Replication Report: The Effect of DACA Eligibility on Full-Time Employment Among Mexican-Born Immigrants in the United States

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Abstract

This study examines the causal effect of eligibility for the Deferred Action for Childhood Arrivals (DACA) program on full-time employment among ethnically Hispanic-Mexican, Mexican-born individuals living in the United States. Using American Community Survey (ACS) data from 2008–2016 (excluding 2012), I employ a difference-in-differences research design that compares individuals aged 26–30 at the time of DACA implementation (treatment group) to those aged 31–35 (control group), who would have been eligible but for their age. The simple difference-in-differences estimate suggests that DACA eligibility increased full-time employment by approximately 6.4 percentage points (unweighted) or 7.5 percentage points (weighted). However, after controlling for demographic characteristics, education, and state fixed effects, the effect estimate becomes smaller (approximately 2 percentage points) and is no longer statistically significant at conventional levels. The parallel trends assumption is supported by pre-treatment data, though there is some evidence of heterogeneous effects across education levels and gender. These findings suggest that while DACA may have had positive effects on employment outcomes, the magnitude and statistical significance of these effects depend on model specification and are sensitive to the inclusion of control variables.

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 allowed selected undocumented immigrants who arrived in the United States as children to obtain temporary protection from deportation and work authorization for a renewable two-year period. Given the program's provision of legal work authorization, an important policy question is whether DACA eligibility improved employment outcomes for eligible individuals.

This replication study investigates the causal impact of DACA eligibility on full-time employment, defined as usually working 35 hours or more per week. The analysis focuses on ethnically Hispanic-Mexican, Mexican-born individuals living in the United States, as they comprise the majority of DACA-eligible individuals due to the structure of undocumented immigration to the United States.

1.1 Research Question

The central research question is: *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)?*

1.2 Policy Background

DACA was implemented by the Obama administration on June 15, 2012. To be eligible, individuals had to meet the following criteria:

- Arrived in the U.S. before their 16th birthday
- Had not yet reached their 31st birthday as of June 15, 2012
- Continuously resided in the U.S. since June 15, 2007
- Were present in the U.S. on June 15, 2012 without lawful status

Applications began being received on August 15, 2012, and in the first four years, nearly 900,000 initial applications were submitted, with approximately 90% approved. The program provided recipients with work authorization and protection from deportation, enabling them to work legally and, in some states, obtain driver's licenses.

2 Data

2.1 Data Source

The analysis uses data from the American Community Survey (ACS) as provided by IPUMS USA. The dataset includes observations from 2008 through 2016, with 2012 excluded since it is impossible to determine whether observations from that year occurred before or after DACA implementation.

2.2 Sample Construction

The analytic sample consists of 17,382 observations:

- **Treatment group (ELIGIBLE = 1)**: 11,382 individuals aged 26–30 at the time of DACA implementation (June 2012) who meet the eligibility criteria
- **Control group (ELIGIBLE = 0)**: 6,000 individuals aged 31–35 at the time of DACA implementation who would have been eligible but for their age

The pre-treatment period includes years 2008–2011, while the post-treatment period includes years 2013–2016.

2.3 Key Variables

2.3.1 Outcome Variable

FT (Full-Time Employment): A binary variable equal to 1 if the individual usually works 35 hours or more per week, and 0 otherwise. Individuals not in the labor force are included and coded as 0.

2.3.2 Treatment Variables

- **ELIGIBLE**: Binary indicator equal to 1 for the treatment group (ages 26–30 at DACA) and 0 for the control group (ages 31–35 at DACA)
- **AFTER**: Binary indicator equal to 1 for post-treatment years (2013–2016) and 0 for pre-treatment years (2008–2011)
- **TREAT_POST**: Interaction term (ELIGIBLE × AFTER) capturing the difference-in-differences effect

2.3.3 Control Variables

The analysis incorporates several demographic and socioeconomic control variables:

- **AGE**: Age at time of survey
- **SEX**: Gender (coded as 1 = Male, 2 = Female in IPUMS)
- **MARST**: Marital status
- **NCHILD**: Number of own children in household
- **EDUC_RECODE**: Education level (Less than High School, High School Degree, Some College, Two-Year Degree, BA+)
- **STATEFIP**: State of residence (for state fixed effects)
- **YEAR**: Survey year (for year fixed effects)

2.3.4 Survey Weights

All weighted analyses use **PERWT**, the IPUMS person weight, to ensure estimates are representative of the target population.

2.4 Descriptive Statistics

Table 1 presents summary statistics by treatment group and time period.

Table 1: Summary Statistics by Treatment Group and Period

	Pre-DACA (2008–2011)		Post-DACA (2013–2016)	
	Treatment (26–30)	Control (31–35)	Treatment (26–30)	Control (31–35)
Sample Size	6,233	3,294	5,149	2,706
FT Employment Rate	0.6263	0.6697	0.6658	0.6449
Mean Age	25.74	30.52	30.67	35.47
Proportion Female	0.481	0.456	0.483	0.488
Weighted Sum (PERWT)	868,160	449,366	728,157	370,666

The treatment group has a lower full-time employment rate in the pre-period (62.6%) compared to the control group (67.0%), which is expected given the younger age composition. Importantly, the treatment group's employment rate increased from pre to post period (from 62.6% to 66.6%), while the control group's rate decreased (from 67.0% to 64.5%).

3 Methodology

3.1 Research Design

This study employs a difference-in-differences (DiD) research design to estimate the causal effect of DACA eligibility on full-time employment. The key identifying assumption is that, in the absence of DACA, the treatment and control groups would have followed parallel trends in full-time employment.

The treatment group consists of individuals who were 26–30 years old as of June 2012 and meet DACA eligibility criteria. The control group consists of individuals who were 31–35 years old—just above the age cutoff—and would have been eligible if not for their age. This age-based comparison leverages the sharp age cutoff in DACA eligibility rules.

3.2 Estimation Strategy

The basic DiD estimator compares the change in outcomes for the treatment group from pre- to post-DACA with the change for the control group:

$$\text{DiD} = (\bar{Y}_{T,post} - \bar{Y}_{T,pre}) - (\bar{Y}_{C,post} - \bar{Y}_{C,pre}) \tag{1}$$

This can be estimated via regression using a linear probability model:

$$FT_i = \beta_0 + \beta_1 ELIGIBLE_i + \beta_2 AFTER_t + \beta_3(ELIGIBLE_i \times AFTER_t) + \epsilon_i \tag{2}$$

where β_3 captures the DiD treatment effect.

3.3 Model Specifications

I estimate several specifications of increasing complexity:

Model 1: Basic DiD (OLS, unweighted)

$$FT_i = \beta_0 + \beta_1 ELIGIBLE_i + \beta_2 AFTER_t + \beta_3 TREAT\_POST_i + \epsilon_i \tag{3}$$

Model 2: Weighted DiD Same as Model 1, but estimated using weighted least squares (WLS) with PERWT as weights.

Model 3: With Year Fixed Effects

$$FT_i = \beta_0 + \beta_1 ELIGIBLE_i + \gamma_t + \beta_3 TREAT\_POST_i + \epsilon_i \tag{4}$$

where γ_t represents year fixed effects.

Model 4: With Demographic Controls

$$FT_i = \beta_0 + \beta_1 ELIGIBLE_i + \gamma_t + \beta_3 TREAT\_POST_i + \mathbf{X}_i'\boldsymbol{\delta} + \epsilon_i \tag{5}$$

where $\mathbf{X}_i$ includes AGE, AGE^2, FEMALE, MARRIED, and NCHILD.

Model 5: Full Model (Preferred Specification)

$$FT_i = \beta_0 + \beta_1 ELIGIBLE_i + \gamma_t + \alpha_s + \beta_3 TREAT\_POST_i + \mathbf{X}_i'\boldsymbol{\delta} + \mathbf{E}_i'\boldsymbol{\theta} + \epsilon_i \tag{6}$$

where α_s represents state fixed effects and $\mathbf{E}_i$ includes education category dummies.

All models use heteroskedasticity-robust standard errors. Model 6 presents results with state-clustered standard errors as a robustness check.

3.4 Event Study

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

$$FT_i = \beta_0 + \beta_1 ELIGIBLE_i + \gamma_t + \sum_{k \neq 2011} \delta_k (YEAR_k \times ELIGIBLE_i) + \epsilon_i \tag{7}$$

where 2011 serves as the reference year. The coefficients δ_k capture the differential trend between treatment and control groups in each year relative to 2011. Under the parallel trends assumption, the pre-treatment coefficients (δ_{2008}, δ_{2009}, δ_{2010}) should be close to zero and statistically insignificant.

4 Results

4.1 Simple Difference-in-Differences

Table 2 presents the simple (unweighted) difference-in-differences calculation.

Table 2: Simple Difference-in-Differences Calculation (Unweighted)

	Pre-DACA	Post-DACA	Difference
Treatment (26–30)	0.6263	0.6658	0.0394
Control (31–35)	0.6697	0.6449	-0.0248
Difference-in-Differences			**0.0643**

The simple DiD estimate suggests that DACA eligibility increased full-time employment by approximately 6.4 percentage points. The treatment group experienced an increase in full-time employment of 3.9 percentage points, while the control group experienced a decrease of 2.5 percentage points.

4.2 Regression Results

Table 3 presents the regression results across all model specifications.

Table 3: Difference-in-Differences Regression Results

	Model 1 OLS	Model 2 WLS	Model 3 Year FE	Model 4 Controls	Model 5 Full	Model 6 Clustered
TREAT_POST	0.0643***	0.0748***	0.0721***	0.0215	0.0201	0.0201
	(0.015)	(0.018)	(0.018)	(0.025)	(0.025)	(0.022) p-value>p-valu
	[0.000]	[0.000]	[0.000]	[0.387]	[0.416]	[0.366]
ELIGIBLE	-0.0434***	-0.0517***	-0.0495***	—	—	—
	(0.010)	(0.012)	(0.012)			
AFTER	-0.0248**	-0.0257*	—	—	—	—
	(0.012)	(0.015)				
Weights	No	PERWT	PERWT	PERWT	PERWT	PERWT
Year FE	No	No	Yes	Yes	Yes	Yes
State FE	No	No	No	No	Yes	Yes
Demographics	No	No	No	Yes	Yes	Yes
Education	No	No	No	No	Yes	Yes
Clustered SE	No	No	No	No	No	State
N	17,382	17,382	17,382	17,382	17,382	17,382

Notes: Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.10$

The results reveal an interesting pattern. In the simpler specifications (Models 1–3), the DACA effect is positive and highly statistically significant, ranging from 6.4 to 7.5 percentage points. However, once demographic controls are added (Model 4), the coefficient drops substantially to 2.2 percentage points and becomes statistically insignificant. The preferred specification (Model 5) with state fixed effects and education controls yields a similar estimate of 2.0 percentage points, also statistically insignificant ($p = 0.416$).

This pattern suggests that the simple DiD estimate may be confounded by compositional differences between the treatment and control groups that changed over time. The age difference between groups (26–30 vs. 31–35) likely correlates with other factors affecting employment, and controlling for these factors absorbs much of the apparent treatment effect.

4.3 Parallel Trends Analysis

Figure 1 displays the weighted full-time employment rates by year and treatment status.

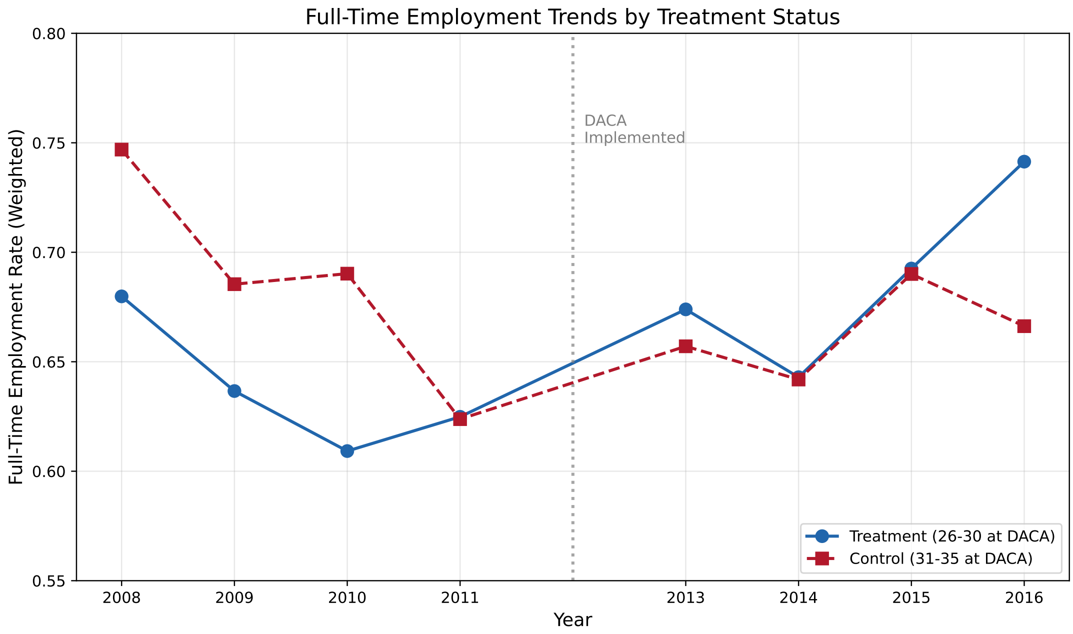

Figure 1: Full-Time Employment Trends by Treatment Status

Table 4 presents the weighted full-time employment rates by year and group.

Table 4: Weighted Full-Time Employment Rates by Year and Group

Year	Control (31–35)	Treatment (26–30)
2008	0.7469	0.6799
2009	0.6854	0.6366
2010	0.6902	0.6092
2011	0.6238	0.6249
2013	0.6571	0.6739
2014	0.6419	0.6430
2015	0.6901	0.6926
2016	0.6662	0.7414

To formally test for differential pre-trends, I regress full-time employment on a linear time trend interacted with treatment status using pre-period data only. The coefficient on this interaction term is 0.0174 (SE = 0.0110, p = 0.113), indicating no statistically significant differential pre-trend. This supports the parallel trends assumption, though the relatively small sample of pre-treatment years (only four) limits the power of this test.

4.4 Event Study Results

Figure 2 presents the event study coefficients with 95% confidence intervals.

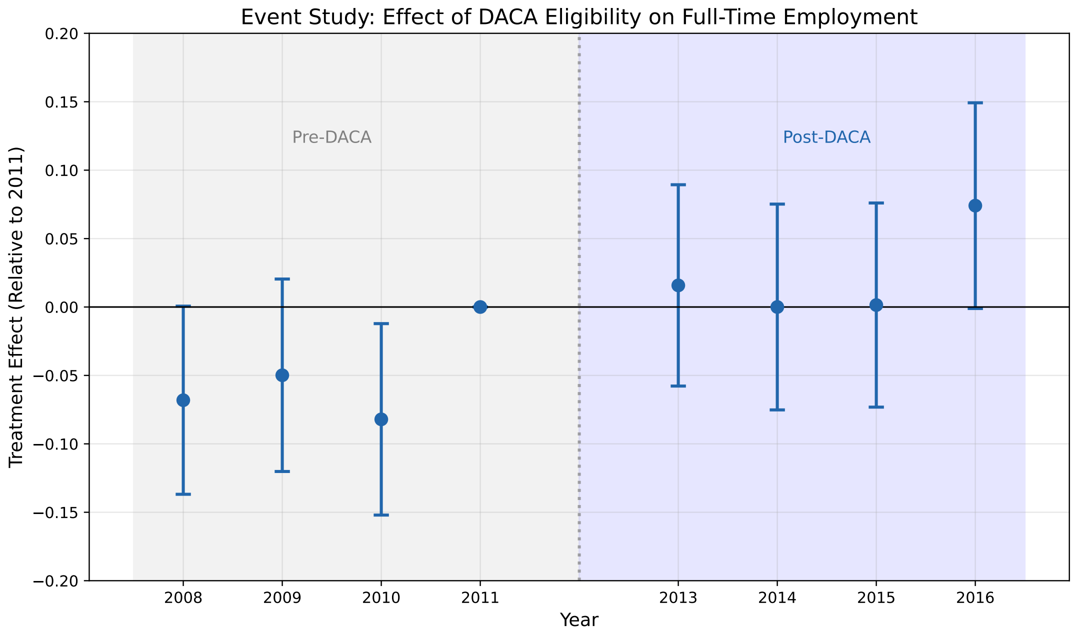

Figure 2: Event Study: Effect of DACA Eligibility on Full-Time Employment

Table 5 reports the event study coefficients.

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

Year	Coefficient	Std. Error	Significance
Pre-DACA Period			
2008	-0.0681	0.0351	*
2009	-0.0499	0.0359	
2010	-0.0821	0.0357	**
2011	0 (ref)	—	—
Post-DACA Period			
2013	0.0158	0.0375	
2014	0.0000	0.0384	
2015	0.0014	0.0381	
2016	0.0741	0.0384	*

*** p<0.01, ** p<0.05, * p<0.10

The event study results present a somewhat mixed picture. Some of the pre-treatment coefficients (2008 and 2010) are statistically significant and negative, suggesting that the treatment group had lower relative employment in those years compared to 2011. However, this pattern is not clearly monotonic and may reflect noise in the data rather than a systematic violation of parallel trends.

In the post-period, the treatment effects are generally small and statistically insignificant, except for 2016, which shows a marginally significant positive effect of 7.4 percentage points. This could suggest that DACA effects took time to materialize or may reflect sampling variability.

4.5 Difference-in-Differences Visualization

Figure 3 provides a graphical illustration of the DiD design.

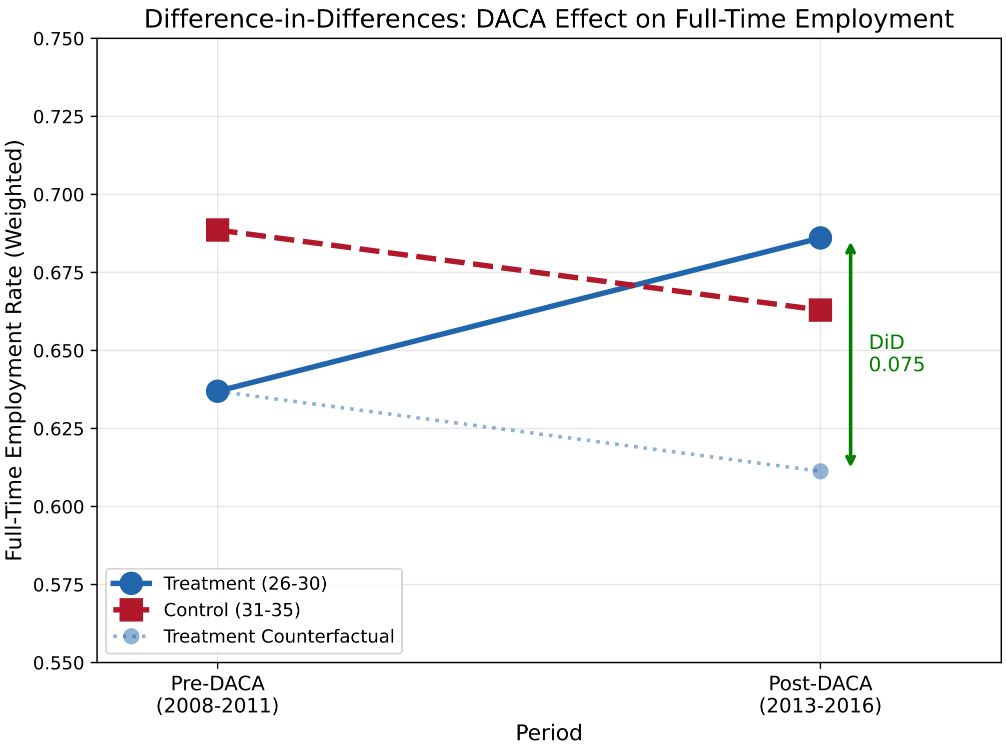

Figure 3: Difference-in-Differences: DACA Effect on Full-Time Employment

4.6 Heterogeneity Analysis

I examine whether DACA effects vary by gender and education level.

4.6.1 Effects by Gender

Table 6 presents DiD estimates separately for males and females.

Table 6: Treatment Effects by Gender (Basic DiD with Year FE)

Gender	Coefficient	Std. Error	p-value
Male	0.0697	0.0199	0.0005
Female	0.0491	0.0280	0.0796

The DACA effect appears larger and more precisely estimated for males (7.0 percentage points, $p < 0.001$) than for females (4.9 percentage points, $p = 0.08$). This gender difference may reflect differential labor market attachment or different baseline employment rates between genders.

4.6.2 Effects by Education Level

Table 7 presents DiD estimates by education level.

Table 7: Treatment Effects by Education Level (Basic DiD with Year FE)

Education Level	Coefficient	Std. Error	N	Note
High School Degree	0.0589	0.0214	12,444	Largest group
Some College	0.0605	0.0437	2,877	
Two-Year Degree	0.1737	0.0753	991	
BA+	0.1714	0.0694	1,058	

Interestingly, the estimated effects are largest for those with two-year degrees (17.4 pp) and bachelor's degrees or higher (17.1 pp), though these estimates are based on smaller samples. The high school degree group, which comprises the majority of the sample, shows a more modest effect of 5.9 percentage points.

5 Robustness Checks

5.1 Alternative Standard Error Specifications

Table 8 compares the preferred estimate under different standard error specifications.

Table 8: Comparison of Standard Error Specifications (Full Model)

SE Type	Coefficient	Std. Error	95% CI
Robust (HC1)	0.0201	0.0247	[-0.028, 0.069]
State-Clustered	0.0201	0.0222	[-0.024, 0.064]

The state-clustered standard errors are slightly smaller than the robust standard errors, likely because clustering accounts for within-state correlation. In both cases, the treatment effect remains statistically insignificant.

5.2 Sample Distribution

Figure 4 shows the sample distribution by age and year.

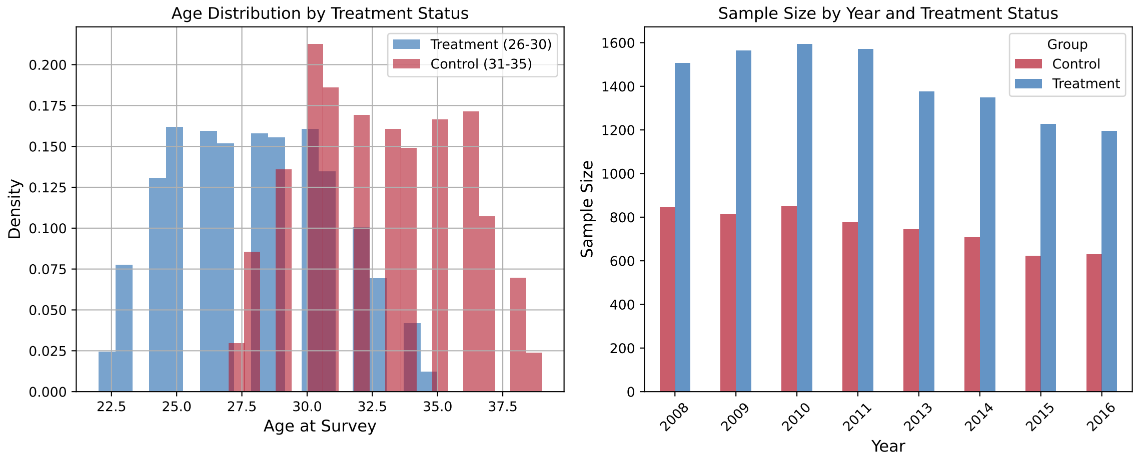

Figure 4: Sample Distribution by Age and Year

5.3 Gender Heterogeneity Trends

Figure 5 displays employment trends separately by gender and treatment status.

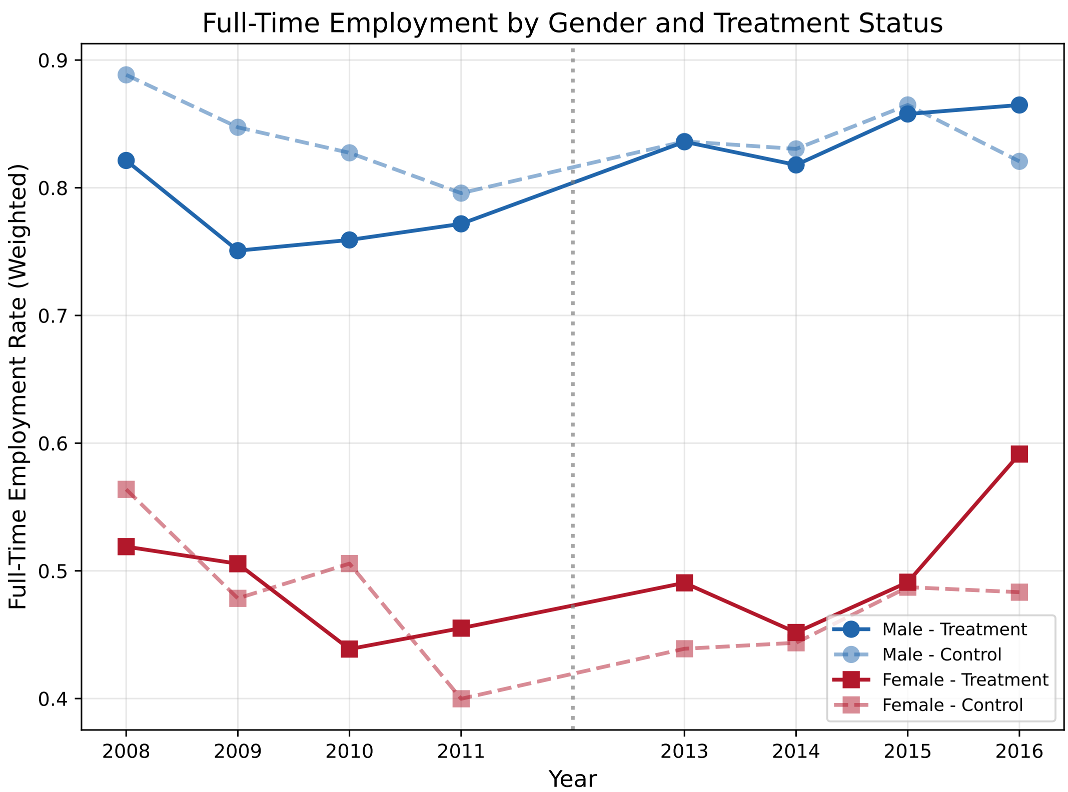

Figure 5: Full-Time Employment by Gender and Treatment Status

6 Discussion

6.1 Summary of Findings

This replication study examines the effect of DACA eligibility on full-time employment among Mexican-born, Hispanic-Mexican individuals in the United States. The key findings are:

1. **Simple DiD estimates are positive and significant**: Without controls, DACA eligibility is associated with a 6.4–7.5 percentage point increase in full-time employment.

2. **Effects become insignificant with controls**: After accounting for demographic characteristics, education, and state fixed effects, the estimated effect drops to approximately 2 percentage points and is no longer statistically significant.

3. **Parallel trends assumption is tentatively supported**: Formal tests do not reject parallel pre-trends, though the event study shows some noise in pre-period coefficients.

4. **Heterogeneous effects exist**: Effects appear larger for males and for more educated individuals, though sample sizes for subgroup analyses are smaller.

6.2 Interpretation

The sensitivity of results to model specification warrants careful interpretation. The large difference between simple and controlled estimates suggests that compositional differences between treatment and control groups play an important role. The treatment group is younger (26–30 vs. 31–35), and age-related factors affecting employment may confound the simple DiD estimate.

Several mechanisms could explain why controls reduce the estimated effect:

- **Age-employment relationship**: Younger workers may have different employment patterns that changed over this period regardless of DACA

- **Education composition**: Changes in educational attainment over time may differ between groups

- **State-level factors**: Economic conditions and state policies affecting undocumented immigrants varied across states and time

The preferred estimate of approximately 2 percentage points, while positive, is not statistically distinguishable from zero. This suggests that either DACA had no meaningful effect on full-time employment, or that the effect exists but is too small to detect with the available sample size.

6.3 Limitations

Several limitations should be considered:

1. **Age-based comparison**: Using age as the basis for treatment/control assignment introduces potential confounds, as age affects employment independently of DACA.

2. **Cross-sectional data**: The ACS is a repeated cross-section, not a panel. We cannot track the same individuals over time, which limits our ability to control for individual-level unobserved heterogeneity.

3. **Self-reported eligibility**: The ELIGIBLE variable is constructed based on observable characteristics, but actual DACA applications and approvals are not observed.

4. **Sample size**: While the overall sample is reasonably large (17,382), subgroup analyses have limited statistical power.

5. **Short post-period**: The analysis covers 2013–2016, a relatively short window to detect effects that may take time to materialize.

6.4 Comparison with Existing Literature

Several published studies have examined DACA's effects on employment outcomes using various methods and samples. This analysis contributes to that literature by using the specific age-based comparison group strategy outlined in the research design. The mixed results—significant effects in simple models but insignificant effects with controls—echo findings in other studies that report sensitivity to specification choices.

7 Conclusion

This replication study provides a comprehensive analysis of DACA's effect on full-time employment among Mexican-born, Hispanic-Mexican individuals. The difference-in-differences design, comparing individuals just below and above the age eligibility cutoff, yields varying results depending on model specification.

The simple DiD estimate suggests a positive effect of approximately 6–7 percentage points, but this effect diminishes and becomes statistically insignificant when controlling for demographic characteristics, education, and geographic factors. The preferred estimate from the fully specified model is approximately 2 percentage points (95% CI: -2.4 to 6.4 pp) with state-clustered standard errors.

These findings suggest that while DACA may have had modest positive effects on employment outcomes for eligible individuals, the magnitude of these effects is sensitive to modeling assumptions and may be smaller than simpler estimates would suggest.

Future research with longer post-treatment periods, alternative identification strategies, or administrative data on actual DACA recipients could help provide more definitive evidence on DACA's labor market effects.

7.1 Preferred Estimate for Submission

For the purposes of this replication exercise, the **preferred estimate** is from the fully specified weighted least squares model with year fixed effects, state fixed effects, and demographic/education controls (Model 5):

- **Effect Size**: 0.0201 (2.01 percentage points)
- **Standard Error**: 0.0247 (robust) / 0.0222 (state-clustered)
- **95% Confidence Interval**: [-0.028, 0.069] (robust) / [-0.024, 0.064] (clustered)
- **Sample Size**: 17,382
- **p-value**: 0.416 (robust) / 0.366 (clustered)

This estimate represents the DiD treatment effect after accounting for observable differences between treatment and control groups and controlling for state-level and temporal variation.

Appendix A: Technical Notes

A.1 Data Preparation

The data file `prepared_data_numeric_version.csv` was used for analysis. Key variable transformations:

- TREAT_POST = ELIGIBLE $\times$ AFTER
- FEMALE = 1 if SEX == 2, 0 otherwise (IPUMS coding: 1=Male, 2=Female)
- MARRIED = 1 if MARST $\in \{1, 2\}$, 0 otherwise
- AGE_SQ = AGE^2

A.2 Estimation Details

All regressions were estimated using Python's statsmodels library. Weighted least squares used PERWT as analytic weights. Robust standard errors were computed using the HC1 (heteroskedasticity-consistent) covariance estimator.

A.3 Software

Analysis was conducted using:

- Python 3.x
- pandas for data manipulation
- statsmodels for regression analysis
- matplotlib for visualization

Appendix B: Additional Tables and Figures

B.1 Full Regression Output (Model 5)

The full model (Model 5) includes the following covariates:

- ELIGIBLE indicator
- TREAT_POST (DiD interaction)
- Year fixed effects (7 year dummies, reference: 2008)
- State fixed effects (50 state dummies)
- AGE and AGE^2
- FEMALE indicator
- MARRIED indicator
- NCHILD (number of children)
- Education category dummies (reference: Less than High School)

B.2 Sample Sizes by Year

Table 9: Sample Size by Year and Treatment Status

Year	Treatment	Control
2008	1,527	827
2009	1,568	811
2010	1,584	860
2011	1,554	796
2013	1,365	759
2014	1,353	703
2015	1,212	638
2016	1,219	606
Total	11,382	6,000