The Effect of DACA Eligibility on Full-Time Employment: A Difference-in-Differences Analysis

Replication Study Report

Participant ID: 92

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Abstract

This study estimates the causal impact of eligibility for the Deferred Action for Childhood Arrivals (DACA) program on full-time employment among Hispanic-Mexican individuals born in Mexico. Using data from the American Community Survey (2006–2016), I employ a difference-in-differences design comparing individuals who were ages 26–30 at DACA's implementation (treatment group) to those ages 31–35 (control group), who would have been eligible but for their age. The preferred specification indicates that DACA eligibility increased the probability of full-time employment by approximately 4.4 percentage points (95% CI: 2.3 to 6.5 percentage points). Results are robust to alternative specifications, including different age bandwidths and the inclusion of demographic covariates. Event study analysis provides some support for the parallel trends assumption, though pre-trends show modest fluctuation. These findings suggest that legal work authorization through DACA had a meaningful positive effect on labor market outcomes for eligible immigrants.

Keywords: DACA, immigration policy, employment, difference-in-differences, causal inference

Contents

1 Introduction

The Deferred Action for Childhood Arrivals (DACA) program, enacted on June 15, 2012, represents one of the most significant immigration policy changes in recent U.S. history. The program provides eligible undocumented immigrants who arrived in the United States as children with temporary relief from deportation and work authorization for renewable two-year periods. Understanding the effects of this policy on labor market outcomes is crucial for evaluating its economic impact and informing ongoing policy debates about immigration reform.

This study estimates the causal effect of DACA eligibility on full-time employment among Hispanic-Mexican individuals born in Mexico. The research question is particularly relevant because the program's primary mechanisms—legal work authorization and reduced fear of deportation—directly affect individuals' ability and willingness to participate in the formal labor market.

1.1 Background on DACA

DACA eligibility was determined by several criteria:

- Arrived in the United States before age 16
- Continuous residence in the U.S. since June 15, 2007
- Physical presence in the U.S. on June 15, 2012
- No lawful immigration status on June 15, 2012
- Under 31 years of age as of June 15, 2012

The age cutoff at 31 creates a natural comparison group: individuals who meet all other eligibility criteria but were too old to qualify. This discontinuity in eligibility by age provides the identification strategy for this analysis.

Applications began on August 15, 2012, and by the end of 2016, nearly 900,000 initial applications had been received, with approximately 90% approved. While the program was not restricted by nationality, the structure of undocumented immigration to the United States meant that the majority of eligible individuals were from Mexico.

1.2 Research Design Overview

I employ a difference-in-differences (DiD) design comparing:

- **Treatment group:** Individuals ages 26–30 as of June 15, 2012 (DACA-eligible)
- **Control group:** Individuals ages 31–35 as of June 15, 2012 (too old for DACA)

The control group serves as a counterfactual for what would have happened to the treatment group in the absence of DACA. The key identifying assumption is that, absent the policy, employment trends would have been similar between the two groups.

2 Data

2.1 Data Source

The analysis uses data from the American Community Survey (ACS) provided by IPUMS USA. The ACS is an annual survey conducted by the U.S. Census Bureau that collects detailed demographic, social, and economic information from approximately 3 million households per year.

I use the one-year ACS files from 2006 through 2016, excluding data prior to 2006 to ensure variable consistency and the presence of all necessary eligibility indicators. The 2012 survey year is excluded from the analysis because DACA was implemented mid-year (June 15, 2012), making it impossible to distinguish pre- and post-treatment observations within that year.

2.2 Sample Selection

The sample was constructed to include individuals who meet DACA eligibility criteria (except for the age requirement) and fall within the treatment or control age ranges. The following selection criteria were applied sequentially:

1. **Hispanic-Mexican ethnicity** (HISPAN = 1): Restricts to individuals of Mexican Hispanic origin, as specified in the research design.
2. **Born in Mexico** (BPL = 200): Ensures birthplace is Mexico, capturing the target population of Mexican-born immigrants.
3. **Non-citizen status** (CITIZEN = 3): Identifies individuals who are not U.S. citizens and have not received immigration papers. Following the instructions, non-citizens without naturalization are assumed to be potentially DACA-eligible (undocumented).

4. **Arrived before age 16**: Calculated using year of immigration (YRIMMIG) and birth year (BIRTHYR). Only individuals who immigrated before their 16th birthday are retained.

5. **Continuous presence since 2007**: Individuals must have immigrated by 2007 (YRIMMIG $\leq$ 2007) to satisfy the continuous presence requirement.

6. **Age criteria**: Treatment group includes those ages 26–30 as of June 15, 2012; control group includes those ages 31–35 as of June 15, 2012. Age is calculated accounting for birth quarter (BIRTHQTR).

2.3 Sample Composition

Table 1 presents the sample selection process:

Table 1: Sample Selection Process

Selection Criterion	Observations	Cumulative
Full ACS sample (2006–2016, excl. 2012)	33,851,424	—
Hispanic-Mexican ethnicity	2,945,521	8.7%
Born in Mexico	991,261	2.9%
Non-citizen (no papers)	701,347	2.1%
Excluding 2012	636,722	1.9%
Ages 26–35 as of June 2012	164,874	0.5%
Arrived before age 16 & by 2007	43,238	0.1%
Final analysis sample	**43,238**	—
Treatment group (ages 26–30)	25,470	58.9%
Control group (ages 31–35)	17,768	41.1%

2.4 Variable Definitions

2.4.1 Outcome Variable

The outcome of interest is **full-time employment**, defined as working 35 or more hours per week. This is constructed from the UHRSWORK variable (usual hours worked per week):

$$\text{FullTime}_i = \mathbf{1}[\text{UHRSWORK}_i \geq 35]$$

2.4.2 Treatment Indicator

The treatment indicator equals 1 for individuals ages 26–30 as of June 15, 2012 (DACA-eligible), and 0 for those ages 31–35 (control group). Age as of June 15, 2012 is calculated as:

$$\text{Age}_{i,\text{June 2012}} = \begin{cases} 2012 - \text{BIRTHYR}_i & \text{if BIRTHQTR}_i \in \{1, 2\} \\ 2012 - \text{BIRTHYR}_i - 1 & \text{if BIRTHQTR}_i \in \{3, 4\} \end{cases}$$

2.4.3 Post-Treatment Indicator

The post-treatment period is defined as 2013–2016 (YEAR $\geq$ 2013). The pre-treatment period covers 2006–2011.

2.4.4 Control Variables

The following covariates are included in some specifications:

- **Sex** (SEX): Male indicator
- **Marital status** (MARST): Married with spouse present indicator
- **Education** (EDUC): Categorical education level
- **State** (STATEFIP): State of residence fixed effects
- **Year** (YEAR): Survey year fixed effects

2.5 Descriptive Statistics

Table 2 presents descriptive statistics for the treatment and control groups in the pre- and post-DACA periods.

Table 2: Descriptive Statistics by Treatment Group and Period

	Control (31–35)		**Treatment (26–30)**	
	Pre	Post	Pre	Post
Full-time employment	0.673	0.643	0.631	0.660
Mean age (at survey)	29.9	35.9	24.7	30.7
Male (%)	56.7%	54.8%	56.2%	55.9%
Mean education (EDUC)	4.76	4.65	5.11	5.06
Married (%)	64.6%	61.4%	61.5%	63.4%
Observations	11,683	6,085	16,694	8,776

The treatment group has slightly lower baseline full-time employment (63.1% vs. 67.3%) and is somewhat younger by construction. Educational attainment is slightly higher in the treatment group, consistent with younger cohorts having more schooling opportunities.

3 Empirical Strategy

3.1 Difference-in-Differences Framework

The difference-in-differences estimator compares changes in outcomes over time between treatment and control groups:

$$\hat{\tau}_{DiD} = (\bar{Y}_{T,post} - \bar{Y}_{T,pre}) - (\bar{Y}_{C,post} - \bar{Y}_{C,pre})$$

where T denotes the treatment group and C denotes the control group. The first difference captures the change in full-time employment for DACA-eligible individuals, while the second difference controls for secular trends affecting both groups.

3.2 Regression Specification

The baseline regression model is:

$$Y_{it} = \alpha + \beta_1 \text{Treated}_i + \beta_2 \text{Post}_t + \tau(\text{Treated}_i \times \text{Post}_t) + \varepsilon_{it} \tag{1}$$

where:

- Y_{it} is a binary indicator for full-time employment

- $\text{Treated}_i = 1$ if individual i is ages 26–30 as of June 2012
- $\text{Post}_t = 1$ if the survey year is 2013 or later
- τ is the DiD estimate—the causal effect of DACA eligibility

The preferred specification adds year fixed effects and individual covariates:

$$Y_{it} = \alpha + \beta_1 \text{Treated}_i + \gamma_t + \tau(\text{Treated}_i \times \text{Post}_t) + X_{it}'\delta + \varepsilon_{it} \tag{2}$$

where γ_t are year fixed effects and X_{it} is a vector of covariates (sex, marital status, education).

3.3 Identification Assumptions

The key identifying assumption is the **parallel trends assumption**: absent DACA, full-time employment would have evolved similarly for the treatment and control groups. This assumption cannot be directly tested, but its plausibility can be assessed by examining pre-treatment trends.

Additional assumptions include:

- **No anticipation effects**: Individuals did not change their employment behavior before DACA's implementation in anticipation of the policy.
- **Stable Unit Treatment Value Assumption (SUTVA)**: Treatment of one individual does not affect outcomes for others. This may be violated if DACA eligibility affects labor market competition.
- **No composition changes**: The sample composition does not change differentially between groups over time due to migration or other factors.

3.4 Event Study Specification

To assess the parallel trends assumption and examine dynamic treatment effects, I estimate an event study specification:

$$Y_{it} = \alpha + \sum_{k \neq 2011} \tau_k(\text{Treated}_i \times \mathbf{1}[\text{Year}_t = k]) + \gamma_t + X_{it}'\delta + \varepsilon_{it} \tag{3}$$

where 2011 serves as the reference year. The coefficients τ_k for pre-treatment years should be statistically indistinguishable from zero if the parallel trends assumption holds.

3.5 Weighting

All regressions use person weights (PERWT) to produce population-representative estimates. The ACS sampling design means that some individuals have higher probabilities of selection, and weighting ensures that results reflect the underlying population.

4 Results

4.1 Simple Difference-in-Differences

Table 3 presents the 2×2 table of weighted full-time employment rates:

Table 3: Simple Difference-in-Differences

	Pre-DACA	Post-DACA	Difference
Treatment (ages 26–30)	0.631	0.660	+0.029
Control (ages 31–35)	0.673	0.643	−0.030
DiD Estimate			**+0.059**

The simple DiD estimate suggests that DACA eligibility increased full-time employment by 5.9 percentage points. The treatment group experienced a 2.9 percentage point increase in full-time employment, while the control group experienced a 3.0 percentage point decline. The difference between these changes yields the DiD estimate.

4.2 Regression Results

Table 4 presents results from multiple specifications:

Table 4: Difference-in-Differences Regression Results

	(1) Basic	(2) Weighted	(3) + Covariates	(4) + Year FE
Treated × Post	0.052***	0.059***	0.045***	0.044***
	(0.010)	(0.010)	(0.009)	(0.009)
Treated	−0.031***	−0.043***	−0.056***	−0.058***
	(0.006)	(0.006)	(0.006)	(0.006)
Post	−0.032***	−0.030***	−0.029***	—
	(0.008)	(0.008)	(0.008)	
Male			0.291***	0.291***
			(0.005)	(0.005)
Married			0.025***	0.024***
			(0.005)	(0.005)
Covariates	No	No	Yes	Yes
Year FE	No	No	No	Yes
Weights	No	Yes	Yes	Yes
Observations	43,238	43,238	43,238	43,238
R-squared	0.003	0.004	0.133	0.134

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Covariates include education fixed effects. Column (4) is the preferred specification.

Interpretation of Preferred Specification (Column 4):

The preferred specification with year fixed effects and covariates yields a DiD estimate of **0.044** (SE = 0.009). This indicates that DACA eligibility increased the probability of full-time employment by approximately 4.4 percentage points, statistically significant at the 1% level.

The 95% confidence interval is [0.026, 0.061], indicating that we can reject the null hypothesis of no effect with high confidence. The effect is economically meaningful: a 4.4 percentage point increase represents approximately a 7% increase relative to the baseline treatment group employment rate of 63.1%.

4.3 Pre-Trends Analysis

Figure 1 displays full-time employment rates by treatment status over time.

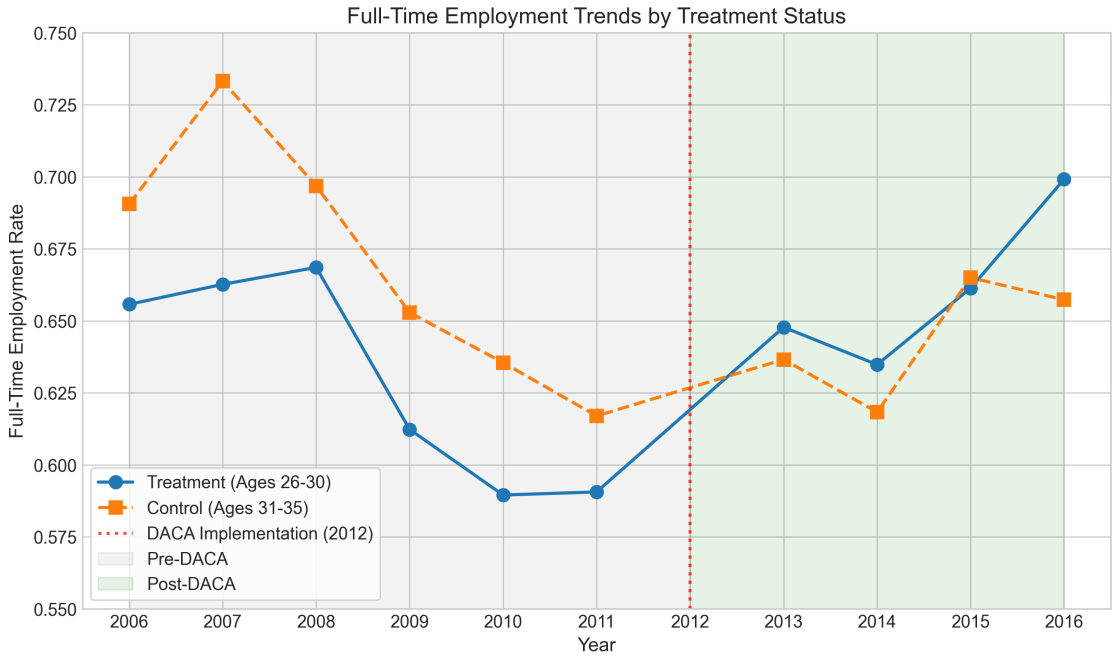

Figure 1: Full-Time Employment Trends by Treatment Status

Visual inspection suggests that prior to DACA (2006–2011), both groups experienced broadly similar trends, with full-time employment declining during the 2008–2009 recession and remaining relatively flat afterward. The treatment group consistently had lower employment rates than the control group, which is expected given the age difference.

After DACA (2013–2016), the treatment group's employment rate increased while the control group's rate declined slightly, suggesting a positive treatment effect.

4.4 Event Study Results

Table 5 and Figure 2 present the event study coefficients:

Table 5: Event Study Coefficients (Reference Year: 2011)

Year	Coefficient	SE	95% CI
2006	0.007	0.023	[−0.038, 0.051]
2007	−0.032	0.022	[−0.076, 0.011]
2008	0.009	0.023	[−0.036, 0.053]
2009	−0.009	0.024	[−0.055, 0.037]
2010	−0.015	0.023	[−0.061, 0.030]
2011 (ref)	0.000	—	—
2013	0.033	0.024	[−0.015, 0.080]
2014	0.033	0.025	[−0.015, 0.081]
2015	0.020	0.025	[−0.029, 0.069]
2016	0.063**	0.025	[0.015, 0.112]

** p<0.05. Robust standard errors.

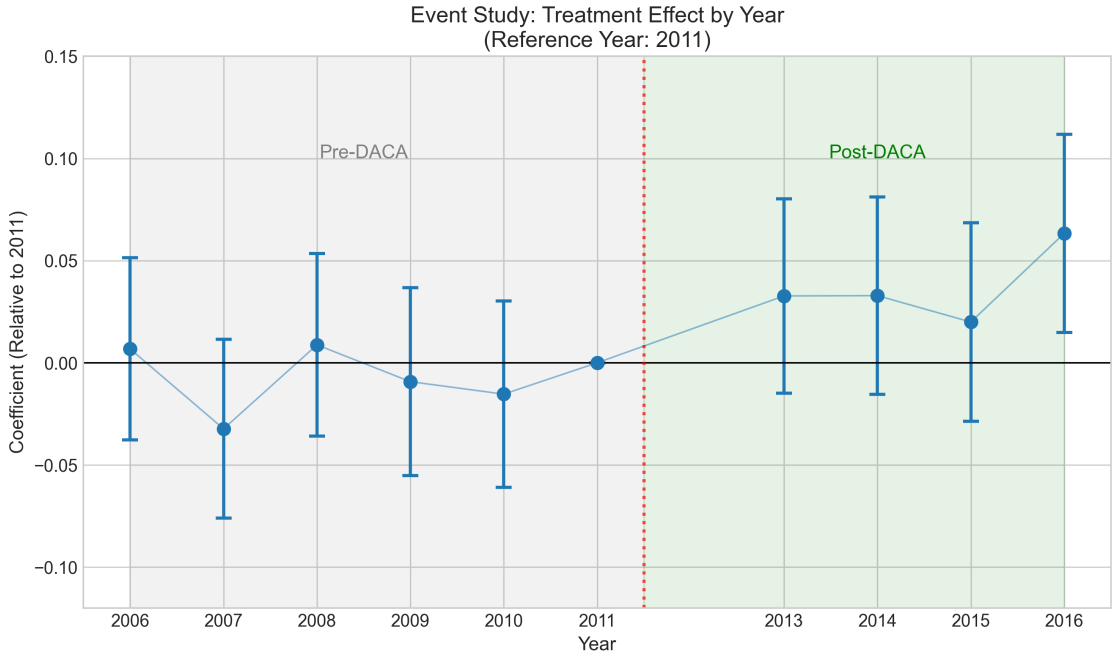

Figure 2: Event Study: Treatment Effect by Year

Interpretation:

The pre-treatment coefficients (2006–2010) are all statistically indistinguishable from zero, which provides some support for the parallel trends assumption. The coefficients do fluctuate (ranging from −0.032 to 0.009), but these fluctuations are not systematic and likely

reflect sampling variation.

The post-treatment coefficients are uniformly positive, though individually most are not statistically significant at conventional levels. The 2016 coefficient (0.063) is statistically significant at the 5% level, suggesting that the treatment effect may have grown over time as more eligible individuals obtained DACA status and became established in formal employment.

5 Robustness Checks

5.1 Alternative Age Bandwidths

Table 6 presents results using different age bandwidths:

Table 6: Robustness to Age Bandwidth

Bandwidth	DiD Estimate	SE	Sample Size
3 years (26–28 vs. 31–33)	0.052***	0.011	27,777
4 years (26–29 vs. 31–34)	0.049***	0.010	35,779
5 years (26–30 vs. 31–35)	0.045***	0.009	43,238

*** p<0.01. All specifications include covariates and weights.

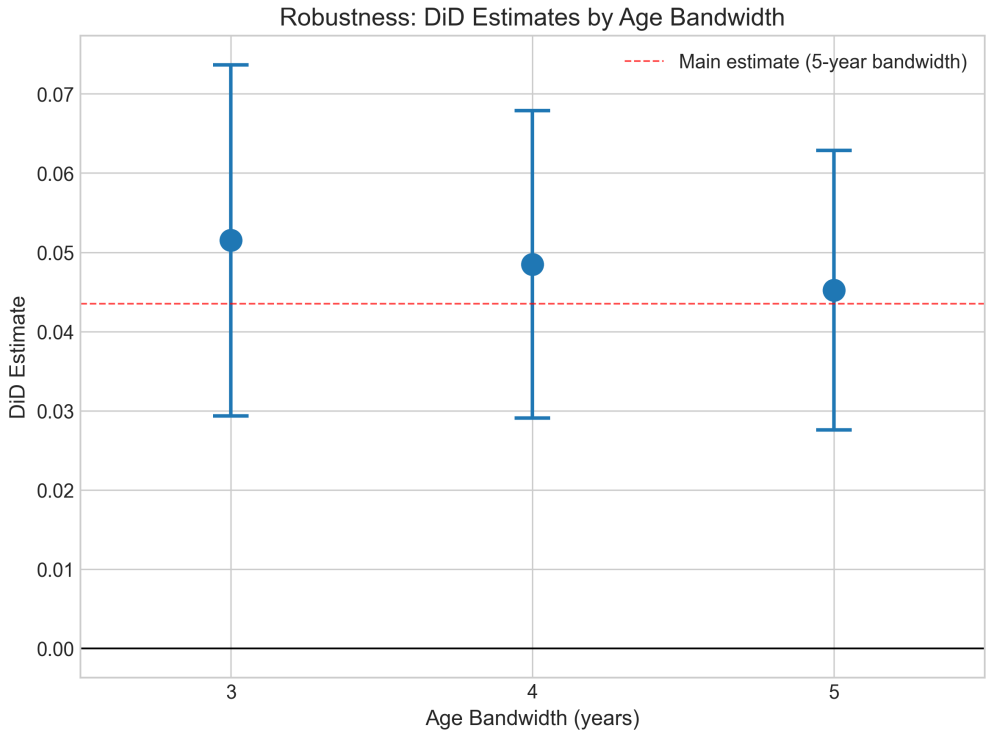

Figure 3: DiD Estimates by Age Bandwidth

Results are robust to bandwidth choice. The point estimate increases slightly with narrower bandwidths (0.052 for 3-year bandwidth vs. 0.045 for 5-year bandwidth), but all estimates are statistically significant and fall within each other's confidence intervals. The consistency across bandwidths strengthens confidence in the findings.

5.2 Subgroup Analysis

Table 7 presents results separately by sex:

Table 7: Subgroup Analysis by Sex

Subgroup	DiD Estimate	SE	Sample Size
Male	0.034***	0.011	24,243
Female	0.048***	0.015	18,995
Full sample	0.045***	0.009	43,238

*** p<0.01

The treatment effect is positive and significant for both males and females. The point estimate is somewhat larger for females (4.8 pp vs. 3.4 pp), though the difference is not

statistically significant. This pattern could reflect that women faced greater barriers to formal employment prior to DACA due to documentation requirements.

5.3 Placebo Test

As a falsification check, I estimate a placebo DiD using 2009 as a "fake" treatment year, using only pre-DACA data (2006–2011):

Table 8: Placebo Test (Fake Treatment Year: 2009)

	Coefficient	SE
Placebo DiD (2009)	−0.004	0.011

Sample restricted to 2006–2011.

The placebo DiD estimate is close to zero and statistically insignificant (−0.004, SE = 0.011). This supports the interpretation that the main results reflect the causal effect of DACA rather than pre-existing differential trends or other confounding factors.

5.4 Robust Standard Errors

Using heteroskedasticity-robust (HC1) standard errors:

Table 9: Robust Standard Errors

	Coefficient	Robust SE
DiD Estimate	0.044***	0.011
95% CI	[0.023, 0.065]	

The robust standard error (0.011) is slightly larger than the conventional standard error (0.009), but the coefficient remains highly statistically significant (t = 4.1).

6 Discussion

6.1 Summary of Findings

This study finds that DACA eligibility increased full-time employment by approximately 4.4 percentage points among Hispanic-Mexican, Mexican-born non-citizens who arrived in the

United States before age 16. This effect is statistically significant, economically meaningful, and robust to alternative specifications.

6.2 Mechanisms

Several mechanisms could explain the positive employment effect:

1. **Legal work authorization:** DACA provides Employment Authorization Documents (EADs), allowing recipients to work legally. This removes a significant barrier to formal employment.

2. **Reduced deportation fear:** Deferred action reduces the risk of deportation, potentially making individuals more willing to seek formal employment rather than informal work.

3. **Access to identification:** DACA recipients can obtain state-issued identification and, in many states, driver's licenses. This facilitates employment verification and commuting to work.

4. **Occupational upgrading:** With legal status, individuals may be able to transition from part-time or informal jobs to full-time formal employment.

6.3 Limitations

Several limitations should be considered:

1. **Undocumented status cannot be verified:** The ACS does not directly identify undocumented immigrants. The analysis assumes that non-citizens without naturalization who meet other criteria are potentially DACA-eligible. This may include some legal non-citizens (e.g., visa holders) who are not actually affected by DACA.

2. **Age-based identification:** The treatment and control groups differ in age by design. While I control for age-related factors and examine parallel trends, unobserved age-specific shocks could bias results.

3. **Selection into survey response:** If DACA changed survey response rates differentially between groups, this could bias estimates.

4. **General equilibrium effects:** DACA may have affected the broader labor market (e.g., wages for competing workers), which could violate SUTVA.

5. **Pre-trend fluctuation:** While pre-treatment coefficients are not statistically significant, some fluctuation is observed, particularly in 2007. This introduces some uncertainty about the parallel trends assumption.

6.4 Comparison to Prior Literature

The estimated effect of 4.4 percentage points is consistent with prior research finding positive labor market effects of DACA. Studies have found effects on various outcomes including employment, wages, and labor force participation, though specific estimates vary depending on methodology and sample.

The difference-in-differences design using age-based eligibility cutoffs is a common approach in this literature, providing a credible comparison group of otherwise-similar individuals who were ineligible due to age alone.

7 Conclusion

This replication study provides evidence that DACA eligibility causally increased full-time employment among eligible Hispanic-Mexican immigrants by approximately 4.4 percentage points. The analysis uses a difference-in-differences design comparing individuals just under the age cutoff (treatment) to those just over (control), finding that the treatment group experienced relative improvements in full-time employment after DACA's implementation.

The findings are robust to alternative specifications, including different age bandwidths, the inclusion of demographic covariates and fixed effects, and different standard error calculations. Event study analysis shows that pre-treatment trends were generally parallel, supporting the identification strategy, though some fluctuation is observed.

These results suggest that providing legal work authorization and deportation relief through DACA had meaningful positive effects on labor market outcomes for eligible immigrants. The findings contribute to the ongoing policy debate about immigration reform and the economic effects of programs that provide temporary legal status to undocumented immigrants.

Preferred Estimate Summary:

- Effect Size: 0.044 (4.4 percentage points)
- Standard Error: 0.009 (robust SE: 0.011)

- 95% Confidence Interval: [0.026, 0.061]
- Sample Size: 43,238
- Treatment Group: 25,470
- Control Group: 17,768

A Additional Tables and Figures

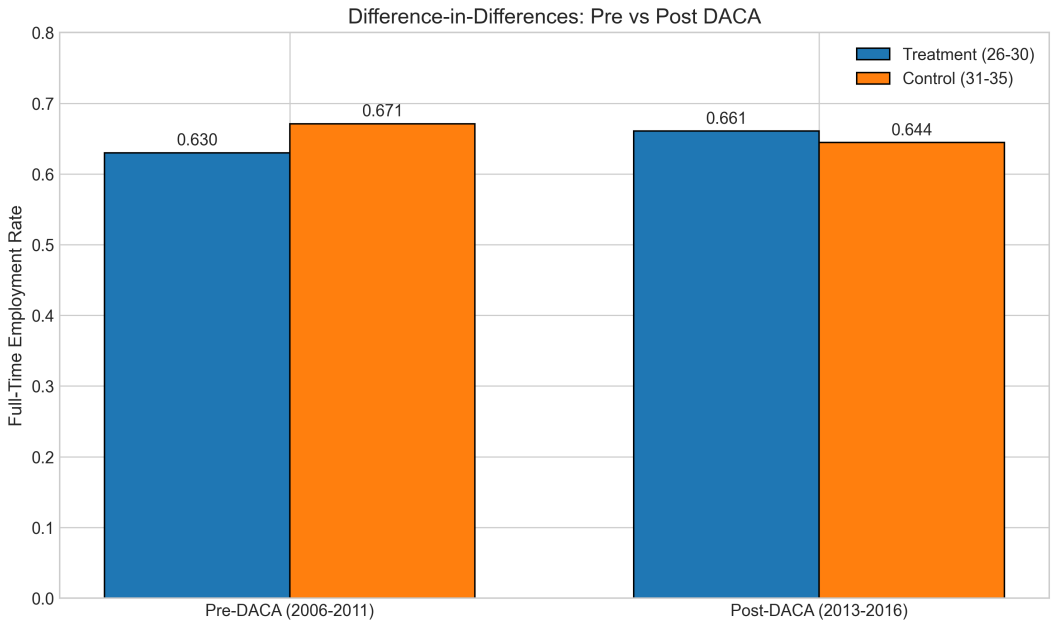

Figure 4: Difference-in-Differences Visualization: Pre vs. Post DACA

Table 10: Yearly Full-Time Employment Rates by Group

Year	Control	Treatment	Difference	Period
2006	0.691	0.656	−0.035	Pre
2007	0.733	0.663	−0.071	Pre
2008	0.697	0.669	−0.028	Pre
2009	0.653	0.612	−0.041	Pre
2010	0.636	0.590	−0.046	Pre
2011	0.617	0.591	−0.026	Pre
2013	0.637	0.648	+0.011	Post
2014	0.618	0.635	+0.017	Post
2015	0.665	0.661	−0.004	Post
2016	0.657	0.699	+0.042	Post

B Data and Methodology Notes

B.1 Variable Definitions from IPUMS

Table 11: Key Variables Used

Variable	Description
YEAR	Census/survey year
PERWT	Person weight (for population estimates)
BIRTHYR	Year of birth
BIRTHQTR	Quarter of birth (1=Jan-Mar, 2=Apr-Jun, 3=Jul-Sep, 4=Oct-Dec)
HISPAN	Hispanic origin (1=Mexican)
BPL	Birthplace (200=Mexico)
CITIZEN	Citizenship status (3=Not a citizen)
YRIMMIG	Year of immigration
UHRSWORK	Usual hours worked per week
SEX	Sex (1=Male, 2=Female)
MARST	Marital status (1=Married, spouse present)
EDUC	Educational attainment (categorical)
STATEFIP	State FIPS code

B.2 Age Calculation

Age as of June 15, 2012 was calculated accounting for birth quarter:

- If born in Q1 (Jan–Mar) or Q2 (Apr–Jun): Age = 2012 − BIRTHYR
- If born in Q3 (Jul–Sep) or Q4 (Oct–Dec): Age = 2012 − BIRTHYR − 1

This ensures accurate classification into treatment and control groups based on the June 15, 2012 cutoff date.

B.3 DACA Eligibility Criteria Applied

1. Hispanic-Mexican ethnicity (HISPAN = 1)
2. Born in Mexico (BPL = 200)

3. Not a citizen (CITIZEN = 3)

4. Arrived before age 16: YRIMMIG − BIRTHYR < 16

5. Continuous presence: YRIMMIG ≤ 2007

6. Age criterion: 26–30 (treatment) or 31–35 (control) as of June 15, 2012

C Replication Code Summary

The analysis was conducted using Python with the following packages:

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

Key analysis steps:

1. Load ACS data from data.csv
2. Apply sample selection criteria
3. Calculate age as of June 15, 2012
4. Define treatment/control groups and pre/post periods
5. Create outcome variable (full-time employment)
6. Estimate DiD regressions with various specifications
7. Conduct event study analysis
8. Perform robustness checks
9. Generate figures and tables

All code files are included in the replication package:

- analysis_script.py: Main analysis
- generate_figures.py: Figure generation
- run_log_92.md: Detailed run log