0.35	0.29	5.36	0.15	1.24	0.02	2.73	90.99
Daggett	0.00	0.03	0.07	0.01	0.00	0.18	0.01	0.00	0.00	0.01	0.02	0.00	0.00	0.01	0.00	0.00	0.00	4.03	0.01	0.01	0.01	0.03	0.02	0.02	0.29	0.01	0.07	0.00	0.15	5.00
Davis	0.56	6.26	15.53	2.66	0.09	0.00	1.80	1.07	0.56	1.19	4.94	0.79	0.71	1.31	0.58	0.09	0.18	864.63	1.13	2.36	2.32	6.54	4.07	3.35	63.48	1.77	14.59	0.28	32.49	1035.36
Duchesne	0.03	0.38	0.94	0.16	0.01	2.33	0.00	0.07	0.03	0.07	0.30	0.05	0.04	0.08	0.04	0.01	0.01	52.47	0.07	0.14	0.14	0.40	0.25	0.20	3.83	0.11	0.88	0.02	1.95	65.02
Emery	0.02	0.25	0.61	0.10	0.00	1.50	0.07	0.00	0.02	0.05	0.19	0.03	0.03	0.05	0.02	0.00	0.01	33.83	0.04	0.09	0.09	0.26	0.16	0.13	2.47	0.07	0.57	0.01	1.26	41.94
Garfield	0.01	0.14	0.35	0.06	0.00	0.87	0.04	0.02	0.00	0.03	0.11	0.02	0.02	0.03	0.01	0.00	0.00	19.64	0.03	0.05	0.05	0.15	0.09	0.08	1.43	0.04	0.33	0.01	0.73	24.35
Grand	0.02	0.27	0.66	0.11	0.00	1.64	0.08	0.05	0.02	0.00	0.21	0.03	0.03	0.06	0.03	0.00	0.01	36.92	0.05	0.10	0.10	0.28	0.17	0.14	2.69	0.08	0.62	0.01	1.37	45.78
Iron	0.08	0.93	2.29	0.39	0.01	5.64	0.26	0.16	0.08	0.17	0.00	0.11	0.10	0.19	0.08	0.01	0.03	126.87	0.16	0.35	0.34	0.98	0.60	0.49	9.25	0.26	2.14	0.04	4.72	156.76
Juab	0.02	0.19	0.47	0.08	0.00	1.15	0.05	0.03	0.02	0.04	0.15	0.00	0.02	0.04	0.02	0.00	0.01	25.99	0.03	0.07	0.07	0.20	0.12	0.10	1.90	0.05	0.44	0.01	0.97	32.23
Kane	0.02	0.17	0.43	0.07	0.00	1.06	0.05	0.03	0.02	0.03	0.14	0.02	0.00	0.04	0.02	0.00	0.00	23.85	0.03	0.07	0.06	0.18	0.11	0.09	1.74	0.05	0.40	0.01	0.89	29.57
Millard	0.03	0.29	0.72	0.12	0.00	1.78	0.08	0.05	0.03	0.06	0.23	0.04	0.03	0.00	0.03	0.00	0.01	40.16	0.05	0.11	0.11	0.31	0.19	0.16	2.93	0.08	0.68	0.01	1.49	49.79
Morgan	0.01	0.15	0.36	0.06	0.00	0.90	0.04	0.03	0.01	0.03	0.12	0.02	0.02	0.03	0.00	0.00	0.00	20.14	0.03	0.06	0.05	0.15	0.09	0.08	1.47	0.04	0.34	0.01	0.75	24.99
Piute	0.00	0.03	0.07	0.01	0.00	0.18	0.01	0.00	0.00	0.01	0.02	0.00	0.00	0.01	0.00	0.00	0.00	3.98	0.01	0.01	0.01	0.03	0.02	0.02	0.29	0.01	0.07	0.00	0.15	4.94
Rich	0.00	0.05	0.13	0.02	0.00	0.33	0.02	0.01	0.00	0.01	0.04	0.01	0.01	0.01	0.01	0.00	0.00	7.48	0.01	0.02	0.02	0.06	0.04	0.03	0.55	0.02	0.13	0.00	0.28	9.29
Salt Lake	21.68	162.01	363.71	78.22	4.66	855.16	56.55	37.00	21.85	40.32	132.12	28.71	26.39	43.68	22.42	4.61	8.55	0.00	38.58	70.85	69.93	168.20	111.91	94.93	1388.32	55.84	343.45	12.35	719.73	4981.73
San Juan	0.02	0.26	0.63	0.11	0.00	1.57	0.08	0.04	0.02	0.05	0.20	0.03	0.03	0.05	0.02	0.00	0.01	35.32	0.00	0.10	0.10	0.27	0.17	0.14	2.58	0.07	0.60	0.01	1.31	43.80
Sanpete	0.04	0.48	1.19	0.21	0.01	2.95	0.14	0.08	0.04	0.09	0.38	0.06	0.05	0.10	0.04	0.01	0.01	66.44	0.09	0.00	0.18	0.51	0.31	0.26	4.84	0.14	1.12	0.02	2.47	82.28
Sevier	0.04	0.48	1.18	0.21	0.01	2.91	0.14	0.08	0.04	0.09	0.38	0.06	0.05	0.10	0.04	0.01	0.01	65.44	0.09	0.18	0.00	0.50	0.31	0.26	4.77	0.14	1.10	0.02	2.43	81.05
Summit	0.10	1.19	2.93	0.50	0.02	7.23	0.34	0.20	0.10	0.22	0.95	0.15	0.13	0.25	0.11	0.02	0.03	162.58	0.21	0.45	0.44	0.00	0.77	0.64	11.86	0.33	2.75	0.05	6.05	200.59
Tooele	0.07	0.79	1.93	0.33	0.01	4.76	0.22	0.13	0.07	0.15	0.62	0.10	0.09	0.16	0.07	0.01	0.02	107.12	0.14	0.28	0.29	0.82	0.00	0.41	7.81	0.22	1.81	0.03	3.98	132.44
Uintah	0.06	0.66	1.62	0.28	0.01	4.00	0.19	0.11	0.06	0.12	0.52	0.08	0.07	0.14	0.06	0.01	0.02	89.96	0.12	0.25	0.24	0.69	0.42	0.00	6.56	0.18	1.52	0.03	3.34	111.31
Utah	0.94	10.29	25.35	4.40	0.15	63.07	2.99	1.80	0.95	1.99	8.14	1.32	1.19	2.19	0.98	0.15	0.31	1411.05	1.89	3.92	3.86	10.74	6.71	5.54	0.00	2.95	23.82	0.48	52.59	1648.77
Wasatch	0.03	0.38	0.93	0.16	0.01	2.30	0.11	0.06	0.03	0.07	0.30	0.05	0.04	0.08	0.03	0.01	0.01	51.83	0.07	0.14	0.14	0.40	0.24	0.20	3.78	0.00	0.87	0.02	1.93	64.23
Washingt	0.22	2.47	6.23	1.04	0.03	15.19	0.70	0.42	0.22	0.46	1.94	0.31	0.28	0.51	0.23	0.03	0.07	340.80	0.44	0.92	0.91	2.57	1.60	1.31	24.89	0.69	0.00	0.11	12.72	417.31
Wayne	0.01	0.08	0.20	0.03	0.00	0.49	0.02	0.01	0.01	0.02	0.06	0.01	0.01	0.02	0.01	0.00	0.00	10.92	0.01	0.03	0.03	0.08	0.05	0.04	0.80	0.02	0.18	0.00	0.41	13.55
Weber	0.47	5.25	13.05	2.22	0.07	32.62	1.50	0.90	0.47	1.00	4.14	0.66	0.59	1.10	0.49	0.07	0.15	725.45	0.94	1.98	1.94	5.48	3.41	2.80	53.14	1.48	12.26	0.24	0.00	873.89
Attraction	24.87	196.77	446.08	93.24	5.16	1037.02	66.75	43.11	25.06	47.10	159.75	33.20	30.45	51.15	25.74	5.11	9.58	4937.68	45.01	84.21	83.09	204.45	134.74	113.79	1646.26	65.90	421.17	13.96	876.90	

Table H-2-3: Total Converted Number of Within Daily Empty Trucks

All	Beaver	Box Elder	Cache	Carbon	Daggett	Davis	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Millard	Morgan	Piute	Rich	Salt Lake	San Juan	Sanpete	Sevier	Summit	Tooele	Uintah	Utah	Wasatch	Washingt	Wayne	Weber	Productio
Beaver	0.00	0.04	0.11	0.02	0.00	0.26	0.01	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.00	0.00	0.00	5.90	0.01	0.02	0.02	0.04	0.03	0.02	0.43	0.01	0.10	0.00	0.22	7.32
Box Elder	0.03	0.00	0.86	0.15	0.00	2.11	0.10	0.06	0.03	0.06	0.27	0.04	0.04	0.07	0.03	0.00	0.01	47.51	0.06	0.13	0.13	0.36	0.23	0.18	3.47	0.10	0.80	0.02	1.77	58.63
Cache	0.07	0.79	0.00	0.33	0.01	4.88	0.23	0.13	0.07	0.15	0.63	0.10	0.09	0.16	0.07	0.01	0.02	109.43	0.14	0.30	0.29	0.83	0.51	0.42	7.99	0.22	1.88	0.03	4.08	133.88
Carbon	0.01	0.16	0.40	0.00	0.00	0.99	0.05	0.03	0.01	0.03	0.13	0.02	0.02	0.03	0.01	0.00	0.00	22.27	0.03	0.06	0.06	0.17	0.10	0.09	1.62	0.05	0.38	0.01	0.83	27.58
Daggett	0.00	0.01	0.02	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.22	0.00	0.00	0.00	0.01	0.01	0.00	0.09	0.00	0.02	0.00	0.05	1.51
Davis	0.17	1.90	4.71	0.81	0.03	0.00	0.55	0.33	0.17	0.36	1.50	0.24	0.22	0.40	0.18	0.03	0.06	262.04	0.34	0.72	0.70	1.98	1.23	1.01	19.24	0.54	4.42	0.09	9.85	313.78
Duchesne	0.01	0.12	0.29	0.05	0.00	0.71	0.00	0.02	0.01	0.02	0.09	0.01	0.01	0.02	0.01	0.00	0.00	15.90	0.02	0.04	0.04	0.12	0.07	0.06	1.16	0.03	0.27	0.01	0.59	19.71
Emery	0.01	0.07	0.18	0.03	0.00	0.46	0.02	0.00	0.01	0.01	0.06	0.01	0.01	0.02	0.01	0.00	0.00	10.25	0.01	0.03	0.03	0.08	0.05	0.04	0.75	0.02	0.17	0.00	0.38	12.71
Garfield	0.00	0.04	0.11	0.02	0.00	0.26	0.01	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.00	0.00	0.00	5.95	0.01	0.02	0.02	0.05	0.03	0.02	0.43	0.01	0.10	0.00	0.22	7.38
Grand	0.01	0.08	0.20	0.03	0.00	0.50	0.02	0.01	0.01	0.00	0.06	0.01	0.01	0.02	0.01	0.00	0.00	11.19	0.01	0.03	0.03	0.09	0.05	0.04	0.82	0.02	0.19	0.00	0.42	13.87
Iron	0.02	0.28	0.69	0.12	0.00	1.71	0.08	0.05	0.02	0.05	0.00	0.03	0.03	0.06	0.03	0.00	0.01	38.45	0.05	0.11	0.10	0.30	0.18	0.15	2.80	0.08	0.65	0.01	1.43	47.51
Juab	0.01	0.06	0.14	0.02	0.00	0.35	0.02	0.01	0.01	0.01	0.05	0.00	0.01	0.01	0.01	0.00	0.00	7.88	0.01	0.02	0.02	0.06	0.04	0.03	0.57	0.02	0.13	0.00	0.29	9.77
Kane	0.00	0.05	0.13	0.02	0.00	0.32	0.02	0.01	0.00	0.01	0.04	0.01	0.00	0.01	0.00	0.00	0.00	7.23	0.01	0.02	0.02	0.05	0.03	0.03	0.53	0.01	0.12	0.00	0.27	8.96
Millard	0.01	0.09	0.22	0.04	0.00	0.54	0.03	0.02	0.01	0.02	0.07	0.01	0.01	0.00	0.01	0.00	0.00	12.17	0.02	0.03	0.03	0.09	0.06	0.05	0.89	0.03	0.21	0.00	0.45	15.09
Morgan	0.00	0.04	0.11	0.02	0.00	0.27	0.01	0.01	0.00	0.01	0.04	0.01	0.01	0.01	0.00	0.00	0.00	6.10	0.01	0.02	0.02	0.05	0.03	0.02	0.45	0.01	0.10	0.00	0.23	7.57
Piute	0.00	0.01	0.02	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.21	0.00	0.00	0.00	0.01	0.01	0.00	0.09	0.00	0.02	0.00	0.04	1.50
Rich	0.00	0.02	0.04	0.01	0.00	0.10	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	2.27	0.00	0.01	0.01	0.02	0.01	0.01	0.17	0.00	0.04	0.00	0.08	2.81
Salt Lake	6.57	49.10	110.23	23.71	1.41	259.17	17.14	11.21	6.62	12.22	40.04	8.70	8.00	13.24	6.79	1.40	2.59	0.00	11.69	21.47	21.19	50.98	33.92	28.77	420.76	16.92	104.09	3.74	218.13	1509.81
San Juan	0.01	0.08	0.19	0.03	0.00	0.48	0.02	0.01	0.01	0.01	0.06	0.01	0.01	0.02	0.01	0.00	0.00	10.70	0.00	0.03	0.03	0.08	0.05	0.04	0.78	0.02	0.18	0.00	0.40	13.27
Sanpete	0.01	0.15	0.36	0.06	0.00	0.89	0.04	0.02	0.01	0.03	0.12	0.02	0.02	0.03	0.01	0.00	0.00	20.13	0.03	0.00	0.05	0.15	0.09	0.08	1.47	0.04	0.34	0.01	0.75	24.94
Sevier	0.01	0.14	0.36	0.06	0.00	0.88	0.04	0.02	0.01	0.03	0.11	0.02	0.02	0.03	0.01	0.00	0.00	19.83	0.03	0.05	0.00	0.15	0.09	0.08	1.45	0.04	0.33	0.01	0.74	24.56
Summit	0.03	0.36	0.89	0.15	0.00	2.19	0.10	0.06	0.03	0.07	0.29	0.04	0.04	0.07	0.03	0.00	0.01	49.27	0.06	0.14	0.13	0.00	0.23	0.19	3.59	0.10	0.83	0.02	1.83	60.79
Tooele	0.02	0.24	0.59	0.10	0.00	1.44	0.07	0.04	0.02	0.04	0.19	0.03	0.03	0.05	0.02	0.00	0.01	32.46	0.04	0.09	0.09	0.25	0.00	0.13	2.37	0.07	0.55	0.01	1.21	40.14
Uintah	0.02	0.20	0.49	0.08	0.00	1.21	0.06	0.03	0.02	0.04	0.16	0.02	0.02	0.04	0.02	0.00	0.01	27.26	0.04	0.08	0.07	0.21	0.13	0.00	1.99	0.06	0.46	0.01	1.01	33.73
Utah	0.29	3.12	7.68	1.33	0.05	19.11	0.91	0.54	0.29	0.60	2.47	0.40	0.36	0.67	0.30	0.05	0.09	427.64	0.57	1.19	1.17	3.25	2.03	1.68	0.00	0.89	7.22	0.14	15.94	499.99
Wasatch	0.01	0.11	0.28	0.05	0.00	0.70	0.03	0.02	0.01	0.02	0.09	0.01	0.01	0.02	0.01	0.00	0.00	15.71	0.02	0.04	0.04	0.12	0.07	0.06	1.15	0.00	0.26	0.01	0.58	19.47
Washingt	0.07	0.75	1.89	0.32	0.01	4.60	0.21	0.13	0.07	0.14	0.59	0.09	0.08	0.15	0.07	0.01	0.02	103.29	0.13	0.28	0.28	0.78	0.49	0.40	7.54	0.21	0.00	0.03	3.86	126.47
Wayne	0.00	0.02	0.06	0.01	0.00	0.15	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.01	0.00	0.00	0.00	3.31	0.00	0.01	0.01	0.03	0.02	0.01	0.24	0.01	0.06	0.00	0.12	4.11
Weber	0.14	1.59	3.96	0.67	0.02	9.89	0.46	0.27	0.14	0.30	1.26	0.20	0.18	0.33	0.15	0.02	0.05	219.66	0.29	0.60	0.59	1.66	1.03	0.85	15.04	0.42	3.47	0.07	0.00	263.50
Attraction	7.54	59.63	135.19	28.26	1.57	314.28	20.23	13.07	7.60	14.27	48.41	10.06	9.23	15.50	7.80	1.55	2.80	1486.46	13.64	25.52	25.18	61.96	40.84	34.49	497.86	19.94	127.40	4.23	265.76	

Table H-2-4: Total Converted Number of Within Daily Trucks Included Empty Trucks

All	Beaver	Box Elder	Cache	Carbon	Daggett	Davis	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Millard	Morgan	Piute	Rich	Salt Lake	San Juan	Sanpete	Sevier	Summit	Tooele	Uintah	Utah	Wasatch	Washingt	Wayne	Weber	Productio
Beaver	0.00	0.18	0.46	0.08	0.00	1.13	0.05	0.03	0.02	0.04	0.15	0.02	0.02	0.04	0.02	0.00	0.01	25.36	0.03	0.07	0.07	0.19	0.12	0.10	1.85	0.05	0.43	0.01	0.94	31.46
Box Elder	0.13	0.00	3.68	0.63	0.02	9.08	0.42	0.25	0.13	0.28	1.18	0.18	0.17	0.31	0.14	0.02	0.04	204.27	0.26	0.56	0.55	1.56	0.98	0.79	14.90	0.42	3.45	0.07	7.60	252.07
Cache	0.30	3.41	0.00	1.44	0.05	20.97	0.97	0.58	0.30	0.64	2.69	0.42	0.38	0.71	0.31	0.05	0.10	470.49	0.61	1.28	1.26	3.56	2.21	1.82	34.36	0.96	8.08	0.15	17.55	575.62
Carbon	0.06	0.70	1.72	0.00	0.01	4.26	0.20	0.12	0.06	0.13	0.55	0.09	0.08	0.15	0.06	0.01	0.02	95.76	0.13	0.26	0.26	0.73	0.45	0.37	6.98	0.20	1.62	0.03	3.56	118.57
Daggett	0.00	0.04	0.09	0.02	0.00	0.23	0.01	0.01	0.00	0.01	0.03	0.00	0.00	0.01	0.00	0.00	0.00	5.25	0.01	0.01	0.01	0.04	0.02	0.02	0.38	0.01	0.09	0.00	0.19	6.51
Davis	0.73	8.16	20.24	3.46	0.12	0.00	2.34	1.40	0.74	1.55	6.44	1.03	0.93	1.71	0.76	0.11	0.24	1126.68	1.47	3.08	3.03	8.52	5.31	4.36	82.72	2.31	19.02	0.37	42.33	1349.14
Duchesne	0.04	0.50	1.23	0.21	0.01	3.04	0.00	0.09	0.04	0.09	0.39	0.06	0.06	0.10	0.05	0.01	0.01	68.37	0.09	0.19	0.19	0.52	0.32	0.27	4.99	0.14	1.15	0.02	2.54	84.73
Emery	0.03	0.32	0.79	0.14	0.00	1.96	0.09	0.00	0.03	0.06	0.25	0.04	0.04	0.07	0.03	0.00	0.01	44.08	0.06	0.12	0.12	0.34	0.21	0.17	3.22	0.09	0.74	0.01	1.64	54.66
Garfield	0.02	0.19	0.46	0.08	0.00	1.14	0.05	0.03	0.00	0.04	0.15	0.02	0.02	0.04	0.02	0.00	0.01	25.59	0.03	0.07	0.07	0.19	0.12	0.10	1.87	0.05	0.43	0.01	0.95	31.73
Grand	0.03	0.35	0.86	0.15	0.00	2.14	0.10	0.06	0.03	0.00	0.28	0.04	0.04	0.07	0.03	0.00	0.01	48.12	0.06	0.13	0.13	0.37	0.23	0.19	3.51	0.10	0.81	0.02	1.79	59.65
Iron	0.11	1.21	2.98	0.51	0.02	7.35	0.34	0.20	0.11	0.23	0.00	0.15	0.13	0.25	0.11	0.02	0.03	166.32	0.21	0.45	0.44	1.27	0.78	0.64	12.06	0.34	2.79	0.05	6.15	204.27
Juab	0.02	0.25	0.61	0.10	0.00	1.50	0.07	0.04	0.02	0.05	0.19	0.00	0.03	0.05	0.02	0.00	0.01	33.87	0.04	0.09	0.09	0.26	0.16	0.13	2.47	0.07	0.57	0.01	1.26	42.00
Kane	0.02	0.23	0.56	0.10	0.00	1.38	0.06	0.04	0.02	0.04	0.18	0.03	0.00	0.05	0.02	0.00	0.01	31.07	0.04	0.08	0.08	0.24	0.15	0.12	2.27	0.06	0.52	0.01	1.15	38.54
Millard	0.03	0.38	0.94	0.16	0.01	2.32	0.11	0.07	0.03	0.07	0.30	0.05	0.04	0.00	0.04	0.01	0.01	52.34	0.07	0.14	0.14	0.40	0.25	0.20	3.82	0.11	0.88	0.02	1.94	64.88
Morgan	0.02	0.19	0.47	0.08	0.00	1.17	0.05	0.03	0.02	0.04	0.15	0.02	0.02	0.04	0.00	0.00	0.01	26.25	0.03	0.07	0.07	0.20	0.12	0.10	1.91	0.05	0.44	0.01	0.98	32.56
Piute	0.00	0.04	0.09	0.02	0.00	0.23	0.01	0.01	0.00	0.01	0.03	0.00	0.00	0.01	0.00	0.00	0.00	5.19	0.01	0.01	0.01	0.04	0.02	0.02	0.38	0.01	0.09	0.00	0.19	6.44
Rich	0.01	0.07	0.18	0.03	0.00	0.43	0.02	0.01	0.01	0.01	0.06	0.01	0.01	0.01	0.01	0.00	0.00	9.75	0.01	0.03	0.03	0.07	0.05	0.04	0.71	0.02	0.16	0.00	0.36	12.10
Salt Lake	28.25	211.11	473.94	101.93	6.07	1114.34	73.69	48.22	28.47	52.54	172.17	37.41	34.39	56.91	29.21	6.01	11.14	0.00	50.27	92.33	91.13	219.18	145.83	123.70	1809.08	72.77	447.53	16.09	937.86	6491.54
San Juan	0.03	0.33	0.83	0.14	0.00	2.05	0.10	0.06	0.03	0.06	0.26	0.04	0.04	0.07	0.03	0.00	0.01	46.02	0.00	0.13	0.12	0.35	0.22	0.18	3.36	0.10	0.78	0.01	1.71	57.07
Sanpete	0.06	0.63	1.56	0.27	0.01	3.85	0.18	0.11	0.06	0.12	0.50	0.08	0.07	0.13	0.06	0.01	0.02	86.57	0.11	0.00	0.23	0.66	0.41	0.34	6.31	0.18	1.46	0.03	3.22	107.22
Sevier	0.05	0.62	1.53	0.27	0.01	3.79	0.18	0.11	0.06	0.12	0.49	0.08	0.07	0.13	0.06	0.01	0.02	85.27	0.11	0.23	0.00	0.65	0.40	0.33	6.22	0.18	1.44	0.03	3.17	105.62
Summit	0.14	1.55	3.82	0.65	0.02	9.42	0.44	0.26	0.14	0.29	1.23	0.19	0.17	0.32	0.14	0.02	0.04	211.05	0.28	0.58	0.57	0.00	1.00	0.83	15.45	0.43	3.58	0.07	7.88	261.38
Tooele	0.09	1.03	2.52	0.43	0.01	6.21	0.29	0.17	0.09	0.19	0.80	0.12	0.11	0.21	0.09	0.01	0.03	139.58	0.18	0.38	0.37	1.06	0.00	0.54	10.18	0.28	2.36	0.04	5.19	172.58
Uintah	0.07	0.85	2.11	0.36	0.01	5.21	0.24	0.14	0.08	0.16	0.68	0.11	0.10	0.18	0.08	0.01	0.02	117.22	0.15	0.33	0.32	0.90	0.55	0.00	8.55	0.24	1.98	0.04	4.36	145.04
Utah	1.23	13.41	33.04	5.74	0.20	82.18	3.90	2.34	1.24	2.60	10.61	1.72	1.56	2.86	1.28	0.19	0.40	1838.69	2.46	5.10	5.03	13.99	8.75	7.21	0.00	3.84	31.05	0.62	68.53	2149.76
Wasatch	0.04	0.49	1.21	0.21	0.01	3.00	0.14	0.08	0.04	0.09	0.39	0.06	0.06	0.10	0.05	0.01	0.01	67.54	0.09	0.19	0.18	0.52	0.32	0.26	4.93	0.00	1.14	0.02	2.51	83.70
Washingt	0.28	3.22	8.12	1.35	0.04	19.80	0.91	0.54	0.28	0.60	2.53	0.40	0.36	0.67	0.29	0.04	0.09	444.09	0.57	1.20	1.18	3.35	2.09	1.71	32.43	0.90	0.00	0.14	16.58	543.79
Wayne	0.01	0.10	0.26	0.04	0.00	0.63	0.03	0.02	0.01	0.02	0.08	0.01	0.01	0.02	0.01	0.00	0.00	14.23	0.02	0.04	0.04	0.11	0.07	0.06	1.04	0.03	0.24	0.00	0.53	17.65
Weber	0.61	6.84	17.01	2.90	0.10	42.51	1.96	1.17	0.61	1.30	5.40	0.86	0.77	1.43	0.63	0.09	0.20	945.31	1.23	2.57	2.53	7.14	4.44	3.65	68.18	1.90	15.74	0.30	0.00	1137.39
Attraction	32.41	256.40	581.28	121.50	6.73	1351.31	86.98	56.18	32.66	61.37	208.16	43.26	39.67	66.65	33.54	6.66	12.49	6434.14	58.65	109.73	108.27	266.41	175.58	148.27	2144.12	85.84	548.56	18.19	1142.66	

H-2-3-2 Total Converted Number of Trucks Produced From Utah

Table H-2-5: Daily Production of Number of Loaded Truck

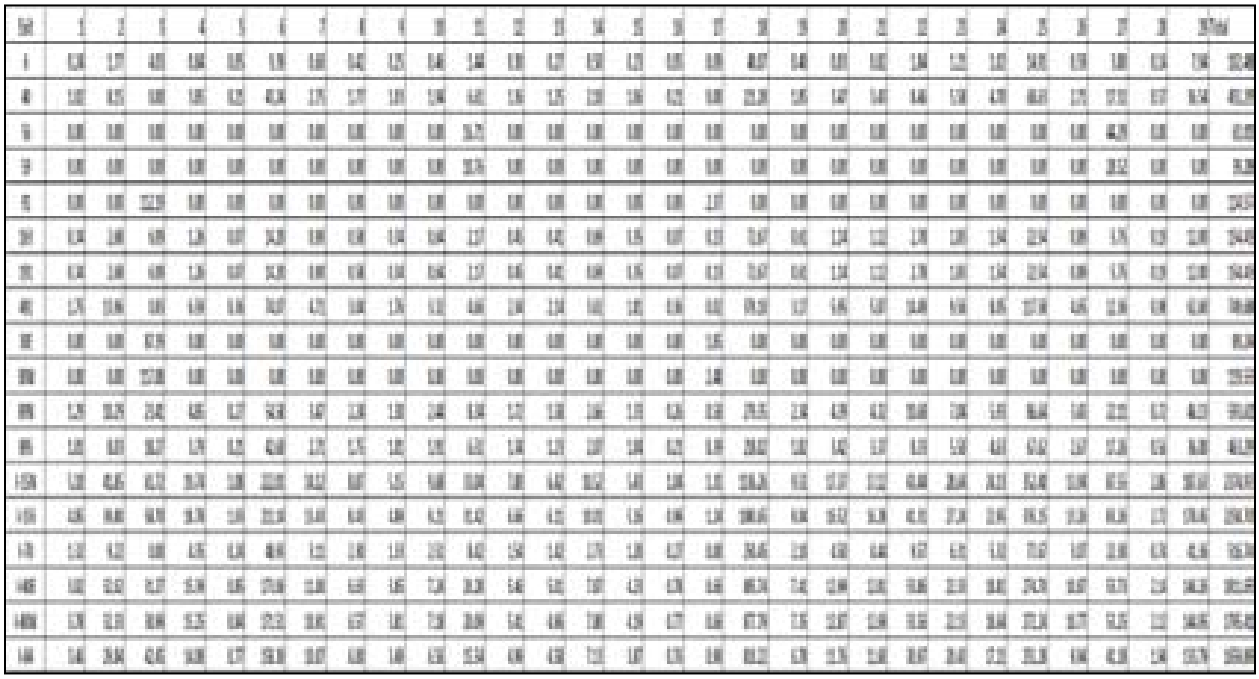
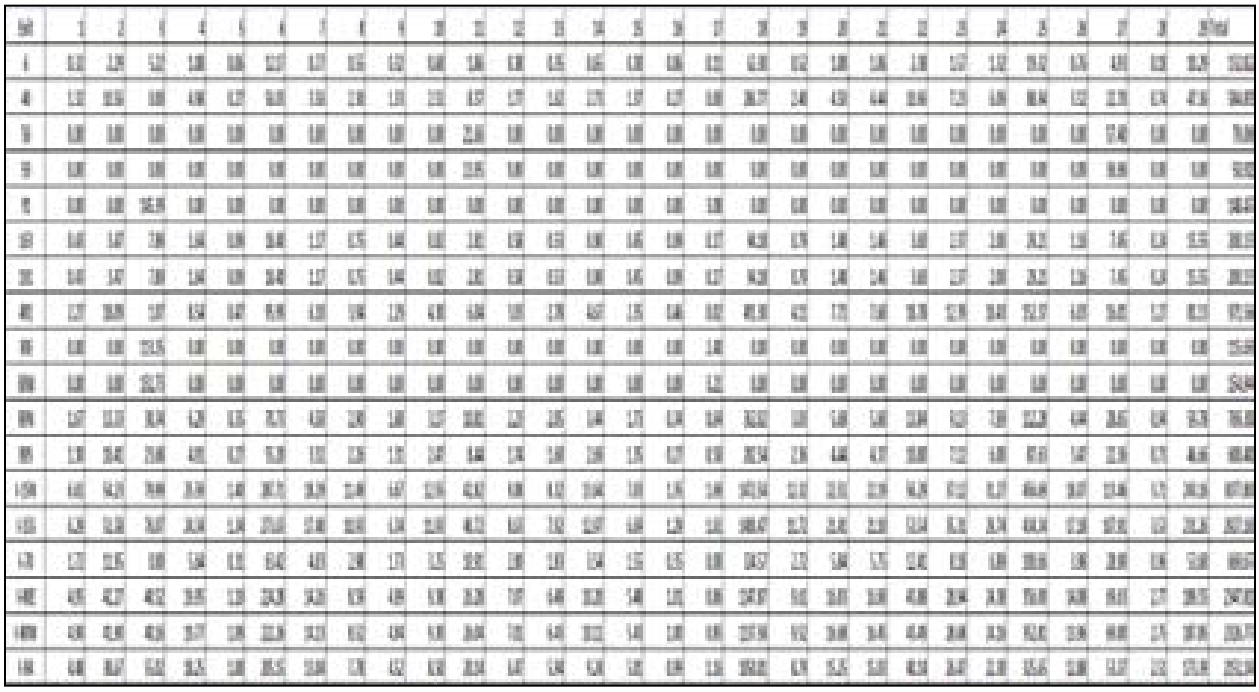


Table H-2-6: Daily Production of Number of Empty Truck

Exit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	Total
6	0.07	0.52	1.19	0.25	0.01	2.78	0.18	0.13	0.07	0.14	0.42	0.09	0.08	0.15	0.07	0.01	0.03	14.23	0.12	0.25	0.24	0.54	0.36	0.30	4.41	0.17	1.13	0.04	2.35	30.33
40	0.30	2.41	0.00	1.14	0.06	12.80	0.81	0.52	0.30	0.57	1.96	0.40	0.37	0.62	0.31	0.06	0.00	65.49	0.55	1.03	1.01	2.50	1.65	1.39	20.31	0.80	5.18	0.17	10.81	133.56
56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.11	0.00	0.00	18.06
59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.44	0.00	0.00	11.63
91	0.00	0.00	33.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.91
163	0.10	0.79	1.80	0.37	0.02	4.20	0.27	0.17	0.10	0.19	0.64	0.13	0.12	0.20	0.10	0.02	0.04	21.51	0.18	0.34	0.33	0.82	0.54	0.46	6.67	0.26	1.70	0.06	3.55	45.70
191	0.10	0.79	1.80	0.37	0.02	4.20	0.27	0.17	0.10	0.19	0.64	0.13	0.12	0.20	0.10	0.02	0.04	21.51	0.18	0.34	0.33	0.82	0.54	0.46	6.67	0.26	1.70	0.06	3.55	45.70
491	0.52	4.13	0.25	1.95	0.11	21.92	1.39	0.90	0.52	0.98	1.38	0.69	0.63	1.07	0.54	0.11	0.01	112.20	0.94	1.76	1.74	4.29	2.83	2.38	34.80	1.38	3.66	0.29	18.53	221.87
30E	0.00	0.00	25.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.41
30W	0.00	0.00	34.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.38
89N	0.38	3.04	6.93	1.44	0.08	16.15	1.03	0.66	0.38	0.72	2.47	0.51	0.47	0.79	0.39	0.08	0.15	82.67	0.69	1.30	1.28	3.16	2.08	1.76	25.64	1.01	6.54	0.21	13.65	175.68
89S	0.30	2.38	5.41	1.12	0.06	12.61	0.80	0.52	0.30	0.56	1.93	0.40	0.36	0.61	0.31	0.06	0.11	64.52	0.54	1.01	1.00	2.47	1.63	1.37	20.01	0.79	5.11	0.17	10.65	137.11
I-15N	1.51	12.38	18.27	5.84	0.32	65.70	4.18	2.62	1.52	2.87	9.78	2.07	1.90	3.11	1.61	0.31	0.39	336.28	2.81	5.14	5.07	12.86	8.48	7.14	104.29	4.13	25.91	0.85	55.53	702.87
I-15S	1.44	11.78	17.37	5.56	0.31	62.49	3.97	2.50	1.45	2.72	9.30	1.97	1.81	2.96	1.53	0.29	0.37	319.82	2.68	4.89	4.82	12.23	8.06	6.79	99.19	3.92	24.64	0.81	52.81	668.47
I-70	0.39	2.73	0.00	1.29	0.07	14.48	0.92	0.68	0.39	0.74	2.49	0.46	0.42	0.81	0.35	0.08	0.00	74.12	0.62	1.33	1.31	2.83	1.87	1.57	22.99	0.91	6.60	0.22	12.24	152.93
I-80E	1.13	9.65	9.25	4.55	0.25	51.22	3.26	1.96	1.14	2.14	6.00	1.62	1.48	2.33	1.25	0.23	0.20	262.13	2.19	3.84	3.79	10.02	6.61	5.57	81.30	3.22	15.90	0.63	43.29	536.16
I-80W	1.12	9.57	9.17	4.51	0.25	50.76	3.23	1.94	1.13	2.12	5.95	1.60	1.47	2.31	1.24	0.23	0.19	259.78	2.17	3.81	3.76	9.93	6.55	5.52	80.57	3.19	15.76	0.63	42.90	531.35
I-84	1.02	8.83	12.56	4.17	0.23	46.85	2.98	1.78	1.03	1.94	4.60	1.48	1.36	2.11	1.15	0.23	0.27	239.79	2.01	3.48	3.43	9.17	6.04	5.09	74.37	2.94	12.19	0.57	39.60	491.25

Table H-2-7: Daily Production of Number of Total Truck



H-2-3-3 Total Converted Number of Trucks Attracted to Utah

Table H-2-8: Daily Attraction of Number of Loaded Truck

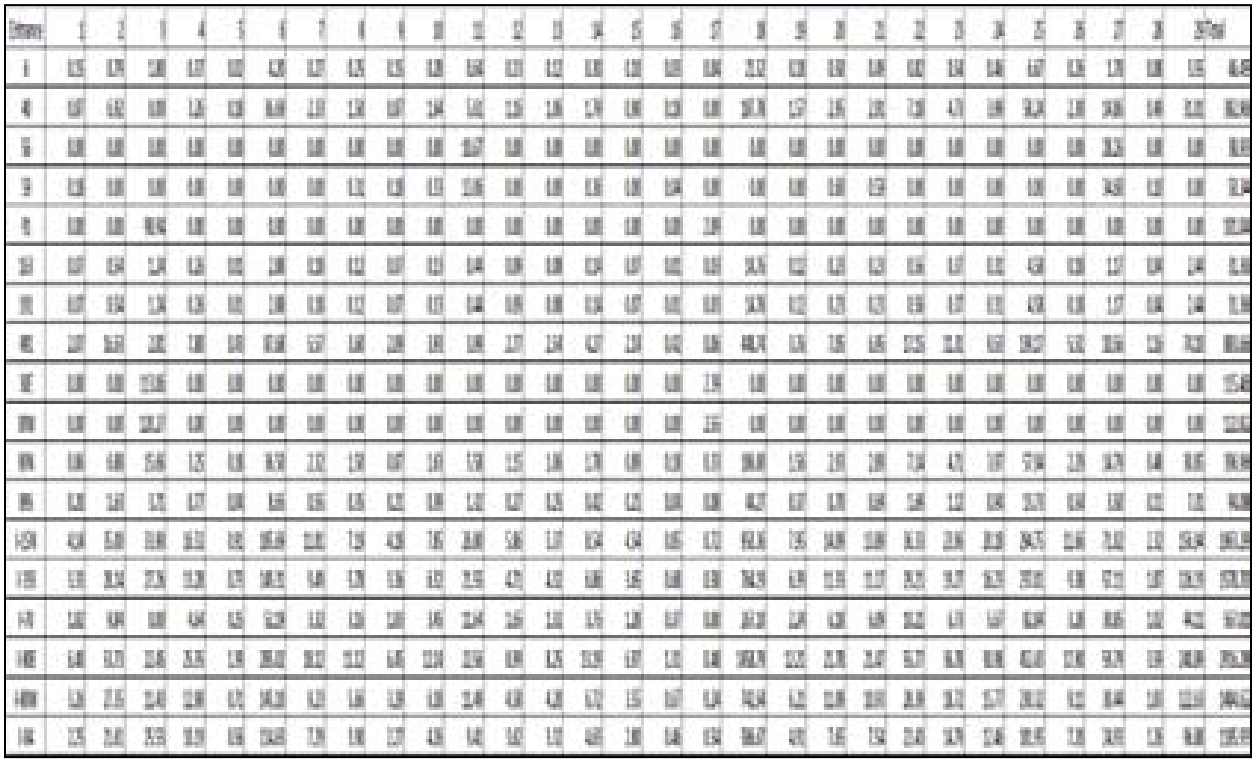


Table H-2-9: Daily Attraction of Number of Empty Truck

Entrance	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	Total
6	0.03	0.17	0.38	0.08	0.00	0.88	0.06	0.05	0.03	0.06	0.13	0.03	0.03	0.06	0.02	0.01	0.01	4.51	0.04	0.10	0.10	0.17	0.11	0.10	1.40	0.06	0.36	0.02	0.74	9.72
40	0.18	1.45	0.00	0.68	0.04	7.68	0.49	0.32	0.18	0.34	1.17	0.24	0.22	0.37	0.19	0.04	0.00	39.21	0.33	0.62	0.61	1.50	0.99	0.83	12.19	0.48	3.11	0.10	6.49	80.17
56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.92	0.00	0.00	8.15
59	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.07	2.73	0.00	0.00	0.08	0.00	0.01	0.00	0.00	0.00	0.13	0.12	0.00	0.00	0.00	0.00	0.00	7.24	0.02	0.00	10.54
91	0.00	0.00	20.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.15
163	0.01	0.11	0.26	0.05	0.00	0.60	0.04	0.02	0.01	0.03	0.09	0.02	0.02	0.03	0.01	0.00	0.01	3.09	0.03	0.05	0.05	0.12	0.08	0.07	0.96	0.04	0.24	0.01	0.51	6.57
191	0.01	0.11	0.26	0.05	0.00	0.60	0.04	0.02	0.01	0.03	0.09	0.02	0.02	0.03	0.01	0.00	0.01	3.09	0.03	0.05	0.05	0.12	0.08	0.07	0.96	0.04	0.24	0.01	0.51	6.57
491	0.43	3.46	0.59	1.63	0.09	18.36	1.17	0.75	0.44	0.82	0.83	0.58	0.53	0.89	0.45	0.09	0.01	93.95	0.79	1.48	1.45	3.59	2.37	1.99	29.14	1.15	2.21	0.24	15.51	185.00
30E	0.00	0.00	23.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.17
30W	0.00	0.00	25.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.71
89N	0.18	1.44	3.28	0.68	0.04	7.64	0.49	0.31	0.18	0.34	1.17	0.24	0.22	0.37	0.19	0.04	0.07	39.11	0.33	0.61	0.61	1.50	0.99	0.83	12.13	0.48	3.10	0.10	6.46	83.11
89S	0.04	0.34	0.78	0.16	0.01	1.81	0.12	0.07	0.04	0.08	0.28	0.06	0.05	0.09	0.04	0.01	0.02	9.27	0.08	0.15	0.14	0.35	0.23	0.20	2.87	0.11	0.73	0.02	1.53	19.70
I-15N	0.87	7.33	7.10	3.46	0.19	38.87	2.47	1.51	0.87	1.64	5.61	1.23	1.12	1.79	0.95	0.18	0.15	198.96	1.66	2.95	2.91	7.61	5.02	4.23	61.71	2.44	14.87	0.49	32.86	411.03
I-15S	0.70	5.89	5.71	2.78	0.15	31.26	1.99	1.21	0.70	1.32	4.51	0.99	0.90	1.44	0.76	0.14	0.12	159.99	1.34	2.37	2.34	6.12	4.03	3.40	49.62	1.96	11.96	0.39	26.42	330.51
I-70	0.38	2.06	0.00	0.97	0.05	10.93	0.69	0.66	0.38	0.72	2.44	0.34	0.32	0.78	0.27	0.08	0.00	55.92	0.47	1.29	1.28	2.14	1.41	1.19	17.34	0.69	6.46	0.21	9.23	118.71
I-80E	1.34	11.25	4.70	5.31	0.29	59.67	3.79	2.33	1.35	2.54	4.72	1.88	1.73	2.76	1.46	0.27	0.10	305.41	2.56	4.56	4.49	11.68	7.70	6.49	94.72	3.75	12.52	0.75	50.43	610.54
I-80W	0.68	5.73	2.39	2.70	0.15	30.38	1.93	1.18	0.69	1.29	2.40	0.96	0.88	1.41	0.74	0.14	0.05	155.48	1.30	2.32	2.29	5.94	3.92	3.30	48.22	1.91	6.37	0.38	25.67	310.81
I-84	0.47	4.52	5.34	2.13	0.12	24.00	1.53	0.82	0.47	0.89	1.97	0.76	0.69	0.97	0.59	0.10	0.11	122.82	1.03	1.60	1.58	4.70	3.10	2.61	38.09	1.51	5.22	0.26	20.28	248.28

Table H-2-10: Daily Attraction of Number of Total Truck

Entrance	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	Total
6	0.18	0.96	2.18	0.45	0.02	5.09	0.32	0.31	0.18	0.34	0.78	0.16	0.15	0.36	0.12	0.04	0.05	26.03	0.22	0.60	0.59	1.00	0.66	0.55	8.07	0.32	2.06	0.10	4.30	56.17
40	1.05	8.36	0.00	3.95	0.22	44.37	2.82	1.82	1.06	1.99	6.78	1.40	1.28	2.16	1.08	0.21	0.00	227.09	1.90	3.57	3.52	8.68	5.72	4.82	70.43	2.79	17.97	0.59	37.50	463.13
56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.18	0.00	0.00	47.08
59	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.22	0.40	15.79	0.00	0.00	0.44	0.00	0.04	0.00	0.00	0.00	0.73	0.72	0.00	0.00	0.00	0.00	0.00	41.84	0.12	0.00	60.88
91	0.00	0.00	119.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	122.19
163	0.08	0.66	1.50	0.31	0.02	3.49	0.22	0.14	0.08	0.16	0.53	0.11	0.10	0.17	0.09	0.02	0.03	17.85	0.15	0.28	0.28	0.68	0.45	0.38	5.54	0.22	1.41	0.05	2.95	37.93
191	0.08	0.66	1.50	0.31	0.02	3.49	0.22	0.14	0.08	0.16	0.53	0.11	0.10	0.17	0.09	0.02	0.03	17.85	0.15	0.28	0.28	0.68	0.45	0.38	5.54	0.22	1.41	0.05	2.95	37.93
491	2.50	19.99	3.40	9.43	0.52	106.03	6.74	4.35	2.52	4.75	4.82	3.34	3.07	5.16	2.59	0.51	0.07	542.69	4.54	8.52	8.40	20.75	13.68	11.52	168.31	6.66	12.77	1.40	89.62	1068.66
30E	0.00	0.00	136.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	139.63
30W	0.00	0.00	145.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	148.53
89N	1.04	8.32	18.93	3.93	0.22	44.14	2.81	1.81	1.05	1.98	6.75	1.39	1.28	2.15	1.08	0.21	0.40	225.91	1.89	3.55	3.50	8.64	5.70	4.80	70.06	2.77	17.88	0.58	37.31	480.06
89S	0.25	1.97	4.49	0.93	0.05	10.46	0.67	0.43	0.25	0.47	1.60	0.33	0.30	0.51	0.26	0.05	0.09	53.54	0.45	0.84	0.83	2.05	1.35	1.14	16.61	0.66	4.24	0.14	8.84	113.78
I-15N	5.01	42.33	40.99	19.97	1.10	224.56	14.28	8.70	5.05	9.50	32.41	7.08	6.50	10.32	5.49	1.02	0.87	1149.33	9.62	17.04	16.80	43.94	28.97	24.41	356.45	14.10	85.89	2.81	189.79	2374.32
I-15S	4.03	34.04	32.96	16.06	0.88	180.57	11.48	6.99	4.06	7.64	26.06	5.70	5.22	8.30	4.41	0.82	0.70	924.18	7.73	13.70	13.51	35.33	23.30	19.63	286.63	11.34	69.07	2.26	152.61	1909.21
I-70	2.20	11.90	0.00	5.61	0.31	63.11	4.01	3.82	2.22	4.17	14.08	1.99	1.83	4.53	1.54	0.45	0.00	323.02	2.70	7.48	7.37	12.35	8.14	6.86	100.18	3.96	37.31	1.23	53.34	685.71
I-80E	7.74	64.97	27.15	30.66	1.68	344.69	21.92	13.44	7.80	14.68	27.29	10.87	9.97	15.96	8.43	1.58	0.57	1764.19	14.76	26.34	25.96	67.44	44.47	37.46	547.15	21.64	72.31	4.34	291.33	3526.82
I-80W	3.94	33.08	13.82	15.61	0.86	175.48	11.16	6.84	3.97	7.47	13.89	5.54	5.08	8.12	4.29	0.81	0.29	898.11	7.52	13.41	13.22	34.33	22.64	19.07	278.54	11.02	36.81	2.21	148.31	1795.43
I-84	2.72	26.13	30.87	12.33	0.68	138.62	8.81	4.72	2.74	5.16	11.38	4.37	4.01	5.60	3.39	0.56	0.65	709.50	5.94	9.25	9.12	27.12	17.89	15.07	220.04	8.70	30.15	1.52	117.16	1494.21

H-3 Process of 2002 ATR Stations on Main Utah Truck Networks

Table H-3-1: 46 ATR Stations Working in 2002

ATR	Description	ATR	Description
301	I-80, 1 mile East of I-215, Parleys Canyon	403	I-15, 0.5 mile North of North Beaver Int., Beaver
303	US-91, 1.5 miles North of SR 61, Webster Jct.	404	I-70, 1 mile West of US-6 Int., Green River
306	I-15, 2 miles North of Center Street Int., Provo	407	SR-68, 2 miles North of Utah County Line, Bluffdale
309	I-80, 1 mile East of Echo Jct., Echo	411	US-89, 10 miles East of Kanab, Kanab
310	I-15, 3 miles South of Plymouth Int., Plymouth	415	US-89, 1 mile North of Marysvale, Marysvale
313	I-15, 1 mile South of Scipio Int., Scipio	416	US-89, 5.5 miles South of US-6, Birdseye
314	US-6, 2 miles West of US-191, Helper	418	US-6, 0.7 mile North of I-70, Green River
315	I-15, 1.8 miles South of Lagoon Drive Int., Farmington	420	US-191, 6 miles North of US-491, Monticello
316	US-89, 2 miles South of SR 193, Hillfield Road, Layton	421	US-191, 0.2 mile North of SR-279, Moab
317	SR-210, Mouth of Little Cottonwood Canyon, SLC	424	US-191, 3.5 miles North of US-40, Vernal
318	I-80, 1 mile West of Coalville Int., Coalville	425	US-40, 3 miles West of SR-121, Roosevelt
320	SR-39, 0.5 mile West of SR 158, Ogden Canyon	427	SR-10, 1 mile North of SR-155, Huntington
321	US-6, 0.25 mile West of SR 68, Elberta Jct.	430	SR-30, 6.01 miles East of SR-42, Curlew Jct.
323	I-80, 1 mile West of Delle Interchange, Delle	431	SR-28, 1.5 miles South of SR-78, Levan
324	US-491 9 miles East of US-191, Monticello	502	I-15, 0.5 mile South of South Nephi Int., Nephi
349	I-15, 2 miles North of Santaquin Int., Santaquin	503	US-89, 0.5 mile South of US-50, Salina
350	US-189, 3710 North University Avenue, Provo	504	US-89, 1 mile South of Circleville, Circleville
351	I-215, 700 West, SLC	506	US-191, 1.2 miles West of US-163, Bluff
362	US-89, 0.2 mile West of SR 30, Garden City	508	I-70, 1.5 miles NorTheast of West Richfield Int., Richfield
363	US-91, 0.8 mile North of SR 101, Wellsville	509	US-40, 0.5 mile West of SR-32, Heber/Midway
400	I-15, 1 mile South of Bloomington Int., Bloomington	513	I-15, 1 mile North of South Parowan Int., Parowan
401	I-15, 1 mile South of Leeds Int., Leeds	606	SR-248, 0.5 mile West of US-40, Park City
402	SR-9, 1.3 miles West of SR 318, Hurricane	611	I-15, 1 mile South of SR-77 Springville Int., Springville

Table H-3-2: Traffic Statistics of 46 ATR Stations Working in 2002

Truck	2002 Estimation		Roadway, Monthly Hourly Volume for May 2008		
2002	Estimated Hourly Truck Volume	Daily Traffic	ATR 11-12:00	AADT	K factor
301	389	7339	2508	47335	0.0530
303	73	1471	316	6339	0.0499
306	825	15824	3819	73224	0.0522
309	785	13298	837	14171	0.0591
310	190	3179	509	8526	0.0597
313	219	3338	717	10932	0.0656
314	165	2274	391	5402	0.0724
315	602	12178	7348	148563	0.0495
316	204	4743	1620	37720	0.0429
317	1	19	140	2850	0.0491
318	322	5727	774	13787	0.0561
320	49	906	373	6957	0.0536
321	20	446	48	1087	0.0442
323	246	3716	504	7603	0.0663
324	88	1240	172	2433	0.0707
349	437	8065	1585	29238	0.0542
350	109	2002	1785	32871	0.0543
351	230	4972	5531	119568	0.0463
362	20	290	141	2026	0.0696
363	224	4271	963	18369	0.0524
400	367	5450	1286	19106	0.0673
401	360	5821	1158	18704	0.0619
402	105	1758	1375	23003	0.0598
403	338	5492	850	13809	0.0616
404	206	2790	360	4882	0.0737
407	38	990	688	17859	0.0385
411	72	1034	170	2453	0.0693
415	31	442	109	1548	0.0704
416	22	449	96	2004	0.0479
418	125	2047	253	4131	0.0612
420	112	1658	254	3761	0.0675
421	139	2117	524	7980	0.0657

Table H-3-2: Continued

Truck	2002 Estimation		Roadway, Monthly Hourly Volume for May 2008		
2002	Estimated Hourly Truck Volume	Daily Traffic	ATR 11-12:00	AADT	K factor
424	51	911	105	1886	0.0557
425	126	2084	758	12580	0.0603
427	71	1259	267	4762	0.0561
430	22	293	30	405	0.0741
431	73	1112	150	2289	0.0655
502	288	4346	691	10425	0.0663
503	136	2044	393	5886	0.0668
504	20	279	88	1236	0.0712
506	42	601	167	2392	0.0698
508	154	2268	385	5681	0.0678
509	155	2817	998	18153	0.0550
513	333	5017	957	14436	0.0663
606	56	933	951	15840	0.0600
611	753	14271	4305	81590	0.0528

Table H-3-3: Traffic Statistics of 38 ATR Stations on Main Truck Corridors Working in 2002

2002	Estimated Hourly Truck Volume	Daily Traffic
301	389	7339
303	73	1471
306	825	15824
309	785	13298
310	190	3179
313	219	3338
314	165	2274
315	602	12178
316	204	4743
318	322	5727
323	246	3716
324	88	1240
349	437	8065
350	109	2002
351	230	4972
362	20	290
363	224	4271
400	367	5450
401	360	5821
402	105	1758
403	338	5492
404	206	2790
411	72	1034
415	31	442
418	125	2047
421	139	2117
424	51	911
425	126	2084
431	73	1112
502	288	4346
503	136	2044
504	20	279
506	42	601
508	154	2268
509	155	2817
513	333	5017
606	56	933
611	753	14271

Appendix I: Program Source Code and Input / Output Data for Optimization

I-1 Source Code for Genetic Algorithms

I-1-1 Source Code for TransCAD Operation

```
//---------------------------------------------------------------------------//
// Macro to Count and Return Centroids w/ More than One Connector
//---------------------------------------------------------------------------//
Macro "GetCentroids"
        //workspaceName = ChooseFile({{"Workspace (*.wrk)", "*.wrk"}},
        //"Choose a Workspace file", )

        workspaceName = "C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-4F\\Workspace for
        Optimization.wrk"
        OpenWorkspace(workspaceName, )
        SetWindow("Editor|Endpoint Matrix File")
        m = GetMatrix()

        matrixInfo = GetMatrixInfo(m)

        dim centroids[matrixInfo[5][1]]
        dim tempCentroids[matrixInfo[5][1]]

        mc = CreateMatrixCurrency(m, GetMatrixCore(m), , ,)

        centroids = GetMatrixRowLabels(mc)

        SetWindow("Map|Network")
        SetView("Network")
        view = GetView()
        numCentroids = matrixInfo[5][1]
        splitCentCnt = 0

        recordHandle = GetFirstRecord(view + "|",
        {

        {"Centroid_Node_ID", "Ascending"},
        {"ID", "Ascending"}                                        })

        for i = 1 to numCentroids do
                centroidNum = S2I(centroids[i])
                while view.Centroid_Node_ID <> centroidNum do
                        recordHandle = GetNextRecord(view + "|", null,

        {
```

```
        {"Centroid_Node_ID", "Ascending"},

        {"ID", "Ascending"}                                     })
                        end

                // We will now be on a line with the right centroid number

                numCollectors = view.Number_of_Centroid_Connector

                // if numCollectors = 1 we don't care - skip this one
                if (numCollectors = 2) then do
                        splitCentCnt = splitCentCnt + 1
                        tempCentroids[splitCentCnt] = centroidNum
                        end
                else if (numCollectors = 3) then do
                        splitCentCnt = splitCentCnt + 1
                        tempCentroids[splitCentCnt] = 0 - centroidNum
                        end

                end

        centroidFileName = "C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-
        4F\\Working\\Centroids.txt"
        centroidFile = OpenFile(centroidFileName, "w")

        for i = 1 to splitCentCnt do
                WriteLine(centroidFile, I2S(tempCentroids[i]))
                end

        CloseFile(centroidFile)

        endMacro

//---------------------------------------------------------------------------//
// Macro to Read ATR Data
//---------------------------------------------------------------------------//
Macro "ReadATRData"
        nameATRTable = OpenTable("ATR Numbers", "CSV", {"C:\\Temp\\Thomas Jin\\40-
TransCAD\\Analysis-4F\\ATR.csv", null} )
        SetView(nameATRTable)
        numATRStations = GetRecordCount(nameATRTable,)
        dim ATRData[numATRStations, 2]
        atrSet = nameATRTable + "|"

        i = 1
        rec = GetFirstRecord(atrSet, {{"FIELD_1", "Ascending"}})
        while rec <> null do
                ATRData[i][1] = nameATRTable.FIELD_1
```

```
            ATRData[i][2] = nameATRTable.FIELD_2
            i = i + 1
            rec = GetNextRecord(atrSet, null, {{"FIELD_1", "Ascending"}})
            end

        CloseView(nameATRTable)

        ATRFileName = "C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-4F\\Working\\ATRData.txt"
        ATRFile = OpenFile(ATRFileName, "w")

        for i = 1 to numATRStations do
            WriteLine(ATRFile, I2S(ATRData[i][1]))
            WriteLine(ATRFile, I2S(ATRData[i][2]))
            end

        CloseFile(ATRFile)

        endMacro

//-------------------------------------------------------------------------//
// Macro to Plug Generated Percents into TransCAD
//-------------------------------------------------------------------------//
Macro "AnalyzePercents"

        ResetLogFile()

        // Open the centroid file and read in the array of centroids

        centroidFileName = "C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-
        4F\\Working\\Centroids.txt"
        centroidFile = OpenFile(centroidFileName, "r")
        stringCentroids = ReadArray(centroidFile)
        CloseFile(centroidFile)

        numCentroids = ArrayLength(stringCentroids)
        dim centroids[numCentroids]
        for i = 1 to numCentroids do
            centroids[i] = S2I(stringCentroids[i])
            end


        // Open the ATR Data file and read in the list of stations and counts

        ATRFileName = "C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-4F\\Working\\ATRData.txt"
        ATRFile = OpenFile(ATRFileName, "r")
        stringATRData = ReadArray(ATRFile)
        CloseFile(ATRFile)

        numATRStations = ArrayLength(stringATRData) / 2
```

```
dim ATRData[numATRStations, 2]
for i = 1 to numATRStations do
        ATRData[i][1] = S2I(stringATRData[i*2-1])
        ATRData[i][2] = S2I(stringATRData[i*2])
        end


// Open the file with this generations percents and read in the generation

percentFileName = "C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-
4F\\Working\\Percents.txt"
percentFile = OpenFile(percentFileName, "r")
stringPercents = ReadArray(percentFile)
CloseFile(percentFile)

numCandidates = ArrayLength(stringPercents)
firstCandidate = ParseString(stringPercents[1], " ")
numGenes = ArrayLength(firstCandidate)

dim percents[numCandidates, numGenes]
for i = 1 to numCandidates do
        currCandidate = ParseString(stringPercents[i], " ")
        for j = 1 to numGenes do
                percents[i][j] = S2R(currCandidate[j])
                end
        end

dim RMSEvalues[numCandidates]
for candidateNum = 1 to numCandidates do
        SetView("Network")
        view = GetView()
        viewSet = view + "|"
        rec = GetFirstRecord(viewSet, {

{"Centroid_Node_ID", "Ascending"},
{"ID", "Ascending"}                                     })
        ddvNum = 1
        for i = 1 to numCentroids do
                centroidNum = R2I(Abs(centroids[i]))
                while view.Centroid_Node_ID = null || view.Centroid_Node_ID < centroidNum
                do
                rec = GetNextRecord(viewSet, null,
                {
                {"Centroid_Node_ID", "Ascending"},
                {"ID", "Ascending"}                                     })
                        end

                // We will now be on a line with the right centroid number
```

```
if view.Centroid_Node_ID = centroidNum then do
        if centroids[i] > 0 then numCollectors = 2
        else numCollectors = 3
        end
else numCollectors = 1

if(centroidNum = 4353 ||
        numCollectors = 1) then do
        view.AB_Loading_Pct = 1.0
        view.BA_Loading_Pct = 1.0
        end
else if (centroidNum = 4335 ||
                        numCollectors = 2) then do
        collector1 = percents[candidateNum][ddvNum]
        collector2 = 1.0 - collector1
        ddvNum = ddvNum + 1
        collector3 = percents[candidateNum][ddvNum]
        collector4 = 1.0 - collector3
        ddvNum = ddvNum + 1
        view.AB_Loading_Pct = collector1
        view.BA_Loading_Pct = collector3
        rec = GetNextRecord(viewSet, null,
        {
        {"Centroid_Node_ID", "Ascending"},
        {"ID", "Ascending"}     })
        view.AB_Loading_Pct = collector2
        view.BA_Loading_Pct = collector4
        end
else if (numCollectors = 3) then do
        collector1 = percents[candidateNum][ddvNum]
        ddvNum = ddvNum + 1
        collector2 = percents[candidateNum][ddvNum]
        collector3 = 1.0 - collector1 - collector2
        ddvNum = ddvNum + 1
        collector4 = percents[candidateNum][ddvNum]
        ddvNum = ddvNum + 1
        collector5 = percents[candidateNum][ddvNum]
        collector6 = 1.0 - collector4 - collector5
        ddvNum = ddvNum + 1
        view.AB_Loading_Pct = collector1
        view.BA_Loading_Pct = collector4

        rec = GetNextRecord(viewSet, null,
        {
        {"Centroid_Node_ID", "Ascending"},
        {"ID", "Ascending"}     })
        view.AB_Loading_Pct = collector2
        view.BA_Loading_Pct = collector5
```

```
                        rec = GetNextRecord(viewSet, null,
                        {
                        {"Centroid_Node_ID", "Ascending"},
                        {"ID", "Ascending"}     })
                        view.AB_Loading_Pct = collector3
                        view.BA_Loading_Pct = collector6
                        end
                end

        // Call to TransCAD's "run" method
        RunMacro("BatchMacro")

        // Code to calculate RMSE
        // Table with AADT data from TransCAD
        aadtView = OpenTable("AADT", "FFB", {"C:\\Temp\\Thomas Jin\\40-
        TransCAD\\Analysis-4F\\Results\\MPA_LinkFlow.bin", "C:\\Temp\\Thomas Jin\\40-
        TransCAD\\Analysis-4F\\Results\\MPA_LinkFlow.dcb"})
        viewSet = aadtView + "|"
        rec = GetFirstRecord(viewSet, )
        // ATRData is an array with AADT data from ATR stations
        RMSE = 0
        for i = 1 to numATRStations do
                while aadtView.ID1 <> ATRData[i][1] do
                        rec = GetNextRecord(viewSet, , )
                        end

                RMSE = RMSE + (aadtView.Tot_Flow - ATRData[i][2]) *
                        (aadtView.Tot_Flow - ATRData[i][2])
                end

        RMSE = Sqrt (RMSE / numATRStations)
        CloseView(aadtView)

        RMSEvalues[candidateNum] = RMSE
        end

RMSEFileName = "C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-4F\\Working\\RMSE.txt"
RMSEFile = OpenFile(RMSEFileName, "w")
for i = 1 to numCandidates do
        WriteLine(RMSEFile, R2S(RMSEvalues[i]))
        end
CloseFile(RMSEFile)

endMacro

//---------------------------------------------------------------------------//
// Macro to Run TransCAD's Assignment Algorithm
//---------------------------------------------------------------------------//
Macro "BatchMacro"
```

```
RunMacro("TCB Init")
// STEP 1: Highway Network Setting
Opts = null
Opts.Input.Database = "C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis 3\\Network.DBD"
Opts.Input.Network = "C:\\TEMP\\THOMAS JIN\\40-TRANSCAD\\ANALYSIS-
4F\\NETWORK-F.NET"
Opts.Input.[Update Link Source Sets] = {{"C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis
3\\Network.DBD|Network", "Network"}}
Opts.Global.[Update Network Fields].Links = {{"[AB_Loading_Pct / BA_Loading_Pct]",
{"Network.AB_Loading_Pct", "Network.BA_Loading_Pct", , , "False"}}}
Opts.Global.[Update Network Fields].Formulas = {}
Opts.Flag.[Centroids in Network] = 1

ret_value = RunMacro("TCB Run Operation", "Highway Network Setting", Opts, &Ret)

if !ret_value then goto quit

// STEP 2: MPA Assignment
Opts = null
Opts.Input.Database = "C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis 3\\Network.DBD"
Opts.Input.Network = "C:\\TEMP\\THOMAS JIN\\40-TRANSCAD\\ANALYSIS-
4F\\NETWORK-F.NET"
Opts.Input.[OD Matrix Currency] = {"C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-4F\\O-D
matrix.mtx", "Matrix 1", "Endpoint (Selection)", "Endpoint (Selection)"}
Opts.Field.LinkPercent = "[AB_Loading_Pct / BA_Loading_Pct]"
Opts.Field.[VDF Fld Names] = {"Length", "[Capacity-Fhv]", "None", "None", "None"}
Opts.Global.[Load Method] = "AON"
Opts.Global.[Loading Multiplier] = 1
Opts.Global.[Cost Function File] = "bpr.vdf"
Opts.Global.[VDF Defaults] = {, , 0.15, 4, 0}
Opts.Output.[Flow Table] = "C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-
4F\\Results\\MPA_LinkFlow.bin"
Opts.Output.[Flow Matrix].Label = "Flow Matrix"
Opts.Output.[Flow Matrix].[File Name] = "C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-
4F\\Results\\MPA_Flow.mtx"

ret_value = RunMacro("TCB Run Procedure", "MPA Assignment", Opts, &Ret)

if !ret_value then goto quit

quit:

Return( RunMacro("TCB Closing", ret_value, False) )

endMacro
```

I-1-2 Source Code for File Operation (cpp)

```
//
//  FileOperations.cpp
//  VerticalCityOptimization
//
//  Created by Bradley Mecham on 7/14/11.
//  Copyright 2011 Brigham Young University. All rights reserved.
//

#include "FileOperations.hpp"

/*=============================================================================*/
/* Default constructor                                                         */
/*=============================================================================*/
FileOperations::FileOperations()
{
	delimStr = " ";
	delimiter = delimStr->ToCharArray();
}

/*=============================================================================*/
/* Opens a file for reading or writing                                         */
/*=============================================================================*/
void FileOperations::OpenFile(String^ filename, string use)
{
	if (use == "r")
	{
		sr = gcnew StreamReader(filename);
	}

	if (use == "w")
	{
		sw = gcnew StreamWriter(filename, false);
	}

	if (use == "a")
	{
		sw = gcnew StreamWriter(filename, true);
	}
}

/*=============================================================================*/
/* Closes a file after using it                                                */
/*=============================================================================*/
void FileOperations::CloseFile(string use)
{
	if (use == "r")
		sr->Close();
```

```
	if (use == "w" || use == "a")
		sw->Close();
}
/*=========================================================================*/
/* Input a String                                                          */
/*=========================================================================*/
void FileOperations::ReadLine(String^ s)
{
	s = sr->ReadLine();
}

/*=========================================================================*/
/* Input a Scalar                                                          */
/*=========================================================================*/
void FileOperations::ReadDouble(double % d)
{
	d = double::Parse(sr->ReadLine());
}

/*=========================================================================*/
/* Input an Integer Scalar                                                 */
/*=========================================================================*/
void FileOperations::ReadInteger(int % i)
{
	i = int::Parse(sr->ReadLine());
}

/*=========================================================================*/
/* Input a Vector                                                          */
/*=========================================================================*/
void FileOperations::ReadVector(int len, array<double> ^ vect)
{
	String^ Line = sr->ReadLine();
	array<String^>^ vecVals;
	vecVals = Line->Split(delimiter);
	for (int i = 0; i < len; i++)
		vect[i] = double::Parse(vecVals[i]);
}

/*=========================================================================*/
/* Input an Double Vector Contained On Multiple Lines                      */
/*=========================================================================*/
array<double> ^ FileOperations::ReadVector(int & len)
{
	vector<double> localVector;
	double currLine;
	while (sr->EndOfStream != true)
	{
		currLine = double::Parse(sr->ReadLine());
```

```
		localVector.push_back (currLine);
	}

	len = (int) localVector.size();
	array<double> ^ vect = gcnew array<double>(len);
	for (int i = 0; i < len; i++)
	{
		vect[i] = localVector[i];
	}

	return vect;
}

/*=========================================================================*/
/* Input an Integer Vector                                                 */
/*=========================================================================*/
void FileOperations::ReadIVector(int len, array<int> ^ vect)
{
	String^ Line = sr->ReadLine();
	array<String^>^ vecVals;
	vecVals = Line->Split(delimiter);

	for (int i = 0; i < len; i++)
		vect[i] = int::Parse(vecVals[i]);
}

/*=========================================================================*/
/* Input an Integer Vector Contained On Multiple Lines                     */
/*=========================================================================*/
array<int> ^ FileOperations::ReadIVector(int & len)
{
	vector<int> localVector;
	int currLine;
	while (sr->EndOfStream != true)
	{
		currLine = int::Parse(sr->ReadLine());
		localVector.push_back (currLine);
	}

	len = (int) localVector.size();
	array<int> ^ vect = gcnew array<int>(len);
	for (int i = 0; i < len; i++)
	{
		vect[i] = localVector[i];
	}

	return vect;
}
/*=========================================================================*/
```

```
/* Input a Matrix                                        */
/*======================================================================*/
void FileOperations::ReadMatrix(int rows, int cols, DoubleMatrix ^ matx)
{
        array<String^>^ vecVals;
        for (int i = 0; i < rows; i++)
        {
                String^ Line = sr->ReadLine();
                vecVals = Line->Split(delimiter);
                for(int j = 0; j < cols; j++)
                        matx[i][j] = double::Parse(vecVals[j]);
        }
}

/*======================================================================*/
/* Input an Integer Matrix                               */
/*======================================================================*/
void FileOperations::ReadIMatrix(int rows, int cols, IntMatrix ^ matx)
{
        array<String^>^ vecVals;
        for (int i = 0; i < rows; i++)
        {
                String^ Line = sr->ReadLine();
                vecVals = Line->Split(delimiter);
                for(int j = 0; j < cols; j++)
                        matx[i][j] = int::Parse(vecVals[j]);
        }
}

/*======================================================================*/
/* Output a String                                       */
/*======================================================================*/
void FileOperations::WriteString(String^ label, String^ s)
{
        sw->WriteLine(label);
        sw->WriteLine(s);
}

/*======================================================================*/
/* Output a Scalar                                       */
/*======================================================================*/
void FileOperations::WriteDouble(String^ label, double d)
{
        sw->WriteLine(label);
        sw->WriteLine(d);
}

/*======================================================================*/
/* Output an Integer Scalar                              */
```

```
/*=========================================================================*/
void FileOperations::WriteInteger(String^ label, int i)
{
	sw->WriteLine(label);
	sw->WriteLine(i);
}



/*=========================================================================*/
/* Output a Vector                                                         */
/*=========================================================================*/
void FileOperations::WriteVector(String^ label, int len, array<double> ^ vect)
{
	sw->WriteLine(label);
	sw->Write(vect[0].ToString());
	for (int i = 1; i < len; i++)
	{
		sw->Write(" ");
		sw->Write(vect[i].ToString());
	}
	sw->WriteLine();
}

/*=========================================================================*/
/* Output an Integer Vector                                                */
/*=========================================================================*/
void FileOperations::WriteIVector(String^ label, int len, array<int> ^ vect)
{
	sw->WriteLine(label);
	sw->Write(vect[0].ToString());
	for (int i = 1; i < len; i++)
	{
		sw->Write(" ");
		sw->Write(vect[i].ToString());
	}
	sw->WriteLine();
}

/*=========================================================================*/
/* Output a Matrix                                                         */
/*=========================================================================*/
void FileOperations::WriteMatrix(String^ label, int rows, int cols, DoubleMatrix ^ matx)
{
	sw->WriteLine(label);
	for (int i = 0; i < rows; i++)
	{
		sw->Write(matx[i][0].ToString());
		for (int j = 1; j < cols; j++)
```

```
		{
			sw->Write(" ");
			sw->Write(matx[i][j].ToString());
		}
		sw->WriteLine();
	}
	sw->WriteLine();
}


/*=========================================================================*/
/* Output an Integer Matrix                                                */
/*=========================================================================*/
void FileOperations::WriteIMatrix(String^ label, int rows, int cols, IntMatrix ^ matx)
{
	sw->WriteLine(label);
	for (int i = 0; i < rows; i++)
	{
		sw->Write(matx[i][0].ToString());
		for (int j = 1; j < cols; j++)
		{
			sw->Write(" ");
			sw->Write(matx[i][j].ToString());
		}
		sw->WriteLine();
	}
	sw->WriteLine();
}

/*=========================================================================*/
/* Output a String                                                         */
/*=========================================================================*/
void FileOperations::WriteString(String^ s)
{
	sw->WriteLine(s);
}

/*=========================================================================*/
/* Output a Scalar                                                         */
/*=========================================================================*/
void FileOperations::WriteDouble(double d)
{
	sw->WriteLine(d);
}

/*=========================================================================*/
/* Output an Integer Scalar                                                */
/*=========================================================================*/
```

```
void FileOperations::WriteInteger(int i)
{
	sw->WriteLine(i);
}

/*==========================================================================*/
/* Output a Vector                                                          */
/*==========================================================================*/
void FileOperations::WriteVector(int len, array<double> ^ vect)
{
	sw->Write(vect[0].ToString());
	for (int i = 1; i < len; i++)
	{
		sw->Write(" ");
		sw->Write(vect[i].ToString());
	}
	sw->WriteLine();
}

/*==========================================================================*/
/* Output an Integer Vector                                                 */
/*==========================================================================*/
void FileOperations::WriteIVector(int len, array<int> ^ vect)
{
	sw->Write(vect[0].ToString());
	for (int i = 1; i < len; i++)
	{
		sw->Write(" ");
		sw->Write(vect[i].ToString());
	}
	sw->WriteLine();
}

/*==========================================================================*/
/* Output a Matrix                                                          */
/*==========================================================================*/
void FileOperations::WriteMatrix(int rows, int cols, DoubleMatrix ^ matx)
{
	for (int i = 0; i < rows; i++)
	{
		sw->Write(matx[i][0].ToString());
		for (int j = 1; j < cols; j++)
		{
			sw->Write(" ");
			sw->Write(matx[i][j].ToString());
		}
		sw->WriteLine();
	}
	sw->WriteLine();
```

```
}

/*=========================================================================*/
/* Output an Integer Matrix                                                */
/*=========================================================================*/
void FileOperations::WriteIMatrix(int rows, int cols, IntMatrix ^ matx)
{
        for (int i = 0; i < rows; i++)
        {
                sw->Write(matx[i][0].ToString());
                for (int j = 1; j < cols; j++)
                {
                        sw->Write(" ");
                        sw->Write(matx[i][j].ToString());
                }
                sw->WriteLine();
        }
        sw->WriteLine();
}

/*=========================================================================*/
/* Write an Error Message and Stop the Program                             */
/*=========================================================================*/
int FileOperations::WriteErrorMessage(String^ label)
{
        sw->WriteLine();
        sw->WriteLine("Error: ");
        sw->WriteLine(label);
        return 1;
}

/*=========================================================================*/
/* Write a Warning Message and Continue the Program                        */
/*=========================================================================*/
void FileOperations::WriteWarningMessage(String^ label)
{
        sw->WriteLine();
        sw->WriteLine("Warning: ");
        sw->WriteLine(label);
}
```

I-1-3 Source Code for File Open (hpp)

```
//
//  FileOperations.h
//  VerticalCityOptimization
//
//  Created by Bradley Mecham on 7/14/11.
//  Copyright 2011 Brigham Young University. All rights reserved.
//

#ifndef FILE_OPERATIONS_HPP
#define FILE_OPERATIONS_HPP

#include <string>
#include <vector>

using namespace std;
using namespace System;
using namespace System::IO;

typedef array<array<int>^> IntMatrix;
typedef array<array<double>^> DoubleMatrix;

ref class FileOperations
{
public:
        FileOperations();
        void OpenFile(String^ filename, string use);
        void CloseFile(string use);
        void ReadLine(String^ s);
        void ReadDouble(double % d);
        void ReadInteger(int % i);
        void ReadVector(int len, array<double> ^ vect);
        array<double> ^ ReadVector(int & len);
        void ReadIVector(int len, array<int> ^ vect);
        array<int> ^ ReadIVector(int & len);
        void ReadMatrix(int rows, int cols, DoubleMatrix ^ matx);
        void ReadIMatrix(int rows, int cols, IntMatrix ^ matx);
        void WriteString(String^ s);
        void WriteDouble(double d);
        void WriteInteger(int i);
```

```
        void WriteVector(int len, array<double> ^ vect);
        void WriteIVector(int len, array<int> ^ vect);
        void WriteMatrix(int rows, int cols, DoubleMatrix ^ matx);
        void WriteIMatrix(int rows, int cols, IntMatrix ^ matx);
        void WriteString(String^ label, String^ s);
        void WriteDouble(String^ label, double d);
        void WriteInteger(String^ label, int i);
        void WriteVector(String^ label, int len, array<double> ^ vect);
        void WriteIVector(String^ label, int len, array<int> ^ vect);
        void WriteMatrix(String^ label, int rows, int cols, DoubleMatrix ^ matx);
        void WriteIMatrix(String^ label, int rows, int cols, IntMatrix ^ matx);
        int WriteErrorMessage(String^ label);
        void WriteWarningMessage(String^ label);
private:
        FileStream^ fs;
        StreamReader^ sr;
        StreamWriter^ sw;
        String^ delimStr;
        array<Char>^ delimiter;
};

#endif
```

I-1-4 Source Code for Genetic Algorithm (cpp)

```
//
//  GeneticAlgo.cpp
//  For TransCAD Assignment Optimization
//
//  Created by Bradley Mecham on 6/22/11.
//  Copyright 2011 Brigham Young University. All rights reserved.
//

#include "GeneticAlgo.hpp"

int main()
{
	GeneticAlgo^ myGeneticAlgo = gcnew GeneticAlgo();
	myGeneticAlgo->GeneticAlgorithm();
	delete myGeneticAlgo;
	myGeneticAlgo = nullptr;
}

/*=============================================================================*/
/* Analyze the Fitness of One Chromosome                                       */
/*=============================================================================*/
void GeneticAlgo::AppAnalysis(int startingIndex)
{
	// Function to convert 0-20 (or whatever) into 0-100
	array<double> ^ percents = gcnew array<double>(numPercents);
	int chromoID;

	FileOperations myFileOperator;
	myFileOperator.OpenFile("C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-
	4F\\Working\\Percents.txt","w");

	for (int indx = startingIndex; indx < ndesign; indx++)
	{
		chromoID = index[indx];
		int geneNum = 0;
		for (int i = 0; i < nddv; i++)
		{
			if(dmax[i] != sglVarMax) // If this gene represents 3 collectors
			{
				int minuend = sglVarSum - ddv[chromoID][i]; // We do a little magic
				int subtrahend = sglVarSum - sglVarMax; // to determine the
				int subtrahend2 = sglVarMax; // values of the 3 percentages
				int term1=0, term2=0;
				while (minuend - subtrahend < 0)
				{
					term1++;
					subtrahend -= subtrahend2--;
```

```
                        }
                        term2 = minuend - subtrahend;

                        double divisor = (double)sglVarMax;
                        double multiplicand = 100.0 / divisor;
                        percents[geneNum] = (term1 * multiplicand) / 100;
                        geneNum++;
                        percents[geneNum] = (term2 * multiplicand) / 100;
                        geneNum++;
                    }
                    else
                    {
                        double divisor = (double)sglVarMax;  // Otherwise, if there are
                        double multiplicand = 100.0 / divisor; // only 2 collectors, it is
                        percents[geneNum] = ((ddv[chromoID][i]) * multiplicand) / 100; //
                        straightforward
                        geneNum++;
                    }
                }

                myFileOperator.WriteVector(numPercents,percents);
            }
            myFileOperator.CloseFile("w");

            // Call to TransCAD macros here
            gisdk = gcnew CaliperForm::Connection();
            gisdk->MappingServer = "TransCAD";
            gisdk->Open();
            gisdk->DoMacro("AnalyzePercents", "CaliperCode");
            gisdk->Close();

            myFileOperator.OpenFile("C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-
            4F\\Working\\RMSE.txt", "r");
            int numRMSEvals;
            array<double> ^ RMSE = myFileOperator.ReadVector(numRMSEvals);
            if (numRMSEvals != nsize)
            {
                numRMSEvals++;
            }
            myFileOperator.CloseFile("r");

            for (int indx = startingIndex, i = 0; indx < ndesign; indx++, i++)
            {
                chromoID = index[indx];
                fitness[chromoID] = RMSE[i];
                obj[chromoID][0] = RMSE[i];
                feasible[chromoID] = 0.0;
            }
}
```

```
/*=============================================================================*/
/* Prepare the Application to Evaluate Chromosomes                             */
/*=============================================================================*/
void GeneticAlgo::AppInitialize()
{
	gisdk = gcnew CaliperForm::Connection();
	gisdk->MappingServer = "TransCAD";
	gisdk->Open();
	gisdk->DoFunction("SetSearchPath", "C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-4f\\");
	// All we really care about here is the centroid number and whether
	// there are 2 connectors or three.  So pass no parameters in and
	// return a vector of positive & negative numbers--positive if it's
	// 2 connectors, negative if it's 3
	gisdk->DoMacro("GetCentroids", "calipercode");
	gisdk->DoMacro("ReadATRData",  "calipercode");
	gisdk->Close();
	delete gisdk;
	gisdk = nullptr;

	FileOperations myFileOperator;
	myFileOperator.OpenFile("C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-
	4f\\Working\\Centroids.txt", "r");
	int numCentroids;
	centroids = myFileOperator.ReadIVector(numCentroids);
	myFileOperator.CloseFile("r");

	numPercents = 0;
	for (int i = 0; i < numCentroids; i++)
	{
		if (centroids[i] > 0)
			numPercents += 2;
		else
			numPercents += 4;
	}

	// int numCentroids = sizeof(centroids)/sizeof(int);

	// Once we return with an array holding all of these positive & negative centroid numbers,
	// we need to create the dmax & dmin arrays
	nddv = 2 * numCentroids;
	ncdv = 0;

	numGenes = nddv + ncdv;

	//myFileOperator.ReadInteger(nddv);
	dmin = gcnew array<int>(nddv);
	dmax = gcnew array<int>(nddv);
	//myFileOperator.ReadIVector(nddv,dmin);
```

```
	//myFileOperator.ReadIVector(nddv,dmax);
	ddv = gcnew IntMatrix(2*nsize+1);
	for(int i = 0; i < 2*nsize+1; i++)
	{
		ddv[i] = gcnew array<int>(nddv);
	}

/*
	//myFileOperator.ReadInteger(ncdv);
	myMemoryManager.AllocVec(ncdv, cmin);
	myMemoryManager.AllocVec(ncdv, cmax);
	//myFileOperator.ReadVector(ncdv,cmin);
	//myFileOperator.ReadVector(ncdv,cmax);
	myMemoryManager.AllocMat(2*nsize+1,ncdv, cdv);
*/

	sglVarSum = 0;
	int tempVar = sglVarMax;

	while (tempVar > 0)
	{
		sglVarSum += (tempVar+1);
		tempVar--;
	}
	for (int i = 0; i < numCentroids; i++)
	{
		dmin[i*2] = 0;
		dmin[i*2+1] = 0;
		if (centroids[i] > 0)
		{
			dmax[i*2] = sglVarMax;
			dmax[i*2+1] = sglVarMax;
		}
		else
		{
			dmax[i*2] = sglVarSum;
			dmax[i*2+1] = sglVarSum;
		}
	}
}

/*============================================================================*/
/* Copy Variables from Design 1 to Design 2                                   */
/*============================================================================*/
void GeneticAlgo::CopyDesign (int chromo1, int chromo2)
{
	for (int k = 0; k < nddv; k++)
	{
		ddv[chromo2][k] = ddv[chromo1][k];
```

```
        }
/*
        for (int k = 0; k < ncdv; k++)
        {
                cdv[chromo2][k] = cdv[chromo1][k];
        }
*/
}

/*=========================================================================*/
/* Uniform and Blend Crossover                                             */
/*=========================================================================*/
void GeneticAlgo::Crossover (int child1, int child2)
{
        double r,a,x1,x2;
/*-------------------------------------------------------------------------*/
        if (RandomReal(0.0, 1.0) < probcross)
        {
                for (int i = 0; i < nddv; i++)
                {
                        r = RandomReal(0.0, 1.0);
                        if (r <= 0.5)
                        {
                                a = 0.0;
                                if (dcrosspar > 0.0)
                                        a = pow(2.0 * r, 1.0 / dcrosspar) / 2.0;
                        }
                        else
                        {
                                a = 1.0;
                                if (dcrosspar > 0.0)
                                        a = 1.0 - pow(2.0 - 2.0 * r, 1.0 / dcrosspar) / 2.0;
                        }
                        x1 = (double)ddv[child1][i];
                        x2 = (double)ddv[child2][i];
                        if (x2 >= x1)
                        {
                                x1 += 0.00001;
                                x2 += 0.99999;
                        }
                        else
                        {
                                x2 += 0.00001;
                                x1 += 0.99999;
                        }
                        ddv[child1][i] = (int)(a * x1 + (1.0 - a) * x2);
                        ddv[child2][i] = (int)((1.0 - a) * x1 + a * x2);
                }
/*
```

```
                for (int i = 0; i < ncdv; i++)
                {
                        r = RandomReal(0.0, 1.0);
                        if (r <= 0.5)
                        {
                                a = 0.0;
                                if (ccrosspar > 0.0)
                                        a = pow(2.0 * r, 1.0 / ccrosspar) / 2.0;
                        }
                        else
                        {
                                a = 1.0;
                                if (ccrosspar > 0.0)
                                        a = 1.0 - pow(2.0 - 2.0 * r, 1.0 / ccrosspar) / 2.0;
                        }
                        x1 = cdv[child1][i];
                        x2 = cdv[child2][i];
                        cdv[child1][i] = a * x1 + (1.0 - a) * x2;
                        cdv[child2][i] = (1.0 - a) * x1 + a * x2;
                }
*/
        }
}

/*==========================================================================*/
/* Analysis of Duplicate Design                                             */
/*==========================================================================*/
int GeneticAlgo::DupAnalysis (int chromoID)
{
        int ii, j, jj, dup;
/*-------------------------------------------------------------------------*/
        ii = index[chromoID];
        dup = 0;
        j = 0;

        while (dup == 0 && j < chromoID)
        {
                jj = index[j];
                dup = DupValue(ii,jj);
                j++;
        }
        if (dup == 1)
        {
                for (int k = 0; k < nobj; k++)
                        obj[ii][k] = obj[jj][k];
                feasible[ii] = feasible[jj];
                fitness[ii] = fitness[jj];
        }
```

```
	return dup;
}

/*==========================================================================*/
/* Check if Design 1 and Design 2 have Duplicate Values                     */
/*==========================================================================*/
int GeneticAlgo::DupValue (int chromo1, int chromo2)
{
	int k, dup;
/*--------------------------------------------------------------------------*/
	dup = 1;

	k = 0;
	while (dup == 1 && k < nddv)
	{
		if (ddv[chromo1][k] != ddv[chromo2][k]) dup = 0;
		k++;
	}

/*
	k = 0;
	while (dup == 1 && k < ncdv)
	{
		if (cdv[chromo1][k] != cdv[chromo2][k]) dup = 0;
		k++;
	}
*/
	return dup;
}

/*==========================================================================*/
/* Elistism Sort                                                            */
/*==========================================================================*/
void GeneticAlgo::EliteSort ()
{
	int ii,jj,k;
	double minfit;
/*--------------------------------------------------------------------------*/
	for (int i = 0; i < nsize; i++)
	{
		minfit = DBL_MAX;

		for (int j = ndesign-1; j >= i; j--)
		{
			jj = index[j];
			if (fitness[jj] <= minfit)
			{
				minfit = fitness[jj];
				k = j;
```

```
                        }
                }
                if (k != i)
                {
                        ii = index[i];
                        index[i] = index[k];
                        index[k] = ii;
                }
        }
}

/*=========================================================================*/
/* Inputs Information from a Previously-generated Dataset                  */
/*=========================================================================*/
void GeneticAlgo::InputGeneration (int startGen)
{
        int currGen=0;
        String^ currLine = gcnew String("");

        FileOperations localFileOperations;
/*-------------------------------------------------------------------------*/
        localFileOperations.OpenFile("C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-
4F\\Run100\\inputfile.txt","r");

        localFileOperations.ReadInteger(currGen);
        while (currGen != startGen - 1)
        {
                while (currLine != "----------")
                {
                        localFileOperations.ReadLine(currLine);
                }
                localFileOperations.ReadInteger(currGen);
        }

        localFileOperations.ReadIMatrix(2*nsize+1, nddv, ddv);

//      localFileOperations.ReadMatrix(2*nsize+1, ncdv, cdv);

        localFileOperations.ReadMatrix(2*nsize, nobj, obj);
        localFileOperations.ReadVector(2*nsize, feasible);
        localFileOperations.ReadVector(2*nsize, fitness);
        localFileOperations.ReadIVector(2*nsize, index);

        localFileOperations.CloseFile("r");
}

/*=========================================================================*/
/* Segregated Maximin Fitness                                              */
/*=========================================================================*/
```

```
void GeneticAlgo::MaximinFitness ()
{
	double maxfit,maxvalue,minvalue,value;
/*--------------------------------------------------------------------------*/
	maxfit = 0.0;
	for (int i = 0; i < ndesign; i++)
		if (feasible[i] == 0.0)
		{
			maxvalue = -DBL_MAX;
			for (int j = 0; j < ndesign; j++)
				if (feasible[j] == 0.0 && j != i)
				{
					minvalue = DBL_MAX;
					for (int k = 0; k < nobj; k++)
					{
						value = obj[i][k] - obj[j][k];
						if (value < minvalue) minvalue = value;
					}
					if (minvalue > maxvalue) maxvalue = minvalue;
				}
			fitness[i] = maxvalue;
			if (maxvalue > maxfit) maxfit = maxvalue;
		}
	for (int i = 0; i < ndesign; i++)
		if (feasible[i] > 0.0)
			fitness[i] = maxfit + feasible[i];
}

/*==========================================================================*/
/* Uniform and Dynamic Mutation                                             */
/*==========================================================================*/
void GeneticAlgo::Mutation (int child)
{
	double x,r;
/*--------------------------------------------------------------------------*/
	for (int i = 0; i < nddv; i++)
	{
		if (RandomReal(0.0, 1.0) < probmutate)
		{
			x = (double)ddv[child][i];
			r = RandomReal((double)dmin[i] - 0.49999, (double)dmax[i] + 0.49999);
			if (r <= x)
				ddv[child][i] = (int)(dmin[i] + pow(r - dmin[i] + 0.5, dalpha)
				 * pow(x – dmin[i] + 0.5, 1.0 - dalpha));
			else
				ddv[child][i] = (int)(dmax[i] + 1.0 - pow(dmax[i] + 0.5 - r, dalpha)
				 * pow(dmax[i] + 0.5 - x, 1.0 - dalpha));
		}
	}
```

```
/*
        for (int i = 0; i < ncdv; i++)
        {
                if (RandomReal(0.0, 1.0) < probmutate)
                {
                        x = cdv[child][i];
                        r = RandomReal(cmin[i], cmax[i]);
                        if (r <= x)
                                cdv[child][i] = cmin[i] + pow(r - cmin[i], calpha)
                                * pow(x - cmin[i], 1.0 - calpha);
                        else
                                cdv[child][i] = cmax[i] - pow(cmax[i] - r, calpha)
                                * pow(cmax[i] - x, 1.0 - calpha);
                }
        }
*/
}


/*==========================================================================*/
/* Generates a random integer value (between minval and maxval)             */
/*==========================================================================*/
int GeneticAlgo::RandomInteger (int minval, int maxval)
{
        int i, range;
/*-------------------------------------------------------------------------*/
        range = maxval - minval;

        i = (int)(floor(((double)rand()/(double)RAND_MAX) * range + 0.5));
        i = i + minval;

        return i;
}

/*==========================================================================*/
/* Generates a random value (between minval and maxval)                     */
/*==========================================================================*/
double GeneticAlgo::RandomReal (double minval, double maxval)
{
        double a, range;
/*-------------------------------------------------------------------------*/
        range = maxval - minval;

        a = ((double)rand()/(double)RAND_MAX) * range;
        a = a + minval;

        return a;
}
```

```
/*==========================================================================*/
void GeneticAlgo::TournamentSelection (int child)
{
	int candidate, parent;
	double minfit;
/*--------------------------------------------------------------------------*/
	minfit = DBL_MAX;
	for (int i = 0; i < ntourn; i++)
	{
		candidate = index[RandomInteger(0, nsize-1)];
		if (fitness[candidate] <= minfit)
		{
			minfit = fitness[candidate];
			parent = candidate;
		}
	}

	for (int i = 0; i < nddv; i++)
		ddv[child][i] = ddv[parent][i];
/*
	for (int i = 0; i < ncdv; i++)
		cdv[child][i] = cdv[parent][i];
*/
}

/*==========================================================================*/
/* Put Variables Within Their Ranges                                        */
/*==========================================================================*/
void GeneticAlgo::VarRange (int chromoID)
{
	for (int k = 0; k < nddv; k++)
	{
		if (dmin[k] == dmax[k])
			ddv[chromoID][k] = dmin[k];
		else {
			while (ddv[chromoID][k] > dmax[k])
				ddv[chromoID][k] -= dmax[k] - dmin[k] + 1;
			while (ddv[chromoID][k] < dmin[k])
				ddv[chromoID][k] += dmax[k] - dmin[k] + 1;
		}
	}
/*
	for (int k = 0; k < ncdv; k++)
	{
		if (cmin[k] == cmax[k])
			cdv[chromoID][k] = cmin[k];
		else
		{
			while (cdv[chromoID][k] > cmax[k])
```

```
                                cdv[chromoID][k] -= cmax[k] - cmin[k];
                        while (cdv[chromoID][k] < cmin[k])
                                cdv[chromoID][k] += cmax[k] - cmin[k];
                }
        }
*/
}

/*=========================================================================*/
/* Writes a Generation Out to a File                                       */
/*=========================================================================*/
void GeneticAlgo::WriteGeneration (int genNum, string permissions)
{
        FileOperations localFileOperations;
/*-------------------------------------------------------------------------*/
        localFileOperations.OpenFile("C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-
        4F\\Run100\\output.txt", permissions);

        if (permissions == "w")
        {
                localFileOperations.WriteString("New Test");
                localFileOperations.WriteInteger(ngener);
                localFileOperations.WriteInteger(nsize);

                localFileOperations.WriteInteger(nddv);
                localFileOperations.WriteIVector(nddv, dmax);
                localFileOperations.WriteIVector(nddv, dmin);

/*
                localFileOperations.WriteInteger(ncdv);
                localFileOperations.WriteVector(ncdv, cmax);
                localFileOperations.WriteVector(ncdv, cmin);
*/
                localFileOperations.WriteInteger(nobj);
                localFileOperations.WriteInteger(ntourn);
                localFileOperations.WriteInteger(outbest);

                localFileOperations.WriteDouble(probcross);
                localFileOperations.WriteDouble(dcrosspar);
                //localFileOperations.WriteDouble(ccrosspar);
                localFileOperations.WriteDouble(probmutate);
                localFileOperations.WriteDouble(dmutpar);
                //localFileOperations.WriteDouble(cmutpar);
        }

        localFileOperations.WriteInteger(genNum);

        localFileOperations.WriteIMatrix(2*nsize+1, nddv, ddv);
//      localFileOperations.WriteMatrix(2*nsize+1, ncdv, cdv);
```

```
	localFileOperations.WriteMatrix(2*nsize,nobj, obj);
	localFileOperations.WriteVector(2*nsize, feasible);
	localFileOperations.WriteVector(2*nsize, fitness);
	localFileOperations.WriteIVector(2*nsize, index);
	localFileOperations.WriteString("----------");

	localFileOperations.CloseFile(permissions);
}

/*=========================================================================*/
/* Main Function in the Genetic Algorithm                                  */
/*=========================================================================*/
void GeneticAlgo::GeneticAlgorithm()
{
	int child1, child2, firstnew;
/*-------------------------------------------------------------------------*/

	srand( (unsigned int)time(NULL) );

	/*Preprocessing*/
	FileOperations myFileOperator;

	myFileOperator.OpenFile("C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-
	4F\\Run100\\Assignment.input", "r");

	myFileOperator.ReadInteger(ngener);
	myFileOperator.ReadInteger(nsize);
	myFileOperator.ReadInteger(sglVarMax);

	AppInitialize();

	myFileOperator.ReadInteger(nobj);
	myFileOperator.ReadInteger(ntourn);
	myFileOperator.ReadInteger(outbest);
	obj = gcnew DoubleMatrix(2*nsize);
	for (int i = 0; i < 2*nsize; i++)
	{
		obj[i] = gcnew array<double>(nobj);
	}
	feasible = gcnew array<double>(2*nsize);
	fitness = gcnew array<double>(2*nsize);
	index = gcnew array<int>(2*nsize);

	myFileOperator.ReadDouble(probcross);
	myFileOperator.ReadDouble(dcrosspar);
	//myFileOperator.ReadDouble(ccrosspar);
	myFileOperator.ReadDouble(probmutate);
	myFileOperator.ReadDouble(dmutpar);
```

```
	//myFileOperator.ReadDouble(cmutpar);

	myFileOperator.ReadInteger(startGen);

	myFileOperator.CloseFile("r");

	if (startGen != 0)
	{
		InputGeneration(startGen);
	}

	for (int j = startGen; j < ngener; j++)
	{
		dalpha = pow(1.0-(double)(j-1)/(double)ngener,dmutpar);
		//calpha = pow(1.0-(double)(j-1)/(double)ngener,cmutpar);
		/*Starting Generation*/
		if (j == 0)
		{
			for (int i = 0; i < nsize; i++)
			{
				for (int k = 0; k < nddv; k++)
				{
					ddv[i][k] = RandomInteger(dmin[k],dmax[k]);
				}
/*
				for (int k = 0; k < ncdv; k++)
				{
					cdv[i][k] = RandomReal(cmin[k],cmax[k]);
				}
*/
			}
			for (int i = 0; i < 2 * nsize; i++)
				index[i] = i;
			ndesign = nsize;
			firstnew = 0;
		}
		/*Child Generation*/
		else
		{
			int k = nsize;
			for (int i = 0; i < nsize; i+=2)
			{
				child1 = index[k];
				child2 = index[k+1];
				TournamentSelection(child1);
				TournamentSelection(child2);
				Crossover(child1,child2);
				Mutation(child1);
				Mutation(child2);
```

```
                        k += 2;
                }
                ndesign = k;
                firstnew = nsize;
        }
        /*Analyze Generation*/
        AppAnalysis(firstnew);
        /*Evaluate Fitness and Sort*/
        MaximinFitness();
        EliteSort();
        if (outbest == 1)
        {
                if (j == 0)
                        myFileOperator.OpenFile("C:\\Temp\\Thomas Jin\\40-
TransCAD\\Analysis-4F\\Run100\\Results.output", "w");
                else
                        myFileOperator.OpenFile("C:\\Temp\\Thomas Jin\\40-
TransCAD\\Analysis-4F\\Run100\\Results.output", "a");
                myFileOperator.WriteInteger("Generation: ", j);
               myFileOperator.WriteIVector("RMSE: " + obj[index[0]][0].ToString() + " Genes:
", nddv, ddv[index[0]]);

                array<double> ^ printPercents = gcnew array<double>(numPercents);
                int ii;
                for (int i = 0; i < 10; i++)
                {
                        ii = index[i];
                        if (fitness[ii] < DBL_MAX)
                        {
                                myFileOperator.WriteInteger("design number",i);
                                if (nddv > 0)
                                {
                                        myFileOperator.WriteIVector("discrete values", nddv,
ddv[ii]);
                                }

                                int geneNum = 0;
                                for (int dv = 0; dv < nddv; dv++)
                                {
                                        if(dmax[dv] != sglVarMax) // If this gene represents 3
collectors
                                        {
                                                int minuend = sglVarSum - ddv[ii][dv]; // We do
a little magic
                                                int subtrahend = sglVarSum - sglVarMax; // to
determine the
                                                int subtrahend2 = sglVarMax; // values of the 3
percentages
                                                int term1=0, term2=0;
```

```
                                                while (minuend - subtrahend < 0)
                                                {
                                                        term1++;
                                                        subtrahend -= subtrahend2--;
                                                }
                                                term2 = minuend - subtrahend;

                                                double divisor = (double)sglVarMax;
                                                double multiplicand = 100.0 / divisor;
                                               printPercents[geneNum] = (term1 * multiplicand)
/ 100;
                                                geneNum++;
                                               printPercents[geneNum] = (term2 * multiplicand)
/ 100;
                                                geneNum++;
                                        }
                                        else
                                        {
                                                double divisor = (double)sglVarMax;  //
Otherwise, if there are
                                                double multiplicand = 100.0 / divisor; // only 2
collectors, it is
                                                printPercents[geneNum] = ((ddv[ii][dv]) *
multiplicand) / 100; // straightforward
                                                geneNum++;
                                        }
                                }
                /*
                                if (ncdv > 0)
                                {
                                        myFileOperator.WriteVector("continuous
values",ncdv,cdv[ii]);
                                }
                */
                                myFileOperator.WriteVector(numPercents,printPercents);
                                myFileOperator.WriteVector("objectives",nobj,obj[ii]);
                                myFileOperator.WriteDouble("feasibility",feasible[ii]);
                                myFileOperator.WriteDouble("fitness",fitness[ii]);
                        }
                }
                myFileOperator.CloseFile("a");
        }
    }
    /*Postprocess*/
    if (outbest == 1)
    {
        EliteSort();
    }
```

```
	myFileOperator.OpenFile("C:\\Temp\\Thomas Jin\\40-TransCAD\\Analysis-
	4F\\Run100\\Results.output", "a");

	int ii;

	for (int i = 0; i < nsize; i++)
	{
		ii = index[i];
		if (fitness[ii] < DBL_MAX) {
			myFileOperator.WriteInteger("design number",i);
			if (nddv > 0)
			{
				myFileOperator.WriteIVector("discrete values", nddv, ddv[ii]);
			}
/*
			if (ncdv > 0)
			{
				myFileOperator.WriteVector("continuous values",ncdv,cdv[ii]);
			}
*/
			myFileOperator.WriteVector("objectives",nobj,obj[ii]);
			myFileOperator.WriteDouble("feasibility",feasible[ii]);
			myFileOperator.WriteDouble("fitness",fitness[ii]);
		}
	}
	myFileOperator.CloseFile("a");
}

/*****************************************************************/
GeneticAlgo::~GeneticAlgo ()
{
}
```

I-1-5 Source Code for Genetic Algorithm (hpp)

```
//
//  GeneticAlgo.hpp
//  VerticalCityOptimization
//
//  Created by Bradley Mecham on 6/22/11.
//  Copyright 2011 Brigham Young University. All rights reserved.
//

#ifndef GENETIC_ALGO_HPP
#define GENETIC_ALGO_HPP

#include <stdlib.h>
```

```
#include <stdio.h>
#include <math.h>
#include <time.h>
#include <cstdlib>
#include <iostream>
#include <sstream>
#include <string>
#include <limits>

#include "FileOperations.hpp"
#include "MemoryManager.hpp"

//#import "CaliperForm.tlb"

ref class FileOperations;
ref class MemoryManager;

using namespace std;

typedef array<array<int>^> IntMatrix;
typedef array<array<double>^> DoubleMatrix;

ref class GeneticAlgo
{
public:
	GeneticAlgo(){};
	~GeneticAlgo();
	void GeneticAlgorithm();
private:
	void AppInitialize();
	void AppAnalysis (int startingIndex);
	void CopyDesign (int chromo1, int chromo2);
	void Crossover (int child1, int child2);
	int DupAnalysis (int chromoID);
	int DupValue (int chromo1, int chromo2);
	void EliteSort();
	void InputGeneration(int startGen);
	void MaximinFitness();
	void Mutation (int child);
	int RandomInteger (int minval, int maxval);
	double RandomReal (double minval, double maxval);
	void TournamentSelection (int child);
	void VarRange (int chromoID);
	void WriteGeneration (int genNum, string permissions);
	int ngener;
	int nsize;
	int ndesign;
	int sglVarMax;
	int sglVarSum;
```

```
        int nddv;
        IntMatrix ^ ddv;
        array<int> ^ dmin;
        array<int> ^ dmax;
        int ncdv;
        DoubleMatrix ^ cdv;
        array<double> ^ cmin;
        array<double> ^ cmax;
        int ntourn;
        array<double> ^ fitness;
        array<double> ^ feasible;
        int outbest;
        double probcross;
        double dcrosspar;
        //double ccrosspar;
        double probmutate;
        double dmutpar;
        //double cmutpar;
        double dalpha;
        //double calpha;
        int nobj;
        DoubleMatrix ^ obj;
        int ncon;
        array<int> ^ index;
        int startGen;

        int numGenes;

        CaliperForm::Connection^ gisdk;
        array<int> ^ centroids;
        int numPercents;

        MemoryManager myMemoryManager;
};

#endif
```

I-2 Input and Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1	0.53	357	691	I-15 North Bound	Interstate	65	1	1		0	9142.55	5432.82	14575.37	4861.58	2888.92	7750.49
2	0.08	722	719	I-15	Interstate	65	1	1		0	0.00	3670.00	3670.00	0.00	281.83	281.83
3	0.29	723	714	I-15 North Bound	Interstate	65	1	1		0	9142.55	5432.82	14575.37	2624.73	1559.70	4184.43
4	3.44	382	246	I-15	Interstate	25	1	1		0	2453.46	1363.03	3816.49	8444.64	4691.47	13136.10
5	1.73	192	245	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
6	1.80	122	427	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
7	0.17	246	242	I-15	Interstate	65	1	1		0	2453.46	1363.03	3816.49	419.80	233.22	653.02
8	0.28	230	243	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
9	0.43	245	232	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
10	0.27	242	231	I-15	Interstate	35	1	1		0	2453.46	1363.03	3816.49	656.13	364.51	1020.64
11	0.41	229	230	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
12	0.42	231	217	I-15	Interstate	35	1	1		0	2453.46	1363.03	3816.49	1029.28	571.82	1601.11
13	0.42	232	218	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
14	6.40	119	229	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
15	6.39	217	121	I-15	Interstate	25	1	1		0	2453.46	1363.03	3816.49	15680.62	8711.46	24392.08
16	6.40	218	120	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
17	0.31	112	119	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
18	0.32	121	113	I-15	Interstate	35	1	1		0	2453.46	1363.03	3816.49	776.52	431.40	1207.92
19	0.31	120	115	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
20	0.35	100	112	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
21	0.36	113	99	I-15	Interstate	35	1	1		0	2453.46	1363.03	3816.49	880.75	489.31	1370.06
22	0.35	115	116	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
23	5.73	11	100	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
24	5.73	99	6	I-15	Interstate	25	1	1		0	2453.46	1363.03	3816.49	14065.54	7814.19	21879.73
25	5.74	116	5	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
26	1.11	412	764	SR-91	Other Principal Arte	35	1	1		0	1570.95	994.97	2565.93	1749.92	1108.32	2858.25
27	1.11	413	764	SR-91	Other Principal Arte	35	1	1		0	1570.95	994.97	2565.93	1749.97	1108.36	2858.33
28	0.09	382	763	SR-91	Other Principal Arte	35	1	1		0	1570.95	994.97	2565.93	145.90	92.40	238.30
29	0.09	382	763	SR-91	Other Principal Arte	35	1	1		0	1570.95	994.97	2565.93	146.07	92.52	238.59
30	2.46	763	735	SR-91	Other Principal Arte	35	1	1		0	1570.95	994.97	2565.93	3862.66	2446.44	6309.10
31	1.51	735	696	SR-91	Other Principal Arte	35	1	1		0	1570.95	994.97	2565.93	2369.33	1500.63	3869.95
32	0.37	696	689	SR-91	Other Principal Arte	35	1	1		0	1570.95	994.97	2565.93	582.12	368.69	950.81
33	0.11	16102	16099	SR-491 Old SR-666	Other Principal Arte	35	1	1		0	2040.24	2031.19	4071.42	232.90	231.86	464.76
34	2.26	16099	16159	SR-491 Old SR-666	Other Principal Arte	25	1	1		0	2040.24	2031.19	4071.42	4616.40	4595.93	9212.33
35	5.19	16159	16160	SR-491 Old SR-666	Other Principal Arte	45	1	1		0	2040.24	2031.19	4071.42	10595.29	10548.30	21143.59
36	2.08	16160	16182	SR-491 Old SR-666	Other Principal Arte	45	1	1		0	2040.24	2031.19	4071.42	4250.91	4232.06	8482.97
37	1.05	16182	16181	SR-491 Old SR-666	Other Principal Arte	45	1	1		0	2040.24	2031.19	4071.42	2144.55	2135.04	4279.58
38	2.13	16181	16196	SR-491 Old SR-666	Other Principal Arte	45	1	1		0	2040.24	2031.19	4071.42	4340.92	4321.67	8662.59

Figure I-2-1: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD1A	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
39	1.06	16196	20499	SR-491 Old SR-666	Other Principal Art	45	1	1		0	2040.24	2031.19	4071.42	2168.01	2158.39	4326.40
40	0.62	20499	20505	SR-491 Old SR-666	Other Principal Art	45	1	1		0	2040.24	2031.19	4071.42	1263.32	1257.71	2521.03
41	3.30	10100	15346	SR-191	Other Principal Art	45	1	1		0	2671.17	2678.64	5349.81	8803.40	8828.00	17631.40
42	0.74	20240	20233	SR-191	Other Principal Art	55	1	1		0	2671.17	2678.64	5349.81	1985.62	1991.17	3976.80
43	12.96	20233	20200	SR-191	Other Principal Art	35	1	1		0	2671.17	2678.64	5349.81	34605.39	34702.12	69307.51
45	1.23	10079	20147	SR-191	Other Principal Art	35	1	1		0	2671.17	2678.64	5349.81	3297.08	3306.30	6603.38
46	5.48	10077	20147	SR-191	Other Principal Art	35	1	1		0	2671.17	2678.64	5349.81	14632.80	14673.70	29306.50
49	2.13	14270	14285	I-70	Interstate	65	1	1		0	4173.92	4177.63	8351.55	8891.31	8899.21	17790.53
50	8.28	14285	14455	I-70	Interstate	65	1	1		0	4173.92	4177.63	8351.55	34562.10	34592.80	69154.90
51	0.33	14455	14450	I-70	Interstate	65	1	1		0	4173.92	4177.63	8351.55	1384.19	1385.42	2769.62
52	0.26	14450	14443	I-70	Interstate	65	1	1		0	4173.92	4177.63	8351.55	1085.88	1086.84	2172.72
53	5.09	14443	14396	I-70	Interstate	65	1	1		0	4173.92	4177.63	8351.55	21232.61	21251.47	42484.08
55	0.67	14396	14384	I-70	Interstate	65	1	1		0	4173.92	4177.63	8351.55	2803.31	2805.80	5609.12
56	0.17	14384	14378	I-70	Interstate	65	1	1		0	4173.92	4177.63	8351.55	700.49	701.11	1401.61
57	0.40	14378	14372	I-70	Interstate	65	1	1		0	4173.92	4177.63	8351.55	1682.62	1684.12	3366.74
58	0.03	14376	14373	SR-191	Other Principal Art	45	1	1		0	2671.17	2678.64	5349.81	85.11	85.34	170.45
59	0.01	14373	14372	SR-191	Other Principal Art	45	1	1		0	2671.17	2678.64	5349.81	37.99	38.09	76.08
60	0.01	14372	14370	SR-191	Other Principal Art	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
61	0.01	14371	20099	SR-191	Other Principal Art	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
62	0.03	14370	14371	SR-191	Other Principal Art	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
63	0.34	14372	14365	I-70	Interstate	65	1	1		0	1519.23	1538.40	3045.63	510.19	513.94	1024.12
64	4.93	14365	14289	I-70	Interstate	1	1	1		0	1519.23	1538.40	3045.63	7485.19	7540.25	15025.44
65	4.17	18841	18842	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
66	0.99	9419	18838	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	3674.59	3635.38	7309.97
67	0.04	9429	18846	I-84	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
68	0.04	9413	18846	I-84	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
69	0.71	14	18837	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	2650.43	2622.15	5272.58
70	0.42	18846	22	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
71	0.33	22	23	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
72	0.66	25	14	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	2449.98	2423.85	4873.83
73	0.32	23	26	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
74	1.23	28	25	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	4536.77	4547.73	9144.50
75	1.32	26	29	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
76	0.19	29	31	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
77	0.53	30	28	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	1973.11	1952.06	3925.18
78	0.28	31	34	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-2: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
79	0.39	34	35	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
80	0.38	33	30	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	1428.28	1413.04	2841.32
81	4.41	35	51	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
82	4.33	54	31	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	16134.34	15962.21	32096.55
83	0.36	2	11	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
84	0.34	6	7	I-15	Interstate	35	1	1		0	2453.46	1363.03	3816.49	823.35	457.42	1280.77
85	0.33	5	3	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
86	0.32	18832	2	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
87	0.40	7	18828	I-15	Interstate	35	1	1		0	2453.46	1363.03	3816.49	976.58	542.54	1519.12
88	0.35	3	18830	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
89	0.02	18828	18826	I-15	Interstate	65	1	1		0	2453.46	1363.03	3816.49	60.62	33.68	94.29
90	1.43	18832	18833	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
91	0.67	18826	18827	I-15	Interstate	65	1	1		0	2453.46	1363.03	3816.49	1635.18	908.44	2543.62
92	1.41	18829	18830	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
93	1.39	18889	18876	SR-89	Other Principal Art	45	1	1		0	523.73	345.47	873.20	728.87	486.35	1215.22
94	4.22	18876	60	SR-89	Other Principal Art	45	1	1		0	323.51	338.74	662.24	1365.58	1429.87	2795.45
95	0.17	23	47	SR-89	Other Principal Art	35	1	1		0	317.79	316.43	634.21	55.39	55.06	110.36
96	0.09	23	47	SR-89	Other Principal Art	35	1	1		0	317.79	316.43	634.21	27.64	27.52	55.16
97	0.27	11329	11328	SR-40	Other Principal Art	35	1	1		0	1588.53	1589.83	3018.36	400.85	401.19	802.04
98	1.76	11328	11326	SR-40	Other Principal Art	35	1	1		0	1588.53	1589.83	3018.36	2652.69	2654.89	5307.48
99	1.00	11326	11324	SR-40	Other Principal Art	45	1	1		0	1588.53	1589.83	3018.36	1505.15	1506.45	3011.58
100	4.04	11324	11162	SR-40	Other Principal Art	45	1	1		0	1588.53	1589.83	3018.36	6087.07	6092.32	12179.39
101	2.66	5581	10271	SR-40	Other Principal Art	45	1	1		0	1182.23	1485.23	2597.47	2934.94	3741.75	6676.68
102	5.33	5581	10271	SR-40	Other Principal Art	45	1	1		0	1864.98	1063.06	2128.04	5671.43	5661.16	11332.58
103	0.13	10744	10745	SR-40	Other Principal Art	55	1	1		0	1048.00	1048.00	2095.99	132.02	132.02	264.03
104	0.65	10745	10759	SR-40	Other Principal Art	45	1	1		0	1048.00	1048.00	2095.99	677.75	677.75	1355.49
105	5.40	5380	19803	SR-40	Other Principal Art	45	1	1		0	1048.00	1048.00	2095.99	5661.45	5661.45	11322.90
106	5.40	5379	19803	SR-40	Other Principal Art	45	1	1		0	1048.00	1048.00	2095.99	5661.34	5661.34	11322.69
107	3.00	9902	19805	SR-40	Other Principal Art	45	1	1		0	1048.00	1048.00	2095.99	3143.95	3143.95	6287.89
108	1.50	9901	19805	SR-40	Other Principal Art	45	1	1		0	1048.00	1048.00	2095.99	1571.94	1571.94	3143.88
109	0.28	10271	10254	SR-40	Other Principal Art	45	1	1		0	1864.98	1063.06	2128.04	382.38	381.75	684.05
110	0.58	5127	10234	SR-40	Other Principal Art	35	1	1		0	1864.98	1063.06	2128.04	618.56	617.44	1235.99
111	0.58	5127	10234	SR-40	Other Principal Art	35	1	1		0	1864.98	1063.06	2128.04	618.58	617.46	1236.03
112	0.03	10234	10231	1500	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
113	0.26	10234	10206	SR-40	Other Principal Art	35	1	1		0	1864.98	1063.06	2128.04	278.94	278.44	557.38
114	0.02	10204	10206	500 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-3: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
115	0.38	51033	19128	SR-40	Other Principal Arte	35	1	1		0	1064.98	1063.06	2128.04	405.33	404.60	809.93
116	0.38	51033	19128	SR-40	Other Principal Arte	35	1	1		0	1064.98	1063.06	2128.04	405.31	404.58	809.89
117	0.25	19128	19123	SR-40	Other Principal Arte	35	1	1		0	1064.98	1063.06	2128.04	271.56	271.07	542.64
118	0.50	19123	19122	SR-40	Other Principal Arte	35	1	1		0	1064.98	1063.06	2128.04	534.55	533.58	1068.14
119	0.10	19122	19113	SR-191	Other Principal Arte	35	1	1		0	17.77	15.84	33.62	1.73	1.54	3.27
120	0.20	19113	19087	SR-191	Other Principal Arte	35	1	1		0	17.77	15.84	33.62	3.59	3.20	6.79
121	0.50	19122	19121	SR-40	Other Principal Arte	35	1	1		0	1048.00	1048.00	2095.99	523.52	523.52	1047.05
122	0.34	19033	19368	SR-40	Other Principal Arte	35	1	1		0	1048.00	1048.00	2095.99	351.64	351.64	703.27
123	1.02	19249	19033	SR-40	Other Principal Arte	35	1	1		0	1048.00	1048.00	2095.99	1063.97	1063.97	2127.94
124	0.52	50097	19248	SR-40	Other Principal Arte	35	1	1		0	1048.00	1048.00	2095.99	542.04	542.04	1084.08
125	0.52	50097	19248	SR-40	Other Principal Arte	35	1	1		0	1048.00	1048.00	2095.99	542.11	542.11	1084.23
126	1.10	19121	19174	SR-40	Other Principal Arte	35	1	1		0	1048.00	1048.00	2095.99	1149.60	1149.60	2299.20
127	8.89	19368	19744	SR-40	Other Principal Arte	45	1	1		0	1048.00	1048.00	2095.99	9316.24	9316.24	18632.49
128	0.99	9413	18838	I-84 Ivest Bound	Interstate	65	1	1		0	3585.37	3585.37	7170.73	3537.61	3537.61	7075.21
129	3.03	14299	14356	I-70	Interstate	1	1	1		0	1519.23	1530.40	3049.63	4608.66	4634.50	9235.17
130	5.64	14056	14366	I-70	Interstate	65	1	1		0	1493.54	1531.51	3025.05	8428.44	8634.53	17054.98
131	1.59	14366	14307	I-70	Interstate	65	1	1		0	1353.55	1401.01	2754.56	2141.37	2216.45	4357.83
132	5.14	14308	14188	I-70	Interstate	65	1	1		0	1353.55	1401.01	2754.56	6957.16	7201.10	14158.26
133	1.29	14188	14183	I-70	Interstate	65	1	1		0	1353.55	1401.01	2754.56	1736.24	1797.12	3533.36
134	0.17	14183	14178	I-70	Interstate	65	1	1		0	1355.40	1355.40	2710.81	231.78	231.78	463.56
135	0.18	14179	14174	I-70	Interstate	65	1	1		0	1355.40	1355.40	2710.81	249.06	249.06	498.12
136	0.19	14174	14170	I-70	Interstate	65	1	1		0	1355.40	1355.40	2710.81	261.22	261.22	522.43
137	0.12	14170	14168	I-70	Interstate	65	1	1		0	1355.40	1355.40	2710.81	164.72	164.72	329.44
138	6.95	14168	14055	I-70	Interstate	65	1	1		0	1355.40	1355.40	2710.81	9419.20	9419.20	18838.39
139	0.24	14055	14041	I-70	Interstate	65	1	1		0	1355.40	1355.40	2710.81	321.28	321.28	642.56
140	0.24	14041	14036	I-70	Interstate	65	1	1		0	1355.40	1355.40	2710.81	321.86	321.86	643.72
141	3.67	14036	13961	I-70	Interstate	1	1	1		0	1355.40	1355.40	2710.81	4980.87	4980.87	9961.74
142	1.06	13961	13936	I-70	Interstate	65	1	1		0	1355.40	1355.40	2710.81	1437.60	1437.60	2875.20
143	0.23	13936	13937	I-70	Interstate	65	1	1		0	1355.40	1355.40	2710.81	314.62	314.62	629.24
144	0.30	13937	20040	I-70	Interstate	65	1	1		0	1355.40	1355.40	2710.81	402.48	402.48	804.96
145	2.17	20040	20041	I-70	Interstate	1	1	1		0	1355.40	1355.40	2710.81	2937.42	2937.42	5874.84
146	6.28	6460	12935	SR-6	Other Principal Arte	45	1	1		0	84.35	4315.41	4399.77	529.36	27088.92	27618.28
147	6.28	6458	12935	SR-6	Other Principal Arte	45	1	1		0	84.35	4315.41	4399.77	529.35	27088.71	27618.06
148	2.45	6470	12948	SR-6	Other Principal Arte	45	1	1		0	84.35	4315.41	4399.77	206.46	10562.08	10768.54
149	3.36	12897	12312	SR-40	Other Principal Arte	45	1	1		0	1968.28	2013.96	3982.25	6606.20	6759.51	13365.70
150	6.48	6756	12408	SR-40	Other Principal Arte	45	1	1		0	1968.28	2013.96	3982.25	12759.52	13055.63	25815.15

Figure I-2-4: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPOTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
151	6.48	6156	12800	SR-80	Other Principal Arti	45	1	1		0	1968.28	2013.96	3982.25	12758.59	13056.78	25815.29
152	2.03	6204	12386	SR-80	Other Principal Arti	45	1	1		0	1968.28	2013.96	3982.25	3997.90	4090.68	8088.57
153	2.03	6204	12386	SR-80	Other Principal Arti	45	1	1		0	1968.28	2013.96	3982.25	3997.91	4090.69	8088.59
154	3.13	6193	12387	SR-80	Other Principal Arti	45	1	1		0	1968.28	2013.96	3982.25	6155.83	6298.69	12454.51
155	3.13	6193	12387	SR-80	Other Principal Arti	45	1	1		0	1968.28	2013.96	3982.25	6155.78	6298.63	12454.41
156	0.96	12387	18775	SR-80	Other Principal Arti	45	1	1		0	1968.28	2013.96	3982.25	1896.83	1940.85	3837.68
157	8.39	18775	18795	SR-80	Other Principal Arti	45	1	1		0	1968.28	2013.96	3982.25	16507.71	16890.88	33398.59
158	0.13	9098	18666	SR-80	Other Principal Arti	35	1	1		0	1573.52	1687.29	3260.81	159.16	213.56	412.73
159	0.25	9097	18666	SR-80	Other Principal Arti	35	1	1		0	1576.18	1588.19	3156.36	398.89	399.90	798.79
160	0.05	9000	18757	SR-80	Other Principal Arti	35	1	1		0	1576.18	1588.19	3156.36	72.10	72.28	144.38
161	7.79	18937	18889	SR-89	Other Principal Arti	45	1	1		0	523.73	349.47	873.20	4078.51	2721.44	6799.95
162	1.63	60	66	SR-89	Other Principal Arti	35	1	1		0	323.51	338.74	662.24	528.71	553.68	1082.31
163	2.45	66	18853	SR-89	Other Principal Arti	35	1	1		0	323.51	338.74	662.24	806.43	844.40	1650.83
164	0.70	9446	46	SR-89	Other Principal Arti	35	1	1		0	323.51	338.74	662.24	226.23	236.88	463.11
165	1.40	9447	46	SR-89	Other Principal Arti	35	1	1		0	317.79	316.43	634.21	444.52	442.61	887.13
166	3.93	14737	14712	I-70	Interstate	65	1	1		0	5243.94	958.81	6202.75	20595.55	3765.73	24361.28
167	0.30	14712	14704	I-70	Interstate	65	1	1		0	5243.94	958.81	6202.75	1562.24	285.64	1847.89
168	0.19	14704	14696	I-70	Interstate	65	1	1		0	5243.94	958.81	6202.75	989.59	178.15	1168.74
169	0.05	14696	14692	I-70	Interstate	65	1	1		0	5243.94	958.81	6202.75	255.71	46.76	302.47
170	0.03	14692	14693	I-70	Interstate	65	1	1		0	5243.94	958.81	6202.75	156.52	28.62	185.13
171	3.65	7347	14689	I-70	Interstate	65	1	1		0	5243.94	958.81	6202.75	19186.01	3508.01	22694.02
172	1.03	7346	14689	I-70	Interstate	65	1	1		0	5243.94	958.81	6202.75	9592.97	1754.09	11346.96
173	0.11	14683	14686	I-70	Interstate	65	1	1		0	5224.01	961.14	6185.15	578.14	104.90	675.04
174	0.40	14686	14657	I-70	Interstate	65	1	1		0	5224.01	961.14	6185.15	2064.48	379.03	2444.31
175	0.07	14657	14655	I-70	Interstate	65	1	1		0	5224.01	961.14	6185.15	342.88	63.08	405.96
176	0.35	14655	14650	I-70	Interstate	65	1	1		0	5224.01	961.14	6185.15	1858.93	348.54	2191.48
177	0.27	14650	14662	I-70	Interstate	65	1	1		0	5224.01	961.14	6185.15	1427.65	262.67	1690.31
178	0.12	14662	14663	I-70	Interstate	65	1	1		0	5224.01	961.14	6185.15	611.04	112.42	723.46
179	0.29	14660	14645	I-70 View Area Acce	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
180	0.76	14663	14679	I-70	Interstate	65	1	1		0	5224.01	961.14	6185.15	3945.82	725.97	4671.79
181	3.50	14679	14619	I-70	Interstate	65	1	1		0	5224.01	961.14	6185.15	18308.12	3368.42	21676.53
182	6.62	14619	14583	I-70	Interstate	65	1	1		0	5154.58	969.25	6123.83	34136.21	6418.83	40555.03
183	0.23	14583	14562	I-70	Interstate	65	1	1		0	5154.58	969.25	6123.83	1175.74	221.08	1396.82
184	0.22	14562	14554	I-70	Interstate	65	1	1		0	5154.58	969.25	6123.83	1143.43	215.01	1358.44
185	0.07	14554	14551	I-70	Interstate	65	1	1		0	5154.58	969.25	6123.83	344.91	64.86	409.77
186	1.56	14551	14534	I-70	Interstate	65	1	1		0	5154.58	969.25	6123.83	8028.40	1509.12	9528.52

Figure I-2-5: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
187	0.02	6613	13205	STATE HWY 139	Other Principal Art	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
188	0.02	6595	13205	STATE HWY 139	Other Principal Art	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
189	2.45	6469	12948	SR 6	Other Principal Art	45	1	1		0	84.35	4315.41	4399.77	206.46	10561.87	10768.32
190	5.02	12971	13013	SR 6	Other Principal Art	45	1	1		0	84.35	4315.41	4399.77	423.40	21660.35	22083.75
191	1.61	6474	12970	SR 6	Other Principal Art	45	1	1		0	84.35	4315.41	4399.77	136.06	6960.75	7096.81
192	0.68	12970	12971	SR 6	Other Principal Art	45	1	1		0	84.35	4315.41	4399.77	57.10	2921.36	2978.47
193	0.48	15213	15207	I-70	Interstate	65	1	1		0	5121.72	193.84	5315.55	2534.80	95.93	2630.73
194	1.48	15207	15183	I-70	Interstate	65	1	1		0	5121.72	193.84	5315.55	7652.46	289.62	7942.08
195	0.38	15183	15166	I-70	Interstate	65	1	1		0	5121.72	193.84	5315.55	1967.53	74.46	2042.00
196	0.40	15166	15148	I-70	Interstate	65	1	1		0	5121.72	193.84	5315.55	2042.57	77.30	2119.88
197	7.05	7080	12958	SR 6	Other Principal Art	45	1	1		0	320.28	264.25	584.54	2257.83	1862.82	4120.65
198	0.77	12958	12901	SR 6	Other Principal Art	45	1	1		0	350.33	406.50	756.83	271.27	314.77	586.05
199	0.77	6979	12931	SR 6	Other Principal Art	45	1	1		0	442.41	456.89	899.30	342.60	353.81	696.40
200	0.77	6979	13901	SR 6	Other Principal Art	45	1	1		0	442.41	456.89	899.30	342.58	353.79	696.36
201	22.67	12931	12776	SR 6	Other Principal Art	45	1	1		0	442.41	456.89	899.30	10029.04	10357.26	20386.31
202	0.42	14758	14752	I-15	Interstate	65	1	1		0	757.87	34.08	791.95	318.81	14.34	333.15
203	0.45	14759	14751	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	2526.15	4967.58	7493.73
204	1.00	14752	14731	I-15	Interstate	65	1	1		0	757.87	34.08	791.95	780.47	35.23	815.70
205	1.06	7375	14684	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	5988.38	11779.83	17770.21
206	0.54	14713	14730	I-15 South Bound	Interstate	65	1	1		0	197.81	82.57	279.58	186.87	44.79	151.66
207	0.53	14731	14714	I-15	Interstate	65	1	1		0	757.87	34.08	791.95	404.46	18.19	422.65
208	1.06	7376	14684	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	5988.58	11780.23	17770.81
209	0.57	14714	14683	I-15	Interstate	25	1	1		0	757.87	34.08	791.95	438.20	19.34	449.55
210	0.55	14681	14713	I-15 South Bound	Interstate	65	1	1		0	197.81	82.57	279.58	108.22	45.78	155.00
211	0.18	14683	14674	I-15	Interstate	25	1	1		0	757.87	34.08	791.95	134.67	6.06	140.72
212	0.18	14684	14675	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	1097.59	1581.38	2388.97
213	4.83	13795	13842	SR 50	Other Principal Art	45	1	1		0	462.61	490.40	953.01	2234.51	2368.73	4603.24
214	5.15	14529	14681	I-15 South Bound	Interstate	65	1	1		0	197.81	82.57	279.58	1015.06	425.43	1440.50
215	4.86	14675	14533	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	27467.42	54013.52	81480.94
216	4.88	14674	14532	I-15	Interstate	25	1	1		0	757.87	34.08	791.95	3697.61	166.27	3863.88
217	0.08	14532	14530	I-15	Interstate	55	1	1		0	757.87	34.08	791.95	60.45	2.72	63.17
218	0.23	14533	14526	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	1277.45	2512.05	3789.50
219	0.15	14530	14525	I-15	Interstate	35	1	1		0	757.87	34.08	791.95	112.08	5.04	117.12
220	0.15	14524	14529	I-15 South Bound	Interstate	65	1	1		0	197.81	82.57	279.58	29.36	12.31	41.67
221	0.15	14525	14521	I-15	Interstate	35	1	1		0	757.87	34.08	791.95	110.72	4.98	115.70
222	0.25	14515	14524	I-15 South Bound	Interstate	65	1	1		0	197.81	82.57	279.58	48.91	20.50	69.41

Figure I-2-6: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
223	0.27	14526	14516	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	1511.29	2971.88	4483.17
224	0.05	7258	14517	I-15	Interstate	55	1	1		0	757.87	34.08	791.95	38.66	1.74	40.40
225	1.05	14216	14236	I-79	Interstate	65	1	1		0	4173.52	4177.63	8351.55	4400.77	4404.68	8805.45
226	1.12	14236	14275	I-79	Interstate	60	1	1		0	4173.52	4177.63	8351.55	4664.81	4668.55	9333.75
227	0.38	14275	14274	I-79	Interstate	25	1	1		0	4173.52	4177.63	8351.55	4106.27	4109.92	8216.18
228	0.28	14274	14266	I-79	Interstate	65	1	1		0	4173.52	4177.63	8351.55	1188.04	1189.10	2377.14
229	0.30	14266	14265	I-79	Interstate	60	1	1		0	4173.52	4177.63	8351.55	1249.46	1250.57	2500.03
230	0.29	14265	14270	I-79	Interstate	65	1	1		0	4173.52	4177.63	8351.55	1194.94	1196.00	2390.93
231	5.94	14006	14280	SR-6	Other Principal Arte	45	1	1		0	76.28	4344.30	4420.58	452.88	25819.91	26272.79
232	10.09	9995	14006	SR-6	Other Principal Arte	45	1	1		0	76.28	4344.30	4420.58	768.96	43840.52	44609.48
233	3.31	9980	19971	SR-6	Other Principal Arte	45	1	1		0	76.28	4344.30	4420.58	252.41	14398.81	14643.22
234	5.53	9986	19990	SR-6	Other Principal Arte	45	1	1		0	76.28	4344.30	4420.58	421.75	24044.86	24466.61
235	5.53	9985	19990	SR-6	Other Principal Arte	45	1	1		0	76.28	4344.30	4420.58	421.74	24044.72	24466.47
236	10.09	9995	14006	SR-6	Other Principal Arte	45	1	1		0	76.28	4344.30	4420.58	768.97	43840.58	44609.55
237	3.05	10069	20111	SR-191	Other Principal Arte	45	1	1		0	2671.17	2678.64	5349.81	8148.05	8170.83	16318.88
238	0.24	10062	20109	SR-191	Other Principal Arte	45	1	1		0	2671.17	2678.64	5349.81	651.66	653.48	1305.14
239	13.55	14376	20109	SR-191	Other Principal Arte	45	1	1		0	2671.17	2678.64	5349.81	36203.29	36304.47	72507.76
240	0.47	20111	20110	SR-191	Other Principal Arte	45	1	1		0	2671.17	2678.64	5349.81	1242.77	1246.25	2489.02
241	5.93	20137	20117	SR-191	Other Principal Arte	45	1	1		0	2671.17	2678.64	5349.81	15832.93	15877.18	31710.11
242	1.01	20143	20137	SR-191	Other Principal Arte	45	1	1		0	2671.17	2678.64	5349.81	2706.15	2713.72	5419.87
243	1.62	20147	20143	SR-191	Other Principal Arte	45	1	1		0	2671.17	2678.64	5349.81	4319.13	4331.20	8650.33
244	3.05	10058	20111	SR-191	Other Principal Arte	45	1	1		0	2671.17	2678.64	5349.81	8147.97	8170.75	16318.72
245	7.70	8307	16615	SR-191	Other Principal Arte	45	1	1		0	657.36	655.71	1313.08	5061.63	5049.44	10111.07
246	4.94	16615	16105	SR-191	Other Principal Arte	45	1	1		0	657.36	655.71	1313.08	3244.32	3236.51	6480.83
247	0.20	16109	16105	SR-191	Other Principal Arte	35	1	1		0	657.36	655.71	1313.08	129.98	129.59	259.49
248	0.91	8053	16102	SR-491 Old SR-666	Other Principal Arte	35	1	1		0	2040.24	2031.19	4071.42	1865.58	1857.23	3722.73
249	0.91	8052	16102	SR-491 Old SR-666	Other Principal Arte	35	1	1		0	2040.24	2031.19	4071.42	1865.45	1857.18	3722.63
250	14.29	16105	16106	SR-191	Other Principal Arte	45	1	1		0	2671.17	2678.64	5349.81	38177.36	38284.07	76461.43
251	5.13	15106	15803	SR-191	Other Principal Arte	45	1	1		0	2671.17	2678.64	5349.81	13708.81	13747.13	27455.94
252	8.22	15854	20040	SR-191	Other Principal Arte	45	1	1		0	2671.17	2678.64	5349.81	21964.58	22026.06	44050.64
253	1.68	15903	20077	SR-191	Other Principal Arte	45	1	1		0	2671.17	2678.64	5349.81	4495.17	4511.74	9010.91
254	2.26	20277	15854	SR-191	Other Principal Arte	45	1	1		0	2671.17	2678.64	5349.81	6043.33	6060.22	12103.55
255	0.06	8051	16099	SR-491 Old SR-666	Other Principal Arte	35	1	1		0	2040.24	2031.19	4071.42	116.45	115.93	232.38
256	0.06	8051	16099	SR-491 Old SR-666	Other Principal Arte	35	1	1		0	2040.24	2031.19	4071.42	116.45	115.93	232.38
257	0.25	17079	17069	I-15	Interstate	25	1	1		0	0.00	6543.30	6543.30	0.00	1609.72	1609.72
258	0.25	17060	17067	I-15 South Bound	Interstate	55	1	1		0	133.57	324.69	458.66	33.03	80.05	113.08

Figure I-2-7: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pot	BA Loading Pot	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
259	0.24	17069	17061	I-15	Interstate	25	1	1		0	0.00	6543.38	6543.38	0.00	1580.47	1580.47
260	0.50	8534	17052	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	122.86	56.32	179.18
261	0.38	8525	17060	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	50.31	121.94	172.25
262	0.75	17061	17050	I-15	Interstate	65	1	1		0	0.00	6543.38	6543.38	0.00	5188.44	5188.44
263	0.50	8536	17052	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	122.69	56.33	179.22
264	0.38	8526	17060	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	50.32	121.95	172.27
265	0.19	17046	17061	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	25.27	61.23	86.50
266	0.13	17052	17048	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	46.03	21.10	67.13
267	0.15	17050	17047	I-15	Interstate	25	1	1		0	0.00	6543.38	6543.38	0.00	992.41	992.41
268	0.17	17041	17046	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	22.53	54.61	77.14
269	0.17	17047	17042	I-15	Interstate	25	1	1		0	0.00	6543.38	6543.38	0.00	1135.98	1135.98
270	0.17	17048	17042	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	42.94	19.68	62.62
271	1.23	17042	17018	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	302.41	138.63	441.04
272	1.23	17016	17041	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	164.69	398.13	563.82
273	1.23	17040	17017	I-15	Interstate	65	1	1		0	0.00	6543.38	6543.38	0.00	8032.71	8032.71
274	0.18	17012	17016	I-15 South Bound	Interstate	50	1	1		0	133.97	324.69	458.66	23.47	56.87	80.33
275	0.17	17017	17013	I-15	Interstate	25	1	1		0	0.00	6543.38	6543.38	0.00	1123.73	1123.73
276	0.17	17018	17014	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	42.15	19.32	61.47
277	0.20	17013	17008	I-15	Interstate	25	1	1		0	0.00	6543.38	6543.38	0.00	1312.63	1312.63
278	0.21	17005	17012	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	28.76	69.69	98.45
279	0.21	17014	17007	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	50.62	23.21	73.83
280	2.00	16375	17005	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	273.00	676.16	955.16
281	2.10	17007	16376	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	515.64	236.38	752.02
282	3.01	17009	16960	I-15	Interstate	65	1	1		0	0.00	6543.38	6543.38	0.00	19672.95	19672.95
283	0.34	20054	14181	SR 6	Other Principal Art	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
284	14.10	14181	13958	SR 6	Other Principal Art	45	1	1		0	189.01	189.01	378.01	2664.78	2664.77	5329.55
285	7.05	7091	13958	SR 6	Other Principal Art	45	1	1		0	218.56	257.95	476.50	1540.69	1818.39	3359.08
286	0.64	19494	19462	I-80	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
287	0.21	19462	3634	I-80	Interstate	65	1	1		0	4122.21	4122.21	8244.42	880.17	888.17	1769.34
288	0.05	3634	3629	I-80	Interstate	65	1	1		0	4122.21	4122.21	8244.42	185.71	185.71	371.41
289	0.11	3629	3604	I-80	Interstate	65	1	1		0	4425.72	4425.72	8851.44	466.44	466.44	932.87
290	0.49	3604	3605	I-80	Interstate	65	1	1		0	4425.72	4425.72	8851.44	2176.51	2176.52	4353.03
291	0.31	3605	3633	I-80	Interstate	65	1	1		0	4425.72	4425.72	8851.44	1372.67	1372.67	2745.34
292	0.11	3630	3641	I-80	Interstate	65	1	1		0	4425.72	4425.72	8851.44	471.13	471.13	942.27
293	0.65	3641	3673	I-80	Interstate	65	1	1		0	4425.72	4425.72	8851.44	2887.03	2887.04	5774.07
294	0.13	3673	3695	I-80	Interstate	65	1	1		0	4425.72	4425.72	8851.44	561.72	561.72	1123.45

Figure I-2-8: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectio	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
295	0.44	3695	3716	I-80	Interstate	65	1	1		0	4425.72	4425.72	8851.44	1927.84	1927.84	3855.69
296	0.19	3716	3732	I-80	Interstate	65	1	1		0	4425.72	4425.72	8851.44	844.76	844.76	1689.51
297	0.21	3732	3736	I-80	Interstate	65	1	1		0	4425.72	4425.72	8851.44	933.16	933.16	1866.31
298	5.44	3736	3906	I-80	Interstate	65	1	1		0	4425.72	4425.72	8851.44	24083.45	24083.47	48166.92
299	0.20	3906	3909	I-80	Interstate	65	1	1		0	4425.72	4425.72	8851.44	866.56	866.57	1733.13
300	0.45	3909	3917	I-80	Interstate	65	1	1		0	4425.72	4425.72	8851.44	1999.50	1999.50	3999.00
301	0.10	3917	3923	I-80	Interstate	20	1	1		0	4425.72	4425.72	8851.44	422.72	422.72	845.43
302	15.29	3923	4806	I-80	Interstate	65	1	1		0	4934.13	4446.51	9380.64	75425.93	67971.91	143397.84
303	0.30	4806	4810	I-80	Interstate	65	1	1		0	4923.72	4546.68	9470.40	1496.99	1382.35	2879.34
304	0.28	4810	4815	I-80	Interstate	65	1	1		0	4923.72	4546.68	9470.40	1378.26	1265.33	2635.59
305	2.46	8606	17218	SR-9	Other Principal Arti	35	1	1		0	6711.43	537.83	7249.26	16491.68	1321.58	17813.26
306	0.68	8610	17219	SR-9	Other Principal Arti	35	1	1		0	6711.43	537.83	7249.26	4568.15	365.43	4925.59
307	0.68	8606	17219	SR-9	Other Principal Arti	35	1	1		0	6711.43	537.83	7249.26	4559.40	365.37	4924.78
308	2.35	8610	17282	SR-9	Other Principal Arti	35	1	1		0	6711.43	537.83	7249.26	15744.85	1261.74	17006.59
309	4.69	8609	17282	SR-9	Other Principal Arti	35	1	1		0	6658.97	463.37	7122.34	31241.68	2173.96	33415.63
310	1.17	8641	20927	SR-9	Other Principal Arti	35	1	1		0	6658.97	463.37	7122.34	7773.43	548.92	8314.34
311	2.33	8641	20927	SR-9	Other Principal Arti	35	1	1		0	6635.24	462.04	7097.28	15459.84	1078.69	16563.53
312	0.72	10463	17214	SR-9 Zion National P	Other Principal Arti	35	1	1		0	6635.24	462.04	7097.28	4744.24	330.36	5074.59
313	0.72	10464	17214	SR-9 Zion National P	Other Principal Arti	35	1	1		0	6635.24	462.04	7097.28	4744.59	330.41	5075.39
314	5.27	8607	20902	SR-9 Zion National P	Other Principal Arti	35	1	1		0	6635.24	462.04	7097.28	34974.83	2435.44	37410.28
315	0.91	16959	16975	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	122.57	297.04	419.61
316	0.91	16976	16961	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	223.14	102.29	325.43
317	0.02	16960	16958	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	143.36	143.36
318	0.11	16953	16959	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	14.94	36.22	51.16
319	0.10	16958	16954	I-15	Interstate	25	1	1		0	0.00	6543.30	6543.30	0.00	625.22	625.22
320	0.12	16961	16955	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	29.42	13.49	42.90
321	12.03	17258	17745	SR-89	Other Principal Arti	45	1	1		0	763.67	877.48	1641.15	9185.12	10554.01	19739.13
322	2.58	20897	17268	SR-89	Other Principal Arti	45	1	1		0	752.70	792.34	1545.04	1942.01	2044.28	3986.29
323	7.84	17647	20897	SR-89	Other Principal Arti	45	1	1		0	752.70	792.34	1545.04	5904.78	6215.75	12120.53
324	2.60	10524	17647	SR-89	Other Principal Arti	45	1	1		0	714.20	714.20	1428.39	1858.95	1858.95	3717.89
325	5.21	10524	17647	SR-89	Other Principal Arti	45	1	1		0	752.70	792.34	1545.04	3918.41	4124.77	8043.18
326	3.66	10556	21848	SR-89	Other Principal Arti	45	1	1		0	714.20	714.20	1428.39	2612.64	2612.64	5225.28
327	1.83	10555	21848	SR-89	Other Principal Arti	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
328	5.32	10554	20861	SR-191	Other Principal Arti	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
329	10.65	10555	20861	SR-191	Other Principal Arti	45	1	1		0	476.15	476.15	952.30	5069.49	5069.49	10138.98
330	4.13	20861	17157	SR-191	Other Principal Arti	35	1	1		0	476.15	476.15	952.30	1967.56	1967.56	3935.13

Figure I-2-9: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD	BA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
331	0.62	17157	17156	SR-191	Other Principal Arte	35		1	1		0	476.15	476.15	952.30	295.33	295.33	591.66
332	0.83	17156	17154	SR-191	Other Principal Arte	35		1	1		0	476.15	476.15	952.30	15.40	15.40	30.81
333	5.23	8577	16936	SR-191	Other Principal Arte	45		1	1		0	476.15	476.15	952.30	2488.44	2488.44	4976.88
334	5.23	8577	16936	SR-191	Other Principal Arte	45		1	1		0	476.15	476.15	952.30	2488.44	2488.44	4976.88
335	10.83	15936	16679	SR-191	Other Principal Arte	35		1	1		0	476.15	476.15	952.30	5158.08	5158.09	10316.17
336	3.49	15679	16632	SR-191	Other Principal Arte	35		1	1		0	476.15	476.15	952.30	1663.43	1663.43	3326.87
337	0.25	8314	16617	SR-191	Other Principal Arte	35		1	1		0	476.15	476.15	952.30	117.00	117.00	234.00
338	0.12	8318	16617	SR-191	Other Principal Arte	35		1	1		0	476.15	476.15	952.30	58.52	58.52	117.04
339	0.69	19617	19614	SR-191	Other Principal Arte	35		1	1		0	547.67	638.69	1186.37	48.52	56.58	105.10
340	3.85	8307	16615	SR-191	Other Principal Arte	45		1	1		0	547.67	638.69	1186.37	2108.68	2458.14	4567.82
341	0.62	15721	16720	PERKINS	Other Principal Arte	35		1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
342	7.18	16219	16311	I-15 South Bound	Interstate	65		1	1		0	154.04	499.79	653.83	1105.55	3587.03	4692.58
343	7.83	15306	16220	I-15 North Bound	Interstate	65		1	1		0	0.00	62.94	62.94	0.00	442.26	442.26
344	7.66	15305	16218	I-15	Interstate	65		1	1		0	236.03	6746.73	6982.76	1664.68	47583.49	49248.17
345	0.28	15220	16212	I-15 North Bound	Interstate	65		1	1		0	0.00	62.94	62.94	0.00	17.52	17.52
346	0.27	16218	16219	I-15 South Bound	Interstate	65		1	1		0	154.04	499.79	653.83	42.18	136.86	179.04
347	0.25	16218	16211	I-15	Interstate	25		1	1		0	236.03	6746.73	6982.76	59.63	1704.34	1763.97
348	0.23	15211	16205	I-15	Interstate	25		1	1		0	236.03	6746.73	6982.76	54.43	1555.97	1610.40
349	0.24	16212	16206	I-15 North Bound	Interstate	65		1	1		0	0.00	62.94	62.94	0.00	15.01	15.01
350	0.31	16203	16210	I-15 South Bound	Interstate	65		1	1		0	154.04	499.79	653.83	48.19	156.36	204.55
351	0.83	16205	16204	I-15	Interstate	55		1	1		0	236.03	6746.73	6982.76	7.80	222.98	230.79
352	0.73	8103	16200	I-15 North Bound	Interstate	65		1	1		0	0.00	62.94	62.94	0.00	45.75	45.75
353	0.23	15351	16336	I-15 North Bound	Interstate	65		1	1		0	0.00	62.94	62.94	0.00	14.42	14.42
354	0.37	8178	16329	SR-130	Other Principal Arte	35		1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
355	0.65	15337	16333	I-15	Interstate	45		1	1		0	236.03	6746.73	6982.76	11.74	335.57	347.31
356	0.36	15336	16329	I-15 North Bound	Interstate	65		1	1		0	0.00	62.94	62.94	0.00	22.85	22.85
357	0.33	15326	16334	I-15 South Bound	Interstate	65		1	1		0	154.04	499.79	653.83	51.58	167.36	218.94
358	0.33	15333	16327	I-15	Interstate	1		1	1		0	236.03	6746.73	6982.76	77.25	2208.01	2285.25
359	0.37	8176	16329	SR-130	Other Principal Arte	35		1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
360	0.35	16311	16326	I-15 South Bound	Interstate	65		1	1		0	154.04	499.79	653.83	53.43	173.34	226.77
361	0.35	15327	16312	I-15	Interstate	35		1	1		0	236.03	6746.73	6982.76	82.01	2344.22	2426.23
362	0.49	15328	16306	I-15 North Bound	Interstate	65		1	1		0	0.00	62.94	62.94	0.00	30.64	30.64
363	0.14	15312	16305	I-15	Interstate	65		1	1		0	236.03	6746.73	6982.76	33.41	955.09	988.50
364	5.27	8607	20902	SR-9 Zion National P	Other Principal Arte	35		1	1		0	6635.24	462.04	7097.28	34975.06	2435.46	37410.51
365	1.71	20902	17200	SR-9	Other Principal Arte	35		1	1		0	6635.24	462.04	7097.28	11317.40	788.08	12105.47
366	10.60	17203	17212	SR-9	Other Principal Arte	35		1	1		0	6635.24	462.04	7097.28	70324.37	4896.97	75221.34

Figure I-2-10: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
367	3.48	17249	17213	SR-89	Other Principal Art	45	1	1		0	775.69	895.57	1671.26	2698.68	3115.78	5814.46
368	0.28	17239	17240	SR-89	Other Principal Art	45	1	1		0	775.69	895.57	1671.26	217.66	251.38	468.96
369	0.16	17243	17239	SR-89	Other Principal Art	45	1	1		0	775.69	895.57	1671.26	125.28	144.64	269.93
370	5.29	17348	17243	SR-89	Other Principal Art	45	1	1		0	775.69	895.57	1671.26	4104.17	4738.51	8842.68
371	2.05	10534	17348	SR-89	Other Principal Art	35	1	1		0	775.69	895.57	1671.26	1592.86	1839.05	3431.90
372	2.05	10535	17348	SR-89	Other Principal Art	35	1	1		0	775.69	895.57	1671.26	1592.95	1839.16	3432.12
373	4.62	10535	17745	SR-89	Other Principal Art	35	1	1		0	895.57	775.69	1671.26	4136.53	3582.86	7719.40
374	4.11	21069	17348	SR-89	Other Principal Art	35	1	1		0	775.69	895.57	1671.26	3185.86	3678.27	6864.13
375	4.62	10534	17745	SR-89	Other Principal Art	35	1	1		0	895.57	775.69	1671.26	4136.59	3582.83	7719.42
376	4.42	8607	17103	SR-89	Other Principal Art	35	1	1		0	6568.52	515.21	7083.73	29094.26	2274.99	31278.25
377	4.42	8606	17103	SR-89	Other Principal Art	35	1	1		0	6568.52	515.21	7083.73	29093.57	2274.94	31278.51
378	4.49	8552	16929	SR-89	Other Principal Art	35	1	1		0	6568.52	515.21	7083.73	29589.41	2314.61	31824.02
379	4.49	8551	16929	SR-89	Other Principal Art	35	1	1		0	6568.52	515.21	7083.73	29589.18	2314.68	31823.78
380	2.35	8464	16957	SR-89	Other Principal Art	45	1	1		0	6568.52	515.21	7083.73	15435.34	1210.69	16646.03
381	2.35	8465	16957	SR-89	Other Principal Art	45	1	1		0	6568.52	515.21	7083.73	15435.50	1210.71	16646.29
382	10.28	8428	16300	SR-89	Other Principal Art	45	1	1		0	6568.52	515.21	7083.73	67549.90	5298.38	72848.28
383	10.28	8429	16300	SR-89	Other Principal Art	45	1	1		0	6568.52	515.21	7083.73	67558.02	5298.39	72848.40
384	6.75	16298	16466	SR-12	Other Principal Art	35	1	1		0	26.01	15.14	35.15	135.03	102.21	237.24
385	3.67	14609	14748	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	19339.62	3846.63	23186.25
386	0.21	14574	14585	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	1121.00	222.97	1343.97
387	0.09	14585	14588	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	445.17	88.74	534.91
388	0.03	14559	14560	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	170.10	33.85	204.03
389	0.28	14560	14574	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	1479.28	292.44	1762.71
390	0.53	14588	14609	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	2766.39	550.23	3316.62
391	0.09	14774	14773	I-70	Interstate	65	1	1		0	5243.94	958.81	6202.75	489.89	87.93	568.81
392	0.28	14773	14769	I-70	Interstate	65	1	1		0	5243.94	958.81	6202.75	1491.19	272.65	1763.85
393	0.26	14769	14766	I-70	Interstate	65	1	1		0	5243.94	958.81	6202.75	1338.44	244.72	1583.16
394	0.06	14766	14765	I-70	Interstate	65	1	1		0	5243.94	958.81	6202.75	291.07	53.22	344.29
395	3.99	14765	14737	I-70	Interstate	65	1	1		0	5243.94	958.81	6202.75	20986.43	3822.57	24729.00
396	3.51	4815	4794	I-80	Interstate	65	1	1		0	4923.72	4546.68	9478.40	17381.96	15977.03	33278.99
397	0.34	4794	4760	I-80	Interstate	65	1	1		0	4996.79	4564.01	9560.80	1723.02	1573.78	3296.80
398	0.34	4760	4726	I-80	Interstate	65	1	1		0	4996.79	4564.01	9560.80	1722.29	1573.12	3295.40
399	6.53	4726	3668	I-80	Interstate	65	1	1		0	4996.79	4564.01	9560.80	32628.29	29795.09	62415.29
400	0.15	3693	3656	I-80	Interstate	65	1	1		0	4996.79	4564.01	9560.80	754.02	688.71	1442.73
401	0.25	3656	3632	I-80	Interstate	65	1	1		0	4996.79	4564.01	9560.80	1251.43	1143.04	2394.47
402	0.23	3632	3588	I-80	Interstate	65	1	1		0	4996.79	4564.01	9560.80	1138.70	1040.08	2178.78

Figure I-2-11: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
403	0.19	3599	3558	I-80	Interstate	65	1	1		0	4996.79	4564.01	9560.80	946.52	864.54	1811.06
404	5.63	3558	3402	I-80	Interstate	65	1	1		0	4996.79	4564.01	9560.80	25132.13	22955.40	48087.53
405	0.21	3402	3386	I-80	Interstate	65	1	1		0	4996.79	4564.01	9560.80	1029.41	940.25	1969.66
406	0.11	3386	3397	I-80	Interstate	65	1	1		0	4996.79	4564.01	9560.80	560.29	511.76	1072.05
407	0.23	3861	3910	I-80	Interstate	65	1	1		0	5054.72	5065.50	10120.22	1167.64	1170.13	2337.77
408	7.36	3387	3784	I-80	Interstate	65	1	1		0	5054.72	5065.50	10120.22	37192.25	37271.58	74463.83
409	0.16	3784	3901	I-80	Interstate	65	1	1		0	5054.72	5065.50	10120.22	803.29	805.00	1608.29
410	4.49	3040	8556	SR-138	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
411	0.20	8556	8561	SR-138	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
412	0.52	8561	8568	SR-138	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
413	0.31	8568	8573	SR-138	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
414	6.45	3910	4504	I-80	Interstate	65	1	1		0	5054.72	5065.50	10120.22	32581.23	32650.72	65231.95
415	0.21	4504	4510	I-80	Interstate	65	1	1		0	5054.72	5065.50	10120.22	1080.70	1083.01	2163.71
416	0.15	4510	4521	I-80	Interstate	35	1	1		0	5054.72	5065.50	10120.22	742.56	744.15	1486.71
417	1.75	17267	17288	I-15 South Bound	Interstate	65	1	1		0	4357.79	0.29	4358.08	7616.11	0.50	7616.61
418	2.53	17298	17253	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
419	2.12	17294	17263	I-15 North Bound	Interstate	65	1	1		0	4806.39	529.36	5335.75	10258.16	1122.78	11380.94
420	0.34	17257	17267	I-15 South Bound	Interstate	65	1	1		0	4357.79	0.29	4358.08	1497.19	0.10	1497.29
421	0.19	17263	17255	I-15 North Bound	Interstate	65	1	1		0	4806.39	529.36	5335.75	935.94	102.44	1038.38
422	0.10	17252	17257	I-15 South Bound	Interstate	65	1	1		0	4357.79	0.29	4358.08	429.01	0.03	429.04
423	0.63	17247	17248	SR-9	Other Principal Art	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
424	0.64	17248	17249	SR-9	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
425	0.62	17253	17255	SR-9	Other Principal Art	35	1	1		0	2244.33	0.00	2244.33	51.38	0.00	51.38
426	0.62	17255	17256	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	145.52	11.66	157.19
427	0.63	17256	17258	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	186.82	14.91	200.93
428	0.61	17258	17259	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	91.72	7.35	99.08
429	0.12	17259	17265	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	795.72	63.77	859.48
430	0.62	17249	17252	SR-9	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
431	0.63	17252	17253	SR-9	Other Principal Art	35	1	1		0	0.00	4258.97	4258.97	0.00	111.85	111.85
432	0.20	17295	17246	I-15 North Bound	Interstate	65	1	1		0	1786.39	1408.63	3195.02	349.15	275.31	624.46
433	0.78	17265	17276	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	5220.70	418.37	5639.07
434	0.83	8638	17258	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	5577.12	446.93	6024.05
435	0.83	8638	17258	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	5577.34	446.95	6024.29
436	2.34	8623	17207	I-15 North Bound	Interstate	65	1	1		0	1786.39	1408.63	3195.02	5250.61	4140.29	9390.90
437	5.37	17200	17252	I-15 South Bound	Interstate	65	1	1		0	123.96	65.43	189.39	790.85	416.99	1207.84
438	1.69	17251	17275	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	7240.61	580.24	7820.85

Figure I-2-12: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectio	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
439	0.20	17275	17274	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	1323.61	106.07	1429.68
440	0.66	8638	17250	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	4402.84	352.83	4755.67
441	6.65	17253	17195	I-15	Interstate	1	1	1		0	0.00	6543.30	6543.30	0.00	43511.50	43511.50
442	1.47	8623	17207	I-15 North Bound	Interstate	65	1	1		0	1786.39	1408.63	3195.02	2625.27	2070.12	4695.39
443	0.66	8636	17250	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	4402.32	352.79	4755.11
444	1.26	17250	17244	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	8440.82	676.35	9116.37
445	0.98	8622	17231	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	6590.99	528.18	7119.17
446	0.98	8622	17231	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	6590.96	528.18	7119.14
447	0.25	8617	17232	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	1709.53	137.00	1846.52
448	0.25	8614	17232	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	1708.82	136.94	1845.76
449	0.34	8617	17233	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	2308.45	184.99	2493.44
450	0.34	8615	17233	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	2308.07	184.96	2493.03
451	0.43	8615	17226	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	2870.97	230.07	3101.04
452	0.43	8617	17226	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	2871.35	230.10	3101.45
453	0.91	8613	17216	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	6128.56	491.12	6619.68
454	0.91	8613	17216	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	6129.01	491.16	6620.17
455	2.46	8608	17218	SR-9	Other Principal Art	35	1	1		0	6711.43	537.83	7249.26	16492.39	1321.64	17814.03
456	0.59	17207	17196	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	145.80	66.83	212.63
457	0.26	17194	17200	I-15 South Bound	Interstate	65	1	1		0	123.96	65.43	189.39	32.41	17.10	49.51
458	1.14	17195	17180	I-15	Interstate	25	1	1		0	0.00	6543.30	6543.30	0.00	7447.37	7447.37
459	1.14	17196	17184	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	280.13	128.41	408.54
460	1.14	17182	17194	I-15 South Bound	Interstate	65	1	1		0	123.96	65.43	189.39	141.63	74.75	216.38
461	0.25	17178	17182	I-15 South Bound	Interstate	65	1	1		0	123.96	65.43	189.39	30.60	16.15	46.75
462	0.24	17184	17179	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	58.42	26.78	85.20
463	3.76	17180	17130	I-15	Interstate	25	1	1		0	0.00	6543.30	6543.30	0.00	24701.25	24701.25
464	3.27	17142	17178	I-15 South Bound	Interstate	65	1	1		0	123.96	65.43	189.39	405.73	214.14	619.87
465	3.30	17179	17141	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	812.99	372.69	1185.67
466	0.13	17129	17142	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	18.84	48.82	67.66
467	0.23	17141	17131	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	57.52	26.37	83.89
468	0.22	17124	17129	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	29.44	71.35	100.79
469	0.29	17131	17122	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	71.65	32.84	104.49
470	2.24	17130	17098	I-15	Interstate	1	1	1		0	0.00	6543.30	6543.30	0.00	14643.05	14643.05
471	2.02	17097	17124	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	270.45	655.46	925.91
472	1.95	17122	17099	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	480.55	228.29	708.84
473	0.53	17098	17089	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	3452.92	3452.92
474	0.52	17099	17090	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	129.69	58.18	188.27

Figure I-2-13: Input Output Data for Optimization (ID 1-38)

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
475	0.72	17077	17097	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	96.17	233.07	329.24
476	0.16	17088	17082	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	1015.89	1015.89
477	0.16	17090	17083	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	38.62	17.71	56.33
478	0.03	17082	17079	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	203.41	203.41
479	0.24	17067	17077	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	32.60	79.00	111.60
480	0.27	17083	17070	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	67.66	31.02	98.68
481	0.07	17484	17485	SR-34	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
482	0.29	17453	17483	I-15 South Bound	Interstate	65	1	1		0	4357.79	0.29	4358.08	1248.99	0.08	1241.87
483	0.02	17485	17486	SR-34	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
484	0.34	17484	17446	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	1657.48	181.42	1838.89
485	0.00	17486	17487	SR-34	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
486	0.10	17422	17426	RED CLIFFS	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
487	1.72	17397	17453	I-15 South Bound	Interstate	65	1	1		0	4357.79	0.29	4358.08	7480.45	0.49	7480.95
488	0.06	17418	17422	TELEGRAPH	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
489	2.28	17402	17372	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
490	1.67	17446	17385	I-15 North Bound	Interstate	35	1	1		0	4836.39	529.36	5365.75	8073.51	883.67	8957.18
491	0.02	17418	17417	RED CLIFFS	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
492	0.03	17417	17416	RED CLIFFS	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
493	0.29	17370	17387	I-15 South Bound	Interstate	65	1	1		0	4357.79	0.29	4358.08	1249.39	0.08	1249.46
494	0.25	17385	17376	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	1238.90	135.60	1374.50
495	0.01	17376	17374	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	31.45	3.45	34.94
496	0.01	17374	17373	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	33.41	3.66	37.07
497	0.00	17389	17370	I-15 South Bound	Interstate	65	1	1		0	4357.79	0.29	4358.08	13.91	0.00	13.91
498	0.01	17367	17369	I-15 South Bound	Interstate	65	1	1		0	4357.79	0.29	4358.08	33.06	0.00	33.06
499	0.23	17373	17346	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	1113.90	121.92	1235.82
500	0.26	17343	17367	I-15 South Bound	Interstate	65	1	1		0	4357.79	0.29	4358.08	1202.78	0.08	1202.86
501	0.33	17372	17341	I-15	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
502	0.70	8673	17313	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	3393.50	371.43	3764.93
503	1.35	17310	17343	I-15 South Bound	Interstate	65	1	1		0	4357.79	0.29	4358.08	6058.07	0.40	6058.46
504	0.70	8673	17313	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	3393.81	371.46	3765.27
505	2.13	17341	17298	I-15	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
506	0.27	8656	17305	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	1314.94	143.92	1458.87
507	0.49	17303	17310	I-15 South Bound	Interstate	65	1	1		0	4357.79	0.29	4358.08	2121.67	0.14	2121.81
508	0.27	8657	17305	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	1315.05	143.94	1458.99
509	0.30	17299	17303	I-15 South Bound	Interstate	65	1	1		0	4357.79	0.29	4358.08	1314.52	0.09	1314.60
510	0.27	17305	17299	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	1313.90	143.81	1457.71

Figure I-2-14: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectio	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
511	0.23	17299	17294	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	1122.97	122.91	1245.88
512	0.33	17288	17297	I-15 South Bound	Interstate	65	1	1		0	4357.79	0.29	4358.08	1419.57	0.09	1419.66
513	0.91	17597	17576	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	4386.87	480.16	4867.03
514	0.24	17457	17463	SR-18	Other Principal Art	35	1	1		0	0.00	196.18	196.18	0.00	46.94	46.94
515	0.10	17397	17388	SR-18	Other Principal Art	35	1	1		0	50.47	0.00	50.47	4.92	0.00	4.92
516	0.97	17469	17397	SR-18	Other Principal Art	35	1	1		0	50.47	0.00	50.47	48.92	0.00	48.92
517	0.29	8736	17472	SR-34	Other Principal Art	35	1	1		0	0.00	246.65	246.65	0.00	71.83	71.83
518	0.34	8804	17559	SR-18	Other Principal Art	35	1	1		0	0.00	196.18	196.18	0.00	65.89	65.89
519	0.80	17559	17497	SR-18	Other Principal Art	35	1	1		0	0.00	196.18	196.18	0.00	157.49	157.49
520	0.25	8733	17472	SR-34	Other Principal Art	35	1	1		0	0.00	246.65	246.65	0.00	71.81	71.81
521	0.12	8740	17473	SR-34	Other Principal Art	35	1	1		0	0.00	246.65	246.65	0.00	28.46	28.46
522	0.12	8732	17473	SR-34	Other Principal Art	35	1	1		0	0.00	246.65	246.65	0.00	28.43	28.43
523	0.12	8737	17474	SR-34	Other Principal Art	35	1	1		0	0.00	246.65	246.65	0.00	29.11	29.11
524	0.12	8736	17474	SR-34	Other Principal Art	35	1	1		0	0.00	246.65	246.65	0.00	29.11	29.11
525	0.17	8695	17328	SR-18	Other Principal Art	35	1	1		0	50.47	0.00	50.47	8.54	0.00	8.54
526	0.34	8693	17328	SR-18	Other Principal Art	35	1	1		0	50.47	0.00	50.47	17.07	0.00	17.07
527	0.39	8788	17518	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	1904.70	208.47	2113.18
528	0.75	17522	17574	I-15 South Bound	Interstate	65	1	1		0	4111.14	0.29	4111.43	3083.65	0.22	3083.87
529	0.79	17575	17517	I-15	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
530	0.39	8788	17518	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	1904.92	208.50	2113.42
531	0.04	17515	17522	I-15 South Bound	Interstate	65	1	1		0	4111.14	0.29	4111.43	163.06	0.01	163.08
532	0.03	17518	17509	I-15 North Bound	Interstate	45	1	1		0	4836.39	529.36	5365.75	123.56	13.52	137.08
533	0.25	17493	17515	I-15 South Bound	Interstate	65	1	1		0	4111.14	0.29	4111.43	1022.13	0.07	1022.20
534	0.25	17517	17492	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
535	0.22	17509	17484	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	1079.99	118.21	1198.20
536	0.18	8738	17477	SR-34	Other Principal Art	35	1	1		0	0.00	246.65	246.65	0.00	43.44	43.44
537	0.18	8736	17477	SR-34	Other Principal Art	35	1	1		0	0.00	246.65	246.65	0.00	43.43	43.43
538	0.17	8739	17479	SR-34	Other Principal Art	35	1	1		0	0.00	246.65	246.65	0.00	42.94	42.94
539	0.17	8738	17479	SR-34	Other Principal Art	35	1	1		0	0.00	246.65	246.65	0.00	42.94	42.94
540	0.13	17479	17480	SR-34	Other Principal Art	35	1	1		0	0.00	246.65	246.65	0.00	32.68	32.68
541	0.02	17480	17481	SR-34	Other Principal Art	35	1	1		0	0.00	246.65	246.65	0.00	5.94	5.94
542	0.06	17481	17483	SR-34	Other Principal Art	35	1	1		0	0.00	246.65	246.65	0.00	15.48	15.48
543	0.01	17483	17482	SR-34	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
544	0.01	17482	17484	SR-34	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
545	0.06	21092	21094	I-15 South Bound	Interstate	65	1	1		0	4836.39	4836.39	9672.78	274.32	274.32	548.65
546	0.11	21095	17764	I-15	Interstate	1	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-15: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
547	0.06	21896	21893	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
548	0.31	21893	17762	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
549	0.55	17761	21892	I-15 South Bound	Interstate	65	1	1		0	4836.39	4836.39	9672.78	2678.20	2678.20	5356.40
550	1.18	17762	17763	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
551	0.89	17760	17761	I-15 South Bound	Interstate	65	1	1		0	4836.39	4836.39	9672.78	4296.95	4296.95	8593.90
552	0.61	17763	17743	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
553	4.59	17764	17702	I-15	Interstate	1	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
554	0.82	17743	17744	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
555	2.77	17723	17760	I-15 South Bound	Interstate	65	1	1		0	4836.39	4836.39	9672.78	13406.69	13406.69	26813.37
556	1.37	17744	17721	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
557	0.40	17701	17723	I-15 South Bound	Interstate	65	1	1		0	4836.39	4836.39	9672.78	1922.16	1922.16	3844.33
558	0.31	17721	17706	I-15 North Bound	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
559	0.33	17684	17701	I-15 South Bound	Interstate	65	1	1		0	4836.39	4836.39	9672.78	1606.65	1606.65	3213.30
560	0.46	17706	17679	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
561	0.95	17652	17684	I-15 South Bound	Interstate	65	1	1		0	4836.39	4836.39	9672.78	4605.26	4605.26	9210.52
562	0.84	17679	17651	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
563	1.68	17702	17620	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
564	0.37	17651	17621	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
565	0.40	17619	17652	I-15 South Bound	Interstate	65	1	1		0	4836.39	4836.39	9672.78	1922.02	1922.02	3844.05
566	0.10	17634	17621	SR-18	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
567	0.12	17619	17615	SR-18	Other Principal Art	35	1	1		0	0.00	196.18	196.18	0.00	23.91	23.91
568	0.01	17620	17619	SR-18	Other Principal Art	45	1	1		0	529.36	4836.39	5365.75	4.32	39.46	43.78
569	0.01	17621	17620	SR-18	Other Principal Art	45	1	1		0	529.36	4836.39	5365.75	6.29	57.47	63.76
570	0.10	17615	17606	SR-18	Other Principal Art	35	1	1		0	0.00	196.18	196.18	0.00	20.21	20.21
571	0.34	8802	17553	SR-18	Other Principal Art	35	1	1		0	0.00	196.18	196.18	0.00	65.88	65.88
572	0.20	8800	17597	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	971.75	106.36	1078.11
573	0.35	17609	17613	I-15 South Bound	Interstate	65	1	1		0	4111.14	0.29	4111.43	1448.10	0.10	1448.21
574	0.20	8813	17597	I-15 North Bound	Interstate	65	1	1		0	4836.39	529.36	5365.75	972.39	106.43	1078.82
575	1.30	17629	17575	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
576	0.93	17574	17609	I-15 South Bound	Interstate	65	1	1		0	4111.14	0.29	4111.43	3836.51	0.27	3836.78
577	0.10	16949	16953	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	13.85	33.56	47.41
578	0.10	16954	16950	I-15	Interstate	25	1	1		0	0.00	6543.30	6543.30	0.00	666.12	666.12
579	0.14	16955	16947	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	34.11	15.64	49.75
580	0.03	16950	16946	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	223.10	223.10
581	3.18	16895	16949	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	426.07	1032.60	1458.67
582	3.15	16946	16894	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	20617.69	20617.69

Figure I-2-16: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
583	3.13	16947	16886	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	771.13	353.50	1124.63
584	0.21	16877	16885	I-15 South Bound	Interstate	65	1	1		0	133.57	324.69	458.66	28.42	68.87	97.28
585	0.21	16884	16878	I-15	Interstate	35	1	1		0	0.00	6543.30	6543.30	0.00	1362.53	1362.53
586	0.22	16886	16875	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	54.66	25.05	79.71
587	0.24	16874	16877	I-15 South Bound	Interstate	65	1	1		0	133.57	324.69	458.66	31.96	77.46	109.42
588	0.24	16878	16873	I-15	Interstate	35	1	1		0	0.00	6543.30	6543.30	0.00	1578.39	1578.39
589	0.24	16879	16875	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	58.24	27.15	85.40
590	1.41	16895	16874	I-15 South Bound	Interstate	65	1	1		0	133.57	324.69	458.66	188.58	457.04	645.62
591	1.40	16873	16856	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	9181.61	9181.61
592	1.43	16875	16853	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	352.86	161.76	514.62
593	0.04	16856	16852	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	267.81	267.81
594	0.27	16841	16855	I-15 South Bound	Interstate	65	1	1		0	133.57	324.69	458.66	35.61	86.29	121.90
595	0.23	16852	16842	I-15	Interstate	35	1	1		0	0.00	6543.30	6543.30	0.00	1482.41	1482.41
596	0.24	16853	16843	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	58.43	26.79	85.22
597	0.07	16842	16837	I-15	Interstate	35	1	1		0	0.00	6543.30	6543.30	0.00	470.72	470.72
598	0.29	16829	16841	I-15 South Bound	Interstate	65	1	1		0	133.57	324.69	458.66	39.47	95.53	134.94
599	0.23	16837	16829	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	1515.62	1515.62
600	0.40	16843	16825	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	98.34	45.08	143.42
601	0.02	16828	16827	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	158.35	158.35
602	1.56	16827	16783	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	10208.94	10208.94
603	1.70	16779	16825	I-15 South Bound	Interstate	65	1	1		0	133.57	324.69	458.66	227.47	551.28	778.75
604	1.48	16825	16782	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	367.66	168.54	536.20
605	0.79	16783	16751	I-15	Interstate	1	1	1		0	0.00	6543.30	6543.30	0.00	5155.27	5155.27
606	0.83	16782	16743	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	205.09	93.98	299.08
607	0.72	16746	16779	I-15 South Bound	Interstate	65	1	1		0	133.57	324.69	458.66	96.87	234.76	331.63
608	0.05	16751	16744	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	316.28	316.28
609	6.03	16743	16660	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	1480.02	679.03	2162.06
610	6.07	16658	16746	I-15 South Bound	Interstate	65	1	1		0	133.57	324.69	458.66	812.61	1969.40	2782.01
611	6.05	16744	16659	I-15	Interstate	1	1	1		0	0.00	6543.30	6543.30	0.00	39617.15	39617.15
612	0.03	16659	16656	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	222.77	222.77
613	0.27	16660	16650	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	65.48	30.02	95.49
614	0.25	16648	16658	I-15 South Bound	Interstate	65	1	1		0	133.57	324.69	458.66	33.98	82.34	116.32
615	0.21	16656	16649	I-15	Interstate	35	1	1		0	0.00	6543.30	6543.30	0.00	1404.20	1404.20
616	0.23	16650	16638	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	57.63	26.42	84.05
617	0.22	16649	16639	I-15	Interstate	35	1	1		0	0.00	6543.30	6543.30	0.00	1451.29	1451.29
618	0.26	16635	16648	I-15 South Bound	Interstate	65	1	1		0	133.57	324.69	458.66	34.36	83.28	117.64

Figure I-2-17: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectio	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
619	0.04	16639	16636	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	238.26	238.26
620	2.88	16638	16600	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	709.67	325.32	1034.99
621	2.85	16599	16635	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	382.22	926.33	1308.55
622	2.85	16636	16599	I-15	Interstate	35	1	1		0	0.00	6543.30	6543.30	0.00	18672.74	18672.74
623	0.02	16431	20590	SR 56	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
624	2.76	20590	16430	SR 56	Other Principal Arti	35	1	1		0	533.47	592.53	1126.00	1474.56	1637.82	3112.38
625	2.07	16583	16598	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	277.02	671.37	948.39
626	2.13	16599	16581	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	13954.33	13954.33
627	2.23	16600	16580	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	547.74	251.09	798.83
628	0.10	16581	16579	I-15	Interstate	55	1	1		0	0.00	6543.30	6543.30	0.00	641.53	641.53
629	0.45	16575	16583	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	68.50	166.63	287.14
630	0.31	16580	16572	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	75.89	34.75	110.65
631	0.29	16579	16573	I-15	Interstate	45	1	1		0	0.00	6543.30	6543.30	0.00	1915.13	1915.13
632	0.44	8265	16555		Other Principal Arti	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
633	1.32	16429	16525		Other Principal Arti	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
634	0.44	8264	16555		Other Principal Arti	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
635	0.62	16555	16559		Other Principal Arti	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
636	0.24	16560	16575	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	31.96	77.47	109.43
637	0.24	16573	16561	I-15	Interstate	45	1	1		0	0.00	6543.30	6543.30	0.00	1541.30	1541.30
638	0.23	16572	16562	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	56.20	25.76	81.96
639	0.07	16557	16558		Other Principal Arti	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
640	0.23	16439	16442	SR 56	Other Principal Arti	35	1	1		0	533.47	592.53	1126.00	121.10	134.51	255.62
641	0.03	16455	16456	SR 56	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
642	0.00	16456	16457	SR 56	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
643	0.27	16457	16458	SR 56	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
644	0.38	16458	16459	SR 56	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
645	0.11	16536	16530	SR 130	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
646	0.06	16531	16481	SR 130	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
647	0.29	16459	16460	SR 56	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
648	0.25	16481	16460	SR 130	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
649	0.18	8228	16425	SR 130	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
650	0.25	16430	16429	SR 56	Other Principal Arti	35	1	1		0	533.47	592.53	1126.00	134.50	149.39	283.90
651	0.42	8215	16438	SR 56	Other Principal Arti	35	1	1		0	533.47	592.53	1126.00	222.65	247.30	469.95
652	0.42	8214	16438	SR 56	Other Principal Arti	35	1	1		0	533.47	592.53	1126.00	222.62	247.27	469.89
653	0.33	16448	16428	I-15	Interstate	65	1	1		0	245.25	6806.43	7051.68	79.91	2217.71	2297.62
654	0.33	16449	16427	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	20.87	20.87

Figure I-2-18: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectio	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
555	0.42	16417	16453	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	64.78	210.17	274.94
556	0.08	16426	16419	I-15	Interstate	25	1	1		0	245.25	6806.43	7051.68	19.41	538.57	557.98
557	0.08	16427	16418	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	4.97	4.97
558	0.57	16390	16417	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	87.38	283.53	370.91
559	0.57	16419	16391	I-15	Interstate	25	1	1		0	245.25	6806.43	7051.68	138.75	3850.64	3989.39
560	0.56	16419	16392	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	35.44	35.44
561	1.86	16391	16358	I-15	Interstate	25	1	1		0	245.25	6806.43	7051.68	455.35	12637.02	13092.37
562	2.11	16348	16390	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	324.63	1053.29	1377.92
563	2.09	16392	16351	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	131.39	131.39
564	0.18	8232	16425	SR-130	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
565	0.91	8212	16367	SR-130	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
566	0.91	8213	16367	SR-130	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
567	0.29	8182	16354	SR-130	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
568	0.04	16359	16356	I-15	Interstate	1	1	1		0	245.25	6806.43	7051.68	9.20	257.64	266.92
569	0.29	8185	16354	SR-130	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
570	0.20	16356	16349	I-15	Interstate	65	1	1		0	245.25	6806.43	7051.68	49.47	1372.83	1422.30
571	0.10	16349	16337	I-15	Interstate	25	1	1		0	245.25	6806.43	7051.68	25.50	707.63	733.13
572	0.24	16334	16348	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	37.28	120.94	158.22
573	0.09	16442	16445	SR-56	Other Principal Arte	35	1	1		0	533.47	592.53	1126.00	49.72	55.22	104.94
574	0.01	16445	16446	SR-56	Other Principal Arte	35	1	1		0	533.47	592.53	1126.00	5.83	6.48	12.31
575	0.26	16446	16451	SR-56	Other Principal Arte	35	1	1		0	533.47	592.53	1126.00	148.75	156.34	297.09
576	0.18	16571	16564	SR-130	Other Principal Arte	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
577	0.30	16553	16560	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	40.74	98.73	139.46
578	0.32	16561	16552	I-15	Interstate	25	1	1		0	0.00	6543.30	6543.30	0.00	2104.12	2104.12
579	0.38	16562	16549	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	93.14	42.69	135.83
580	0.47	16564	16554	SR-130	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
581	0.02	8276	16550	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	168.91	168.91
582	0.02	8276	16550	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	168.91	168.91
583	0.54	16519	16553	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	72.57	175.87	248.44
584	0.48	16550	16517	I-15	Interstate	25	1	1		0	0.00	6543.30	6543.30	0.00	3131.00	3131.00
585	0.47	16549	16520	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	116.35	53.34	169.69
586	0.29	8277	16536	SR-130	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
587	0.29	8277	16536	SR-130	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
588	0.36	8259	16488	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	88.45	40.54	128.99
589	0.60	16457	16519	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	79.84	193.50	273.34
590	0.60	16517	16496	I-15	Interstate	25	1	1		0	0.00	6543.30	6543.30	0.00	3913.65	3913.65

Figure I-2-19: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
691	0.36	8261	16488	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	88.46	40.55	129.01
692	0.12	16486	16437	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	16.43	39.81	56.24
693	0.12	16436	16487	I-15	Interstate	25	1	1		0	0.00	6543.30	6543.30	0.00	781.66	781.66
694	0.24	16464	16486	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	32.20	78.03	110.23
695	0.25	16487	16461	I-15	Interstate	65	1	1		0	0.00	6543.30	6543.30	0.00	1639.38	1639.38
696	0.26	16488	16455	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	65.05	29.82	94.87
697	0.01	16451	16452	SR 56	Other Principal Art	35	1	1		0	533.47	592.53	1126.00	3.80	4.22	8.03
698	0.07	16452	16453	SR 56	Other Principal Art	35	1	1		0	533.47	592.53	1126.00	37.75	41.93	79.69
699	0.02	16453	16464	I-15 South Bound	Interstate	65	1	1		0	133.97	324.69	458.66	3.24	7.86	11.10
700	0.01	16461	16454	I-15	Interstate	35	1	1		0	0.00	6543.30	6543.30	0.00	92.52	92.52
701	0.01	16453	16454	SR 56	Other Principal Art	35	1	1		0	547.02	761.12	1308.13	4.05	5.63	9.68
702	0.01	16454	16455	SR 56	Other Principal Art	35	1	1		0	88.31	276.53	356.84	0.65	2.34	2.90
703	0.01	16454	16448	I-15	Interstate	35	1	1		0	245.25	6806.43	7051.68	3.62	100.55	104.18
704	0.01	16455	16449	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	0.63	0.63
705	1.67	145	152	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
706	1.64	159	147	I-84 West Bound	Interstate	65	1	1		0	6700.44	7751.13	14451.57	11007.49	12733.57	23741.06
707	0.22	160	163	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
708	0.27	164	157	I-84 West Bound	Interstate	65	1	1		0	6700.44	7751.13	14451.57	1796.75	2078.50	3875.25
709	0.13	183	186	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
710	0.33	196	192	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
711	0.33	188	190	I-84 West Bound	Interstate	65	1	1		0	6700.44	7751.13	14451.57	2238.28	2589.26	4827.54
712	0.44	192	200	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
713	0.44	196	188	I-84 West Bound	Interstate	65	1	1		0	6700.44	7751.13	14451.57	2948.51	3410.86	6359.37
714	6.46	200	455	I-84	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
715	6.45	473	196	I-84 West Bound	Interstate	65	1	1		0	6700.44	7751.13	14451.57	43220.60	49998.81	93218.61
716	0.06	539	540	I-84	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
717	0.22	555	537	I-84 West Bound	Interstate	65	1	1		0	6700.44	7751.13	14451.57	1460.10	1689.06	3149.16
718	0.15	540	557	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
719	0.09	578	571	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
720	0.13	571	557	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
721	0.25	582	555	I-84 West Bound	Interstate	65	1	1		0	6700.44	7751.13	14451.57	1673.82	1936.29	3610.11
722	0.30	602	578	I-84	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
723	0.25	600	582	I-84 West Bound	Interstate	65	1	1		0	6700.44	7751.13	14451.57	1669.99	1931.86	3601.84
724	0.23	455	475	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
725	0.23	471	473	I-84 West Bound	Interstate	65	1	1		0	6700.44	7751.13	14451.57	1569.13	1815.19	3384.32
726	0.26	475	488	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-20: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
727	0.27	487	471	I-84 West Bound	Interstate	65	1	1		0	6788.44	7751.13	14451.57	1797.32	2079.16	3876.48
728	0.44	269	487	I-84 West Bound	Interstate	65	1	1		0	6788.44	7751.13	14451.57	2941.55	3402.82	6344.38
729	0.88	488	539	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
730	0.44	268	487	I-84 West Bound	Interstate	65	1	1		0	6788.44	7751.13	14451.57	2941.22	3402.44	6343.66
731	8.82	12947	12907	I-15	Interstate	25	1	1		0	1213.41	0.00	1213.41	10705.66	0.00	10705.66
732	8.74	12910	12946	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	7047.81	103.56	7151.37
733	8.63	12945	12909	I-15 North Bound	Interstate	65	1	1		0	6881.14	11462.88	18264.02	59083.06	99580.64	158663.70
734	0.26	12902	12910	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	207.74	3.05	210.80
735	0.23	12909	12904	I-15 North Bound	Interstate	65	1	1		0	6881.14	11462.88	18264.02	1552.61	2616.83	4169.45
736	0.21	12907	12903	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	258.18	0.00	258.18
737	0.23	2829	2830	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
738	0.18	2832	2842	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
739	0.17	2831	2841	I-84	Interstate	65	1	1		0	39805.20	0.00	39805.20	6915.67	0.00	6915.67
740	0.18	2840	2829	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
741	0.22	2766	2765	I-84	Interstate	65	1	1		0	39805.20	0.00	39805.20	8742.51	0.00	8742.51
742	0.23	2762	2764	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
743	0.01	2768	2769	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
744	0.31	2784	2762	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
745	2.23	2842	2870	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
746	2.24	2841	2871	I-84	Interstate	65	1	1		0	39805.20	0.00	39805.20	89264.42	0.00	89264.42
747	2.24	2874	2840	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
748	0.90	3063	3057	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	638.60	37357.30	37988.19
749	0.47	3039	3044	I-80	Interstate	65	1	1		0	40497.74	683.82	41181.56	18863.38	318.52	19181.89
750	0.23	3044	3051	I-80	Interstate	65	1	1		0	40497.74	683.82	41181.56	8956.40	151.23	9107.63
751	0.81	1519	3020	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	556.17	32937.93	33494.11
752	0.20	3057	3051	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	138.16	8182.38	8320.54
753	1.13	3022	3040	I-80 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
754	0.30	2900	2927	I-80	Interstate	65	1	1		0	5721.21	5699.92	11421.14	1708.08	1701.72	3409.80
755	0.35	2927	2891	I-80	Interstate	65	1	1		0	5721.21	5699.92	11421.14	1984.69	1977.31	3962.00
756	0.18	2891	2880	I-80	Interstate	65	1	1		0	5721.21	5699.92	11421.14	1014.01	1010.23	2024.24
757	8.79	2883	2735	I-80	Interstate	25	1	1		0	5721.21	5699.92	11421.14	50278.67	50083.64	100354.31
758	0.18	2735	2725	I-80	Interstate	65	1	1		0	5721.21	5699.92	11421.14	1005.33	1001.59	2006.92
759	0.16	2725	2721	I-80	Interstate	65	1	1		0	5721.21	5699.92	11421.14	908.20	904.82	1813.02
760	2.30	2721	2611	I-80	Interstate	65	1	1		0	5721.21	5699.92	11421.14	13292.37	13242.92	26535.29
761	0.15	2611	2607	I-80	Interstate	65	1	1		0	5841.25	5125.24	10166.49	749.56	762.05	1511.61
762	0.31	2607	2591	I-80	Interstate	65	1	1		0	5841.25	5125.24	10166.49	1587.88	1614.34	3202.22

Figure I-2-21: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
763	0.40	2591	2585	I-80	Interstate	65	1	1		0	5841.25	5125.24	10166.49	2012.07	2045.60	4057.67
764	0.08	2585	2584	I-80	Interstate	65	1	1		0	5841.25	5125.24	10166.49	426.13	433.23	859.36
765	3.09	2584	2482	I-80	Interstate	1	1	1		0	5841.25	5125.24	10166.49	15555.62	15814.81	31370.43
766	0.05	18951	259	SR-89	Other Principal Art	45	1	1		0	537.85	349.31	887.16	29.05	18.87	47.92
767	1.05	259	18948	SR-89	Other Principal Art	45	1	1		0	523.73	349.47	873.20	550.46	367.30	917.76
768	4.74	18948	18937	SR-89	Other Principal Art	45	1	1		0	523.73	349.47	873.20	2482.65	1656.58	4139.23
769	0.41	7488	14923	SR-120	Other Principal Art	35	1	1		0	0.00	191.28	191.28	0.00	79.04	79.04
770	0.09	14923	14899	SR-120	Other Principal Art	35	1	1		0	0.00	191.28	191.28	0.00	18.01	18.01
771	1.16	14853	14812	I-70	Interstate	65	1	1		0	5121.72	2.56	5124.28	5929.31	2.96	5932.27
772	0.38	14899	14881	SR-120	Other Principal Art	35	1	1		0	0.00	191.28	191.28	0.00	72.41	72.41
773	0.30	14881	14859	SR-120	Other Principal Art	35	1	1		0	0.00	191.28	191.28	0.00	56.90	56.90
774	0.19	14859	14839	SR-120	Other Principal Art	35	1	1		0	0.00	191.28	191.28	0.00	36.32	36.32
775	0.41	14839	14829	SR-120	Other Principal Art	35	1	1		0	0.00	191.28	191.28	0.00	78.77	78.77
776	0.06	14812	14810	I-70	Interstate	65	1	1		0	5121.72	2.56	5124.28	282.98	0.14	283.12
777	0.49	14829	14808	SR-120	Other Principal Art	35	1	1		0	0.00	191.28	191.28	0.00	93.94	93.94
778	0.33	14810	14803	I-70	Interstate	65	1	1		0	5121.72	2.56	5124.28	1701.82	0.85	1702.67
779	0.01	14804	14803	SR-120	Other Principal Art	35	1	1		0	0.00	191.28	191.28	0.00	1.38	1.38
789	0.01	14803	14802	SR-120	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
791	0.04	14802	14799	SR-120	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
792	0.06	14799	14800	SR-120	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
793	0.05	7206	14805	SR-120	Other Principal Art	35	1	1		0	0.00	191.28	191.28	0.00	8.66	8.66
794	0.05	7413	14805	SR-120	Other Principal Art	35	1	1		0	0.00	191.28	191.28	0.00	8.68	8.68
795	0.04	14805	14804	SR-120	Other Principal Art	35	1	1		0	0.00	191.28	191.28	0.00	7.05	7.05
786	0.36	14803	14794	I-70	Interstate	65	1	1		0	5121.72	193.84	5315.55	1832.44	69.35	1901.79
787	0.04	14796	14793	I-70	Interstate	45	1	1		0	5121.72	193.84	5315.55	204.71	7.75	212.46
788	7.81	14748	14947	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	41101.96	8175.13	49277.09
789	0.13	14947	14948	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	701.67	139.56	841.24
790	0.38	14948	14951	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	1999.06	397.61	2396.67
791	0.28	14951	14949	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	1475.41	293.46	1768.87
792	0.32	14949	14950	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	1675.73	333.30	2009.03
793	1.08	14957	14962	SR-76	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
794	3.24	14950	14925	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	17029.44	3387.14	20416.58
795	1.84	14962	14929	SR-72	Interstate	35	1	1		0	45.43	0.00	45.43	83.47	0.00	83.47
796	0.42	14925	14918	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	2199.35	437.45	2636.80
797	0.06	14929	14924	SR-72	Interstate	35	1	1		0	45.43	0.00	45.43	2.59	0.00	2.59
798	0.04	14924	14919	SR-10	Interstate	35	1	1		0	45.43	0.00	45.43	1.83	0.00	1.83

Figure I-2-22: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectio	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
799	0.01	14919	14918	SR-10	Interstate	35	1	1		0	45.43	0.00	45.43	0.52	0.00	0.52
800	0.01	14918	14916	SR-10	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
801	0.04	14916	14905	SR-10	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
802	0.09	14905	14892	SR-10	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
803	0.28	14918	14896	I-70	Interstate	65	1	1		0	5268.34	1006.00	6274.34	1451.14	277.10	1728.24
804	0.07	14896	14893	I-70	Interstate	65	1	1		0	5268.34	1006.00	6274.34	358.06	68.37	426.43
805	3.87	14893	14774	I-70	Interstate	65	1	1		0	5268.34	1006.00	6274.34	20406.33	3896.64	24302.97
806	5.39	14793	14665	I-70	Interstate	25	1	1		0	5121.72	193.84	5315.55	27581.62	1043.85	28625.47
807	2.49	14665	14602	I-70	Interstate	25	1	1		0	5121.72	193.84	5315.55	12778.02	483.60	13261.61
808	0.27	14602	14595	I-70	Interstate	65	1	1		0	5121.72	193.84	5315.55	1397.31	52.88	1450.19
809	0.12	14595	14592	I-70	Interstate	65	1	1		0	5121.72	193.84	5315.55	616.48	23.33	639.82
810	0.23	14592	14584	I-70	Interstate	65	1	1		0	5121.72	193.84	5315.55	1194.05	45.19	1239.24
811	0.05	14584	14581	I-70	Interstate	65	1	1		0	5121.72	193.84	5315.55	256.39	9.70	266.09
812	0.08	14581	14570	I-70	Interstate	65	1	1		0	5121.72	193.84	5315.55	393.68	14.90	408.57
813	0.09	13915	13914	I-15	Interstate	65	1	1		0	752.51	0.00	752.51	60.62	0.00	60.62
814	0.33	13909	13916	I-15 South Bound	Interstate	65	1	1		0	11648.89	499.07	12147.96	3789.45	162.35	3951.80
815	0.29	13917	13911	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	1659.69	37.29	1696.97
816	0.21	13914	13910	I-15	Interstate	25	1	1		0	752.51	0.00	752.51	157.23	0.00	157.23
817	0.16	13910	13906	I-15	Interstate	25	1	1		0	752.51	0.00	752.51	121.34	0.00	121.34
818	0.17	13911	13907	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	967.13	22.18	1089.31
819	0.22	13903	13909	I-15 South Bound	Interstate	65	1	1		0	11648.89	499.07	12147.96	2586.39	110.81	2697.19
820	4.31	13906	13873	I-15	Interstate	65	1	1		0	752.51	0.00	752.51	3241.21	0.00	3241.21
821	4.29	13907	13882	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	24183.34	543.33	24726.66
822	4.23	13878	13903	I-15 South Bound	Interstate	65	1	1		0	11648.89	499.07	12147.96	49247.11	2109.89	51357.00
823	0.35	13882	13885	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	1975.87	44.39	2020.26
824	0.35	13883	13878	I-15 South Bound	Interstate	65	1	1		0	11648.89	499.07	12147.96	4041.71	173.16	4214.87
825	0.33	13879	13884	I-15	Interstate	65	1	1		0	752.51	0.00	752.51	251.13	0.00	251.13
826	0.35	13885	13855	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	1956.05	43.95	2000.00
827	0.36	13854	13863	I-15 South Bound	Interstate	65	1	1		0	11648.89	499.07	12147.96	4173.28	178.80	4352.07
828	0.37	13864	13853	I-15	Interstate	65	1	1		0	752.51	0.00	752.51	280.95	0.00	280.95
829	5.46	13853	13787	I-15	Interstate	65	1	1		0	752.51	0.00	752.51	4111.05	0.00	4111.05
830	8.72	13729	13854	I-15 South Bound	Interstate	65	1	1		0	11648.89	499.07	12147.96	101557.80	4351.03	105908.84
831	8.74	13855	13730	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	49384.07	1109.51	50493.58
832	3.50	14570	14424	I-70	Interstate	25	1	1		0	5088.56	193.96	5282.52	17795.46	678.30	18473.76
833	2.05	7025	14099	SR-50	Other Principal Art	45	1	1		0	462.61	490.40	953.01	948.33	1005.30	1953.63
834	0.08	14164	14162	I-15	Interstate	65	1	1		0	757.87	34.08	791.95	58.84	2.65	61.49

Figure I-2-23: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD	TA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
835	0.35	14165	14129	I-15 North Bound	Interstate	65		1	1		0	5647.59	11105.76	16753.35	1961.19	3856.59	5817.77
836	0.33	14137	14163	I-15 South Bound	Interstate	65		1	1		0	197.81	82.57	279.58	64.42	27.00	91.43
837	0.27	14162	14138	I-15	Interstate	35		1	1		0	757.87	34.08	791.95	208.19	9.36	217.55
838	0.34	14130	14127	I-15 South Bound	Interstate	65		1	1		0	197.81	82.57	279.58	66.66	27.94	94.60
839	0.34	14138	14126	I-15	Interstate	35		1	1		0	757.87	34.08	791.95	256.67	11.54	268.21
840	0.40	14139	14129	I-15 North Bound	Interstate	65		1	1		0	5647.59	11105.76	16753.35	2279.08	4481.72	6760.80
841	2.65	7025	14099	SR-58	Other Principal Arte	45		1	1		0	462.61	490.40	953.01	948.33	1005.29	1953.62
842	0.14	7053	14099	SR-64	Other Principal Arte	35		1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
843	0.14	7057	14099	SR-64	Other Principal Arte	35		1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
844	4.10	13979	14130	I-15 South Bound	Interstate	65		1	1		0	197.81	82.57	279.58	807.60	338.48	1146.09
845	4.19	14131	13977	I-15	Interstate	65		1	1		0	757.87	34.08	791.95	3173.49	142.70	3316.19
846	4.11	14129	13978	I-15 North Bound	Interstate	65		1	1		0	5647.59	11105.76	16753.35	23238.85	45682.49	68913.34
847	1.55	7050	13971	SR-58	Other Principal Arte	45		1	1		0	462.61	490.40	953.01	717.29	760.37	1477.66
848	1.55	7049	13971	SR-58	Other Principal Arte	45		1	1		0	462.61	490.40	953.01	717.28	760.36	1477.64
849	0.39	13972	13979	I-15 South Bound	Interstate	65		1	1		0	197.81	82.57	279.58	76.09	31.89	107.98
850	0.30	13977	13973	I-15	Interstate	45		1	1		0	757.87	34.08	791.95	226.33	10.18	236.50
851	0.31	13978	13974	I-15 North Bound	Interstate	65		1	1		0	5647.59	11105.76	16753.35	1748.26	3422.15	5162.41
852	0.05	13971	13972	SR-58	Other Principal Arte	45		1	1		0	462.61	490.40	953.01	24.72	26.21	50.93
853	0.01	13972	13973	SR-58	Other Principal Arte	45		1	1		0	11139.83	132.25	11272.08	143.41	1.70	145.11
854	0.01	13973	13974	SR-58	Other Principal Arte	45		1	1		0	11185.76	126.88	11232.64	138.82	1.49	132.31
855	0.05	13974	13975	SR-58	Other Principal Arte	45		1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
856	0.29	13979	13964	I-15	Interstate	45		1	1		0	752.51	0.00	752.51	214.27	0.00	214.27
857	0.29	13974	13963	I-15 North Bound	Interstate	65		1	1		0	5647.59	126.88	5774.48	1662.87	37.36	1700.23
858	0.35	13962	13972	I-15 South Bound	Interstate	65		1	1		0	11648.89	498.07	12147.96	4101.02	175.70	4276.72
859	4.74	13964	13915	I-15	Interstate	1		1	1		0	752.51	0.00	752.51	3565.52	0.00	3565.52
860	4.71	13963	13917	I-15 North Bound	Interstate	65		1	1		0	5647.59	126.88	5774.48	26602.20	597.67	27199.87
861	4.65	13916	13962	I-15 South Bound	Interstate	65		1	1		0	11648.89	498.07	12147.96	54213.56	2322.67	56536.23
862	1.01	13776	13775	SR-6	Other Principal Arte	35		1	1		0	442.41	456.89	899.30	448.83	463.52	912.35
863	1.02	6888	13777	SR-6	Other Principal Arte	45		1	1		0	442.41	456.89	899.30	452.56	467.37	919.93
864	1.02	6887	13777	SR-6	Other Principal Arte	45		1	1		0	442.41	456.89	899.30	452.53	467.34	919.86
865	0.31	14883	14869	I-15	Interstate	35		1	1		0	757.87	34.08	791.95	232.26	10.44	242.70
866	0.30	14941	14868	I-15 South Bound	Interstate	65		1	1		0	197.81	82.57	279.58	74.57	31.25	105.83
867	0.38	14869	14842	I-15	Interstate	35		1	1		0	757.87	34.08	791.95	286.90	12.90	299.80
868	0.38	14870	14843	I-15 North Bound	Interstate	65		1	1		0	5647.59	11105.76	16753.35	2126.08	4180.84	6306.92
869	3.58	14842	14758	I-15	Interstate	25		1	1		0	757.87	34.08	791.95	2711.16	121.91	2833.08
870	3.57	14843	14759	I-15 North Bound	Interstate	65		1	1		0	5647.59	11105.76	16753.35	20187.77	39698.39	59886.16

Figure I-2-24: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
871	0.05	14828	14827	STATE HWY 133	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
872	5.03	14730	14841	I-15 South Bound	Interstate	65	1	1		0	197.01	82.57	279.58	990.17	415.00	1405.17
873	3.46	15695	15601	SR-89	Other Principal Art	45	1	1		0	6676.66	541.36	7218.02	23097.38	1872.80	24970.18
874	0.58	15631	15615	SR-89	Other Principal Art	25	1	1		0	6669.95	542.78	7212.73	3884.16	316.08	4200.24
875	1.18	15601	15531	SR-89	Other Principal Art	45	1	1		0	6676.66	541.36	7218.02	7861.89	637.46	8499.35
876	2.36	15601	15531	SR-89	Other Principal Art	45	1	1		0	6669.95	542.78	7212.73	15709.29	1278.38	16987.67
877	3.18	15519	15474	SR-89	Other Principal Art	35	1	1		0	6669.95	542.78	7212.73	21225.71	1727.29	22953.00
878	0.07	7734	15472	SR-89	Other Principal Art	35	1	1		0	6669.95	542.78	7212.73	459.33	37.38	496.71
879	0.07	7740	15472	SR-89	Other Principal Art	35	1	1		0	6669.95	542.78	7212.73	459.66	37.41	497.07
880	4.97	15472	15396	SR-89	Other Principal Art	45	1	1		0	6669.95	542.78	7212.73	33170.61	2699.33	35869.94
881	6.59	15367	15362	I-70	Interstate	25	1	1		0	4491.51	5695.01	10186.52	29600.84	37532.37	67133.22
882	2.29	15362	15330	I-70	Interstate	65	1	1		0	4491.51	5695.01	10186.52	10265.44	13016.05	23281.49
883	0.04	15330	15328	I-70	Interstate	65	1	1		0	4491.51	5695.01	10186.52	182.73	231.69	414.41
884	0.19	15328	15322	I-70	Interstate	65	1	1		0	4491.51	5695.01	10186.52	859.31	1089.56	1948.87
885	0.20	15322	15316	I-70	Interstate	65	1	1		0	4491.51	5695.01	10186.52	878.03	1113.30	1991.33
886	4.78	15316	15249	I-70	Interstate	25	1	1		0	4491.51	5695.01	10186.52	21463.57	27214.72	48678.29
887	0.74	15249	15222	I-70	Interstate	65	1	1		0	4491.51	5695.01	10186.52	3338.90	4233.56	7572.46
888	3.43	15395	15257	SR-89	Other Principal Art	45	1	1		0	6669.95	542.78	7212.73	22870.34	1861.13	24731.47
889	0.40	15257	15229	SR-89	Other Principal Art	35	1	1		0	6663.52	532.14	7195.67	2695.98	215.38	2911.28
890	0.01	15222	15221	I-70	Interstate	65	1	1		0	4491.51	5695.01	10186.52	35.91	45.53	81.44
891	0.36	15221	15218	I-70	Interstate	65	1	1		0	4491.51	5695.01	10186.52	1608.30	2039.25	3647.55
892	0.16	15229	15225	SR-89	Other Principal Art	35	1	1		0	6663.52	532.14	7195.67	1061.78	84.79	1146.58
893	0.19	15225	15219	SR-89	Other Principal Art	35	1	1		0	6663.52	532.14	7195.67	1270.09	101.43	1371.52
894	0.01	15219	15218	SR-89	Other Principal Art	35	1	1		0	6663.52	532.14	7195.67	72.25	5.77	78.02
895	0.07	15218	15216	I-70	Interstate	65	1	1		0	5121.72	193.84	5315.55	375.44	14.21	389.65
896	0.11	15216	15213	I-70	Interstate	65	1	1		0	5121.72	193.84	5315.55	557.00	21.08	578.08
897	1.74	13777	13756	SR-6	Other Principal Art	45	1	1		0	442.41	456.89	899.30	768.82	793.98	1562.79
898	0.25	6878	13753	SR-6	Other Principal Art	35	1	1		0	442.41	456.89	899.30	111.83	115.49	227.31
899	0.51	6878	13753	SR-6	Other Principal Art	35	1	1		0	462.61	490.40	953.01	233.83	247.87	481.70
900	0.36	6877	13752	SR-6	Other Principal Art	35	1	1		0	462.61	490.40	953.01	164.38	174.25	338.63
901	0.36	6876	13752	SR-6	Other Principal Art	35	1	1		0	462.61	490.40	953.01	164.37	174.24	338.60
902	0.42	6877	13748	SR-50	Other Principal Art	35	1	1		0	462.61	490.40	953.01	192.74	204.32	397.05
903	0.42	6875	13748	SR-50	Other Principal Art	35	1	1		0	462.61	490.40	953.01	192.71	204.29	396.99
904	0.51	6874	13749	SR-50	Other Principal Art	45	1	1		0	462.61	490.40	953.01	233.73	247.77	481.49
905	0.51	6874	13749	SR-50	Other Principal Art	45	1	1		0	462.61	490.40	953.01	233.71	247.75	481.46
906	1.55	13749	13755	SR-50	Other Principal Art	25	1	1		0	462.61	490.40	953.01	718.29	761.44	1479.73

Figure I-2-25: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
907	5.17	15148	15063	I-79	Interstate	65	1	1		0	5121.72	193.84	5315.56	26454.36	1001.19	27455.55
908	0.08	15063	15067	I-79	Interstate	65	1	1		0	5121.72	193.84	5315.56	400.38	15.15	415.53
909	0.30	15067	15060	I-79	Interstate	65	1	1		0	5121.72	193.84	5315.56	1552.81	58.77	1611.58
910	0.37	15060	15052	I-79	Interstate	65	1	1		0	5121.72	193.84	5315.56	1897.21	71.80	1969.01
911	0.16	15052	15046	I-79	Interstate	65	1	1		0	5121.72	193.84	5315.56	794.65	30.07	824.72
912	4.62	15046	14986	I-79	Interstate	65	1	1		0	5121.72	193.84	5315.56	23658.51	895.38	24553.89
913	0.05	14986	14984	I-79	Interstate	65	1	1		0	5121.72	193.84	5315.55	260.88	9.84	269.92
914	0.05	7484	14980	I-79	Interstate	65	1	1		0	5121.72	193.84	5315.55	231.24	8.75	239.99
915	0.05	7500	14980	I-79	Interstate	65	1	1		0	5121.72	193.84	5315.55	231.72	8.77	240.48
916	0.03	14967	14966	SR-120	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
917	0.17	14969	14983	I-79	Interstate	65	1	1		0	5121.72	193.84	5315.56	879.98	33.30	913.28
918	0.03	14966	14968	SR-120	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
919	0.01	14968	14963	SR-120	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
920	0.01	14963	14970	SR-120	Other Principal Arti	35	1	1		0	0.00	191.28	191.28	0.00	1.83	1.83
921	0.03	14970	14971	SR-120	Other Principal Arti	35	1	1		0	0.00	191.28	191.28	0.00	5.17	5.17
922	0.37	14963	14935	I-79	Interstate	65	1	1		0	5121.72	2.56	5124.28	1889.51	0.94	1890.46
923	0.38	14971	14972	SR-120	Other Principal Arti	35	1	1		0	0.00	191.28	191.28	0.00	73.24	73.24
924	0.62	7467	14853	I-79	Interstate	25	1	1		0	5121.72	2.56	5124.28	3170.08	1.58	3171.67
925	0.62	7468	14853	I-79	Interstate	25	1	1		0	5121.72	2.56	5124.28	3170.41	1.58	3171.99
926	0.22	14972	14973	SR-120	Other Principal Arti	35	1	1		0	0.00	191.28	191.28	0.00	41.94	41.94
927	0.32	14973	14974	SR-120	Other Principal Arti	35	1	1		0	0.00	191.28	191.28	0.00	62.00	62.00
928	0.41	7486	14923	SR-120	Other Principal Arti	35	1	1		0	0.00	191.28	191.28	0.00	79.03	79.03
929	0.75	8041	16132	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	115.01	373.16	488.17
930	1.51	16134	16083	I-15	Interstate	25	1	1		0	311.44	6759.18	7070.61	471.78	10239.15	10710.93
931	1.54	16136	16084	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	96.86	96.86
932	0.75	8041	16132	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	115.01	373.16	488.17
933	1.03	8042	16059	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	64.73	64.73
934	2.02	16060	16082	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	311.74	1011.46	1323.19
935	2.09	16083	16058	I-15	Interstate	25	1	1		0	311.44	6759.18	7070.61	649.97	14106.42	14756.38
936	1.03	8042	16059	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	64.73	64.73
937	0.31	16061	16060	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	48.02	155.81	203.83
938	0.25	16058	16053	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	15.92	15.92
939	0.24	16058	16052	I-15	Interstate	25	1	1		0	311.44	6759.18	7070.61	73.55	1596.24	1669.78
940	0.33	16052	16045	I-15	Interstate	25	1	1		0	311.44	6759.18	7070.61	101.61	2205.34	2306.95
941	0.33	16053	16046	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	20.54	20.54
942	0.32	16044	16051	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	49.67	161.17	210.85

Figure I-2-26: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
943	4.82	16045	16007	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	1502.23	32603.47	34105.70
944	4.84	16045	16006	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	304.90	304.90
945	4.86	16004	16044	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	749.11	2430.55	3179.66
946	0.12	16007	16003	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	37.47	813.32	850.80
947	0.69	15993	16004	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	92.78	300.77	393.47
948	0.61	16006	15994	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	38.13	38.13
949	0.49	16003	15995	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	151.24	3282.39	3433.63
950	0.09	15995	15992	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	24.82	538.66	563.48
951	1.57	15992	15978	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	488.21	10595.73	11083.93
952	6.11	15958	15993	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	941.68	3055.35	3997.03
953	6.15	15994	15959	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	386.80	386.80
954	4.51	15978	15957	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	1404.37	30479.59	31883.96
955	0.33	15951	15958	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	50.74	164.64	215.38
956	0.32	15957	15952	I-15	Interstate	35	1	1		0	311.44	6759.18	7070.61	100.49	2180.88	2281.37
957	0.32	15959	15953	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	20.08	20.08
958	0.36	15945	15951	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	55.26	179.31	234.57
959	0.40	15952	15943	I-15	Interstate	35	1	1		0	311.44	6759.18	7070.61	125.15	2716.25	2841.41
960	0.40	15953	15944	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	24.97	24.97
961	0.21	10575	21145	SR-89	Other Principal Arte	35	1	1		0	516.48	6564.93	7081.41	110.69	1406.93	1517.61
962	0.21	10571	21145	SR-89	Other Principal Arte	35	1	1		0	516.48	6564.93	7081.41	110.65	1406.47	1517.12
963	1.01	10573	21136	SR-89	Other Principal Arte	45	1	1		0	6564.93	516.48	7081.41	6610.61	520.08	7130.68
964	0.06	16300	16296	SR-89	Other Principal Arte	55	1	1		0	6568.52	515.21	7083.73	374.68	29.38	403.98
965	0.07	16294	16296	SR-89	Other Principal Arte	55	1	1		0	516.48	6564.93	7081.41	34.75	441.68	476.43
966	0.05	16296	16297	SR-12	Other Principal Arte	35	1	1		0	20.81	15.14	35.15	1.00	0.78	1.81
967	0.01	16297	16298	SR-12	Other Principal Arte	50	1	1		0	20.81	15.14	35.15	0.16	0.12	0.29
968	4.02	21136	21133	SR-89	Other Principal Arte	45	1	1		0	6564.93	516.48	7081.41	26402.67	2077.18	28479.85
969	5.00	10566	15860	SR-89	Other Principal Arte	35	1	1		0	6589.75	539.97	7129.72	32959.71	2700.77	35660.48
970	10.00	10567	15860	SR-89	Other Principal Arte	35	1	1		0	6676.66	541.36	7218.02	66783.98	5415.51	72205.49
971	0.39	7929	15850	SR-89	Other Principal Arte	35	1	1		0	6676.66	541.36	7218.02	2606.91	211.38	2818.29
972	0.39	7931	15850	SR-89	Other Principal Arte	35	1	1		0	6676.66	541.36	7218.02	2607.48	211.42	2818.90
973	0.55	15850	15846	SR-89	Other Principal Arte	35	1	1		0	6676.66	541.36	7218.02	3680.05	298.39	3978.43
974	1.29	15846	15822	SR-89	Other Principal Arte	35	1	1		0	6676.66	541.36	7218.02	8043.73	652.21	8695.94
975	0.06	7910	15818	SR-89	Other Principal Arte	35	1	1		0	6676.66	541.36	7218.02	384.85	31.20	416.05
976	0.06	7912	15818	SR-89	Other Principal Arte	35	1	1		0	6676.66	541.36	7218.02	384.99	31.22	416.20
977	0.60	15818	15771	SR-89	Other Principal Arte	35	1	1		0	6676.66	541.36	7218.02	3985.49	323.15	4308.64
978	1.36	7885	15695	SR-89	Other Principal Arte	35	1	1		0	6676.66	541.36	7218.02	9063.24	734.87	9798.12

Figure I-2-27: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
979	1.36	7888	15695	SR 89	Other Principal Art	35	1	1		0	6676.66	541.36	7218.02	9063.82	734.52	9798.74
980	1.90	15952	15616	I-15 South Bound	Interstate	65	1	1		0	152.22	518.14	670.36	288.98	983.64	1272.62
981	3.80	15617	15556	I-15	Interstate	25	1	1		0	311.44	6759.18	7070.61	1182.75	25669.55	26852.30
982	3.80	15618	15551	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	239.01	239.01
983	1.78	15503	15552	I-15 South Bound	Interstate	65	1	1		0	150.40	536.49	686.90	267.30	953.45	1220.75
984	3.56	15556	15602	I-15	Interstate	25	1	1		0	311.44	6759.18	7070.61	1109.07	24048.87	25156.95
985	3.54	15551	15604	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	222.82	222.82
986	0.99	15552	15683	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	152.51	494.84	647.35
987	1.85	15684	15650	I-15	Interstate	35	1	1		0	311.44	6759.18	7070.61	325.64	7067.50	7393.14
988	1.81	15685	15651	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	63.40	63.40
989	0.35	15636	15652	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	54.07	175.43	229.49
990	0.30	15650	15637	I-15	Interstate	35	1	1		0	311.44	6759.18	7070.61	92.00	1996.75	2088.75
991	0.33	15651	15638	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	21.00	21.00
992	0.34	15637	15630	I-15	Interstate	35	1	1		0	311.44	6759.18	7070.61	107.15	2325.52	2432.67
993	4.58	15928	15945	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	706.07	2292.91	2998.98
994	4.56	15944	15927	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	286.78	286.78
995	4.57	15943	15926	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	1424.75	30921.85	32346.60
996	0.31	15922	15928	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	48.10	156.09	204.19
997	0.30	15927	15924	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	18.58	18.58
998	0.27	15926	15923	I-15	Interstate	35	1	1		0	311.44	6759.18	7070.61	85.61	1857.96	1943.56
999	0.31	15923	15918	I-15	Interstate	35	1	1		0	311.44	6759.18	7070.61	96.64	2097.38	2194.02
1000	0.31	15917	15922	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	47.67	154.65	202.32
1001	0.31	15924	15919	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	19.76	19.76
1002	0.68	15918	15914	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	211.83	4599.10	4791.13
1003	0.99	15905	15917	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	152.55	494.95	647.49
1004	3.70	7876	15905	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	569.22	1846.87	2416.09
1005	8.51	15919	15752	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	535.35	535.35
1006	6.94	15914	15769	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	2161.89	46920.13	49082.02
1007	3.70	7877	15805	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	569.22	1846.88	2416.10
1008	0.83	15769	15751	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	258.89	5601.47	5859.57
1009	0.83	15751	15750	I-15	Interstate	45	1	1		0	311.44	6759.18	7070.61	9.39	203.76	213.15
1010	0.27	15742	15753	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	42.83	136.37	178.40
1011	0.27	15752	15744	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	17.09	17.09
1012	0.23	15750	15743	I-15	Interstate	35	1	1		0	311.44	6759.18	7070.61	70.16	1522.76	1592.92
1013	0.27	15734	15742	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	41.82	133.10	174.12
1014	0.27	15743	15735	I-15	Interstate	35	1	1		0	311.44	6759.18	7070.61	82.95	1800.22	1883.17

Figure I-2-28: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1015	0.25	15744	15736	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	16.43	16.43
1016	0.92	15701	15734	I-15 South Bound	Interstate	65	1	1		0	154.84	498.79	653.63	141.44	458.91	600.36
1017	0.92	15726	15702	I-15	Interstate	25	1	1		0	311.44	6758.18	7078.61	286.05	6208.17	6494.22
1018	0.92	15736	15703	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	58.12	58.12
1019	0.25	7850	15685	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	16.59	16.59
1020	0.53	15680	15701	I-15 South Bound	Interstate	65	1	1		0	154.84	498.79	653.63	81.23	263.55	344.78
1021	0.53	15702	15684	I-15	Interstate	25	1	1		0	311.44	6758.18	7078.61	164.23	3564.33	3728.56
1022	0.25	7853	15685	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	16.60	16.60
1023	6.39	21145	16294	SR-89	Other Principal Art	45	1	1		0	516.48	6564.93	7081.41	3300.25	41948.96	45249.21
1024	1.08	10573	21136	SR-89	Other Principal Art	45	1	1		0	6564.93	516.48	7081.41	6610.07	520.03	7130.11
1025	1.44	16204	16199	I-15	Interstate	25	1	1		0	236.83	6746.73	6982.76	340.43	9730.78	10071.20
1026	1.40	16198	16203	I-15 South Bound	Interstate	65	1	1		0	154.84	498.79	653.63	216.05	701.00	917.06
1027	0.72	8103	16200	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	45.75	45.75
1028	2.90	16189	16196	I-15 South Bound	Interstate	65	1	1		0	154.84	498.79	653.63	448.81	1449.71	1898.52
1029	2.92	16195	16190	I-15	Interstate	65	1	1		0	236.83	6746.73	6982.76	689.57	19710.65	20400.21
1030	2.99	16200	16188	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	188.25	188.25
1031	0.07	16190	16187	I-15	Interstate	55	1	1		0	236.83	6746.73	6982.76	16.54	472.83	489.37
1032	0.34	16178	16189	I-15 South Bound	Interstate	65	1	1		0	154.84	498.79	653.63	52.45	170.19	222.64
1033	0.28	16188	16180	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	17.62	17.62
1034	0.25	16187	16179	I-15	Interstate	35	1	1		0	236.83	6746.73	6982.76	62.15	1776.39	1838.54
1035	0.25	16179	16174	I-15	Interstate	35	1	1		0	236.83	6746.73	6982.76	61.07	1745.71	1806.78
1036	0.28	16172	16178	I-15 South Bound	Interstate	65	1	1		0	154.84	498.79	653.63	42.61	138.24	180.85
1037	0.36	16180	16171	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	22.57	22.57
1038	0.10	16174	16170	I-15	Interstate	65	1	1		0	236.83	6746.73	6982.76	23.68	682.69	706.57
1039	0.61	8088	16164	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	38.27	38.27
1040	1.30	16162	16172	I-15 South Bound	Interstate	65	1	1		0	154.84	498.79	653.63	200.07	649.14	849.21
1041	1.21	16170	16163	I-15	Interstate	25	1	1		0	236.83	6746.73	6982.76	286.28	8183.09	8469.37
1042	0.61	8085	16164	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	38.26	38.26
1043	0.39	8083	16154	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	24.53	24.53
1044	0.76	16155	16163	I-15 South Bound	Interstate	65	1	1		0	154.84	498.79	653.63	116.69	378.60	495.29
1045	0.80	16163	16152	I-15	Interstate	25	1	1		0	236.83	6746.73	6982.76	189.58	5419.09	5608.68
1046	0.39	8081	16154	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	24.53	24.53
1047	0.29	16147	16155	I-15 South Bound	Interstate	65	1	1		0	154.84	498.79	653.63	44.18	143.35	187.54
1048	0.25	16154	16149	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	15.84	15.84
1049	0.24	16152	16148	I-15	Interstate	35	1	1		0	236.83	6746.73	6982.76	55.82	1595.69	1651.52
1050	0.13	8076	16141	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	7.92	7.92

Figure I-2-29: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1051	0.11	16148	16143	I-15	Interstate	35	1	1		0	236.03	6746.73	6982.76	27.14	775.71	802.85
1052	0.25	16139	16147	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	38.15	127.03	166.19
1053	0.13	8873	16141	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	8.00	7.92	7.92
1054	0.39	16143	16134	I-15	Interstate	25	1	1		0	311.44	6759.18	7070.61	122.61	2661.03	2783.64
1055	0.36	16141	16136	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	8.00	22.90	22.90
1056	0.38	16132	16139	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	58.15	188.67	246.82
1057	0.39	15627	15636	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	59.84	194.17	254.01
1058	0.49	15638	15625	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	8.00	30.63	30.63
1059	0.40	15616	15627	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	61.22	198.64	259.86
1060	0.10	15630	15626	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	30.97	672.24	703.21
1061	0.34	15625	15617	I-15	Interstate	25	1	1		0	311.44	6759.18	7070.61	106.36	2308.31	2414.66
1062	0.30	15625	15618	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	8.00	18.79	18.79
1063	0.13	15496	15503	I-15 South Bound	Interstate	65	1	1		0	150.40	536.49	686.90	29.14	103.95	133.09
1064	0.20	15504	15497	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	8.00	12.63	12.63
1065	0.19	15502	15496	I-15	Interstate	25	1	1		0	311.44	6759.18	7070.61	58.63	1272.46	1331.09
1066	0.24	15491	15495	I-15 South Bound	Interstate	65	1	1		0	150.40	536.49	686.90	35.79	127.66	163.44
1067	0.26	15496	15490	I-15	Interstate	25	1	1		0	311.44	6759.18	7070.61	79.87	1733.43	1813.30
1068	0.24	15497	15492	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	8.00	15.09	15.09
1069	3.46	15492	15465	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	8.00	217.65	217.65
1070	3.46	15463	15491	I-15 South Bound	Interstate	65	1	1		0	150.40	536.49	686.90	520.52	1856.68	2377.20
1071	3.44	15490	15464	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	1070.17	23226.32	24296.50
1072	0.99	15443	15463	I-15 South Bound	Interstate	65	1	1		0	150.40	536.49	686.90	149.45	533.09	682.55
1073	0.99	15464	15442	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	309.76	6722.93	7032.69
1074	1.04	15465	15440	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	8.00	65.71	65.71
1075	1.06	15432	15418	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	338.87	7188.91	7511.77
1076	0.05	15442	15441	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	14.89	323.20	338.89
1077	0.43	15433	15443	I-15 South Bound	Interstate	65	1	1		0	150.40	536.49	686.90	64.34	229.50	293.84
1078	0.10	15435	15432	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	32.15	697.80	729.95
1079	0.27	15441	15435	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	85.35	1852.34	1937.69
1080	0.28	15440	15434	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	8.00	17.73	17.73
1081	1.13	15434	15419	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	8.00	71.68	71.68
1082	0.47	15418	15403	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	146.15	3172.01	3318.16
1083	0.56	15419	15401	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	8.00	35.55	35.55
1084	3.97	15377	15433	I-15 South Bound	Interstate	65	1	1		0	150.40	536.49	686.90	596.99	2129.45	2726.44
1085	2.46	15403	15375	I-15	Interstate	65	1	1		0	311.44	6759.18	7070.61	765.09	16605.06	17370.15
1086	2.38	15401	15376	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	8.00	149.80	149.80

Figure I-2-30: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1887	0.22	15371	15377	I-15 South Bound	Interstate	65	1	1		0	158.40	536.45	686.90	33.77	120.45	154.21
1888	0.20	15375	15372	I-15	Interstate	35	1	1		0	311.44	6759.18	7078.61	63.18	1371.12	1434.30
1889	0.21	15376	15373	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	13.02	13.02
1890	0.27	15366	15371	I-15 South Bound	Interstate	65	1	1		0	158.40	536.45	686.90	40.01	142.73	182.75
1891	0.26	15372	15367	I-15	Interstate	35	1	1		0	311.44	6759.18	7078.61	80.05	1737.34	1817.38
1892	0.37	15373	15365	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	23.52	23.52
1893	1.77	15326	15366	I-15 South Bound	Interstate	65	1	1		0	158.40	536.45	686.90	266.43	950.34	1216.77
1894	1.81	15367	15324	I-15	Interstate	65	1	1		0	311.44	6759.18	7078.61	563.00	12219.00	12782.00
1895	2.14	15365	15302	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	134.39	134.39
1896	0.46	15324	15301	I-15	Interstate	65	1	1		0	311.44	6759.18	7078.61	143.88	3122.73	3266.61
1897	0.56	15298	15326	I-15 South Bound	Interstate	65	1	1		0	158.40	536.45	686.90	83.77	298.82	382.59
1898	0.07	15301	15299	I-15	Interstate	65	1	1		0	311.44	6759.18	7078.61	20.26	439.63	459.89
1899	0.23	15302	15285	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	14.31	14.31
1100	0.16	15290	15286	I-70	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1101	0.13	15288	15298	I-15 South Bound	Interstate	65	1	1		0	158.40	536.45	686.90	19.77	70.54	90.31
1102	0.14	15299	15287	I-15	Interstate	55	1	1		0	311.44	6759.18	7078.61	43.66	947.62	991.28
1103	0.01	15286	15288	I-15 South Bound	Interstate	65	1	1		0	158.40	536.45	686.90	1.26	4.48	5.73
1104	0.01	15281	15286	I-15 South Bound	Interstate	55	1	1		0	195.80	9.08	204.88	2.31	0.11	2.42
1105	0.01	15286	15284	I-70	Interstate	65	1	1		0	581.91	9.10	591.01	6.95	0.11	7.06
1106	0.01	15287	15284	I-15	Interstate	55	1	1		0	311.44	6759.18	7078.61	2.62	56.88	59.51
1107	0.01	15284	15282	I-70	Interstate	55	1	1		0	158.75	6749.48	6908.23	1.68	48.22	49.90
1108	0.01	15285	15282	I-15 North Bound	Interstate	65	1	1		0	0.00	62.94	62.94	0.00	0.51	0.51
1109	0.01	15284	15280	I-15	Interstate	55	1	1		0	757.87	34.08	791.95	8.69	0.29	9.08
1110	0.01	15282	15279	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	64.75	127.33	192.09
1111	0.21	15280	15272	I-15	Interstate	55	1	1		0	757.87	34.08	791.95	162.09	7.29	169.38
1112	0.21	15279	15271	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	1200.69	2361.11	3561.81
1113	0.22	15282	15276	I-70	Interstate	55	1	1		0	4491.51	5695.01	10186.52	971.05	1231.24	2202.29
1114	0.72	15276	15261	I-70	Interstate	65	1	1		0	4491.51	5695.01	10186.52	3237.13	4104.52	7341.65
1115	1.67	7635	15191	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	6033.40	11864.42	17897.82
1116	2.35	15193	15281	I-15 South Bound	Interstate	65	1	1		0	195.80	9.08	204.88	459.83	21.32	481.15
1117	2.16	15272	15190	I-15	Interstate	65	1	1		0	757.87	34.08	791.95	1634.23	73.48	1707.71
1118	1.67	7636	15191	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	6034.04	11865.69	17899.74
1119	0.33	15178	15193	I-15 South Bound	Interstate	65	1	1		0	195.80	9.08	204.88	65.44	3.03	68.48
1120	0.31	15190	15175	I-15	Interstate	35	1	1		0	757.87	34.08	791.95	232.23	10.44	242.67
1121	0.32	15191	15176	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	1829.03	3596.71	5425.74
1122	0.29	15168	15178	I-15 South Bound	Interstate	65	1	1		0	195.80	9.08	204.88	56.64	2.63	59.27

Figure I-2-31: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pot	BA Loading Pot	Centroid Node ID	Number of Centroid Connectio	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1123	0.29	15875	15870	I-15	Interstate	35	1	1		0	757.87	34.08	791.95	214.79	9.66	224.45
1124	0.34	15876	15860	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	1918.61	3768.93	5685.54
1125	0.05	15870	15861	I-15	Interstate	65	1	1		0	757.87	34.08	791.95	35.29	1.59	36.88
1126	0.91	15835	15868	I-15 South Bound	Interstate	65	1	1		0	195.80	9.08	204.88	177.78	8.24	186.03
1127	1.40	15861	15818	I-15	Interstate	65	1	1		0	757.87	34.08	791.95	1062.05	47.76	1109.81
1128	0.45	15820	15835	I-15 South Bound	Interstate	65	1	1		0	195.80	9.08	204.88	87.99	4.08	92.07
1129	0.06	15819	15820	I-15 South Bound	Interstate	65	1	1		0	195.80	9.08	204.88	12.19	0.57	12.76
1130	2.59	15860	15093	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	14558.87	28629.40	43188.26
1131	1.17	15094	15819	I-15 South Bound	Interstate	65	1	1		0	195.80	9.08	204.88	228.12	10.58	238.70
1132	1.22	15818	15092	I-15	Interstate	65	1	1		0	757.87	34.08	791.95	926.68	41.67	968.35
1133	0.33	15084	15094	I-15 South Bound	Interstate	65	1	1		0	195.80	9.08	204.88	64.20	2.98	67.18
1134	0.29	15083	15086	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	1638.35	3217.81	4856.16
1135	0.25	15092	15085	I-15	Interstate	25	1	1		0	757.87	34.08	791.95	186.01	8.40	195.21
1136	0.25	15085	15076	I-15	Interstate	25	1	1		0	757.87	34.08	791.95	190.09	8.91	207.00
1137	0.31	15086	15077	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	1729.75	3401.49	5131.24
1138	0.31	15076	15084	I-15 South Bound	Interstate	65	1	1		0	195.80	9.08	204.88	61.35	2.84	64.19
1139	0.27	15251	15240	I-70	Interstate	65	1	1		0	4491.51	5695.01	10186.52	1197.86	1518.83	2716.69
1140	0.21	15240	15235	I-70	Interstate	65	1	1		0	4491.51	5695.01	10186.52	923.70	1171.20	2094.90
1141	0.09	15235	15231	I-70	Interstate	65	1	1		0	4491.51	5695.01	10186.52	396.28	502.47	898.75
1142	0.91	7616	15226	I-70	Interstate	1	1	1		0	4491.51	5695.01	10186.52	4182.58	5301.86	9304.44
1143	0.91	7615	15226	I-70	Interstate	1	1	1		0	4491.51	5695.01	10186.52	4182.51	5301.78	9304.29
1144	3.55	15226	15227	I-70	Interstate	25	1	1		0	4491.51	5695.01	10186.52	15958.96	20225.01	36175.97
1145	0.64	15227	15234	I-70	Interstate	65	1	1		0	4491.51	5695.01	10186.52	2886.54	3659.98	6546.52
1146	0.23	15234	15253	I-70	Interstate	65	1	1		0	4491.51	5695.01	10186.52	1015.89	1288.10	2303.99
1147	0.21	15253	15267	I-70	Interstate	65	1	1		0	4491.51	5695.01	10186.52	965.31	1223.96	2189.26
1148	7.75	15077	14886	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	43762.09	86056.30	129818.39
1149	7.89	15078	14883	I-15	Interstate	65	1	1		0	757.87	34.08	791.95	5962.81	268.12	6230.93
1150	7.82	14882	15076	I-15 South Bound	Interstate	65	1	1		0	195.80	9.08	204.88	1531.13	70.99	1602.13
1151	0.35	14886	14870	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	2193.56	4313.55	6507.12
1152	0.15	14868	14882	I-15 South Bound	Interstate	65	1	1		0	197.81	82.57	279.58	38.01	12.58	42.59
1153	0.05	7263	14517	I-15	Interstate	55	1	1		0	757.87	34.08	791.95	38.69	1.74	40.43
1154	4.37	14354	14515	I-15 South Bound	Interstate	65	1	1		0	197.81	82.57	279.58	861.06	360.89	1221.95
1155	4.45	14517	14346	I-15	Interstate	25	1	1		0	757.87	34.08	791.95	3488.72	152.92	3553.64
1156	4.46	14516	14347	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	25282.88	49717.72	75000.60
1157	0.44	14336	14354	I-15 South Bound	Interstate	65	1	1		0	197.81	82.57	279.58	87.07	36.49	123.56
1158	0.34	14346	14337	I-15	Interstate	35	1	1		0	757.87	34.08	791.95	253.89	11.42	265.31

Figure I-2-32: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1159	0.34	14347	14339	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	1912.78	3761.39	5674.17
1160	0.31	14337	14314	I-15	Interstate	35	1	1		0	757.87	34.08	791.95	232.82	10.47	243.29
1161	0.35	14311	14338	I-15 South Bound	Interstate	65	1	1		0	197.01	82.57	279.58	69.89	29.29	99.18
1162	0.36	14339	14310	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	2044.09	4019.62	6063.71
1163	1.83	14314	14245	I-15	Interstate	25	1	1		0	757.87	34.08	791.95	1390.65	62.53	1453.18
1164	1.79	14244	14311	I-15 South Bound	Interstate	65	1	1		0	197.01	82.57	279.58	352.60	147.78	500.38
1165	1.78	14310	14246	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	10040.84	19744.88	29785.72
1166	0.51	7122	14207	I-15	Interstate	25	1	1		0	757.87	34.08	791.95	390.10	17.54	407.64
1167	0.97	14246	14210	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	5487.19	10790.32	16277.50
1168	0.99	14208	14244	I-15 South Bound	Interstate	65	1	1		0	197.01	82.57	279.58	193.22	80.98	274.21
1169	0.51	7123	14207	I-15	Interstate	25	1	1		0	757.87	34.08	791.95	390.16	17.54	407.70
1170	0.27	14201	14208	I-15 South Bound	Interstate	65	1	1		0	197.01	82.57	279.58	52.50	22.00	74.50
1171	0.26	14210	14203	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	1488.01	2926.11	4414.12
1172	0.21	14207	14202	I-15	Interstate	35	1	1		0	757.87	34.08	791.95	161.09	7.24	168.33
1173	0.25	14203	14196	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	1391.04	2735.42	4126.46
1174	0.23	14202	14195	I-15	Interstate	35	1	1		0	757.87	34.08	791.95	176.35	7.93	184.28
1175	0.25	14194	14201	I-15 South Bound	Interstate	65	1	1		0	197.01	82.57	279.58	49.02	20.55	69.57
1176	3.09	7081	14194	I-15 South Bound	Interstate	65	1	1		0	197.01	82.57	279.58	609.20	255.33	864.53
1177	6.18	14195	14164	I-15	Interstate	1	1	1		0	757.87	34.08	791.95	4684.04	210.62	4894.66
1178	6.18	14196	14165	I-15 North Bound	Interstate	65	1	1		0	5647.59	11105.76	16753.35	34898.25	68625.95	103524.21
1179	3.09	7082	14194	I-15 South Bound	Interstate	65	1	1		0	197.01	82.57	279.58	609.22	255.34	864.55
1180	0.12	13957	13955	SR-100	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1181	3.34	13898	13957	SR-59	Other Principal Arte	45	1	1		0	462.61	490.40	953.01	1543.39	1636.10	3179.50
1182	2.49	6579	14060	SR-59	Other Principal Arte	45	1	1		0	462.61	490.40	953.01	1110.22	1176.90	2287.12
1183	2.49	6578	14060	SR-59	Other Principal Arte	45	1	1		0	462.61	490.40	953.01	1110.18	1176.87	2287.04
1184	6.51	13842	13898	SR-59	Other Principal Arte	45	1	1		0	462.61	490.40	953.01	3010.46	3191.30	6201.76
1185	1.59	13108	13050	I-15	Interstate	65	1	1		0	1213.41	0.00	1213.41	1935.17	0.00	1935.17
1186	1.52	13049	13107	I-15 South Bound	Interstate	65	1	1		0	732.49	19.03	751.52	1115.44	28.98	1144.42
1187	0.25	13038	13049	I-15 South Bound	Interstate	65	1	1		0	732.49	19.03	751.52	183.55	4.77	188.32
1188	0.25	13050	13037	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	308.21	0.00	308.21
1189	0.13	13051	13036	I-15 North Bound	Interstate	65	1	1		0	6751.96	11230.04	18082.00	897.15	1505.45	2402.60
1190	0.25	13037	13029	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	299.41	0.00	299.41
1191	0.31	13027	13038	I-15 South Bound	Interstate	65	1	1		0	732.49	19.03	751.52	228.98	5.95	234.93
1192	0.03	6512	13026	I-15	Interstate	65	1	1		0	1213.41	0.00	1213.41	38.87	0.00	38.87
1193	0.25	13036	13029	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	1680.32	2832.08	4512.40
1194	2.25	13001	13027	I-15 South Bound	Interstate	65	1	1		0	732.49	19.03	751.52	1647.19	42.80	1689.99

Figure I-2-33: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1195	2.20	13026	13002	I-15	Interstate	25	1	1		0	1213.41	0.00	1213.41	2674.06	0.00	2674.06
1196	0.24	12989	13001	I-15 South Bound	Interstate	65	1	1		0	732.49	19.03	751.52	174.17	4.53	178.69
1197	0.19	12999	12988	I-15	Interstate	65	1	1		0	1213.41	0.00	1213.41	233.14	0.00	233.14
1198	0.31	13003	12987	I-15 North Bound	Interstate	65	1	1		0	6881.14	11462.88	18264.02	2138.59	3605.13	5744.13
1199	0.10	13002	12999	I-15	Interstate	65	1	1		0	1213.41	0.00	1213.41	125.33	0.00	125.33
1200	1.13	6514	13003	I-15 North Bound	Interstate	65	1	1		0	6881.14	11462.88	18264.02	7679.30	12942.95	20622.25
1201	0.03	6517	13026	I-15	Interstate	65	1	1		0	1213.41	0.00	1213.41	38.90	0.00	38.90
1202	1.13	6514	13003	I-15 North Bound	Interstate	65	1	1		0	6881.14	11462.88	18264.02	7679.09	12942.60	20621.69
1203	0.11	12992	12989	I-15 South Bound	Interstate	65	1	1		0	886.16	11.85	818.01	98.63	1.33	51.96
1204	0.20	12988	12993	I-15	Interstate	65	1	1		0	1213.41	0.00	1213.41	242.71	0.00	242.71
1205	0.43	12987	12990	I-15 North Bound	Interstate	65	1	1		0	6881.14	11462.88	18264.02	2950.65	4973.14	7923.79
1206	0.17	12993	12991	I-15	Interstate	65	1	1		0	1213.41	0.00	1213.41	206.57	0.00	206.57
1207	4.70	12985	12992	I-15 South Bound	Interstate	65	1	1		0	886.16	11.85	818.01	3730.51	55.70	3846.20
1208	4.56	12991	12994	I-15	Interstate	25	1	1		0	1213.41	0.00	1213.41	5531.45	0.00	5531.45
1209	4.41	12990	12986	I-15 North Bound	Interstate	65	1	1		0	6881.14	11462.88	18264.02	30322.64	50601.20	80923.83
1210	0.19	12952	12985	I-15 South Bound	Interstate	65	1	1		0	886.16	11.85	818.01	155.20	2.29	157.98
1211	0.24	12986	12951	I-15 North Bound	Interstate	65	1	1		0	6881.14	11462.88	18264.02	1651.27	2783.10	4434.37
1212	0.17	12994	12952	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	210.12	0.00	210.12
1213	0.33	12948	12953	I-15 South Bound	Interstate	65	1	1		0	886.16	11.85	818.01	266.74	3.92	270.66
1214	0.29	12952	12947	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	350.49	0.00	350.49
1215	0.40	12951	12945	I-15 North Bound	Interstate	65	1	1		0	6881.14	11462.88	18264.02	2725.21	4593.16	7318.37
1216	5.61	14531	14559	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	29530.60	5873.60	35404.20
1217	0.38	14424	14418	I-70	Interstate	65	1	1		0	5182.50	173.38	5275.88	1926.88	65.42	1991.50
1218	0.04	14422	14419	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1219	0.01	14419	14418	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1220	0.01	14418	14417	SR-89	Other Principal Art	35	1	1		0	1162.59	450.29	1612.87	14.84	5.75	20.58
1221	0.02	14417	14416	SR-89	Other Principal Art	35	1	1		0	1162.59	450.29	1612.87	26.71	10.34	37.05
1222	1.06	14416	14348	SR-89	Other Principal Art	35	1	1		0	1162.59	450.29	1612.87	1236.23	478.81	1715.04
1223	0.31	7173	14313	SR-89	Other Principal Art	35	1	1		0	1162.59	450.29	1612.87	357.72	138.55	496.28
1224	0.31	7175	14313	SR-89	Other Principal Art	35	1	1		0	1162.59	450.29	1612.87	357.86	138.60	496.46
1225	0.20	7156	14299	SR-89	Other Principal Art	35	1	1		0	1162.59	450.29	1612.87	232.49	90.05	322.54
1226	0.44	14418	14427	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	2301.99	457.86	2759.85
1227	0.20	7157	14299	SR-89	Other Principal Art	35	1	1		0	1162.59	450.29	1612.87	232.51	90.06	322.57
1228	0.72	14299	14276	SR-89	Other Principal Art	45	1	1		0	1162.59	450.29	1612.87	831.39	322.01	1153.40
1229	2.62	14276	14179	SR-89	Other Principal Art	45	1	1		0	1162.59	450.29	1612.87	3049.50	1181.11	4230.62
1230	5.74	14427	14486	I-70	Interstate	25	1	1		0	5263.88	1046.98	6310.86	30206.67	6008.07	36214.74

Figure I-2-34: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1231	0.31	14489	14491	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	1627.19	323.65	1950.83
1232	0.31	14491	14496	I-70	Interstate	65	1	1		0	5263.88	1046.98	6310.86	1656.73	329.52	1986.25
1233	2.25	7248	14531	I-70	Interstate	25	1	1		0	5263.88	1046.98	6310.86	11853.66	2357.68	14211.34
1234	2.25	7248	14531	I-70	Interstate	25	1	1		0	5263.88	1046.98	6310.86	11853.34	2357.62	14210.96
1235	2.58	7085	14083	SR 89	Other Principal Art	45	1	1		0	1258.72	443.68	1702.32	3248.27	1149.08	4409.27
1236	2.58	7090	14083	SR 89	Other Principal Art	45	1	1		0	1258.72	443.68	1702.32	3248.33	1149.02	4409.35
1237	0.79	7042	13980	SR 89	Other Principal Art	35	1	1		0	1258.72	443.68	1702.32	992.54	349.79	1342.33
1238	0.79	7041	13980	SR 89	Other Principal Art	35	1	1		0	1258.72	443.68	1702.32	992.41	349.75	1342.16
1239	0.41	6990	13961	SR 89	Other Principal Art	35	1	1		0	1258.72	443.68	1702.32	509.99	179.79	689.60
1240	0.41	6990	13961	SR 89	Other Principal Art	35	1	1		0	1258.72	443.68	1702.32	509.91	179.79	689.61
1241	0.22	6980	13960	SR 89	Other Principal Art	35	1	1		0	1258.72	443.68	1702.32	273.88	96.52	370.40
1242	2.10	6980	13896	SR 28	Other Principal Art	35	1	1		0	1258.72	443.68	1702.32	2640.04	930.41	3570.45
1243	0.22	6981	13960	SR 89	Other Principal Art	35	1	1		0	1258.72	443.68	1702.32	273.94	96.54	370.48
1244	5.25	6948	13768	SR 28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	6538.34	2346.39	8884.73
1245	2.10	6980	13896	SR 28	Other Principal Art	35	1	1		0	1258.72	443.68	1702.32	2640.18	930.43	3570.53
1246	2.62	6948	13768	SR 28	Other Principal Art	35	1	1		0	1258.72	443.68	1702.32	3300.91	1164.38	4468.29
1247	7.59	13707	13680	I-15	Interstate	65	1	1		0	752.51	0.00	752.51	5707.91	0.00	5707.91
1248	4.15	13685	13729	I-15 South Bound	Interstate	65	1	1		0	11648.89	498.07	12147.96	48309.72	2069.73	50379.45
1249	4.31	13730	13684	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	24327.29	546.56	24873.85
1250	0.52	13677	13686	I-15 South Bound	Interstate	65	1	1		0	11648.89	498.07	12147.96	6143.44	263.29	6406.64
1251	0.35	13684	13679	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	1988.62	44.58	2025.12
1252	0.33	13683	13678	I-15	Interstate	65	1	1		0	752.51	0.00	752.51	247.02	0.00	247.02
1253	0.35	13678	13667	I-15	Interstate	65	1	1		0	752.51	0.00	752.51	266.28	0.00	266.28
1254	0.38	13664	13677	I-15 South Bound	Interstate	65	1	1		0	11648.89	498.07	12147.96	4478.55	191.87	4670.43
1255	0.39	13679	13666	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	2196.58	49.35	2245.93
1256	1.22	13667	13663	I-15	Interstate	65	1	1		0	752.51	0.00	752.51	918.81	0.00	918.81
1257	3.66	13645	13664	I-15 South Bound	Interstate	65	1	1		0	11648.89	498.07	12147.96	42645.76	1827.07	44472.83
1258	3.67	13666	13647	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	20727.68	465.69	21193.57
1259	2.54	13663	13645	I-15	Interstate	65	1	1		0	752.51	0.00	752.51	1909.59	0.00	1909.59
1260	0.32	13638	13646	I-15 South Bound	Interstate	65	1	1		0	11648.89	498.07	12147.96	3760.08	161.09	3921.17
1261	0.31	13647	13640	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	1748.87	39.29	1788.16
1262	0.25	13645	13639	I-15	Interstate	65	1	1		0	752.51	0.00	752.51	191.54	0.00	191.54
1263	0.28	13639	13634	I-15	Interstate	65	1	1		0	752.51	0.00	752.51	214.39	0.00	214.39
1264	0.32	13631	13638	I-15 South Bound	Interstate	65	1	1		0	11648.89	498.07	12147.96	3817.52	163.57	3981.49
1265	0.30	13640	13632	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	1711.39	38.45	1749.74
1266	0.51	13768	13759	SR 28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	634.35	227.65	861.99

Figure I-2-35: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDLIM	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1267	0.68	13759	13741	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	845.51	304.86	1154.38
1268	0.09	13741	13739	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	99.59	35.74	135.33
1269	0.50	13739	13736	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	627.05	225.03	852.08
1270	0.46	13736	13728	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	580.68	215.21	814.89
1271	1.60	13728	13709	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	1991.15	714.56	2705.70
1272	0.30	13709	13701	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	375.56	134.78	510.34
1273	1.03	13701	13692	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	1279.42	459.14	1738.56
1274	1.31	13692	13669	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	1626.04	583.53	2209.58
1275	0.04	13669	13665	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	52.65	18.90	71.55
1276	2.81	13665	13650	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	3496.99	1254.95	4751.94
1277	2.28	13650	13587	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	2844.83	1020.91	3865.75
1278	0.34	13597	13591	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	418.20	150.08	568.27
1279	12.47	13634	13205	I-15	Interstate	25	1	1		0	752.51	0.00	752.51	9388.11	0.00	9388.11
1280	12.45	13632	13206	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	70288.16	1579.16	71867.32
1281	12.42	13204	13631	I-15 South Bound	Interstate	65	1	1		0	11648.89	499.07	12147.96	144684.98	6198.73	150883.71
1282	1.30	13591	13542	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	1620.99	581.72	2202.71
1283	0.92	6771	13510	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	1142.39	409.96	1552.35
1284	0.92	6771	13510	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	1142.52	410.01	1552.54
1285	0.05	6795	13507	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	65.04	23.34	88.38
1286	0.05	6795	13507	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	65.04	23.34	88.38
1287	0.09	13507	13504	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	116.94	41.97	158.91
1288	0.27	13504	13499	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	333.09	119.54	452.63
1289	1.76	13499	13442	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	2191.77	786.55	2978.32
1290	1.82	13205	13180	I-15	Interstate	25	1	1		0	752.51	0.00	752.51	1371.78	0.00	1371.78
1291	2.85	13185	13204	I-15 South Bound	Interstate	65	1	1		0	11648.89	499.07	12147.96	33217.17	1423.12	34640.29
1292	2.88	13206	13163	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	16253.44	365.17	16618.60
1293	2.01	13442	13291	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	2504.01	898.61	3402.62
1294	1.01	13291	13257	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	1257.02	451.18	1708.12
1295	1.01	13257	13235	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	1258.98	451.81	1710.79
1296	1.62	13235	13179	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	2013.86	722.71	2736.57
1297	1.04	13180	13164	I-15	Interstate	25	1	1		0	752.51	0.00	752.51	786.37	0.00	786.37
1298	0.31	13179	13175	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	391.80	140.61	532.44
1299	0.30	13164	13153	I-15	Interstate	25	1	1		0	752.51	0.00	752.51	222.67	0.00	222.67
1300	0.27	13163	13157	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	1544.16	34.69	1578.85
1301	0.38	13149	13185	I-15 South Bound	Interstate	65	1	1		0	11648.89	499.07	12147.96	4474.07	191.68	4665.75
1302	0.37	13175	13162	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	462.58	166.00	628.58

Figure I-2-36: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1303	0.13	13153	13147	I-15	Interstate	65	1	1		0	752.51	0.00	752.51	99.53	0.00	99.53
1304	0.38	13157	13139	I-15 North Bound	Interstate	65	1	1		0	5647.59	126.88	5774.48	2146.29	48.22	2194.51
1305	0.33	13137	13149	I-15 South Bound	Interstate	65	1	1		0	11648.89	498.07	12147.96	3832.94	164.21	3997.16
1306	0.43	13162	13143	SR-28	Other Principal Art	35	1	1		0	1245.42	446.94	1692.36	541.63	194.37	736.00
1307	0.25	13147	13138	I-15	Interstate	35	1	1		0	752.51	0.00	752.51	198.72	0.00	198.72
1308	0.27	13139	13123	I-15 North Bound	Interstate	65	1	1		0	6751.96	11338.04	18082.00	1793.68	3009.86	4803.54
1309	0.26	13138	13116	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	318.96	0.00	318.96
1310	0.61	13107	13137	I-15 South Bound	Interstate	65	1	1		0	732.49	19.03	751.52	448.33	11.65	459.98
1311	0.30	13116	13108	I-15	Interstate	65	1	1		0	1213.41	0.00	1213.41	359.63	0.00	359.63
1312	1.92	13123	13851	I-15 North Bound	Interstate	65	1	1		0	6751.96	11338.04	18082.00	12936.57	21708.02	34644.59
1313	0.05	1347	1351	SR-134	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1314	0.03	1351	1352	SR-134	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1315	0.01	1352	1353	SR-134	Other Principal Art	35	1	1		0	197.85	0.00	197.85	1.38	0.00	1.38
1316	0.01	1353	1354	SR-134	Other Principal Art	35	1	1		0	197.85	0.00	197.85	2.43	0.00	2.43
1317	0.31	1330	1352	I-15 South Bound	Interstate	65	1	1		0	4472.48	11195.75	15668.24	1371.93	3434.27	4806.20
1318	0.29	1353	1332	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1319	0.30	1354	1331	I-15 North Bound	Interstate	65	1	1		0	1046.96	7738.16	8785.12	318.28	2352.43	2670.70
1320	0.02	1354	1356	SR-134	Other Principal Art	45	1	1		0	1518.00	2554.51	4072.51	36.35	61.17	97.51
1321	0.02	1356	1357	SR-134	Other Principal Art	35	1	1		0	1518.00	2554.51	4072.51	35.48	59.71	95.18
1322	0.47	1357	1349	SR-134	Other Principal Art	35	1	1		0	1518.00	2554.51	4072.51	719.13	1210.16	1929.29
1323	0.53	1349	1348	SR-134	Other Principal Art	35	1	1		0	1518.00	2554.51	4072.51	799.11	1344.75	2143.86
1324	0.21	1382	1348	SR-89	Other Principal Art	35	1	1		0	2554.51	1518.00	4072.51	548.40	325.88	874.28
1325	1.77	1330	1228	I-15 South Bound	Interstate	65	1	1		0	11195.75	4472.48	15668.24	19824.28	7919.41	27743.69
1326	1.77	1332	1231	I-15	Interstate	1	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1327	0.89	1230	1231	I-15 North Bound	Interstate	65	1	1		0	7391.35	1282.74	8674.08	6553.42	1137.32	7690.73
1328	4.64	1174	1190	I-15 South Bound	Interstate	65	1	1		0	4472.48	11195.75	15668.24	20757.69	51961.72	72719.40
1329	4.51	1191	1176	I-15 North Bound	Interstate	65	1	1		0	1282.74	7391.35	8674.08	5767.74	33349.92	39137.66
1330	4.55	1189	1175	I-15	Interstate	1	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1331	0.12	1175	1173	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1332	1.83	1476	1382	SR-89	Other Principal Art	35	1	1		0	2554.51	1518.00	4072.51	4662.15	2770.45	7432.60
1333	0.37	3069	18183	I-15	Interstate	35	1	1		0	38265.21	0.00	38265.21	14054.66	0.00	14054.66
1334	0.36	18198	18184	I-15 North Bound	Interstate	65	1	1		0	4289.81	3088.58	7320.39	1568.96	1120.95	2689.92
1335	0.71	18170	3070	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	542.93	312.34	855.27
1336	0.14	18184	18177	I-15 North Bound	Interstate	65	1	1		0	4289.81	3088.58	7320.39	599.94	430.83	1030.77
1337	0.17	18183	18176	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	6535.10	0.00	6535.10
1338	0.20	18176	18169	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	2611.08	0.00	2611.08

Figure I-2-37: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connecto	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1339	0.26	18177	18167	I-15 North Bound	Interstate	65	1	1		0	4289.81	3088.58	7370.39	1118.58	803.27	1921.86
1340	0.21	18151	18170	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	163.27	93.93	257.20
1341	0.19	18169	18152	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	7171.66	0.00	7171.66
1342	0.16	18167	18153	I-15 North Bound	Interstate	65	1	1		0	4289.81	3088.58	7370.39	698.57	495.91	1186.47
1343	0.44	18137	18151	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	339.56	195.35	534.90
1344	0.43	18152	18141	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	16439.78	0.00	16439.78
1345	0.52	5019	10139	SR-40	Other Principal Arte	35	1	1		0	2095.33	2221.76	4317.09	1085.27	1150.75	2236.02
1346	2.45					45	1	1		0	2095.33	2221.76	4317.09	5134.41	5444.23	10578.64
1347	0.59	4910	9624	SR-40	Other Principal Arte	45	1	1		0	4314.60	25364.89	29679.49	2546.05	14967.82	17513.87
1348	0.20	3430	3488	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	135.39	8017.94	8153.32
1349	0.22	3488	3472	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	153.40	9084.86	9238.26
1350	0.25	3472	3461	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	169.02	10009.86	10178.88
1351	0.20	3461	3453	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	134.63	7973.02	8107.65
1352	1.03	3453	3413	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	705.89	41804.21	42510.10
1353	4.80	3412	3063	I-80	Interstate	25	1	1		0	683.82	40497.74	41181.56	3279.05	194153.04	197472.09
1354	0.19	17999	18008	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	144.18	82.94	227.12
1355	0.18	18006	17998	I-15	Interstate	35	1	1		0	38092.92	42.11	38135.02	6703.39	7.41	6710.80
1356	0.13	18002	17997	I-15 North Bound	Interstate	65	1	1		0	4289.81	3088.58	7370.39	577.43	414.66	992.09
1357	0.04	18009	18006	I-15	Interstate	65	1	1		0	38092.92	42.11	38135.02	1713.75	1.89	1715.65
1358	0.76	8979	17999	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	582.97	335.38	918.36
1359	1.48	17998	17969	I-15	Interstate	1	1	1		0	38092.92	42.11	38135.02	56297.82	62.23	56360.05
1360	1.46	17997	17960	I-15 North Bound	Interstate	65	1	1		0	4289.81	3088.58	7370.39	6251.31	4499.17	10748.48
1361	0.29	18526	18534	I-15 South Bound	Interstate	65	1	1		0	2408.32	0.00	2408.32	692.01	0.00	692.01
1362	0.28	18532	18525	I-15	Interstate	35	1	1		0	114.48	538.61	653.10	32.05	150.79	182.84
1363	0.30	18533	18523	I-15 North Bound	Interstate	65	1	1		0	8494.18	2584.07	11078.25	2528.36	769.17	3297.53
1364	0.26	18561	18575	I-15 South Bound	Interstate	65	1	1		0	2408.32	0.00	2408.32	635.76	0.00	635.76
1365	0.05	18564	18562	I-15	Interstate	65	1	1		0	114.48	538.61	653.10	5.15	24.25	29.41
1366	0.06	18583	18581	I-15	Interstate	65	1	1		0	38092.92	42.11	38135.02	2354.58	2.60	2357.19
1367	0.23	18575	18582	I-15 South Bound	Interstate	65	1	1		0	3158.34	3732.72	6931.07	741.68	865.59	1607.27
1368	0.22	18581	18576	I-15	Interstate	65	1	1		0	38092.92	42.11	38135.02	8472.43	9.36	8481.80
1369	0.32	18564	18577	I-15 North Bound	Interstate	65	1	1		0	4289.81	3088.58	7370.39	1356.03	973.79	2329.82
1370	0.05	18574	18575	SR-193	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1371	0.20	18576	18564	I-15	Interstate	65	1	1		0	114.48	538.61	653.10	22.67	106.64	129.31
1372	0.21	18577	18563	I-15 North Bound	Interstate	65	1	1		0	8494.18	2584.07	11078.25	1743.48	530.39	2273.87
1373	0.01	18575	18576	SR-193	Other Principal Arte	65	1	1		0	5321.99	2379.30	7701.29	52.23	23.35	75.58
1374	0.01	18576	18577	SR-193	Other Principal Arte	65	1	1		0	41457.47	39.83	41497.30	272.90	0.26	273.16

Figure I-2-38: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1375	0.07	18577	18578	SR-193	Other Principal Art	35	1	1		0	36716.76	0.00	36716.76	2575.87	0.00	2575.87
1376	0.05	18578	18579	SR-193	Other Principal Art	35	1	1		0	36716.76	0.00	36716.76	1807.38	0.00	1807.38
1377	0.14	9345	9313	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1378	0.48	9313	9217	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1379	0.11	9217	9199	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1380	0.39	9199	9094	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1381	0.09	9094	9085	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1382	0.52	9085	9027	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1383	0.50	9027	8962	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1384	1.01	4491	8571	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1385	1.01	4491	8571	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1386	0.75	8571	8057	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1387	0.75	8357	8143	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1388	1.04	4071	7299	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1389	0.26	6579	6598	I-80	Interstate	65	1	1		0	5054.72	5065.50	10120.22	1297.42	1300.19	2597.61
1390	0.20	6598	6617	I-80	Interstate	65	1	1		0	5054.72	5065.50	10120.22	1003.21	1005.35	2008.56
1391	2.52	3309	6506	I-80	Interstate	65	1	1		0	5054.72	5065.50	10120.22	12739.65	12766.82	25506.47
1392	5.04	3309	6506	I-80	Interstate	65	1	1		0	4593.98	5649.17	10643.07	23172.38	28475.38	53647.76
1393	1.04	4072	7299	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1394	0.21	7299	7367	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1395	0.46	3683	7080	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1396	0.46	3684	7080	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1397	1.76	7080	6548	SR-36	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1398	0.13	6548	6514	SR-36	Other Principal Art	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1399	0.17	6506	6467	I-80	Interstate	65	1	1		0	4593.98	5649.17	10643.07	837.79	947.72	1785.51
1400	0.09	6467	6430	I-80	Interstate	65	1	1		0	4593.98	5649.17	10643.07	429.43	485.77	915.20
1401	0.18	6430	6356	I-80	Interstate	65	1	1		0	4593.98	5649.17	10643.07	901.29	1019.55	1920.84
1402	0.24	6356	6304	I-80	Interstate	65	1	1		0	4593.98	5649.17	10643.07	1205.22	1363.36	2568.58
1403	2.11	6304	5552	I-80	Interstate	65	1	1		0	4593.98	5649.17	10643.07	10556.05	11941.17	22497.22
1404	0.05	5552	5534	I-80	Interstate	65	1	1		0	4593.98	5649.17	10643.07	244.54	276.63	521.17
1405	0.23	5534	5340	I-80	Interstate	65	1	1		0	4593.98	5649.17	10643.07	1166.13	1319.15	2485.28
1406	2.37	5340	4842	I-80	Interstate	65	1	1		0	4593.98	5649.17	10643.07	11852.96	13408.25	25261.21
1407	0.15	51	55	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1408	0.15	52	54	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	565.37	559.34	1124.71
1409	0.11	2261	4535	I-80	Interstate	65	1	1		0	5054.72	5065.50	10120.22	558.81	561.98	1102.79
1410	0.11	2260	4535	I-80	Interstate	65	1	1		0	5054.72	5065.50	10120.22	558.54	561.71	1102.25

Figure I-2-39: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1411	4.49	3040	8506	SR-138	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1412	6.61	4535	5868	I-80	Interstate	65	1	1		0	5854.72	5065.50	10120.22	33435.27	32506.59	66941.87
1413	0.31	5875	6080	SR-138	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1414	0.02	5868	5875	SR-138	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1415	0.02	5867	5868	SR-138	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1416	0.25	5868	5908	I-80	Interstate	65	1	1		0	5854.72	5065.50	10120.22	1256.67	1259.35	2516.01
1417	0.14	15601	5867	SR-138	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1418	3.99	5973	6575	I-80	Interstate	65	1	1		0	5854.72	5065.50	10120.22	20177.95	20220.98	40398.93
1419	0.33	5908	5973	I-80	Interstate	65	1	1		0	5854.72	5065.50	10120.22	1667.94	1671.49	3339.43
1420	0.07	8573	8575	SR-138	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1421	1.61	8575	8584	SR-138	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1422	0.56	8584	8677	SR-112	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1423	1.71	4339	9008	SR-112	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1424	2.19	9008	9272	SR-112	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1425	1.04	9272	9477	SR-112	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1426	1.71	4339	9008	SR-112	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1427	0.31	9867	9821	SR-36	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1428	0.25	9821	9806	SR-36	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1429	0.40	9806	9771	SR-36	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1430	0.35	9771	9758	SR-36	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1431	0.38	9758	9720	SR-36	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1432	0.15	9720	9658	SR-36	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1433	0.25	9658	9589	SR-36	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1434	0.27	9589	9543	SR-36	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1435	0.25	9543	9497	SR-36	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1436	0.63	9477	9481	SR-112	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1437	0.52	9481	9493	SR-112	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1438	0.31	9493	9497	SR-112	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1439	0.30	9497	9421	SR-36	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1440	0.14	9421	9345	SR-36	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1441	0.18	55	63	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1442	0.13	62	52	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	707.03	699.48	1406.51
1443	3.35	63	76	I-84	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1444	3.36	52	62	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	12495.67	12362.35	24858.02
1445	0.25	77	93	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1446	0.28	93	52	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	1043.61	1032.47	2076.08

Figure I-2-40: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1447	0.04	76	77	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1448	0.19	93	96	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1449	0.26	97	90	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	970.89	960.53	1931.42
1450	1.13	96	88	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1451	1.09	86	97	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	3721.07	3681.37	7402.44
1452	0.04	89	85	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1453	0.39	80	86	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	1115.35	1103.45	2218.80
1454	0.22	85	81	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1455	0.21	81	82	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1456	0.23	79	80	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	866.29	856.96	1723.17
1457	3.68	109	134	I-84	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1458	3.62	132	110	I-84 West Bound	Interstate	65	1	1		0	6780.44	7751.13	14451.57	24277.01	28083.88	52360.89
1459	2.54	82	103	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1460	2.52	101	79	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	9388.49	9288.32	18676.81
1461	0.21	103	106	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1462	0.22	105	101	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	801.97	793.31	1595.18
1463	0.23	106	109	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1464	0.13	110	105	I-84 West Bound	Interstate	65	1	1		0	6780.44	7751.13	14451.57	857.36	991.80	1849.17
1465	5.15	163	183	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1466	5.24	190	164	I-84 West Bound	Interstate	65	1	1		0	6780.44	7751.13	14451.57	35181.32	40605.54	75706.85
1467	0.27	147	137	I-84 West Bound	Interstate	65	1	1		0	6780.44	7751.13	14451.57	1802.41	2085.04	3887.45
1468	0.23	138	145	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1469	0.24	134	138	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1470	0.27	137	132	I-84 West Bound	Interstate	65	1	1		0	6780.44	7751.13	14451.57	1810.93	2084.90	3905.83
1471	0.22	152	160	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1472	0.20	157	155	I-84 West Bound	Interstate	65	1	1		0	6780.44	7751.13	14451.57	1371.61	1586.69	2958.31
1473	0.27	11312	11274	SR-169	Other Principal Art	35	1	1		0	19.71	0.00	19.71	5.27	0.00	5.27
1474	0.11	11274	11248	SR-169	Other Principal Art	35	1	1		0	19.71	0.00	19.71	2.13	0.00	2.13
1475	0.08	11247	11248	SR-52	Other Principal Art	35	1	1		0	140.81	21336.43	21476.44	10.96	1670.67	1681.63
1476	0.01	11248	11285	SR-169	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1477	0.12	5624	11238	SR-169	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1478	0.24	11248	11238	SR-52	Other Principal Art	35	1	1		0	159.72	21336.43	21496.15	38.43	5133.22	5171.65
1479	0.12	5621	11238	SR-169	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1480	5.48	11238	10979	SR-169	Other Principal Art	35	1	1		0	159.72	21336.43	21496.15	874.58	116805.73	117710.32
1481	1.16	10979	10867	SR-169	Other Principal Art	55	1	1		0	159.72	21336.43	21496.15	185.68	24805.57	24991.25
1482	7.41	12868	12888	SR-6	Other Principal Art	45	1	1		0	84.35	4315.41	4399.77	625.48	31998.37	32623.85

Figure I-2-41: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1483	8.78	12888	12915	SR-6	Other Principal Arte	45	1	1		0	84.35	4315.41	4399.77	740.91	37903.66	38644.57
1484	1.23					45	1	1		0	2054.51	2222.85	4277.36	2517.29	2723.55	5240.84
1485	4.90					45	1	1		0	2054.51	2222.85	4277.36	10068.69	10893.57	20962.17
1486	1.23					45	1	1		0	2031.38	2104.69	4136.07	2488.77	2579.58	5067.35
1487	0.69	6053	12087	SR-40	Other Principal Arte	45	1	1		0	1868.28	2013.96	3882.25	1351.21	1382.56	2733.77
1488	0.69	6053	12087	SR-40	Other Principal Arte	45	1	1		0	1868.28	2013.96	3882.25	1351.13	1382.49	2733.62
1489	2.69	5433	10449	SR-189	Other Principal Arte	55	1	1		0	159.72	21336.43	21496.15	438.36	57492.26	57922.62
1490	2.69	5434	10445	SR-189	Other Principal Arte	55	1	1		0	159.72	21336.43	21496.15	438.38	57494.15	57924.53
1491	1.27	13445	10440	SR-189	Other Principal Arte	45	1	1		0	159.72	21336.43	21496.15	203.43	27176.25	27379.68
1492	2.07	5220	10222	SR-189	Other Principal Arte	45	1	1		0	159.72	21336.43	21496.15	338.55	44158.68	44489.24
1493	2.07	5220	10222	SR-189	Other Principal Arte	45	1	1		0	159.72	21336.43	21496.15	338.56	44160.14	44498.71
1494	0.82	5111	10036	SR-189	Other Principal Arte	35	1	1		0	159.72	21336.43	21496.15	138.95	17493.07	17624.02
1495	0.82	5111	10036	SR-189	Other Principal Arte	35	1	1		0	159.72	21336.43	21496.15	138.94	17492.95	17623.89
1496	0.40	5049	10025	SR-189	Other Principal Arte	35	1	1		0	159.72	21336.43	21496.15	63.38	8467.38	8530.76
1497	0.40	5049	10025	SR-189	Other Principal Arte	35	1	1		0	159.72	21336.43	21496.15	63.39	8467.82	8531.21
1498	0.10	5013	10025	SR-189	Other Principal Arte	35	1	1		0	159.72	21336.43	21496.15	16.22	2167.03	2183.25
1499	0.10	5016	10025	SR-189	Other Principal Arte	35	1	1		0	159.72	21336.43	21496.15	16.23	2167.98	2184.21
1500	0.49	5012	9991	SR-189	Other Principal Arte	35	1	1		0	159.72	21336.43	21496.15	77.65	10373.18	10450.83
1501	0.49	5013	9991	SR-189	Other Principal Arte	35	1	1		0	159.72	21336.43	21496.15	77.66	10374.23	10451.89
1502	0.17	4996	9974	SR-189	Other Principal Arte	25	1	1		0	159.72	21336.43	21496.15	26.78	3577.56	3604.34
1503	0.17	4996	9974	SR-189	Other Principal Arte	25	1	1		0	159.72	21336.43	21496.15	26.78	3577.70	3604.48
1504	0.09	9974	9960	SR-189	Other Principal Arte	50	1	1		0	159.72	21336.43	21496.15	12.85	1717.02	1729.87
1505	0.20	5401	6325	I-215 Negative	Interstate	65	1	1		0	0.00	22757.93	22757.93	0.00	4451.52	4451.52
1506	0.18	6255	6324	I-215 Positive	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1507	0.20	6222	6326	I-215	Interstate	65	1	1		0	0.00	1466.59	1466.59	0.00	288.40	288.40
1508	0.23	6325	6210	I-215 Negative	Interstate	65	1	1		0	0.00	22757.93	22757.93	0.00	5239.36	5239.36
1509	0.07	6198	6222	I-215	Interstate	65	1	1		0	0.00	1466.59	1466.59	0.00	96.64	96.64
1510	0.11	6085	6063	I-89	Interstate	65	1	1		0	3877.48	22520.51	26397.91	438.67	2501.41	2932.08
1511	0.08	6063	5971	I-89	Interstate	65	1	1		0	3877.48	22520.51	26397.91	295.66	1717.26	2012.92
1512	0.86	5971	5632	I-89	Interstate	65	1	1		0	3877.48	22520.51	26397.91	3339.71	19397.52	22737.22
1513	0.24	5632	5556	I-89	Interstate	65	1	1		0	3877.48	22520.51	26397.91	917.54	5329.23	6246.78
1514	0.50	5556	5268	I-89	Interstate	65	1	1		0	3877.48	22520.51	26397.91	1929.34	11205.88	13135.22
1515	0.14	5268	5245	I-89	Interstate	65	1	1		0	3877.48	22520.51	26397.91	554.82	3222.47	3777.29
1516	1.17	5245	5076	I-89	Interstate	65	1	1		0	3877.48	22520.51	26397.91	4537.79	26356.16	30893.95
1517	0.14	5076	5033	I-89	Interstate	65	1	1		0	3877.48	22520.51	26397.91	547.83	3181.89	3729.72
1518	0.15	5033	4996	I-89	Interstate	65	1	1		0	3877.48	22520.51	26397.91	565.46	3284.27	3849.73

Figure I-2-42: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1519	0.10	4996	4964	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	398.23	2266.54	2656.77
1520	0.31	4964	4910	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	1197.11	6952.98	8150.09
1521	0.18	4910	4860	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	685.61	3982.14	4667.75
1522	0.79	4860	4727	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	3058.13	17715.61	20765.74
1523	0.06	4727	4695	I-80	Interstate	55	1	1		0	3877.48	22528.51	26397.91	223.58	1298.57	1522.15
1524	0.26	4695	4663	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	1015.76	5899.67	6915.43
1525	0.32	4663	4744	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	1233.17	7162.41	8395.58
1526	0.46	4744	4771	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	1802.17	10467.25	12269.42
1527	0.37	4771	4839	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	1432.18	8318.31	9750.49
1528	0.97	4839	4993	I-80	Interstate	1	1	1		0	3877.48	22528.51	26397.91	3752.16	21793.11	25545.27
1529	0.10	4993	5010	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	378.71	2199.63	2578.34
1530	0.19	5010	5048	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	739.32	4294.10	5033.43
1531	0.33	6346	12682	SR-198	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1532	0.33	6346	12682	SR-198	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1533	0.09	12682	12679	SR-198	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1534	0.18	12679	12675	SR-156	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1535	0.33	6304	12683	SR-6	Other Principal Art	35	1	1		0	84.35	4315.41	4399.77	28.00	1434.19	1462.23
1536	0.61	12683	12685	SR-6	Other Principal Art	35	1	1		0	84.35	4315.41	4399.77	51.81	2650.29	2702.10
1537	0.56	10725	10650	I-15	Interstate	65	1	1		0	0.00	2601.37	2601.37	0.00	1452.33	1452.33
1538	0.31	5321	10726	I-15 South Bound	Interstate	65	1	1		0	1677.02	18223.79	19900.80	520.94	5660.91	6181.85
1539	0.32	5368	10649	I-15 North Bound	Interstate	65	1	1		0	7707.38	493.21	8200.51	2449.84	156.77	2606.61
1540	0.32	5368	10649	I-15 North Bound	Interstate	65	1	1		0	7707.38	493.21	8200.51	2449.47	156.75	2606.22
1541	0.06	10731	10725	I-15	Interstate	65	1	1		0	0.00	2601.37	2601.37	0.00	163.79	163.79
1542	0.07	10607	10606	SR-73	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1543	0.03	10606	10605	SR-73	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1544	0.01	10605	10604	SR-73	Other Principal Art	35	1	1		0	0.00	1569.07	1569.07	0.00	12.10	12.10
1545	0.01	10604	10603	SR-73	Other Principal Art	35	1	1		0	0.00	4178.44	4178.44	0.00	34.37	34.37
1546	0.03	10603	10602	SR-73	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1547	0.24	10559	10605	I-15 South Bound	Interstate	65	1	1		0	1677.02	19792.86	21469.87	405.65	4804.84	5244.49
1548	0.26	10604	10557	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1549	0.26	10603	10556	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	1994.13	1206.53	3200.65
1550	0.07	10551	10559	I-15 South Bound	Interstate	65	1	1		0	1677.02	19792.86	21469.87	112.90	1332.80	1445.73
1551	0.04	10557	10552	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1552	0.03	10556	10553	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	269.22	162.89	432.11
1553	0.21	10605	10644	I-15 South Bound	Interstate	65	1	1		0	1677.02	18223.79	19900.80	355.04	3861.59	4260.63
1554	0.22	10645	10604	I-15	Interstate	35	1	1		0	0.00	2601.37	2601.37	0.00	568.15	568.15

Figure I-2-43: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1555	0.33	10602	10598	SR-73	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1556	0.23	10764	10731	I-15	Interstate	65	1	1		0	0.00	2601.37	2601.37	0.00	592.74	592.74
1557	0.22	10765	10736	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	1714.29	109.70	1823.99
1558	0.32	10763	10821	I-15 South Bound	Interstate	65	1	1		0	1677.82	18223.79	19900.80	544.16	5913.24	6457.39
1559	0.31	10818	10764	I-15	Interstate	35	1	1		0	0.00	2601.37	2601.37	0.00	793.53	793.53
1560	0.31	10819	10765	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	2409.83	154.21	2564.04
1561	1.13	10821	10858	I-15 South Bound	Interstate	65	1	1		0	1677.82	18223.79	19900.80	1901.35	20661.60	22562.95
1562	1.14	10857	10818	I-15	Interstate	65	1	1		0	0.00	2601.37	2601.37	0.00	2971.61	2971.61
1563	0.50	9743	9744	SR-71	Other Principal Art	35	1	1		0	0.00	24672.86	24672.86	0.00	12448.85	12448.85
1564	0.92	4872	9668	SR-71	Other Principal Art	35	1	1		0	0.00	24672.86	24672.86	0.00	22799.50	22799.50
1565	0.92	4872	9668	SR-71	Other Principal Art	35	1	1		0	0.00	24672.86	24672.86	0.00	22798.35	22798.35
1566	0.53	9891	9920	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	0.00	735.39	735.39	0.00	465.62	465.62
1567	0.14	9896	9891	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	0.00	735.39	735.39	0.00	104.93	104.93
1568	0.08	9893	9896	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	0.00	735.39	735.39	0.00	61.87	61.87
1569	0.95	12190	12019	I-15	Interstate	25	1	1		0	15696.89	4278.39	19974.47	14848.34	4047.31	18895.65
1570	0.36	12019	11995	I-15	Interstate	25	1	1		0	15696.89	4278.39	19974.47	5631.85	1535.11	7166.96
1571	0.38	11880	11926	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	1013.05	1013.05
1572	0.37	11925	11881	I-15	Interstate	25	1	1		0	15696.89	4278.39	19974.47	5845.62	1593.38	7439.00
1573	0.37	11923	11882	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	5236.62	5236.62
1574	0.56	11820	11779	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1575	0.51	11903	11824	SR-89	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1576	0.21	11927	11903	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1577	0.06	11824	11820	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1578	0.62	11782	11818	SR-265	Other Principal Art	35	1	1		0	19.71	0.00	19.71	12.27	0.00	12.27
1579	0.50	11777	11778	SR-265	Other Principal Art	35	1	1		0	159.72	21336.43	21496.15	80.41	10742.12	10822.54
1580	0.26	5890	11779	SR-265	Other Principal Art	25	1	1		0	159.72	21336.43	21496.15	44.60	5958.66	6003.26
1581	0.27	5827	11565	SR-89	Other Principal Art	35	1	1		0	140.81	21336.43	21476.44	37.27	5679.45	5716.72
1582	0.27	5783	11467	SR-89	Other Principal Art	35	1	1		0	140.81	21336.43	21476.44	37.62	5732.69	5770.30
1583	0.27	5782	11467	SR-89	Other Principal Art	35	1	1		0	140.81	21336.43	21476.44	37.61	5731.80	5769.41
1584	0.27	5732	11252	SR-89	Other Principal Art	35	1	1		0	140.81	21336.43	21476.44	37.63	5734.07	5771.69
1585	0.27	5735	11252	SR-89	Other Principal Art	35	1	1		0	140.81	21336.43	21476.44	37.69	5737.37	5775.02
1586	0.26	5888	11779	SR-265	Other Principal Art	25	1	1		0	159.72	21336.43	21496.15	44.59	5956.70	6001.29
1587	0.27	5881	11852	SR-89	Other Principal Art	35	1	1		0	140.81	21336.43	21476.44	37.48	5712.50	5749.98
1588	0.12	11779	11765	SR-89	Other Principal Art	35	1	1		0	140.81	21336.43	21476.44	17.31	2638.14	2655.45
1589	0.27	5884	11852	SR-89	Other Principal Art	35	1	1		0	140.81	21336.43	21476.44	37.50	5715.12	5752.63
1590	0.27	5825	11565	SR-89	Other Principal Art	35	1	1		0	140.81	21336.43	21476.44	37.26	5678.03	5715.29

Figure I-2-44: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectio	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1591	0.45	11779	11792	SR-265	Other Principal Art	35	1	1		0	19.71	0.00	19.71	8.86	0.00	8.86
1592	0.23	11334	11308	I-15	Interstate	25	1	1		0	15536.37	2601.37	18137.74	3636.59	608.90	4245.50
1593	0.24	11305	11333	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	409.15	655.67	1064.82
1594	0.29	11335	11300	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	2235.32	143.04	2378.36
1595	0.06	11305	11299	I-15	Interstate	65	1	1		0	15536.37	2601.37	18137.74	989.93	165.75	1155.68
1596	0.27	11258	11305	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	449.43	728.21	1169.63
1597	0.21	11259	11259	I-15	Interstate	35	1	1		0	15536.37	2601.37	18137.74	3334.19	558.27	3892.46
1598	0.22	11300	11260	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	1712.35	109.58	1821.93
1599	0.02	11266	11263	SR-52	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1600	0.09	11263	11265	SR-52	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1601	0.35	11023	11002	I-15	Interstate	35	1	1		0	0.00	2601.37	2601.37	0.00	918.07	918.07
1602	0.35	11022	11001	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	2735.61	175.06	2910.67
1603	0.01	11025	11023		Interstate	35	1	1		0	0.00	15536.37	15536.37	0.00	113.43	113.43
1604	0.01	11023	11022		Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1605	0.02	11022	11020		Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1606	0.01	11020	11019		Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1607	0.41	11025	11048	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	688.13	1102.73	1790.86
1608	0.40	11047	11023	I-15	Interstate	25	1	1		0	15536.37	2601.37	18137.74	6283.93	1052.17	7336.09
1609	0.41	11046	11022	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	3133.13	200.50	3333.63
1610	0.52	10952	10940	SR-89	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1611	0.49	10863	10952	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1612	1.70	11048	11100	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	2857.41	4579.00	7436.41
1613	1.70	11099	11047	I-15	Interstate	25	1	1		0	15536.37	2601.37	18137.74	26445.78	4428.01	30873.79
1614	1.69	11098	11046	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	13026.85	833.62	13860.47
1615	0.37	10905	10863	SR-89	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1616	0.38	10969	10905	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1617	0.12	10965	10969	SR-89	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1618	0.33	11752	11880	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	2512.64	2512.64
1619	0.95	11861	11790	I-15	Interstate	25	1	1		0	15696.09	4278.39	19974.47	14864.91	4051.83	18916.74
1620	0.94	11892	11791	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	13257.69	13257.69
1621	0.38	5777	11697	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	639.86	1025.38	1665.24
1622	0.38	5776	11697	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	639.97	1025.56	1665.53
1623	0.78	11698	11556	I-15	Interstate	25	1	1		0	15536.37	2601.37	18137.74	12053.12	2018.14	14071.27
1624	0.82	11704	11557	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	6307.16	403.61	6710.77
1625	0.28	11509	11555	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	463.13	751.78	1228.91
1626	0.29	11556	11507	I-15	Interstate	25	1	1		0	15536.37	2601.37	18137.74	4558.24	763.22	5321.46

Figure I-2-45: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1627	0.27	11557	11511	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	2107.63	134.87	2242.50
1628	0.22	11443	11509	I-15 South Bound	Interstate	65	1	1		0	1677.82	2687.42	4364.43	370.85	593.00	963.85
1629	0.21	11507	11450	I-15	Interstate	35	1	1		0	15536.37	2601.37	18137.74	3216.75	538.60	3755.35
1630	0.23	11511	11448	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	1751.22	112.07	1863.29
1631	0.23	11420	11449	I-15 South Bound	Interstate	65	1	1		0	1677.82	2687.42	4364.43	390.98	626.41	1017.31
1632	0.23	11450	11421	I-15	Interstate	35	1	1		0	15536.37	2601.37	18137.74	3602.91	603.26	4206.17
1633	0.12	12244	12229	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	1732.43	1732.43
1634	0.13	6122	12257	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	271.87	271.87
1635	0.22	12190	12191	SR-114	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1636	0.50	12277	12243	I-15	Interstate	65	1	1		0	15696.89	4278.39	19974.47	7810.08	2128.84	9938.92
1637	0.13	6120	12257	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	271.81	271.81
1638	0.23	12258	12244	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	3313.58	3313.58
1639	0.30	12257	12276	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	797.75	797.75
1640	0.25	12278	12258	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	3687.82	3687.82
1641	0.47	12276	12304	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	1275.79	1275.79
1642	0.47	12303	12277	I-15	Interstate	25	1	1		0	15696.89	4278.39	19974.47	7338.28	2000.24	9338.52
1643	0.46	12302	12278	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	6538.61	6538.61
1644	0.22	12194	12193	SR-114	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1645	0.09	12196	12194	SR-114	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1646	0.09	12197	12196	SR-114	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1647	0.40	10856	10879	I-15 South Bound	Interstate	65	1	1		0	1677.82	18223.79	19900.60	677.47	7361.95	8039.42
1648	0.40	10879	10857	I-15	Interstate	25	1	1		0	0.00	2601.37	2601.37	0.00	1041.77	1041.77
1649	0.42	10877	10856	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	3206.90	205.22	3412.12
1650	0.27	10925	10878	I-15	Interstate	35	1	1		0	0.00	2601.37	2601.37	0.00	692.84	692.84
1651	0.26	10879	10927	I-15 South Bound	Interstate	65	1	1		0	1677.82	18223.79	19900.60	438.65	4766.74	5205.39
1652	0.25	10919	10877	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	1926.61	123.29	2049.90
1653	0.26	10963	10926	I-15	Interstate	35	1	1		0	0.00	2601.37	2601.37	0.00	677.01	677.01
1654	0.29	10927	10964	I-15 South Bound	Interstate	65	1	1		0	1677.82	18223.79	19900.60	478.78	5202.77	5681.55
1655	0.27	10962	10919	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	2071.30	132.55	2203.87
1656	0.25	10964	10973	I-15 South Bound	Interstate	65	1	1		0	1677.82	18223.79	19900.60	442.98	4812.93	5255.84
1657	0.30	10974	10963	I-15	Interstate	35	1	1		0	0.00	2601.37	2601.37	0.00	789.55	789.55
1658	0.31	10975	10962	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	2383.53	152.53	2536.12
1659	0.25	10973	11004	I-15 South Bound	Interstate	65	1	1		0	1677.82	18223.79	19900.60	422.76	4593.38	5016.07
1660	0.24	11002	10974	I-15	Interstate	35	1	1		0	0.00	2601.37	2601.37	0.00	638.24	638.24
1661	0.23	11001	10975	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	1794.92	114.86	1909.79
1662	0.01	11029	11027		Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-46: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1663	0.02	11027	11025		Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1664	0.35	11004	11025	I-15 South Bound	Interstate	65	1	1		0	1677.02	18223.79	19900.80	591.66	6429.47	7021.14
1665	0.40	6293	12758	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	2727.52	4597.05	7324.56
1666	0.71	12765	12785	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	575.71	8.45	584.16
1667	0.81	12786	12754	I-15	Interstate	1	1	1		0	1213.41	0.00	1213.41	979.03	0.00	979.03
1668	0.40	6294	12758	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	2727.64	4597.27	7324.91
1669	0.36	12744	12765	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	294.04	4.32	298.36
1670	0.25	12754	12745	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	307.91	0.00	307.91
1671	0.24	12758	12746	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	1646.26	2774.67	4420.93
1672	0.28	12738	12744	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	225.69	3.32	229.00
1673	0.29	12745	12735	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	349.92	0.00	349.92
1674	0.36	12746	12736	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	2461.50	4148.69	6610.19
1675	0.05	12739	12737	I-15	Interstate	65	1	1		0	1213.41	0.00	1213.41	63.32	0.00	63.32
1676	2.01	12720	12738	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	1623.64	23.86	1647.50
1677	1.94	12736	12721	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	13198.44	22245.11	35443.54
1678	2.00	12737	12719	I-15	Interstate	25	1	1		0	1213.41	0.00	1213.41	2424.29	0.00	2424.29
1679	0.29	12709	12720	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	233.49	3.43	236.92
1680	0.31	12721	12711	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	2139.36	3605.75	5745.11
1681	0.26	12719	12710	I-15	Interstate	25	1	1		0	1213.41	0.00	1213.41	320.41	0.00	320.41
1682	0.36	12695	12709	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	287.72	4.23	291.95
1683	0.34	12710	12697	I-15	Interstate	25	1	1		0	1213.41	0.00	1213.41	413.00	0.00	413.00
1684	0.35	12711	12696	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	2347.45	3956.47	6303.92
1686	0.77	12697	12688	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	932.76	0.00	932.76
1687	0.38	12696	12689	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	2598.56	4379.71	6978.27
1688	2.39	12638	12687	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	1930.33	28.36	1958.69
1689	1.64	12688	12639	I-15	Interstate	25	1	1		0	1213.41	0.00	1213.41	1992.29	0.00	1992.29
1690	1.65	12689	12640	I-15 North Bound	Interstate	65	1	1		0	9948.36	15639.15	25587.51	16370.11	25734.37	42104.48
1691	0.32	12120	12189	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	863.81	863.81
1692	0.34	12176	12115	I-15 North Bound	Interstate	45	1	1		0	0.00	14122.34	14122.34	0.00	4783.20	4783.20
1693	0.19	12189	12242	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	517.29	517.29
1694	0.20	12243	12190	I-15	Interstate	65	1	1		0	15696.09	4278.39	19974.47	3068.23	836.33	3904.56
1695	0.02	12191	12176	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	288.15	288.15
1696	0.07	12229	12191	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	1022.00	1022.00
1697	0.06	8106	8124	HIGHLAND	Other Principal Art	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1698	0.06	8072	8106	SR-152	Other Principal Art	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1699	0.04	8057	8072	SR-152	Other Principal Art	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-47: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connecto	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1700	1.12	10856	10819	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	8607.33	550.81	9158.13
1701	0.89	10840	10827	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1702	0.03	9005	8999	WASATCH	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1703	0.03	8989	8999	WASATCH	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1704	0.55	8966	9005	SR-209 9400 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1705	0.21	8965	8989	WASATCH	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1706	0.62	4503	9007	SR-209 9400 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1707	1.00	8625	8819	SR-210	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1708	0.62	4502	9007	SR-209 9400 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1709	1.64	8819	9007	SR-210	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1710	0.49	8529	8625	SR-210	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1711	0.73	8343	8529	SR-210	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1712	0.50	4047	8343	SR-150	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1713	0.50	4045	8343	SR-150	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1714	0.12	7621	7620	I-215 Negative	Interstate	65	1	1		0	396.15	0.00	396.15	46.95	0.00	46.95
1715	0.15	7618	7617	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1716	0.04	7619	7618	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1717	0.04	7612	7611	I-215 Positive	Interstate	65	1	1		0	0.00	2354.40	2354.40	0.00	92.69	92.69
1718	0.79	7620	7836	I-215 Negative	Interstate	65	1	1		0	396.15	0.00	396.15	312.34	0.00	312.34
1719	0.79	7835	7619	I-215	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1720	0.79	7828	7612	I-215 Positive	Interstate	65	1	1		0	0.00	2354.40	2354.40	0.00	1871.62	1871.62
1721	0.43	7888	7835	I-215	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1722	0.45	7836	7900	I-215 Negative	Interstate	65	1	1		0	396.15	0.00	396.15	179.50	0.00	179.50
1723	0.45	7882	7828	I-215 Positive	Interstate	65	1	1		0	0.00	2354.40	2354.40	0.00	1066.36	1066.36
1724	0.09	7899	7888	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1725	0.12	7900	7908	I-215 Negative	Interstate	65	1	1		0	396.15	0.00	396.15	47.74	0.00	47.74
1726	0.12	7897	7882	I-215 Positive	Interstate	65	1	1		0	0.00	2354.40	2354.40	0.00	274.73	274.73
1727	0.05	7904	7899	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1728	0.01	7908	7910	I-215 Negative	Interstate	65	1	1		0	396.15	0.00	396.15	4.97	0.00	4.97
1729	0.27	9677	11269	SR-89	Other Principal Art	35	1	1		0	140.01	21336.43	21476.44	37.33	5688.95	5726.28
1730	0.30	11269	11268	SR-52	Other Principal Art	35	1	1		0	140.01	21336.43	21476.44	41.65	6316.99	6358.44
1731	0.54	11269	11200	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1732	0.50	11268	11271	SR-52	Other Principal Art	35	1	1		0	140.01	21336.43	21476.44	70.48	10741.20	10811.69
1733	0.50	11271	11272	SR-52	Other Principal Art	35	1	1		0	140.01	21336.43	21476.44	70.69	10773.22	10843.92
1734	0.50	4959	9923	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	2282.86	0.00	2282.86	1142.27	0.00	1142.27
1735	0.50	4958	9923	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	2282.86	0.00	2282.86	1142.17	0.00	1142.17

Figure I-2-48: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1736	0.77	9968	9917	SR-69 Redwood Rd	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1737	0.39	8816	8815	SR-209 9000 S	Other Principal Arti	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1738	0.67	4406	8817	SR-209 9000 S	Other Principal Arti	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1739	0.32	8175	8310	5600 WEST	Other Principal Arti	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1740	0.18	8133	8175	5600 WEST	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1741	0.09	8122	8133	5600 WEST	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1742	0.05	8111	8122	5600 WEST	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1743	0.09	8063	8111	5600 WEST	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1744	0.05	4006	8063	5600 WEST	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1745	0.05	4012	8065	5600 WEST	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1746	0.04	7990	8018	5600	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1747	0.05	7972	7990	5600	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1748	0.49	9910	9848	SR-154 Bangerter Hi	Other Principal Arti	35	1	1		0	2282.86	0.00	2282.86	1112.12	0.00	1112.12
1749	0.51	4924	9736	SR-154 Bangerter Hi	Other Principal Arti	35	1	1		0	2282.86	0.00	2282.86	1168.02	0.00	1168.02
1750	0.51	4924	9736	SR-154 Bangerter Hi	Other Principal Arti	35	1	1		0	2282.86	0.00	2282.86	1168.12	0.00	1168.12
1751	0.39	9737	9736	SR-71	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1752	0.76	4868	9333	SR-154 Bangerter Hi	Other Principal Arti	35	1	1		0	2282.86	0.00	2282.86	1726.89	0.00	1726.89
1753	0.19	9739	9737	SR-71	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1754	0.76	4868	9333	SR-154 Bangerter Hi	Other Principal Arti	35	1	1		0	2282.86	0.00	2282.86	1727.08	0.00	1727.08
1755	0.66	4667	9077	SR-154 Bangerter Hi	Other Principal Arti	25	1	1		0	2282.86	0.00	2282.86	1508.49	0.00	1508.49
1756	0.66	4668	9077	SR-154 Bangerter Hi	Other Principal Arti	25	1	1		0	2282.86	0.00	2282.86	1507.91	0.00	1507.91
1757	1.03	9923	9910	SR-154 Bangerter Hi	Other Principal Arti	35	1	1		0	2282.86	0.00	2282.86	2358.15	0.00	2358.15
1758	0.82	9739	9740	SR-71	Other Principal Arti	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1759	0.49	9917	9862	SR-69 Redwood Rd	Other Principal Arti	35	1	1		0	0.00	3018.25	3018.25	0.00	1470.94	1470.94
1760	0.02	9863	9862	13400	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1761	0.03	6190	12373	SR-89	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1762	0.03	6184	12373	SR-89	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1763	1.00	12641	12568	SR-89	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1764	1.08	12568	12547	SR-89	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1765	0.08	12547	12544	SR-89	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1766	0.78	12544	12495	SR-89	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1767	0.27	12096	12042	SR-89	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1768	0.22	6021	11988	SR-89	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1769	0.49	11988	11927	SR-89	Other Principal Arti	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1770	0.22	6021	11988	SR-89	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1771	0.09	5996	11988	1230	Other Principal Arti	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-49: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1772	0.18	12859	12859	SR-189	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1773	0.09	12859	12948	SR-189	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1774	0.31	12048	12004	SR-189	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1775	0.09	5994	11969	1230	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1776	0.10	11950	11969	1230	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1777	0.18	11952	11950	1230	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1778	0.13	12004	11952	SR-189	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1779	0.18	5996	11937	SR-189	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1780	0.18	5996	11937	SR-189	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1781	0.30	11818	11855	SR-265	Other Principal Arte	35	1	1		0	19.71	0.00	19.71	5.94	0.00	5.94
1782	0.46	11855	11914	SR-265	Other Principal Arte	25	1	1		0	19.71	0.00	19.71	9.09	0.00	9.09
1783	0.23	11914	11937	SR-265	Other Principal Arte	35	1	1		0	19.71	0.00	19.71	4.53	0.00	4.53
1784	0.26	5968	11845	SR-189	Other Principal Arte	25	1	1		0	19.71	0.00	19.71	5.16	0.00	5.16
1785	0.26	5969	11845	SR-189	Other Principal Arte	25	1	1		0	19.71	0.00	19.71	5.16	0.00	5.16
1786	0.68	5922	11531	SR-189	Other Principal Arte	25	1	1		0	19.71	0.00	19.71	13.34	0.00	13.34
1787	0.68	5923	11531	SR-189	Other Principal Arte	25	1	1		0	19.71	0.00	19.71	13.34	0.00	13.34
1788	0.51	5915	11439	SR-189	Other Principal Arte	25	1	1		0	19.71	0.00	19.71	10.15	0.00	10.15
1789	0.51	5916	11439	SR-189	Other Principal Arte	25	1	1		0	19.71	0.00	19.71	10.15	0.00	10.15
1790	0.70	11439	11312	SR-189	Other Principal Arte	35	1	1		0	19.71	0.00	19.71	13.86	0.00	13.86
1791	1.05	11272	11246	SR-52	Other Principal Arte	35	1	1		0	140.01	21336.43	21476.44	146.65	22348.61	22495.26
1792	0.03	11246	11247	SR-52	Other Principal Arte	35	1	1		0	140.01	21336.43	21476.44	3.54	539.37	542.91
1793	0.26	12893	12902	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	211.52	3.11	214.63
1794	0.29	12903	12894	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	308.73	0.00	308.73
1795	0.26	12904	12895	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	1749.34	2948.40	4697.73
1796	1.59	12894	12890	I-15	Interstate	1	1	1		0	1213.41	0.00	1213.41	1925.10	0.00	1925.10
1797	1.58	12889	12893	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	1273.64	18.71	1292.36
1798	1.61	12895	12887	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	12336.63	20792.59	33129.22
1799	0.12	6445	12886	I-15	Interstate	45	1	1		0	1213.41	0.00	1213.41	148.63	0.00	148.63
1800	0.12	6445	12886	I-15	Interstate	45	1	1		0	1213.41	0.00	1213.41	148.62	0.00	148.62
1801	0.00	12886	12885	I-15	Interstate	45	1	1		0	1213.41	0.00	1213.41	2.36	0.00	2.36
1802	0.52	12889	12889	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	417.14	6.13	423.27
1803	0.30	12887	12892	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	2035.02	3429.50	5464.52
1804	0.28	12885	12881	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	335.76	0.00	335.76
1805	0.23	12873	12880	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	185.52	2.73	188.25
1806	0.23	12881	12874	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	276.56	0.00	276.56
1807	0.36	12882	12872	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	2460.28	4160.12	6620.40

Figure I-2-50: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1808	0.14	12874	12871	I-15	Interstate	65	1	1		0	1213.41	0.00	1213.41	171.32	0.00	171.32
1809	1.88	12861	12873	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	1517.64	22.30	1539.94
1810	1.74	12871	12862	I-15	Interstate	1	1	1		0	1213.41	0.00	1213.41	2114.47	0.00	2114.47
1811	1.75	12872	12863	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	11886.55	20034.00	31920.54
1812	1.65	12845	12861	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	1333.05	19.59	1352.64
1813	1.66	12862	12844	I-15	Interstate	1	1	1		0	1213.41	0.00	1213.41	2011.14	0.00	2011.14
1814	1.65	12863	12845	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	11247.24	18956.49	30203.73
1815	0.27	12836	12845	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	215.52	3.17	218.69
1816	0.26	12844	12837	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	320.54	0.00	320.54
1817	0.27	12846	12838	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	1824.57	3075.19	4899.76
1818	0.34	12816	12836	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	276.55	4.06	280.61
1819	0.36	12837	12815	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	441.86	0.00	441.86
1820	0.43	12838	12811	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	2892.19	4874.61	7766.80
1821	0.07	12815	12810	I-15	Interstate	65	1	1		0	1213.41	0.00	1213.41	81.58	0.00	81.58
1822	0.72	12795	12816	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	579.77	8.52	588.29
1823	0.63	12810	12786	I-15	Interstate	1	1	1		0	1213.41	0.00	1213.41	766.73	0.00	766.73
1824	0.64	12811	12787	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	4343.73	7321.08	11664.82
1825	0.28	11448	11414	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	2196.57	140.56	2337.13
1826	0.07	11421	11413	I-15	Interstate	65	1	1		0	15536.37	2601.37	18137.74	1014.10	169.80	1183.90
1827	0.27	11333	11420	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	456.13	730.95	1187.09
1828	0.21	11413	11334	I-15	Interstate	25	1	1		0	15536.37	2601.37	18137.74	3225.48	540.07	3765.54
1829	0.22	11414	11335	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	1691.12	108.22	1799.34
1830	0.08	11752	11746	SR-265	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1831	0.01	11740	11746	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	12.40	19.88	32.28
1832	0.01	11746	11753	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	15.06	15.06
1833	0.01	11746	11745	SR-265	Other Principal Art	35	1	1		0	1677.02	0.00	1677.02	13.40	0.00	13.40
1834	0.01	11745	11743	SR-265	Other Principal Art	35	1	1		0	159.72	0.00	159.72	1.16	0.00	1.16
1835	0.01	11743	11741	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	47.07	3.06	50.94
1836	0.00	11749	11743	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	20.80	20.80
1837	0.34	11697	11740	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	564.35	904.37	1468.72
1838	0.07	11711	11698	I-15	Interstate	65	1	1		0	15536.37	2601.37	18137.74	1162.35	194.62	1356.97
1839	0.26	11745	11711	I-15	Interstate	35	1	1		0	15536.37	2601.37	18137.74	3972.03	665.07	4637.10
1840	0.28	11741	11704	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	2167.04	138.68	2305.72
1841	0.23	11764	11745	I-15	Interstate	35	1	1		0	15696.09	4278.39	19974.47	3576.41	974.85	4551.26
1842	0.28	11753	11732	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	759.02	759.02
1843	0.28	11791	11749	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	4024.72	4024.72

Figure I-2-51: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDLA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1844	0.06	11743	11739	SR-265	Other Principal Arte	35	1	1		0	159.72	21336.43	21496.15	9.05	1208.96	1218.01
1845	0.03	11739	11738	SR-265	Other Principal Arte	35	1	1		0	159.72	21336.43	21496.15	5.16	688.98	694.14
1846	0.05	11760	11764	I-15	Interstate	65	1	1		0	15696.89	4278.35	19974.47	787.71	214.71	1002.42
1847	0.20	11738	11764	SR-265	Other Principal Arte	35	1	1		0	159.72	21336.43	21496.15	31.35	4188.14	4219.50
1848	0.48	11764	11777	SR-265	Other Principal Arte	35	1	1		0	159.72	21336.43	21496.15	76.37	10202.12	10278.49
1849	0.58	11526	12000	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	1557.96	1557.96
1850	0.56	11395	11525	I-15	Interstate	65	1	1		0	15696.89	4278.35	19974.47	8765.12	2389.17	11154.29
1851	0.58	11398	11923	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	8217.41	8217.41
1852	0.34	12000	12002	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	904.10	904.10
1853	0.34	12018	11998	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	4746.38	4746.38
1854	0.31	6010	12120	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	838.53	838.53
1855	0.59	12115	12018	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	8310.45	8310.45
1856	0.31	6010	12120	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	838.55	838.55
1857	0.45	11231	11175	I-15	Interstate	65	1	1		0	15536.37	2601.37	18137.74	6941.91	1162.34	8104.25
1858	0.59	11171	11230	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	833.89	1336.30	2170.19
1859	0.26	11259	11236	I-15	Interstate	35	1	1		0	15536.37	2601.37	18137.74	4104.52	687.25	4791.77
1860	0.27	11260	11235	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	2048.18	131.07	2179.25
1861	0.34	11230	11258	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	571.71	916.16	1487.87
1862	0.09	11236	11231	I-15	Interstate	65	1	1		0	15536.37	2601.37	18137.74	1153.14	193.78	1292.91
1863	0.46	11235	11180	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	3521.82	225.32	3746.34
1864	0.20	11180	11108	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	331.39	531.06	862.45
1865	0.21	11108	11132	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	345.38	553.35	898.65
1866	0.22	11130	11107	I-15	Interstate	35	1	1		0	15536.37	2601.37	18137.74	3358.18	562.29	3920.47
1867	0.25	11134	11105	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	1945.51	124.50	2070.01
1868	0.18	11105	11098	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	1417.35	90.70	1508.05
1869	0.20	11107	11099	I-15	Interstate	35	1	1		0	15536.37	2601.37	18137.74	3128.00	523.74	3651.74
1870	0.27	11132	11171	I-15 South Bound	Interstate	65	1	1		0	1677.02	2687.42	4364.43	452.95	725.86	1178.81
1871	0.29	11173	11133	I-15	Interstate	35	1	1		0	15536.37	2601.37	18137.74	4516.49	756.23	5272.73
1872	0.39	11180	11134	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	2947.89	188.64	3136.54
1873	0.03	11175	11173	I-15	Interstate	65	1	1		0	15536.37	2601.37	18137.74	442.49	74.09	516.58
1874	0.41	11265	11295	SR-52	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1875	0.25	5628	11256	SR-52	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1876	0.25	5627	11256	SR-52	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1877	0.36	11087	11068	SR-89	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1878	0.53	11200	11124	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1879	0.57	11124	11087	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-52: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD1A	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1880	0.34	11012	10980	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1881	0.66	11051	11012	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1882	0.23	10980	10965	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1883	0.33	11068	11057	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1884	0.07	11057	11056	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1885	0.17	11056	11051	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1886	0.09	11256	11267	SR-52	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1887	0.13	11267	11263	SR-52	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1888	0.27	5675	11263	SR-89	Other Principal Arte	35	1	1		0	140.01	21336.43	21476.44	37.32	5687.72	5725.04
1889	0.04	6455	6456	SR-171 3500 S	Other Principal Arte	45	1	1		0	2828.59	3433.95	5462.54	75.86	128.41	204.27
1890	0.02	6456	6457	SR-171 3500 S	Other Principal Arte	25	1	1		0	2828.59	3433.95	5462.54	56.15	95.05	151.20
1891	0.06	6457	6458	SR-171 3500 S	Other Principal Arte	25	1	1		0	2828.59	3433.95	5462.54	124.55	210.83	335.38
1892	0.44	6458	6461	SR-171 3500 S	Other Principal Arte	25	1	1		0	2828.59	3433.95	5462.54	888.36	1503.80	2392.16
1893	0.24	3231	6393	SR-171 3500 S	Other Principal Arte	35	1	1		0	2828.59	3433.95	5462.54	481.48	814.91	1296.32
1894	0.07	5385	5322	SR-154 Bangerter Hi	Other Principal Arte	45	1	1		0	1290.26	625.06	1915.32	92.24	44.68	136.92
1895	0.01	5322	5318	SR-154 Bangerter Hi	Other Principal Arte	65	1	1		0	1290.26	625.06	1915.32	7.21	3.49	10.71
1896	0.01	5318	5312	SR-154 Bangerter Hi	Other Principal Arte	65	1	1		0	1290.26	625.06	1915.32	8.01	3.88	11.90
1897	0.08	5312	5262	SR-154 Bangerter Hi	Other Principal Arte	45	1	1		0	1290.26	625.06	1915.32	102.38	49.56	151.86
1898	0.27	5262	5167	SR-154 Bangerter Hi	Other Principal Arte	25	1	1		0	1290.26	625.06	1915.32	343.89	166.60	510.48
1899	0.51	6443	6251	SR-154 Bangerter Hi	Other Principal Arte	35	1	1		0	1290.26	625.06	1915.32	656.63	318.10	974.73
1900	0.54	6251	6032	SR-154 Bangerter Hi	Other Principal Arte	35	1	1		0	1290.26	625.06	1915.32	699.03	339.03	1038.07
1901	0.96	6032	5385	SR-154 Bangerter Hi	Other Principal Arte	25	1	1		0	1290.26	625.06	1915.32	1235.22	598.40	1833.61
1902	0.88	5167	4840	SR-154 Bangerter Hi	Other Principal Arte	35	1	1		0	1290.26	625.06	1915.32	1135.22	551.89	1691.12
1903	0.80	4840	4495	SR-154 Bangerter Hi	Other Principal Arte	35	1	1		0	1290.26	625.06	1915.32	1038.22	502.96	1541.18
1904	0.03	4434	4495	700	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1905	0.24	4495	4400	SR-154 Bangerter Hi	Other Principal Arte	35	1	1		0	1290.26	625.06	1915.32	308.36	149.38	457.75
1906	0.05	4400	4379	SR-154 Bangerter Hi	Other Principal Arte	35	1	1		0	1290.26	625.06	1915.32	75.44	36.55	111.99
1907	0.27	4379	4280	SR-154 Bangerter Hi	Other Principal Arte	35	1	1		0	1290.26	625.06	1915.32	342.52	165.93	508.45
1908	0.29	6347	6449	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	10.77	10.77
1909	0.30	6451	6337	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	6125.94	2798.32	8924.26
1910	0.31	6450	6333	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1911	0.22	6277	6347	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	8.51	8.51
1912	0.19	6333	6276	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1913	0.20	6337	6279	I-215 Positive	Interstate	45	1	1		0	20443.76	9338.67	29782.43	4071.54	1859.87	5931.41
1914	0.56	5976	6277	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	22.25	22.25
1915	0.56	6276	5975	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-53: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1916	0.58	6279	5980	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	11777.12	5379.76	17156.88
1917	0.53	5856	5878	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	20.48	20.48
1918	0.48	5980	5697	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	9800.52	4476.86	14277.38
1919	0.53	5879	5657	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1920	0.32	5472	5656	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	12.55	12.55
1921	0.00	9106	9112	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1922	0.01	9102	9106	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1923	0.01	9105	9107	SR-151	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1924	0.01	9114	9108	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	40.13	0.00	40.13
1925	0.01	9109	9103	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	24.96	0.00	24.96
1926	0.27	9107	9074	I-15	Interstate	25	1	1		0	735.39	0.00	735.39	197.91	0.00	197.91
1927	0.29	9103	9089	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	1274.50	0.00	1274.50
1928	0.54	4810	9064	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	4222.61	4222.61
1929	0.25	4682	9047	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	1944.74	1944.74
1930	0.25	4682	9047	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	1945.09	1945.09
1931	0.25	4623	9131	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	1975.59	1975.59
1932	0.25	4624	9131	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	1976.02	1976.02
1933	0.50	4565	8864	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	3929.87	3929.87
1934	0.50	8830	8829	SR-209 9000 S	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1935	1.00	8829	8843	SR-209 9000 S	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1936	0.43	8843	8834	SR-209 9000 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1937	0.94	8765	8553	I-15	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1938	0.93	8784	8554	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	4096.73	0.00	4096.73
1939	0.88	8552	8774	I-15 South Bound	Interstate	65	1	1		0	0.00	735.39	735.39	0.00	643.73	643.73
1940	0.35	8432	8552	I-15 South Bound	Interstate	65	1	1		0	0.00	735.39	735.39	0.00	254.99	254.99
1941	0.35	8553	8429	I-15	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1942	0.35	8554	8430	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	1526.53	0.00	1526.53
1943	0.05	8428	8432	I-15 South Bound	Interstate	65	1	1		0	0.00	735.39	735.39	0.00	35.38	35.38
1944	0.04	8429	8425	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1945	0.21	8425	8387	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1946	0.26	8378	8424	I-15 South Bound	Interstate	65	1	1		0	0.00	735.39	735.39	0.00	188.58	188.58
1947	0.20	8430	8394	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	900.00	0.00	900.00
1948	0.06	8387	8376	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1949	0.12	8394	8373	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	526.58	0.00	526.58
1950	0.38	8285	8378	I-15 South Bound	Interstate	65	1	1		0	0.00	735.39	735.39	0.00	283.78	283.78
1951	0.38	8376	8278	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-54: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1952	0.36	8373	8288	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	1599.81	0.00	1599.81
1953	0.12	5539	5352	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	2698.68	13.10	2711.79
1954	0.07	5352	5305	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	1568.27	7.61	1575.89
1955	0.01	5305	5300	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	163.18	0.79	163.98
1956	0.01	5300	5295	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	155.24	0.75	155.99
1957	0.07	5295	5254	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	1568.13	7.61	1575.80
1958	0.12	5254	5210	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	2699.21	13.10	2712.32
1959	0.13	2605	5131	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	3029.54	14.71	3044.25
1960	0.13	2605	5131	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	3029.54	14.71	3044.25
1961	0.54	5131	4822	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	12182.47	58.15	12241.61
1962	0.50	2461	4479	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	11399.97	55.35	11455.31
1963	0.50	2461	4479	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	11400.37	55.35	11455.72
1964	0.45	2239	3934	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	11240.04	54.57	11294.61
1965	0.50	4097	7792	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	2282.86	625.06	2907.92	1149.24	314.67	1463.91
1966	0.52	3896	7463	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	2282.86	625.06	2907.92	1187.56	325.16	1512.72
1967	0.50	3734	7151	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	2282.86	625.06	2907.92	1144.99	313.51	1458.50
1968	0.52	3896	7463	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	2282.86	625.06	2907.92	1187.85	325.24	1513.09
1969	0.50	3735	7151	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	2282.86	625.06	2907.92	1145.26	313.58	1458.85
1970	0.13	7175	7169	4715	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	1005.22	13.88	1019.11
1971	0.13	7182	7175	4715	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	1005.16	13.88	1019.04
1972	0.13	7184	7182	4715	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	1040.00	14.36	1054.36
1973	0.07	7186	7184	4715	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	536.79	7.41	544.20
1974	0.04	7187	7186	4715 SOUTH	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	320.65	4.43	325.08
1975	0.05	7188	7187	4715	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	398.71	5.51	404.21
1976	0.05	7188	7188	4715	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	416.33	5.75	422.08
1977	0.09	7164	7189	4715	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	689.12	9.52	698.64
1978	0.02	7155	7164	4700 SOUTH	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	129.04	1.78	130.82
1979	0.07	7147	7155	4700 SOUTH	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	585.05	8.08	593.13
1980	0.18	7150	7147	4700	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	1457.35	20.13	1477.47
1981	0.50	6439	6441	SR-171 3500 S	Other Principal Art	35	1	1		0	0.00	14737.08	14737.08	0.00	7394.68	7394.68
1982	0.50	6441	6442	SR-171 3500 S	Other Principal Art	35	1	1		0	0.00	14737.08	14737.08	0.00	7427.74	7427.74
1983	0.08	7151	7150	4700	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	660.60	9.12	669.72
1984	0.50	3575	6851	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	2282.86	7987.87	10270.72	1143.62	4001.59	5145.21
1985	0.05	8838	8831	SR-209 9000 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1986	0.06	4416	8832	SR-209 9000 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1987	0.06	4415	8832	SR-209 9000 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-55: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
1988	0.27	8832	8833	SR-209 9000 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1989	0.47	8833	8828	SR-209 9000 S	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1990	0.50	4566	8954	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	3929.90	3929.90
1991	0.51	8934	8925	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	3980.77	3980.77
1992	0.52	8828	8841	SR-209 9000 S	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1993	0.52	8935	8841	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	4057.24	4057.24
1994	0.48	8841	8703	SR-71	Other Principal Art	25	1	1		0	0.00	7852.37	7852.37	0.00	3742.95	3742.95
1995	0.03	8750	8703	8600 SOUTH	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1996	0.16	8002	8043	I-215 Negative	Interstate	65	1	1		0	4396.84	0.00	4396.84	707.96	0.00	707.96
1997	0.16	8039	7999	I-215	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1998	0.06	8044	8039	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
1999	0.05	8040	8035	I-215 Positive	Interstate	35	1	1		0	2566.68	9318.96	11885.64	128.35	466.01	594.36
2000	0.27	8043	8066	I-215 Negative	Interstate	65	1	1		0	4396.84	0.00	4396.84	1180.32	0.00	1180.32
2001	0.15	8058	8044	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2002	0.75	8703	8566	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	5898.88	5898.88
2003	0.25	8566	8496	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	1938.11	1938.11
2004	0.53	8076	8040	I-215 Positive	Interstate	65	1	1		0	2566.68	9318.96	11885.64	1359.96	4937.67	6297.64
2005	0.32	8074	8058	I-215	Interstate	1	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2006	0.60	8066	8104	I-215 Negative	Interstate	65	1	1		0	4396.84	0.00	4396.84	3522.87	0.00	3522.87
2007	0.55	8096	8074	I-215	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2008	0.49	8093	8076	I-215 Positive	Interstate	65	1	1		0	2566.68	9318.96	11885.64	1261.68	4580.83	5842.51
2009	0.45	4421	8904	SR-209 9400 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2010	0.45	4420	8904	SR-209 9400 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2011	0.51	4470	8940	SR-209 9400 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2012	0.51	4469	8940	SR-209 9400 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2013	0.98	8496	8260	SR-71	Other Principal Art	25	1	1		0	0.00	7852.37	7852.37	0.00	7714.82	7714.82
2014	0.53	8260	8114	SR-71	Other Principal Art	25	1	1		0	0.00	7852.37	7852.37	0.00	4141.98	4141.98
2015	0.17	8104	8105	I-215 Negative	Interstate	65	1	1		0	4396.84	0.00	4396.84	763.02	0.00	763.02
2016	0.17	8094	8093	I-215 Positive	Interstate	65	1	1		0	2566.68	9318.96	11885.64	438.94	1593.67	2032.61
2017	1.01	9862	9743	SR-68 Redwood Rd	Other Principal Art	35	1	1		0	0.00	3018.25	3018.25	0.00	3038.42	3038.42
2018	1.00	9740	9743	SR-71	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2019	1.50	9743	9342	SR-68 Redwood Rd	Other Principal Art	35	1	1		0	22398.01	735.39	23125.40	33654.57	1105.37	34759.95
2020	1.25	9342	9078	SR-68 Redwood Rd	Other Principal Art	35	1	1		0	22398.01	735.39	23125.40	27960.46	918.35	28878.81
2021	0.67	4407	8817	SR-209 9000 S	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2022	0.13	4410	8820	SR-209 9000 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2023	0.13	4407	8820	SR-209 9000 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-56: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2024	0.79	9077	8975	SR-154 Bangerter Hi	Other Principal Art	25	1	1		0	2282.86	0.00	2282.86	1793.54	0.00	1793.54
2025	1.01	8975	8822	SR-154 Bangerter Hi	Other Principal Art	25	1	1		0	2282.86	0.00	2282.86	2301.25	0.00	2301.25
2026	0.49	8820	8822	SR-209 9000 S	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2027	0.38	8822	8754	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	2282.86	625.06	2907.92	877.70	240.32	1118.02
2028	0.14	8754	8685	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	2282.86	625.06	2907.92	329.22	90.14	419.36
2029	0.48	4344	8466	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	2282.86	625.06	2907.92	1101.06	301.48	1402.53
2030	0.26	4411	8823	SR-209 9000 S	Other Principal Art	35	1	1		0	625.06	0.00	625.06	162.18	0.00	162.18
2031	0.26	4411	8823	SR-209 9000 S	Other Principal Art	35	1	1		0	625.06	0.00	625.06	162.17	0.00	162.17
2032	0.48	4345	8466	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	2282.86	625.06	2907.92	1101.20	301.52	1402.72
2033	0.50	4233	8193	SR-154 Bangerter Hi	Other Principal Art	25	1	1		0	2282.86	625.06	2907.92	1142.03	312.70	1454.72
2034	0.50	4233	8193	SR-154 Bangerter Hi	Other Principal Art	25	1	1		0	2282.86	625.06	2907.92	1142.03	312.70	1454.73
2035	0.50	4096	7752	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	2282.86	625.06	2907.92	1148.95	314.59	1463.54
2036	0.25	4411	8824	SR-209 9000 S	Other Principal Art	25	1	1		0	625.06	0.00	625.06	156.22	0.00	156.22
2037	0.25	4412	8824	SR-209 9000 S	Other Principal Art	25	1	1		0	625.06	0.00	625.06	156.22	0.00	156.22
2038	0.50	4412	8830	SR-209 9000 S	Other Principal Art	25	1	1		0	625.06	0.00	625.06	313.94	0.00	313.94
2039	0.75	9078	8980	SR-68 Redwood Rd	Other Principal Art	35	1	1		0	22390.01	735.39	23125.40	16774.36	550.95	17325.31
2040	1.01	8980	8830	SR-68 Redwood Rd	Other Principal Art	35	1	1		0	22390.01	735.39	23125.40	22688.14	745.18	23433.32
2041	0.50	4412	8830	SR-209 9000 S	Other Principal Art	25	1	1		0	625.06	0.00	625.06	313.92	0.00	313.92
2042	1.51	8830	8474	SR-68 Redwood Rd	Other Principal Art	35	1	1		0	22390.01	110.33	22500.34	33782.90	166.08	33868.98
2043	0.50	4237	8212	SR-68 Redwood Rd	Other Principal Art	35	1	1		0	22390.01	110.33	22500.34	11182.32	55.10	11237.42
2044	0.50	4237	8212	SR-68 Redwood Rd	Other Principal Art	35	1	1		0	22390.01	110.33	22500.34	11182.42	55.10	11237.52
2045	0.48	4106	7830	SR-68 Redwood Rd	Other Principal Art	35	1	1		0	22390.01	110.33	22500.34	10716.69	52.81	10769.50
2046	0.37	4842	4757	I-80	Interstate	65	1	1		0	4993.90	5649.17	10643.07	1842.03	2083.73	3925.75
2047	0.36	4757	4616	I-80	Interstate	65	1	1		0	4993.90	5649.17	10643.07	1802.19	2038.67	3840.85
2048	6.25	4616	3842	I-80	Interstate	65	1	1		0	4993.90	5649.17	10643.07	31200.73	35294.74	66495.47
2049	0.06	7629	7588	SR-68 Redwood Rd	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2050	0.05	7588	7576	SR-68 Redwood Rd	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2051	0.03	7616	7615	I-215	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2052	0.04	7608	7629	I-215 Positive	Interstate	35	1	1		0	0.00	2354.40	2354.40	0.00	93.58	93.58
2053	0.12	7617	7616	I-215	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2054	0.27	7611	7608	I-215 Positive	Interstate	65	1	1		0	0.00	2354.40	2354.40	0.00	627.97	627.97
2055	0.68	7480	7598	I-215 Negative	Interstate	65	1	1		0	110.33	21993.86	22104.19	75.35	15021.49	15096.85
2056	0.67	7593	7481	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2057	0.69	7596	7482	I-215 Positive	Interstate	65	1	1		0	0.00	2354.40	2354.40	0.00	1635.97	1635.97
2058	0.16	7161	7155	4700	Other Principal Art	35	1	1		0	625.06	110.33	735.39	182.57	18.10	120.67
2059	0.15	7161	7165	4700 SOUTH	Other Principal Art	35	1	1		0	110.33	625.06	735.39	16.12	91.33	107.45

Figure I-2-57: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2060	0.02	7165	7166	4700	Other Principal Art	35	1	1		0	110.33	625.06	735.39	2.16	12.22	14.37
2061	0.03	7166	7167	4700	Other Principal Art	35	1	1		0	110.33	625.06	735.39	3.63	20.56	24.19
2062	0.02	7167	7168	4700	Other Principal Art	35	1	1		0	110.33	625.06	735.39	2.63	14.88	17.50
2063	0.11	7168	7170	4700	Other Principal Art	35	1	1		0	110.33	625.06	735.39	12.56	71.13	83.69
2064	0.06	7170	7171	4700	Other Principal Art	35	1	1		0	110.33	625.06	735.39	6.76	38.33	45.09
2065	0.04	7171	7172	4700	Other Principal Art	35	1	1		0	110.33	625.06	735.39	4.39	24.86	29.25
2066	0.13	7172	7180	4700	Other Principal Art	35	1	1		0	110.33	625.06	735.39	14.46	81.94	96.40
2067	0.26	7176	7310	I-215 Negative	Interstate	65	1	1		0	110.33	21993.86	22104.19	28.50	5680.92	5709.42
2068	0.26	7312	7177	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2069	0.31	7321	7178	I-215 Positive	Interstate	65	1	1		0	0.00	2354.40	2354.40	0.00	729.78	729.78
2070	0.02	7180	7179	4700	Other Principal Art	35	1	1		0	110.33	625.06	735.39	2.05	11.60	13.64
2071	0.02	7179	7176	SR-266 4500 S	Other Principal Art	45	1	1		0	110.33	625.06	735.39	2.42	13.70	16.12
2072	0.01	7176	7177	SR-266 4500 S	Other Principal Art	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2073	0.01	7177	7178	SR-266 4500 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2074	0.01	7178	7181	SR-266 4500 S	Other Principal Art	35	1	1		0	8612.49	20443.76	29056.26	55.86	132.58	188.45
2075	0.13	7177	7115	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2076	0.12	7178	7119	I-215 Positive	Interstate	65	1	1		0	20443.76	10966.90	31410.66	2432.56	1304.93	3737.49
2077	0.31	7065	7176	I-215 Negative	Interstate	65	1	1		0	625.06	21993.86	22618.92	192.76	6782.43	6975.19
2078	0.13	7115	7076	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2079	0.14	7119	7077	I-215 Positive	Interstate	45	1	1		0	20443.76	10966.90	31410.66	2917.29	1564.96	4482.24
2080	0.05	7076	7062	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2081	0.04	4384	8751	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2082	0.04	4391	8751	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2083	0.03	8751	8716	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2084	0.09	8716	8690	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2085	0.02	8693	8690	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2086	0.02	8690	8686	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2087	0.05	8686	8681	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2088	0.08	8662	8653	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2089	0.07	8681	8662	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2090	0.79	4470	8966	SR-209 9400 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2091	0.04	8611	8617	CREEK	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2092	0.01	8650	8653	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2093	0.04	8647	8650	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2094	0.02	8646	8647	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2095	0.01	8645	8646	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-58: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectio	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2096	0.02	8643	8645	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2097	0.06	8639	8643	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2098	0.05	8622	8637	HIGHLAND	Other Principal Arte	15	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2099	0.03	8617	8622	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2100	0.22	8542	8590	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2101	0.17	8388	8411	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2102	0.13	8512	8542	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2103	0.27	8411	8512	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2104	0.11	8362	8381	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2105	0.23	8313	8365	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2106	0.01	8318	8319	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2107	0.27	8219	8318	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2108	0.17	8157	8219	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2109	0.06	8148	8157	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2110	0.04	8130	8148	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2111	0.27	8013	8061	I-215 Negative	Interstate	65	1	1		0	7852.37	4396.84	12249.21	2147.35	1202.38	3349.73
2112	0.09	8124	8138	HIGHLAND	Other Principal Arte	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2113	0.22	3085	3374	I-215	Interstate	65	1	1		0	3802.66	0.00	3802.66	873.02	0.00	873.02
2114	0.18	3372	3369	I-215 Negative	Interstate	45	1	1		0	327.49	6368.94	7288.43	59.04	1255.00	1314.05
2115	0.77	10609	10614	SR-73	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2116	0.01	10614	10620	SR-73	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2117	1.53	10620	10626	SR-73	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2118	0.42	10268	10302	I-15 South Bound	Interstate	65	1	1		0	1677.82	15792.86	21469.87	707.47	8349.81	9057.28
2119	0.46	10309	10267	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2120	0.46	10300	10266	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	3568.82	2159.28	5728.10
2121	0.39	10302	10327	I-15 South Bound	Interstate	65	1	1		0	1677.82	15792.86	21469.87	650.02	7671.81	8321.83
2122	0.36	10325	10301	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2123	0.36	10323	10300	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	2740.11	1657.87	4397.98
2124	0.19	10412	10400	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2125	0.26	10400	10386	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2126	0.48	10394	10415	I-15 South Bound	Interstate	65	1	1		0	1677.82	15792.86	21469.87	888.57	9554.89	10364.46
2127	0.44	10411	10385	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	3427.18	2073.58	5500.75
2128	0.94	10327	10394	I-15 South Bound	Interstate	65	1	1		0	1677.82	15792.86	21469.87	1408.52	16623.95	18032.46
2129	0.89	10386	10325	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2130	0.88	10385	10323	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	6798.81	4113.55	10912.37
2131	0.88	5010	10269	I-15 South Bound	Interstate	65	1	1		0	1722.93	15896.60	21619.53	1520.32	17556.92	19077.24

Figure I-2-59: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2122	1.76	5011	10269	I-15 South Bound	Interstate	65	1	1		0	1722.93	19896.60	21619.53	3040.58	35113.13	38153.72
2123	0.55	9908	9917	SR-154 Bangerter H	Other Principal Art	35	1	1		0	0.00	735.39	735.39	0.00	403.64	403.64
2134	0.63	4960	9938	SR-154 Bangerter H	Other Principal Art	35	1	1		0	0.00	735.39	735.39	0.00	462.80	462.80
2135	0.12	10022	10029	I-15	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2136	0.63	4960	9938	SR-154 Bangerter H	Other Principal Art	35	1	1		0	0.00	735.39	735.39	0.00	462.75	462.75
2137	3.38	10267	10022	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2138	3.38	10268	10023	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	26053.39	15763.34	41816.73
2139	0.44	10023	10006	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	3407.70	2061.84	5469.53
2140	0.36	10003	10021	I-15 South Bound	Interstate	65	1	1		0	1722.93	19896.60	21619.53	612.09	7068.47	7680.56
2141	0.33	10020	10005	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2142	0.25	10006	9989	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	1966.06	1189.55	3155.61
2143	0.28	9987	10003	I-15 South Bound	Interstate	65	1	1		0	1722.93	19896.60	21619.53	487.28	5627.28	6114.48
2144	0.31	10005	9985	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2145	0.18	7914	7904	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2146	0.17	7898	7897	I-215 Positive	Interstate	65	1	1		0	0.00	2354.40	2354.40	0.00	395.47	395.47
2147	0.25	7910	7908	I-215 Negative	Interstate	65	1	1		0	396.15	0.00	396.15	97.68	0.00	97.68
2148	0.18	7949	8020	I-15 South Bound	Interstate	65	1	1		0	0.00	735.39	735.39	0.00	130.07	130.07
2149	0.17	8019	7950	I-15	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2150	0.02	7916	7914	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2151	0.00	7894	7898	I-215 Positive	Interstate	45	1	1		0	0.00	2354.40	2354.40	0.00	65.54	65.54
2152	0.06	7918	7916	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2153	0.01	7892	7894	I-215 Positive	Interstate	65	1	1		0	0.00	2354.40	2354.40	0.00	153.19	153.19
2154	0.01	7939	7949	I-15 South Bound	Interstate	65	1	1		0	0.00	735.39	735.39	0.00	5.94	5.94
2155	0.01	7939	7941	I-215 Negative	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2156	0.02	7958	7952	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	121.70	0.00	121.70
2157	0.01	7950	7941	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2158	0.01	7941	7943	I-215 Negative	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2159	0.01	7952	7943	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	37.02	0.00	37.02
2160	0.01	7938	7939	I-215 Negative	Interstate	65	1	1		0	396.15	0.00	396.15	5.42	0.00	5.42
2161	0.01	7935	7939	I-15 South Bound	Interstate	65	1	1		0	0.00	1131.54	1131.54	0.00	0.14	0.14
2162	0.04	7919	7935	I-15 South Bound	Interstate	65	1	1		0	0.00	1131.54	1131.54	0.00	45.87	45.87
2163	0.01	7941	7936	I-15	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2164	0.01	7943	7937	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2165	0.04	7936	7920	I-15	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2166	0.01	7919	7918	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2167	0.04	7902	7919	I-15 South Bound	Interstate	65	1	1		0	0.00	1892.50	1892.50	0.00	70.24	70.24

Figure I-2-60: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2168	0.08	7920	7919	I-215	Interstate	65	1	1		0	768.96	0.00	768.96	6.76	0.00	6.76
2169	0.08	7921	7920	I-215	Interstate	65	1	1		0	768.96	0.00	768.96	7.81	0.00	7.81
2170	0.00	7920	7905	I-15	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2171	0.08	7890	7892	I-215 Positive	Interstate	65	1	1		0	0.00	2354.40	2354.40	0.00	38.26	38.26
2172	0.08	7905	7895	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2173	0.08	7893	7902	I-15 South Bound	Interstate	65	1	1		0	0.00	1892.50	1892.50	0.00	15.55	15.55
2174	0.08	7894	7893	I-15 South Bound	Interstate	65	1	1		0	3887.94	5858.78	9666.72	34.19	52.60	86.79
2175	0.08	7895	7893	I-215 Positive	Interstate	65	1	1		0	3145.53	5341.59	8487.12	28.32	48.08	76.40
2176	0.08	7895	7895	I-15	Interstate	45	1	1		0	0.00	3018.21	3018.21	0.00	26.96	26.96
2177	0.14	8017	7956	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	628.74	0.00	628.74
2178	0.04	7937	7921	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2179	0.11	7943	7951	I-215 Negative	Interstate	65	1	1		0	4396.84	0.00	4396.84	466.66	0.00	466.66
2180	0.03	7921	7906	I-15 North Bound	Interstate	65	1	1		0	0.00	768.96	768.96	0.00	26.43	26.43
2181	0.08	7906	7896	I-15 North Bound	Interstate	65	1	1		0	0.00	768.96	768.96	0.00	9.45	9.45
2182	0.08	7896	7895	I-215 Positive	Interstate	65	1	1		0	3143.18	8357.45	11500.63	35.88	95.40	131.27
2183	0.08	7896	7896	I-15 North Bound	Interstate	65	1	1		0	14.55	2313.52	2328.07	0.14	23.02	23.16
2184	0.07	7923	7921	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2185	0.25	7895	7729	I-15	Interstate	45	1	1		0	0.00	3018.21	3018.21	0.00	748.91	748.91
2186	0.24	7896	7740	I-15 North Bound	Interstate	65	1	1		0	14.55	2313.52	2328.07	3.56	565.13	568.68
2187	0.45	7892	7884	I-15 South Bound	Interstate	65	1	1		0	3887.94	5858.78	9666.72	1745.57	2685.69	4431.26
2188	0.06	7729	7715	I-15	Interstate	65	1	1		0	0.00	3018.21	3018.21	0.00	189.15	189.15
2189	0.22	7740	7685	I-15 North Bound	Interstate	65	1	1		0	14.55	2313.52	2328.07	3.23	514.19	517.43
2190	0.16	7715	7687	I-15	Interstate	35	1	1		0	0.00	3018.21	3018.21	0.00	477.28	477.28
2191	0.08	7686	7682	I-15 South Bound	Interstate	65	1	1		0	3887.94	5858.78	9666.72	39.78	47.36	78.14
2192	0.22	3753	7686	I-15 South Bound	Interstate	65	1	1		0	3887.94	5858.78	9666.72	851.06	1388.41	2168.47
2193	0.46	7190	7007	SR-266 4500 S	Other Principal Art	35	1	1		0	8612.49	20443.76	29056.26	4002.60	9501.59	13504.39
2194	0.23	3595	7007	SR-266 4500 S	Other Principal Art	35	1	1		0	5155.08	12705.28	17860.27	1197.93	2952.49	4150.42
2195	0.46	3595	7007	SR-266 4500 S	Other Principal Art	35	1	1		0	4722.61	5828.03	10542.64	2194.76	2708.66	4899.42
2196	0.14	7007	7009	SR-266 4500 S	Other Principal Art	35	1	1		0	4722.61	5828.03	10542.64	682.33	848.85	1523.18
2197	0.53	6520	6691	I-15 South Bound	Interstate	65	1	1		0	0.00	3512.61	3512.61	0.00	1808.32	1808.32
2198	0.27	7940	7923	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2199	0.34	7931	7896	I-215 Positive	Interstate	65	1	1		0	2586.68	9318.96	11885.64	869.24	3156.99	4025.23
2200	0.23	7951	7946	I-215 Negative	Interstate	65	1	1		0	4396.84	0.00	4396.84	1012.92	0.00	1012.92
2201	0.00	7946	7945	I-215 Negative	Interstate	45	1	1		0	4396.84	0.00	4396.84	17.96	0.00	17.96
2202	0.08	7942	7940	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2203	0.08	7932	7931	I-215 Positive	Interstate	45	1	1		0	2586.68	9318.96	11885.64	34.97	126.62	161.58

Figure I-2-61: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connecto	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2204	0.05	7948	7942	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2205	0.15	7945	7956	I-215 Negative	Interstate	65	1	1		0	4396.84	0.00	4396.84	638.82	0.00	638.82
2206	0.33	7963	7902	I-215 Positive	Interstate	65	1	1		0	2566.68	9318.96	11885.64	843.19	3061.41	3904.60
2207	0.08	7954	7948	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2208	0.36	7665	7568	I-15 North Bound	Interstate	65	1	1		0	14.55	2313.52	2328.07	5.22	830.27	835.49
2209	0.43	7667	7534	I-15	Interstate	35	1	1		0	0.00	3018.21	3018.21	0.00	1309.70	1309.70
2210	0.22	3761	7666	I-15 South Bound	Interstate	65	1	1		0	3807.94	5858.78	9666.72	851.55	1310.17	2161.71
2211	0.16	7956	7981	I-215 Negative	Interstate	65	1	1		0	4396.84	0.00	4396.84	721.36	0.00	721.36
2212	0.18	7982	7954	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2213	0.06	7981	8002	I-215 Negative	Interstate	65	1	1		0	4396.84	0.00	4396.84	242.74	0.00	242.74
2214	0.05	7999	7982	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2215	0.19	8035	7963	I-215 Positive	Interstate	65	1	1		0	2566.68	9318.96	11885.64	477.25	1732.76	2210.00
2216	0.45	7568	7451	I-15 North Bound	Interstate	65	1	1		0	14.55	2313.52	2328.07	6.54	1039.17	1045.71
2217	0.36	7449	7520	I-15 South Bound	Interstate	65	1	1		0	3807.94	5858.78	9666.72	1392.32	2126.80	3519.12
2218	0.38	7534	7447	I-15	Interstate	35	1	1		0	0.00	3018.21	3018.21	0.00	1158.30	1158.30
2219	0.01	7448	7445	I-15 South Bound	Interstate	65	1	1		0	3807.94	5858.78	9666.72	23.72	36.49	60.20
2220	0.01	7444	7448	I-15 South Bound	Interstate	65	1	1		0	3807.94	5858.78	9666.72	25.04	38.53	63.57
2221	0.01	7451	7446	I-15 North Bound	Interstate	65	1	1		0	14.55	2313.52	2328.07	8.15	24.50	24.66
2222	0.01	7446	7440	I-15 North Bound	Interstate	65	1	1		0	14.55	2313.52	2328.07	8.09	12.33	12.41
2223	0.36	7447	7365	I-15	Interstate	35	1	1		0	0.00	3018.21	3018.21	0.00	1108.46	1108.46
2224	0.39	7359	7444	I-15 South Bound	Interstate	65	1	1		0	3807.94	5858.78	9666.72	1496.76	2302.87	3799.64
2225	0.39	7443	7357	I-15 North Bound	Interstate	65	1	1		0	14.55	2313.52	2328.07	5.72	909.69	915.41
2226	0.03	7365	7361	I-15	Interstate	65	1	1		0	0.00	3018.21	3018.21	0.00	97.47	97.47
2227	0.01	7354	7359	I-15 South Bound	Interstate	65	1	1		0	3807.94	5858.78	9666.72	50.97	78.43	129.40
2228	0.02	7361	7353	I-15	Interstate	35	1	1		0	0.00	3018.21	3018.21	0.00	48.73	48.73
2229	0.01	7357	7352	I-15 North Bound	Interstate	65	1	1		0	14.55	2313.52	2328.07	0.22	34.48	34.70
2230	0.23	7195	7354	I-15 South Bound	Interstate	65	1	1		0	9745.05	1004.45	10749.50	2244.56	231.35	2475.91
2231	0.46	7353	7196	I-15	Interstate	35	1	1		0	0.00	3018.21	3018.21	0.00	1386.41	1386.41
2232	0.46	7352	7198	I-15 North Bound	Interstate	65	1	1		0	14.55	2313.52	2328.07	6.66	1058.40	1065.06
2233	0.15	7120	7195	I-15 South Bound	Interstate	65	1	1		0	9745.05	1004.45	10749.50	1465.69	151.09	1616.78
2234	0.24	7196	7098	I-15	Interstate	35	1	1		0	0.00	3018.21	3018.21	0.00	717.71	717.71
2235	0.15	7198	7121	I-15 North Bound	Interstate	65	1	1		0	14.55	2313.52	2328.07	2.19	347.37	349.55
2236	0.34	7017	7120	I-15 South Bound	Interstate	65	1	1		0	9745.05	1004.45	10749.50	3265.11	336.54	3601.65
2237	0.33	7121	7019	I-15 North Bound	Interstate	65	1	1		0	14.55	2313.52	2328.07	4.84	770.11	774.95
2238	0.25	7098	7012	I-15	Interstate	35	1	1		0	0.00	3018.21	3018.21	0.00	765.40	765.40
2239	0.05	7009	7011	SR-266 4500 S	Other Principal Art	35	1	1		0	4722.61	5828.03	10542.64	253.68	311.87	564.55

Figure I-2-62: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2240	0.01	7081	7817	I-15 South Bound	Interstate	35	1	1		0	9745.85	1004.45	10749.50	57.86	5.96	63.83
2241	0.15	7153	7151	4700	Other Principal Arti	25	1	1		0	625.86	110.33	735.39	93.43	16.49	109.93
2242	0.09	7154	7153	4700	Other Principal Arti	25	1	1		0	625.86	110.33	735.39	56.00	9.89	65.92
2243	0.50	3576	6851	SR-154 Bangerter Hi	Other Principal Arti	35	1	1		0	2282.86	7987.87	10270.72	1143.76	4002.09	5145.85
2244	0.25	7156	7154	4700	Other Principal Arti	35	1	1		0	625.86	110.33	735.39	154.82	27.33	182.14
2245	0.06	7157	7156	4700	Other Principal Arti	35	1	1		0	625.86	110.33	735.39	37.34	6.59	43.93
2246	0.19	7159	7157	4700	Other Principal Arti	35	1	1		0	625.86	110.33	735.39	120.50	21.27	141.76
2247	0.51	3425	6443	SR-154 Bangerter Hi	Other Principal Arti	35	1	1		0	2282.86	7987.87	10270.72	1153.06	4034.63	5187.69
2248	0.51	3426	6443	SR-154 Bangerter Hi	Other Principal Arti	35	1	1		0	2282.86	7987.87	10270.72	1153.09	4034.73	5187.82
2249	0.31	6442	6443	SR-171 3500 S	Other Principal Arti	35	1	1		0	0.00	14737.00	14737.00	0.00	4506.02	4506.02
2250	0.20	6443	6444	SR-171 3500 S	Other Principal Arti	35	1	1		0	625.86	21732.35	22357.41	122.25	4250.56	4372.81
2251	0.50	6444	6445	SR-171 3500 S	Other Principal Arti	35	1	1		0	625.86	21732.35	22357.41	312.86	10877.71	11190.57
2252	0.70	7481	7319	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2253	0.75	7310	7480	I-215 Negative	Interstate	65	1	1		0	110.33	21993.86	22104.19	82.58	16462.20	16544.78
2254	0.70	7482	7321	I-215 Positive	Interstate	65	1	1		0	0.00	2354.40	2354.40	0.00	1640.45	1640.45
2255	0.04	7319	7312	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2256	0.01	3803	7593	I-215	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2257	0.01	3796	7593	I-215	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2258	0.40	4106	7830	SR-68 Redwood Rd	Other Principal Arti	35	1	1		0	22390.81	110.33	22500.34	10710.38	52.82	10771.20
2259	0.04	7830	7823	SR-68 Redwood Rd	Other Principal Arti	35	1	1		0	22390.81	110.33	22500.34	996.50	4.91	1001.41
2260	0.35	7598	7622	I-215 Negative	Interstate	65	1	1		0	110.33	21993.86	22104.19	38.18	7610.70	7648.88
2261	0.31	7614	7599	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2262	0.32	7609	7596	I-215 Positive	Interstate	65	1	1		0	0.00	2354.40	2354.40	0.00	762.20	762.20
2263	0.28	7823	7680	SR-68 Redwood Rd	Other Principal Arti	35	1	1		0	22390.81	110.33	22500.34	6157.87	30.34	6188.21
2264	0.02	7680	7654	SR-68 Redwood Rd	Other Principal Arti	35	1	1		0	22390.81	110.33	22500.34	446.51	2.20	448.71
2265	0.04	7654	7637	SR-68 Redwood Rd	Other Principal Arti	35	1	1		0	22390.81	110.33	22500.34	925.43	4.56	929.99
2266	0.05	7637	7628	SR-68 Redwood Rd	Other Principal Arti	45	1	1		0	22390.81	110.33	22500.34	1134.00	5.59	1139.59
2267	0.02	7622	7623	I-215 Negative	Interstate	45	1	1		0	110.33	21993.86	22104.19	1.90	383.79	385.72
2268	0.02	7628	7623	SR-68 Redwood Rd	Other Principal Arti	45	1	1		0	22390.81	110.33	22500.34	494.38	2.44	496.82
2269	0.01	7623	7615	SR-68 Redwood Rd	Other Principal Arti	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2270	0.23	7623	7621	I-215 Negative	Interstate	45	1	1		0	396.15	0.00	396.15	89.69	0.00	89.69
2271	0.03	7615	7614	I-215	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2272	0.01	7615	7609	SR-68 Redwood Rd	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2273	0.03	3085	3079	I-15	Interstate	35	1	1		0	38265.21	0.00	38265.21	1262.33	0.00	1262.33
2274	0.26	3087	3088	I-15 North Bound	Interstate	65	1	1		0	4209.81	3080.58	7370.39	1114.87	800.61	1915.48
2275	0.28	3077	3086	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	214.31	123.29	337.60

Figure I-2-63: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD1A	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2276	0.22	3079	3078	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	8538.53	0.00	8538.53
2277	0.17	3071	3077	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	128.61	73.99	202.60
2278	0.19	3078	3073	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	7218.99	0.00	7218.99
2279	0.23	30888	18233	I-15 North Bound	Interstate	65	1	1		0	4289.81	3088.58	7378.39	975.43	700.51	1676.00
2280	0.07	3073	3068	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	2734.80	0.00	2734.80
2281	0.22	3070	3071	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	168.83	97.13	265.96
2282	0.15	30688	3063	I-15	Interstate	35	1	1		0	38265.21	0.00	38265.21	5649.62	0.00	5649.62
2283	0.18	18233	18198	I-15 North Bound	Interstate	65	1	1		0	4289.81	3088.58	7378.39	766.81	550.66	1317.48
2284	0.54	7926	8092	SR-190	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2285	0.28	7039	7110	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2286	0.26	7039	7106	I-215 Positive	Interstate	65	1	1		0	1885.72	1466.59	3272.31	465.73	378.26	844.00
2287	0.02	7029	7031	SR-266 4500 S	Other Principal Art	35	1	1		0	1791.17	26374.98	28166.15	36.90	543.41	580.31
2288	0.02	7031	7038	SR-266 4500 S	Other Principal Art	45	1	1		0	1791.17	26374.98	28166.15	27.58	406.09	433.66
2289	0.01	7038	7039	SR-266 4500 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2290	0.01	7039	7042	SR-266 4500 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2291	0.05	7042	7048	SR-266 4500 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2292	0.22	6981	7039	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2293	0.25	6973	7038	I-215 Positive	Interstate	65	1	1		0	26389.53	1466.59	27856.12	6595.89	367.12	6973.01
2294	0.53	7042	6927	I-215 Negative	Interstate	65	1	1		0	3635.87	0.00	3635.87	1918.78	0.00	1918.78
2295	0.33	6917	6981	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2296	0.38	6898	6973	I-215 Positive	Interstate	65	1	1		0	26389.53	1466.59	27856.12	9988.50	558.66	10459.16
2297	0.14	6831	6917	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2298	0.39	6927	6757	I-215 Negative	Interstate	65	1	1		0	3635.87	0.00	3635.87	1401.15	0.00	1401.15
2299	0.30	6753	6898	I-215 Positive	Interstate	65	1	1		0	26389.53	1466.59	27856.12	7912.30	439.72	8352.03
2300	0.21	6759	6831	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2301	0.02	6755	6759	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2302	0.02	6757	6754	I-215 Negative	Interstate	65	1	1		0	3635.87	0.00	3635.87	65.74	0.00	65.74
2303	0.16	6641	6753	I-215 Positive	Interstate	65	1	1		0	26389.53	1466.59	27856.12	4163.31	231.37	4394.69
2304	0.16	6643	6755	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2305	0.10	3437	3434	I-15	Interstate	65	1	1		0	5433.37	53.89	5487.26	528.90	5.17	526.06
2306	0.10	3432	3436	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2307	0.48	3498	3434	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2308	0.04	3435	3429	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2309	0.03	3434	3430	I-15	Interstate	35	1	1		0	5433.37	53.89	5487.26	175.57	1.74	177.31
2310	0.06	3429	3423	I-15 North Bound	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2311	0.10	3430	3422	I-15	Interstate	65	1	1		0	5433.37	53.89	5487.26	526.85	5.23	532.07

Figure I-2-64: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2312	0.34	3423	3418	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2313	0.31	3422	3416	I-15	Interstate	65	1	1		0	5433.37	53.89	5487.26	1661.17	16.48	1677.64
2314	0.56	3415	3420	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2315	0.75	3416	3395	I-15	Interstate	35	1	1		0	5433.37	53.89	5487.26	4091.12	40.58	4131.69
2316	0.77	3418	3393	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2317	0.37	3378	3379	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	13594.32	260.87	13855.18
2318	0.36	3374	3375	I-215	Interstate	65	1	1		0	3982.66	0.00	3982.66	1434.24	0.00	1434.24
2319	0.36	3371	3369	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	2496.14	117.43	2613.58
2320	0.19	1688	3376	I-215	Interstate	65	1	1		0	3982.66	0.00	3982.66	747.50	0.00	747.50
2321	0.37	3370	3371	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	2592.06	121.95	2714.01
2322	0.19	1687	3376	I-215	Interstate	65	1	1		0	3982.66	0.00	3982.66	747.50	0.00	747.50
2323	0.72	3379	3364	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	26807.96	514.43	27322.39
2324	0.58	3397	3415	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2325	0.38	3376	3360	I-215	Interstate	65	1	1		0	3982.66	0.00	3982.66	1515.39	0.00	1515.39
2326	0.45	3355	3370	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	3140.19	147.73	3287.92
2327	0.15	3364	3397	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2328	0.15	3395	3362	I-15	Interstate	35	1	1		0	5433.37	53.89	5487.26	793.12	7.93	801.05
2329	0.15	3393	3361	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2330	0.01	3364	3362	I-215 Positive	Interstate	45	1	1		0	37117.63	0.00	37117.63	390.49	0.00	390.49
2331	0.06	3360	3364	I-15 South Bound	Interstate	65	1	1		0	712.53	13.97	726.50	43.25	0.85	44.10
2332	0.01	3362	3361	I-215 Positive	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2333	0.06	3362	3359	I-15	Interstate	65	1	1		0	42551.00	53.89	42604.89	2646.99	3.35	2650.35
2334	0.06	3361	3358	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2335	0.01	3360	3359	I-215	Interstate	65	1	1		0	4039.32	7062.00	11101.32	44.55	77.89	122.43
2336	0.10	3355	3360	I-15 South Bound	Interstate	65	1	1		0	769.19	7075.97	7845.16	77.77	715.39	793.16
2337	1.01	6395	6397	SR-171 3300 S	Other Principal Arte	25	1	1		0	0.00	4.27	4.27	0.00	4.33	4.33
2338	0.85	6070	6096	I-215 Positive	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2339	0.56	6088	5974	I-215 Negative	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2340	0.56	6065	6094	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2341	0.00	5934	5937	I-80	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2342	0.01	5929	5937	SR-186 Foothill Blvd	Other Principal Arte	35	1	1		0	2648.23	0.00	2648.23	17.19	0.00	17.19
2343	0.01	5943	5937	SR-186 Foothill Blvd	Other Principal Arte	35	1	1		0	1466.59	22757.93	24224.51	8.01	124.31	132.32
2344	0.01	5937	5935	I-80	Interstate	35	1	1		0	3877.40	22520.51	26397.91	27.74	161.09	188.83
2345	0.07	5984	5943	SR-186 Foothill Blvd	Other Principal Arte	35	1	1		0	1466.59	22757.93	24224.51	103.39	1604.36	1707.75
2346	0.06	5939	5953	I-80	Interstate	65	1	1		0	3877.40	22520.51	26397.91	218.03	1266.36	1484.48
2347	0.04	5953	5961	I-80	Interstate	65	1	1		0	3877.40	22520.51	26397.91	152.41	885.21	1037.61

Figure I-2-65: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2348	0.02	2674	5416	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	61.07	0.00	61.07
2349	0.02	2673	5416	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	61.07	0.00	61.07
2350	0.28	2575	5347	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	739.77	0.00	739.77
2351	0.45	5930	5931	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2352	0.07	5866	5896	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	189.66	0.00	189.66
2353	0.11	5835	5866	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	291.28	0.00	291.28
2354	0.05	5764	5835	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	144.86	0.00	144.86
2355	0.11	5886	5917	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	287.41	0.00	287.41
2356	0.03	5931	5934	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2357	0.05	5917	5929	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	120.08	0.00	120.08
2358	0.52	5416	5764	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	1375.46	0.00	1375.46
2359	0.46	5024	5151	SR-186 Foothill Blvd	Other Principal Art	25	1	1		0	2648.23	0.00	2648.23	1205.58	0.00	1205.58
2360	0.21	4946	5024	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	565.29	0.00	565.29
2361	0.31	4834	4946	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	826.30	0.00	826.30
2362	0.37	4676	4834	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	968.65	0.00	968.65
2363	0.34	4675	4676	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	909.57	0.00	909.57
2364	0.19	4441	4675	SR-186 Foothill Blvd	Other Principal Art	25	1	1		0	2648.23	0.00	2648.23	513.36	0.00	513.36
2365	0.28	2576	5347	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	740.80	0.00	740.80
2366	0.07	4058	4074	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2367	0.13	4074	4121	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2368	0.47	4121	4226	I-80	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2369	0.37	3773	7378	SR-152	Other Principal Art	25	1	1		0	760.96	0.00	760.96	282.02	0.00	282.02
2370	0.36	3528	7022	SR-71	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2371	0.08	7266	7257	SR-71	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2372	0.12	7290	7266	SR-152	Other Principal Art	35	1	1		0	760.96	0.00	760.96	93.82	0.00	93.82
2373	0.31	7022	7026	SR-266 4500 S	Other Principal Art	35	1	1		0	1791.17	26374.98	28166.15	555.88	8185.30	8741.18
2374	0.30	3513	7028	SR-266 4500 S	Other Principal Art	35	1	1		0	1791.17	26374.98	28166.15	537.88	7920.33	8458.21
2375	0.30	3513	7028	SR-266 4500 S	Other Principal Art	35	1	1		0	1791.17	26374.98	28166.15	537.76	7918.48	8456.24
2376	0.66	7028	7033	SR-266 4500 S	Other Principal Art	35	1	1		0	1791.17	26374.98	28166.15	1180.20	17378.43	18558.63
2377	0.26	8046	8003	I-215 Positive	Interstate	65	1	1		0	9318.96	0.00	9318.96	2390.33	0.00	2390.33
2378	0.24	8006	8048	I-215	Interstate	65	1	1		0	1805.72	0.00	1805.72	441.99	0.00	441.99
2379	0.01	8003	7998	SR-152	Other Principal Art	45	1	1		0	760.96	0.00	760.96	4.11	0.00	4.11
2380	0.02	7998	7986	SR-152	Other Principal Art	35	1	1		0	760.96	0.00	760.96	18.48	0.00	18.48
2381	0.04	7986	7974	SR-152	Other Principal Art	45	1	1		0	760.96	0.00	760.96	28.49	0.00	28.49
2382	0.04	7974	7960	SR-152	Other Principal Art	25	1	1		0	760.96	0.00	760.96	27.41	0.00	27.41
2383	0.08	8013	8057	SR-152	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-66: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2384	0.01	8006	8013	SR-152	Other Principal Art	35	1	1		0	961.51	2566.68	3528.19	0.69	23.21	31.91
2385	0.01	8004	8006	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2386	0.02	8008	8013	I-215 Negative	Interstate	65	1	1		0	8696.58	3635.87	12332.46	167.94	70.21	238.15
2387	0.01	8006	8003	SR-152	Other Principal Art	45	1	1		0	760.96	961.51	1722.47	4.81	6.07	10.88
2388	0.01	8003	8001	I-215 Positive	Interstate	45	1	1		0	8357.45	0.00	8357.45	48.73	0.00	48.73
2389	0.02	7732	7725	VINE	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2390	0.18	7837	7722	SR-152	Other Principal Art	35	1	1		0	760.96	0.00	760.96	134.66	0.00	134.66
2391	0.27	7960	7837	SR-152	Other Principal Art	35	1	1		0	760.96	0.00	760.96	205.70	0.00	205.70
2392	0.23	7971	8004	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2393	0.24	7973	8008	I-215 Negative	Interstate	65	1	1		0	8696.58	3635.87	12332.46	2115.15	884.30	2999.46
2394	0.25	8007	7968	I-215 Positive	Interstate	65	1	1		0	8357.45	0.00	8357.45	2142.52	0.00	2142.52
2395	0.02	7725	7722	VINE	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2396	0.27	7964	7971	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2397	0.25	7973	7965	I-215 Negative	Interstate	65	1	1		0	3635.87	8696.58	12332.46	898.95	2149.96	3048.91
2398	0.25	7962	7968	I-215 Positive	Interstate	65	1	1		0	0.00	8357.45	8357.45	0.00	2073.76	2073.76
2399	0.58	7966	7962	I-215 Positive	Interstate	65	1	1		0	0.00	8357.45	8357.45	0.00	4831.77	4831.77
2400	0.64	7965	7967	I-215 Negative	Interstate	65	1	1		0	3635.87	8696.58	12332.46	2310.59	5526.65	7837.23
2401	0.07	4468	4471	600	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2402	0.09	4415	4417	500	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2403	0.28	2453	4713	SR-71	Other Principal Art	25	1	1		0	2648.23	0.00	2648.23	740.20	0.00	740.20
2404	0.15	4713	4599	SR-71	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	397.63	0.00	397.63
2405	0.15	4599	4526	SR-71	Other Principal Art	25	1	1		0	2648.23	0.00	2648.23	387.87	0.00	387.87
2406	0.15	4526	4472	SR-71	Other Principal Art	25	1	1		0	2648.23	0.00	2648.23	405.73	0.00	405.73
2407	0.07	4471	4469	600	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2408	0.07	4417	4416	500	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2409	0.09	4469	4470	600	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2410	0.06	4470	4467	600	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2411	0.07	4416	4422	500	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2412	0.02	2214	4419	500	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2413	0.02	2208	4419	500	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2414	0.05	4419	4418	500	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2415	0.15	4467	4472	600	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2416	0.08	4418	4420	500	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2417	0.15	4472	4423	SR-71	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	391.79	0.00	391.79
2418	0.07	4420	4423	500	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2419	0.15	4423	4367	SR-71	Other Principal Art	25	1	1		0	2648.23	0.00	2648.23	405.70	0.00	405.70

Figure I-2-67: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2420	0.72	8052	7692	SR-71	Other Principal Arts	25	1	1		0	0.00	760.96	760.96	0.00	550.70	550.70
2421	0.02	7636	7641	VINE	Other Principal Arts	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2422	0.12	7692	7643	SR-71	Other Principal Arts	35	1	1		0	0.00	760.96	760.96	0.00	91.27	91.27
2423	0.02	7641	7645	VINE	Other Principal Arts	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2424	0.01	7646	7645	VINE	Other Principal Arts	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2425	0.01	7645	7644	VINE	Other Principal Arts	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2426	0.02	7644	7643	VINE	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2427	0.40	7643	7525	SR-71	Other Principal Arts	25	1	1		0	0.00	760.96	760.96	0.00	303.28	303.28
2428	1.13	7525	7266	SR-71	Other Principal Arts	35	1	1		0	0.00	760.96	760.96	0.00	856.87	856.87
2429	0.61	7276	7290	SR-152	Other Principal Arts	35	1	1		0	760.96	0.00	760.96	462.33	0.00	462.33
2430	0.45	3861	7545	SR-152	Other Principal Arts	25	1	1		0	760.96	0.00	760.96	341.56	0.00	341.56
2431	0.45	3861	7545	SR-152	Other Principal Arts	25	1	1		0	760.96	0.00	760.96	341.52	0.00	341.52
2432	0.37	3772	7276	SR-152	Other Principal Arts	25	1	1		0	760.96	0.00	760.96	281.99	0.00	281.99
2433	0.43	3842	3841	I-80	Interstate	65	1	1		0	4993.90	5649.17	10643.07	2159.23	2442.56	4601.79
2434	0.06	7955	7972	5600	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2435	0.04	7520	7955	5600	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2436	0.06	7909	7928	5600	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2437	0.06	7870	7909	5600	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2438	0.03	7858	7870	5600	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2439	0.16	7758	7858	5600	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2440	0.50	3879	7466	SR-172	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2441	0.50	3879	7466	SR-172	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2442	0.50	3730	7139	SR-172	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2443	0.50	3730	7139	SR-172	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2444	0.07	7138	7139	4700 SOUTH	Other Principal Arts	35	1	1		0	7987.87	110.33	8098.20	565.02	7.80	572.82
2445	0.18	7140	7138	4700 SOUTH	Other Principal Arts	35	1	1		0	7987.87	110.33	8098.20	1455.91	20.11	1476.01
2446	0.50	3569	6815	SR-172	Other Principal Arts	35	1	1		0	7987.87	110.33	8098.20	4007.49	55.35	4062.84
2447	0.04	7140	7144	4700 SOUTH	Other Principal Arts	35	1	1		0	110.33	7987.87	8098.20	4.37	316.33	320.70
2448	0.14	7144	7141	4700 SOUTH	Other Principal Arts	35	1	1		0	110.33	7987.87	8098.20	14.52	1080.10	1095.02
2449	0.50	3570	6815	SR-172	Other Principal Arts	35	1	1		0	7987.87	110.33	8098.20	4007.56	55.35	4062.91
2450	0.50	3407	6436	SR-172	Other Principal Arts	35	1	1		0	7987.87	110.33	8098.20	3982.73	55.01	4037.75
2451	0.50	3408	6436	SR-172	Other Principal Arts	35	1	1		0	7987.87	110.33	8098.20	3983.38	55.02	4038.40
2452	0.05	7141	7142	4700 SOUTH	Other Principal Arts	35	1	1		0	110.33	7987.87	8098.20	5.17	374.12	379.29
2453	0.03	3574	7143	4700 SOUTH	Other Principal Arts	35	1	1		0	110.33	7987.87	8098.20	3.83	277.42	281.25
2454	0.03	3568	7143	4700 SOUTH	Other Principal Arts	35	1	1		0	110.33	7987.87	8098.20	3.83	277.00	280.83
2455	0.34	7146	7143	4700 SOUTH	Other Principal Arts	35	1	1		0	7987.87	110.33	8098.20	2719.21	37.56	2756.77

Figure I-2-68: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2456	0.07	7152	7146	4700 SOUTH	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	523.21	7.23	530.44
2457	0.05	7152	7158	4700 SOUTH	Other Principal Art	35	1	1		0	110.33	7987.87	8098.20	5.76	416.83	422.58
2458	0.09	7160	7158	4715	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	753.79	10.41	764.21
2459	0.05	7163	7160	4715	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	389.93	5.39	395.32
2460	0.09	7169	7163	4715	Other Principal Art	35	1	1		0	7987.87	110.33	8098.20	753.77	10.41	764.18
2461	1.00	6436	6439	SR-171 3500 S	Other Principal Art	35	1	1		0	0.00	14737.08	14737.08	0.00	14747.16	14747.16
2462	0.50	6436	6216	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	11321.51	54.97	11376.48
2463	0.50	6216	6061	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	11456.76	55.62	11512.38
2464	0.82	6061	5539	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	18652.72	90.56	18743.28
2465	0.01	4147	4154	I-80	Interstate	45	1	1		0	22218.77	259.43	22478.19	278.81	3.26	282.06
2466	0.01	4173	4154	SR-154 Bangerter Hi	Other Principal Art	45	1	1		0	1290.26	625.06	1915.32	11.22	5.44	16.66
2467	0.01	4154	4139	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2468	0.01	4139	4124	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2469	0.03	4124	4068	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2470	0.01	4154	4155	I-80	Interstate	35	1	1		0	23509.83	884.49	24393.52	326.67	12.30	339.16
2471	0.28	4068	3937	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2472	0.27	3907	3786	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2473	0.24	4155	4163	I-80	Interstate	65	1	1		0	23509.83	884.49	24393.52	5758.89	216.67	5975.56
2474	0.14	4163	4167	I-80	Interstate	35	1	1		0	23509.83	884.49	24393.52	3298.01	127.84	3525.85
2475	0.11	4167	4168	I-80	Interstate	65	1	1		0	23509.83	884.49	24393.52	2591.46	97.50	2688.96
2476	0.20	4168	4171	I-80	Interstate	45	1	1		0	23509.83	884.49	24393.52	4636.38	174.44	4810.82
2477	0.09	4171	4172	I-80	Interstate	45	1	1		0	23509.83	884.49	24393.52	2155.06	81.08	2236.14
2478	0.05	4172	4176	I-80	Interstate	65	1	1		0	23509.83	884.49	24393.52	1286.27	48.39	1334.66
2479	0.31	4176	4149	I-80	Interstate	65	1	1		0	23509.83	884.49	24393.52	7246.94	272.65	7519.59
2480	0.21	4149	4131	I-80	Interstate	65	1	1		0	23509.83	884.49	24393.52	4906.52	184.60	5091.12
2481	0.36	4131	4107	I-80	Interstate	65	1	1		0	23509.83	884.49	24393.52	8380.28	315.29	8695.57
2482	0.09	4107	4099	I-80	Interstate	65	1	1		0	23509.83	884.49	24393.52	2003.29	75.37	2078.66
2483	0.09	4206	4279	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	3.59	3.59
2484	0.09	4276	4229	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2485	0.06	4273	4242	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	1298.68	593.20	1891.88
2486	0.06	4112	4206	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	2.15	2.15
2487	0.07	4225	4111	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2488	0.07	4242	4110	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	1517.51	693.20	2210.71
2489	0.01	4097	4112	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	0.40	0.40
2490	0.01	4111	4096	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2491	0.01	4110	4095	I-215 Positive	Interstate	45	1	1		0	20443.76	9338.67	29782.43	214.96	98.19	313.16

Figure I-2-69: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2492	0.06	4099	4092	I-80	Interstate	65	1	1		0	23509.03	884.49	24393.52	1372.29	51.63	1423.92
2493	0.02	4092	4090	I-80	Interstate	65	1	1		0	23509.03	884.49	24393.52	583.24	21.94	605.19
2494	0.01	4090	4097	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	0.22	0.22
2495	0.01	4075	4090	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	48.72	2.29	51.01
2496	0.01	4090	4088	I-80	Interstate	45	1	1		0	30009.17	712.53	30721.70	230.20	5.47	235.66
2497	0.33	4961	4803	I-215 Positive	Interstate	65	1	1		0	26443.76	9338.67	25782.43	6819.05	3114.93	9933.97
2498	0.44	4552	4797	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	17.08	17.08
2499	0.45	4805	4555	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2500	0.45	4803	4556	I-215 Positive	Interstate	65	1	1		0	26443.76	9338.67	25782.43	9282.01	4240.00	13522.01
2501	0.31	4443	4552	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	11.83	11.83
2502	0.40	4555	4430	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2503	0.23	4556	4489	I-215 Positive	Interstate	65	1	1		0	26443.76	9338.67	25782.43	4617.87	2109.43	6727.30
2504	0.15	4402	4443	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	5.81	5.81
2505	0.06	4430	4403	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2506	0.23	4489	4404	I-215 Positive	Interstate	65	1	1		0	26443.76	9338.67	25782.43	4769.83	2107.98	6877.81
2507	0.29	4287	4402	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	11.04	11.04
2508	0.30	4403	4284	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2509	0.31	4404	4283	I-215 Positive	Interstate	65	1	1		0	26443.76	9338.67	25782.43	6268.51	2863.44	9131.96
2510	0.04	4279	4287	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	1.65	1.65
2511	0.04	4284	4276	I-215	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2512	0.03	4283	4273	I-215 Positive	Interstate	45	1	1		0	26443.76	9338.67	25782.43	688.26	314.40	1002.66
2513	0.41	3841	3844	I-80	Interstate	65	1	1		0	4993.90	5649.17	10643.07	2048.67	2317.48	4366.15
2514	1.10	3844	3851	I-80	Interstate	65	1	1		0	4993.90	5649.17	10643.07	5503.67	6225.83	11729.50
2515	0.48	3851	3852	I-80	Interstate	65	1	1		0	4993.90	5649.17	10643.07	2401.32	2716.41	5117.73
2516	0.49	2240	3934	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	11240.34	54.57	11294.91
2517	0.12	3934	3855	SR-172	Other Principal Art	35	1	1		0	22724.95	110.33	22835.28	2817.92	13.68	2831.60
2518	0.01	3855	3852	SR-172	Other Principal Art	65	1	1		0	22724.95	110.33	22835.28	169.36	0.82	170.18
2519	0.01	3852	3846	SR-172	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2520	0.37	3852	3853	I-80	Interstate	65	1	1		0	22218.77	259.43	22478.19	8325.18	97.20	8422.38
2521	0.07	3846	3797	SR-172	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2522	0.67	3853	3920	I-80	Interstate	65	1	1		0	22218.77	259.43	22478.19	14993.78	175.07	15168.85
2523	0.10	3920	3941	I-80	Interstate	65	1	1		0	22218.77	259.43	22478.19	2233.15	26.07	2259.22
2524	0.09	3941	3949	I-80	Interstate	65	1	1		0	22218.77	259.43	22478.19	2097.07	24.49	2122.37
2525	0.30	3949	4009	I-80	Interstate	65	1	1		0	22218.77	259.43	22478.19	6776.18	79.12	6855.29
2526	0.53	4009	4147	I-80	Interstate	65	1	1		0	22218.77	259.43	22478.19	11739.89	137.07	11876.96
2523	0.09	4280	4217	SR-154 Barangaster Hi	Other Principal Art	35	1	1		0	1290.26	625.06	1915.32	114.84	55.63	170.47

Figure I-2-70: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2528	0.02	4217	4173	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	1290.26	625.06	1915.32	28.50	13.81	42.31
2529	0.70	6887	7065	I-215 Negative	Interstate	65	1	1		0	625.06	21993.86	22618.92	435.22	15313.78	15748.99
2530	0.70	7062	6882	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2531	0.51	6445	6446	SR-171 3500 S	Other Principal Art	35	1	1		0	625.06	21732.35	22357.41	316.30	10997.09	11313.39
2532	0.13	6446	6447	SR-171 3500 S	Other Principal Art	35	1	1		0	625.06	21732.35	22357.41	79.94	2779.26	2859.20
2533	0.37	3270	6887	I-215 Negative	Interstate	65	1	1		0	625.06	21993.86	22618.92	229.66	8081.11	8310.77
2534	0.02	3265	6536	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2535	0.02	3279	6536	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2536	0.08	6447	6448	SR-171 3500 S	Other Principal Art	45	1	1		0	625.06	21732.35	22357.41	48.79	1696.12	1744.91
2537	0.26	6452	6540	I-215 Negative	Interstate	65	1	1		0	625.06	21993.86	22618.92	160.63	5651.37	5812.59
2538	0.23	6546	6480	I-215 Positive	Interstate	65	1	1		0	20443.76	10966.90	31410.66	4709.56	2526.41	7235.96
2539	0.39	6536	6475	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2540	0.07	6448	6449	SR-171 3500 S	Other Principal Art	35	1	1		0	625.06	21732.35	22357.41	45.99	1598.04	1645.03
2541	0.01	6449	6462	I-215 Negative	Interstate	65	1	1		0	625.06	21993.86	22618.92	8.77	308.63	317.40
2542	0.01	6449	6450	SR-171 3500 S	Other Principal Art	65	1	1		0	222.87	0.00	222.87	2.20	0.00	2.20
2543	0.03	6475	6463	I-215	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2544	0.04	6480	6464	I-215 Positive	Interstate	45	1	1		0	20443.76	10966.90	31410.66	846.19	453.93	1300.12
2545	0.02	6464	6451	I-215 Positive	Interstate	45	1	1		0	20443.76	10966.90	31410.66	355.96	190.95	546.90
2546	0.02	6463	6450	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2547	0.01	6450	6451	SR-171 3500 S	Other Principal Art	65	1	1		0	222.87	0.00	222.87	1.74	0.00	1.74
2548	0.01	6451	6452	SR-171 3500 S	Other Principal Art	65	1	1		0	2028.59	3433.95	5462.54	19.82	33.55	53.36
2549	0.04	7181	7174	SR-266 4500 S	Other Principal Art	35	1	1		0	8612.49	20443.76	29056.26	328.26	779.21	1107.47
2550	0.01	7174	7173	SR-266 4500 S	Other Principal Art	35	1	1		0	8612.49	20443.76	29056.26	111.78	265.33	377.10
2551	0.08	7173	7185	SR-266 4500 S	Other Principal Art	35	1	1		0	8612.49	20443.76	29056.26	654.80	1554.32	2209.13
2552	0.07	7185	7183	SR-266 4500 S	Other Principal Art	35	1	1		0	8612.49	20443.76	29056.26	645.90	1533.19	2179.09
2553	0.74	7077	6884	I-215 Positive	Interstate	65	1	1		0	20443.76	10966.90	31410.66	15204.41	8156.29	23360.70
2554	0.59	7183	7190	SR-266 4500 S	Other Principal Art	25	1	1		0	8612.49	20443.76	29056.26	4329.17	10276.30	14605.47
2555	0.37	3270	6887	I-215 Negative	Interstate	65	1	1		0	625.06	21993.86	22618.92	229.60	8078.73	8308.33
2556	0.72	6882	6544	I-215	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2557	0.72	6884	6546	I-215 Positive	Interstate	65	1	1		0	20443.76	10966.90	31410.66	14641.52	7854.33	22495.85
2558	0.05	6452	6453	SR-171 3500 S	Other Principal Art	65	1	1		0	2028.59	3433.95	5462.54	96.10	162.67	258.77
2559	0.07	6453	6454	SR-171 3500 S	Other Principal Art	45	1	1		0	2028.59	3433.95	5462.54	143.08	242.21	385.30
2560	0.01	6454	6455	SR-171 3500 S	Other Principal Art	45	1	1		0	2028.59	3433.95	5462.54	17.90	30.30	48.20
2561	0.33	9657	5458	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2562	0.40	9657	5420	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	8132.09	3714.72	11846.80
2563	0.05	5365	5472	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	2.05	2.05

Figure I-2-71: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2564	0.01	5354	5365	I-215 Negative	Interstate	45	1	1		0	0.00	38.64	38.64	0.00	0.31	0.31
2565	0.04	5458	5367	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2566	0.03	5420	5369	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	558.32	255.04	813.36
2567	0.01	5367	5355	I-215	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2568	0.01	5344	5354	I-215 Negative	Interstate	45	1	1		0	0.00	38.64	38.64	0.00	0.37	0.37
2569	0.01	5355	5346	I-215	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2570	0.01	5369	5361	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	144.07	65.81	209.89
2571	0.01	5361	5349	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	209.69	95.79	305.47
2572	0.06	5309	5344	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	2.39	2.39
2573	0.06	5346	5313	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2574	0.05	5349	5319	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	1091.43	498.56	1589.99
2575	0.25	5313	5192	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2576	0.33	5319	5181	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	6656.76	3040.79	9697.55
2577	0.33	5171	5309	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	12.63	12.63
2578	0.15	5123	5171	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	5.86	5.86
2579	0.22	5192	5124	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2580	0.17	5181	5125	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	3385.14	1546.32	4931.46
2581	0.23	5062	5123	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	8.93	8.93
2582	0.27	5124	5052	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2583	0.26	5125	5057	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	5353.79	2445.69	7799.38
2584	0.27	4966	5062	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	10.38	10.38
2585	0.23	5052	4963	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2586	0.24	5057	4968	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	4806.84	2195.75	7002.59
2587	0.00	4962	4966	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	0.19	0.19
2588	0.01	4960	4962	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	0.25	0.25
2589	0.01	4962	4961	I-215 Positive	Interstate	65	1	1		0	20443.76	9338.67	29782.43	159.58	72.90	232.48
2590	0.01	4961	4951	I-215 Positive	Interstate	45	1	1		0	20443.76	9338.67	29782.43	114.44	52.28	166.72
2591	0.33	4963	4805	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2592	0.35	4797	4950	I-215 Negative	Interstate	65	1	1		0	0.00	38.64	38.64	0.00	13.48	13.48
2593	0.19	3573	3623	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	778.11	778.11
2594	0.36	3634	3571	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	2537.39	119.38	2656.76
2595	0.35	3636	3573	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	1377.58	1377.58
2596	0.35	3572	3635	I-215 Positive	Interstate	45	1	1		0	37131.68	712.53	37844.13	12978.50	248.90	13215.39
2597	0.55	1767	3482	I-215 Positive	Interstate	65	1	1		0	37131.68	712.53	37844.13	20238.31	388.36	20626.67
2598	1.07	3483	3634	I-215 Negative	Interstate	45	1	1		0	6960.94	327.49	7288.43	7476.92	351.76	7828.68
2599	1.09	3484	3636	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	4354.44	4354.44

Figure I-2-72: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2600	0.55	1768	3482	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	20238.53	388.37	20626.89
2601	0.17	3470	3484	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	657.43	657.43
2602	0.16	3482	3471	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	5879.25	114.74	5993.99
2603	0.21	3466	3483	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	1464.66	68.91	1533.57
2604	0.07	3465	3470	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	268.57	268.57
2605	0.31	3446	3466	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	2130.92	100.25	2231.17
2606	0.36	3471	3445	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	13202.53	253.35	13455.88
2607	0.20	3444	3465	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	1132.73	1132.73
2608	0.29	3427	3446	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	2012.12	94.66	2106.78
2609	0.30	3425	3444	I-215	Interstate	1	1	1		0	0.00	3982.66	3982.66	0.00	1187.16	1187.16
2610	0.29	3445	3426	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	10731.89	205.94	10937.83
2611	0.90	3410	3425	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	3593.38	3593.38
2612	0.94	3408	3427	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	6530.50	307.61	6846.11
2613	1.16	3426	3359	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	43118.79	827.42	43946.22
2614	0.01	3409	3410	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	36.74	36.74
2615	0.17	3404	3409	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	696.57	696.57
2616	0.29	3408	3384	I-215 Negative	Interstate	65	1	1		0	327.49	6960.94	7288.43	93.61	1989.64	2083.24
2617	0.12	3404	3396	I-215	Interstate	65	1	1		0	3982.66	0.00	3982.66	490.54	0.00	490.54
2618	0.02	3384	3380	I-215 Negative	Interstate	65	1	1		0	327.49	6960.94	7288.43	6.49	138.04	144.54
2619	0.01	3380	3377	I-215 Negative	Interstate	65	1	1		0	327.49	6960.94	7288.43	4.65	98.82	103.47
2620	0.15	3399	3388	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	5512.43	105.78	5618.21
2621	0.07	3377	3373	I-215 Negative	Interstate	45	1	1		0	327.49	6960.94	7288.43	21.35	453.72	475.07
2622	0.10	3396	3395	I-215	Interstate	45	1	1		0	3982.66	0.00	3982.66	397.05	0.00	397.05
2623	0.08	3373	3372	I-215 Negative	Interstate	45	1	1		0	327.49	6960.94	7288.43	26.04	553.39	579.42
2624	0.21	3388	3378	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	7738.74	148.50	7887.24
2625	0.01	4096	4088	I-215	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2626	0.01	4066	4075	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	68.97	3.24	72.22
2627	0.01	4073	4089	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	29.61	29.61
2628	0.01	4095	4087	I-215 Positive	Interstate	45	1	1		0	20443.76	9338.67	29782.43	117.13	53.50	170.63
2629	0.01	4088	4087	I-88	Interstate	45	1	1		0	26026.50	712.53	26739.04	185.21	5.07	190.28
2630	0.01	4064	4073	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	40.58	40.58
2631	0.01	4087	4072	I-215 Positive	Interstate	45	1	1		0	37131.60	712.53	37844.13	271.99	5.22	277.21
2632	0.02	4087	4086	I-88	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2633	0.01	4072	4062	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	377.50	7.24	384.75
2634	0.18	3998	4064	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	718.45	718.45
2635	0.18	4062	3997	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	6724.23	129.03	6853.26

Figure I-2-73: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2636	0.24	3950	4066	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	1667.94	78.47	1746.41
2637	0.02	4086	4085	I-80	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2638	0.10	4085	4071	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2639	0.06	3948	3998	I-215	Interstate	45	1	1		0	0.00	3982.66	3982.66	0.00	246.06	246.06
2640	0.20	3997	3864	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	7586.10	145.57	7731.67
2641	0.14	3863	3948	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	572.96	572.96
2642	0.16	3858	3950	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	1140.28	53.65	1193.92
2643	0.02	3856	3863	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	78.09	78.09
2644	0.02	3864	3857	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	737.95	14.16	752.11
2645	0.02	4071	4070	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2646	0.12	4070	4059	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2647	0.07	3802	3858	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	465.56	21.90	487.46
2648	0.55	3857	3660	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	20502.98	393.44	20896.42
2649	0.58	3852	3856	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	2316.83	2316.83
2650	0.49	3661	3802	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	3391.12	159.54	3550.66
2651	0.30	4059	4046	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2652	0.02	4046	4045	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2653	0.17	4045	4058	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2654	0.14	3623	3852	I-215	Interstate	65	1	1		0	0.00	3982.66	3982.66	0.00	543.56	543.56
2655	0.36	3571	3661	I-215 Negative	Interstate	65	1	1		0	6960.94	327.49	7288.43	2516.77	118.41	2635.17
2656	0.36	3660	3572	I-215 Positive	Interstate	65	1	1		0	37131.60	712.53	37844.13	13358.74	256.35	13615.09
2657	0.02	9674	9675	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	179.85	179.85
2658	0.37	9572	9664	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2659	0.20	9672	9610	I-15	Interstate	35	1	1		0	735.39	0.00	735.39	145.42	0.00	145.42
2660	0.22	9666	9607	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	948.32	0.00	948.32
2661	0.03	9610	9604	I-15	Interstate	65	1	1		0	735.39	0.00	735.39	23.33	0.00	23.33
2662	0.23	9604	9562	I-15	Interstate	65	1	1		0	735.39	0.00	735.39	169.41	0.00	169.41
2663	0.05	9562	9557	I-15	Interstate	65	1	1		0	735.39	0.00	735.39	39.33	0.00	39.33
2664	0.03	9675	9676	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	259.27	259.27
2665	0.07	9676	9680	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	512.33	512.33
2666	0.20	9924	9909	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2667	0.36	9680	9632	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	2846.65	2846.65
2668	0.28	4947	9673	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	2178.54	2178.54
2669	0.28	4945	9673	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	2177.86	2177.86
2670	0.13	9673	9619	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	989.21	989.21
2671	0.54	4909	9064	SR-71	Other Principal Art	35	1	1		0	0.00	7852.37	7852.37	0.00	4222.54	4222.54

Figure I-2-74: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2672	0.35	9279	9349	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2673	0.35	9350	9278	I-15	Interstate	25	1	1		0	735.39	0.00	735.39	256.58	0.00	256.58
2674	0.35	9351	9277	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	1542.32	0.00	1542.32
2675	0.18	9557	9511	I-15	Interstate	65	1	1		0	735.39	0.00	735.39	129.06	0.00	129.06
2676	1.01	9607	9351	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	4434.67	0.00	4434.67
2677	0.85	9349	9572	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2678	0.54	9511	9350	I-15	Interstate	25	1	1		0	735.39	0.00	735.39	395.85	0.00	395.85
2679	0.40	9278	9190	I-15	Interstate	65	1	1		0	735.39	0.00	735.39	291.57	0.00	291.57
2680	0.20	4534	9279	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2681	0.20	4534	9279	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2682	0.37	9277	9200	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	1641.30	0.00	1641.30
2683	0.27	9112	9188	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2684	0.28	9190	9107	I-15	Interstate	25	1	1		0	735.39	0.00	735.39	206.60	0.00	206.60
2685	0.29	9200	9114	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	1291.06	0.00	1291.06
2686	0.35	9063	9102	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2687	0.24	4537	9018	I-15	Interstate	25	1	1		0	735.39	0.00	735.39	176.46	0.00	176.46
2688	0.45	9063	9019	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	1993.76	0.00	1993.76
2689	0.25	9900	9926	I-15 South Bound	Interstate	65	1	1		0	1722.93	19896.60	21619.53	440.92	5091.77	5532.68
2690	0.23	9916	9895	I-15	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2691	0.25	9925	9902	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	1956.85	1183.97	3140.83
2692	0.08	9894	9893	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	0.00	735.39	735.39	0.00	55.89	55.89
2693	0.01	9894	9900	I-15 South Bound	Interstate	65	1	1		0	1722.93	19896.60	21619.53	10.22	118.07	128.29
2694	0.00	9895	9894	I-15 South Bound	Interstate	65	1	1		0	1622.12	21145.74	22767.85	6.04	78.79	84.83
2695	0.01	9896	9894	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	614.55	0.00	614.55	4.56	0.00	4.56
2696	0.01	9896	9895	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	3318.16	0.00	3318.16	32.16	0.00	32.16
2697	0.01	9902	9896	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	52.77	31.93	84.69
2698	0.00	9896	9890	I-15 North Bound	Interstate	65	1	1		0	4901.79	5176.30	10078.09	16.93	17.88	34.81
2699	0.24	9895	9868	I-15	Interstate	45	1	1		0	2703.61	0.00	2703.61	647.89	0.00	647.89
2700	0.29	9845	9889	I-15 South Bound	Interstate	65	1	1		0	1622.12	21145.74	22767.85	464.83	6059.47	6524.30
2701	0.29	9890	9845	I-15 North Bound	Interstate	65	1	1		0	4901.79	5176.30	10078.09	1415.18	1494.44	2909.62
2702	0.07	9899	9896	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2703	0.11	4957	9899	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2704	0.11	4952	9899	SR-154 Bangerter Hi	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2705	0.48	4922	9745	I-15 North Bound	Interstate	65	1	1		0	4901.79	5176.30	10078.09	2350.64	2482.29	4832.93
2706	1.03	9868	9741	I-15	Interstate	65	1	1		0	2703.61	0.00	2703.61	2780.59	0.00	2780.59
2707	0.97	9742	9846	I-15 South Bound	Interstate	65	1	1		0	1622.12	21145.74	22767.85	1580.80	20607.10	22187.90

Figure I-2-75: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2708	0.48	4923	9745	I-15 North Bound	Interstate	65	1	1		0	4901.79	5176.30	10078.09	2251.01	2482.67	4833.68
2709	0.28	9679	9742	I-15 South Bound	Interstate	65	1	1		0	1622.12	21145.74	22767.85	458.45	5872.00	6322.44
2710	0.28	9741	9672	I-15	Interstate	35	1	1		0	2703.61	0.00	2703.61	758.55	0.00	758.55
2711	0.29	9745	9688	I-15 North Bound	Interstate	65	1	1		0	4901.79	5176.30	10078.09	1418.77	1489.77	2908.54
2712	0.17	9688	9667	SR-71	Other Principal Art	35	1	1		0	0.00	24672.86	24672.86	0.00	4079.00	4079.00
2713	0.04	9667	9669	SR-71	Other Principal Art	35	1	1		0	0.00	24672.86	24672.86	0.00	1067.83	1067.83
2714	0.02	9669	9671	SR-71	Interstate	35	1	1		0	0.00	24672.86	24672.86	0.00	614.46	614.46
2715	0.00	9671	9679	I-15 South Bound	Interstate	65	1	1		0	1622.12	21145.74	22767.85	5.60	72.95	78.55
2716	0.00	9664	9671	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2717	0.01	9671	9672	SR-71	Interstate	35	1	1		0	735.39	5884.64	6620.03	7.90	63.21	71.11
2718	0.01	9672	9674	SR-71	Other Principal Art	35	1	1		0	0.00	3181.02	3181.02	0.00	24.64	24.64
2719	0.01	9688	9674	I-15 North Bound	Interstate	65	1	1		0	4901.79	5176.30	10078.09	38.45	32.16	62.61
2720	0.00	9674	9666	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	12.46	0.00	12.46
2721	0.52	4954	9925	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	3958.14	2491.49	6378.63
2722	0.98	9926	9987	I-15 South Bound	Interstate	65	1	1		0	1722.93	19896.60	21619.53	1694.70	19578.71	21265.41
2723	1.00	9985	9916	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2724	0.52	4995	9925	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	3978.08	2402.06	6372.13
2725	0.02	10626	10623	SR-73	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2726	0.33	10617	10612	SR-73	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2727	0.04	5310	10611	SR-73	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2728	0.04	5302	10611	SR-73	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2729	0.50	10490	10515	I-15 South Bound	Interstate	65	1	1		0	1677.02	19792.86	21469.87	842.23	9940.39	10782.62
2730	0.51	10513	10489	I-15	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2731	0.52	10512	10488	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	3997.07	2418.39	6415.46
2732	0.00	10514	10513	I-15	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2733	0.43	10611	10609	SR-73	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2734	0.28	10608	10607	SR-73	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2735	0.31	10536	10551	I-15 South Bound	Interstate	65	1	1		0	1677.02	19792.86	21469.87	516.87	6100.38	6617.25
2736	0.33	10552	10534	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2737	0.34	10553	10533	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	2655.89	1606.92	4262.81
2738	0.46	10515	10536	I-15 South Bound	Interstate	65	1	1		0	1677.02	19792.86	21469.87	776.95	9169.95	9946.90
2739	0.46	10534	10514	I-15	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2740	0.45	10533	10512	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	3498.00	2117.03	5616.03
2741	0.03	10430	10429	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2742	0.00	10415	10417	I-15 South Bound	Interstate	35	1	1		0	1677.02	19792.86	21469.87	6.12	72.18	78.29
2743	0.31	10417	10431	I-15 South Bound	Interstate	65	1	1		0	1677.02	19792.86	21469.87	514.43	6071.56	6585.99

Figure I-2-76: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2744	0.29	10429	10412	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2745	0.30	10428	10411	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	2303.64	1411.94	3245.58
2746	0.68	10431	10490	I-15 South Bound	Interstate	65	1	1		0	1677.02	19792.86	21469.87	1142.02	13478.65	14620.68
2747	0.69	10488	10428	I-15 North Bound	Interstate	65	1	1		0	7706.21	4662.56	12368.77	5288.97	3200.03	8489.00
2748	0.67	10489	10430	I-15	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2749	0.27	10649	10603	I-15 North Bound	Interstate	65	1	1		0	7707.30	493.21	8200.51	2089.79	133.73	2223.52
2750	0.06	10650	10645	I-15	Interstate	65	1	1		0	0.00	2601.37	2601.37	0.00	147.11	147.11
2751	0.31	5323	10726	I-15 South Bound	Interstate	65	1	1		0	1677.02	18223.79	19900.80	521.15	5663.24	6184.39
2752	0.29	10726	10763	I-15 South Bound	Interstate	65	1	1		0	1677.02	18223.79	19900.80	484.63	5267.01	5751.70
2753	0.01	8277	8295	I-15 South Bound	Interstate	65	1	1		0	0.00	735.39	735.39	0.00	3.84	3.84
2754	0.01	8273	8277	I-15 South Bound	Interstate	65	1	1		0	0.00	735.39	735.39	0.00	5.20	5.20
2755	0.01	8286	8273	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	22.66	0.00	22.66
2756	0.01	8279	8274	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	29.87	0.00	29.87
2757	0.42	8278	8150	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2758	0.41	8274	8151	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	1814.15	0.00	1814.15
2759	0.47	8136	8273	I-15 South Bound	Interstate	65	1	1		0	0.00	735.39	735.39	0.00	347.51	347.51
2760	0.06	8150	8135	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2761	0.33	8020	8136	I-15 South Bound	Interstate	65	1	1		0	0.00	735.39	735.39	0.00	242.71	242.71
2762	0.33	8135	8013	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2763	0.39	8151	8017	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	1730.48	0.00	1730.48
2764	0.39	9017	9061	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2765	0.24	4537	9018	I-15	Interstate	25	1	1		0	735.39	0.00	735.39	176.48	0.00	176.48
2766	0.93	8891	9017	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2767	0.89	9019	8894	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	3905.24	0.00	3905.24
2768	0.95	9018	8888	I-15	Interstate	25	1	1		0	735.39	0.00	735.39	699.27	0.00	699.27
2769	0.34	8894	8845	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	1500.77	0.00	1500.77
2770	0.30	8851	8891	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2771	0.28	8888	8852	I-15	Interstate	65	1	1		0	735.39	0.00	735.39	204.50	0.00	204.50
2772	0.08	8834	8835	SR-209 9000 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2773	0.32	8836	8795	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2774	0.38	8774	8825	I-15 South Bound	Interstate	65	1	1		0	0.00	735.39	735.39	0.00	280.63	280.63
2775	0.33	8827	8794	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	1433.20	0.00	1433.20
2776	0.03	8840	8851	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2777	0.03	8852	8836	I-15	Interstate	35	1	1		0	735.39	0.00	735.39	24.39	0.00	24.39
2778	0.01	8835	8840	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2779	0.01	8826	8825	I-15 South Bound	Interstate	65	1	1		0	0.00	735.39	735.39	0.00	4.63	4.63

Figure I-2-77: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectio	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2780	0.01	8835	8836	SR-203 9000 S	Other Principal Art	35	1	1		0	0.00	735.39	735.39	0.00	6.58	6.58
2781	0.02	8845	8842	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	105.00	0.00	105.00
2782	0.01	8842	8837	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	40.38	0.00	40.38
2783	0.01	8837	8827	I-15 North Bound	Interstate	65	1	1		0	4396.84	0.00	4396.84	22.24	0.00	22.24
2784	0.05	8837	8838	SR-203 9000 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2785	0.16	8099	8098	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2786	0.02	8114	8105	SR-71	Other Principal Art	65	1	1		0	0.00	7852.37	7852.37	0.00	163.64	163.64
2787	0.01	8105	8099	SR-71	Other Principal Art	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2788	0.01	8099	8094	SR-71	Other Principal Art	65	1	1		0	1805.72	0.00	1805.72	12.83	0.00	12.83
2789	0.01	8894	8087	SR-71	Other Principal Art	45	1	1		0	0.00	760.96	760.96	0.00	8.03	8.03
2790	0.09	8087	8052	SR-71	Other Principal Art	35	1	1		0	0.00	760.96	760.96	0.00	61.55	61.55
2791	0.18	8105	8109	I-215 Negative	Interstate	65	1	1		0	4396.84	7852.37	12249.21	800.46	1429.54	2230.00
2792	0.18	8100	8099	I-215	Interstate	65	1	1		0	1805.72	0.00	1805.72	327.60	0.00	327.60
2793	0.18	8096	8094	I-215 Positive	Interstate	65	1	1		0	0.00	9318.96	9318.96	0.00	1687.25	1687.25
2794	0.02	8097	8096	I-215 Positive	Interstate	65	1	1		0	0.00	9318.96	9318.96	0.00	222.94	222.94
2795	0.03	8101	8100	I-215	Interstate	65	1	1		0	1805.72	0.00	1805.72	56.77	0.00	56.77
2796	0.04	8109	8110	I-215 Negative	Interstate	65	1	1		0	4396.84	7852.37	12249.21	170.58	304.65	475.23
2797	0.17	8095	8097	I-215 Positive	Interstate	65	1	1		0	0.00	9318.96	9318.96	0.00	1612.93	1612.93
2798	0.16	8103	8101	I-215	Interstate	65	1	1		0	1805.72	0.00	1805.72	286.15	0.00	286.15
2799	0.17	8110	8107	I-215 Negative	Interstate	65	1	1		0	4396.84	7852.37	12249.21	745.84	1332.00	2077.84
2800	0.20	8107	8091	I-215 Negative	Interstate	65	1	1		0	4396.84	7852.37	12249.21	896.27	1600.65	2496.92
2801	0.22	8086	8103	I-215	Interstate	65	1	1		0	1805.72	0.00	1805.72	403.20	0.00	403.20
2802	0.22	8084	8095	I-215 Positive	Interstate	65	1	1		0	0.00	9318.96	9318.96	0.00	2017.93	2017.93
2803	0.03	8091	8061	I-215 Negative	Interstate	65	1	1		0	4396.84	7852.37	12249.21	3662.84	6541.52	10204.37
2804	0.85	8046	8084	I-215 Positive	Interstate	65	1	1		0	0.00	9318.96	9318.96	0.00	7907.24	7907.24
2805	0.86	8048	8086	I-215	Interstate	65	1	1		0	1805.72	0.00	1805.72	1555.56	0.00	1555.56
2806	0.06	8945	8940	HIGHLAND	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2807	0.23	8890	8940	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2808	0.79	4470	8966	SR-209 9400 S	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2809	0.02	8887	8890	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2810	0.07	8882	8887	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2811	0.16	8865	8882	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2812	0.02	8862	8865	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2813	0.02	8861	8862	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2814	0.02	8853	8861	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2815	0.12	8812	8853	HIGHLAND	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-78: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2916	0.30	8812	8775	HIGHLAND	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2917	0.64	7963	7964	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2918	0.35	7967	7968	I-215 Positive	Interstate	65	1	1		0	0.00	8357.45	8357.45	0.00	2936.73	2936.73
2919	0.31	7967	7973	I-215 Negative	Interstate	65	1	1		0	3635.87	8696.58	12332.46	1114.02	2664.61	3778.64
2920	0.30	7968	7963	I-215	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2921	0.05	7857	7866	SR-150	Other Principal Arte	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2922	0.00	7866	7867	I-215 Positive	Interstate	45	1	1		0	0.00	8357.45	8357.45	0.00	30.70	30.70
2923	0.01	7866	7868	SR-150	Other Principal Arte	45	1	1		0	8696.58	0.00	8696.58	57.86	0.00	57.86
2924	0.01	7863	7866	I-215 Positive	Interstate	45	1	1		0	1805.72	1466.59	3272.31	9.75	7.92	17.67
2925	0.00	7873	7871	I-215 Negative	Interstate	35	1	1		0	3635.87	8696.58	12332.46	15.74	37.65	53.39
2926	0.01	7868	7871	SR-150	Other Principal Arte	35	1	1		0	8696.58	0.00	8696.58	44.37	0.00	44.37
2927	0.00	7871	7863	I-215 Negative	Interstate	65	1	1		0	3635.87	0.00	3635.87	10.91	0.00	10.91
2928	0.21	7724	7863	I-215 Positive	Interstate	65	1	1		0	1805.72	1466.59	3272.31	384.90	312.61	697.50
2929	0.08	7913	7926	SR-150	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2930	0.06	7871	7891	SR-150	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2931	0.05	7891	7913	SR-150	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2932	0.20	7746	7868	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2933	0.20	7869	7745	I-215 Negative	Interstate	65	1	1		0	3635.87	0.00	3635.87	734.16	0.00	734.16
2934	2.12	7110	7746	I-215	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2935	2.12	7106	7724	I-215 Positive	Interstate	65	1	1		0	1805.72	1466.59	3272.31	3836.22	3115.73	6951.96
2936	2.39	7745	7042	I-215 Negative	Interstate	65	1	1		0	3635.87	0.00	3635.87	8707.74	0.00	8707.74
2937	0.63	7033	7043	SR-266 4500 S	Other Principal Arte	35	1	1		0	1791.17	26374.98	28166.15	1123.65	16545.74	17669.39
2938	0.27	7043	7044	SR-266 4500 S	Other Principal Arte	35	1	1		0	1791.17	26374.98	28166.15	483.88	7123.93	7607.73
2939	0.51	7044	7004	SR-266 4500 S	Other Principal Arte	35	1	1		0	1791.17	26374.98	28166.15	915.13	13476.23	14391.43
2940	0.62	7004	7025	SR-266 4500 S	Other Principal Arte	25	1	1		0	1791.17	26374.98	28166.15	1102.04	16227.57	17329.62
2941	0.31	6379	6380	SR-171 3000 S	Other Principal Arte	35	1	1		0	0.00	4.27	4.27	0.00	1.31	1.31
2942	0.30	3191	6381	SR-171 3000 S	Other Principal Arte	35	1	1		0	0.00	4.27	4.27	0.00	1.28	1.28
2943	0.30	3189	6381	SR-171 3000 S	Other Principal Arte	35	1	1		0	0.00	4.27	4.27	0.00	1.28	1.28
2944	0.14	5767	5738	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2945	0.17	5738	5731	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2946	0.42	5731	5708	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2947	0.05	5768	5710	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2948	0.13	5710	5712	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2949	0.04	4340	4374	I-80 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2950	0.01	4325	4340	I-80 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2951	0.21	4270	4325	I-80 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-79: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDLIM	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2852	0.26	4337	4438	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2853	0.31	4445	4335	I-15	Interstate	45	1	1		0	5433.37	53.89	5487.26	1671.12	16.57	1687.70
2854	0.25	4437	4346	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2855	0.04	4448	4476	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2856	0.02	4444	4448	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2857	0.04	4438	4444	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2858	0.02	4453	4445	I-15	Interstate	45	1	1		0	5433.37	53.89	5487.26	131.63	1.31	132.94
2859	0.02	4454	4446	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2860	0.06	4446	4437	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2861	0.01	4324	4337	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2862	0.01	4346	4323	I-15 North Bound	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2863	0.19	4306	4324	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2864	0.22	4339	4266	I-15	Interstate	65	1	1		0	5433.37	53.89	5487.26	1188.52	11.79	1200.31
2865	0.11	4263	4306	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2866	0.29	4323	4272	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2867	0.17	4563	4636	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2868	0.17	4687	4567	I-15	Interstate	25	1	1		0	5433.37	53.89	5487.26	910.10	9.03	919.13
2869	0.17	4688	4568	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2870	0.21	4636	4770	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2871	0.39	4814	4687	I-15	Interstate	25	1	1		0	5433.37	53.89	5487.26	2136.42	21.19	2157.61
2872	0.34	4796	4688	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2873	0.08	4567	4543	I-15	Interstate	35	1	1		0	5433.37	53.89	5487.26	443.73	4.46	454.19
2874	0.11	4568	4531	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2875	0.27	2215	4407	SR-269	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2876	0.45	4449	4451	SR-269	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2877	0.09	6364	6370	I-15 South Bound	Interstate	65	1	1		0	0.00	3512.61	3512.61	0.00	15.71	15.71
2878	0.01	6364	6365	SR-171 3300 S	Other Principal Arti	35	1	1		0	2107.25	0.00	2107.25	20.03	0.00	20.03
2879	0.01	6365	6366	SR-171 3300 S	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2880	0.01	6372	6366	I-15 North Bound	Interstate	65	1	1		0	89.56	20801.67	20891.23	0.92	212.71	213.63
2881	0.15	6754	6645	I-215 Negative	Interstate	65	1	1		0	3635.87	0.00	3635.87	558.02	0.00	558.02
2882	0.07	6620	6643	I-215	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2883	0.22	6573	6641	I-215 Positive	Interstate	45	1	1		0	26389.53	1466.59	27856.12	5876.76	326.60	6203.36
2884	0.30	6645	6549	I-215 Negative	Interstate	65	1	1		0	3635.87	0.00	3635.87	1093.49	0.00	1093.49
2885	0.21	6554	6620	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2886	0.01	6552	6554	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2887	0.35	6473	6573	I-215 Positive	Interstate	65	1	1		0	26389.53	1466.59	27856.12	9126.69	507.21	9633.90

Figure I-2-80: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connecto	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2888	0.29	6468	6552	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2889	0.44	6549	6401	I-215 Negative	Interstate	65	1	1		0	3535.87	0.00	3535.87	1599.34	0.00	1599.34
2890	0.09	6099	6088	I-215 Negative	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2891	0.10	6094	6104	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2892	0.02	6104	6099	SR-186 Foothill Blvd	Other Principal Arte	65	1	1		0	1466.59	0.00	1466.59	30.74	0.00	30.74
2893	0.20	6099	5984	SR-186 Foothill Blvd	Other Principal Arte	55	1	1		0	1466.59	22757.93	24224.51	286.28	4442.46	4728.74
2894	0.31	6096	6154	I-215 Positive	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2895	0.22	6104	6151	I-215	Interstate	65	1	1		0	0.00	1466.59	1466.59	0.00	318.90	318.90
2896	0.32	6163	6099	I-215 Negative	Interstate	55	1	1		0	0.00	22757.93	22757.93	0.00	7188.41	7188.41
2897	0.14	6151	6176	I-215	Interstate	65	1	1		0	0.00	1466.59	1466.59	0.00	211.43	211.43
2898	0.11	6182	6163	I-215 Negative	Interstate	65	1	1		0	0.00	22757.93	22757.93	0.00	2569.49	2569.49
2899	0.15	6187	6255	I-215 Positive	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2900	0.07	6183	6196	I-215	Interstate	65	1	1		0	0.00	1466.59	1466.59	0.00	107.03	107.03
2901	0.12	6213	6182	I-215 Negative	Interstate	45	1	1		0	0.00	22757.93	22757.93	0.00	2689.82	2689.82
2902	0.05	6176	6183	I-215	Interstate	65	1	1		0	0.00	1466.59	1466.59	0.00	67.67	67.67
2903	0.19	6154	6187	I-215 Positive	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2904	0.64	5961	6095	I-80	Interstate	65	1	1		0	3877.48	22520.51	26397.91	3266.29	18971.09	22237.38
2905	0.17	6400	6473	I-215 Positive	Interstate	65	1	1		0	26389.53	1466.59	27856.12	4436.52	246.56	4683.08
2906	0.16	6402	6468	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2907	0.02	6397	6400	SR-171 3300 S	Other Principal Arte	35	1	1		0	0.00	4.27	4.27	0.00	0.09	0.09
2908	0.01	6400	6402	SR-171 3300 S	Other Principal Arte	45	1	1		0	1466.59	26383.80	27850.39	9.79	176.11	185.90
2909	0.01	6402	6401	SR-171 3300 S	Other Principal Arte	45	1	1		0	0.00	26383.80	26393.80	0.00	197.04	197.04
2910	0.02	6401	6398	SR-171 3300 S	Other Principal Arte	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2911	0.20	6324	6400	I-215 Positive	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2912	0.19	6325	6402	I-215	Interstate	65	1	1		0	0.00	1466.59	1466.59	0.00	284.37	284.37
2913	0.17	6381	6386	SR-171 3300 S	Other Principal Arte	35	1	1		0	0.00	4.27	4.27	0.00	0.75	0.75
2914	0.19	3193	6387	SR-171 3300 S	Other Principal Arte	35	1	1		0	0.00	4.27	4.27	0.00	0.81	0.81
2915	0.19	3193	6387	SR-171 3300 S	Other Principal Arte	35	1	1		0	0.00	4.27	4.27	0.00	0.81	0.81
2916	0.25	6387	6388	SR-171 3300 S	Other Principal Arte	35	1	1		0	0.00	4.27	4.27	0.00	1.05	1.05
2917	0.01	6388	6389	SR-171 3300 S	Other Principal Arte	25	1	1		0	0.00	4.27	4.27	0.00	0.03	0.03
2918	0.05	5712	5713	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2919	0.13	5713	5714	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2920	0.07	5714	5715	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2921	0.37	5715	5783	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2922	0.46	5783	5872	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2923	0.15	4367	4368	SR-186 400 S	Other Principal Arte	35	1	1		0	2648.23	0.00	2648.23	405.36	0.00	405.36

Figure I-2-81: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD1A	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2924	0.15	4369	4369	SR-186 4000 S	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	399.76	0.00	399.76
2925	0.39	4369	4426	SR-186 5000 S	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	1048.14	0.00	1048.14
2926	0.15	2213	4427	SR-186 5000 S	Other Principal Art	25	1	1		0	2648.23	0.00	2648.23	400.35	0.00	400.35
2927	0.15	2213	4427	SR-186 5000 S	Other Principal Art	25	1	1		0	2648.23	0.00	2648.23	400.22	0.00	400.22
2928	0.44	4427	4428	SR-186 Foothill Blvd	Other Principal Art	25	1	1		0	2648.23	0.00	2648.23	1176.74	0.00	1176.74
2929	0.51	4428	4441	SR-186 Foothill Blvd	Other Principal Art	35	1	1		0	2648.23	0.00	2648.23	1354.54	0.00	1354.54
2930	0.24	6389	6392	SR-171 3300 S	Other Principal Art	35	1	1		0	0.00	4.27	4.27	0.00	1.04	1.04
2931	0.50	6392	6394	SR-171 3300 S	Other Principal Art	35	1	1		0	0.00	4.27	4.27	0.00	2.14	2.14
2932	0.16	5920	5954	I-80	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2933	0.09	5954	5975	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2934	0.06	5975	6004	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2935	0.14	6004	6059	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2936	0.35	5872	5920	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2937	0.50	6394	6395	SR-171 3300 S	Other Principal Art	35	1	1		0	0.00	4.27	4.27	0.00	2.13	2.13
2938	0.10	6005	6018	I-215 Negative	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2939	0.07	6059	6064	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2940	0.07	6059	6018	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2941	0.04	6018	6021	I-215 Negative	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2942	0.16	6018	5930	I-80	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2943	0.21	6064	6065	I-215	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2944	0.17	6021	5974	I-215 Negative	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2945	0.01	7005	7011	I-15 South Bound	Interstate	35	1	1		0	0.00	3512.61	3512.61	0.00	22.88	22.88
2946	0.01	7011	7012	SR-266 4500 S	Other Principal Art	35	1	1		0	4676.44	18028.89	22691.33	48.00	154.33	194.32
2947	0.01	7012	7010	SR-266 4500 S	Other Principal Art	35	1	1		0	4676.44	21039.10	25708.54	43.96	198.04	242.01
2948	0.01	7010	7010	I-15 North Bound	Interstate	35	1	1		0	14.55	2313.52	2328.07	0.13	20.95	21.08
2949	0.00	7010	7008	I-15 North Bound	Interstate	35	1	1		0	85.56	20691.67	20891.23	0.30	78.54	78.84
2950	0.05	7010	7013	SR-266 4500 S	Other Principal Art	35	1	1		0	2356.92	312.42	2669.35	128.52	15.98	136.49
2951	0.33	6943	7005	I-15 South Bound	Interstate	65	1	1		0	0.00	3512.61	3512.61	0.00	1168.47	1168.47
2952	0.25	7012	6959	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2953	0.32	7008	6945	I-15 North Bound	Interstate	65	1	1		0	85.56	20691.67	20891.23	28.21	6552.73	6588.95
2954	0.03	7013	7014	SR-266 4500 S	Other Principal Art	35	1	1		0	2356.92	312.42	2669.35	78.89	10.46	89.34
2955	0.05	7014	7015	SR-266 4500 S	Other Principal Art	35	1	1		0	2356.92	312.42	2669.35	116.15	15.40	131.54
2956	0.20	3508	7019	SR-266 4500 S	Other Principal Art	25	1	1		0	2356.92	312.42	2669.35	464.21	61.53	525.74
2957	0.20	3507	7019	SR-266 4500 S	Other Principal Art	25	1	1		0	2356.92	312.42	2669.35	464.16	61.53	525.68
2958	0.16	7019	7020	SR-266 4500 S	Other Principal Art	35	1	1		0	2356.92	312.42	2669.35	378.54	49.12	419.66
2959	0.59	6959	6939	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-82: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2960	0.51	6691	6943	I-15 South Bound	Interstate	65	1	1		0	0.00	3512.61	3512.61	0.00	1785.84	1785.84
2961	0.53	6949	6702	I-15 North Bound	Interstate	65	1	1		0	89.56	20801.67	20891.23	47.21	10965.28	11012.49
2962	0.51	6702	6528	I-15 North Bound	Interstate	65	1	1		0	89.56	20801.67	20891.23	45.42	10549.60	10595.02
2963	0.57	6699	6505	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2964	0.40	6378	6520	I-15 South Bound	Interstate	65	1	1		0	0.00	3512.61	3512.61	0.00	1416.65	1416.65
2965	0.40	6524	6372	I-15 North Bound	Interstate	65	1	1		0	89.56	20801.67	20891.23	36.25	8420.78	8457.03
2966	0.25	6505	6365	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2967	0.30	3511	7021	SR-266 4500 S	Other Principal Art	35	1	1		0	2356.92	312.42	2669.35	697.12	92.41	789.53
2968	0.30	3509	7021	SR-266 4500 S	Other Principal Art	35	1	1		0	2356.92	312.42	2669.35	696.89	92.38	789.27
2969	0.27	3629	7022	SR-71	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2970	0.29	7021	7022	SR-266 4500 S	Other Principal Art	35	1	1		0	2356.92	312.42	2669.35	682.65	90.49	773.14
2971	0.44	3511	6684	SR-71	Other Principal Art	25	1	1		0	28419.48	1791.17	30210.65	12423.73	783.02	13206.75
2972	0.44	3511	6684	SR-71	Other Principal Art	25	1	1		0	28419.48	1791.17	30210.65	12427.07	783.23	13210.30
2973	0.44	3342	6379	SR-71	Other Principal Art	35	1	1		0	28419.48	1791.17	30210.65	12595.78	793.86	13389.64
2974	0.44	3342	6379	SR-71	Other Principal Art	35	1	1		0	28419.48	1791.17	30210.65	12598.00	794.00	13392.00
2975	0.24	3238	6393	SR-171 3500 S	Other Principal Art	35	1	1		0	2028.59	3433.95	5462.54	481.28	814.69	1295.97
2976	0.10	6393	6395	SR-171 3500 S	Other Principal Art	35	1	1		0	2028.59	3433.95	5462.54	205.43	347.74	553.17
2977	0.06	6366	6367	SR-171 3300 S	Other Principal Art	35	1	1		0	0.00	5269.42	5269.42	0.00	326.26	326.26
2978	0.01	6361	6364	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
2979	0.01	6365	6360	I-15 North Bound	Interstate	65	1	1		0	5354.71	20797.40	26152.11	49.60	192.65	242.25
2980	0.05	6367	6368	SR-171 3300 S	Other Principal Art	35	1	1		0	0.00	5269.42	5269.42	0.00	283.92	283.92
2981	0.30	6368	6373	SR-171 3300 S	Other Principal Art	35	1	1		0	0.00	5269.42	5269.42	0.00	1594.87	1594.87
2982	0.15	6373	6374	SR-171 3300 S	Other Principal Art	35	1	1		0	0.00	5269.42	5269.42	0.00	792.30	792.30
2983	0.15	6374	6376	SR-171 3300 S	Other Principal Art	35	1	1		0	0.00	5269.42	5269.42	0.00	781.21	781.21
2984	0.20	5788	5802	I-80	Interstate	65	1	1		0	2082.48	20797.40	22879.88	409.61	4090.67	4500.27
2985	0.03	5802	5806	I-80	Interstate	65	1	1		0	2082.48	20797.40	22879.88	59.92	598.40	658.32
2986	0.04	5806	5799	I-80	Interstate	65	1	1		0	2082.48	20797.40	22879.88	92.07	927.46	1028.33
2987	0.16	5799	5797	I-80	Interstate	65	1	1		0	2082.48	20797.40	22879.88	339.98	3395.34	3735.32
2988	0.06	5797	5796	I-80	Interstate	65	1	1		0	2082.48	20797.40	22879.88	132.07	1319.00	1451.07
2989	0.15	5796	5794	I-80	Interstate	65	1	1		0	2082.48	20797.40	22879.88	315.56	3151.42	3466.98
2990	0.15	5794	5807	I-80	Interstate	65	1	1		0	2082.48	20797.40	22879.88	312.20	3118.68	3430.96
2991	0.29	6376	6377	SR-171 3300 S	Other Principal Art	35	1	1		0	0.00	5269.42	5269.42	0.00	1545.32	1545.32
2992	0.30	6377	6378	SR-171 3300 S	Other Principal Art	35	1	1		0	0.00	5269.42	5269.42	0.00	1590.94	1590.94
2993	0.29	6378	6379	SR-171 3300 S	Other Principal Art	35	1	1		0	0.00	5269.42	5269.42	0.00	1547.58	1547.58
2994	0.44	3189	6003	SR-71	Other Principal Art	25	1	1		0	23154.33	1791.17	24945.50	10225.38	791.01	11016.39
2995	0.44	3190	6003	SR-71	Other Principal Art	25	1	1		0	23154.33	1791.17	24945.50	10227.29	791.16	11018.45

Figure I-2-83: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD TA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
2996	0.18	3000	5837	SR-71	Other Principal Arte	25	1	1		0	23154.33	1791.17	24945.50	4251.56	328.89	4580.45
2997	0.21	5807	5808	I-80	Interstate	65	1	1		0	2882.48	20797.40	22679.88	441.07	4404.89	4845.96
2998	0.09	5808	5809	I-80	Interstate	65	1	1		0	2882.48	20797.40	22679.88	175.70	1754.66	1930.36
2999	0.30	5809	5815	I-80	Interstate	65	1	1		0	2882.48	20797.40	22679.88	623.97	6231.47	6855.44
3000	0.10	5815	5816	I-80	Interstate	65	1	1		0	2882.48	20797.40	22679.88	200.18	1988.34	2198.43
3001	0.01	5816	5817	I-80	Interstate	65	1	1		0	2882.48	20797.40	22679.88	28.21	281.74	309.95
3002	0.18	3003	5837	SR-71	Other Principal Arte	25	1	1		0	23154.33	1791.17	24945.50	4254.74	329.14	4583.87
3003	0.01	5837	5827	SR-71	Other Principal Arte	45	1	1		0	23154.33	1791.17	24945.50	289.21	22.37	311.58
3004	0.19	5817	5767	I-80	Interstate	25	1	1		0	2882.48	20797.40	22679.88	389.78	3892.64	4282.41
3005	0.03	5827	5778	SR-71	Other Principal Arte	65	1	1		0	23154.33	1791.17	24945.50	698.22	54.01	752.23
3006	0.01	5778	5767	SR-71	Other Principal Arte	65	1	1		0	23154.33	1791.17	24945.50	158.17	12.24	170.41
3007	0.01	5767	5751	SR-71	Other Principal Arte	65	1	1		0	2648.23	0.00	2648.23	21.38	0.00	21.38
3008	0.03	5751	5730	SR-71	Other Principal Arte	45	1	1		0	2648.23	0.00	2648.23	92.10	0.00	92.10
3009	0.08	5777	5695	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3010	0.09	5668	5745	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3011	0.18	5684	5668	I-15	Interstate	45	1	1		0	5433.37	53.89	5487.26	1005.08	9.97	1015.05
3012	0.11	5695	5627	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3013	0.19	5577	5668	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3014	0.07	5627	5601	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3015	0.14	5473	5577	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3016	0.18	5588	5430	I-15	Interstate	45	1	1		0	5433.37	53.89	5487.26	952.31	9.45	961.76
3017	0.22	5601	5392	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3018	0.04	5373	5473	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3019	0.03	5430	5375	I-15	Interstate	45	1	1		0	5433.37	53.89	5487.26	155.62	1.54	157.16
3020	0.01	5392	5376	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3021	0.56	5129	5373	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3022	0.30	5376	5207	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3023	0.56	5375	5130	I-15	Interstate	35	1	1		0	5433.37	53.89	5487.26	3023.09	29.98	3053.08
3024	0.03	5117	5125	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3025	0.26	5207	5126	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3026	0.32	5126	5036	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3027	0.40	5130	5006	I-15	Interstate	35	1	1		0	5433.37	53.89	5487.26	2185.30	21.67	2206.98
3028	0.53	4877	5117	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3029	0.10	5036	5003	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3030	0.16	5006	4877	I-15	Interstate	65	1	1		0	5433.37	53.89	5487.26	851.73	8.45	860.17
3031	0.13	5003	4879	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-84: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD IA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3032	0.21	4770	4822	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3033	0.24	4822	4877	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3034	0.26	4878	4814	I-15	Interstate	45	1	1		0	5433.37	53.89	5487.26	1431.09	14.19	1445.29
3035	0.28	4879	4808	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3036	0.03	4808	4796	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3037	0.09	4536	4563	I-15 South Bound	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3038	0.18	4478	4536	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3039	0.22	4543	4453	I-15	Interstate	45	1	1		0	5433.37	53.89	5487.26	1211.76	12.02	1223.78
3040	0.19	4531	4454	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3041	0.02	5730	5699	SR-71	Other Principal Arte	45	1	1		0	2648.23	0.00	2648.23	57.56	0.00	57.56
3042	0.40	5699	5411	SR-71	Other Principal Arte	25	1	1		0	2648.23	0.00	2648.23	1053.81	0.00	1053.81
3043	0.28	2705	5142	SR-71	Other Principal Arte	25	1	1		0	2648.23	0.00	2648.23	738.27	0.00	738.27
3044	0.27	2214	4407	SR-269	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3045	0.15	4451	4452	SR-269	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3046	0.15	4407	4408	SR-269	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3047	0.15	4452	4456	SR-269	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3048	0.07	2204	4410	SR-269	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3049	0.07	2204	4410	SR-269	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3050	0.09	2205	4409	SR-269	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3051	0.15	4456	4457	SR-269	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3052	0.09	2205	4409	SR-269	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3053	0.07	2229	4458	SR-269	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3054	0.07	2228	4458	SR-269	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3055	0.07	2205	4411	SR-269	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3056	0.07	2204	4413	SR-269	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3057	0.06	4459	4459	600	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3058	0.03	4459	4460	600	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3059	0.09	2207	4412	500	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3060	0.28	2706	5142	SR-71	Other Principal Arte	25	1	1		0	2648.23	0.00	2648.23	738.49	0.00	738.49
3061	0.28	2570	4906	SR-71	Other Principal Arte	25	1	1		0	2648.23	0.00	2648.23	743.96	0.00	743.96
3062	0.28	2572	4906	SR-71	Other Principal Arte	25	1	1		0	2648.23	0.00	2648.23	744.29	0.00	744.29
3063	0.28	2853	4713	SR-71	Other Principal Arte	25	1	1		0	2648.23	0.00	2648.23	739.92	0.00	739.92
3064	0.06	4460	4463	600	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3065	0.09	2206	4412	500	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3066	0.09	2206	4411	500 SOUTH	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3067	0.15	4463	4464	600 SOUTH	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-85: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3068	0.08	2206	4411	500 SOUTH	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3069	0.05	4464	4465	600	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3070	0.10	4465	4468	600	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3071	0.07	4411	4414	500 SOUTH	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3072	0.08	4414	4415	500 SOUTH	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3073	0.47	6385	6383	SR-171 3000 S	Other Principal Art	35	1	1		0	2028.59	3433.95	5462.54	957.48	1620.79	2578.27
3074	0.15	6383	6382	SR-171 3000 S	Other Principal Art	35	1	1		0	2028.59	3433.95	5462.54	318.44	525.51	835.95
3075	0.30	6382	6371	SR-171 3000 S	Other Principal Art	25	1	1		0	2028.59	3433.95	5462.54	611.20	1034.63	1645.83
3076	0.30	6371	6369	SR-171 3000 S	Other Principal Art	35	1	1		0	2028.59	3433.95	5462.54	617.39	1045.11	1662.50
3077	0.11	6369	6363	SR-171 3000 S	Other Principal Art	35	1	1		0	2028.59	3433.95	5462.54	215.84	365.38	581.22
3078	0.06	6363	6364	SR-171 3000 S	Other Principal Art	35	1	1		0	2028.59	3433.95	5462.54	116.13	196.57	312.70
3079	0.31	6385	6297	I-15	Interstate	35	1	1		0	2107.25	0.00	2107.25	658.11	0.00	658.11
3080	0.36	6213	6361	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3081	0.41	6360	6197	I-15 North Bound	Interstate	65	1	1		0	5354.71	20797.40	26152.11	2178.99	8431.99	10602.98
3082	0.29	6139	6213	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3083	0.38	6297	6131	I-15	Interstate	65	1	1		0	2107.25	0.00	2107.25	807.23	0.00	807.23
3084	0.24	6197	6141	I-15 North Bound	Interstate	65	1	1		0	5354.71	20797.40	26152.11	1276.61	4958.30	6234.91
3085	0.22	6015	6139	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3086	0.26	6141	5960	I-15 North Bound	Interstate	65	1	1		0	5354.71	20797.40	26152.11	1369.91	5320.64	6690.55
3087	0.19	5894	6015	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3088	0.55	6131	5941	I-15	Interstate	45	1	1		0	2107.25	0.00	2107.25	1148.74	0.00	1148.74
3089	0.16	5960	5850	I-15 North Bound	Interstate	65	1	1		0	5354.71	20797.40	26152.11	869.96	3378.69	4248.65
3090	0.16	5845	5894	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3091	0.18	5850	5801	I-15 North Bound	Interstate	65	1	1		0	5354.71	20797.40	26152.11	965.95	3751.69	4717.63
3092	0.07	5765	5845	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3093	0.03	5941	5810	I-15	Interstate	45	1	1		0	2107.25	0.00	2107.25	54.98	0.00	54.98
3094	0.02	5810	5764	I-15	Interstate	45	1	1		0	2107.25	0.00	2107.25	32.14	0.00	32.14
3095	0.01	5764	5765	I-80	Interstate	65	1	1		0	2082.48	5354.71	7437.19	25.11	64.56	89.67
3096	0.02	5801	5801	I-15 North Bound	Interstate	65	1	1		0	5354.71	20797.40	26152.11	106.45	413.44	519.89
3097	0.01	5801	5765	I-15 North Bound	Interstate	65	1	1		0	5354.71	20797.40	26152.11	48.05	186.64	234.70
3098	0.02	5795	5788	I-80	Interstate	45	1	1		0	2082.48	20797.40	22879.88	35.54	354.97	390.51
3099	0.02	5788	5786	I-80	Interstate	45	1	1		0	2082.48	20797.40	22879.88	51.64	515.71	567.35
3100	0.01	5786	5788	0015-0080-S-307 (4)	Interstate	45	1	1		0	2082.48	20797.40	22879.88	17.38	173.55	190.93
3101	0.02	5745	5765	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3102	0.02	5764	5754	I-15	Interstate	45	1	1		0	5433.37	53.89	5487.26	113.51	1.13	114.63
3103	0.08	5754	5694	I-15	Interstate	65	1	1		0	5433.37	53.89	5487.26	457.63	4.54	462.37

Figure I-2-86: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectio	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3104	0.01	5785	5777	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3105	0.06	3562	3556	I-15	Interstate	65	1	1		0	5433.37	53.89	5487.26	319.94	3.17	323.11
3106	0.25	3557	3599	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3107	0.23	3616	3562	I-15	Interstate	35	1	1		0	5433.37	53.89	5487.26	1254.15	12.44	1266.59
3108	0.22	3597	3563	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3109	0.09	3563	3551	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3110	0.19	3503	3541	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3111	0.57	3552	3499	I-15	Interstate	45	1	1		0	5433.37	53.89	5487.26	3106.62	30.81	3137.43
3112	0.18	3496	3501	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3113	0.17	3499	3497	I-15	Interstate	45	1	1		0	5433.37	53.89	5487.26	342.71	3.35	362.06
3114	0.18	3501	3503	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3115	0.02	3500	3498	I-15 North Bound	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3116	0.56	3551	3500	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3117	0.33	3528	3708	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3118	0.34	3707	3616	I-15	Interstate	35	1	1		0	5433.37	53.89	5487.26	1860.17	18.45	1878.62
3119	0.33	3706	3627	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3120	0.01	3627	3617	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3121	0.01	3617	3597	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3122	0.31	3457	3495	I-15	Interstate	65	1	1		0	5433.37	53.89	5487.26	1711.12	16.97	1728.09
3123	0.73	3475	3496	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3124	0.23	1748	3472	I-15	Interstate	65	1	1		0	5433.37	53.89	5487.26	1229.49	12.19	1241.69
3125	0.27	1747	3469	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3126	0.09	3473	3468	I-15	Interstate	65	1	1		0	5433.37	53.89	5487.26	492.03	4.88	496.91
3127	0.23	1747	3473	I-15	Interstate	65	1	1		0	5433.37	53.89	5487.26	1229.48	12.19	1241.67
3128	0.27	1747	3469	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3129	0.58	3441	3475	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3130	0.44	3458	3442	I-15	Interstate	65	1	1		0	5433.37	53.89	5487.26	2376.07	23.57	2399.63
3131	0.55	3459	3440	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3132	0.11	3442	3435	I-15	Interstate	65	1	1		0	5433.37	53.89	5487.26	591.99	5.87	597.87
3133	0.13	3436	3441	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3134	0.02	3440	3438	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3135	0.03	3439	3437	I-15	Interstate	35	1	1		0	5433.37	53.89	5487.26	167.41	1.66	169.07
3136	0.10	3438	3435	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3137	0.26	4239	4252	I-80 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3138	0.35	4226	4245	I-80	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3139	0.04	4252	4270	I-80 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-87: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3140	0.00	4259	4263	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3141	0.01	4255	4259	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3142	0.04	4243	4255	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3143	0.02	4266	4251	I-15	Interstate	65	1	1		0	5433.37	53.89	5487.26	111.28	1.10	112.39
3144	0.05	4272	4247	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3145	0.03	4180	4243	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3146	0.06	4251	4181	I-15	Interstate	45	1	1		0	5433.37	53.89	5487.26	345.42	3.43	348.85
3147	0.05	4247	4182	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3148	0.22	4003	4180	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3149	0.15	4182	4013	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3150	0.32	4181	3952	I-15	Interstate	25	1	1		0	5433.37	53.89	5487.26	1735.63	17.21	1752.84
3151	0.00	4002	4003	I-15 South Bound	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3152	0.10	3951	4002	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3153	0.10	4013	3999	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3154	0.06	3999	3954	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3155	0.15	3866	3951	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3156	0.15	3952	3867	I-15	Interstate	35	1	1		0	5433.37	53.89	5487.26	849.55	8.43	857.97
3157	0.15	3954	3868	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3158	0.30	3753	3866	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3159	0.30	3867	3754	I-15	Interstate	25	1	1		0	5433.37	53.89	5487.26	1623.91	16.11	1640.01
3160	0.30	3868	3755	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3161	0.11	3708	3753	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3162	0.11	3754	3707	I-15	Interstate	25	1	1		0	5433.37	53.89	5487.26	506.01	5.01	511.02
3163	0.11	3755	3706	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3164	0.01	3615	3628	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3165	0.01	3599	3615	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3166	0.20	3541	3555	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3167	0.05	3555	3557	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3168	0.03	3556	3552	I-15	Interstate	45	1	1		0	5433.37	53.89	5487.26	168.12	1.67	169.79
3169	0.01	3059	3058	I-215	Interstate	65	1	1		0	4289.81	3080.58	7370.39	47.08	33.81	80.89
3170	0.42	3061	3045	I-215 Positive	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3171	0.33	3059	3047	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	12589.31	0.00	12589.31
3172	0.34	3058	3045	I-215	Interstate	65	1	1		0	4289.81	0.00	4289.81	1465.84	0.00	1465.84
3173	0.33	3056	3045	I-15 North Bound	Interstate	65	1	1		0	0.00	3080.58	3080.58	0.00	1016.21	1016.21
3174	0.22	3049	3055	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	169.76	97.66	267.42
3175	0.06	3027	3049	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	48.79	28.07	76.86

Figure I-2-88: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3176	0.05	3347	3329	I-15	Interstate	35	1	1		0	38265.21	0.00	38265.21	1888.23	0.00	1888.23
3177	0.04	3345	3329	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	174.74	125.49	300.23
3178	0.25	3312	3327	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	188.36	109.51	299.87
3179	0.23	3328	3313	I-15	Interstate	35	1	1		0	38265.21	0.00	38265.21	8936.50	0.00	8936.50
3180	0.63	3329	3282	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	2705.23	1942.67	4647.90
3181	0.42	3313	3281	I-15	Interstate	35	1	1		0	38265.21	0.00	38265.21	15881.75	0.00	15881.75
3182	0.42	3279	3312	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	324.11	186.46	510.56
3183	0.68	3234	3279	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	519.88	299.08	818.96
3184	0.71	3282	3235	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	3045.94	2187.34	5233.29
3185	0.70	3281	3233	I-15	Interstate	35	1	1		0	38265.21	0.00	38265.21	26924.60	0.00	26924.60
3186	0.22	3207	3234	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	178.65	98.18	268.83
3187	0.21	3235	3214	I-15 North Bound	Interstate	45	1	1		0	4289.81	3080.58	7370.39	921.83	661.98	1583.81
3188	0.21	3233	3212	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	7949.44	0.00	7949.44
3189	0.24	3214	3183	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1018.57	732.17	1751.73
3190	0.32	3177	3207	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	245.16	141.04	386.20
3191	0.32	3212	3178	I-15	Interstate	35	1	1		0	38265.21	0.00	38265.21	12241.36	0.00	12241.36
3192	0.73	3183	3139	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	3140.94	2255.56	5396.49
3193	0.64	3137	3177	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	494.53	284.50	779.03
3194	0.65	3178	3138	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	24722.01	0.00	24722.01
3195	0.45	3113	3137	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	348.20	200.32	548.52
3196	0.46	3138	3112	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	17708.79	0.00	17708.79
3197	0.45	3139	3114	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1943.47	1395.63	3339.10
3198	0.21	3086	3113	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	159.04	91.50	250.54
3199	0.22	3112	3085	I-15	Interstate	35	1	1		0	38265.21	0.00	38265.21	7541.77	0.00	7541.77
3200	0.21	3114	3087	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	886.59	636.67	1523.26
3201	0.18	12581	12574	I-15 North Bound	Interstate	65	1	1		0	42.70	0.00	42.70	7.70	0.00	7.70
3202	0.04	12572	12576	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3203	0.04	12577	12573	I-15	Interstate	45	1	1		0	11585.64	15876.63	27462.27	442.39	606.23	1048.62
3204	0.01	12583	12585	SR-6	Other Principal Arte	35	1	1		0	0.00	2687.42	2687.42	0.00	15.49	15.49
3205	0.20	12585	12597	SR-6	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	23.33	1193.59	1216.92
3206	0.01	12573	12565	I-15	Interstate	45	1	1		0						
3207	0.15	12574	12564	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	2663.06	2663.06
3208	0.50	12566	12572	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	1575.79	1575.79
3209	0.36	12565	12559	I-15	Interstate	25	1	1		0	15696.05	4278.39	19974.47	5655.64	1541.59	7197.23
3210	0.99	12564	12550	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	13919.02	13919.02
3211	0.62	12566	12543	I-15	Interstate	25	1	1		0	15696.05	4278.39	19974.47	9796.58	2670.32	12466.90

Figure I-2-89: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDLA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3212	0.57	12551	12556	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	1536.96	1536.96
3213	0.87	12487	12551	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	2328.70	2328.70
3214	0.87	12550	12486	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	12287.24	12287.24
3215	0.91	12549	12483	I-15	Interstate	65	1	1		0	15696.89	4278.39	19974.47	14217.32	3875.31	18092.63
3216	0.30	12452	12487	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	798.71	798.71
3217	0.29	12486	12454	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	4134.31	4134.31
3218	0.26	12483	12453	I-15	Interstate	35	1	1		0	15696.89	4278.39	19974.47	4034.06	1099.59	5133.65
3219	0.30	12403	12452	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	887.26	887.26
3220	0.30	12453	12435	I-15	Interstate	35	1	1		0	15696.89	4278.39	19974.47	5151.82	1404.27	6556.09
3221	0.30	12454	12434	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	4666.67	4666.67
3222	0.43	12648	12671	SR-6	Other Principal Art	35	1	1		0	84.35	4315.41	4399.77	36.44	1864.06	1900.50
3223	0.22	6312	12648	SR-6	Other Principal Art	35	1	1		0	84.35	4315.41	4399.77	18.53	947.78	966.31
3224	0.22	6308	12648	SR-6	Other Principal Art	35	1	1		0	84.35	4315.41	4399.77	18.52	947.22	965.74
3225	0.33	6307	12683	SR-6	Other Principal Art	35	1	1		0	84.35	4315.41	4399.77	28.04	1434.70	1462.74
3226	0.09	12494	12489	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3227	0.12	12489	12479	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3228	0.16	12479	12461	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3229	0.38	12461	12418	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3230	0.13	6207	12412	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3231	0.13	6211	12412	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3232	0.32	12380	12363	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	4518.51	4518.51
3233	0.21	6350	12722	SR-6	Other Principal Art	35	1	1		0	84.35	4315.41	4399.77	17.79	910.13	927.92
3234	0.33	12694	12638	SR-6	Other Principal Art	35	1	1		0	84.35	4315.41	4399.77	27.54	1409.11	1436.66
3235	1.97	12685	12634	SR-6	Other Principal Art	35	1	1		0	84.35	4315.41	4399.77	89.88	4598.17	4688.05
3236	2.43	12722	13641	SR-89	Other Principal Art	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3237	0.21	6348	12722	SR-6	Other Principal Art	35	1	1		0	84.35	4315.41	4399.77	17.78	909.73	927.51
3238	6.18	12722	12847	SR-6	Other Principal Art	35	1	1		0	84.35	4315.41	4399.77	521.09	26657.87	27178.95
3239	3.35	12847	12868	SR-6	Other Principal Art	45	1	1		0	84.35	4315.41	4399.77	282.33	14443.32	14725.65
3240	0.32	12612	12638	I-15 South Bound	Interstate	65	1	1		0	653.41	541.37	1194.78	208.41	172.68	381.09
3241	0.62	12639	12613	I-15	Interstate	25	1	1		0	1213.41	0.00	1213.41	757.95	0.00	757.95
3242	0.61	12640	12614	I-15 North Bound	Interstate	65	1	1		0	9948.36	15639.15	25587.51	6053.33	9525.47	15584.80
3243	0.04	12614	12611	I-15 North Bound	Interstate	65	1	1		0	9948.36	15639.15	25587.51	381.53	599.78	981.30
3244	0.01	12610	12612	I-15 South Bound	Interstate	65	1	1		0	577.80	805.13	1383.16	5.34	7.46	12.81
3245	0.04	12613	12609	I-15	Interstate	25	1	1		0	1213.41	0.00	1213.41	46.16	0.00	46.16
3246	0.34	12590	12610	I-15 South Bound	Interstate	65	1	1		0	577.80	805.13	1383.16	197.35	275.70	473.05
3247	0.32	12611	12592	I-15 North Bound	Interstate	65	1	1		0	9948.36	15639.15	25587.51	3160.85	4968.96	8129.81

Figure I-2-90: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3248	0.32	12609	12591	I-15	Interstate	35	1	1		0	1213.41	0.00	1213.41	388.12	0.00	388.12
3249	0.10	13675	12660	SR-156	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3250	0.35	12660	12647	SR-156	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3251	0.35	12647	12625	SR-156	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3252	0.25	12625	12596	SR-156	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3253	0.01	12596	12594	SR-156	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3254	0.02	12594	12593	SR-156	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3255	0.27	12597	12520	SR-6	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	22.81	1166.84	1189.65
3256	0.05	12593	12592	SR-156	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3257	0.01	12592	12591	SR-156	Other Principal Arte	35	1	1		0	9885.66	15639.15	25644.81	98.43	155.40	253.83
3258	0.01	12590	12598	SR-156	Other Principal Arte	35	1	1		0	806.13	577.03	1383.16	5.29	6.65	15.94
3259	0.04	12587	12590	SR-156	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3260	0.01	12586	12587	MAIN	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3261	0.17	12591	12580	I-15	Interstate	35	1	1		0	11585.64	15876.63	27462.27	1986.38	2722.08	4708.46
3262	0.18	12592	12581	I-15 North Bound	Interstate	65	1	1		0	42.70	0.00	42.70	7.70	0.00	7.70
3263	0.31	12576	12590	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3264	0.15	12580	12577	I-15	Interstate	65	1	1		0	11585.64	15876.63	27462.27	1703.55	2334.50	4038.05
3265	0.29	12317	12297	SR-189	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3266	0.14	6127	12251	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3267	0.14	6101	12197	SR-114	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3268	0.16	12251	12235	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3269	0.14	6097	12197	SR-114	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3270	0.10	12235	12196	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3271	0.09	12196	12167	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3272	0.09	12167	12143	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3273	0.29	12143	12096	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3274	0.14	6125	12251	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3275	0.29	12297	12282	SR-189	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3276	0.09	12282	12268	SR-189	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3277	0.19	12253	12252	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3278	0.19	12268	12253	SR-189	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3279	0.09	6126	12238	SR-189	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3280	0.09	6127	12238	SR-189	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3281	0.09	12238	12205	SR-189	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3282	0.10	12205	12171	SR-189	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3283	0.09	12171	12152	SR-189	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-91: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3284	0.29	12152	12095	SR-189	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3285	0.18	6126	12253	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3286	0.18	6126	12253	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3287	0.27	12255	12254	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3288	0.11	6132	12255	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3289	0.11	6133	12255	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3290	0.08	12274	12269	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3291	0.07	12268	12274	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3292	0.46	6205	12402	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3293	0.46	6207	12402	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3294	1.82	12402	12374	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3295	0.79	6198	12288	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3296	0.79	6197	12288	SR-89	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3297	1.29	12405	12403	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	3215.07	3215.07
3298	1.22	12435	12404	I-15	Interstate	65	1	1		0	15696.09	4278.39	19974.47	19105.57	5207.73	24313.31
3299	1.23	12434	12401	I-15 North Bound	Interstate	45	1	1		0	0.00	14122.34	14122.34	0.00	17400.29	17400.29
3300	0.32	12395	12405	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	863.73	863.73
3301	0.30	12404	12396	I-15	Interstate	35	1	1		0	15696.09	4278.39	19974.47	4747.97	1294.19	6042.16
3302	0.29	12403	12397	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	4034.16	4034.16
3303	0.63	12395	12390	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	1857.84	1857.84
3304	0.71	12391	12384	I-15	Interstate	65	1	1		0	15696.09	4278.39	19974.47	11160.41	3042.07	14202.48
3305	0.33	12384	12376	I-15	Interstate	65	1	1		0	15696.09	4278.39	19974.47	5130.61	1398.48	6529.09
3306	0.48	12371	12385	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	1302.19	1302.19
3307	0.87	12392	12380	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	12285.66	12285.66
3308	0.36	12390	12395	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	971.64	971.64
3309	0.36	12396	12391	I-15	Interstate	65	1	1		0	15696.09	4278.39	19974.47	5590.05	1523.72	7113.77
3310	0.36	12397	12392	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	5016.31	5016.31
3311	0.65	12304	12330	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	1782.69	1782.69
3312	0.65	12329	12303	I-15	Interstate	25	1	1		0	15696.09	4278.39	19974.47	10422.76	2841.00	13263.76
3313	0.65	12327	12303	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	9202.83	9202.83
3314	0.31	12330	12348	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	840.34	840.34
3315	0.31	12347	12329	I-15	Interstate	45	1	1		0	15696.09	4278.39	19974.47	4889.44	1332.75	6222.19
3316	0.32	12346	12327	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	4544.09	4544.09
3317	0.03	12361	12367	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	88.57	88.57
3318	0.04	12365	12353	I-15	Interstate	45	1	1		0	15696.09	4278.39	19974.47	696.69	189.90	886.59
3319	0.01	12367	12371	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	30.30	30.30

Figure I-2-92: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3320	0.01	12370	12365	I-15	Interstate	45	1	1		0	15696.09	4278.39	19974.47	157.72	42.99	200.71
3321	0.07	12348	12361	I-15 South Bound	Interstate	65	1	1		0	0.00	2687.42	2687.42	0.00	179.52	179.52
3322	0.11	12364	12346	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	1518.15	1518.15
3323	0.06	12353	12347	I-15	Interstate	65	1	1		0	15696.09	4278.39	19974.47	933.12	254.35	1187.46
3324	0.15	12376	12370	I-15	Interstate	45	1	1		0	15696.09	4278.39	19974.47	2309.17	629.43	2938.59
3325	0.01	12369	12364	I-15 North Bound	Interstate	65	1	1		0	0.00	14122.34	14122.34	0.00	146.30	146.30
3326	0.14	12339	12331	SR-189	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3327	0.11	12331	12323	SR-189	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3328	0.21	12323	12317	SR-189	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3329	0.01	5220	5225	SR-40	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3330	0.01	5225	5227	SR-40	Other Principal Art	25	1	1		0	6541.14	4314.60	10855.75	65.91	43.47	109.38
3331	0.04	5209	5220	SR-40	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3332	0.02	5203	5208	SR-40	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3333	0.06	5202	5203	SR-40	Other Principal Art	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3334	0.13	5227	5270	SR-40	Other Principal Art	25	1	1		0	6541.14	4314.60	10855.75	866.22	571.37	1437.59
3335	0.46	5225	5152	I-80	Interstate	65	1	1		0	698.80	40393.20	41093.00	325.19	18778.55	19095.74
3336	0.15	5152	5120	I-80	Interstate	65	1	1		0	698.80	40393.20	41093.00	105.61	6095.93	6201.54
3337	0.57	5120	5043	I-80	Interstate	65	1	1		0	698.80	40393.20	41093.00	396.05	22860.56	23256.61
3338	1.67	3460	7978	SR-40	Other Principal Art	25	1	1		0	25364.89	4314.60	29679.49	42418.35	7215.42	49633.77
3339	0.84	3625	6929	SR-248	Other Principal Art	35	1	1		0	18823.75	0.00	18823.75	15777.06	0.00	15777.06
3340	0.05	6929	6921	SR-248	Other Principal Art	35	1	1		0	18823.75	0.00	18823.75	900.14	0.00	900.14
3341	0.01	6921	6920	SR-248	Other Principal Art	65	1	1		0	18823.75	0.00	18823.75	177.57	0.00	177.57
3342	1.67	3460	7978	SR-40	Other Principal Art	25	1	1		0	25364.89	4314.60	29679.49	42419.19	7215.56	49634.76
3343	2.39	6092	6920	SR-40	Other Principal Art	1	1	1		0	6541.14	4314.60	10855.75	15640.61	10316.70	25957.31
3344	0.41	5043	4762	I-80	Interstate	65	1	1		0	698.80	40393.20	41093.00	288.93	16677.45	16966.38
3345	0.04	2379	4736	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	27.03	1600.52	1627.54
3346	0.04	2380	4736	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	27.08	1603.61	1630.69
3347	1.59	4736	3921	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	1090.06	64555.75	65645.80
3348	0.16	3921	3810	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	106.28	6294.40	6400.69
3349	0.14	3810	3781	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	94.50	5596.60	5691.11
3350	0.04	3781	3776	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	24.28	1437.89	1462.17
3351	1.58	3776	3506	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	1082.98	64136.83	65219.82
3352	2.34	3506	3490	I-80	Interstate	65	1	1		0	683.82	40497.74	41181.56	1598.20	94649.44	96247.64
3353	4.90					45	1	1		0	2095.33	2221.76	4317.09	10268.02	10888.44	21157.26
3354	0.05	10139	10144	SR-40	Other Principal Art	25	1	1		0	2095.33	2221.76	4317.09	102.85	109.06	211.91
3355	0.52	5017	10139	SR-40	Other Principal Art	35	1	1		0	2095.33	2221.76	4317.09	1084.95	1150.42	2235.37

Figure I-2-93: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3956	0.19	10144	10159	SR-40	Other Principal Art	35	1	1		0	2095.33	2221.76	4317.09	402.77	427.07	829.84
3957	0.20	4998	10030	SR-40	Other Principal Art	35	1	1		0	4043.32	4169.75	8213.08	822.08	847.79	1669.87
3958	0.26	13000	10036	SR-40	Other Principal Art	35	1	1		0	2095.33	2221.76	4317.09	534.85	567.12	1101.97
3959	0.47	9960	9997	SR-40	Other Principal Art	35	1	1		0	4043.32	4169.75	8213.08	1900.34	1962.86	3866.21
3960	0.41	4998	10030	SR-40	Other Principal Art	35	1	1		0	4043.32	4169.75	8213.08	1644.21	1695.62	3339.83
3961	0.26	4868	9960	SR-40	Other Principal Art	35	1	1		0	25364.89	4314.60	29679.49	6518.01	1187.36	7617.38
3962	0.26	4971	9960	SR-40	Other Principal Art	35	1	1		0	25364.89	4314.60	29679.49	6512.78	1187.83	7620.61
3963	0.21	4953	9939	SR-40	Other Principal Art	35	1	1		0	25364.89	4314.60	29679.49	5332.99	987.15	6240.14
3964	0.21	4954	9939	SR-40	Other Principal Art	35	1	1		0	25364.89	4314.60	29679.49	5334.75	987.45	6242.20
3965	0.09	9878	9907	SR-40	Other Principal Art	35	1	1		0	25364.89	4314.60	29679.49	2217.74	377.24	2594.98
3966	0.23	4935	9819	SR-40	Other Principal Art	25	1	1		0	4314.60	25364.89	29679.49	981.05	5767.44	6748.49
3967	0.23	4939	9819	SR-40	Other Principal Art	25	1	1		0	4314.60	25364.89	29679.49	981.08	5767.64	6748.72
3968	0.59	4909	9624	SR-40	Other Principal Art	45	1	1		0	4314.60	25364.89	29679.49	2545.80	14966.39	17512.19
3969	0.20	4647	9229	RIVER	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3970	0.20	4647	9229	RIVER	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3971	0.21	9229	9209	RIVER	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3972	0.26	9205	9187	RIVER	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3973	1.03	4812	9187	SR-40	Other Principal Art	45	1	1		0	4314.60	25364.89	29679.49	4455.89	26195.49	30651.38
3974	0.03	4590	9187	SR-40	Other Principal Art	35	1	1		0	25364.89	4314.60	29679.49	656.52	111.67	768.19
3975	0.03	4590	9187	SR-40	Other Principal Art	35	1	1		0	25364.89	4314.60	29679.49	656.52	111.67	768.19
3976	1.03	4812	9187	SR-40	Other Principal Art	45	1	1		0	4314.60	25364.89	29679.49	4456.19	26197.24	30653.43
3977	0.89	7978	8252	SR-40	Other Principal Art	65	1	1		0	25364.89	4314.60	29679.49	22576.45	3848.29	26416.73
3978	2.12	4200	9180	SR-40	Other Principal Art	25	1	1		0	25364.89	4314.60	29679.49	53689.36	9132.64	62821.99
3979	2.12	4201	9180	SR-40	Other Principal Art	25	1	1		0	25364.89	4314.60	29679.49	53690.14	9132.77	62822.91
3980	0.73	8252	9401	SR-40	Other Principal Art	65	1	1		0	25364.89	4314.60	29679.49	18516.23	3149.64	21665.87
3981	0.34	5048	5023	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	1318.32	7618.51	8920.83
3982	0.13	5023	5007	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	519.68	3018.38	3538.06
3983	2.26	5007	4641	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	8761.13	50885.94	59647.07
3984	0.32	4641	4579	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	1232.65	7158.41	8392.06
3985	0.25	4579	4655	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	968.57	5625.62	6594.19
3986	0.30	4655	4737	I-80	Interstate	45	1	1		0	3877.48	22528.51	26397.91	1155.68	6712.39	7868.06
3987	0.17	6567	6516	SR-224	Other Principal Art	35	1	1		0	0.00	18823.75	18823.75	0.00	3165.37	3165.37
3988	1.91	4737	4625	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	7418.68	43042.31	50452.98
3989	1.77	6516	5634	SR-224	Other Principal Art	35	1	1		0	0.00	18823.75	18823.75	0.00	33489.62	33489.62
3990	0.63	5179	5451	I-80	Interstate	65	1	1		0	3877.48	22528.51	26397.91	2455.76	14263.44	16719.20
3991	0.19	5634	5597	SR-224	Other Principal Art	35	1	1		0	0.00	18823.75	18823.75	0.00	3434.24	3434.24

Figure I-2-94: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3392	0.10	5597	5556	SR-224	Other Principal Arte	35	1	1		0	0.00	18823.75	18823.75	0.00	1863.45	1863.45
3393	0.07	5550	5491	SR-224	Other Principal Arte	35	1	1		0	0.00	18823.75	18823.75	0.00	1234.96	1234.96
3394	0.03	5491	5466	SR-224	Other Principal Arte	35	1	1		0	0.00	18823.75	18823.75	0.00	582.88	582.88
3395	0.00	5466	5451	SR-224	Other Principal Arte	45	1	1		0	0.00	18823.75	18823.75	0.00	91.72	91.72
3396	0.01	5451	5427	SR-224	Other Principal Arte	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3397	0.03	5427	5386	SR-224	Other Principal Arte	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3398	0.02	5386	5358		Other Principal Arte	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3399	0.01	5358	5351		Other Principal Arte	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3400	1.51	4730	5179	I-80	Interstate	65	1	1		0	3877.48	22520.51	26397.91	5861.63	34045.23	39906.86
3401	0.19	4625	4624	I-80	Interstate	65	1	1		0	3877.48	22520.51	26397.91	749.76	4354.69	5104.45
3402	0.23	4624	4730	I-80	Interstate	65	1	1		0	3877.48	22520.51	26397.91	904.33	5252.46	6156.79
3403	0.33	3631	7256	SR-224	Other Principal Arte	35	1	1		0	0.00	18823.75	18823.75	0.00	6152.57	6152.57
3404	0.99	3525	6567	SR-224	Other Principal Arte	35	1	1		0	0.00	18823.75	18823.75	0.00	18567.82	18567.82
3405	0.99	3526	6567	SR-224	Other Principal Arte	35	1	1		0	0.00	18823.75	18823.75	0.00	18569.56	18569.56
3406	0.28	3628	7051	SR-224	Other Principal Arte	35	1	1		0	0.00	18823.75	18823.75	0.00	5352.60	5352.60
3407	0.33	3630	7256	SR-224	Other Principal Arte	35	1	1		0	0.00	18823.75	18823.75	0.00	6154.28	6154.28
3408	0.28	3628	7051	SR-224	Other Principal Arte	35	1	1		0	0.00	18823.75	18823.75	0.00	5352.09	5352.09
3409	0.27	7384	7376	SR-248	Other Principal Arte	35	1	1		0	18823.75	0.00	18823.75	5054.00	0.00	5054.00
3410	0.23	7376	7355	SR-248	Other Principal Arte	35	1	1		0	18823.75	0.00	18823.75	4343.90	0.00	4343.90
3411	0.10	7355	7344	SR-248	Other Principal Arte	35	1	1		0	18823.75	0.00	18823.75	1915.89	0.00	1915.89
3412	0.49	7344	7262	SR-248	Other Principal Arte	25	1	1		0	18823.75	0.00	18823.75	9175.89	0.00	9175.89
3413	0.16	3631	7253	SR-248	Other Principal Arte	35	1	1		0	18823.75	0.00	18823.75	3069.41	0.00	3069.41
3414	0.16	3631	7253	SR-248	Other Principal Arte	35	1	1		0	18823.75	0.00	18823.75	3068.97	0.00	3068.97
3415	0.84	3627	6929	SR-248	Other Principal Arte	35	1	1		0	18823.75	0.00	18823.75	15777.23	0.00	15777.23
3416	0.42	5451	5592	I-80	Interstate	65	1	1		0	1691.24	39158.09	40849.33	709.07	16417.49	17126.56
3417	1.11	5592	5647	I-80	Interstate	25	1	1		0	1691.24	39158.09	40849.33	1885.57	43657.59	45543.16
3418	0.38	5647	5555	I-80	Interstate	1	1	1		0	1691.24	39158.09	40849.33	645.70	14950.26	15595.96
3419	0.45	5555	5298	I-80	Interstate	45	1	1		0	1691.24	39158.09	40849.33	769.51	17816.85	18586.36
3420	0.14	5298	5253	I-80	Interstate	65	1	1		0	1691.24	39158.09	40849.33	241.81	5598.81	5840.62
3421	0.51	5270	5637	SR-40	Other Principal Arte	55	1	1		0	6541.14	4314.68	10855.75	3341.48	2204.02	5545.42
3422	0.45	5637	5887	SR-40	Other Principal Arte	55	1	1		0	6541.14	4314.68	10855.75	2918.24	1924.90	4843.14
3423	0.33	5887	6092	SR-40	Other Principal Arte	65	1	1		0	6541.14	4314.68	10855.75	2183.57	1440.31	3623.88
3424	0.15	5253	5225	I-80	Interstate	65	1	1		0	1691.24	39158.09	40849.33	259.51	6008.50	6268.00
3425	0.26	151	287	SR-91	Other Principal Arte	35	1	1		0	67.68	257.17	324.85	17.35	65.95	83.30
3426	0.26	152	287	SR-91	Other Principal Arte	35	1	1		0	67.68	257.17	324.85	17.36	65.98	83.34
3427	0.25	143	272	SR-91	Other Principal Arte	35	1	1		0	67.68	257.17	324.85	17.19	65.34	82.53

Figure I-2-95: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3428	0.25	144	272	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	17.20	65.37	82.58
3429	0.44	136	252	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	29.94	113.77	143.71
3430	0.44	136	252	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	29.94	113.78	143.72
3431	0.74	126	201	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	50.22	190.85	241.07
3432	0.74	125	201	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	50.23	190.86	241.08
3433	0.33	100	182	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	22.06	83.82	105.88
3434	0.33	101	182	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	22.06	83.84	105.90
3435	1.06	182	153	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	71.30	270.94	342.24
3436	0.22	76	154	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	14.77	56.13	70.91
3437	0.22	77	154	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	14.77	56.13	70.91
3438	0.22	77	18804	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	14.61	55.51	70.12
3439	0.22	77	18804	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	14.62	55.54	70.16
3440	0.07	9462	143	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	4.82	18.31	23.12
3441	0.07	9472	143	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	4.82	18.32	23.15
3442	2.99	149	65	SR-91	Other Principal Arti	35	1	1		0	67.68	257.17	324.85	202.02	767.66	969.68
3443	0.40	306	307	SR-89	Other Principal Arti	35	1	1		0	1758.20	992.72	2750.92	703.80	397.38	1101.18
3444	0.23	337	354	SR-89	Other Principal Arti	35	1	1		0	1758.20	992.72	2750.92	412.37	232.83	645.20
3445	2.21	354	18951	SR-89	Other Principal Arti	45	1	1		0	1112.23	926.24	2038.47	2460.38	2048.94	4509.32
3446	4.42	354	18951	SR-89	Other Principal Arti	45	1	1		0	537.85	349.31	887.16	2379.50	1545.38	3924.88
3447	0.06	2839	2947	SR-55	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3448	0.19	2838	2946	I-84 East Bound	Interstate	65	1	1		0	0.00	68.64	68.64	0.00	12.58	12.58
3449	0.19	2837	2944	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	7080.63	0.00	7080.63
3450	0.02	2944	2945	I-84	Interstate	45	1	1		0	39835.20	0.00	39835.20	797.84	0.00	797.84
3451	0.31	2918	2825	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3452	0.32	2917	2824	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	9545.89	0.00	9545.89
3453	0.32	2823	2916	I-84 West Bound	Interstate	65	1	1		0	68.64	9677.58	9746.22	21.83	3077.40	3099.23
3454	0.25	2825	2938	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3455	0.25	2824	2937	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	7557.06	0.00	7557.06
3456	0.25	2936	2823	I-84 West Bound	Interstate	65	1	1		0	68.64	9677.58	9746.22	17.06	2405.74	2422.81
3457	0.89	1273	2567	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3458	1.43	2558	2542	I-84 West Bound	Interstate	65	1	1		0	68.64	9677.58	9746.22	97.82	13792.62	13890.45
3459	1.43	2544	2563	I-84	Interstate	1	1	1		0	30157.62	0.00	30157.62	43184.18	0.00	43184.18
3460	0.89	1272	2567	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3461	0.45	2564	2559	I-84 West Bound	Interstate	65	1	1		0	68.64	9677.58	9746.22	31.09	4383.66	4414.75
3462	0.44	2563	2565	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	13382.63	0.00	13382.63
3463	0.26	2567	2560	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-96: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3464	2.11	2565	2587	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	63524.34	0.00	63524.34
3465	1.90	2568	2600	I-84 East Bound	Interstate	1	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3466	2.11	2586	2564	I-84 West Bound	Interstate	25	1	1		0	68.64	9677.58	9746.22	144.67	20397.34	20542.00
3467	0.23	2603	2602	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3468	0.21	2567	2601	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	6476.29	0.00	6476.29
3469	0.22	2600	2586	I-84 West Bound	Interstate	55	1	1		0	68.64	9677.58	9746.22	15.26	2151.12	2166.38
3470	0.22	2602	2608	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3471	0.13	1306	2600	I-84 West Bound	Interstate	65	1	1		0	68.64	9677.58	9746.22	9.06	1276.82	1285.87
3472	0.23	2601	2605	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	7022.28	0.00	7022.28
3473	0.13	1304	2600	I-84 West Bound	Interstate	65	1	1		0	68.64	9677.58	9746.22	9.05	1275.82	1284.87
3474	4.24	2608	2732	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3475	4.22	2605	2731	I-84	Interstate	1	1	1		0	30157.62	0.00	30157.62	127368.48	0.00	127368.48
3476	4.15	2729	2610	I-84 West Bound	Interstate	65	1	1		0	68.64	9677.58	9746.22	287.80	40578.76	40866.57
3477	2.18	2732	2813	I-84 East Bound	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3478	2.18	2731	2812	I-84	Interstate	25	1	1		0	30157.62	0.00	30157.62	65709.33	0.00	65709.33
3479	2.18	2611	2729	I-84 West Bound	Interstate	25	1	1		0	68.64	9677.58	9746.22	149.73	21111.72	21261.46
3480	0.15	2813	2818	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3481	0.15	2812	2817	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	5638.78	0.00	5638.78
3482	0.18	2816	2811	I-84 West Bound	Interstate	65	1	1		0	68.64	9677.58	9746.22	12.65	1782.96	1795.60
3483	0.00	886	885	SR-13	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3484	0.10	887	886	SR-13	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3485	0.25	878	880	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3486	0.22	882	881	I-15	Interstate	55	1	1		0	0.00	3670.00	3670.00	0.00	807.12	807.12
3487	0.44	876	878	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3488	0.46	881	875	I-15	Interstate	1	1	1		0	0.00	3670.00	3670.00	0.00	1675.46	1675.46
3489	0.27	720	725	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3490	0.15	724	722	I-15	Interstate	35	1	1		0	0.00	3670.00	3670.00	0.00	693.41	693.41
3491	0.20	725	729	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3492	0.20	727	724	I-15	Interstate	35	1	1		0	0.00	3670.00	3670.00	0.00	749.48	749.48
3493	0.22	726	723	I-15 North Bound	Interstate	65	1	1		0	9142.55	5432.82	14575.37	2024.15	1202.82	3226.97
3494	0.74	860	876	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3495	0.74	875	853	I-15	Interstate	1	1	1		0	0.00	3670.00	3670.00	0.00	2710.49	2710.49
3496	5.40	859	794	I-15	Interstate	1	1	1		0	0.00	3670.00	3670.00	0.00	19805.18	19805.18
3497	5.46	791	860	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3498	6.58	860	796	I-15 North Bound	Interstate	65	1	1		0	9142.55	5432.82	14575.37	60144.15	35739.73	95883.88
3499	0.20	785	791	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-97: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3500	0.19	790	786	I-15	Interstate	35	1	1		0	0.00	3670.00	3670.00	0.00	709.79	709.79
3501	0.05	389	771	I-15	Interstate	65	1	1		0	0.00	3670.00	3670.00	0.00	176.43	176.43
3502	0.28	773	785	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3503	0.20	786	776	I-15	Interstate	35	1	1		0	0.00	3670.00	3670.00	0.00	745.13	745.13
3504	0.21	787	777	I-15 North Bound	Interstate	65	1	1		0	9142.55	5432.82	14575.37	1902.40	1130.47	3032.87
3505	0.05	389	771	I-15	Interstate	65	1	1		0	0.00	3670.00	3670.00	0.00	176.64	176.64
3506	3.27	729	773	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3507	3.36	777	726	I-15 North Bound	Interstate	65	1	1		0	9142.55	5432.82	14575.37	30678.50	18230.23	48908.73
3508	1.63	386	727	I-15	Interstate	25	1	1		0	0.00	3670.00	3670.00	0.00	5997.41	5997.41
3509	1.63	385	727	I-15	Interstate	25	1	1		0	0.00	3670.00	3670.00	0.00	5996.84	5996.84
3510	0.29	796	787	I-15 North Bound	Interstate	65	1	1		0	9142.55	5432.82	14575.37	2618.64	1556.08	4174.72
3511	0.09	794	790	I-15	Interstate	65	1	1		0	0.00	3670.00	3670.00	0.00	320.25	320.25
3512	0.38	1171	1170	I-15 South Bound	Interstate	65	1	1		0	4472.48	11195.75	15668.24	1693.11	4238.27	5931.38
3513	0.07	1164	1162	I-15	Interstate	1	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3514	0.40	1176	1168	I-15 North Bound	Interstate	65	1	1		0	1282.74	7391.35	8674.08	553.59	3189.88	3743.47
3515	0.29	1170	1174	I-15 South Bound	Interstate	65	1	1		0	4472.48	11195.75	15668.24	1311.87	3283.94	4595.80
3516	0.27	1173	1169	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3517	0.27	1169	1164	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3518	0.30	1168	1163	I-15 North Bound	Interstate	65	1	1		0	1282.74	7391.35	8674.08	389.87	2246.52	2636.40
3519	0.23	580	1171	I-15 South Bound	Interstate	65	1	1		0	4472.48	11195.75	15668.24	1039.83	2602.95	3642.78
3520	0.51	1162	1153	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3521	0.44	18153	18139	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1891.17	1358.08	3249.26
3522	0.23	18130	18137	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	180.59	103.89	284.49
3523	0.24	18138	18131	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1008.31	724.08	1732.39
3524	0.33	18141	18125	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	12577.39	0.00	12577.39
3525	0.08	18126	18124	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	2996.32	0.00	2996.32
3526	0.35	18112	18130	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	271.16	156.00	427.15
3527	0.35	18131	18114	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1515.29	1088.16	2603.45
3528	0.19	18124	18113	I-15	Interstate	35	1	1		0	38265.21	0.00	38265.21	7289.91	0.00	7289.91
3529	0.20	18104	18112	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	155.53	89.48	245.01
3530	0.22	18113	18102	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	8330.33	0.00	8330.33
3531	0.20	18114	18103	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	869.96	624.73	1494.69
3532	0.09	18100	18104	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	66.13	38.05	104.18
3533	0.12	18103	18097	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	515.74	370.36	886.09
3534	2.58	18084	18100	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	1985.49	1142.25	3127.74
3535	2.60	18102	3005	I-15	Interstate	25	1	1		0	38265.21	0.00	38265.21	100021.60	0.00	100021.60

Figure I-2-98: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3536	2.69	18097	3010	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7378.39	11544.45	8290.26	19834.71
3537	0.23	18079	18068	I-15	Interstate	65	1	1		0	38092.92	42.11	38135.02	8866.81	9.80	8876.61
3538	0.25	18075	18066	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7378.39	1066.11	765.50	1831.71
3539	0.34	18067	2888	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	259.93	149.54	409.47
3540	0.24	2888	2904	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	181.62	104.48	286.10
3541	0.22	2898	2899	I-15	Interstate	35	1	1		0	38265.21	0.00	38265.21	8579.03	0.00	8579.03
3542	0.04	2899	18078	I-15	Interstate	35	1	1		0	38265.21	0.00	38265.21	1670.07	0.00	1670.07
3543	0.09	18075	2884	I-15 North Bound	Interstate	35	1	1		0	3088.58	4289.81	7378.39	292.44	407.23	699.67
3544	0.19	2884	2896	I-15 North Bound	Interstate	65	1	1		0	3088.58	4289.81	7378.39	583.96	813.18	1397.15
3545	0.14	2908	18085	SR-89	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3546	0.53	18008	18025	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	408.52	235.02	643.53
3547	0.37	18022	18009	I-15	Interstate	20	1	1		0	38092.92	42.11	38135.02	14114.54	15.60	14130.15
3548	0.52	18024	18002	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7378.39	2229.88	1608.49	3848.37
3549	0.63	18051	18022	I-15	Interstate	35	1	1		0	38092.92	42.11	38135.02	24124.33	26.67	24150.99
3550	0.57	18050	18024	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7378.39	2440.94	1752.88	4193.82
3551	0.51	18025	18052	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	389.67	224.18	613.85
3552	0.85	18052	18067	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	650.11	374.00	1024.11
3553	0.02	2897	2896	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7378.39	89.03	63.94	152.97
3554	0.03	2901	2897	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7378.39	146.35	105.10	251.44
3555	0.07	2911	2905	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	2570.05	0.00	2570.05
3556	0.06	2907	2902	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7378.39	270.81	194.47	465.28
3557	0.06	2906	2917	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	46.23	26.59	72.82
3558	0.07	2921	2911	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	2514.06	0.00	2514.06
3559	0.07	2920	2910	SR-89	Other Principal Arte	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3560	0.33	2910	2908	SR-89	Other Principal Arte	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3561	0.45	8866	17911	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3562	0.45	8867	17911	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3563	0.13	17911	17900	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3564	0.79	17900	17849	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3565	0.41	17849	17814	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3566	0.25	8905	17801	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3567	0.25	8906	17801	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3568	1.05	17801	17791	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3569	0.37	8895	2643	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3570	0.37	8896	2643	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3571	1.33	2641	18560	SR-190	Other Principal Arte	35	1	1		0	36716.76	0.00	36716.76	48727.45	0.00	48727.45

Figure I-2-99: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3572	0.44	1321	2617	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3573	0.44	1322	2617	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3574	0.21	2617	2613	SR-89	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3575	0.12	18560	2615	SR-193	Other Principal Arte	35	1	1		0	36716.76	0.00	36716.76	4527.05	0.00	4527.05
3576	0.18	2615	2613	SR-193	Other Principal Arte	35	1	1		0	36716.76	0.00	36716.76	6575.88	0.00	6575.88
3577	0.04	2613	2616	SR-190	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3578	0.27	2613	2614	SR-89	Other Principal Arte	55	1	1		0	36716.76	0.00	36716.76	10092.34	0.00	10092.34
3579	0.44	1307	2576	SR-89	Other Principal Arte	35	1	1		0	36716.76	0.00	36716.76	16108.74	0.00	16108.74
3580	0.44	1307	2576	SR-89	Other Principal Arte	35	1	1		0	36716.76	0.00	36716.76	16113.45	0.00	16113.45
3581	0.17	1240	2461	SR-89	Other Principal Arte	35	1	1		0	3605.09	6948.58	10553.67	604.11	1164.38	1768.48
3582	0.17	1240	2461	SR-89	Other Principal Arte	35	1	1		0	3605.09	6948.58	10553.67	603.65	1163.50	1767.15
3583	0.69	2524	2480	SR-89	Other Principal Arte	35	1	1		0	3605.09	6948.58	10553.67	2494.86	4808.69	7303.55
3584	0.23	2548	2556	I-84 West Bound	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3585	0.81	18534	18554	I-15 South Bound	Interstate	65	1	1		0	2408.32	0.00	2408.32	1956.29	0.00	1956.29
3586	0.83	18555	18532	I-15	Interstate	25	1	1		0	114.48	538.61	653.10	94.46	444.42	538.88
3587	0.81	18556	18533	I-15 North Bound	Interstate	65	1	1		0	8454.18	2584.07	11078.25	6901.36	2099.51	9000.87
3588	0.41	18563	18556	I-15 North Bound	Interstate	65	1	1		0	8454.18	2584.07	11078.25	3509.72	1067.72	4577.43
3589	0.36	18554	18561	I-15 South Bound	Interstate	65	1	1		0	2408.32	0.00	2408.32	857.36	0.00	857.36
3590	0.38	18562	18558	I-15	Interstate	25	1	1		0	114.48	538.61	653.10	43.11	202.81	245.92
3591	0.32	18493	18526	I-15 South Bound	Interstate	65	1	1		0	2408.32	0.00	2408.32	766.48	0.00	766.48
3592	0.35	18525	18491	I-15	Interstate	35	1	1		0	114.48	538.61	653.10	40.39	190.02	230.41
3593	0.34	18523	18492	I-15 North Bound	Interstate	65	1	1		0	8454.18	2584.07	11078.25	2917.97	887.70	3805.67
3594	2.02	18491	18480	I-15	Interstate	1	1	1		0	114.48	538.61	653.10	230.85	1086.12	1316.98
3595	2.16	18479	18493	I-15 South Bound	Interstate	65	1	1		0	2408.32	0.00	2408.32	5197.68	0.00	5197.68
3596	2.01	18492	18481	I-15 North Bound	Interstate	65	1	1		0	8454.18	2584.07	11078.25	17047.58	5185.16	22233.74
3597	0.29	18590	2638	I-15 South Bound	Interstate	65	1	1		0	3198.34	3732.72	6931.07	923.92	1078.29	2002.20
3598	0.25	2647	18591	I-15	Interstate	65	1	1		0	38092.92	42.11	38135.02	9529.24	10.53	9539.78
3599	0.29	2635	2634	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1253.50	900.16	2153.66
3600	0.14	1316	2648	I-15 South Bound	Interstate	65	1	1		0	3198.34	3732.72	6931.07	449.84	525.00	974.84
3601	0.22	2646	2647	I-15	Interstate	65	1	1		0	38092.92	42.11	38135.02	8470.86	9.36	8480.22
3602	0.30	2649	2635	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1304.09	936.48	2240.57
3603	0.14	1315	2648	I-15 South Bound	Interstate	65	1	1		0	3198.34	3732.72	6931.07	449.75	524.89	974.65
3604	0.36	1335	2649	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1524.70	1094.92	2619.62
3605	0.23	2708	2717	I-15 South Bound	Interstate	65	1	1		0	3198.34	3732.72	6931.07	731.78	854.05	1585.83
3606	0.23	2716	2706	I-15	Interstate	35	1	1		0	38092.92	42.11	38135.02	8766.30	9.69	8775.99
3607	0.23	2715	2705	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	999.42	717.70	1717.12

Figure I-2-100: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3608	0.66	2717	2741	I-15 South Bound	Interstate	65	1	1		0	3198.34	3732.72	6931.07	2097.18	2447.58	4544.77
3609	0.65	2740	2716	I-15	Interstate	25	1	1		0	38092.92	42.11	38135.02	24733.93	27.34	24761.27
3610	0.64	2739	2715	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	2750.00	1974.82	4724.83
3611	0.61	2670	2646	I-15	Interstate	65	1	1		0	38092.92	42.11	38135.02	30965.61	34.23	30999.24
3612	0.76	2648	2671	I-15 South Bound	Interstate	65	1	1		0	3198.34	3732.72	6931.07	2438.93	2846.42	5285.35
3613	0.36	1334	2649	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1524.21	1094.56	2618.77
3614	0.25	2671	2708	I-15 South Bound	Interstate	65	1	1		0	3198.34	3732.72	6931.07	801.69	935.63	1737.32
3615	0.25	2706	2670	I-15	Interstate	35	1	1		0	38092.92	42.11	38135.02	9671.22	10.69	9681.91
3616	0.27	2705	2663	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1159.11	832.37	1991.48
3617	0.52	2638	2620	SR-193	Other Principal Arte	35	1	1		0	36716.76	0.00	36716.76	19090.39	0.00	19090.39
3618	0.29	1310	2641	SR-193	Other Principal Arte	35	1	1		0	36716.76	0.00	36716.76	10615.97	0.00	10615.97
3619	0.29	1310	2641	SR-193	Other Principal Arte	35	1	1		0	36716.76	0.00	36716.76	10612.27	0.00	10612.27
3620	0.33	2867	2515	I-84	Interstate	65	1	1		0	0.00	293.69	293.69	0.00	96.81	96.81
3621	0.34	2488	2466	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3622	2.64	2556	2488	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3623	2.66	2515	2559	I-84	Interstate	1	1	1		0	0.00	293.69	293.69	0.00	780.94	780.94
3624	0.09	2455	2433	SR-89	Other Principal Arte	35	1	1		0	2164.59	0.00	2164.59	189.44	0.00	189.44
3625	0.11	2455	2432	SR-203	Other Principal Arte	35	1	1		0	3605.09	9113.17	12718.26	394.31	996.77	1391.08
3626	0.28	2461	2455	SR-89	Other Principal Arte	35	1	1		0	3605.09	6948.58	10553.67	1012.42	1951.37	2963.79
3627	1.53	1680	1692	SR-39	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3628	0.11	18480	18478	I-15	Interstate	65	1	1		0	114.48	538.61	653.10	12.33	58.03	70.37
3629	0.29	18481	2424	I-15 North Bound	Interstate	65	1	1		0	8494.18	2584.07	11078.25	2440.49	742.44	3182.93
3630	0.16	18478	18476	I-15	Interstate	65	1	1		0	114.48	538.61	653.10	18.16	85.42	103.57
3631	0.19	2408	18479	I-15 South Bound	Interstate	65	1	1		0	2408.32	0.00	2408.32	461.00	0.00	461.00
3632	0.03	18476	2409	I-15	Interstate	35	1	1		0	114.48	538.61	653.10	3.03	14.27	17.31
3633	0.02	2424	2410	I-15 North Bound	Interstate	35	1	1		0	8494.18	2584.07	11078.25	137.48	41.82	179.30
3634	0.22	2392	2408	I-15 South Bound	Interstate	65	1	1		0	2408.32	0.00	2408.32	530.06	0.00	530.06
3635	0.22	2409	2393	I-15	Interstate	35	1	1		0	114.48	538.61	653.10	25.01	117.65	142.65
3636	0.55	2410	2364	I-15 North Bound	Interstate	65	1	1		0	8494.18	2584.07	11078.25	4647.02	1413.70	6060.72
3637	0.33	2393	2365	I-15	Interstate	65	1	1		0	114.48	538.61	653.10	37.32	175.60	212.92
3638	0.40	2354	2392	I-15 South Bound	Interstate	65	1	1		0	2408.32	0.00	2408.32	1041.33	0.00	1041.33
3639	0.11	2365	2351	I-15	Interstate	35	1	1		0	114.48	538.61	653.10	13.11	61.67	74.78
3640	0.12	2364	2350	I-15 North Bound	Interstate	65	1	1		0	8494.18	2584.07	11078.25	1000.78	304.45	1305.23
3641	0.00	2352	2354	I-15 South Bound	Interstate	35	1	1		0	2408.32	0.00	2408.32	10.06	0.00	10.06
3642	0.05	2348	2352	I-15 South Bound	Interstate	65	1	1		0	2408.32	0.00	2408.32	129.24	0.00	129.24
3643	0.01	2351	2350	SR-26	Other Principal Arte	65	1	1		0	577.22	538.61	1115.84	6.63	6.19	12.82

Figure I-2-101: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3644	0.08	2351	2342	I-15	Interstate	35	1	1		0	114.46	577.22	691.71	8.82	44.46	53.27
3645	0.10	2350	2347	SR-26	Other Principal Arti	45	1	1		0	0.00	2545.46	2545.46	0.00	251.03	251.03
3646	0.14	2347	2332	SR-26	Other Principal Arti	35	1	1		0	0.00	2545.46	2545.46	0.00	360.82	360.82
3647	0.07	2331	2344	I-84	Interstate	65	1	1		0	0.00	293.69	293.69	0.00	19.17	19.17
3648	0.14	2355	2335	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3649	0.13	1649	2037	SR-26	Other Principal Arti	35	1	1		0	0.00	2584.07	2584.07	0.00	325.04	325.04
3650	0.13	1639	2037	SR-26	Other Principal Arti	35	1	1		0	0.00	2584.07	2584.07	0.00	325.03	325.03
3651	0.50	2122	2039	SR-89	Other Principal Arti	35	1	1		0	2164.59	0.00	2164.59	1087.62	0.00	1087.62
3652	0.23	2037	2022	SR-26	Other Principal Arti	35	1	1		0	0.00	2584.07	2584.07	0.00	603.87	603.87
3653	0.18	2039	2022	SR-89	Other Principal Arti	35	1	1		0	2164.59	0.00	2164.59	399.37	0.00	399.37
3654	0.27	1611	1965	SR-89	Other Principal Arti	35	1	1		0	1587.37	2086.85	3584.22	420.70	531.88	952.58
3655	0.23	993	1968	SR-73	Other Principal Arti	35	1	1		0	10498.73	1587.37	12086.09	2379.61	359.79	2739.39
3656	0.16	1968	1960	SR-73	Other Principal Arti	25	1	1		0	0.00	1587.37	1587.37	0.00	282.45	282.45
3657	0.27	1941	1968	SR-73	Other Principal Arti	35	1	1		0	0.00	10498.73	10498.73	0.00	2869.10	2869.10
3658	0.12	1960	1961	SR-73	Other Principal Arti	35	1	1		0	0.00	1587.37	1587.37	0.00	185.67	185.67
3659	0.03	1961	1963	SR-73	Other Principal Arti	25	1	1		0	0.00	1587.37	1587.37	0.00	50.83	50.83
3660	0.15	1942	1941	SR-73	Other Principal Arti	35	1	1		0	0.00	10498.73	10498.73	0.00	1573.13	1573.13
3661	0.15	1963	1964	SR-73	Other Principal Arti	35	1	1		0	0.00	1587.37	1587.37	0.00	234.26	234.26
3662	0.15	1943	1942	SR-73	Other Principal Arti	35	1	1		0	0.00	10498.73	10498.73	0.00	1532.45	1532.45
3663	0.27	1611	1965	SR-89	Other Principal Arti	35	1	1		0	1587.37	2086.85	3584.22	420.71	531.89	952.59
3664	0.15	1964	1965	SR-73	Other Principal Arti	35	1	1		0	0.00	1587.37	1587.37	0.00	232.14	232.14
3665	0.14	1965	1944	SR-89	Other Principal Arti	35	1	1		0	0.00	2086.85	2086.85	0.00	298.17	298.17
3666	0.15	1944	1943	SR-73	Other Principal Arti	35	1	1		0	0.00	10498.73	10498.73	0.00	1534.70	1534.70
3667	0.28	1944	1910	SR-89	Other Principal Arti	35	1	1		0	71.28	1118.22	1189.49	20.21	317.07	337.28
3668	0.07	973	1944	SR-73	Other Principal Arti	35	1	1		0	0.00	9538.82	9538.82	0.00	674.55	674.55
3669	0.07	972	1944	SR-73	Other Principal Arti	35	1	1		0	0.00	9538.82	9538.82	0.00	673.56	673.56
3670	0.14	955	1872	SR-89	Other Principal Arti	35	1	1		0	71.28	1118.22	1189.49	10.31	161.78	172.09
3671	0.14	955	1872	SR-89	Other Principal Arti	35	1	1		0	71.28	1118.22	1189.49	10.31	161.78	172.10
3672	0.15	1872	1843	SR-89	Other Principal Arti	35	1	1		0	71.28	1118.22	1189.49	10.45	163.98	174.43
3673	0.14	1843	1830	SR-89	Other Principal Arti	35	1	1		0	71.28	1118.22	1189.49	10.33	162.07	172.41
3674	0.23	2370	2358	SR-89	Other Principal Arti	35	1	1		0	2164.59	0.00	2164.59	506.66	0.00	506.66
3675	0.43	2387	2370	SR-89	Other Principal Arti	35	1	1		0	2164.59	0.00	2164.59	932.11	0.00	932.11
3676	0.33	2401	2387	SR-89	Other Principal Arti	35	1	1		0	2164.59	0.00	2164.59	705.27	0.00	705.27
3677	0.22	2415	2401	SR-89	Other Principal Arti	35	1	1		0	2164.59	0.00	2164.59	468.99	0.00	468.99
3678	0.57	2433	2415	SR-89	Other Principal Arti	35	1	1		0	2164.59	0.00	2164.59	1227.21	0.00	1227.21
3679	1.04	2403	2302	SR-203	Other Principal Arti	35	1	1		0	3605.09	9113.17	12718.26	3757.23	9497.75	13254.98

Figure I-2-102: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD1A	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3680	0.35	2432	2418	SR-203	Other Principal Arte	35	1	1		0	3605.09	9113.17	12718.26	1261.66	3189.31	4450.97
3681	0.03	1699	1700	SR-39	Other Principal Arte	35	1	1		0	0.00	1951.50	1951.50	0.00	62.41	62.41
3682	0.05	1700	1701	SR-39	Other Principal Arte	35	1	1		0	0.00	1951.50	1951.50	0.00	92.90	92.90
3683	0.01	1701	1702	SR-39	Other Principal Arte	35	1	1		0	0.00	1951.50	1951.50	0.00	13.11	13.11
3684	0.01	1702	1703	SR-39	Other Principal Arte	35	1	1		0	0.00	1951.50	1951.50	0.00	28.67	28.67
3685	0.22	1703	1704	SR-39	Other Principal Arte	35	1	1		0	0.00	1951.50	1951.50	0.00	436.72	436.72
3686	0.35	1658	1685	I-15 South Bound	Interstate	65	1	1		0	4400.01	11321.13	15721.14	1550.24	3988.72	5538.96
3687	0.35	1684	1657	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3688	0.21	1686	1664	I-15 North Bound	Interstate	65	1	1		0	0.00	7925.56	7925.56	0.00	1663.38	1663.38
3689	0.13	1664	1659	I-15 North Bound	Interstate	45	1	1		0	0.00	7925.56	7925.56	0.00	1059.53	1059.53
3690	0.33	1528	1557	I-15 South Bound	Interstate	65	1	1		0	4400.01	11321.13	15721.14	1433.57	3688.54	5122.11
3691	0.31	1553	1528	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3692	0.28	1511	1528	I-15 South Bound	Interstate	65	1	1		0	4400.01	11321.13	15721.14	1253.32	3224.78	4478.10
3693	0.29	1529	1510	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3694	0.29	1530	1512	I-15 North Bound	Interstate	65	1	1		0	0.00	7925.56	7925.56	0.00	2278.53	2278.53
3695	0.52	800	1554	I-15 North Bound	Interstate	65	1	1		0	0.00	7925.56	7925.56	0.00	4090.51	4090.51
3696	1.01	1557	1656	I-15 South Bound	Interstate	65	1	1		0	4400.01	11321.13	15721.14	4453.16	11457.87	15911.03
3697	1.02	1657	1553	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3698	0.31	1554	1530	I-15 North Bound	Interstate	65	1	1		0	0.00	7925.56	7925.56	0.00	2473.81	2473.81
3699	1.17	1429	1511	I-15 South Bound	Interstate	65	1	1		0	4400.01	11321.13	15721.14	5149.27	13246.39	18394.66
3700	1.16	1510	1430	I-15	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3701	1.17	1512	1431	I-15 North Bound	Interstate	65	1	1		0	0.00	7925.56	7925.56	0.00	9270.33	9270.33
3702	2.23	2256	2460	I-84	Interstate	1	1	1		0	0.00	293.63	293.63	0.00	655.49	655.49
3703	2.22	2459	2255	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3704	0.31	2239	2223	SR-26	Other Principal Arte	35	1	1		0	0.00	2584.07	2584.07	0.00	811.79	811.79
3705	0.44	2339	2289		Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3706	0.33	1144	2204		Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3707	0.90	2223	2141	SR-26	Other Principal Arte	35	1	1		0	0.00	2584.07	2584.07	0.00	2331.44	2331.44
3708	0.33	1145	2204		Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3709	0.25	1171	2335		Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3710	0.25	1170	2335		Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3711	0.11	2338	2341		Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3712	0.06	2334	2338		Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3713	0.06	2833	2825	I-15	Interstate	65	1	1		0	38052.92	42.11	38135.02	2180.06	2.41	2182.47
3714	0.24	2781	2795	I-15 South Bound	Interstate	65	1	1		0	3158.34	3732.72	6931.07	769.66	898.26	1667.92
3715	0.23	2794	2762	I-15	Interstate	35	1	1		0	38052.92	42.11	38135.02	8900.45	9.84	8910.29

Figure I-2-103: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connecto	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3716	0.38	2757	2781	I-15 South Bound	Interstate	65	1	1		0	3198.34	3732.72	6931.07	1229.28	1434.58	2663.78
3717	0.38	2782	2758	I-15	Interstate	35	1	1		0	38092.92	42.11	38135.02	14625.27	16.17	14641.43
3718	0.39	2783	2759	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1686.96	1211.43	2898.39
3719	0.32	2809	2794	I-15	Interstate	65	1	1		0	38092.92	42.11	38135.02	12187.28	13.47	12200.75
3720	0.40	2795	2827	I-15 South Bound	Interstate	65	1	1		0	3198.34	3732.72	6931.07	1285.43	1508.20	2705.63
3721	0.45	2826	2809	I-15	Interstate	65	1	1		0	38092.92	42.11	38135.02	17270.07	19.09	17289.16
3722	0.42	2854	2810	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1787.95	1283.96	3071.91
3723	0.57	2810	2783	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	2439.11	1751.56	4190.67
3724	0.76	8979	17969	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	583.03	335.41	918.44
3725	0.35	17968	2853	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1520.10	1091.61	2611.70
3726	0.30	2851	17968	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	233.06	134.54	368.49
3727	0.29	17967	2852	I-15	Interstate	35	1	1		0	38092.92	42.11	38135.02	10981.95	12.14	10994.08
3728	0.31	2852	2833	I-15	Interstate	35	1	1		0	38092.92	42.11	38135.02	11646.11	12.87	11658.98
3729	0.33	2827	2851	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	251.09	144.45	395.54
3730	0.38	2853	2854	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1613.99	1159.03	2773.02
3731	0.05	17969	17967	I-15	Interstate	65	1	1		0	38092.92	42.11	38135.02	1882.12	2.08	1884.20
3732	0.29	2741	2757	I-15 South Bound	Interstate	65	1	1		0	3198.34	3732.72	6931.07	924.00	1078.39	2002.39
3733	0.30	2758	2740	I-15	Interstate	25	1	1		0	38092.92	42.11	38135.02	11507.88	12.72	11520.60
3734	0.31	2759	2739	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1342.54	964.10	2306.65
3735	0.67	18591	18583	I-15	Interstate	65	1	1		0	38092.92	42.11	38135.02	25475.90	28.16	25504.09
3736	0.68	18582	18580	I-15 South Bound	Interstate	65	1	1		0	3198.34	3732.72	6931.07	2183.44	2548.25	4731.69
3737	0.60	2634	18584	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	2554.21	1834.22	4388.43
3738	0.74	9290	2637	SR-193	Other Principal Art	35	1	1		0	36716.76	0.00	36716.76	27046.63	0.00	27046.63
3739	0.74	9289	2637	SR-193	Other Principal Art	35	1	1		0	36716.76	0.00	36716.76	27046.58	0.00	27046.58
3740	0.06	1318	18588	SR-232	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3741	0.06	1319	18589	SR-232	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3742	0.26	2460	2467	I-84	Interstate	65	1	1		0	0.00	293.69	293.69	0.00	75.89	75.89
3743	0.26	2466	2459	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3744	0.70	2637	2638	SR-193	Other Principal Art	35	1	1		0	36716.76	0.00	36716.76	25724.80	0.00	25724.80
3745	0.01	760	1516	SR-89	Other Principal Art	25	1	1		0	2554.51	1518.00	4072.51	36.11	21.46	57.57
3746	0.01	758	1516	SR-89	Other Principal Art	25	1	1		0	2554.51	1518.00	4072.51	35.98	21.38	57.36
3747	0.43	857	1714	SR-39	Other Principal Art	35	1	1		0	399.78	4434.73	4834.51	172.25	1910.73	2082.98
3748	0.43	856	1714	SR-39	Other Principal Art	35	1	1		0	399.78	4434.73	4834.51	172.22	1910.48	2082.70
3749	0.43	1806	1809	SR-203	Other Principal Art	25	1	1		0	6057.23	1662.32	7719.56	2600.85	713.77	3314.62
3750	0.15	1809	1785	SR-203	Other Principal Art	25	1	1		0	6057.23	1662.32	7719.56	888.04	243.71	1131.75
3751	0.14	1785	1759	SR-203	Other Principal Art	25	1	1		0	6057.23	1662.32	7719.56	854.86	234.61	1089.47

Figure I-2-104: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDLIA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3752	0.32	879	1725	SR-203	Other Principal Arti	35	1	1		0	6057.23	1662.32	7719.56	1944.28	533.58	2477.86
3753	0.23	1714	1725	SR-39	Other Principal Arti	35	1	1		0	399.78	4434.73	4834.51	91.91	1019.58	1111.49
3754	0.32	880	1725	SR-203	Other Principal Arti	35	1	1		0	6057.23	1662.32	7719.56	1945.01	533.78	2478.79
3755	0.01	1231	1229	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3756	0.08	1229	1223	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3757	0.13	1222	1230	I-15 North Bound	Interstate	65	1	1		0	7391.35	1282.74	8674.08	986.67	171.23	1157.90
3758	0.23	1230	1210	I-15 South Bound	Interstate	65	1	1		0	4472.48	11195.75	15668.24	1042.38	2609.14	3651.44
3759	0.23	1209	1199	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3760	0.07	1199	1196	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3761	0.29	1208	1195	I-15 North Bound	Interstate	65	1	1		0	1282.74	7391.35	8674.08	369.98	2131.42	2501.32
3762	0.10	1210	1218	I-15 South Bound	Interstate	65	1	1		0	4472.48	11195.75	15668.24	447.88	1121.16	1569.04
3763	0.11	1217	1209	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3764	0.28	1228	1218	I-15 South Bound	Interstate	65	1	1		0	11195.75	4472.48	15668.24	3171.33	1266.88	4438.21
3765	0.15	1221	1217	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3766	0.07	1223	1221	I-15	Interstate	1	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3767	0.27	1222	1208	I-15 North Bound	Interstate	65	1	1		0	1282.74	7391.35	8674.08	348.67	2009.11	2357.78
3768	0.56	1190	1200	I-15 South Bound	Interstate	65	1	1		0	4472.48	11195.75	15668.24	2501.93	6262.97	8764.90
3769	0.45	1196	1189	I-15	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3770	0.48	1195	1191	I-15 North Bound	Interstate	65	1	1		0	1282.74	7391.35	8674.08	618.14	3561.80	4179.94
3771	0.92	1388	1429	I-15 South Bound	Interstate	65	1	1		0	4400.01	11321.13	15721.14	4028.85	10366.15	14395.00
3772	0.92	1430	1387	I-15	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3773	0.92	1431	1386	I-15 North Bound	Interstate	65	1	1		0	0.00	7925.56	7925.56	0.00	7320.90	7320.90
3774	0.26	1352	1388	I-15 South Bound	Interstate	65	1	1		0	4400.01	11321.13	15721.14	1155.44	2972.91	4128.35
3775	0.26	1387	1353	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3776	0.25	1386	1354	I-15 North Bound	Interstate	65	1	1		0	0.00	7925.56	7925.56	0.00	2017.12	2017.12
3777	0.08	2416	2400	SR-203	Other Principal Arti	35	1	1		0	3605.09	9113.17	12718.26	288.39	729.02	1017.41
3778	0.16	2282	2241	SR-203	Other Principal Arti	35	1	1		0	3605.09	9113.17	12718.26	575.12	1453.82	2028.94
3779	0.09	2241	2227	SR-203	Other Principal Arti	35	1	1		0	3605.09	9113.17	12718.26	324.04	819.12	1143.15
3780	0.46	2227	2157	SR-203	Other Principal Arti	35	1	1		0	3605.09	9113.17	12718.26	1660.18	4196.51	5856.62
3781	0.13	2157	2148	SR-203	Other Principal Arti	35	1	1		0	3605.09	9113.17	12718.26	473.06	1195.84	1668.90
3782	0.12	2148	2131	SR-203	Other Principal Arti	35	1	1		0	3605.09	9113.17	12718.26	449.80	1137.04	1586.84
3783	0.15	1947	1945	SR-79	Other Principal Arti	35	1	1		0	0.00	9538.82	9538.82	0.00	1395.92	1395.92
3784	0.29	1948	1947	SR-79	Other Principal Arti	35	1	1		0	0.00	9538.82	9538.82	0.00	2809.46	2809.46
3785	0.15	1949	1948	SR-79	Other Principal Arti	35	1	1		0	0.00	9538.82	9538.82	0.00	1390.38	1390.38
3786	0.22	976	1949	SR-79	Other Principal Arti	35	1	1		0	0.00	9538.82	9538.82	0.00	2058.55	2058.55
3787	0.23	2131	2085	SR-203	Other Principal Arti	35	1	1		0	3605.09	9113.17	12718.26	827.97	2092.99	2920.96

Figure I-2-105: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD1A	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3768	0.17	2085	2073	SR-203	Other Principal Arte	35	1	1		0	3605.09	9113.17	12718.26	620.17	1567.72	2187.89
3769	0.12	2073	2058	SR-203	Other Principal Arte	35	1	1		0	3605.09	9113.17	12718.26	441.36	1115.69	1557.04
3790	0.85	2058	1951	SR-203	Other Principal Arte	35	1	1		0	3605.09	9113.17	12718.26	3053.20	7718.06	10771.26
3791	0.22	575	1949	SR-79	Other Principal Arte	35	1	1		0	0.00	9538.82	9538.82	0.00	2058.54	2058.54
3792	0.15	1951	1929	SR-203	Other Principal Arte	35	1	1		0	5618.11	1587.37	7205.47	845.33	238.84	1084.17
3793	0.14	1929	1917	SR-203	Other Principal Arte	35	1	1		0	5618.11	1587.37	7205.47	775.44	219.10	994.54
3794	0.29	1917	1890	SR-203	Other Principal Arte	35	1	1		0	5618.11	1587.37	7205.47	1635.46	462.09	2097.55
3795	0.14	1890	1851	SR-203	Other Principal Arte	35	1	1		0	5618.11	1587.37	7205.47	804.86	227.41	1032.27
3796	0.07	1851	1836	SR-203	Other Principal Arte	25	1	1		0	5618.11	1587.37	7205.47	407.92	115.26	523.18
3797	1.63	1704	1712	SR-39	Other Principal Arte	35	1	1		0	0.00	1951.50	1951.50	0.00	3179.39	3179.39
3798	0.22	915	1803	SR-89	Other Principal Arte	35	1	1		0	71.28	1118.22	1189.49	15.37	241.10	256.47
3799	0.22	915	1803	SR-89	Other Principal Arte	35	1	1		0	71.28	1118.22	1189.49	15.37	241.16	256.53
3800	0.14	1803	1768	SR-89	Other Principal Arte	35	1	1		0	71.28	1118.22	1189.49	10.32	161.98	172.31
3801	0.91	1768	1713	SR-89	Other Principal Arte	35	1	1		0	71.28	1118.22	1189.49	64.84	1017.29	1082.13
3802	0.13	1712	1710	SR-39	Other Principal Arte	35	1	1		0	0.00	1951.50	1951.50	0.00	262.23	262.23
3803	0.15	1710	1711	SR-39	Other Principal Arte	35	1	1		0	0.00	1951.50	1951.50	0.00	291.34	291.34
3804	0.15	1711	1713	SR-39	Other Principal Arte	35	1	1		0	0.00	1951.50	1951.50	0.00	289.00	289.00
3805	0.51	1713	1641	SR-89	Other Principal Arte	35	1	1		0	2554.51	1518.00	4072.51	1308.04	777.29	2085.33
3806	0.52	1641	1608	SR-89	Other Principal Arte	35	1	1		0	2554.51	1518.00	4072.51	1317.74	783.06	2100.80
3807	0.94	1608	1518	SR-89	Other Principal Arte	35	1	1		0	2554.51	1518.00	4072.51	2393.63	1422.40	3816.03
3808	0.79	1518	1476	SR-89	Other Principal Arte	35	1	1		0	2554.51	1518.00	4072.51	2018.96	1199.75	3218.72
3809	0.12	2344	2356	I-84	Interstate	65	1	1		0	0.00	293.69	293.69	0.00	34.21	34.21
3810	0.85	2342	2159	I-15	Interstate	65	1	1		0	114.48	577.22	691.71	97.21	490.12	587.33
3811	0.91	2190	2348	I-15 South Bound	Interstate	65	1	1		0	2408.32	0.00	2408.32	2190.09	0.00	2190.09
3812	0.95	2350	2193	I-15 North Bound	Interstate	65	1	1		0	8494.18	0.00	8494.18	8106.42	0.00	8106.42
3813	0.27	2332	2320	SR-26	Other Principal Arte	35	1	1		0	0.00	2545.46	2545.46	0.00	699.50	699.50
3814	0.05	2320	2317	SR-26	Other Principal Arte	35	1	1		0	0.00	2545.46	2545.46	0.00	114.93	114.93
3815	0.01	2317	2316	SR-26	Other Principal Arte	45	1	1		0	0.00	2545.46	2545.46	0.00	26.20	26.20
3816	0.01	2316	2314	SR-26	Other Principal Arte	45	1	1		0	0.00	2545.46	2545.46	0.00	21.60	21.60
3817	0.15	2246	2316	I-84	Interstate	45	1	1		0	0.00	293.69	293.69	0.00	55.62	55.62
3818	0.20	2314	2243	I-84 West Bound	Interstate	65	1	1		0	577.22	538.61	1115.84	114.92	107.23	222.14
3819	0.05	2314	2310	SR-26	Other Principal Arte	35	1	1		0	0.00	2584.07	2584.07	0.00	128.61	128.61
3820	0.10	2231	2246	I-84	Interstate	45	1	1		0	0.00	293.69	293.69	0.00	38.72	38.72
3821	0.37	2243	2202	I-84 West Bound	Interstate	65	1	1		0	577.22	538.61	1115.84	212.50	198.28	410.78
3822	0.29	2201	2231	I-84	Interstate	65	1	1		0	0.00	293.69	293.69	0.00	82.67	82.67
3823	0.03	2159	2158	I-15	Interstate	35	1	1		0	114.48	577.22	691.71	3.90	19.66	23.56

Figure I-2-106: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD1A	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3824	0.16	2130	2167	I-15 North Bound	Interstate	65	1	1		0	8494.18	0.00	8494.18	1319.59	0.00	1319.59
3825	0.17	2198	2166	I-15	Interstate	35	1	1		0	114.48	577.22	691.71	19.45	98.05	117.50
3826	0.18	2163	2190	I-15 South Bound	Interstate	65	1	1		0	2488.32	0.00	2488.32	425.95	0.00	425.95
3827	0.17	2161	2208	I-84	Interstate	65	1	1		0	0.00	293.69	293.69	0.00	50.23	50.23
3828	0.04	2167	2161	I-15 North Bound	Interstate	65	1	1		0	8494.18	0.00	8494.18	329.31	0.00	329.31
3829	0.04	2166	2160	I-15	Interstate	65	1	1		0	114.48	577.22	691.71	4.23	21.32	25.55
3830	0.01	2160	2161	I-84	Interstate	65	1	1		0	538.61	577.22	1115.84	4.36	4.67	9.04
3831	0.17	2315	2331	I-84	Interstate	65	1	1		0	0.00	293.69	293.69	0.00	49.98	49.98
3832	0.20	2335	2314	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3833	0.29	2310	2245	SR-26	Other Principal Arte	35	1	1		0	0.00	2584.07	2584.07	0.00	753.04	753.04
3834	0.16	2245	2229	SR-26	Other Principal Arte	35	1	1		0	0.00	2584.07	2584.07	0.00	402.35	402.35
3835	0.48	2202	2136	I-84 West Bound	Interstate	65	1	1		0	577.22	538.61	1115.84	279.92	261.20	541.11
3836	0.32	2161	2136	I-15 North Bound	Interstate	65	1	1		0	9326.48	577.22	9903.70	2982.45	184.59	3167.04
3837	0.31	2160	2133	I-15	Interstate	65	1	1		0	114.48	538.61	653.10	35.48	166.93	202.41
3838	0.55	2098	2163	I-15 South Bound	Interstate	65	1	1		0	2488.32	0.00	2488.32	1321.96	0.00	1321.96
3839	0.22	2133	2092	I-15	Interstate	65	1	1		0	114.48	538.61	653.10	24.98	117.52	142.50
3840	0.84	2136	2030	I-15 North Bound	Interstate	65	1	1		0	8787.87	0.00	8787.87	7372.64	0.00	7372.64
3841	0.62	2029	2091	I-15 South Bound	Interstate	65	1	1		0	2488.32	0.00	2488.32	1495.91	0.00	1495.91
3842	0.51	1921	1862	I-15 South Bound	Interstate	65	1	1		0	3246.91	0.00	3246.91	1646.68	0.00	1646.68
3843	0.50	1860	1920	I-15	Interstate	65	1	1		0	0.00	4400.01	4400.01	0.00	2212.13	2212.13
3844	0.49	1857	1823	I-15 North Bound	Interstate	65	1	1		0	8608.66	3917.69	12526.35	4224.31	1922.43	6146.74
3845	0.35	1862	1905	I-15 South Bound	Interstate	65	1	1		0	3246.91	0.00	3246.91	1148.60	0.00	1148.60
3846	0.31	1899	1860	I-15	Interstate	35	1	1		0	114.48	4400.01	4514.49	35.06	1347.38	1382.44
3847	0.34	1901	1857	I-15 North Bound	Interstate	65	1	1		0	8494.18	3917.69	12411.87	2865.76	1321.74	4187.50
3848	0.01	1860	1857	SR-53	Interstate	35	1	1		0	114.48	0.00	114.48	0.90	0.00	0.90
3849	0.03	1857	1850	SR-53	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3850	2.00	1692	1689	SR-39	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3851	0.37	1689	1693	SR-39	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3852	0.01	1693	1694	SR-39	Other Principal Arte	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3853	0.02	1694	1695	SR-39	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3854	0.52	829	1554	I-15 North Bound	Interstate	65	1	1		0	0.00	7925.56	7925.56	0.00	4089.72	4089.72
3855	0.28	1802	1821	I-15 South Bound	Interstate	65	1	1		0	3246.91	0.00	3246.91	917.93	0.00	917.93
3856	0.29	1820	1800	I-15	Interstate	35	1	1		0	0.00	4400.01	4400.01	0.00	1232.55	1232.55
3857	0.29	1823	1799	I-15 North Bound	Interstate	65	1	1		0	8608.66	3917.69	12526.35	2465.60	1122.06	3587.65
3858	0.39	1735	1755	I-15 South Bound	Interstate	65	1	1		0	3246.91	0.00	3246.91	1271.72	0.00	1271.72
3859	0.44	1753	1730	I-15 North Bound	Interstate	65	1	1		0	8608.66	3917.69	12526.35	3784.88	1722.45	5507.34

Figure I-2-107: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD [A]	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3860	0.36	1755	1802	I-15 South Bound	Interstate	65	1	1		0	3246.91	0.00	3246.91	1154.36	0.00	1154.36
3861	0.36	1800	1752	I-15	Interstate	35	1	1		0	0.00	4488.01	4488.01	0.00	1598.74	1598.74
3862	0.36	1799	1753	I-15 North Bound	Interstate	65	1	1		0	8608.66	3917.69	12526.35	3101.75	1411.57	4513.31
3863	0.37	1697	1735	I-15 South Bound	Interstate	65	1	1		0	3246.91	0.00	3246.91	1216.81	0.00	1216.81
3864	0.76	1752	1698	I-15	Interstate	35	1	1		0	0.00	4488.01	4488.01	0.00	3339.28	3339.28
3865	0.32	1730	1690	I-15 North Bound	Interstate	65	1	1		0	8608.66	3917.69	12526.35	2754.38	1253.48	4007.86
3866	0.04	1695	1696	SR-39	Other Principal Arth	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3867	0.04	1696	1697	SR-39	Other Principal Arth	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3868	0.06	1685	1697	I-15 South Bound	Interstate	65	1	1		0	4400.01	11321.13	15721.14	281.43	724.12	1005.55
3869	0.01	1697	1698	SR-39	Other Principal Arth	35	1	1		0	4400.01	14568.04	18968.05	40.00	135.10	175.99
3870	0.07	1698	1684	I-15	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3871	0.01	1698	1699	SR-39	Other Principal Arth	35	1	1		0	0.00	14568.04	14568.04	0.00	136.59	136.59
3872	0.06	1699	1686	I-15 North Bound	Interstate	65	1	1		0	0.00	7925.56	7925.56	0.00	508.15	508.15
3873	0.21	2358	2334	SR-89	Other Principal Arth	35	1	1		0	2164.59	0.00	2164.59	457.26	0.00	457.26
3874	0.22	2334	2297	SR-89	Other Principal Arth	35	1	1		0	2164.59	0.00	2164.59	470.05	0.00	470.05
3875	0.53	2297	2196	SR-89	Other Principal Arth	35	1	1		0	2164.59	0.00	2164.59	1138.25	0.00	1138.25
3876	0.07	2196	2175	SR-89	Other Principal Arth	35	1	1		0	2164.59	0.00	2164.59	154.73	0.00	154.73
3877	0.40	2175	2122	SR-89	Other Principal Arth	35	1	1		0	2164.59	0.00	2164.59	869.26	0.00	869.26
3878	0.62	2092	2028	I-15	Interstate	65	1	1		0	114.48	538.61	653.10	71.03	334.19	405.22
3879	0.45	2009	2029	I-15 South Bound	Interstate	65	1	1		0	2408.32	0.00	2408.32	1088.32	0.00	1088.32
3880	0.45	2028	2010	I-15	Interstate	65	1	1		0	114.48	538.61	653.10	51.08	240.30	291.38
3881	0.46	2030	2007	I-15 North Bound	Interstate	65	1	1		0	8787.87	0.00	8787.87	4000.57	0.00	4000.57
3882	0.02	2010	2005	I-15	Interstate	65	1	1		0	114.48	538.61	653.10	2.78	13.10	15.88
3883	0.03	1997	1996	SR-79	Other Principal Arth	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3884	0.07	1996	2009	I-15 South Bound	Interstate	65	1	1		0	2408.32	0.00	2408.32	166.13	0.00	166.13
3885	0.05	2005	1995	I-15	Interstate	35	1	1		0	114.48	538.61	653.10	5.26	24.76	30.02
3886	0.06	2007	1994	I-15 North Bound	Interstate	65	1	1		0	8787.87	0.00	8787.87	558.91	0.00	558.91
3887	0.01	1996	1995	SR-79	Other Principal Arth	35	1	1		0	2427.86	1589.27	4017.13	18.52	12.12	30.64
3888	0.01	1995	1994	SR-79	Other Principal Arth	35	1	1		0	6287.35	1587.37	7874.72	60.81	15.35	76.16
3889	0.02	1994	1993	SR-79	Other Principal Arth	35	1	1		0	10498.73	1587.37	12086.09	164.24	24.83	189.07
3890	0.10	1993	1990	SR-79	Other Principal Arth	35	1	1		0	10498.73	1587.37	12086.09	1018.04	153.92	1171.97
3891	0.06	1990	1985	SR-79	Other Principal Arth	35	1	1		0	10498.73	1587.37	12086.09	662.74	100.20	762.95
3892	0.39	1905	1939	I-15 South Bound	Interstate	65	1	1		0	3246.91	0.00	3246.91	1270.15	0.00	1270.15
3893	0.43	1940	1901	I-15 North Bound	Interstate	65	1	1		0	8494.18	3917.69	12411.87	3686.11	1708.11	5386.22
3894	0.44	1938	1899	I-15	Interstate	65	1	1		0	114.48	4488.01	4514.49	50.42	1937.85	1988.27
3895	0.31	1939	1975	I-15 South Bound	Interstate	65	1	1		0	3246.91	0.00	3246.91	991.55	0.00	991.55

Figure I-2-108: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3896	0.29	1972	1938	I-15	Interstate	65	1	1		0	114.48	4400.01	4514.49	32.20	1237.64	1269.84
3897	0.26	1974	1940	I-15 North Bound	Interstate	65	1	1		0	8494.18	3917.69	12411.87	2395.81	1105.09	3500.91
3898	0.08	1975	1936	I-15 South Bound	Interstate	65	1	1		0	3246.91	0.00	3246.91	245.78	0.00	245.78
3899	0.10	1995	1972	I-15	Interstate	35	1	1		0	114.48	4400.01	4514.49	11.82	454.22	466.04
3900	0.08	1994	1974	I-15 North Bound	Interstate	65	1	1		0	8494.18	3917.69	12411.87	716.87	330.63	1047.50
3901	0.23	992	1968	SR-79	Other Principal Arte	35	1	1		0	10498.73	1587.37	12086.09	2379.58	359.78	2739.36
3902	0.33	2141	2089	SR-26	Other Principal Arte	35	1	1		0	0.00	2584.87	2584.87	0.00	842.28	842.28
3903	0.14	2089	2080	SR-26	Other Principal Arte	35	1	1		0	0.00	2584.87	2584.87	0.00	362.40	362.40
3904	0.08	2083	2079	SR-26	Other Principal Arte	35	1	1		0	0.00	2584.87	2584.87	0.00	204.08	204.08
3905	0.86	18068	18051	I-15	Interstate	35	1	1		0	38092.92	42.11	38135.02	32729.90	36.18	32766.07
3906	0.65	18064	18050	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	2808.58	2016.89	4825.48
3907	0.09	9037	18064	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	380.86	273.50	654.36
3908	0.09	9025	18064	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	380.51	273.25	653.76
3909	0.07	18065	18063	SR-89	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3910	0.45	18063	18038	SR-89	Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3911	0.15	18030	18026	SR-89	Other Principal Arte	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3912	0.14	18038	18030	SR-89	Other Principal Arte	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3913	0.48	18026	18004	SR-89	Other Principal Arte	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3914	0.20	18004	17995	SR-89	Other Principal Arte	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3915	0.19	17995	17991	SR-89	Other Principal Arte	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3916	0.16	17991	17987	SR-89	Other Principal Arte	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3917	0.56	17987	17973	SR-89	Other Principal Arte	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3918	0.77	2542	2981	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	593.16	338.94	928.10
3919	0.75	2980	2943	I-15	Interstate	45	1	1		0	38265.21	0.00	38265.21	28852.60	0.00	28852.60
3920	0.74	2979	2944	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	3197.28	2288.84	5476.12
3921	0.15	3009	18004	I-15 South Bound	Interstate	45	1	1		0	769.19	442.51	1211.70	111.68	64.25	175.93
3922	0.02	3009	3004	I-15	Interstate	25	1	1		0	38265.21	0.00	38265.21	581.59	0.00	581.59
3923	0.10	3010	2995	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	445.39	319.84	765.24
3924	0.35	2981	3008	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	267.66	153.98	421.64
3925	0.15	3004	2995	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	6260.79	0.00	6260.79
3926	0.27	2999	2973	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	1144.63	821.98	1966.61
3927	0.19	2995	2980	I-15	Interstate	45	1	1		0	38265.21	0.00	38265.21	6921.08	0.00	6921.08
3928	0.28	2918	2935	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	214.45	123.37	337.83
3929	0.49	2944	2907	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	2686.30	1498.21	3584.51
3930	0.23	2934	2921	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	8806.82	0.00	8806.82
3931	0.15	2935	2942	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	124.40	71.57	195.97

Figure I-2-109: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD1A	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3902	0.17	2943	2934	I-15	Interstate	25	1	1		0	38265.21	0.00	38265.21	6559.55	0.00	6559.55
3933	0.01	2917	2918	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	5.09	2.93	8.02
3934	0.04	2904	2906	I-15 South Bound	Interstate	65	1	1		0	769.19	442.51	1211.70	30.77	17.70	48.47
3935	0.03	2905	2898	I-15	Interstate	65	1	1		0	38265.21	0.00	38265.21	1234.14	0.00	1234.14
3936	0.00	2902	2901	I-15 North Bound	Interstate	65	1	1		0	4289.81	3080.58	7370.39	11.36	8.16	19.52
3937	0.23	2559	2549	I-84	Interstate	55	1	1		0	0.00	293.69	293.69	0.00	68.41	68.41
3938	0.08	2527	2525	SR-89	Other Principal Art	35	1	1		0	3605.09	6948.58	10553.67	304.13	586.19	890.32
3939	0.23	17768	2563	SR-89	Other Principal Art	55	1	1		0	36716.76	0.00	36716.76	8288.49	0.00	8288.49
3940	0.06	2563	2566	SR-89	Other Principal Art	55	1	1		0	36716.76	0.00	36716.76	2113.10	0.00	2113.10
3941	0.01	2547	2548	I-84 West Bound	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3942	0.04	2547	2537	SR-89	Other Principal Art	35	1	1		0	3605.09	6948.58	10553.67	154.00	296.82	450.82
3943	0.08	2566	2560	SR-89	Other Principal Art	55	1	1		0	36716.76	0.00	36716.76	2848.68	0.00	2848.68
3944	0.01	2551	2543	SR-89	Other Principal Art	35	1	1		0	36716.76	0.00	36716.76	258.90	0.00	258.90
3945	0.03	2560	2551	SR-89	Other Principal Art	35	1	1		0	36716.76	0.00	36716.76	936.05	0.00	936.05
3946	0.01	2549	2547	SR-89	Other Principal Art	35	1	1		0	6265.46	0.00	6265.46	35.25	0.00	35.25
3947	0.08	2537	2527	SR-89	Other Principal Art	35	1	1		0	3605.09	6948.58	10553.67	296.50	571.49	868.00
3948	0.17	2549	2550	I-84	Interstate	35	1	1		0	30157.62	0.00	30157.62	5060.96	0.00	5060.96
3949	0.21	2543	2547	I-84 West Bound	Interstate	35	1	1		0	68.64	9677.58	9746.22	14.18	1999.26	2013.44
3950	0.27	2576	2573	SR-89	Other Principal Art	35	1	1		0	36716.76	0.00	36716.76	10019.15	0.00	10019.15
3951	0.23	2573	2574	SR-89	Other Principal Art	35	1	1		0	36716.76	0.00	36716.76	8386.55	0.00	8386.55
3952	0.09	2574	17768	SR-89	Other Principal Art	35	1	1		0	36716.76	0.00	36716.76	3203.28	0.00	3203.28
3953	0.38	2525	2524	SR-89	Other Principal Art	35	1	1		0	3605.09	6948.58	10553.67	1366.51	2633.86	4000.37
3954	1.24	2550	2557	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	37321.20	0.00	37321.20
3955	1.61	1276	2531	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3956	0.79	1279	2540	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	23875.35	0.00	23875.35
3957	4.15	2530	2543	I-84 West Bound	Interstate	65	1	1		0	68.64	9677.58	9746.22	285.09	40196.16	40481.25
3958	1.61	1276	2531	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3959	0.79	1278	2540	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	23873.06	0.00	23873.06
3960	0.40	2540	2529	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	12150.18	0.00	12150.18
3961	0.33	2529	2530	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	10059.77	0.00	10059.77
3962	0.34	2531	2532	I-84 East Bound	Interstate	20	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3963	0.60	2532	2548	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3964	0.63	2530	2528	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	18905.23	0.00	18905.23
3965	0.01	2539	2541	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	330.20	0.00	330.20
3966	0.21	2546	2545	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3967	0.18	2541	2544	I-84	Interstate	65	1	1		0	30157.62	0.00	30157.62	5361.87	0.00	5361.87

Figure I-2-110: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD1A	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
3968	0.17	2542	2538	I-84 West Bound	Interstate	65	1	1		0	68.64	9677.58	9746.22	11.73	1653.19	1664.91
3969	0.78	904	902	SR-13	Other Principal Arte	35	1	1		0	0.00	1318.38	1318.38	0.00	1025.42	1025.42
3970	0.41	905	904	SR-13	Other Principal Arte	35	1	1		0	0.00	1318.38	1318.38	0.00	538.60	538.60
3971	0.34	501	903	SR-13	Other Principal Arte	35	1	1		0	0.00	1318.38	1318.38	0.00	454.21	454.21
3972	0.38	933	905	SR-13	Other Principal Arte	35	1	1		0	0.00	1318.38	1318.38	0.00	495.39	495.39
3973	0.22	1067	1065	SR-91	Other Principal Arte	35	1	1		0	1570.95	994.97	2565.93	349.99	221.67	571.66
3974	0.07	543	1088	SR-91	Other Principal Arte	35	1	1		0	1570.95	994.97	2565.93	105.47	66.88	172.26
3975	0.07	542	1088	SR-91	Other Principal Arte	35	1	1		0	1570.95	994.97	2565.93	105.43	66.77	172.20
3976	1.48	1086	1066	SR-91	Other Principal Arte	55	1	1		0	1570.95	994.97	2565.93	2331.62	1476.75	3808.37
3977	0.02	1099	1086	SR-91	Other Principal Arte	55	1	1		0	1570.95	994.97	2565.93	32.43	20.54	52.97
3978	0.20	1096	1092	SR-91	Other Principal Arte	25	1	1		0	1570.95	994.97	2565.93	306.38	194.05	500.43
3979	0.85	1092	1062	SR-91	Other Principal Arte	25	1	1		0	1570.95	994.97	2565.93	1392.63	882.03	2274.67
3980	0.23	531	1002	SR-91	Other Principal Arte	35	1	1		0	1570.95	994.97	2565.93	360.38	228.25	588.63
3981	0.23	531	1002	SR-91	Other Principal Arte	35	1	1		0	1570.95	994.97	2565.93	360.49	228.32	588.82
3982	4.59	503	834	SR-91	Other Principal Arte	55	1	1		0	1570.95	994.97	2565.93	7210.40	4566.75	11777.16
3983	4.59	503	834	SR-91	Other Principal Arte	55	1	1		0	1570.95	994.97	2565.93	7210.50	4566.82	11777.32
3984	0.68	834	825	SR-91	Other Principal Arte	55	1	1		0	1570.95	994.97	2565.93	1062.57	672.99	1735.56
3985	0.18	619	636	I-15 South Bound	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3986	0.17	636	623	I-15 North Bound	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3987	0.01	615	615	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3988	0.01	611	615	I-15 South Bound	Interstate	65	1	1		0	3670.00	0.00	3670.00	38.75	0.00	38.75
3989	0.01	616	615	I-84	Interstate	65	1	1		0	0.00	3670.00	3670.00	0.00	43.23	43.23
3990	0.01	620	616	I-15	Interstate	55	1	1		0	0.00	3670.00	3670.00	0.00	26.65	26.65
3991	0.01	623	620	I-15 North Bound	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3992	0.01	620	616	I-15 North Bound	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3993	0.01	614	611	I-84 West Bound	Interstate	65	1	1		0	6700.44	4081.13	10781.57	79.93	48.68	127.01
3994	0.01	616	614	I-15	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3995	0.01	615	614	I-84 West Bound	Interstate	55	1	1		0	9142.55	5432.82	14575.37	66.78	39.68	106.46
3996	0.15	621	620	I-15	Interstate	55	1	1		0	0.00	3670.00	3670.00	0.00	551.65	551.65
3997	0.29	615	602	I-84	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
3998	0.29	611	600	I-84 West Bound	Interstate	65	1	1		0	6700.44	7751.13	14451.57	1936.39	2240.03	4176.42
3999	0.33	574	611	I-15 South Bound	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4000	0.15	308	580	I-15 North Bound	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4001	1.04	1116	1060	I-15	Interstate	1	1	1		0	0.00	5328.32	5328.32	0.00	5524.19	5524.19
4002	0.29	1044	1065	I-15 South Bound	Interstate	65	1	1		0	877.28	10550.38	11427.66	250.67	3014.64	3265.31
4003	0.25	1060	1045	I-15	Interstate	25	1	1		0	0.00	5328.32	5328.32	0.00	1326.57	1326.57

Figure I-2-111: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD1A	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4004	0.32	1070	1346	I-15 North Bound	Interstate	65	1	1		0	2078.75	5057.50	7128.25	652.35	1593.28	2245.63
4005	0.27	1045	987	I-15	Interstate	25	1	1		0	0.00	5328.32	5328.32	0.00	1417.67	1417.67
4006	0.32	1043	1344	I-15 South Bound	Interstate	65	1	1		0	877.28	10550.38	11427.66	283.01	3403.52	3686.53
4007	0.32	1046	986	I-15 North Bound	Interstate	65	1	1		0	2078.75	5057.50	7128.25	654.18	1597.73	2251.91
4008	1.07	1126	1126	SR-91	Other Principal Arte	35	1	1		0	734.96	1477.29	2212.25	789.37	1586.65	2376.02
4009	0.77	493	898	I-15	Interstate	65	1	1		0	0.00	5328.32	5328.32	0.00	4085.92	4085.92
4010	1.48	887	1343	I-15 South Bound	Interstate	65	1	1		0	877.28	10550.38	11427.66	1297.14	15599.68	16896.82
4011	1.48	986	889	I-15 North Bound	Interstate	65	1	1		0	2078.75	5057.50	7128.25	3057.14	7491.03	10548.17
4012	0.77	434	898	I-15	Interstate	65	1	1		0	0.00	5328.32	5328.32	0.00	4086.05	4086.05
4013	0.01	888	887	SR-13	Other Principal Arte	35	1	1		0	877.28	10550.38	11427.66	6.20	74.61	80.82
4014	0.01	889	888	SR-13	Other Principal Arte	35	1	1		0	6205.60	14220.38	20425.98	63.16	144.74	207.90
4015	0.07	892	889	SR-13	Other Principal Arte	35	1	1		0	0.00	1318.38	1318.38	0.00	87.24	87.24
4016	0.09	883	887	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4017	0.11	888	892	I-15	Interstate	35	1	1		0	0.00	3670.00	3670.00	0.00	391.65	391.65
4018	0.09	889	884	I-15 North Bound	Interstate	65	1	1		0	9142.55	5432.82	14575.37	848.10	503.97	1352.07
4019	0.03	893	892	SR-13	Other Principal Arte	35	1	1		0	0.00	1318.38	1318.38	0.00	43.16	43.16
4020	0.24	884	880	I-15 North Bound	Interstate	65	1	1		0	9142.55	5432.82	14575.37	2237.26	1329.46	3566.71
4021	0.31	447	893	SR-13	Other Principal Arte	35	1	1		0	0.00	1318.38	1318.38	0.00	405.53	405.53
4022	0.31	447	893	SR-13	Other Principal Arte	35	1	1		0	0.00	1318.38	1318.38	0.00	405.45	405.45
4023	0.53	898	894	SR-13	Other Principal Arte	35	1	1		0	0.00	1318.38	1318.38	0.00	698.58	698.58
4024	0.27	902	898	SR-13	Other Principal Arte	35	1	1		0	0.00	1318.38	1318.38	0.00	361.35	361.35
4025	0.31	563	1127	SR-91	Other Principal Arte	35	1	1		0	734.96	1477.29	2212.25	224.45	451.15	675.61
4026	0.31	563	1127	SR-91	Other Principal Arte	35	1	1		0	734.96	1477.29	2212.25	224.38	451.00	675.38
4027	0.65	1127	1105	SR-13	Other Principal Arte	35	1	1		0	0.00	1318.38	1318.38	0.00	858.95	858.95
4028	1.70	1127	1387	SR-91	Other Principal Arte	35	1	1		0	1570.95	994.97	2565.93	2669.18	1690.54	4359.73
4029	0.70	1105	1367	SR-13	Other Principal Arte	35	1	1		0	0.00	1318.38	1318.38	0.00	921.05	921.05
4030	0.30	1067	1038	SR-13	Other Principal Arte	25	1	1		0	0.00	1318.38	1318.38	0.00	393.43	393.43
4031	0.17	1038	1008	SR-13	Other Principal Arte	35	1	1		0	0.00	1318.38	1318.38	0.00	222.08	222.08
4032	0.34	500	903	SR-13	Other Principal Arte	35	1	1		0	0.00	1318.38	1318.38	0.00	454.13	454.13
4033	0.58	1163	1158	I-15 North Bound	Interstate	65	1	1		0	1282.74	7391.35	8674.08	738.85	4257.35	4996.20
4034	0.23	581	1171	I-15 South Bound	Interstate	65	1	1		0	4472.48	11195.75	15668.24	1039.89	2603.10	3642.99
4035	0.05	1159	1157	I-15	Interstate	20	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4036	0.87	1160	1161	I-15 South Bound	Interstate	65	1	1		0	4472.48	11195.75	15668.24	3894.22	9748.21	13642.43
4037	0.79	1157	1158	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4038	1.03	1158	1150	I-15 North Bound	Interstate	65	1	1		0	1282.74	7391.35	8674.08	1323.10	7623.93	8947.03
4039	0.22	1151	1149	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-112: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4040	0.49	574	1145	I-15	Interstate	1	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4041	0.49	575	1146	I-15 North Bound	Interstate	65	1	1		0	1282.74	7391.35	8674.08	625.34	3603.31	4228.65
4042	0.24	575	1146	I-15 North Bound	Interstate	65	1	1		0	1282.74	7391.35	8674.08	312.61	1801.30	2113.91
4043	0.49	575	1145	I-15	Interstate	1	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4044	2.39	1139	1160	I-15 South Bound	Interstate	65	1	1		0	4472.48	11195.75	15668.24	10681.51	26738.51	37420.02
4045	0.64	1145	1140	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4046	0.64	1146	1141	I-15 North Bound	Interstate	65	1	1		0	1319.71	7427.27	8746.98	845.63	4759.17	5604.81
4047	0.50	1140	1138	I-15	Interstate	1	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4048	0.66	1141	1137	I-15 North Bound	Interstate	65	1	1		0	1319.71	7427.27	8746.98	875.57	4927.68	5803.25
4049	0.07	1138	1136	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4050	0.36	1132	1139	I-15 South Bound	Interstate	65	1	1		0	4472.48	11195.75	15668.24	1624.90	4067.54	5692.45
4051	0.27	1137	1130	I-15 North Bound	Interstate	65	1	1		0	1319.71	7427.27	8746.98	354.32	1994.09	2348.41
4052	0.26	1136	1131	I-15	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4053	0.05	1134	1132	SR-91	Other Principal Arti	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4054	0.01	1132	1131	SR-91	Other Principal Arti	35	1	1		0	645.37	3585.20	4240.57	5.48	38.53	36.01
4055	0.01	1131	1130	SR-91	Other Principal Arti	35	1	1		0	5973.69	3585.20	9568.90	50.95	35.48	94.43
4056	0.04	1130	1129	SR-91	Other Principal Arti	35	1	1		0	734.96	1477.28	2212.25	31.68	63.68	95.36
4057	0.28	1131	1121	I-15	Interstate	55	1	1		0	0.00	5328.32	5328.32	0.00	1478.90	1478.90
4058	0.29	1130	1120	I-15 North Bound	Interstate	65	1	1		0	2070.75	5057.50	7128.25	592.86	1447.97	2040.83
4059	0.17	1129	1128	SR-91	Other Principal Arti	35	1	1		0	734.96	1477.28	2212.25	123.62	248.47	372.09
4060	0.43	1133	1132	I-15 South Bound	Interstate	65	1	1		0	877.28	10568.38	11427.66	370.09	4546.99	4925.07
4061	0.08	560	1116	I-15	Interstate	65	1	1		0	0.00	5328.32	5328.32	0.00	411.47	411.47
4062	0.08	561	1116	I-15	Interstate	65	1	1		0	0.00	5328.32	5328.32	0.00	411.87	411.87
4063	1.12	1120	1870	I-15 North Bound	Interstate	65	1	1		0	2070.75	5057.50	7128.25	2312.92	5648.95	7961.87
4064	1.00	1865	1130	I-15 South Bound	Interstate	65	1	1		0	877.28	10568.38	11427.66	879.00	10571.09	11450.09
4065	0.32	614	579	I-15	Interstate	55	1	1		0	2453.46	1363.03	3816.49	773.86	429.92	1203.78
4066	0.16	308	580	I-15 North Bound	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4067	0.11	551	574	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4068	0.14	580	550	I-15 North Bound	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4069	0.14	579	549	I-15	Interstate	35	1	1		0	2453.46	1363.03	3816.49	334.75	185.97	520.73
4070	0.79	635	664		Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4071	0.63	628	649	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4072	0.51	638	616	I-84 West Bound	Interstate	65	1	1		0	9142.55	5432.82	14575.37	4681.86	2782.12	7463.98
4073	0.36	640	631	I-15	Interstate	65	1	1		0	0.00	3670.00	3670.00	0.00	1315.66	1315.66
4074	0.21	648	640	I-15	Interstate	25	1	1		0	0.00	3670.00	3670.00	0.00	752.62	752.62
4075	0.20	647	638	I-15 North Bound	Interstate	65	1	1		0	9142.55	5432.82	14575.37	1864.81	1108.13	2972.94

Figure I-2-113: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPD	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4076	0.41	649	685	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4077	0.35	346	691	I-15	Interstate	25	1	1		0	0.00	3670.00	3670.00	0.00	1298.92	1298.92
4078	1.07	691	647	I-15 North Bound	Interstate	65	1	1		0	9142.55	5432.82	14575.37	9770.87	5805.71	15576.58
4079	0.66	685	694	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4080	0.35	346	691	I-15	Interstate	25	1	1		0	0.00	3670.00	3670.00	0.00	1298.53	1298.53
4081	0.37	691	648	I-15	Interstate	25	1	1		0	0.00	3670.00	3670.00	0.00	1345.25	1345.25
4082	0.38	274	462	I-15	Interstate	35	1	1		0	2453.46	1363.03	3816.49	923.68	513.15	1436.83
4083	0.75	463	551	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4084	0.72	550	466	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4085	0.38	275	462	I-15	Interstate	35	1	1		0	2453.46	1363.03	3816.49	923.85	513.25	1437.11
4086	0.26	428	463	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4087	0.25	462	429	I-15	Interstate	65	1	1		0	2453.46	1363.03	3816.49	623.65	346.49	970.14
4088	0.29	466	426	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4089	0.34	427	428	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4090	0.34	429	392	I-15	Interstate	65	1	1		0	2453.46	1363.03	3816.49	834.97	463.87	1298.84
4091	0.33	426	393	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4092	1.80	121	427	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4093	1.73	191	245	I-15 North Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4094	0.53	357	691	I-15 North Bound	Interstate	65	1	1		0	9142.55	5432.82	14575.37	4861.68	2888.98	7750.65
4095	1.08	694	720	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4096	1.09	719	692	I-15	Interstate	25	1	1		0	0.00	3670.00	3670.00	0.00	3984.92	3984.92
4097	0.07	689	697	SR-91	Other Principal Arth	25	1	1		0	1570.95	994.97	2565.93	112.88	71.49	184.37
4098	0.25	343	641	SR-91	Other Principal Arth	45	1	1		0	1570.95	994.97	2565.93	399.20	252.84	652.04
4099	0.25	344	641	SR-91	Other Principal Arth	45	1	1		0	1570.95	994.97	2565.93	399.31	252.91	652.22
4100	0.08	641	639	SR-91	Other Principal Arth	35	1	1		0	1570.95	994.97	2565.93	125.35	79.39	204.74
4101	0.34	320	591	SR-91	Other Principal Arth	35	1	1		0	1570.95	994.97	2565.93	534.08	338.26	872.34
4102	0.34	319	591	SR-91	Other Principal Arth	35	1	1		0	1570.95	994.97	2565.93	534.04	338.24	872.28
4103	0.09	592	591	1200 SOUTH	Other Principal Arth	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4104	0.01	297	592	1200 SOUTH	Other Principal Arth	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4105	0.01	296	592	1200 SOUTH	Other Principal Arth	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4106	0.63	591	531	SR-91	Other Principal Arth	35	1	1		0	1570.95	994.97	2565.93	987.20	625.25	1612.45
4107	0.63	371	373	SR-30	Other Principal Arth	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4108	0.12	531	524	SR-91	Other Principal Arth	35	1	1		0	1570.95	994.97	2565.93	189.43	119.98	309.41
4109	0.32	524	476	SR-91	Other Principal Arth	35	1	1		0	1570.95	994.97	2565.93	507.50	321.43	828.92
4110	0.13	476	453	SR-91	Other Principal Arth	35	1	1		0	1570.95	994.97	2565.93	205.73	130.30	336.03
4111	0.38	453	390	SR-91	Other Principal Arth	35	1	1		0	1570.95	994.97	2565.93	590.55	374.03	964.58

Figure I-2-114: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4112	0.27	390	374	SR-91	Other Principal Arte	35	1	1		0	1578.95	994.97	2565.93	418.67	264.79	682.97
4113	0.14	373	374	SR-30	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4114	0.27	374	358	SR-91	Other Principal Arte	35	1	1		0	1578.95	994.97	2565.93	419.66	265.79	685.45
4115	0.13	358	343	SR-91	Other Principal Arte	35	1	1		0	67.68	257.17	324.85	8.69	33.01	41.70
4116	0.14	358	359	SR-89	Other Principal Arte	35	1	1		0	1758.20	992.72	2750.92	239.41	135.18	374.59
4117	0.25	343	317	SR-91	Other Principal Arte	35	1	1		0	67.68	257.17	324.85	17.03	64.79	81.73
4118	0.19	156	303	SR-91	Other Principal Arte	35	1	1		0	67.68	257.17	324.85	12.96	49.24	62.20
4119	0.13	359	360	SR-89	Other Principal Arte	35	1	1		0	1758.20	992.72	2750.92	227.21	128.29	355.50
4120	0.53	360	361	SR-89	Other Principal Arte	35	1	1		0	1758.20	992.72	2750.92	932.96	526.77	1459.73
4121	0.51	361	352	SR-89	Other Principal Arte	35	1	1		0	1758.20	992.72	2750.92	900.82	508.62	1409.44
4122	0.25	352	342	SR-89	Other Principal Arte	35	1	1		0	1758.20	992.72	2750.92	431.71	243.76	675.47
4123	0.17	347	339		Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4124	0.01	339	340		Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4125	0.01	341	342		Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4126	0.01	340	341		Other Principal Arte	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4127	0.10	342	336	SR-89	Other Principal Arte	35	1	1		0	1758.20	992.72	2750.92	173.29	97.85	271.14
4128	0.19	159	303	SR-91	Other Principal Arte	35	1	1		0	67.68	257.17	324.85	12.96	49.26	62.22
4129	0.24	2971	2975	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	9439.55	0.00	9439.55
4130	0.24	2972	2974	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4131	1.78	3015	3003	I-89	Interstate	65	1	1		0	683.82	40497.74	41181.56	1217.40	72097.24	73314.64
4132	0.01	1520	3020	I-89	Interstate	65	1	1		0	683.82	40497.74	41181.56	556.26	32943.30	33499.56
4133	0.47	3020	3015	I-89	Interstate	65	1	1		0	683.82	40497.74	41181.56	320.60	18986.58	19307.18
4134	1.24	1500	3021	I-89 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4135	3.92	2980	2990	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4136	3.74	2978	2977	I-84	Interstate	25	1	1		0	39835.20	0.00	39835.20	149011.28	0.00	149011.28
4137	3.71	19281	2973	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4138	0.19	2977	2989	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	7556.74	0.00	7556.74
4139	0.13	2989	2991	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	4999.30	0.00	4999.30
4140	0.09	2988	19281	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4141	0.02	3003	3002	I-89	Interstate	65	1	1		0	683.82	40497.74	41181.56	12.24	724.63	736.87
4142	0.10	3002	2996	I-89	Interstate	65	1	1		0	683.82	40497.74	41181.56	68.09	4032.27	4100.36
4143	0.03	2998	2993	I-89	Interstate	65	1	1		0	683.82	40497.74	41181.56	22.86	1353.78	1376.64
4144	0.01	2991	2993	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	235.34	0.00	235.34
4145	0.11	2993	2985	I-89	Interstate	65	1	1		0	5721.21	5699.92	11421.14	620.46	618.15	1238.61
4146	0.18	2985	2976	I-89	Interstate	65	1	1		0	5721.21	5699.92	11421.14	1019.96	1016.16	2036.12
4147	1.24	1500	3021	I-89 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-115: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDLA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connecto	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4148	0.03	2976	2972	I-80	Interstate	35	1	1		0	5721.21	5689.92	11421.14	149.29	148.73	298.01
4149	0.18	2972	2966	I-80	Interstate	65	1	1		0	5721.21	5689.92	11421.14	1004.42	1000.68	2005.10
4150	0.22	2966	2957	I-80	Interstate	65	1	1		0	5721.21	5689.92	11421.14	1286.31	1281.53	2567.84
4151	0.08	2957	2955	I-80	Interstate	65	1	1		0	5721.21	5689.92	11421.14	429.23	427.63	856.86
4152	1.01	2955	2933	I-80	Interstate	65	1	1		0	5721.21	5689.92	11421.14	5780.93	5758.43	11540.36
4153	0.30	2765	2785	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	11957.54	0.00	11957.54
4154	0.30	2769	2786	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4155	0.31	2808	2821	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	12395.83	0.00	12395.83
4156	0.60	2785	2808	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	23883.38	0.00	23883.38
4157	0.68	2786	2820	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4158	0.90	2830	2784	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4159	0.24	2820	2832	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4160	0.22	2821	2831	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	8861.15	0.00	8861.15
4161	0.02	2838	2839	SR-66	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4162	0.01	2837	2838	SR-66	Interstate	25	1	1		0	0.00	68.64	68.64	0.00	0.59	0.59
4163	0.01	2836	2837	SR-66	Interstate	25	1	1		0	9677.58	68.64	9746.22	63.93	0.45	63.48
4164	0.04	2835	2836	SR-66	Interstate	25	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4165	0.16	2843	2836	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4166	1.92	2846	2806	I-84 East Bound	Interstate	55	1	1		0	0.00	68.64	68.64	0.00	131.71	131.71
4167	1.94	2799	2843	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4168	1.91	2845	2803	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	76208.38	0.00	76208.38
4169	0.17	2806	2804	I-84 East Bound	Interstate	65	1	1		0	0.00	68.64	68.64	0.00	11.73	11.73
4170	0.16	2803	2801	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	6345.16	0.00	6345.16
4171	0.17	2797	2799	I-84 West Bound	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4172	0.16	2804	2805	I-84 East Bound	Interstate	65	1	1		0	0.00	68.64	68.64	0.00	11.17	11.17
4173	0.15	2801	2802	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	6095.13	0.00	6095.13
4174	0.16	2800	2797	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4175	0.86	1403	2793	I-84 East Bound	Interstate	65	1	1		0	0.00	68.64	68.64	0.00	59.14	59.14
4176	1.72	2802	2791	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	68705.18	0.00	68705.18
4177	1.71	2792	2800	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4178	0.43	1402	2793	I-84 East Bound	Interstate	65	1	1		0	0.00	68.64	68.64	0.00	29.57	29.57
4179	0.22	2775	2792	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4180	0.22	2791	2777	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	8676.98	0.00	8676.98
4181	0.22	2793	2778	I-84 East Bound	Interstate	65	1	1		0	0.00	21.12	21.12	0.00	4.63	4.63
4182	0.20	2777	2771	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	8117.65	0.00	8117.65
4183	0.22	2774	2775	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-116: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4184	0.20	2778	2772	I-84 East Bound	Interstate	65	1	1		0	0.00	21.12	21.12	0.00	4.30	4.30
4185	0.66	2764	2774	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4186	0.66	2764	2774	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4187	1.42	2772	2768	I-84 East Bound	Interstate	65	1	1		0	0.00	21.12	21.12	0.00	30.03	30.03
4188	2.63	2771	2766	I-84	Interstate	25	1	1		0	39835.20	0.00	39835.20	104905.13	0.00	104905.13
4189	0.18	2876	2880	I-84 East Bound	Interstate	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4190	0.15	2875	2878	I-84	Interstate	65	1	1		0	39835.20	0.00	39835.20	6159.34	0.00	6159.34
4191	0.18	2879	2872	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4192	0.24	2870	2876	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4193	0.87	13013	13878	SR-6	Other Principal Arti	35	1	1		0	84.35	4315.41	4399.77	73.23	3746.15	3819.37
4194	7.53	14534	14405	I-70	Interstate	65	1	1		0	5087.71	953.83	6041.54	38330.31	7186.06	45516.37
4195	2.02	14434	14481	I-70	Interstate	65	1	1		0	5087.71	953.83	6041.54	10301.10	1931.22	12232.33
4196	0.14	14481	14479	I-70	Interstate	65	1	1		0	5087.71	953.83	6041.54	702.00	131.62	833.65
4197	0.38	14479	14468	I-70	Interstate	65	1	1		0	5087.71	953.83	6041.54	1930.61	361.95	2292.56
4198	0.20	14468	14460	I-70	Interstate	65	1	1		0	5087.71	953.83	6041.54	1007.50	188.88	1196.39
4199	0.26	14460	14461	I-70	Interstate	65	1	1		0	5087.71	953.83	6041.54	1300.37	243.79	1544.16
4200	2.32	14461	14462	I-70	Interstate	65	1	1		0	5087.71	953.83	6041.54	11796.45	2211.57	14008.02
4201	0.18	14405	14406	I-70	Interstate	65	1	1		0	5087.71	953.83	6041.54	940.67	176.35	1117.02
4202	0.22	14406	14410	I-70	Interstate	65	1	1		0	5087.71	953.83	6041.54	1113.81	208.81	1322.63
4203	0.94	14411	14434	I-70	Interstate	65	1	1		0	5087.71	953.83	6041.54	4803.08	900.45	5703.45
4204	0.10	14410	14411	I-70	Interstate	65	1	1		0	5087.71	953.83	6041.54	533.58	100.02	633.52
4205	8.16	14462	14261	I-70	Interstate	65	1	1		0	5087.71	953.83	6041.54	41532.55	7786.41	49318.96
4206	0.39	14260	14254	SR-6	Other Principal Arti	45	1	1		0	88.63	4226.21	4314.84	34.63	1653.99	1688.62
4207	0.57	14261	14255	I-70	Interstate	65	1	1		0	5087.71	953.83	6041.54	2908.58	545.30	3453.89
4208	0.39	14254	14253	SR-6	Other Principal Arti	45	1	1		0	88.63	4226.21	4314.84	34.86	1652.43	1687.29
4209	0.01	14253	14255	SR-6	Other Principal Arti	65	1	1		0	88.63	4226.21	4314.84	0.98	43.05	43.95
4210	0.01	14256	14255	SR-6	Other Principal Arti	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4211	0.04	14255	14250	I-70	Interstate	65	1	1		0	4173.92	4177.63	8351.55	177.58	177.74	355.32
4212	0.36	14257	14256	SR-6	Other Principal Arti	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4213	0.40	14250	14243	I-70	Interstate	65	1	1		0	4173.92	4177.63	8351.55	1657.39	1658.86	3316.25
4214	0.17	14243	14241	I-70	Interstate	65	1	1		0	4173.92	4177.63	8351.55	690.78	691.40	1382.18
4215	1.27	14241	14230	I-70	Interstate	65	1	1		0	4173.92	4177.63	8351.55	5311.07	5315.79	10626.87
4216	0.19	14230	14226	I-70	Interstate	65	1	1		0	4173.92	4177.63	8351.55	804.77	805.48	1610.25
4217	0.42	14226	14219	I-70	Interstate	65	1	1		0	4173.92	4177.63	8351.55	1773.27	1775.35	3549.12
4218	0.05	14225	14220	SR-13	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4219	0.02	14220	14219	SR-13	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-117: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4220	0.01	14215	14217	SR-19	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4221	0.05	14217	14218	SR-19	Interstate	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4222	0.01	14218	14214	SR-19	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4223	0.30	14219	14215	I-79	Interstate	65	1	1		0	4173.92	4177.63	8351.55	1393.96	1395.20	2789.16
4224	0.06	14215	14216	I-79	Interstate	65	1	1		0	4173.92	4177.63	8351.55	242.56	242.78	485.35
4225	0.43	6506	13078	SR-6	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	36.61	1872.67	1909.28
4226	0.43	6507	13078	SR-6	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	36.61	1873.13	1909.75
4227	0.36	13467	13467	SR-10	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4228	0.04	13467	13461	SR-10	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4229	0.01	13461	13459	SR-10	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4230	0.03	13459	13458	SR-10	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4231	0.11	13458	13443	SR-10	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4232	0.25	13443	13435	SR-10	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4233	0.15	6716	13419	SR-10	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4234	0.15	6715	13419	SR-10	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4235	0.10	13419	13407	SR-10	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4236	0.13	13395	13394	SR-55	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	11.15	570.37	581.52
4237	0.35	13394	13391	SR-55	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	29.80	1524.74	1554.54
4238	0.10	13407	13391	SR-10	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4239	0.11	13391	13389	SR-55	Other Principal Arte	25	1	1		0	84.35	4315.41	4399.77	9.41	481.19	490.59
4240	0.10	13389	13390	SR-55	Other Principal Arte	25	1	1		0	84.35	4315.41	4399.77	8.44	431.84	440.28
4241	0.10	13390	13393	SR-55	Other Principal Arte	25	1	1		0	84.35	4315.41	4399.77	8.48	433.89	442.37
4242	0.10	13393	13404	SR-55	Other Principal Arte	25	1	1		0	84.35	4315.41	4399.77	8.24	421.38	429.61
4243	0.10	13404	13406	SR-55	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	8.68	443.84	452.52
4244	0.20	13406	13405	SR-55	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	16.89	863.90	880.79
4245	0.10	13405	13400	SR-55	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	8.29	424.25	432.54
4246	0.01	13468	13463	SR-55	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4247	0.01	13466	13468	SR-55	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4248	0.01	13465	13466	SR-55	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4249	0.05	13464	13465	SR-55	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4250	0.06	13453	13464	SR-55	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	4.69	239.88	244.56
4251	0.02	6726	13453	SR-55	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	1.89	96.44	98.32
4252	0.02	6729	13453	SR-55	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	1.89	96.47	98.36
4253	0.34	13403	13420	SR-55	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	28.93	1480.19	1509.12
4254	0.59	13420	13455	SR-55	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	49.36	2525.38	2574.66
4255	0.31	13464	13473	US-6 WB EXC242 to 1	Other Principal Arte	35	1	1		0	84.35	4315.41	4399.77	26.12	1336.06	1362.17

Figure I-2-118: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4257	1.63	6474	12970	SR-6	Other Principal Arts	45	1	1		0	84.35	4315.41	4399.77	136.07	6961.00	7097.07
4258	1.46	6769	13487	SR-10	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4259	1.46	6770	13487	SR-10	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4260	1.64	6766	13502	SR-6	Other Principal Arts	45	1	1		0	84.35	4315.41	4399.77	137.95	7057.45	7195.40
4261	0.63	13481	13531	SR-6	Other Principal Arts	55	1	1		0	84.35	4315.41	4399.77	51.38	2628.34	2679.72
4262	1.64	6765	13502	SR-6	Other Principal Arts	45	1	1		0	84.35	4315.41	4399.77	137.95	7057.08	7195.03
4263	0.26	13532	13538	SR-6	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	21.92	1121.32	1143.24
4264	0.06	13536	13534	SR-6	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	7.09	362.81	369.91
4265	1.09	6767	13535	SR-6	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	92.15	4714.11	4806.26
4266	1.09	6767	13535	SR-6	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	92.14	4713.79	4805.94
4267	0.26	13535	19959	SR-6	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	22.22	1136.70	1158.92
4268	0.03	19959	19960	SR-6	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	2.95	150.99	153.94
4269	1.66	9980	19971	SR-6	Other Principal Arts	45	1	1		0	82.75	4313.37	4396.12	137.06	7144.34	7281.41
4270	0.43	13238	13242	SR-6	Other Principal Arts	55	1	1		0	84.35	4315.41	4399.77	36.21	1852.28	1888.49
4271	0.87	13313	13343	SR-6	Other Principal Arts	55	1	1		0	84.35	4315.41	4399.77	73.47	3758.46	3831.93
4272	0.47	13353	13397	SR-6	Other Principal Arts	55	1	1		0	84.35	4315.41	4399.77	39.62	2026.95	2066.57
4273	0.09	13343	13353	SR-6	Other Principal Arts	55	1	1		0	84.35	4315.41	4399.77	7.50	383.92	391.42
4274	0.05	13397	13400	SR-55	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4275	0.02	13397	13399	SR-55	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	1.52	77.73	79.25
4276	0.03	13399	13398	SR-55	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	2.23	113.84	116.06
4277	0.19	13398	13396	SR-55	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	15.98	817.74	833.73
4278	0.14	13396	13395	SR-55	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	11.92	609.78	621.70
4279	2.26	13242	13313	SR-6	Other Principal Arts	55	1	1		0	84.35	4315.41	4399.77	190.61	9751.38	9942.00
4280	0.36	13225	13228	SR-6	Other Principal Arts	55	1	1		0	84.35	4315.41	4399.77	31.87	1630.58	1662.45
4281	2.13	13144	13225	SR-6	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	180.06	9211.49	9391.55
4282	0.34	6539	13098	SR-6	Other Principal Arts	25	1	1		0	84.35	4315.41	4399.77	28.96	1481.60	1510.56
4283	0.24	6554	13144	SR-6	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	20.51	1049.42	1069.93
4284	0.24	6556	13144	SR-6	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	20.52	1049.67	1070.18
4285	0.11	13098	18677	SR-6	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	9.49	485.26	494.75
4286	0.20	18677	13106	SR-6	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	17.25	882.39	899.64
4287	0.15	13106	13110	SR-6	Other Principal Arts	35	1	1		0	84.35	4315.41	4399.77	13.05	667.80	680.86
4288	0.34	6540	13098	SR-6	Other Principal Arts	25	1	1		0	84.35	4315.41	4399.77	28.97	1482.16	1511.13
4289	0.05	9033	18797	SR-40	Other Principal Arts	35	1	1		0	1576.18	1580.19	3156.36	72.10	72.28	144.38
4290	0.13	9099	18856	SR-40	Other Principal Arts	35	1	1		0	1576.18	1580.19	3156.36	296.70	297.46	594.16
4291	0.13	9098	18856	SR-40	Other Principal Arts	35	1	1		0	1576.18	1580.19	3156.36	296.69	297.45	594.14
4292	0.21	9028	18857	SR-40	Other Principal Arts	35	1	1		0	1576.18	1580.19	3156.36	331.96	332.81	664.77

Figure I-2-119: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4293	0.21	9328	18857	SR-40	Other Principal Arts	35	1	1		0	1576.18	1580.19	3156.36	331.94	332.79	664.73
4294	4.65	9029	18864	SR-40	Other Principal Arts	45	1	1		0	1576.18	1580.19	3156.36	7323.87	7342.51	14666.38
4295	4.65	9029	18864	SR-40	Other Principal Arts	45	1	1		0	1576.18	1580.19	3156.36	7323.81	7342.45	14666.26
4296	6.96	18864	18849	SR-40	Other Principal Arts	45	1	1		0	1576.18	1580.19	3156.36	10972.00	10999.92	21971.91
4297	0.04	2462	2473	I-89	Interstate	55	1	1		0	5041.25	5125.24	10166.49	212.21	215.74	427.95
4298	0.11	2473	2464	I-89	Interstate	55	1	1		0	5018.03	5017.47	10035.50	561.03	560.97	1122.00
4299	2.15	2464	2221	I-89	Interstate	55	1	1		0	5018.03	5017.47	10035.50	10996.65	10995.41	21992.05
4300	1.10	19166	19170	I-89 West Bound	Interstate	55	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4301	1.08	2221	2110	I-89	Interstate	1	1	1		0	5018.03	5017.47	10035.50	5443.39	5442.77	10886.16
4302	0.41	2110	2074	I-89	Interstate	55	1	1		0	5018.03	5017.47	10035.50	2081.36	2081.12	4162.48
4303	0.11	2074	2075	I-89	Interstate	55	1	1		0	5018.03	5017.47	10035.50	572.89	572.83	1145.71
4304	0.12	2075	19166	I-89	Interstate	55	1	1		0	5018.03	5017.47	10035.50	583.55	583.49	1167.04
4305	2.45	19166	19167	I-89	Interstate	55	1	1		0	5018.03	5017.47	10035.50	12270.80	12269.41	24540.21
4306	1.36	18849	18821	SR-40	Other Principal Arts	45	1	1		0	1576.18	1580.19	3156.36	2168.65	2174.16	4342.81
4307	0.31	18821	18818	SR-40	Other Principal Arts	35	1	1		0	1576.18	1580.19	3156.36	481.88	483.11	964.99
4308	0.46	9008	18817	SR-40	Other Principal Arts	45	1	1		0	1576.18	1580.19	3156.36	728.69	730.54	1459.23
4309	0.46	9010	18817	SR-40	Other Principal Arts	45	1	1		0	1576.18	1580.19	3156.36	728.85	730.70	1459.55
4310	1.50	18817	12173	SR-40	Other Principal Arts	45	1	1		0	1576.18	1580.19	3156.36	2366.22	2372.24	4738.45
4311	0.99	12173	12003	SR-40	Other Principal Arts	45	1	1		0	1576.18	1580.19	3156.36	1565.15	1569.13	3134.27
4312	0.93	12003	11888	SR-40	Other Principal Arts	45	1	1		0	1576.18	1580.19	3156.36	1473.13	1476.88	2950.00
4313	1.34	11888	11729	SR-40	Other Principal Arts	35	1	1		0	1576.18	1580.19	3156.36	3857.22	3865.00	6122.22
4314	2.37	11729	11502	SR-40	Other Principal Arts	35	1	1		0	1576.18	1580.19	3156.36	3729.63	3739.12	7468.75
4315	0.55	11502	11411	SR-40	Other Principal Arts	35	1	1		0	1576.18	1580.19	3156.36	865.94	868.15	1734.09
4316	0.09	11411	11356	SR-40	Other Principal Arts	35	1	1		0	1576.18	1580.19	3156.36	144.53	144.90	289.43
4317	0.34	11356	11348	SR-40	Other Principal Arts	35	1	1		0	1511.46	1514.91	3026.37	519.41	520.69	1040.01
4318	0.50	11348	11331	SR-40	Other Principal Arts	35	1	1		0	1511.46	1514.91	3026.37	751.88	753.59	1505.47
4319	1.00	11331	11327	SR-40	Other Principal Arts	35	1	1		0	1511.46	1514.91	3026.37	1510.06	1513.50	3023.56
4320	1.99	11327	11329	SR-40	Other Principal Arts	45	1	1		0	1508.53	1509.83	3018.36	3000.50	3003.09	6003.59
4321	0.99	47	18881	SR-89	Other Principal Arts	35	1	1		0	62.47	124.94	187.41	62.07	124.14	186.21
4322	1.54	9442	18882	SR-89	Other Principal Arts	45	1	1		0	62.47	124.94	187.41	96.20	192.39	288.59
4323	0.77	9441	18882	SR-89	Other Principal Arts	45	1	1		0	62.47	124.94	187.41	48.10	96.20	144.30
4324	0.10	16349	16307	I-15	Interstate	25	1	1		0	226.03	6746.73	6982.76	24.53	701.39	725.94
4325	66.79						1	0.6	4211	2	126.18	75.71	201.89	8427.67	5056.60	13484.28
4326	0.17	8695	17328	SR-18	Other Principal Arts	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4327	55.03						0	0.4	4211	2	0.00	50.47	50.47	0.00	2777.68	2777.68
4328	0.06	21092	21094	I-15 South Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-120: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4329	11.48						1	1	4214	1	4836.39	4836.39	9672.78	55526.08	55526.09	111052.17
4330	0.13	17129	17142	I-15 South Bound	Interstate	65	1	1		0	123.96	65.43	189.39	15.59	8.23	23.81
4331	10.85						0.2	0.05	4215	2	332.01	82.76	414.78	3601.17	897.78	4498.87
4332	1.47	8623	17207	I-15 North Bound	Interstate	65	1	1		0	246.11	112.82	358.93	361.72	165.82	527.53
4333	7.84						0.8	0.95	4215	2	1328.86	1572.53	2988.58	10408.98	12325.87	22734.04
4334	0.12	16148	16143	I-15	Interstate	35	1	1		0	311.44	6759.18	7070.61	35.83	777.53	813.35
4335	25.29						0.15	0.05	4219	2	94.14	31.15	125.33	2380.65	788.63	3168.27
4336	0.01	16431	20590	SR-56	Other Principal Arts	35	1	1		0	533.47	592.53	1126.00	8.00	8.89	16.89
4337	13.91						0.85	0.95	4219	2	533.47	592.53	1126.00	7421.65	8243.35	15665.00
4338	7.05	7060	13958	SR-6	Other Principal Arts	45	1	1		0	358.33	406.58	764.83	2469.57	2865.57	5335.14
4339	59.42						0	0	4222	2	0.00	0.00	0.00	0.00	0.00	0.00
4340	0.34	20054	14101	SR-6	Other Principal Arts	45	1	1		0	189.01	189.01	378.01	63.37	63.37	126.75
4341	13.15						1	1	4222	2	189.01	189.01	378.01	2485.92	2485.91	4971.82
4342	0.64	19434	13462	I-80	Interstate	35	1	1		0	4122.21	4122.21	8244.42	2642.82	2642.83	5285.65
4343	13.06						1	1	4225	1	4122.21	4122.21	8244.42	53849.50	53849.51	107699.01
4344	0.05	3634	3625	I-80	Interstate	65	1	1		0	4425.72	4425.72	8851.44	199.45	199.45	398.89
4345	52.63						1	1	4227	1	303.51	303.51	607.02	15973.42	15973.63	31947.04
4346	1.17	8641	20927	SR-9	Other Principal Arts	35	1	1		0	6635.24	462.84	7097.28	7745.11	539.32	8284.44
4347	21.83						0.1	0.3	4229	2	11.14	33.55	44.69	243.19	732.22	975.41
4348	2.35	8610	17202	SR-9	Other Principal Arts	35	1	1		0	6658.97	463.37	7122.34	15620.93	1086.99	16707.92
4349	26.94						0.9	0.7	4229	2	100.28	78.28	178.55	2701.25	2108.58	4809.84
4350	5.00	19566	15860	SR-89	Other Principal Arts	35	1	1		0	6676.66	541.36	7218.02	33394.67	2707.73	36102.40
4351	57.17						0.8	0.15	4232	3	59.96	18.57	118.53	5714.19	1061.65	6775.84
4352	12.00	17268	17745	SR-89	Other Principal Arts	45	1	1		0	775.69	895.57	1671.26	9329.60	10771.58	20101.18
4353	21.00						0.1	0.15	4232	3	12.49	18.57	31.07	262.40	390.02	652.42
4354	2.56	20997	17268	SR-89	Other Principal Arts	45	1	1		0	763.67	877.48	1641.15	1970.38	2264.03	4234.41
4355	9.67						0.1	0.7	4232	3	12.49	86.67	99.16	120.78	837.78	958.57
4356	1.83	19555	21948	SR-89	Other Principal Arts	45	1	1		0	714.20	714.20	1428.39	1306.32	1306.32	2612.65
4357	17.21						1	1	4236	1	714.20	714.20	1428.39	12292.99	12292.99	24585.98
4358	5.32	19554	20861	SR-191	Other Principal Arts	45	1	1		0	476.15	476.15	952.30	2534.74	2534.74	5069.48
4359	29.17						1	1	4238	1	238.08	238.08	476.15	6944.28	6944.29	13888.57
4360	3.85	8007	16615	SR-191	Other Principal Arts	45	1	1		0	657.30	655.71	1313.01	2530.83	2524.74	5055.57
4361	20.51						0.6	0.1	4240	2	116.94	18.33	129.27	2275.68	376.03	2651.71
4362	0.12	8018	16617	SR-191	Other Principal Arts	35	1	1		0	547.67	638.69	1186.37	67.32	78.50	145.82
4363	17.50						0.4	0.5	4240	2	73.96	164.98	238.94	1325.36	2956.54	4281.90
4364	16.17						1	1	4242	1	238.08	238.08	476.15	3850.77	3850.77	7701.54

Figure I-2-121: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connecto	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4365	1.78	15503	15552	I-15 South Bound	Interstate	65	1	1		0	152.22	518.14	670.36	270.52	920.81	1191.33
4366	31.29						0.35	0.15	4244	3	35.05	14.88	49.93	1096.63	465.55	1562.18
4367	14.10	14189	13958	SR-6	Other Principal Arte	45	1	1		0	218.56	257.95	476.50	3081.38	3636.78	6718.16
4368	56.22						0.3	0.7	4244	3	30.04	69.44	99.48	1689.42	3904.76	5594.18
4369	1.90	15552	15616	I-15 South Bound	Interstate	65	1	1		0	154.04	499.79	653.83	292.42	948.77	1241.19
4370	31.46						0.35	0.15	4244	3	35.05	14.88	49.93	1103.19	468.33	1571.52
4371	0.77	13958	13831	SR-6	Other Principal Arte	45	1	1		0	442.41	456.89	899.30	342.58	353.79	696.37
4372	5.81						0.45	0.25	4248	3	92.82	51.13	143.95	539.36	297.07	836.43
4373	4.51						0.15	0.7	4248	3	30.94	143.15	174.09	139.43	645.08	784.50
4374	0.15	14868	14892	I-15 South Bound	Interstate	65	1	1		0	195.80	9.08	204.88	29.83	1.38	31.22
4375	36.27						0.4	0.05	4248	3	82.51	10.23	92.73	2992.46	370.85	3363.31
4376	0.11	12982	12989	I-15 South Bound	Interstate	65	1	1		0	732.49	19.03	751.52	82.30	2.14	84.44
4377	50.69						0.1	0.7	4251	3	13.62	94.49	108.11	690.53	4789.10	5479.63
4378	7.05	7091	13958	SR-6	Other Principal Arte	45	1	1		0	328.28	264.25	584.54	2257.82	1862.81	4120.63
4379	56.38						0.75	0.05	4251	3	102.18	6.75	108.93	5760.27	380.48	6140.75
4380	0.25	6870	13753	SR-6	Other Principal Arte	35	1	1		0	462.61	490.48	953.01	116.90	123.93	240.83
4381	26.28						0.15	0.25	4251	3	20.44	33.74	54.18	537.04	886.89	1423.84
4382	3.43	15295	15257	SR-89	Other Principal Arte	45	1	1		0	6663.52	532.14	7195.67	22849.19	1824.72	24673.91
4383	17.11						0.65	0.45	4255	3	13.38	9.16	22.54	228.94	156.82	385.76
4384	1.18	15609	15531	SR-89	Other Principal Arte	45	1	1		0	6669.95	542.78	7212.73	7854.89	639.21	8494.09
4385	4.96						0.05	0.45	4255	3	1.03	9.16	10.19	5.10	45.45	50.55
4386	24.99						0.3	0.1	4255	3	6.17	2.04	8.21	154.29	50.88	205.17
4387	3.50	14570	14424	I-70	Interstate	25	1	1		0	5102.50	173.38	5275.80	17844.53	606.06	18450.59
4388	11.64						0.5	0.4	4256	3	167.73	133.13	300.86	1952.55	1549.71	3502.25
4389	0.06	14569	14570	I-70	Interstate	65	1	1		0	5088.56	193.96	5282.52	390.88	14.90	405.78
4390	12.17						0	0.1	4256	3	0.00	33.28	33.28	0.00	405.18	405.18
4391	4.02	21136	21133	SR-89	Other Principal Arte	45	1	1		0	6589.75	539.97	7129.72	26503.32	2171.72	28675.04
4392	67.07						0.5	0.5	4256	3	167.73	166.41	334.14	11249.38	11160.58	22409.96
4393	1.08	14957	14962	SR-76	Interstate	25	1	1		0	45.43	0.00	45.43	49.11	0.00	49.11
4394	62.20						0.45	0	4262	3	45.43	0.00	45.43	2825.65	0.00	2825.65
4395	6.75	16298	16466	SR-12	Other Principal Arte	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4396	45.97						0.15	0.2	4262	3	15.14	20.01	35.15	696.14	919.66	1615.81
4397	2.60	10624	17547	SR-89	Other Principal Arte	45	1	1		0	752.70	792.34	1545.04	1959.21	2062.39	4021.61
4398	54.81						0.4	0.6	4262	3	48.38	80.62	129.40	2213.39	4386.14	6599.53
4399	0.13	13051	13936	I-15 North Bound	Interstate	65	1	1		0	6801.14	11462.88	18264.02	903.76	1523.23	2427.00
4400	26.45						0.3	0.55	4266	3	102.06	185.73	287.79	2699.22	4912.02	7611.24

Figure I-2-122: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connecto	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4401	2.62	5948	13758	SR-28	Other Principal Arte	35	1	1		0	1245.42	446.94	1692.36	3269.16	1173.19	4442.36
4402	17.32						0.1	0.15	4266	3	34.02	50.65	84.67	589.10	877.13	1466.23
4403	2.62	14276	14179	SR-89	Other Principal Arte	45	1	1		0	1258.72	443.60	1702.32	3301.81	1163.63	4465.44
4404	28.90						0.6	0.3	4266	3	204.12	101.31	305.42	5898.86	2927.64	8826.50
4405	3.51	4815	4794	I-80	Interstate	65	1	1		0	4396.79	4564.81	9568.60	17558.40	16037.64	33596.04
4406	19.35						0.15	0.65	4270	3	83.38	27.64	111.03	1613.73	535.01	2148.74
4407	15.29	3923	4806	I-80	Interstate	65	1	1		0	4323.72	4546.68	9470.40	75266.46	69502.82	144769.29
4408	29.70						0	0.2	4270	3	0.00	110.58	110.58	0.00	3284.51	3284.51
4409	0.88	5010	10263	I-15 South Bound	Interstate	65	1	1		0	1677.02	19752.86	21469.87	1479.67	17463.73	18943.40
4410	64.50						0.85	0.75	4270	3	472.50	414.67	887.17	30474.67	26744.46	57219.13
4411	0.99	9418	18838	I-84 West Bound	Interstate	65	1	1		0	3585.37	3585.37	7170.73	3537.80	3537.89	7075.59
4412	34.84						0.15	0.2	4274	3	121.80	161.53	283.33	4243.10	5627.31	9870.41
4413	0.10	3917	3923	I-80	Interstate	20	1	1		0	4934.13	4446.51	9380.64	471.26	424.69	895.94
4414	67.17						0.7	0.1	4274	3	568.39	80.77	649.15	38178.40	5424.98	43603.37
4415	0.11	3386	3387	I-80	Interstate	65	1	1		0	5054.72	5065.50	10120.22	566.65	567.86	1134.51
4416	49.12						0.15	0.7	4274	3	121.80	565.36	687.16	5983.25	27772.97	33756.22
4417	0.23	3595	7007	SR-266 4500 S	Other Principal Arte	35	1	1		0	4722.81	5820.03	10542.84	1097.53	1352.51	2450.03
4418	0.50						0.35	0.65	4278	3	7531.91	1078.86	8610.77	3750.45	537.21	4287.66
4419	0.45	7190	7007	SR-266 4500 S	Other Principal Arte	35	1	1		0	5155.00	12705.28	17860.27	2395.97	5905.23	8301.20
4420	0.38						0.6	0.4	4278	3	12911.85	8630.86	21542.71	4928.68	3294.15	8222.23
4421	0.23	7195	7254	I-15 South Bound	Interstate	65	1	1		0	3807.94	5858.78	9666.72	876.81	1349.03	2225.84
4422	1.18						0.05	0.55	4278	3	1075.99	11867.43	12943.42	1271.93	14028.54	15300.47
4423	0.01	12510	12512	I-15 South Bound	Interstate	65	1	1		0	653.41	541.37	1194.78	6.07	5.03	11.11
4424	0.56						0.05	0	4282	3	341.14	0.00	341.14	199.39	0.00	199.39
4425	0.38	12696	12689	I-15 North Bound	Interstate	65	1	1		0	9548.36	15639.15	25587.51	3801.73	5976.45	9778.19
4426	2.18						0.85	1	4282	3	5799.38	6828.44	12627.81	12625.27	14865.54	27490.81
4427	0.32	12512	12638	I-15 South Bound	Interstate	65	1	1		0	806.16	11.85	818.01	257.12	3.78	260.90
4428	0.33						0.1	0	4282	3	682.28	0.00	682.28	228.48	0.00	228.48
4429	0.41	5043	4762	I-80	Interstate	65	1	1		0	683.82	40457.74	41181.56	282.43	16726.31	17008.75
4430	32.74						0.2	0.65	4286	3	54.18	174.76	228.93	1773.72	5719.05	7492.77
4431	1.23					45	1	1		0	2031.38	2104.69	4136.07	2488.71	2578.52	5067.23
4432	4.56						0.45	0.1	4286	3	121.91	26.88	148.79	556.12	122.61	678.73
4433	1.23					45	1	1		0	1968.28	2013.96	3982.25	2411.31	2467.27	4878.58
4434	5.53						0.35	0.25	4286	3	94.82	67.19	162.01	524.62	371.77	896.40
4435	0.40	2795	2827	I-15 South Bound	Interstate	65	1	1		0	768.19	442.51	1211.70	309.13	177.84	486.97
4436	8.94						0.8	0.5	4290	3	3429.04	2577.98	6017.01	30749.32	23050.37	53799.69

Figure I-2-123: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDLA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connecto	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4437	2.52	3309	6506	I-89	Interstate	65	1	1		0	4993.90	5649.17	10643.07	12586.03	14237.51	26823.54
4438	25.42						0	0.15	4290	3	0.00	644.49	644.49	0.00	17027.94	17027.94
4439	0.04	2899	18978	I-15	Interstate	35	1	1		0	38092.92	42.11	38135.02	1665.51	1.84	1667.35
4440	10.72						0.2	0.25	4290	3	859.76	1074.16	1933.92	9213.92	11511.60	20725.52
4441	0.24	575	1146	I-15 North Bound	Interstate	65	1	1		0	1319.71	7427.27	8746.98	321.76	1810.83	2132.58
4442	15.01						0.2	0.2	4294	3	726.76	725.71	1452.46	10911.46	10896.65	21807.12
4443	0.23	1714	1725	SR-39	Other Principal Arth	35	1	1		0	1662.32	6057.23	7719.56	382.16	1392.54	1774.71
4444	2.59						0.55	0.65	4294	3	1998.59	2358.54	4357.13	5176.18	6108.44	11284.62
4445	0.07	1851	1836	SR-203	Other Principal Arth	25	1	1		0	6057.23	1662.32	7719.56	439.86	120.71	560.57
4446	3.81						0.25	0.15	4294	3	908.45	544.28	1452.73	3457.98	2071.78	5529.76
4447	2.21	354	18951	SR-89	Other Principal Arth	45	1	1		0	537.85	349.31	887.16	1189.73	772.68	1962.41
4448	1.69						0.45	0.45	4298	3	872.62	870.07	1742.69	1471.67	1467.38	2939.05
4449	0.23	337	354	SR-89	Other Principal Arth	35	1	1		0	1112.23	926.24	2038.47	260.78	217.17	477.95
4450	2.91						0.1	0.4	4298	3	193.91	773.40	967.31	564.46	2251.24	2815.70
4451	0.89	1230	1331	I-15 North Bound	Interstate	65	1	1		0	7738.16	1046.96	8785.12	6860.02	928.15	7788.17
4452	31.24						0.45	0.15	4298	3	872.62	289.02	1162.64	27256.44	9058.95	36315.40
4453	2.32	2721	2611	I-89	Interstate	65	1	1		0	5041.25	5125.24	10166.49	11712.65	11907.81	23620.45
4454	18.06						0.35	1	4302	3	36.96	104.62	141.57	667.44	1889.28	2556.72
4455	0.43	1402	2790	I-84 East Bound	Interstate	65	1	1		0	0.00	21.12	21.12	0.00	9.10	9.10
4456	2.86						0.45	0	4302	3	47.52	0.00	47.52	136.11	0.00	136.11
4457	1.42	2772	2768	I-84 East Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4458	1.90						0.2	0	4302	3	21.12	0.00	21.12	40.15	0.00	40.15
4459	0.70	9446	46	SR-89	Other Principal Arth	35	1	1		0	317.79	316.43	634.21	222.27	221.32	443.59
4460	22.47						0.65	0.25	4306	3	26.80	10.21	37.01	602.25	229.46	831.71
4461	0.05	18951	259	SR-89	Other Principal Arth	45	1	1		0	523.73	349.47	873.20	28.38	18.88	47.18
4462	23.00						0.05	0.4	4306	3	2.06	16.34	18.40	47.43	375.85	423.27
4463	2.45	19166	19167	I-89	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4464	28.88						0.3	0.35	4306	3	12.37	14.30	26.67	357.24	412.88	770.12
4465	1.83	7346	14659	I-70	Interstate	65	1	1		0	5224.01	961.14	6185.15	9556.22	1758.20	11314.42
4466	35.79						0	0.4	4310	2	0.00	22.25	22.25	0.00	796.59	796.59
4467	3.87	14893	14774	I-70	Interstate	65	1	1		0	5243.94	958.81	6202.75	20311.73	3713.84	24025.57
4468	38.59						1	0.6	4310	2	56.17	33.38	89.56	2168.01	1288.34	3456.35
4469	5.94	14006	14280	SR-6	Other Principal Arth	45	1	1		0	88.63	4226.21	4314.84	526.73	25117.62	25644.34
4470	21.33						0.85	0.1	4313	3	147.75	17.23	164.98	3151.66	367.53	3519.19
4471	3.50	14679	14619	I-70	Interstate	65	1	1		0	5154.58	968.25	6123.83	18064.48	3396.75	21461.16
4472	12.05						0	0.45	4313	3	0.00	77.53	77.53	0.00	933.93	933.93

Figure I-2-124: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDLIM	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connectors	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4473	1.56	14551	14534	I-70	Interstate	65	1	1		0	5087.71	953.83	6041.54	7916.14	1484.10	9400.24
4474	8.14						0.15	0.45	4313	3	26.07	77.53	103.61	212.38	631.31	843.61
4475	8.39	18775	18795	SR-40	Other Principal Arti	45	1	1		0	1573.52	1687.29	3260.81	13196.89	14151.08	27347.96
4476	36.13						0.65	0.55	4317	3	249.37	209.39	458.76	9008.76	7564.59	16573.35
4477	0.03	19959	19960	SR-6	Other Principal Arti	35	1	1		0	82.75	4313.37	4396.12	2.98	158.92	153.81
4478	8.99						0.15	0.15	4317	3	57.55	57.11	114.65	517.23	513.28	1030.51
4479	1.66	9960	19971	SR-6	Other Principal Arti	45	1	1		0	76.20	4344.30	4420.50	126.21	7195.47	7321.68
4480	7.67						0.2	0.3	4317	3	76.73	114.21	190.94	588.23	875.61	1463.84
4481	1.28	14188	14183	I-70	Interstate	65	1	1		0	1355.40	1355.40	2710.81	1738.69	1738.69	3477.38
4482	14.68						0.25	0	4321	3	47.46	0.00	47.46	696.77	0.00	696.77
4483	3.03	14289	14356	I-70	Interstate	1	1	1		0	1493.54	1531.51	3025.05	4522.86	4637.86	9160.72
4484	5.87						0	0.15	4321	3	0.00	26.80	26.80	0.00	157.26	157.26
4485	5.64	14356	14366	I-70	Interstate	65	1	1		0	1353.55	1401.01	2754.56	7631.09	7898.65	15529.74
4486	4.31						0.75	0.85	4321	3	142.38	151.86	294.24	613.77	654.67	1268.44
4487	0.04	3482	3473	I-80	Interstate	65	1	1		0	5018.03	5017.47	10035.50	211.64	211.62	423.26
4488	21.90						0.15	0.05	4325	3	126.47	41.90	168.37	2779.03	921.08	3700.91
4489	20.86						0.85	0.9	4325	3	716.66	754.29	1470.94	14946.22	15730.96	30677.18
4490	2.45					45	1	1		0	2054.51	2222.85	4277.36	5034.06	5446.53	10480.59
4491	38.17						0	0.05	4325	3	0.00	41.90	41.90	0.00	1599.60	1599.60
4492	0.09	11411	11359	SR-40	Other Principal Arti	35	1	1		0	1511.46	1514.91	3026.37	138.64	138.96	277.60
4493	23.08						0.25	0.25	4328	3	68.60	68.04	136.64	1583.31	1570.29	3153.60
4494	11.41						0.35	0.75	4328	3	96.04	294.11	390.15	1095.74	2328.70	3424.43
4495	0.13	9398	18666	SR-40	Other Principal Arti	35	1	1		0	1576.18	1580.19	3156.36	199.43	199.94	399.36
4496	9.33						0.4	0	4328	3	109.76	0.00	109.76	1024.62	0.00	1024.62
4497	14.54						0.65	0.65	4330	2	3818.52	3818.52	7637.05	55511.73	55511.73	111023.47
4498	0.20	4998	10000	SR-40	Other Principal Arti	35	1	1		0	2095.33	2221.76	4317.09	425.85	451.55	877.40
4499	63.11						0.35	0.35	4330	2	2056.13	2056.13	4112.26	129759.42	129759.42	259518.84
4500	0.09	23	47	SR-69	Other Principal Arti	35	1	1		0	62.47	124.94	187.41	5.43	10.87	16.30
4501	27.84						0.75	1	4333	2	191.49	255.32	446.81	5330.16	7106.85	12437.00
4502	36.64						0.25	0	4333	2	63.63	0.00	63.63	2466.12	0.00	2466.12
4503	2.66	9581	10271	SR-40	Other Principal Arti	45	1	1		0	1064.98	1063.06	2128.04	2835.63	2838.50	5666.12
4504	15.93						0.75	0.1	4335	3	351.47	46.54	398.01	5599.67	741.35	6340.02
4505	4.04	11324	11162	SR-40	Other Principal Arti	45	1	1		0	1102.23	1405.23	2507.47	4447.58	5670.22	10117.80
4506	18.03						0.25	0.9	4335	3	117.16	418.86	536.01	2112.18	7551.46	9663.64
4507	2.17	20040	20041	I-70	Interstate	1	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4508	68.42						0	0	4335	3	0.00	0.00	0.00	0.00	0.00	0.00

Figure I-2-125: Input Output Data for Optimization

ID	Length	FNODE	TNODE	NAME	FC	SPDTA	AB Loading Pct	BA Loading Pct	Centroid Node ID	Number of Centroid Connector	AB_Flow	BA_Flow	Tot_Flow	AB_VMT	BA_VMT	Tot_VMT
4509	1.00	11331	11327	SR-40	Other Principal Art	35	1	1		0	1508.53	1509.83	3018.36	1507.12	1508.42	3015.54
4510	46.69						0.25	0.15	4339	2	5.28	3.14	8.42	246.58	146.42	393.00
4511	0.20	10113	10087	SR-191	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4512	29.45						0.75	0.85	4339	2	15.84	17.77	33.62	466.67	523.43	990.10
4513	0.99	9419	18838	I-84 West Bound	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4514	11.47						1	1	4342	1	3585.37	3585.37	7170.73	41114.98	41114.98	82229.95
4515	0.13	110	105	I-84 West Bound	Interstate	65	1	1		0	3724.22	3684.48	7408.70	476.75	471.66	948.41
4516	24.73						0.75	0.55	4344	2	4089.10	2998.67	7087.77	101125.79	74158.92	175284.71
4517	0.67	18826	18827	I-15	Interstate	65	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4518	11.20						0.25	0.45	4344	2	1363.03	2453.46	3816.49	15260.41	27468.74	42729.15
4519	2.99	149	69	SR-91	Other Principal Art	35	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4520	21.64						0.95	0.25	4347	2	257.17	67.68	324.85	5564.79	1464.42	7029.21
4521	1.39	18889	18876	SR-89	Other Principal Art	45	1	1		0	323.51	338.74	662.24	450.25	471.45	921.70
4522	14.41						0.05	0.75	4347	2	13.54	203.03	216.57	195.04	2925.54	3120.58
4523	0.77	9441	18882	SR-89	Other Principal Art	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4524	21.42						0.1	0.05	4350	2	124.94	62.47	187.41	2676.41	1338.21	4014.62
4525	62.40						0.9	0.95	4350	2	1124.44	1186.91	2311.34	70163.91	74061.91	144225.82
4526	0.62	20499	20505	SR-491 Old SR-666	Other Principal Art	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4527	12.84						1	1	4352	1	2031.19	2040.24	4071.42	26089.01	26205.23	52294.24
4528	13.26						1	1	4353	2	1355.40	1355.40	2710.81	17976.87	17976.87	35953.74
4529	0.74	20240	20233	SR-191	Other Principal Art	55	1	1		0	2671.17	2678.64	5349.81	1985.84	1991.39	3977.23
4530	63.99						0	0	4353	2	0.00	0.00	0.00	0.00	0.00	0.00
4531	1.50	9901	19805	SR-40	Other Principal Art	45	1	1		0	0.00	0.00	0.00	0.00	0.00	0.00
4532	12.77						1	1	4356	1	1048.00	1048.00	2095.99	13384.92	13384.92	26769.83
4533	0.17	12583	12585	SR-6	Other Principal Arterial		1	1			84.35	4315.41	4399.77	14.04	718.45	732.49
4534	0.01	12583	12585	SR-6	Other Principal Arterial		1	1			84.34	18480.44	18564.78	0.92	201.99	202.91
4535	0.01	12577	12573	I-15	Interstate		1	1			0.00	0.00	0.00	0.00	0.00	0.00
4536	0.18	12573	12565	I-15	Interstate		1	1			15696.09	4278.39	19974.47	2837.82	773.52	3611.35
4537	0.02	13162	13143	SR-28	Other Principal Arterial		1	1			11395.17	958.81	12353.98	201.08	16.92	218.00
4538	0.02	13162	13143	SR-28	Other Principal Arterial		1	1			11395.15	497.88	11893.03	224.68	9.82	234.49

Figure I-2-126: Input Output Data for Optimization