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The Effect of Mobile Voting Units on Voter Turnout: An Ada County, Idaho Case Study

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ABSTRACT

THE EFFECT OF MOBILE VOTING UNIT ON VOTER TURNOUT: AN ADA COUNTY, IDAHO CASE STUDY

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Counties across the United States are struggling to find solutions that decrease the costs of voting while increasing voter turnout across varying demographics. In particular, because of transportation and information costs, voting is costly for low-income citizens. Ada County, Idaho attempted to mitigate these costs through introducing a mobile voting unit. This mobile voting unit is used during early voting periods and targets precincts that do not have a permanent voting location. Using voter registration data from 2006 to 2020, I attempt to identify a treatment effect of the mobile voting unit on voter turnout in general elections. My paper is the first to explore the relationship between this new method of voting and voter turnout. With a synthetic control model of Idaho donor counties, I find that there are no notable effects of the mobile voting unit on the overall voter turnout, or the turnout of demographic subgroups, including political party, age, gender, or income level. Finding no effect is important, especially for counties that are spending large sums of resources to increase voter turnout. Thus, my results could inform county-level policymakers on possible solutions to make the mobile voting unit more effective at increasing voter turnout in general elections.

Table of Contents

LIST OF TABLES

APPENDIX TABLES

LIST OF FIGURES

APPENDIX FIGURES

I. Introduction:

Elections require votes, but voting is not free. Voters must take time away from work and school to travel to voting sites, only to wait in line and cast their ballots. Voting demands hours from hard-working citizens, and low-income individuals may not have the luxury or work flexibility to regularly vote. If unable to vote, their voices cannot be heard or considered in choosing politicians to represent them. This creates a cycle of low-income voters lacking resources to vote for politicians that could potentially give them the needed resources. In Ada County, Idaho a county clerk attempted to tackle this issue and provide more easily accessible voting sites.

In Ada County, the creation of a mobile voting unit was implemented for the first time in 2016. The mobile voting unit was created with the intention to increase voter turnout in precincts and areas without access to permanent voting sites. Generally, the areas that are affected the most by a mobile voting site are rural areas. The rural areas in Ada County are more likely to lack a permanent voting location, and thus citizens must travel significantly farther to vote than non-rural citizens. Although increasing voter turnout among lower-income registered voters was only a secondary goal with the mobile voter unit, generally increasing turnout in elections was the main priority.

Although voter turnout varies across counties and precincts throughout states, low turnout is highly correlated with low-income status (Horn, 2011). The broad purpose of this paper is to understand if there are alternative ways to help improve the representation of underserved areas in elections. Specifically, I looked at if the introduction of mobile voting units in 2016 in Ada County, Idaho affected voter participation in general elections by analyzing voter turnout between 2006 and 2020. My paper will exploit a natural experiment to provide evidence on the

relationship between mobile voting units and voter turnout. To explore this relationship, I have broken down my thesis into sub-questions: Did mobile voting units in Idaho increase voter turnout? If so, what types of people and demographics were most affected?

II. Background:

Ada County, Idaho currently has a population of 507,000 and has grown 28.95% from 2010-2020 (Idaho Press Staff, 2021). This county is made up of the most populated cities in Idaho: Boise, Meridian, and Eagle. In 2019, Ada County had several cities that were among the nation's fastest-growing cities with three eclipsing 100,000 residents. Idaho's population is just shy of 2,000,000 residents, 983,716 of which are registered voters (Idaho Press Staff, 2021). With nearly half of the Idaho population registered to vote, a previous Ada County Clerk decided to implement a mobile voting unit in 2016 after coming up with the idea three years earlier. In a conversation with the current Ada County Clerk, I learned that a voting place located at a school had undergone a lockdown during voting hours in 2013. The lockdown prohibited hundreds of voters from casting their ballots during the hours the school was locked down. As the idea for mobile voting came to life, it was designed with a secondary purpose to act as a backup voting location on election day with a primary purpose to aid underserved areas during early voting. The underserved areas were typically rural and low-income without permanent early voting locations in their precincts.

The Idaho mobile voting unit method has been coined as "food truck voting" because of the food truck-like vehicle that travels around Ada County printing on-site ballots and collecting votes during early voting periods (Barnhill, 2016). The mobile unit can set up a temporary voting station in under twenty minutes, houses several printers, and has an off-line secure network to ensure privacy (McGrane 2017). It can also be sent to workplaces where voters can cast their

ballots during their lunch breaks, further decreasing the costs of voting. For the purpose of this paper, I will focus on the specific impact of mobile voting on low-income voter turnout rather than trying to pick apart the effects of the unit at these workplaces. An additional benefit from an increase in low-income voter turnout is a possible increase in low-income representation in the elections of local and state government officials.

Figure 1: Visualization of the Mobile Voting Unit

Note: This picture shows what the mobile voting booth looks like when set up (Long, 2016).

I used one of the first successful mobile voting units in the United States to determine the correlation between the mobile voting unit and voter turnout. There has been no previous research or publicly available analyses on this new specific type of voting, and I hypothesize that this form of voting will become more popular in the following years. Thus, my analysis yields current and relevant results. Specifically, with regards to how low-income area voter turnout rates change in response to lower opportunity costs of voting through the mobile voting unit. If the mobile voting unit affects the level and composition of voters, this analysis could help

governments better understand how voter representation affects election results. This is particularly relevant when considering statewide elections for US Representatives, Senators, Governors, and other high-ranking state officials, where the electorate is often more diverse. Diversity in elected officials would increase as diversity in voter turnout increases. Similarly, finding evidence of zero effect of the mobile voting unit on voter turnout is as useful as finding a statistically significant positive correlation. If no effect is found, Ada County could re-evaluate the effectiveness of the unit and instead re-allocate its funding to other worthwhile opportunities.

Although I will not explicitly analyze the benefits of increased voter turnout, studies have found that there are substantial societal rewards for political participation. Current literature suggests that increased political participation leads to more opportunities for funding in the precincts and voting districts that experienced voter turnout growth (Martin, 2003). Thus, there are financial benefits to low-income precincts and counties when voter turnout increases within those areas. This could result in an increase in benefits beyond the thrill of political participation. If the mobile voting unit yields a positive outcome on voter turnout in Ada County, especially in lower-income zip codes, then similar counties could adopt mobile voting units.

Literature Review

Currently, there is no research that analyzes mobile voting units, especially with the same methods I rely on for this paper. However, research has been done on the economic costs of voting which I predict are an interacting factor with the introduction of mobile voting units. Mosche Haspel and Gibbs Knotts analyzed the costs and benefits of voting in Atlanta, Georgia during a single presidential election (Haspel, 2005). They focused on the costs of geographic location and the correlation between living farther away from a voting location and voter turnout. The authors concluded that holding all other observable variables constant, living farther away

from a polling location decreased the probability of a person voting. Although this study lacked external validity due to the size and time frame of the data, it still represents the economic costs of residential distance to election day voting polls. Like my research, registered voters that live in Ada County and have no easy access to a voting station are less likely to vote (Barreto et al., 2009). Voters that live farther away from polling places face higher costs of voting which limits equal opportunities for voting.

Another study by Henry Brady and John McNulty looked at the location of polling places and how changing the geographic location increased costs for some voters while decreasing it for others. They looked at the Los Angeles County gubernatorial recall election in 2003 that provided a natural experiment (Brady & McNulty, 2011). The polling location changed between the original election and the recall election providing a setup for a nonrandom statistical matching analysis. Brady and McNulty concluded that changing polling locations increased the search and transportation costs of voting. The change in polling location forced registered voters to conduct more research on the location and had the potential to decrease voter turnout as voters faced increased opportunity costs. Following this model, in my research it is possible that placing a mobile voting unit in areas that do not have permanent polling locations should increase voter turnout and decrease the costs of voting. However, the mobile voting unit changes locations weekly and sometimes daily, which could increase the costs of searching, even if the mobile voting unit is closer in proximity to their house.

Voter turnout, in general, is highly correlated with the quality and quantity of polling places (Barreto et al., 2009). Lower quality polling places are very small, more susceptible to weather disturbances like rain, have very little standing room, and poorly trained volunteers (Barreto et al., 2009). Lower quality polling places are not randomly distributed throughout

precincts and tend to be in lower-income neighborhoods if fortunate enough to have a voting location at all. Barreto et al. discussed many factors that increase the costs of voting: voter registration, research on candidates, locating a polling place, and time factors associated with voting. Barreto et al. address the possibility of costs outweighing the benefits of voting. It is expensive to determine the potential benefits of voting because it would require convincing every citizen that their vote would be the deciding factor in any particular election. However, this is rarely the case. Many citizens recognize the benefits of voting and vote out of a sense of civic duty, even if the costs are high (Sigelman & Berry, 1982). Unfortunately, the costs seem to outweigh the benefits in many under-privileged neighborhoods with low-quality polling places or no polling place.

The mobile voting unit is primarily used during early voting and information costs on the location of the unit on any given day can be costly. However, early voting provides more flexibility as citizens can vote on days other than just election day and can avoid lines. Similarly, Gronke et al. explored the relationship between early voting and turnout and found a small, but statistically significant, increase in turnout when voters are given flexibility (Gronke & Miller, 2007). Walker et al. looked at voter turnout during early voting for the 2016 general election in North Carolina and found little evidence of changes (Walker & Smith, 2019). They recognize that the changes to early voting might be conditional on local conditions and that early voting trends may not be consistent with current literature. So, it is possible that voters that are aware of early voting are citizens that would have voted anyway on election day.

In the paper, I specifically look at the trends in voter turnout during general elections from 2006 to 2020. In 2011, House Bill 351 passed and allowed parties to conduct closed primaries if they chose to only allow affiliated registered voters to participate (Idaho Secretary of

State, 2022). After this bill was enacted, the Republican party opted to keep their primaries closed while the Democrats kept their primaries open. This has the potential to affect voter turnout in primaries as Idaho is an overwhelmingly Republican state (Electoral Ventures, 2022). The gap between general and primary election turnout has been growing (Ranney, 1972). Because the difference in voter turnout is large for primary and general elections, I focus on general elections to better see trends in turnout that are not affected by low primary turnout.[1]

There are explicit benefits of high voter turnout, especially for lower-income and underprivileged citizens that live in areas with very few resources. Political participation matters because it can heavily impact political rewards, particularly at the federal level (Martin, 2003). Citizens can benefit from electing members of Congress that are dedicated to allocating funds to their jurisdiction. Members of Congress strategically allocate their funds to precincts and voting districts that have high turnout to better increase their chances of reelection (Martin, 2003). If there is a positive effect on turnout for low-income voters, counties could strategically place the mobile voting unit in under-funded precincts to increase turnout and thus bring in more funding.

[1] Voter turnout in primary elections is significantly lower, so we might expect the mobile voting truck to have effects there. I have also examined primary vote shares in Ada County, relative to a synthetic counterfactual and find that the gap in primary election vote share does close after 2016. However, the synthetic match in the pre-period is not a very good fit and lacks parallel trends, suggesting the counterfactual might not be an accurate representation. Also, as noted above, the rules about participation in the Republican primary changed in 2011, making it challenging to disentangle whether this is an effect of the policy or something else.

III. Theory and Methods

Idaho Voter Registration Data

This paper is based on data collected from all 44 counties in Idaho. I have voter registration data for all registered voters in Idaho from 2006 to 2020 broken down by county and zip code that I obtained through public record requests. I looked specifically at general elections every other year starting in 2006 and analyzed how often each voter turned out in state-wide general elections. I had access to voter registration for every Idaho citizen and their participation, or lack of, in these elections. Because citizens can register to vote at the mobile voting unit, I will check to see if it is a problem in my synthetic control results. I worked closely with the performance analyst for Ada County Clerk's office to understand the registered voter's data. He helped me obtain permission to have access to individual-level voter registration information, which I collapsed down to the county level. Because I had access to personal identifying information, I had to apply for an exemption through the BYU Institutional Review Board. From voter registration information, I have access to age, gender, date of registration, political affiliation, precinct, county, and if they voted in elections. Additionally, I have data on how many people cast votes at the mobile voting unit as shown in Appendix A. Unfortunately, I do not have information on what registered voters utilized the unit.

Additionally, I used population data for voting age adults in each county during each election year that I look at. This county level population data came from a census count that the National Bureau of Economic Research conducted (NBER, 2022). I created a variable of county population for each county in Idaho in each election year the provided the number of voting age citizens. I used this to account for any changes in population that might have occurred. Another important variable on the voter registration form is zip code. The zip code information allowed

me to match the counties in Idaho with income data to depict the relationship more accurately between mobile voting and voter turnout in lower-income regions. Below is a map of Idaho broken down by county. Ada County is in the southwest region of the state.

Figure 2: Map of Idaho Counties

Note: Ada County is in the southwest corner (Idaho County Map, 2021).

Income Data by Zip Code

In addition to the individual voter registration data, I used income data broken down by zip code. The income data came from the Internal Revenue Service (IRS). Rather than assigning each zip code as low-income during each general election year, I opted to only use income data in 2014. This is the last general election before the introduction of the mobile voting unit and during the extreme population growth, so it is appropriate to classify each zip code according to

their income status in 2014. The incomes for each zip code were reported as the number of tax returns that fell into the categories of $1 to $25,000, $25,000 to $50,000, $50,000 to $75,000, $75,000 to $100,000, $100,000 to $200,000, and over $200,000.

For a zip code to be classified as low-income, over 60% of the population had to make less than $50,000. I chose this cutoff because I wanted to include anyone making under $50,000 even though this number is higher than the poverty line. Poverty lines adjust according to the number of people living in a household, and I do not have data on the number of family members each registered voter lives with (ASPE, 2021). For example, five person households living in Idaho in 2014 that make less than $27,910 are considered to live below the poverty threshold (ASPE, 2021). To capture most families that are considered in poverty, I had to include the $25,000 under $50,000 bin to capture larger families and because the income data by zip code did not further break down the income bins.

Under this definition of low-income, 79% of the zip codes in Idaho are considered low-income and 27% of Ada County zip codes are classified as low-income. Because Ada County has a lower representation of low-income voters than other counties, I use the synthetic control method to create a counterfactual. The 79% appears to be relatively high, but to capture larger families that live in poverty, I had to include all voters that made less than $50,000. The median income in Idaho in 2014 was $53,438, so it is possible that my definition of low-income it plausible (Fred, 2022). Due to how I define low-income zip codes, there are several counties that are entirely low-income. There were eight counties that, under this classification, were entirely low-income. Because of this, I do not specifically look at the treatment effect relative to non-low-income voter share. However, this is not concerning because these zip codes had small populations that held very little or no weight in the synthetic control. To effectively use the

income data, I matched zip codes to their corresponding counties which allowed me to determine low-income vote share within each county.

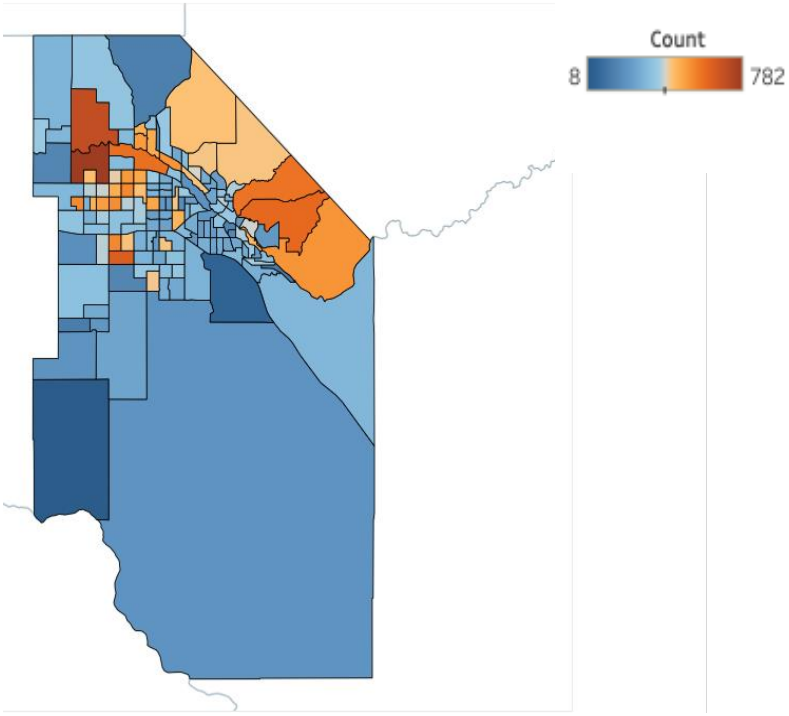
Hypothesis and Methodology

My initial hypothesis was that the mobile voting unit would increase general voter turnout, especially among low-income individuals living in Ada County. To test my hypothesis, I used a synthetic control method to determine if there was a causal relationship between mobile voting and voter turnout. By using a synthetic control, non-randomly selected counties act as a combination of untreated observations that can provide an appropriate comparison rather than a single untreated unit comparison (Xu, 2017). Ada County will act as my treated county while every other county in Idaho will be weighted and aggregated to match the pre-treatment vote share trend of Ada County as a single control entity. The combination of the other counties may "approximate the characteristics of the affected unit better than any unaffected unit alone" (Swarup, 2021). This method weights and aggregates control counties based on how well they match with Ada County on vote shares by age, gender, political party, and income. Under the assumption that this counterfactual synthetic county represents how outcomes would have evolved in Ada County if the mobile voting unit was not implemented, I was able to determine if there was any causal impact of mobile voting on voter outcomes. I compared voter turnout rates across the counties to make sure that they were trending at similar rates before the mobile voting unit was introduced in Ada County and found that they did trend in similar positive fashions. Thus, the parallel trends assumption holds.

Ada County is assigned as the treated county because it was the only county that had access to the mobile voting unit between 2016 to 2020. The mobile voting unit is utilized nearly every day during early voting periods and reserved on election day as a backup for permanent

voting locations. Although not all precincts within Ada County were targeted directly, certain large businesses had access to the mobile voting unit, so the entire county is included in the treatment group. Because businesses that had access to the mobile voting unit employed voters from all over the entire county, all of Ada acted as the treatment group. As shown in Figure 3, each precinct had access to the mobile voting unit in some capacity as there is evidence of spillover. The unit was sometimes parked at public street corners or parking lots, and any registered voter in Ada County was legally allowed to vote at the unit. Thus, it is impossible to separate the zip codes that were particularly treated because any registered voter could have their ballot printed at the mobile voting unit and cast their vote. Voters that opted to vote at the mobile voting unit did not have to be residents of the precinct that the unit was in that day. The mobile voting unit printed-on-demand ballots specific to each precinct for all citizens to vote during early voting weeks. For example, if a citizen opted to vote at the mobile voting unit while visiting a grocery store in which the unit was located, they could still vote regardless of the precinct they were shopping in. Figure 3 is a heat map of the number of votes cast at the mobile voting booth during early voting in the 2016 general election. The map is broken down by precinct.

Figure 3: Number of Ballots Cast at the Mobile Voting Unit by Precinct in 2016



Notes: This map was created by the Ada County performance analyst and shows how many votes were cast in each precinct at the mobile voting unit in 2016 (Lock-Smith, 2018).

Synthetic control methods require numerous other donor counties to be weighted according to how well they match with certain factors in the treatment county. For example, I wanted to analyze how vote shares in general elections were impacted by the mobile voting unit, so I weighted the donor counties according to how similar predictor variables were to Ada County. This allows the weighted donor counties to have parallel trends with Ada County and then see how vote share trends continue in the absence of the treatment. Thus, I weighted and aggregated to match the pre-treatment trends in Ada County to create a synthetic counterfactual.

Latah County had the highest weight in the total vote share synthetic control with 55.2% of the weight as seen in Appendix B. The remaining counties carried approximately equal weight with the other 44.8% of the weight. Latah County is home to University of Idaho and has a

population about 11x smaller than Ada County, but it has very similar voter turnout in all elections (U.S. Department of Commerce, 2022). Ada County has the largest population in Idaho with Latah County sitting as the 11th largest county. Although Ada County is much larger, both counties are home to state universities. Each county houses professors, students, and other professionals that work at the universities. Also, Latah County tends to vote Democrat in elections and Ada County has started trending more Democratic over the past election years (Best Places, 2022). Thus, it is reasonable that Latah County shares similar vote shares as the counties have similar demographic make-up.

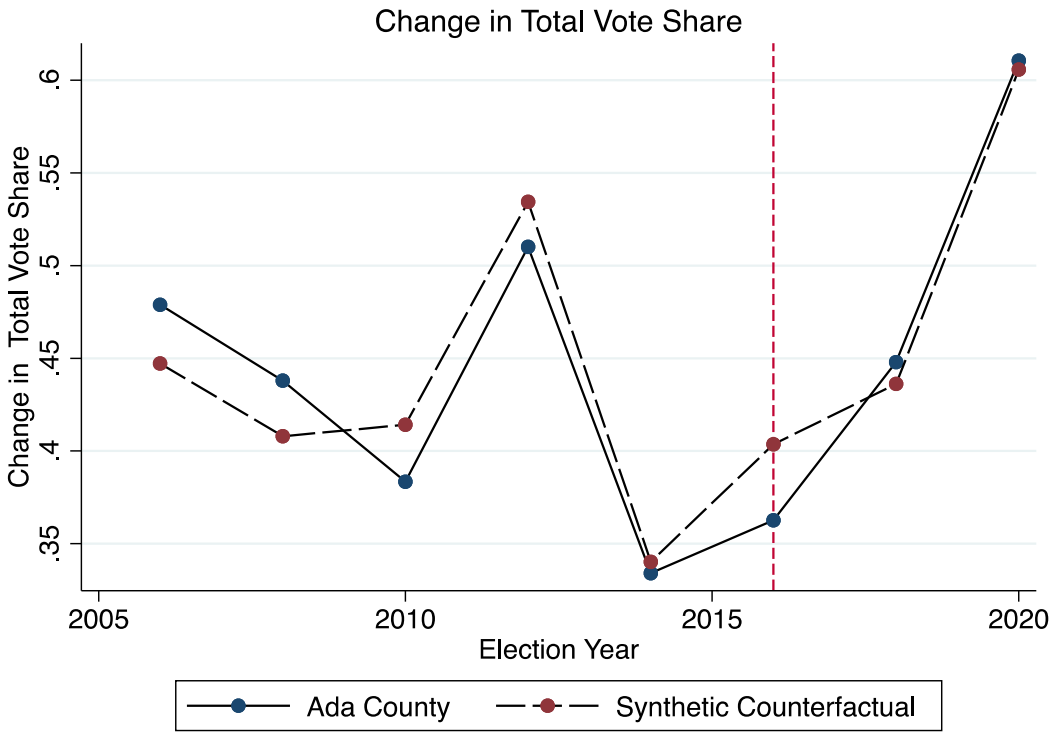
IV. Results

The synthetic control yielded results that went against my initial hypothesis as the mobile voting unit did not increase voter turnout in general elections after it was introduced in Ada County. For the first synthetic control, total vote share acted as my only predictor variable to weigh the donor counties, and there appeared to be zero effect. Total vote share is the share of the county that voted in the general elections from 2006 to 2020. The total vote share trends were parallel between the treatment and the synthetic control from 2006 to 2016, and if there had been a positive effect, Ada County would have increased significantly faster than the synthetic county. However, I see that Ada County's general election vote share simply continues to trend at the same rate as the synthetic county.

The main assumption of a synthetic control requires that the treatment and control are trending at similar rates prior to the introduction of the treatment. When there are parallel trends, I can better predict and visualize the effect, if any, of the program. The trends in total vote share were parallel between Ada County and the synthetic control. Figure 4 is the visualization of the vote share trends in the synthetic control that only uses total vote share as a predictor variable.

One thing to note, the election turnout in 2016 was much lower than the presidential year directly before and after. This is not too concerning as the 2016 election had the lower turnout than presidential elections in the previous 20 years (Wallace, 2022). The low turnout in 2016 took place across the entire United States, so it makes sense that it would occur in Ada County and the other counties in Idaho. The treatment line does not drastically differ from the synthetic control after 2016, so there likely is little, if any, treatment effect.

Figure 4: Change in Total Election Vote Share Relative to Synthetic Control Counterfactual

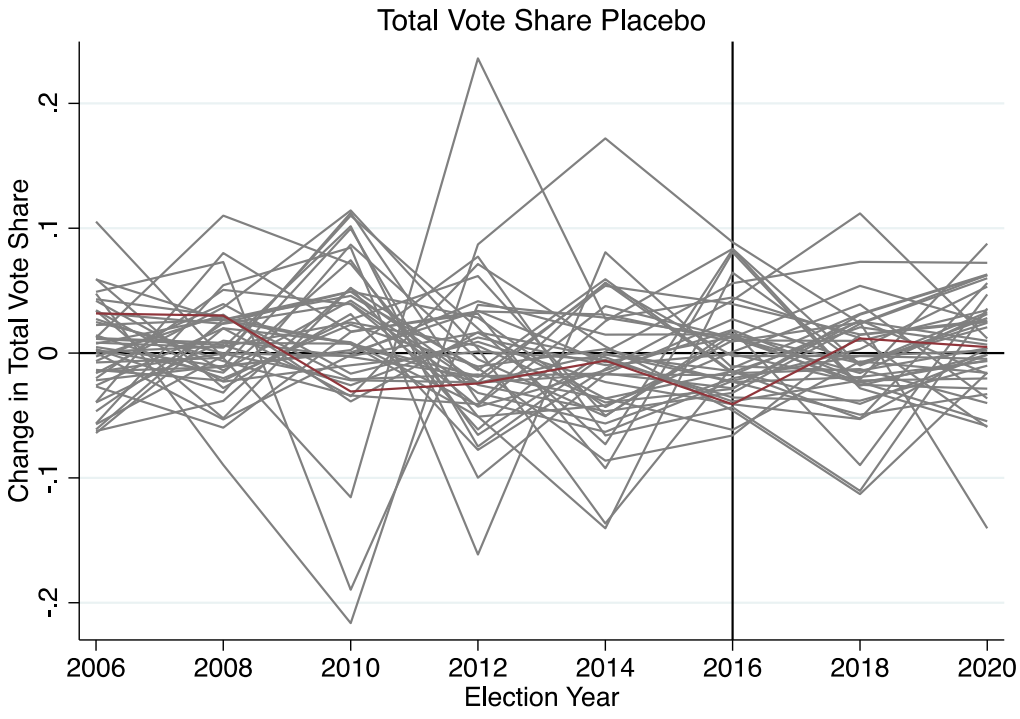


Note: The red line marks the beginning of the treatment in 2016. The dotted line represents the counterfactual average from the weighted donor counties. The solid line is Ada County, and the synthetic control is matched on total vote share.

To determine if these results were a fluke, I ran a series of placebo tests using each of the donor counties as the treatment county. However, I removed Ada County from the donor pool

because they were the only treated county. If I included Ada County, the predicted effect would be skewed because there would be a county that had received treatment. To run the placebos, each county was assigned as the treatment county and I ran the same synthetic control. I ran the placebo test 43 times to see how big of treatment effects we might just observe by chance, when there is no policy change. As in the initial synthetic control, the only predictor variable was total vote share. The placebo test showed that the initial synthetic control test appeared to match well with the placebo tests, so the results are reliable. The graph below shows every placebo test relative to the original synthetic control.

Figure 5: Placebo Changes in Total Election Vote Share



Note: The black line represents the beginning of the treatment. The red line represents Ada County total vote share, and the gray lines are placebo treatments derived from the donor counties.

To better interpret the results of the graph, I looked at the difference in total vote share between the treated and the synthetic control in Table 1. To do this, I took the difference in vote

share before and after the introduction of the mobile voting unit in 2016. The results are in Table 1. The placebo point estimates in both the pre- and post-period are sufficiently imprecise, that the actual pattern for the treated county in Figure 5 is within the bounds of these placebo effects, lending further evidence that there was likely not a treatment effect in Ada County as seen in Table 1.

Table 1: Average Pre- and Post-Treatment to Control Differences

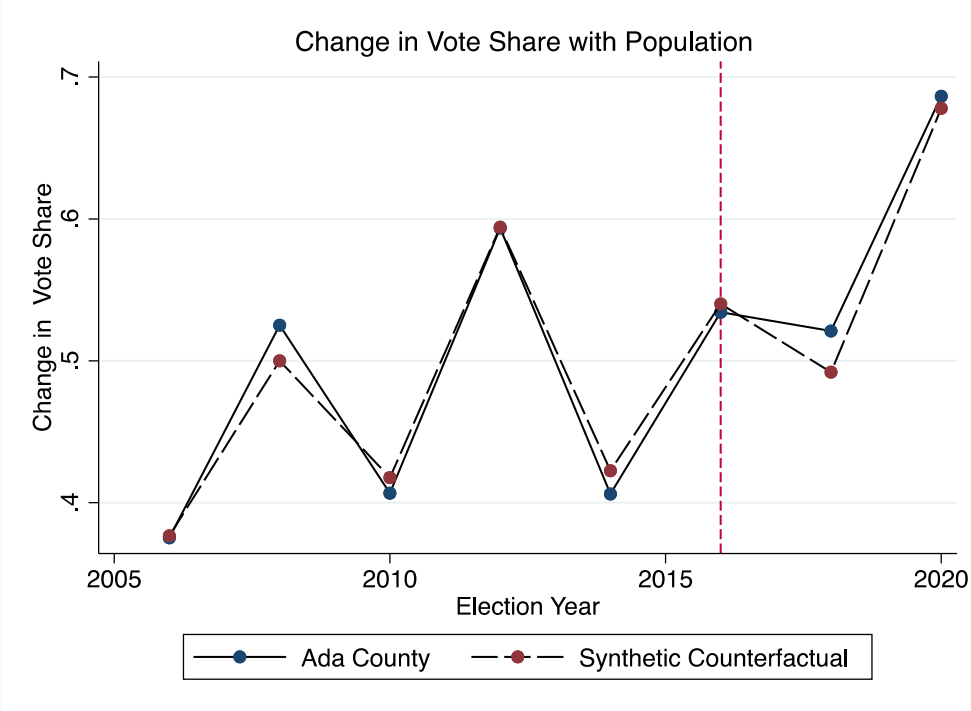
Predictor Variables:	**Pre-Treatment Difference**	**Post-Treatment Difference**
Total Vote Share	.0000931	-.0081371
Low-Income Vote Share	-.0019442	-.008796
Unaffiliated Vote Share	.0015029	.0323748

Note: The pre-treatment period is 2006-2016 and the post-treatment period is 2016-2020. The reported numbers represent the difference between the treatment and synthetic control units. The pre- and post-treatment differences provide additional evidence of the lack of a treatment effect. The three included predictor variables are the ones I discuss further in the paper.

For most of my data, I constructed vote share as a fraction of the number of registered voters in Ada County. Citizens in Ada County can register to vote at the mobile voting unit, so if I found any treatment effects if could make the vote share look like it is falling or is unchanged. To account for this, I use the population as the denominator and find that mobile voting registration does not appear to be an issue. To make sure that this did not pose a problem because of the rapidly increasing population in Ada County. I constructed another synthetic control that constructed vote share as the fraction of the population that voted, rather than just of registered voters. Figure 6 below lustrates that there appears to be no significant change in the difference

between the synthetic control and the treated county when I look at the fraction of the overall county population that voted. Because I cannot construct a good measure of the population by income level and population by party status, I continue to construct vote share as the fraction of registered voters that vote. This is not a problem as the general vote share did not appear to have any treatment effects when I constructed vote share as the fraction of county population.

Figure 6: Change in Vote Share Relative to Population

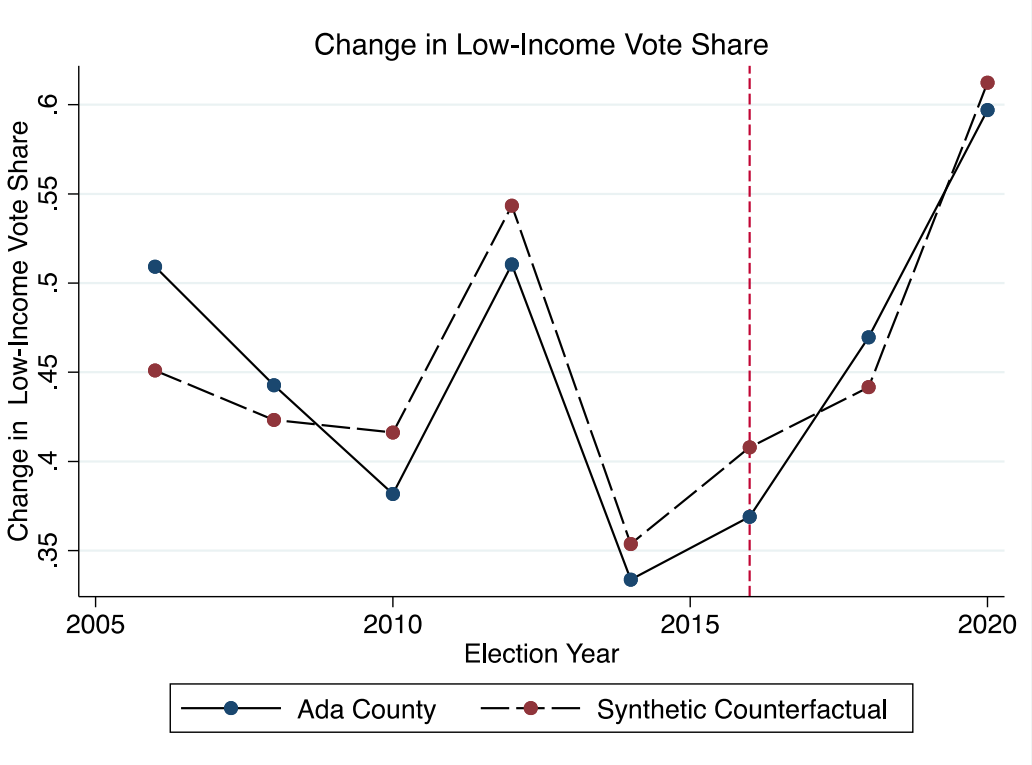


Note: The red line marks the beginning of the treatment in 2016. The dotted line represents the counterfactual average from the weighted donor counties. The solid line is Ada County, and the synthetic control is matched on general vote share relative to county population.

In another synthetic control, I created a synthetic control that matched the low-income vote share in each county. Low-income vote share is the share of the voters in each county that are considered low-income. There was one very small county that did not have any income data, so I excluded it in this test. I was not concerned with how this would affect the results because it carried no weight in the synthetic control because of its low population. Again, Latah County

held the most weight in the control with 40.5% of the weight and the remaining split approximately evenly among the other donor counties. The synthetic control group follows very similar vote share trends in the pre-treatment, so it is reasonable to assume that the post-treatment control group would represent how the treated county would trend in the absence of the treatment. Thus, the parallel trends assumption holds. However, the low-income zip code vote shares continue to trend at very similar rates after the introduction of the treatment. Because there appears to be very little evidence of an unexpected increase in vote share, I conclude that the effects of the mobile voting unit on vote share are non-existent or extremely minimal. Below is the graph that illustrates parallel trends in the pre-period and the lack of any treatment effect.

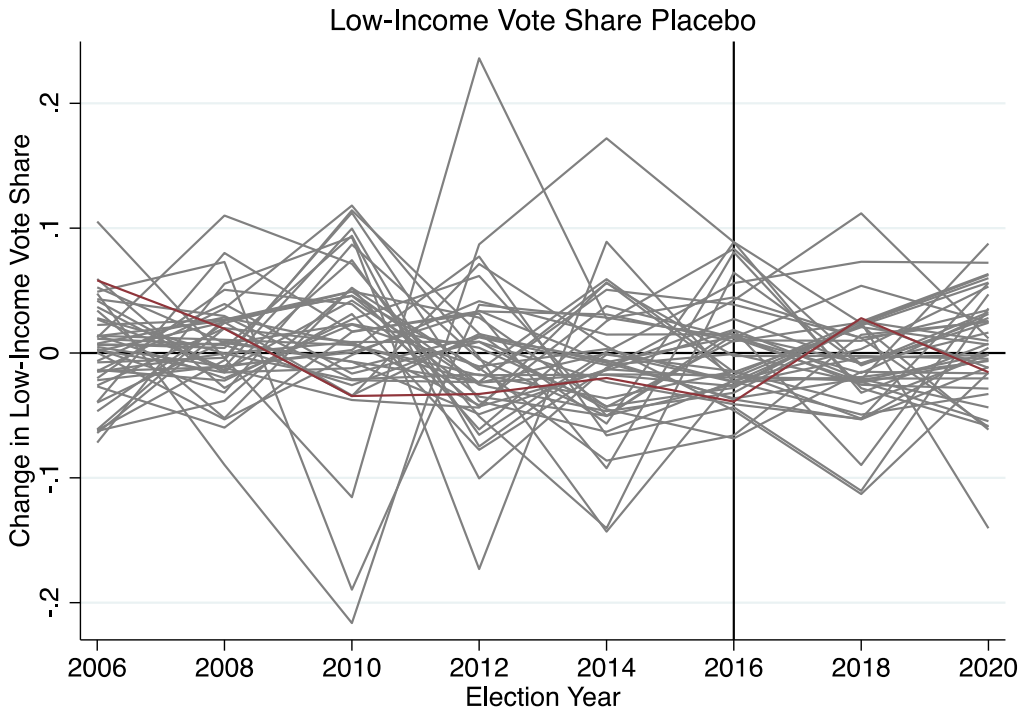
Figure 7: Change in Low-Income Election Vote Share Relative to Synthetic Control Counterfactual



Note: The red line marks the beginning of the treatment in 2016. The dotted line represents the counterfactual average from the weighted donor counties. The solid line is Ada County, and the synthetic control is matched on low-income vote share.

Like the first synthetic control, I ran a series of placebo tests to ensure that the low-income predictor variable synthetic control was not a fluke. Each county in the donor pool was individually assigned to be the treatment, in the absence of the treated county, and there is no evidence that the synthetic test was an anomaly. The Ada County trends are in the middle of the pack, which leads me to believe that my initial results are reliable. Below is the placebo test with low-income vote share as the only predictor variable. When I create a synthetic control that weights donor counties according to low-income vote share, I find that there is a decrease in the difference from before treatment to after treatment as shown in Table 1. This was shocking because I believed that the mobile voting unit would increase the change in general vote share from the control to the treatment.

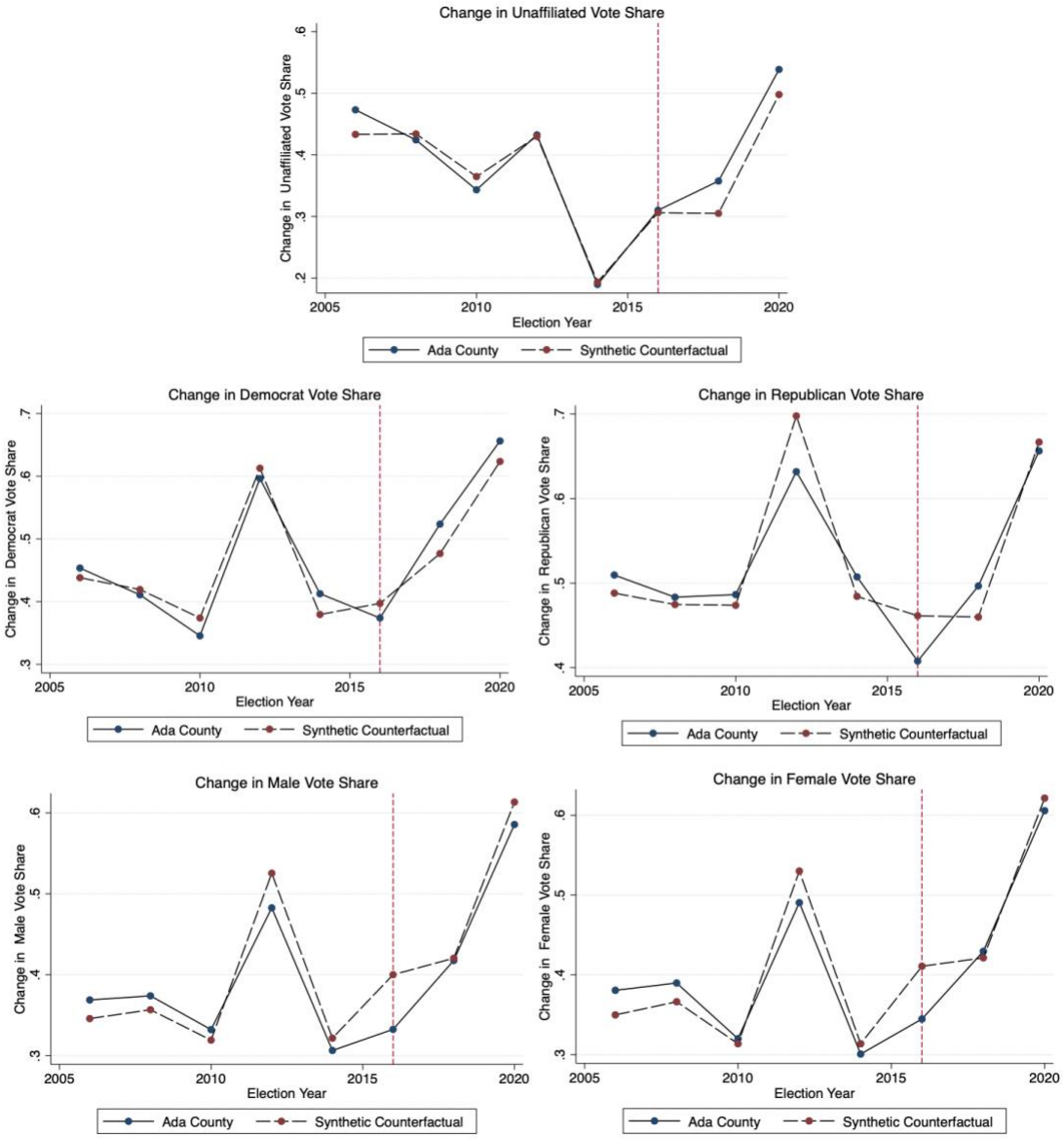
Figure 8: Placebo Changes in Low-Income General Election Vote Share

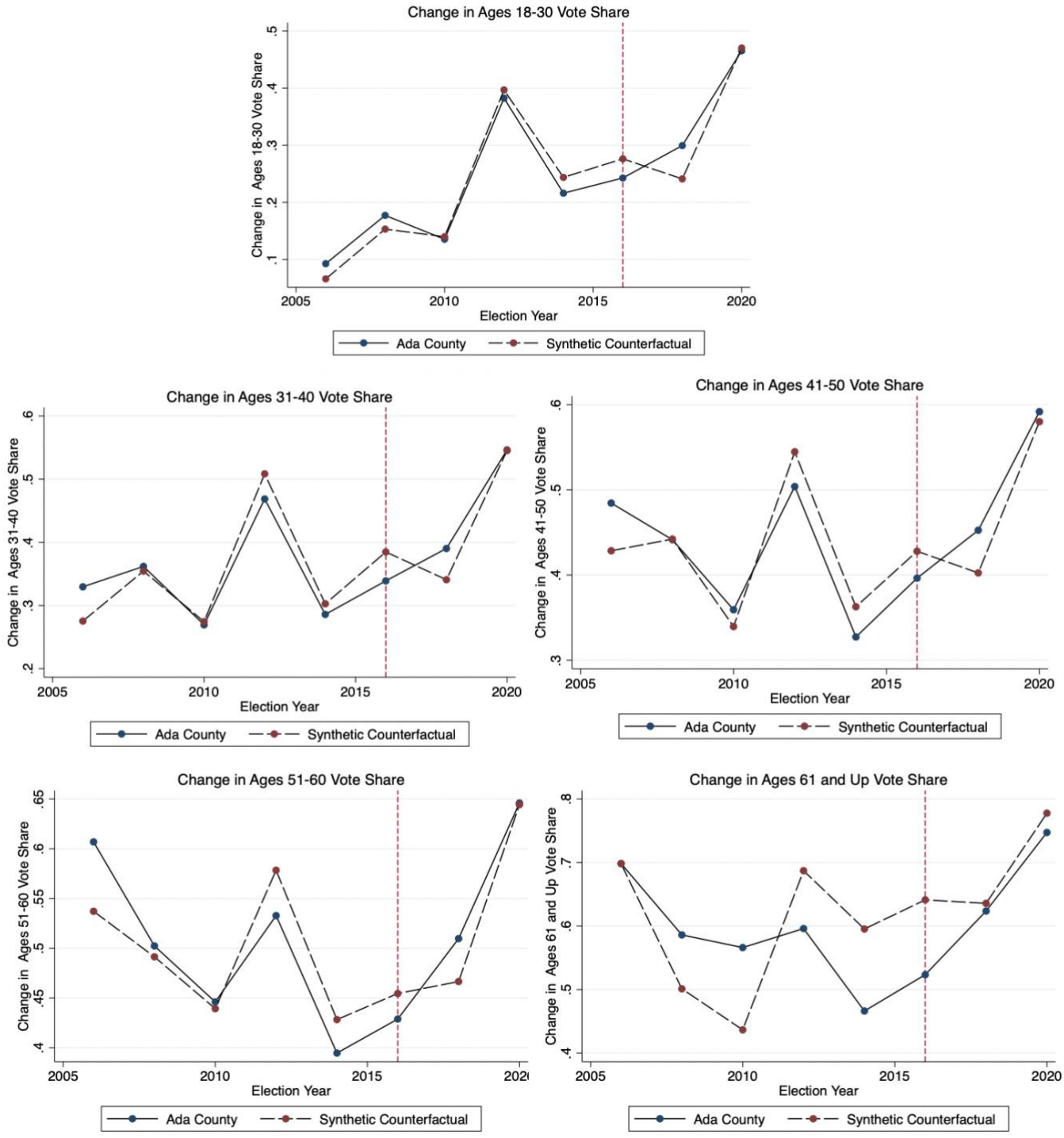


Note: The black line represents the beginning of the treatment. The red line represents Ada County low-income vote share, and the gray lines are placebo treatments derived from the donor counties.

It was somewhat surprising that there appeared to be no treatment effect on vote share during general elections when I created synthetic controls with total vote share or with low-income vote share, so I ran several more synthetic controls. I was unable to run a synthetic control that weighted donor counties on high-income voter turnout because many of the counties did not have any registered voters that would be considered as high-income. For this reason, I only focused on low-income vote share. To examine other subgroup voting rates, I created additional synthetic controls from the donor pool of counties based on voter turnout by gender, political affiliation, and age. I created controls that matched counties based on vote shares of females, males, Republicans, Democrats, unaffiliated voters, and different age groups. I ran each synthetic control with a single vote share group, rather than all together. I wanted to be able to specifically look at turnout for certain groups, rather than turnout among most registered voters. However, I still ran a synthetic control that matched on all my predictor variables and there was no treatment effect. When I ran synthetic controls that only matched on one predictor variable at a time, I saw little evidence of any effect on the vote share of interest. Like previously discussed tests, I used placebo tests to determine the reliability of the outcomes.

Figure 9: Changes in Various Election Vote Shares Relative to Synthetic Counterfactual Control



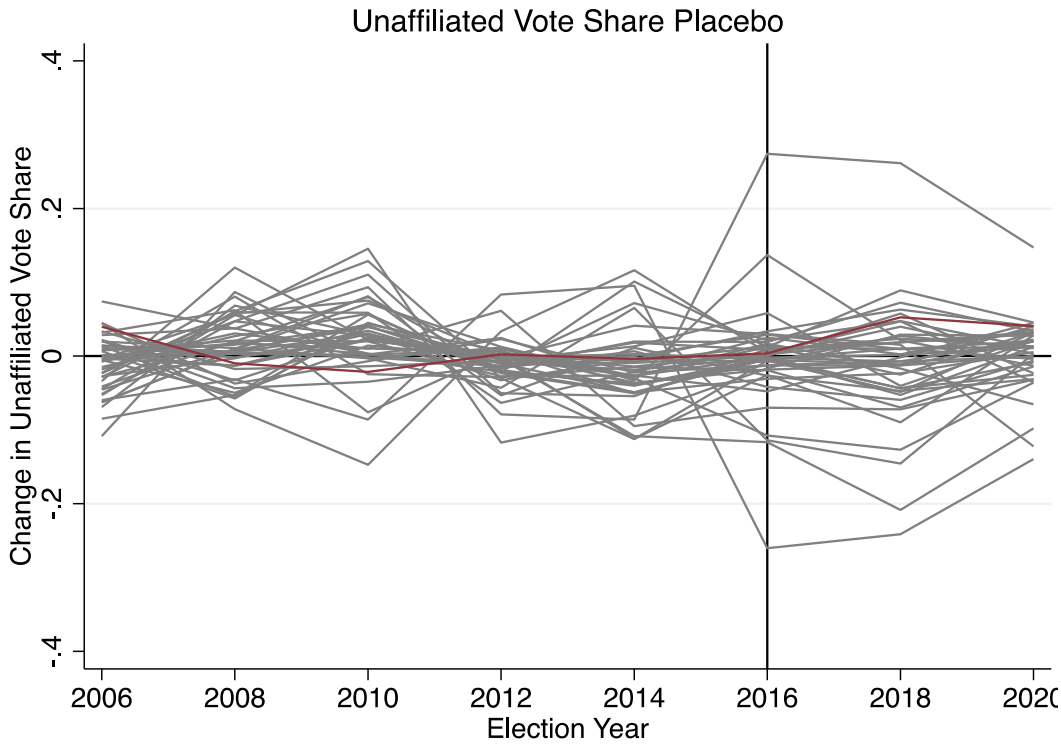


Note: The red lines mark the beginning of the treatment in 2016. The dotted line represents the counterfactual average from the weighted donor counties. The solid line is Ada County, and the synthetic control is matched on various vote shares.

I ran additional synthetic controls that individually matched on other various vote shares. Of all the synthetic controls I looked at, the only outcome that showed any possible treatment effect was the Unaffiliated vote share. For this synthetic control, all the donor counties held very similar weights as seen in Appendix B (Politics and Voting in Ada County, 2022). Because there appeared to be some form of treatment effect for the unaffiliated voters, I predict that unaffiliated voters were more likely to vote during the 2016, 2018, and 2020 elections. Another possible theory for why there was a small treatment effect could be that registered voters did not want to be tied down or associated with a particular political party during the controversial presidential election years.

As Ada County has grown in population, more registered Democrats have moved in and started voting. It is possible that unaffiliated voters began to increase their turnout in response to the increase in Democrat votes. It is interesting, however, that the placebo test places the treated Ada County synthetic control above zero and floating near the top of all other placebo synthetic controls. Although the graph appears to show a treatment effect, it is important to note that the difference between treatment and control before and after the mobile unit was introduced are about the same. As shown in Table 1, unaffiliated voter turnout increased by 0.0308719 in the from the pre-period to the post-treatment period when compared to the synthetic control. Thus, we see that voter turnout increased for unaffiliated voters relative to the introduction of the mobile voting unit.

Figure 10: Placebo Changes in Unaffiliated Election Vote Share



Note: The black line represents the beginning of the treatment. The red line represents Ada County Republican vote share, and the gray lines are placebo treatments derived from the donor counties.

V. Discussion

There are many possible reasons that the treatment did not have any statistical effect on the vote share in general elections. First, it is possible the mobile voting unit was not utilized enough for there to be appropriate power to predict a treatment effect. The mobile voting unit is only utilized during early voting, which typically occurs within 15-22 days before the election day and does not occur within four days of voting day. It is possible that the hours that the mobile voting booth run are inaccessible to the working class that cannot afford to take time off work to vote. The booth only runs between 10 am and 5 pm during weekdays. It is likely very challenging for low-income voters, and realistically many voters, to make these times work. Only occasionally and sporadically is the mobile voting unit utilized on Saturdays, so voters

cannot rely on the booth being open on weekends. Because the unit is only open during work hours during the week and in early voting periods, it is possible that the goal of targeting low-income voters is completely missed. If the unit were to stay open later, regularly function on election day, and open on weekends, more voters could participate.

Another explanation for the minimal effect of the booth is the lack of clear and accessible advertising. The mobile voting unit changes locations daily, and often during the day, which requires voters to be aware and informed of where the booth is parked at any given time. The cost of information increases as more barriers are put up before citizens can cast their ballots. The location of the unit is advertised on the Ada County Clerk's website, but I believe that many citizens are unaware of where to even begin to look (Ada County Clerk's Office, 2022). To maximize the number of cast ballots more effectively, Ada County should establish an opt-in text or email that informs interested citizens of the unit's location each time it changes. This could increase knowledge and decrease the costs of obtaining the information.

Although there appeared to be a general increase in total voter turnout and thousands of ballots cast at the mobile voting unit during general elections, it is possible that voters who voted at the mobile voting unit were citizens that would have voted anyway. Voters may have substituted away from voting at their polling stations and opted to vote at the mobile voting unit located at their local grocery store or at various businesses around the county. The mobile voting unit was occasionally parked at large businesses such as Micron, Roaring Springs, and T-Sheets (Lock-Smith, 2018). It is possible that the workers at these businesses would have voted anyway. The mobile voting unit, however, lowered the transportation costs of voting for these citizens. Thus, the mobile voting unit may have only changed how people vote, not if they vote.

The information costs of voting at the mobile unit are possibly too large and add to the costs for low-income individuals, so they did not opt to vote there. It is difficult to determine if voters that vote at the mobile voting unit only voted there because it was available. In the absence of the treatment, however, the evidence shows that voter turnout trends would have trended upward anyway. The mobile voting unit is only accessible during early voting, and this reduces the likelihood of finding a treatment effect. Historically, early voting turnout in general elections is lower than election day turnout (Morin, 2020). So, this could explain why less people utilize the mobile voting booth during early voting.

VI. Conclusion

Using voter registration data from Idaho general elections, I found only found evidence for a treatment effect on the unaffiliated voter turnout, but no strong evidence for an effect of the mobile voting unit on voter turnout for the other demographics. It is possible that the hours the unit is open and substitution towards an easier voting method could explain why the mobile voting unit had no perceivable effect on voter turnout in general elections. To increase voter turnout at the mobile voter booth, Ada County could extend the hours that the booth is open, open more mobile voting units, spread information on the unit's location, and utilize the unit during election day. Although no treatment effects were detected, a "non-effect" is as useful of knowledge as finding an effect because Ada County can adjust their methods to effectively increase voter turnout.

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APPENDIX A: NUMBER OF VOTES CAST AT THE MOBILE VOTING UNIT

Figure 11: Votes Cast at the Mobile Voting Unit in 2018

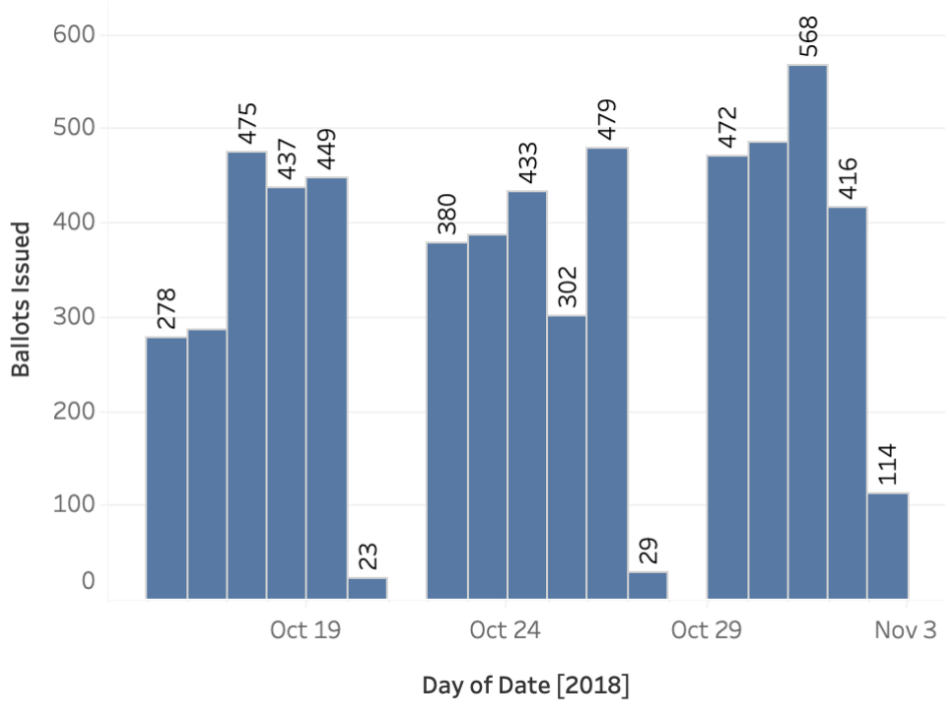
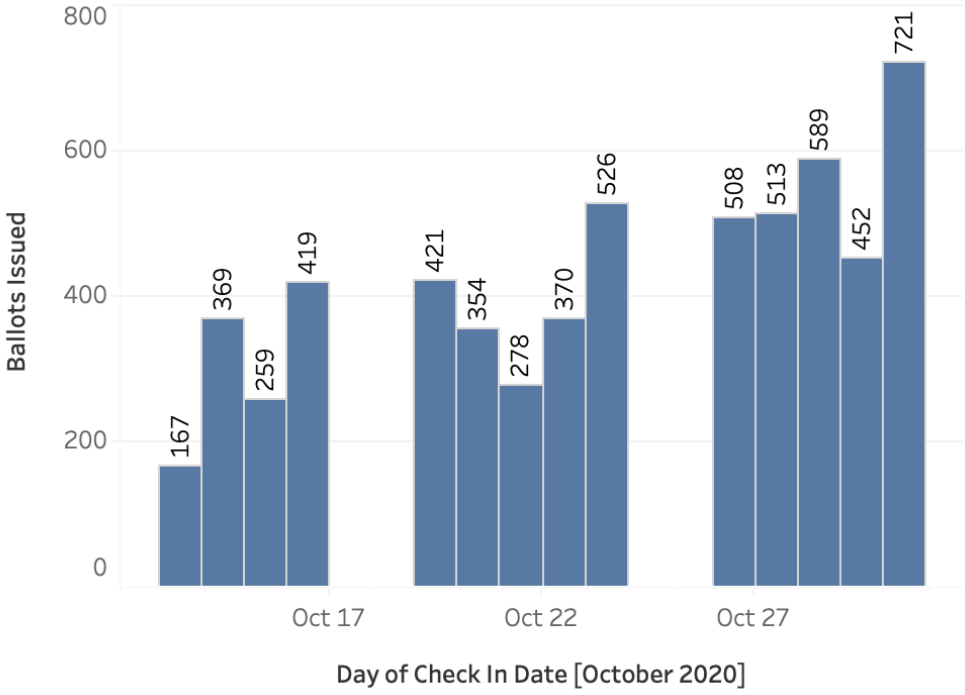


Figure 12: Votes Cast at the Mobile Voting Unit in 2020



APPENDIX B: DONOR COUNTY SYNTHETIC WEIGHTS

Table 2: Synthetic Weights

County	Total Rate	Low-Income	Unaffiliated
Adams	.005	.01	.029
Bannock	.012	.017	.022
Bear Lake	.006	.011	.02
Benewah	.012	.017	.019
Bingham	.009	.014	.018
Blaine	.012	.017	.111
Boise	.008	.013	.038
Bonner	.01	.016	.023
Bonneville	.012	.017	.02
Boundary	.01	.016	.016
Butte	.005	.01	.031
Camas	.007	.013	.015
Canyon	.013	.017	.016

Caribou	.006	0.0	.02
Cassia	.008	.014	.014
Clark	.003	.007	.045
Clearwater	.011	.017	.025
Custer	.006	.014	.019
Elmore	.012	.017	.016
Franklin	.009	.014	.015
Fremont	.006	.011	.017
Gem	.009	.015	.021
Gooding	.01	.016	.02
Idaho	.006	.011	.024
Jefferson	.011	.013	.017
Jerome	.014	.017	.016
Kootenai	.013	.017	.019
Latah	.552	.405	.019
Lemhi	.006	.011	.022

Lewis	.01	.017	.022
Lincoln	.013	.017	.013
Madison	.062	.015	.17
Minidoka	.008	.014	.019
Nez Perce	.013	.017	.021
Oneida	.008	.013	.029
Owyhee	.012	.017	.017
Payette	.012	.017	.015
Power	.01	.016	.025
Shoshone	.01	.017	.021
Teton	.011	.017	.021
Twin Falls	.013	.017	.018
Valley	.009	.012	.028
Washington	.006	.011	.023

APPENDIX C: TOTAL VOTES IN IDAHO COUNTIES FROM 2006-2020

Table 3: Total Votes in Idaho Counties

County Name |	Total Votes
ADA	3,865,434
ADAMS	41,262
BANNOCK	675,534
BEAR LAKE	54,056
BENEWAH	82,102
BINGHAM	327,310
BLAINE	204,786
BOISE	75,512
BONNER	403,780
BONNEVILLE	832,772
BOUNDARY	98,626
BUTTE	24,180
CAMAS	11,186

CANYON	**1,438,284**
CARIBOU	**58,880**
CASSIA	**155,712**
CLARK	**5,880**
CLEARWATER	**73,410**
CUSTER	**45,826**
ELMORE	**166,118**
FRANKLIN	**104,038**
FREMONT	**109,050**
GEM	**154,722**
GOODING	**99,578**
IDAHO	**157,970**
JEFFERSON	**219,182**
JEROME	**129,862**
KOOTENAI	**1,299,080**
LATAH	**348,202**

LEMHI	**79,654**
LEWIS	**32,480**
LINCOLN	**32,828**
MADISON	**273,530**
MINIDOKA	**128,042**
NEZ PERCE	**336,888**
ONEIDA	**40,486**
OWYHEE	**78,374**
PAYETTE	**177,272**
POWER	**53,678**
SHOSHONE	**104,890**
TETON	**97,330**
TWIN FALLS	**571,368**
VALLEY	**105,684**
WASHINGTON	**83,942**