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Cover Page Footnote

Many thanks to the University of Utah for the data contribution and Dr. Sotomayor for the review of this analysis.

Tourism in Utah as an Economic Development Tool

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Abstract

Tourism in Utah is largely driven by seasonal recreation at its variety of natural-heritage resources through all its seasons. This study uses empirical evidence and empirical testing to explain different variables to examine if there is a long run relationship between economic development and tourism in the state of Utah. Traditionally, in order to measure the impact that tourism has had over economic growth, variables such as the nominal and real GDP among other income variables have been used and just give one-sided economic approach. However, what can be said about tourism as an economic development tool?

This study will use and test variables that explain the economic development and tourism behavior in the state of Utah. For the economic development, this study will use the non-Income Human Development Index derived from the Human Development Index (HDI) which was originally developed by the United Nations; and to explain tourism, we will use Taxable Accommodation Sales and Leisure and Hospitality Sales in the state of Utah from 1990 to 2016.

The methodology of this research uses VAR – a bivariate vector auto regression – to examine the relationship between tourism and economic development in Utah and applies the Granger Causality test to determine the causal nature of the relationship. Previous studies have found a significant relationship between economic development and tourism growth. The results of this study can be used by the Utah State Government to assist on budget resources on specific areas of tourism.

INTRODUCTION

The state of Utah is known to have a variety of recreational areas and activities and has been one of the top states for outdoor enthusiasts through the last couple of decades. Because of the state's diverse travel and tourism industry, jobs and income have generated a positive revenue inflow from taxes. It has been previously stated that hosting the 2002 Olympic Winter Games created a new tourism pathway for the state, and Utah's state legislators and state businesses have been striving to capitalize the state's tourism potential. However, while there were years where tourism did not create a vast impact in Utah's GDP, tourism visitation and spending were still increasing. (Robson, 2001).

Utah is home of the famous "might five" national parks, forty-three state parks, two national recreational areas, one national historic site, seven national monuments along with some of the most attractive ski resorts during snow season which total fourteen up to this year (Leaver, 2017). These state attractions have been a resourceful factor to attract visitors from different parts of the country and the world to keep the tourism industry strong during all-weather seasons. It has also been noticed that after the state hosted the 2002 Winter Olympic Games, visitation has been positively growing year after year (with a few downs attributed to the financial crisis of 2008 that expanded into the beginning of 2009), and finally in 2015 the state set a high record of national park visitations, which recorded \$8.17 billion from which \$1.15 billion was generated in total state and local tax revenue. Along those high records, it has been also reported that tourism in Utah has generated approximated 142,5000 total jobs in 2015 and \$4.28 billion in wages, which has created a positive impact in Utah's economy (Leaver, 2017).

All the statistics above confirm a positive economic indicator of the state's tourism industry and could also be interpreted as a strong and positive tourism growth that has pushed the

economic growth of the state, however it is important to highlight that this research aims to find a factual linkage between tourism and economic development between years 1990 and 2016.

There are many indicators that there is a relationship, however there has not been a study done explaining variables that indicate the relationship between these two factors. Before I explain the economic indicator that I will be using in this study, it is important to highlight the definition of economic development versus economic growth. Economic development measures the quality of life of a population being studied, and not its economic growth alone. In most cases, to measure the economic development of a specific population, economists and researchers use the Human Development Index (HDI), an index created by the United Nations (UN). The HDI measures people's capabilities and measures three different dimensions: a long and healthy life, measured by the life expectancy index, being knowledgeable, measured by the education index, and have a decent standard of living, measured by the GNI index. Once the three indexes are obtained, the HDI is found by taking the geometric mean of normalized indices for each of the three dimensions (United Nations Development Programme). In contrast, economic growth measures different economic indicators on an annual increase such as GDP, GNP between others.

According to the U.S Economic Development Administration, economic development creates the conditions for economic growth and improved quality of life by expanding the capacity of individuals, firms, and communities to maximize their talent use and skills to support innovation, lower transaction costs, and responsibly produce and trade valuable goods and services. Economic development requires effective, collaborative institutions focused on advancing mutual gain for the public and private sector. The Utah's tourism office has provided evidence suggesting that there has been a positive impact in Utah's economy, however this study also aims to find how that impact relates to the well-being of Utah's residents.

As stated previously, this study is to find a relationship between tourism and economic development in the state of Utah between 1990 and 2016 and will use accommodation sales and leisure & hospitality sales as indicators to explain tourism growth. To explain the economic development in Utah, I will gather data to build the HDI of the state by collecting information on health, education and income. Once the three indexes are gathered, I will also build a second index, which is the principal economic development indicator that this paper will be focusing on by taking the income portion out, which will create a non-income HDI. The purpose of the second index is to focus on the development of health and education to analyze, along with the tourism indicators, the impact of the studied indicators in the improvement of lives among of Utah residents. The results obtained in this study can be used by the Government of Utah to facilitate and assist on budget and tasks related to the tourism industry in the state.

The paper is structured as it follows. Section 2 reviews the relationship between economic development and tourism in other countries and related empirical evidence from other countries and studies done in Utah. Section 3, describes how the data was built and the methodology applied to determine the relationship between tourism and economic development to determine if there is a relationship associated with both indicators. Section 4 presents the results and the discussion of the data analysis.

2. LITERATURE REVIEW

In the last couple of decades, tourism has changed in various ways allowing a constant expansion of economic development and growth in different places around the world. From a general perspective, tourism relies on natural heritage resources it offers its residents and visitors and it does not only help sustain economic growth but contributes to the economic development

of the area where tourism is part of (Min, Roh, & Bak, 2016). In several countries¹, tourism is one of the top industries that help promote economic development. However, in order to promote development within a country, it is important to study whether there is a negative or positive potential impact if the population being studied relies on tourism as a means of economic development, which has been the focus of several journals and research analysis projects.

To determine if there is an existent relationship between two or more factors, Karimi (2018) has found that it is important to also determine causality to gather more information if an indicator causes another one, or if both of the indicators being studied cause each other, and to find this relationship, the Granger Causality test has been created and widely used. In past studies when trying to determine causality, researchers have been able to find a one-way causal and a two-way causal relationship by using different models and techniques, which results were obtained depending on the population being studied (Brida & Pulina, 2010).

As an example of causality, Chi-Ok Oh (2002) examined the impact between tourism and economic development in Korea and found a relationship between the two factors to have a one way one-causality relationship with economic development that was slowly expanding tourism growth by using Engle and Granger two-stage approach and a bivariate Vector Autoregression (VAR) model. Using a similar methodology used by Oh, a study done by Balanguer and Cantavella-Jorda (2002) and Chen & Jang (2006) in Spain found a long-run relationship between tourism and economic development by applying the Granger causality test and using panel data from 1975 to 1997, which results explained the one-way causality of Spain's economic growth also by using the tourism-led growth hypothesis. That means that by using the Granger approach, the relationship between tourism growth and economic development has been significant, and with

¹ Maldives (39.6 percent of GDP), British Virgin Islands (35.4 percent of GDP), Macau (29.3 percent of GDP). World Tourism Organization (UNWTO)

the increase of tourism in the economic activity of the area being studied, there is a potential strong growth in economic development. With a similar approach and methodology, Odhiambo (2002) studied the population in Zambia to find a relationship between tourism and economic development. Odhiambo's results found that tourism had a unidirectional or one-way causal effect on the Zambian economic development. His findings were also able to explain the current initiatives from the Zambian government to boost the tourism sector with the purpose of promoting economic development. Tourism growth's speed has caused not only an economic growth but has also caused an important impact in the economic development of Zambia, and like in other countries, the impact caused by tourism has been considered to create a positive relationship with the raise of economic development factors. By using similar methodologies and with similar results to explain causality effects, Ridderstaat, Croes, & Nijkamp (2016) found that there is a two-way causal chain between economic development and tourism in small islands by using an exploratory and confirmatory factor analysis combined with modeling of structural equations, where the conclusion proposes new recommendations in the scope of tourism theory to be used by the island's respective governments. This means that tourism and economic development both support each other's growth which creates a positive relationship and a steady growth if one causes the other.

When finding relationships and causalities, different studies have found different types of limitations. One of the limitations that was taken very seriously was brought up by Oh (2002), stating that tourism cannot be measured using the same methods due to countries having different data sets and variables, and also explained that some results could end up being not significant because they could be explaining a short-term relationship between tourism and economic development and not a long-term one. Whether the results of the relationship are positive or

negative, the study should aim to find a long-term relationship between tourism and economic development to establish significant findings that can be used as helpful resources. To make sure that the results to be found were significant, Schubert, Brida, and Risso (2011) found a long-term relationship with significant evidence between tourism and economic development in Antigua and Barbuda by performing a co-integration analysis and the vector error correction model (VECM) that looked for the existence of a long-run relationship among variables of economic development. With similar goals in finding significant evidence, a study conducted by Dritsakis (2012) in the Mediterranean countries found a long-term relationship between economic development and tourism, and concluded by explaining that the countries studied in the research were a co-integrated group by using a multivariate model with tourism receipts per capita, the number of international tourist arrivals per capita, real effective exchange rate, and real GDP per capita using heterogeneous panel co-integration techniques.

According to the studies mentioned above, it is important to keep in mind that finding causalities to determine the relationship between two factors will be impactful as an outcome. Even more so when the causality between the two factors being studied could determine the impact of the lifestyles and well-being of the population being analyzed. Another important point to prioritize while doing a relationship-causality study is to be certain that the results will be significant and will not describe the effect of a short-term period. The studies mentioned above allowed this research to have a more structured view, it narrowed down the best techniques to use, and it allowed the study to be aware of the limitations that it could encounter while selecting different variables to explain the relationship between tourism and economic development in Utah.

Previous empirical evidence for Utah has found that economic development is powered by tourism marketing programs that are used to induce international trade growth as well as exports

promotion programs (Teerakapibal, 2016). In the past, Utah's government did not allow a large portion to go to tourism areas for branding and marketing because there was no priority in promoting touristic areas before the Winter Olympic Games, and even after the Olympics, some legislators did not consider it essential because it was thought that the legacy of the Winter Olympics taking place in Utah would carry on automatically after they happened. Even though the number of visitors kept increasing in the consequent years, new legislators saw there was a large potential in increasing revenues in the state if certain marketing and advertising techniques were applied to promote the beauty and entertainment of the state. Soon after new legislators entered in effect, they have identified how powerful the tourism industry is in Utah and have allowed a much larger budget to fill tourism initiatives and investment in the state. New marketing techniques along with a large variety of summer and winter advertising campaigns took effect in the summer of 2012 and allowed a much larger return on investment in tourism as reported in 2013 which have also been reported to be an important part of the contribution of Utah's economy as it has generated jobs and wages, directly and indirectly, and contributes to Utah's overall tax base (Leaver, 2017).

Utah's population is mostly centered in the northern side of the state, and while it has several attractions that incentivize tourist visitation, several of the biggest national and state parks are situated in the corners of the not-so-populated areas of the state which are composed of more scattered cities located in rural counties. Some of these counties count primarily on tourism activities to promote their financial activities. Jennifer Leaver (2017) explained that rural counties such as Daggett County, which is the youngest and least populated county in Utah, had the largest leisure and hospitality share of total private jobs in 2016, ranking first statewide. Like Daggett County, there are several other counties that heavily rely on tourism to promote investment. A study done by Hodur, Leistriz and Wolfe (2005) explains that counties with small populations

relying on seasonal tourism be able to significantly improve if there is special importance given at seeking the improvement of services in order to generate more employment, that will turn out to be a positive factor in the county's and state's economic development. Therefore, there could be a significant change in the well-being of citizens living in the rural counties if their respective governments allow to prioritize investment in areas that will further incentivize and spur tourism activities. To exemplify how tourism has influenced the economic development in Utah, Wrigley and Lewis (2002) found that the rural community of Springdale, which is located at the entrance to Zion National Park, has a population of 457 people and has reported to have a full-time economic development director for the local chamber of commerce because of the active tourism industry they incur on. Like Springdale, there are several other communities that could be experimenting a similar situation if more emphasis is given to counties that rely on tourism to improve the well-being of their citizens through the creation of jobs and tax revenues from tourism activities that will be able to improve the economic development of the area.

Wrigley and Lewis (2002) found that Utah's tourism is higher during winter months due to a large increase in ski and snowboarding hours and explained that the development of the winter sports industry has been very successful in areas with the right mix of resources. In the past, Park City was a small mining town, and currently it is known to be a world-class resort city with the highest per capita income and property values in the state. Like winter months popularity with its visitors, there are certain areas in the state that conflict with the number of visitation depending on the time of the year and is more common that during warmer months visitors and residents travel across the state to visit national and state parks due to the availability and services offered. However, Steed, Roberts and Eastep (2014) found that central and southern Utah tend to receive less visitors because it is known that many of the southern parks close for several months of the

year due to snowfall and safety reasons, which can negatively impact some counties' economic development. Visitors seeking certain activities may not visit central or southern Utah at certain times of the year.

In previous years to the Olympic Winter Games and some short time after, tourism in Utah's was not prioritized as it is now. However, in the last couple of years Utah's new legislators have prioritized tourism which has given the industry a significant positive change, that has not only promoted economic growth but economic development that has improved the allocation of economic resources to enhance the well-being of Utah residents in terms of health, education and income. However, before these changes and thoughts even occurred, Wrigley and Lewis (2002) stated that some areas across the state of Utah tended to rate tourism advertising more than other areas, suggesting that marketing tools and advertising campaigns were essential to promote tourism growth within the state. In the consequent years, marketing techniques were used and were successfully applied and made Utah's tourism grow even more. While the marketing campaigns helped promote tourism throughout the state, there were still several rural counties that did not incentivize tourist visitation as they expected. Several rural counties across the state heavily depend on tourism and need to rely on advertising to attract visitors more than other areas where advertising is not a necessity given that recreational activities done in larger areas are already known by visitors whom are frequently going back. It is important for the Tourism Office in Utah to be aware which areas and communities are in need of more advertising to increase visitation numbers and consequently, local tax revenues. In comparison to other areas, the need of tourism revenues for smaller communities that highly depend on tourism is an important issue that should not be overlooked on, even if tourism activities are already known. The expansion of rural

communities can significantly increase local businesses that can promote the well-being of their residents to help economic development increase as a whole in the long-term period.

Many of the studies presented above have addressed several important points and have highlighted the most significant part of their findings in regard to the relationship between tourism and economic development. However, most of the studies that have found a linkage and causality relationship between tourism and economic development have been done in under-developed countries and developing countries, but not in developed countries, states or cities, which is one of the reasons why it was decided to exclude the income portion of the HDI, so the results could be focused on education and health indexes and the impact with tourism in the area being studied. Studies done in Utah that have analyzed economic development are either too outdated, only analyze economic growth or have never built a Human Development Index in the state, all these reasons have been a motivation to start this research and to test if it is possible to find a relationship between tourism growth and economic development in the western state.

3. METHODOLOGY AND RESULTS

To start the analysis between economic development and tourism in Utah, we need to define the variables that will be used to describe the tourism and economic development behavior in Utah. For economic development, this analysis will use the non-Income Human Development Index in Utah derived from the Human Development Index (HDI) in Utah from years 1990 to 2016. The HDI is formed by three composites: a health index, an education index and an income index, which will be explained with more detail in the next paragraph. And for tourism, this study will use the Taxable Accommodation Sales and Leisure and Hospitality Sales in Utah from 1990 to 2016. Once the variable's data was gathered, this study proceeds to use VAR - a bivariate vector auto regression – to examine and test if there is relationship between

tourism and economic development and applies the Granger Causality test to determine the causal nature of the relationship of the two variables.

As mentioned previously, the Human Development Index (HDI) was developed by the United Nations (UN), and to build the HDI the UN calculated the HDI by building three composites: a health index, an education index and an income index. The life index measures the population's healthy life and it is normally measured by the life expectancy. The education index measures the population's knowledge and it is measured by the expected years of schooling and mean years of schooling. The income index measures the standard of living of a given population and it is usually measured by the real GDP per capita. Once these indexes are found, the United Nation used the geometric mean of the three indexes to find the HDI value. The UN gives updated Human Development Reports on every country in the world they have access to; however, there is no information on Human Development Reports per state in any given country, which is the main reason why this study needed to recreate the approach that the UN applied on countries to find the HDI for the state of Utah. This research paper also gathered U.S. statistical data to gather all the necessary information to build the three composites that are needed to construct HDI in the state of Utah. Building the HDI for the state of Utah is the main contribution of this paper.

First, to build the health, education and income indexes for the state of Utah, this paper followed the methods used by the United Nations with insights from the Measure of America Organization. For purposes of this paper, the Education Index has been built by using school attainment percentages, conformed by high school and bachelor's degree completion rates of the population age 25 years and older from years 1990 to 2016 (Measure of America, 2014). The Health Index was built using the life expectancy at birth following the methodology used by

Human Development Reports (United Nations) and Measure of America where they followed the method used by C. L. Chiang, which involves the construction of abridged life tables that use population and mortality counts by age groups as inputs. After gathering the data, the Health Index scales the life expectancy at birth values using the maximum and minimum goalposts, which are 90 and 66 years old respectively. Finally, the Income Index was built using gross per capita income values, which are per capita personal income divided by total midyear population reported by the Bureau of Economic Analysis. However, the values reported were not adjusted to inflation. To adjust these values to inflation I used CPI values adjusted to 2016 dollars². Once all the indexes were built, I proceeded to calculate the HDI by using the geometric mean of the three indexes (life expectancy index, education index and the income index) using the UN method. To find the non-income HDI, the income index was extracted from the formula and to find the index only the health and education index were included in the geometric mean.

Human Development Index in Utah:

$$\sqrt[3]{(\text{life expectancy index}) * (\text{education index}) * (\text{income index})}$$

Non-income Human Development Index in Utah:

$$\sqrt[2]{(\text{life expectancy index}) * (\text{education index})}$$

Once the geometric mean is applied, the values obtained are given in a rank that goes from 0 to 1. The closest it gets to 1 explains a better economic development; and the closest it gets to 0 explains a slow economic development. See table I for the results in the state of Utah.

² Jennifer Leaver' data. Research analyst from the University of Utah.

Table I.³ Human Development Index and non-Income Human Development Index Results

<i>Year</i>	<i>Health Index</i>	<i>Education Index</i>	<i>Income Index</i>	<i>HDI Utah</i>	<i>non-Income HDI Utah</i>
1990	0.4792	0.3827	0.4554	0.4371	0.4282
1991	0.4708	0.4040	0.4554	0.4425	0.4361
1992	0.4854	0.3933	0.4656	0.4463	0.4370
1993	0.4667	0.4180	0.4758	0.4528	0.4417
1994	0.4708	0.4140	0.4939	0.4583	0.4415
1995	0.4729	0.4280	0.5176	0.4714	0.4499
1996	0.4875	0.4180	0.5399	0.4792	0.4514
1997	0.4813	0.4140	0.5604	0.4815	0.4464
1998	0.4792	0.4280	0.5792	0.4916	0.4529
1999	0.4875	0.4180	0.5841	0.4919	0.4514
2000	0.5313	0.4140	0.5941	0.5074	0.4690
2001	0.5333	0.4280	0.5878	0.5120	0.4778
2002	0.5292	0.4180	0.5826	0.5051	0.4703
2003	0.5292	0.4140	0.5837	0.5038	0.4681
2004	0.5396	0.4280	0.6003	0.5176	0.4806
2005	0.5583	0.4180	0.6260	0.5267	0.4831
2006	0.5625	0.4140	0.6581	0.5352	0.4826
2007	0.5646	0.4280	0.6757	0.5466	0.4916
2008	0.5854	0.4180	0.6719	0.5478	0.4947
2009	0.5958	0.4140	0.6255	0.5364	0.4967
2010	0.5896	0.4280	0.6194	0.5387	0.5023
2011	0.5833	0.4180	0.6429	0.5392	0.4938
2012	0.5896	0.4140	0.6650	0.5455	0.4941
2013	0.5750	0.4280	0.6647	0.5469	0.4961
2014	0.5812	0.4180	0.6826	0.5494	0.4929
2015	0.5750	0.4140	0.7106	0.5531	0.4879
2016*	0.5808*	0.4184*	0.7185*	0.5589*	0.4930*

³ No data available public data for life expectancy for 2016. It was calculated using an estimation trend from the last five years*

Data retrieved from Public Health Indicator Report of Life Expectancy at Birth and CDC Wonder Base.

Life expectancy is calculated based on a widely used method developed by C. L. Chiang. This method involves the construction of abridged life tables that use population and mortality counts by age group as inputs (Methodology by Measure of America).

1990-1999 data was retrieved using estimates from United States Census Bureau.

Population Estimates: National Center for Health Statistics (NCHS) through a collaborative agreement with the U.S. Census Bureau, IBIS Version 2015.

Utah Death Certificate Database, Office of Vital Records and Statistics, Utah Department of Health.

National Vital Statistics System, National Center for Health Statistics, U.S. Centers for Disease Control and Prevention.

After analyzing the results in the table above, we can see that the value of Utah's HDI and the non-Income HDI is slightly lower than the half mark than 0.5 which does seem to have a high value in economic development. The main reason is seen to be caused by the education index which seems to not have increased much since 1990, while the other two indexes show to have constant growth since 1990. When we analyze the non-Income HDI in Utah, we see that the value, drops by a few decimal points, which implies to be caused by the education index. This drop suggests that a closer look should be given to education in the state. The Education Index has been built using high school and bachelor's degree completion rates of people over 25 years old which suggest not to have increased significantly in the last few years.

After doing an analysis over the results in our economic development variable, this study will explain which variables were used to explain tourism in the state of Utah. To explain the tourism behavior in the state, the model used the taxable accommodation sales, leisure and hospitality sales; and as an independent variable. Taxable accommodation sales, leisure and hospitality sales are values that explain the visitation we receive in many touristic areas in Utah year-round and explain the inflow we receive in terms of tourism in the state. All the variables explaining the tourism behavior in the state of Utah were given in dollar values since year 1990 to 2016 (Leaver, 2018). However, to make the analysis of this study easier, these variables were converted and made smaller by taking logarithms of each value.

After all the variables and data sets were built from 1990 until 2016, we started the analysis of this study to test the relationship between tourism and economic development. To do that, a statistical program was used, where all the variables were input to start the analysis.

Before starting the analysis between tourism and economic development, this study anticipated to establish a strong relationship between the two variables and expected a one-way

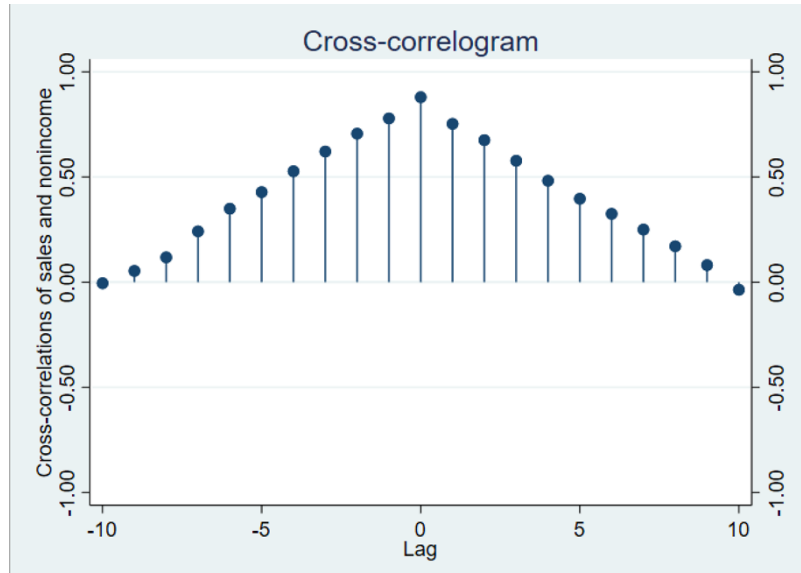
causal effect from tourism affecting the economic development in the state of Utah, meaning that for every increase in tourism, the economic development of the state in Utah would grow bigger. However, the hypothesis had not been yet tested. In the next paragraphs, this study will explain the analysis done and what results were given.

To start, we set each variable: accommodation sales (sales), leisure and hospitality sales (hotel), as independent variables, and health index (health), education index (edu), income index (income), HDI in Utah (hdiutah) and the non-income HDI in Utah (nonincome) are the dependent variables. After we stated the variables that we will use throughout the study, we proceeded to set all the variables to a times series data by yearly given that the data has been collected in yearly values. In order to use VAR, we need to have all of our values expressed in past values, all expressed in logarithms by using the “L” operator, by doing this, the generated values of each variable would be explained by the impact of its previous values on current ones, which is a possible correlation between variables and will be later explained by a correlogram in the next paragraphs. Another operator that needs to be generated to later use when applying VAR tests is the difference between the current and previous values, which will be explained by the “D” operator. Also expressed,

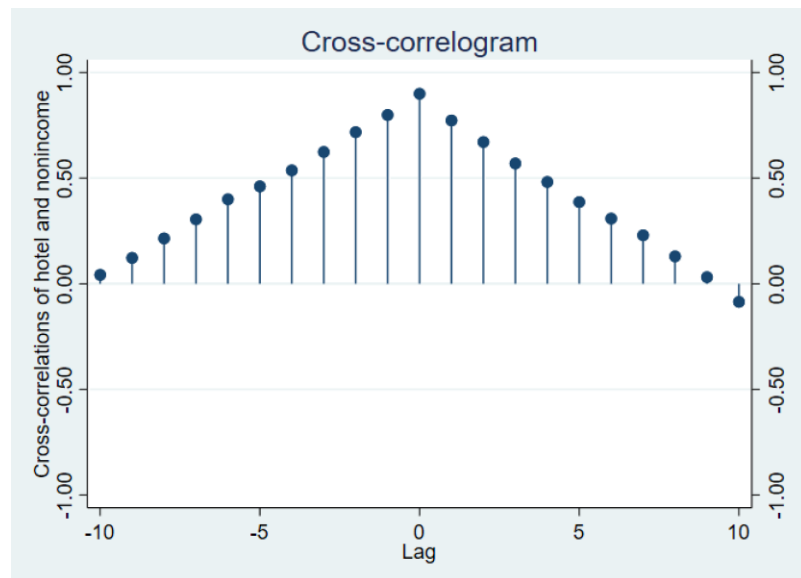
$$D1 = Y_t - Y_{t-1}$$

After gathering a new set of ‘L’ and ‘D’ values, this study explores the relationship between two-time series by using a cross correlation command. The graphs below exemplify the correlation between accommodation sales and the non-income HDI, and the correlation between leisure and hospitality sales and the non-income HDI.

Graph II. Correlation between accommodation sales and the non-income HDI in Utah.



Graph III. Correlation between hospitality and leisure sales and the non-income HDI in Utah.



The graph above explains that at lag 0, there is a positive immediate correlation. The correlation between accommodation sales and hospitality & leisure sales versus the non-income HDI show to be positive, this means that an increase in accommodation sales or hospitality and leisure, causes an immediate increase in the non-income Human Development Index in Utah, and vice versa when there is a drop in either of the sales variables. At this early stage, it shows that there is a relationship between tourism and economic development and it shows to be positive. Nevertheless, there are more tests that need to be applied to get to test for VAR and Granger causality.

While testing the variables of this study it is necessary to be aware of errors in the forecasts, if too few lags are used, relevant information could be left out (Ivanov and Killian, 2001), which is why we ran three commonly used procedures to help our analysis determine the approximate number of lags that should be used: Schwarz's Bayesian information criterion (SBIC), the Akaike's information Criterion (AIC), and the Hannan and Quinn information criterion (HQIC). All these criteria are reported in Stata and were found to be 10.

After we have determined the number of lags, this study proceeded to find if our variables had unit roots. When a variable has a unit root in a time-series data it means that there is more than one trend in the series. To determine if our variables had unit root, we applied the Dickey-Fuller and the Perron test as they the most commonly used tests for stationarity. After applying the Dickey-Fuller and Perron test, we obtained no unit roots when we applied the differences of each value against its previous value which means that we can overwhelmingly reject the null hypothesis of a unit root at all common significance levels. See table V.

Table V.⁴ Univariate Unit Root Tests

Variables	<i>Levels</i>		<i>First Differences</i>	
	ADF	PP	ADF	PP
1. Accommodation Sales	-0.784(0)	-0.745(2)	-5.599(0)	-5.606(2)
2. Hospitality and Leisure Sales	-1.00(0)	-0.974(2)	-3.195(0)	-3.208(2)
3. Real GDP	-1.994(0)	-1.876(2)	-3.597(0)	-3.597(2)
4. Health Index	-0.764(0)	-0.8392(2)	-5.207(0)	-5.227(2)
5. Education Index	-5.325(1)	-6.024(2)	-9.278(1)	-11.936(2)
6. Income Index	-1.434(1)	-0.919(2)	-4.119(1)	-3.107(2)
7. HDI Utah	-1.575(0)	-1.618(2)	-4.285(0)	-4.257(2)
8. non-income HDI	-1.684(0)	-0.3664(2)	-5.472(0)	-5.603(2)

Unit roots are stochastic trends in a time series, and their tests are necessary in this study given that they test for stationarity in a time series. Now that all of our variables have been tested for autocorrelation and stationarity, we proceeded to apply the VAR test and Granger causality test. First, we tested the tourism as the accommodation sales versus the non-income HDI. See table VI.

Table VI. Granger Causality test between Sales (Tourism) and non-Income (Economic Development) in Utah.

<i>Equation</i>	<i>Excluded</i>	<i>chi2</i>	<i>df</i>	<i>Prob > chi2</i>
sales	nonincome	0.4196	2	0.959
sales	ALL	0.4196	2	0.959
nonincome	sales	8.2001	2	0.1357
nonincome	ALL	8.2001	2	0.1357

In the graph above, the null hypothesis ‘sales Granger-cause nonincome’ can be rejected referring that accommodation sales (sales) which refers to tourism at 0.4196 does not cause non-income HDI (nonincome) which refers to the economic development in Utah, at 0.959. However,

⁴ Note: The number in parenthesis indicates the lag order selected based on the recursive t-statistic, as suggested by Perron (1989).

nonincome at 8.2001 does cause hotel at 0.1357. This means that the non-income HDI causes accommodation sales in Utah, which causes a one-way causality between economic development and tourism in the state of Utah.

Next, the second variable that explains tourism in Utah are the leisure and hospitality sales, which we tested against the non-income HDI in Utah as it was done above. See table VII.

Table VII. Granger Causality test between Sales (Tourism) and non-Income (Economic Development) in Utah.

<i>Equation</i>	<i>Excluded</i>	<i>chi2</i>	<i>df</i>	<i>Prob > chi2</i>
hotel	nonincome	0.02771	2	0.986
hotel	ALL	0.02771	2	0.986
nonincome	hotel	8.3214	2	0.016
nonincome	ALL	8.3214	2	0.016

The table above shows very similar results to table VI and explains that with the tourism's second variable it is possible to explain again that there is a one-way causality between tourism and economic development in Utah. The results above explain that the null hypothesis can be rejected when hotel is being tested against nonincome variable, which means that we can reject that tourism Granger-cause economic development in Utah. However, the graph above explains that the non-income HDI explaining the economic development in Utah at 8.3214 causes leisure and hospitality at 0.02771 that explain tourism with great significance.

After each of the two variables describing tourism and economic development were tested against each other, this study also input the two variables explaining tourism against the economic development variable described by the non-Income HDI in Utah together (See Table VIII). The three variables were input in the statistical software being used. We proceeded to use VAR and apply the Granger Causality test. The results after the test suggest that there is still a one-way

causality, meaning that the nonincome variable explaining the economic development causes the hotel and sales variables that explain the tourism behavior in Utah, this again, explains a one-way causality between the non-income HDI and tourism in Utah.

Table VIII. Granger Causality test between Hotel (Tourism), sales (Tourism) and non-Income (Economic Development) in Utah.

<i>Equation</i>	<i>Excluded</i>	<i>chi2</i>	<i>df</i>	<i>Prob > chi2</i>
hotel	sales	1.6244	2	0.444
hotel	nonincome	0.00564	2	0.997
hotel	ALL	1.6539	4	0.799
sales	hotel	8.7646	2	0.012
sales	nonincome	2.4757	2	0.29
sales	ALL	10.982	4	0.027
nonincome	hotel	0.21208	2	0.899
nonincome	sales	16.441	2	0
nonincome	ALL	30.235	4	0

After applying VAR and Granger causality we have found that in fact, increases in the non-income HDI does cause growth in tourism sector in Utah. However, before concluding on this statement, we needed to test for serial autocorrelation using the Breush-Godfrey and Durbin-Watson tests, which we found to be negative, meaning that there is no serial correlation, and concludes our study to be satisfactory.

4. DISCUSSION AND CONCLUSION

After having done extensive analysis on the variables gathered, we were able to conclude that economic development variables explained by the non-income HDI has a relationship with the tourism in Utah explained by the accommodation sales and leisure and hospitality sales. The main hypothesis of this study was to find a strong relationship between tourism and economic development in Utah, which was obtained. Nevertheless, I would have no predicted that there was

a one-way causality relationship coming from tourism towards the economic development of the state being studied. However, these are two variables that include much more than tourism behavior. This study concludes that economic development is an important tool in tourism growth in the state of Utah, this means that the better the state does in incrementing their health and education levels, people from outside the state will feel encouraged to visit because it is a state that promotes the well-being of their citizens and it is seen in multiple areas of the state.

The literature review of this study allowed this research to establish goals from an early stage and made the process easier by knowing what type of data needed to be chosen to have significant results. Oh (2002) advised future researchers to prioritize long-term period results given that those would be the most helpful. Thanks to previous literature review, this study made sure to use as much as historic data as possible since 1990 to recent years; the results found show to have a consistent increase in the variables gathered as years became more recent until 2016. However, one of the most intriguing results was the unmotivated increase in the education index portion since 1990 to recent years. This finding suggests that there should be a closer look put into graduation rates to investigate the root of the cause.

Utah's tourism has been increasingly growing and have been marked since the Olympics took place in 2002, more advertising has definitely caused a huge impact in the tourism sector of the state and were essential for its growth (Wrigley and Lewis, 2002). It is because of the growth in tourism that there has been an inherent and substantial increase in jobs and wages which has supported Utah's economy overall. Nevertheless, the economy's growth is not all that matters in a society, but its population's well-being is vital as well (Leaver, 2017).

This study sets the initial quantitative step in finding an existent relationship between tourism and economic development in the state of Utah, which was satisfactory. Nevertheless,

there are countless of other variables that can be used to test for relationship and causality, which would need further research. Many of the limitations in this study was finding data before the year 2000 in order to build the Human Development Index in Utah. This research's data goes from 1990 until 2016, and while I would have preferred to include a wider range of years, I found myself limited by the lack of information from the Utah's government in tourism behavior given the fact that the tourism industry and sector was not prioritized years before 1990. The Human Development Index was created to better explain the well-being of citizens of different countries in different parts of the world, and while it has been done on a macroeconomic level, I suggest that governments help researchers into accessing more data to be able to do microeconomic analysis in smaller areas. The results will not only help city governments, but it could be used as a useful tool to better assist budget plans in government areas that relate to tourism.

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