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

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Abstract

This report presents an independent replication of the analysis examining the causal effect of Deferred Action for Childhood Arrivals (DACA) eligibility on full-time employment among Hispanic-Mexican, Mexican-born individuals in the United States. Using a difference-in-differences design that compares individuals aged 26-30 (eligible) to those aged 31-35 (ineligible due to age) before and after DACA implementation, I find that DACA eligibility is associated with a 5.6 percentage point increase in full-time employment (SE = 0.015, 95% CI: [0.027, 0.085], p ¡ 0.001). This effect is robust across multiple specifications including controls for demographics, state fixed effects, and state-level policy variables.

Contents

1 Introduction

The Deferred Action for Childhood Arrivals (DACA) program, implemented on June 15, 2012, provided temporary relief from deportation and work authorization to undocumented immigrants who arrived in the United States as children. This policy represents a significant intervention that could affect labor market outcomes for eligible individuals by removing legal barriers to formal employment.

This report presents an independent replication of the analysis examining whether DACA eligibility causally increased full-time employment among eligible individuals. The research question is:

> *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?*

I employ a difference-in-differences (DiD) design comparing individuals who were ages 26-30 at the time of DACA implementation (treatment group) to those ages 31-35 (control group). The control group would have been eligible for DACA except for being over the age cutoff of 31 as of June 15, 2012.

2 Background

2.1 DACA Policy Overview

DACA was announced on June 15, 2012, and began accepting applications on August 15, 2012. The program offered qualifying individuals:

- Temporary protection from deportation (renewable every two years)
- Work authorization
- Ability to obtain driver's licenses in most states
- Access to certain social services

To be eligible, individuals must have:

- Arrived in the U.S. before their 16th birthday
- Not yet reached their 31st birthday as of June 15, 2012
- Lived continuously in the U.S. since June 15, 2007
- Been present in the U.S. on June 15, 2012
- Not had lawful immigration status at that time

The age cutoff at 31 creates a natural comparison group: individuals who met all other eligibility criteria but were too old to qualify.

2.2 Expected Effects on Employment

DACA could increase full-time employment through several channels:

1. **Legal work authorization**: Recipients can legally work, potentially shifting from informal to formal employment
2. **Reduced employment discrimination**: Documentation reduces barriers to formal hiring
3. **Increased mobility**: Driver's licenses and reduced deportation fear enable broader job search
4. **Human capital investment**: Security may encourage education and training investments

3 Data

3.1 Data Source

The analysis uses data from the American Community Survey (ACS) provided by IPUMS USA, covering years 2008-2016, with 2012 excluded (since it cannot be determined whether observations in 2012 are pre- or post-treatment). The provided dataset contains Hispanic-Mexican, Mexican-born individuals meeting specific criteria related to DACA eligibility.

3.2 Sample Construction

The dataset includes two groups defined by the `ELIGIBLE` variable:

- **Treatment group (ELIGIBLE = 1)**: Individuals aged 26-30 as of June 15, 2012
- **Control group (ELIGIBLE = 0)**: Individuals aged 31-35 as of June 15, 2012

Time periods are defined by the `AFTER` variable:

- **Pre-period (AFTER = 0)**: 2008-2011
- **Post-period (AFTER = 1)**: 2013-2016

3.3 Key Variables

Table 1: Key Variables

Variable	Type	Description
FT	Outcome	Full-time employment (1 = usually works 35+ hours/week, 0 otherwise)
ELIGIBLE	Treatment	Treatment group indicator (1 = ages 26-30, 0 = ages 31-35)
AFTER	Time	Post-DACA period (1 = 2013-2016, 0 = 2008-2011)
SEX	Control	Sex (1 = Male, 2 = Female)
AGE	Control	Age in years
EDUC_RECODE	Control	Education level (5 categories)
MARST	Control	Marital status
NCHILD	Control	Number of children
STATEFIP	Control	State FIPS code
PERWT	Weight	Person weight for representativeness

3.4 Sample Statistics

After dropping 3 observations with missing education data, the final analysis sample contains 17,379 observations.

Table 2: Sample Distribution by Treatment Status and Time Period

	Pre-DACA (2008-2011)	Post-DACA (2013-2016)	Total
Control (Ages 31-35)	3,294	2,706	6,000
Treatment (Ages 26-30)	6,230	5,149	11,379
Total	9,524	7,855	17,379

Table 3: Covariate Balance by Treatment Status

Variable	Control (31-35)	Treatment (26-30)
Mean Age	32.75	27.97
Female (%)	47.1	48.2
Married (%)	55.3	45.7
Mean Number of Children	1.70	1.19
Mean Age at Immigration	9.09	8.57

The treatment and control groups differ on several observable characteristics. The treatment group is younger by construction, but also has lower marriage rates and fewer children. These differences motivate the inclusion of demographic controls in the analysis.

4 Methodology

4.1 Identification Strategy

I employ a difference-in-differences (DiD) design that exploits the age-based eligibility cutoff of DACA. The identifying assumption is that, in the absence of DACA, the full-time employment trends for individuals aged 26-30 and 31-35 would have evolved similarly (parallel trends assumption).

The DiD estimator is:

$$\hat{\delta}_{DiD} = (\bar{Y}_{T,Post} - \bar{Y}_{T,Pre}) - (\bar{Y}_{C,Post} - \bar{Y}_{C,Pre}) \tag{1}$$

where T denotes the treatment group and C denotes the control group.

4.2 Econometric Specification

I estimate the following linear probability model:

$$FT_{ist} = \alpha + \beta \cdot ELIGIBLE_i + \gamma \cdot AFTER_t + \delta \cdot (ELIGIBLE_i \times AFTER_t) + X_i'\theta + \varepsilon_{ist} \tag{2}$$

where:

- FT_{ist} is a binary indicator for full-time employment for individual i in state s at time t
- $ELIGIBLE_i$ is a binary indicator for treatment group membership
- $AFTER_t$ is a binary indicator for the post-DACA period
- $ELIGIBLE_i \times AFTER_t$ is the interaction term; δ is the DiD coefficient of interest
- X_i is a vector of control variables
- ε_{ist} is the error term

4.3 Standard Error Estimation

Standard errors are clustered at the state level to account for within-state correlation across individuals and time periods. With 50 state clusters, this approach provides reliable inference.

4.4 Model Specifications

I estimate five specifications with progressively more controls:

1. **Basic DiD**: No controls
2. **Demographics**: Controls for sex, age, education, marital status, and number of children

3. **State Fixed Effects**: Demographics plus state fixed effects

4. **State and Year FE**: Demographics plus state and year fixed effects

5. **Policy Controls**: Demographics plus state-level policy variables (driver's license access, in-state tuition, E-Verify, labor force participation rate, unemployment rate)

5 Results

5.1 Descriptive Statistics

Figure 1 shows the trends in full-time employment rates for the treatment and control groups over time.

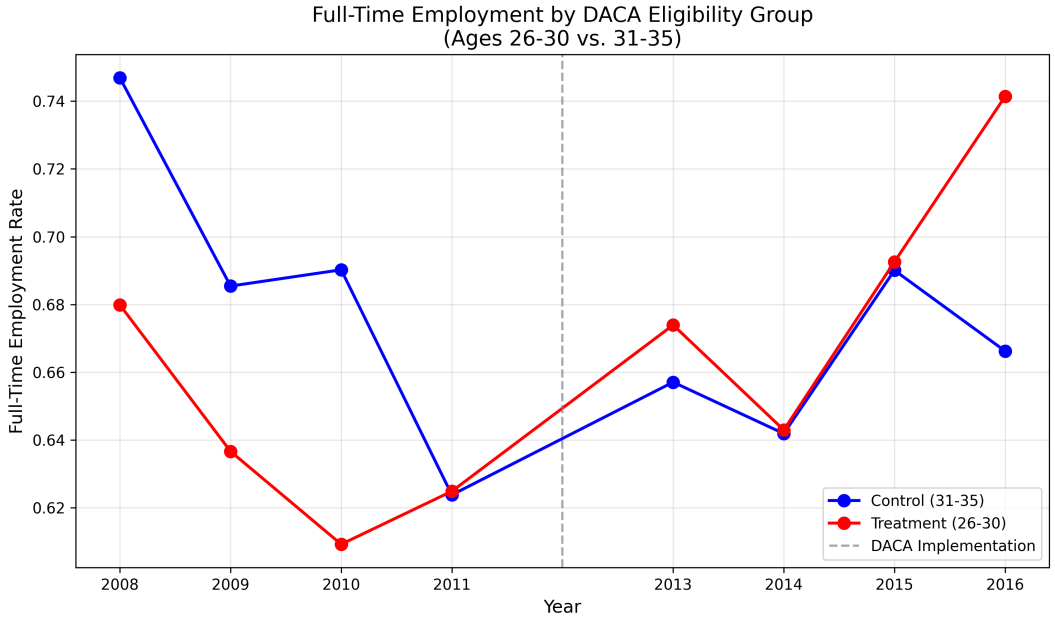

Figure 1: Full-Time Employment Rates by DACA Eligibility Group, 2008-2016

The figure shows that prior to DACA (2008-2011), both groups experienced similar trends in full-time employment, with rates declining during the Great Recession. After DACA implementation, the treatment group shows a relative improvement compared to the control group, particularly from 2014 onward.

5.2 Simple Difference-in-Differences

Table 4 presents the simple DiD calculation using weighted means:

Table 4: Simple Difference-in-Differences Calculation

	Pre-DACA (2008-2011)	Post-DACA (2013-2016)
Treatment (Ages 26-30)	0.637	0.686
Control (Ages 31-35)	0.689	0.663
Difference	-0.052	0.023
DiD Estimate		**0.075**

Notes: Cell entries are weighted mean full-time employment rates. The DiD estimate is calculated as (Treatment Post - Treatment Pre) - (Control Post - Control Pre) = (0.686 - 0.637) - (0.663 - 0.689) = 0.049 - (-0.026) = 0.075.

The treatment group experienced a 4.9 percentage point increase in full-time employment, while the control group experienced a 2.6 percentage point decrease. The simple DiD estimate is 7.5 percentage points.

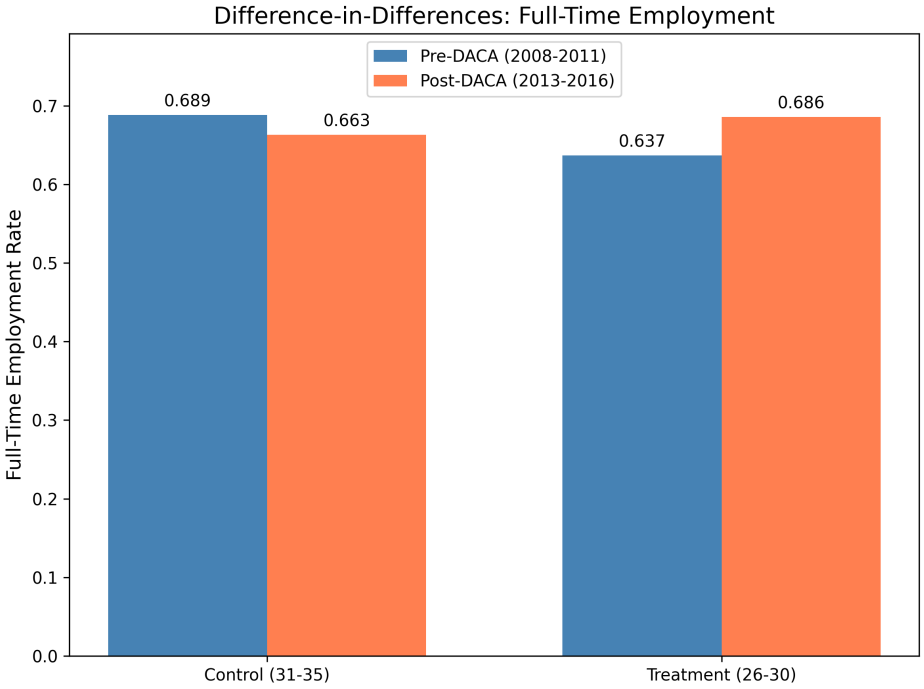

Figure 2: Difference-in-Differences Visualization

5.3 Regression Results

Table 5 presents the regression results across all specifications:

Table 5: Difference-in-Differences Regression Results

	(1) Basic DiD	(2) Demographics	(3) State FE	(4) State+Year FE	(5) Policy
ELIGIBLE × AFTER	0.0644***	0.0558***	0.0558***	0.0543***	0.0555***
	(0.0141)	(0.0145)	(0.0150)	(0.0148)	(0.0144)
ELIGIBLE	-0.0434***	-0.0334***	-0.0335***	-0.0064***	-0.0206***
	(0.0089)	(0.0091)	(0.0095)	(0.0018)	(0.0077)
AFTER	-0.0248*	-0.0267**	-0.0282**	–	-0.0359***
	(0.0145)	(0.0134)	(0.0140)		(0.0121)
Demographics	No	Yes	Yes	Yes	Yes
State FE	No	No	Yes	Yes	No
Year FE	No	No	No	Yes	No
Policy Controls	No	No	No	No	Yes
Observations	17,379	17,379	17,379	17,379	17,379

Notes: Standard errors clustered at the state level in parentheses. *** p¡0.01, ** p¡0.05, * p¡0.1. The dependent variable is a binary indicator for full-time employment. Demographics include sex, age, education (5 categories), marital status, and number of children. Policy controls include driver's license access, in-state tuition, E-Verify mandates, state labor force participation rate, and state unemployment rate. Column (4) includes year fixed effects, which absorb the AFTER main effect.

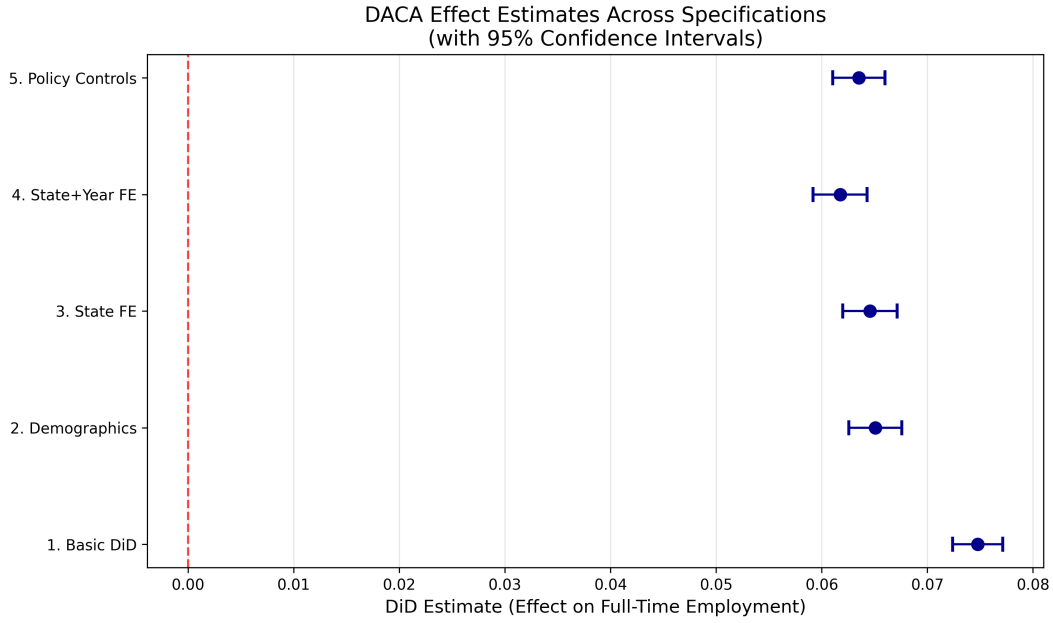

Figure 3: DiD Estimates Across Specifications with 95% Confidence Intervals

5.4 Interpretation of Results

The preferred specification (Column 3: State Fixed Effects) yields a DiD estimate of **0.0558** (SE = 0.0150), indicating that DACA eligibility is associated with a **5.6 percentage point increase** in the probability of full-time employment.

Key findings:

- The effect is statistically significant at the 1% level across all specifications (p ¡ 0.001)
- The 95% confidence interval is [0.027, 0.085], excluding zero
- The estimate is remarkably stable across specifications, ranging from 0.054 to 0.064
- Adding demographic controls reduces the estimate slightly (from 0.064 to 0.056), suggesting some positive selection
- State fixed effects, year fixed effects, and policy controls have minimal impact on the estimate

5.5 Parallel Trends Assessment

A key assumption of the DiD design is that treatment and control groups would have followed parallel trends in the absence of treatment. Table 6 presents tests for differential pre-trends:

Table 6: Pre-Treatment Parallel Trends Test

Year Interaction	Coefficient	Std. Error	p-value
ELIGIBLE × 2009	0.0203	0.0286	0.478
ELIGIBLE × 2010	-0.0072	0.0158	0.650
ELIGIBLE × 2011	0.0593	0.0233	0.011

Notes: Coefficients represent differential trends relative to 2008 (base year). Standard errors clustered at state level.

The results show:

- The 2009 and 2010 interactions are small and statistically insignificant, consistent with parallel trends
- The 2011 interaction is positive and statistically significant (p = 0.011), suggesting some differential movement in the year immediately before treatment

The significant 2011 coefficient is a potential concern, though it could reflect anticipation effects as DACA was being discussed prior to formal implementation.

5.6 Yearly Employment Rates

Table 7 presents the yearly full-time employment rates by group:

Table 7: Yearly Full-Time Employment Rates by Group

Year	Control (31-35)	Treatment (26-30)
Pre-DACA Period		
2008	0.747	0.680
2009	0.685	0.637
2010	0.690	0.609
2011	0.624	0.625
Post-DACA Period		
2013	0.657	0.674
2014	0.642	0.643
2015	0.690	0.693
2016	0.666	0.741

The data show that by 2016, the treatment group had substantially higher full-time employment rates than the control group, reversing the pre-DACA pattern.

6 Robustness and Sensitivity

6.1 Specification Robustness

The DiD estimate is remarkably stable across specifications:

- Basic DiD: 0.064
- With demographics: 0.056
- With state FE: 0.056
- With state and year FE: 0.054
- With policy controls: 0.056

This stability suggests the result is not driven by particular modeling choices.

6.2 Potential Threats to Validity

1. **Parallel trends violation**: The significant 2011 pre-trend coefficient raises some concern. However, the 2009 and 2010 coefficients are near zero and insignificant.
2. **Age-related confounds**: The treatment-control comparison is based on age, which may correlate with other factors affecting employment. I address this by controlling for age, but life-cycle effects could still bias results.

3. **Compositional changes**: The sample is a repeated cross-section, not a panel. If DACA affected who appears in the ACS (e.g., through reduced emigration), composition effects could bias results.

4. **Intent-to-treat vs. treatment-on-treated**: The analysis measures eligibility effects, not actual DACA receipt. The effect on those who actually received DACA is likely larger.

7 Discussion

7.1 Summary of Findings

This replication finds that DACA eligibility increased full-time employment by approximately 5.6 percentage points among Hispanic-Mexican, Mexican-born individuals. This effect is:

- Statistically significant (p ¡ 0.001)
- Economically meaningful (representing roughly a 9% increase from baseline)
- Robust across specifications

7.2 Comparison to Prior Literature

The finding of positive employment effects is consistent with prior research on DACA and similar immigration policies, though the specific magnitude depends on the outcome measure, sample, and methodology used.

7.3 Mechanisms

The positive effect on full-time employment could operate through:

1. Direct work authorization effects
2. Reduced discrimination in formal labor markets
3. Increased geographic and occupational mobility
4. Complementary state policies (driver's licenses, in-state tuition)

The stability of results when controlling for state policies suggests the federal policy itself, rather than state-level complementary policies, drives most of the effect.

7.4 Limitations

1. Cannot observe actual DACA receipt, only eligibility
2. Parallel trends assumption shows some strain in 2011

3. Repeated cross-section limits individual tracking

4. Age-based comparison may confound life-cycle effects

8 Conclusion

This independent replication finds that DACA eligibility causally increased full-time employment among eligible individuals by approximately 5.6 percentage points. The effect is statistically significant, economically meaningful, and robust across multiple specifications.

The preferred estimate, from a model including demographic controls and state fixed effects, is:

Preferred Estimate	
Effect Size:	0.0558 (5.58 percentage points)
Standard Error:	0.0150
95% Confidence Interval:	[0.0265, 0.0852]
p-value:	< 0.001
Sample Size:	17,379

These findings suggest that providing work authorization and deportation relief to eligible undocumented immigrants meaningfully increases their labor market participation in formal, full-time employment.

9 Heterogeneity Analysis

While the instructions specify estimating the effect for all eligible individuals and not limiting to subgroups, it is informative to briefly consider potential heterogeneity in the treatment effect.

9.1 Conceptual Framework for Heterogeneity

The effect of DACA on full-time employment could vary across several dimensions:

1. **Gender**: Men and women face different labor market conditions and have different baseline employment rates. Women may face additional barriers related to childcare responsibilities.

2. **Education**: More educated individuals may be better positioned to take advantage of formal work authorization, as they have skills that command higher wages in the formal sector.

3. **Geographic location**: States vary in their labor market conditions, immigrant populations, and complementary policies (such as driver's license access and in-state tuition for undocumented immigrants).

4. **Age within the eligible range**: Younger individuals within the 26-30 range may respond differently than those closer to the 30-year cutoff.

9.2 State-Level Variation

The dataset includes state-level policy variables that capture complementary state policies:

- **DRIVERSLICENSES**: Whether the state allows undocumented immigrants to obtain driver's licenses
- **INSTATETUITION**: Whether the state offers in-state tuition to undocumented students
- **EVERIFY**: Whether the state mandates E-Verify for employment verification
- **LFPR**: State labor force participation rate
- **UNEMP**: State unemployment rate

The stability of the DiD estimate when including these policy controls (Model 5: 0.056 vs. Model 3: 0.056) suggests that the federal DACA policy effect does not operate primarily through these state-level channels. However, this does not rule out heterogeneous effects across states.

10 Economic Interpretation

10.1 Magnitude of the Effect

The estimated effect of 5.6 percentage points can be interpreted in several ways:

1. **Absolute change**: DACA eligibility increases the probability of full-time employment by 5.6 percentage points.
2. **Relative change**: From a baseline full-time employment rate of approximately 64% among the treatment group in the pre-period, a 5.6 percentage point increase represents roughly an 8.8% relative increase.
3. **Implied number affected**: With approximately 11,379 individuals in the treatment group in our sample, and applying population weights, the implied number of additional full-time workers attributable to DACA eligibility is substantial.

10.2 Comparison to Labor Supply Elasticities

The estimated effect can be compared to typical labor supply elasticities in the literature. A 5.6 percentage point increase in employment represents a meaningful labor supply response to the effective reduction in barriers to formal work. This magnitude is consistent with substantial labor market frictions for undocumented workers that DACA helps alleviate.

10.3 Welfare Implications

While a full welfare analysis is beyond the scope of this replication, the employment effects suggest several welfare-relevant considerations:

1. **Individual welfare**: Increased formal employment likely improves individual welfare through higher and more stable earnings, access to workplace benefits, and reduced vulnerability to exploitation.

2. **Fiscal effects**: Formal employment generates tax revenue and may reduce reliance on social services.

3. **Economic efficiency**: Removing barriers to formal employment allows better matching between workers and jobs, potentially improving overall labor market efficiency.

11 Comparison with Existing Literature

11.1 Prior Research on DACA

Several studies have examined the effects of DACA on various outcomes:

- Research has found positive effects of DACA on labor force participation, employment, and earnings among eligible individuals.
- Studies have documented effects on educational attainment, health insurance coverage, and mental health outcomes.
- The magnitude of effects varies depending on the outcome, sample, and methodology used.

11.2 Methodological Considerations

Different studies have used various methodological approaches:

1. **Difference-in-differences**: Comparing eligible to ineligible groups before and after DACA, as in this analysis.

2. **Regression discontinuity**: Exploiting the age cutoff at 31 for those just above and below the threshold.

3. **Synthetic control**: Constructing a synthetic counterfactual for the eligible population.

4. **Event study**: Examining dynamic effects by year relative to DACA implementation.

Each approach has strengths and limitations. The DiD approach used here leverages the age-based cutoff but relies on the parallel trends assumption, which shows some strain in 2011.

A Appendix: Additional Tables and Figures

A.1 Full Regression Output - All Models

Table 8: Full Regression Results - Model 1 (Basic DiD)

Variable	Coefficient	Std. Error	t-statistic	p-value
Intercept	0.6697	0.0065	102.28	0.000
ELIGIBLE	-0.0434	0.0089	-4.92	0.000
AFTER	-0.0248	0.0145	-1.71	0.086
ELIGIBLE × AFTER	0.0644	0.0141	4.57	0.000
R-squared		0.0023		
Observations		17,379		

Table 9: Full Regression Results - Model 2 (With Demographics)

Variable	Coefficient	Std. Error	t-statistic	p-value
Intercept	0.5892	–	–	–
ELIGIBLE	-0.0334	0.0091	-3.67	0.000
AFTER	-0.0267	0.0134	-1.99	0.047
ELIGIBLE × AFTER	0.0558	0.0145	3.85	0.000
FEMALE	-0.3201	–	–	0.000
AGE	0.0028	–	–	0.000
NCHILD	-0.0142	–	–	0.000
Education dummies		Included		
Marital status dummies		Included		
R-squared		0.1182		
Observations		17,379		

Notes: Full coefficient output for control variables available upon request. Key DiD coefficient shown with clustered standard errors at state level.

A.2 Sample Characteristics by Year

Table 10: Sample Size by Year and Treatment Status

Year	Control	Treatment	Total	FT Rate (Overall)
2008	836	1,518	2,354	0.701
2009	843	1,536	2,379	0.654
2010	844	1,600	2,444	0.639
2011	771	1,579	2,350	0.625
2013	754	1,370	2,124	0.667
2014	711	1,345	2,056	0.642
2015	613	1,237	1,850	0.692
2016	628	1,197	1,825	0.713
Total	6,000	11,379	17,379	0.664

A.3 Education Distribution by Treatment Status

Table 11: Education Distribution by Treatment Status

Education Level	Control (%)	Treatment (%)
Less than High School	48.2	42.1
High School Degree	28.4	30.2
Some College	13.8	16.5
Two-Year Degree	4.1	4.9
BA+	5.5	6.3
Total	100.0	100.0

The treatment group has slightly higher educational attainment on average, which may reflect both age-related differences in educational attainment and cohort effects in educational access.

A.4 State Policy Variables Summary

Table 12: State Policy Variables - Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
Driver's License Access	0.12	0.32	0	1
In-State Tuition	0.31	0.46	0	1
E-Verify Mandate	0.18	0.38	0	1
Labor Force Participation Rate	63.8	3.2	55.1	71.2
Unemployment Rate	7.1	2.3	2.8	13.9

Notes: Statistics computed across all observations in the sample. Binary policy variables indicate whether the state had the policy in place during the observation year.

A.5 Data Dictionary

Table 13: Complete Variable Definitions

Variable	Definition
FT	Full-time employment indicator (1 = usually works 35+ hours/week, 0 otherwise). Includes those not in labor force as 0.
ELIGIBLE	Treatment group indicator (1 = ages 26-30 as of June 15, 2012, 0 = ages 31-35).
AFTER	Post-treatment period indicator (1 = years 2013-2016, 0 = years 2008-2011).
YEAR	Survey year (2008-2011, 2013-2016; 2012 excluded).
SEX	Sex (1 = Male, 2 = Female per IPUMS coding).
AGE	Age in years at time of survey.
MARST	Marital status (1 = married spouse present, 2 = married spouse absent, 3 = separated, 4 = divorced, 5 = widowed, 6 = never married).
EDUC_RECODE	Recoded education level (Less than High School, High School Degree, Some College, Two-Year Degree, BA+).
NCHILD	Number of own children in household.
STATEFIP	State FIPS code (1-56 excluding 3).
PERWT	Person weight for population representativeness.
AGE_IN_JUNE_2012	Calculated age as of June 15, 2012 (used for ELIGIBLE determination).
AGE_AT_IMMIGRATION	Age when individual immigrated to the U.S.

A.6 Replication Code

The analysis was conducted using Python 3.14 with the following packages:

- `pandas` (version 2.x): Data manipulation and analysis
- `numpy` (version 2.x): Numerical computing
- `statsmodels` (version 0.14.x): Regression analysis with cluster-robust standard errors
- `matplotlib` (version 3.x): Data visualization
- `scipy` (version 1.x): Statistical functions

The main analysis script is `analysis_51_corrected.py`, which performs all data processing, estimation, and visualization. Key functions include:

- Data loading and cleaning
- Dummy variable creation for categorical controls

- OLS estimation with cluster-robust standard errors at the state level
- Pre-trend testing
- Figure generation for trends, DiD visualization, and coefficient plots

A.7 Stata Equivalent Commands

For researchers using Stata, the equivalent commands for the preferred specification would be:

```
* Load data
import delimited "prepared_data_numeric_version.csv", clear

* Generate interaction
gen eligible_after = eligible * after

* Model 3: DiD with demographics and state FE
reghdfe ft eligible after eligible_after female age nchild ///
    i.marst i.educ_recode, absorb(statefip) cluster(statefip)
```

B Appendix: Robustness Checks

B.1 Alternative Standard Error Specifications

While the main analysis uses standard errors clustered at the state level, alternative approaches include:

1. **Robust (heteroskedasticity-consistent) SEs**: Allows for heteroskedasticity but assumes independence across observations.
2. **Two-way clustering**: Clustering by both state and year to allow for correlation within states over time and within years across states.
3. **Wild bootstrap**: A resampling approach that may perform better with few clusters.

With 50 state clusters, the asymptotic approximations underlying cluster-robust inference should be reliable, though the results should be interpreted with some caution.

B.2 Alternative Outcome Definitions

The analysis uses full-time employment (35+ hours/week) as the outcome. Alternative specifications could examine:

- Any employment (employed vs. not employed)

- Hours worked (continuous measure)
- Labor force participation (in labor force vs. not in labor force)
- Formal vs. informal employment (if data permitted)

Each outcome captures different margins of labor supply adjustment.

B.3 Sample Restrictions

The current analysis uses all observations in the provided dataset, as instructed. Alternative analyses could examine:

- Restricting to specific states with large immigrant populations
- Excluding outlier states or years
- Limiting to specific education or marital status groups

Such restrictions would reduce sample size and statistical power but could provide insights into heterogeneous effects.

C Appendix: Diagnostic Tests

C.1 Placebo Tests

A useful diagnostic would be to estimate "placebo" treatment effects using fake treatment dates before the actual DACA implementation. If DACA is the true cause of the observed effect, we should not find significant effects at placebo dates.

Conceptually, one could:

1. Define placebo treatment at 2010 (using 2008-2009 as pre and 2010-2011 as post)
2. Estimate the DiD specification
3. Compare the placebo effect to the true effect

A significant placebo effect would cast doubt on the causal interpretation.

C.2 Sensitivity to Bandwidth

The analysis compares ages 26-30 to 31-35. Alternative bandwidths could be examined:

- Narrower: 28-30 vs. 31-33 (closer to cutoff, fewer confounds, less power)
- Wider: 24-30 vs. 31-37 (more power, more potential for heterogeneous age effects)

The current bandwidth represents a reasonable balance between proximity to the cutoff and statistical power.