The Impacts of the Earned Income Tax Credit and Welfare Reform on Work Entry and Exit

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Abstract

This paper examines whether the employment effects associated with the Earned Income Tax Credit (EITC) and welfare reform are due to increased work entry or decreased work exit. Differentiating entry and exit effects is important for understanding how these well-regarded programs raise employment among people with different types of labor market attachment. Focusing empirically on the 1993 EITC expansion and the 1992–1996 welfare reforms, I apply a differences-in-differences framework and find that the EITC increased employment among low-educated unmarried mothers by six percentage points. Approximately 70 percent of this effect can be attributed to fewer labor market exits and only 30 percent to additional entries. Welfare reforms, in contrast, increased employment by 7.4 percentage points, entirely through increased entry. My findings indicate that while the tax credit is more successful at keeping workers attached to the labor market, the direct work requirements and time limits imposed by welfare reform are more effective at inducing non-workers to enter the labor force.

JEL codes: H2, I38, J2

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Introduction

During the 1990s, there was a fundamental shift in how the U.S. government provided support to low-income families as the emphasis shifted from providing unconditional support to people who are not working to instead subsidizing and incentivizing labor market participation. Two important program changes were implemented. First, the traditional cash assistance program, Aid to Families with Dependent Children (AFDC), was replaced by Temporary Assistance for Needy Families (TANF), which introduced time limits and work requirements. Second, the Earned Income Tax Credit (EITC) was greatly expanded, which offered a wage subsidy to working individuals with low incomes. Despite a large body of evidence that shows both policy changes succeeded in raising employment of unmarried mothers, we know much less about how the employment effects are achieved.[1] This paper examines whether the positive employment effects associated with the EITC and welfare reforms in the 1990s are due to increases in labor market entry by non-workers or by fewer transitions out of the labor market by workers.

The distinction between the entry and exit effects of these programs may refine the way we think about how these programs achieve their goals. The popular and academic view is that these policy changes induced non-workers to enter the labor market. For example, in one of the most highly-cited studies of the EITC, Joseph Hotz (2003) wrote: "The EITC creates an incentive for these non-workers to enter the labor force since it increases the marginal value of working by raising the effective wage." However, the EITC could also affect decisions of people who are already working by giving them an increased incentive not to exit the labor market (Mead 2014).

The EITC expansion could affect exit behaviors through at least three channels. First, it makes workers less likely to leave the labor market when there is a shock to their reservation wages or actual wages, for example, a plant closing, a decline in pay, or the birth of a child. It could also alter search behavior and shorten unemployment duration, leading to decreased exit. Finally, it incentivizes workers to put forth more effort, therefore decreasing job separation rates.

In fact, the exit effect may be quite large because those already in the labor market are more likely to know about the program through filing income tax.[2] It may be the case that the

[1] See Meyer and Rosenbaum (2000, 2001), Eissa and Hoynes (2006), Hoynes and Patel (2015), Ellwood (2000), and Grogger (2003, 2004).

[2] The EITC benefits have to be claimed while filing income tax. Blumenthal et al (2005) shows the EITC take-up rate is 35 percent for eligible households not required to file a tax return as compared to approximately 90 percent for those required to file.

entry effect is small if many non-workers have sufficiently high reservation wages that even a modest EITC payment does not induce them to enter the labor market. A better understanding of the separate effects on entry and exit decisions sheds light on types of people who are affected by the EITC and welfare reforms.

On the other hand, welfare reforms should increase employment primarily from increased work entry due to time limits and work requirements. These restrictions are transparent to welfare users, and do not rely on a labor supply response to higher wages like the EITC. These restrictions may have little effect on work exit because the majority of people who lose their jobs are generally given 12 to 24 months to land a new job while still qualify for welfare benefits.

To measure the effect of the EITC expansion and welfare reforms on work entry and exit, I use data from the Current Population Survey (CPS) and the Survey of Income Program Participation (SIPP) with a differences-in-differences research design that exploits changes in the generosity of these programs. I compare changes in employment, entry, and exit following the 1993 EITC expansion that differentially increased benefits for women with zero, one, and two children. Consistent with the existing literature, I find that employment went up by six percentage points for unmarried mothers relative to unmarried childless women after the major EITC expansion. Approximately 70 percent of the employment increase can be attributed to fewer labor market exits and 30 percent to additional labor market entry.

I also study the timing of state welfare reforms in the early 1990s and the 1996 federal reform. These program changes mainly affect low-skilled unmarried women with children, but have little or no effect on childless women, making the latter a natural comparison group in this study. My results suggest that for families with children living in states that adopted AFDC waiver or TANF, employment increased by 7.4 percentage points, an effect that is entirely driven by increased labor market entry.

My empirical design for the EITC relies on the assumption that the entry and exit rate of unmarried women without children would have followed the same trajectories as those with children in the absence of the EITC expansion. While this assumption is inherently untestable, several pieces of evidence support the use of differences-in-differences in this context. First, I show evidence that the treatment and comparison groups have parallel trends in the employment rate prior to the policy expansion. Second, results from the two data sets show robust estimates with the inclusion of interaction terms between treatment status and demographic indicators. The robustness results suggest that differential unobserved trends by treatment status may not bias the EITC estimates. For welfare reforms, the effect is identified

by differences in year of adoption by state and differences between women with and without children. To control for unobserved state specific trends, I interact the treatment indicator with the state unemployment rate for older men and include it as a control variable. I have also included state by year fixed effects in the sensitivity analysis and show that coefficients hardly change.

In addition to providing a more holistic understanding of the low-skilled labor market and how it responds to changes in incentives, this research also shows that the total employment effects of a policy are a weighted average of the entry and exit effects and that these weights are a function of the current labor force participation rate. This insight suggests that if a program's primary effect is to reduce labor force exit, it will be more effective during times of high employment than in times of low employment. Similarly, programs that encourage labor force entry will be most effective when there is a large pool currently out of the labor force. This question is of first-order importance for understanding the likely future effects of the EITC during different phases of business cycles, especially when much of what we know about the policy efficacies is based on past expansionary periods.

1. How the EITC and Welfare Reforms Changed Work Incentives

The Earned Income Tax Credit and AFDC/TANF are two of the most important cash-transfer programs for low-income Americans. The EITC is a refundable tax credit for low- and moderate-income working families, particularly those with children. According to the 2015 IRS Statistics, almost 28 million tax filers received over $66 billion in EITC benefits for the tax year 2014, and the average amount of the EITC paid out was more than $2,400 per family.[3] The EITC is now the largest antipoverty program in the US.

EITC benefits vary by a recipient's income and number of children. There are three benefit regions that depend on a family's earned income. In the phase-in region, the EITC acts as a wage subsidy. Each additional dollar earned leads to a larger EITC credit, until the maximum credit is reached. The credit is fixed in the flat region, so each additional dollar of wage earnings have no effect on the EITC payment. Finally, in the phase-out region the credit decreases with each additional dollar earned, thus acting as a traditional tax on earnings. Although similar in its general shape, the EITC benefit schedule differs by number of children and filing status.

[3] The data is from the Earned Income Tax Credit Central-IRS.gov. https://www.eitc.irs.gov/Partner-Toolkit/basicmaterials/ff

Figure 1 provides an illustration of the program history by plotting the maximum federal EITC amount over time, and separately by the number of children. The program was expanded in 1986, 1990, 1993, 2001 and 2009, with the 1993 expansion (implanted gradually between 1994 to 1996) being the most dramatic change. As a result, the 1993 expansion increases the maximum benefit for families with children relative to no children by about $1700, and also for families with two children relative to one child by $1300.

From 1935 to 1996, the AFDC was the largest cash-assistance program for low-income Americans. It provided cash financial support to families with dependent children. A fixed benefit amount was paid to eligible households if they have no income. After a small earnings disregard, any labor market earnings were taxed by the system through a reduction in AFDC benefits. This feature is widely thought to discourage labor market participation. During the 1990s, a series of welfare reform efforts were initiated by both states and the federal government. Between 1992 and 1996, states received waivers from the federal government that allowed them to impose restrictions, such as time limits and work requirements, on their traditional welfare program. In 1996, the Personal Responsibility and Work Opportunity Act replaced the AFDC program with the TANF, which has many of the features of earlier state reforms. Specifically, in TANF there is a maximum of 60 months of benefits within one's lifetime, though some states have instituted shorter periods. TANF also requires recipients to find a job within 12 to 24 months upon receiving aid.

2. Theoretical Framework

2a. The Static Labor Supply Model

The static labor supply model is the standard framework for understanding the impact of these program changes on labor supply.[4] In the traditional static labor supply framework, the EITC increases the net wage and does so differentially by family income. Figure 2a illustrates the budget constraints for a person with two or more children, with a $10 hourly wage, without the EITC, with the EITC that was in place in 1993 (pre-expansion), and with an enlarged credit in 1996 (post-expansion). The credit alters value of work and expands the family budget constraint from AB (when there is no EITC) to ACDE (in 1993) and then to AFGH (in 1996). The expansion of the EITC creates substitution and income effects that differ according to where a person is located in their budget constraints. For a non-worker at point A,

[4] See Meyer and Rosenbaum (2000, 2001), Hotz (2003), Eissa and Hoynes (2006), Hoynes and Patel (2015), etc.

the EITC generates a substitution effect that may induce some to enter the labor market. The substitution effect could lead people who are already working to increase their hours of work (if they were on segment AC) or to decrease their hours (if they are on segment DE). The expansion also generates an income effect among people already in the labor market that may tend to reduce hours of work. Therefore, the theoretical prediction is that the expansion of the EITC will unambiguously increase employment at the extensive margin, while the effect on hours of work among people already working is ambiguous.

Figure 2b illustrates TANF's effect on a person's budget constraint, specifically with the introduction of work requirements. It assumes 20 hours of minimum weekly work, as imposed by the TANF for single mothers with children under 6. It further makes the assumption of $500 monthly benefit with a 50% tax rate in 1996 (pre-TANF) and a lower tax rate at 33% in 1997 (post-TANF).[5] I also presume that all of the 20 hours of work are paid. The picture shows that such a change in welfare will shift a person's budget constraint from ACDB to AEFGB. The effect of a 20-hour work requirement is that the administrative mandate will induce non-workers to enter the labor and that they will end up with lower utilities than before (from C to F). They will enter because the utility derived from a welfare program with work requirements (at F) is still larger than no welfare at all (at A).

There is extensive empirical support for the basic predictions of the static model. Past research finds that the EITC increased the employment rate of unmarried mothers (Eissa and Liebman 1996, Meyer and Rosenbaum 2000, 2001, Eissa and Hoynes 2006, Hoynes and Patel 2015, Ellwood 2000). Meyer and Rosenbaum (2001), for example, find that the EITC caused 5.2 percentage point increase in annual employment of single mothers between 1984 and 1996; the literature generally agrees with this finding. For low-educated mothers who are already working, the literature finds little or no effect of hours worked due to the EITC. Eissa and Liebman (1996), for example, find a zero impact of annual hours worked on low-educated single mothers. Meyer and Rosenbaum (2001) find small insignificant impacts of the EITC on hours worked. Rothstein (2005) finds no difference between single mothers and childless single women in weekly hours worked across the wage distribution. Studies further show that welfare reforms played an important role in raising the employment rate for unmarried mothers. Specifically, Meyer and Rosenbaum (2001) finds that time limit waivers increased employment by between 1.4 and 4.8 percentage points during 1984 to 1996. Grogger (2003) likewise shows

[5] The actual average monthly benefit provided by the TANF is $490, while the tax rate on wage earnings ranging widely across states.

that the average family whose youngest child is three years old increased employment by 3.4 percentage points after their state implemented time limits in the periods of 1979 to 1999.

2b. How the EITC Expansion May Affect Work Exit

The EITC could also affect decisions to leave the labor market in ways that are not easily captured by the static model. The increase in the after-tax wage due to the EITC expansion could affect exit behaviors through at least three channels. First, it makes workers less likely to leave the labor market when there is a shock to their reservation wages or actual wages. Second, it could alter search behavior and shorten unemployment duration. Finally, it incentivizes workers to put forth more effort, therefore decreasing job separation rates.

The EITC may affect how people respond to shocks to their reservation wages or their actual wages. Define the reservation wage $W_R(Z_t)$ as the minimum amount a person must take home after taxes to accept any job. Z_t are factors that affect the reservation wage at time *t*, such as a birth of a child or a family member becomes sick. The EITC operates as a negative tax τ_t on the pre-tax wage W. For example, a person works in 1993 if $W(1-\tau_{93}) > W_R(Z_{93})$. A shock that increases the reservation wage from W_R to W_R' will, all else equal, induce some workers to leave the labor market. The expansion of the EITC raises $W(1-\tau_{93})$ to $W(1-\tau_{96})$. Workers for whom $W(1-\tau_{93}) < W_R'(Z_{96}) < W(1-\tau_{96})$ would drop of the labor market at the lower 1993 reservation wage, but remain in the labor market at the higher 1996 reservation wage. Similarly, the EITC expansion may also prevent work exit caused by an exogenous shock to the actual wage W.

The EITC may also affect labor market exits through its impacts on search behavior and unemployment duration. In a dynamic search model (Mortensen 1977), the probability of escaping an unemployment spell or the hazard rate is proportional to $s[1-F(W)]$, where s is endogenous search intensity, *W* is the reservation wage and *F(W)* is the cumulative distribution of wage offers. Incorporating the EITC as a negative tax τ_t, the hazard rate becomes $s(\tau_t)[1-F(\frac{W}{1-\tau_t})]$, where the search intensity and job offer distribution are functions of the tax rate. An increase in EITC benefits decrease pre-tax reservation wage and increase search intensity by raising the value of being employed. These changes may lead to shortened unemployment durations. For data aggregated to the annual level, the shortening of unemployment spells will appear as a decline in the labor market exit rate.

Lastly, the EITC may affect work exit if it changes the amount of effort people put forth at their jobs. Suppose there is an endogenous probability of job separation that depends on

employee effort and that effort is a function of the difference $W(1-\tau_t) - W_R(Z)$. When the EITC increases, the surplus $W(1-\tau_t) - W_R$ increases and a person may put forth more effort to keep their current job because the value of being employed is higher.

2c. The Entry and Exit Effects of Welfare Reforms

In contrast to the EITC, welfare reforms are likely to exert a major entry impact among those who are largely out of the labor market, and a relatively small exit influence on those with intermittent labor force attachment. Large entry effects are expected since work requirements and time limits are transparent to welfare users and do not rely on substitution effects like the EITC. On the other hand, there may be little exit effects associated with the TANF. Frist, the work participation rate for welfare users is approximately 33% in 2014 (U.S. Department of Health and Human Services, Administration for Children and Families). If a worker on welfare loses his job, he will have six weeks searching for a new job or will have to participate job training programs or community services. In that case, the welfare worker may decrease work exit through any of the three mechanisms mentioned above. But since the majority of welfare users do not work, this exit effect may not be large. If a worker who is not on welfare loses his job, he will be given 12 to 24 months to land a job while receiving welfare benefits, in which case the exit effect is likely to be small since he has plenty of time before his benefits are exhausted.

3. A Decomposition of Employment Effect into Entry and Exit Effects

As noted, there is evidence that the EITC and welfare reform increased employment. This change in employment can be decomposed into changes in entry and exit.

I begin by defining the employment rate at time t as the probability of working given the EITC program parameters in year t:

$$\text{Employment}_t = \text{P}(\text{E}_{it} = 1|\text{EITC}_{it})$$

where E_{it} is an indicator for whether person i is employed in year t. The conditional entry rate at time t is the probability of working in year t, conditional on not working in year t-1. It is the entry rate among non-workers given the EITC at time t:

$$\text{Entry}_t = \text{P}(\text{E}_{it} = 1|\text{E}_{it-1} = 0, \text{EITC}_{it})$$

Similarly, the conditional exit rate at time t is the probability of not working in year t, conditional on working in year t-1. It is the exit rate among workers given the EITC at time t:

$$\mathrm{Exit_t} = \mathrm{P}(\mathrm{E_{it}} = 0 | \mathrm{E_{it-1}} = 1, \mathrm{EITC_{it}})$$

The $\mathrm{Employment_t}$ can be decomposed into three terms: employment rate at time t-1, conditional entry at time t, and conditional exit at time t:

$$\mathrm{P}(\mathrm{E_{it}} = 1, \mathrm{EITC_{it}}) = \mathrm{P}(\mathrm{E_{it-1}} = 1, \mathrm{EITC_{it}}) + \mathrm{P}(\mathrm{E_{it}} = 1 | \mathrm{E_{it-1}} = 0, \mathrm{EITC_{it}})\mathrm{P}(\mathrm{E_{it-1}} = 0)$$
$$-\mathrm{P}(\mathrm{E_{it}} = 0 | \mathrm{E_{it-1}} = 1, \mathrm{EITC_{it}})\mathrm{P}(\mathrm{E_{it-1}} = 1, \mathrm{EITC_{it}}) \quad (1)$$

where the second term on the right is the conditional entry and the third term is the conditional exit.

Taking the derivative of equation (1) with respect to the $\mathrm{EITC_t}$ yields the change in employment with respect to a change in the EITC. This is what the literature estimates as the employment effect associated with the EITC.

$$\frac{\partial \mathrm{Employment_t}}{\partial \mathrm{EITC_t}} = (1 - \alpha_{t-1}) \frac{\partial \mathrm{Entry_t}}{\partial \mathrm{EITC_t}} - \alpha_{t-1} \frac{\partial \mathrm{Exit_t}}{\partial \mathrm{EITC_t}} \quad (2)$$

where α_{t-1} is $\mathrm{Employment_{t-1}}$.

Equation (2) provides the basis of my empirical models. It suggests that the effect of the EITC on employment is a weighted average of entry and exit effects, with the weight being the initial employment rate. The same decomposition applies to the welfare reforms as well. The other implication from Equation (2) is that the employment effects depend on the initial employment rate. As it varies during business cycles, the employment effects will fluctuate accordingly.

To provide an illustration of how policy-induced changes in employment are related to entry and exit, I conduct a simulation in response to the 1993 EITC expansion. The simulation shows that a permanent increase in entry or decrease in exit leads to a gradual increase in the employment rate.

First, suppose the EITC expansion affects employment only through decreased work exit. Specifically, I make the exit rate decrease from 0.09 (pre-1993) to 0.04 (post-1993) while the entry rate stays constant at 0.24. Then, I make the opposite assumption that the EITC works entirely through increased work entry by raising the entry rate from 0.24 to 0.46 after 1993 and keeping the exit rate at 0.09. The pre-expansion entry rate of 0.24 and exit rate of 0.09 are

based on actual 1993 CPS data, and changes in entry and exit rates are selected to match actual employment rates in 1993 and 2003. In reality, the effect may come from both entry and exit margins instead of through only one behavior.

Figure 3 plots simulated employment rates for the two extreme cases. These figures offer several instructive implications. First, it shows that the same EITC induced employment effect can be achieved from either a permanent decrease in exit or increase in entry. More importantly, the employment effects from a permanent change in entry or exit do not produce a discrete jump in employment, but an increasing effect with time. These insights are important in guiding the empirical specifications in Section 5.

4. Data

The data used in this analysis come from the March Current Population Survey (CPS) and the Survey of Program Participation (SIPP). Each data set possesses different strengths. The CPS is a nationally representative survey of approximately 60,000 households, providing monthly reports on employment situations. In the March interviews, detailed retrospective information including work status, weeks worked, wages and income during the previous year are collected. To fully utilize multiple EITC expansions and welfare reforms in the 1990s, I use the March CPS for 1985-2004, which provide information on the years 1984-2003. Following Meyer and Rosenbaum (2001), I limit the sample to single women (including those widowed, divorced, and never married) without a college education, who are 19 to 44 years of age, and not in school. In addition, women who were ill or disabled during the previous year, who had positive earned income but zero hours of work, or who had zero hours of work but positive income are also excluded. This sample has 124,882 observations. The employment status is based on whether a woman ever worked in the previous year. The EITC is based on annual earnings so previous year's work status is preferred to weekly or monthly work status.

At least two years of data are needed to construct labor market transitions. Respondents in the CPS are interviewed four months per year and during the same four months of the following year. The CPS is not designed to follow people in each month, but it is possible to match most respondents across two years based on their household ID, household number and person line number. This is what the literature refers to as a "naïve match" (Madrian and Lefgren 1999). In a particular survey year, the best case is that half of the people are linked to the previous year, with the other half to the next year. This naïve procedure includes some false

matches and misses potential matches due to errors in the CPS identifiers.[6] Some common causes of matching failures include sample non-responses, mortality, migration and recording errors. I refine the naïve match by restricting the matched person to having the same race and gender in two consecutive years, with age difference equal to one. Appendix Table A1 reports matching rates for naïve and refined matches with different demographic restrictions. In line with previous research (Madrian and Lefgren 1999), the naïve match rate for the whole sample is 70%. After my sample restrictions, the naïve rate goes down to 57%. The refined match rate for the overall sample is 61% and once it's restricted to unmarried low-educated women, the refined rate becomes 46%.

The SIPP is a household-based survey designed as a series of national panels. In this analysis, I use data from the 1984-1987, 1990-1993, 1996 and 2001 SIPP panels, which provide information for calendar year s1984-2003. Each of these panels is a longitudinal survey which lasts for two to four years. Interviews take place every four months, in which respondents report monthly employment status for each of the past four months. The final sample size is 65,809, after applying the same restrictions as in the CPS. The matching process with the SIPP data is more straightforward since it was designed as a longitudinal survey.

To create a dataset on annual employment, entry, and exit, I first aggregate the monthly employment measures to the annual level. One potential problem is that in the first year of each panel, a person may enter the survey in the middle of a year and this may lead me to understate annual employment for people who worked in the months before the survey began, but not after it. For my main analysis, I keep people if they are observed for more than six months during a year.[7] Consequently, year 1988, 1989, 1995, 1999, and 2000 cannot be matched since these are the starting or ending years of a panel. Then, I create work transition variables if a person is in the survey for more than two years to prepare for the entry and exit analysis.

A comparison of summary statistics in the full and matched samples are shown in Table 1. In the CPS, the matched sample is composed of people who are linked in two years. In the SIPP, the matched sample are those who are interviewed for at least two years. Table 1 shows that the matched sample for the CPS are a little older and are less likely to be high school dropouts, Hispanics, and never married. They also have slightly lower (imputed) EITC benefits

[6] Although in theory the combination of household ID, household number and person line number should uniquely identify individuals, there are some cases when the same identifiers are assigned to different people or the same person is assigned to different identifiers in two consecutive surveys. This is mostly caused by a wrongly counted household number or person line number.

[7] Sensitivity results from different month restrictions are shown in Appendix A2.

than the full sample.[8] The SIPP data is balanced across all variables except for the maximum welfare benefit. Comparing across the CPS and SIPP samples, SIPP respondents have more children and therefore have higher EITC and welfare benefits. Other characteristics are fairly similar across both data sets. Despite the fact that the matched samples are somewhat different from their respective full samples, below I discuss evidence that my baseline employment estimate are quite similar with the full and matched samples.

In addition to the main survey data, policy variables are obtained from the following sources: the maximum amount of the EITC is constructed using policy rules varying by year and by number of qualified children (Tax Policy Center 2016); the welfare reform indicator, whether the state a family resides in received AFDC waivers or adopted the TANF, is constructed using data from the U.S. Department of Health & Human Services; the variable maximum amount of welfare is provided by the University of Kentucky Center for Poverty Research, reflecting the total amount of AFDC/TANF and food stamp that a single parent family with children can obtain.

5. Estimation Strategy

The EITC and welfare reform policy changes differentially affect low-income families by their number of children and, in the case of welfare reform, by their state of residence. This leads naturally to the differences-in-differences estimation approach that has been used extensively in past work (Eissa and Liebman 1996, Meyer and Rosenbaum 2000, 2001, Hotz 2003, Eissa and Hoynes 2006, Hoynes and Patel 2015). To motivate this approach, I first present in Figure 4 general trends of annual employment rates for unmarried women with zero, one, and two or more children. Three patterns are noticeable: a) employment for unmarried women with children increased relative to those without children after 1993; b) women with two or more children experienced a sharper rise than those with only one child; and c) the increase in employment is not a one-time jump but rather a gradual climb. The third feature is especially noteworthy since it is consistent with the previous simulation of how employment rate varies with changes in entry and exit rates.

I present several differences-in-differences specifications in this section, utilizing the 1993 EITC expansion and 1992-1996 welfare reforms across family size. The 1993 EITC expansion raised the maximum credit for families with children relative to those without

[8] Federal EITC benefits are imputed from respondents' reported income and number of children using the TAXSIM program provided by the NBER (Feenberg and Coutts 1993)

children by about $2700. It also affected families with two or more children differentially than those with only one child by around $2000 in maximum benefits. To fully explore these differences in program rules by family size, I use two sets of treatment and comparison groups: a) unmarried mothers with children vs. unmarried women without children, and b) unmarried mothers with two or more children vs. unmarried mothers with only one child.

The effect of the AFDC waivers and TANF differs from the EITC expansion in the way that they do not have differential impacts on single mothers with one child relative to those with two or more children—all mothers with children are affected, although perhaps those with more children are more affected by time limits.[9] Therefore, I use only one treatment and comparison group to identify the effect from welfare reform: unmarried mothers with children vs. unmarried mothers without children.

I first present an "event time model" that captures the aggregated effects from the EITC and welfare and allows treatment effects to differ by year:

$$Y_{it} = \alpha + \beta_t(\mathrm{Year}_t \times \mathrm{Treat}_i) + \mathrm{Year}_t + \gamma_c + \eta X_{it} + \lambda_{sct} + \varepsilon_{it} \quad (2)$$

where i is an individual tax payer, c indicates number of children, t is tax year. Y_{it} includes three outcomes of interest: an indicator for employed during the year, exited, or entered. Year_t are year dummies, controlling for the overall time trends in unmarried female employment. Treat_i is an indicator if a woman is in the treatment group. γ_c are dummies indicating number of children. X_{it} are controls of demographic and business cycle factors including education, race, ethnicity, marital status, age group indicators, and state fixed effects.

λ_{sct} are a set of control variables that vary by state, year and treatment status, such as the interaction between Treat_i and state unemployment rate for men aged 45 to 65, Treat_i and marital status indicator, and Treat_i and education group indicator. λ_{sct} are included to test whether there are any unobserved time-varying state specific factors or any compositional change between the treatment and comparison group that may confound the effect of program changes. If the treatment effects do not change with the inclusion of λ_{sct}, it validates the research design.

β_t are differences-in-differences estimates, capturing the overall treatment effects of the EITC expansion and welfare reforms on unmarried mothers. These are the differences

[9] A mother with more children may expect to be on program longer because of the age ranges of her child. Therefore, the time limit may be more binding.

between the treatment and comparison groups, in period i (relative to the omitted year 1993). Estimates of β are plotted and any trends away from zero in the pre-93 periods may indicate unobserved differences in the treatment and controls which were not adequately controlled for.

The event study graphs provide a direct examination of the parallel trends assumption in the differences-in-difference estimation. Also, it models treatment effects flexibly, allowing the treatment to differ by year. However, given the moderate sample size of both data sets, allowing flexible treatment effects may result in noisy estimates. This is especially true for the entry model since entry is defined among non-workers, which is only about one fourth of the entire population.

Next, I turn to parameterized DD models. First, I separately estimate the treatment effect of the EITC using a single pre-post estimator, and the effect of AFDC waiver and TANF using the interaction between treatment status and a state welfare reform indicator. This is my main specification. Then based on simulated figures shown earlier, I allow treatment effects to vary linearly with time. Finally, I replace the pre-post estimator with an intensity treatment variable, the maximum amount of EITC benefits a family can receive contingent on tax year and number of children. The first pre-post model is specified below:

$$Y_{it} = \alpha + \beta(\text{Post93} * \text{Treat}_i) + \delta(\text{WaiverTANF}_{st} * \text{Treat}_i) + \text{WaiverTANF}_{st} + \text{Year}_t + \gamma_c + \eta X_{it} + \lambda_{sct} + \varepsilon_{it} \quad (3a)$$

The coefficient (β) of the interaction between post93 and treatment indicator delivers the treatment effect of the ETIC expansion. The identification comes from differential changes after 1993 between women without children and those with children (or women with one child vs. those with two and more children). If the employment effect is mainly from reducing labor market exits, β will be economically large and negative for the exit model whereas small and positive for the entry model.

My identification of the EITC effect relies on exogenous changes in program rules and number of children, and there are concerns that the fertility decision may be affected by the EITC. The Hoynes et al (2015) had a thorough discussion regarding this concern. In theory, the EITC could increase fertility due to its greater benefits for larger family sizes, but it could also decrease fertility because of the increased opportunity cost of mothers' time from employment. The empirical evidence suggests the EITC does not impact fertility decisions

(Baughman and Dickert-Conlin 2009) or family formation (Dickert-Conlin 2002, Ellwood 2000, Herbst 2011). Taken together, it is plausible to assume exogenous fertility behaviors.

In addition, if there are any unobserved factors that change differentially by treatment status over time, it may also confound the EITC results. To address this concern, I interact treatment status with demographic indicators such as education and marital status. Robustness results are shown in section 7b with and without the inclusion of theses controls.

The $\mathrm{WaiverTANF_{st}}$ is an indicator whether the state that a family resides in has adopted the AFDC waivers or switched to the TANF program. The coefficient (δ) of the interaction between this variable and the treatment indicator offers the treatment effect of welfare reforms. It is identified by differences in year of adoption by state and differences between women without children and those with children. If the employment effect is entirely from additional labor market entry, δ will be large and positive for the entry model whereas a negative small value or zero for the exit model.

Since the welfare effect is identified by variation in state*year*treat, there are concerns that differential unobserved state specific trends may confound the results. To address this issue, I interact state unemployment for older men with treatment indicator in the main specification. In addition, I include the state by year fixed effects in the sensitivity analysis in section 7b to show the robustness of my main results.

Equation (3a) is the standard DD model employed in literature, but it fails to account for the time-varying treatment effects displayed by simulation pictures. To explicitly model time-varying treatment effects as shown in the simulation, I include two additional terms to Equation (3a) :$\mathrm{Post93} * \mathrm{Treat_i} * \mathrm{Time}$ [10]and $\mathrm{post96} * \mathrm{Treat_i} * \mathrm{Time'}$[11]. Now Equation (3a) becomes:

$$\begin{aligned} \mathrm{Y_{it}} = \alpha + \beta_1(\mathrm{Post93} * \mathrm{Treat_i} * \mathrm{Time}) + \beta_2(\mathrm{Post93} * \mathrm{Treat_i}) + \delta_1(\mathrm{WaiverTANF_{st}} \\ * \mathrm{Treat_i} * \mathrm{Time'}) + \delta_2(\mathrm{WaiverTANF_{st}} * \mathrm{Treat_i}) + \mathrm{WaiverTANF_{st}} + \mathrm{Year_t} \\ + \gamma_c + \eta \mathrm{X_{it}} + \lambda_{sct} + \varepsilon_{it} \end{aligned} \quad (3b)$$

where β_1 captures the EITC induced treatment effects that vary linearly with time. Specifically, it is the incremental treatment effect by year for each year after 1994. β_2 picks up the level treatment effect which can be seen as a one-time permanent increase for post-93 periods

[10] Here Time is defined as Year minus 1993. For example, Time takes on a value of 1 if year is 1994.
[11] Here Time' is defined as Year minus Start year of waiver or TANF.

relative to pre-periods. The combination of those two terms provide the total effects of the EITC expansion. Likewise, δ_1 and δ_2 account for the welfare induced time-varying treatment effects for post-reform periods relative to pre-periods.

Finally, since there are multiple EITC expansions over time, an intensity treatment variable, the maximum amount of EITC benefits for a working family, is employed to fully utilize variation in EITC policies over multiple years. This last parameterized model is specified below:

$$Y_{it} = \alpha + \beta \text{MaxEITC}_{ct} + \delta(\text{WaiverTANF}_{st} * \text{Treat}_i) + \text{WaiverTANF}_{st} + \text{Year}_t + \gamma_c + \eta X_{it} + \lambda_{sct} + \varepsilon_{it} \quad (4)$$

MaxEITC_{ct} summarizes changes in the EITC by family size c and year t. The advantage of using MaxEITC_{ct} instead of the actual EITC is that it is not endogenously determined by labor supply decisions.

6. Results

6a. Event Study Graphs

I begin with presenting event study graphs of employment effects for unmarried mothers relative to childless women. In Figure 5, both data from the CPS and SIPP consistently display zero effects in the pre-1993 period, and a treatment effect increasing with time in the post-1993 period. This pattern validates the identification assumption and is consistent with the simulation figures of employment rates. Figure 6 plots the same estimates, but for unmarried mothers with two or more children relative to those with one child. Both data sets predict a marginally significant treatment effect after 1994, and a marginally significant pre-trend. It indicates women with one child may not be an ideal comparison group for women with two or more children. Based on Figure 4 and 5, I will emphasize estimates from comparison 1.

Figure 7 shows event-study estimates of exit for the first treatment and comparison groups. As seen from Figure 7a, the CPS estimates of exit are close to zero before 1994, dip a little after 1994 and remain low. A similar pattern is confirmed by Figure 7b using the SIPP, with a stronger statistical significance for decreased exit in the post 1993 period. Finally, Figure 8 presents the entry graph for the same treatment and comparison groups. Both data sets fail to

show any effects on entry, but estimates are quite imprecise and the confidence interval contains economically important effect sizes.

Results from these event study graphs suggest decreased exits after 1993 is more evident than increased entries. In addition, the research design is more convincing for comparisons between unmarried mothers with children and those without children. Finally, the data lacks statistical power to detect entry effect when the treatment effect is modelled flexibly.

6b. Parameterized Differences-in-differences Estimates

Next, I turn to regression results from the pre-post DD model in Equation (3a). Table 2 Panel a shows a comparison of main results between the CPS and SIPP. The CPS suggests that relative to unmarried childless women, the employment rate of unmarried mothers increased six percentage points in the post-93 periods. This six percentage point increase is a result of a 3.9 percentage decrease in exits, and a 4.3 percentage increase in entries. Put differently, the six percentage rise in the employment rate can be decomposed into a 70% contribution from decreased exit and a 30% contribution from increased entry applying the decomposition formula in Equation (2). Findings from the SIPP are consistent with this result, indicating a 3.5 percentage increase in employment, of which 61% can be explained by decreased exit, and 39% explained by increased entry. The entry effect with both data sets shows large standard errors and is not statistically different from zero.

The effects of welfare reforms are consistent with prior expectations. Estimates form the CPS suggest unmarried mothers living in states of AFDC or TANF increased employment by 7.4 percentage points relative to the comparison group. This effect is mainly through increased entry rather than decreased exit since the entry effect is large with tight standard errors and exit effects are tiny with big standard errors. The SIPP data validates this finding by identifying a 7.8 percentage entry-driven employment increase.

Table 2 Panel b shows the counterpart of Panel a but for unmarried mothers with two or more children relative to those with only one child. For this model, I only include the treatment effect for the EITC and not welfare reforms since the time limits and work requirements do not differentially affect mothers with different member of children[12]. Estimates from the CPS indicate an EITC-induced 7.9 percentage increase in employment,

[12] To obtain a more precise estimate for the EITC, I exclude the treatment variable for welfare in the main specification for 2+ children vs. 1 child. However, mothers with different number of children can respond differentially to welfare reforms.

which is entirely due to decreased exits. The SIPP results suggest a five percentage point increase in employment driven by imprecisely estimated exit effect.

I now move to results for Equation 3(b), in which the treatment effect varies linearly with time. Results from Equation 3a are shown for comparison purposes. The CPS finds a permanent 3.3 percentage increase in employment in the post-93 periods with a 0.1 percentage additional increase every year relative to pre-93. The results for welfare suggests a 3.5 percentage permanent increase in post welfare reform years with a 1 percentage additional increase every year relative to the time before welfare reform. On the other hand, the SIPP results suggests a bigger linear treatment effect for the EITC and a negative effect for welfare reforms. The reason why results from these two data sets do not confirm each other is possibly due to the fact that the SIPP data shows an employment effect lagging behind the CPS for one to two years, and therefore it is more difficult to disentangle the effect of welfare reforms with the EITC with the SIPP.

Finally, I turn to results from the last parameterized DD specification. Table 4 Panel a presents effects of the maximum EITC and AFDC waiver/TANF on employment, exit and entry for the two treatment and comparison groups. Specifically, for the CPS, $1000 policy induced increase in the maximum EITC raises employment for unmarried mothers by 4.5 percentage points, driven by 1.8 percentage decrease in exit and 1.9 percentage increase in entry. The SIPP data finds a 4.4 percentage EITC-induced employment effect which is driven by 1.4 percentage decrease in exit and 2.2 percentage decrease in entry. The entry effects are not statistically different from zero.

When I limit the sample to unmarried mothers in Panel b, the effect of the maximum EITC on employment is around five percentage points, driven mainly by decreased exit. The effect of entry is of a negative sign for both data sets and display large standard errors.

In summary, both the CPS and SIPP find the 1993 EITC expansion raised employment of unmarried mothers, and most of the effect is through decreased exits rather than increased entry. On the other hand, the AFDC waiver and TANF increased employment entirely through the entry margin.

7. Exit Effects on the EITC Eligible Group and Sensitivity Analysis

7a. Exit Effects on the EITC Eligible Group

In this subsection, I separately estimate the pre-post and parameterized DD models by the EITC eligibility to examine whether the exit effects are entirely from the EITC-eligible group. The eligibility is generated using NBER TAXSIM calculator and it is an indicator based

on actual family income and program rules. For this analysis, only people who worked in the previous year are included.

Table 5 shows the pre-post and parameterized DD exit estimates among the EITC eligible and ineligible groups. The analysis suggests that the EITC exit effect is entirely among people who qualify for the credit, and that AFDC waivers and TANF do not affect these people from the exit margin. Specifically, the pre-post DD results indicate, among the EITC eligible, a 5.4 percentage decrease for unmarried mothers relative to unmarried childless women. This effect is 1.5 percentage greater than the exit effect among all women (The exit effect from Table 2 is 3.9 percentage points). The estimate for the ineligible group is 0.8 percentage points and it is not statistically different from zero, indicating no effect among women that should not be affected by the EITC. Same findings are confirmed by the parameterized DD model shown in column 3 and 4.

This test suggests that the exit effect is entirely from the group which are supposed to be affected by the tax credit and is zero among people disqualify for the credit. It further validates my research design.

7b. Sensitivity Analysis

In this subsection, I present three sensitivity tables to address concerns that potentially threaten my identification strategies: 1) unobserved factors that may bias the estimate of program changes, 2) the CPS matched sample selection problem, and 3) SIPP sample restriction according to number of months observed in a year.

As mentioned in section 5, the main EITC effect is identified by variation in post93*treat. Therefore, any unobserved factors that change differentially by treatment status over time may confound my findings. Similarly, the main waiver/TANF effect is identified by variation in year*state*treat, so that any differential unobserved state specific time trends may bias the estimate of welfare reforms. To address the concern for differential unobserved time-varying factors by treatment status, I show models in Appendix Table A2 with and without the variable that interacts the treatment status with education indicators and marital indicators. I also include state by year fixed effects and the interaction between state unemployment rate and treatment status to focus on the potential problem of having unobserved state specific trends.

Appendix Table A2 shows same estimates of the EITC and welfare reforms with and without these controls for the CPS. The SIPP does imply a 0.9 percentage decrease after

including these controls but it is not statistically significant based on its standard error. These results suggest that unobserved factors do not drive main results and they are of a lesser concern.

Appendix Table A3 shows the full and matched sample estimates for the pre-post DD model. The purpose is to confirm that the matching procedure do not bias the results. As table 3 does show different sizes of estimates, they are not statistically different from each other based on standard errors.

Appendix Table A4 shows the pre-post estimates for SIPP when all people are included (full sample), only people in the data for more than 3 months (>3month) are included and only those in the data for more than 6 months (>6months) are used. The results show qualitatively similar estimates across restrictions and indicate sample resections according to number of months observed in a year is not a major problem in the study.

8. Conclusion

I evaluate how EITC expansions and welfare reforms in the 1990s affected labor market entry and exit decisions. Differentiating entry and exit is important because changes in employment are caused by changes in entry and exit behavior and it is these decisions that are relevant to both theory and policy.

One key insight of my research is that the EITC only has a moderate influence on motivating non-workers to join the labor market, but has a larger effect on workers by keeping them attached to the labor market. This is not the popular view in the EITC literature, but helps us understand how a major and well-regarded cash and transfer program has achieved its objective. In addition, I provide discussion of possible mechanisms through which work exit can be affected.

Using a differences-in-differences identification strategy that exploits variation in the generosity of the EITC benefits and differences in the welfare eligibility, I find the employment went up by six percentage points for unmarried mothers relative to unmarried childless women after the 1993 EITC expansion. Approximately 70% of the employment increase can be attributed to fewer labor market exits, and 30% of the effect resulted from additional labor market entries. Notably, all of the reduced exits from the labor market are among families eligible for EITC benefits, which helps validate my research design. In contrast, a similar analysis applied to welfare reform indicates that the AFDC waivers or TANF increased employment by 7.4 percentage points. Consistent with prior expectation, I find welfare reforms raised employment entirely through increased entry.

These findings suggest that the EITC is more effective at preventing labor market exits than encouraging entries when compared with welfare reforms. If future policies aim at motivating the unemployed to join the labor force, administrative mandates imposed by welfare reforms may be preferred than non-administrative means like the tax credit. However, if the policy goal is to build work experiences for those marginally attached to the labor market, the EITC may be a more effective tool.

Overall, this paper presents evidence on how the EITC and welfare reforms have achieved their goal of promoting work by altering entry and exit behaviors among people with different labor market attachment. Analysis of these behaviors is important for improving employment policies and for understanding the low-skilled labor market more generally. The results also provide guidance on policies regarding how to design and implement the EITC and other similar social welfare programs.

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Figure 1: Maximum Federal EITC by Tax Year and Number of Qualifying Children

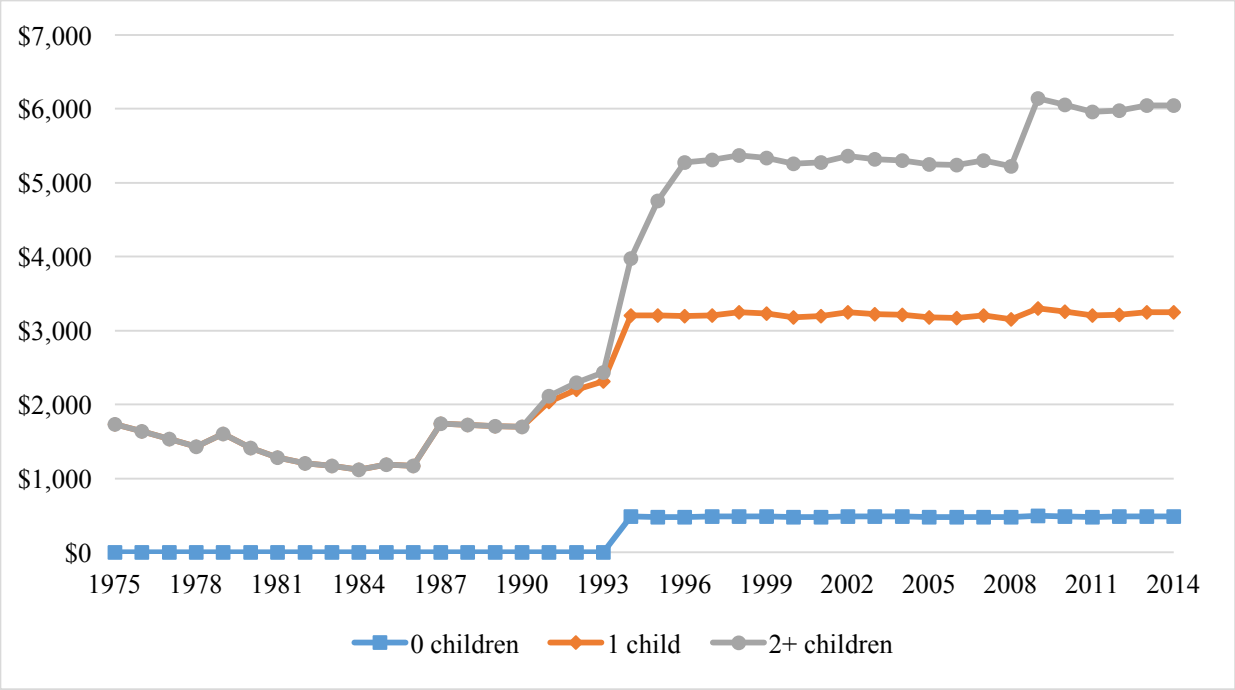

Figure 2a. The EITC Affected Budget Constraints for Single Families with Two or More Children

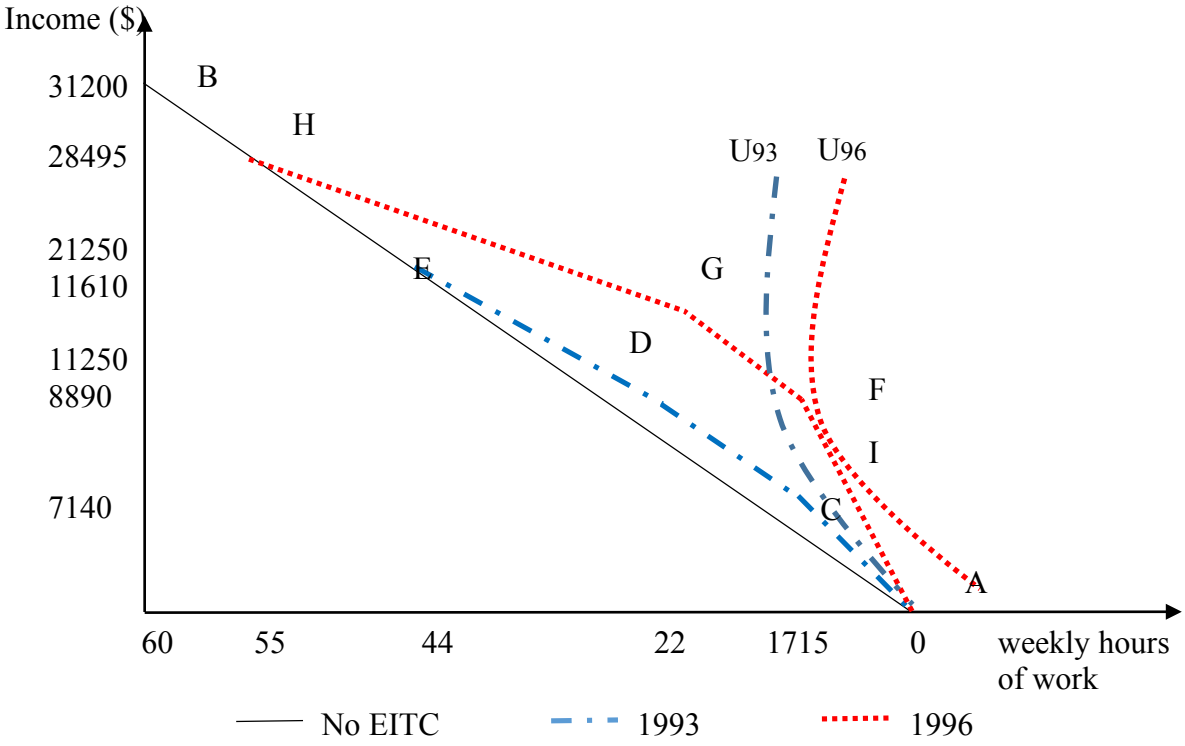

Figure 2b. The TANF (20-hour Work Requirement) Affected Budget Constraints for Single Families with Children

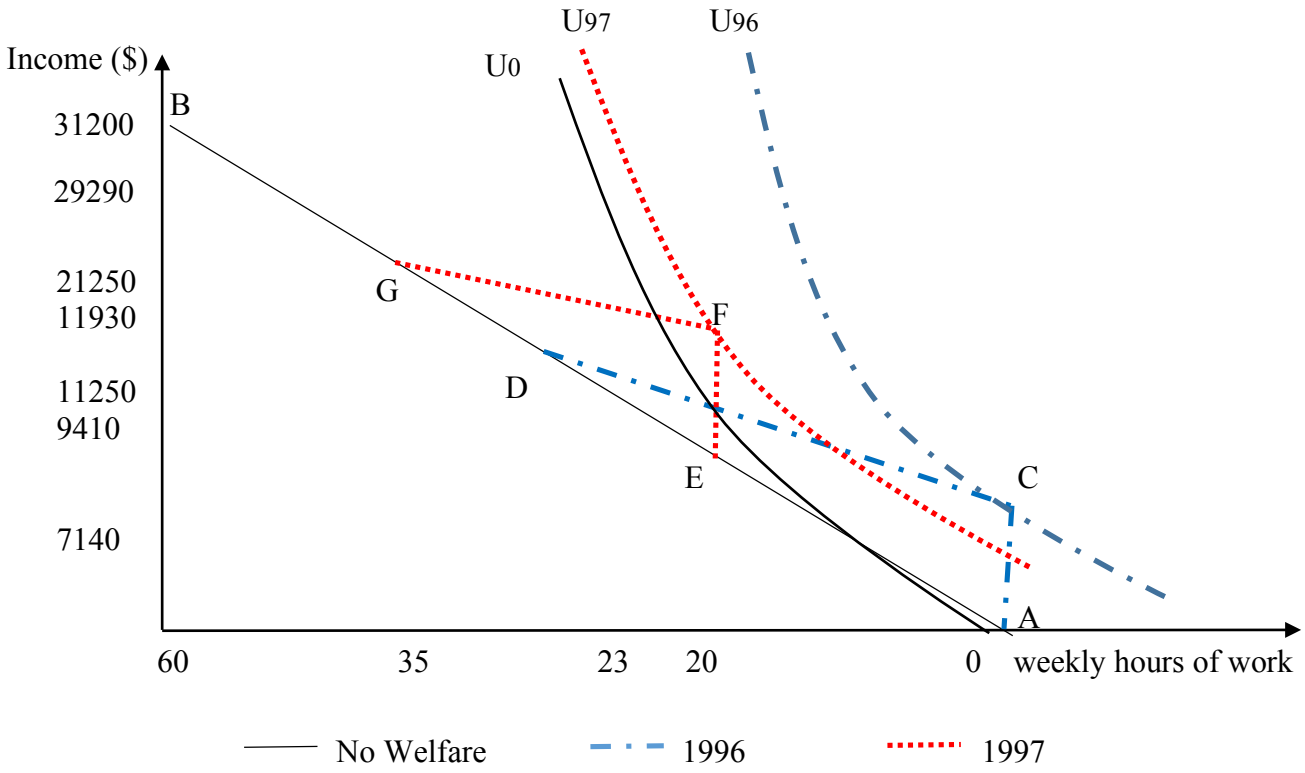

Figure 3: Simulated Employment Rates for Single Mothers

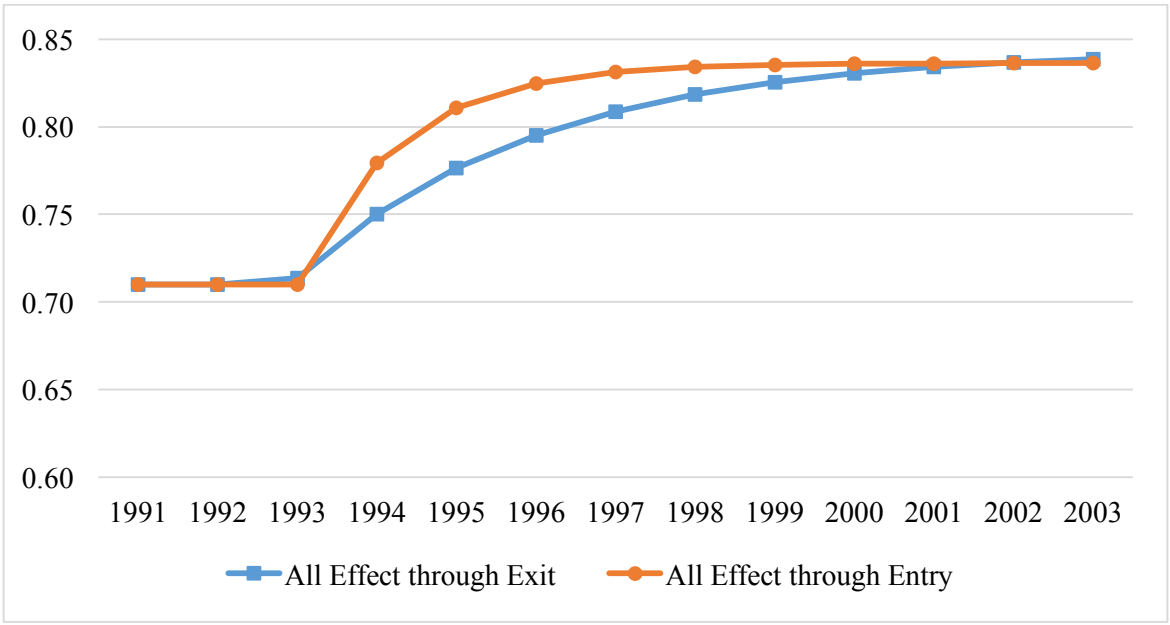

Figure 4: Employment of Unmarried Women by Number of Children- CPS

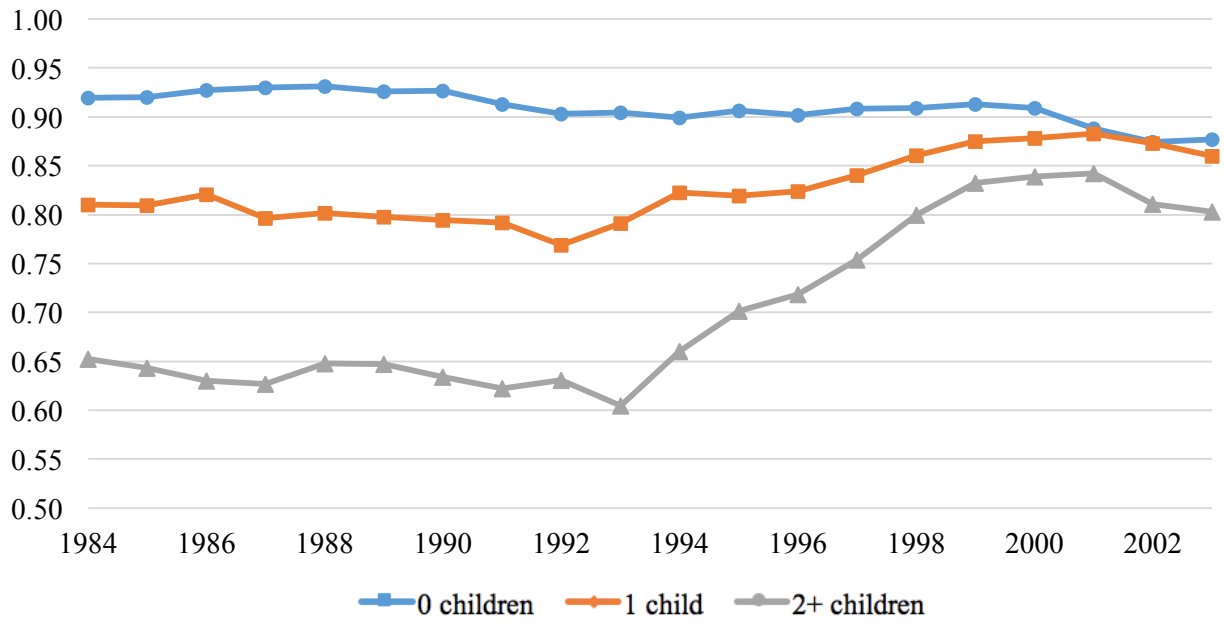

Figure 5a: DD Estimates of Employment for Unmarried Women-CPS

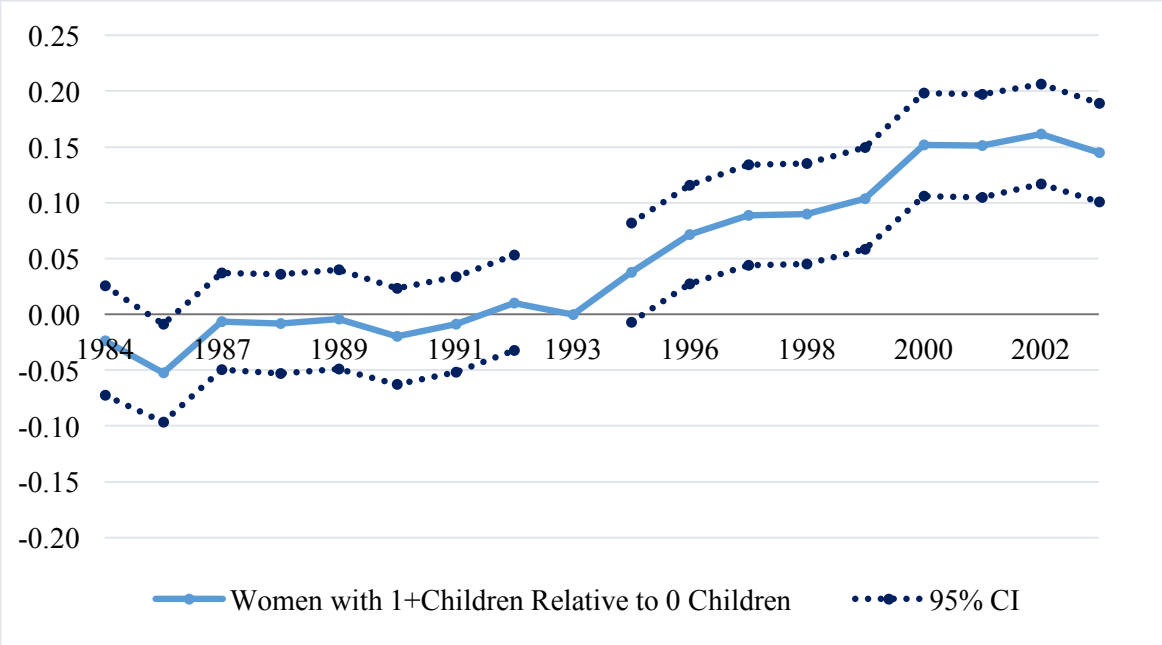

Figure 5b: DD Estimates of Employment for Unmarried Women-SIPP

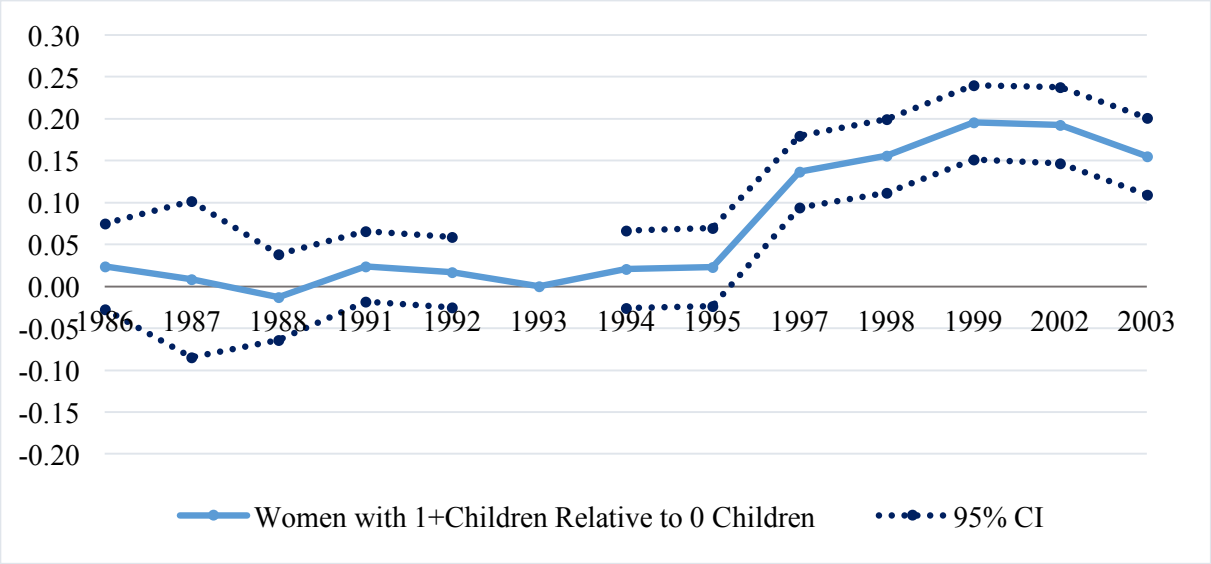

Figure 6a: DD Estimates of Employment for Unmarried Women- CPS

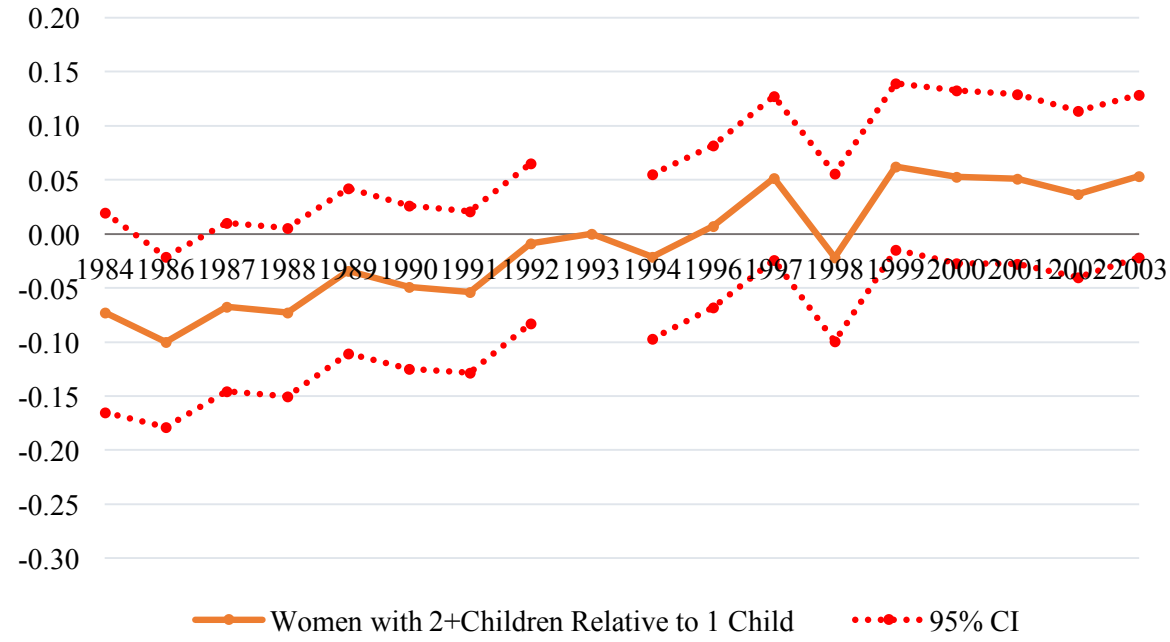

Figure 6b: DD Estimates of Employment for Unmarried Women-SIPP

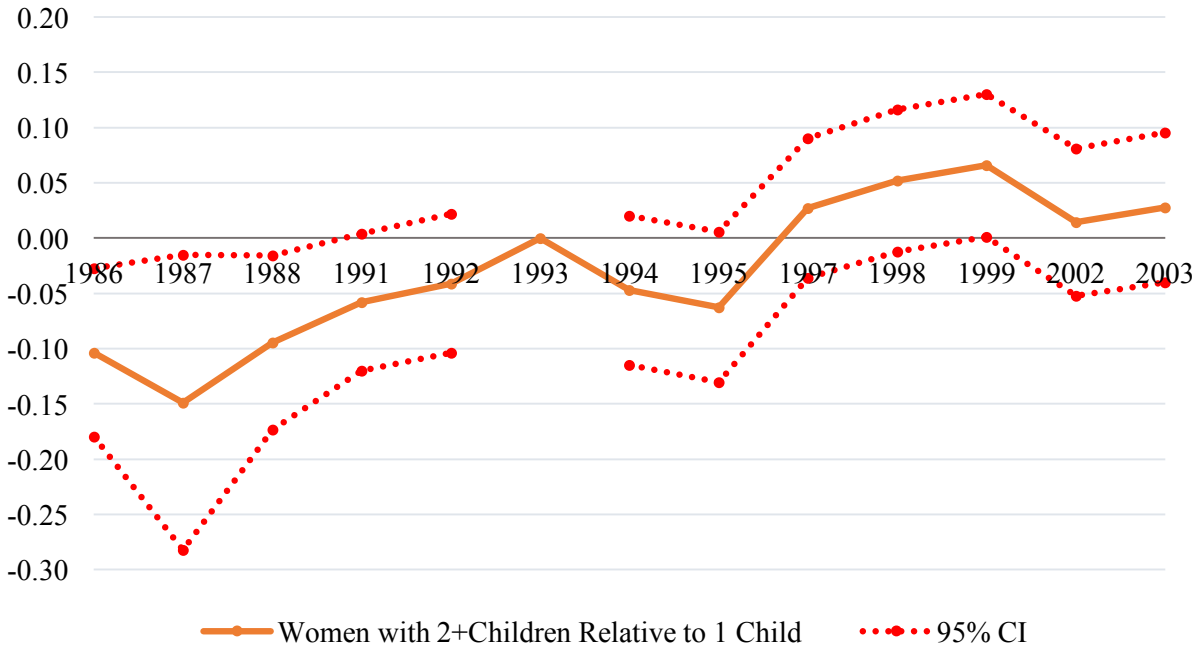

Figure 7a: DD Estimates of Exit for Unmarried Women- CPS

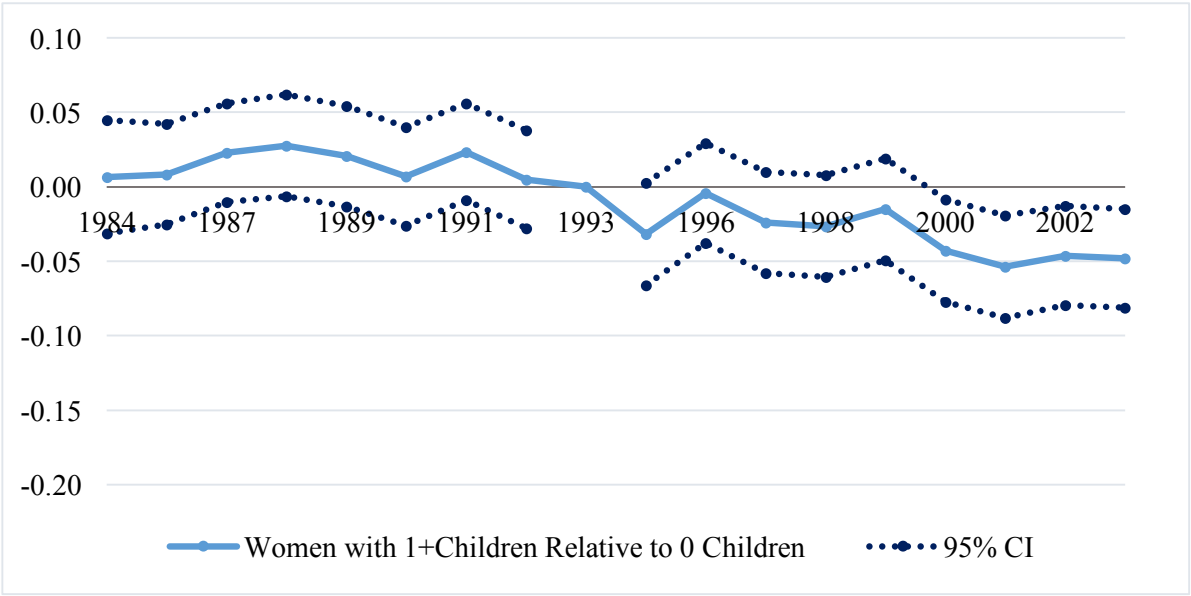

Figure 7b: DD Estimates of Exit for Unmarried Women-SIPP

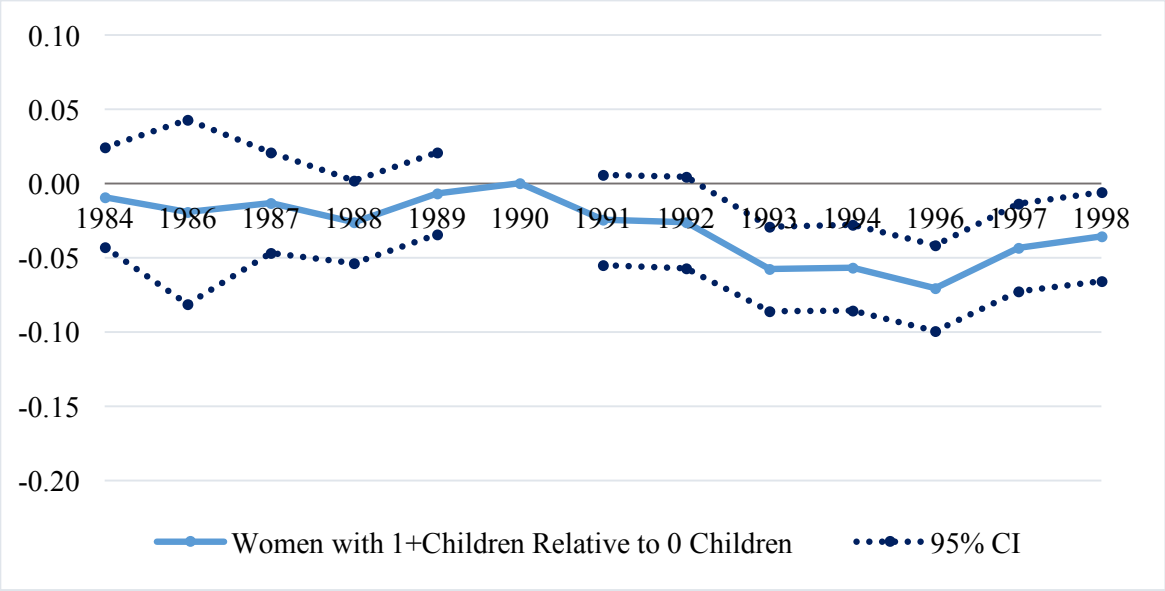

Figure 8a: DD Estimates of Entry for Unmarried Women- CPS

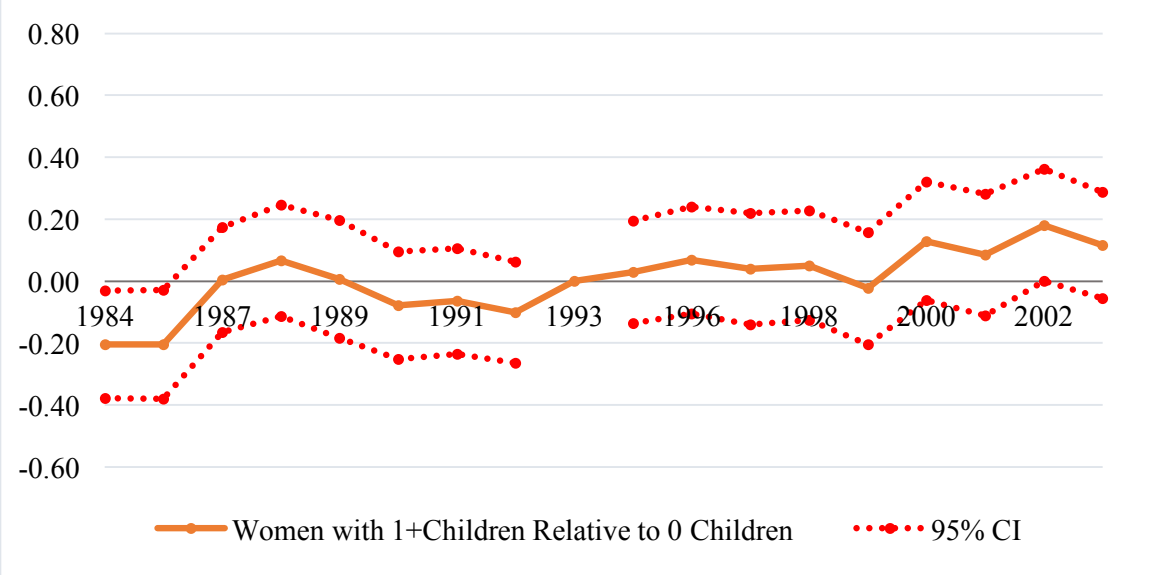

Figure 8b: DD Estimates of Entry for Unmarried Women-SIPP

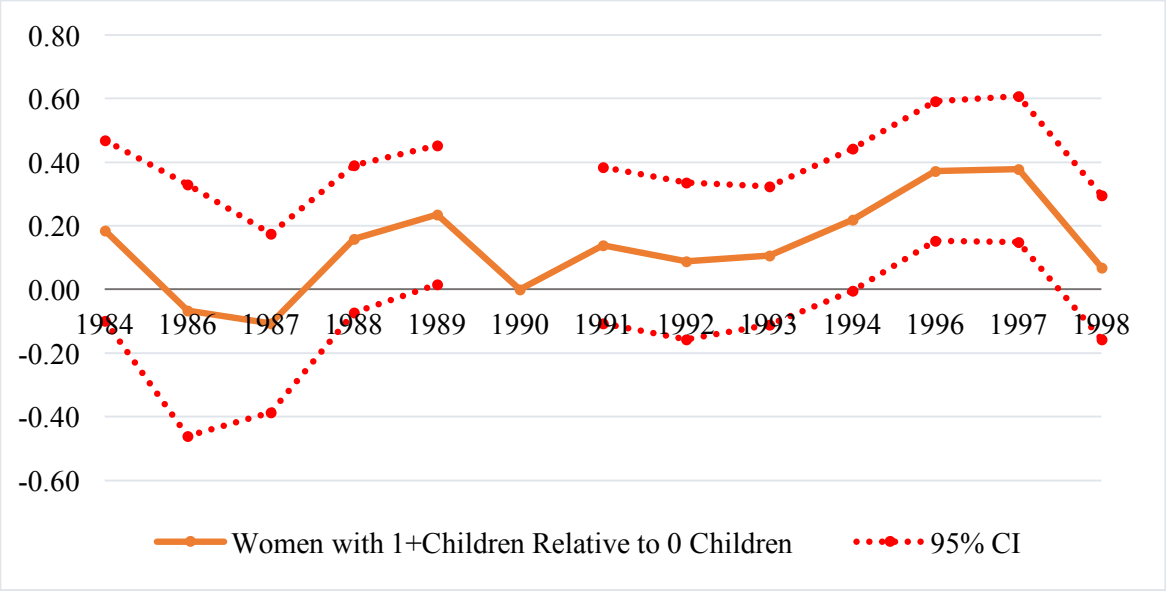

Table 1: Summary Statistics of Full and Matched Sample

	March CPS		SIPP	
	Full	**Matched**	**Full**	**Matched**
Employed last year	0.83	0.86	0.87	0.87
Age	30.15	32.52	30.74	31.37
Less than HS degree	0.18	0.14	0.09	0.09
HS degree	0.47	0.47	0.50	0.51
Some college	0.35	0.38	0.32	0.31
Hispanic	0.17	0.10	0.12	0.13
White	0.75	0.74	0.73	0.73
Black	0.20	0.22	0.23	0.24
Number of EITC qualifying children	0.86	0.90	1.16	1.18
Widowed	0.03	0.04	0.02	0.02
Divorced	0.32	0.35	0.30	0.30
Never married	0.65	0.61	0.58	0.57
Maximum amount of EITC[b]($)	1,245	1,260	1,420	1,427
Maximum amount of Welfare[c]($)	4,191	4,366	5,433	5,514
Number of unique individuals	97, 943	26,939	37,126	20,156
Number of observations	124,882	53,878	65,809	48,839

Note: a. Both the full sample and marched March CPS data are from 1985-2004. Both Samples include unmarried women aged 19-44 without college degree, not in school and disabled.

b. Full sample SIPP data are from 1984-2003; matched sample SIPP are from 1985-2003. Same sample restrictions apply as in the March CPS.

c. The maximum amount of the EITC is the maximum amount of federal EITC a family can receive annually. It varies by year and number of children. The data are from the University of Kentucky Center for Poverty Research.

d. The maximum amount of welfare is the maximum amount of AFDC or TANF plus the maximum amount of food stamp that a single family can receive annually. It varies by year, state and number of children. This data are from the University of Kentucky Center for Poverty Research.

Table 2: Pre-post Differences-in-differences Estimates for the EITC and AFDC Waiver/TANF

	CPS			SIPP		
	Employed	**Exit**	**Entry**	**Employed**	**Exit**	**Entry**
Panel a. Women with 1+ Children vs. 0 Children						
Post93*(1+children)	0.060***	-0.039***	0.044	0.035***	-0.020**	0.040
	(0.021)	(0.012)	(0.044)	(0.012)	(0.008)	(0.068)
Any AFDC waiver or TANF*(1+children)	0.074***	-0.008	0.119**	0.078***	-0.009	0.116*
	(0.023)	(0.012)	(0.046)	(0.012)	(0.008)	(0.067)
Mean of dependent variable for treatment group pre-1993	0.726	0.087	0.222	0.757	0.065	0.171
Number of observation	26778	22782	3996	25113	21519	3594
Panel b. Women with 2+ Children vs. 1 Child						
Post93*(2+children)	0.079***	-0.040***	-0.024	0.050**	-0.011	-0.045
	(0.014)	(0.012)	(0.039)	(0.013)	(0.008)	(0.041)
Mean of dependent variable for treatment group pre-1993	0.643	0.116	0.197	0.672	0.086	0.150
Number of observation	11695	9030	2665	14938	11932	3006

Note: The data are from the 1985-2004 March CPS and 1984-2003 SIPP. Samples include unmarried women aged 19-44 without college degree, not in school and disabled. Panel a includes all women, and panel b keeps mothers only. Control variables include race, ethnicity, age group, education, marital status, umber of children, unearned income, whether live in central city, state unemployment rate and year indicator, the interaction of treatment dummy and state unemployment rate. Exit is defined as conditional exit rate from labor force, and entry is conditional entry rate from out of labor force. Standard errors are clustered on state for the CPS; state*person for the SIPP. Significance levels: *10%, **5%, ***1%.

Table 3: Linear Time-varying Treatment Effect Model for Women with 1+ Children Relative to 0 Children

	CPS		SIPP	
	Equation 3a	**Equation 3b**	**Equation 3a**	**Equation 3b**
Post93*(1+children)*time		.001		0.015***
		(0.003)		(0.004)
Post93*(1+children)	0.060***	0.033*	0.035***	0.019
	(0.021)	(0.017)	(0.012)	(0.012)
Any AFDC waiver or TANF *(1+children)*time'		0.01**		-0.003
		(0.004)		(0.003)
Any AFDC waiver or TANF*(1+children)	0.074***	0.035**	0.119***	-0.037***
	(0.023)	(0.073)	(0.046)	(0.012)
Number of observations	26778	26778	14343	14343

Note: The data are from the 1985-2004 March CPS and 1984-2003 SIPP. Time is year minus 1994; Time' is year minus start year of AFDC Waiver or TANF. Samples restrictions and control variables are the same as in Table 2. Significance levels: *10%, **5%, ***1%

Table 4: Parameterized Differences-in-differences Estimates of Maximum EITC and AFDC Waiver/TANF

	CPS			SIPP		
	Employed	**Exit**	**Entry**	**Employed**	**Exit**	**Entry**
Panel a. Women with 1+ Children vs. 0 Children						
Maximum EITC ($1000)	0.045***	-0.018***	0.019	0.044***	-0.014***	-0.022
	(0.006)	(0.004)	(0.018)	(0.007)	(0.004)	(0.024)
Any AFDC waiver or TANF	0.047***	-0.015*	0.117**	0.048***	-0.005	0.176**
	(0.013)	(0.008)	(0.045)	(0.012)	(0.007)	(0.062)
Mean of dependent variable for treatment group pre-1993	0.726	0.087	0.222	0.757	0.065	0.171
Number of Observation	26778	22782	3996	25113	21519	3594
Panel b. Women with 2+ Children vs. 1 Child						
Maximum EITC ($1000)	0.050***	-0.021***	-0.006	0.045***	-0.013**	-0.035
	(0.009)	(0.006)	(0.08)	(0.009)	(0.005)	(0.029)
Mean of dependent variable for treatment group pre-1993	0.643	0.116	0.197	0.705	0.064	0.171
Number of observation	11695	9030	2665	14938	11932	3006

Note: Sample restrictions and control variables are the same as in Table 2. Significance levels: *10%, **5%, ***1%

Table 5: Exit Effects from the EITC by Program Eligibilities

	Pre-post DD		Maximum EITC	
	EITC Eligible	**EITC Ineligible**	**EITC Eligible**	**EITC Ineligible**
Post93*(1+children)	-0.054***	-0.008	-0.029***	0.004
	(0.014)	(0.015)	(0.006)	(0.005)
Any AFDC waiver or TANF*(1+children)	-0.007	-0.001	-0.013	-0.011
	(0.014)	(0.017)	(0.011)	(0.010)
Number of observation	12640	10275	12640	10275

Note: The data are from the 1985-2004 March CPS. The sample restricts to unmarried working women in year t-1. Column 1 and 2 are simple pre-post model among the EITC eligible. Column 3 and 4 are parameterized maximum EITC model among by the EITC eligibility. EITC eligibility is generated by the NBER TAXSIM program based on income and EITC rules.

Appendix Table A1: Sensitivity of Match Rates for the CPS

	Naïve Match	Refined Match
Without sample restrictions	0.70	0.61
Women with age restriction	0.65	0.55
Unmarried, low-ed women with age restriction	0.57	0.46

Appendix Table A2: Pre-post Differences-in-differences Model Robustness Check

	CPS		**SIPP**	
Post93*(1+children)	0.058**	0.059**	0.038***	0.029**
	(0.024)	(0.022)	(0.012)	(0.013)
Any AFDC waiver or TANF*(1+children)	0.075***	0.075***	0.080***	0.081***
	(0.025)	(0.025)	(0.013)	(0.013)
Number of observation	26778	26778	25113	25113
Controls				
Demographics	X	X	X	X
State indicators	X		X	
Year indicators	X		X	
State*year indicators		X		X
Unemployment rate*(1+Children)		X		X
Education indicators*(1+Children)		X		X
Marital status indicators*(1+Children)		X		X

Note: The sample restrictions are the same as in Table 2

Appendix Table A3: Pre-post Differences-in-differences Estimates of Employment-Full and Matched Sample

	CPS Full	CPS Matched	SIPP Full	SIPP Matched
(Year>1993)*(1+children)	0.070***	0.060***	0.056***	0.035***
	(0.010)	(0.013)	(0.009)	(0.012)
Any AFDC waiver or TANF*(1+children)	0.034***	0.074***	0.047**	0.078***
	(0.011)	(0.012)	(0.009)	(0.012)
Mean of dependent variable for treatment group pre-1993	0.715	0.726	0.775	0.769
Number of observation	141664	26778	57407	25113

Note: The comparison groups are women with children relative to no children. The data are from the 1985-2004 March CPS and 1984-2003 SIPP. Samples include unmarried women aged 19-44 without college degree, not in school and disabled. Control variables include race, ethnicity, age group, education, marital status, umber of children, unearned income, whether live in central city, state unemployment rate and year indicator, the interaction of treatment dummy and state unemployment rate. Exit is defined as conditional exit rate from labor force, and entry is conditional entry rate from out of labor force. Standard errors are clustered on unique individual for SIPP. Significance levels: *10%, **5%, ***1%

Appendix Table A4: Sensitivity Results of SIPP

	Full Sample	**>3months**	**>6 months**
(Year>1993)*(1+children)	0.048***	0.040***	0.035**
	(0.010)	(0.011)	(0.012)
Any AFDC waiver or TANF*(1+children)	0.066***	0.073***	0.078***
	(0.010)	(0.011)	(0.012)
Number of observation	63712	36333	25113

Note: The dependent variable is ever employed during the year. Full sample includes all people regardless of their frequency of appearance in the SIPP. >3months, keeps people that appear more than three months.>6months, keeps people that appear more than half a year. The data are from the 1985-2004 March CPS and 1984-2003 SIPP. Other sample restrictions are the same as in the main analysis. Significance levels: *10%, **5%, ***1%