Labor Supply Response to the Elimination of the EITC for Undocumented Immigrants: Evidence from the 1996 Welfare Reform

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The paper examines the labor market effects of eliminating the Earned Income Tax Credit (EITC) for undocumented immigrants by requiring a Social Security number to claim the EITC. Exploiting variation across the number of children of undocumented single women, the timing of the policy, and a placebo group of undocumented married men shows that ending the EITC reduced the labor force participation of undocumented single mothers by 7 pp. Children of undocumented immigrants, most of whom are citizens, suffer a double disadvantage, as they are deprived of tax credits while their mothers' labor supply is reduced.

JEL: H20, I38, J15, J21, J38, K37

Keywords: EITC, Labor Supply, Undocumented Immigrants

I.   Introduction

Estimates from 2017 indicate that undocumented immigrants comprise 3.2% of the United States' population and 4.6% of its labor force (Krogstad, Passel and Cohn, 2019). Researchers have established that many policies affect the labor supply of undocumented immigrants, including tighter immigration enforcement (Amuedo-Dorantes and Bansak, 2012), amnesty programs (Kaushal, 2006), access to driving license (Amuedo-Dorantes, Arenas-Arroyo and Sevilla, 2020), and Deferred Action for Childhood Arrivals (DACA) (Amuedo-Dorantes and Antman, 2017). This paper asks: could tax-based policies affect the labor market outcomes of undocumented immigrants? In particular, I examine the effects of cash for work and a tax-based safety net on the labor supply of undocumented immigrants.

To examine the effects of a tax-based safety net policy on the labor supply of undocumented immigrants, I exploit a provision of the 1996 Welfare Reform Act that prevents undocumented immigrants from receiving the Earned Income Tax Credit (EITC) by requiring them, their spouses, and their dependents to have a valid Social Security number (SSN). The EITC is a refundable tax credit for lower-income taxpayers based on their earned income and number of children. My paper examines labor supply responses to eliminating the EITC for undocumented immigrants.

Learning how undocumented immigrants respond to the EITC, a policy encouraging work, matters for many reasons. First, there is no evidence of whether a safety net policy associated with the filing of tax returns has any impact on the labor supply of undocumented immigrants. The standard model of labor market participation predicts that the EITC will increase the labor force participation of single parents. However, undocumented immigrants' responses to the EITC are complicated by several factors, including: (a) whether they file taxes; (b) the elasticity of the labor supply;[1] and (c) employment restrictions due to lack of authorization. Second, the EITC has long been

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[1]The wage elasticity of the labor supply of undocumented men is extremely inelastic because almost all come to the United States solely to work (Borjas, 2003).

believed to increase the labor supply of single mothers and to improve outcomes for children (Eissa and Liebman, 1996; Meyer and Rosenbaum, 2000, 2001; Eissa, Kleven and Kreiner, 2008; Bastian and Michelmore, 2018; Bastian, 2020). In light of this, examining the effects of the EITC on undocumented immigrants, a low-income group, helps us better understand the EITC's effect on labor supply as well as its effects on the lives of families and children of undocumented immigrants, many of whom are citizens. Third, studying the effects of the EITC on undocumented immigrants may offer insight into the effects of future work-related policies on immigrants, as well as the general equilibrium effects on wages and employment for native workers.

In order to causally evaluate the impact of requiring an SSN for receiving the EITC on undocumented immigrants, I navigate several empirical challenges. To study the effect on the likelihood of undocumented immigrants receiving the EITC, I use the 1993 and 1996 panels of the Survey of Income and Program Participation (SIPP). The topical module of this data set provides information on whether a person filed taxes and received the EITC. I employ a difference-in-difference design to compare Mexican, Central, and South Americans with natives. I find extensive evidence indicating that making the SSN mandatory for claiming the EITC significantly decreased the likelihood of Mexican, Central, and South Americans receiving the EITC. A comparison of Mexican, Central, and South Americans with natives in the SIPP data before and after the year 1996 shows a 23 percent decrease in the likelihood of Mexican, Central, and South Americans receiving the EITC. To supplement this individual-level design, I use the 1990 and 2000 Census data and exploit geographic and time variations to determine whether the counties with a relatively high share of Hispanic non-citizens experienced a reduction in the EITC after 1996. The difference-in-difference method compares counties with low and high percentages of Hispanic non-citizens before and after 1996. The county-level difference-in-difference analysis indicates that counties with higher undocumented immigrant shares experienced a relatively larger decrease in EITC per person post-1996.

To study the labor supply effect of eliminating the EITC for undocumented immigrants, I utilize the March 1994-2002 Current Population Survey (CPS). This data is

well suited for my purposes since it contains detailed demographic information on foreign birth, citizenship status, year of immigration, as well as their participation in welfare programs. I focus on the labor supply response of likely undocumented immigrants ages 16–59 identified using Passel and Cohn (2014) and Borjas (2017) method. The policy variation created differences in effect among undocumented immigrants depending on the number of children, the year, as well as the marital status and gender (undocumented single women versus undocumented married men). I utilize two reduced-form specifications that leverage this rich variation to estimate the intent to treat effects of the end of the EITC for undocumented immigrants. First, using the difference-in-difference, I compare labor market outcomes of undocumented single women with children (treated) to undocumented single women without children (control) over time. Second, exploiting the differential impact across undocumented groups (married men versus single women) and children (with and without children), I employ a triple difference design to uncover the effects of eliminating the EITC on the labor supply of undocumented single mothers.

I find, consistent with theory, that the end of the EITC for undocumented immigrants had a significant negative impact on the extensive margin of labor supply of single-mother undocumented immigrants. Difference-in-difference (comparing single women with and without children among the sample of likely undocumented) and triple-difference (comparing married men versus single women and comparing individuals with and without children among the sample of likely undocumented) estimates indicate a reduction of 6 to 7 percentage points in the labor force participation and employment of single-mother undocumented immigrants. Expanding the sample beyond single mothers, I find that ending the EITC for undocumented immigrants had no impact on the labor supply of undocumented men immigrants. Finally, I find that the labor supply elasticity of undocumented immigrants overall is only 0.04 (almost zero) which is below that of native men in the United States while that of undocumented single mothers with two or more children is 1.15, which exceeds that of native single mothers.

Considering (a) the potential confounding effect of changes to other federal programs under PWRORA as well as (b) the imprecise measurement of likely undocumented im-

migrants in survey data, I probe the robustness of my results in several ways. The results are similar across the double and triple difference models, and are robust when limiting the sample to control for changes occurring across different groups of immigrants and over time in the sample period. In the robustness section, by restricting the data to those likely undocumented immigrants who migrated before 1995 (the Mexican Peso Crisis) and 1996 (PRWORA), I demonstrate that migration is not influencing my results. The results are robust to restricting the sample to people living in the "filled in" Food Stamp Policy (FSP) states, which are the states that "filled in" FSP benefits for legal immigrants using state funds (East, 2018). Falsification tests conducted on single mothers who are legal immigrants show no decline in the labor supply of these "untreated" groups. Falsification test on undocumented married men, who are primary earners not affected by the EITC policy and have inelastic labor supply, shows no changes in the labor supply following the policy change. Further, in Table 8, I describe several policy changes that took place during the year 1996 and discuss how undocumented immigrants were never eligible for these policies and remain unaffected by them. It is possible that the method used to identify undocumented immigrants could also include some legal immigrants. In the robustness section, I discuss the steps I used to minimise noise in my sample of undocumented immigrants and show that the noise I may be including in my proxy measure of undocumented immigrants was not impacted by welfare reform or other changes in 1996. Thus, even though the coefficients here are conservatively biased toward zero, I find a significant negative effect on undocumented single mothers' labor supply.

My paper contributes to several strands of literature. First, it contributes to the literature on the effect of public policies on the labor supply of undocumented immigrants. Previous studies focused on the impact of tougher interior immigration enforcement measures (Amuedo-Dorantes and Bansak, 2012; Bohn and Lofstrom, 2012; Orrenius and Zavodny, 2015; Amuedo-Dorantes and Antman, 2022), amnesty (Kaushal, 2006; Amuedo-Dorantes and Bansak, 2011), access to driving license (Cho, 2019; Amuedo-Dorantes, Arenas-Arroyo and Sevilla, 2020; Lueders, 2021), and DACA (Amuedo-Dorantes and Antman, 2017). My contribution is to investigate the effect of the EITC, a refundable tax credit for work pol-

icy, on the labor supply of undocumented immigrants. To my knowledge, I am the first to study the effect of a federal tax policy that eliminates the EITC for undocumented immigrants on their labor market outcomes. Second, my paper contributes to the literature on the impact of introducing and expanding the EITC on the labor supply of native single mothers (Eissa and Liebman, 1996; Meyer and Rosenbaum, 2000; Rothstein, 2010; Kleven, 2019; Bastian and Lochner, 2020). I complement such analyses by studying the effect of the *ending* the EITC for another group of low-wage workers—undocumented immigrants. My results suggest that undocumented single mothers respond sensitively to the elimination of the EITC. Moreover, my study provides insights into the impact of public finance policies on the incentive for undocumented immigrants to file tax returns (Cascio and Lewis, 2019; Gee, Gardner and Wiehe, 2016). Further, my results speak to the symmetry of labor supply elasticity. As opposed to previous studies that used the effect of expanding the EITC to estimate the elasticity, I estimate the elasticity using the change in wage caused by the removal of tax credits for low-income workers.

These findings shed light on the unintended consequences of policies that deny credit and welfare benefits to undocumented immigrants. In my sample, three-fourths of the children born to undocumented mothers are American citizens and most of these children live in households with incomes below 150% of the federal poverty level. The results suggest that ending the EITC for undocumented immigrants makes these children doubly disadvantaged—not only do they lose a tax credit, but their mothers' labor supply is also reduced. Studies of the EITC suggest that the EITC reduces poverty (Hoynes and Patel, 2018), fosters education (Manoli and Turner, 2018; Bastian and Michelmore, 2018; Dahl and Lochner, 2017; Chetty, Friedman and Rockoff, 2011), and improves the health of children (Braga, Blavin and Gangopadhyaya, 2020; Hoynes, Miller and Simon, 2015). It follows that ending the EITC for undocumented immigrants negatively affects the children of single-mother undocumented immigrants, most of whom are American citizens.

Recently, policymakers have been reconsidering whether to allow undocumented immigrants to receive the EITC. For instance, starting in 2020, workers without SSNs can claim the state EITC in California and Colorado. Maryland, New Mexico, and Washington also

passed legislation in 2021 allowing workers with individual taxpayer identification numbers (ITINs) to claim the state EITC. My study, which examines how the federal EITC affects undocumented immigrants, provides insights into the impacts of such state-level policies.

II. Background

A. EITC

Earned Income Tax Credit (EITC) is a refundable tax credit for low-income taxpayers. The amount of the credit depends on earnings and the number of qualifying children in the household. In order to be eligible for the EITC, a worker must file a federal income tax return and citizenship is not a requirement. The EITC schedule contains a phase-in region, where credit increases linearly with earnings; a plateau region, where credit remains constant; and a phase-out region, where credit decreases linearly with income. The EITC parameters for families were significantly changed by the Omnibus Budget Reconciliation Act of 1993 (OBRA '93). The credit rates were raised from 23% to 34% for a family with one child and from 25% to 40% for a family with two or more children. The phase-out rate for families with one child was slightly lowered (from 16.43% to 15.98%) and the phase-out rate for families with two or more children was increased from 17.86% to 21.06%. Before 1994, workers without children were not eligible to claim the EITC, and workers with qualifying children were eligible for the credits. The EITC became available to workers without children in 1994. However, workers with two or more children were entitled to a more generous credit than those with one child or no children. Furthermore, until 2001, the EITC structure was identical for single and married filers. Comprehensive literature reviews of the EITC and its effects can be found in Hotz (2003), Eissa and Hoynes (2006), Nichols and Rothstein (2015) and Hoynes and Rothstein (2016).

B.   1996 Welfare Reform

The Personal Responsibility and Work Opportunity Reconciliation Act of 1996, commonly known as welfare reform, transformed large parts of the welfare system. Major changes include terminating the cash welfare program under the Social Security Act, replacing Aid to Families with Dependent Children (AFDC) with Temporary Assistance for Needy Families (TANF), and ending welfare program for permanent residents. Moffitt et al. (1999); Loprest, Schmidt and Witte (2000); Grogger, Karoly and Grogger (2009) comprehensively review and analyze welfare reform act, and its effect.

In the 1996 welfare reform act, Congress also decided that "individuals who are not authorized to work in the United States" should not be eligible for EITC benefits, and amended the Tax Code to require that taxpayers seeking EITC benefits provide valid Social Security Numbers (SSN) for themselves, their spouse and their dependent children.[2] As SSNs authorizing work are not issued to undocumented immigrants, workers without a work-authorizing SSN cannot claim the EITC beginning with tax returns filed in 1997 (Broder and Blazer, 2011).

C.   Taxes by undocumented immigrants

A common understanding is that undocumented immigrants do not pay taxes and therefore, should not be given any benefits. However, (Blum, 2006) finds that in the year 2000, 353,000 undocumented immigrants filed federal tax returns. Moreover, Gee, Gardner and Wiehe (2016) estimated that at least half of all undocumented immigrants filed state and federal income taxes in 2014 and contributed more than $11 billion. Undocumented immigrants may file tax returns for several reasons. First, an employer must pay Social Security payroll taxes and thus deduct tax from workers, and undocumented immigrants must file tax returns in order to recover overpaid taxes. Second, even if an employer pays cash to undocumented immigrants, they are motivated to file tax returns since this is

[2]CRS Report R42628, Ability of Unauthorized Aliens to Claim Refundable Tax Credits

a key step toward naturalization. Third, if undocumented immigrants receive legal status in the future, they are entitled to receive Social Security benefits based on all Social Security-covered earnings regardless of their legal status during the earning period.

III.   Data and Empirical Strategy

A.   Data

My empirical analysis exploits several data sets, including both county and individual data. To assess the effect of making an SSN compulsory to claim the EITC on the likelihood of undocumented immigrants receiving the EITC, I use the 1993 and 1996 panels of the Survey of Income and Program Participation (SIPP). The data set is suitable for analysis since some waves of the SIPP data contain self-reported and sometimes verified information on the required outcome variable, such as whether the respondent filed a tax return and received the EITC. Based on the availability of the outcome variable, waves corresponding to the years 1994 and 1995 of the 1993 SIPP are pre-periods, and waves assigned to the years 1997-1999 of the 1996 SIPP as post-periods. Data from the SIPP panel helps me study whether making the SSN compulsory to receive the EITC indeed affected the EITC received by undocumented immigrants. However, the SIPP data does not provide information about the respondent's citizenship or legal status. Consequently, I use Mexican, Central, and South Americans living in the U.S. as an ethnic group containing a higher percentage of undocumented immigrants than Mexican-Americans, Europeans, or African Americans. Table 1 presents summary statistics of the SIPP sample. To estimate the undocumented immigrant population at the county level, I use the 1990 and 2000 Census population estimates and interpolate for the 1991-1999 years, as in Hungerman (2005). I obtain county-level EITC and per capita consumption data from the Regional Economic Information System provided by the Bureau of Economic Analysis. Since Census public use microdata is only available for counties with populations over 100,000, I analyzed data for 297 counties. To estimate the percentage of undocumented immigrants living in the counties, I use the Hispanic non-citizen population as a proxy measure. Other

Table 1—Summary Statistics – SIPP sample

Variables	Mean	Standard Deviation
Percent Mexican, Central, and South Americans	6.03	23.81
Percent tax filers	34.6	47.57
Percent receiving the EITC	2.69	16.18
Percent receiving the EITC among tax filers	7.75	26.74
Percent Female	52.2	49.95
Percent White	83.06	37.5
Percent Black	12.44	33.01
Percent Asian	3.36	18.02
Percent married	41.14	49.21
Age	34.89	22.37

Note: The table displays the summary statistics of the 340,653 people covering the years 1994, 1995, 1997, 1998, and 1999.
Source: 1993 and 1996 SIPP.

control variables, including the number of legal non-citizens, Whites, Blacks, the number of citizens aged under five, the number of citizens under 18, and the number of citizens living below the poverty line, are also taken from the census data. Analysis of the EITC per capita is based on my sample of 297 counties from 1992 to 2000 and all amounts are in real 2012 dollars. Table 2 presents summary statistics of all counties in my sample.

Table 2—Summary Statistics of Counties

County Level Variables	Mean	Standard Deviation
Percent under 5	7	9.5
Percent under 18	19.8	2.4
Percent White	79.5	14.8
Percent Black	11.5	12.3
Percent Hispanic	9.6	13.3
Percent Below Poverty line	11	5.2
Percent Legal Immigrants	2.8	2.9
Percent Undocumented Immigrants	1.19	1.9
Per Capital Consumption(2012 USD)	20331.54	6116
EITC per person(2012 USD)	61.30	36.68

Note: The table displays the summary statistics of the 297 counties from the year 1992 to 2000. The county-level estimates of the undocumented immigrant population are based on micro-level IPUMS 1990 and 2000 census data. Consumption and EITC data are derived from the Regional Economic Information System provided by the Bureau of Economic Analysis.
Source: 1990 and 2000 Census, BEA

To evaluate the effect on labor supply at the individual level, I use data from 1994-2002

from the Current Population Survey March Supplement, also known as the Annual Social and Economic Supplement (ASEC) of the Current Population Survey (CPS) (Flood et al., 2020). The data set contains detailed questions that cover the social and economic characteristics of every family member, their work experience, earnings components, employment status, occupation, and industry. In the March CPS, employment and income data are derived from the preceding year's data while demographic data are calculated at the time of the survey. The data contain information on characteristics such as age, sex, race, household relationship, and Hispanic origin for each person in the household enumerated. Since information concerning the year of immigration, citizenship status, and place of birth is consistently available from the 1994-2002 survey years, I limit my analysis to this period.

The CPS data do not directly identify undocumented immigrants but collect information on their citizenship status, place of birth, year of immigration, and race. This March CPS is well suited to my purposes since it contains detailed demographic information on foreign births, citizenship status, as well as whether the individuals participate in welfare programs (Undocumented immigrants are not eligible for welfare programs), and some of this information is not available in Monthly CPS. My sample for undocumented immigrants is based on Passel and Cohn (2014) and a methodology developed by Pew Research Center. Passel and Cohn (2014) draws its data from the Annual Social and Economic Supplement (ASEC) files of the CPS, which I used as a sample of the data. Furthermore, Borjas (2017) method, widely used to identify undocumented immigrants, is an extension of Passel and Cohn (2014). The algorithm identifies which foreign-born individuals are likely to be legal and then classes the remaining group as likely to be undocumented.

First, I identify the sample of foreign-born and non-citizens in the March CPS data. I classify a person as a legal immigrant if any of the following holds true

- That person arrived before 1980 or was born in Cuba

- The person receives Social Security benefits, Supplemental Security Income, Medi-

caid, Medicare, or Military Insurance

- The person is a veteran or works for the military or government;

- The person works as a physician, registered nurse, air traffic controller, or lawyer.

- The person's spouse is a legal immigrant or citizen.

- The person works in higher education jobs such as computer scientist

- This person holds a bachelor's, master's, or doctoral degree

The residual sample of foreign born non-citizens is treated as sample of likely undocumented immigrants.

The sample I study consists of 40,145 likely undocumented immigrants aged 19 to 65.[3] Approximately 48% of likely undocumented immigrants are childless, 19% have one child, and the rest have two or more eligible children for EITC. Table 3 presents summary statistics of Hispanic non-citizens aged 19 to 65 in my sample.

TABLE 3—SUMMARY STATISTICS OF LIKELY UNDOCUMENTED IMMIGRANTS IN THE CPS

Variable	Mean	Standard Deviation
Number of eligible children	1.05	1.27
Age	31.82	9.50
Proportion of Single	.41	.49
Proportion of Female	.46	.49
Proportion with Less than high school	.81	.38
Proportion of Self-employed	.29	.45
Total family Income	35062.8	35275.06
Total Individual Earnings	12929.89	17316.29
Proportion of Labour force Participation	.75	0.42
Proportion of Employed	.71	.45
Months worked per year	10.57	2.84

Note: The table presents the summary statistics of 40,145 likely undocumented immigrants aged 19 to 65.
Source: 1994–2002 CPS.

[3]I use the term "undocumented immigrant" to refer to the proxy variable constructed using the above strategy.

Appendix A describes and illustrates the trends in labor supply for likely undocumented immigrants, natives, and legal immigrants. Figure A1 illustrates the percentage of undocumented, native, and legal immigrants between the ages of 19 and 65 who are in the labor force from 1993 to 2001. Figure A2 presents labor force participation rates among undocumented, native, and legal immigrants between the ages of 19 and 65 from 1993-2001. In the year 1997, the labor supply of undocumented women immigrants fell, while that of legal women immigrants slightly increased, indicating that something changed for undocumented immigrants compared to legal immigrants. Appendix D contains a summary of the datasets used in the paper, including the methodology for constructing the outcome variables.

B. Identification Strategy

My analysis focuses on two types of groups: a treatment group (Undocumented immigrants with children), which was significantly affected by the policy change, and a control group (Undocumented immigrants without children), which was unaffected. Finally, there are two time periods, namely pre- and post-implementation of the policy. To establish a counterfactual, my identification strategy compares undocumented immigrants with children with undocumented immigrants without children. I use this method to estimate differences-in-differences (DD). This difference-in-difference identification strategy assumes that undocumented immigrants with children would have trended similarly to those without children regardless of policy change. Empirically, difference-in-difference can be expressed as a comparison of pre-1997 and post-1997 (inclusive of 1997) means for the treated groups (undocumented immigrants with children) versus the control sample (undocumented immigrants without children). Appendix Table B1 provides descriptive statistics of the likely undocumented immigrant with children (treatment) and likely undocumented immigrant without children (control) groups from 1993 to 2000. To enhance the explanatory power of this simple DD model, I include covariates to control for individual characteristics and state-level variables, as well as time effects. Equation (1)

illustrates the specification:

(1) $$Y_i = \alpha + \beta Treat_i + \delta_{dd}(Treat_i \times Post) + \gamma X_i + \theta_t + \psi_s + \epsilon_i.$$

Here Y_i is the outcome of interest for person i; $Treat_i$ is an indicator variable for the treatment group; X_i is the set of explanatory variables; $Post$ is an indicator variable equal to 1 for the year 1997 or after; θ_t is the time fixed effect and ψ_s is the state fixed effect and standard errors are clustered at the state level. The effect of eliminating the EITC is captured by δ_{dd}.

I also present reduced-form evidence on the effect of ending the EITC for undocumented immigrants in equation (2):

(2) $$Y_i = \alpha + \beta Treat_i + \sum_{l=1993, l \neq 1996}^{2001} \delta_{dd}(Treat_i \times year_l) + \gamma X_i + \theta_t + \psi_s + \epsilon_i.$$

Each coefficient δ_{dd} can be interpreted as an estimate of the impact over the years, where interaction with the year 1996 is the omitted category.

As a placebo group, I use undocumented married men as an example of those who were not affected by policy changes in 1996. As far as this placebo group is concerned, they are not affected by any other changes in 1996 other than the end of the EITC for them. However, the end of EITC does not affect the labor supply of undocumented married men since (a) undocumented men have close to one labor supply elasticity (Borjas and Cassidy, 2019), (b) EITC does not impact the labor supply of primary earners in a married household. Additionally, I present empirical evidence indicating that the labor supply of undocumented men with and without children did not change after 1996 in Appendix Figure C1 and Table C1.

Using variation in the effects of the end of the EITC for undocumented immigrants with children, not only in terms of the number of children but also in terms of who among undocumented immigrants was affected, I identify the impact of welfare reform on single

mother undocumented immigrants. Using a "triple difference" approach, I compare individuals with and without children within the same group (undocumented single women versus undocumented married men), as well as individuals across groups. The triple difference estimator is equal to the difference between two difference-in-differences, i.e., difference-in-differences for individuals with children, comparing the undocumented single women and undocumented married men, minus a difference-in-differences for Individuals without children, comparing the undocumented single women versus undocumented married men. The triple-difference identification assumes that the relative outcome of undocumented single women with and without children will trend in the same way as the relative outcome of undocumented married men with and without children, in the absence of the policy change. This method yields estimates that are robust both to group-specific trends and to trends associated with individuals with children. To evaluate the effect of ending the EITC on the labor supply of undocumented immigrants, I estimate:

$$Y_i = \alpha + \beta_1 Treat_i + \beta_2 Singlewomen + \delta_1(Singlewomen \times Treat_i)$$

$$(3) \quad + \sum_{l=1993, l \neq 1996}^{2001} \delta_2(Singlewomen \times year_l) + \sum_{l=1993, l \neq 1996}^{2001} \delta_3(Treat_i \times year_l)$$

$$+ \sum_{l=1993, l \neq 1996}^{2001} \delta_{dd}(Treat_i \times year_l \times Singlewomen) + \gamma X_i + \theta_t + \psi_s + \epsilon_i$$

Each coefficient δ_{dd} can be interpreted as an estimate of the impact over the years, where interaction with the year 1996 is the omitted category. The standard errors are clustered at the state level.

I supplement the individual-level data with a county-level analysis by asking whether counties with high shares of working-age undocumented immigrants experienced greater changes in EITC payments per person after mid-1996. To do this, I regress EITC per person of the share of undocumented immigrants and post times the share of undocumented immigrants with the time and county fixed effect. One concern is that counties with more undocumented immigrants are correlated with counties with more legal immigrants. The worry is that these additional legal immigrants may have experienced relative increases

in EITC as a result of reductions in other welfare benefits that, in turn, induced them to work (Borjas, 2003). To address this, I include the share of legal immigrants and post times the share of legal immigrants to control for the time-varying effects of the legal immigrant population. Since my empirical strategy is based upon variation across areas over time, I also add controls to mitigate the risk of local shocks that affect both the share of immigrants and the EITC per person at the same time. Equation 4 shows the specification at the county level:

$$(4) \ EITC_{ct} = \alpha + \beta(UI) + \delta(UI \times Post) + \beta_l(LI) + \delta_{ll}(LI \times Post) + \gamma X_{ct} + \theta_t + \psi_c + \epsilon_{ct}.$$

Here $EITC_{ct}$ is per person EITC at the county level c; UI and LI are the shares of undocumented and legal immigrants; X_{ct} is the set of controls; $Post$ is an indicator variable equal to 1 for the year 1997 or after, and θ_t is a time fixed effect and ψ_c is a county fixed effect. The regression is weighted by the population of undocumented immigrants in the county and the standard errors are clustered at the county level.

IV.   Effect of elimination of the EITC for undocumented immigrants

This section describes the overall effects of eliminating the EITC for undocumented immigrants. I first examine the effect of the policy on tax filings, EITC received, and the amount of EITC undocumented immigrants receive. I then examine dynamic changes in labor supply along the extensive and intensive margins - following their evolution for five years after the policy - and static policy effects. Finally, I estimate the labor supply elasticity of undocumented immigrants.

A.   Effect on the EITC received by undocumented immigrants

I first examine whether making the SSN compulsory to claim the EITC led to fewer undocumented immigrants receiving the EITC. Since the SIPP data do not contain information regarding citizenship or legal status, I define the treatment group as Mexicans,

Central, Americans, and South Americans, and the control group as all other ethnic groups, including Mexican-Americans, Europeans, etc. The treatment and control groups are not perfect measures of undocumented immigrants and natives, but there will be a greater proportion of undocumented immigrants in the treatment group than in the control group.

Figure 1 depicts the event study estimates from equation (2) where the outcome is an indicator for receiving the EITC. The treatment group consists of Mexicans, Central, and South Americans, while the comparison group consists of all other ethnic groups, including Mexican-Americans, Europeans, etc. The specification includes individual controls, year and state fixed effect. Based on the figures, Mexican, Central, and South Americans have experienced a decrease in their chances of receiving the EITC after 1996.
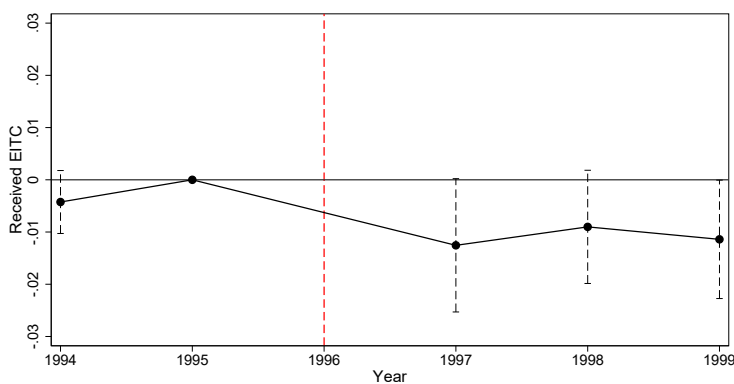

Figure 1. Effect on receiving the EITC

Note: This figure shows the coefficients and 95 percent confidence intervals from the difference-in-difference event study regressions where the outcome is an indicator for receiving an EITC. Treatment is Mexican, Central, and South Americans, and the comparison group is all other ethnic groups. Standard errors are robust to heteroskedasticity and clustered at the state level. Controls include age, sex, marital status, education level, race, and hispanic; state and year fixed effects.
Source: 1993 and 1996 panels of the SIPP

Next, I segregate the effect of the decline in the EITC claim into (a) a decline in tax return filing, and (b) fewer undocumented immigrants being eligible for the EITC. Requiring the SSN to claim the EITC may disincentivize some undocumented immigrants from filing returns. This may cause some to leave the labor market, resulting in fewer tax

returns filed by undocumented immigrants. The event study in Figure 2 examines the timing of the effects on the likelihood of filing a tax return. The figure shows that the likelihood of filing a tax return fell after 1996. The event study in Figure 3 illustrates the effect on the EITC received by those who file tax returns. The figure shows that Mexican, Central and South American taxpayers were less likely than control group taxpayers to receive the EITC after 1996.
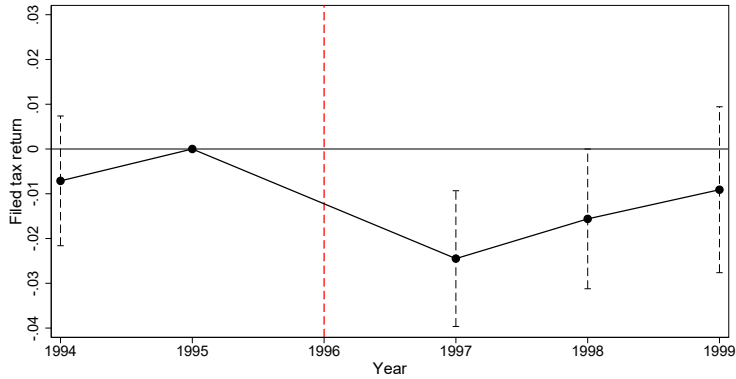

FIGURE 2. EFFECT ON FILING A TAX RETURN

Note: This figure shows the coefficients and 95 percent confidence intervals from the difference-in-difference event study regressions where the outcome is an indicator for filing a tax return. Treatment is Mexican, Central, and South Americans, and the comparison group is all other ethnic groups. Standard errors are robust to heteroskedasticity and clustered at the state level. Controls include age, sex, marital status, education level, race, and hispanic; state and year fixed effects.
Source: 1993 and 1996 panels of the SIPP

Table 4 shows the difference-in-difference table where $post \times Treatment$ is the estimated coefficients of δ_{dd} from equation (1). The treatment is Mexican, Central, and South Americans, and the comparison group is all other ethnic groups. The post dummy variable shows a negative and significant interaction with the Treatment. In line with the event studies, we find that mandating an SSN to claim the EITC resulted in a statistically significant decrease in the probability of the EITC being received by Mexican, Central, and South Americans, with a 1 percentage-point decline among Mexican, Central, and South Americans, equivalent to a 23 percent decrease. Column (2)–(3) shows that the policy change resulted in a reduction of 1 and 2 percentage points in the likelihood of filing a tax return and receiving an EITC among Mexican, Central, and South Americans
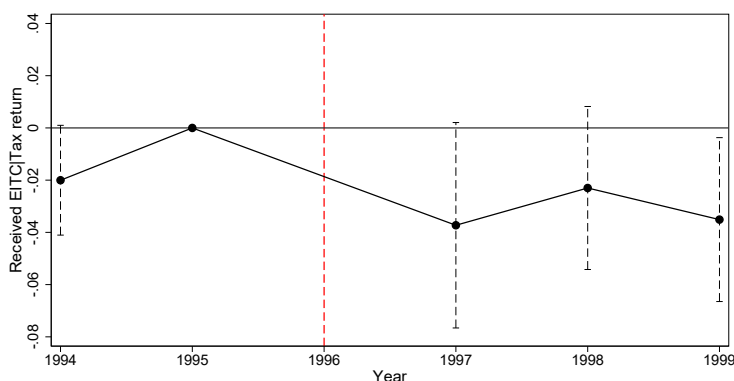
FIGURE 3. EFFECT ON THE EITC RECEIVED BY THOSE WHO FILE TAX RETURNS

Note: This figure shows the coefficients and 95 percent confidence intervals from the difference-in-difference event study regressions where the outcome is an indicator for receiving an EITC among those who filed a tax return. Treatment is Mexican, Central, and South Americans, and the comparison group is all other ethnic groups. Standard errors are robust to heteroskedasticity and clustered at the state level. Controls include age, sex, marital status, education level, race, and hispanic; state and year fixed effects.
Source: 1993 and 1996 panels of the SIPP

who file a tax return. These estimates are equivalent to a 3.4 and 14 percent decline in the likelihood of filing a tax return and the likelihood of receiving the EITC among those Mexican, Central, and South Americans who file a tax return. The inclusion of the SSN as a requirement in order to claim the EITC affected only the EITC receipts of undocumented immigrants during the year, and did not affect the receipts of other immigrants and natives. As the "potential undocumented immigrants" comprise both those who lost the EITC and those who were not affected, the coefficients should be viewed as lower bounds of the effect of the policy.

Next, to estimate the impact on the amount of the EITC received by undocumented immigrants, I examine the effect on the EITC per person at the county level. Exploiting the variation in the share of working-age Hispanic non-citizens by county and the timing of the 1996 welfare reform, I examine whether counties with higher percentages of working-age Hispanic non-citizens saw a decrease in the EITC payment per person after the year 1996. If counties with large shares of Hispanic non-citizens had lower EITC per person after welfare law was passed, the difference is at least partly caused by the 1996 welfare

Table 4—Effect on the EITC received, filing a tax return, and EITC received among tax filers

VARIABLES	(1) EITC	(2) Filing a Tax return	(3) EITC on the Tax return
Post × Treatment	-0.01*	-0.01*	-0.02*
	(0.005)	(0.007)	(0.013)
Treatment	0.02**	-0.04***	0.07***
	(0.008)	(0.011)	(0.024)
Mean Treatment	.038	0.28	0.13
Observations	334,401	334,401	117,861
R-squared	0.031	0.094	0.065

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: This table displays the difference-in-difference estimation for the impact of making the SSN compulsory to claim the EITC on the EITC received and on filing a tax return. Treatment is Mexican, Central, and South Americans, and the comparison group is all other ethnic groups. The outcome in Column (1)–(3) is an indicator variable for receiving the EITC, filing a tax return, and receiving the EITC conditional on filing a tax return. Standard errors are robust to heteroskedasticity and clustered at the state level. Controls include age, sex, marital status, education level, race, and hispanic; state and year fixed effects.
Source: 1993 and 1996 panels of the SIPP

reform. Table 5 presents estimates of equation (4) for EITC per capita in 2012 USD. County and year fixed effects are included and standard errors are clustered at the county level. Column 1 shows the estimates without controls and Column 2 shows the estimates with county-level controls. The post dummy variable shows a negative and significant interaction with the percentage of Hispanic non-citizens in the county. This suggests that counties with higher Hispanic non-citizens shares experienced a relatively larger decrease in EITC per person after 1996 when SSN was made compulsory to claim the EITC. EITC transfers per person fell by on average $175 for each additional percentage point increase in Hispanic non-citizens share. Thus, in the absence of spillover effects on the remaining state population, the average Hispanic non-citizens experienced a decline of about 174 USD in EITC per individual before and after 1996 than the average citizen.

Table 5—Effect of making the SSN compulsory on the EITC per person

VARIABLES	(1) EITC per person	(2) EITC per person
Post × Share Hispanic non-citizen	-261.06***	-174.55***
	(96.033)	(49.530)
Share Hispanic non-citizen	1,239.15***	730.70***
	(402.850)	(166.499)
Share Legal Immigrant	-627.42**	-227.52
	(292.630)	(180.630)
Post1997 × Share Legal Immigrants	96.27	198.04***
	(62.137)	(49.462)
Controls	No	Yes
Year FE	Yes	Yes
County FE	Yes	Yes
Constant	44.73**	166.77
	(21.400)	(118.220)
Observations	2,311	2,311
R-squared	0.966	0.979

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: This table displays the result from equation (4) for EITC per person. Column 1 is without controls and column 2 is with controls.
Source: 1990 and 2000 Census, BEA

B.   Effect on Labor Supply

Theory of Labor supply

To understand the impacts of eliminating the EITC for undocumented immigrants on their labor supply, it is useful to discuss the predicted impact based on labor market theory. As a wage subsidy, the EITC can affect the decision to work (the extensive margin) as well as the number of hours worked (the intensive margin). However, the complicated structure of the EITC schedule creates different incentives for households depending on the income region and family structure. According to a standard labor supply model where both leisure and market goods are normal goods, by having all substitution and no income

effect, having the EITC increases the labor force participation of single parents. The effect on the hours worked for those who are already employed is ambiguous depending on the income relative to the EITC schedule (see Hotz (2003) for a formalized discussion).

However, the labor supply effect of the EITC for a married couple is complicated due to their joint tax filing status. For a married couple, both labor force participation and hours worked in presence of the EITC depend on the joint income relative to the EITC schedule and wage elasticity of couples. In fact, in some scenarios, having an EITC may cause one partner of a couple to exit the labor market.

The literature on the EITC has found (a) a positive effect of having the EITC on the labor force participation of single mothers and (b) most of the effects of the EITC are concentrated on single mothers (Dickert, Houser and Scholz, 1995; Eissa, Kleven and Kreiner, 2008; Meyer and Rosenbaum, 2000, 2001). Based on the standard labor supply model, the theory predicts that policy change in terms of eliminating the EITC for undocumented immigrants will reduce the labor supply of single mothers at an extensive margin and the effect on hours will be ambiguous. I next causally estimate the labor supply response of eliminating the EITC for single-mother undocumented immigrants.

Labor supply response of Single Mother Undocumented Immigrants

Figure 4 illustrates how the trend of labor force participation of single women undocumented immigrants with and without children tracked closely between 1994 and 2001. The labor force of single women undocumented immigrants with children, the group affected by the end of the EITC for undocumented immigrants, declined after 1996 in comparison to the labor force of single women undocumented immigrants without children. Further, Appendix Figure A3 illustrates the trend in labor force participation among single undocumented women with no children, one child, and two or more children. As shown in the Appendix Figure A3, single women with one child and two or more children experience a decline in labor force participation compared to single women without children.
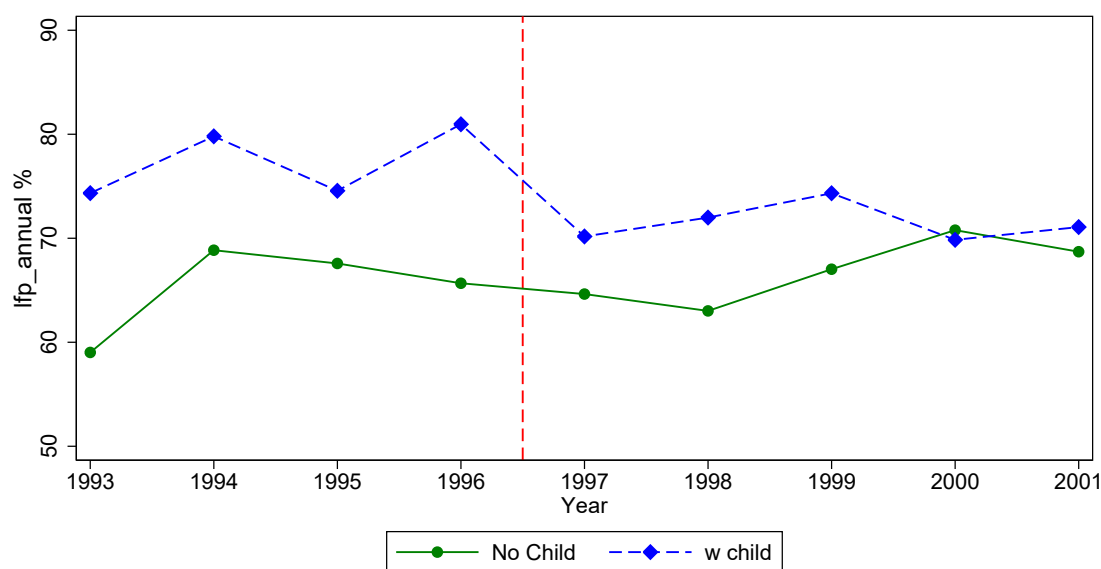
FIGURE 4. PERCENTAGE OF PEOPLE: ANNUAL LABOUR FORCE PARTICIPATION

Note: This figure shows the percentage of single women aged 19-65 for undocumented immigrant with children and without children.
Source: 1994–2002 CPS.

Using both difference-in-difference and triple-difference approaches, I examine the impact of ending the EITC on single-mother undocumented immigrants. Using equation (2), the difference-in-difference event study compares undocumented single women with and without children over time. Using equation (3), the triple-difference approach compares undocumented immigrants with and without children within the same group (single women versus married men), as well as undocumented immigrants with children across groups of single women and married men. I consider two measures of the extensive margin of labor supply: the participation rate at the annual level and the employment rate at the annual level. Employment indicates whether an individual is working or not, whereas participation in the labor force encompasses working people as well as unemployed individuals who are either looking for work or were temporarily laid off.

Figure 5 illustrates the effects on the likelihood of labor force participation for single mother undocumented immigrants when the policy was in place and after 6 years when the policy was rescinded. The panel A of the figure 5 shows the estimated coefficients

of δ_{dd} from equation 2 along with their 95% confidence intervals. These patterns provide support for common trends and show that there was no pre-trend between our treatment and control groups. Panel B of Figure 5 plots the coefficients on the three-way interaction term by year from equation (3) for labor force participation. This figure illustrates the clear negative effects of the elimination of the EITC for undocumented immigrants on the labor force participation of undocumented single mothers.

Figure 6 presents estimates of the employment indicator during the period when the policy was in effect and six years following the revocation of the EITC for undocumented immigrants. Panel A uses the difference-in-difference identification strategy and coefficient from equation (2) while Panel B employs a triple identification method and a coefficient from equation (3). Figure 6 reveals a sharp decline in employment for single mothers undocumented immigrants.

To estimate the magnitude of the negative effect on the extensive margin labor supply response of the undocumented single mothers, I estimate the difference-in-difference and triple difference estimate in Table 6 and Table 7. Table 6 shows the difference-in-difference table for the sample of undocumented immigrants where $post \times treatment$ is the estimated coefficients of δ_{dd} from equation (1). Table 7 presents the estimates using the triple difference identification strategy where $post \times treat \times singlewomen$ is the estimated coefficient of interaction between single women, Individual with children, and post for the year after 1996. I found that ending the EITC for undocumented immigrants reduced the labor supply of single mothers undocumented immigrants by 6-9pp at the extensive margin.

As discussed, the effect of the EITC on the intensive margin of the labor supply is ambiguous depending on income. I discuss the effect on the intensive margin in Appendix B. Appendix Figure B1 shows the event study estimates of the months worked per year for four years when the policy was in action and the six years after the EITC was ended for undocumented immigrants. Panel A uses the difference-in-difference identification strategy and coefficient from (1) while Panel B employs a triple identification method

Panel A: Diff-in-Diff
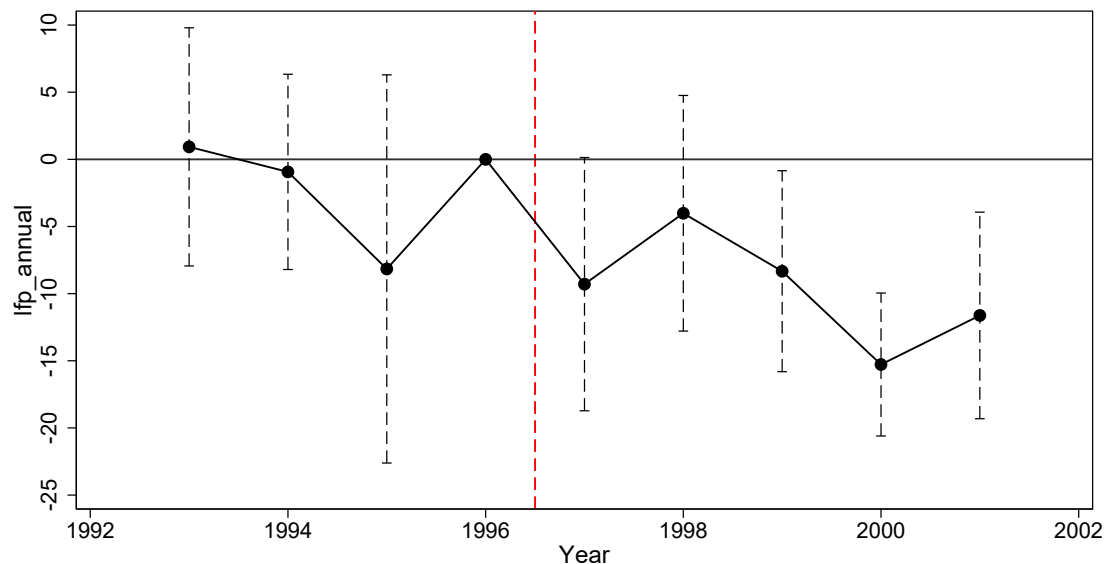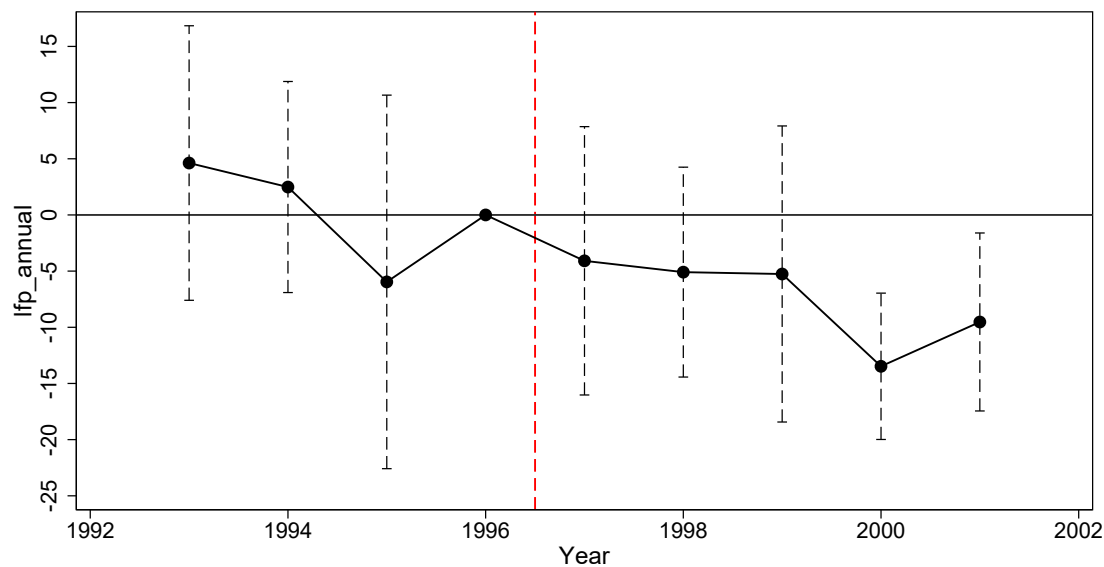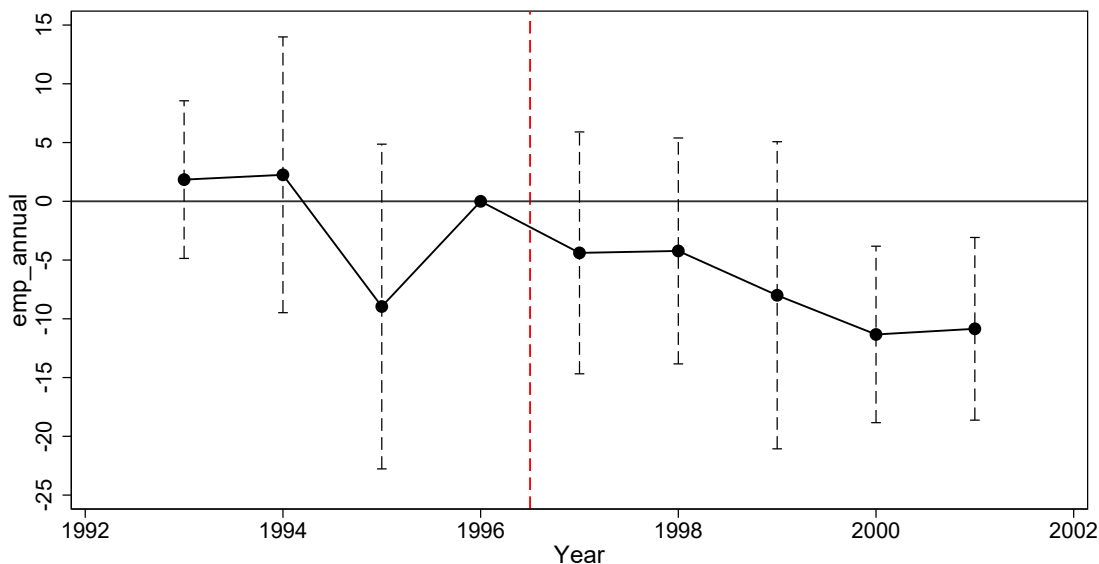

Panel B: Triple Difference

FIGURE 5. LABOR FORCE PARTICIPATION

Note: This figure shows the coefficients and 95 percent confidence intervals from event study regressions where the outcome is an indicator of being in the labor force. Panel A shows the coefficients and 95 percent confidence intervals from the difference-in-difference event study regressions. Panel B shows the coefficients and 95 percent confidence intervals from event study regressions that estimate the three-way interaction between the undocumented immigrant group (single women versus married men), year, and treatment indicators. Treatment in Panel A is defined as undocumented single women with children, and the comparison group is undocumented single women without children. Treatment in Panel B is defined as undocumented immigrants with children, and the comparison group is undocumented immigrants without children. Standard errors are robust to heteroskedasticity and clustered at the state level. Controls include age, education level, race, and hispanic; state and year fixed effects.
Source: 1994–2002 CPS.

Panel A: Diff-in-Diff
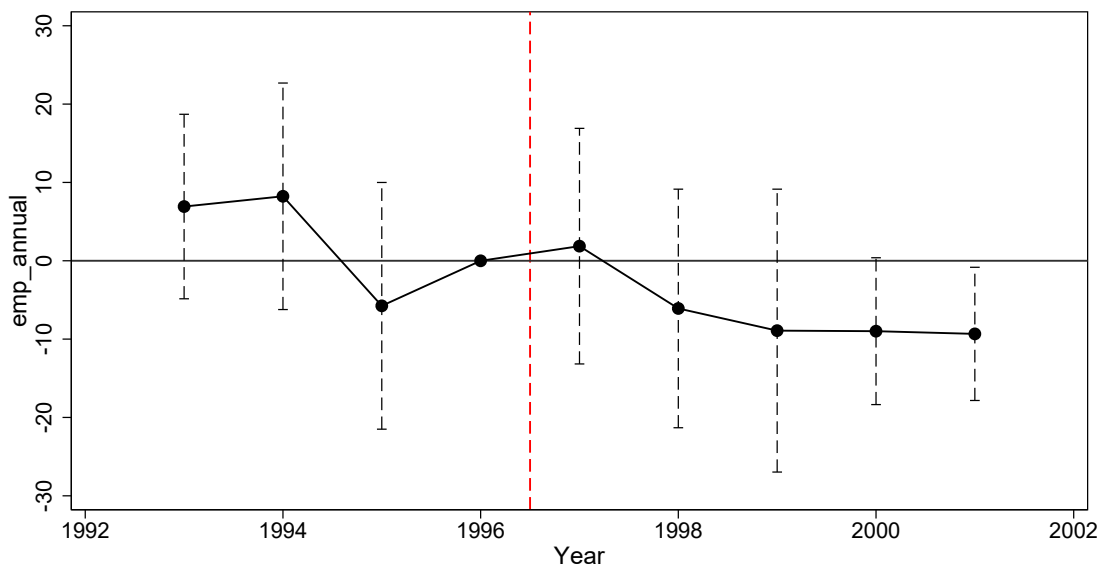

Panel B: Triple Difference

FIGURE 6. EMPLOYMENT

Note: This figure shows the coefficients and 95 percent confidence intervals from event study regressions where the outcome is an indicator of being employed. Panel A shows the coefficients and 95 percent confidence intervals from the difference-in-difference event study regressions. Panel B shows the coefficients and 95 percent confidence intervals from event study regressions that estimate the three-way interaction between the undocumented immigrant group (single women versus married men), year, and treatment indicators. Treatment in Panel A is defined as undocumented single women with children, and the comparison group is undocumented single women without children. Treatment in Panel B is defined as undocumented immigrants with children, and the comparison group is undocumented immigrants without children. Standard errors are robust to heteroskedasticity and clustered at the state level. Controls include age, education level, race, and hispanic; state and year fixed effects.
Source: 1994–2002 CPS.

Table 6—Difference-in-difference estimation: Effect of ending the EITC on Single mother Undocumented Immigrants

VARIABLES	(1) Labor force participation	(2) Employment
Post × treat	-7.60***	-6.45**
	(1.905)	(2.649)
treat	9.13***	7.17***
	(2.300)	(2.459)
Mean	76.94	71.38
Observations	6,672	6,672
R-squared	0.068	0.053

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: This table displays the difference-in-difference estimation for the impact of ending the EITC on Labor supply at the extensive margin of undocumented single mothers. Treated workers are defined as single women undocumented immigrants with children, and the comparison group is comprised of single women undocumented immigrants without children. The outcome in Columns (1) and (2) denotes Labor force participation and employment. Standard errors are robust to heteroskedasticity and clustered at the state level. Controls include age, education level, race, and hispanic; state and year fixed effects. *Source:* 1994–2002 CPS.

and a coefficient from (3). Event study does not clearly demonstrate the effect of ending the EITC on intensive margins. Appendix Figure B1 shows that the intensive margin of labor supply for single mother undocumented immigrants decreased slightly during the second and third years of the policy change. I estimate difference-in-difference and triple-difference estimators of months worked per year in Column (1) and column (2) of Table B2. Coefficient of $post \times treat$ in column (1) and Coefficient $post \times treat \times singlewomen$ in Column (2) of Appendix Table B2 demonstrate a negative significant effect by about 0.6-1 month per year at the intense margin. Overall, the end of the EITC for undocumented immigrants has reduced the extensive margin labor supply of undocumented single mothers by 6-9 percentage points, and the intensive margin labor supply by 0.6-1 months per year.

In Appendix Figure C1 and Table C1, I also present and discuss the estimates for undocumented married men immigrants in the sample. I do not find any effects on the labor force participation and employment of undocumented married men immigrants. It

TABLE 7—TRIPLE-DIFFERENCE ESTIMATION: EFFECT OF ENDING THE EITC ON SINGLE MOTHER UNDOCUMENTED IMMIGRANTS

VARIABLES	(1) Labor force participation	(2) Employment
post $\times$ treat $\times$ single women	-8.25***	-9.37**
	(2.705)	(3.677)
treat $\times$ post	0.31	2.37
	(1.500)	(1.898)
single women $\times$ post	0.63	1.85
	(1.870)	(2.172)
single women $\times$ treat	3.77	3.75*
	(2.647)	(2.167)
treat	6.62***	4.68***
	(1.025)	(1.152)
single women	-21.79***	-20.74***
	(1.393)	(1.556)
Mean	76.94	71.38
Observations	18,228	18,228
R-squared	0.145	0.095

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: This table displays the triple difference estimates for the impact of ending the EITC on Labor supply at the extensive margin of single women. Treated workers are defined as undocumented immigrants with children, and the comparison group is comprised of undocumented immigrants without children. The Single women dummy variable takes a value of 1 for being a single woman and 0 for being a married man in the sample of likely undocumented immigrants. The outcome in Columns (1) and (2) denotes Labor force participation and employment. Standard errors are robust to heteroskedasticity and clustered at the state level. Controls include age, education level, race, and hispanic; state and year fixed effects. *Source:* 1994–2002 CPS.

is consistent with the theory of the EITC that it affects the labor supply of single mothers, but not that of married men. Moreover, the supply of labor for undocumented men is highly inelastic (Borjas and Cassidy, 2019). A comparison of undocumented married men with and without children provides a placebo test and provides the basis for estimating the triple difference in 3.

In sum, I find that ending the EITC reduces the labor supply of single mother undocumented immigrants.[4] Consistent with previous research (Eissa and Liebman, 1996; Meyer

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[4]I separately analyze effects on the labor supply and earnings for the sample of men. The results are

and Rosenbaum, 2000, 2001; Eissa, Kleven and Kreiner, 2008; Dickert, Houser and Scholz, 1995; Ellwood, 2000; Grogger, 2003) suggesting that the EITC expansion increases the labor supply of native single-mothers, I find that ending the EITC for the undocumented immigrant reduces the labor supply of single-mother undocumented immigrants.

C. Elasticity

I estimate the extensive margin (employment) of labor supply elasticity as the change in log employment rates divided by the change in log net income. Undocumented immigrants were ineligible for other welfare benefits, so I estimate their pre-reform period earnings to be wages and the EITC for those who are employed and no income for those who are not. I find an employment elasticity of 0.28 for a representative undocumented single mother with one child, and 1.15 for a representative undocumented single mother with two or more children. I show my back-of-the-envelope approach and calculation in Appendix D. To put in perspective, Chetty et al. (2013) estimate the steady-state (Hicksian) elasticity for single mothers in the U.S to be 0.30 in Eissa and Liebman (1996) and 0.43 in Meyer and Rosenbaum (2001) and that of native men to be 0.13. According to Bastian (2020), using the 1975 EITC introduction, the labor supply elasticity of single mothers in the United States is 0.58. However, the labor supply elasticity of married women has decreased over time (Heim, 2007). I find that single women undocumented immigrants have a very high labor supply elasticity, higher than that of native single women.

V. Robustness

The results indicate that eliminating the EITC for undocumented immigrants had a significant negative impact on the labor supply of single-mother undocumented immigrants. I now test alternative explanations for these findings and specifications for the analysis.

First, I consider other policies affecting undocumented immigrants during this period. As argued by (Kleven, 2019), there were other changes in the year 1996 that put single

qualitatively identical to those using married men undocumented immigrants

mothers off welfare, raising the concern that I might observe the effect of welfare reforms rather than that of ending the EITC for undocumented immigrants. Crucially, undocumented immigrants remain unaffected by the eligibility requirement of other welfare programs in the 1996 welfare reform bill such as Food stamps, Supplemental Security Income (SSI), Temporary Assistance for Needy Families (TANF), and Medicaid (Hungerman, 2005). Furthermore, undocumented immigrants were never eligible for federal means-tested benefits (Fix and Passel, 1999; Broder and Blazer, 2011) and thus were unaffected by those changes. The only component of welfare reform that affected undocumented immigrants was section 451, which mandated the use of a valid SSN to qualify for the EITC, rendering undocumented immigrants ineligible for EITC starting in 1997.

Second, I examine the error in measuring the sample of undocumented immigrants and examine its implications for the estimated effect. The sample is divided into five categories, namely a, b, c, d, and e, as shown in Table 8. Using the CPS data, I calculate the number of undocumented immigrants using (Passel and Cohn, 2014) method. Depending on citizenship status, likely undocumented immigrants will fall into one of four categories: b, c, d, or e. In Table 9, I remove group b, Legal immigrants with Green Cards who arrived after 1996. Using (Passel and Cohn, 2014) method, I remove groups c, legal immigrants with green cards/residency who came to the US before 1996 and are thus impacted by welfare reforms such as TANF, food stamps, as well as people receiving welfare. I cannot remove some people from group c who did not receive social assistance and are therefore unaffected by welfare reforms. Group d, legal immigrants without permanent residence or green cards, are not affected by policy changes, but may be included in my proxy measure of likely undocumented immigrants. Finally, the proxy measure includes undocumented immigrants plus noise, where noise consists of some of group d (Legal immigrants without a Green Card/Residency who have not been affected) as well as some of group c (Legal immigrants with a Green Card/Residency who came to the US before 1996) who did not take any welfare. The noise group is not affected by welfare reform or any other changes in 1996, so including them is likely to attenuate the difference-in-difference estimates, which will average responses for those who received benefits changes and those who did

not. Despite this conservative bias towards zero, I find a significant negative effect on the labor supply of undocumented single mothers.

TABLE 8—EFFECT OF WELFARE REFORMS FOR DIFFERENT GROUPS

Group	Group	Policy change in the Year 1996	Ways to control
a	U.S citizens	Affected by welfare reforms such as TANF, Food stamps etc	Not included in either treatment or control group (both conditioning on non citizen proxy)
b	Legal immigrants with Green card/residency who came to the U.S after 1996	Denied federal welfare benefits during their first five years of U.S. residence	Removed in the Robustness section
c	Legal immigrants with Green card/residency who came to the US before 1996	Affected by welfare reforms such as TANF, Food stamps etc	Removed people who are on any welfare (affected group) in Table 9
d	Legal immigrants without Green card/residency but with valid visa such as students, temporary workers, and tourists	Never eligible- remain unaffected	Included in both treatment and control, most likely leading to attenuation
e	Undocumented Immigrants	Never eligible- remain unaffected	Included in both treatment and control

Note: The table describes how different groups of people are were affected by welfare reforms in the year 1996.

Third, I test the sensitivity of my main findings to alternative sample selection criteria and refinements. My results are robust to various sample restrictions such as limiting the sample to those who migrated before 1996 (enactment of welfare reform and PRWORA) and 1995 (Mexican Peso crises). The first and second columns of Table 9 reproduce our baseline results on labor force participation and employment of single undocumented women. I re-estimate the difference-in-differences and triple difference results by limiting the sample to immigrants who migrated before 1996 (enactment of welfare reform/ PRWORA) in columns 3-4 and 1995 (Mexican Peso crisis) in columns 5-6. Columns with odd numbers show estimates of labor force participation, while columns with even num-

bers show coefficients for employment. The coefficient Post $\times$ treat $\times$ is similar across alternative samples and remains similar to the baseline effects.

TABLE 9—EFFECT OF ELIMINATING THE EITC FOR UNDOCUMENTED IMMIGRANTS ON SINGLE MOTHER UNDOCUMENTED IMMIGRANT: ALTERNATIVE SAMPLE RESTRICTIONS

VARIABLES	(1) Labor force	(2) Employment	(3) Labor force	(4) Employment	(5) Labor force	(6) Employment	(7) Labor force	(8) Employment
	Baseline		Immigrated before 1996		Immigrated before 1995		FSP fill-in States	
treat × post	-7.60***	-6.45**	-8.22***	-6.62**	-7.94***	-6.65*	-11.91***	-11.71***
	(1.905)	(2.649)	(2.240)	(3.157)	(2.694)	(3.886)	(1.067)	(2.282)
treat	9.13***	7.17***	9.00***	6.97***	8.86***	6.88***	5.27***	3.04
	(2.300)	(2.459)	(1.875)	(2.025)	(1.816)	(1.991)	(1.130)	(2.536)
Constant	32.43***	32.01***	34.26***	33.51***	35.66***	35.37***	39.07***	37.36***
	(2.612)	(3.063)	(2.096)	(2.468)	(2.296)	(2.499)	(3.263)	(3.690)
Observations	6,672	6,672	5,044	5,044	4,372	4,372	1,740	1,740
R-squared	0.068	0.053	0.074	0.058	0.074	0.058	0.073	0.063

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: This table shows difference-in-difference estimates for the impact of ending the EITC on Labor force participation and employment of single-mother undocumented immigrants, with different restrictions. Columns 1 and 2 contain baseline results from Tables 6 and 7. Columns 3 and 4 adjust the sample to include only individuals who immigrated before the year 1996. Columns 5 and 6 adjust the sample to include only individuals who immigrated by the year 1995. Columns 7 and 8 restrict the sample to people living in "filled in" Food stamp policy states as used in East (2018). Post is an indicator for 1997 or later, and the dependent variables are labor force participation and employment. Standard errors are robust to heteroskedasticity and clustered at the state level. Controls include age, education level, race, and hispanic; state and year fixed effects.
Source: 1994–2002 CPS.

Four, using East (2018), I restrict the sample to those living in the "filled in" Food Stamp Policy (FSP) states. PWRORA made legal immigrants ineligible for the food stamp program (FSP) in 1996, however several states "filled in" FSP benefits for legal immigrants using state funds. Using variation across states and over time in FSP eligibility, East (2018) compares immigrants across the Fill-In and No-Fill-In states over time and finds that foreign-born non-citizen single women reduced their labor force participation when eligible for the food stamp program. One possible concern with my results is that I may be capturing legal immigrants whose labor supply may have been affected by FSP, as found in East (2018). Therefore, I limit my sample to people who live in "filled in" FSP states in order to check the robustness of my findings. Specifically, I restrict the sample to likely undocumented immigrants living in California, Connecticut, Maine, Massachusetts, Minnesota, Nebraska, Rhode Island, Washington, and Wisconsin. Columns 7 and 8 of Table 9 shows the estimates of labor force participation and employment for single undocumented women. I find an even greater negative effect on the labor supply of single-mother undocumented immigrants when I restrict to sample to a few states where there was no FSP policy change related to legal immigrants. Moreover, the FSP does not affect the eligibility of U.S.-born children, but rather the eligibility of the parents of U.S.-born legal immigrants. Consequently, when I compare undocumented single women with and without children, and I restrict the comparison to U.S.-born children, I am comparing groups that are similarly affected by the FSP policy, but which have been disproportionately impacted by the EITC policy change.

Five, as a counterfactual, I estimate the difference-in-difference regression for a sample of single women legal immigrants. The legal immigrants are calculated using the (Borjas, 2017) residual method. Figure 7 shows that the labor supply of single mothers increased after 1996 for legal immigrants. It is consistent with the theory that suggests that the 1996 welfare reform removed people from welfare and therefore increased the labor supply of legal immigrants. In contrast, the labor supply of single undocumented mothers was negatively affected because they were not affected by changes in welfare reform save for the one that prevented them from receiving the EITC.
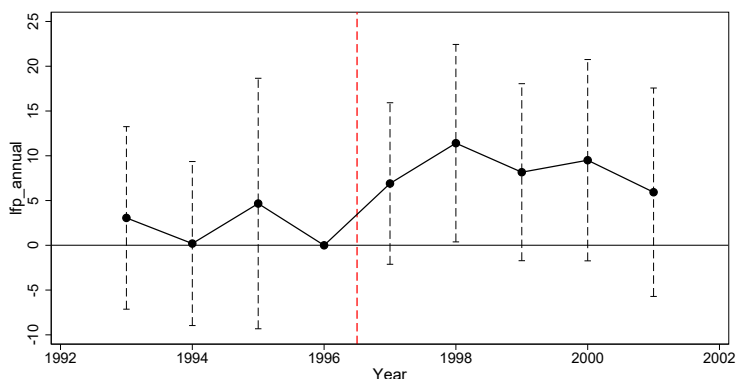
FIGURE 7. DIFFERENCE-IN-DIFFERENCE EVENT STUDY: EXTENSIVE MARGIN LABOR SUPPLY OF SIN-GLE WOMEN LEGAL IMMIGRANTS

Note: This figure shows the coefficients and 95 percent confidence intervals from difference-in-difference event study regressions where the outcome is labor force participation. Treatment is defined as single women legal immigrants with children, and the comparison group is comprised of single women legal immigrants without children. Standard errors are robust to heteroskedasticity and clustered at the state level. Controls include age, education level, race, and hispanic; state and year fixed effects.
Source: 1994-2002 CPS

The loss of the EITC, coupled with the reduced labor supply of undocumented single mothers, makes it unclear how these families will replace their lost income. The household income may be supplemented by other members of the household. Figure 8 presents the event study of the effect on the total income of the family [5]. However, the figure represents the negative impact on the total family income of undocumented single mothers following the year 1996. This analysis of the total income of the family treats the primary family and the related sub-families as if they were one family. Thus, even if other family members contribute to the household, this does not make up for the loss of wage income from single mothers. The reduction in total family income also reinforces the argument that children living in the household were adversely affected.

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[5]I use OFFTOTVAL variable as total household income which is defined as total family income used for replicating official poverty rates. In accordance with the official poverty guidelines, the primary family and related subfamilies are treated as one family in calculating OFFTOTVAL.
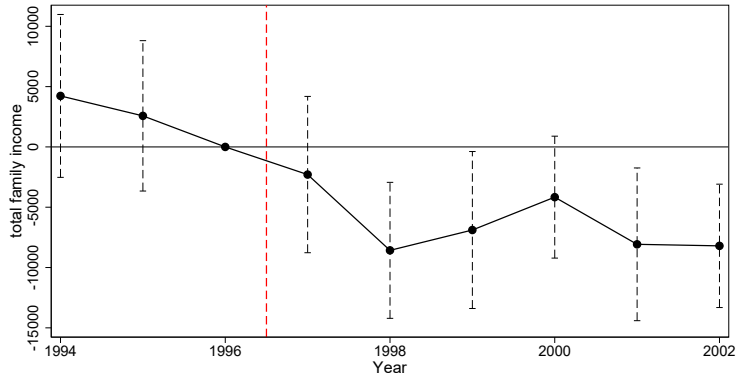
FIGURE 8. DIFFERENCE-IN-DIFFERENCE EVENT STUDY: TOTAL FAMILY INCOME OF SINGLE WOMEN UNDOCUMENTED IMMIGRANTS

Note: This figure shows the coefficients and 95 percent confidence intervals from difference-in-difference event study regressions where the outcome is total family income. Treatment is defined as single women undocumented immigrants with children, and the comparison group is comprised of single women undocumented immigrants without children. Standard errors are robust to heteroskedasticity and clustered at the state level. Controls include age, education level, race, and hispanic; state and year fixed effects. *Source:* 1994-2002 CPS

VI. Conclusion

The paper examines the labor supply responses of undocumented immigrants to cash for work and a tax-based safety net. I examine variation in the labor supply response from the elimination of the EITC for undocumented immigrants by exploiting a provision of the 1996 welfare reform that mandated an SSN to qualify for the EITC. Using a difference-in-difference design and comparing Mexican, Central, and South Americans with natives, I first demonstrate that requiring an SSN to receive the EITC significantly reduced the likelihood that Mexican, Central, and South Americans receive the EITC. Exploiting the timing and variation in the percentage of working-age undocumented immigrants across counties, I find that counties with a higher share of Hispanic non-citizens experienced a relatively larger decline in EITC per person transfers after the policy change.

Using CPS data and a difference-in-difference design comparing undocumented single women with children (treated) to undocumented single women without children (control) over time, I then show that ending the EITC has a negative and significant impact on

the labor force participation of undocumented single mothers. Using a triple difference technique based on the variation in the effect of welfare reform based on who among undocumented immigrants was affected (undocumented single women versus undocumented married men) and the number of children of undocumented immigrants further reveals negative and robust effects of ending the EITC for undocumented immigrants on the labor supply of single mothers. In sum, I find that ending the EITC reduced the labor force participation of undocumented single mothers by 6-7 percentage points. The results are robust when limiting the sample to control for changes occurring across different groups of immigrants and over time in the sample period.

These results have significant policy implications. First, the findings suggest that EITC, wage subsidies, and taxes do influence the labor supply decision of undocumented single mothers. Second, most children born to undocumented single mothers are citizens who live in poor households. Thus, eliminating the EITC for undocumented immigrants has a dual negative effect on these children by denying them a tax credit and reducing the labor supply of their mothers.

REFERENCES

Amuedo-Dorantes, Catalina, and Cynthia Bansak. 2011. "The impact of amnesty on labor market outcomes: A panel study using the legalized population survey." *Industrial Relations: A Journal of Economy and Society*, 50(3): 443–471.

Amuedo-Dorantes, Catalina, and Cynthia Bansak. 2012. "The labor market impact of mandated employment verification systems." *American Economic Review*, 102(3): 543–48.

Amuedo-Dorantes, Catalina, and Francisca Antman. 2017. "Schooling and labor market effects of temporary authorization: Evidence from DACA." *Journal of population economics*, 30(1): 339–373.

Amuedo-Dorantes, Catalina, and Francisca M Antman. 2022. "De facto immigration enforcement, ICE raid awareness, and worker engagement." *Economic Inquiry*,

60(1): 373–391.

Amuedo-Dorantes, Catalina, Esther Arenas-Arroyo, and Almudena Sevilla. 2020. "Labor market impacts of states issuing of driver's licenses to undocumented immigrants." *Labour Economics*, 63: 101805.

Bachmeier, James D, Jennifer Van Hook, and Frank D Bean. 2014. "Can we measure immigrants' legal status? Lessons from two US surveys." *International Migration Review*, 48(2): 538–566.

Bastian, Jacob. 2020. "The rise of working mothers and the 1975 earned income tax credit." *American Economic Journal: Economic Policy*, 12(3): 44–75.

Bastian, Jacob, and Katherine Michelmore. 2018. "The long-term impact of the earned income tax credit on children's education and employment outcomes." *Journal of Labor Economics*, 36(4): 1127–1163.

Bastian, Jacob, and Lance Lochner. 2020. "The EITC and Maternal Time Use: More Time Working and Less Time with Kids?" National Bureau of Economic Research.

Bernhardt, Robert, and Phani V Wunnava. 2020. "The CPS Citizenship Question and Survey Refusals: Causal and Semi-Causal Evidence Featuring a Two-Stage Regression Discontinuity Design."

Blum, Cynthia. 2006. "Rethinking Tax Compliance of Unauthorized Workers After Immigration Reform." *Geo. Immigr. LJ*, 21: 595.

Bohn, Sarah, and Magnus Lofstrom. 2012. "Employment effects of state legislation against the hiring of unauthorized immigrant workers."

Borjas, George J. 2003. "Welfare reform, labor supply, and health insurance in the immigrant population." *Journal of Health Economics*, 22(6): 933–958.

Borjas, George J. 2017. "The labor supply of undocumented immigrants." *Labour Economics*, 46: 1–13.

Borjas, George J, and Hugh Cassidy. 2019. "The wage penalty to undocumented immigration." *Labour Economics*, 61: 101757.

Braga, Breno, Fredric Blavin, and Anuj Gangopadhyaya. 2020. "The long-term effects of childhood exposure to the earned income tax credit on health outcomes." *Journal of Public Economics*, 190: 104249.

Broder, Tanya, and Jonathan Blazer. 2011. "Overview of immigrant eligibility for federal programs."

Brown, J David, Misty L Heggeness, Suzanne M Dorinski, Lawrence Warren, and Moises Yi. 2019. "Predicting the effect of adding a citizenship question to the 2020 census." *Demography*, 56(4): 1173–1194.

Cascio, Elizabeth U, and Ethan G Lewis. 2019. "Distributing the Green (Cards): Permanent residency and personal income taxes after the Immigration Reform and Control Act of 1986." *Journal of Public Economics*, 172: 135–150.

Chetty, Raj, Adam Guren, Day Manoli, and Andrea Weber. 2013. "Does indivisible labor explain the difference between micro and macro elasticities? A meta-analysis of extensive margin elasticities." *NBER macroeconomics Annual*, 27(1): 1–56.

Chetty, Raj, John N Friedman, and Jonah Rockoff. 2011. "New evidence on the long-term impacts of tax credits." *IRS Statistics of Income White Paper*.

Cho, Heepyung. 2019. "Driver's License Reforms and Job Accessibility among Undocumented Immigrants." *Available at SSRN 3356102*.

Dahl, Gordon B, and Lance Lochner. 2017. "The impact of family income on child achievement: Evidence from the earned income tax credit: Reply." *American Economic Review*, 107(2): 629–31.

Dickert, Stacy, Scott Houser, and John Karl Scholz. 1995. "The earned income tax credit and transfer programs: a study of labor market and program participation." *Tax policy and the economy*, 9: 1–50.

East, Chloe N. 2018. "Immigrants' labor supply response to Food Stamp access." *Labour Economics*, 51: 202–226.

Eissa, Nada, and Hilary W Hoynes. 2006. "Behavioral responses to taxes: Lessons from the EITC and labor supply." *Tax policy and the economy*, 20: 73–110.

Eissa, Nada, and Jeffrey B Liebman. 1996. "Labor supply response to the earned income tax credit." *The quarterly journal of economics*, 111(2): 605–637.

Eissa, Nada, Henrik Jacobsen Kleven, and Claus Thustrup Kreiner. 2008. "Evaluation of four tax reforms in the United States: Labor supply and welfare effects for single mothers." *Journal of Public Economics*, 92(3-4): 795–816.

Ellwood, David T. 2000. "The impact of the earned income tax credit and social policy reforms on work, marriage, and living arrangements." *National tax journal*, 1063–1105.

Fix, M, and J Passel. 1999. "Trends in non-citizens' and citizens' use of public benefits following welfare reform: 1994-1997 Washington." *DC: Urban Institute.*

Flood, Sarah, Miriam King, Renae Rodgers, Steven Ruggles, and J Robert Warren. 2018. "Integrated Public Use Microdata Series, Current Population Survey: Version 6.0 [dataset]." *Minneapolis, MN: IPUMS.*

Flood, Sarah, Miriam King, Renae Rodgers, Steven Ruggles, and J Robert Warren. 2020. "Integrated Public Use Microdata Series, Current Population Survey: Version 7.0 [dataset]. Minneapolis: IPUMS, 2020."

Gee, Lisa Christensen, Matthew Gardner, and Meg Wiehe. 2016. "Undocumented immigrants' state & local tax contributions." *The Institute on Taxation and Economic Policy.*

Grogger, Jeff, Lynn A Karoly, and Jeff Grogger. 2009. *Welfare reform: Effects of a decade of change.* Harvard University Press.

Grogger, Jeffrey. 2003. "The effects of time limits, the EITC, and other policy changes on welfare use, work, and income among female-headed families." *Review of Economics and statistics*, 85(2): 394–408.

Heim, Bradley T. 2007. "The incredible shrinking elasticities married female labor supply, 1978–2002." *Journal of Human resources*, 42(4): 881–918.

Hotz, V Joseph. 2003. "The earned income tax credit." In *Means-tested transfer programs in the United States.* 141–198. University of Chicago press.

Hoynes, Hilary, and Jesse Rothstein. 2016. "Tax policy toward low-income families." National Bureau of Economic Research.

Hoynes, Hilary, Doug Miller, and David Simon. 2015. "Income, the earned income tax credit, and infant health." *American Economic Journal: Economic Policy*, 7(1): 172–211.

Hoynes, Hilary W, and Ankur J Patel. 2018. "Effective policy for reducing poverty and inequality? The Earned Income Tax Credit and the distribution of income." *Journal of Human Resources*, 53(4): 859–890.

Hungerman, Daniel M. 2005. "Are church and state substitutes? Evidence from the 1996 welfare reform." *Journal of public economics*, 89(11-12): 2245–2267.

Kaushal, Neeraj. 2006. "Amnesty programs and the labor market outcomes of undocumented workers." *Journal of Human resources*, 41(3): 631–647.

Kleven, Henrik. 2019. "The EITC and the Extensive Margin: A Reappraisal." National Bureau of Economic Research.

Krogstad, Jens Manuel, Jeffrey S Passel, and D'Vera Cohn. 2019. "5 Facts about Illegal Immigration in the US." *Pew Research Center*, 19.

Loprest, Pamela, Stefanie Schmidt, and Ann Dryden Witte. 2000. "Welfare Reform under PRWORA: Aid to Children with Working Families?" *Tax policy and the economy*, 14: 157–203.

Lueders, Hans. 2021. "Licensed to Drive, but Not to Work: The Labor Market Effects of Driver Licenses for Unauthorized Immigrants." *Journal of Economics, Race, and Policy*, 1–17.

Manoli, Day, and Nicholas Turner. 2018. "Cash-on-hand and college enrollment: Evidence from population tax data and the earned income tax credit." *American Economic Journal: Economic Policy*, 10(2): 242–71.

Meyer, Bruce D, and Dan T Rosenbaum. 2000. "Making single mothers work: Recent tax and welfare policy and its effects." National bureau of economic research.

Meyer, Bruce D, and Dan T Rosenbaum. 2001. "Welfare, the earned income tax credit, and the labor supply of single mothers." *The quarterly journal of economics*, 116(3): 1063–1114.

Moffitt, Robert A, et al. 1999. "The effect of pre-PRWORA waivers on AFDC caseloads and female earnings, income, and labor force behavior." *Economic conditions and welfare reform*, 91–118.

Nichols, Austin, and Jesse Rothstein. 2015. "The earned income tax credit." In *Economics of Means-Tested Transfer Programs in the United States, Volume 1*. 137–218. University of Chicago Press.

Orrenius, Pia M, and Madeline Zavodny. 2015. "The impact of E-Verify mandates on labor market outcomes." *Southern Economic Journal*, 81(4): 947–959.

Passel, Jeffrey S, and D'Vera Cohn. 2014. "Unauthorized immigrant totals rise in 7 states, fall in 14."

Rothstein, Jesse. 2010. "Is the EITC as good as an NIT? Conditional cash transfers and tax incidence." *American economic Journal: economic policy*, 2(1): 177–208.

Van Hook, Jennifer, and James Bachmeier. 2013. "Citizenship reporting in the American community survey." *Demographic Research*, 29: 1–32.

Appendix

A- Characteristics of Undocumented Immigrants

Figure A1 presents the share of undocumented, native, and legal immigrants in the age group 19-65 who are in the labor force from the year 1993 to 2001. The labor force participation of the natives has been very stable and higher than the immigrants. The labor force participation rate of undocumented immigrants, however, is higher than that of legal immigrants.
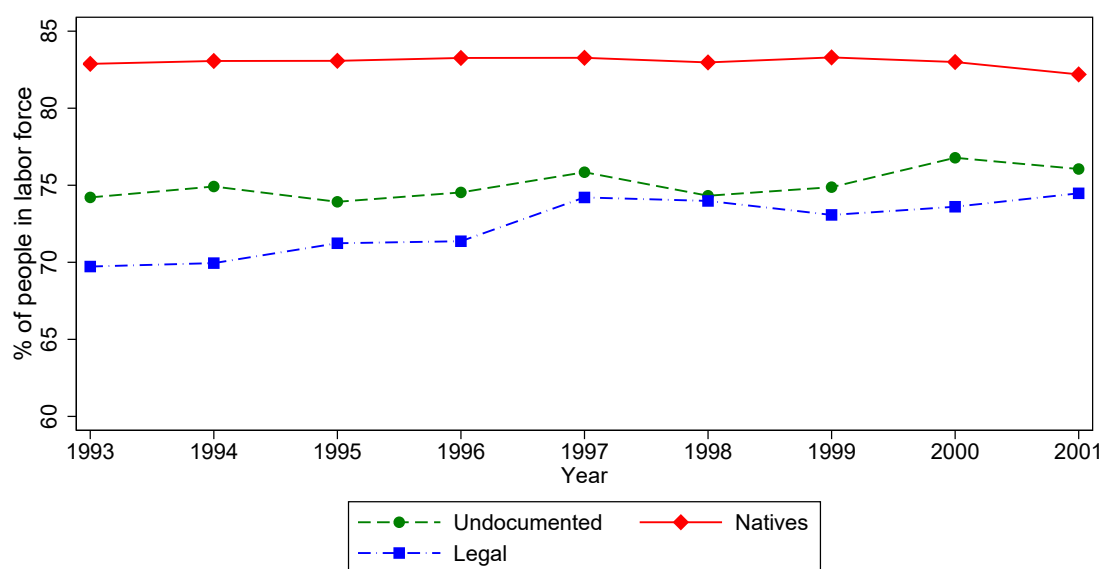

Figure A1. Percentage of People: Annual labour force participation

Note: This figure shows the percentage of population aged 19-65 for undocumented immigrants, natives and legal immigrants.
Source: 1994–2002 CPS.

Figure A2 presents the labor force participation of single women among undocumented, native, and legal immigrants in the age group 19-65 from the year 1993 to 2001. Native women have the highest labor force participation rate, followed by undocumented and legal women immigrants.

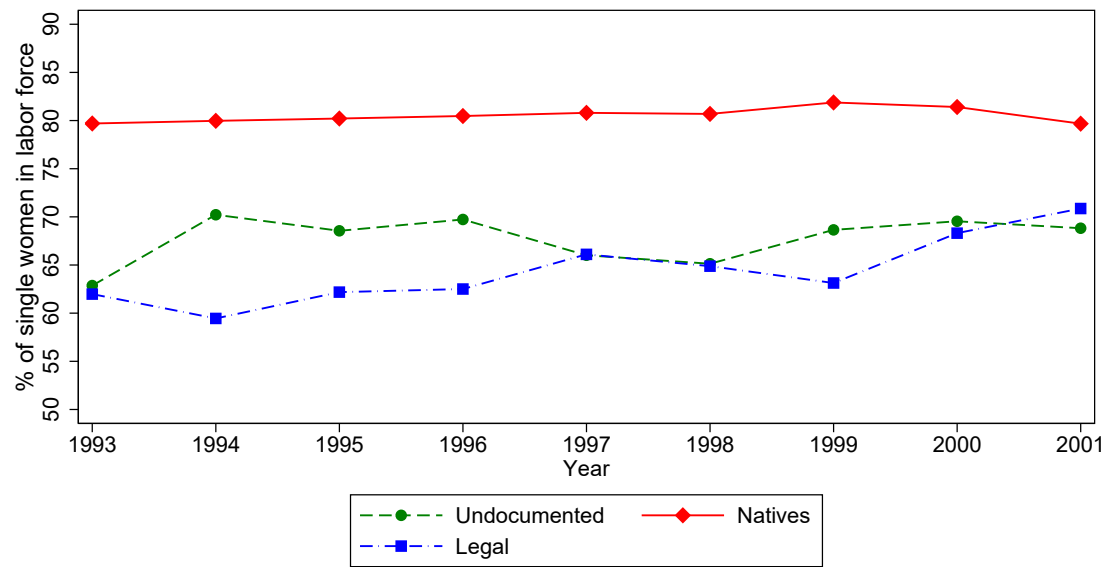Figure A3 illustrates the labor force participation trends of undocumented women with

FIGURE A2. PERCENTAGE OF PEOPLE: ANNUAL LABOUR FORCE PARTICIPATION

Note: This figure shows the percentage of single women aged 19-65 for undocumented immigrants, natives, and legal immigrants.
Source: 1994–2002 CPS.

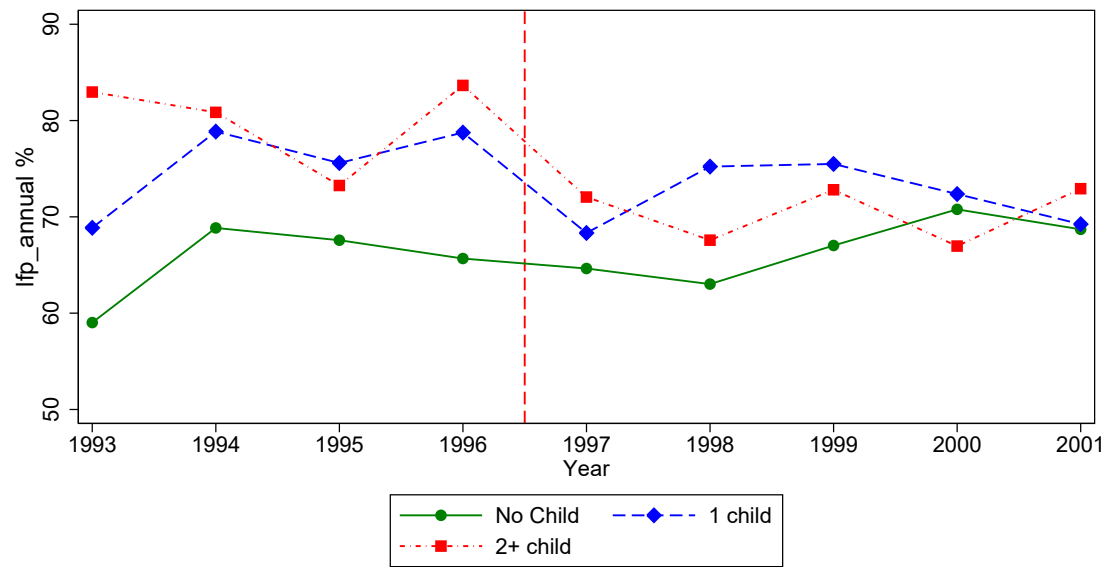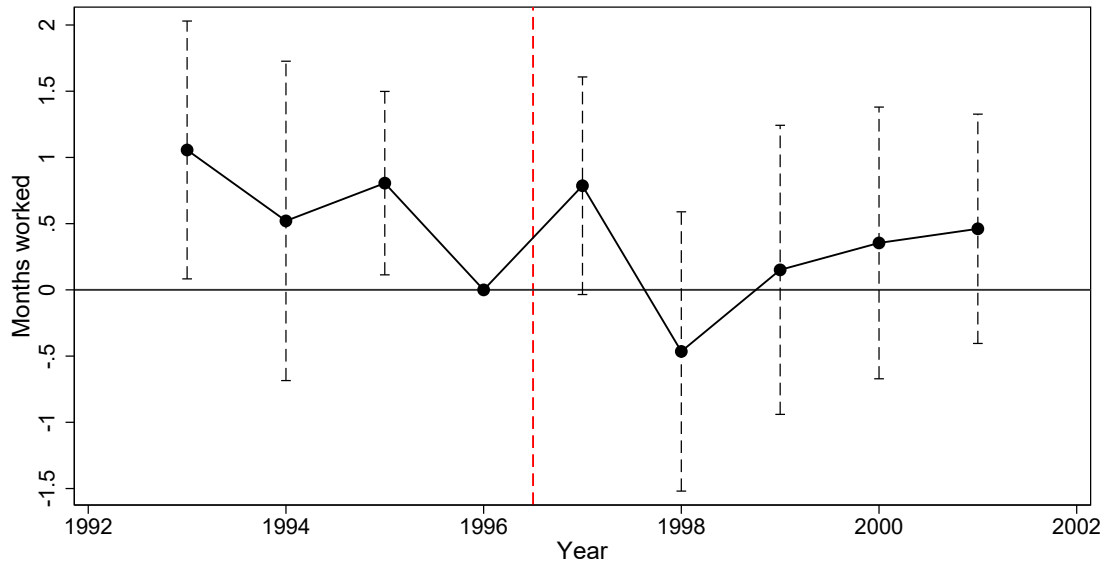no children, one child, and two or more children.

FIGURE A3. PERCENTAGE OF PEOPLE: ANNUAL LABOUR FORCE PARTICIPATION

Note: This figure shows the percentage of single women aged 19-65 for undocumented immigrants without children, with one child, and with two or more children.
Source: 1994–2002 CPS.

B- SUPPLEMENTARY FIGURES AND TABLES

Panel A: Diff-in-Diff
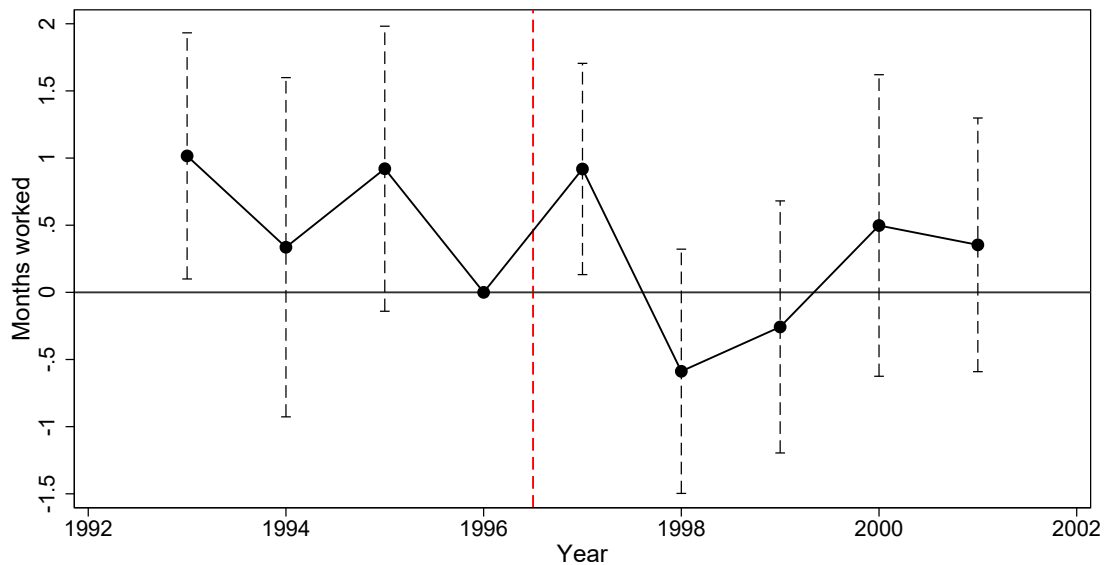

Panel B: Triple Difference

Figure B1. Months worked per year

Note: This figure shows the coefficients and 95 percent confidence intervals from event study regressions that estimate the effect on the number of months worked per year. Panel A shows the coefficients and 95 percent confidence intervals from the difference-in-difference event study regressions. Panel B shows the coefficients and 95 percent confidence intervals from event study regressions that estimate the three-way interaction between the undocumented immigrant group (single women versus married men), year, and treatment indicators. Treatment in Panel A is defined as undocumented single women with children, and the comparison group is undocumented single women without children. Treatment in Panel B is defined as undocumented immigrants with children, and the comparison group is undocumented immigrants without children.
Source: 1994–2002 CPS.

TABLE B1—CHARACTERISTICS OF UNDOCUMENTED TREATMENT AND COMPARISON GROUPS

Variable	Without children	With children
female	.28	0.41
Age	29.81	34.49
Single	.71	.15
Less than high school	.77	.84
Self- employed	.012	.019
Total family Income	38029.39	37052.51
Total Individual Earnings	15711.63	18611.18
Labour force Participation	0.78	0.73
Employed	.74	.68
Months worked per year	10.37	10.69
Observation	19,290	20,855

Note: This table shows summary characteristics for eligible individuals (Column 1), and the comparison group (Column 2). The treatment group is defined as likely undocumented immigrants with children, and the comparison group is comprised of likely undocumented immigrants without children.
Source: 1994–2002 CPS.

Table B2—Effect of ending the EITC on Single mother Undocumented Immigrants-Months worked per year

VARIABLES	(1) Months worked per year	(2) Months worked per year
Post × treat × single women		-0.60**
		(0.242)
Post × treat	-0.99***	0.32***
	(0.243)	(0.052)
treatment	0.02	0.17**
	(0.205)	(0.075)
single women × post		0.27
		(0.171)
single women × treat		0.42*
		(0.219)
single women		-1.02***
		(0.157)
Constant	8.33***	10.81***
	(0.743)	(0.063)
Observations	1,489	14,687
R-squared	0.121	0.043

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: This table displays the difference-in-difference and triple difference estimates for the impact of ending the EITC on Labor supply at the extensive of undocumented single mothers. In Column (1), Treated workers are defined as single women undocumented immigrants with children, and the comparison group is comprised of single women undocumented immigrants without children. In column (2), Treated workers are defined as undocumented immigrants with children, and the comparison group is comprised of undocumented immigrants without children. The Single women dummy variable takes a value of 1 for being a single woman and 0 for being a married man in the sample of likely undocumented immigrants. The outcome in Columns (1) and (2) denotes Months worked per year for those who are working.
Source: 1994–2002 CPS.

C- Labor supply of Married Men Undocumented Immigrants

Figure C1 presents an event study of the extensive margin of labor supply for undocumented married male immigrants from 1993 to 2002. The figure shows the difference-in-difference event study estimation along with their 95% confidence intervals. The figures confirm that there were no pre-existing trends between our treatment and control groups and show that all coefficients are insignificant before and after the policy change.
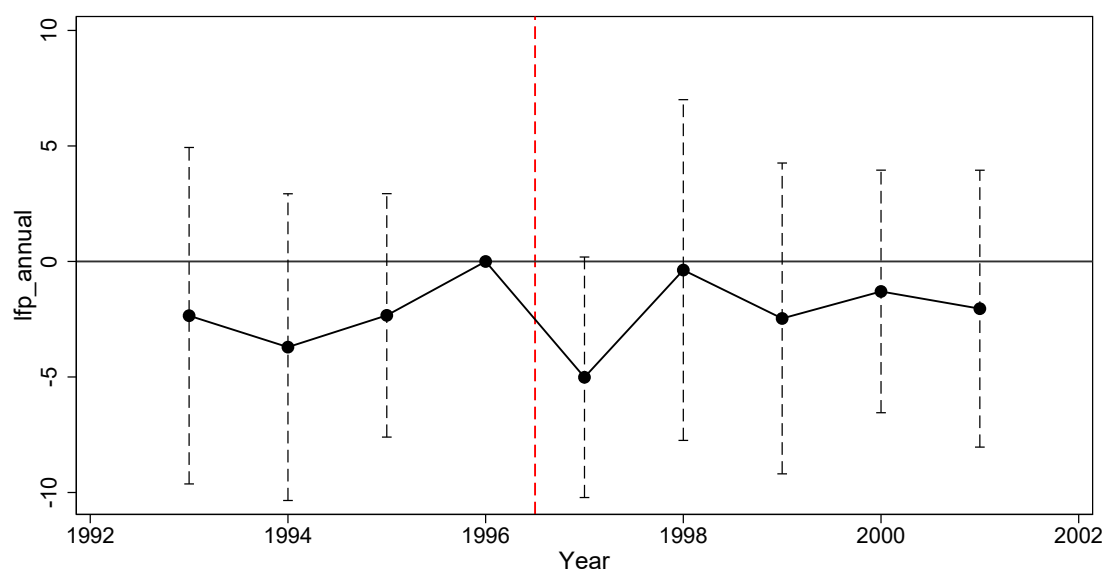

Figure C1. Effect of ending the EITC on the Extensive Margin of Labor Supply of undocumented immigrant

Note: This figure shows the coefficients and 95 percent confidence intervals from difference-in-difference event study regressions where the outcome is an indicator of labor force participation. Treatment is defined as undocumented married male immigrants with children, and the comparison group is comprised of undocumented married male immigrants without children.
Source: 1994–2002 CPS.

Table C1 shows the difference-in-difference table for the sample of undocumented married male immigrants. Columns 1–2 show the average effect of ending the EITC on labor force participation and employment. Across the set of different measures of the extensive margin of the labor supply, the estimates are small and statistically insignificant and are consistent with the event study. The figure shows that ending the EITC for undocumented

immigrant did not affect the labor supply of undocumented married male immigrants.

TABLE C1—EFFECT OF ENDING THE EITC ON THE EXTENSIVE MARGIN OF LABOR SUPPLY FOR UNDOCUMENTED MARRIED MALE

VARIABLES	(1) labor force participation	(2) Employment
Post × treatment	-0.14	0.58
	(0.845)	(1.132)
treatment	7.34***	6.42***
Constant	77.73***	78.48***
	(1.376)	(1.818)
Observations	21,424	21,424
R-squared	0.065	0.044

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: This table displays the difference-in-difference estimation for the extensive margin of the labor supply of undocumented married male immigrants. Treatment is defined as undocumented married male immigrants with children, and the comparison group is comprised of undocumented married male immigrants without children. The outcome in Column (1)– (2) is Labor force participation and employment.
Source: 1994–2002 CPS.

<center>D- Data Description</center>

<center>*D1. SIPP*</center>

The SIPP is a longitudinal survey that provides comprehensive information on the dynamics of income, employment, household composition, and participation in government programs. In several survey data such as the CPS and ACS, information on whether the individual filed taxed, taxable income amount, actual federal and state tax paid by the surveyed individual is not determined by direct questioning of respondents. Rather, values for these variables come from the Census Bureau's tax model, which simulates individual tax returns to produce estimates of federal, state, and payroll taxes. Many papers (Hoynes, Miller and Simon, 2015) use the NBER taxsim model to calculate the after-tax income, estimated tax paid by an individual given his/her wage, marital status, number of dependents. However, the taxsim model has some limitations when used to calculate the estimated federal tax calculation, adjusted gross income, and after-tax income for undocumented immigrants. The taxsim model cannot differentiate between those who use a valid Social Security Number and those who do not, such as undocumented immigrants or ITIN filers. Second, the taxsim model does not account for the fact that undocumented immigrants became ineligible for EITC starting in 1997.

However, a few modules of the SIPP data contain self-reported information and sometimes verified information on whether the individual has filed their tax returns and received their EITC. The SIPP topical module is the only source where I was able to find survey data on whether the person filed a tax return and received the EITC. I use the following wave of data from the tax module of the SIPP

- SIPP 1993 Panel Wave 05 covering interview months of February 1993 - May 1993 Core and Topical Module Data

- SIPP 1993 Panel Wave 08 covering interview months of February 1993 - May 1993 Core and Topical Module Data

- SIPP 1996 Panel Wave 04 covering interview months of April 1997 - July 1997 Core and Topical Module Data.

- SIPP 1996 Panel Wave 07 covering interview months of April 1998 - July 1998 Core and Topical Module Data.

- SIPP 1996 Panel Wave 10 covering interview months of April 1999 - July 1999 Core and Topical Module Data.

I used both the tax module and the core data which contains demographic information to create the data for analysis. I use the following two questions in the SIPP data to construct dependent variables.

1) Did an individual claim an earned income credit on the Federal income tax return filed in year y?

2) Did Persons 15 or older who filed a Federal tax return in year y?

There are two reasons why the variables above are less likely to be misreported. First, the tax information in the SIPP is self-reported, so there is less reason for respondents to misreport in the survey data. Second, for several following questions related to tax information, such as the amount of credit claimed, the respondent was asked to refer to a copy of the Federal tax form or a worksheet.

D2.   Census

Using Census 1990 and Census 2000, I compute the following Independent Variables at the county level: total population, Hispanic population, white population, black population, number of kids under the age of 5, number of kids under the age of 18, foreign-born population, noncitizen population, and number of people living below the poverty line. I find the share of Hispanic non-citizens and non-Hispanic non-citizens and treat them as

proxies for the undocumented and legal population in a county. I interpolate the 1991-1999 data using the 1990 and 2000 data. Finally, as Census Public Use Microdata is only available for counties with a population of at least 100,000, I utilize the data for 297 counties only to estimate the impact of the policy change on the EITC per person at the county level.

I obtain county-level EITC and per capita consumption data from the Regional Economic Information System provided by the Bureau of Economic Analysis[6]. I obtain data for years 1991-1999 and generate EITC per person at the county data using population data from the census. Finally, the EITC per capita is converted into real 2012 dollars. There is no score for misreporting because the variables used here are obtained from official sources, therefore they reflect the actual EITC amounts per individual claimed at the geographic level.

D3. Current Population Survey (CPS)

Social scientists use several estimation techniques to estimate the number of undocumented immigrants using the Census, the American Community Survey (ACS), and the Current Population Survey (CPS). The March CPS contains approximately 75K households in the clustered sample (full sample), whereas ACS contains approximately 1.2M households in random public-use data. ACS is larger than the CPS, but ACS was not available prior to 2000; while the Census is a decennial survey.

To evaluate the effect on labor supply, I use data from 1994-2002 from the Current Population Survey March Supplement, also known as the Annual Social and Economic Supplement (ASEC) of the Current Population Survey (CPS) (Flood et al., 2018). The data set contains detailed questions that cover the social and economic characteristics of every family member, their work experience, earnings components, employment status, occupation, and industry. In the March CPS, employment and income data are derived from the preceding year's data while demographic data are calculated at the time of the

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[6]https://apps.bea.gov/iTable/iTable.cfm?acrdn=7isuri=1reqid=70step=1reqid=70step=1isuri=1

survey. The data contain information about welfare benefits such as food stamps, school lunch programs, employer-provided group health insurance, employer-provided pensions, personal health insurance, Medicaid, Medicare, etc. The data contain information on characteristics such as age, sex, race, household relationship, and Hispanic origin for each person in the household enumerated. Since information concerning the year of immigration, citizenship status, and the place of birth is consistently available from the 1994-2002 survey years, I limit my analysis to this period. Since all variables used from the CPS data, including extensive and intensive margins of labor supply, as well as family income, are self-reported, there is a possibility of misreporting error. Nevertheless, there is little cause for concern since my analysis is based on Difference in Difference, and the misreporting is unlikely to change before or after 1996.

<center>EXTENSIVE MARGIN MEASURES</center>

Employment indicates whether an individual is working or not, whereas labor force participation includes both employed individuals and unemployed individuals who are looking for work or were laid off temporarily. Those with positive earnings are classified as employed. Respondents who worked or looked for work for one or more weeks last year are classified as participating in the labor force last year. Labor supply extensive and intensive margins are defined for the population between 19 and 65 years old.

1) Labor force participation (lfp_annual): Respondents are given a value of one if they worked (WKSWORK1) or looked for work (NWLOOKWK) for at least one week last year and takes on a value of zero if the respondent didn't look for work at all last year (WKSWORK1 = 0 and NWLOOKWK =0), and is missing otherwise.

2) Employment (emp_annual): Respondents are given a value of one if they had positive earnings last year (INCWAGE > 0), zero if they had zero earnings last year.

Intensive Margin Measures

The intensive margin measure is the number of months worked in the last year, conditioned on working. This is calculated by converting the number of calendar weeks worked last year (WKSWRK1) into the number of calendar months worked last year.

Total Family Income

The total family income variable used is the OFFTOTVAL in the CPS data. It is the total family income used for replicating official poverty rates. OFFTOTVAL treats primary families and related subfamilies within a given household as one family, in accordance with the official poverty guidelines.

Identifying likely undocumented immigrants

CPS data do not directly identify undocumented immigrants but collect information on their citizenship status, place of birth, year of immigration, and race. To create a proxy for undocumented immigrants, I use the following strategy. As a first step, I use imputation algorithm for the Current Population Surveys (CPS) developed at the Pew Research Center. Passel and Cohn (2014) describe the methodology used to add an undocumented status identifier to the Annual Social and Economic Supplement (ASEC) files of the CPS. The algorithm identifies the foreign-born persons in the sample who are likely to be legal, and then classifies the residual group as likely to be undocumented. The residual method classifies a foreign-born person as a legal immigrant if any of the following conditions hold:

1) That person arrived before 1980;

2) That person is a citizen;

3) That person receives Social Security benefits, SSI, Medicaid, Medicare, or Military Insurance;

4) That person is a veteran, or is currently in the Armed Forces;

5) That person works in the government sector;

6) That person resides in public housing or receives rental subsidies, or that person is a spouse of someone who resides in public housing or receives rental subsidies;

7) That person was born in Cuba (as practically all Cuban immigrants were granted refugee status);

8) That person's occupation requires some form of licensing (such as physicians, registered nurses, air traffic controllers, and lawyers);

9) That person's spouse is a legal immigrant or citizen.

Further, using Borjas (2017), I remove people who work as software developers or in computer-related jobs to remove people on H1B visas.

One concern is that the results and the data used to construct the sample rely on individual responses to a government survey. In the case of undocumented immigrants, citizenship status is inaccurately reported on U.S. surveys (Van Hook and Bachmeier, 2013). The citizenship issue and bias in the estimation of undocumented immigrants is a significant area of immigration literature. Researchers such as Bachmeier, Van Hook and Bean (2014) found that the introduction of legal status questions did not affect the participation of undocumented immigrants in surveys, while other researchers such as Brown et al. (2019) suggest that introducing a citizenship question would discourage respondents from answering the question. In the case of the CPS, the citizenship question was first included in the redesigned survey in January 1994. Bernhardt and Wunnava (2020) finds that an 8% increase in refusals may be attributable to the CPS citizenship question. However, I use the CPS data from 1994 to 2000, so there is no reason to believe that refusal to answer a question would change from 1994-2000. Furthermore, when I compare undocumented immigrants with and without children, my estimates are biased only if misreporting in the CPS survey question is correlated with the number of children or for either group it changes over time.

ELASTICITY

The numerator of the elasticity is calculated as the pre-1996-post-1996 change in the log employment rate. The denominator of the elasticity is calculated as the pre-1996-post-1996 change in the log earnings from working. I allow earnings to account for EITC only as undocumented immigrants were never eligible for other benefits such as AFDC, food stamps, WIC, etc. Using the CPS data, I calculate the average pre-income for unmarried mothers with one child to be \$6997 (in real 2012 dollars)[7]. A single parent with one child receiving the EITC at a rate of 34 percent would have a pre-1996 income of \$8338.5. The post-1996 income (in real 2012 dollars) is \$7487 and the post-1996 EITC is zero. In the pre-1996 period, the average employment rate for undocumented single mothers was 0.69, while in the post-1996 period, the average employment rate was 0.67.

Elasticity is calculated as $\varepsilon = \frac{log(Emp_{post1996}) - log(Emp_{pre1996})}{log(wage_{post1996}) - log(wage_{pre1996} + EITC_{pre1996})}$

$\varepsilon = \frac{.013}{.046} = .28$

For single women with two or more children at the pre-1996 EITC rate of 40% , Elasticity is calculated as

$\varepsilon = \frac{log(.67) - log(.73}{log(7499) - log(8044 + 0.4*8044}$

$\varepsilon = 1.15$

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[7]I use incwage variable in the CPS data which denote wage and salary income of a person