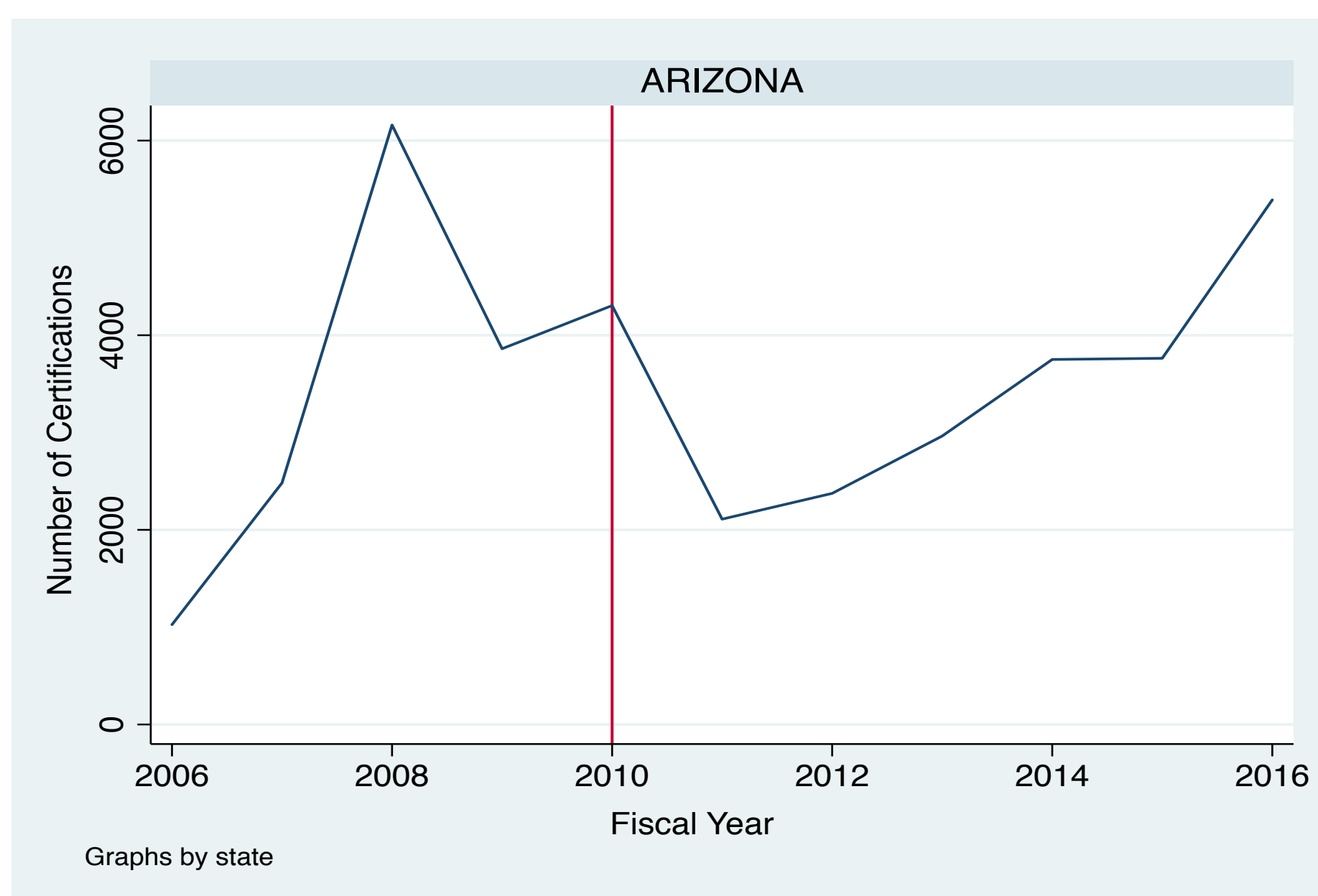## Introduction

➤ To what extent do state-level "Show Me Your Papers" laws influence the locational decisions of undocumented immigrants in the United States?

➤ How do these enhanced enforcement policies affect the workforce composition of industries which rely heavily upon undocumented labour?
  • The National Agricultural Workers Survey estimates that approximately one half of the United States agricultural labour force is undocumented.

➤ In particular, what effect does this have on the employment of their legal counterparts in these industries? Are they positively or negatively affected?

➤ This study will examine the short term effects of Arizona Senate Bill 1070 on hiring trends for seasonal foreign guest workers granted entry to the United States under the H-2A Temporary Agricultural Workers Program.

# Does enhanced illegal immigration enforcement affect the employment of legal migrant workers?

## Evidence from Arizona SB 1070 and H-2A Seasonal Visa Workers in Agriculture

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## Findings

➤ The results indicate that an exogenous negative shock to undocumented labour has a downward effect on legal employment in the same sector. This suggests they are complements, rather than substitutes in farm production.

➤ Arizona SB 1070 caused a decrease of 1,313 – 1,573 in the number of certifications from 2010 to 2011, $\sim \frac{3}{4}$ of the observed 2,195 decrease.

➤ Three of four predictor sets give estimates of a decrease within the closer range of −1517 to −1543 (down from 4,305 in 2010).

➤ Estimates are fairly consistent across columns with the predictable exception of the Demographic Characteristics only column.
  • This set contained the fewest agricultural predictors of all four.

➤ The p-values (displayed in Table 3) are fairly stable across the columns:
  • Results are largely statistically significant at the 0.05 level for the first year post-treatment, and at the 0.10 level for the second year.

## Background – Arizona Senate Bill 1070

➤ Also called the "Support Our Law Enforcement and Safe Neighborhoods Act".
  • Signed into law in April 2010 and enacted in July of the same year.

➤ Widely considered to be the strictest piece of anti-illegal immigration legislation yet passed in the United States at the time.

➤ The infamous "Show Me Your Papers" clause
  • Made failure to carry I.D. at all times a state misdemeanour crime for aliens residing in Arizona. Allowed law enforcement officers to demand proof of authorization whenever "reasonable suspicion" existed.
  • Put into practice, this led to numerous accusations of racial profiling.

➤ 3 out of 4 provisions were overruled by the Supreme Court in 2012; the final provision (the "Show me your papers" clause) was abolished in 2016.
  • Will mainly look for effects in the first year following the law's passage.

## Estimation Strategy

➤ This study uses the synthetic control method developed by Abadie et al. (2010).

➤ Idea: use a weighted convex combination of outcomes in other states to simulate a counterfactual "synthetic Arizona" as a comparison unit.

➤ States are selected to minimize the weighted sum of differences (RMSPE) for a certain set of predictor variables (displayed in Table 2 on the right).

➤ The simulated counterfactual outcome for Arizona at time $t$ is given by:

$$Y'_{AZ,t} = \sum_{s \in S}(W_s \cdot Y_{s,t})$$

  • $S$ – the set of all donor states $s$
  • $Y_{s,t}$ – the actual number of certifications in state $s$ at time $t$
  • $W$ – a $1 \times |S|$ vector with $\sum_{s \in S} W_s = 1$ where $W_s \geq 0$ is the weight assigned to state $s$

➤ The effect at time $t$ is then calculated by taking differences:

$$Effect_{AZ,t} = (Y_{AZ,t}) - (Y'_{AZ,t})$$

**Table 2 – Sets of Predictor Variables Used**

| Variable | Farmland Area Characteristics | Demographic Characteristics | Farm and Demographic | W/o Hispanic Population |
|---|---|---|---|---|
| Number of certified workers [2007][2009][2015] | * | * | * | * |
| % of state land in farms | * | | * | * |
| Average farm size in acres [2007][2012] | * | | * | * |
| Median farm size in acres+ [2007][2012] | * | | | |
| % of state used for grassland [2012] | * | | * | * |
| Adverse Effect Wage Rate | | * | * | * |
| % of population Hispanic | | * | * | |
| % less than HS education | | * | * | * |
| % with at most HS education | | * | * | * |
| Median household income (log) | | * | * | * |
| % of state used for cropland+ [2012] | | | | |

• All years used for variables without brackets
• Indicates variable was tried and omitted due to Arizona being an extreme outlier for these values.
• Column 4: Hispanic percentage removed to test for endogeneity, otherwise identical to Column 3.
• Adverse Effect Wage Rate – the minimum wage required to be paid to H-2A workers in each state.
• Data for predictor variables are sourced from the Current Population Survey (yearly) and the USDA Census of Agriculture (2007 and 2012).
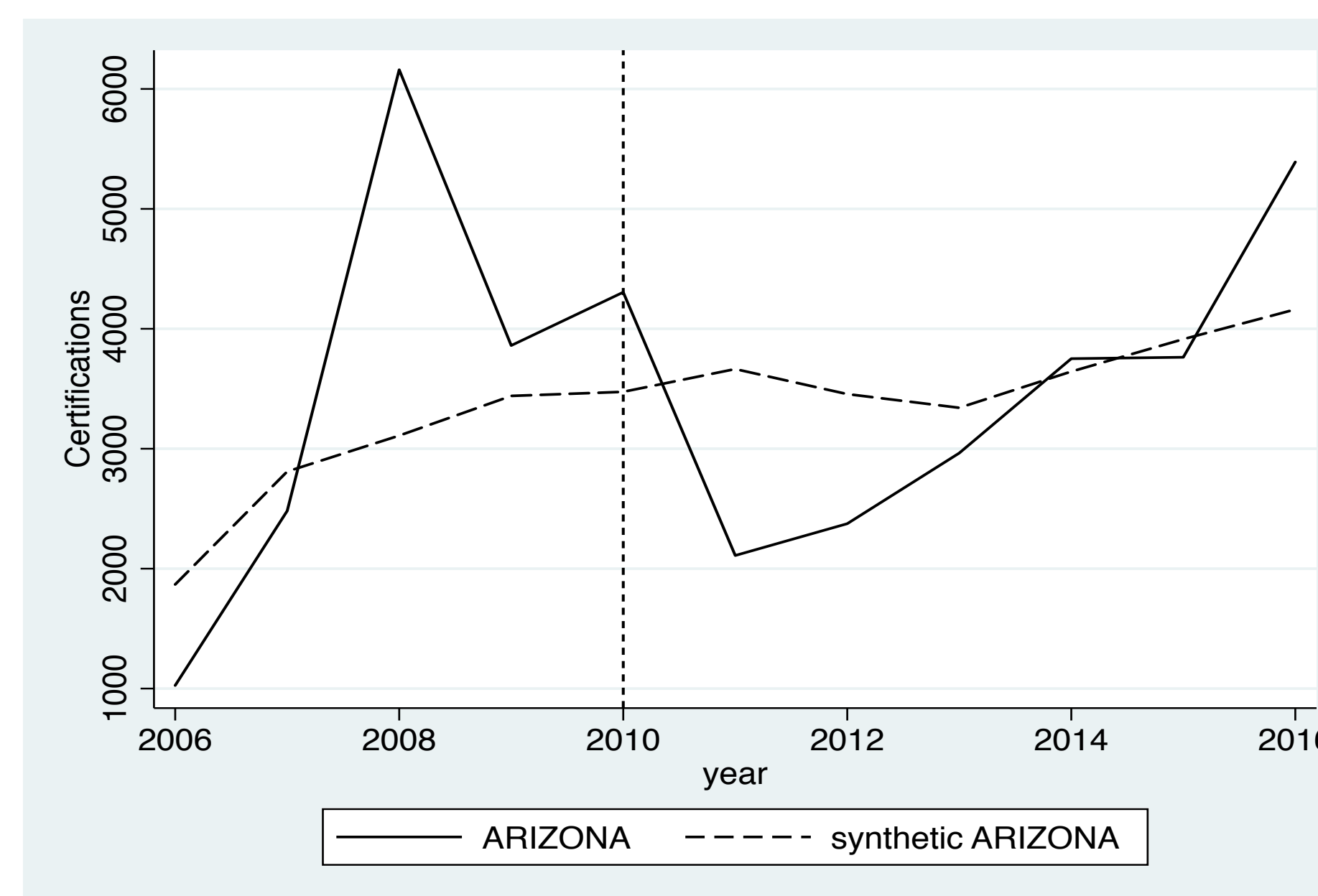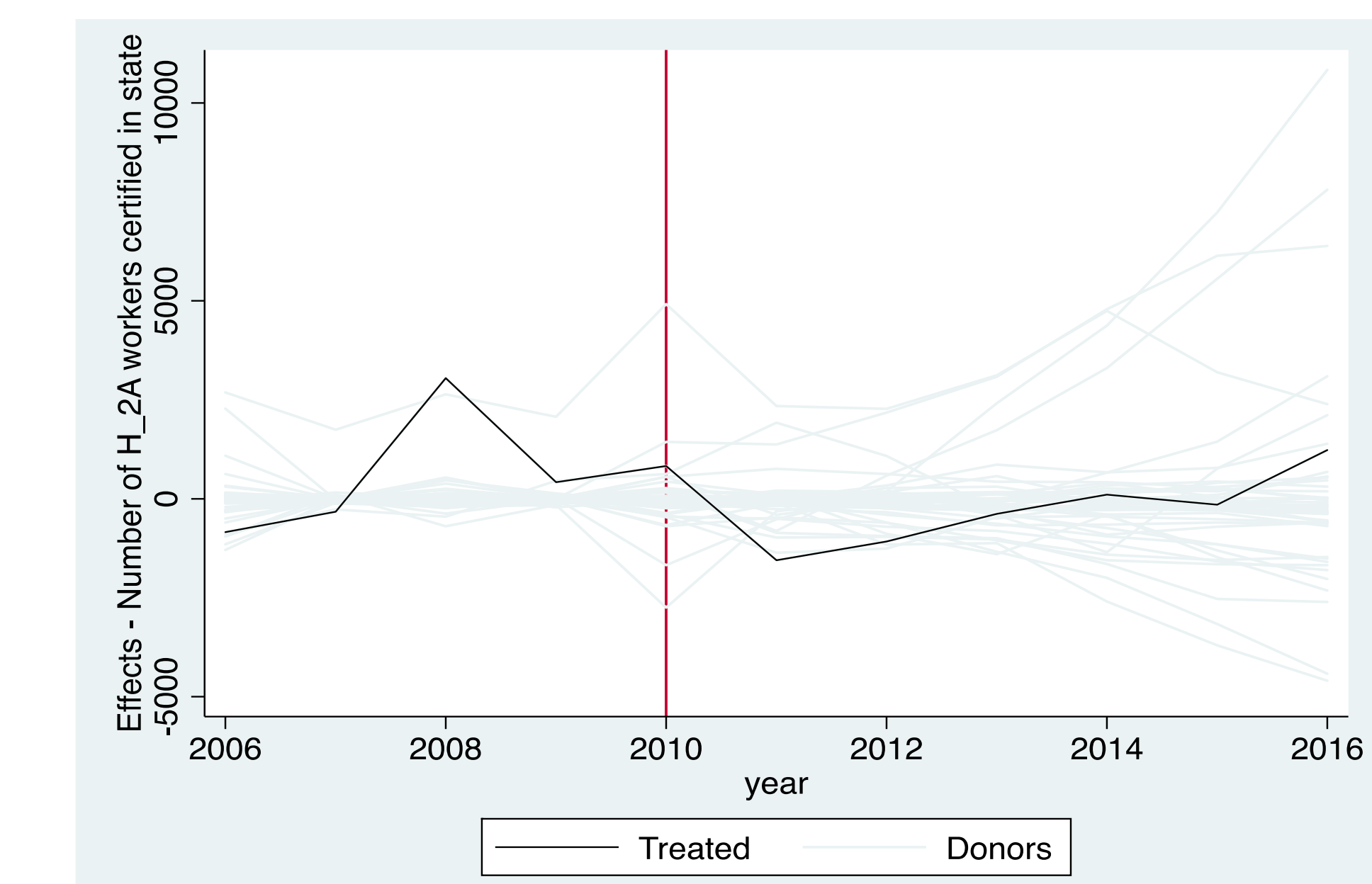
## Robustness Checks

**Permutation Test**
➤ Using the same predictors, a synthetic control and placebo effects are obtained for each state in the donor pool. The probability of randomly obtaining the observed effects in Arizona is calculated.

➤ A robust synthetic control framework should generate effects close to zero for the nontreatment states
  • This is the case here, as we can see that the vast majority of the donor states are clustered near the x-axes.

➤ Arizona experiences an anomalous spike in certifications in 2008, hypothesized to be the partial result of the 2008 Legal Arizona Workers Act. (an earlier clampdown on unauthorized workers).

➤ To rule out the possibility that this event may be driving the results, the analysis was repeated leaving out the outcome variable for 2008.
  • An effect of −1,379 in the first year following the policy implementation is obtained.

## H-2A Visa Certifications in Arizona



Graphs by state

## Main results



**Table 3 – Main Results (Estimated Effects with Placebo Test P-Values and Root Mean Squared Prediction Error)**

| Year | Unrestricted Donor Pool (48 states) | | | | Restricted Donor Pool (43 states) | | | |
|---|---|---|---|---|---|---|---|---|
| Predictor Variables | Farmland area characteristics | Demographic characteristics | Farm and Demographic | W/o Hispanic population | Farmland area characteristics | Demographic characteristics | Farm and Demographic | W/o Hispanic population |
| 2010 | 837.108 (.0833333) | 1019.627 (.0833333) | 839.95 (.0833333) | 830.421 (.0833333) | 812.826 (.0697674) | 1026.896 (.0697674) | 860.158 (.0697674) | 838.499 (.0697674) |
| 2011 | -1527.438 (.0416667) | -1320.773 (.0833333) | -1543.721 (.0416667) | -1554.634 (.0416667) | -1573.932 (.0697674) | -1313.62 (.0930233) | -1517.094 (.0465116) | -1541.224 (.0465116) |
| 2012 | -1035.744 (.1041667) | -861.109 (.1041667) | -1071.258 (.0833333) | -1080.661 (.1041667) | -1012.827 (.1162791) | -854.606 (.1162791) | -1055.652 (.1162791) | -1077.006 (.1162791) |
| 2013 | -299.442 (.5416667) | -251.241 (.5416667) | -368.288 (.4166667) | -377.641 (.4166667) | -281.964 (.4418605) | -245.688 (.4651163) | -349.93 (.372093) | -370.999 (.372093) |
| 2014 | 188.664 (.5625) | 142.129 (.7083333) | 117.988 (.7083333) | 107.635 (.75) | 199.068 (.5116279) | 149.568 (.6976744) | 139.162 (.7906977) | 115.955 (.744186) |
| 2015 | -63.258 (.8958333) | -235.843 (.6458333) | -139.305 (.8541667) | -150.673 (.7708333) | -71.589 (.8139535) | -227.922 (.627907) | -113.398 (.8372093) | -138.726 (.7906977) |
| 2016 | 1288.701 (.2291667) | 990.191 (.3541667) | 1241.608 (.2291667) | 1229.436 (.3541667) | 1264.1 (.2093023) | 997.298 (.3255814) | 1269.334 (.2790698) | 1242.283 (.2790698) |
| RMSPE | 1596.565 | 1320.437 | 1608.717 | 1605.213 | 1598.208 | 1323.077 | 1612.858 | 1606.24 |

• Unit of estimated effects: number of visa certifications in Arizona.
• Values in brackets are the p-values generated by running permutation tests for each of the donor states and calculating the probability of randomly obtaining the estimated value.
• Restricted donor pool omits 5 states which implemented or partially implemented similar policies – Utah, Georgia, Alabama, Indiana, and South Carolina.

## Permutation Test (2008 Included)



## Summary of H-2A Disclosure Data

**Table 1 – Number of H-2A Certifications, Percentage of U.S. Total (× 100), and Yearly Growth**

| Variable | | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arizona | Certified Workers | 1,026 | 2,482 | 6,160 | 3,861 | 4,305 | 2,110 | 2,375 | 2,964 | 3,751 | 3,763 | 5,391 |
| | % of U.S. total × 100 | 1.68 | 3.23 | 6.83 | 4.49 | 5.44 | 2.73 | 2.79 | 3.00 | 3.21 | 2.79 | 3.25 |
| | Growth Rate | – | 1.4191 | 1.4819 | 0.3732 | 0.1150 | -0.5099 | 0.1256 | 0.2480 | 0.2655 | 0.0032 | 0.4326 |
| U.S. | Certified Workers | 60,917 | 76,818 | 90,125 | 85,965 | 79,203 | 77,164 | 85,248 | 98,814 | 116,689 | 139,725 | 165,741 |
| | Growth Rate | – | 0.2610 | 0.1732 | -0.0459 | -0.0789 | -0.0257 | 0.1048 | 0.1591 | 0.1809 | 0.1974 | 0.1862 |

➤ Source: Office of Foreign Labor Certification (Department of Labor).
➤ Fiscal Years: 2006 – 2016.
➤ Contains select fields extracted from all H-2A applications submitted by employers in ...
  • Start date ... ed per application ...
➤ The data con... ations, status updates – w...
➤ Applications ... on statistics for each state.

| Variable | Description | X1 | X2 | X3 | X4 |
|---|---|---|---|---|---|
| num_cert [2007][2009][2015] | Number of certified workers | * | * | * | * |
| pct_farmland | % of state land in farms | * | | * | * |
| avg_farm_size [2007][2012] | Average farm size in acres | * | | * | * |
| median_farm_size [2007][2012]+ | Median farm size in acres | * | | | |
| grassland_pasture [2012] | % of state used for grassland | * | | * | * |
| AEWR | Adverse Effect Wage Rate | | * | * | * |
| hispanic_percentage | % of population Hispanic | | * | * | |
| less_than_HS | % less than HS education | | * | * | * |
| HS_or_Equiv | % with at most HS education | | * | * | * |
| ln_median_income | Median household income (log) | | * | * | * |

## Composition of Synthetic Arizona

➤ The composition of the final synthetic control is displayed in this panel.
  • Generated using a combination of Farm and Demographic predictors (rightmost column in Tables 2 and 3).

➤ In order of descending magnitude of contribution, the states used to construct Synthetic Arizona are: Louisiana, Wyoming, and Nevada.

➤ Predictor Balance: the observed and synthetic values of each of the relevant predictor variables (listed in the same order as in Table 2).

**States with Positive Unit Weights:**

| | |
|---|---|
| LOUISIANA | .443 |
| NEVADA | .175 |
| WYOMING | .382 |

**Predictor Balance:**

| | Treated | Synthetic |
|---|---|---|
| num_cert(2007) | 2482 | 2810.078 |
| num_cert(2009) | 3861 | 3440.484 |
| num_cert(2015) | 3763 | 3913.673 |
| pct_farmland(2012) | 36.1 | 32.8196 |
| avg_farm_size(2007) | 1670 | 1488.274 |
| avg_farm_size(2012) | 1312 | 1362.792 |
| grassland_pasture(2012) | 59.94443 | 45.00997 |
| AEWR | 8.6975 | 8.635207 |
| less_than_HS | 17.2747 | 13.66945 |
| HS_or_Equiv | 28.19517 | 33.84158 |
| ln_median_income | 10.74996 | 10.7403 |

## Permutation Test (2008 Omitted)