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Effects of the Alabama HB 56 Immigration Law on Crime: A Synthetic
Control Approach

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Effects of the Alabama HB 56 Immigration Law on Crime: A Synthetic Control Approach

Abstract

The act of Alabama HB 56, passed in 2011 is considered to be the strictest anti-illegal immigration bill in the United States. This paper evaluates the impact of this policy on crime, by using the synthetic control method to create a counterfactual Alabama. The results provide suggestive evidence of heterogeneous causal effects of Alabama HB 56 on crime. Compared to the synthetic group, the violent crime rate increased as a response to Alabama HB 56, while there was no significant change in property crime rate after the act. A placebo test was also performed to demonstrate the robustness of the results.

Keywords: anti-illegal immigrant law, Alabama, crime, synthetic control

JEL: J15, J61, K37

1. Introduction

Over the last decade, illegal immigration has received considerable attention from state governments. In 2007, Arizona passed the Legal Arizona Workers Act (LAWA), which was followed in 2010 by SB 1070; the harshest U.S. act against undocumented immigrants at the time. One year later Alabama enacted the Beason-Hammon Alabama Taxpayer and Citizen Protection Act (Alabama HB 56), which is now considered the nation's strictest anti-illegal immigration bill (Fausset 2011). Both legislative acts were enacted to restrict the enrollment of undocumented immigrants in schooling and in the job market. The consequences of these anti-illegal immigration acts have received much attention from governments and researchers. For example, despite the growing interest in the relationship between illegal immigration and crime environment, the evaluation of the

causal effect of those policies is subject to debate. While evidence of positive relationship between immigration and crime has been found in some recent studies, such as Spenkuch (2013), a major vast literature provides suggestive evidence that immigrant legalization has contributed to the decline of crime (Baker 2015, Mastrobuoni and Pinotti 2015, Pinotti 2014). Meanwhile, some previous studies suggest that immigration has no effect on crime (Butcher and Piehl 1998, Chalfin 2014).

This paper evaluates the impact of Alabama HB 56 on crime using the synthetic control approach, which was first employed by Abadie and Gardeazabal (2003) to estimate the consequences of the conflict in Basque, Spain. They constructed a synthetic ‘Basque’ using a weighted average of other provinces in Spain according to similarities in economic and demographic indicators. Following their approach, we create a counterfactual synthetic Alabama based on crime reports, economic indicators, and demographic characteristic during the period 1998-2014. The results provide suggestive evidence of heterogeneous causal effects of Alabama HB 56 on crime. Compared with the synthetic counterpart, Alabama HB 56 contributed to an increase in violent crime rates, while there was no significant change in property crime rates after the act.

Our study is motivated by a recent interest in the literature to evaluate anti-illegal immigrant laws. For instance, using a synthetic control method, Bohn, Lofstrom, and Raphael (2014) find that the 2007 Legal Arizona Workers Act substantially reduced the proportion of undocumented immigrants in the population of Arizona. Hoekstra and Orozco-Aleman (2014) examined the effect of Arizona SB 1070 on the undocumented immigrants’ individual decisions regarding their migration destination. Their results show that the passage of the bill significantly reduced unauthorized immigration to Arizona by

70%. Our study focuses on the causal effect of Alabama HB 56 on crime, rather than the direct effect on the proportion of unlawfully present immigrants.

Bell, Fasani, and Machin (2013) conducted a similar study where they examined the relationship between crime and immigration in the UK during the 1990s and 2000s. They found that preventing asylum seekers from finding jobs resulted in increases in property crime, but had no impact on violent crime. We use a different estimation framework and focus on the evaluation of the treatment effect of anti-illegal immigrant laws on crime in Alabama. In contrast to their finding, Alabama HB 56 increased violent crime but had no impact on property crime.

Our results can be linked to literature after Becker (1968), who modeled criminal behavior from a rational decision analysis based on the benefits and opportunity costs. In general, unemployment status decreases the opportunity cost of criminal behavior. Fleisher (1966) and Ehrlich (1973) documented the significant causal effect of unemployment on criminal activities in the US. Since the Alabama HB restricts undocumented immigrants from taking job positions, it is expected to increase criminal activities. However, there is also literature suggesting that increasing police force can reduce crime (Di Tella and Schargrofsky 2004, Levitt 1997). According to this view, the increase in immigration police force due to Alabama HB 56 may reduce crime. In spite of the contradictory predictions, our results support the former; the anti-immigrant law is more likely to increase violent crime.

The rest of this paper proceeds as follow. Section 2 introduces the institutional background of Alabama HB 56. Section 3 describes the methodology and data. Section 4 presents the results of the synthetic control method followed by a brief discussion of policy

implications and conclusion in section 5.

2. Institutional Background

Alabama HB 56 bill was passed in June 2011. It is regarded as the strictest anti-illegal immigration law in the US. The bill imposes extreme restrictions on undocumented immigrants in Alabama and limits every aspect of their lives. It requires every public elementary and secondary school to determine whether students were born outside of the US or if their parents are undocumented. The bill also makes it a felony for an undocumented immigrant to “enter into any business transaction with a government agency”, including applying for a driver’s license, business license or identification card. It also prohibits signing rental agreements or providing housing accommodations for undocumented immigrants. Like other immigration acts, Alabama HB 56 also requires “every business entity or employer in the state to enroll in E-Verify”, the federal government’s online database used to check the employment eligibility of its employees.¹ As a consequence, a significant portion of job positions are no longer available for undocumented immigrants. Further, it requires all law enforcement officers in Alabama to verify the immigration status of persons stopped or detained, if they have “reasonable suspicion” of this person being unlawfully present.

This act also creates new immigration-related laws which include forbidding every citizen and legal resident from “transporting” or “harboring” unlawful aliens with knowledge of their migration status beforehand. It authorizes the State Homeland Security Department to hire law enforcement officers to fulfill special needs of “carrying out the

¹ Preliminary Analysis of 56 “Alabama Taxpayer and Citizen Protection Act. Retrieved from https://www.aclu.org/files/assets/prelimanalysis_alabama_HB_56_0.pdf

enforcement of this act”.² To enforce this policy, section 22 created a new state immigration police force, supplanting federal Immigration and Customs Enforcement.

Ever since it was enacted in the mid-2011 significant attention has been given to this bill. Various media outlets highlighted potential unconstitutional aspects of the act. Moreover, the U.S. Department of Justice in conjunction with a coalition of civil right groups filed lawsuits to the Supreme Court against it. At the end of 2013, a settlement was made between the plaintiff and the state government. Some sections of the bill were blocked permanently, including that officers cannot stop anyone “for the purpose of ascertaining that person’s immigration status or because of a belief that the person lacks lawful immigration status.” However, some provisions such as preventing illegal immigrants from obtaining a business license or enrolling at college as well as E-verify are still in effect.³

3. Data Description and Methodology

To explore the relationship between the passage of the bill and any potential effects on crime, we incorporated several data sources at the individual and state levels.

Our outcome variables of interest are violent and property crime rates. We extracted these two measurements at the state level from the FBI’s Uniform Crime Reporting (UCR) statistics from 1998 to 2014. Table 1 present an excerpt of crime changes for every 100,000 residents in Alabama. On an aggregate level, both violent and property crime show a declining trend from 2008 to 2014. There is an obvious fluctuation around 2010 and 2011, when both kinds of crime dropped, first in 2010 and then rose again in 2011. This rising

² Summary of HB 56 as Amended by HB 658. Retrieved from <http://www.fairus.org/DocServer/HB56SummaryAmended.pdf>

³ Alabama’s HB 56 Anti-Immigrant Law Takes Final Gasps. Retrieved from <http://immigrationimpact.com/2013/10/30/alabamas-hb-56-anti-immigrant-law-takes-final-gasps/>

pattern continues in 2012 for violent crime and then stops in 2013. While for aggregate level property crime, it decreases constantly following its one time jump in 2011.

Table 1 : Trends of Crime Cases Breakdown Per 100,000 population

Series	2008	2009	2010	2011	2012	2013	2014
Violent Crime Total:	452.8	450.1	383.7	419.8	449.9	430.8	427.4
Robbery	157.6	133.1	101.6	102.1	104.1	96.2	96.9
Aggravate Assault	253	278.3	248	282.9	311.8	285.2	283.4
Other Violent Crime	42.2	38.7	34	34.7	34	36.7	35.3
Property Crime Total:	4084.5	3780.4	3528	3605.4	3502.2	3351.3	3177.6
Burglary	1081.3	1037.3	887.8	1064.2	984.7	877.8	819
Larceny Theft	2714.3	2507.5	2414.9	2319.3	2312.8	2254.8	2149.5
Motor Vehicle Theft	288.9	235.5	225.3	222	204.8	218.7	209.1

Sources: The authors calculate by UCR Statistics from 2008 to 2014.

To evaluate the potential treatment effect of HB 56, one needs to find a reasonable counterfactual for Alabama. This can be accomplished either by finding a state that has similar economic and population characteristics with Alabama (i.e., states bordering with it), or by employing a data-driven approach to construct a synthetic Alabama, which is a weighted average over all control states. This paper employs the synthetic control method in addressing the problem.

The following analysis is based on the synthetic control method (SCM) (Abadie and Gardeazabal 2003, Abadie, Diamond, and Hainmueller 2010). Let J be the number of states, $j = 1$ is the treated state, Alabama. The rest of the states from $j = 2, \dots, J$ would be the potential control alternatives composing a “donor pool”, in order to build a synthetic Alabama.

Define Y_{jt}^C as the outcome of unit j at time t in control group, Y_{jt}^T the outcome of unit j at time t in treatment group, $t = T_0$ the pre-intervention period and $t = T_1$ the post intervention period. The general model is $Y_{jt} = Y_{jt}^C + \beta_{jt}D_{jt}$, where Y_{jt} is the observed outcome, $D_{jt} = 1$, if unit is treated, otherwise $D_{jt} = 0$.

Accordingly, $Y_{1t} = Y_{1t}^C + \beta_{1t} = Y_{1t}^T$ at $t = T_1$, $Y_{1t} = Y_{1t}^C$ at $t = T_0$. $\beta_{1t} = Y_{1t}^T - Y_{1t}^C$ provides the measurement for the treatment effect. To build Y_{1t}^C at $t = T_1$, a counterfactual unit was constructed. Let $W = \{w_1, w_2, \dots, w_{J-1}\}$ be the $(J - 1) * 1$ vector of weights, with $w_j > 0$ and $w_1 + w_2 + \dots + w_{J-1} = 1$. We solve the minimization problem under the summation condition above at $t = T_0$

$$\operatorname{argmin}_W (Y_{1t}^T - Y_t^C W)' (Y_{1t}^T - Y_t^C W) \quad (1)$$

The solution will be W^* , that is $Y_{1t}^C = Y_t^C W^*$, where Y_t^C is the $J - 1$ vector of outcome variables measured in $J - 1$ states. After applying W^* to the post intervention, we have $Y_{1t}^C = Y_t^C W$ at $t = T_1$, the treatment effect can be calculated accordingly.

Next, we document how to define the variables that are used to construct the synthetic Alabama. The literature on crime behavior focuses mainly on cost and benefit analysis. To proxy the risk of being arrested and punished, we use both police presence and bivariate capital sentence legality in predicting the violent crime model; and police presence in the property crime model. We combine the state level police labor force data from 1998 to 2014 from the Bureau of Labor Statistics (BLS) and calculate *per capita* statistics.⁴ We use death penalty legality for the same period as a control variable in the violent crime model.

Fajnzylber, Lederman, and Loayza (2002) analyzed the impact of illicit drug use on crime behavior. They also investigated how religious preferences and church attendance account for cultural characteristics. We follow their line of reasoning in this paper, adding these variables into both violent and property crime models. Limited by the availability of

⁴ Detectives and Criminal Investigator, Police and Sheriff's Patrol Officers and Security Guards are considered as the three key indicators for police presence.

drug abuse data, we used the admission cases of primary substance use as covariates. Alcohol and Marijuana use per 100,000 habitants were accessed from the Substance Abuse and Mental Health Services Administration's website.

Gallup's polling data for practicing religion from 2006 to 2014 are also included as a potential deterrent force for crime. Since the population of most states is predominantly Christian, we use the percentage of Christians as control for religion. Church attendance, "at least once a week" as well as percentage of population which considers religion as "an important part of daily life" are also added into the models.

There is substantial evidence documenting how income inequality contributes to crime behavior, in particular violent crimes (Bailey 1984, Blau and Blau (1982)). Thus, the state level Gini index in the American Community Survey (ACS) from 2006 to 2014, and individual level unemployment status in the Current Population Survey (CPS) from 1998 to 2014 are considered in the models. Specifically, we collapse CPS individual level data and create the variable of unemployment rate at the state-year level.

To capture the heterogeneity in labor force across different industries and states, we controlled for the labor force percentages of five occupations with a large proportion of undocumented immigrants⁵, including 1) service, 2) farming, fishing and forestry, 3) construction and extraction, 4) production, and 5) transportation and material moving occupations. We also include weekly wages in three industries, including construction, landscaping, and accommodation services in our property crime model. Weekly average salary data can be found at BLS's database, and labor force percentage is found in CPS

⁵ According to Pew report, these occupations are the top five with the highest share of unauthorized immigrants labor force. See the details in <http://www.pewhispanic.org/2015/03/26/share-of-unauthorized-immigrant-workers-in-production-construction-jobs-falls-since-2007/>.

data.

Regarding demographic and cultural aspects, we study the population age, education, and race composition. Age was grouped into four categories: younger than 18, 18 to 44, 45 to 64, and older than 65. Fajnzylber, Lederman, and Loayza (2002) used the age range of 15 to 29 as the major source of the population in predicting the crime rate. In our paper, since the population being impacted by HB 56 is not limited to younger undocumented immigrants, we extended the age band to a wider range. On top of that, we controlled for race composition as well as education level. In particular, we used the proportion of over 15 years old Hispanic non-citizen without college education in residents, as proposed in the literature, for the share of likely undocumented immigrants. All of these factors enter both the violent and property crime models.

Over the past ten years, several states have launched their own strict immigration regulations, these states either enact Omnibus Immigration Legislation (OIL) or require the mandatory use of E-verify⁶. Thus, to build a synthetic control group for Alabama, we remove from the donor pool all the states that passed E-verify or OIL.⁷ A total of 37 states finally enter the violent crime and property crime models.

4. Results Analysis

4.1 Violent Crime

As mentioned in previous sections, we construct a synthetic Alabama which is most like Alabama in terms of the outcome variables as well as its predictors. Figure 1 is a

⁶ Federal government's online database, designed for employer to check the employment eligibility of its employee.

⁷Arizona, Georgia, Indiana, Kansas, Louisiana, Mississippi, Missouri, North Carolina, Rhode Island, South Carolina, Tennessee, Utah as well as West Virginia are excluded from the donor pool. Retrieved from <http://www.ncsl.org/research/immigration/omnibus-immigration-legislation.aspx>

graphic presentation of the trends for violent crime cases per 100,000 people in Alabama and synthetic Alabama. The magnitude of the estimated impact of HB 56 is significant. In the pre-intervention periods 1998 through 2010, the violent crime rate for synthetic Alabama is close to the rate in actual Alabama showing a good model fit.

Interestingly, Figure 1 also displays a sizable pre-treatment gap around 2009 and 2010. Our research suggests that this unexpected instability is related to the nationwide institutional background at this very period. The period from 2007 to 2011 witnessed a big wave of immigration policy changes in state legislation. In 2007, Arizona passed the Legal Arizona Workers Act, making the use of E-verify mandatory for hiring new employees, which essentially made it difficult for unauthorized immigrants to find jobs. Later in 2010, the controversial Arizona SB1070 was enacted as an Omnibus Legislation intended to further deter undocumented immigrants from entering Arizona. In 2011, eight states including Alabama passed either OIL or E-verify regulation bills. Tennessee and Georgia are bordering states with Alabama; North and South Carolina are contiguous with Tennessee and Georgia; Louisiana is bordering Mississippi and Mississippi had already passed the E-verify bill in 2008. That is, all other states around Alabama except Florida have passed immigration deterring laws. In this context, we should anticipate some pre-intervention treatment effects.

HB 56 was signed into law in June 2011, the gap between Alabama and synthetic Alabama continued to widen up from 2011 through 2012. That is, the increase in violent crime cases observed in Alabama did not happen in synthetic Alabama for the whole post period. In 2013, at the time the Supreme Court blocked much of its provisions, the gap narrowed down slightly.

According to the UCR's database, there are four different classifications of violent crime offenses, which are aggravated assault, robbery, rape, and murder. Over 65% of violent offenses come from aggravated assault. A Comparison of aggravated assault between Alabama and synthetic Alabama shows a similar divergent pattern around the pre-treated period of 2009 to 2011, which indicates that the departure from the control group in aggregate level may have mainly come from this category.

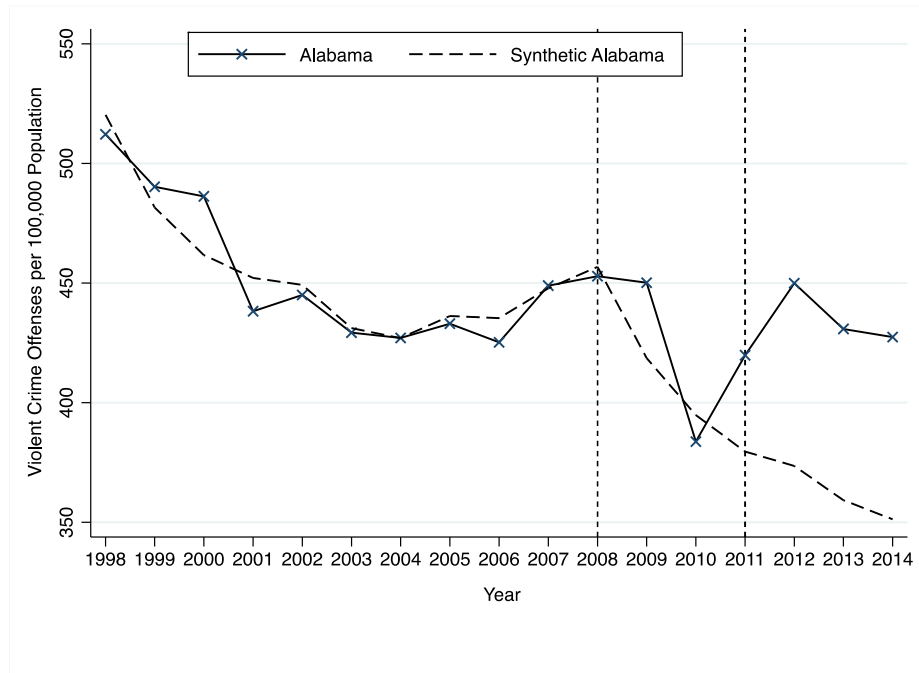


Figure 1: Trends in Violent Crime Cases per 100,000 Population: Alabama vs. Synthetic Alabama 1998-2014

Figure 2 displays the placebo test results for violent crime rates. Specifically, we repeatedly apply SCM of estimating the effect of HB 56 to all other control states in the donor pool. The gray lines give the gaps in outcome variables between the control and treated group from 1998 to 2014 for selected states in the donor pool. Here, we follow the rule proposed by Abadie, Diamond, and Hainmueller (2010) that removes the states with pre-treatment periods' MSPE (mean squared prediction error) larger than twice of that of Alabama. The states with bad performance in pre-period will not give valid information to

compare the true treatment effect and the placebo effect. The black line denotes the gap estimated for Alabama. In 2009, there was already a jump in the treatment effect in the black line, which is consistent with the time schedule in Figure 1. Although the passage of HB 56 happened in the middle of 2011, Alabama was subject to the highest treatment effect from this bill as early as 2009 and continued to be the highest by 2014.

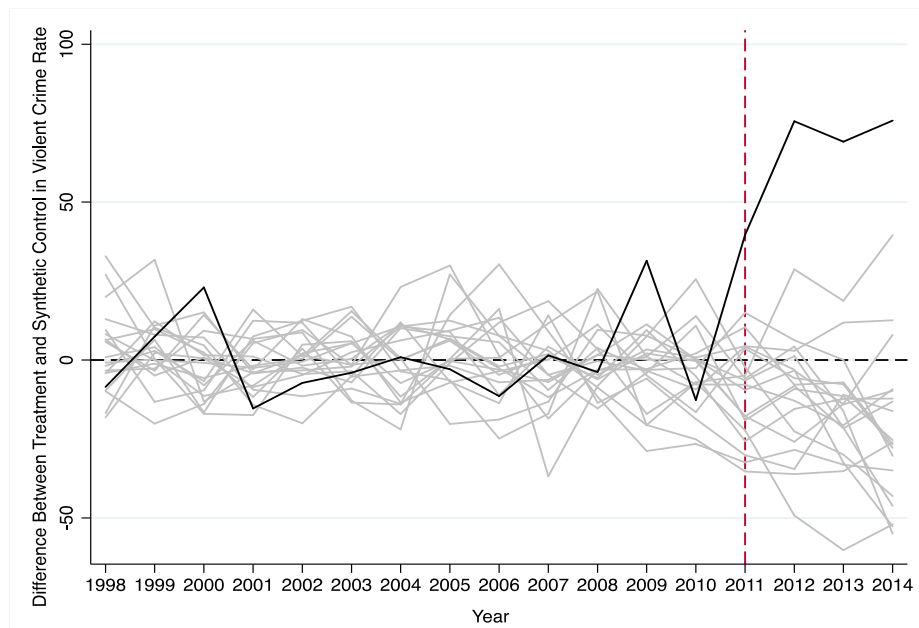


Figure 2: Per 100,000 Population Violent Crime Offenses Gaps in Alabama and Placebo Gaps in 19 Control States (With Pre-intervention MSPE Two Times Larger than Alabama's Being Removed) 1998-2014

4.2 Property Crime

Figure 3 displays the total property crime rates from 2002 to 2014. No significant influence from the immigration policy to the overall property crime decision is found. Despite the slight fluctuation before 2008, the graph presents a good match between Alabama and synthetic Alabama.

To further explore this phenomenon, we check the subcategories under property crime. On average, around twenty-five percent of property crime cases come from burglary, almost two-thirds larceny theft, and less than eight percent from the other subcategories.

Figure 4 shows a non-negligible effect of larceny theft between the treated and control group after 2010. A similar logic applies here as in the previous section; we argue for a pre-period treatment effect due to the complex background environment around this period. For the other two subcategories (not shown here), burglary indicates a jump while motor vehicle theft displays a minor decline around the same period; due to this pattern, they contribute to a good fit of aggregate property crime before and after the exogenous shock.

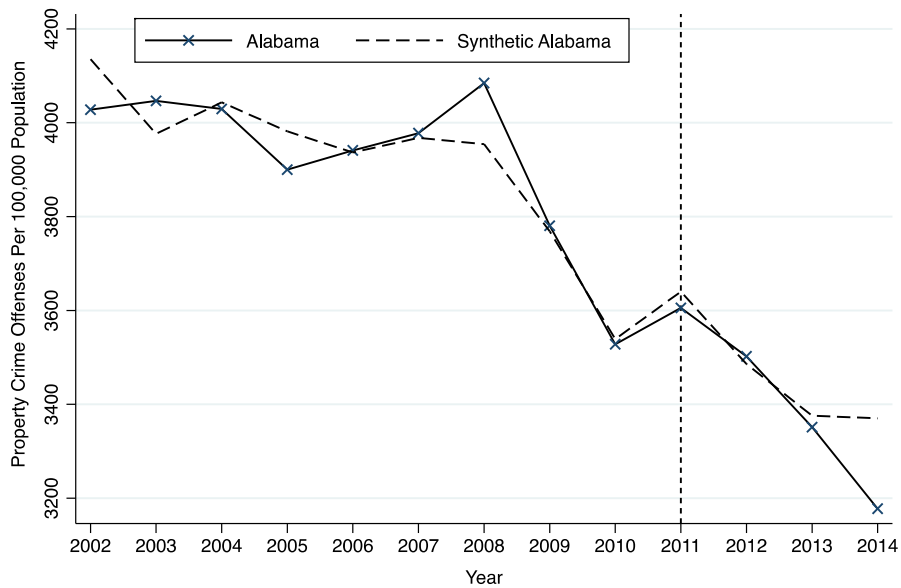


Figure 3 Trends in Property Crime Cases Per 100,000 Population: Alabama vs. Synthetic Alabama 2002-2014

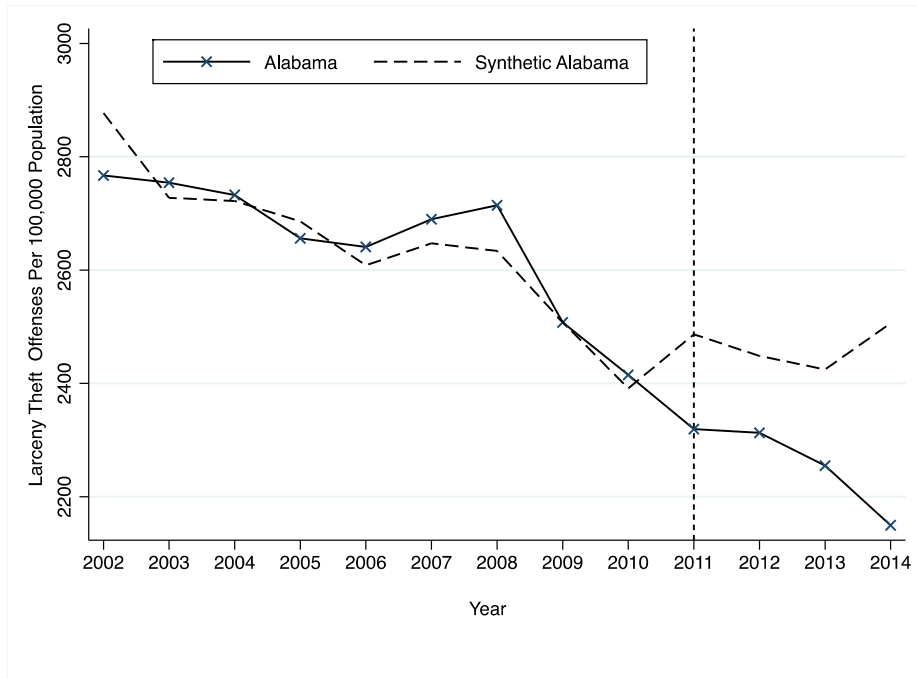


Figure 4 Trends in Larceny Theft Cases Per 100,000 Population: Alabama vs. Synthetic Alabama 2002-2014

The placebo test for larceny theft is presented in Figure 5. We apply to the strictest cutoff rule of discarding all the states in the donor pool with MSPE of larger than that of Alabama. The treatment effect for Alabama in 2011 is only marginally significant and temporary, resulting in the second highest effect after Wyoming. In the post-period, it ranked as the third highest treatment effect until 2013. Together with the trend pattern in Figure 3, we can conclude that the influence from the passage of the immigration policy did not transfer much to property crime rates.

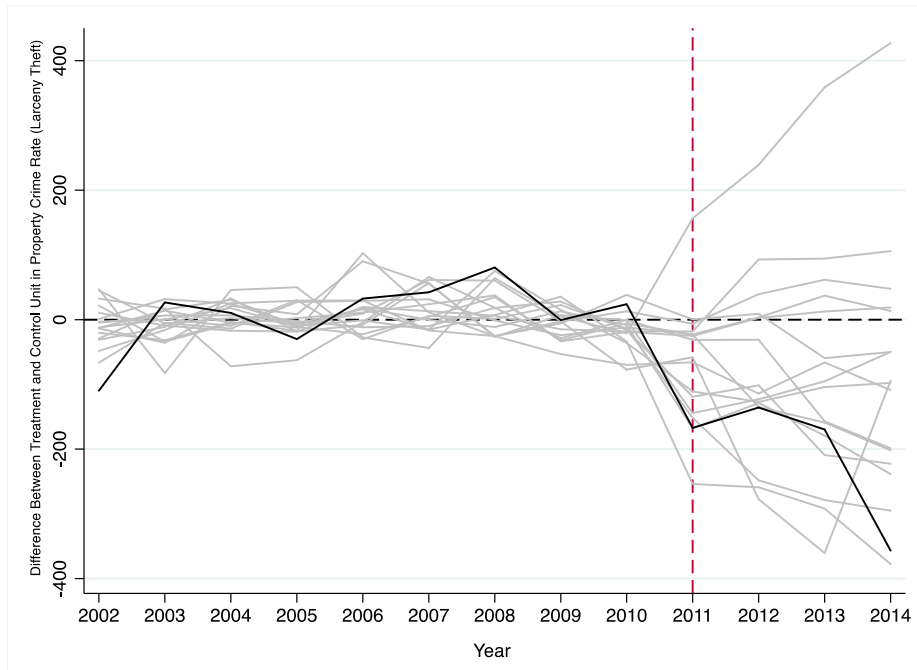


Figure 5 Per 100,000 Population Larceny Theft Offenses Gaps in Alabama and Placebo Gaps in 16 Control States (With Pre-intervention MSPE Larger Than Alabama's Being Removed) 2002-2014

In Table 2, we present the summary of the results for all three estimations above, denoting both the states assigned with positive weights and the weights for synthetic Alabama. It suggests that the passage of HB 56 resulted in significant increase in violent crime rate (especially aggravated assault offenses), while to some degree reducing property crime (such as larceny theft).

Table 2 : States Weights for the Synthetic Alabama in Figure 1, 2 and 4

Violent Crime Cases: 1998-2014	Property Crime Cases: 2002-2014	Crime Cases: 2002-2014	Larceny Theft Cases: 2002-2014
Kentucky	0.421	Arkansas	0.444
Oklahoma	0.406	Florida	0.400
Florida	0.096	Delaware	0.131
New Mexico	0.076	District of Columbia	0.025
		District of Columbia	0.081

Note: Results from the Minimization Solutions

This interesting pattern of crime actions may be driven by some plausible explanations. It could be due to psychological reasons arising from the pressure and frustration of losing a job and a source of income. This is possibly a reason to make people

concern and more likely get irritable to normal issues with either family members or neighbors. The sufferers may also feel discriminated upon in working places while dealing with colleagues and supervisors, in public places while dealing with other people who are citizens, and aggrieved while being forced to consider moving to other states or going back to their home countries. Violent emotional explosion happens prior to the so-called “crimes of passion”. People who have the inclination to commit this kind of crime are motivated mainly by over-whelming emotions (Floch 1955).

On the contrary, property crime action tends to have less connection with emotions and feelings than violent crime. The part of undocumented immigrants who are theft criminals should rationally consider being more law-abiding to avoid confronting officers at this very period. That is why we could observe a deviation of theft rate from the common trend. The temporary departure is not significant in the sense that it is not directly caused by immigration policy change, meaning that acting to reduce the frequency of committing crime may be out of temporary expediency. Since there is no direct treatment of law enforcement to crime, if the crime committed is less connected with emotions, then there should be no significant structural change in the trend.

From the perspective of cost-benefits analysis, the potential cost of being caught is getting lower as the bill is being passed. With the feeling that sooner or later they will be fired, they and their family are going to be deported, they have less to lose.

5. Concluding Remarks

The recent waves of anti-immigrant regulation have been paid interest from researchers and governments. In this paper, we estimate the causal effect of the harshest anti-immigration bill, Alabama HB 56, on crime using a synthetic control approach. We

provide suggestive evidence of heterogeneous effects of Alabama HB 56 on violent crime and property crime. Although this anti-immigrant bill did not affect property crime in Alabama, violent crime significantly increased after the bill was enacted. Besides negative economic consequences⁸, Alabama HB 56 may have unintended effects resulting in violent crime. This calls for federal government to establish coordinated nationwide acts on immigration issues.

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⁸ According to a report by Addy (2012), HB56 could cost Alabama as much as \$11 billion in economic output and another \$264.5 million in tax revenue.

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