The short-term response of the Hispanic noncitizen population to anti-illegal immigration legislation

The case of Arizona SB 1070

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Abstract

Purpose – This paper aims to examine the short-term effect of the Arizona Immigration Law of 2010 (SB 1070) on the noncitizen Hispanic state population.

Design/methodology/approach – To get a consistent estimate of this effect, a synthetic control method has been used to calculate a suitable counterfactual.

Findings – Results indicate that this bill produced a statistically significant short-term reduction in the proportion of noncitizen Hispanics in Arizona between 10 and 15 per cent. However, the evidence suggests that this effect vanishes after a few months.

Originality/value – These findings are consistent with previous evidence of the high mobility of the undocumented population in the US, and contribute to the understanding of the effects of federal and state-level immigration legislation.

Keywords Hispanic population, Illegal immigration, Synthetic control

Paper type Research paper

Resumen

Propósito – Este artículo examina el efecto a corto plazo de la Ley de Inmigración de Arizona de 2010 (SB 1070) sobre la población hispana no ciudadana.

Diseño/metodología/enfoque – Para obtener una estimación consistente sobre este efecto, he utilizado un método de control sintético para calcular una hipótesis de contraste adecuada.

Hallazgos – Los resultados indican que este proyecto produjo una reducción a corto plazo estadísticamente significativa en la proporción de hispanos no ciudadanos en Arizona —entre el 10% y el 15%—. Sin embargo, la evidencia sugiere que este efecto desaparece después de unos meses.

Originalidad/valor – Estos hallazgos son consistentes con la evidencia previa de la alta movilidad de la población indocumentada en los Estados Unidos, y contribuyen a la comprensión de los efectos de la legislación de inmigración federal y estatal.

Palabras clave – Población hispana, Inmigración ilegal, Control sintético

Tipo de artículo – Artículo de investigación

JEL classification – J61, J68

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1. Introduction

Immigration legislation and its consequences are among the most important topics in the public policy debates in the US. In recent years, a series of measures at the federal and state levels have modified the immigration system. These actions have attracted the attention of researchers trying to assess their effects. See, for instance, Hanson and Spilimbergo (1999), Orrenius (2001), Dávila *et al.* (2002), Hanson *et al.* (2002), Amuedo-Dorantes and Bansak (2012), Good (2013) and Bohn *et al.* (2014). This paper joins this literature by evaluating the short-term effects of immigration legislation.

In particular, the main objective of this paper is to estimate the short-term effect of state immigration legislation on the stock of undocumented population. To reach this goal, I studied the Arizona Senate Bill 1070 enacted in 2010 (SB 1070), which is arguably one of the strictest state immigration bills passed in recent years. In particular, Arizona was the first state to enact a law that mandates law enforcement personnel to inquire about the immigration status of individuals suspected to be illegal aliens, and detain those who fail to show proper documentation ("show me your papers" provision). It also made it a crime for an unauthorized individual to apply for or hold a job in Arizona. In other words, this law increased the expected costs and risk of being an illegal immigrant in Arizona.

Anecdotal evidence suggests that the passage of this law caused a reduction in the Hispanic population in Arizona, with churches, schools, businesses and health-care facilities reporting drops in the number of Hispanic users (Goldberg, 2010; Gómez, 2010). Clearly, these reports do not imply a causal relation and could be misleading. Instead of relying on information not statistically representative, I estimated the effect of this law on the composition of the population Arizona. Specifically, this paper focuses on two outcome variables. The first is the proportion of noncitizen Hispanics. The second outcome variable is constructed as the ratio between the number of noncitizen Hispanics with a high school diploma or less, who are between 15 and 45 years of age, and the total population with those characteristics.

To get a consistent estimate of this effect, I used state-level aggregate data from the Current Population Survey (CPS) and the synthetic control method proposed by Abadie *et al.* (2010) to calculate a counterfactual for Arizona.

In that sense, this paper closely follows Bohn *et al.* (2014). The authors estimate the impact of the Arizona's 2007 Legal Arizona Workers Act (LAWA) using synthetic control methods, and find that this law caused a notable decline in the share of the Hispanic noncitizen population in Arizona.

The use of SB 1070 has one important advantage over the use of LAWA. The latter aimed to reduce the "demand" of undocumented workers by requiring employers to verify the identity of new employees using the federal E-verify system. On the other hand, SB 1070 targeted undocumented individuals directly, therefore not only making it more difficult to find a job but also riskier to reside in Arizona. This feature offers a wider perspective to study state-level legislation, by allowing the estimation of its impact on the labor supply not included in the formal sector, and also on the population not looking for a job.

This paper is also related to Hoekstra and Orozco-Aleman's (2014) paper, which studies the effect of SB 1070 on the flow of immigrants from Mexico. The paper finds that passage of the Arizona Immigration Law reduced the flow of undocumented immigrants from Mexico to Arizona by 30 to 70 percent. Another closely related paper is that of Amuedo-Dorantes and Lozano (2015). The authors use synthetic control methods to estimate the effect of SB 1070 on the proportion of noncitizen Hispanics in Arizona and find that the effect of the law since it was passed until 2013 was minimal; however, the estimations of the paper do not consider the changing implications of the legislation, and its short-term effects.

In that context, one contribution of this paper is that it assesses the flexibility of the illegal population to move as a response to the dynamics of the legislation. Shortly after the law was passed on April 23, 2010, lawsuits were filed against it, and before it went into effect, on July 29, the most controversial parts of the law were blocked by a US District Court. Moreover, in April 2011, the US Court of Appeals upheld the District Court's decision. However, the US Supreme Court upheld in 2012 parts of the original law, including the one mandating, if there is reasonable suspicion, police officers to inquire the immigration status of individuals suspected to be in the country illegally ("show me your papers" provision). These events allow the estimation of the short-term effects of this state legislation given its changing implications. In that sense, this paper joins the small, but growing literature studying the response of undocumented individuals to unfavorable conditions (Cadena and Kovak, 2016; Watson, 2013; Kleemans and Magruder, 2015).

Results indicate that the Arizona Immigration Law produced a statistically significant short-term decline in the share of noncitizen Hispanics in Arizona between 10 and 15 per cent. However, this impact disappeared around one year after the implementation of the Law. The short length of the effect could be partially explained by the decision of the US Court of Appeals to uphold the District Court's decision to block the "show me your papers" provision in April 2011, as that event likely reduced the perceived severity of the Law.

These results support previous evidence of the high mobility of the undocumented population in the US, and contribute to the understanding of the effects of immigration legislation. In particular, the evidence suggests that the response of the undocumented population facing higher risk of deportation is to quickly move out. The findings also suggest that when that risk diminishes, the undocumented population increases.

2. Institutional background

Arizona has historically passed legislation aimed at restricting illegal immigration. For instance, under a 1996 Arizona law, driver's licenses are available only to citizens or those who prove legal presence in the country. In 2004, the Arizona *P200* was passed requiring proof of citizenship to register to vote, voter identification at the polling place and verification of immigration status of applicants of non-federally mandated public benefits. In 2007, the Legal Arizona Workers Act (LAWA) was enacted, which mandated all Arizona employers to use the E-Verify system during the employment process to assess the legal eligibility of new employees. In fact, laws similar to SB 1070 were approved by the Arizona state legislature in 2006 and 2008, but were vetoed by the Governor.

The passage of SB 1070 on April 23, 2010 received significant attention by the media nationwide, which included live broadcasting of the Governor signing the bill. This law was qualified as the nation's toughest bill, and caused immediate reaction for and against it (Fryberg *et al.*, 2012).

In general terms, SB 1070 implies that immigration offenses in Arizona are not only violations of federal laws but are also state crimes. Specifically, it makes it illegal for an unauthorized individual to apply for or hold a job in Arizona. It also imposes penalties on those transporting, sheltering or hiring undocumented individuals. But the most controversial part of the bill is the so-called "show me your papers" provision. This clause requires law enforcement personnel to inquire about the immigration status of those they reasonably suspect are in the country illegally, and to detain those who fail to show proper documentation.

This law was scheduled to go into effect on July 29, 2010. However, just one week after it was signed, it was modified by the Arizona House Bill 2162 (HB 2162). The changes were a response to critics stating that the law encouraged "racial profiling". The main modification indicates that prosecutors would not investigate immigration status based on race, color or

national origin. Another adjustment says that law enforcement personnel may only inquire immigration status of those they stop, detain or arrest.

Despite of those modifications, this immigration bill faced several legal challenges, including one filed by the US Department of Justice. In response to this lawsuit, a US District Judge issued a preliminary injunction on July 28, 2010 that blocked temporally the "show me your papers" provision. Therefore, the enforcement of SB 1070 did not initially include this clause. The decision of the US District was upheld on April 11, 2011 by the Ninth Circuit panel, thus ruling in favor of the Department of Justice. However, in July, 2012, the US Supreme Court upheld the "show me your papers" clause, which consequently ended up being part of the Arizona legislation.

3. Data and research design

To evaluate the impact of the Arizona Immigration Law on the stock of undocumented population living in Arizona, it would be ideal to know the legal status of individuals. Unfortunately, this information is not part of any state-level official survey in the US[1]. Because of this limitation, and following Passel and Cohn (2009a, 2009b), I used the proportion of Hispanic noncitizens as a proxy for legal status.

I used the monthly CPS data sets corresponding to the period 2009-2012, and combined them within five-month periods to estimate the proportion of residents in each state who are reported to be Hispanic noncitizens. This combination allows the estimation of short-term effects while adding enough observations to increase precision[2].

This paper focuses on estimating the impact of SB 1070 on two outcome variables. The first is the proportion of Hispanic non-citizens on the population. Then, I consider the demographic group more likely to be impacted by the law. Using the 2008 American Community Survey, Bohn *et al.* (2014) estimate that in Arizona, 90 per cent of the population defined as noncitizens of working age with no more than high school diploma were unauthorized. Hence, the second outcome variable is constructed as the ratio between the number of noncitizen Hispanics with a high school diploma or less, who are between 15 and 45 years of age, and the total population with those characteristics.

In the following analysis, the first "post-treatment" point is the five-month term after the Arizona Immigration Law took effect, or the interval between August and November 2010. Columns 2 and 3 of Table I show the proportion of the population who are Hispanic noncitizens for both Arizona and the other states. The estimation corresponding to states other than Arizona shows a steady path. On the other hand, the estimation corresponding to Arizona shows a modest upward trend before the law was implemented, and an important reduction from that point and until the period between April and July 2011. Specifically, between the periods April-July 2010 and April-July 2011, the proportion of Hispanic noncitizens went down from around 7.3 per cent to around 5.7 per cent. This period is similar to the one between the partial implementation of the law and the decision of the US Court of Appeals to uphold the District Court's decision to block the most controversial part of the law (see previous section). From this point, there is an upward trend that lasted until the beginning of 2012, which is when the US Supreme Court decided to uphold parts of the original law, including the "show me your papers" mandate. Table I also shows in Columns 4 and 5 the proportion of Hispanic noncitizens among the population with a high school diploma or less, between the ages of 15 and 45 years. This variable shows a path similar to the one corresponding to Hispanic noncitizens.

The previous estimations offer a general idea of the trends of the variables that motivate this study. However, they do not offer a causal interpretation. To get a consistent estimate of the effect of Arizona Immigration Law, it is necessary to obtain a suitable counterfactual. To

Period	Hispanic noncitizens		Hispanic noncitizens between 15 and 45 years old with high school diploma or less	
	Arizona (1) %	Other states (2) %	Arizona (3) %	Other states (4) %
Dec-Mar	6.12	4.07	8.07	5.49
Apr-Jul	6.58	4.08	9.03	5.55
Aug-Nov (2009)	6.98	4.17	8.88	5.54
Dec-Mar	6.29	3.96	8.74	5.36
Apr-Jul	7.34	4.15	10.10	5.67
Aug-Nov (2010)	6.07	4.10	7.62	5.57
Dec-Mar	6.11	3.96	7.75	5.36
Apr-Jul	5.67	3.92	7.33	5.39
Aug-Nov (2011)	6.15	3.96	8.74	5.35
Dec-Mar	6.95	3.92	8.45	5.20
Apr-Jul	5.87	3.87	7.77	5.29
Aug-Nov (2012)	5.53	3.96	7.68	5.34

Notes: Columns (1) and (2) are calculated as the ratio between the estimated number of Hispanic noncitizens and the estimated population. Columns (3) and (4) are calculated as the ratio between the estimated number of Hispanic noncitizens with a high school diploma or less, who are between 15 and 45 years of age, and the total population with those characteristics. See text for details
Source: Current Population Survey

Table I. Proportion of Hispanic noncitizen population in Arizona and other states

obtain it, I used the synthetic control method proposed by Abadie *et al.* (2010). This method produces a synthetic control by using convex combinations of potential control units (donors) and selecting the one that better replicates the trajectory of the treated unit before treatment. Formally, consider $J + 1$ units and T periods. Let unit 1 be the treated unit during the periods $T_0 + 1, \ldots, T$. The other J units belong to the "donor" group. Let Y_A denote the outcome of interest for the treated unit, and Y_D denote a matrix containing the corresponding outcome for the donor units. The synthetic control method solves the following minimization problem:

$$\hat{W} = \arg\min_{W} (A_b - D_b W)' V (A_b - D_b W)$$

Where A_b is a $(kx1)$ vector of pre-intervention variables that predict the outcome of interest for the treated unit, $D_b W$ is a weighted average of the pre-treatment vectors for the donor units, W is a $(J \times 1)$ vector of positive weights that add up to one and V is a positive $(k \times k)$ semidefinite matrix used to allow different weights to the predictor variables[3].

Once $\hat{W}$ is estimated, the synthetic control for period t is calculated as $\hat{W}$. The estimations presented in the following section use the pre-treatment values of the outcome variable as only predictors. The use of other variables as predictors did not significantly change the results of the synthetic control method[4].

This paper closely follows the application of synthetic control methods used by Bohn *et al.* (2014). Specifically, once the synthetic Arizona is obtained, the treatment effect is calculated as a simple double-difference estimate, in which the average difference between the Arizona and synthetic control in the pre-treatment period is subtracted from the corresponding difference for the post-treatment period. Therefore, the identifying assumption is that in the absence of the Law, Arizona would have followed the same trajectory as the synthetic Arizona. When using the synthetic control method, I excluded from the sample the states that

implemented laws similar to SB 1070 between 2010 and 2012: Alabama, Georgia, Indiana, South Carolina and Utah. The results do not change if these states are not removed.

Table II shows the weights used to construct the synthetic Arizona for the two outcome variables. Four states received positive weights: Texas, California, Washington and Kentucky. As the table shows the weights are different for the two outcome variables. The large contribution of Texas and California to the synthetic Arizona is not surprising, as the two states have a relatively large Hispanic noncitizen population. On the other hand, Washington and Kentucky have relatively small Hispanic noncitizen population, but they experienced trends similar to Arizona before the implementation of the Arizona Immigration Law. This explains why these states were selected to build the synthetic Arizona.

To perform inference analysis, I used the permutation method proposed by Abadie *et al.* (2010). In particular, I calculated the same difference-in-difference estimate outlined previously for every state in the sample to obtain a distribution of "placebo" estimates. This distribution allows the comparison of the estimated effect for Arizona with an effect estimated for a state chosen at random. Under the null hypothesis of non-negative treatment effect, the estimate for Arizona is not expected to be abnormally large (negative) within the distribution of placebo effects. To estimate the p-value for this null hypothesis, I follow Bohn *et al.* (2014) and exclude Arizona from the donor pool for each placebo estimate. First, I rank the estimated treatment effects from the most negative to the most positive, then calculate the one-sided p-value as the position of the estimate corresponding to Arizona over the total number of estimates.

4. Results

I start by presenting graphic evidence that compares Arizona and synthetic Arizona before and after the implementation of the Immigration Law. Figure 1 shows this comparison for the proportion of Hispanic noncitizens. The synthetic Arizona tracks very closely Arizona before the implementation of the law, but they begin to diverge in the next period. This difference persists for around one year and then vanishes, due to an increase in the proportion of Hispanic noncitizens in Arizona. Interestingly, the increase coincides with the decision of the US Court of Appeals to uphold the District Court's decision to block the most controversial part of the law ("show me your papers" provision). In other words, this change happened around the time when, most likely, the perception of the severity of the bill was diminishing. As explained before, the Supreme Court ended up upholding this provision in 2012. This last decision may explain the downward trend of the proportion of Hispanic noncitizens in Arizona since then. Because this change happened several periods after the bill was implemented, I do not estimate effects specific for this period.

Figure 2 shows the proportion of Hispanic noncitizens between 15 and 45 years of age with a high school diploma or less for both Arizona and its synthetic control. The trends that

Table II.
States with positive weights in the synthetic control estimations

State	Hispanic noncitizens (%)	Hispanic noncitizens between 15 and 45 years old with high school diploma or less (%)
Texas	40.30	15.10
Washington	24.40	40.50
California	23.30	41.50
Kentucky	12.10	2.90

Source: Own elaboration

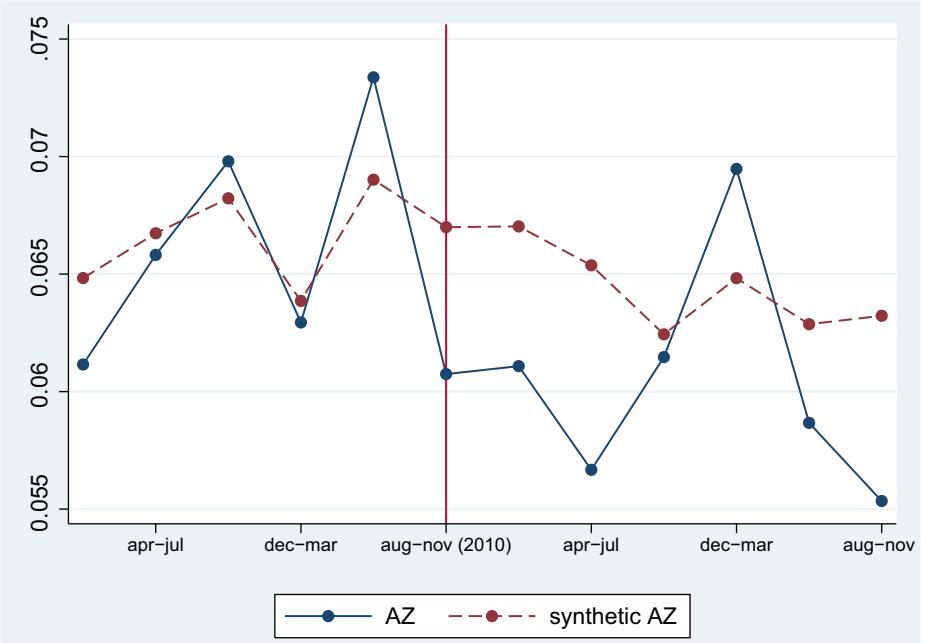

Figure 1. Proportion of Hispanic noncitizens in Arizona and synthetic control

Source: Own elaboration

the figure shows are similar to the previous one, but the differences after the implementation of the bill is larger.

Table III presents the corresponding estimates. Panel A shows the differences between Arizona and the synthetic control for three periods. There are no significant differences in the pre-treatment period. On the other hand, the differences in the post-treatment period between August 2010 and July 2011 (first post-treatment period) are −0.7 percentage points for Hispanic noncitizens and −1.4 percentage points for Hispanic noncitizens with high school diploma or less and of age between 15 and 45 years. Finally, the estimations in the post-period between August 2010 and December 2012 is approximately half of the ones estimated for the first post-treatment period.

Panel B of Table III shows the difference-in-difference estimates for the first post-treatment period. Because the differences in the pre-treatment period are relatively small, these estimates are very similar to the simple difference estimates. For the proportion of Hispanic noncitizens, I find a reduction of around 0.7 percentage points, which implies a reduction of approximately 10 per cent. The application of the permutation test outlined before (Figures 3 and 4) brings about a one-tailed p-value of 0.087. For the Hispanic noncitizens with high school diploma or less between the ages of 15 and 45 years, the estimated reduction is around 1.5 per cent, which implies a reduction of around 15 per cent, with a one tailed p-value of 0.043.

Finally, Panel C of Table III shows the estimates for the post-period between August 2010 and December 2012. They are smaller than those estimated for the first post-treatment period and not significant at the 10 per cent significance level. The smaller magnitude of

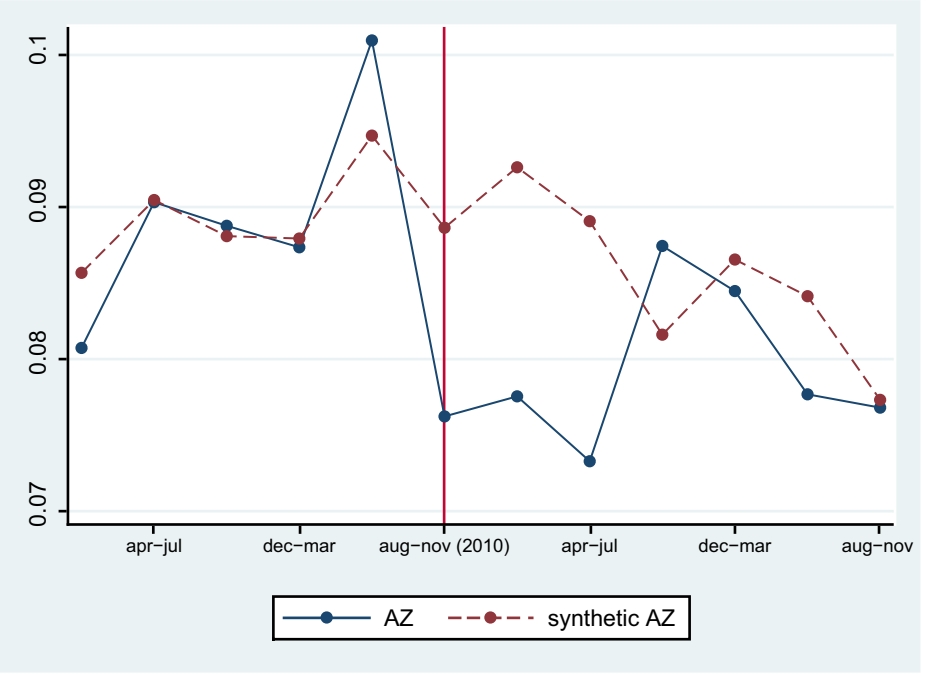

Figure 2.
Proportion of Hispanic noncitizens among the population between 15 and 45 years old with high school diploma or less in Arizona and synthetic control

Source: Own elaboration

Specification	All	High school diploma or less (15-45 years old)
Panel A. Average differences relative to the synthetic control		
1. Pre-treatment (2009-Jul 2010)	0.000	0.000
2. Post-treatment (Aug 2010-Jul 2011)	−0.007	−0.014
3. Post-treatment (Aug 2010-Dec 2012)	−0.004	0.007
Panel B. Diff-in-diff. (*A2-A1*)		
Difference post-pre	−0.007	−0.015
Rank lowest to highest effect	4	2
Equivalent *p*-value (one-tailed test)	0.087	0.043
Panel C. Diff-in-diff. (*A3-A1*)		
Difference post-pre	−0.004	−0.007
Rank lowest to highest effect	7	6
Equivalent *p*-value (one-tailed test)	0.152	0.13

Table III.
Estimated impact of the introduction of SB 1070 on the proportion of noncitizen Hispanics among Arizona residents in the respective group

Notes: The outcome variable in Column (1) is the ratio between the estimated number of Hispanic noncitizens and the estimated population. The outcome variable in Column (2) is calculated as the ratio between the estimated number of Hispanic noncitizens with a high school diploma or less, who are between 15 and 45 years of age, and the total population with those characteristics. See text for details. One-sided *p*-value calculated as the relative position of the estimate corresponding to Arizona within the placebo effects' distribution
Source: Own elaboration

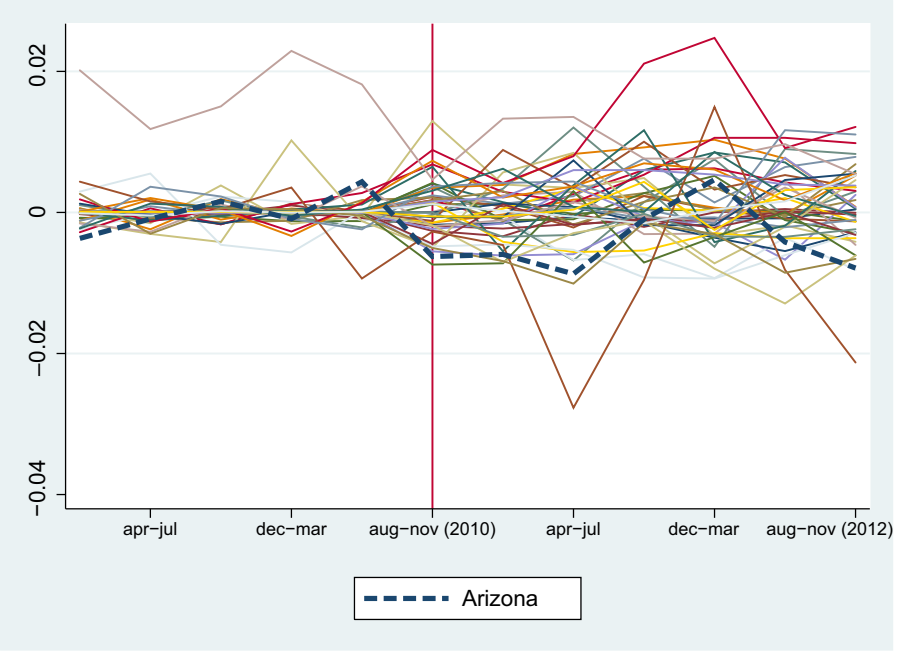

Figure 3. Permutation exercise – outcome variable: proportion of Hispanic noncitizens

Notes: The figure shows the difference between the outcome variable and its synthetic control calculated for 46 states. See text for details
Source: Own elaboration

these estimates is due mainly to the increase in the proportion of Hispanic noncitizens around the second semester of 2011.

As a robustness check, I use the same methodology to estimate the effect for groups less likely to be affected by SB 1070. Table IV shows the estimates corresponding to Hispanic naturalized citizens, non-Hispanic non-citizens and Hispanic born in the US. For all of these groups, I found little evidence that they responded to the law. The estimated effects are close to zero and not significant at standard levels.

5. Discussion

This paper estimates the impact of the Arizona Immigration Law of 2010. The results indicate that this bill initially produced a significant reduction in the proportion of Hispanic noncitizens living in Arizona estimated to be between 10 and 15 per cent. However, the findings suggest that the impact weakened one year after the implementation of the Law. This implies that the overall effect for the period between August 2010 and December 2012 is small and not significant.

The short length of the effect could be partially explained by the decision of the US Court of Appeals to uphold the District Court's decision to block the most controversial part of the law ("show me your papers" provision). That event probably reduced the perceived severity of the Law and the risk of deportation.

These results support previous evidence of the high mobility of the undocumented population in the US and contribute to the understanding of the effects of immigration

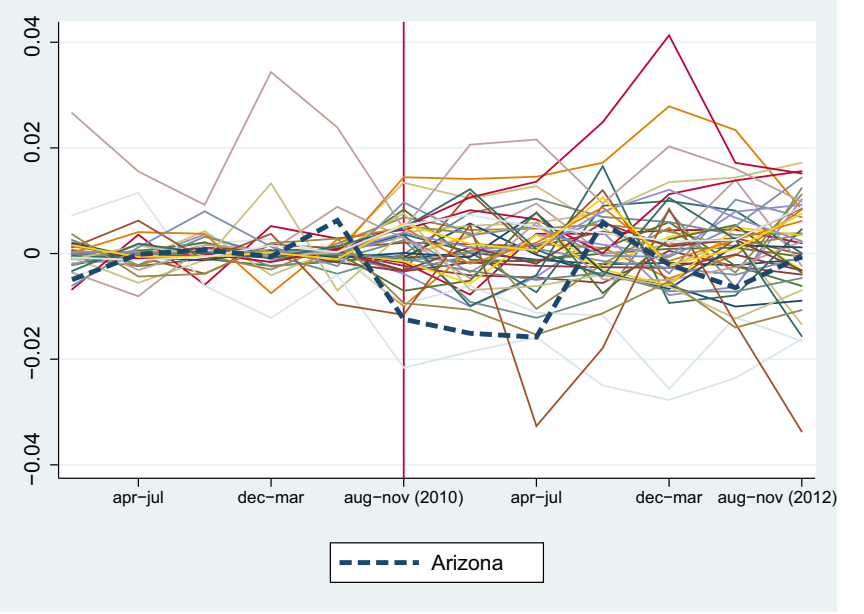

Figure 4.
Permutation exercise – outcome variable: proportion of Hispanic noncitizens among the population between 15 and 46 years old with high school diploma or less

Notes: The figure shows the difference between the outcome variable and its synthetic control calculated for 46 states. See text for details
Source: Own elaboration

Specification	Estimate	Rank	Equivalent *p*-value
Panel A. post treatment (Aug 2010-Jul 2011)			
Share of Hispanic naturalized citizens	−0.001	16	0.35
Share of non-Hispanic non-citizens	−0.002	15	0.33
Share of Hispanic born in the US	−0.0007	16	0.35
Panel B. post treatment (Aug 2010-Dec 2012)			
Share of Hispanic naturalized citizens	0.0007	28	0.61
Share of non-Hispanic non-citizens	−0.0009	25	0.54
Share of Hispanic born in the US	0.0005	23	0.5

Table IV.
Robustness checks – estimated impact of the introduction of SB 1070 for groups not affected by the legislation

Notes: This table shows difference-in-difference estimates calculated from the synthetic control calculation (see text for details). One-sided *p*-value calculated as the relative position of the estimate corresponding to Arizona within the placebo effects' distribution
Source: Own elaboration

legislation. In particular, the evidence suggests that the response of the undocumented population facing higher risk of deportation is to quickly move out. The findings also suggest that when that risk diminishes, the undocumented population increases.

It is important to point out the limitations of these results. The most important one is the short length of the events that makes it difficult to estimate effects with precision. Also, the unavailability of legal status in the official surveys, together with the possibility of untruthful answers might bias the estimations. Nevertheless, these findings contribute to the understanding of the implications of federal and state-level immigration legislation, and could be useful to estimate the potential impact of future reforms.

More research is needed to shed light on the effects of the dynamic immigration policies at the federal and state levels, not only for the undocumented population but also for citizens who might be affected by those policies.

Notes

1. The National Agricultural Workers Survey (NAWS), is the only survey that records legal status of individuals; however, except for California, the data are not available at the state level.
2. Estimations with data combined within quarters produce very similar results, which are available upon request.
3. The estimations were performed using the Stata code developed by Abadie *et al.* (2010), and its default option for selecting the V matrix that uses a regression-based method to minimize the mean squared error for the pre-intervention period. Because the use of the advanced fully nested option produced very similar results, I decided to report only the default estimations.
4. These variables are: employment rates and employment distribution in agriculture and construction.

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