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Crime in a time of cannabis: Estimating the effect of legalizing marijuana on crime rates in
Colorado and Washington using the synthetic control method

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ABSTRACT

The legalization of marijuana for recreational use continues to expand across America. Colorado and Washington were the first states to legalize marijuana in 2012. A primary concern regarding legalization is how these policy changes affect crime rates. Researchers have begun to estimate the effect marijuana legalization has had on crime rates. We extend this literature by using a different analytical approach. State level data covering years 2000-2019 were analyzed

using the synthetic control method to find that legalizing marijuana for recreational use in Colorado and Washington was generally not associated with variations in index crime rates. These findings substantiate prior research. Increased crime rates should not be a primary concern as more states move to adopt recreational marijuana use legislation. Instead, the benefits to states via harm reduction, increased tax revenue, and a more efficient allocation of policing resources ought to be more of a consideration for states when passing recreational marijuana legislation.

INTRODUCTION

As the legalization of marijuana for both medicinal and recreational use continues to expand across the United States, one of the top concerns among politicians and citizens alike is how these policy changes are impacting crime. Public support for the legalization of marijuana has continued to grow each year. The latest Gallup Poll (2020) reveals that now, more than ever in the past five decades, Americans support the legalization of marijuana in the United States, at 68 percent. Support has certainly increased exponentially since Gallup's initial review in 1969, when only 12 percent of the population endorsed legalization. Support steadily climbed for decades hitting 30 percent in 2000, and trended ever upward, and sharply, to nearly double as states began voting to approve legalization for recreational purposes in 2012.

Public support is undeniably being reflected in policy reform. The National Council of State Legislatures (2021) provided a post-2020 election update on marijuana laws, outlining that as of mid-April, 2021, 36 states and four territories have approved measures to regulate cannabis for medical use. Beyond medicinal marijuana, 17 states, two territories, and the District of Columbia, have approved measures to regulate cannabis for recreational use. In 2012, Colorado

and Washington were the first two states to regulate use for recreational purposes. In mid-2013, the U.S. Department of Justice (USDOJ) released a statement updating their marijuana enforcement policy, stating that while marijuana remains illegal federally, the USDOJ expect states reforming their policies to create “strong, state-based enforcement efforts... and will defer the right to challenge their legalization laws at this time” (USDOJ, 2013).

As policies continue to shift, the USDOJ, through a 2018 memorandum from a more conservative Attorney General, flexed the reality that federal prosecutors decide how to prioritize enforcement of federal marijuana laws. U.S. Attorneys were directed to “weigh all relevant considerations, including federal law enforcement priorities set by the Attorney General, the seriousness of the crime, the deterrent effect of criminal prosecution, and the cumulative impact of particular crimes on the community” (USDOJ, 2018). To effectively achieve these objectives regarding marijuana law enforcement, it is necessary to review evidence-based research and policy recommendations.

The authors can appreciate traditional typologies of the drug/crime nexus as primary arguments against drug policy reform, whereby use and psychopharmacological effects may illicit antisocial behaviors, economic-compulsive crime can arise in association with efforts to obtain money to finance illicit drug addictions, and that systemic crime can erupt from dealing within illegal drug markets (Goldstein, 1985). However, these considerations have not been supported in relation to marijuana, which has not been found to illicit violent behaviors or to be as addictive, dangerous, or expensive as substances to which these traditional typologies typically refer (Budney et al., 2007; Dragone et al., 2019; Hall and Degenhardt, 2009). Additionally, systemic crime as it relates to illegal drug markets is a less relevant concern within this analysis than the systemic crime developing from the now *legal* marijuana market. In

general, micro-level drug/crime models are not entirely appropriate to apply to the present analysis which focuses on a macro-level approach reviewing how state policy changes have resulted in changes to crime rates.

To review the considerations outlined by the Attorney General (USDOJ, 2018) as they apply to marijuana law enforcement and policy reform, the literature review in this paper considers the seriousness of marijuana-related crimes and enforcement since legalization. The authors provide a greater review of these considerations than whether mechanisms for deterrence against marijuana involved activities achieve desired outcomes, or the overall impacts of marijuana on communities, as the present analysis focuses strictly on whether legalization impacts crime rates. There are a variety of considerations to be made in relation to cannabis and crime, including how legalization has impacted offense levels relating to marijuana possession, use, or distribution. The FBI 2019 Uniform Crime Report (UCR) reflects that over one-third (35 percent) of arrests for drug abuse violations were for marijuana possession and sale or manufacturing (32 percent specifically for possession alone). But when broken down by region, marijuana related arrests made up less than 13 percent of total drug arrests in the West, which is well known to be mostly made-up of states with reformed marijuana policies, where other regions' marijuana arrests were between about 42-52 percent of drug related arrests.

The authors acknowledge that speculative and propagandized concerns about “reefer madness” type rhetoric around marijuana use and behavioral changes that culminate in crime may impact marijuana policy reform (Carroll, 2004; Stringer & Maggard, 2016). Concerns surrounding marijuana as being addictive, a gateway drug, more dangerous than alcohol and tobacco, and that decriminalization sends a message that people, including youth, *should* be using it, in addition to claims that marijuana legalization is causing more serious crime (see

generally, Mosher & Akins, 2014), have stymied reform efforts. More than 50 percent of Americans who identify as Republican or of more conservative political ideology hold out against legalization (Gallup, 2020). But in fact, there is substantial, empirical evidence to the contrary of each of these unjustified criticisms. Marijuana has been found to be less potentially addictive and carries a much lower public health burden than alcohol, tobacco, or other drugs (Budney et al., 2007; Hall & Degenhardt, 2009), and was not found to be a gateway drug among teens and young adults (Jorgensen & Wells, 2021; Van Gundy & Rebellon, 2010). The use of marijuana or other drugs among youth has not been found to be substantially increased in states where marijuana has been decriminalized (Colorado Division of Criminal Justice, 2021; Maier et al., 2017; Midgette & Reuter, 2020; Shepard & Blackley, 2016). Due to the lack of empirical support for sensationalized arguments against legalization, the authors will not provide any additional review of popular opinion to motivate this study, which focuses on actual impacts of legalization on index crime rates. This is relevant for policy reform considerations because non-evidence-based speculation can hinder reforms that evidence supports as being more beneficial than detrimental, and this study serves to reduce misconceptions about the detriments of marijuana reform through empirical evaluation of speculation around how marijuana legalization impacts crime.

With focus on more serious crimes, the purpose of this paper will be to review the outcomes of marijuana legalization on index crime rates across the first two states to reform recreational marijuana policies, Colorado and Washington. Lu and colleagues (2019) utilized a quasi-experimental, interrupted time-series design to examine this research question and found that marijuana legalization and sales in these states had no significant effect on violent or property crime. Another recent study employed a synthetic control design to study the effects of

recreational marijuana dispensaries in Denver and found that property crime increased by 18 percent in the immediate area surrounding the marijuana dispensary (not the entire city); however, no effects on violent crime were observed (Conneally et al., 2020). This study seeks to extend this literature by analyzing state/year data and using a methodologically rigorous approach which allows for causal inference. The current study employs the synthetic control method for comparative case studies to analyze a 20-year state-level panel dataset to estimate what index crime rates would be had Colorado and Washington not legalized marijuana, and demonstrates the utility and/or limitations of this method. Here, we contribute to this research arena methodologically and practically by implementing an analytical plan that has yet to be used, thereby aiding the triangulation of findings in the current body of literature. Scientific evaluation of public policy requires replication, studying similar concepts through varying approaches. The current study also seeks to accomplish this task.

LITERATURE REVIEW

The Seriousness of Marijuana Related Crimes

Statistics on marijuana related crimes would likely convince anyone that marijuana is a serious contributor to drug crimes and other offenses, unless the context surrounding how and why marijuana impacts these statistics is revealed. As mentioned in the introduction, the FBI 2019 UCR states that 35 percent of arrests for drug abuse violations nationwide were marijuana related, but in the context for *how* marijuana is related, 32 percent of those violations were for simple possession alone. This percentage decreases greatly when controlling for arrests by geography, as marijuana legalization has helped reduce arrests and incarceration of non-violent drug offenders.

Many counties that border Colorado and Washington have seen increases in possession charges since legalization in these states, and there is evidence that law enforcement in surrounding areas feel recreational marijuana has had a negative impact on their enforcement duties, and are cracking down (Hao & Cowan, 2020; Ward et al., 2019). However, data from 11 Western states does not show any evidence of negative spillover effects of marijuana legalization on actual crime rates in neighboring states, so this concern from law enforcement seems unfounded (Shepard & Blackley, 2016). Some research even suggests that the spillover effect of legalization in the Colorado region to various neighboring states is contributing to an overall crime *reduction* in the rates of property crimes and simple assault (Wu et al., 2020).

But has marijuana legalization resulted in increases in violent and property crimes? The FBI's Uniform Crime Report (2019) shows index crime rates have been decreasing since before marijuana legalization began in 2012 and continued to decline for several years. In a recent study employing a robust quasi-experimental design, Lu and colleagues (2019) directly tested the effect of marijuana legalization on index crime rates, both violent and property, and found that the shift to legalization in Colorado and Washington was not associated with variations in crime rates at the state level. Contrary to these findings, Wu, Wen, and Wilson (2021) used a differences-in-differences approach to examine the effect of Oregon's recreational marijuana law to find that legalizing marijuana was associated with an increase in property crimes.

The context with which marijuana has potentially contributed to changes in crime rates may revolve around the location of dispensaries for the sale of marijuana. A variety of peer-reviewed articles consider how marijuana dispensary location has impacted crime rates in the immediate area and areas adjacent to dispensaries, with some studies having found there to be increases in violent and/or property crimes since the foundation of both medical and recreational

dispensaries (Connealy et al., 2020; Contreras, 2017; Freisthler et al., 2017; Hughes et al., 2020). However, a deeper review of the correlation allows for the recognition that the sale of marijuana for any purpose is still federally illegal as a Schedule One drug, therefore dispensaries are forced to operate within a cash economy without support from banks due to money laundering concerns (Chemerinsky et al., 2015). This leaves dispensaries more vulnerable as businesses and their clients more at risk for victimization, as offenders, potentially even industry-workers, seek to obtain large amounts of cash kept on hand for transactions (Contreras, 2017). Early increases in crime surrounding dispensaries were quickly addressed through target hardening mechanisms, including increasing security (Brinkman & Mok-Lamme, 2019; Kepple & Freisthler, 2012). A review in Denver, Colorado found while burglary accounted for more than half of all industry-related crime in 2019, the rate of crimes committed against or by licensed marijuana facilities has remained stable since recreational legalization, and make up less than 0.4% of overall crime in Denver (Colorado Division of Criminal Justice, 2021).

Taking these factors into account, other recent studies have shown that dispensaries can actually decrease crime by reducing vacant buildings by filling retail space, increasing security in these areas, displacing illicit criminal organizations, and actually providing a substitution for more harmful substances (Brinkman & Mok-Lamme, 2019; Hunt et al., 2018). Additionally, since the increase in crime associated with dispensaries tends to be isolated to small spatial units immediately surrounding the dispensary, these effects may not be observed when analyzing larger units of analysis such as states. It could be the case that these increases in crime around dispensaries are being offset by decreases in crimes in other micro-locations.

Overall, the discussion and evidence of the legalization of marijuana and whether it increases crime has mixed results and must be considered through various contexts and lenses.

Perhaps there is no change at all, as some studies have reviewed medical and recreational marijuana law effects on violent and property crime and found no statistically significant causal effect (Maier et al., 2017; Morris et al., 2014). Lu et al. (2019) found no long-term effects of legalizing marijuana for recreational use on property or violent crime rates in Colorado and Washington. Some reviews have found effects in individual states, however. Wu et al. (2020) found decreases in property crime, larceny, and simple assault in the entire Colorado region following legalization, in addition to Chu and Townsend (2019) finding medical marijuana laws reduce both violent and property crime in California by 20 percent. Dragone and colleagues (2019) found reductions in rape and property crime in Washington state after legalization, as well as reduced consumption of other drugs and alcohol. In sum, the discussion and evidence on the seriousness of marijuana related crimes does not seem to support the notion that stringent enforcement efforts are necessary, yet these efforts to enforce and incarcerate non-violent marijuana users persist.

The Deterrent Effect of Marijuana Law Enforcement, and the Cumulative Impact of Marijuana on the Community

While the purpose of the present analysis is to focus on the impacts of the legalization of marijuana on index crime rates, the authors would like to briefly address the Attorney General's assertion that law enforcement priorities also consider "the deterrent effect of criminal prosecution, and the cumulative impact of particular crimes on the community" (USDOJ, 2018), and how this relates to marijuana policy reform. It is clearly becoming difficult to enforce marijuana laws when various laws confound each other from state to state. Though unfounded, if the perception is that marijuana increases crime rates, then penalties for marijuana must be strict to deter use. Deterrence is also becoming increasingly difficult as public opinions and attitudes toward marijuana use and

legalization do not regard it as requiring harsh criminal justice responses (Arazan et al., 2015), yet still, these law enforcement considerations prevent reform.

Attempts to achieve deterrence disproportionately impacts minority communities, where marijuana related arrests for Black individuals, even in states with decriminalized laws, still occur at an average of nearly four times the rate of white arrests, despite rates of use between races being similar (ACLU, 2020). As for the monetary costs for achieving deterrence, police enforcement of marijuana related crimes was reported by the ACLU (2013) as being more than \$3.6 billion annually. The large sums spent enforcing marijuana laws, combined with the fees to defend or pay restitution for the offenses, and coupled with the economic losses across a lifetime for those convicted, is a massive cost to achieve deterrence, and further still does not consider the cost to families and society, as opportunities are reduced for offenders. The enforcement of these laws is clearly taking a toll that may not otherwise exist, as a study from Human Rights Watch (2012) indicated that 90 percent of those arrested for marijuana possession had no prior felony conviction, meaning there is no criminal history to deter, making it unlikely to assume that marijuana law enforcement deters subsequent offending.

Police made more arrests in 2019 for marijuana than for all violent crimes combined (UCR, 2019), confounding priorities in law enforcement about the most important or serious crimes to deter. If the concern of the criminal justice system is genuinely seated in the deterrent effect of criminal prosecution to prevent crime, the legalization of marijuana would allow law enforcement focus efforts on more serious crimes rather than constant concern over petty marijuana enforcement. However, neither Jorgensen and Harper (2020) nor Makin and colleagues (2019) found clearance rates of index crimes to increase substantively in Colorado or Washington post marijuana legalization, so there is not support for the notion that the criminal

justice system has shifted focus to more serious crimes in lieu of marijuana enforcement. When considering the seriousness of marijuana offenses in line with the costs to enforce marijuana laws, which are detrimental to minority communities, incarceration rates, treatment and recovery efforts, and health research, the benefits of achieving deterrence for marijuana use must be weighed against the benefits of policy reform and legalization, which potentially include reductions in crime. Deterrence in the context of marijuana law enforcement is not equitable or economical.

In general it also seems that residents of decriminalized states feel legalization is more beneficial than detrimental through the creation of marijuana industry jobs (PEW, 2017), reduction of prior marijuana criminal history impacts through retroactive reform application (Thompson, 2017), revenue building for health care, substance abuse prevention and treatment programs, the investment in state public schools, and toward improvements in education, prevention, and research (Colorado General Assembly, 2012; Washington State Treasurer, 2019), as well as increases in housing and other business development and tourism by drawing people to decriminalized states (Zambiasi and Stillman, 2019).

In addition to helping decrease mass incarceration of non-violent offenders and the disproportionate representation of minorities in the criminal justice system, as well as addressing barriers people with marijuana convictions face even in light of changing policies, federal legalization of marijuana could boost important areas of public service that are often underfunded and undervalued in communities across the country. If communities are making the effort to reform policies for the betterment of citizens, the concerns about the potential impact of marijuana on crime rates must be empirically reviewed to help promote evidence-based policy.

METHODS

Colorado and Washington legalizing marijuana for recreational use beginning in 2012 provides a natural experiment to assess the effect legalizing marijuana has on index crime rates¹. The research question for the current analysis is as follows: What effect did legalizing marijuana have on index crime rates in Colorado and Washington? The paragraphs below outline the research methods used in this study.

Analytical Strategy

The current study takes a counterfactual analytical approach to examine what the case would be had Colorado and Washington not legalized marijuana for recreational use in 2012². We employ the synthetic control method for comparative case studies developed by Abadie, Diamond, and Hainmueller (2010)³. The *synth* and *synth runner* commands in *Stata 15* were used in this analysis. The synthetic control method is a useful counterfactual approach to examine the effects of policies enacted at the state level by creating a synthetic state from weighted data of other non-treatment states (states that have not legalized marijuana for recreational use in this case) in a “donor pool” such that the synthetic state and the actual state can be compared. This approach approximates the randomized control trial via quasi-experimental methods using observational panel data. A synthesized control group (i.e., a synthetic state) is created and compared to the experimental group (i.e., the actual state). Using

¹ Previous research examining this natural experiment has suffered some notable limitations that this study intends to overcome. Those limitations and how we overcome those limitations are addressed in the discussion section.

² Legislation legalizing marijuana in these states passed in 2012, but for the purpose of this study 2013 was used as the intervention year since the legislation was passed so late in 2012 (November for Colorado and December for Washington). Citizens were allowed to possess and grow cannabis in 2013, however, retail sales did not begin until 2014. As far as crime rates are concerned, 2013 is an appropriate year for analysis since law enforcement could no longer enforce simple possession of marijuana at this time.

³ See Abadie (2021) for a discussion on why Abadie argues that the synthetic control model is preferable to more traditional policy evaluation methods such as fixed-effects and difference-in-difference models.

this method, the control group and experimental group are ideally balanced on a variety of predictors theoretically predictive of the outcome of interest with the exception of the treatment thereby creating a quasi-experimental condition. Trend lines of the outcome variable for both the synthetic state and actual state are then plotted alongside each other. In the pre-treatment period, both trend lines will ideally track closely together. If the treatment has an effect on the outcome, there will be a divergence between these two trend lines in the post-treatment period. Since the data are ideally balanced, any observed divergence between the synthetic trend and actual trend in the post-treatment period is said to be caused by the treatment.

In the current study, this method shows the actual crime rate trajectories of the treated units (i.e., Colorado and Washington) as well as the counterfactual trajectories of the treated units overlain the actual trajectories which allows for the estimation of the causal effects of marijuana legalization in these states. As required by the statistical method used here, states that legalized marijuana for recreational use between 2012 to 2019 were dropped from the donor pool. There were 40 states in the donor pool for both Colorado and Washington models. States that had enacted medical marijuana laws but had not enacted recreational marijuana laws were included in the donor pool.

The robustness of the findings were assessed by in-time checks, leave-one-out checks, and re-estimating models with unbalanced predictors removed (Abadie, 2021). For the in-time checks, the treatment period in synthetic control models were specified at 2010 instead of 2013. The results presented here are robust to this check. For leave-one-out, highly influential donor states were dropped and models were re-estimated. This was only necessary in the model estimating aggravated assault in Washington. The findings presented here are robust to this

check. Lastly, predictors that did not achieve balance were dropped and models re-estimated. The models presented here are robust to this check.

Data

A 50-state panel dataset covering years 2000 to 2019 was created and analyzed. Since recreational marijuana use laws are enacted at the state level, states are an appropriate unit of analysis. The data contain state level information on crime rates, marijuana regulation, gun control legislation, criminal justice system activity, political climate, and demographics. All data were gathered from federal and state government websites, The Giffords Law Center, NORML, and internet searches. A handful of missing observations were present in this dataset. Only a few variables in the dataset contained missing values (e.g., arrest rates, incarceration rates) and within these variables very few observations were missing. These missing cases were coded identically as the prior year. For example, if the incarceration rate for Illinois in 2007 was missing, that observation was given the same value as the incarceration rate for Illinois in 2006. Doing so was necessary so that all of the theoretically important variables and all 20 years of data could be used in the analysis. Missing data points would cause the models to not converge given the desired specification.

Measures

The independent variable in this study is recreational use of marijuana legislation and is captured dichotomously (0=no, 1=yes) per each state/year observation. We indicate that the treatment group is Colorado and Washington, separately. The year 2013 is specified as the treatment year since both states passed their legalization legislation late in 2012. While dispensaries may have required some time post-legalization to begin sales of recreational

marijuana, legalization allowed for individual plant growth, possession, and consumption immediately, and law enforcement could no longer arrest such individuals. As such, 2013 is the optimal intervention year to test⁴. Table 1 below shows the states that have legalized recreational marijuana use during the study period and were therefore excluded from the donor pool. The dependent variables used in this analysis were rates for each index crime (excluding rape and arson): murder, robbery, aggravated assault, burglary, larceny/theft, and motor vehicle theft. The crime rate data were downloaded from each state's UCR program website.

Predictor Variables

Several predictor variables that are theoretical relevant and have been identified by prior research (see generally, Kovandzic et al., 2005; Donohue et al., 2019; Lu et al., 2019; Wu et al., 2021) to be important in state-level crime rate research are used in this analysis to create the synthetic states. Crime trends are coded dichotomously and indicated whether crime increased or decreased in a state during a given year (0=decreased, 1=increased). Considering the drug-crime nexus, this variable is theoretically relevant. Law enforcement rates, arrest rates, and incarceration rates are all measured continuously. Criminal Justice system activity is also theoretically relevant to examining the association between marijuana legalization and crime rates. Right-to-Carry laws are measured dichotomously (0=law not present, 1=law present). Gun prevalence is measured by the percentage of individuals who own a firearm in a given state. These two variables account for the gun/crime nexus which could obfuscate the marijuana/crime nexus. Political climate is captured by 1) measuring the percentage of voters who voted for the

⁴ Within-state variation in access to legal marijuana dispensaries does exist. For example, some counties in legal states may not opt to allow dispensary operations. However, people living in these counties may still grow, possess, and use marijuana legally. They may also travel to counties where there are dispensaries to obtain legal marijuana for recreational purposes. The authors argue that states, not counties or cities, are the appropriate unit of analysis to examine given the research question at hand.

Republican candidate during the last presidential election and 2) whether the state's electoral votes went to the Republican candidate (0=no, 1=yes) during the last presidential election. The same value was assigned for all four years in the election cycle. These two⁵ variables are related to the political climate of a state are thought to be indicative of the likelihood of passing recreational marijuana use legislation. Demographic variables are measured continuously and include percentage of the population that is African-American, percentage of households that are female-headed, median income, poverty rate, population density, unemployment rate, alcohol consumption per capita, and percentage of the population ages 19-24. These demographic variables are common controls included in state-level crime rate research. Seven pretreatment years of individual index crime rates were included as predictors in the Colorado and Washington synthetic control models (2000, 2002, 2004, 2006, 2008, 2010, 2012)⁶.

** TABLE 1 ABOUT HERE **

RESULTS

Figure 1 below shows the index crime rate⁷ trends from 2000-2019. The graphs show the National, Colorado, and Washington crime rate trends overlain each other. Both Colorado and Washington had substantially lower rates of murder than the national average for the entire study period. The robbery rate in Colorado was lower than the national average for all years. In the case of Washington, robbery rates were initially lower than the national average then became equivalent to them after 2010. Aggravated assault rates in Colorado and Washington were lower than the national average with the exception of a couple aberrant years in Colorado. Property

⁵ However, we also assume that the RTC and gun prevalence variables are also indicative of political climate.

⁶ Information on donor pool and their weights, pre-treatment RMSPE, post-treatment RMSPE, percent difference between pre- and post-treatment RMSPE, average p-value of post-treatment effects, and predictor balance for each model is found in tables 2-15 in the Appendix. They are omitted from the main text to save space.

⁷ Rape was left out of this analysis due to the change in measurement in 2012.

crime rates in Washington were consistently higher than national averages during the study period. The property crime rates in Colorado were rather similar to national trends, however, some years for larceny/theft and motor vehicle theft rates were higher than the national averages while some years for burglary rates were lower than the national average.

**** FIGURE 1 ABOUT HERE****

Figures 2 through 7 below show the results of the synthetic control models examining the effects of legalizing marijuana on index crime rates in Colorado. The synthetic Colorado murder rate trend and the actual Colorado murder rate trend tracked fairly well throughout the study period without diverging in the post-treatment period (2013-2019) suggesting that legalizing marijuana had no effect on murder rates (pre-treatment RMSPE=.376; post-treatment RMSPE=.177). For robbery rates, synthetic Colorado and actual Colorado trends tracked well in the pretreatment period (pre-treatment RMSPE=4.698; post-treatment RMSPE=13.322). The divergence between these trends began in 2014, however, none of the post treatment year differences were significant at conventional alpha levels. Similarly, aggravated assault rate trends tracked reasonably well until 2017 (pre-treatment RMSPE=12.29; post-treatment RMSPE=26.266). The divergence between the synthetic aggravated assault rate trend and the actual aggravated assault rate trend in Colorado that began 2017 was not statistically significant. None of these models reached an average post-treatment p-value of less than or equal to .05 and none of the placebo tests show an effect that is unusually large in the post-treatment period. Legalizing marijuana had no meaningful impact on violent crime in Colorado.

Turning to property crimes, the synthetic model assessing burglary rates found that the synthetic rate trend and actual rate trend tracked well throughout the entire study period (pre-treatment RMSPE=37.332; post-treatment RMSPE=36.040) suggesting that there was no effect

of marijuana legalization on burglary rates in Colorado. The trends of synthetic larceny/theft rates and actual larceny/theft rates in Colorado tracked well during the pretreatment period and for the first few years in the post treatment period (pre-treatment RMSPE=101.944; post-treatment RMSPE=222.049). A statistically significant difference between the synthetic trend and actual trend was observed for 2018 and 2019 suggesting that the difference was unusually large and had Colorado not legalized marijuana, Colorado would have experienced about 320 fewer thefts per 100,000 people during these years, which would be about a 16% reduction. Confidence in this finding should be tempered as the average p-value in the post-treatment period was .200, and the placebo test shows that the effect was only unusually large at the very end of the post-treatment period. Although it is possible that the effect of marijuana legalization could become manifest 5 years after the fact, it is unlikely that it is the sole cause of the observed divergence. Additionally, this model did not achieve balance⁸ on population density and medical marijuana legislation. For motor vehicle theft, the synthetic trend and actual trend tracked well up until 2011 (pre-treatment RMSPE=28.782; post-treatment RMSPE=116.04). In this case, the divergence between these trends began prior to 2013, the treatment year in the model. The differences between the synthetic motor vehicle theft rates and the actual motor vehicle theft rates were statistically significant in 2017, 2018, and 2019, and the placebo test suggests that the effect could be unusually large these years. It could be possible that marijuana legalization in Colorado caused an increase in motor vehicle theft of about 25-30% beginning in 2017.

However, since the divergence began prior to the treatment year and that the divergence became

⁸ Models that did not achieve balance were re-estimated with the unbalanced variables removed. The findings were not substantively different. As such, it is reasonable that the unbalanced variables did not bias the findings presented here. In the pursuit of reducing omitted variable bias and achieving a more complete model specification, the unbalanced variables were included in the analyses presented in this paper. This approach was applied to all models that did not achieve perfect balance on all predictor variables.

unusually large several years after the treatment, it is not likely. What is more, this model did not achieve balance on population density and medical marijuana legislation. These models indicate that there is a possibility that theft marginally increased as a result of Colorado legalizing marijuana. However, a reasonable conclusion is that the probability of this occurring is quite low.

****FIGURES 2 THROUGH 7 ABOUT HERE****

Figures 8 through 13 below show the findings of synthetic control models testing the effect of marijuana legalization on index crime rates in Washington. The synthetic murder rate trend and the actual murder rate trend in Washington tracked well for the entire study period showing no divergence in the post treatment period (pre-treatment RMSPE=.152; post-treatment RMSPE=.290). For both robbery rates (pre-treatment RMSPE=3.709; post-treatment RMSPE=6.594) and aggravated assault rates (pre-treatment RMSPE=3.185; post-treatment RMSPE=13.293) in Washington, the synthetic trends and actual trends tracked fairly closely throughout the study period. The divergences observed in the post treatment period for both crime types were not statistically significant suggesting a null effect. None of the average post-treatment p-values reached statistical significance and none of the placebo tests show an unusually large effect in the post-treatment period.

The synthetic burglary rate trend and actual burglary rate trend in Washington tracked reasonably well throughout the study period with some divergent years both pre- and post-treatment (RMSPE=51.926; post-treatment RMSPE=60.201). The differences between the synthetic trend and actual trend were significant in 2014 and 2015 ($p > .05$) suggesting that had Washington not legalized marijuana there would have been 96 fewer burglaries per 100,000 residents in 2014 and 99 fewer per 100,000 residents in 2015 (approximately 15% decrease). The

effect in the placebo test could be interpreted as unusually large (at least somewhat) during these two years. The divergence disappeared in 2016 and remained unobserved for the remainder of the study period. The model did not achieve balance on incarceration rate, medical marijuana legislation, population density, and political climate. Additionally, the average p-value for the post-treatment period was .300, suggesting that the average post-treatment effect was null. For larceny/theft, the synthetic model showed a good fit where the synthetic trend and actual trend tracked closely together to entire study period suggesting that legalizing marijuana in Washington did not affect larceny/theft rates (pre-treatment RMSPE=78.18; post-treatment RMSPE=131.99). In contrast, the synthetic motor vehicle theft rate trend did not track the actual motor vehicle rate theft trend that well (pre-treatment RMSPE=57.364; post-treatment RMSPE=115.716). The divergence between trends began in 2009, well before the treatment year. The differences between trends in the post-treatment period were statistically significant for 2013, 2014, 2016, and 2019. However, these differences are unlikely due to Washington legalizing marijuana. Instead, the model may be insufficiently estimating synthetic Washington motor-vehicle theft rates. This model failed to achieve balance on incarceration rate, medical marijuana legislation, population density, and political climate. As such, confidence in the results from this model is unfounded. The results of these models suggest that there may be a short-lived and marginal effect that increased burglaries in Washington after the state legalized marijuana. This may be due to Marijuana dispensaries being cash-based businesses because of federal marijuana legislation thereby making them a suitable target for burglary.

****FIGURES 8 THROUGH 13 ABOUT HERE****

DISCUSSION

This study attempts to extend the literature on marijuana legalization. Of particular relevance are the recent studies by Wu et al. (2021), Lu et al. (2019) and Conneally et al. (2020). Wu et al. (2021) analyzed county level data from 2007-2017 to estimate the effect of marijuana legalization in Oregon using a counterfactual differences-in-differences approach using 19 states that had not legalized marijuana to create a quasi-experimental condition. Lu et al. (2019) analyzed monthly crime rate data from 1999-2016 in Colorado and Washington using a multi-group time series modeling strategy comparing Colorado and Washington crime rates to 21 other states that had not legalized marijuana. Conneally et al. (2020) focused on recreational marijuana dispensaries in Denver by analyzing crime rate variations within street segments immediately adjacent to dispensaries compared to synthetic control street segments from 2014-2016. In contrast, this study uses a different methodological approach than prior research and employs the synthetic control method to analyze state/year panel data covering all 50 states from 2000-2019. This method is an effective tool for state-level policy analysis such as the legalization of marijuana primarily because it allows for causal inference (Abadie, 2021). As demonstrated in this study, synthetic crime trends and actual crime trends can readily be compared in pre- and post-treatment periods which make assessing the effects of the intervention intuitive. The findings from this study generally support the findings prior research, although not all. Synthetic control models found that legalizing marijuana in Colorado and Washington was generally not associated with subsequent index crime variations. However, there may be some possible exceptions. In Colorado, the findings suggest that marijuana legalization was associated with an increase in larceny/theft and motor vehicle theft. In both cases, the increase occurred several years after the treatment, and the effects were rather limited. Also in both cases, the models were

not ideal as balance was not achieved on a few key variables⁹. As such, it is unlikely that marijuana legalization alone was the cause of the increased larceny/theft and motor vehicle theft rates in Colorado.

In Washington, there may have been a short-lived effect of legalizing marijuana on a marginal increase in burglary rates. However, no long-term effects were observed. It is possible that the short-term increase in burglary rates in Washington were real. Since marijuana is federally prohibited, individuals and businesses involved in the marijuana industry operate on a cash basis making them a suitable target for burglary, which may help explain the slight increase in burglary rates immediately after Washington legalized marijuana (Chemerinsky et al., 2015; Contreras, 2017). After experiencing a burglary (both personally and/or vicariously), these individuals and businesses could have taken target hardening steps to reduce the chance of victimization, which helps explain the convergence of the synthetic burglary trend and actual burglary trend in Washington in 2016. In the case of motor vehicle theft in Washington, the findings are not reliable. The synthetic control model produced a poor fit. Additionally, motor vehicle theft, comparatively, is not a crime that is typically associated with marijuana use. As such, it is unlikely that legalizing marijuana in Washington caused an increase in motor vehicle theft. In sum, we conclude that legalizing marijuana for recreational use in Colorado and Washington was not associated with variations in violent crime rates, and that such legislation may have had a marginal but temporary impact that could have increased property crime rates in these states.

⁹ These models were not perfect, but they were still usable since balance was achieved on almost all of the covariates used to create the synthetic trends. It is unlikely that the outcomes of these models would be drastically different had complete balance been achieved. Models that removed unbalanced covariates were not substantively different than models that included the unbalanced covariates. For the sake of pursuing a more complete model specification and reducing omitted variable bias, the unbalanced covariates were included.

As the majority of studies have found little evidence of the negative effects of the legalization of recreational marijuana on public health and safety, continued research, including this paper, is helping to provide context how the perceived detriments of these policy changes do not outweigh the potential benefits. If federal law enforcement and prosecution are indeed weighing “all relevant considerations, including federal law enforcement priorities set by the Attorney General, the seriousness of the crime, the deterrent effect of criminal prosecution, and the cumulative impact of particular crimes on the community” (USDOJ, 2018), the evidence recommends policies surrounding marijuana enforcement be reconsidered.

Marijuana’s classification as a Schedule One drug disallows businesses legitimate federal trade of money earned through legal marijuana transactions, which could perpetuate some of these issues of burglary and/or need for target hardening (Brinkman & Mok-Lamme, 2019; Kepple & Freisthler, 2012). This classification of marijuana also prevents necessary scientific research of this crop for medical purposes, which has clearly been throttled by these federal limitations restricting research to specific sources of marijuana licensed by the NIH (C-SPAN, 2019). This measure also severely hampers the government’s ability to further regulate the marijuana trade by preventing the review of different types of marijuana and the properties associated with cannabis that can be produced and distributed commercially across the US. It is also clear that while the U.S. economy was in distress due to the COVID-19 pandemic and many businesses were forced to lay-off workers or shutter, the marijuana industry bloomed as an essential business, declared by governors and public health officials to remain open in states with legalization policies (Angell, 2020). In fact, the cannabis industry supports over 321,000 full-time jobs and actually added more than 77,000 jobs in 2020 during the pandemic, a 32 percent growth over 2019, and at a time when the broader economy shrank by 3.5 percent (Barcott,

Whitney, and Bailey, 2021). The levels of opportunity to benefit from marijuana from criminal justice, health, social, and greater economic systems' perspectives could be a game-changer for the US, rather than a continued punishment on the entire country over arbitrary and obsolete policies left-over from the ineffective and draconian "War on Drugs". It is vitally important that policymakers review the empirical research surrounding prior decisions regarding marijuana and promote evidence-based reform for the future.

Limitations

There are a few notable limitations in this study. An important variable or combination of variables may be missing from the analysis. In the synthetic control models, it could be the case that the predictors used to create the synthetic Colorado and Washington are absent of some other state level variable(s) that would have improved the fit of the synthetic controls. Also of importance is the limited number of years in the dataset. The dataset include years 2000-2019. However, most of the states that legalized marijuana for recreational use did so towards the end of the study period timeline contained in the dataset used here. Therefore, including other states that have legalized marijuana in this analysis was not achievable.

A few models did not track well in the pre-treatment period thereby lending the comparison between the synthetic state trend and actual state trend difficult to interpret. This may be due to these models being unbalanced on key predictor variables or theoretically relevant omitted variables. Additionally, this study relied on official reported data and assumed they were correct. However, official data often contain flaws. Caution is warranted when interpreting the results found in this study until further research has replicated the findings. Future research should explore possible omitted variables and should include more years of data as they become available to assess the effects of legalizing marijuana use in other states. Lastly, the states studied

here are not representative of the country as a whole and may not be representative of many individual states outside of the intermountain and coastal West.

CONCLUSION

In the past decade, several states have moved away from marijuana prohibition and have allowed their citizens to use marijuana recreationally. This trend began with Colorado and Washington in 2012. Recent research findings examining the effect of marijuana legalization on crime rates have begun to reach consensus. The general consensus so far is that legalizing marijuana is not associated with meaningful or long-term increases in crime and that any criminogenic effect of legalization on property crime may actually be due to federal marijuana prohibition itself. For policymakers and stakeholders, fears of changing marijuana laws because it could increase crime are unfounded. On the other hand, legalizing marijuana for recreational use could be a viable option since it is supported by a broad swath of the population and that doing so could provide net benefits to constituents. For researchers, there is more work to be done. As more data become available, researchers ought to examine the effects of legalizing marijuana for recreational use in states other than Colorado and Washington. It is imperative that research be done on other states since what is true for Colorado and Washington may not be true for other states, and review/replication is necessary for promoting evidence-based policies and practices.

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TABLES

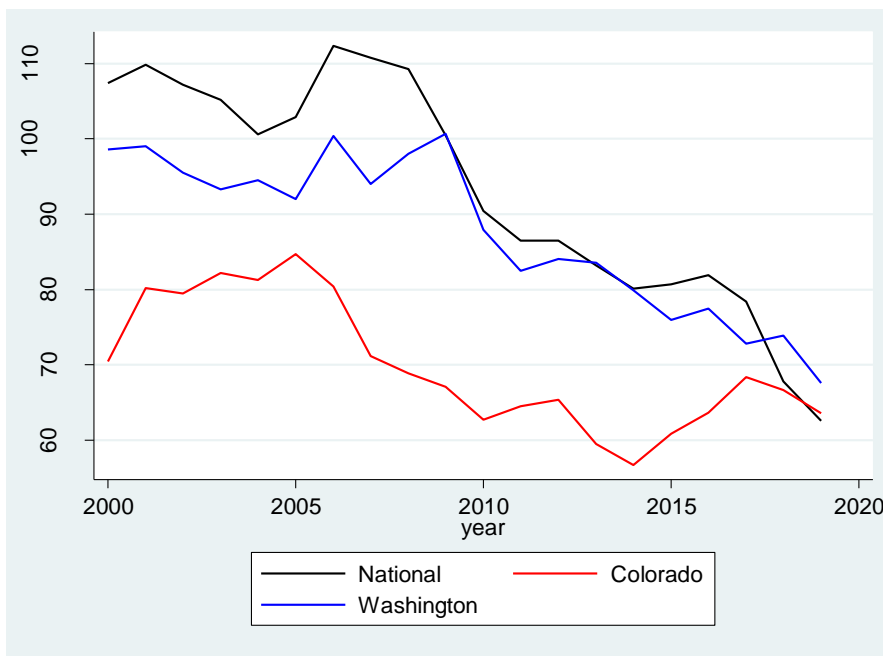
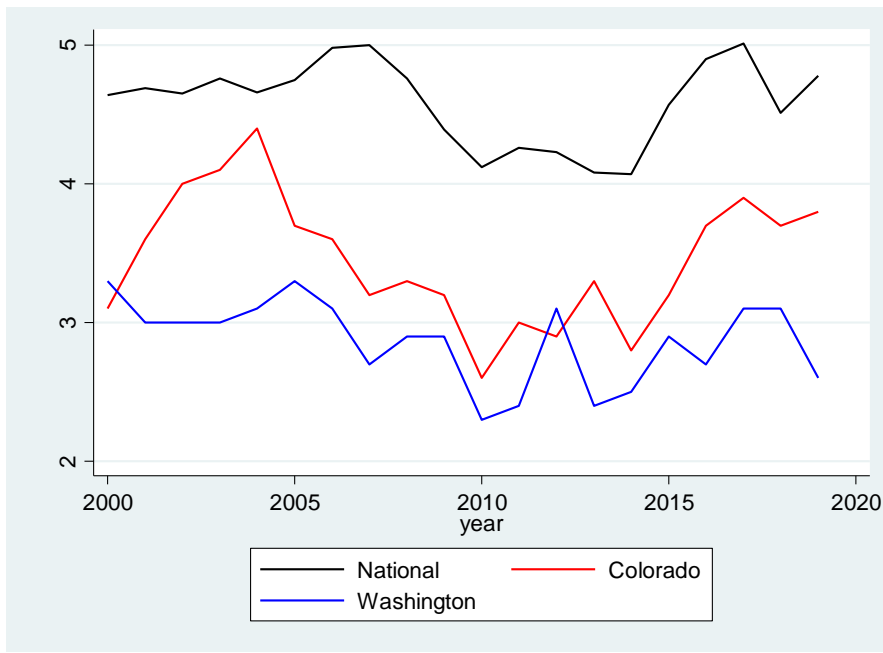
Table 1. State and Year Legalizing Recreational Marijuana During the Study Period

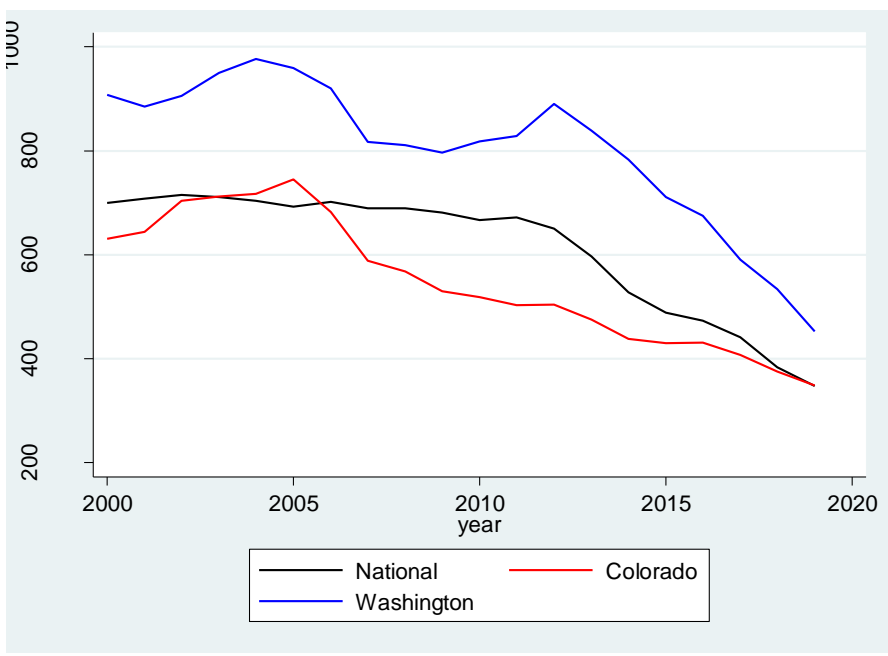
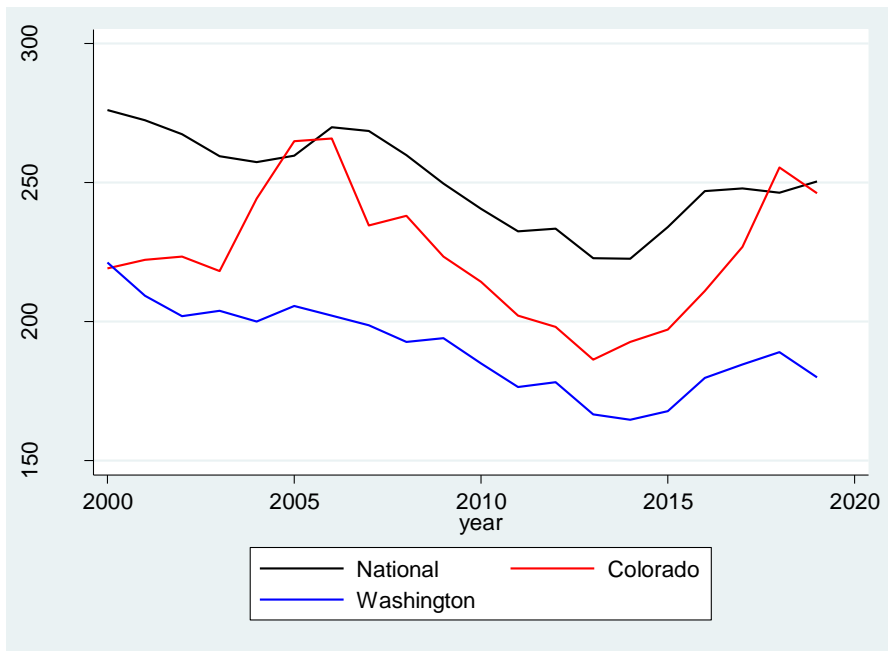
Alaska	2014
California	2016
Colorado	2012
Maine	2016
Massachusetts	2016
Michigan	2018
Nevada	2016
Oregon	2014
Vermont	2018
Washington	2012

Note: Year represents the year states voted to legalize marijuana. In most cases, the legal use of marijuana began the following year.

FIGURES

Figure 1. Index Crime Trends 2000-2019





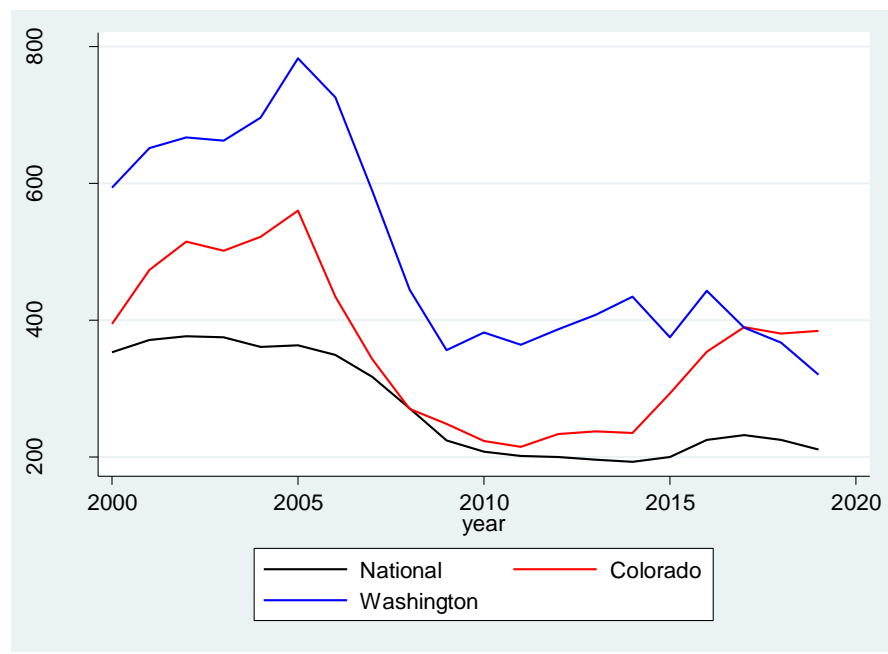
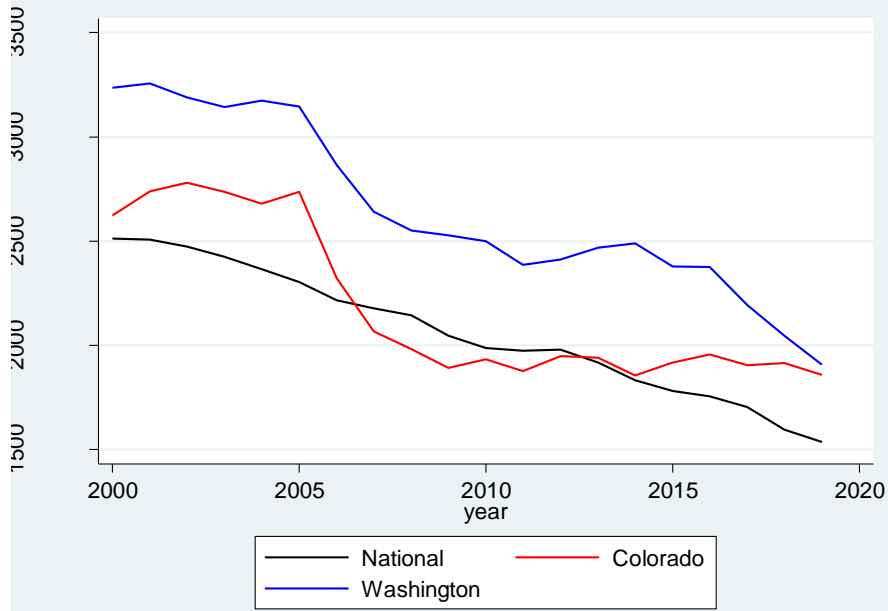


Figure 2. Colorado Murder Rate Synthetic Control Model

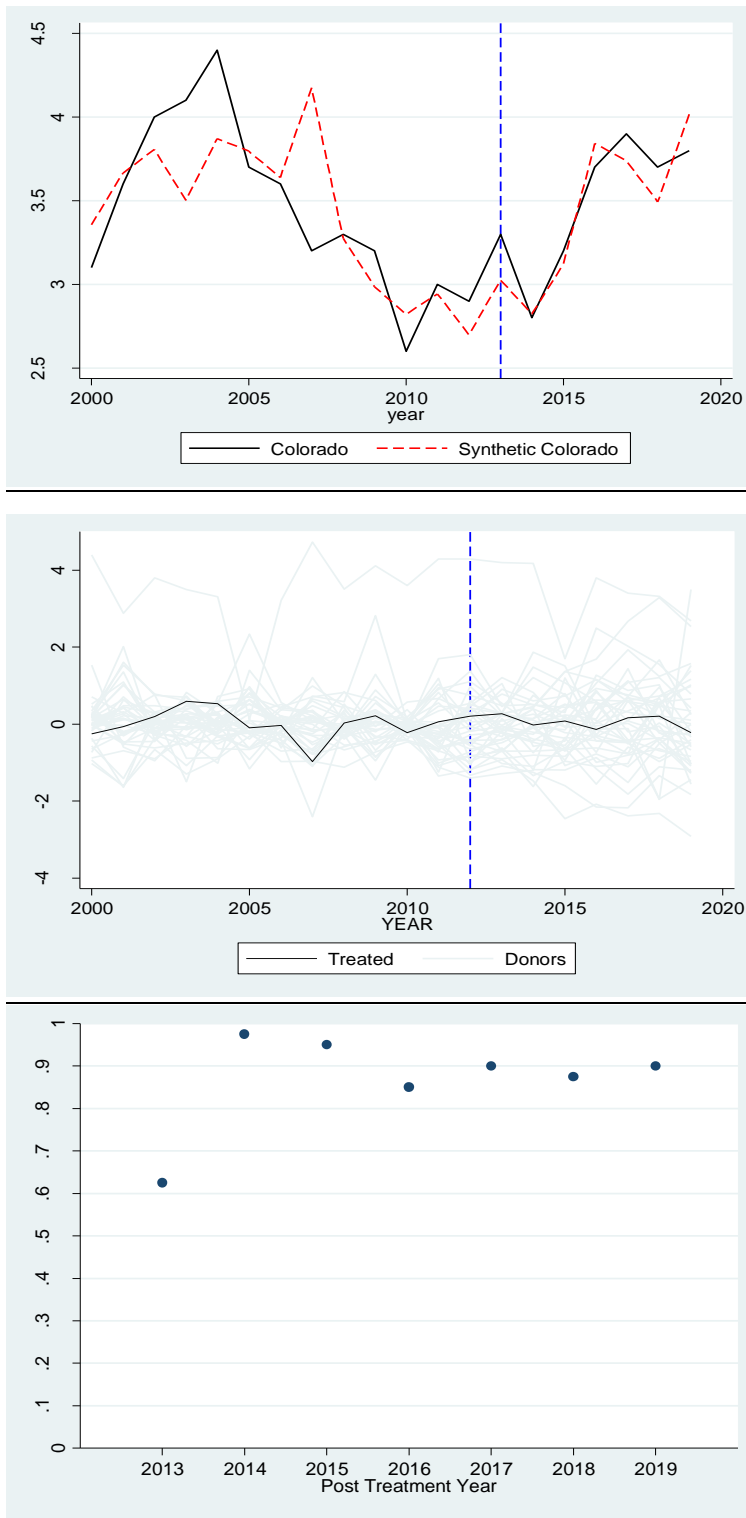


Figure 3. Colorado Robbery Rate Synthetic Control Model

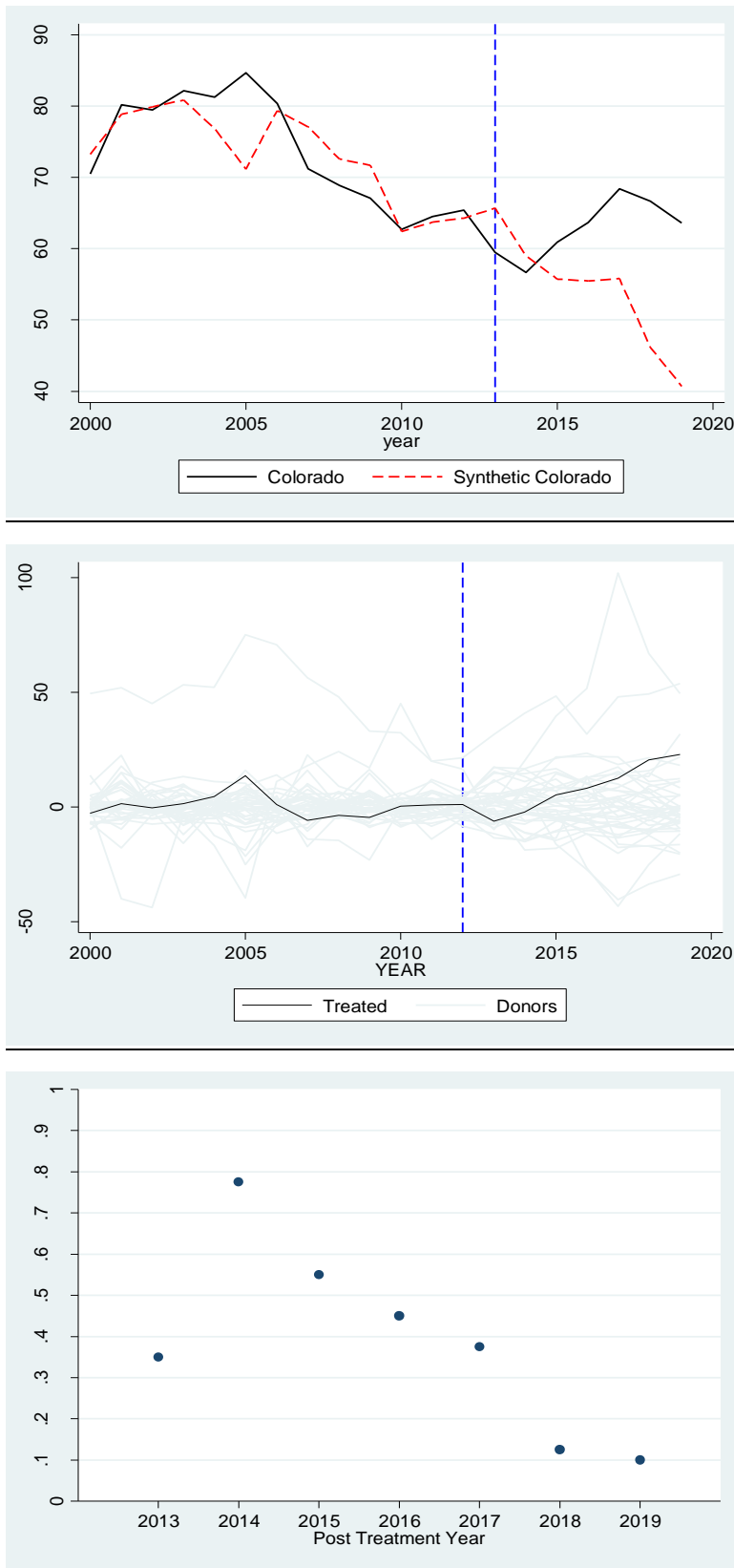


Figure 4. Colorado Aggravated Assault Synthetic Control Model

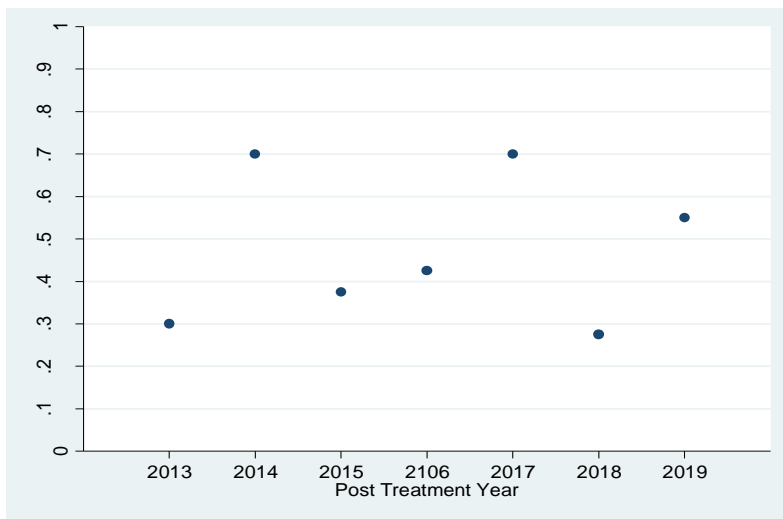
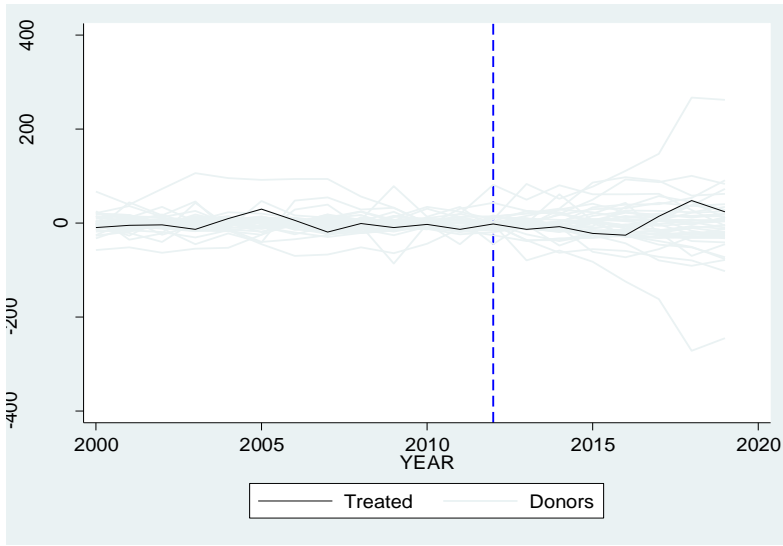
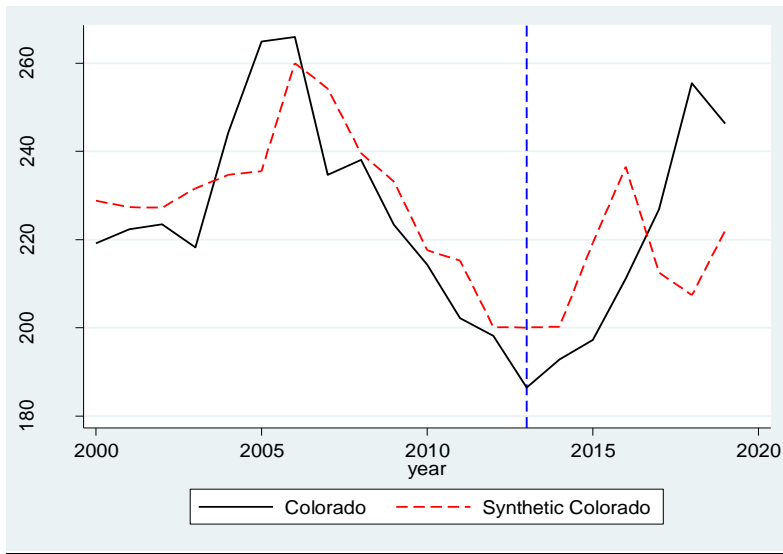


Figure 5. Colorado Burglary Rate Synthetic Control Model

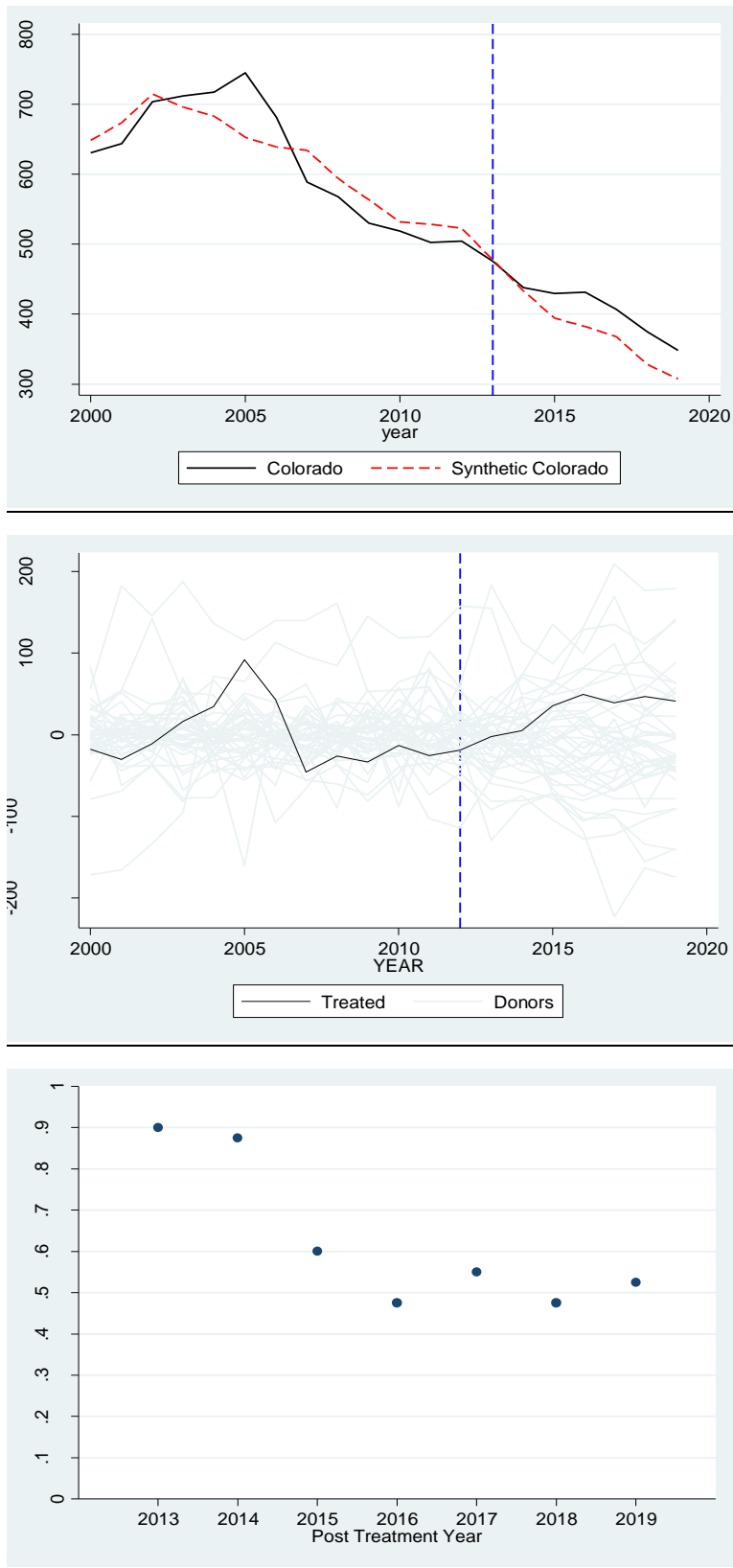


Figure 6. Colorado Larceny/Theft Rate Synthetic Control Model

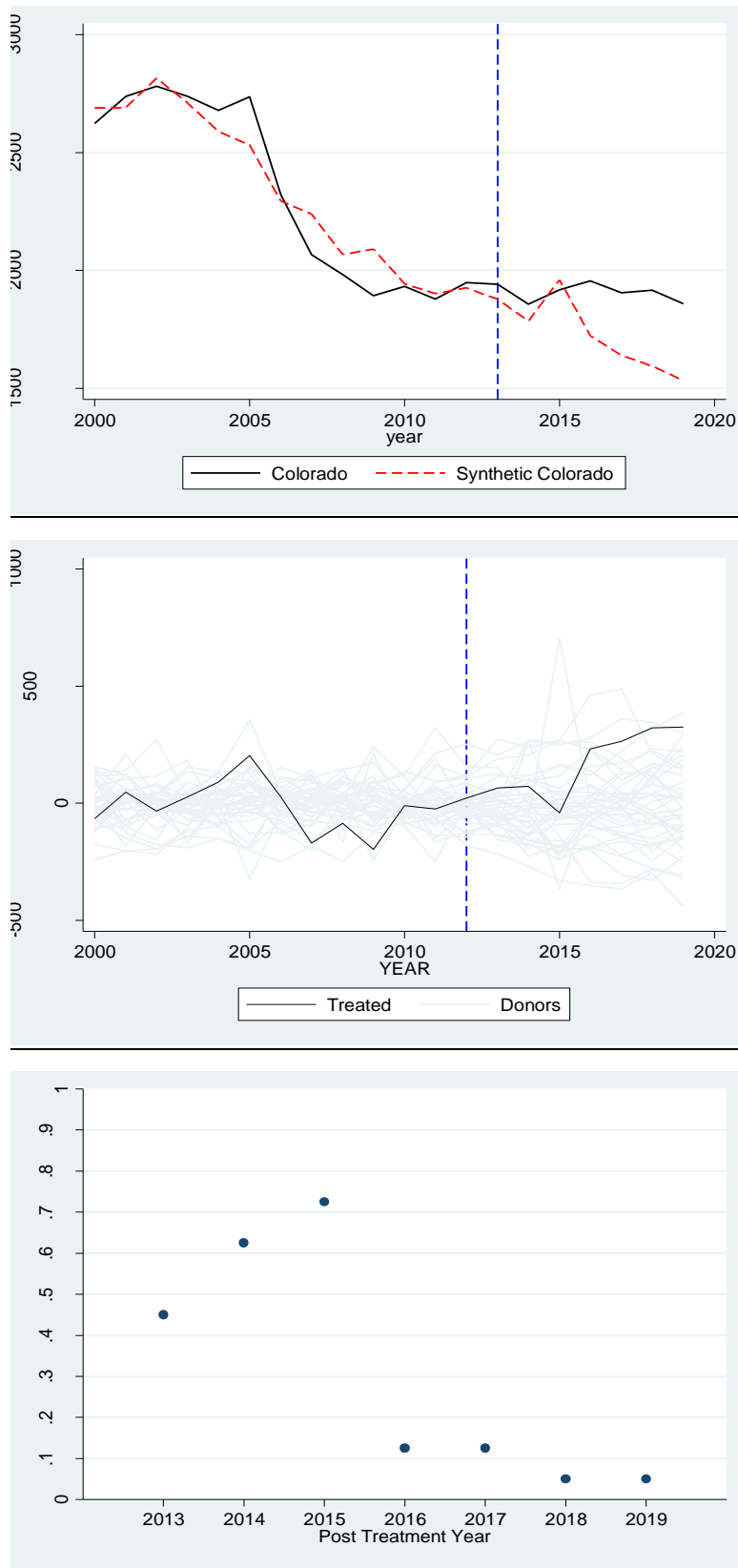


Figure 7. Colorado Motor Vehicle Theft Rate Synthetic Control Model



Figure 8. Washington Murder Rate Synthetic Control Model

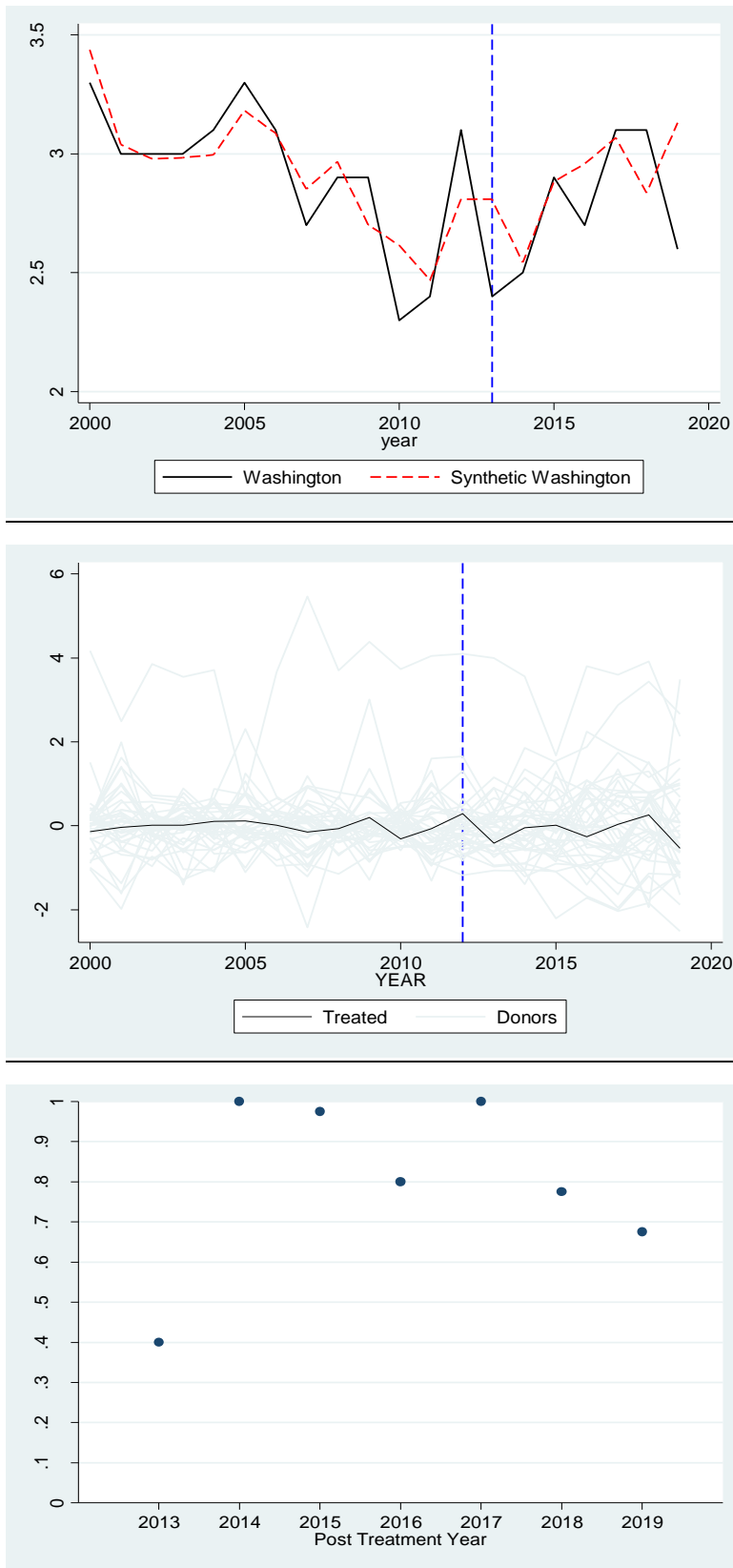


Figure 9. Washington Robbery Rate Synthetic Control Model

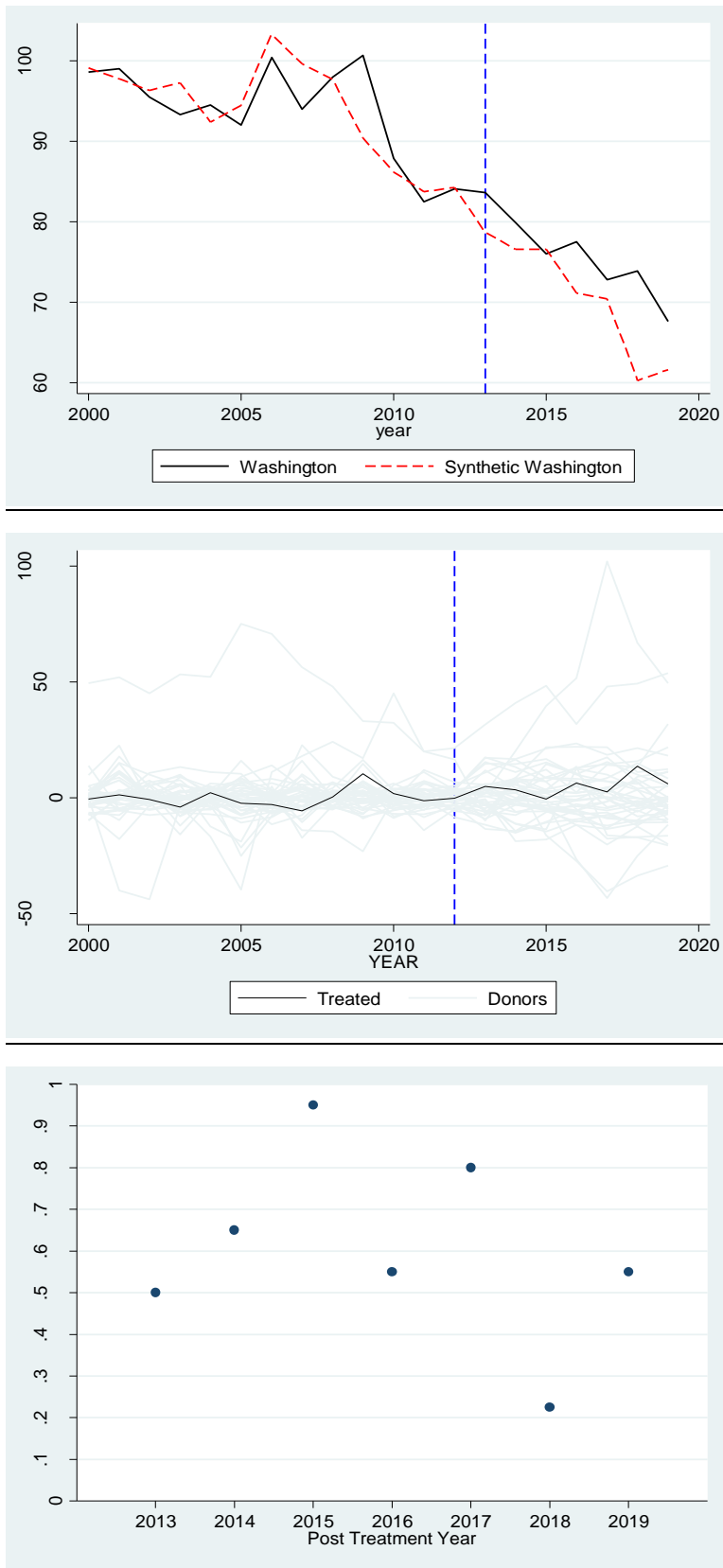


Figure 10. Washington Aggravated Assault Rate Synthetic Control Model

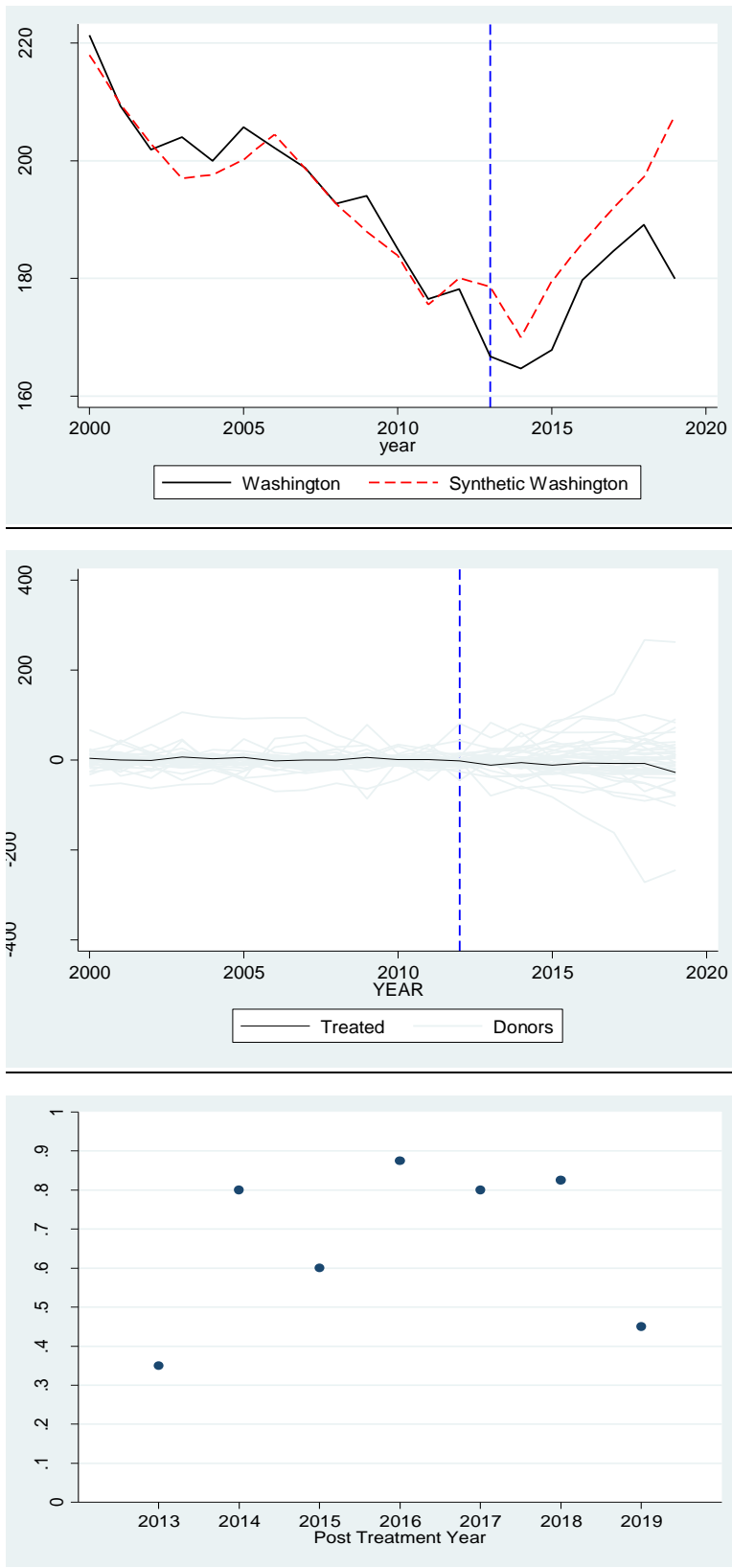


Figure 11. Washington Burglary Rate Synthetic Control Model

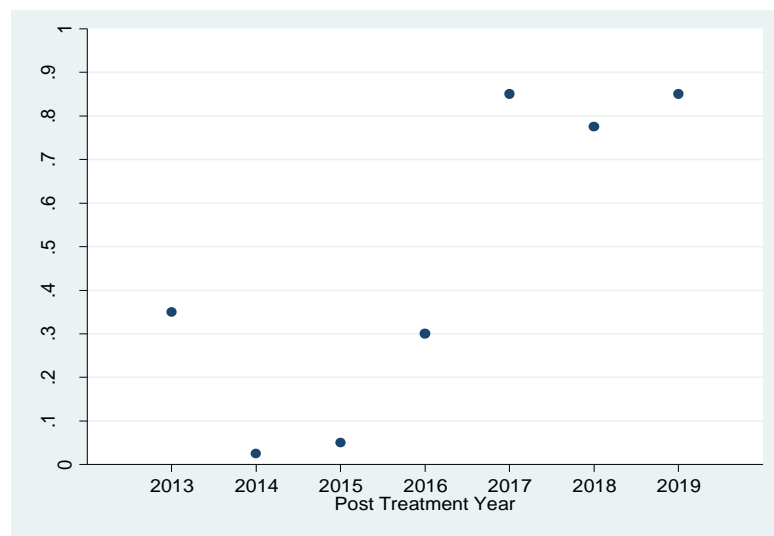
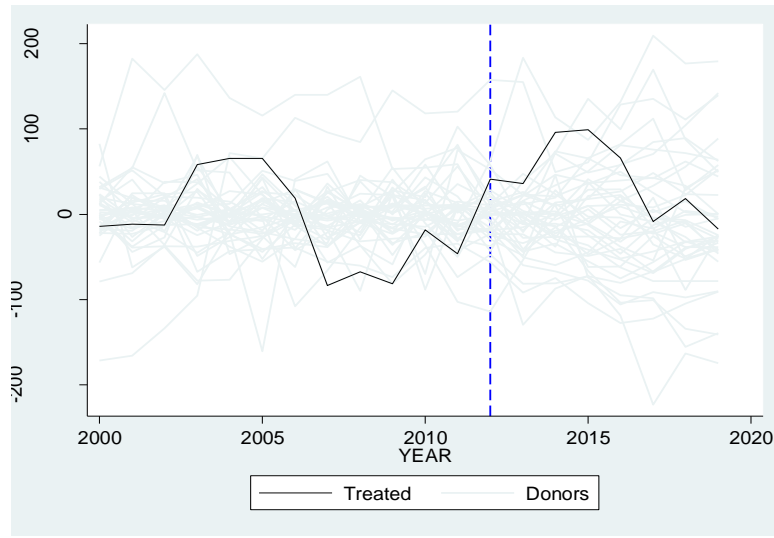
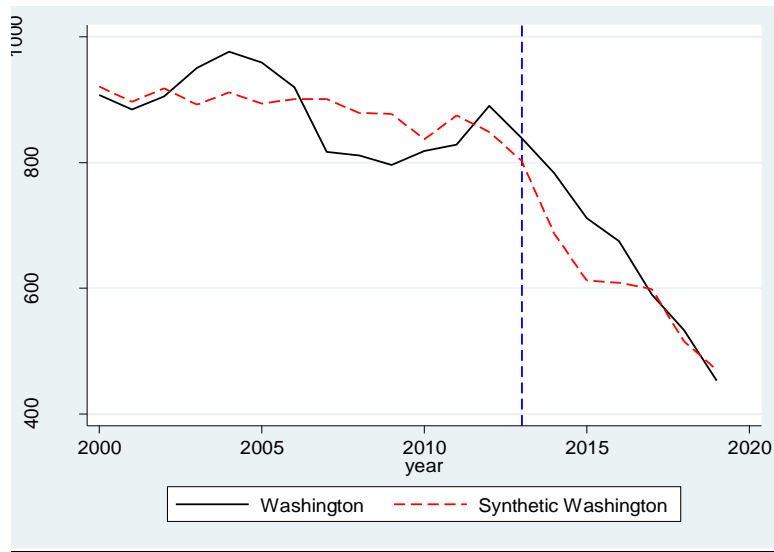


Figure 12. Washington Larceny/Theft Rate Synthetic Control Model

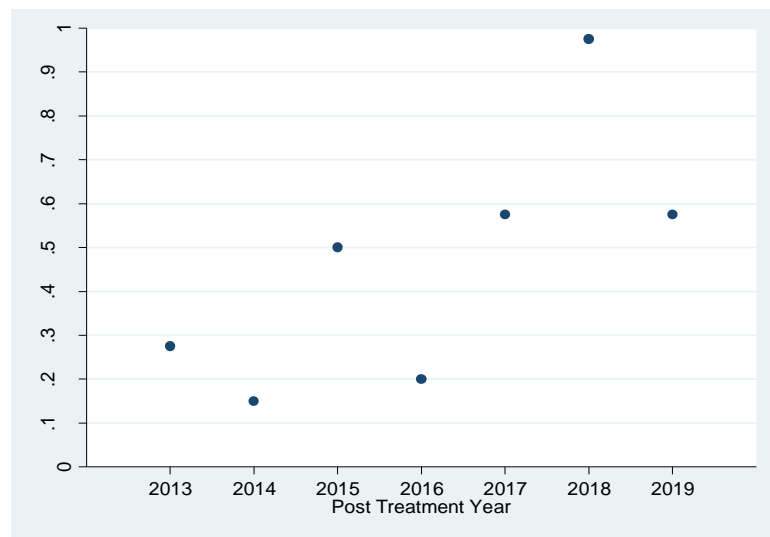
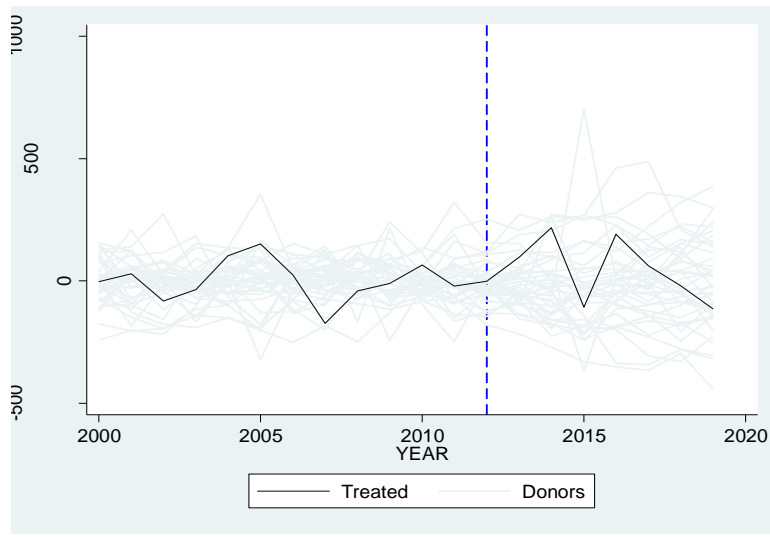
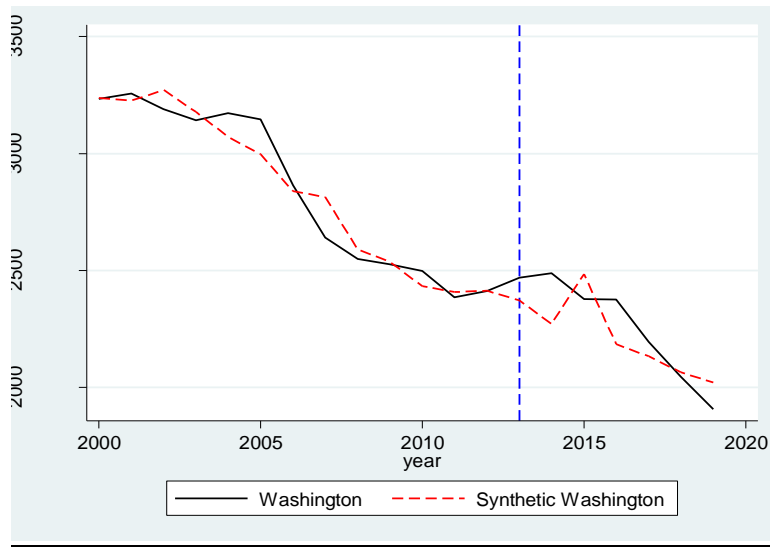
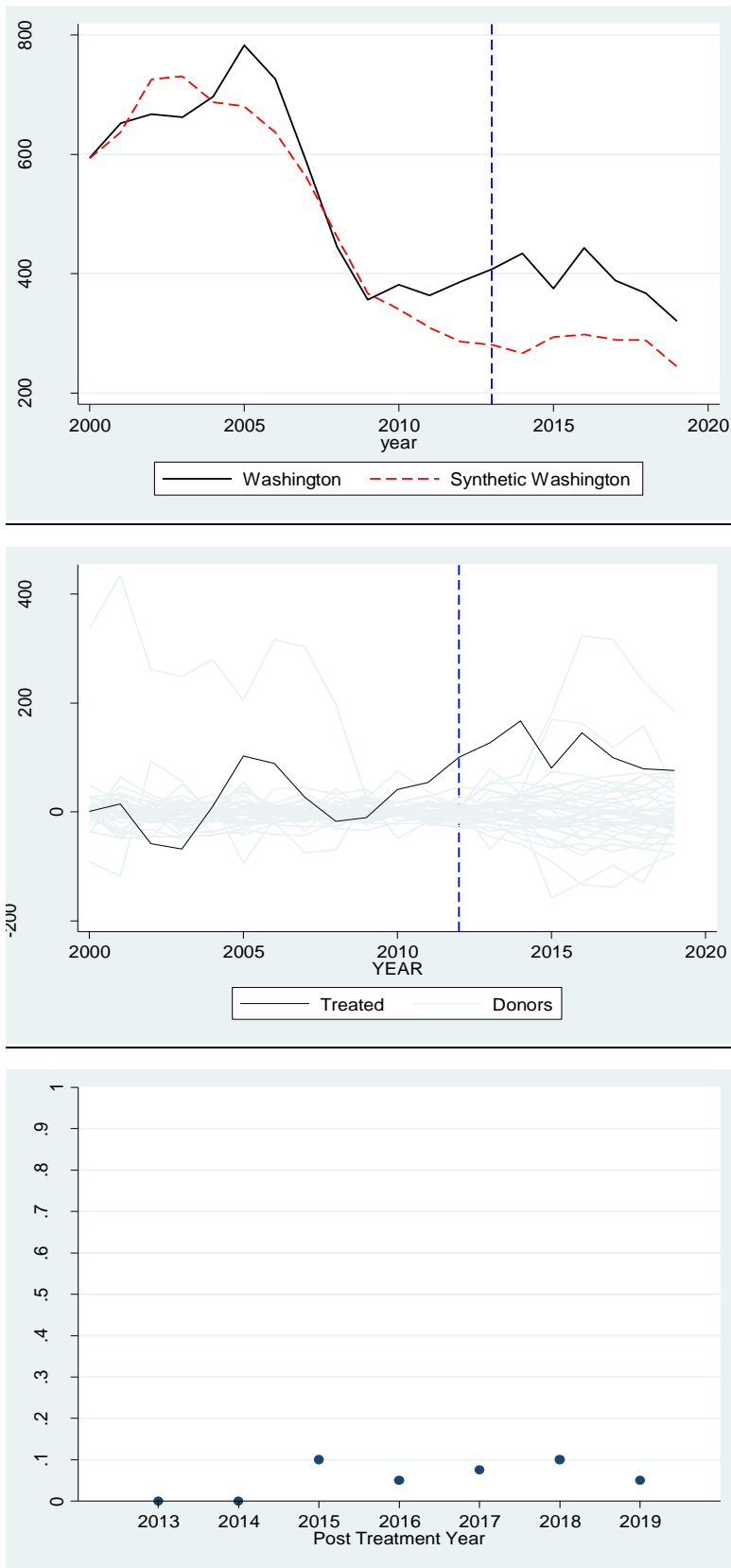


Figure 13. Washington Motor Vehicle Theft Rate Synthetic Control Model



APPENDIX

Table 2. Synthetic Colorado Murder Rate Statistics

Donor States	Weight		Predictor Balance	
			Colorado	Synthetic Colorado
Hawaii	.383	Crime Trend	.385	.455
Idaho	.36	LEO Rate	2.311	2.157
Maryland	.21	Arrest Rate	47.105	42.588
Montana	.007	Incarceration Rate	434.846	389.6
Wyoming	.04	Medical Marijuana	.923	.358
		Shall Issue	.769	.407
Pre-RMSPE	.376	Gun Prevalence	34.3	44.622
Post-RMSPE	.177	Percent Vote Republican	48.815	48.446
Difference	-53%	Electoral Vote Republican	.615	.407
p-value	1.000	% Female Headed House	10.153	12.414
		% African American	3.846	6.789
		Median Income	54.923	52.482
		Poverty Rate	10.738	10.635
		Population Density	45.534	147.148
		Unemployment Rate	5.669	5.103
		% Ages 19-24	7.769	7.756
		Alcohol Consumption	2.81	2.639

Table 3. Synthetic Colorado Rape Rate Statistics

Donor States	Weight		Predictor Balance	
			Colorado	Synthetic Colorado
Hawaii	.131	Crime Trend	.385	.37
Kansas	.022	LEO Rate	2.311	2.018
Nebraska	.133	Arrest Rate	47.105	41.341
New Hampshire	.007	Incarceration Rate	434.846	313.409
New Mexico	.467	Medical Marijuana	.923	.304
Oklahoma	.049	Shall Issue	.769	.682
Rhode Island	.007	Gun Prevalence	34.3	40.219
South Dakota	.051	Percent Vote Republican	48.815	50.932
Utah	.132	Electoral Vote Republican	.615	.532
		% Female Headed House	10.153	11.907
Pre-RMSPE	2.359	% African American	3.846	2.375
Post-RMSPE	7.59	Median Income	54.923	45.367
Difference	222%	Poverty Rate	10.738	14.165
p-value	.375	Population Density	45.534	40.997
		Unemployment Rate	5.669	5.045
		% Ages 19-24	7.769	8.538
		Alcohol Consumption	2.81	2.21

Table 4. Synthetic Colorado Robbery Rate Statistics

Donor States	Weight		Predictor Balance	
			Colorado	Synthetic Colorado
Connecticut	.308	Crime Trend	.385	.462
Hawaii	.002	LEO Rate	2.311	2.101
Minnesota	.029	Arrest Rate	47.105	31.978
Montana	.407	Incarceration Rate	434.846	365.381
New Hampshire	.103	Medical Marijuana	.923	.265
New Jersey	.085	Shall Issue	.769	.906
Texas	.066	Gun Prevalence	34.3	32.353
		Percent Vote Republican	48.815	48.122
Pre-RMSPE	4.698	Electoral Vote Republican	.615	.505
Post-RMSPE	13.322	% Female Headed House	10.153	10.662
Difference	183%	% African American	3.846	5.124
p-value	.25	Median Income	54.923	49.976
		Poverty Rate	10.738	11.114
		Population Density	45.534	304.348
		Unemployment Rate	5.669	5.373
		% Ages 19-24	7.769	7.342
		Alcohol Consumption	2.81	2.95

Table 5. Synthetic Colorado Aggravated Assault Rate Statistics

Donor States	Weight		Predictor Balance	
			Colorado	Synthetic Colorado
Arkansas	.118	Crime Trend	.385	.463
Hawaii	.353	LEO Rate	2.311	2.294
Louisiana	.127	Arrest Rate	47.105	39.729
Minnesota	.16	Incarceration Rate	434.846	430.213
Montana	.01	Medical Marijuana	.923	.332
South Carolina	.032	Shall Issue	.769	.61
Virginia	.056	Gun Prevalence	34.3	45.608
Wyoming	.144	Percent Vote Republican	48.815	47.798
		Electoral Vote Republican	.615	.451
Pre-RMSPE	12.29	% Female Headed House	10.153	12.254
Post-RMSPE	26.266	% African American	3.846	9.344
Difference	113%	Median Income	54.923	49.392
p-value	.400	Poverty Rate	10.738	11.897
		Population Density	45.534	83.918
		Unemployment Rate	5.669	5.109
		% Ages 19-24	7.769	7.844
		Alcohol Consumption	2.81	2.517

Table 6. Synthetic Colorado Burglary Rate Statistics

Donor States	Weight		Predictor Balance	
			Colorado	Synthetic Colorado
Arizona	.207	Crime Trend	.385	.473
Hawaii	.142	LEO Rate	2.311	2.058
Minnesota	.362	Arrest Rate	47.105	45.172
Wyoming	.29	Incarceration Rate	434.846	327.245
		Medical Marijuana	.923	.163
Pre-RMSPE	37.332	Shall Issue	.769	.775
Post-RMSPE	36.040	Gun Prevalence	34.3	41.978
Difference	-3%	Percent Vote Republican	48.815	51.310
p-value	.55	Electoral Vote Republican	.615	.481
		% Female Headed House	10.153	10.333
		% African American	3.846	2.579
		Median Income	54.923	51.1
		Poverty Rate	10.738	10.736
		Population Density	45.534	50.741
		Unemployment Rate	5.669	5.080
		% Ages 19-24	7.769	7.798
		Alcohol Consumption	2.81	2.629

Table 7. Synthetic Colorado Larceny/Theft Rate Statistics

Donor States	Weight		Predictor Balance	
			Colorado	Synthetic Colorado
Connecticut	.156	Crime Trend	.385	.493
Hawaii	.315	LEO Rate	2.311	2.111
Idaho	.168	Arrest Rate	47.105	38.459
Kansas	.004	Incarceration Rate	434.846	420.132
Oklahoma	.192	Medical Marijuana	.923	.291
West Virginia	.086	Shall Issue	.769	.684
Wyoming	.08	Gun Prevalence	34.3	41.44
		Percent Vote Republican	48.815	50.536
Pre-RMSPE	101.944	Electoral Vote Republican	.615	.523
Post-RMSPE	222.049	% Female Headed House	10.153	12.285
Difference	118%	% African American	3.846	3.9
p-value	.200	Median Income	54.923	49.417
		Poverty Rate	10.738	11.601
		Population Density	45.534	156.417
		Unemployment Rate	5.669	5.113
		% Ages 19-24	7.769	7.707
		Alcohol Consumption	2.81	2.435

Table 8. Synthetic Colorado Motor Vehicle Theft Rate Statistics

Donor States	Weight		Predictor Balance	
			Colorado	Synthetic Colorado
Arizona	.15	Crime Trend	.385	.493
Hawaii	.287	LEO Rate	2.311	2.191
Idaho	.319	Arrest Rate	47.105	40.257
Kansas	.144	Incarceration Rate	434.846	402.85
New Jersey	.088	Medical Marijuana	.923	.302
Oklahoma	.013	Shall Issue	.769	.56
		Gun Prevalence	34.3	41.977
Pre-RMSPE	28.782	Percent Vote Republican	48.815	51.805
Post-RMSPE	116.04	Electoral Vote Republican	.615	.614
Difference	303%	% Female Headed House	10.153	12.165
p-value	.05	% African American	3.846	3.27
		Median Income	54.923	49.214
		Poverty Rate	10.738	11.853
		Population Density	45.534	140.456
		Unemployment Rate	5.669	5.486
		% Ages 19-24	7.769	7.838
		Alcohol Consumption	2.81	2.54

Table 9. Synthetic Washington Murder Rate Statistics

Donor States	Weight		Predictor Balance	
			Washington	Synthetic Washington
Hawaii	.149	Crime Trend	.385	.45
Idaho	.01	LEO Rate	1.59	1.892
Illinois	.006	Arrest Rate	33.961	32.62
Kentucky	.025	Incarceration Rate	263.154	247.185
Minnesota	.414	Medical Marijuana	1	.211
Pennsylvania	.13	Shall Issue	1	.613
Rhode Island	.136	Gun Prevalence	27.7	35.053
West Virginia	.13	Percent Vote Republican	43.085	43.84
		Electoral Vote Republican	0	.155
Pre-RMSPE	.152	% Female Headed House	10.077	11.156
Post-RMSPE	.290	% African American	3.292	4.548
Difference	91%	Median Income	52.538	50.624
p-value	.975	Poverty Rate	10.977	10.778
		Population Density	89.435	210.523
		Unemployment Rate	6.915	5.579
		% Ages 19-24	7.769	7.691
		Alcohol Consumption	2.26	2.516

Table 10. Synthetic Washington Rape Rate Statistics

Donor States	Weight		Predictor Balance	
			Washington	Synthetic Washington
Arkansas	.016	Crime Trend	.385	.395
Delaware	.221	LEO Rate	1.59	2.038
Hawaii	.091	Arrest Rate	33.961	39.086
Idaho	.037	Incarceration Rate	263.154	306.282
Minnesota	.337	Medical Marijuana	1	.206
New Mexico	.274	Shall Issue	1	.548
Utah	.025	Gun Prevalence	27.7	35.123
		Percent Vote Republican	43.085	45.039
Pre-RMSPE	1.741	Electoral Vote Republican	0	.161
Post-RMSPE	6.911	% Female Headed House	10.077	11.803
Difference	297%	% African American	3.292	6.648
p-value	.400	Median Income	52.538	49.61
		Poverty Rate	10.977	11.971
		Population Density	89.435	113.369
		Unemployment Rate	6.915	5.286
		% Ages 19-24	7.769	7.951
		Alcohol Consumption	2.26	2.787

Table 11. Synthetic Washington Robbery Rate Statistics

Donor States	Weight		Predictor Balance	
			Washington	Synthetic Washington
Hawaii	.274	Crime Trend	.385	.432
Indiana	.002	LEO Rate	1.59	2.012
Kentucky	.069	Arrest Rate	33.961	33.569
Montana	.032	Incarceration Rate	263.154	313.541
New Hampshire	.126	Medical Marijuana	1	.329
New Mexico	.013	Shall Issue	1	.629
Oklahoma	.008	Gun Prevalence	27.7	30.866
Pennsylvania	.332	Percent Vote Republican	43.085	44.463
Rhode Island	.095	Electoral Vote Republican	0	.203
Utah	.05	% Female Headed House	10.077	12.071
		% African American	3.292	5.083
Pre-RMSPE	3.709	Median Income	52.538	50.742
Post-RMSPE	6.594	Poverty Rate	10.977	10.811
Difference	78%	Population Density	89.435	233.235
p-value	.65	Unemployment Rate	6.915	5.444
		% Ages 19-24	7.769	7.709
		Alcohol Consumption	2.26	2.7

Table 12. Synthetic Washington Aggravated Assault Rate Statistics

Donor States	Weight		Predictor Balance	
			Washington	Synthetic Washington
Indiana	.032	Crime Trend	.385	.44
Minnesota	.554	LEO Rate	1.59	1.828
Mississippi	.063	Arrest Rate	33.961	35.539
New Mexico	.119	Incarceration Rate	263.154	242.58
Pennsylvania	.042	Medical Marijuana	1	.135
Rhode Island	.166	Shall Issue	1	.678
West Virginia	.023	Gun Prevalence	27.7	33.396
		Percent Vote Republican	43.085	44.573
Pre-RMSPE	3.185	Electoral Vote Republican	0	.143
Post-RMSPE	13.293	% Female Headed House	10.077	11.072
Difference	317%	% African American	3.292	6.254
p-value	.875	Median Income	52.538	50.1
		Poverty Rate	10.977	11.311
		Population Density	89.435	202.414
		Unemployment Rate	6.915	5.729
		% Ages 19-24	7.769	7.826
		Alcohol Consumption	2.26	2.581

Table 13. Synthetic Washington Burglary Rate Statistics

Donor States	Weight		Predictor Balance	
			Washington	Synthetic Washington
Arizona	.342	Crime Trend	.385	.454
Arkansas	.14	LEO Rate	1.59	1.977
Hawaii	.025	Arrest Rate	33.961	43.757
New Hampshire	.18	Incarceration Rate	263.154	397.762
New Mexico	.314	Medical Marijuana	1	.196
		Shall Issue	1	.904
Pre-RMSPE	51.926	Gun Prevalence	27.7	38.541
Post-RMSPE	60.201	Percent Vote Republican	43.085	49.197
Difference	16%	Electoral Vote Republican	0	.6
p-value	.300	% Female Headed House	10.077	11.791
		% African American	3.292	4.125
		Median Income	52.538	45.175
		Poverty Rate	10.977	14.892
		Population Density	89.435	58.143
		Unemployment Rate	6.915	5.724
		% Ages 19-24	7.769	7.735
		Alcohol Consumption	2.26	2.677

Table 14. Synthetic Washington Larceny/Theft Rate Statistics

Donor States	Weight		Predictor Balance	
			Washington	Synthetic Washington
Delaware	.102	Crime Trend	.385	.397
Hawaii	.387	LEO Rate	1.59	2.34
Kansas	.129	Arrest Rate	33.961	32.563
South Carolina	.382	Incarceration Rate	263.154	405.836
		Medical Marijuana	1	.365
Pre-RMSPE	78.18	Shall Issue	1	.451
Post-RMSPE	131.999	Gun Prevalence	27.7	39.099
Difference	69%	Percent Vote Republican	43.085	47.001
p-value	.45	Electoral Vote Republican	0	.511
		% Female Headed House	10.077	13.946
		% African American	3.292	14.558
		Median Income	52.538	48.097
		Poverty Rate	10.977	12.149
		Population Density	89.435	137.562
		Unemployment Rate	6.915	5.816
		% Ages 19-24	7.769	7.829
		Alcohol Consumption	2.26	2.493

Table 15. Synthetic Washington Motor Vehicle Theft Rate Statistics

Donor States	Weight		Predictor Balance	
			Washington	Synthetic Washington
Arizona	.303	Crime Trend	.385	.383
Georgia	.43	LEO Rate	1.59	2.258
Hawaii	.267	Arrest Rate	33.961	37.322
		Incarceration Rate	263.154	484.29
Pre-RMSPE	57.364	Medical Marijuana	1	.293
Post-RMSPE	115.716	Shall Issue	1	.733
Difference	102%	Gun Prevalence	27.7	35.417
p-value	.05	Percent Vote Republican	43.085	48.903
		Electoral Vote Republican	0	.71
		% Female Headed House	10.077	12.835
		% African American	3.292	13.98
		Median Income	52.538	47.81
		Poverty Rate	10.977	13.894
		Population Density	89.435	113.479
		Unemployment Rate	6.915	5.896
		% Ages 19-24	7.769	7.813
		Alcohol Consumption	2.26	2.236