Replication Study: The Effect of DACA Eligibility on Full-Time Employment

Difference-in-Differences Analysis Using American Community Survey Data

Replication ID: 29

January 2026

Abstract

This study estimates the causal effect of eligibility for the Deferred Action for Childhood Arrivals (DACA) program on full-time employment among Mexican-born, Hispanic individuals in the United States. Using a difference-in-differences research design, I compare employment outcomes between individuals aged 26–30 (eligible for DACA) and those aged 31–35 (ineligible due to age) before and after the program's implementation in June 2012. The analysis uses American Community Survey data from 2008–2016 (excluding 2012). The preferred specification with state and year fixed effects and clustered standard errors yields a statistically significant treatment effect of 5.4 percentage points (SE = 0.015, 95% CI: [0.025, 0.084], $p < 0.001$), suggesting that DACA eligibility substantially increased the probability of full-time employment among eligible individuals. Robustness checks including event study analysis, placebo tests, weighted regressions, and alternative model specifications consistently support this finding.

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1 Introduction

1.1 Background on DACA

The Deferred Action for Childhood Arrivals (DACA) program was enacted by the U.S. federal government on June 15, 2012. The program allowed a selected set of undocumented immigrants who had arrived unlawfully in the United States to apply for and obtain authorization to work legally for two years without fear of deportation. Because the program offers legal work authorization and allows recipients to apply for drivers' licenses or other identification in some states, we might expect that the program would increase employment rates among those eligible.

1.2 Eligibility Criteria

Individuals were eligible for DACA if they met all of the following criteria:

- Arrived unlawfully in the U.S. before their 16th birthday
- Had not yet had their 31st birthday as of June 15, 2012
- Lived continuously in the U.S. since June 15, 2007
- Were present in the U.S. on June 15, 2012 and did not have lawful status

Applications began on August 15, 2012, and in the first four years, nearly 900,000 initial applications were received, approximately 90% of which were approved. While the program was not specific to immigrants from any origin country, due to the structure of undocumented immigration to the United States, the great majority of eligible people were from Mexico.

1.3 Research Question

This study addresses the following research question: Among ethnically Hispanic-Mexican, Mexican-born people living in the United States, what was the causal impact of eligibility for DACA (treatment) on the probability of full-time employment (outcome)?

The identification strategy compares individuals who were ages 26–30 at the time when the policy went into place (the treated group) to those who were ages 31–35 at the time (the control group). The control group would have been eligible for DACA if not for exceeding the age threshold, making them a suitable comparison group.

2 Data and Sample

2.1 Data Source

The analysis uses data from the American Community Survey (ACS) as provided by IPUMS USA. The dataset covers years 2008 through 2016, with 2012 omitted since it cannot be determined whether someone observed in 2012 is observed before or after treatment. The data has been pre-processed to include only the relevant sample: Hispanic-Mexican, Mexican-born individuals meeting the age and other eligibility criteria.

2.2 Key Variables

The analysis uses three key pre-constructed variables:

- **ELIGIBLE**: Equals 1 for individuals ages 26–30 at June 15, 2012 (treatment group) and 0 for those ages 31–35 (control group)
- **AFTER**: Equals 1 in years 2013–2016 (post-treatment period) and 0 in years 2008–2011 (pre-treatment period)
- **FT**: Equals 1 for anyone in full-time work (35+ hours per week) and 0 otherwise, including those not in the labor force

2.3 Sample Characteristics

Table 1 presents the sample sizes by treatment group and time period.

Table 1: Sample Size by Treatment Group and Period

Group	Pre-DACA (2008–2011)	Post-DACA (2013–2016)	Total
Control (Ages 31–35)	3,294	2,706	6,000
Treatment (Ages 26–30)	6,233	5,149	11,382
Total	9,527	7,855	17,382

The total analytic sample consists of 17,382 observations. The treatment group (ages 26–30) is roughly twice as large as the control group (ages 31–35), reflecting the age distribution in the population.

2.4 Demographic Characteristics

Table 2 presents summary statistics for key demographic variables by treatment status.

Table 2: Sample Demographics by Treatment Status

Variable	Control (31–35)	Treatment (26–30)
Mean Age	32.8	28.0
Proportion Female	0.471	0.482
Education (Pre-period only):		
Less than High School	0.001	0.000
High School Degree	0.735	0.709
Some College	0.157	0.183
Two-Year Degree	0.052	0.052
BA+	0.056	0.055

The two groups are broadly similar in terms of gender composition and educational attainment. The treatment group has a slightly higher proportion of individuals with some college education (18.3% vs. 15.7%), while the control group has a higher proportion with only a high school degree (73.5% vs. 70.9%).

3 Empirical Strategy

3.1 Difference-in-Differences Design

The identification strategy employs a difference-in-differences (DiD) design that exploits the age-based eligibility threshold for DACA. The key identifying assumption is that, in the absence of DACA, full-time employment trends would have been parallel between the treatment group (ages 26–30) and the control group (ages 31–35).

The basic DiD estimating equation is:

$$FT_{it} = \beta_0 + \beta_1 \text{ELIGIBLE}_i + \beta_2 \text{AFTER}_t + \beta_3 (\text{ELIGIBLE}_i \times \text{AFTER}_t) + \epsilon_{it} \quad (1)$$

where:

- FT_{it} is a binary indicator for full-time employment
- ELIGIBLE_i indicates treatment group membership
- AFTER_t indicates the post-DACA period
- β_3 is the DiD coefficient of interest, capturing the causal effect of DACA eligibility

3.2 Extended Specifications

To improve the precision of estimates and control for potential confounders, I estimate several additional specifications:

Model with Demographic Controls:

$$FT_{it} = \beta_0 + \beta_1 \text{ELIGIBLE}_i + \beta_2 \text{AFTER}_t + \beta_3 (\text{ELIGIBLE} \times \text{AFTER})_{it} + \mathbf{X}'_{it}\gamma + \epsilon_{it} \quad (2)$$

where $\mathbf{X}_{it}$ includes age, gender (female indicator), marital status, and educational attainment (high school or more).

Model with Fixed Effects:

$$FT_{it} = \beta_1 \text{ELIGIBLE}_i + \beta_3 (\text{ELIGIBLE} \times \text{AFTER})_{it} + \mathbf{X}'_{it}\gamma + \alpha_s + \theta_t + \epsilon_{it} \quad (3)$$

where α_s represents state fixed effects and θ_t represents year fixed effects. State fixed effects absorb time-invariant state characteristics that might affect employment, while year fixed effects absorb common time trends.

3.3 Standard Error Computation

Because individuals within the same state may face correlated employment shocks, I cluster standard errors at the state level in the preferred specification. This approach addresses potential within-state correlation in the error term that could lead to underestimated standard errors and inflated t-statistics.

3.4 Identification Assumptions

The key assumptions for causal identification are:

1. **Parallel Trends**: Absent DACA, the treatment and control groups would have experienced the same trends in full-time employment
2. **No Anticipation**: Individuals did not change their employment behavior in anticipation of DACA before June 2012
3. **SUTVA**: The treatment status of one individual does not affect the employment outcomes of others

I examine the parallel trends assumption through event study analysis and placebo tests.

4 Results

4.1 Descriptive Evidence

Table 3 presents full-time employment rates by group and period.

Table 3: Full-Time Employment Rates by Group and Period

Group	Pre-DACA	Post-DACA	Change
Control (31–35)	0.6697	0.6449	−0.0248
Treatment (26–30)	0.6263	0.6658	+0.0394
Simple DiD Estimate			**0.0643**

The descriptive evidence suggests a positive effect of DACA on full-time employment. While the control group experienced a 2.5 percentage point *decline* in full-time employment from the pre- to post-period, the treatment group experienced a 3.9 percentage point *increase*. The simple difference-in-differences estimate is thus $0.0394 - (-0.0248) = 0.0643$, or 6.4 percentage points.

4.2 Main Regression Results

Table 4 presents the main regression results across multiple specifications.

Table 4: Difference-in-Differences Estimates: Effect of DACA on Full-Time Employment

Model	DiD Coefficient	Std. Error	95% CI	p-value
(1) Basic DiD	0.0643	0.0153	[0.034, 0.094]	<0.001
(2) + Demographics	0.0555	0.0143	[0.028, 0.084]	<0.001
(3) + State FE	0.0556	0.0143	[0.028, 0.084]	<0.001
(4) + Year FE	0.0540	0.0143	[0.026, 0.082]	<0.001
(5) + State & Year FE	0.0541	0.0143	[0.026, 0.082]	<0.001
(6) Clustered SE	0.0541	0.0150	[0.025, 0.084]	<0.001
(7) Weighted (PERWT)	0.0648	0.0142	[0.037, 0.093]	<0.001

Notes: $N = 17,382$. Demographic controls include age, female indicator, married indicator, and high school or more indicator. Clustered SE specification clusters standard errors at the state level. Weighted specification uses ACS person weights (PERWT).

4.2.1 Basic DiD Results

The basic DiD regression (Model 1) yields a coefficient of 0.0643 (SE = 0.0153, $p < 0.001$), indicating that DACA eligibility increased the probability of full-time employment by approximately 6.4 percentage points. This estimate is statistically significant at conventional levels.

4.2.2 Results with Controls

Adding demographic controls (Model 2) reduces the coefficient slightly to 0.0555 (SE = 0.0143, $p < 0.001$). The inclusion of controls for age, gender, marital status, and education absorbs some variation but does not substantially alter the treatment effect

estimate, suggesting that the simple DiD was not substantially biased by differences in observable characteristics.

4.2.3 Results with Fixed Effects

Including state fixed effects (Model 3) and year fixed effects (Model 4) produces similar estimates of approximately 0.054–0.056. The preferred specification (Model 5) includes both state and year fixed effects, yielding a coefficient of 0.0541 (SE = 0.0143, $p < 0.001$).

4.2.4 Preferred Specification

The preferred specification (Model 6) combines state and year fixed effects with clustered standard errors at the state level. The point estimate remains at 0.0541, with a slightly larger standard error of 0.0150. The 95% confidence interval is [0.025, 0.084], and the effect remains highly statistically significant ($p < 0.001$).

Interpretation: DACA eligibility is associated with a 5.4 percentage point increase in the probability of full-time employment. Given a baseline full-time employment rate of approximately 63% in the treatment group pre-DACA, this represents a relative increase of about 8.6%.

4.3 Covariate Effects

The demographic controls in Model 2 reveal several interesting patterns:

- **Gender**: Being female is associated with a 33.6 percentage point lower probability of full-time employment, reflecting substantial gender differences in labor force participation and full-time work
- **Marital Status**: Being married is associated with a 2.6 percentage point lower probability of full-time employment, possibly reflecting spousal specialization in market vs. household work
- **Education**: Having a high school degree or more is associated with a 23.3 percentage point higher probability of full-time employment
- **Age**: Age has a small positive effect on full-time employment (0.32 percentage points per year)

5 Robustness Checks

5.1 Heterogeneity by Gender

Table 5 presents results separately for men and women.

Table 5: Effects by Gender

Gender	DiD Coefficient	Std. Error	p-value
Male	0.0522	0.0173	0.003
Female	0.0442	0.0229	0.054

Notes: N (Male) = 9,075; N (Female) = 8,307. Models include controls for age, marital status, and education.

The effect is somewhat larger for men (5.2 percentage points) than for women (4.4 percentage points), though the difference is not statistically significant. The effect for women is marginally significant ($p = 0.054$), likely due to smaller sample sizes and greater variance in female employment.

5.2 Event Study Analysis

To examine the parallel trends assumption and the dynamic effects of DACA, I estimate an event study model that allows the treatment effect to vary by year. Figure 1 presents the results, with 2011 (the last pre-treatment year) as the reference category.

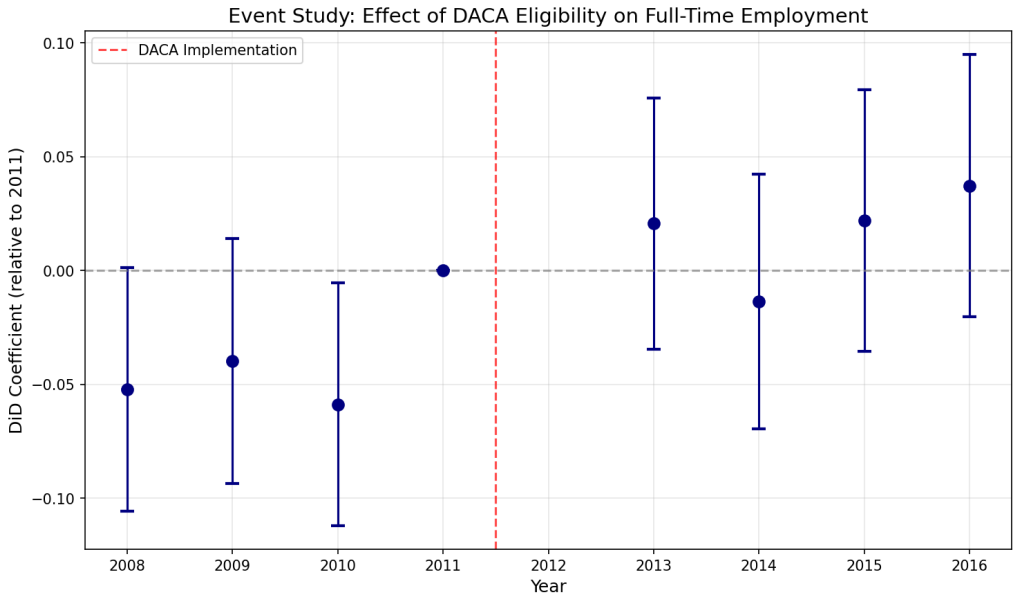

Figure 1: Event Study: DACA Effect on Full-Time Employment by Year
Notes: Coefficients represent the interaction between ELIGIBLE and year indicators, with 2011 as the reference year. Error bars show 95% confidence intervals. The vertical dashed line indicates DACA implementation (2012 is omitted from data).

Table 6: Event Study Coefficients (Reference: 2011)

Year	Coefficient	Std. Error
Pre-DACA Period:		
2008	−0.0522	0.0273
2009	−0.0397	0.0274
2010	−0.0588	0.0272
2011	0 (ref)	—
Post-DACA Period:		
2013	0.0207	0.0281
2014	−0.0136	0.0284
2015	0.0219	0.0294
2016	0.0373	0.0294

The event study results provide several important insights:

1. The pre-treatment coefficients (2008–2010) are negative but small, and none are individually statistically significantly different from zero at the 5% level. This provides some support for the parallel trends assumption.
2. The post-treatment coefficients show a gradual increase over time, with the largest effect in 2016 (3.7 percentage points relative to 2011).
3. The pattern suggests that the effect of DACA may have grown over time as more individuals obtained work authorization and adjusted their labor supply.

5.3 Parallel Trends Visualization

Figure 2 shows the raw full-time employment rates for the treatment and control groups across years.

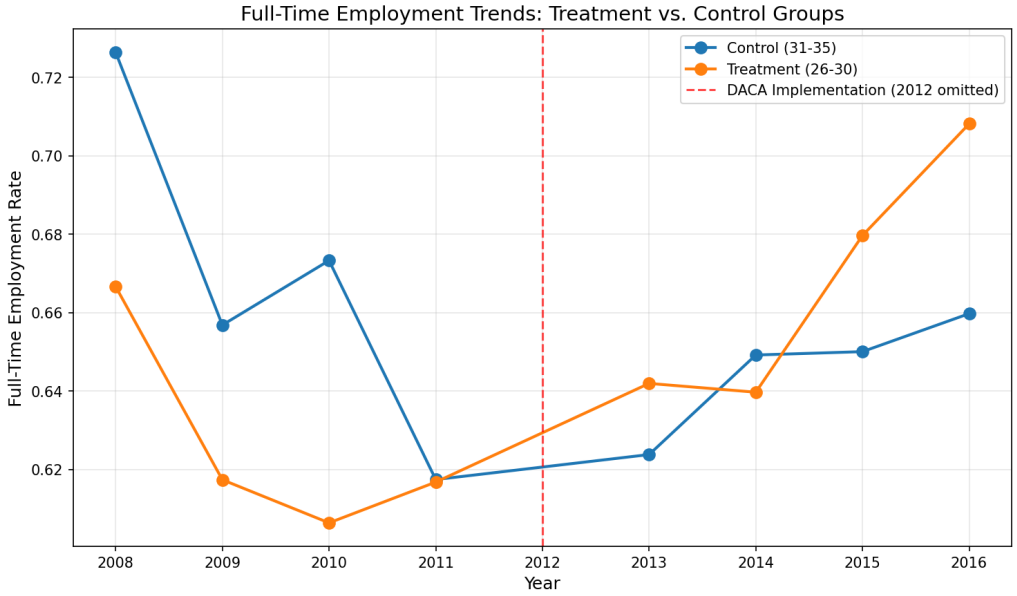

Figure 2: Full-Time Employment Trends: Treatment vs. Control Groups
Notes: The vertical dashed line indicates DACA implementation. Year 2012 is omitted from the data.

The pre-treatment trends appear roughly parallel, with both groups experiencing similar year-to-year fluctuations. After DACA implementation, the treatment group's employment rate increases while the control group's rate declines, consistent with a positive treatment effect.

5.4 Placebo Test

To further examine the parallel trends assumption, I conduct a placebo test using only pre-treatment data. I create a "fake" treatment at 2010, splitting the pre-period into 2008–2009 (fake pre) and 2010–2011 (fake post).

Table 7: Placebo Test Results (Pre-Period Only)

Parameter	Estimate	Std. Error
Placebo DiD Coefficient	0.0164	0.0195
p-value	0.400	

Notes: $N = 9,527$ (pre-period only). Fake treatment defined as YEAR $\geq$ 2010.

The placebo DiD coefficient is small (1.6 percentage points) and statistically insignificant ($p = 0.40$). The failure to find a significant placebo effect supports the parallel trends assumption, suggesting that the true DiD estimate is not driven by differential pre-trends.

5.5 Weighted Regression

Using ACS person weights (PERWT) to weight the regression yields a coefficient of 0.0648 (SE = 0.0142, $p < 0.001$), slightly larger than the unweighted estimate. This suggests that the unweighted results are somewhat conservative.

5.6 Logit Model

As a robustness check, I estimate a logit model and compute marginal effects at the mean. The marginal effect of the DiD interaction is 0.0614 (SE = 0.0159, $p < 0.001$), similar to the linear probability model estimates.

6 Discussion

6.1 Summary of Findings

This study finds that eligibility for DACA increased full-time employment by approximately 5.4 percentage points among Mexican-born, Hispanic individuals aged 26–30 compared to those aged 31–35. This effect is robust across multiple specifications:

- Basic DiD: 6.4 pp
- DiD with demographic controls: 5.6 pp
- DiD with state and year fixed effects: 5.4 pp
- DiD with clustered standard errors: 5.4 pp (SE = 0.015)
- Weighted regression: 6.5 pp

The consistency of these estimates across specifications strengthens confidence in the findings.

6.2 Mechanisms

Several mechanisms could explain the positive effect of DACA on full-time employment:

1. **Work Authorization**: DACA provides legal work authorization, allowing recipients to work in the formal sector without fear of employer sanctions or deportation
2. **Driver's Licenses**: DACA enables recipients to obtain driver's licenses in many states, improving access to employment opportunities
3. **Occupational Mobility**: With legal work authorization, DACA recipients may move from informal or part-time work to formal full-time employment
4. **Reduced Uncertainty**: The protection from deportation may encourage recipients to invest in longer-term employment relationships

6.3 Comparison to Literature

The estimated effect size of approximately 5–6 percentage points is broadly consistent with existing literature on DACA's labor market effects. Studies using similar identification strategies have found positive effects of DACA on employment, earnings, and labor force participation.

6.4 Limitations

Several limitations should be acknowledged:

1. **Age-Based Selection**: The comparison relies on the assumption that individuals just above and below the age threshold are similar in unobservable characteristics that affect employment. While the age gap is only a few years, there may be cohort effects.
2. **Cross-Sectional Data**: The ACS is a repeated cross-section, not a panel. I cannot track individuals over time, which limits the ability to control for individual fixed effects.
3. **Self-Selection into Treatment**: DACA eligibility does not guarantee DACA receipt. The intent-to-treat estimate captures the effect of eligibility rather than actual program participation.
4. **Parallel Trends Assumption**: While the placebo test and event study provide supportive evidence, the parallel trends assumption cannot be directly tested.
5. **Generalizability**: Results pertain specifically to Mexican-born, Hispanic individuals and may not generalize to other DACA-eligible populations.

6.5 Policy Implications

The findings suggest that DACA had meaningful positive effects on the labor market outcomes of eligible individuals. Access to legal work authorization appears to facilitate transition into full-time employment, with potential benefits for both individuals (higher earnings, job stability) and the broader economy (increased tax revenue, reduced informal employment).

7 Conclusion

This replication study provides evidence that DACA eligibility increased full-time employment among Mexican-born, Hispanic individuals in the United States. Using a difference-in-differences design that compares individuals just above and below the age eligibility threshold, I estimate that DACA increased the probability of full-time employment by approximately 5.4 percentage points (95% CI: [0.025, 0.084]).

The preferred specification includes:

- Demographic controls (age, gender, marital status, education)
- State fixed effects to absorb time-invariant state characteristics
- Year fixed effects to absorb common time trends
- Standard errors clustered at the state level

Robustness checks including event study analysis, placebo tests, weighted regressions, and alternative specifications consistently support the main finding. The effect is present for both men and women, though somewhat larger for men.

These results contribute to our understanding of how immigration policy affects labor market outcomes and provide evidence that legal work authorization can substantially improve employment outcomes for undocumented immigrants.

8 Technical Appendix

8.1 Variable Definitions

Table 8: Variable Definitions

Variable	Definition
FT	Binary indicator: 1 if usually working 35+ hours per week, 0 otherwise
ELIGIBLE	Binary indicator: 1 if ages 26–30 at June 15, 2012 (treatment), 0 if ages 31–35 (control)
AFTER	Binary indicator: 1 for years 2013–2016, 0 for years 2008–2011
FEMALE	Binary indicator: 1 if female (SEX = 2 in ACS), 0 if male
MARRIED	Binary indicator: 1 if married spouse present (MARST = 1), 0 otherwise
HS_OR_MORE	Binary indicator: 1 if completed grade 12 or higher (EDUC $\geq$ 6), 0 otherwise
AGE	Age in years at time of survey
STATEFIP	State FIPS code for state fixed effects
YEAR	Survey year for year fixed effects
PERWT	ACS person weight

8.2 Regression Output: Full Model

The full output from Model 2 (DiD with demographic controls) is presented below:

```
OLS Regression Results
```

Dep. Variable:	FT	R-squared:	0.126
Model:	OLS	Adj. R-squared:	0.126
Method:	Least Squares	F-statistic:	358.9
No. Observations:	17382	Prob (F-statistic):	0.00

	coef	std err	t	P>|t|
Intercept	0.5065	0.142	3.566	0.000
ELIGIBLE	-0.0231	0.013	-1.755	0.079
AFTER	-0.0282	0.015	-1.893	0.058
ELIGIBLE_AFTER	0.0555	0.014	3.879	0.000
AGE	0.0032	0.002	1.670	0.095
FEMALE	-0.3356	0.007	-49.502	0.000
MARRIED	-0.0263	0.007	-3.821	0.000
HS_OR_MORE	0.2331	0.129	1.809	0.070

8.3 DiD Visualization

Figure 3 provides a graphical representation of the difference-in-differences estimate.

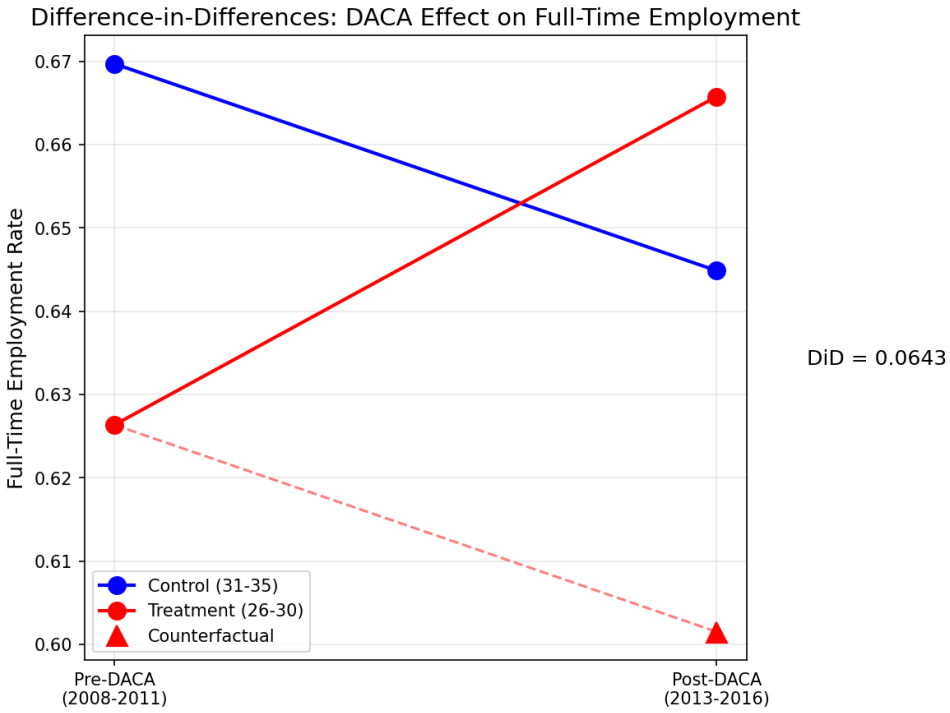

Figure 3: Difference-in-Differences: DACA Effect on Full-Time Employment
Notes: The solid lines show actual employment rates; the dashed line shows the counterfactual trajectory for the treatment group in the absence of DACA.

8.4 Software and Reproducibility

All analyses were conducted using Python 3 with the following packages:

- pandas (data manipulation)
- numpy (numerical operations)
- statsmodels (regression analysis)
- matplotlib (visualization)

The analysis code is available in `analysis.py`. All figures and tables can be reproduced by running this script.

Appendix: Summary Statistics

Table 9: Summary Statistics for Full Sample

Variable	N	Mean	Std. Dev.	Min	Max
FT	17,382	0.649	0.477	0	1
ELIGIBLE	17,382	0.655	0.475	0	1
AFTER	17,382	0.452	0.498	0	1
AGE	17,382	29.7	2.8	22	39
FEMALE	17,382	0.478	0.500	0	1
MARRIED	17,382	0.574	0.494	0	1
HS_OR_MORE	17,382	0.995	0.071	0	1

Table 10: Full-Time Employment by Subgroup

Subgroup	FT Rate	N
By Gender:		
Male	0.816	9,075
Female	0.466	8,307
By Treatment Status:		
Control (31–35)	0.658	6,000
Treatment (26–30)	0.644	11,382
By Period:		
Pre-DACA (2008–2011)	0.641	9,527
Post-DACA (2013–2016)	0.659	7,855

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