

# The Earned Income Tax Credit and the Distribution of Income

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## **Abstract:**

This paper comprehensively examines the effect of the EITC on the employment and income of single mothers with children. We provide the first estimates of this central safety net policy on the full distribution of after-tax and transfer income. We use a quasi-experiment approach, using variation in generosity due to policy expansions across tax years and family sizes. Our results show that a policy-induced \$1000 increase in the EITC leads to a 7.4 to 8.4 percentage point increase in employment and a 5.5 to 9.6 percentage point reduction in the share of families with after-tax and transfer income below 100% poverty. These results are robust to a rich set of controls and to whether we limit our analysis to the sharp increase in EITC due to the 1993 expansion or use the full period of policy expansion, back to the 1986 Tax Reform Act. We find that the income increasing effects of the EITC are concentrated between 75% and 150% of poverty with little effect at the lowest income levels (50% poverty and below) and at levels of 250% of poverty and higher.

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This research represents our private research efforts and does not necessarily reflect the views or opinions of the U.S. Department of the Treasury.

## 1. Introduction

The Earned Income Tax Credit provides a refundable tax credit to lower income working families. Tax expansions over the past two decades have made the EITC a central element of the U.S. safety net (Bitler, Hoynes and Kuka 2014). In 2011, the EITC reached 28 million tax filers at a total cost of \$63 billion, with an average credit amount of \$2,254. Almost 20 percent of all tax filers and 44 percent of filers with children receive the EITC. In contrast, fewer than 2 million families received cash welfare benefits (TANF) in 2011, a 62 percent decline since 1994.

Given the prominence of the credit in the U.S. safety net, it is not surprising that many studies have evaluated its effects. The primary focus in the literature is on estimating the effect of the EITC on labor supply. Among single-earner families with children, labor-supply theory predicts an increase in employment, but hours of work (earnings) for those already in the labor market are predicted to decline.<sup>1</sup> Because the EITC is based on family income, the credit leads to a very different set of incentives for married taxpayers, generally suggesting a reduction in labor supply for secondary earners. Prior work provides consistent and robust evidence that the EITC increases the employment of single mothers (see reviews in Eissa and Hoynes 2006 and Hotz and Scholz 2003) and modest reductions in the employment of married women (Eissa and Hoynes 2004). Although there is less evidence supporting the prediction of a negative intensive margin response on either hours or earnings, recent work suggests that some workers make intensive margin adjustments (Saez 2010 and Chetty et al. 2013).

The fairly widespread support for the EITC may in part derive from its goal to increase income while encouraging work. Importantly, the EITC may increase income through two

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<sup>1</sup> This prediction depends where the taxpayer is in the EITC schedule. If she is in the phase-in region, the EITC leads to an ambiguous impact on hours worked due to the negative income effect and positive substitution effect. In the flat region and phase-out region, the theory predicts an unambiguous reduction in hours worked. Moreover, taxpayers with earnings beyond the phase-out region may choose to reduce their hours of work and take advantage of the credit.

channels on the extensive margin: Through the credit payment itself and through increases in earnings that the credit incentivizes. Calculations based on the Supplemental Poverty Measure show that the EITC (together with the child tax credit) removed 4.7 million children from poverty in 2013 (Short 2014). This makes the EITC the largest anti-poverty program for children in the U.S.<sup>2</sup> This is a “static” calculation, constructed by zeroing out EITC credit income and recalculating poverty. Incorporating the effect of the credit on earnings would lead to *larger* poverty reductions. Given the importance of the program for lower income families, it is surprising that we have little evidence on the full antipoverty effects of the program. This work fills that gap.

In this paper, we comprehensively examine the effects of the EITC on the distribution of income. In particular, we use quasi-experimental identification strategies and estimate the effect of the EITC across the distribution of after-tax and transfer income, using multiples of the federal poverty threshold. Our main results leverage the significant variation in the 1993 expansion of the credit, by employing a difference-in-difference and event study approach using variation across differing family sizes, as first presented in Eissa and Liebman (1996). We then extend that analysis in a parameterized difference-in-difference approach that takes advantage of expansions to the credit over the longer period 1985-1999.

A second contribution of our analysis is to update the existing literature on the employment effects of the EITC. As with our analysis of the distribution of income, our main results use the 1993 EITC expansion in a difference-in-difference and event study framework. We also present results that utilize the multiple reforms over the full sample period.

Throughout our analysis, we focus on single women, who have the largest participation rates in the program. Single filers with children account for almost 60 percent of EITC filers and

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<sup>2</sup> The next largest is SNAP, which removed 2.1 million children from poverty in 2012.

about three-quarters of the cost of the credit. We find that the 1993 expansion of the credit led to a 4.6 to 6.1 percentage point increase in the employment of single mothers, which is large relative to the mean employment rate of 84 percent. These effects translate to a 7.4 percentage point increase per \$1000 of EITC, and an extensive margin elasticity of 0.37. We find that the 1993 expansion led to a 7.9 percentage point decrease in the share below poverty (for families headed by these single women) implying a 9.6 percentage point effect per \$1000 in federal EITC. A fuller analysis across the distribution of income shows that the income-increasing effects of the EITC are concentrated between 75% and 150% of the federal poverty threshold. When we examine the expansions of the EITC through the full period (1985-1999) we find similar magnitude results, in terms of the effects per \$1000 of the EITC. Finally, our event study graphs provide compelling evidence that the research design – comparing outcomes across different family sizes – is valid.

In the following section we describe the EITC and its evolution. In section 3, we explore the incentives created by the EITC on employment and across the income distribution. The dataset is presented in section 4 (also see data appendix), and we detail our estimation strategy in section 5. In section 6 we present our estimates of the effect of the EITC on employment and on the distribution of after tax and transfer income. Finally, we conclude with section 7.

## **2. The Earned Income Tax Credit**

A taxpayer may claim the EITC on a federal income tax return. To be eligible for the EITC, a taxpayer must have earned income during the tax year.<sup>3</sup> Taxpayers must have less than a specified amount of adjusted gross income (AGI) and earned income. The value of the credit is

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<sup>3</sup> Earned income is the sum of wages, tips, salary, union strike benefits, some disability payments, and net self-employment earnings (IRS 2013).

determined by a benefit schedule that generally has three regions (figure 1). In the phase-in region, the credit increases by a share of each additional dollar earned. Once the credit reaches its maximum (capped) value, the taxpayer is in the second region. In the final region, the credit is phased-out with each additional dollar of AGI until it is zero. There are separate schedules, with the same basic shape, by filing status and by the number of qualifying children claimed.<sup>4</sup> Figure 1 displays the schedule in 2013 (as a function of earned income) for single taxpayers with no, one, two, and three or more children. The maximum allowable income for a taxpayer with one child (two or more children) was \$37,870 (\$43,038). The maximum benefit differs substantially across number of children, from \$487 for those without children to \$6,044 for those with three or more children. Finally, unlike other credits on the income tax return, the EITC can also be a payment: If the amount of the credit exceeds a taxpayer's tax liability, they are given the difference in cash after they file their return, much like an over-withholdings refund.<sup>5</sup>

These eligibility rules target working families who are relatively low in the income distribution. This can be observed empirically. The top panel of table 1 contains the distribution of EITC claimants across multiples of the federal poverty threshold. We use after-tax income to determine poverty status. The majority of single taxpayers who claim the EITC are between 50% and 150% of the federal poverty threshold. For example, 40 percent of single EITC recipients with one child have net income between 50 and 100 percent of poverty (\$7752-\$15504 in 2011) while another 29 percent have net income between 100 and 150 percent of poverty (\$15505-\$23256 in 2011). EITC filers with two children, and those filing a joint return (e.g. married), have somewhat higher income levels. For example, 27 percent of married filers with one child

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<sup>4</sup> A qualifying child is younger than 19 (or younger than 24 and a full time student), lives with the taxpayer for more than half the year, has a valid social security number, and is not claimed as a dependent by another taxpayer (IRS 2013).

<sup>5</sup> Hence the EITC is a "refundable" tax credit.

have income between 50 and 100 percent poverty (\$9053-\$18106) and another 33 percent have income between 100 and 150% of poverty. More than 30 percent have incomes beyond that point (largely below 200% of the federal poverty threshold). The bottom panel of table 1 displays the share of filers who claim the EITC by multiples of the federal poverty threshold. The vast majority of filers claim the EITC below 2 times the federal poverty threshold. Overall, the EITC eligibility rules accomplish a transfer for those who have relatively low income.

The EITC schedule has been expanded several times since its inception in 1975. Figure 2 illustrates the changes over time by plotting the maximum credit amount by tax year and number of qualified children (in real 2012 dollars). Figure 2 also identifies the four tax reforms responsible for these changes.<sup>6</sup> The 1993 legislation produced the most dramatic changes to the policy, increasing the benefit for those with any children as well as for those with two or more children relative to those with one child. In contrast to tax year 1984, families claiming two or more children in tax year 1997 enjoyed an increase in the maximum credit of \$4,130 (2012 dollars). Eligible families with one child experienced a smaller increase of \$2,059. Finally, there were smaller increases for those without children (\$475, OBRA 93) and those with three or more children (\$653, ARRA 2009). We use differential expansions across family size over time as the basis of our quasi-experimental design.

In addition to the EITC, there were other changes to tax and transfer policy during this period. Those eligible for the federal EITC also saw changes to their federal personal and dependent exemptions, and to their tax bracket rates and thresholds. These families would also

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<sup>6</sup> The four tax reforms are the Tax Reform Act of 1986 (TRA 86), the Omnibus Budget Reconciliation Acts of 1990 & 1993 (OBRA 90 & OBRA 93), and the American Recovery and Reinvestment Act of 2009 (ARRA 2009). In addition, the flat and phase-out regions were extended for married couples in the Economic Growth and Tax Relief Reconciliation Act of 2001.

be eligible for an increasing number of state-level EITCs.<sup>7</sup> At the same time, traditional welfare benefits for families with children were curtailed.<sup>8</sup> For example, states introduced changes to the Aid to Families with Dependent Children (AFDC) program through federally-approved waivers. These waivers allowed states to introduce various provisions to limit AFDC take-up and potentially encourage work.<sup>9</sup> In 1996, many of these benefit limits were introduced nationally with the Temporary Assistance for Needy Families (TANF) program, which also restricted the amount of federal funding available to states (Crouse 1999). In the empirical specification below, we examine the extent to which changes in other tax and transfer programs may be correlated with concurrent changes in the EITC.

The evolution of these policies increased the relative importance of the EITC as an income support program. Figure 3 displays per capita expenditures for the EITC, the AFDC program, the TANF program and the Supplemental Nutrition Assistance Program (SNAP)<sup>10</sup> (Bitler, Hoynes and Kuka 2014). Prior to 1986, per capita spending on the EITC was only a fraction of other welfare programs. After welfare reform however, and even through the recession beginning in 2008, spending on the EITC was much larger than that on TANF cash grants.

### **3. Expected Effects for Employment and the Distribution of Income**

The evolution of the EITC created several labor supply incentives for single taxpayers that, in some cases, may work against each other.<sup>11</sup> First, an increase in the EITC schedule<sup>12</sup>

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<sup>7</sup> Currently, 28 states including DC have an earned income tax credit (IRS 2014).

<sup>8</sup> See Meyer and Rosenbaum (2001) for more details.

<sup>9</sup> Changes to AFDC through waivers include work and training requirements, time limits on welfare receipt, family caps provisions, expanded income disregards, increased resource limits, Medicaid assistance for the transition to work, expanded eligibility for two-parent families, and improved child support enforcement (HHS 1997).

<sup>10</sup> SNAP was formerly called the Food Stamps Program.

<sup>11</sup> See Hotz and Scholz (2003) and Eissa and Hoynes (2006) for a more detailed discussion. See Eissa and Hoynes (2004) for an examination of married taxpayers.

increases the opportunity cost of working for those outside of the labor force. By requiring work, the EITC creates the incentive for those, otherwise eligible taxpayers, to cross the “extensive” margin, enter the labor force, and collect earned income. Second, a change in the EITC schedule changes the net of tax wage for those who are already in the labor market (figure 1). A change in the net of tax wage may induce a change on the “intensive” labor supply margin, in the number of hours worked. For example, in the phase-in region, the net-of-tax wage increases with an expansion of the EITC schedule. The effect on the intensive margin for those in the phase-in region is ambiguous, because there is a positive substitution effect and a negative income effect. On the other hand, in the phase-out region, both substitution and income effects create a consistent incentive to reduce labor supply in the context of an EITC expansion. Finally, increases in the EITC schedule may put downward pressure on wages as employers interact with increased labor supply on the extensive margin (Rothstein 2010).

Generally, a large body of empirical work has found that the EITC increases labor supply on the extensive margin among those most likely to be eligible, single women with children.<sup>13</sup> For example, Eissa and Liebman (1996) find labor force participation increased by 2.8 percentage points for single females with children, relative to single females without children after the EITC expansion of 1986. Meyer and Rosenbaum (2001) find that labor force participation increased by 7.2 percentage points for single women with children relative to those without children between 1984 and 1996. Chetty, Guren, Manoli and Weber (2013) calculate the extensive margin elasticities for these studies to be 0.3 and 0.43 respectively. Chetty, Friedman and Saez (2013) examines the effect of the EITC on the intensive margin. They find an increase

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<sup>12</sup> In this section we describe the effect of changes in the EITC on labor supply incentives in the context of EITC expansions, like those introduced by OBRA 1993.

<sup>13</sup> Detailed surveys can be found in Hotz and Scholz (2003) and Eissa and Hoynes (2006). More recent work includes Gelber and Mitchell (2012).



in labor supply for those in the phase-in region, but do not find a decrease in labor supply for those in the phase-out region.

The expected effect of the EITC on the distribution of after-tax and transfer income is complex (Grogger 2003, Bollinger, Gonzalez and Ziliak 2009, Meyer 2010, Hoynes, Miller and Simon 2012). First, the EITC may change the composition of income. For example, an individual induced into the labor force by an EITC expansion will have more income through increased earnings and the credit amount. However, the likelihood that the same family qualifies for traditional welfare payments decreases (as other sources of income increases). In other words, even without any changes to other policies, the EITC may change the composition of income through its effect on individual behavior. On net we expect after-tax and transfer income to increase among individuals who respond on the “extensive margin”.<sup>14</sup> For those already in the work force, the direct credit amount will increase after-tax income. However, for those in the phase-out region, a decrease in labor supply may offset the credit. Given that the EITC is targeted toward working families near the poverty threshold, we expect changes in income to be concentrated in that range. We do not expect the EITC to effect the very lowest incomes (say below 50 percent of poverty) nor those with incomes much beyond 200 percent of poverty. In the analysis below, we combine all of these possibilities by using after-tax and transfer income to capture the composite impact of the EITC on the distribution of income.

We use variation across family size and tax year to identify the effects of the EITC (figure 1, 2). Therefore, we rely on the assumption that women are not changing their fertility in response to this incentive. There is some evidence to support this assumption. Baughman and Dickert-Conlin (2009) find a small negative impact of the EITC on higher order fertility within a large sample of birth certificate data. Dickert-Conlin and Chandra (1999) find that the income

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<sup>14</sup> Given perfect calculation of benefits.

tax may be correlated with the *timing* of childbirth, but only within a short window of a few weeks. Finally, Liebman (2000) finds a small number of EITC claimants may be claiming a child who does not reside in the household. Taken together, the evidence suggests that the EITC does little to modify fertility behavior.

#### **4. Data**

The primary dataset is the Current Population Survey March Annual Social and Economic Supplement (CPS). The CPS contains representative income and demographic information, making it appropriate for the study of labor supply and the distribution of income. We restrict the data to focus on those most likely to face the set of incentives described above, while preserving plausible treatment and control groups. We begin with the 1985-2013 surveys, corresponding to income over calendar years 1984-2012. We limit to single women between the ages of 24 and 48, who are not ill, disabled or going to school. We further limit the sample to those who have some college education or less (see data appendix for more details).

We explore the impact of the EITC on different points of the income distribution using multiples of the official poverty threshold. However, unlike official poverty statistics, we do not use before-tax cash income to determine poverty. Instead, we use a broader measure of available family resources, after-tax and transfer income. We construct after-tax and transfer income by adding pre-tax cash income to non-cash subsidies (food stamps and heat subsidies) and subtracting federal and state income taxes and payroll taxes (Bitler and Hoynes 2014).

While the CPS does collect information regarding income and transfers, it does not collect income tax information.<sup>15</sup> We calculate taxes using income and demographics from the CPS that we pass through the NBER TAXSIM calculator (Feenberg and Coutts 1993). Before

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<sup>15</sup> For some years, the CPS does include calculated income taxes.

we apply the restrictions above, we construct tax units by linking each qualified child to their youngest mother, grandmother or great-grandmother between the ages of 24 and 48.<sup>16</sup> For example, if a mother of one child is 17 and her mother lives in the same household, we define the tax unit as having a primary and two child dependents, both of whom may qualify the tax unit for the EITC (assuming there is no one else in the household and the primary is between the ages of 24 and 48). Using these tax units, we use TAXSIM to calculate income and payroll taxes (see data appendix for details). The resulting measure of after-tax and transfer income is consistent over the sample period.<sup>17</sup>

Table 2 presents summary statistics by the presence of children. Single women with children differ from those without children (Eissa and Liebman 1996, Meyer and Rosenbaum 2001). Women without children have more education, are more likely to be white, are less likely to be divorced, and are more likely to be employed. Average earned income is higher for women without children, but after-tax and transfer income is higher for those with children.<sup>18</sup> To better balance these two groups in our empirical specifications below, we include a rich set of demographic controls, as well as controls for policy changes and labor market conditions.

## 5. Methods

The differences-in-differences (DD) estimator is used extensively in the EITC literature to overcome endogeneity arising from the relationship between the EITC, labor supply and unobserved correlates (Eissa and Liebman 1996, Meyer and Rosenbaum 2000, Hotz and Scholz

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<sup>16</sup> IPUMS provides information on the relationship of between children and adults in the household (see data appendix for more details).

<sup>17</sup> Meyer, Mok and Sullivan (2008) note that observed income values in the CPS have deteriorated over time relative to administrative aggregates. Under-reporting may produce bias in our results if it is systematically correlated with the treatment.

<sup>18</sup> See section 6 for statistics by tax year.

2003, Eissa and Hoynes 2006). The DD estimator compares a treatment group to a control group, before and after a legislative change in the EITC. The control group captures common changes across the timing of the legislation. We use the following DD specification to examine the largest of the expansions, OBRA 93 (figure 2), in a transparent way,

$$y_{it} = \alpha + \beta(\text{post} \times \text{treat}) + \eta_{st} + \gamma_c + \Phi X_{it} + \varepsilon_{it}, \quad (1)$$

where  $i$  is an individual taxpayer,  $t$  is a tax year,  $\eta_{st}$  is a set of state by year indicators, and  $\gamma_c$  is a set of number of children indicators (0, 1, 2, 3+). Demographic controls,  $X_{it}$ , include indicators for age, education, race, ethnicity, and divorced status. To focus on OBRA 93, we only use tax years 1991 through 1998, including two years before and after the legislation has fully phased in (figure 2). The DD estimate is  $\beta$ , where  $\text{post}$  is equal to one for any year after 1993. The structure of the OBRA 93 expansion creates two natural comparisons: First, we assign those with children to the treatment group and those without children to the control group. Second, we assign those with two or more children to the treatment group and those with exactly one child to the control group, excluding those without children (figure 2).

The DD estimator naturally works well when there is a single treatment event. However, as described above, there were several EITC expansions over time and across groups. To fully utilize the variation in EITC policy, we replace  $(\text{post} \times \text{treat})$  with a “simulated” EITC.<sup>19</sup> The simulated EITC is a single variable that summarizes changes in the EITC schedule over time and within group (figures 1 & 2). We calculate the simulated federal EITC in the following way<sup>20</sup>:

We begin with our sample of single women in tax year 1982, before the first major expansion in

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<sup>19</sup> This method of summarizing complex policy parameters has been used for other programs including Medicaid (Cutler and Gruber 1996, Currie and Gruber 1996a, Currie and Gruber 1996b, Gruber and Yelowitz 1999) and income taxes (Gruber and Saez 2002, Eissa and Hoynes 2004, Dahl and Lochner 2012).

<sup>20</sup> To be clear, in this paper we calculate income taxes in two ways. The first uses observed individual taxpayer information to approximate actual tax liability. The second we call “simulated”. Our goal with simulated income taxes and transfers is to summarize policy changes across time and groups without including individual taxpayer behavior.

1986 and free of behavior modifications due to the EITC expansions. We then replicate the sample for each tax year in which we would like a simulated EITC. Next, we use the CPI-U to convert the income values in the sample from 1982 dollars into current dollars. Then, we use TAXSIM to calculate the amount of EITC each of these replicated taxpayers would receive if they had existed in the current year. Finally, for each tax year and group (0, 1, and 2 or more children) we take the (sample weighted) average of the EITC value. In this calculation, except for inflation, the sample remains a collection of taxpayers from 1982, but the tax code changes with each replicated year. The result is an average benefit that summarizes changes in policy without including changes in benefits due to family labor supply decisions. Equation (1), modified for the simulated EITC, is

$$y_{it} = \alpha + \beta \overline{\text{SIMEITC}}_{ct} + \eta_{st} + \gamma_c + \Phi X_{it} + \varepsilon_{it}, \quad (2)$$

where  $\overline{\text{SIMEITC}}_{ct}$  is the simulated EITC. Equation (2) also allows us to extend the sample backwards to tax year 1984, taking advantage of variation caused by several expansions and smaller changes in the EITC schedule across earnings, over time and across group (figure 2).<sup>21</sup>

To get a sense of how robust this identifying variation is, we introduce a rich set of controls that vary by year and family size, the level of our identifying variation.<sup>22</sup> We begin with traditional welfare policies which evolved during the sample period. We construct a simulated measure of AFDC and TANF benefits using the same procedure described for the federal EITC, but employing a state-specific welfare calculator (Hoynes and Luttmer 2011). This simulated measure captures changes in benefit parameters across state, year and family size (e.g. and equals 0 for those with no children). We also include an indicator equal to one if a particular state had any welfare waiver in a particular year. We multiply this indicator with an indicator

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<sup>21</sup> We refer to this model as the “parameterized difference-in-difference” model below.

<sup>22</sup> See data appendix for more details regarding the construction of these controls.

equal to one if children are present (or 2+ children for the mothers-only sample). Other provisions of the income tax code were modified during the period of study (see description above). We include simulated income taxes before credits as a control for these changes. This control varies by tax year and family size. Finally, local labor market conditions may play a role in the likelihood of employment. The set of conservative controls also includes state-level unemployment rates interacted with number of children.

The reduced form estimates from equations (1) and (2) may be scaled differently across specifications. Naturally, we expect the estimates to be different as well. To make comparisons across specifications easier, we rescale our reduced-form estimates in several ways. First, we estimate a first stage using equations (1) and (2) but change the outcome ( $y_{it}$ ) to the federal EITC, calculated using individual taxpayer information (including income). Dividing the reduced form from equations (1) and (2) by this first stage (indirect least squares) reinterprets the effect in terms of policy-driven increases in federal EITC dollars. Second, we divide the indirect least squares estimate by the dependent mean to get a percent impact. Finally, we calculate an “extensive margin elasticity” to compare estimates across specifications and with estimates in the literature (Chetty, Guren, Manoli and Weber 2013).<sup>23</sup>

Finally, we can modify equation (1) to test the validity of our design by interacting the treatment group indicator with year specific indicators instead of a single post-event indicator. In subsequent discussion we call the following equation the “event time model,”

$$y_{it} = \alpha + \sum_{j=t^0}^T \beta_j [I(t = j) \times \text{treat}] + \eta_{st} + \gamma_c + \Phi X_{it} + \varepsilon_{it}, \quad (3)$$

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<sup>23</sup> See data appendix for more details regarding the calculation of the extensive margin elasticity.

where  $t^0$  is the first non-omitted year in the sample,  $T$  is the final tax year in the sample, and  $I(t = j)$  is an indicator equal to one if the current year is equal to  $j$ .<sup>24</sup> A coefficient of interest,  $\beta_j$ , is the difference between the treatment and control groups, in period  $j$ , given the same set of controls used in equation (1). In the figures below we define treatment and control groups in three ways. First, we compare those without children to those with children. Second, we compare those without children to those with exactly one child separately from those with two children. Finally, we exclude those without children and include only those with two or more children in the treatment group. When we plot the estimates of  $\beta_j$  we are specifically looking for trends away from zero in the periods before the treatment took effect. These pre-period differences may indicate unobserved differences in the treatment and control groups that we are not adequately controlling for.

## 6. Results

We begin by graphing the share of single women who are employed over time by family size. We do this to get a sense of how employment for these groups may be correlated with the pattern of changes in policy.<sup>25</sup> Figure 4 divides the sample by the presence and number of children. In the mid-1980s, those with children have a different level of employment relative to those without children. Beginning in the early 1990s, there is a trend break for those with children and by the early 2000s, the share employed is similar across groups. Interestingly, families with two or more children exhibit the largest gains in employment. These figures illustrate the potential effect of the EITC expansions on the employment of single women.

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<sup>24</sup> One year will be omitted.

<sup>25</sup> Figures 4-7 update Eissa and Hoynes (2011).

Figure 5 plots the share of single women whose family after-tax and transfer income is above 100% of the federal poverty threshold, by the presence and number of children. As was the case with employment, there is a change for those with children in the 1990s at approximately the same time as the OBRA 93 EITC expansion. Those with two or more children exhibit a change that is larger than those with only one child, mirroring the differential EITC benefit expansions of the 1990s.

Next, we turn to the regression results. Table 3 contains difference-in-difference estimates of the effect of the OBRA 93 EITC expansion on employment (equation 1). The treatment group in column 1 is composed of taxpayers with one or more qualified children. In column 2 we add the conservative control set. Relative to women without children, the share of women with children who are employed increased by 6.1 percentage points, or 4.6 percentage points with the conservative control set. The indirect least squares estimates are much closer, a \$1,000 increase in the policy-induced federal EITC income increases employment by 7.4 and 7.5 percentage points respectively. The extensive margin elasticity indicates that a 1 percent change in after-tax and transfer income for working taxpayers would increase labor force participation by 0.37 or 0.38 percent. Columns 3 and 4 of table 3 limit the sample to single women with a qualified child. The treatment group is composed of families with two or more children and the control group are those with exactly one qualifying child. Although the estimate given the conservative control set is marginally insignificant, we find roughly similar extensive margin elasticities of 0.45 and 0.34.<sup>26</sup>

Tables 4 and 5 contain estimates of equation (2), in which we replace the traditional DD interaction with a simulated measure of the EITC. First, for comparison to the DD estimates in

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<sup>26</sup> Appendix table 1 contains the DD estimates for other levels of education. These estimates, normalized by the first stage, are generally similar to those for our preferred sample of single women with some college education.



table 3, table 4 presents the parameterized difference-in-difference estimates for the OBRA 93 period (1991-1999). Here we find elasticities (between 0.37 and 0.47) that are very similar to those from the DD specification, but we are able to identify the reduced form with more precision.<sup>27</sup> Table 5 extends the analysis to include EITC expansions enacted with TRA 86 and OBRA 90 by including tax years 1984 through 1998. The estimated extensive margin elasticity for this group is 0.32 (or 0.27 with the conservative control set), a smaller estimated effect relative to those just utilizing OBRA 93 (tables 3 and 4). When we exclude those without children, comparing taxpayers with exactly one child to those with two or more children, we estimate an extensive margin elasticity of 0.48 with and without the conservative control set. Across all of these results, the conservative control set matters less than the composition of the treatment and control group. We carry this comparison forward to the analysis of the distribution of income.<sup>28</sup>

We now turn to the estimates from equation (3), the event time model. We can estimate the effect of the EITC for each time period in the sample (with one omitted group taking the value of zero), and visually check if it correlates with the EITC. Perhaps more importantly, however, we will be able to see if there are significant differences between groups prior to the event. Figure 6 plots the coefficients (left axis) from equation (3), where the treatment group is composed of those with children and the omitted year is 1993 (the year prior to the policy expansion).<sup>29</sup> The graph also displays the change in the real average maximum credit for those with children relative to those without children (right axis) to give a sense of how the EITC is

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<sup>27</sup> The simulated EITC is constructed using the 1983 CPS. This may be “too far” from OBRA 93 to accurately reflect the changes the act induced in the income tax code or from welfare reform. Appendix table 2 contains estimates that use the 1993 CPS to construct the simulated EITC, and finds similar results.

<sup>28</sup> These extensive elasticity estimates are in line with others from the literature (Chetty, Guren, Manoli and Weber 2013).

<sup>29</sup> To be clear, estimates of equation (3) do not include the conservative control set and do not use the simulated EITC.

changing over time and across group. Figure 7 plots a similar graph, where the effect is estimated separately for those who have one child and for those who have two or more children. Figures 6 and 7 show that labor supply increases closely follow the pattern of EITC expansions. Further, and importantly, there is little evidence of pre-event trends, validating our research design.

Next, we explore pre-event trends over a longer period of time. Taxpayers with two or more children began to receive a substantially larger credit, relative to taxpayers with one child, in tax year 1994.<sup>30</sup> In other words, prior to 1994, the EITC created similar incentives for those with qualifying children. This produces a natural check on the validity of our design: When we compare taxpayers with two or more children to those with exactly one child (excluding those without children), we should find no trending differences between treatment and control groups prior to tax year 1994. Figure 8 contains estimates from the event time model, using tax years 1984 through 1998, excluding women without children. There is some noise in the estimates for periods prior to tax year 1994, but the difference in the share employed between the two groups clearly begins after tax year 1993.

The increase in the share employed across family size has endured to the present. Appendix figures 2, 3 and 4 extend estimates from the event model up to the last year of available data (tax year 2012). Even through the extreme employment pressure created by the great recession of 2008, the pattern of labor force participation has remained the same across family size over time.

We now move to our main results exploring the effect of the EITC on the distribution of income. We start by using the variation induced by OBRA 1993, as shown in equation (1), where the outcome variable ( $y_{it}$ ) is defined as a multiple of the federal poverty threshold. For example, the share of women whose after-tax and transfer income is above 100% of the federal poverty

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<sup>30</sup> There was a smaller differential beginning in 1991 (figure 2).

threshold. Table 6 contains estimates of the difference-in-difference model (equation 1), where the dependent variable is the share of taxpayers whose after-tax and transfer income is above 100% of the federal poverty threshold. Relative to those without children, those with children experienced an increase in the share above the poverty threshold of 7.9 percentage points with OBRA 93. When we utilize just the expansion across 1 and 2 or more children, the increase is 4.3 percentage points. We rescale these reduced form estimates in the same way as those above; a \$1000 policy-induced increase in the EITC leads to a 5.5 to 9.6 percentage point reduction in the poverty rate. This implies an elasticity of 0.48 to 0.64. These estimates are larger than those of employment, reflecting the density of single taxpayers with children whose income puts them around 100% of the federal poverty threshold (table 1).

We test the validity of our design using the event model in equation (3) where the dependent variable is the share with after-tax and transfer income above 100% of the poverty threshold. Figure 9 examines OBRA 93 across the presence of children. Figure 10 compares taxpayers with two or more children against those with one child back to tax year 1984. The estimates contained in the two figures are very similar to those for employment, showing that the increase in the share above poverty follows the increase in the generosity of the EITC. Additionally, it is reassuring that there is no long term pre-trend.

Like employment, the change in the share above 100% of the federal poverty threshold has endured over time. Appendix figures 5, 6 and 7 estimate the event model for all available tax years (1984-2012) using three different designs (0 vs 1+ children, 0 vs 1 vs 2+ children, and 1 vs 2+ children). The impact of the EITC expansions continues through the Great Recession.

We extend these results to examine effects more comprehensively across the full distribution of income. To do so, we estimate a series of difference-in-difference models for

OBRA93 (as in equation 1) where the dependent variable is an indicator equal to one if after-tax and transfer-income is above some multiple of the poverty threshold. Figure 11 contains estimates in which we compare families with children to those without children and figure 12 compares those with two or more children to those with only one child. In these figures, each estimate and confidence interval comes from a separate regression; we graph them together to illustrate the effects of the credit on the distribution of income.

These figures suggest several important findings. First, the EITC has little effect on the very lowest income groups: the EITC has an estimated zero effect on the share above poverty for those with income between 25% and 50% of the poverty threshold. This may reflect that the very lowest income groups have little attachment to the labor market. Second, the effects of the EITC are large and statistically significant between 75% and 150% of the poverty line. The largest effects occur around 100% of the federal poverty threshold. Importantly, the estimated effects decay and fall to zero by 250% poverty, where there are very few EITC claimants (table 1).

Next, we estimate the parametrized difference-in-difference model, utilizing the full period of policy expansions (TRA86, OBRA90 and OBRA93) in a single simulated EITC variable (as shown in equation 2). Table 7 contains the results where the dependent variable is the share of taxpayers with after-tax and transfer income above 100% of the federal poverty threshold. The results show that a \$1000 increase in policy-induced EITC income leads to a 13 (for children versus no children) to 13.5 (for 2 children versus 1 child) percentage point reduction in the share below poverty. This implies elasticities of 0.58 to 0.69. We find very similar effects whether we use the standard difference-in-difference estimator for OBRA93 or the parametric difference-in-difference model across the full policy period.

We use the parametric difference-in-difference model in Figures 13 and 14 where we estimate the effects on multiples of the federal poverty threshold. Figure 13 utilizes EITC variation across all family sizes, while figure 14 focuses on the variation between those with 2 or more children relative to those with one child. These results confirm our earlier findings when we used only the OBRA93 expansion. We find no effect at the lowest levels of income (25% and 50% poverty), large effects centered on 100% of poverty, and decaying effects going to zero by 250% of poverty. The parametrized difference-in-difference model is more precisely estimated and the results remain significant through 225% poverty.

## **7. Conclusion**

In this paper we comprehensively examine the effects of the EITC on employment and the distribution of income. We use a quasi-experimental research design that leverages the variation in the generosity of the EITC across family sizes and over time. Our analysis of employment largely updates the literature, and presents event study graphs to test and validate the well-used research design. More importantly, we provide the first estimates of the full effects of the EITC on poverty, quantifying the effects on pre-tax income as well as the direct effect of the credit. We explore the effects of the EITC on the distribution of income, capturing where the program leads to increases income and how after-tax and transfer-income poverty is affected.

Our results show that a \$1000 policy-induced increase in the EITC lead to a 7.4 to 8.4 percentage point increase in employment and a 5.5 to 9.6 percentage point reduction in the share of families with after-tax and transfer income below 100% poverty. These results are robust to a rich set of controls including income from other safety net programs (such as AFDC/TANF and

SNAP that decrease with the EITC expansion), controls for welfare reform, and labor market conditions; all allowed to vary by family size (our identifying variation).

Furthermore, we also provide estimates on how the EITC effects the income distribution more broadly. We find little effect on incomes below 50% poverty. The effects of the EITC are large and statistically significant between 75% and 150% of poverty (peaking at 100% poverty), and decay down to zero at 250% of poverty. The pattern of effects across the income distribution reflects where the credit is providing the largest transfers.

Given that the goal of the EITC is to increase family income while encouraging work, these estimates provide important evidence on the efficacy of this central element of the U.S safety net not only to encourage work, but to potentially move families out of poverty

## Data Appendix

Our primary source of data is the Current Population Survey March Annual Demographic File and Income Supplement (CPS). We use survey years 1985 through 2013 for the main analysis. We download this dataset from the IPUMS-CPS database (King, Ruggles, Alexander, Flood, Genadek, Schroeder, Trampe and Vick 2010).

We limit the sample to single women. Single is defined as separated, divorced, widowed, or never married. We limit the sample to women between the ages of 24 and 48. We do not use individuals under the age of 24 because they may be claimed as an EITC qualifying child if they are enrolled in school, clouding the work incentive. We drop women who did not work during the previous year because of illness, disability or school enrollment. These women have visibly different incentives entering their work decision. We drop those living in Hawaii or Alaska.

For the main analysis, we also keep those who do not have a college degree (or more).<sup>31</sup> When restricting the sample based on education, others have focused on those with a high school degree or less (Meyer and Rosenbaum 2000, Eissa and Hoynes 2006). Excluding women who have some college education may ignore an increasingly important part of the EITC eligible population. Appendix figure 1 plots the share in education group X among those who are EITC eligible minus the share in education group X among those who are ineligible, where X is an education group (less than a high school degree, high school graduate, some college, college graduate, post college education). A larger value indicates that the distribution of those in a particular education group favors eligibility. Appendix figure 1 indicates that over the sample period, those who have some college education make up more of the total eligible population. This issue is related but different from stability over time across treatment and control groups required by the difference in difference estimator.<sup>32</sup>

Pre-tax income information available in the CPS includes earnings, self-employed earnings, AFDC/TANF, General Assistance, UI, Worker's Compensation, veteran's benefits, SSI, social security, rail road retirement benefits, survivor benefits, disability benefits, retirement income, interest, dividends, income from rent, alimony, child support, and contributions from others outside of the household (Meyer, Mok and Sullivan 2008). The CPS also collects information on income from food stamps and heat subsidies at the household level. We allocate these to tax units using their proportional size within the household.

The CPS does not contain a consistent record of observed tax information.<sup>33</sup> We use income and family structure in the CPS to calculate federal and state income taxes and payroll taxes using the NBER TAXSIM program (Feenberg and Coutts 1993). Before we perform any restrictions on the data, we construct tax units by linking EITC qualified children to the youngest mother, grandmother or great-grandmother in the CPS-defined family between the ages 24 and 48. A

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<sup>31</sup> Prior to 1992, this is defined as those with fewer than 4 years of college. After 1991, this is defined as those without a college degree.

<sup>32</sup> See appendix table 1 for DD estimates that include women of different education levels.

<sup>33</sup> In some years, the CPS does contain calculated income taxes.

qualified child is defined as under the age of 18 or between 19 and 23 and in school.<sup>34</sup> We link child to parent using the family linkage variables included in the IPUMS-CPS (IPUMS-USA 2014). IPUMS constructs variables that allow us to identify how members of the household are related to each other. Income information is aggregated up to the level of this tax unit. We then pass this tax unit's income and dependent information through TAXSIM. We assume that these tax units take the standard deduction<sup>35</sup>, are fully compliant and that they would take up the EITC if eligible.<sup>36</sup> We are unable to include "above the line" deductions that are not included in the CPS, such as education or moving expenses. It is important to remember that these taxes are calculated using all observed taxpayer information for each time period. This is not the case with the "simulated" taxes and transfers described below.

A woman is employed if she collects positive earned income anytime during the tax year. This includes self-employment earnings. After-tax and transfer income is the sum of the cash and non-cash income available in the CPS, minus income and state taxes as well as payroll taxes. We do not adjust after-tax and transfer income for non-cash benefits such as Medicaid, general assistance, housing assistance and other public programs.

Simulated taxes and transfers are summary measures of policy changes. For simulated income taxes, we begin with a sample of women from the survey year 1983 (applying the same restrictions described above). We then replicate this sample for each year in the sample, and adjust each source of income for inflation. Finally, we pass this dataset through NBER TAXSIM and take average tax values by tax year and family size.

We use the same sample and a similar process to calculate simulated welfare transfers (Hoynes and Luttmer 2011). We calculate AFDC/TANF benefits using a simple benefit formula:

$$B = G - \tau \times (E - D) - U,$$

where  $B$  is the amount of the benefit,  $G$  is the maximum benefit,  $\tau$  is the tax rate (or the benefit reduction rate),  $E$  is countable taxpayer earnings,  $D$  is the flat earnings disregard, and  $U$  is taxpayer unearned income. The policy parameters are  $G$ ,  $\tau$ , and  $D$ . These parameters may vary by state, year and family size. We compiled these parameters from several sources (US House of Representatives, various years, UK Center for Poverty Research 2013, Urban Institute 2013). The calculator does not take into account time limits or work requirements (before or after welfare reform). As was the case with taxes, we use family information to calculate the benefit, and then collapse to the cell level (state, year, family size).

Prior to welfare reform, states were allowed to test changes to AFDC if they applied for and received a waiver from the federal government (Crouse 1999). There were many different types

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<sup>34</sup> There are other rules for a qualifying child that we cannot observe and exclude: A child must live with the taxpayer for more than half the year, has a valid social security number, and is not claimed as a dependent by another taxpayer (IRS 2013).

<sup>35</sup> Among those most likely to receive a refundable credit, the share itemizing deductions is very small (Toder and Baneman 2012).

<sup>36</sup> EITC participation is high, with more than 80% of those who are eligible participating in the program during this period (Scholz 1994, Maynard and Dollins 2002).



of waivers, but they fell into 6 major categories: Work and training requirements, time limits on welfare receipt, family caps provisions, expanded income disregards, increased resource limits, Medicaid assistance for the transition to work, expanded eligibility for two-parent families, and improved child support enforcement (HHS 1997). Our waiver indicator is equal to one if a state has had any waiver based on the date of first major welfare waiver (Bitler, Gelbach and Hoynes 2006). The waiver control, as well as all of our state by year controls, are allowed to vary by family size (either no children versus 1+ children, or one versus two or more children).

The Federal Poverty Threshold (FPT) varies by year and family size and is adjusted for inflation (Census 2014). In private correspondence with Census, we have confirmed that there are two errors in the thresholds: The value for a single parent family with one child in 1993 should be \$9,960. The value for a two parent family with three children should be \$17,245. These values have subsequently been corrected.<sup>37</sup>

Nominal dollars are converted to real dollars using the annual CPI-U.<sup>38</sup>

Unemployment rates by state and year come from the BLS Local Area Unemployment Statistics program (BLS 2013).

In addition to the reduced form, we have several other ways that we present the effect of the EITC. First, we rescale the reduced form using a first stage. In this first stage, the RHS remains exactly the same as the reduced form, but the dependent variable is changed to the federal EITC. This federal EITC is calculated by NBER TAXSIM and uses current income and taxpayer characteristics (it is not the simulated EITC described above). The rescaled effect is in terms of federal EITC dollars. We present this estimate in \$1,000 increments for visual ease. We refer to this estimate as “Per \$1,000 of policy-induced federal EITC”. Second, we divide the indirect least squares estimate by the dependent mean to get a percent impact. This mean is sample specific. We refer to this estimate as the “% impact”. Third, we implement the extensive margin elasticity in Chetty, Guren, Manoli and Weber (2013). They define this elasticity as

$$\epsilon = \frac{\ln(P_0^T + \beta^{ILS}) - \ln(P_0^T)}{\ln(I_1^{T,W} - I_1^{T,N}) - \ln(I_0^{T,W} - I_0^{T,N})}$$

where  $\beta^{ILS}$  is the indirect least squares estimate,  $P_0^T$  is average participation in the pre-treatment period (subscript 0) among the treated group (superscript T),  $I_1^{T,W}$  is average after-tax and transfer income (ATTI) in the post-treatment period among the treated group who are working (superscript W),  $I_1^{T,N}$  is average ATTI in the post-treatment period among the treated group who are not working,  $I_0^{T,W}$  is average ATTI in the pre-treatment period among the treated group who are working, and  $I_0^{T,N}$  is average ATTI in the pre-treatment period among the treated group who are not working. Intuitively, we can think of this elasticity estimate as the log change in labor force participation due to the EITC over the log change in after-tax and transfer income from

<sup>37</sup> December 13, 2014: <https://www.census.gov/hhes/www/poverty/data/threshld/thresh93.html>

<sup>38</sup> Consumer Price Index – All Urban Consumers, series CUUR0000SA0, US city average, all items, chained to 1982-84, annual (BLS 2014).

working induced by the EITC. In addition to labor force participation, we also explore the distribution of after-tax and transfer income using multiples of the federal poverty threshold. In those cases we replace  $P_0^T$  with  $S_0^{T,100\%}$ , the share of taxpayers above 100% of the federal poverty threshold in the pre-treatment period, among the treated group.

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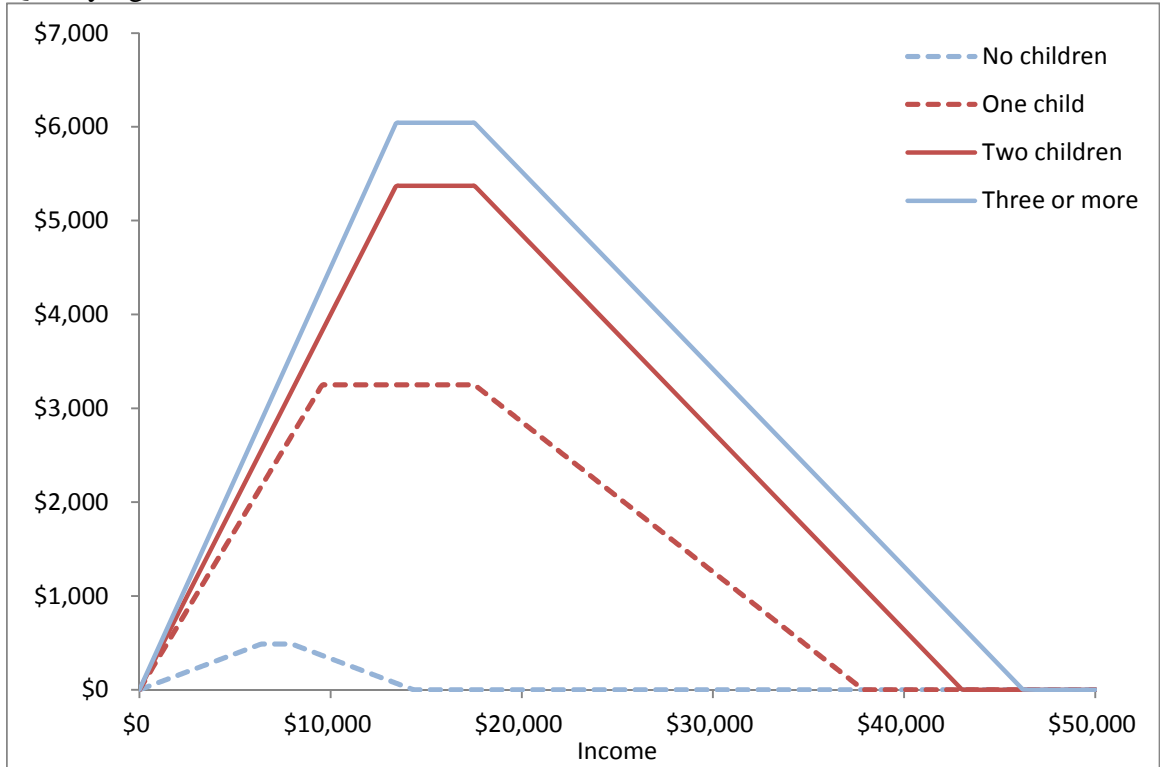
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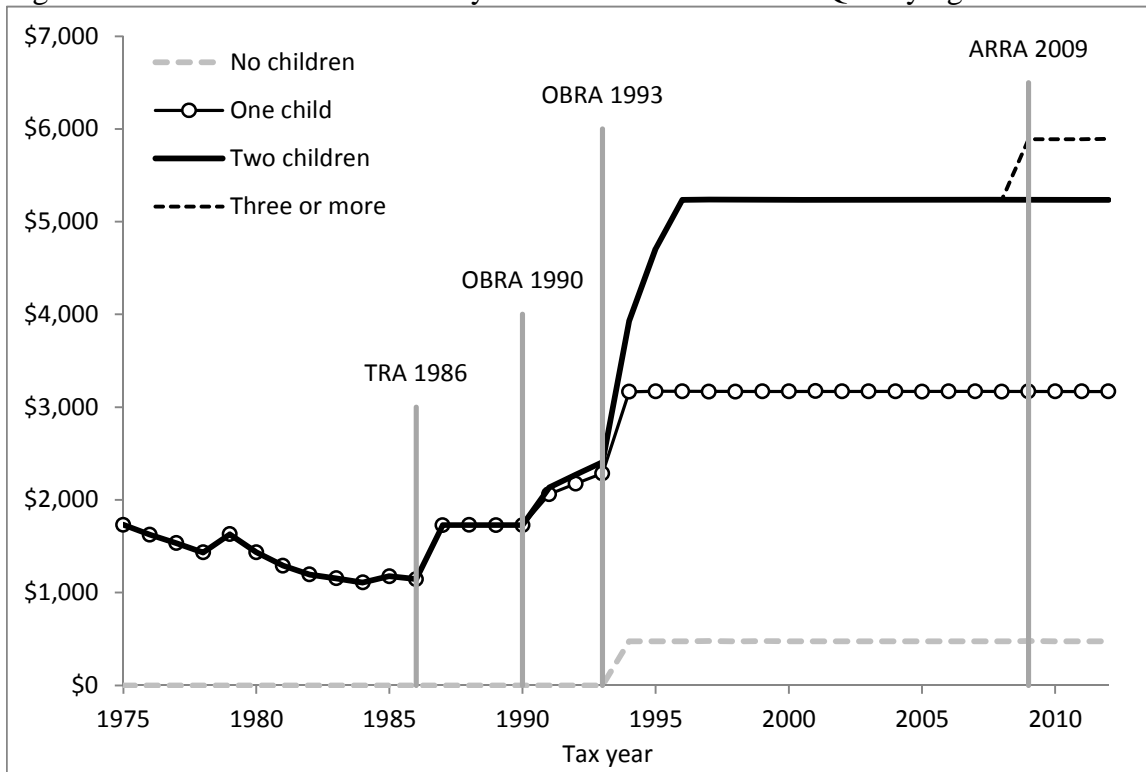
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Figure 1: Federal EITC Schedule for Taxpayers Filing Single in Tax Year 2013 by Number of Qualifying Children



Notes: Tax Policy Center (2014), 2013\$.

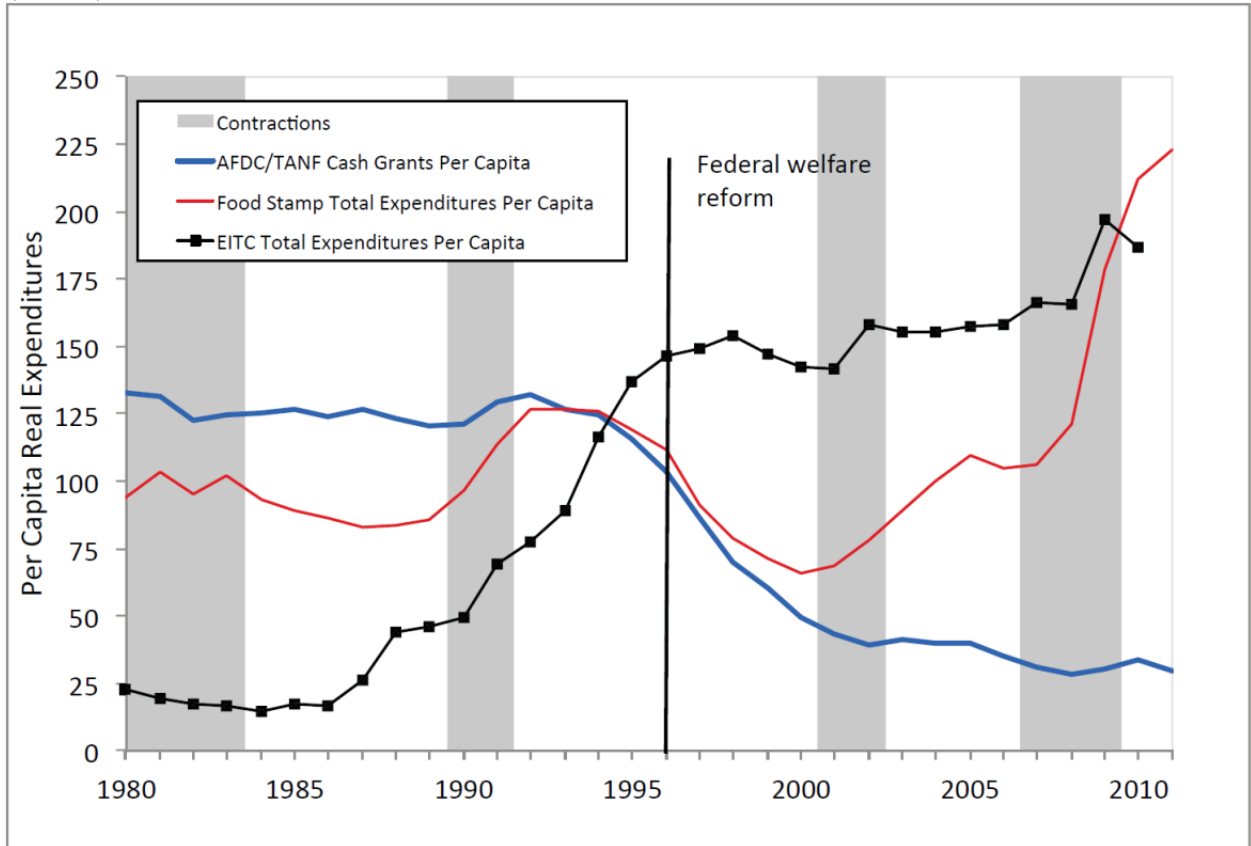
Figure 2: Federal Maximum EITC by Tax Year and Number of Qualifying Children



Notes: Tax Policy Center (2014), 2012\$.

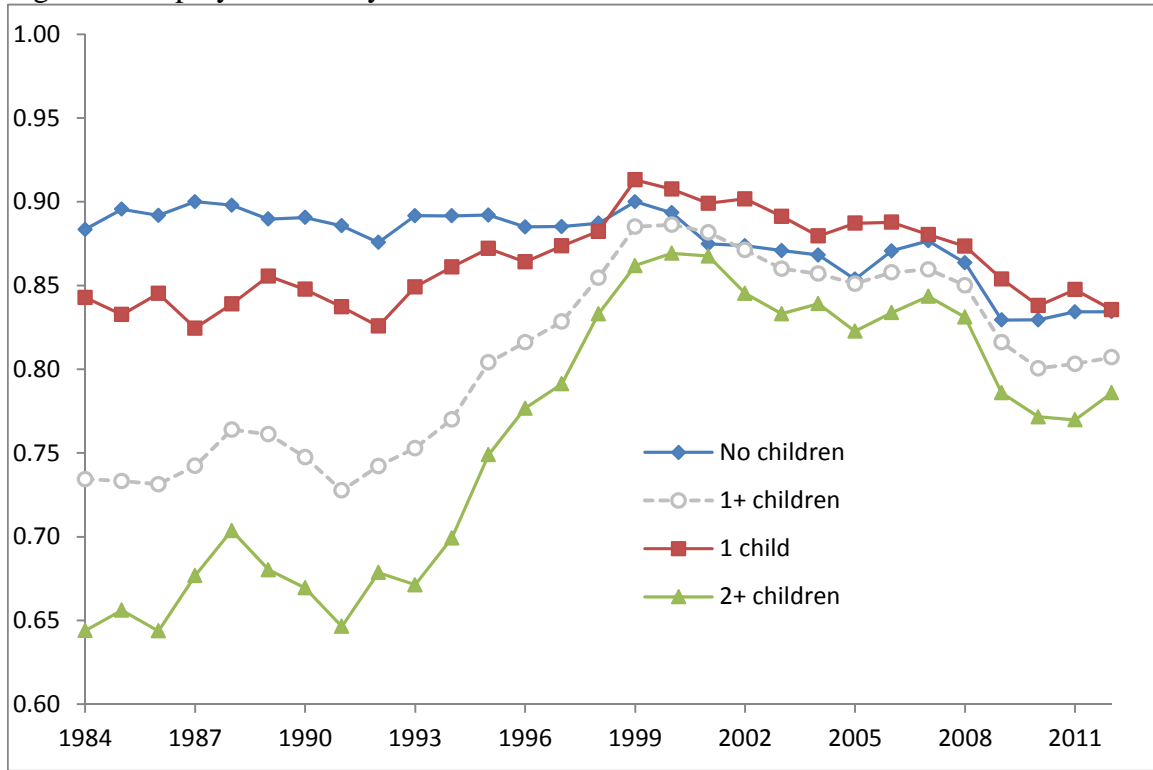


Figure 3: Per Capita Expenditures on Cash and Near Cash Transfer Programs for Families (2009\$)



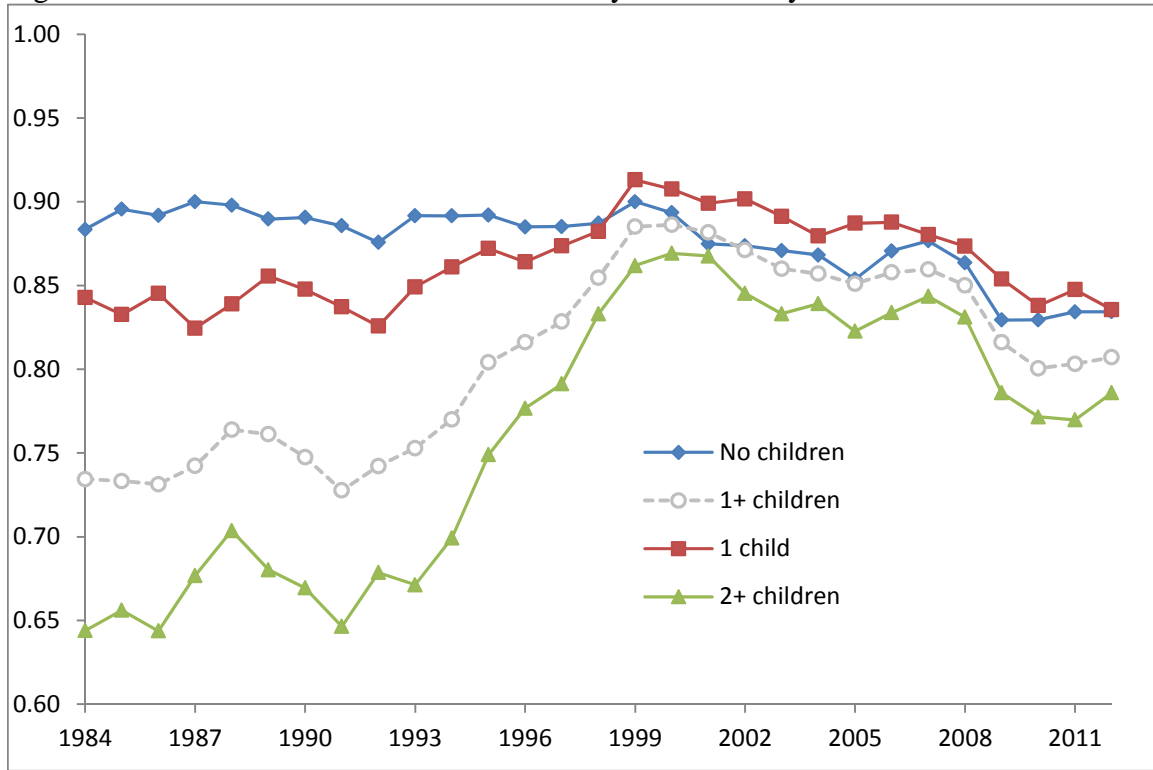
Notes: Bitler, Hoynes and Kuka (2014).

Figure 4: Employed Share by Presence and Number of Children



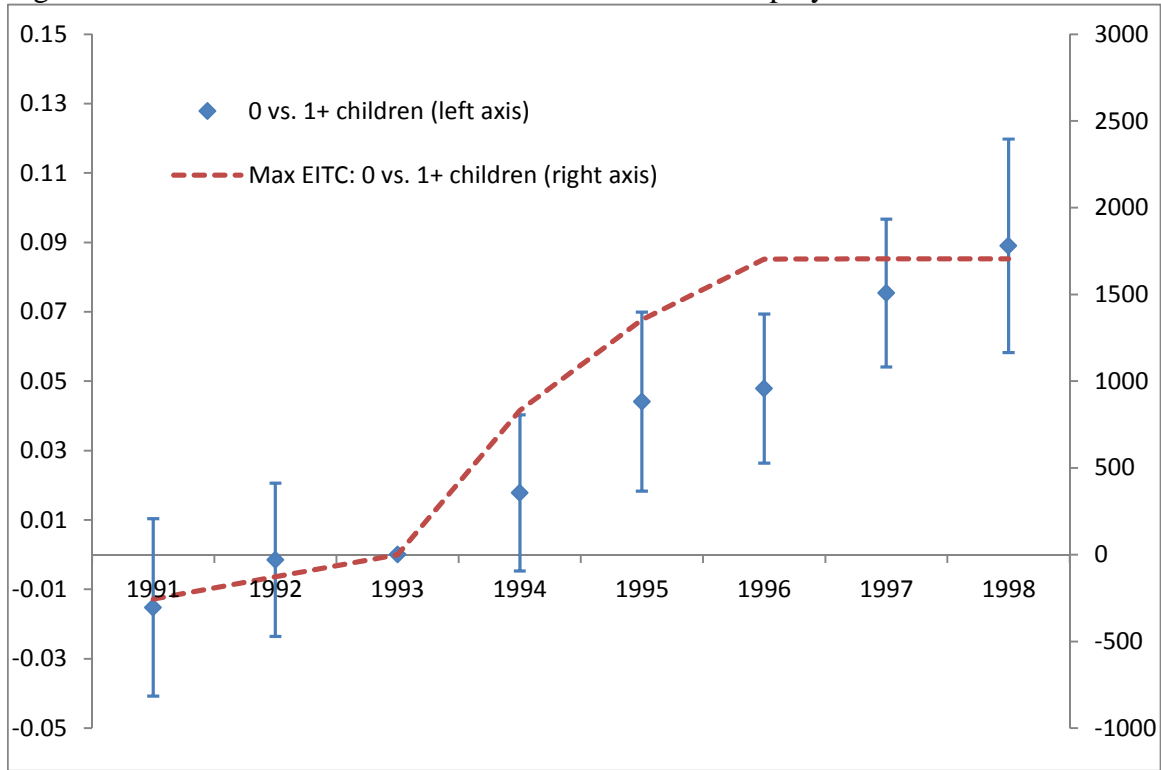
Notes: 1985-2013 CPS, single women, 24-48 years old, some college only.

Figure 5: Share Above 100% of Federal Poverty Threshold by Presence and Number of Children



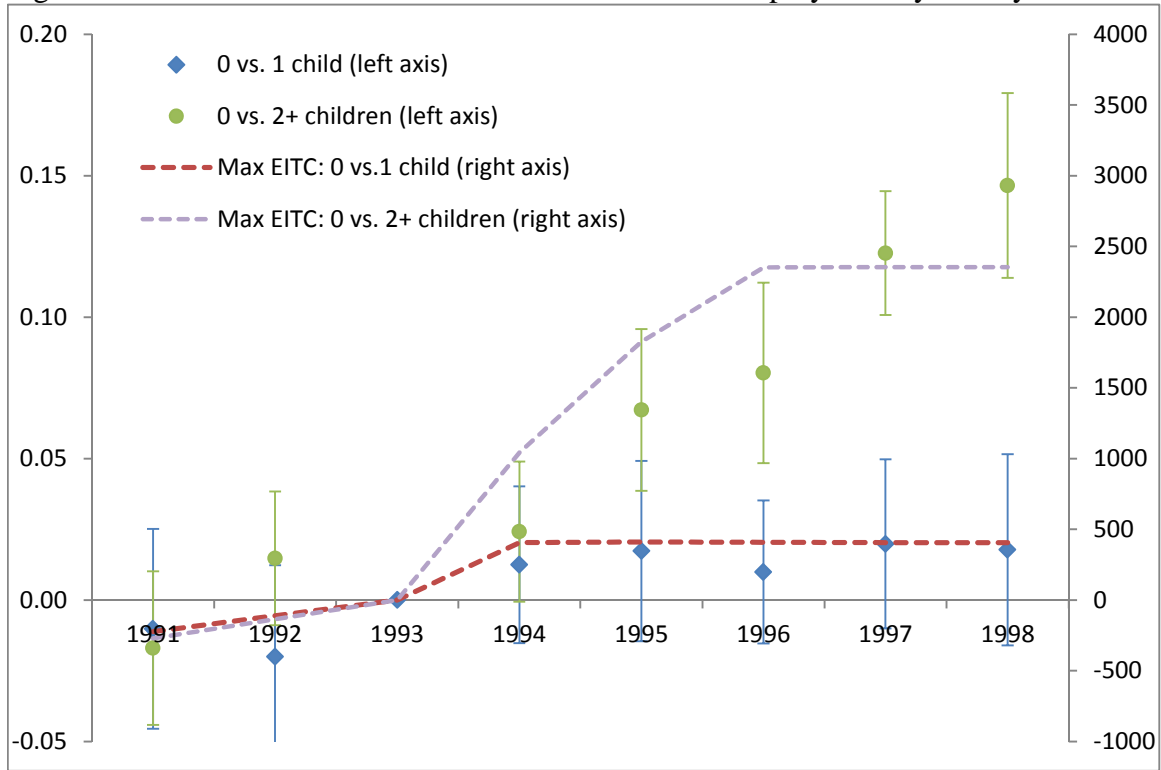
Notes: 1985-2013 CPS, single women, 24-48 years old, some college only. Figure plots share of taxpayers with after-tax and transfer income above 100% of the federal poverty threshold.

Figure 6: Event Time Model Estimates of OBRA 93 on Employment



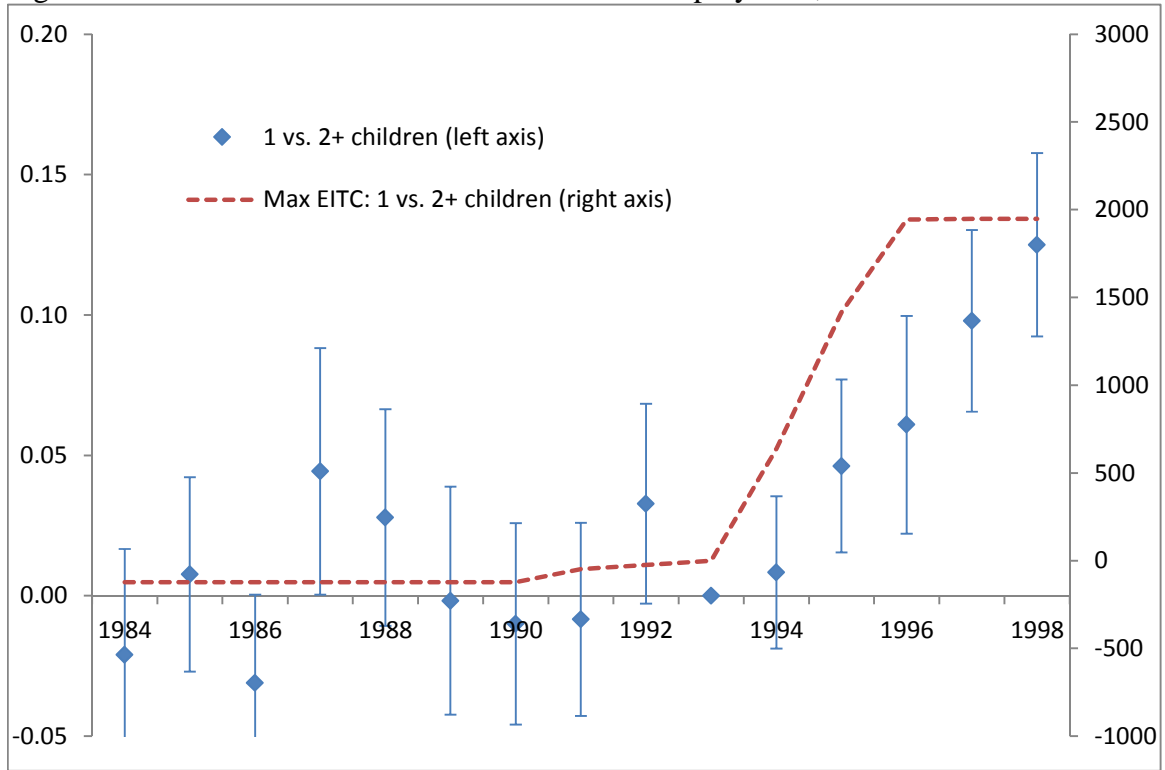
Notes: The sample includes single women, ages 24 through 48 with some college education from the 1992 through 1999 Current Population Survey (March). Tax year 1993 omitted. See equation (3) in text and data appendix for details. Confidence intervals clustered on state.

Figure 7: Event Time Model Estimates of OBRA 93 on Employment by Family Size



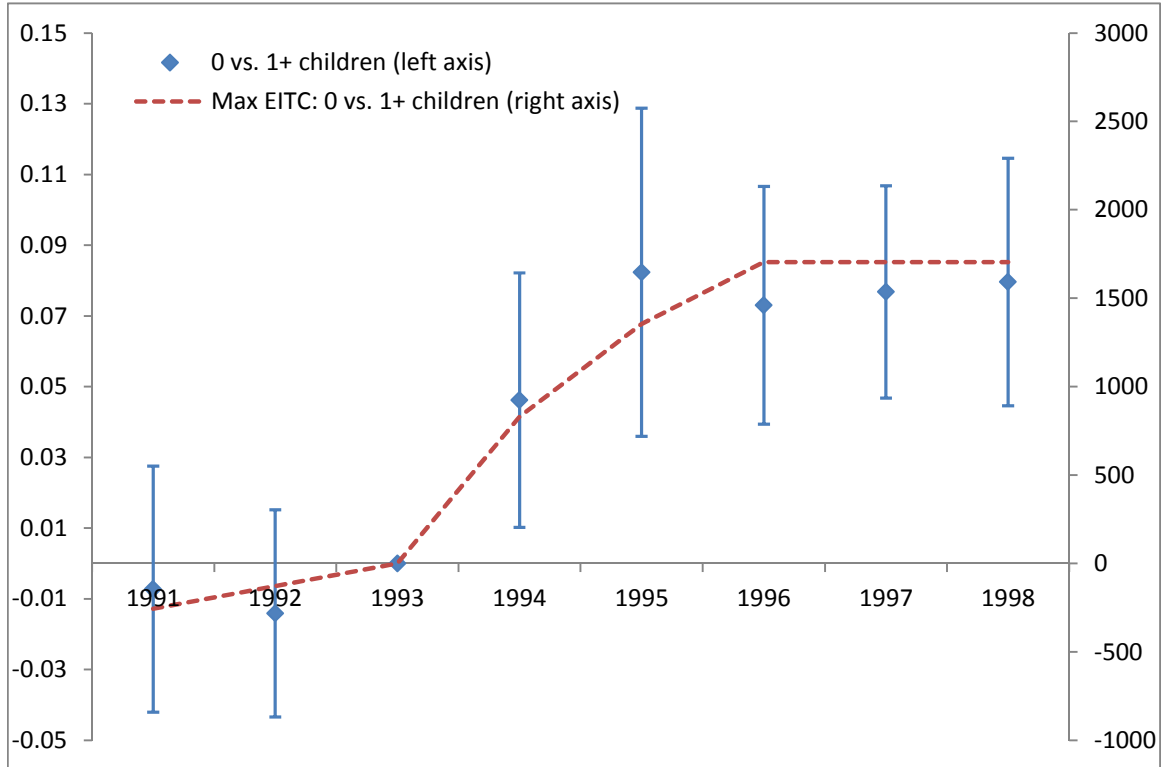
Notes: The sample includes single women, ages 24 through 48 with some college education from the 1992 through 1999 Current Population Survey (March). Tax year 1993 omitted. See equation (3) in text and data appendix for details. Confidence intervals clustered on state.

Figure 8: Event Model Estimates of OBRA 93 on Employment, 1 vs 2+ Children



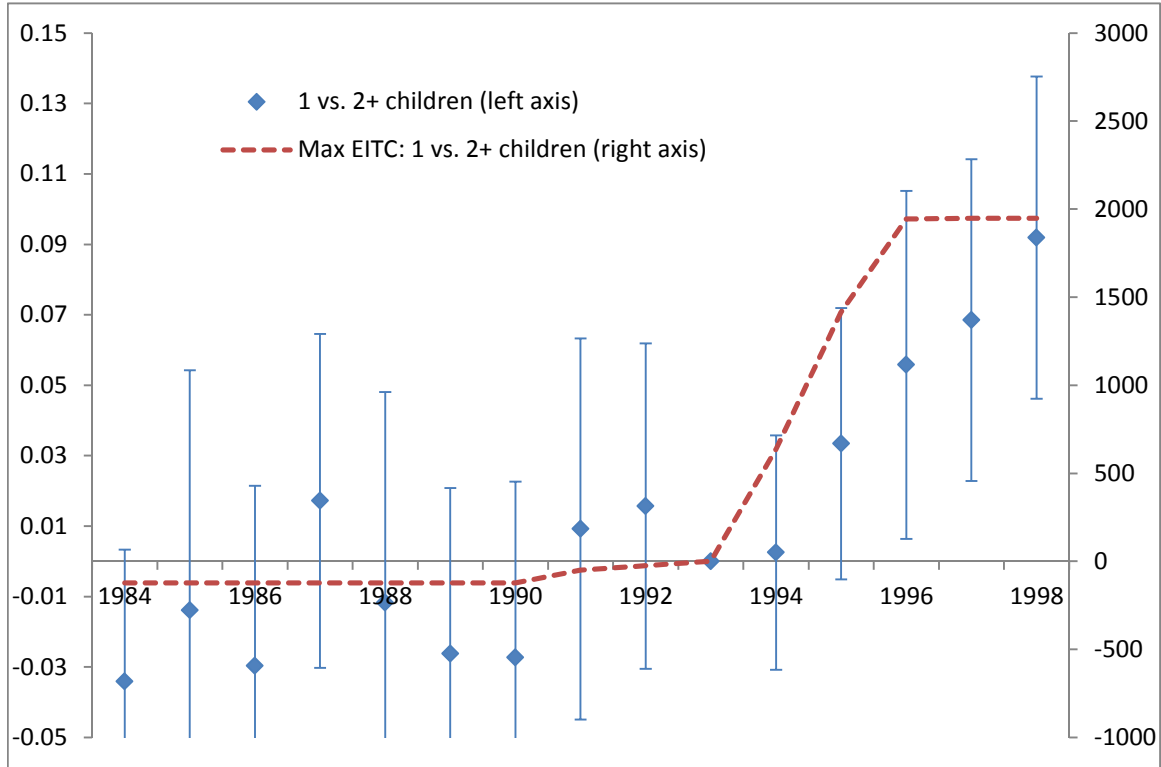
Notes: The sample includes single women with children, ages 24 through 48 with some college education from the 1985 through 1999 Current Population Survey (March). Tax year 1993 omitted. See equation (3) in text and data appendix for details. Confidence intervals clustered on state.

Figure 9: Event Time Model Estimates of OBRA 93 on Share Above 100% of the Poverty Threshold



Notes: The sample includes single women, ages 24 through 48 with some college education from the 1992 through 1999 Current Population Survey (March). Tax year 1993 omitted. See equation (3) in text and data appendix for details. Confidence intervals clustered on state.

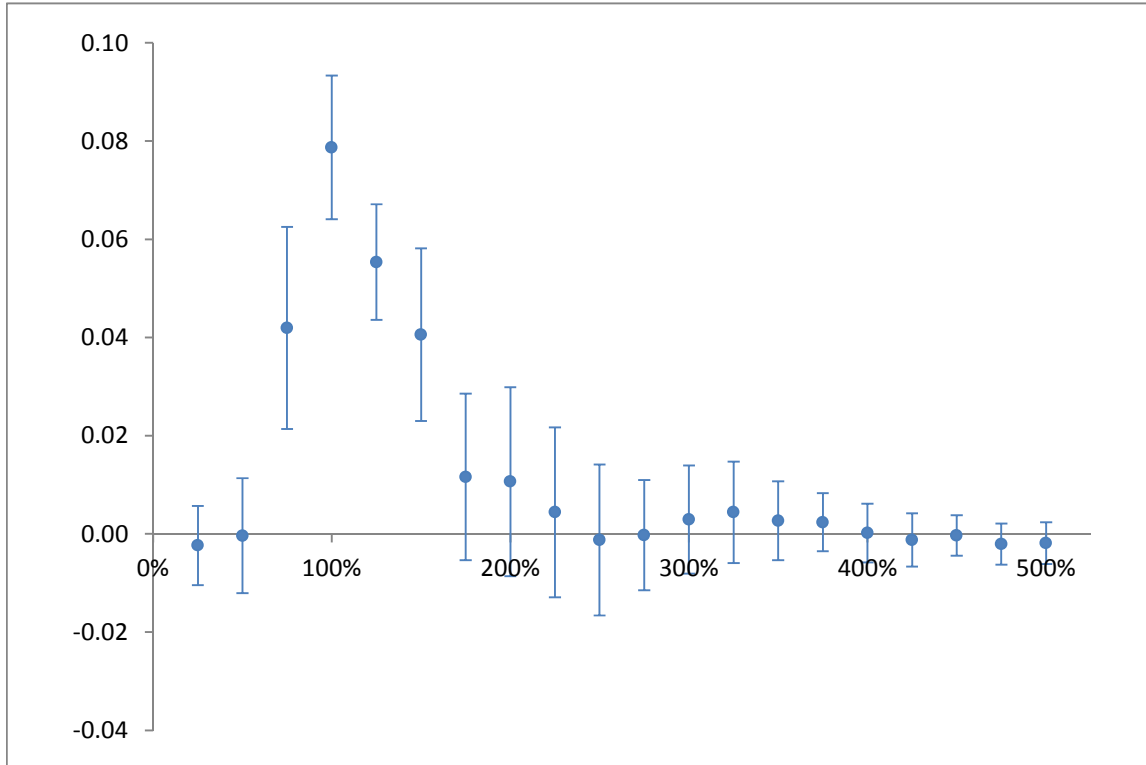
Figure 10: Event Model Estimates of OBRA 93 on Share Above 100% of the Poverty Threshold, 1 vs 2+ Children



Notes: The sample includes single women with children, ages 24 through 48 with some college education from the 1985 through 1999 Current Population Survey (March). Tax year 1993 omitted. See equation (3) in text and data appendix for details. Confidence intervals clustered on state.

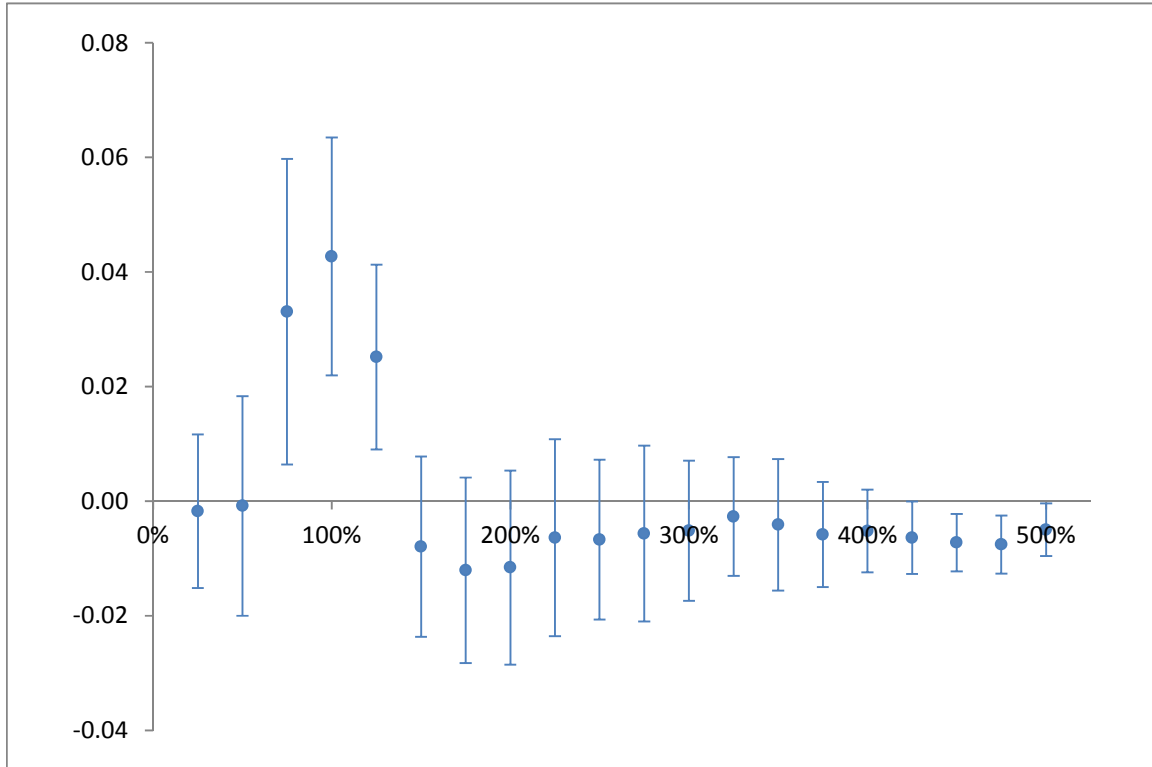


Figure 11: Difference-in-difference Estimates of OBRA 93 on Multiples of the Federal Poverty Threshold, 0 vs 1+ Children



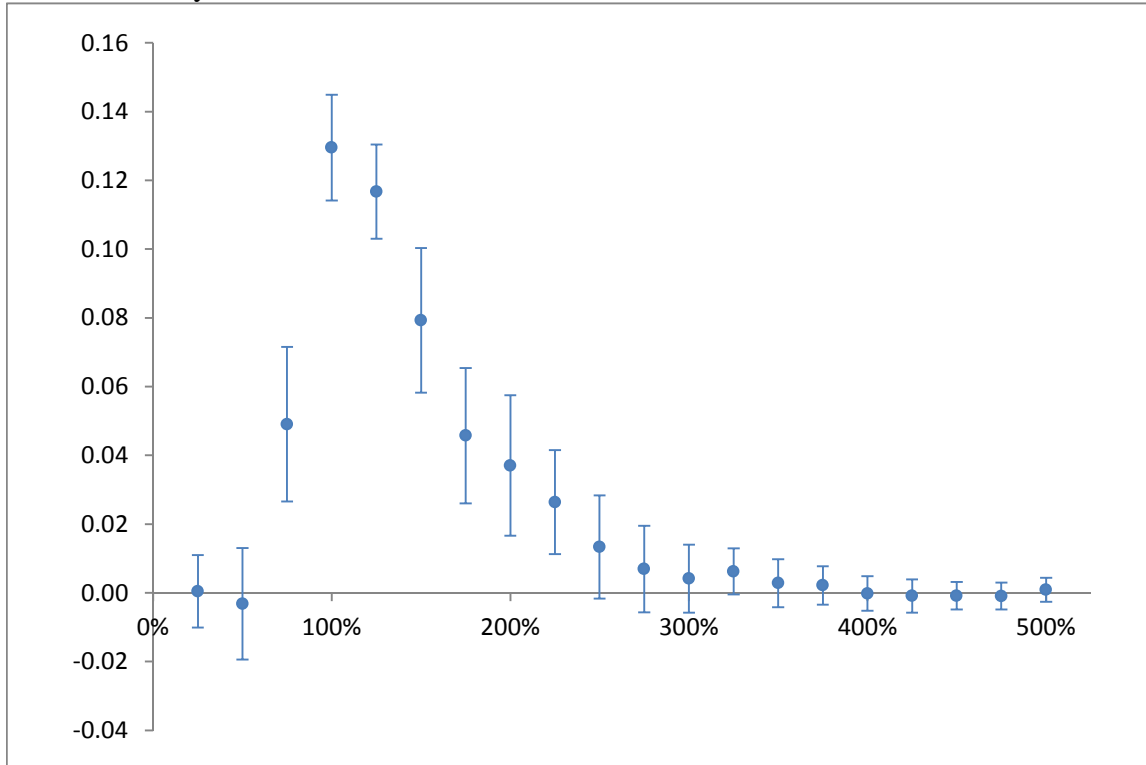
Notes: The sample includes single women, ages 24 through 48 with some college education from the 1992 through 1999 Current Population Survey (March). Each dot and whisker represents a single regression estimate and confidence interval. See equation (1) in text and data appendix for details. Confidence intervals clustered on state.

Figure 12: Difference-in-difference Estimates of OBRA 93 on Multiples of the Federal Poverty Threshold, 1 vs 2+ Children



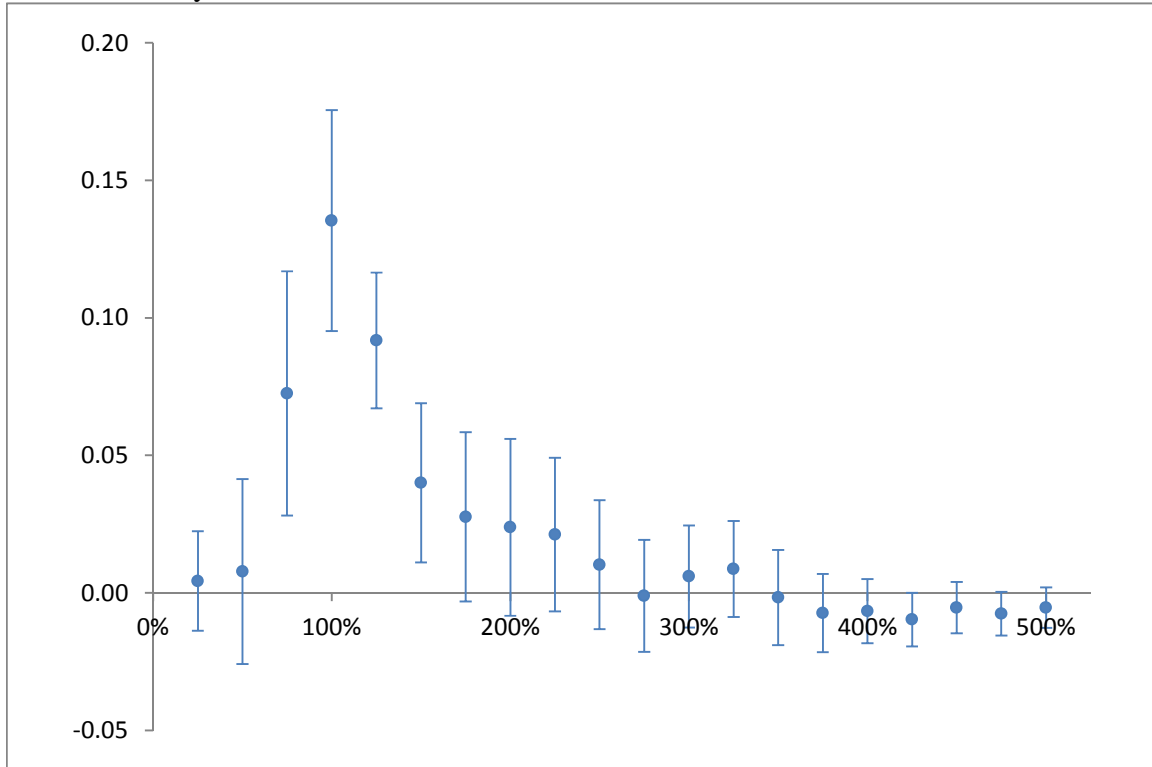
Notes: The sample includes single women with children, ages 24 through 48 with some college education from the 1992 through 1999 Current Population Survey (March). Each dot and whisker represents a single regression estimate and confidence interval. See equation (1) in text and data appendix for details. Confidence intervals clustered on state.

Figure 13: Parameterized DD Estimates of TRA86, OBRA90 and OBRA93 on Multiples of the Federal Poverty Threshold



Notes: The sample includes single women, ages 24 through 48 with some college education from the 1992 through 1999 Current Population Survey (March). Each dot and whisker represents a single regression estimate and confidence interval. Simulated EITC constructed from 1983 CPS and TAXSIM. See equation (1) in text and data appendix for details. Confidence intervals clustered on state.

Figure 14: Parameterized DD Estimates of TRA86, OBRA90 and OBRA93 on Multiples of the Federal Poverty Threshold, 1 vs 2+ Children



Notes: The sample includes single women with children, ages 24 through 48 with some college education from the 1992 through 1999 Current Population Survey (March). Each dot and whisker represents a single regression estimate and confidence interval. Simulated EITC constructed from 1983 CPS and TAXSIM. See equation (1) in text and data appendix for details. Confidence intervals clustered on state.

Table 1: Tax filers, EITC Claimants and Multiples of the Federal Poverty Threshold

	Less than .5 times FPT	Between .5 and 1 of FPT	Between 1 and 1.5 of FPT	Between 1.5 and 2 of FPT	More than 2 times FPT
<i>Distribution of EITC claimants across multiples of the FPT</i>					
Single					
With 1 child	0.12	0.40	0.29	0.15	0.04
With 2 or more children	0.10	0.24	0.43	0.19	0.03
Married filing joint					
With 1 child	0.07	0.27	0.33	0.27	0.06
With 2 or more children	0.06	0.26	0.39	0.25	0.04
<i>Share of filers who claim the EITC by multiples of the FPT</i>					
Single					
With 1 child	0.81	0.88	0.84	0.75	0.11
With 2 or more children	0.76	0.78	0.90	0.82	0.18
Married filing joint					
With 1 child	0.69	0.85	0.86	0.82	0.04
With 2 or more children	0.65	0.82	0.85	0.77	0.03

Notes: FPT is Federal Poverty Threshold. 2011 Statistics of Income Individual Complete Report File (tax year 2011). After tax income is computed using the difference between total income less taxes plus payments. Payroll taxes are imputed using total wages. In the top panel, each row should sum to 1.

Table 2: Summary Statistics

	Without children	With children
Average age	34.0 (0.1)	34.4 (0.1)
Share with HS degree or more	0.876 (0.006)	0.789 (0.010)
Share white	0.785 (0.016)	0.648 (0.027)
Average number of children		1.879 (0.015)
Share divorced	0.361 (0.014)	0.679 (0.012)
Average federal EITC	\$16 (1)	\$937 (38)
Share employed	0.892 (0.006)	0.776 (0.017)
Average earnings	\$28,307 (422)	\$21,745 (361)
Average after tax and transfer income	\$21,710 (256)	\$23,699 (318)
After tax and transfer income above 100% of poverty line	0.741 (0.007)	0.571 (0.008)
Observations	48,989	47,215

Notes: The sample includes single women, ages 24 through 48 with some college education from the 1985 through 1999 Current Population Survey (March). Taxes calculated using the NBER TAXSIM program. Standard errors clustered on state.

Table 3: Difference-in-Difference Estimates of OBRA93 on Employment

Model:	0 vs. 1+ Children		1 vs. 2+ Children	
(Year > 1993) * (1+ children)	0.061***	0.046***		
	(0.01)	(0.01)		
(Year > 1993) * (2+ children)			0.062***	0.025
			(0.01)	(0.01)
Per \$1000 of federal EITC	0.074	0.075	0.080	0.059
% impact	8.7%	8.9%	10.0%	7.5%
Extensive margin elasticity	0.37	0.38	0.45	0.34
Observations	50,508	50,508	25,101	25,101
Mean of the dependent variable	0.844	0.844	0.796	0.796
Controls				
Demographics	X	X	X	X
# of children indicators	X	X	X	X
Year indicators	X	X	X	X
State indicators	X	X	X	X
State * year indicators	X	X	X	X
Simulated tax & transfer benefits		X		X
Any AFDC waiver * 1+ children		X		
Any AFDC waiver * 2+ children				X
Unemp rate * 1+ children		X		
Unemp rate * 2+ children				X

Notes: The sample includes single women, ages 24 through 48 with some college education from the 1992 through 1999 Current Population Survey (March). See text and data appendix for details. Standard errors clustered on state. Significance levels: \*10%, \*\*5%, \*\*\*1%.

Table 4: Parameterized DD Estimates of OBRA93 on Employment

Model:	0 vs. 1+ Children		1 vs. 2+ Children	
Simulated EITC (\$1,000)	0.133***	0.109***	0.147***	0.100**
	(0.01)	(0.01)	(0.02)	(0.04)
Per \$1000 of federal EITC	0.078	0.074	0.084	0.080
% impact	9.2%	8.7%	10.5%	10.0%
Extensive margin elasticity	0.39	0.37	0.47	0.45
Observations	50,508	50,508	25,101	25,101
Mean of the dependent variable	0.844	0.844	0.796	0.796
Controls				
Demographics	X	X	X	X
# of children indicators	X	X	X	X
Year indicators	X	X	X	X
State indicators	X	X	X	X
State * year indicators	X	X	X	X
Simulated tax & transfer benefits		X		X
Any AFDC waiver * 1+ children		X		
Any AFDC waiver * 2+ children				X
Unemp rate * 1+ children		X		
Unemp rate * 2+ children				X

Notes: The sample includes single women, ages 24 through 48 with some college education from the 1992 through 1999 Current Population Survey (March). Simulated EITC constructed from 1983 CPS and TAXSIM. See text and data appendix for details. Standard errors clustered on state. Significance levels: \*10%, \*\*5%, \*\*\*1%.



Table 5: Parameterized DD Estimates of TRA86, OBRA90 and OBRA93 on Employment

Model:	0 vs. 1+ Children		1 vs. 2+ Children	
Simulated EITC (\$1,000)	0.095***	0.077***	0.140***	0.124***
	(0.01)	(0.01)	(0.02)	(0.03)
Per \$1000 of federal EITC	0.063	0.053	0.084	0.084
% impact	7.5%	6.4%	10.8%	10.8%
Extensive margin elasticity	0.32	0.27	0.48	0.48
Observations	96,204	96,204	47,215	47,215
Mean of the dependent variable	0.835	0.835	0.776	0.776
Controls				
Demographics	X	X	X	X
# of children indicators	X	X	X	X
Year indicators	X	X	X	X
State indicators	X	X	X	X
State * year indicators	X	X	X	X
Simulated tax & transfer benefits		X		X
Any AFDC waiver * 1+ children		X		
Any AFDC waiver * 2+ children				X
Unemp rate * 1+ children		X		
Unemp rate * 2+ children				X

Notes: The sample includes single women, ages 24 through 48 with some college education from the 1985 through 1999 Current Population Survey (March). Simulated EITC constructed from 1983 CPS and TAXSIM. See text and data appendix for details. Standard errors clustered on state. Significance levels: \*10%, \*\*5%, \*\*\*1%.

Table 6: Difference-in-Difference Estimates of OBRA93 on Share Above 100% of the Federal Poverty Threshold

Model:	0 vs. 1+ Children	1 vs. 2+ Children
(Year > 1993) * (1+ children)	0.079*** (0.01)	
(Year > 1993) * (2+ children)		0.043*** (0.01)
Per \$1000 of federal EITC	0.096	0.055
% impact	14.3%	9.2%
Extensive margin elasticity	0.64	0.48
Observations	50,508	25,101
Mean of the dependent variable	0.670	0.601
Controls		
Demographics	X	X
# of children indicators	X	X
Year indicators	X	X
State indicators	X	X
State * year indicators	X	X

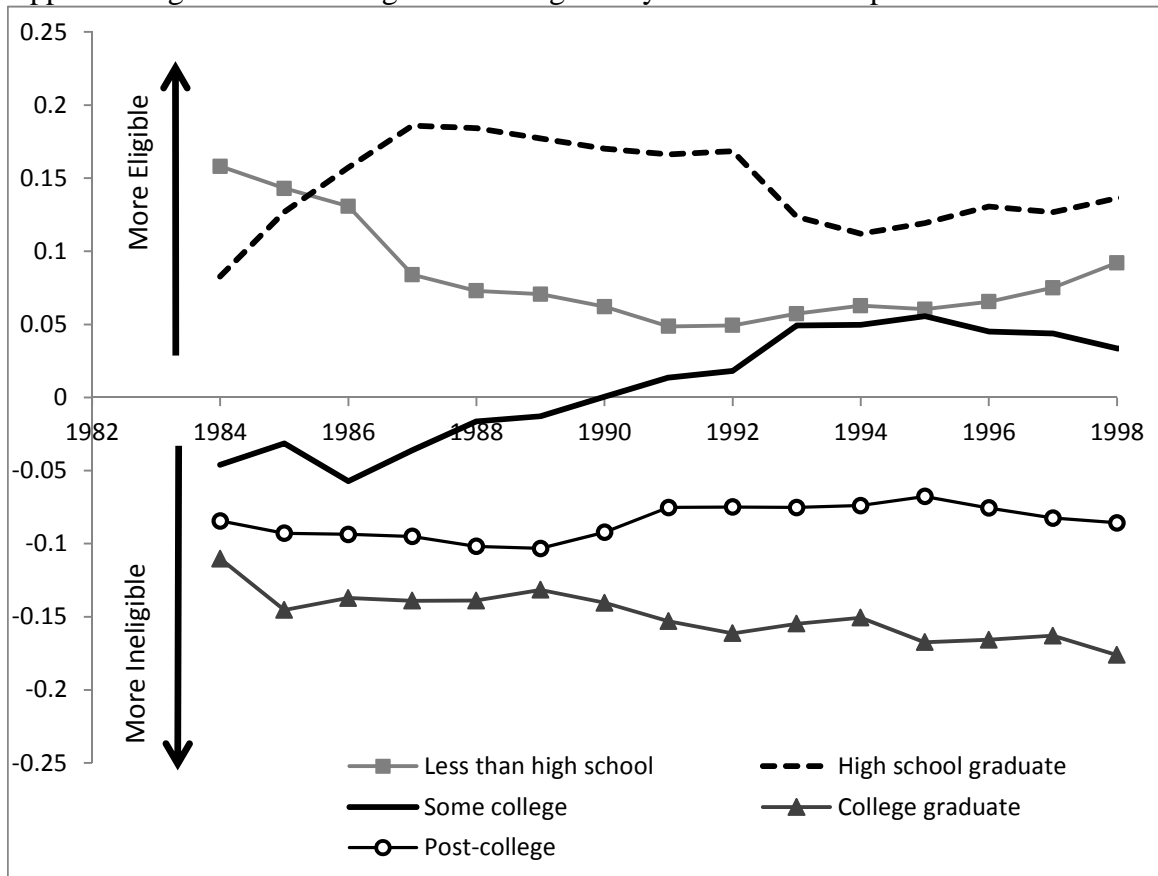
Notes: The sample includes single women, ages 24 through 48 with some college education from the 1992 through 1999 Current Population Survey (March). See text and data appendix for details. Standard errors clustered on state. Significance levels: \*10%, \*\*5%, \*\*\*1%.

Table 7: Parameterized DD Estimates of TRA86, OBRA90 and OBRA93 on the Share Above 100% of the Federal Poverty Threshold

Model:	0 vs. 1+ Children	1 vs. 2+ Children
Simulated EITC (\$1,000)	0.130*** (0.01)	0.135*** (0.02)
Per \$1000 of federal EITC	0.086	0.081
% impact	13.0%	14.2%
Extensive margin elasticity	0.58	0.69
Observations	96,204	47,215
Mean of the dependent variable	0.658	0.571
Controls		
Demographics	X	X
# of children indicators	X	X
Year indicators	X	X
State indicators	X	X
State * year indicators	X	X

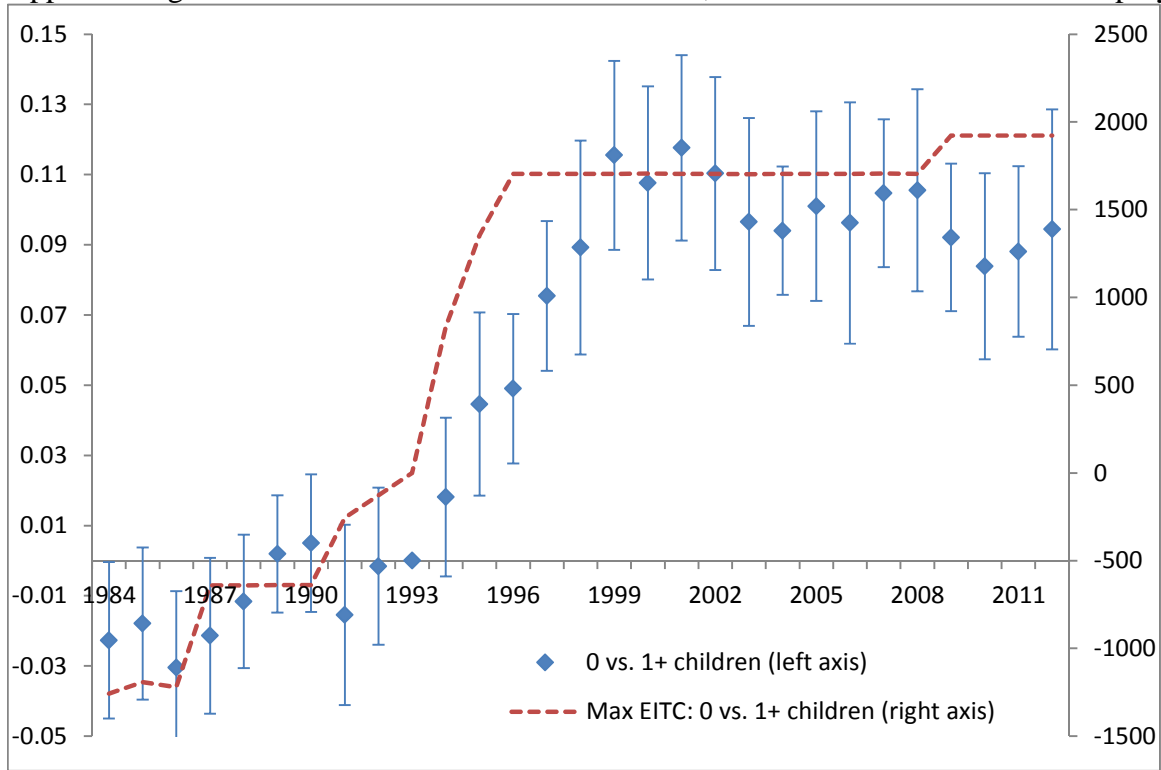
Notes: The sample includes single women, ages 24 through 48 with some college education from the 1985 through 1999 Current Population Survey (March). Simulated EITC constructed from 1983 CPS and TAXSIM. See text and data appendix for details. Standard errors clustered on state. Significance levels: \*10%, \*\*5%, \*\*\*1%.

Appendix Figure 1: EITC Eligible vs Ineligible By Education Group



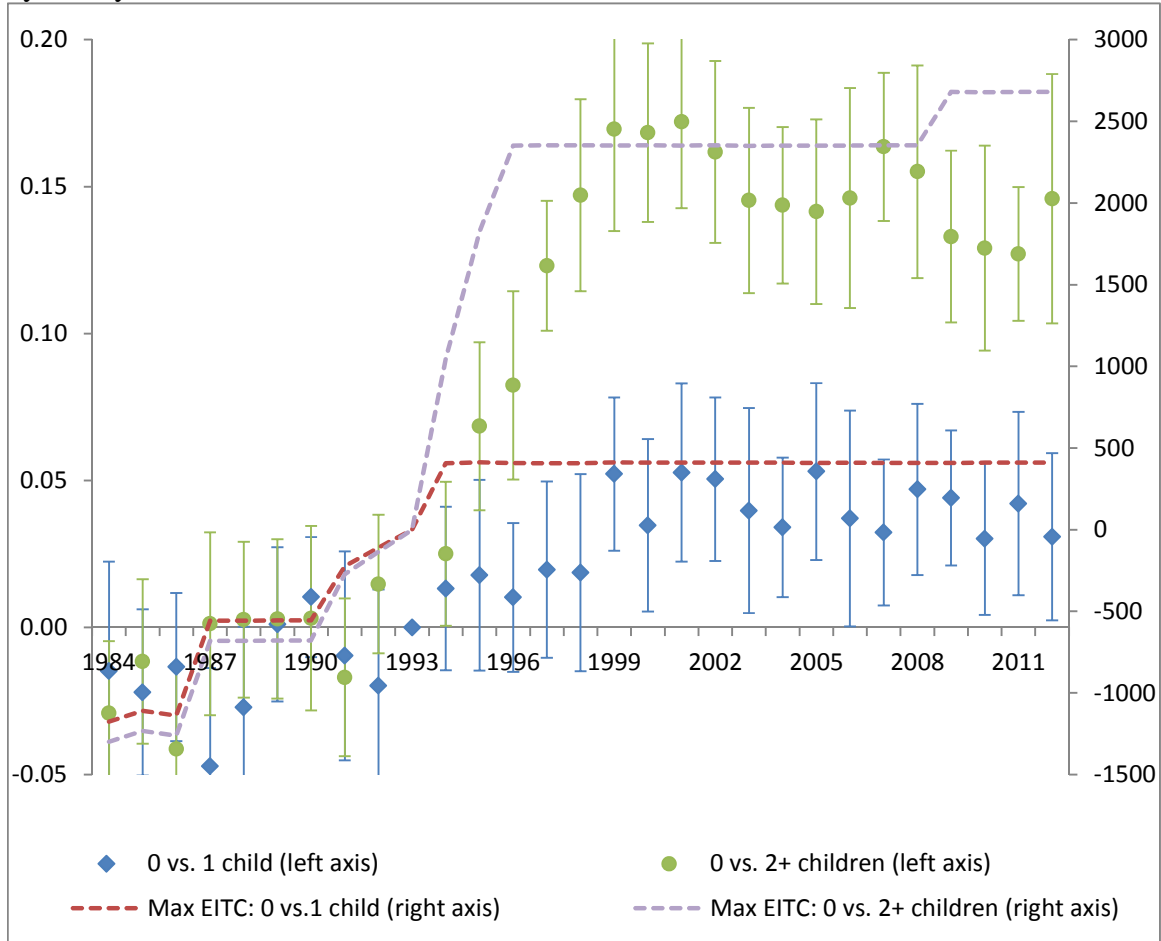
Notes: All other sample restrictions apply (see data appendix).

Appendix Figure 2: Event Model Estimates of TRA86, OBRA90 and OBRA93 on Employment



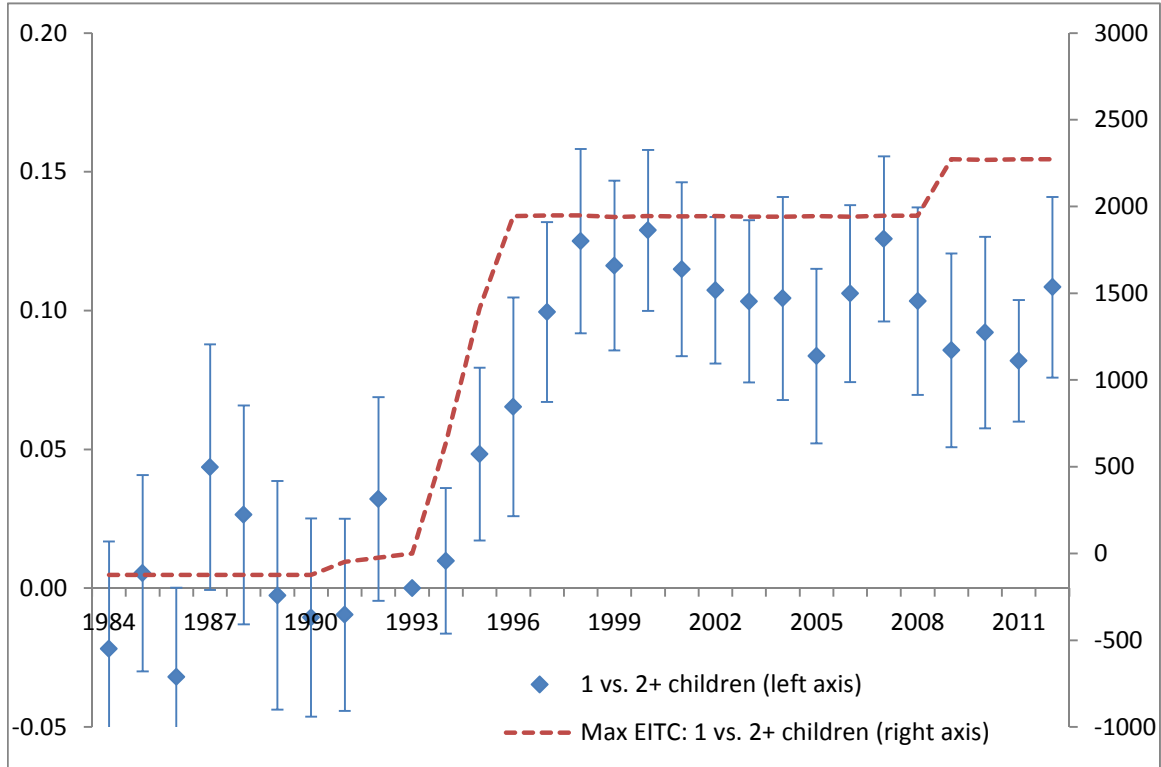
Notes: The sample includes single women, ages 24 through 48 with some college education from the 1985 through 2013 Current Population Survey (March). Tax year 1993 omitted. See equation (3) in text and data appendix for details. Confidence intervals clustered on state.

Appendix Figure 3: Event Model Estimates of TRA86, OBRA90 and OBRA93 on Employment by family size



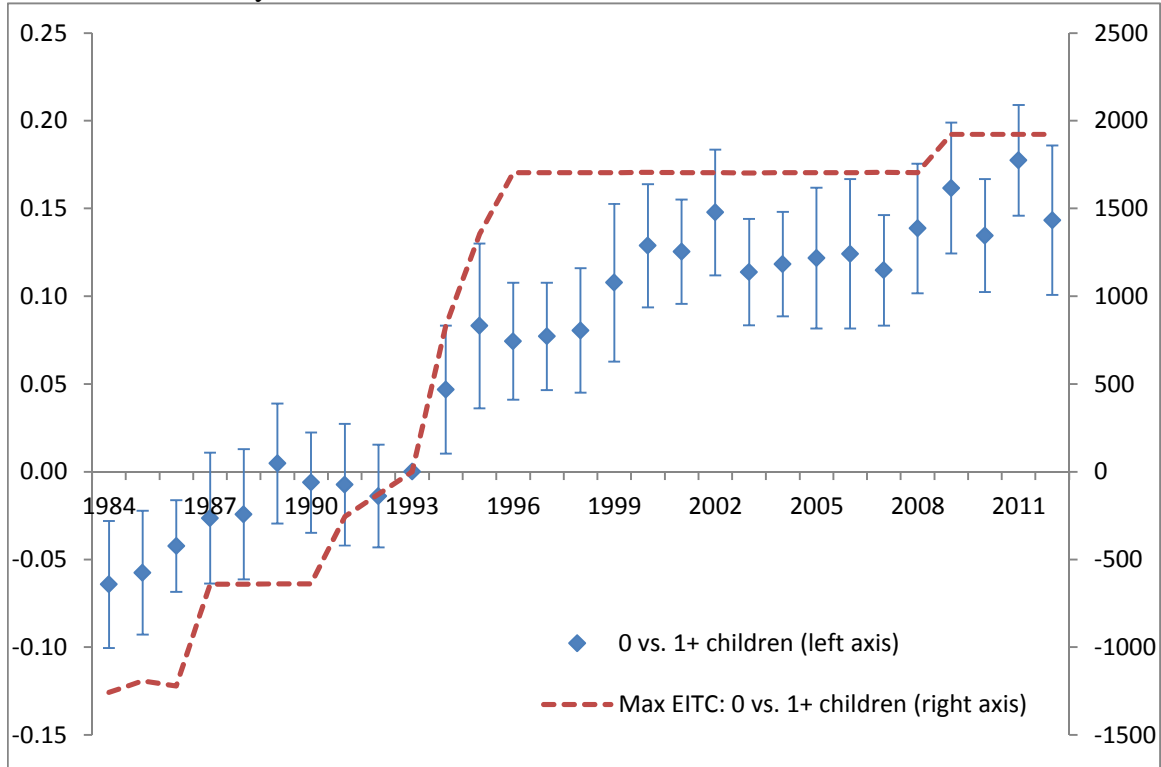
Notes: The sample includes single women, ages 24 through 48 with some college education from the 1985 through 2013 Current Population Survey (March). Tax year 1993 omitted. See equation (3) in text and data appendix for details. Confidence intervals clustered on state.

Appendix Figure 4: Event Model Estimates of TRA86, OBRA90 and OBRA93 on Employment, 1 vs 2+ Children



Notes: The sample includes single women with children, ages 24 through 48 with some college education from the 1985 through 2013 Current Population Survey (March). Tax year 1993 omitted. See equation (3) in text and data appendix for details. Confidence intervals clustered on state.

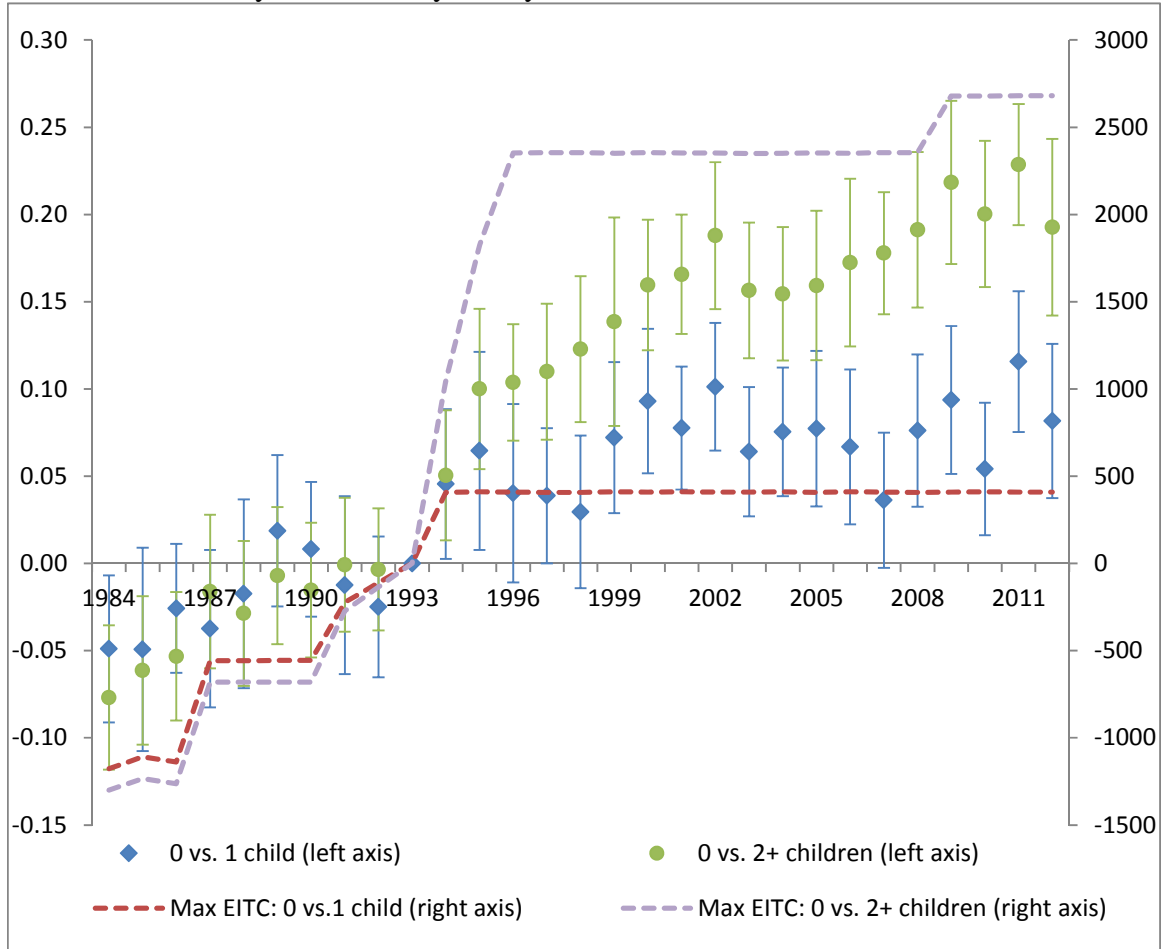
Appendix Figure 5: Event Model Estimates of TRA86, OBRA90 and OBRA93 on Share Above 100% of the Poverty Threshold



Notes: The sample includes single women, ages 24 through 48 with some college education from the 1985 through 2013 Current Population Survey (March). Tax year 1993 omitted. See equation (3) in text and data appendix for details. Confidence intervals clustered on state.

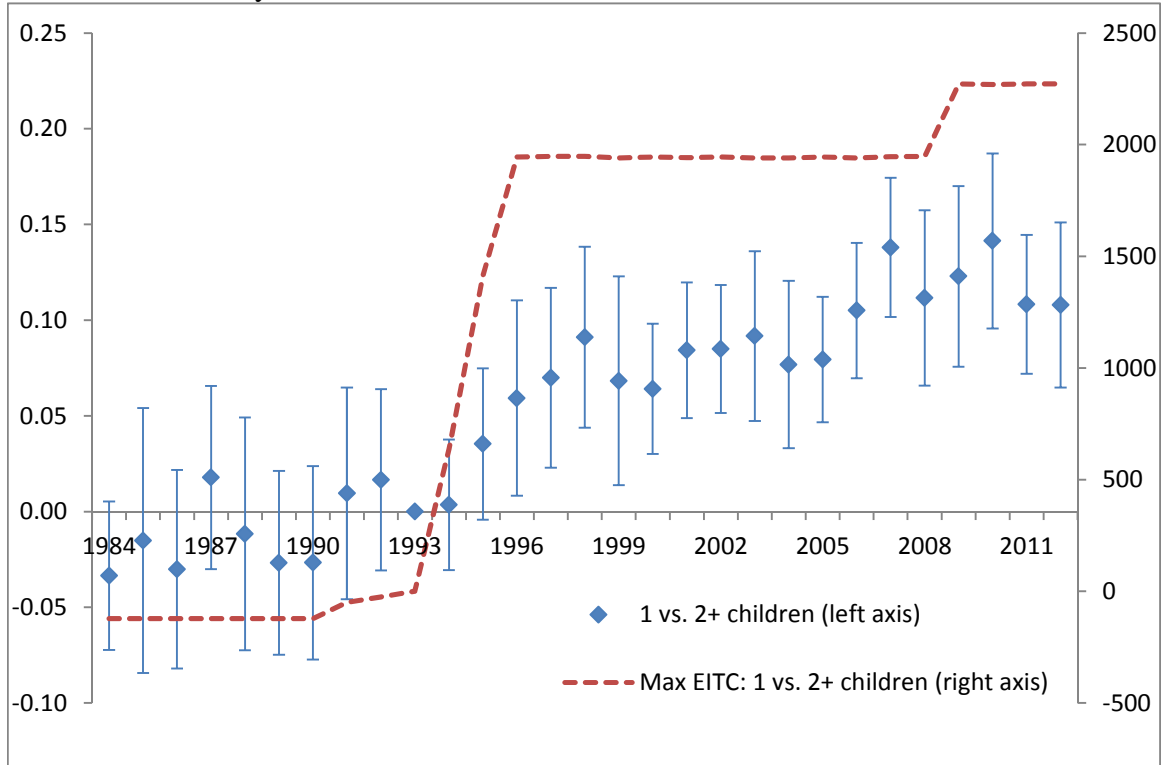


Appendix Figure 6: Event Model Estimates of TRA86, OBRA90 and OBRA93 on Share Above 100% of the Poverty Threshold by family size



Notes: The sample includes single women, ages 24 through 48 with some college education from the 1985 through 2013 Current Population Survey (March). Tax year 1993 omitted. See equation (3) in text and data appendix for details. Confidence intervals clustered on state.

Appendix Figure 7: Event Model Estimates of TRA86, OBRA90 and OBRA93 on Share Above 100% of the Poverty Threshold, 1 vs 2+ Children



Notes: The sample includes single women with children, ages 24 through 48 with some college education from the 1985 through 2013 Current Population Survey (March). Tax year 1993 omitted. See equation (3) in text and data appendix for details. Confidence intervals clustered on state.

Appendix Table 1: Difference-in-Difference Estimates of OBRA93 on Employment by Education Level

Model:	0 vs. 1+ Children		1 vs. 2+ Children	
	<i>All education levels</i>			
(Year > 1993) * (1+ children)	0.056*** (0.01)	0.045*** (0.01)		
(Year > 1993) * (2+ children)			0.057*** (0.01)	0.020 (0.01)
Per \$1000 of federal EITC	0.074	0.077	0.077	0.051
% impact	8.5%	8.8%	9.5%	6.3%
Extensive margin elasticity	0.36	0.37	0.52	0.35
Observations	67,605	67,605	28,509	28,509
Mean of the dependent variable	0.872	0.872	0.813	0.813
	<i>HS grad or less</i>			
(Year > 1993) * (1+ children)	0.062*** (0.01)	0.048*** (0.01)		
(Year > 1993) * (2+ children)			0.073*** (0.02)	0.024 (0.02)
Per \$1000 of federal EITC	0.071	0.074	0.100	0.069
% impact	9.0%	9.3%	13.5%	9.3%
Extensive margin elasticity	0.38	0.39	0.60	0.43
Observations	30,249	30,249	16,182	16,182
Mean of the dependent variable	0.793	0.793	0.742	0.742
<b>Controls</b>				
Demographics	X	X	X	X
# of children indicators	X	X	X	X
Year indicators	X	X	X	X
State indicators	X	X	X	X
State * year indicators	X	X	X	X
Simulated tax & transfer benefits		X		X
Any AFDC waiver * 1+ children		X		
Any AFDC waiver * 2+ children				X
Unemp rate * 1+ children		X		
Unemp rate * 2+ children				X

Notes: The sample includes single women, ages 24 through 48 from the 1992 through 1999 Current Population Survey (March). See text and data appendix for details. Standard errors clustered on state. Significance levels: \*10%, \*\*5%, \*\*\*1%.

Appendix Table 2: Parameterized DD Estimates of OBRA93 on Employment (1993 CPS)

Model:	0 vs. 1+ Children		1 vs. 2+ Children	
Simulated EITC (\$1,000)	0.118***	0.107***	0.124***	0.102***
	(0.01)	(0.01)	(0.02)	(0.03)
Per \$1000 of federal EITC	0.078	0.075	0.075	0.077
% impact	9.2%	8.9%	9.4%	9.6%
Extensive margin elasticity	0.39	0.38	0.43	0.44
Observations	50,508	50,508	25,101	25,101
Mean of the dependent variable	0.844	0.844	0.796	0.796
Controls				
Demographics	X	X	X	X
# of children indicators	X	X	X	X
Year indicators	X	X	X	X
State indicators	X	X	X	X
State * year indicators	X	X	X	X
Simulated tax & transfer benefits		X		X
Any AFDC waiver * 1+ children		X		
Any AFDC waiver * 2+ children				X
Unemp rate * 1+ children		X		
Unemp rate * 2+ children				X

Notes: The sample includes single women, ages 24 through 48 with some college education from the 1992 through 1999 Current Population Survey (March). Simulated EITC constructed from 1993 CPS and TAXSIM. See text and data appendix for details. Standard errors clustered on state. Significance levels: \*10%, \*\*5%, \*\*\*1%.