

Effective Policy for Reducing Poverty and Inequality? The Earned Income Tax Credit and the Distribution of Income

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Abstract:

We examine the effect of the EITC on the poverty and income of single mothers with children using a quasi-experiment approach that leverages variation in generosity due to policy expansions across tax years and family sizes. We find that the income increasing effects of the EITC are concentrated between 75% and 150% of income-to-poverty with little effect at the lowest income levels (50% poverty and below) and at levels of 250% of poverty and higher. Specifically, a policy-induced \$1000 increase in the EITC leads to an 8.4 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 whether we compare single women with and without children or compare women with one child versus women with two or more children. They are also robust to whether we limit our analysis to the sharp increase in the 1993 expansion or use the full period of policy expansion, back to the 1986 Tax Reform Act. Importantly, event study estimates show no evidence of differential pre-trends, providing strong evidence in support of our research design. We use these results to show that by capturing the indirect effects of the credit on earnings, static calculations of the anti-poverty effects of the EITC (such as those released based on the Supplemental Poverty Measure) may be underestimated by almost 50 percent. Ours is the first paper to simultaneously estimate the combined direct and indirect effects of the EITC, to quantify how much we miss by ignoring the behavior effect, and to estimate the effects across the income distribution.

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1. Introduction

Since the mid-1970s, earnings for less skilled workers have stagnated (Autor 2014). Hourly wages for men with less than a high school degree have fallen in real terms by more than 20 percent since 1973. Declines, though of smaller degrees, have occurred for men with a high school degree and for those with some college. Real wages for women with a high school degree or some college show small gains, though high school dropouts have seen no real increases. These factors combine to show losses or no change in real family income for the bottom 20 percent of the population (Mishel et al. 2012). This is particularly salient given the high and persistent premium paid to college graduates (Autor 2014) and the steady gains in income held by the top one percent of taxpayers (Piketty and Saez 2003).

Given this backdrop of stagnating wages and income for lower income Americans, there is a renewed interest in policies aimed at reducing inequality and increasing income and opportunity of the less advantaged population. At the same time, there is also concern about the related problem of secular declines in employment rates among prime aged men, and more recently, women (Economic Report of the President 2015). Policies aimed at raising incomes for less skilled workers include minimum wages, the Earned Income Tax Credit, and pre-market interventions aimed at increasing human capital and skills.¹

In this paper, we evaluate the central “post-market” policy aimed at the twin concerns of stagnant earnings and low employment – the Earned Income Tax Credit (EITC). The EITC provides a refundable tax credit to lower income working families and tax expansions over the past two decades have made the EITC a central element of the U.S. safety net (Bitler, Hoynes and Kuka 2016). In 2014, the EITC reached 28.5 million tax filers at a total cost of \$68.3 billion,

¹ Other policies such as increases in top marginal tax rates may be effective at reducing inequality by reducing top incomes. Our focus in this paper is on lower-tail inequality and the policies that raise incomes at the bottom.

with an average credit amount of \$3,130 for families with children (Internal Review Service 2016). Almost 20 percent of all tax filers and 44 percent of filers with children receive the EITC. In contrast, only 1.7 million families received cash welfare benefits (TANF) in 2014, a 66 percent decline since 1994.

In particular, we estimate the effect of the EITC on poverty and on the distribution of after tax and transfer income. Calculations based on the Supplemental Poverty Measure show that the EITC removed 3.4 million children from poverty in 2012, making the EITC the largest anti-poverty program for children in the U.S.² This is a static calculation, accounting for the credit without considering any behavioral effects of the EITC. However, given the decades of research documenting that the EITC leads to increases in employment (e.g., Eissa and Liebman 1996, Meyer and Rosenbaum 2000, 2001, Grogger 2003), this static calculation is likely an underestimate of the full anti-poverty effects of the EITC. Building on this, our approach captures three central channels through which the EITC may affect after tax and transfer income. We capture the direct effect of the tax payment (*credit* effect) as well as the indirect effect of increasing earnings (*earnings* effect) and any reduction in other public assistance (or other) income (*income adjustment* effect). Ours is the first paper to simultaneously estimate the combined direct and indirect effects of the EITC for single mothers, to quantify how much we miss by ignoring the behavior effect, and to estimate how these effects play out across the income distribution.³

Our analysis focuses on the 1990s, a period with a sharp and large expansion in the EITC,

² We calculate this figure using the 2013 March CPS corresponding to data for the 2012 calendar year. As reported in Short (2013), in 2012 the EITC and the Child Tax Credit together removed 5 million children from poverty. The next largest is SNAP, which removed 2.2 million children from poverty in 2012. This static or simulation approach has also been used by Liebman (1998) and Meyer (2010).

³ As we discuss below, a handful of studies estimate the effect of the EITC on earnings (e.g., Grogger 2003, Neumark and Wascher 2001, 2011) and income or poverty (Bollinger et al. 2009, Grogger 2003, Gunderson and Ziliak 2004).

providing an opportunity to leverage a transparent quasi-experimental research design. Our main results use the significant variation in the 1993 expansion of the credit by employing a difference-in-difference and event time approach. We extend that analysis in a parameterized difference-in-difference approach using credit expansions over a longer period, 1984-1998.⁴ Both approaches take advantage of tax-reform driven variation in the credit across family size and tax year. Throughout our analysis, we focus on single women, who have the largest participation rates in the program. In fact, single filers with children account for almost 60 percent of EITC filers and about three-quarters of the cost of the credit.

The 1990s was a period of significant reductions in poverty. For example, official child poverty rates fell from 21.2 in 1994 to 15.6 in 2000. As many have noted (e.g., Citro and Michael 1995) official poverty is an inadequate measure and, notably, does not account for taxes or in-kind transfers. After tax and transfer poverty rates that correct for these limitations show even larger reductions during this time period (Wimer et al. 2016). At the same time, employment rates of single mothers rose dramatically. Many prior studies have examined this period to understand the role played by the EITC, welfare reform and the strong labor market in employment increases (e.g., Meyer and Sullivan 2004, Grogger 2003). Our empirical approach controls flexibly for the changes in the labor market as well as welfare reform and other policies to isolate the effect of the EITC on after tax and transfer income.

We find that the 1993 expansion led to a 7 percentage point decrease in the share with after tax and transfer income below poverty (for families headed by these single women), implying an 8.4 percentage point effect per \$1000 in federal EITC. Additionally, by examining the effects of the EITC at different points of the income distribution we find that the income-

⁴ As discussed in Section 2, there is minimal variation in the federal EITC after the 1993 expansion, thus we follow the literature by focusing on this period.

increasing effects of the EITC are concentrated between 75% and 150% of the federal poverty threshold, with smaller effects in deep poverty (where there is less connection to the labor market) and at higher income levels. Importantly, we find that the static calculations of the effects of the EITC, by ignoring the induced earnings effect, underestimate the anti-poverty effects of the credit by up to 50 percent.

Our results are robust to several alternative specifications including whether or not we include a conservative set of controls, whether we use identifying variation across single women with no children versus those with children or single women with one versus two or more children, and whether we use the sharp change in 1993 or the full set of EITC expansions back to 1984. Our event time graphs provide compelling evidence that the research design – comparing outcomes across different family sizes – is valid. One caveat is that the results are limited to capturing the effects of the EITC on our sample – single mothers with less than a college degree. While they account for the majority of expenditures among EITC recipients, a substantial number of other families are affected by the EITC. We provide results for an expanded sample including lower educated married couple families. While the dynamic effects are slightly more muted in this expanded sample, the qualitative findings remain unchanged.

In addition to providing new results on the EITC, our paper also contributes to the broader literature on the effects of social policies on the distribution of income. Many studies have used variation in state minimum wages to examine the effects on inequality and the distribution of income (for example see Burkhauser and Sabia 2007, Card and Krueger 1995, Dube 2013, Gunderson and Ziliak 2004, and Neumark et al. 2005). Frandsen (2012) estimates the effects of unionization on the distribution of earnings. Havnes and Mogstad (2015) estimate the effect of universal child care on the distribution of income. It is worth pointing out that many

of these studies use *relative* measures of inequality, such as the ratio of the median to the 10th percentile of income (or earnings). We take a slightly different approach, examining the effects of the EITC on *absolute* measures of inequality, such as the share of the population with income below the poverty threshold or 1.5 times the poverty threshold. We measure absolute inequality for two reasons. First, it provides a link to the static poverty calculations that provide the basis of an important comparison and illustration of the magnitude of the induced earnings effects. Second, our research design is based on comparisons across demographic groups (e.g. families with different numbers of children) and the relative inequality approach would effectively lead to making comparisons between family-size-specific income distributions. While making comparisons across state income distributions, as in the minimum wage literature, seems natural given local labor markets, comparisons across demographic groups is less natural.

In the following section we describe the EITC and its evolution. In section 3, we explore the predictions for the effect of the EITC on the distribution of after tax and transfer income and connect to the existing literature. The dataset is presented in section 4 and we detail our estimation strategy in section 5. In section 6 we present our main results on the effects of the EITC on the distribution of after tax and transfer income. We use the estimates to calculate the effects of the EITC on the aggregate number of individuals and children in poverty in section 7, and we conclude with section 8.

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. Taxpayers must have less than a specified amount of adjusted gross income (AGI) and earned income. The value of the credit is determined by a benefit schedule that has three regions. 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 “flat” region. In the final region, the credit is phased-out with each additional dollar of AGI. There are separate schedules, with the same basic shape, by filing status and by the number of qualifying children claimed.⁵ Appendix Figure 1 displays the schedule in 2016 as a function of earned income for single taxpayers with no, one, two, and three or more children (the dotted lines give the extended schedule for married couples). The phase-in or subsidy rate is substantial at 34/40/45 percent for those with one/two/three or more children. The phase-out rate is much lower at 15.98 (21.06) percent for those with one (two or more) children. The maximum benefit is \$3,373/\$5,572/\$6,269 for those with one/two/three or more children. In contrast, taxpayers without children receive a very small credit (maximum value \$506). The credit reaches fairly high up the earnings distribution, for example maximum allowable income for a taxpayer with two or more children \$44,648 in 2016. Finally, the credit is refundable: If the credit exceeds a taxpayer’s tax liability, they receive the difference as a refund.

To illustrate where in the income distribution the EITC provides benefits, Figure 1, based on a large sample of tax returns in 2011, tabulates the EITC by bins of income-to-poverty for families with children. We define after tax income as gross taxable income less taxes owed plus credits and apply federal poverty thresholds using family size within the tax unit. Panel (a) shows results for single taxpayers with children and panel (b) for those married filing joint. The figure on the left tabulates the share of EITC claims by income-to-poverty bin while the figure on the right tabulates the total taxpayers in this bin who claim the EITC. The majority of single taxpayers with children who claim the EITC are between 50% and 200% of the federal poverty

⁵ 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).

threshold (left graph).⁶ Within each income-to-poverty bin, approximately 80% of filers claim the EITC up to 200% of the federal poverty threshold, declining after that (right graph). Among those filing a joint return, EITC claimants have slightly more after tax income relative to those filing single, though they are still below 200% of the federal poverty threshold. Overall, the EITC eligibility rules accomplish a transfer to those who have relatively low income (Hoynes and Rothstein 2016).

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 2015 dollars). Figure 2 also identifies the four tax reforms responsible for these changes.⁷ The 1993 legislation produced the largest expansion 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. For example, for families with two or more children the maximum credit rose from \$2,552 in 1993 to \$5,548 in 1996 (2015 dollars) for a 117 percent increase. Eligible families with one child experienced a smaller increase, from \$2,421 to \$3,359 for a 38 percent increase. 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 exemptions, and to their tax bracket rates and thresholds. These families would also be eligible for an increasing

⁶ Liebman (1998) finds a similar result using the 1993 CPS with EITC rules from 1996. He contrasts this with traditional welfare (AFDC and Food Stamps), which are targeted at families with lower multiples of the poverty threshold.

⁷ 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.

number of state-level EITCs.⁸ More importantly, traditional welfare benefits for families with children were curtailed during this period (e.g., Bitler and Hoynes 2016a, Moffitt 2003, Ziliak 2015). 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 aimed at reducing AFDC participation and enabling the transition from welfare to work.⁹ 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 control for these changes in other tax and transfer programs to isolate the effects of the EITC.

The evolution of these policies increased the relative importance of the EITC as an income support program. Appendix Figure 2 displays per capita real expenditures for the EITC, the AFDC program, the TANF program and the Supplemental Nutrition Assistance Program (SNAP, formally food stamps) (Bitler and Hoynes 2010). Prior to 1986, spending on the EITC was only a fraction of other welfare programs. After welfare reform, through the Great Recession and its recovery, spending on the EITC was much larger than that on TANF cash grants.

3. The EITC and the Distribution of Income

The expected effect of the EITC on after tax and transfer (ATT) income operates through three primary channels (Liebman 1998, Grogger 2003, Bollinger et al. 2009, Meyer 2010, Hoynes et al. 2015). Beginning with the definition, ATT income equals earnings plus other income plus government transfers less taxes. First, direct EITC payments increase ATT income. Second, EITC-induced changes in earnings affect ATT income. Third, increases in earnings may

⁸ Currently, 28 states including DC have an earned income tax credit (IRS 2014).

⁹ 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).

lead to reductions in other income sources. In particular, the likelihood that the same family qualifies for traditional welfare payments such as cash welfare (AFDC/TANF) and SNAP is expected to decrease (as earnings increase)¹⁰. We call these effects the *credit* effect, the *earnings* effect, and the *income-adjustment* effect. At the core is basic labor supply theory and the incentives for employment and earned income more generally.

The EITC generates labor supply incentives on the intensive and extensive margins that likely differ depending on marital status. Among single parents, who represent the focus of our analysis, the EITC (overall or an expansion in the credit) increases the returns to entering employment for those outside of the labor force – leading to an increase in the extensive margin of labor supply. The effects of the EITC on the intensive margin, for those already in the labor market, are less unambiguously work-promoting. In the phase-in region, the net-of-tax wage increases with the EITC; the effect on the intensive margin is ambiguous due to 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 flat region the pure income effect also is predicted to reduce labor supply).

There is a large body of research that confirms and quantifies these predictions (e.g. see reviews by Hotz and Scholz 2003, Eissa and Hoynes 2006, Nichols and Rothstein 2015). The evidence shows that the EITC leads to substantial increases in employment for single parent families with children (e.g., Eissa and Liebman 1996, Meyer and Rosenbaum 2000, 2001). For example, Meyer and Rosenbaum (2001) find that the EITC raised labor force participation increased by 7.2 percentage points for single women with children relative to those without children between 1984 and 1996. There is less evidence on the intensive margin of labor supply,

¹⁰ The EITC credit amount itself does not count as income when determining eligibility and benefits of means tested transfers.

though some studies show that workers adjust to maximize the credit along the phase-in region (Chetty et al. 2013, Saez 2010, Chetty and Saez 2013).

Because the EITC is based on family income, the credit leads to a somewhat different set of incentives for married taxpayers. Overall, as with singles, we would expect higher rates of “family” employment for married couples, as a result of the credit being tied to work. Among secondary earners, though, the EITC is expected to reduce labor supply due to the increased after-tax income and additional tax due to the phase-out rate generated by the EITC schedule. The research shows small reductions in employment for secondary earners and little effect on primary earners (Eissa and Hoynes 2004).

Given the predicted labor supply effects for single mothers, we expect that the EITC will increase ATT income. For those induced by the EITC to enter the labor market, ATT income should increase due to the positive credit and earnings effects, though potentially offset by a decline in other income. For those single women already in the work force, the main channel for increasing ATT income is the credit effect. In principle, this positive credit effect could be offset by a negative earnings effect, to the extent to which workers respond to the phase-out rate. However, given the lack of evidence of a behavioral response in the phase-out region, we don’t expect the offset to be significant. Additionally, due to the shifting out of the labor supply curve induced by the EITC, market wages may decline as employers interact with increased labor supply on the extensive margin (Rothstein 2010).

To set the stage for our analysis, we present here basic trends for our sample of single women (data and sample discussed in Section 4), separately for those with zero, one and two or more children. Figure 3a shows the share in each group with ATT income above the poverty threshold. In the mid-1980s, the share above poverty was much lower for single women with

children (particularly women with larger families) compared to those without children. Beginning around 1992 or 1993, there is a trend break and the share above poverty rises dramatically for single women with children (and more for women with large families consistent with the EITC expansions) such that by the early 2000s the differences in the ATT poverty rates narrowed significantly across the groups. Figure 3b shows the share in each group that are employed at all during the calendar year. Labor supply expanded substantially for single women with children during this period, particularly for women with two or more children (again consistent with a larger increase in the EITC). The magnitude of the extensive margin results implies that the static calculation of the anti-poverty effects of the EITC, by ignoring the induced earnings effect, may substantially underestimate the effects of the policy.

Ours is not the first study to examine the effects of the EITC on income and poverty. Neumark and Wascher (2001) examine the effect of the state EITC on cash income and poverty and Grogger (2003) estimates the effect of the federal EITC on average and log cash income. Among the few papers that examine a broad after tax income measure, Gunderson and Ziliak (2004) estimate the effects of state EITCs on after tax poverty and Bollinger et al. (2009) estimate the effects of the federal EITC on quantiles of after tax income. Our paper is the first to estimate the direct and indirect effects of the EITC, to assess how much we miss by ignoring the behavior effect, and to quantify how these effects vary across the distribution of income-to-poverty. We also provide transparent event study estimates to evaluate the validity of the differences-in-differences design.

4. Data

The primary dataset is the Current Population Survey March Annual Social and Economic Supplement (CPS). The CPS is an annual survey that collects labor market, income,

and program participation information for individuals for the previous calendar year, as well as demographic information from the time of the survey. This survey is used to report official poverty and supplemental poverty each year.¹¹ We use the 1985-2014 surveys, corresponding to income over calendar years 1984-2013. We use a broad measure of after tax and transfer income defined as pre-tax cash income plus the cash value (as reported by the household or imputed by the Census Bureau) of non-cash programs (food stamps, school lunch, housing subsidies, and energy subsidies), minus payroll, federal and state income taxes (including the EITC, child and child care tax credits). We calculate taxes using the NBER TAXSIM calculator (Feenberg and Coutts 1993). Appendix Table 1 provides detail on the sources of income captured in our ATT income measure. See the data appendix for details on variables and construction of tax units.

We define our sample to include single women between the ages of 24 and 48, who are not ill, disabled or going to school. We limit the sample to women older than 24 to eliminate confusion about whether a woman can be reported as a qualifying child on her parent's return.¹² We also use the women's completed education level to construct a sample likely to be affected by the EITC. To inform our choice, Appendix Figure 3a plots the share of women in the sample who, given their earned income, AGI and number of qualifying children, are eligible for the EITC. At the end of the 1993 expansion (in 1996), 71 percent of single women with a high school degree are eligible for the EITC, compared to 60 percent of those with less than a high school degree, and 68 of those with some college. The eligibility rates drop off significantly with a college degree (47 percent for college, 24 percent for more than college). Given this, we limit

¹¹ Note that while we augment the CPS data with information on the universe of tax returns (e.g. Figure 1), administrative tax information is not sufficient to provide the main data for our analysis given that we need to capture safety net income (not captured in the tax data) and we need to capture movements into and out of the labor force (taxable universe).

¹² Children qualify for the EITC up to age 19 or up to 24 if in school full time. Our results do not qualitatively change if we expand to include younger women or women in school in our sample (Appendix Table 5).

the sample to those who have some college education or less.

Using this sample, we examine the impact of the EITC on different points of the income distribution using multiples of the official poverty threshold (50% poverty, 100% poverty, 150% poverty, etc.). We use the poverty thresholds that are the basis of official poverty, resulting in an ATT income measure of absolute inequality. Our poverty measure is aligned with—though not the same as—the Census Supplemental Poverty Measure (SPM). In particular, like the SPM we include in-kind transfers and taxes following National Academy of Sciences recommendations (Citro and Michael 1995). However, our measure does not include the benefits from public health insurance or out of pocket medical expenses (Bitler and Hoynes 2010, 2016b).¹³

Appendix 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. We discuss the balance of the sample and the validity of the control group below.

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

¹³ The SPM is a new measure and Census provides estimates to calculate the SPM only back to 2009. We choose to exclude the value of (employer and) public health insurance in part because there is no standard in the literature on how to handle it. The Congressional Budget Office uses the “full market value of these benefits,” for example valuing Medicaid as the government outlay per recipient. Prior to the SPM, the Census included the fungible value of Medicaid (and Medicare), essentially only including the market value (outlays per recipient) to the extent that family cash income exceeds needed food and housing costs. The SPM subtracts out of pocket medical expenses (including individual cost of premiums) from resources rather than adding the value of health insurance. The SPM also deducts work expenses from income, includes cohabitants as a family unit, and constructs a new poverty threshold that varies geographically and, in part, reflects relative income amounts.

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,

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

where i is an individual taxpayer, t is a tax year, η_{st} is a set of state by year fixed effects, and γ_c are dummies indicating the number of children (0, 1, 2, 3+). Demographic controls, X_{it} , include age, education, race, ethnicity, and divorced status of the mother. To focus on OBRA 93, we use tax years 1991 through 1998, including two years before and after the legislation has fully phased in (Figure 2). The DD estimate is β , where 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, to leverage the larger expansion in OBRA 93 for those with two or more children (Figure 2), we also estimate models in which women with two or more children are the treatment group and those with exactly one child are the control group (excluding those without children). The dependent variables (y) include a series of indicators equal to one if ATT income is above given multiples of the poverty threshold.

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,

$$y_{it} = \alpha + \sum_{j=t^0}^T \beta_j [I(t=j) \times \text{treat}_c] + \eta_{st} + \gamma_c + X_{it}\Phi + \varepsilon_{it}, \quad (2)$$

where t^0 is the first 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 . A coefficient of interest, β_j , is the difference between the treatment and control groups, in period j (relative to the omitted year¹⁴), 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.

The DD estimator naturally works well when there is a single treatment event. And while the 1993 expansion is the largest (and our focus), to fully utilize the variation in EITC policy over the longer period, we replace $(\text{post} \times \text{treat})$ in (1) with a “simulated” EITC that varies by tax year and number of children.¹⁵ The simulated EITC is a single variable that summarizes changes in the EITC schedule over time and within group (Appendix Figure 1, Figure 2). We calculate the simulated federal EITC in the following way: We begin with our sample of single women in tax year 1982, before the first major expansion in 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 the federal 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

¹⁴ We normalize to drop the coefficient for the year prior to the policy expansion, 1993 for OBRA 93.

¹⁵ This method of summarizing complex policy parameters has been used for other programs including Medicaid (Brown et al. 2014, 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, Milligan and Stabile 2011).

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 (and varies by tax year and family size) without including changes in benefits due to family labor supply decisions.¹⁶

Equation (1), modified for the simulated EITC, is

$$y_{it} = \alpha + \beta \overline{\text{SIMEITC}}_{ct} + \eta_{st} + \gamma_c + X_{it}\Phi + \varepsilon_{it}, \quad (3)$$

where $\overline{\text{SIMEITC}}_{ct}$ is the simulated EITC, and captures the average generosity of the credit for family size c in tax year t . Equation (3) 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. As with the OBRA 93 DD model, this approach (a “parametrized difference in difference”) relies on identification at the tax year by family size level.

Each of these approaches rely on variation at the family size (number of children) by year level. Our most direct test of the validity of our approach comes from the event time estimates. This approach allows us to explicitly examine the validity of the control group by examining differences in pre-trends across groups. Additionally, across the models, we test the robustness of our findings by introducing a rich set of controls (we call this our “conservative controls”) that vary by year and family size, our unit of identifying variation.¹⁷ We control for generosity of cash welfare policies by using a simulated measure of AFDC and TANF benefits calculated 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

¹⁶ To be clear, 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.

¹⁷ See data appendix for more details regarding the construction of these controls.

also include an indicator equal to one if a particular state had any type of welfare waiver in a particular year and allow the coefficient to differ depending on the number of children.¹⁸ To account for other changes in the tax code, we include simulated income taxes before credits (which includes state taxes and varies by state, tax year and family size). Finally, local labor market conditions may play an important role; our conservative controls include state-level unemployment rates interacted with number of children. This amounts to adding variables Z_{cst} and $Z_{st} \times treat_c$ to the models in (1), (2) and (3). In addition, our approach relies on the assumption that women are not changing their fertility in response to this incentive. 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 tax may be correlated with the timing of childbirth, but only within a short window of a few weeks. Taken together, the evidence suggests that the EITC does little to modify fertility behavior.

The reduced form estimates from equations (1) and (3) are not directly comparable; one is a simple DD and the other parametrizes the changes in the credit over time. To make comparisons across specifications easier, we rescale our reduced-form estimates. We estimate a first stage using equations (1) and (3) but change the outcome (y_{it}) to the federal EITC, calculated using observed individual taxpayer information (including income). Dividing the reduced form equations (1) and (3) by this first stage (indirect least squares) reinterprets the effect in terms of policy-driven increases in federal EITC dollars. We can then divide the indirect

¹⁸ When estimating the model comparing single women with children to women without children, we include the main effect for the control and the control interacted with a dummy for having one or more children (the treatment). When estimating the model comparing single women with two or more children to women with one child, we include the main effect for the control and the control interacted with a dummy for having two or more children (the treatment).

least squares estimate by the dependent mean to get a percent impact. We also calculate an “extensive margin elasticity” to compare estimates across specifications and with estimates in the literature (Chetty, Guren, Manoli and Weber 2013).¹⁹

6. Main Results

We first present estimates of the difference-in-difference model using the variation induced by OBRA 93, following equation (1), where the outcome variable (y_{it}) is a dummy equal to one if a woman’s ATT income is above a given multiple of the federal poverty threshold. Here we examine estimates for income above 100 percent of poverty; below we consider effects more comprehensively on the distribution of income (from 25 percent of poverty to 500 percent of poverty).

This is a reduced form approach and captures the overall effect of the change in policy on the treated relative to the control group. The estimates capture the full behavioral effect of the EITC including the direct effect of the credit as well as the indirect effect through changes to earnings and other income. To illustrate the extent of the 1993 expansion, Appendix Figure 4 plots the 1993 and 1996 EITC schedules (in real dollars) for the 1 child (panel A) and 2 or more children (panel B) families. The figure shows that for one child families the expansion was primarily one of increases in benefits, with a stable eligibility range. For families with two or more children, there was a substantial increase in both eligibility and maximum benefits. The vertical lines on Appendix Figure 4 indicate various multiples of the poverty threshold (50%, 100%, 150%); this illustrates the large changes around 100% poverty, validating why we would expect to find effects in this income range.

Table 1 presents the OBRA 93 difference-in-difference estimates. The first three columns

¹⁹ See data appendix for more details regarding the calculation of the extensive margin elasticity.

define the treatment group as single women with one or more children (compared to the control with no children). The second three columns limit the sample to single mothers and compare women with two or more children (the treatment group) to women with one child (the control group). The first specification is the unconditional difference in difference, essentially giving the parameter estimate for the raw data presented in Figure 3a. We then present the conditional difference-in-difference (equation 1), both with and without conservative control set.

Relative to single women without children, the unconditional DD shows that single women with children experienced an increase in the share with ATT income above the poverty threshold of 8.8 percentage points with OBRA 93 (column 1). The conditional DD adding demographics and state x year fixed effects reduces the estimate to 7.0 percentage points. Adding the conservative controls (column 3) changes the estimate slightly to 7.4 percentage points. To rescale these reduced form estimates, we normalize the DD estimates by the magnitude of the EITC treatment. Using the estimates in column 2, the results imply that a \$1000 policy-induced increase in the EITC leads to an 8.4 percentage point increase in the propensity to have ATT income above poverty. If we utilize just the expansion across 1 versus 2 or more children, the unconditional DD (column 4) shows that the EITC expansion led to a 5.6 percentage point increase in the share with ATT income above 100% poverty. The conditional DD (column 5 and 6) shows that a \$1000 policy-induced increase in the EITC leads to a 5.4 to 6.6 percentage point increase in the propensity to have ATT income above poverty.²⁰

Tables 2 and 3 contain estimates of equation (3), in which we replace the traditional DD interaction with a simulated measure of the EITC. First, for comparison to the OBRA 93 DD estimates, Table 2 presents the parameterized difference-in-difference estimates for the same

²⁰ Appendix Table 3 contains the DD estimates for other levels of education. Estimates normalized by the first stage are generally similar to those for our preferred sample of single women with some college education or less.

period (1991-1998). Here we find percent impacts (per \$1000 in EITC) that are very similar to those from the DD specification (but are more precise). For example, when comparing single women with children to those with no children, the DD estimate (Table 1, column 2) shows that a policy-induced \$1000 increase in the EITC leads to an 8.4 percentage point increase in the share with ATT income above poverty for an extensive margin elasticity of 0.53 compared to a 7.2 percentage point increase and an elasticity of 0.46 for the parameterized DD results (Table 2, column 1).²¹

We can extend the parametrized DD analysis and the simulated EITC, utilizing the full period of policy expansions covering 1984-1998 (TRA86, OBRA90 and OBRA93). Table 3 contains the results where the dependent variable equals one if ATT income is above 100% of the federal poverty threshold. The results show that a \$1000 increase in policy-induced EITC income leads to a 6.7 percentage point (for children versus no children) to 6.6 percentage point increase (for 2 children versus 1 child) in the propensity to have ATT income above poverty. (The results are little changed by adding the conservative controls.) Looking back at Table 1, these estimates are very similar to the difference-in-difference estimates for OBRA 93.

Overall the results in Tables 1-3 show that our estimates of the effects of the EITC on the share with ATT income above 100% poverty are remarkably stable across groups, over time, whether we use the base or conservative control set and whether we use a DD or parameterized DD model. Additionally, Appendix Table 5 shows that the results are robust to adjusting our sample selection criteria around age, disability and school status and education level.

We now turn to the estimates from equation (2), the event time model (estimated without

²¹ 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 4 contains estimates that use the 1993 CPS to construct the simulated EITC, and finds similar results.

conservative controls) where the dependent variable is equal to one if ATT income exceeds 100% of the poverty threshold. Figure 4a plots the coefficients and 95 percent confidence intervals for the model where the treatment group is composed of those with children. The graph also displays the change in the real average maximum credit for those with children relative to those without children (dashed line, right axis) to give some guidance as to how the EITC is changing over time and across group. Figure 4b 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 (for each the control is women without children). These event time figures show a sharp increase in the propensity to have ATT income above poverty beginning in 1994, with larger increases for women with two or more children. The increases follow the expansions in the EITC. Additionally, and importantly, the share above poverty prior to OBRA 93 is quite flat between the treatment and control, confirming the validity of the quasi-experimental design.²²

If we limit the sample to women with children and compare those with two or more children to those with one child, we can analyze the effects of OBRA 93 with a much longer (10 year) pre-period. As shown on Figure 2, the generosity of the EITC was virtually identical for all women with children, regardless of family size, for all years prior to 1993. The estimates of that event study, again applied to the propensity to have ATT income above 100 percent poverty, is plotted in Figure 5. Using 1984-1998, the estimates provide striking evidence that the share with ATT income above poverty increases sharply with the expansion of the EITC. Additionally, it is reassuring that there is no evidence of any differential trending in the treatment versus control group over this long pre-trend period.

The differential in the propensity to have ATT income above 100% of the federal poverty

²² When comparing women with children to women without children, we include only two years of pre data given that there was another expansion due to OBRA 90.

threshold has endured over time. Appendix Figures 5-7 estimate the event model for all available tax years (1984-2013) using three different designs (0 vs 1+ children, 0 vs 1 vs 2+ children, and 1 vs 2+ children). The results show that the propensity to have ATT income above poverty follows closely the changes in the EITC over time. Additionally, there has not been deterioration in the effects (e.g., the differences between groups) with the weak labor market of the 2000s.

These DD and event study results show robust evidence that expansions in the EITC lead to economically and statistically significant increases in the propensity to have income above 100% poverty. These large effects in part result from where in the income-to-poverty distribution the credit expansions took place (Appendix Figure 4) and the density of the distribution in those locations (Figure 1), as well as the underlying elasticities. To explore this more fully, we extend these results to examine the effect of the EITC comprehensively across the distribution of income. To do so, we estimate a series of DD models for OBRA 93 where the dependent variable is an indicator equal to one if after tax and transfer income is above a multiple of the poverty threshold. In particular, we estimate models as presented in Table 1 (for the share above 100 percent of the poverty threshold); we vary the threshold in 25 percentile bins from ATT income above 25 percent of poverty to ATT income above 500 percent of poverty. Figure 6 contains estimates in which we compare families with children to those without children. In the figure, each estimate (and 95 percent confidence interval) comes from a separate regression; we graph them together to illustrate the effects of the credit on the distribution of income. For example, consider the point for ATT income above 100 percent poverty plotted in Figure 6. The estimate, 0.07, is the same as that presented previously in Table 1—the interpretation is that OBRA 93 increased the propensity for single women with children to have ATT income above

the poverty threshold by 7 percentage points.²³ We overlay on the figure the difference-in-difference in the EITC credit at each of these income-to-poverty bins. Figure 7 presents estimates for those with two or more children compared to those with only one child.

These figures suggest several important findings. First, the EITC has little effect on the very lowest income groups: The EITC has a small and statistically insignificant effect at 50% or 25% of the poverty threshold. This may reflect that those in deep poverty and the very lowest income groups have little attachment to the labor market (Bitler and Hoynes 2015, Edin and Shaefer 2015). 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. The estimated effects decay and fall to zero by 200%-250% of poverty. These patterns of results are very consistent with expectations, based on the shape and location of the EITC schedule (relative to poverty thresholds), as illustrated by the overlay of the EITC policy changes on the figure. This concordance between our estimated impacts (capturing the direct and indirect effects of the credit) provides strong evidence that we are indeed capturing the causal effects of the EITC on the distribution of income. Further, and substantively, these are large effects and illustrate the potential for this important safety net policy to affect lower tail income inequality.

We extend these results by using the parametric DD model to estimate a series of coefficients where we vary the threshold in 25 percentile bins (from ATT income above 25 percent of poverty to ATT income above 500 percent of poverty). This allows for us to use data and expansions back to 1984. Figure 8 presents estimates for single women with 0 versus 1+ children (filled circles) and single women with 1 versus 2+children (open circles). As above, we combine the models and plot together the estimates (and 95 percent confidence intervals) across

²³ In each case we are plotting the coefficient on $\text{post} \times \text{treat}$ (as in equation 1); the estimates are not scaled as we want to illustrate the reduced form “program evaluation” of the credit, rather than the effect per dollar of treatment.

bins of income to poverty. These results confirm our earlier findings based on the OBRA93 expansion. We find no effect at the lowest levels of income (50% of poverty and below), large effects centered on 100% of poverty, and decaying effects going to zero by 250% of poverty. Appendix Figure 8 shows that the estimates are very similar with and without the conservative controls.

7. The Direct and Indirect Effects of the EITC on the Distribution of Income

As discussed above, highly cited figures on the antipoverty effects of the EITC are static estimates, capturing the direct effects of the credit but omitting the dynamic or indirect effects operating through labor supply, earnings and other income. Our results capture the total effects of the EITC encompassing the static and behavioral responses. Here, we apply these estimates to simulate the aggregate number of individuals and children who are raised above poverty from the EITC and compare the static and dynamic anti-poverty effects.

This analysis starts with our CPS sample of single women with children (ages 24-48, some college education or less, not in school or disabled) for calendar year 2012. We present the static calculation of the number of children (Figure 9a) and persons (Figure 9b) that the EITC removes from poverty (labeled “Static ATT poverty” in the figures). This is calculated by zeroing out the EITC credit, recalculating the poverty measure and, using the CPS weights, aggregating up the number of children (or total individuals) who are raised above poverty *assuming no other change in behavior* (hence the calculation is static). The figure shows that the direct effects of the EITC remove 1.1 million children from poverty.²⁴

²⁴ The 1.1 million is below the 3.4 million children that the EITC removed from poverty in 2012 that we cited in the introduction (and is based on our calculations using the SPM, following Short 2013). This difference has little to do with our ATT measure of poverty (1.1 million based on our ATT poverty is comparable to the 1.0 million if we used the SPM definition). Instead, this results from the fact that we are using a subsample – single mothers 24-48 with some college or less, not in school or disabled, along with their children. Despite the relatively high poverty rate in this group, our sample accounts for only about a third of poor children. The remainder of poor children are in single father headed families (8.4%), other single mother families (7.4%) and the remainder (54.4%) are in married couple

Also plotted in Figure 9 are aggregate counts of “ATT poverty with behavior.” These are based on estimates from our parameterized DD model extended to include data for calendar years 1984 to 2013 (estimates in Appendix Table 6). Using these estimates, we simulate the number of children (and all persons) lifted above the poverty threshold by predicting the model at the observed simulated EITC (for 2012) compared to the prediction with the simulated EITC zeroed out, added up using CPS weights (for details see the data appendix).

The results are dramatic. The number of children that the 2012 EITC raised above poverty increases from 1.1 million to 2.0 million when we incorporate the dynamic effects of the EITC. Similarly, the total number of individuals lifted above poverty by the 2012 EITC rises from 1.7 million to 2.8 million. Ignoring the indirect effects of the EITC underestimates the number of persons raised out of poverty by almost 50 percent.

These estimates imply that the indirect effects of the EITC – induced earnings net of any changes to other income – are large. To learn more about the indirect effect, in Table 4 we present DD estimates of the effects of OBRA 93 on sources of ATT income. The table compares single women with children to those without children and shows that, on average, earnings increase by over \$1000 (annual) and taxes are reduced by \$790 (a reduction in taxes is a net increase to after tax income). These earnings and EITC increases are reduced by the crowd-out of transfers: \$592 in cash welfare (AFDC/TANF), \$178 in SNAP, and an insignificant \$63 in other transfers.²⁵ As shown in earlier studies (e.g., Eissa and Liebman 1996, Meyer and Rosenbaum 2000, 2001, Grogger 2003) the earnings effect results from extensive margin

families. Despite the low poverty rates for married couples (6.7% compared to 28.6% for female headed, Short 2013) the fact that about three times as many children live in two versus one parent families aggregates to a large share of poor children. We return to this below. The static calculations, though, are only used here as a reference to compare to the calculations that incorporate the indirect or behavioral effects.

²⁵ Note that the estimate for ATT Income in column 7 does not equal the sum of the coefficients in columns 1-6. For space we do not report models for private transfers and other unearned income (e.g., asset income) yet this is included in ATT income.

responses to the EITC. We update and replicate those findings for our sample. Appendix Figure 9 shows the event time model, the base model without conservative controls, for any work during the year. The figures show large increases in employment for women with children compared to those without children, with larger increases for women with larger families (who experienced a larger increase in the EITC). The DD estimates (Appendix Table 7) indicate that the 1993 expansion led to a 6.1 percentage point increase in employment those with children compared to those without children and a 6.2 percentage point increase for those with two compared one child.

Returning to the static versus dynamic simulations in Figure 9, we extend the analysis by making similar calculations at other points in the income-to-poverty distribution. The results show significant underestimates of the effects of the EITC on the propensity to raise ATT income above not only 100% of poverty, but also at 150% and 200% of poverty.

Overall, these results suggest that the already sizable contribution to increasing income and reducing poverty attributed to the EITC is significantly understated when all of the program's incentives are taken into account.

A limitation of our analysis, however, is that the results apply to single mothers with less than a college degree. Given that three-quarters of EITC payments go to single parent families, it is not surprising that most of the literature studies single mothers. In extensions to our basic results, though, we estimate models for married couples. We limit the sample to couples where the woman is 24-48, not in school or disabled, and with a high school degree or less.²⁶ Appendix Table 8 shows the results for OBRA 93 DD and the parameterized DD for married couples. The

²⁶ Appendix Figure 3B shows the share of married couples with children eligible for the EITC, by education level. Overall, eligibility rates are much lower for married couples (compared to single mothers) and for this reason we use a lower education group to construct the sample. If we use a higher education level, some college or less, the event time figures suggest some concerns as to the validity of the control group.

DD results show that OBRA 93 led to a 2.2 percentage point increase in the share with ATT income above the poverty threshold (column 1). With the conservative controls, the results are statistically insignificant. The parameterized DD estimates show that a \$1000 increase in EITC leads to a 3.8-4.8 percentage point increase in the share above 100% poverty. This is about half the size of the effect for single mothers (Appendix Table 6). The smaller effect is not due to lower EITC eligibility as the “per \$1000 of EITC” is a treatment on the treated estimate. Instead it derives from a much smaller induced earnings effect.²⁷ Interestingly, there is also less crowdout of other transfers for married couples as they had little access to cash welfare prior to welfare reform. Using these results, and pooling single and married couples with children, we find that the EITC removes 1.8 million children from poverty (static) compared to 3.1 million accounting for the behavioral changes. This implies that the static calculation underestimates the full effect by about 40 percent.

8. Conclusion

In this paper we examine the effects of the federal EITC on the distribution of income relative to poverty. We use a quasi-experimental research design that leverages the variation in the generosity of the EITC across family sizes and over time. Our approach quantifies the effects on pre-tax income as well as the direct effect of the credit. We analyze the effects for single women with less than a college education.

We find that a \$1000 policy-induced increase in the EITC leads to an 8.4 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

²⁷ In fact, if we limit the sample further to married couples with less than a high school degree (Eissa and Hoynes 2004), the extensive margin labor supply response for married women is negative (as found by Eissa and Hoynes).

reform, and labor market conditions; all allowed to vary by family size (our identifying variation). They are also robust to using tax-policy driven reforms across single women with and without children, as well as single women with one versus two or more children and whether we use the sharp changes in the 1993 EITC expansion or policy changes back to the 1986 Tax Reform Act.

Furthermore, 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. Importantly, by capturing the indirect effects of the credit on earnings, our results show that static calculations of the anti-poverty effects of the EITC (such as those released based on the Supplemental Poverty Measure) may be underestimated by as much as 50 percent.

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 reduce lower-tail inequality, raise family income, and move families out of poverty. These findings on how the EITC affects the level and composition of income is also highly relevant for the recent literature estimating the “downstream” effects of the EITC on health (Evans and Garthwaite 2014, Hoynes et al. 2015, Strully et al. 2010), children’s cognitive outcomes (Dahl and Lochner 2012, Chetty, Friedman, and Rockoff 2011) and educational attainment (Bastian and Michelmore 2015, Maxfield 2013, Manoli and Turner 2014).

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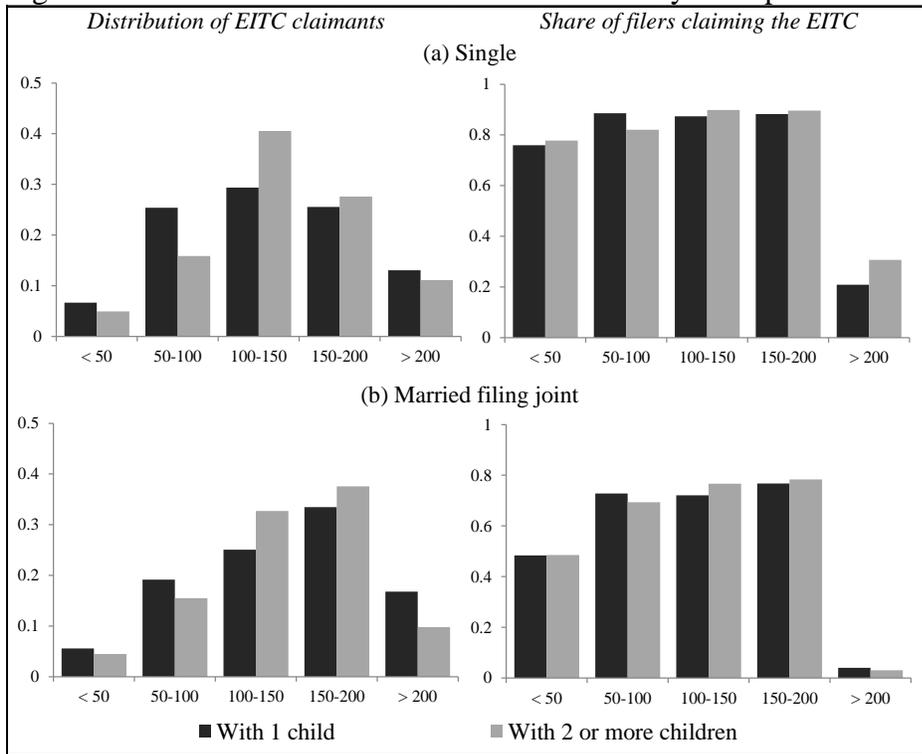
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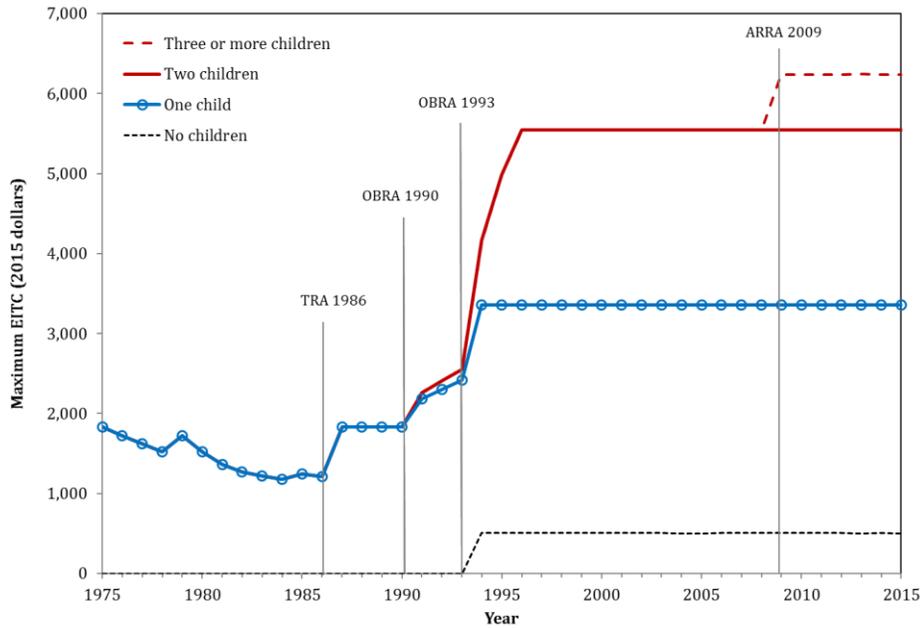
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Figure 1: Tax filers with Children & EITC Claims by Multiples of the Federal Poverty Threshold



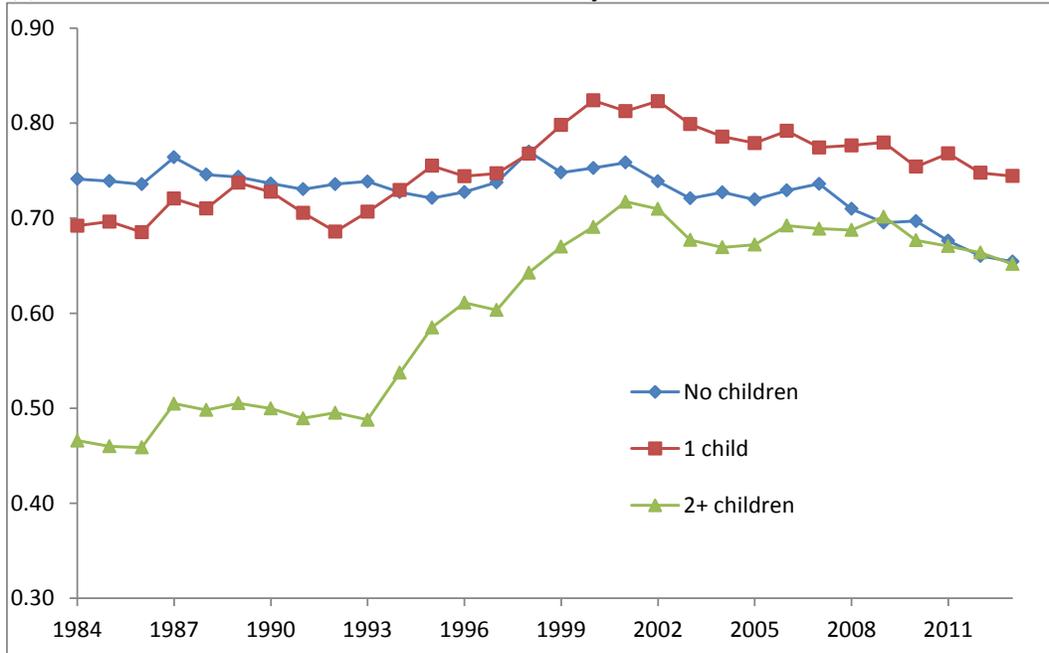
Notes: Source is the Statistics of Income Complete Report File for 2011 and federal poverty thresholds (U.S. Department of Census, 2016). The file is a 1 in 10,000 sample of tax returns from tax year 2011. After tax income is computed as total income less taxes plus payments. Payroll taxes are imputed using total wages and filing status.

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

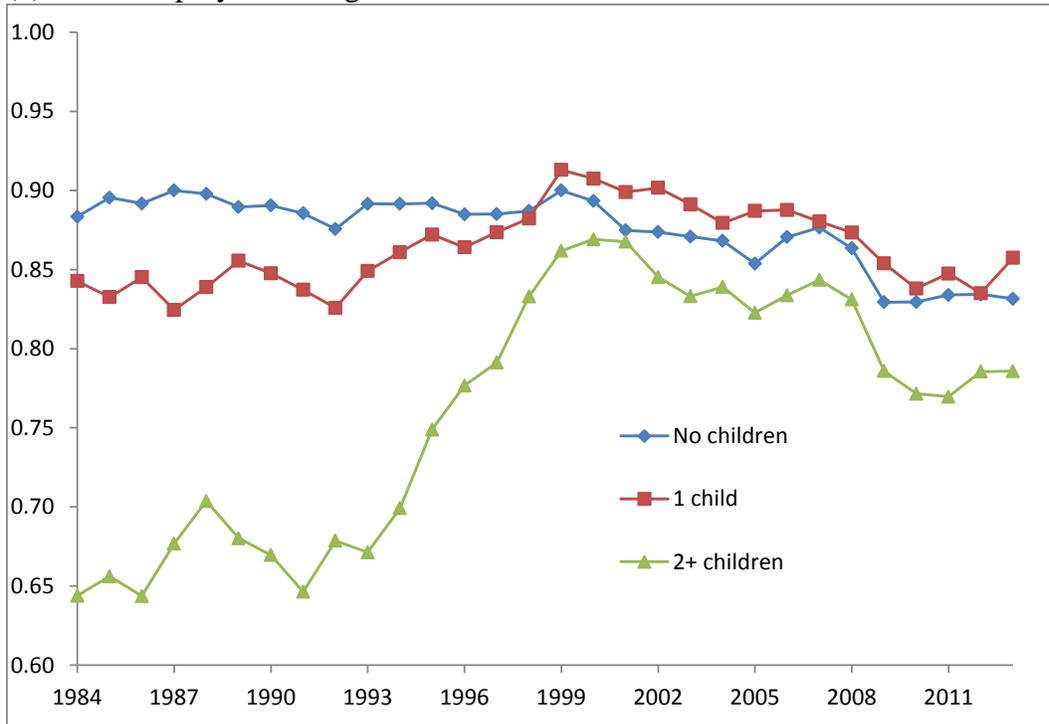


Notes: Tax Policy Center (2016).

Figure 3: Poverty and Employment by Family Size
 (a) Share with ATT Income Above the Poverty Threshold



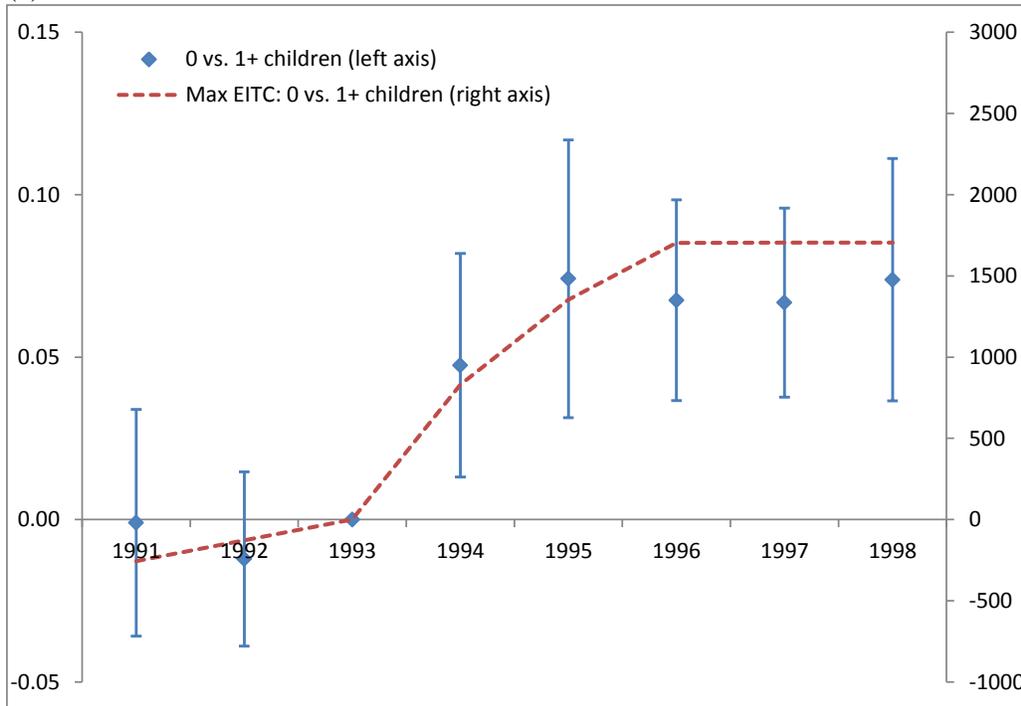
(b) Share Employed During the Calendar Year



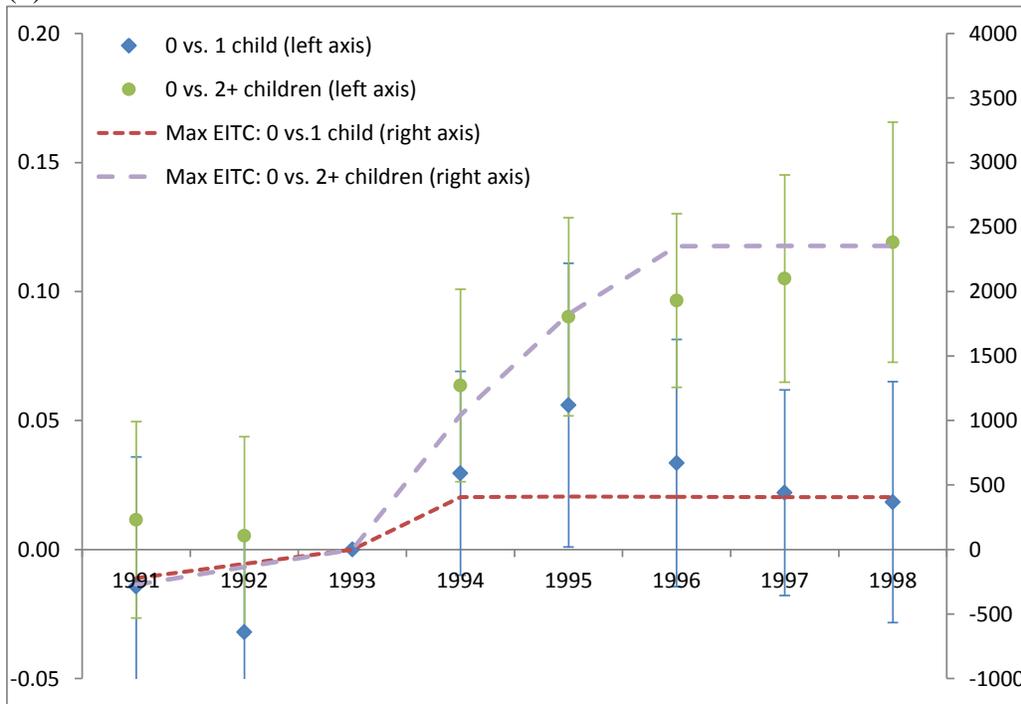
Notes: 1985-2014 CPS, single women, 24-48 years old, with some college education or less.

Figure 4: Event Time Model Estimates of OBRA 93 on ATT Income Above 100% of the Poverty Threshold

(a) 0 vs. 1+ Children

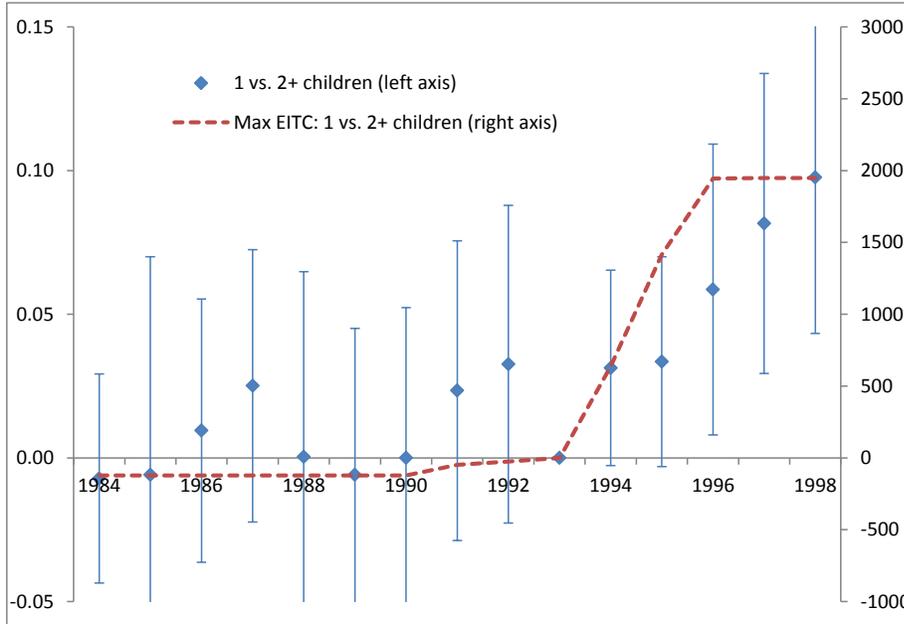


(b) 1 vs. 2+ Children



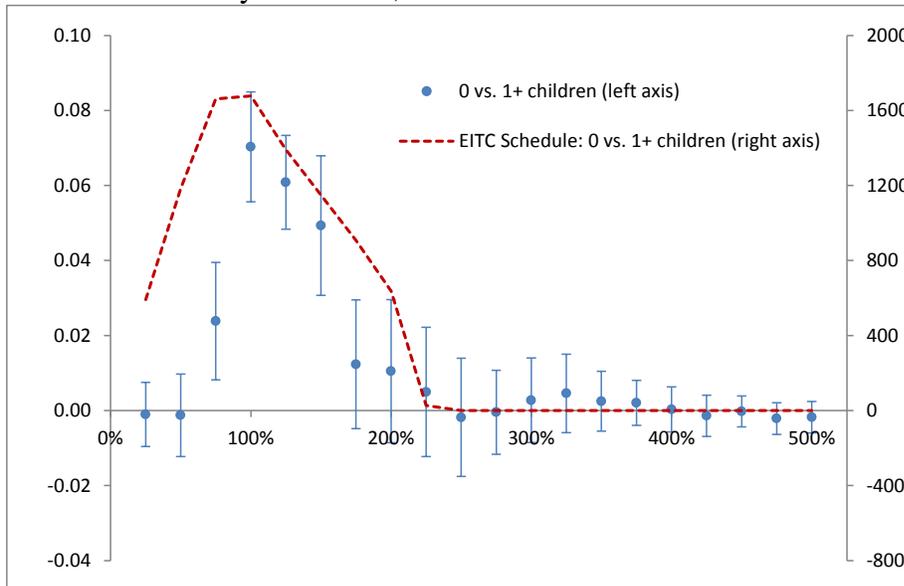
Notes: The sample includes single women, ages 24 through 48 with some college education or less from the 1992 through 1999 Current Population Survey (March). See equation (2) in text and data appendix for details. 95% confidence intervals clustered on state.

Figure 5: Event Model Estimates of OBRA 93 on ATT Income Above 100% of the Poverty Threshold, 1 vs 2+ Children



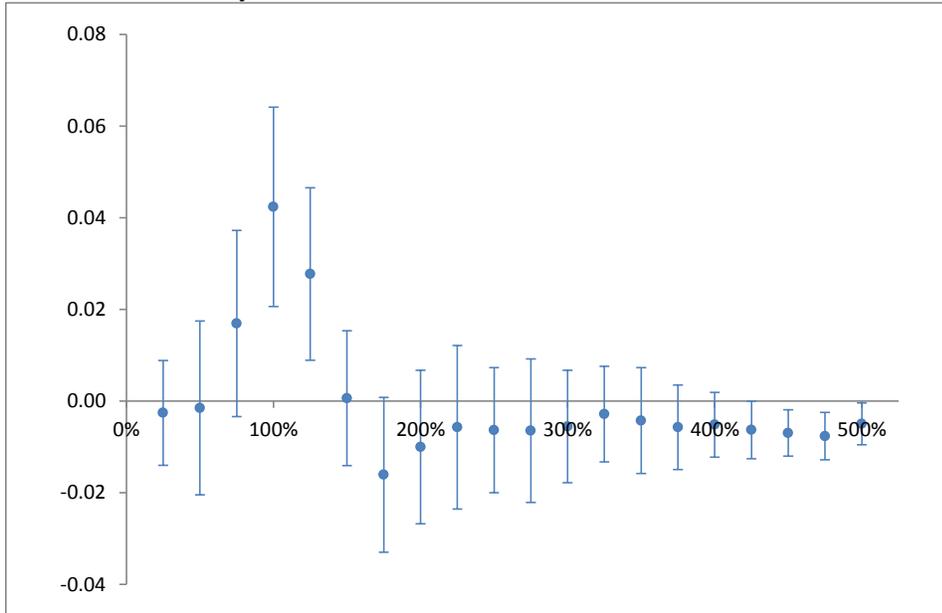
Notes: The sample includes single women with children, ages 24 through 48 with some college education or less from the 1985 through 1999 Current Population Survey (March). See equation (2) in text and data appendix for details. 95% confidence intervals clustered on state.

Figure 6: Difference-in-difference Estimates of OBRA 93 on ATT Income Above Multiples of the Federal Poverty Threshold, 0 vs 1+ Children



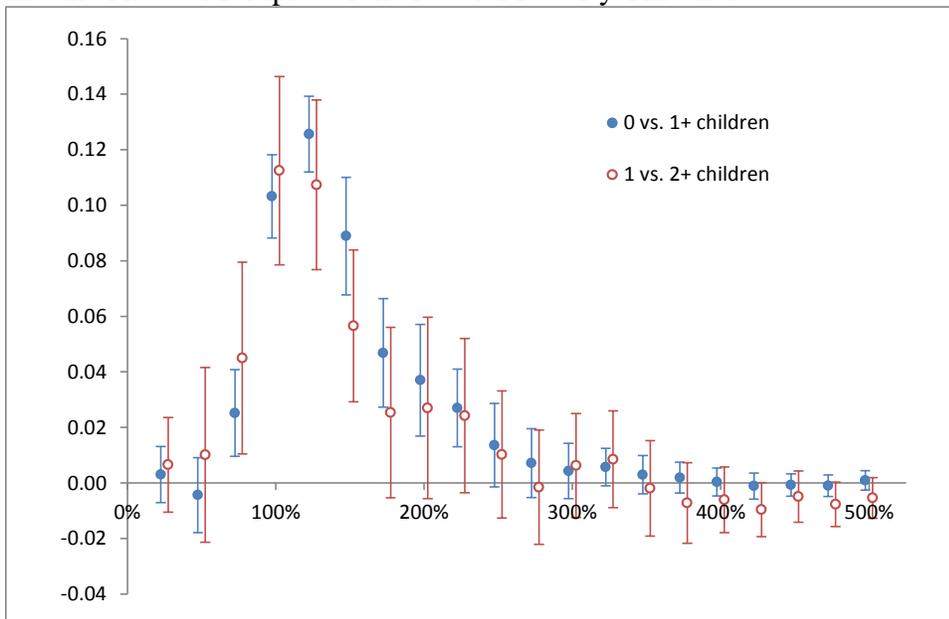
Notes: The sample includes single women, ages 24 through 48 with some college education or less from the 1992 through 1999 Current Population Survey (March). Each dot and whisker represents a single regression estimate and confidence interval. See equation (1) in text and data appendix for details. 95% confidence intervals clustered on state. The dashed line is the weighted change in EITC benefits for families with children versus those without children across the OBRA 93 expansion.

Figure 7: Difference-in-difference Estimates of OBRA 93 on ATT Income Above 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 or less 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. 95% confidence intervals clustered on state.

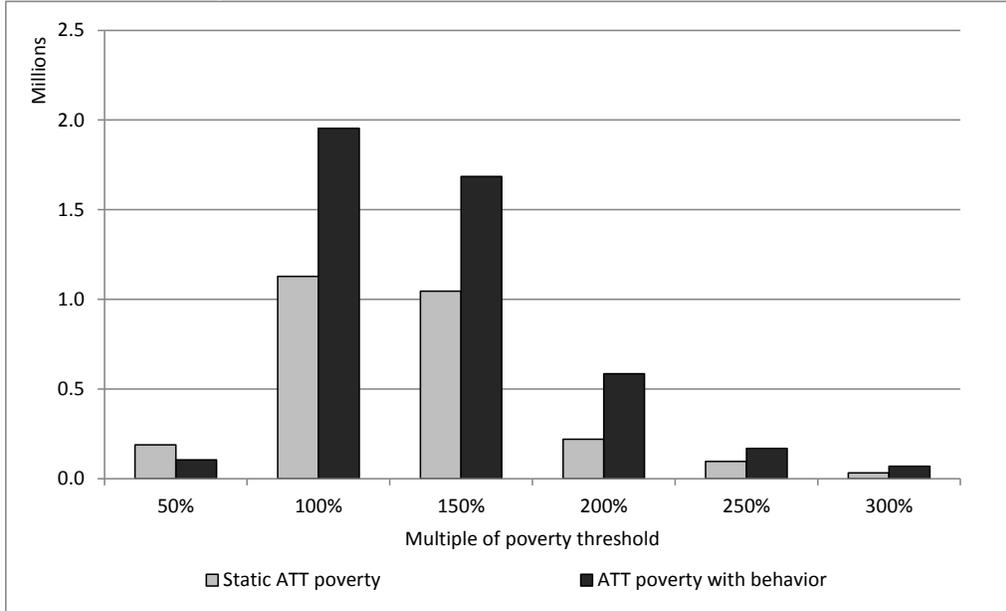
Figure 8: Parameterized DD Estimates of TRA86, OBRA90 and OBRA93 on ATT Income Above Multiples of the Federal Poverty Threshold



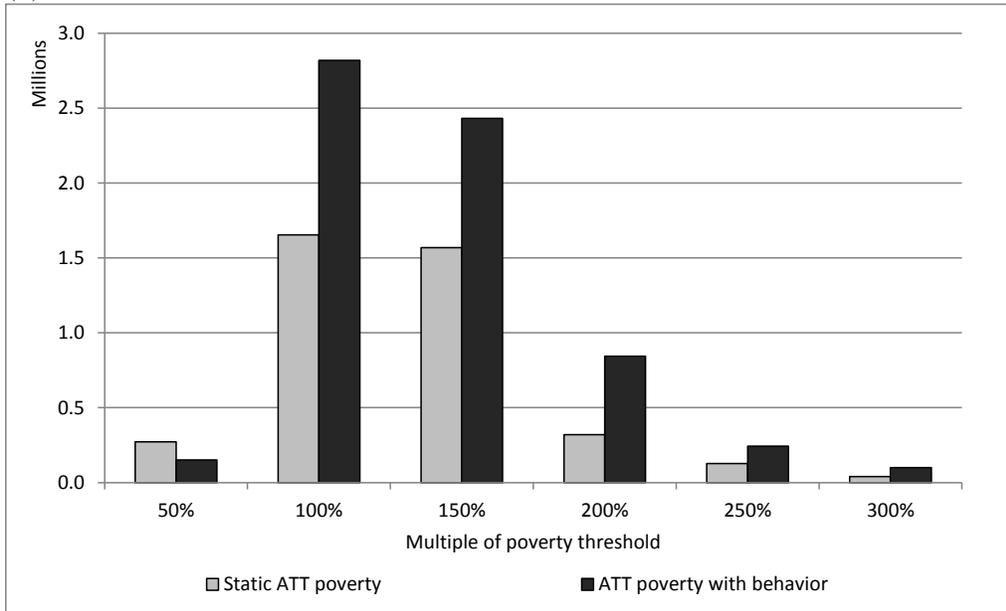
Notes: The sample includes single women, ages 24 through 48 with some college education or less from the 1985 through 1999 Current Population Survey (March). Each dot and whisker represents a single regression estimate and confidence interval. Simulated EITC constructed from 1983 CPS and TAXSIM. See equation (3) in text and data appendix for details. 95% confidence intervals clustered on state.

Figure 9: The Effect of the EITC on the Aggregate Number of Individuals Above Multiples of the Federal Poverty Threshold, 2012

(a) Children Only



(b) All Individuals



Notes: Counts include all children (a) or individuals (b) within families with a single female parent whose age is between 24 and 48 with some college education or less from the 2013 Current Population Survey (March, corresponds to the 2012 calendar year). Each column represents the difference between including and removing the EITC from an aggregate poverty calculation. “Static ATT poverty” excludes the EITC from after tax and income when calculating poverty status. “ATT poverty with behavior” uses fitted values from a regression estimating the effects of the EITC on poverty status (see data appendix for details).

Table 1: Difference-in-Difference Estimates of OBRA93 on ATT Income Above 100% of the Federal Poverty Threshold

Model:	0 vs. 1+ Children			1 vs. 2+ Children		
(Year > 1993) * (1+ children)	0.088*** (0.01)	0.070*** (0.01)	0.074*** (0.01)			
(Year > 1993) * (2+ children)				0.056*** (0.01)	0.042*** (0.01)	0.028* (0.01)
Per \$1000 of federal EITC	0.105	0.084	0.118	0.070	0.054	0.066
% impact	15.1%	12.2%	17.0%	10.9%	8.4%	10.3%
Extensive margin elasticity	0.65	0.53	0.72	0.54	0.42	0.51
Observations	50,508	50,508	50,508	25,101	25,101	25,101
Mean of the dependent variable	0.692	0.692	0.692	0.640	0.640	0.640
Controls						
Treatment (1+, 2+ children)	X			X		
Post (year > 1993)	X			X		
Demographics		X	X		X	X
# of children 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 or less 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 2: Parameterized DD Estimates of OBRA93 on ATT Income Above 100% of the Federal Poverty Threshold

Model:	0 vs. 1+ Children		1 vs. 2+ Children	
Simulated EITC (\$1,000)	0.125*** (0.01)	0.120*** (0.02)	0.096*** (0.02)	0.081** (0.03)
Per \$1000 of federal EITC	0.072	0.080	0.054	0.064
% impact	10.4%	11.6%	8.5%	10.0%
Extensive margin elasticity	0.46	0.51	0.43	0.50
Observations	50,508	50,508	25,101	25,101
Mean of the dependent variable	0.692	0.692	0.640	0.640
Controls				
Demographics	X	X	X	X
# of children 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 or less 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 3: Parameterized DD Estimates of TRA86, OBRA90 and OBRA93 on ATT Income Above 100% of the Federal Poverty Threshold

Model:	0 vs. 1+ Children		1 vs. 2+ Children	
Simulated EITC (\$1,000)	0.103*** (0.01)	0.105*** (0.01)	0.112*** (0.02)	0.094*** (0.02)
Per \$1000 of federal EITC	0.067	0.072	0.066	0.063
% impact	9.8%	10.5%	10.7%	10.3%
Extensive margin elasticity	0.43	0.46	0.51	0.49
Observations	96,204	96,204	47,215	47,215
Mean of the dependent variable	0.683	0.683	0.617	0.617
Controls				
Demographics	X	X	X	X
# of children 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 or less from the 1985 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 TRA86, OBRA90 and OBRA93 on ATT Income Above 100% of the Federal Poverty Threshold

	Earnings	Other labor income	Cash welfare	SNAP	Other Transfers	Taxes	ATT Income
	No children versus 1+ Children						
(Year > 1993) * (1+ children)	\$1,110*** (372)	-\$98 (126)	-\$592*** (61)	-\$178*** (36)	-\$63 (73)	-\$790*** (163)	\$1,138*** (270)
Per \$1000 of federal EITC	\$1,330	-\$117	-\$709	-\$213	-\$76	-\$946	\$1,364
% impact	5.3%	-17.2%	-82.1%	-37.2%	-7.0%	-15.1%	5.7%
Observations	50,508	50,508	50,508	50,508	50,508	50,508	50,508
Mean of the dependent variable	\$24,904	\$683	\$864	\$572	\$1,072	\$6,249	\$23,756
Controls							
Demographics	X	X	X	X	X	X	X
# of children indicators	X	X	X	X	X	X	X
State * year indicators	X	X	X	X	X	X	X

Notes: The sample includes single women, ages 24 through 48 with some college education or less 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 FOR

Effective Policy for Reducing Inequality: The Earned Income Tax Credit and the Distribution of Income

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November 2016

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 2014 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, creating ambiguity on who is subject to the credit. We drop women who did not work during the previous year because of illness, disability or school enrollment. We drop those living in Hawaii or Alaska.¹

For the main analysis, we restrict to those with some college or less.² In contrast, 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 3 plots the share of families that are eligible for the federal EITC by maternal education group. Those with some college experience exhibit a pattern of EITC eligibility that is similar to those with lower education levels.³

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, school lunch, housing and energy 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.⁴ 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 (our main sample age range). A qualified child is defined as under the age of 18 or between 19 and 23 and in school.⁵ 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.

¹ Appendix Table 5 relaxes some of these restrictions.

² 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.

³ See Appendix Table 3 for DD estimates that include women of different education levels.

⁴ In some years, the CPS does contain calculated income taxes, but not enough for our analysis.

⁵ 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, have a valid social security number, and must not be claimed as a dependent by another taxpayer (IRS 2016).

For example, suppose a household contains 3 individuals: a 25-year old mother, her infant child, and the child's 47-year old grandmother. We define the 25-year old mother as the primary tax filer, with one eligible child. If instead the mother was 17 years old, then the 47-year old grandmother is assigned as the primary tax filer, with two EITC eligible children.

Income information is aggregated up to the level of this tax unit. Using these tax units, we use TAXSIM to calculate income and payroll taxes. We assume that these tax units take the standard deduction⁶, are fully compliant and take up the EITC if eligible.⁷ 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 federal and state income taxes as well as payroll taxes. We do not adjust after-tax and transfer income for non-cash benefits such as the fungible value of Medicaid or Medicare.⁸

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, τ 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 , τ , 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 fixed family information to calculate the benefit, and then collapse to the cell level (state, year, family size).

⁶ Among those most likely to receive a refundable credit, the share itemizing deductions is very small (Toder and Baneman 2012).

⁷ 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).

⁸ A complete record of what we include, and do not include, in our measure of after tax and transfer income can be found in Appendix Table 1. In addition, Appendix Table 1 also documents the subset of income sources used to compute Official Poverty.

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 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. 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 is allowed to vary by family size (either no children versus 1 or more 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.⁹

Nominal dollars are converted to real dollars using the annual CPI-U.¹⁰

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 (indirect least squares). In this first stage, the RHS remains exactly the same as the reduced form, but the dependent variable is 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 β^{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

⁹ December 13, 2014: <https://www.census.gov/hhes/www/poverty/data/threshld/thresh93.html>

¹⁰ Consumer Price Index – All Urban Consumers, series CUUR0000SA0, US city average, all items, chained to 1982-84, annual (BLS 2014).

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 working induced by the EITC. We modify this elasticity for use with poverty rates. In particular, 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. The result is an elasticity measuring tax unit movement out of poverty due to EITC induced changes in after tax and transfer income.

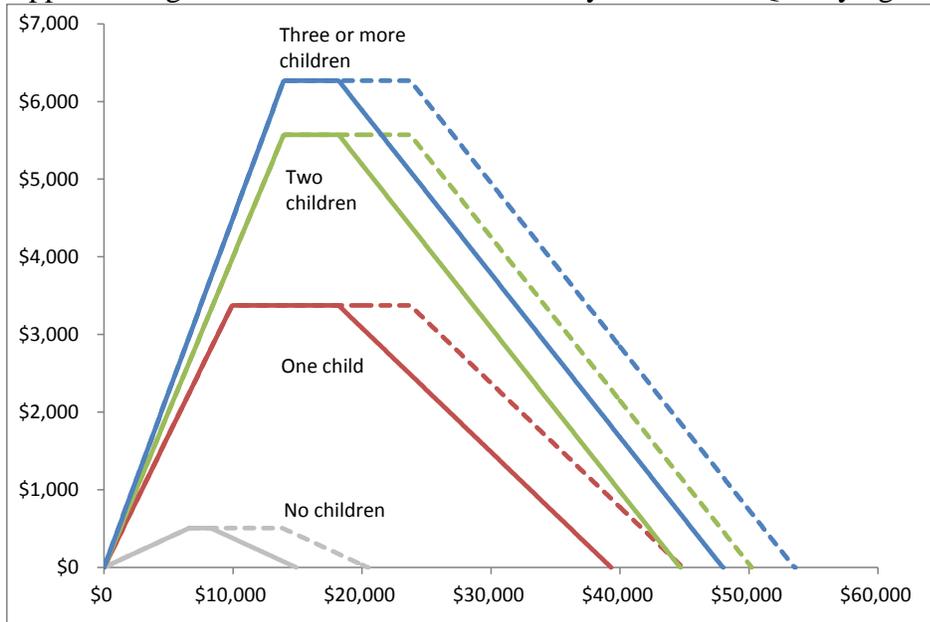
In section 7, we use three measures of poverty to estimate the aggregate number of individuals and children who are above federal poverty threshold multiples (50%, 100%, 150% and 200%). We determine after tax and transfer income poverty status with the EITC and without the EITC, using family-level variables to calculate the EITC and the appropriate federal poverty threshold. We aggregate using the appropriate weights (all individuals, or just children) and subtract to calculate the number who move across a poverty threshold due to the EITC. We do this for each multiple of the federal poverty threshold. Next, we integrate our estimates into a measure of poverty, “ATTI poverty with behavior,” in the following way: First, we extend the parameterized difference-in-difference model (equation 3) to include all tax years between 1984 and 2013. The outcome is equal to one if a family’s after-tax and transfer income is above a multiple of the poverty threshold. We use the conservative control set, which includes controls for business cycles and other tax and transfer programs (such as those used in column 2 of table 3). Second, we predict fitted values with and without the simulated EITC. By excluding the measure of EITC policy expansions, we predict the probability a family is above a poverty threshold in a world without the EITC, based on observable characteristics. Finally, we multiply the average share of the fitted values in both scenarios by the appropriate weights and take the difference.

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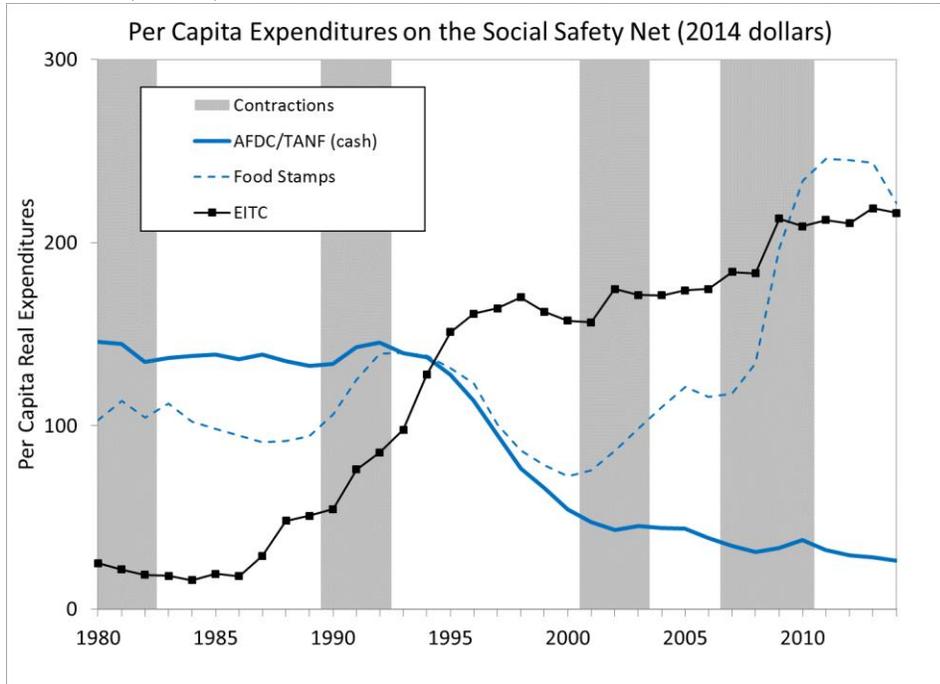
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Appendix Figure 1: Federal EITC Schedule by Number of Qualifying Children, 2016



Notes: Tax Policy Center (2016), 2016\$. Solid lines correspond to taxpayers filing single. Dotted lines correspond to taxpayers filing joint returns.

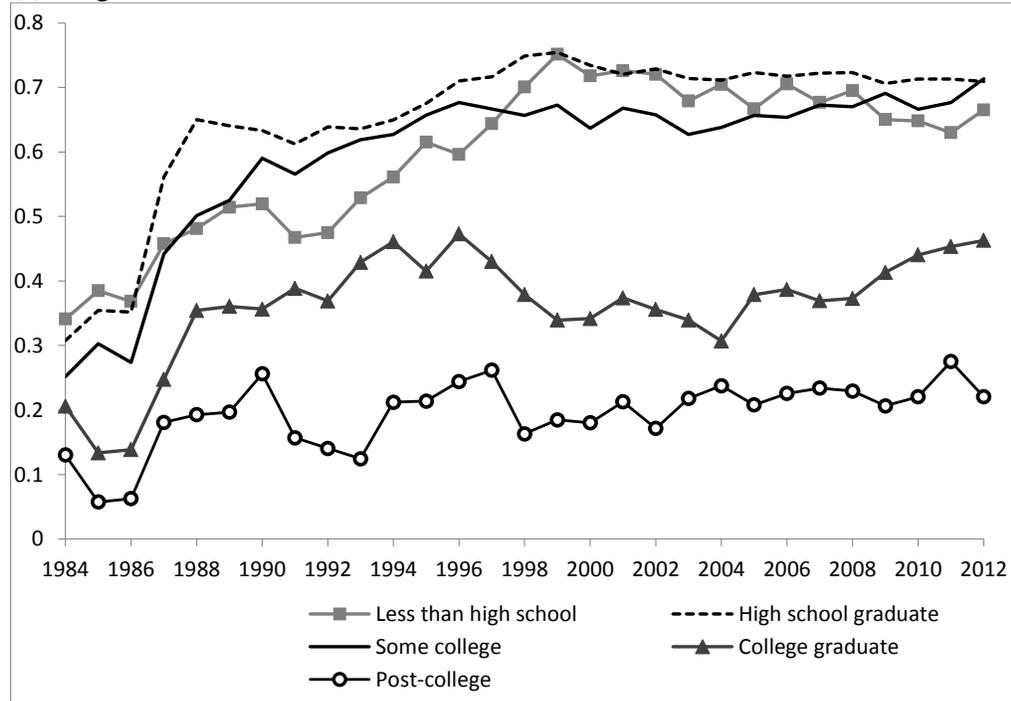
Appendix Figure 2: Per Capita Expenditures on Cash and Near Cash Transfer Programs for Families (2014\$)



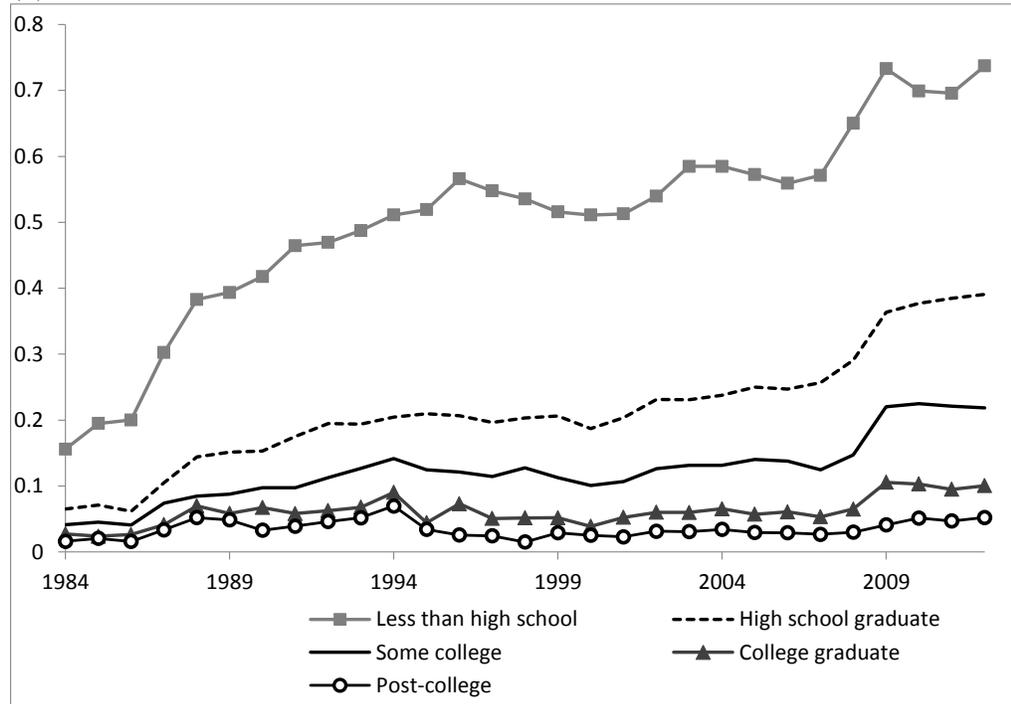
Notes: Bitler and Hoynes (2010), updated to include data through 2014.

Appendix Figure 3: Share EITC Eligible by Maternal Education Group

(a) Single Women with Children



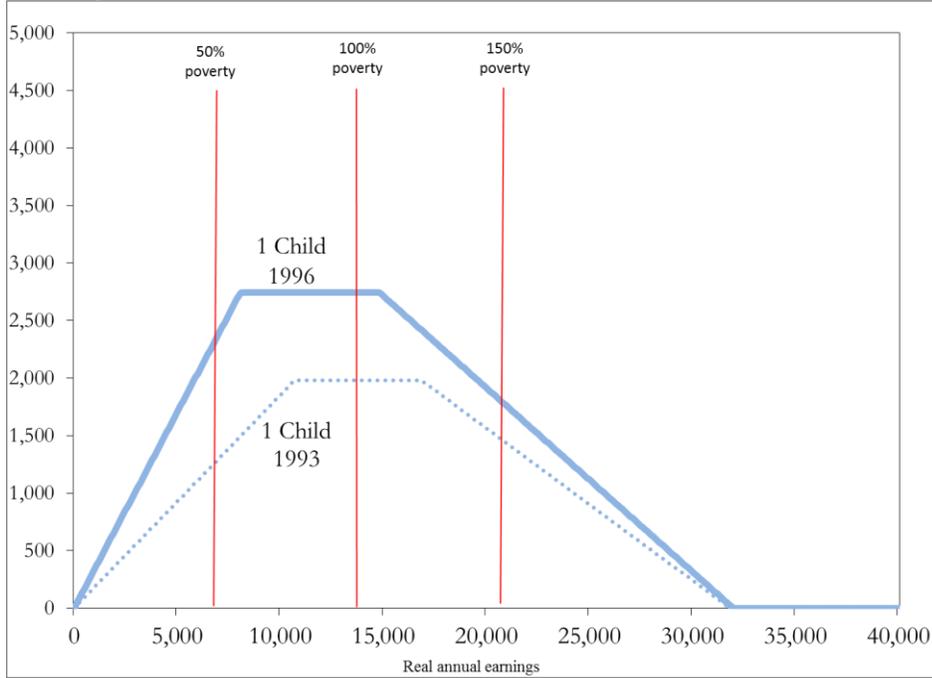
(b) Married Women with Children



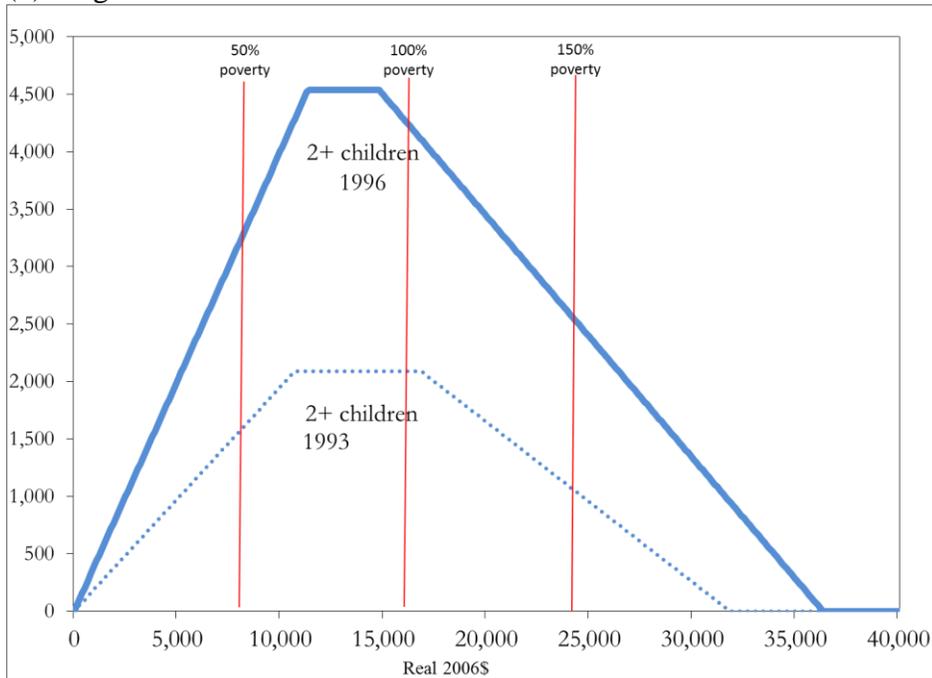
Notes: 1985-2014 CPS, women with children, 24-48 years old.

Appendix Figure 4: Federal EITC Schedule (1993, 1996) and Multiples of the Federal Poverty Threshold

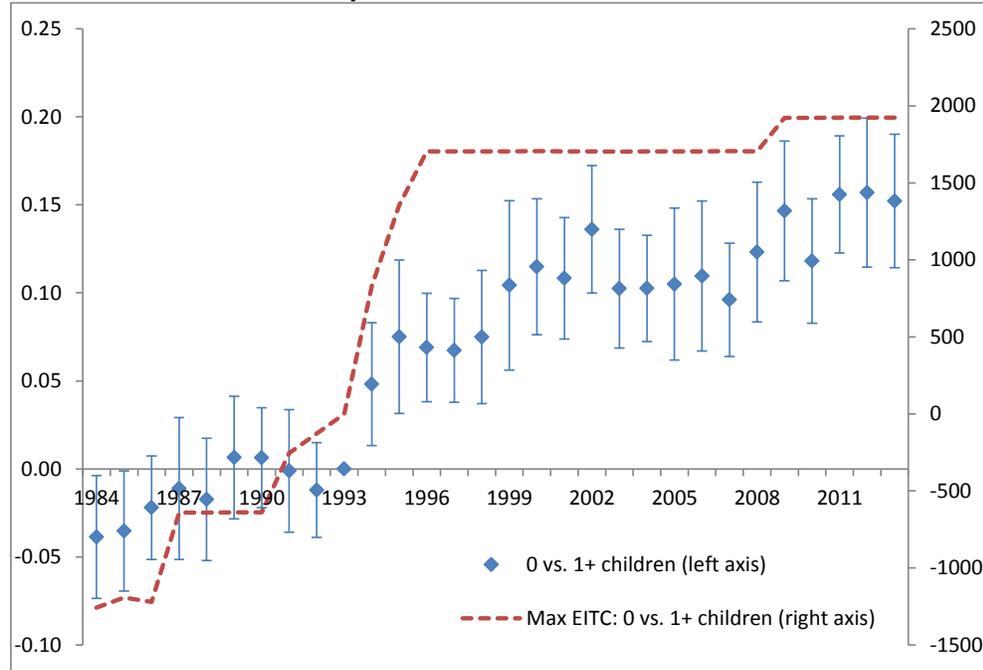
(a) Single Filers with One Child



(b) Single Filers with Two or More Children

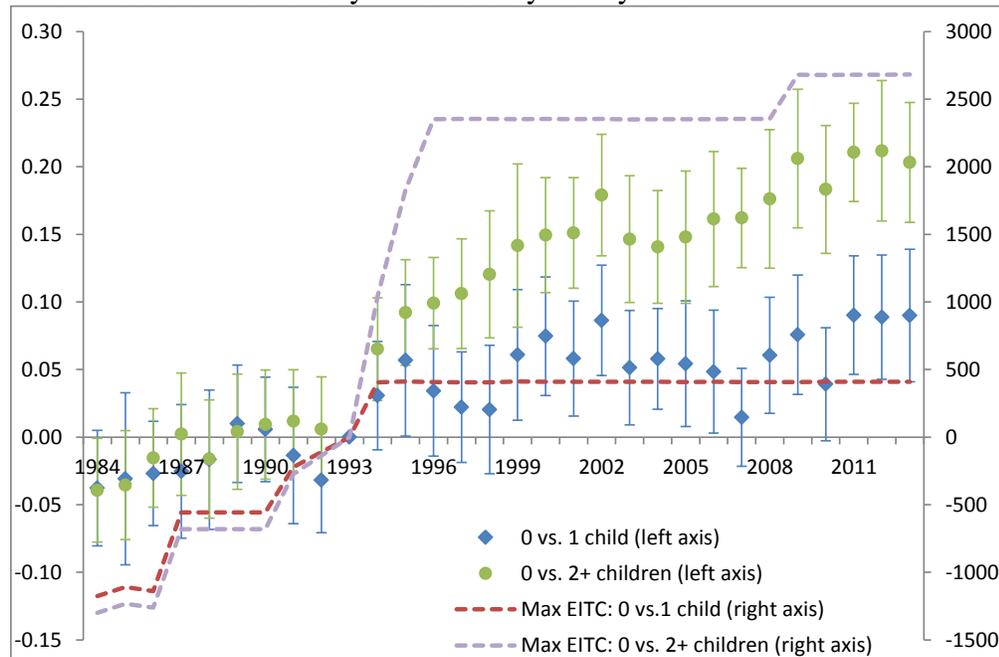


Appendix Figure 5: Event Model Estimates of TRA86, OBRA90 and OBRA93 on ATT Income Above 100% of the Poverty Threshold



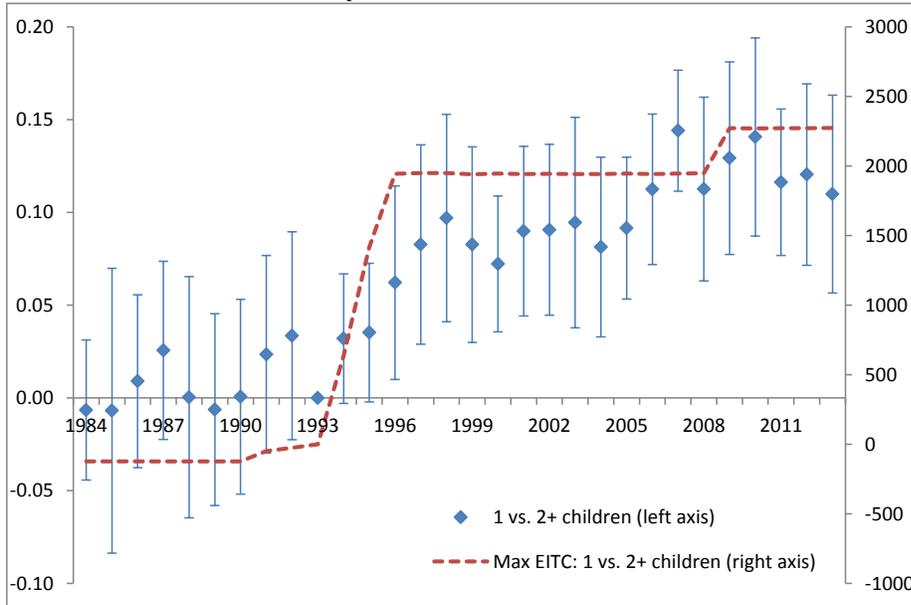
Notes: The sample includes single women, ages 24 through 48 with some college education or less from the 1985 through 2014 Current Population Survey (March). See equation (2) in text and data appendix for details. 95% confidence intervals clustered on state.

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



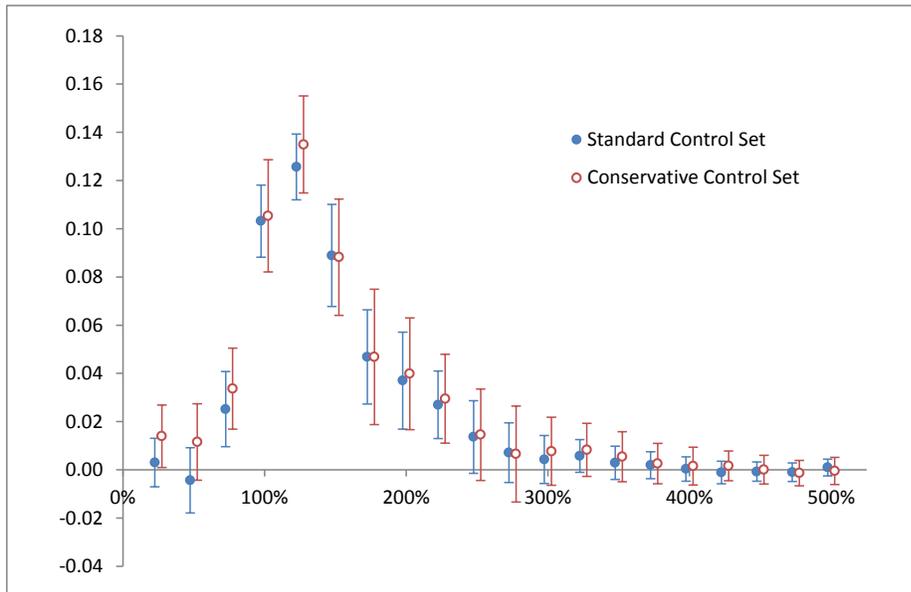
Notes: The sample includes single women, ages 24 through 48 with some college education or less from the 1985 through 2014 Current Population Survey (March). See equation (2) in text and data appendix for details. 95% confidence intervals clustered on state.

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



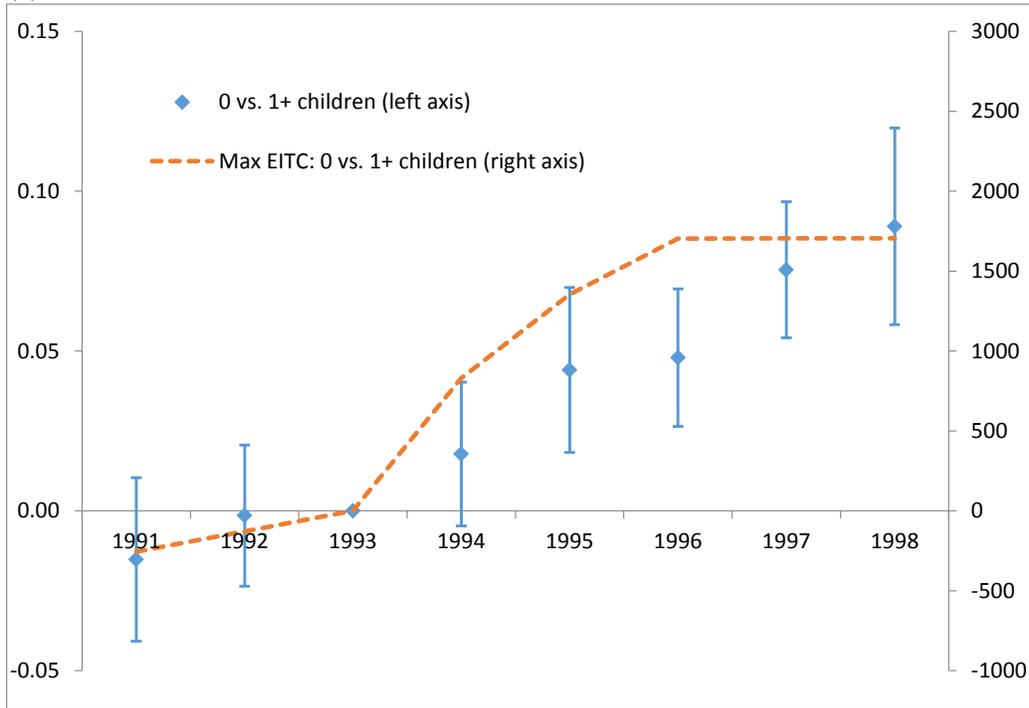
Notes: The sample includes single women with children, ages 24 through 48 with some college education or less from the 1985 through 2014 Current Population Survey (March). See equation (2) in text and data appendix for details. 95% confidence intervals clustered on state.

Appendix Figure 8: Parameterized DD Estimates of TRA86, OBRA90 and OBRA93 on ATT Income Above Multiples of the Federal Poverty Threshold, 0 vs. 1+ Children, with and without Conservative control set

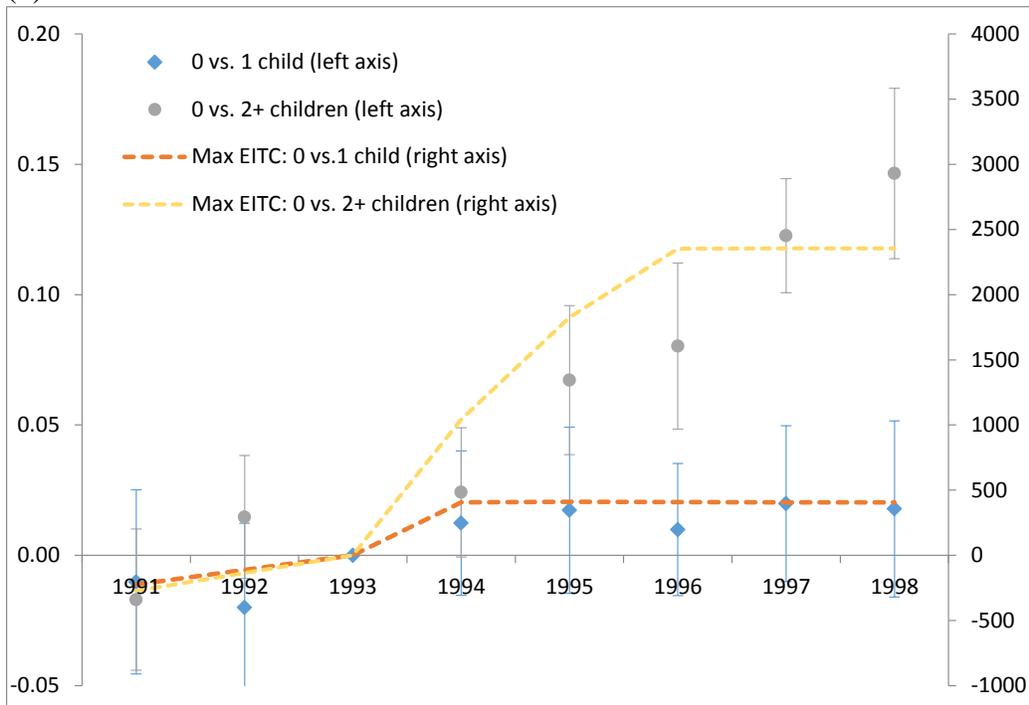


Notes: The sample includes single women, ages 24 through 48 with some college education or less from the 1985 through 1999 Current Population Survey (March). Each dot and whisker represents a single regression estimate and confidence interval. Simulated EITC constructed from 1983 CPS and TAXSIM. See equation (3) in text and data appendix for details. 95% confidence intervals clustered on state.

Appendix Figure 9: Event Time Model Estimates of OBRA 93 on Any Work During the Year
 (a) 0 vs. 1+ Children



(b) 1 vs. 2+ Children



Notes: The sample includes single women, ages 24 through 48 with some college education or less from the 1992 through 1999 Current Population Survey (March). See equation (2) in text and data appendix for details. 95% confidence intervals clustered on state.

Appendix Table 1: ATT Income Sources

	Resource measures	
	Official Poverty	ATT Poverty
<i>Private Income</i>		
Wages and salaries	X	X
Self-employment income	X	X
Farm income	X	X
Returns from assets	X	X
Child support and alimony	X	X
Private disability and retirement	X	X
<i>Transfers</i>		
AFDC/TANF	X	X
Social Security Ret. / SSDI	X	X
SSI	X	X
Unemployment Insurance	X	X
Veterans payments, workers' comp	X	X
Food Stamps		X
Free/Reduced lunch		X
Housing subsidies		X
Energy subsidy (LIHEAP)		X
Fungible value of Medicaid		
Fungible value of Medicare		
<i>Federal taxes</i>		
EITC		X
Child Tax Credit		X
Additional Child Tax Credit		X
Other federal taxes		X
FICA contributions		X

Appendix 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)	\$951 (38)
Share employed	0.892 (0.006)	0.776 (0.017)
Average earnings	\$28,722 (428)	\$22,063 (367)
Average after tax and transfer income	\$22,118 (259)	\$25,068 (287)
After tax and transfer income above 100% of poverty line	0.745 (0.007)	0.617 (0.007)
Observations	48,989	47,215

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

Appendix Table 3: Difference-in-Difference Estimates of OBRA93 on ATT Income Above 100% of the Poverty Threshold 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)	0.058*** (0.01)		
(Year > 1993) * (2+ children)			0.036*** (0.01)	0.018 (0.01)
Per \$1000 of federal EITC	0.073	0.097	0.048	0.045
% impact	9.8%	13.0%	7.1%	6.6%
Extensive margin elasticity	0.43	0.57	0.42	0.40
Observations	67,605	67,605	28,509	28,509
Mean of the dependent variable	0.747	0.747	0.674	0.674
	<i>HS grad or less</i>			
(Year > 1993) * (1+ children)	0.069*** (0.01)	0.079*** (0.01)		
(Year > 1993) * (2+ children)			0.037*** (0.01)	0.021 (0.01)
Per \$1000 of federal EITC	0.078	0.120	0.050	0.059
% impact	12.8%	19.6%	9.0%	10.6%
Extensive margin elasticity	0.56	0.83	0.46	0.54
Observations	30,249	30,249	16,182	16,182
Mean of the dependent variable	0.610	0.610	0.555	0.555
Controls				
Demographics	X	X	X	X
# of children 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 4: Parameterized DD Estimates of OBRA93 on ATT Income Above 100% of the Poverty Threshold (1993 CPS)

Model:	0 vs. 1+ Children		1 vs. 2+ Children	
Simulated EITC (\$1,000)	0.111***	0.115***	0.096***	0.099**
	(0.01)	(0.01)	(0.02)	(0.04)
Per \$1000 of federal EITC	0.072	0.079	0.059	0.075
% impact	10.3%	11.5%	9.1%	11.7%
Extensive margin elasticity	0.46	0.50	0.46	0.58
Observations	50,508	50,508	25,101	25,101
Mean of the dependent variable	0.692	0.692	0.640	0.640
Controls				
Demographics	X	X	X	X
# of children 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 or less 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%.

Appendix Table 5: Relaxing Restrictions (Difference-in-Difference Estimates of OBRA93 on ATT Income Above 100% of the Federal Poverty Threshold)

Model:	Baseline		Add 21-23 year olds		Add disabled or in school		Remove some college	
(Year > 1993) * (1+ children)	0.070***	0.074***	0.071***	0.076***	0.067***	0.063***	0.064***	0.075***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Per \$1000 of federal EITC	0.084	0.118	0.090	0.132	0.090	0.118	0.074	0.118
% impact	12.2%	17.0%	14.0%	20.5%	13.7%	17.9%	12.1%	19.4%
Extensive margin elasticity	0.53	0.72	0.67	0.96	0.71	0.92	0.56	0.87
Observations	50,508	50,508	66,024	66,024	58,886	58,886	32,575	32,575
Mean of the dependent variable	0.692	0.692	0.642	0.642	0.657	0.657	0.611	0.611
Controls								
Demographics	X	X	X	X	X	X	X	X
# of children indicators	X	X	X	X	X	X	X	X
State * year indicators	X	X	X	X	X	X	X	X
Simulated tax & transfer benefits		X		X		X		X
Any AFDC waiver * 1+ children		X		X		X		X
Any AFDC waiver * 2+ children								
Unemp rate * 1+ children		X		X		X		X
Unemp rate * 2+ children								

Notes: The baseline sample includes single women, ages 24 through 48 with some college education or less from the 1992 through 1999 Current Population Survey (March). Moving left, restrictions are modified but are not nested. See text and data appendix for more details. Standard errors clustered on state. Significance levels: *10%, **5%, ***1%.

Appendix Table 6: Parameterized DD Estimates of TRA86, OBRA90 and OBRA93 on ATT Income Above 100% of the Federal Poverty Threshold, 1984-2013

Model:	0 vs. 1+ Children		1 vs. 2+ Children	
Simulated EITC (\$1,000)	0.167***	0.114***	0.184***	0.127***
	(0.01)	(0.01)	(0.01)	(0.01)
Per \$1000 of federal EITC	0.092	0.075	0.093	0.074
% impact	13.1%	10.6%	13.9%	11.1%
Extensive margin elasticity	0.31	0.26	0.34	0.28
Observations	218,970	218,970	114,386	114,386
Mean of the dependent variable	0.702	0.702	0.669	0.669
Controls				
Demographics	X	X	X	X
# of children 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 or less from the 1985 through 2014 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 Table 7: Difference-in-Difference Estimates of OBRA93 on Any Work During the Year

Model:	0 vs. 1+ Children		1 vs. 2+ Children	
(Year > 1993) * (1+ children)	0.061***	0.047***		
	(0.01)	(0.01)		
(Year > 1993) * (2+ children)			0.062***	0.024
			(0.01)	(0.02)
Per \$1000 of federal EITC	0.073	0.074	0.078	0.056
% impact	8.6%	8.8%	9.9%	7.0%
Extensive margin elasticity	0.36	0.37	0.45	0.32
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
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 or less 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 8: Difference-in-Difference Estimates of OBRA93 and Parameterized DD Estimates of TRA86, OBRA90 and OBRA93 on ATT Income Above 100% of the Federal Poverty Threshold for Married Couples

Model:	OBRA 93 DD (1991-1998)		Parameterized DD (1984-2013)	
(Year > 1993) * (1+ children)	0.022*** (0.00)	0.005 (0.01)		
Simulated EITC (\$1,000)			0.079*** (0.01)	0.067*** (0.02)
Per \$1000 of federal EITC	0.073	0.014	0.048	0.038
% impact	8.0%	1.5%	5.3%	4.1%
Observations	60,253	60,253	135,745	135,745
Mean of the dependent variable	0.914	0.914	0.913	0.913
Controls				
Treatment (1+ children)				
Post (year > 1993)				
Demographics	X	X	X	X
# of children 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 married women, ages 24 through 48 with a high school degree or less from the Current Population Survey (March). See text and data appendix for details. Standard errors clustered on state. Significance levels: *10%, **5%, ***1%.