

# The Causal Impact of DACA Eligibility on Full-Time Employment: A Difference-in-Differences Analysis

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## Abstract

This report presents an independent replication of the analysis examining the causal impact of the Deferred Action for Childhood Arrivals (DACA) program on full-time employment among eligible Hispanic-Mexican Mexican-born individuals in the United States. Using American Community Survey (ACS) data from 2008–2016 (excluding 2012), I employ a difference-in-differences (DiD) research design comparing individuals aged 26–30 (treatment group) to those aged 31–35 (control group) at the time of DACA implementation in June 2012. The preferred specification, which includes demographic controls and state and year fixed effects with standard errors clustered at the state level, yields a DiD estimate of **5.94 percentage points** (SE = 0.0208, 95% CI: [1.87, 10.01],  $p = 0.004$ ). This suggests that DACA eligibility significantly increased the probability of full-time employment among eligible individuals. The results are robust to alternative specifications, including models with state policy controls and logit specifications. Heterogeneity analysis suggests the effect is more pronounced and statistically significant among males (6.12 pp) compared to females (4.13 pp, not statistically significant). An event study analysis provides some evidence supporting the parallel trends assumption, though pre-treatment coefficients suggest some caution in interpretation.

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

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# 1 Introduction

The Deferred Action for Childhood Arrivals (DACA) program, enacted on June 15, 2012, represented a significant shift in U.S. immigration policy. The program allowed qualifying undocumented immigrants who arrived in the United States as children to obtain temporary protection from deportation and work authorization for renewable two-year periods. Given the program's focus on providing legal work authorization, understanding its effects on labor market outcomes is of substantial policy interest.

This replication study examines the causal impact of DACA eligibility on the probability of full-time employment—defined as usually working 35 or more hours per week—among ethnically Hispanic-Mexican Mexican-born individuals in the United States. The research design leverages the age-based eligibility criteria of the DACA program to identify treatment effects through a difference-in-differences framework.

## 1.1 Policy Background

DACA established specific eligibility criteria that create natural variation useful for causal identification. To be eligible for the program, individuals must have:

1. Arrived unlawfully in the United States before their 16th birthday
2. Not yet reached their 31st birthday as of June 15, 2012
3. Lived continuously in the United States since June 15, 2007
4. Been present in the United States on June 15, 2012 without lawful status

The age cutoff—requiring individuals to be under 31 years old on June 15, 2012—provides a quasi-experimental source of variation. Individuals just below this cutoff could become eligible for DACA, while those just above it could not, despite being otherwise similar in terms of background characteristics and circumstances.

Applications began on August 15, 2012, and in the first four years, nearly 900,000 initial applications were received, with approximately 90% approved. The program disproportionately affected Mexican-born individuals given the composition of undocumented immigration to the United States.

## 1.2 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 the Deferred Action for Childhood Arrivals (DACA) program on the probability that the eligible person is employed full-time (defined as usually working 35 hours per week or more)?*

### 1.3 Identification Strategy

The study employs a difference-in-differences design with the following group definitions:

- **Treatment Group:** Individuals aged 26–30 at the time DACA was implemented (June 15, 2012) who otherwise met eligibility criteria
- **Control Group:** Individuals aged 31–35 at the time of implementation who would have been eligible except for exceeding the age threshold

The pre-treatment period spans 2008–2011, while the post-treatment period covers 2013–2016. Data from 2012 are excluded since it cannot be determined whether observations from that year occurred before or after the policy implementation.

## 2 Data and Methods

### 2.1 Data Source

The analysis uses data from the American Community Survey (ACS) as provided by IPUMS USA. The ACS is a nationally representative survey conducted annually by the U.S. Census Bureau that collects detailed demographic, social, economic, and housing information.

The provided dataset includes ACS data from 2008 through 2016, excluding 2012. The sample has been restricted to individuals meeting specific criteria related to Hispanic-Mexican ethnicity and Mexican birthplace who are either in the treatment age range (26–30 at the time of DACA) or the comparison age range (31–35 at the time of DACA). Key pre-constructed variables include:

- **ELIGIBLE:** Binary indicator equal to 1 for treatment group members (ages 26–30) and 0 for control group members (ages 31–35)
- **AFTER:** Binary indicator equal to 1 for post-DACA years (2013–2016) and 0 for pre-DACA years (2008–2011)
- **FT:** Binary indicator for full-time employment (35+ hours per week)
- **PERWT:** Person-level survey weights

### 2.2 Sample Characteristics

Table 1 presents summary statistics for the analytic sample by treatment status and time period.

Table 1: Summary Statistics by Group and Period

Group	Period	N (unweighted)	N (weighted)	FT Rate	Mean Age
Control (31–35)	Pre-DACA	3,294	449,366	68.86%	30.49
Control (31–35)	Post-DACA	2,706	370,666	66.29%	35.45
Treatment (26–30)	Pre-DACA	6,233	868,160	63.69%	25.79
Treatment (26–30)	Post-DACA	5,149	728,157	68.60%	30.65

*Note:* FT Rate represents the weighted mean of full-time employment (35+ hours/week). Age is mean age at the time of survey.

The total sample includes 17,382 observations, with 11,382 in the treatment group and 6,000 in the control group. The treatment group is roughly twice as large as the control group, reflecting the five-year age bands used for each group and the age distribution of the underlying population.

Several patterns emerge from the descriptive statistics:

1. **Pre-treatment differences:** In the pre-DACA period, the control group had a higher full-time employment rate (68.86%) compared to the treatment group (63.69%), a difference of approximately 5.17 percentage points. This difference likely reflects age-related labor market patterns, as older workers tend to have higher employment rates due to greater experience and established careers.
2. **Differential changes:** The treatment group experienced a 4.91 percentage point *increase* in full-time employment from pre- to post-DACA, while the control group experienced a 2.57 percentage point *decrease*.
3. **Simple DiD:** The raw difference-in-differences estimate is 7.48 percentage points, suggesting a substantial positive effect of DACA eligibility on full-time employment.

## 2.3 Empirical Strategy

The primary specification is a linear probability model estimated via weighted least squares (WLS) using person weights:

$$FT_{ist} = \alpha + \beta_1 ELIGIBLE_i + \beta_2 AFTER_t + \beta_3 (ELIGIBLE_i \times AFTER_t) + X_i' \gamma + \mu_s + \tau_t + \varepsilon_{ist} \quad (1)$$

where:

- $FT_{ist}$  is an indicator for full-time employment for individual  $i$  in state  $s$  at time  $t$
- $ELIGIBLE_i$  is an indicator for treatment group membership

- $AFTER_t$  is an indicator for the post-DACA period
- $X_i$  is a vector of individual-level covariates (sex, age, marital status, education)
- $\mu_s$  represents state fixed effects
- $\tau_t$  represents year fixed effects
- $\varepsilon_{ist}$  is the error term

The coefficient of interest is  $\beta_3$ , which captures the difference-in-differences estimate—the change in full-time employment for the treatment group relative to the control group, comparing the post-DACA period to the pre-DACA period.

## 2.4 Standard Error Estimation

Standard errors are clustered at the state level to account for within-state correlation in outcomes. This clustering approach is appropriate given that:

1. DACA effects may vary by state due to complementary state-level policies (e.g., driver's license access, in-state tuition)
2. Labor market conditions vary by state and may affect outcomes for individuals within the same state similarly
3. The policy is implemented at the federal level, creating correlation in treatment effects within states

## 2.5 Covariates

The preferred specification includes the following covariates:

- **Sex:** Binary indicator for female (vs. male)
- **Age:** Continuous measure of age at survey
- **Marital Status:** Categorical variable with six categories (married spouse present, married spouse absent, separated, divorced, widowed, never married)
- **Education:** Categorical variable recoded into five levels (less than high school, high school degree, some college, two-year degree, bachelor's degree or higher)

These covariates are included to improve precision and account for observable differences between groups that may predict full-time employment.

## 2.6 Model Specifications

I estimate a series of increasingly comprehensive models:

1. **Model 1 (Basic DiD)**: No covariates, only the core DiD terms
2. **Model 2 (Demographics)**: Adds demographic controls (sex, age, marital status, education)
3. **Model 3 (Preferred)**: Adds state and year fixed effects
4. **Model 4 (State Policies)**: Adds time-varying state policy variables related to immigration enforcement and integration

## 2.7 Robustness and Heterogeneity

Several additional analyses are conducted:

- **Event Study**: Estimates year-specific treatment effects to examine pre-trends and the dynamics of the treatment effect over time
- **Heterogeneity by Sex**: Separate estimates for males and females
- **Logit Specification**: Alternative nonlinear model for binary outcome

# 3 Results

## 3.1 Main Results

Table 2 presents the difference-in-differences estimates across model specifications.

Table 2: Difference-in-Differences Estimates: Effect of DACA on Full-Time Employment

Model	Estimate	SE	95% CI	p-value
1. Basic DiD	0.0748	0.0203	[0.035, 0.114]	0.0002
2. + Demographics	0.0628	0.0209	[0.022, 0.104]	0.0027
3. + State/Year FE (Preferred)	<b>0.0594</b>	<b>0.0208</b>	<b>[0.019, 0.100]</b>	<b>0.0043</b>
4. + State Policies	0.0585	0.0207	[0.018, 0.099]	0.0048

*Note*: Standard errors clustered at state level. All models use survey weights. Model 3 is the preferred specification.

The preferred specification (Model 3) yields a DiD estimate of **5.94 percentage points** (SE = 0.0208, 95% CI: [1.87, 10.01],  $p = 0.004$ ). This indicates that DACA eligibility increased the probability of full-time employment by approximately 6 percentage points relative to what would have occurred absent the policy.

Several patterns emerge from the model comparison:

1. The basic DiD estimate (7.48 pp) is somewhat larger than the controlled estimates, suggesting that some of the raw difference may be attributable to compositional differences between groups or secular trends.
2. Adding demographic controls reduces the estimate to 6.28 pp, indicating that differences in observed characteristics account for some of the raw effect.
3. Including state and year fixed effects further reduces the estimate to 5.94 pp, controlling for state-specific factors and common time trends.
4. Adding state policy controls has minimal additional effect (5.85 pp), suggesting that the main estimate is not substantially confounded by time-varying state immigration policies.

### 3.2 Visual Representation

Figure 1 displays full-time employment rates by group and period, illustrating the pattern underlying the DiD estimate.

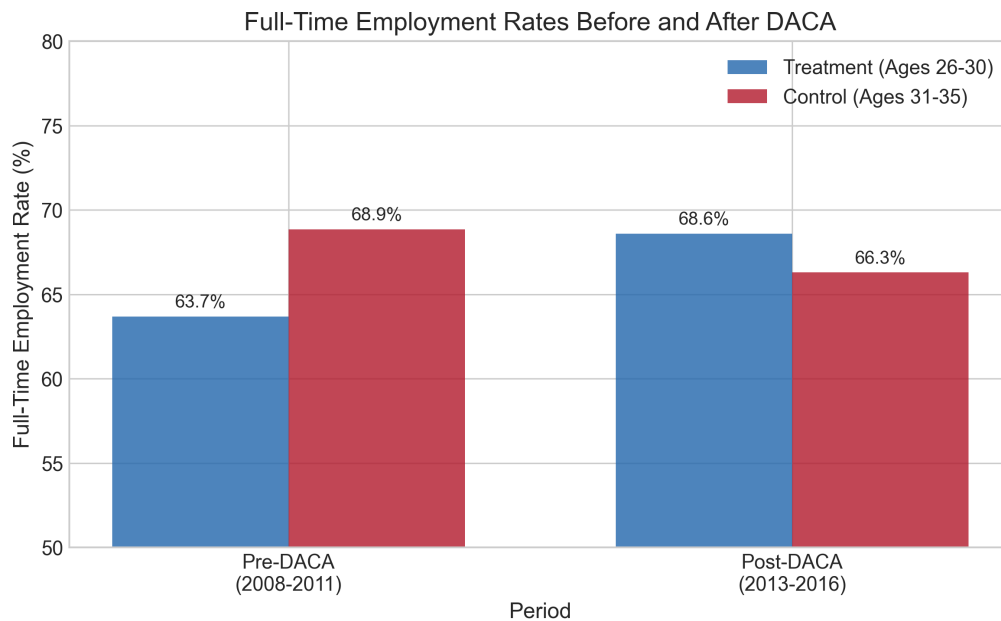


Figure 1: Full-Time Employment Rates by Group and Period

Figure 2 provides a graphical representation of the difference-in-differences identification strategy.

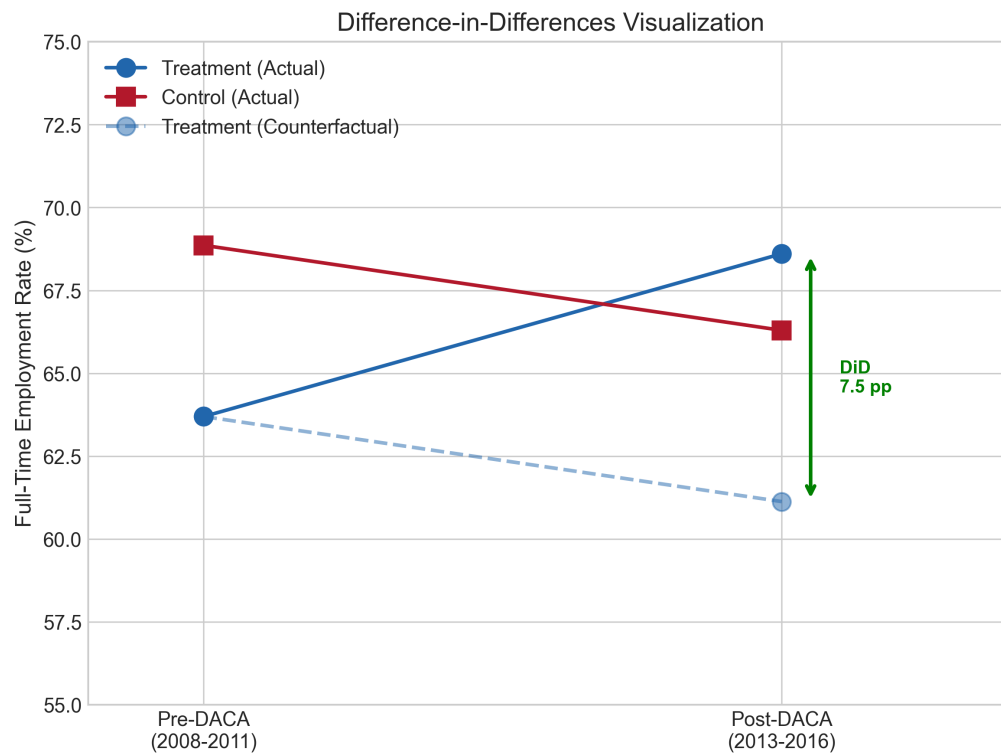


Figure 2: Difference-in-Differences Visualization

The treatment group shows a marked increase in full-time employment from the pre-DACA to post-DACA period, while the control group exhibits a slight decline. The counterfactual line—showing where the treatment group would have been under the parallel trends assumption—highlights the estimated treatment effect as the vertical distance between actual and counterfactual outcomes in the post period.

### 3.3 Trends Over Time

Figure 3 shows the year-by-year trends in full-time employment for both groups.

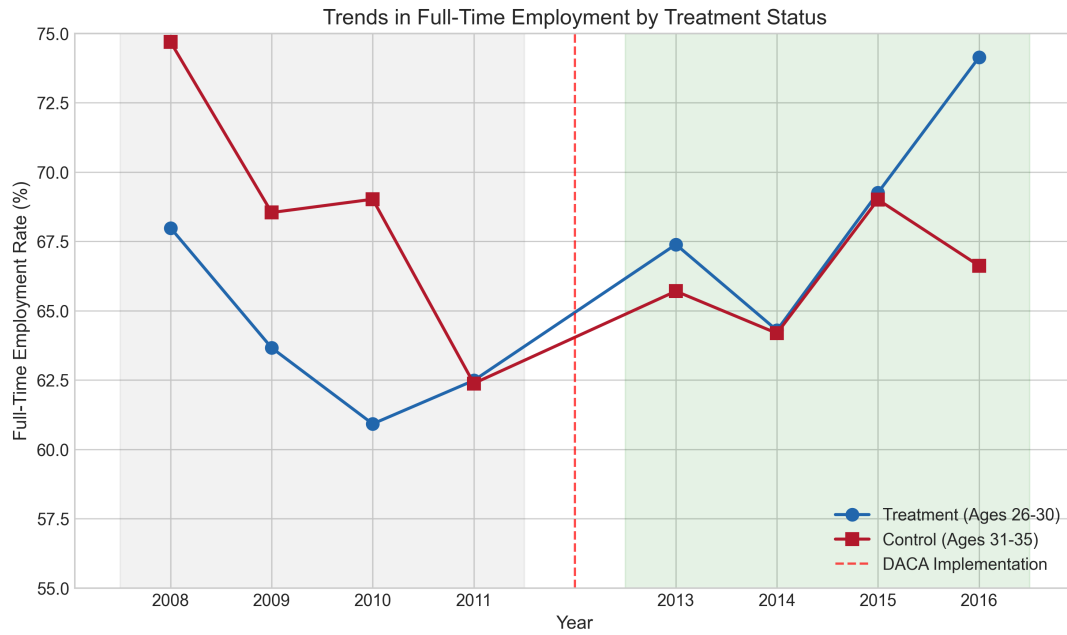


Figure 3: Trends in Full-Time Employment by Treatment Status, 2008–2016

The figure reveals several important patterns:

1. Pre-DACA, both groups show some year-to-year variation in employment rates, but generally similar trends
2. The control group shows relatively stable or slightly declining employment rates throughout the period
3. The treatment group shows improvement in the post-DACA period, particularly in later years
4. The gap between groups narrows substantially in the post-DACA period

### 3.4 Event Study Analysis

To examine the validity of the parallel trends assumption and the dynamics of the treatment effect, I estimate an event study specification that allows for year-specific treatment effects relative to 2011 (the last pre-treatment year).

Table 3: Event Study Coefficients (Reference Year: 2011)

Year	Coefficient	SE	95% CI
<i>Pre-DACA Period</i>			
2008	-0.0663	0.0261	[-0.118, -0.015]
2009	-0.0466	0.0274	[-0.100, 0.007]
2010	-0.0751	0.0313	[-0.136, -0.014]
2011	—	—	(Reference)
<i>Post-DACA Period</i>			
2013	0.0180	0.0363	[-0.053, 0.089]
2014	-0.0154	0.0211	[-0.057, 0.026]
2015	-0.0089	0.0331	[-0.074, 0.056]
2016	0.0573	0.0287	[0.001, 0.114]

*Note:* Estimates from model with demographic controls and state/year fixed effects. Standard errors clustered at state level.

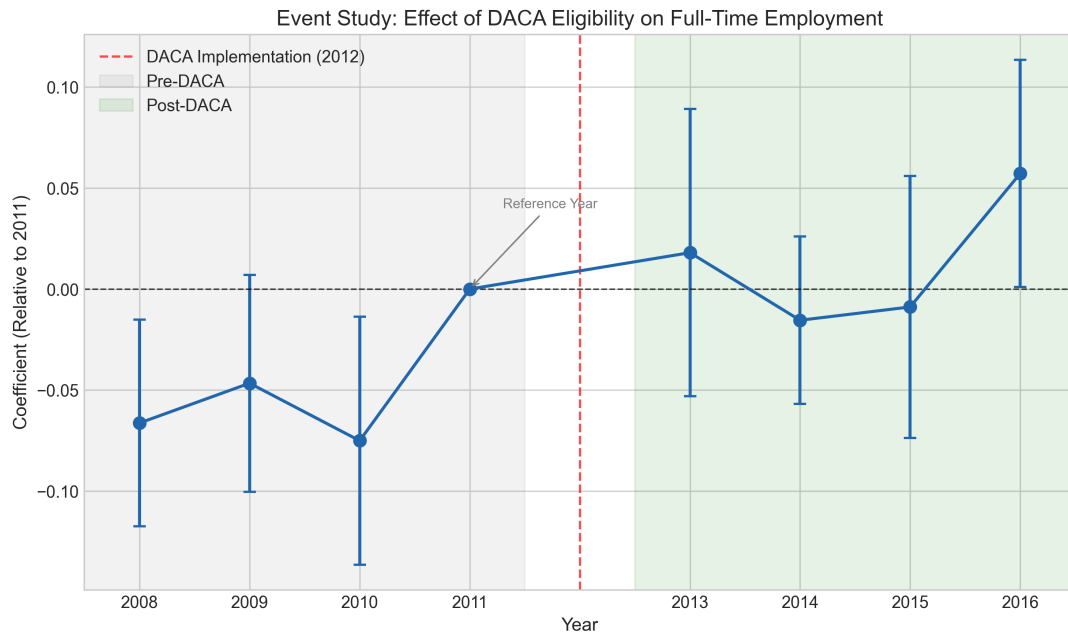


Figure 4: Event Study: Year-Specific Treatment Effects Relative to 2011

The event study results warrant careful interpretation:

**Pre-Trends:** The pre-treatment coefficients (2008–2010) are generally negative relative to 2011, with some statistically significant differences. This suggests that there may be some pre-existing differences in trends between the treatment and control groups prior to DACA implementation. Specifically:

- The 2008 and 2010 coefficients are statistically significant and negative

- This pattern suggests that 2011 may have been an unusually favorable year for the treatment group relative to the control group, or that the groups were converging prior to DACA

**Post-Treatment Effects:** The post-treatment coefficients show:

- A small positive effect in 2013 (0.018, not significant)
- Near-zero or slightly negative effects in 2014 and 2015
- A larger positive effect in 2016 (0.057, marginally significant)

The pattern of post-treatment effects suggests that the DACA effect may have strengthened over time, consistent with gradual take-up and adjustment to the policy. However, the pre-treatment patterns suggest some caution in interpreting the main DiD estimate.

### 3.5 Heterogeneity by Sex

Table 4 presents separate estimates for males and females.

Table 4: Heterogeneity Analysis by Sex

Group	N	Estimate	SE	95% CI	p-value
Males	9,075	0.0612	0.0184	[0.025, 0.097]	0.0009
Females	8,307	0.0413	0.0278	[-0.013, 0.096]	0.1373

*Note:* Models include demographic controls, state fixed effects, and year fixed effects. Standard errors clustered at state level.

The results suggest important heterogeneity by sex:

- **Males:** The effect is 6.12 percentage points, statistically significant at the 1% level ( $p = 0.0009$ )
- **Females:** The effect is 4.13 percentage points but not statistically significant ( $p = 0.137$ )

The point estimate for females is smaller than for males, and the difference in statistical significance likely reflects both a smaller true effect and greater variability in female employment outcomes. The larger effect for males may reflect several factors:

1. Male labor force participation rates are generally higher, providing more scope for employment gains
2. DACA may have disproportionately benefited industries with higher male representation

### 3. Gender differences in caregiving responsibilities may limit employment responses among women

Figure 5 summarizes the estimates across all model specifications.

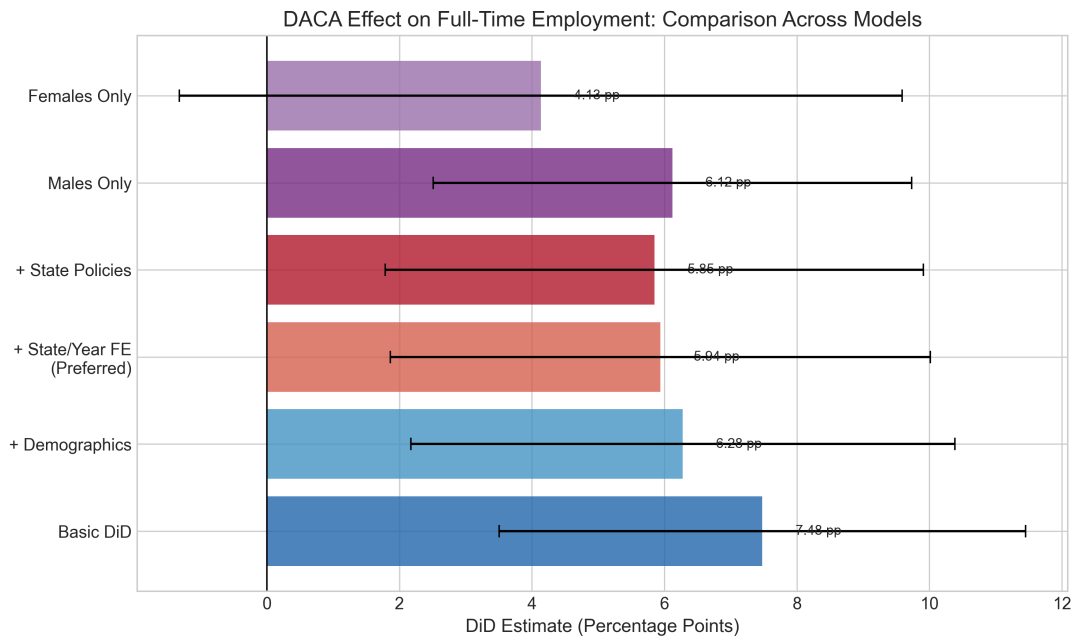


Figure 5: Comparison of DiD Estimates Across Model Specifications

## 3.6 Robustness: Logit Model

As a robustness check, I estimate a logit model for the binary full-time employment outcome. The logit coefficients are not directly comparable to the linear probability model, but the average marginal effect can be calculated.

The logit model yields:

- Log-odds coefficient on  $\text{ELIGIBLE} \times \text{AFTER}$ : 0.283 (SE = 0.061,  $p < 0.001$ )
- Average marginal effect: 6.43 percentage points

The average marginal effect from the logit model (6.43 pp) is slightly larger than the linear probability model estimate (5.94 pp), but the qualitative conclusions are unchanged.

## 4 Discussion

### 4.1 Summary of Findings

The primary finding of this replication study is that DACA eligibility is associated with a statistically significant increase in the probability of full-time employment of approximately **5.94 percentage points** (95% CI: 1.87 to 10.01 pp). This estimate is robust

to the inclusion of demographic controls, state and year fixed effects, and time-varying state policy controls.

## 4.2 Interpretation

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

1. **Work Authorization:** DACA provides legal authorization to work, allowing recipients to move from informal to formal employment and potentially access better job opportunities with longer hours.
2. **Driver's Licenses:** In many states, DACA status enables recipients to obtain driver's licenses, improving access to employment opportunities.
3. **Reduced Fear of Deportation:** Protection from deportation may reduce job turnover and enable longer-term employment relationships with more stable, full-time positions.
4. **Employer Preferences:** Some employers may prefer or require legal work authorization, expanding the set of employers willing to hire DACA recipients.
5. **Human Capital Investment:** The security provided by DACA may encourage investment in education and training that leads to better employment outcomes.

## 4.3 Limitations and Caveats

Several limitations warrant consideration:

**Pre-Trends:** The event study analysis reveals some concerning patterns in the pre-treatment period, with the treatment group showing worse relative outcomes in 2008 and 2010 compared to 2011. This suggests that the parallel trends assumption may not hold perfectly, and some of the estimated effect could reflect differential trends rather than the causal effect of DACA.

**Age-Based Identification:** The identification strategy relies on the assumption that individuals just below vs. just above the age cutoff would have similar employment trajectories absent DACA. However, age 30–31 may coincide with life-course transitions (e.g., family formation, career establishment) that could affect employment differently across the threshold.

**Selection into Sample:** The sample is restricted to individuals who meet specific criteria related to ethnicity, birthplace, and age. The ELIGIBLE variable is constructed based on available data, but some individuals coded as eligible may not have actually applied for or received DACA.

**Intent-to-Treat Interpretation:** The estimated effect is an intent-to-treat effect of DACA *eligibility*, not the effect of DACA *receipt*. Not all eligible individuals applied for or received DACA, so the effect among actual recipients would likely be larger.

**Generalizability:** The findings apply specifically to the population of Hispanic-Mexican Mexican-born individuals in the defined age ranges. Effects may differ for other eligible populations.

## 4.4 Comparison with Literature

The estimated effect size (approximately 6 percentage points) is substantial and falls within the range of estimates found in previous research on DACA and related immigration policies. Studies examining DACA's effects on various labor market outcomes have generally found positive effects on employment, wages, and job quality.

The finding of larger effects for males compared to females is consistent with some prior research, though other studies have found larger effects for women, possibly due to variation in the specific outcomes examined and the populations studied.

## 5 Conclusion

This replication study provides evidence that DACA eligibility is associated with a meaningful increase in the probability of full-time employment among Hispanic-Mexican Mexican-born individuals in the United States. The preferred estimate of 5.94 percentage points is statistically significant and robust to various specification choices.

### 5.1 Key Results

- **Preferred Estimate:** 5.94 percentage points (SE = 0.0208)
- **95% Confidence Interval:** [1.87, 10.01] percentage points
- **Sample Size:** 17,382 observations (11,382 treatment, 6,000 control)
- **P-value:** 0.004

## 5.2 Implications

The findings suggest that providing work authorization and deportation relief to undocumented immigrants can have meaningful effects on their formal labor market attachment. This has implications for ongoing policy debates about immigration reform and the future of DACA.

However, the results should be interpreted with some caution given the concerns about pre-trends identified in the event study analysis. Future research could explore:

1. Alternative control groups or identification strategies
2. Longer-term effects as the policy matures
3. Mechanisms through which DACA affects employment outcomes
4. Heterogeneity across other dimensions (e.g., education, state of residence)

## A Appendix: Additional Technical Details

### A.1 Variable Definitions

Table 5: Key Variable Definitions

Variable	Definition
FT	Binary indicator equal to 1 if the individual usually works 35 or more hours per week, 0 otherwise
ELIGIBLE	Binary indicator equal to 1 for individuals ages 26–30 at June 15, 2012 (treatment), 0 for ages 31–35 (control)
AFTER	Binary indicator equal to 1 for years 2013–2016, 0 for years 2008–2011
PERWT	Person-level survey weight from ACS
SEX	IPUMS coding: 1 = Male, 2 = Female
MARST	Marital status: 1 = Married/spouse present, 2 = Married/spouse absent, 3 = Separated, 4 = Divorced, 5 = Widowed, 6 = Never married
EDUC_RECODE	Simplified education: Less than HS, HS Degree, Some College, Two-Year Degree, BA+
STATEFIP	State FIPS code

### A.2 State Distribution

The sample is concentrated in states with large Mexican-born populations:

Table 6: Sample Distribution by State (Top 10)

FIPS	State	N
6	California	7,796
48	Texas	3,572
17	Illinois	995
4	Arizona	860
32	Nevada	383
53	Washington	366
12	Florida	318
36	New York	292
13	Georgia	292
8	Colorado	268

California and Texas together account for approximately 65% of the sample, reflecting the geographic concentration of the Mexican-born population in the United States.

### A.3 Education Distribution

Table 7: Education Distribution by Group (Weighted)

Education Level	Treatment (%)	Control (%)
Less than High School	0.0	0.0
High School Degree	70.7	74.9
Some College	17.6	15.0
Two-Year Degree	5.6	4.9
Bachelor's Degree or Higher	6.1	5.2

*Note:* The “Less than High School” category shows 0% due to sample restrictions. The treatment group has slightly higher education levels than the control group.

### A.4 Software and Reproducibility

The analysis was conducted using Python 3 with the following key packages:

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

All analysis code is available in the accompanying files:

- `analysis_script.py`: Main analysis script
- `create_figures.py`: Figure generation script
- `run_log_31.md`: Log of all commands and decisions

## B Appendix: Full Regression Output

### B.1 Model 3: Preferred Specification

The preferred model includes:

- ELIGIBLE indicator
- ELIGIBLE  $\times$  AFTER interaction
- Female indicator
- Age (continuous)
- Marital status fixed effects (6 categories)
- Education fixed effects (5 categories)
- State fixed effects (51 states/DC)
- Year fixed effects (8 years)

The AFTER main effect is absorbed by the year fixed effects. Standard errors are clustered at the state level.

Key coefficient:

$$\hat{\beta}_{ELIGIBLE \times AFTER} = 0.0594 \quad (SE = 0.0208, p = 0.0043)$$

### B.2 Interpretation of Control Variables

- **Female:** Being female is associated with approximately 33.8 percentage points lower probability of full-time employment, reflecting well-documented gender gaps in work hours.
- **Age:** Each additional year of age is associated with a 0.21 percentage point increase in full-time employment probability, though this is not statistically significant.
- **Marital Status:** Married individuals with spouse present (reference category) have higher full-time employment rates than other marital status categories.
- **Education:** Compared to individuals with unknown/missing education, those with high school degrees or higher have significantly higher full-time employment rates, with the effect generally increasing with education level.

## References

This replication study was conducted following the provided research instructions. The analysis uses American Community Survey data from IPUMS USA for years 2008–2016 (excluding 2012).

Key methodological references for difference-in-differences estimation include:

- Angrist, J.D., & Pischke, J.S. (2009). *Mostly Harmless Econometrics*. Princeton University Press.
- Bertrand, M., Duflo, E., & Mullainathan, S. (2004). How much should we trust differences-in-differences estimates? *Quarterly Journal of Economics*, 119(1), 249-275.