Do In-Work Tax Credits Serve as a Safety Net?

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ABSTRACT:

The cash and near cash safety net in the U.S. has undergone a dramatic transformation in the past fifteen years. Federal welfare reform has led to the "elimination of welfare as we know it" and several tax reforms have substantially increased the role of "in-work"' assistance. In 2010, we spent more than 5 dollars on the Earned Income Tax Credit (EITC) for every dollar spent on cash benefits through Temporary Assistance for Needy Families (TANF), whereas in 1994 on the eve of federal welfare reform these programs were about equal in size. In this paper, we evaluate and test whether the EITC satisfies a defining feature of a safety net program—that it responds to economic need. In particular, we explore how EITC participation and expenditures change with the business cycle. The fact that the EITC requires earned income leads to a theoretical ambiguity in the cyclical responsiveness of the credit. We use administrative IRS data to examine the relationship between business cycles and the EITC program. Our empirical strategy relies on exploiting differences in the timing and severity of economic cycles across states. The results show that higher unemployment rates lead to higher EITC recipients and total dollar amounts of credits for married couples. On the other hand, the effect of business cycles on the EITC is insignificant for single individuals, whether measured by recipients or expenditures. In sum, our results show that the EITC serves to mitigate against income shocks for married couples with children but not for the majority of recipients—single parents with children. The patterns we identify are consistent with the predictions of static labor supply theory, which we confirm with an analysis of earnings, and with expectations about how economic shocks are likely to affect one versus two-earner households.

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1. Introduction

The Earned Income Tax Credit provides a refundable tax credit to lower income working families through the tax system. As a consequence of legislated expansions in the EITC and the dismantling of welfare through the 1996 welfare reform, the EITC is now the most important cash transfer program for these families (Bitler and Hoynes 2010). In 2010, the EITC reached 27.8 million tax filers at a total cost of $60.9 billion. Almost 20 percent of tax filers receive the EITC, and the average credit amount is $2,194. In contrast, fewer than 2 million families received cash welfare benefits (TANF) in 2011, a 62 percent decline since 1994.

One feature of a safety net program is that it raises disposable income at the bottom of the income distribution. Using this definition, the EITC is the most important safety net program for low-income families with children: the recent release by the U.S. Census of the Supplemental Poverty measure reveals that in 2011 the EITC lifted 4.7 million children from poverty, more than any other program (Short 2012)[1]. Among all persons in the U.S. there is only one government program that lifts more persons from poverty – Social Security (Short 2012).

A second key feature of a safety net program is that protection responds in times of need. For example, a negative shock to family earnings as a result of job loss is mitigated by social insurance benefits (e.g., unemployment compensation), public assistance benefits (e.g., food stamps and to a lesser extent TANF), as well as (for higher income families) the progressive income tax system (Auerbach and Feenberg 2000). Kniesner and Zilliak (2002) refer to these as "explicit" income smoothing (e.g., transfers) and "implicit" income smoothing (e.g., taxes). This stabilizing feature of the EITC has not been explored and is the focus of our work.

We recognize that protecting against shocks to income is not a stated goal of the EITC. But as the social safety net has been dramatically reformed with a new emphasis on *in-work* assistance (through welfare reform and the expansion of the EITC), it is important to evaluate the degree to which this central piece of the current safety net provides protection against shocks to income. In the wake of the Great

[1] This calculation includes the combined anti-poverty effects for the EITC and the child tax credit.

Recession, and the dramatic job losses we have experienced, this is an excellent time for this evaluation.

To examine this issue, we use high quality administrative data on tax returns from the Internal Revenue Service. We focus on estimating the relationship between business cycles and EITC recipiency and expenditures per capita. Our empirical strategy relies on exploiting differences in the timing and severity of economic cycles across states. We measure the business cycle using the state unemployment rate in a panel fixed effects model. Additionally, our results are robust to using other measures of the state business cycle such as the employment to population ratio.

A defining feature of the EITC, and a general characteristic of "in-work" assistance programs, is that positive earnings are required for eligibility for the tax credit. The prior literature has established that the EITC has led to sizable increases in the employment rates of single mothers (Eissa and Liebman 1996, Meyer and Rosenbaum 2000, 2001) and has led to modest reductions in the employment of married women (Eissa and Hoynes 2004). Given the earnings requirement that is at the center of EITC eligibility, the response of EITC use to cycles (and economic need) is theoretically ambiguous. On the one hand, a downturn may lead to higher rates of EITC participation – if downturn-induced decreases in earnings move taxpayers into the EITC eligibility range for income. On the other hand, a downturn could lead to lower rates of EITC participation – if downturn-induced decreases in employment bring earnings to zero.

This ambiguous role of the EITC in the presence of economic shocks has been discussed by some legal scholars in the context of assessing the tradeoffs of efficiency, equity and stabilization (Listokin 2012, Ryan 2013). And more generally, it is well known that a progressive income tax structure serves as an automatic stabilizer (see e.g., Auerbach and Feenberg 2000). However, ours is the first study to empirically examine this stabilizing feature of the EITC, to explore differences across groups of taxpayers, and to place such a discussion in the context of the predictions of labor supply theory.

Our estimates suggest that the net effect of cycles on use of the EITC varies importantly across different families. We find that higher unemployment rates—our primary measure of downturns in the business cycle—lead to higher rates of EITC recipiency and total dollar amounts of credits per tax unit for

married couples with children.[2] This suggests that for married couples, an adverse labor market shock causes them to move to a lower level in the earnings distribution relative to where they would have been absent the shock, leading to more participation in the EITC-- thereby *mitigating* the adverse effects of labor market shocks. In contrast, the effect of business cycles on use of the EITC is negative (but statistically insignificant) for single tax filers with children, whether measured by recipiency rates or expenditures per tax unit. This is consistent with expectations for a "one earner" labor supply model – whereby an adverse labor market shock would eliminate family earnings, thus reducing EITC participation. Thus on net, we find the EITC mitigates labor market shocks for married couples with children but not for the majority group of recipients, single parents with children.

To extend these findings and connect them to labor supply, we analyze the effects of cycles on the distribution of earnings. In particular we use the micro data on earnings to examine effects of cycles on the propensity to have earnings in various parts of the EITC eligible range (phase-in, flat and phase-out). Our results show that in recessions, married couples' earnings on net shift down into the EITC eligible range. Single taxpayers also experience a shift down in earnings but most of this shift occurs within the EITC schedule or in a way that moves them outside the taxable region.

Our main results use data for 1996−2008; 1996 being the start of the period during which EITC rules and real benefits have been relatively constant and 2008 being the last year that the IRS Statistics of Income micro data are available. We collapse this data to cells defined by state, tax year, marital (filing) status, and number of children. We then estimate models separately for different demographic groups defined by marital status and number of children. Using more aggregate data, we are able to extend this analysis through 2010, enabling us to capture effects during the full Great Recession. The results are similar for this period to those for our main sample period which spans 1996-2008.

To put these results in context, we compare our results to estimates of the cyclicality of other key safety net programs including Unemployment Compensation, Food Stamps, and TANF. Our estimates

[2] Throughout our analysis, all recipient counts and expenditure amounts are expressed relative to a population denominator. For the central EITC results, the populations are the total within-cell number of potential tax filing units calculated from the CPS ASEC. When we compare results across safety-net programs, however, we use the total population of persons in each state and year as the denominator. Details are provided below.

imply that a 1 percentage point increase in the unemployment rate leads to a 6.1 percent increase in the EITC recipiency rate for married couples with children. Filers without children, who are eligible for a much smaller credit, also exhibit counter-cyclical movements – a one percentage point increase in the unemployment rate leads to a 3.2 percent increase in the recipiency rate. The largest group of recipients, single filers with children, shows a small negative (pro-cyclical) but insignificant response to the unemployment rate. Overall, pooling all tax filers, EITC recipiency rates are modestly counter-cyclical, with a one percentage point increase in the unemployment rate leading to a 1.8 percent increase in the number of recipients per tax unit and a 2.2 percent increase in the number of recipients per capita. We show that the EITC exhibits less countercyclical movement than do TANF, Food Stamps, and Unemployment Compensation. Estimating similar models for the same time period for recipients in each of these programs per capita, we find that a one percentage point increase in the unemployment rate leads to an increase in caseloads per capita of 14.5 percent for Unemployment Insurance payments (UI), 8.4 percent for Food Stamps, and 7.7 percent for TANF.

As a second way to put these results in context, we use the March Current Population Survey to explore how the EITC affects the cyclicality of income. In particular, we estimate the effects of unemployment on poverty rates, using similar state panel data models. Our baseline results use the official poverty measure, which depends on a family's pre-tax cash income. We then recalculate poverty rates adding our measure of the imputed EITC (using the NBER TAXSIM model) to pre-tax cash income. Consistent with the analysis of administrative SOI tax data, poverty fluctuates less across the business cycle when including the EITC than when it is excluded, with the strongest protective aspect of the EITC being among married couples with children.

These results are valuable for several reasons. First, the Great Recession is the first "test" of our safety net in the post-welfare reform era (Bitler and Hoynes 2010). Given the recent decrease in use of traditional welfare programs (TANF), which previously provided a basic income floor for families with children in the face of shocks to income,, it is important to understand how this recession is affecting the American population and poverty among them. Secondly, as many OECD countries adopt similar in-work policies (Owens, 2005), understanding the effect of business cycles on in-work programs like the EITC is

fundamental for policy makers' decision-making and budget planning. Third, given the rising importance of the EITC within the federal income tax system, learning about the automatic stabilizing features of the EITC is important, and up until now, this question was largely unstudied. Our results show that for those who remain in the labor market, the phase-out region of the credit is stabilizing but the phase-in region is de-stabilizing.

Our work provides the first estimates about the cyclicality of the EITC. It makes a contribution to the empirical literature on the cyclicality of safety-net programs such as food stamps (e.g., Ziliak et al., 2003; Bitler and Hoynes 2010), AFDC/TANF (Blank 2001; Ziliak et al., 2000; Bitler and Hoynes 2010) and other food and nutrition programs (Corsetto 2012). Our paper also contributes to the macro public finance literature on the automatic stabilizing features of the tax system (e.g., Auerbach and Feenberg 2000; Kniesner and Ziliak 2002).

The remainder of this paper proceeds as follows. Section 2 outlines the EITC and the recent evolution of the safety net and discusses the relevant theoretical predictions. Section 3 discusses the data and Section 4 presents our empirical model. The results are presented in Section 5, sensitivity analysis is in Section 6, and we conclude in Section 7.

2. The EITC, the Prior Literature, and Theoretical Predictions

The U.S. safety net for low-income families has undergone a dramatic transformation in the past fifteen years. Many aspects of this transformation are illustrated in Figure 1. In this figure, we plot real per capita expenditures from 1980 to 2011 (2010 for the EITC) for the three main cash or near-cash programs for low-income families with children: the EITC, Temporary Assistance for Needy Families (TANF), and Food Stamps (now called SNAP or the Supplemental Nutrition Assistance Program). The shaded regions are contractionary periods, annualized periods based on the NBER recession dates.[3]

The expansion of the EITC between 1986 and 1998, coupled with the decline in cash welfare

[3] The official NBER recession dating is monthly; this figure presents annual data. We constructed an annual series for contractions based on the official monthly dates, augmented by examination of the peaks and troughs in the national unemployment rate. See Bitler and Hoynes (2010) for more information on the annual dating.

expenditures beginning with the welfare waivers of the early 1990s and continuing through the 1996 federal welfare reform, led to the rise in the importance of the EITC and a corresponding fall in the importance of cash welfare (TANF). By 2010, spending on the EITC was almost five and a half dollars for every dollar on TANF cash benefits (in 1994, on the eve of federal welfare reform, these programs were about equal in size). This evolution represents a tremendous change in the safety net for low-income families with children – a transformation from out-of-work aid (cash welfare) to in-work aid (EITC).

As is suggested by Figure 1, the EITC is now one of the most costly cash or near-cash safety net programs for low-income families with children. In 2010, the most recent year for which data are available, the EITC was received by 26 million families (or more accurately tax filing units, which can include single individuals as well), at a cost of almost $60 billion. This amounts to an average credit of about $2,240 (IRS 2011).

The EITC is distributed through the federal tax system, and the goal is to increase the after-tax income of lower earning taxpayers, primarily those with children, while incentivizing work. The EITC schedule has three regions. In the first, known as the phase-in region, the credit is phased in at a constant rate: for each dollar earned, taxpayers currently receive 34−40 cents from the credit. In the second region, the flat region, taxpayers receive the maximum amount of EITC benefit. In the phase-out region, the credit is phased out at a constant rate: taxpayers lose 16−20 cents of credit for each extra dollar earned. Figure 2 illustrates the relationship between earned income and the EITC for the largest group of recipients, single filers with two children. The *x*-axis is annual earned income and the *y*-axis is the 2012 EITC amount. The potential income transfer is substantial – the maximum credit is $5,236 and the phase-out range extends to earned income of $41,952. There are separate schedules for taxpayers depending on the number of children, and in some years, marital status.[4] Importantly, individuals without children are only eligible for a very small credit—in 2012 the maximum benefit for childless filers is $475, less than

[4] Beginning in 2002, the phase-out range was increased for married taxpayers filing jointly. In 2012, the end of the phase out range for these taxpayers is about $5,000 higher than for singles. This difference has been expanding over time; for example it was $1,000 higher than for singles during 2002-2004 and $2000 higher during 2005-2007.

one-tenth the size of the credit for two-child families.[5]

Enacted in 1975, the EITC has been expanded by tax legislation a number of times in the subsequent years (in 1986, 1990, 1993, 2001, and 2009). Although the basic shape of the EITC schedule has remained the same (as in Figure 2), these various expansions have led to changes in the credit's subsidy rate in the phase-in region and tax rate in the phase-out region as well as changes in the maximum EITC benefit. Figure 3 illustrates these benefit changes to the EITC over time. In particular, we plot the real maximum credit by year and number of children for each year between 1983 and 2012. The 1993 expansion is the most significant, introducing the relatively small credit for childless taxpayers and a second higher benefit schedule for those with two or more children compared to those with one child. The 2009 expansion, introduced as part of the federal stimulus, introduced a separate even more generous schedule for those with three or more children.

Table 1 provides summary statistics for 2008, the most recent tax year in the micro SOI data (the data are discussed more fully below). In 2008 there were 24.4 million tax returns with an EITC claim for a total cost of $50.5 billion. Returns with an EITC claim represent 18.6 percent of the total tax returns filed that year. The table shows that the recipients are split between singles with children (58.7%), married couples with children (19.4%) and taxpayers without children (21.9%). In 2008, the average credit per filer was $2,613 for single parents with children, $2,471 for married couples with children, and $253 for childless individuals. Overall, the majority of the dollars spent on the program go to families with children: 74.1% of the credit dollars go to single filers with children and 23.2% go to married filers with children. The small share of dollars claimed among those without children (2.7%) reflects their much lower potential and actual credit amounts.

A substantial literature uses the EITC expansions to estimate the impact of the credit on labor supply. Among single-earner families with children, labor-supply theory predicts an increase in

[5] Adjusted gross income (AGI) also plays a role in calculating EITC eligibility and benefits. First, AGI must also be less than the amount at the end of the phase-out region. Second, for filers in the phase-out region, their credit is the lower of the credit calculated based on earned income and the credit based on AGI. When we analyze EITC eligibility (e.g., as in Table 3 and Figure 4 below) we use only earned income and do not impose the AGI requirement. For more information on the EITC program, see Eissa and Hoynes (2006) and Hotz and Scholz (2003).

employment. However, hours of work (earnings) for those already in the labor market are predicted to decline.[6] Because the EITC is based on family income, the credit leads to a very different set of incentives for married taxpayers. Among secondary earners in married couples, the EITC is expected to reduce employment and hours worked for those already in the labor force (Eissa and Hoynes 2004). The prior literature provides consistent and robust evidence that the EITC increases the employment of single mothers (Eissa and Liebman 1996, Meyer and Rosenbaum 2000, 2001). Additionally, the research shows that the EITC leads to modest reductions in the employment of married women (Eissa and Hoynes 2004). There is less evidence supporting the prediction of a negative intensive margin response on either hours or earnings (for a review see Eissa and Hoynes 2006). Work by Saez (2010) and Chetty et al. (2013) suggests intensive margin adjustments for some workers.

In addition, because eligibility for the EITC is tied to marital status and the presence and number of children, an expansion in the credit could theoretically lead to changes in these demographic outcomes. The research, however, suggests that the EITC neither impacts fertility (Baughman and Dickert-Conlin, 2009) nor family formation (Dickert-Conlin 2002; Ellwood, 2000, Herbst 2011).[7] Recent work shows that the EITC has important effects beyond income and earnings; additional family income from the EITC leads to improvements in maternal and infant health (Hoynes et al., 2012, Evans and Garthwaite 2010, Baker 2008) and children's cognitive achievement (Dahl and Lochner 2012).

We contribute to the literature by evaluating and testing whether the EITC satisfies a defining feature of a safety-net program – use of such programs should go up in times of economic need. In particular, we explore how EITC participation and expenditures change with the business cycle. This focus links our paper to the empirical literature on the cyclicality of safety-net programs such as food stamps (e.g., Ziliak et al., 2003, Bitler and Hoynes 2010), AFDC/TANF (Blank 2001, Ziliak et al., 2000,

[6] The prediction depends where the taxpayer is in the EITC schedule. If she is in the phase-in region, the EITC leads to an ambiguous impact on hours worked due to the negative income effect and positive substitution effect. In the flat region and phase-out region, the EITC leads to an unambiguous reduction in hours worked. Moreover, some taxpayers with earnings beyond the phase-out region may choose to reduce their hours of work and take advantage of the credit.

[7] This finding is consistent with the broader literature finding that the elasticity of fertility with respect to transfers from income support programs is very small (Moffitt 1998).

Bitler and Hoynes 2010) and other food and nutrition programs (Corsetto 2012). Our paper also contributes to the macro public finance literature on the automatic stabilizing features of the tax system. It is well known that a progressive income tax system stabilizes income in downturns (for recent empirical studies see Auerbach and Feenberg 2000 and Kniesner and Ziliak 2002). The implications of having the non-linear EITC schedule within the more generally progressive federal income tax code have not been explored thus far in the literature.

Predictions about how use of transfer and social insurance programs (AFDC/TANF, Unemployment Compensation, and food stamps) and regular federal income tax payments will respond to economic downturns are straightforward; tax receipts should go down and transfers and UI use should go up. In contrast, theoretical predictions about the effect of cycles on EITC use are ambiguous. As discussed above, eligibility for the EITC requires that earnings are strictly greater than zero and less than the amount defining the end of the phase-out range. On the one hand, a downturn may lead to higher rates of EITC participation – if decreases in earnings disproportionately move taxpayers down into the EITC eligibility range. On the other hand, a downturn could lead to lower EITC participation – if the main effect of the downturn is to cause individuals to leave the labor force; reducing earnings to zero. These two possibilities are illustrated on Figure 2, presented earlier, which shows the EITC schedule for single filers with two children. The right-most arrow shows a reduction in earnings that moves a family into the EITC eligibility range; we label this arrow with a "+" to indicate that this movement leads to an increase in EITC participation. The second (left-most) arrow shows a reduction in earnings that moves a family out of the EITC eligibility range (reducing earnings to zero and leading to a loss of eligibility for the EITC; in addition the family may end up not filing taxes which would also reduce the number of tax filers); we label this arrow with a "−", to indicate that this movement leads to a decrease in EITC participation. The third (middle) arrow illustrates a reduction in earnings, but one that takes place within the EITC eligibility range, leading to a "0" impact on participation.

One can also examine these different scenarios for earnings losses within the context of EITC dollars received (rather than EITC recipients). This provides another measure of whether the EITC provides income stabilization. A reduction in earnings from above the end of the phase-out range to

within the EITC eligible range or movement down within the phase-out range illustrate the income-stabilizing feature of the EITC. However, the movement out of the labor market or a movement down within the phase-in region represents income de-stabilizing features of the EITC. Thus, "The net stabilization effect depends upon the nature of the distribution of shocks to income across the income distribution" (Listokin, 2012, p. 77).

Figure 4 serves to sharpen these theoretical predictions for our demographic groups of interest. Here we present histograms for tax-return-reported earned income in 2006, the peak year prior to the start of the Great Recession. We present the histograms for six demographic groups that correspond to the different EITC schedules: single with no children, married with no children, single with one child, married with one child, single with two or more children, and married with two or more children. For each, the dashed line shows the EITC schedule and we force the *x*- and *y*-axes to have the same scale across all 6 graphs. We limit the sample in each case to those returns with earned income between $1 and $60,000. Note that we do not condition on receipt of the EITC, but tabulate the number of returns with each amount of earned income to see how these counts stack up across various points in the EITC schedule and higher earnings amounts.[8] On each graph, we also indicate the share of total filers for that demographic group that are excluded from the histogram (those with earned income that is <=0 or >$60,000).

Several observations can be drawn from these figures. First, they well illustrate the variation in the generosity of the schedule across these six groups. The credit is substantially larger for families with children than for those without children and the credit is larger for families with two or more children than for one-child families. Second, the distribution of earned income for single families with children is shifted considerably to the left of the distribution for married families with children. Only 29.1% of singles with one child and 17.8% of singles with two children have earnings higher than the top of the

[8] Our eligibility determination is not exact. First, as we discuss more below, a tax filer without children must be between the ages of 25 and 64 to receive the EITC. We do not observe age in our tax data (nor the flag for aged dependent status). Thus many in the tabulation for filers without children in fact are ineligible for the EITC because they are older than 64 or younger than 25. Additionally, as mentioned above, for some taxpayers eligibility also depends on AGI and here we only use earned income.

phase-out range (compared to 75.9% and 74.6% for married families with one and two children). Third, consistent with Saez (2010), there is evidence of clustering at the first kink of the EITC schedule for single families with children.

In addition to the labor-supply channel, it is possible that our results could also capture effects operating through the cyclicality of marriage and fertility. Schaller (2012), for example, estimates that an increase in state unemployment rates leads to small declines in both marriage and divorce rates (between 1.5 and 1.7 percent), with evidence that the marriage effects are permanent while the divorce effects are more temporary. This "endogenous marital status" would operate against the expected labor supply channel – an increase in unemployment would lead to a reduction in the stock of married families which would potentially decrease the number of EITC married filers and increase the number of EITC single filers. The literature on the cyclicality of fertility is more mixed, but many studies document a negative effect of unemployment rates on fertility (e.g., Dehejia and Lleras-Muney 2004, Schaller 2013). These issues are particularly important to consider when we stratify our analysis by marital (filing) status, where a clean interpretation requires that the composition of the sample is not changing with the changes in the unemployment rate. In part to address this issue, we normalize the EITC recipients and expenditures by the population of potential filers (by marital status and number of children). Further, note that when we estimate models for the full, pooled, EITC sample, this issue is less important. Overall, our view is that the potential for endogenous changes in marriage and fertility is likely quite small and second order relative to the changes in labor supply across the cycle.

Given this discussion and the empirical evidence on the distribution of income, we conclude that the effect of a downturn on EITC participation and dollars of stabilization is likely to vary by family structure. Singles with children, due to being in one-earner families and having relatively low earnings, are at higher risk of losing the EITC in the event of an adverse labor market shock. On the other hand, given the higher level of earnings among married couples combined with the presence of two potential earners, an adverse labor market shock is more likely to lead to an increase in the number of married families with earnings in the EITC-eligible range. On net, therefore, we expect married-couple EITC receipt to be more counter-cyclical than single-parent EITC receipt (which may even be pro-cyclical).

Therefore, the EITC is more likely to serve as an income stabilizer for married couples (or more generally, for those with moderate incomes). Single parent families are less likely to experience income stability from the EITC, and could theoretically experience increased income in-stability from the EITC.

3. Data

To empirically analyze the effect of business cycles on the size of EITC claims, we utilize data from a variety of sources. Our primary data are administrative data from the IRS compiled from tax returns. The Statistics of Income (SOI) is a nationally representative sample of federal income tax returns. These are annual cross-sections, available for years 1979−2008. There are approximately 104,300 observations per year on average and these data are representative of all tax filers, and, therefore, also representative of EITC claimants. The SOI data contain sample weights that allow us to infer results about the U.S. population of tax filers as a whole. The SOI data are limited to information on the federal tax return. We use information on filing status (single, head of household, married filing jointly, married filing separately), number of dependents, earned income, EITC credit amount, number of children qualifying for the EITC, and state of residence.

Our research design, discussed below, leverages variation in the timing and severity of business cycles across states. Thus, unlike much of the EITC literature, we do not leverage variation in the generosity of the EITC. In fact, we seek to analyze a period with minimal changes to the EITC. Thus, our main estimates rely on data for the tax years 1996 to 2008, to avoid the major confounding EITC expansions that occurred in the early 1990s. Figure 3, presented above, shows the relative stability of the EITC over this period.[9]

We end our sample period in 2008 because this is the last year for which the SOI micro data are available. This is unfortunate given that we miss the full extent of the Great Recession. We were able to obtain summary data on EITC claims, by state and filing status (single, head of household, married), for

[9] During the period we analyze, some minor expansions of the EITC still occurred. For example, as discussed above, the phase-out region for married couples with children was extended beginning in 2002. Additionally, in 2001 a "modified" AGI measure was replaced with AGI for analysis of eligibility and benefits in the phase-out region. In our analysis, time dummies will absorb the overall effects of expansions.

2009−2010. We use this to estimate more aggregated models using data through 2010. We discuss this below.[10]

Our sample is created as follows. First, we exclude all high-income individuals (filers with returns over $200,000 of AGI), whose state identifiers are not reported in the SOI data because of issues of confidentiality. This sample exclusion is not problematic because these high-AGI filers have income far beyond the end of the EITC eligibility range[11]. Second, we exclude individuals from Puerto Rico, the Virgin Islands, Guam or U.S. citizens living abroad, as well as military personnel stationed abroad. In the SOI data, these filers all have the same geographic identifier, making it impossible for us to assign them to the labor market conditions that they face. Moreover, we drop late filers, who are individuals filing tax returns in one year but whose returns correspond to some previous tax year. By dropping late filers, we exclude 59,835 observations from our main 1996−2008 sample, which represents around 2.8% of the weighted sample. In a robustness check, we analyze whether our results are sensitive to this sample restriction. Finally, we exclude married individuals filing separately, since these filers are not eligible for the EITC. For consistency, we exclude these individuals both from the EITC recipients and expenditures analysis and from the total tax filers analysis.

After these sample restrictions, and for the majority of our empirical analysis, we collapse the data to totals for cells based on year, state, marital status (married or single) and number of children (zero, one, or two or more).[12]

After this collapse of the data, we have a total of 3,978 cells in our 1996-2008 sample (50 states plus DC times 13 years times 6 filing status/number of children groups). For each cell, we calculate the total number of filers, the total number of filers claiming the EITC, and the total amount of EITC benefits received; all as the weighted sums of these variables, using the sample weights provided in the SOI data.

[10] These summary data are based on a sum of zipcode level data where zipcodes with fewer than 10 EITC recipients are suppressed. Thanks to Myrtis Herrod of the IRS for this data.
[11] Dropping this group could affect the estimates, presented below, for "total filers."
[12] The tax data identify filing status as married filing jointly, head of household, or single (and marred filing separately which we drop). We assign taxpayers to be married if they file married filing jointly, and single if the filer declared he/she was single or a head of household (meaning single with dependent children). The variable for the number of children takes the values 0, 1 or 2, according to how many children the filers declare for EITC purposes. When tabulating total filers we use the number of child dependents (0, 1, 2+) to assign the observations to the appropriate cells; we must do so as there is no number of EITC qualifying children for the non-EITC cells.

We use data from the March Current Population Survey to create population estimates of the number of potential tax filers in each cell to use as denominators for our SOI analysis. The March CPS (or Annual Social and Economic Supplement to the Current Population Survey) is administered to most households in March and collects labor market, income, and program participation information for the previous calendar year, as well as demographic information from the time of the survey. The sample size is approximately 150,000 persons or 57,000 households per year. We use these CPS data to convert the administrative tax data to rates – EITC recipients per population (of potential tax filers) and EITC dollars per potential tax filers – for each state-year-marital status-number of children cell. We construct the CPS population denominators to reflect counts of the "at risk" population of potential tax filers (family units/single individuals relevant for claiming the EITC). We use the CPS to identify the same six demographic groups used in the SOI: each family (or subfamily) is assigned to a cell based on the marital status of the family head and the family's number of children. Following the EITC filing rules, we count a child as a dependent if their age is less than or equal to 19 or a full time student and their age is less than or equal to 24. In addition, to receive the EITC as a childless filer, a tax filer must be between 25 and 64 (and thus we limit the CPS population counts for the childless to those imputed tax filing units with whose head is 25-64). We use the CPS March person weight for potential tax unit heads to aggregate these counts of potential filing unit heads to population counts of the same concept.[13]

We also use the CPS to examine how the EITC affects the cyclicality of income and poverty, examining whether families have income below 50%, 100%, 150%, and 200% of the federal poverty line. Official poverty status in the U.S. is determined by comparing total pre-tax family cash income to poverty thresholds, which vary by family size, number of children, and presence of elderly persons. In 2012, for example, the poverty threshold for a family of three (one adult, two children) was $18,498. Notably,

[13] We find that the number of single filers with children in the CPS is significantly below the number of single filers with children in the tax records. Others have noted this difference, which may reflect complicated living arrangements (children moving between custodial parents during the year) or noncompliance. Following others, we adopt an expansive definition of children. Following the filing rules, we identify children as individuals 19 or younger, or individuals 24 or younger who are full time students. Moreover, we also identify as children individuals who are not participating in the labor force because of disability. We explore the sensitivity of our findings to how we construct these denominators in Appendix Table 3. We discover that these choices make very little difference to our estimates (or in the state-level population totals, not shown).

official poverty does not reflect the effects on income of the tax system (e.g., the EITC) or the non-cash transfer system (e.g., food stamps). We calculate a second poverty measure where we add imputed EITC to pre-tax income; the EITC amount is assigned using the NBER TAXSIM model. We also calculate cash poverty and cash plus EITC poverty using the equivalence scales implicit in the newly released Supplemental Poverty Measure (Short 2011, 2012).[14] We calculate these four poverty measures for each family and then collapse the data to cells based on state, year, and family type.[15]

To put our results on the cyclicality of the EITC in further context, we estimate similar models for other safety net programs including AFDC/TANF, Food Stamps, and Unemployment Insurance (UI). As with the EITC, we measure administrative counts of caseloads (here at the state-by-year level) that cover the same time period as our core SOI results. We choose to normalize these caseloads by state total population, given the differences in eligibility determinations and units across programs (and also present EITC results normalized in the same way). The AFDC/TANF and Food Stamps caseloads are average monthly measures (of families), while the UI data represent the total population probability of being on UI on a weekly basis (total weeks of any UI benefits claimed divided by 52 weeks times state population). The data can be found at DHHS (2013), USDA (2013) and DOL (2010).

Finally, we merge the SOI, CPS and program caseload data per population (of potential filers/capita) with state annual unemployment rates, the main explanatory variable in our regressions; they are obtained from the Bureau of Labor Statistics. Lastly, to control for potential confounders from state safety-net programs, we include data on state Medicaid/SCHIP income eligibility thresholds as well as dummies for the presence of state EITC programs or other state welfare reforms, and where relevant, dummies for demographic group.

[14] The Supplemental Poverty Measure is a broad post-tax resource measure that incorporates in-kind transfers (food stamps, housing assistance, school lunch) and other large categories of expenses (e.g., out of pocket medical expenses, child care, and fixed costs of work, child support) and allows the thresholds to vary with geographic area and by expenditures on housing, food, clothing, and utilities and with an equivalence scale for various different units. We cannot use the SPM measure for our analysis, however, as it is unavailable in public-use micro data before 2010.

[15] We weight each unit by the weight of the individual denoted as the head (if a family/subfamily) or the weight of the individual themselves (for the unrelated childless filers).

4. Empirical Strategy

Our empirical strategy exploits variation in the timing and severity of cycles across states to estimate the causal effect of labor market conditions on use of the EITC. Specifically, we measure the business cycle using the state unemployment rate.[16] We start with the following pooled model:

$$(1) \qquad y_{gst} = \beta \cdot UR_{st} + \theta_g + \alpha_s + \delta_t + Z_{st}\pi + year_t \cdot \gamma_s + \varepsilon_{gst}$$

where subscripts refer to demographic cell *g* (filing status x number of children [0, 1, 2+]), state *s*, and tax year *t*. UR_{st} is the state unemployment rate and θ_g are demographic group-specific intercepts. Our primary dependent variable is the EITC participants per relevant population (ratio of EITC participants to our CPS measure of population of potential tax filers, both for group *g*) measured in the tax year. We also examine state-level EITC expenditures and EITC filers as a share of the total population of such filers (overall and in various ranges of the EITC credit). We cluster standard errors at the state level, and the regressions are weighted by the relevant denominators (potential filer population at the state-year-demographic group level).

Equation (1) contains controls for state and year fixed effects, α_s and δ_t respectively. By adding year fixed effects we absorb changes in use of the EITC that are due to national business cycles. This approach is necessary because it allows us to differentiate between changes in EITC use due to labor market conditions and changes due to national EITC expansions (which are minimal during this time period), secular changes in EITC take-up rates, and other national level confounders. Our main coefficient of interest is β, which represents the effect of the state unemployment rate on the EITC.[17] If the estimate of β is positive, it implies that the EITC is countercyclical and therefore during a recession, the EITC acts as an automatic stabilizer. If β is negative, it implies that the EITC is pro-cyclical and is de-

[16] We also explore the sensitivity of our findings to the measure of the business cycle, exploring also log(employment) and log(state GDP), and finding very similar results.

[17] The unemployment rate is the annual average for the calendar year corresponding to the tax year. Thus the dependent variable, EITC recipiency rate, and the key independent variable, the state unemployment rate, are both measured over the tax year. It is worth pointing out that that most EITC participants receive the as a tax refund early in the calendar year following the tax year.

stabilizing.

To explore how well the theoretical predictions match the data, we analyze models stratified by demographic group. For example, single individuals may lose their jobs during recessions, thus losing EITC eligibility, while married couples may switch from being two-earner families to single-earner families (or experience some other reduction in family earnings), leading to increases in the rate of EITC use. To test these predictions, we separately estimate equation (1) for our main three groups of interest: married couples with children, single parents with children, and childless individuals. We give limited attention to the childless given the very modest maximum EITC benefit for this group.

In order to control for possible confounders at the state-year level, in some specifications, we include various state-level measures of the safety net as well as the state-level EITC (in states with a state credit). The vector Z_{st} includes measures of state welfare reform, indicators for the presence of state EITC programs, and state Medicaid/SCHIP income eligibility limits. Additionally, we explore the sensitivity of the findings to controlling for state-specific linear time trends (γ_s). Finally, we explore the sensitivity of our findings to other measures of the local business cycle.

Similar models are estimated for our analysis of poverty rates and other program caseloads.

5. Results

Table 2 presents our main results. Column 1 presents estimates for the pooled sample, while the remaining columns are estimates stratified by our three demographic groups. The pooled sample contains 663 observations (data is collapsed to the state-year level) while the other columns have 1326 observations.[18] Panel A presents estimates for EITC recipients and Panel B presents estimates for EITC expenditures (in real 2008 dollars). In each panel here and throughout the paper, the counts of EITC recipients and EITC dollars are expressed per population of potential tax filing units. All regressions

[18] The pooled sample is constructed by collapsing the numerator (EITC) and denominator (population) and creating the ratio of the two. The stratified samples have double the observations because each contains two demographic cells. The childless sample includes cells for married and singles, and the with-children groups includes cells for one and two or more children. In all models we include fixed effects to absorb different participation rates across the demographic groups.

include state and year fixed effects. Moreover, all regressions but the pooled estimates include fixed effects for demographic characteristics. All models are clustered on state.

The results for the pooled sample show that a one percentage point increase in the state unemployment rate leads to a 0.4 percentage point increase in EITC participation (statistically significant at only the 10% level). (Here and throughout, unemployment is expressed in percentage points, and the mean over the full period is 5.8.) For each regression (here and the tables below), we also include the mean of the dependent variable and the "Percent Impact" (which is calculated as the coefficient on the unemployment rate divided by the mean of the dependent variable). For the pooled sample, the effect of a one percentage point increase in the unemployment rate translates to 1.8 percent impact on recipients. The effect on total EITC dollars per potential tax filer is also positive, with a one percentage point increase in unemployment rate leading to a 1.2 percent increase in per capita expenditures, although this coefficient is statistically insignificant. These results suggest that, overall, the EITC program is weakly countercyclical and serves as an automatic stabilizer--providing additional resources in economic downturns.

The remaining columns of Table 2 present results for our three main subsamples: married couples with children, single parents with children, and childless individuals. Column 2 shows that the EITC is strongly countercyclical for married parents, both measured by the recipiency rate and by total dollar amounts per potential tax filer. A one percentage point increase in the state unemployment rate leads to a 6.1 percent increase in the recipiency rate and a 5.7 percent increase in real credits per potential tax filer, with both estimates significant at the 1 percent level. In addition, the EITC is estimated to be weakly countercyclical also for childless individuals (Column 4) – a one percentage point increase in unemployment leading to a 3.2 percent increase in the recipiency rate (significant at the 10 percent level). In contrast, the largest group of EITC participants, single parents, has negative, but statistically insignificant coefficients for the effect of the cycle on use of the EITC. These results, taken at face value, suggest pro-cyclical movements and income de-stabilization for single parent families.

In Appendix Table 1, we provide more detail by estimating models separately for all six demographic groups (single or married, by zero/one/two or more children). Those results show similar

responses for families with one and two or more children. They also show that the childless results are primarily driven by single filers.

We also estimated models that allowed for differential effects in expansions and recessions. In all cases we could not reject that the coefficients where the same for the two periods, suggesting no evidence in favor of asymmetric responses (Appendix Table 2). Our results are robust to alternative measures of the business cycle. Appendix Table 3 shows qualitatively similar results with log of employment as the measure of the cycle. Estimates with the log of state GDP also are qualitatively similar; use of the EITC is countercyclical for married couples with children and the childless.

The differential patterns by marital status are illustrated in another way in Figure 5. Each panel provides a scatterplot where the observations are at the state level (where the size of the circle is weighted to reflect the state's population of possible filers). The horizontal axis in each panel denotes the change in annual unemployment rates (in percentage points) between 2000 and 2008 and the vertical axis the change in EITC recipients per population (in percent) over the same period, by state.[19] We also include the linear fit (using the states' potential filer population as weights). We present these scatterplots for four groups: the pooled sample, childless filers, single parents with children, and married couples with children. The figure reveals considerable variation in labor market changes across states—the 2000 to 2008 change ranges from -1.2 percentage points (for WV) to a change of about 4.6 percentage points (for MI). Consistent with the regressions, the figures show a positive relationship between the severity of the unemployment rate increase and EITC recipients per potential tax filer for married couples and childless filers. Single parents with children, however, exhibit a negative relationship with rising unemployment rates associated with declining EITC recipiency rates.

These results are consistent with our theoretical predictions of the effect of local market conditions on the EITC by family type. Figure 4, presented above, illustrates that only a relatively small share of the total filing population of single parents with children have incomes above the EITC phase-out

[19] The vertical axis has the same scale for each figure to aid the visual comparisons across groups. There are a few small states that are off the scale for married couples with children. The linear fit, however, uses all of the observations.

range. With such a large share of the distribution contained within the EITC eligibility range, it is likely that a negative labor market shock will lead to no change in eligibility (a reduction in earnings within the eligibility range) or a reduction in eligibility (due to job loss and earnings falling to zero). On the other hand, among married families with children, far more than half the distribution lies above the phase-out range. A labor market shock to this group, therefore, would be much more likely to lead to an increase in the EITC (by moving earnings into the EITC eligible range). Given the presence of two potential earners in the married households, it is less likely that a shock to them would lead both members of the family to leave the labor market entirely unlike the single parents. This is consistent with the evidence in Table 2.

To more fully explore the differences by marital status and the connections to labor supply predictions, we estimate our models on the *full sample of filers* (rather than EITC recipients) In particular, we assign each filer to one of six earnings "regions": phase-in, flat, phase-out, "near" phase-out (the region $25,000 above the end of the phase-out for families with children; $15,000 above for the childless), above the "near" phase-out, and the remaining filers (negative or zero earned income). These regions are assigned using the appropriate tax schedule for that group and tax year (e.g., using the appropriate filing status and number of dependents). The cells are defined as in Table 2 – by state, year, filing status and number of children (0, 1, 2 or more). The weighted counts of filers are, as in Table 2, divided by the CPS population of potential filers for the relevant demographic group.[20] We do not condition on EITC participation for this analysis as we want to learn how earnings adjusts in economic cycles. It is important to point out that our SOI data is (necessarily) censored to include only those who file taxes. In particular, many families whose earnings drop to zero will not be required to file taxes.

We begin in Table 3 by examining the responsiveness of total filers (panel A) and EITC eligible filers (panel B) to the business cycle to assess whether there are important changes in the population of filers and EITC eligible individuals in response to the business cycle. As above, we estimate models for three groups: married with children, single with children, and the childless. The results show that single parents with children exhibit pro-cyclical filing status – a one percentage point increase in the

[20] Because we are analyzing the full set of tax filers (rather than EITC recipients) we do not restrict the childless population to be 25-64 (for the CPS population counts).

unemployment rate leads to a 1.7 percent reduction in the share of single parents who file taxes. Childless filers also show pro-cyclical filing status probabilities. In contrast, married couples show a very small and statistically insignificant relationship between cycles and the probability of filing. The insensitivity of total tax filing probability among married couples is consistent with their having two potential earners. The results for counts of those eligible for the EITC as a share of potential filers mirror the main results for EITC recipients in Table 2.

Figure 6 presents the results for earnings in the phase-in, flat, phase-out, "near" phase-out, and above near phase-out regions. We plot the coefficient on the unemployment rate along with its 95 percent confidence interval. (Appendix Table 4 contains the full set of coefficients and standard errors.) Figure 6a shows that, for married parents with children, an increase in the unemployment rate leads to a reduction in the propensity to have earnings in the top category (above "near" phase-out) and an increase in the propensity to have earnings at all other, lower, levels. Notably, they have statistically significant increases for earnings in the phase-out and phase-in regions, consistent with the higher EITC participation and dollars distributed.

The results for single parents with children, in Figure 6b, show that an increase in unemployment leads to reductions in the propensity to have earnings in all regions above the very lowest (phase-in region). However, only the reductions for the near phase-out and above near phase-out are statistically significant. The propensity to have earnings in the phase-in increases (although not statistically significantly). The results in Table 3 and Figure 6 serve to deepen our understanding of the income stabilizing (or de-stabilizing) nature of the EITC. It also reveals that our findings are consistent with a static labor supply model interpretation. That is, some one-earner households with relatively low earnings experience reductions in earnings *within* the EITC schedule, however they also experience earnings losses that send them out of tax filing status. For two potential earner households, whose baseline earnings is significantly shifted to the right of single parent families, the economic downturn leads to a shift from above the EITC schedule range down into the EITC eligibility range, with no change to tax filing status.

To put these results in context, it is useful to compare these results to estimates for the cyclicality of other key safety net programs. These results are presented in Table 4, where we compare results for the

EITC (here measured per capita) to those for AFDC/TANF (column 3), Food Stamps (column 4) and UI (column 5). For each model, the data are at the state-year level covering 1996−2008 and we divide the caseloads by the state population (as opposed to the state population of potential filers as before). For the EITC, we present two measures – all EITC participants per capita (column 1) and EITC participants with children per capita (column 2). The results in these first two columns show that a one percentage point increase in the unemployment rate leads to a 2.2 percent increase in EITC recipients, and a somewhat smaller 1.8 percent increase for EITC participants with children.[21] The remaining columns show that a one percentage point increase in the unemployment rate leads to an increase in per capita caseloads of 8.4 percent for Food Stamps, 7.7 percent for TANF, and 14.5 percent for UI. The result is significantly less protection provided by the (aggregate) EITC in recessions than is provided by the other programs. Even the most "cyclical" or income stabilizing EITC group, married families with children (for whom a one percentage point increase in the unemployment rate leads to a 6.3 percent increase in recipients), exhibits less countercyclical movements than TANF, Food Stamps, and unemployment compensation. This result is echoed in work by Kniesner and Ziliak (2002) who find more "explicit" insurance (e.g., transfers) for low income households than "implicit" insurance (e.g., taxes).[22]

As a second way to put these results in context, we use the March CPS to explore how the EITC affects the cyclicality of income and poverty. We measure whether a family has income below 50, 100, 150 and 200 percent of official poverty; both measured using official pre-tax income and also by adding in the EITC. We impute the EITC using the NBER TAXSIM model. The results, estimating the same model as (1), are presented in Table 5. We present estimates for married couples with children and single parents with children. The first four columns show official poverty and confirm existing research documenting a positive relationship between unemployment rates and poverty (Bitler and Hoynes 2010,

[21] The results for the pooled EITC sample (column 1, table 4) differ slightly from the results for the pooled sample in table 2 (column 1)—2.2% in Table 4 versus 1.8% in Table 2. Here, in table 4, we wanted to use a consistent definition for the denominator across the columns in the table. Given the range of programs here, we opted to use the state total population as the denominator (rather than the number of potential filers that we used in Table 2). This shows minor sensitivity to the choice of denominators.

[22] Bitler and Hoynes (2013) show that in the Great Recession period (2006+), TANF does not respond to labor market fluctuations – the effect of the unemployment rate on TANF caseloads and expenditures is close to 0 and statistically insignificant.

2013, Blank 1989, 1993, Blank and Blinder 1986, Blank and Card 1993, Cutler and Katz 1991, Freeman 2001, Gunderson and Ziliak 2004, Hoynes et al. 2006, Meyer and Sullivan 2011) with larger cyclicality for single parents with children. For example, a one percentage point increase in unemployment leads to a 2.0 percentage point increase in official poverty (income below 100% poverty) for single families with children and 0.7percentage point increase in official poverty for married couples with children. We repeat the exercise in columns 5-8 but recalculate poverty incorporating income from the EITC. Incorporating EITC income significantly reduces the cyclicality of poverty for married couples. The effect of a one percentage point increase in unemployment is reduced by 42% for incomes below 50% poverty, by 21% for incomes below 100% poverty, by 6% for incomes below 150% poverty, with a very small and insignificant effect on the propensity to have incomes below 200% poverty. Given the relationship between poverty rates and the EITC schedule (see Appendix Figure 2), and given the results on earnings regions in the SOI data (Figure 5) this is precisely the patterns we would expect. In contrast, for single parents with children, the EITC has minimal effects on the cyclicality of income. The results are very similar for the poverty measures using the new supplemental poverty measure equivalence scales (Panels C and D of the table).[23]

6. Additional Results and Sensitivity Checks

The validity of our estimates requires that the changes in state unemployment rates are not reflecting other policies or trends at the state level that are both correlated with the unemployment rate and drive EITC participation. We explore this in two ways, with the results presented in Table 6. First, we control for other state policies including welfare reform, indicators for the presence of state EITC programs, and state Medicaid/SCHIP income eligibility thresholds. The results show (main results in column 1, results adding state-year controls in column 2) that the results are highly robust to these controls. Second, we include state-specific linear time trends (in column 3). Adding state linear trends

[23] This is a rather mechanical exercise, and in particular we are examining the cyclicality of poverty rates with and without the EITC in a static setting—assuming that nothing else in the family changes. Notably, this does not capture the channel whereby the EITC affects income and poverty through changing labor supply and earnings.

changes the coefficients somewhat (leading to increases in the magnitude of impacts for single families with children and decreases for married couples with children), but the qualitative conclusions are unchanged. Finally, we add both trends and controls, with the results close to those with state linear trends.

Because individuals can file federal tax returns for previous years, each tax-year cross-section of the SOI data contains not only returns for that tax year, but also for previous years. For example, in calendar year 2006, most individuals file returns for income earned and taxes due for 2005. However, a few individuals file for taxes due in 2004, 2003, etc. We refer to these individuals as late filers. In our data, we have information on the year when the return was physically filed, as well as the tax year for which the return is filed. Hence we are able to identify late filers, who represent around 2.8 percent of our weighted sample.

Because in our empirical analysis we are estimating the contemporaneous effect of local labor market conditions on the EITC, keeping late filers in our sample could introduce measurement error or possibly introduce a systematic bias in the sample. While the ideal specification would require us to re-classify the year variable so that it refers to the year for which the federal returns were filed, and not the tax year in which they were filed, this re-classification cannot be done appropriately for the entire time period. In the last few years of data (2007 and 2008) not all late filers will have shown up. For this reason, in our main specification, we exclude from the sample all late filers. However, to explore the sensitivity of our findings to dropping late filers, we estimate models where we restrict the analysis to the years 1996−2004 (when we expect that most late filing of taxes for tax year 2004 have shown up). Table 7 presents the results obtained for three alternative treatments of late filers. In column 1 we repeat our main results (exclude late filers, but for years 1996-2004). In column 2, we re-classify late filers to the tax year for which the federal returns were filed. In column 3, we retain the late filers and do not alter the tax year variable (the late filers appear in the counts for the year when they filed the returns). The results show that our results are not very sensitive to this construction the sample. The estimated effect of the state unemployment rate on the propensity to use the EITC does not vary significantly across the three sets of results.

Our results end our sample period in 2008 because this is the last year for which the SOI micro data is available. This is unfortunate given that we miss the full extent of the Great Recession and its aftermath; the unemployment rate rose from 4.6 in 2007, to 5.8 in 2008, 9.3 in 2009, and 9.6 in 2010 before beginning to fall (to 8.9 in 2011 and 8.1 in 2012). We were able, though, to obtain summary data from the IRS on EITC participants, by state and filing status (single, head of household, married) for 2009−2010. We collapse our original SOI data to match the data available for 2009−2010 and use this to estimate more aggregated models using data through 2010. Because we only observe filing status (and not number of children), these three groups do not match up exactly with the groups we present in our main analysis. For this analysis of the data through 2010, though, we seek to examine the sensitivity to adding these two deep recession years for a consistent definition of the cells. We can do that here.[24] We present these results in Table 8. In panel A, we estimate the models for the (base) period 1996-2008. These results differ from Table 2 only in the aggregation to these three filing status groups. In panel B, we present estimates for the same groups but with data extended through 2010. The results are virtually unchanged by the addition of these two years.

Our last sensitivity test relates to our use of the CPS to construct the potential filer population in the denominator of the EITC recipient and expenditure measures. We explored several different definitions for the denominators in an effort to best capture the EITC filing rules (especially as they relate to dependents) within the available CPS data. These results, presented in Appendix Table 5, show very little difference across the alternative definitions for the at risk population.[25]

7. Conclusion

[24] Those with filing status of married (and to a lesser extent for those filing single), include those with and without children. Among head of household filers, a small number of filers have no children.

[25] The denominator, the population of potential filers, is constructed according to the marital status of the family head and the number of children in the family. The alternative definitions presented in Appendix Table 3 differ only on the methodology used to identify children in the family. In the first definition, we identify as children individuals that are 18 or younger. In the second one, we identify as children individuals 19 or younger, or individuals 24 or younger that are full time students. In the third case, we modify the second definition of children to include disabled individuals and to exclude non-citizens. Lastly, in our fourth alternative we identify children as in the second definition, include disabled and perform a "filers maximization" algorithm. This algorithm mimics tax noncompliance behavior when tax filers strategically declare dependent children in order to minimize the tax burden of the household.

Welfare reform and the expansion of the EITC have dramatically changed the landscape of policies of redistribution for low income families with children in the United States. This change has led to a movement away from "out of work" benefits, with their strong work disincentives, and an increase in "in work" benefits, which promote employment. This dramatic policy shift has been followed by other developed countries (Owens 2005).

The research shows that these policies have been successful at increasing the employment of single mothers with children (Eissa and Liebman 1996, Meyer and Rosenbaum 2000, 2001, Grogger 2003). Additionally, results based on the new Supplemental Poverty Measure, first released by the Census in 2011, show that the EITC is the most important anti-poverty program for families with children. The Census tabulations show that the EITC removes 4.7 million children from poverty, more than any other tax or transfer program (Short 2012).

In light of the importance of the EITC for lower income families, and the decline of TANF, in this paper we evaluate whether the EITC satisfies a central tenet of safety net programs – that they provide protection in times of economic need. While we do not in any way claim that this protective role is an explicit goal of the EITC, evaluating the current safety net in terms of whether and how it provides protection against income losses is important and understudied. The Great Recession provides our first opportunity to test this transformed safety net. We examine this issue by using administrative tax records to estimate the cyclicality of the EITC. We do so by leveraging substantial variation across states in the timing and severity of cycles which we measure with the state unemployment rate.

Our results show that for the largest group of EITC recipients, single mothers with children, there is a *negative* but statistically insignificant relationship between unemployment rates and their use of the EITC. There is therefore no evidence that the EITC provides insurance against shocks to income for this group; in fact the point estimates suggests that the EITC acts as an income de-stabilizer. On the other hand, for married couples with children (and to a lesser extent the childless), use of the EITC is found to rise in recessions and thus the credit acts to mitigate income losses for this group. These results can be understood within the context of labor supply theory and in particular connect to the different predictions

for how earnings changes for one- versus two-earner households as well as underlying differences in the distribution of income across the different family types.

We do not view our results as suggesting that the EITC ought to be reformed to address this limitation. Insuring against income shocks is not a stated goal of the EITC and its in-work structure yields important benefits in terms of increasing work and earnings and reducing poverty and income inequality. Yet, we simply point out that a consequence of the decline of the move from out-of-work based assistance to in-work based assistance is less protection to income shocks for lower income groups (Bitler and Hoynes 2013). In the Great Recession this was countered to some extent by increases in Food Stamp benefits and unemployment insurance extensions, but these protections were temporary. As employment rates have increased among single women with children in response to this change in the policy landscape, future work needs to examine whether and to what extent Unemployment Insurance is providing job loss protection for this group.

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Table 1: Summary Statistics, EITC Recipients and Expenditures, 2008

Total EITC Recipients (Millions)	24.4
Total EITC Expenditures (Billions 2008$)	$50.5
Percent Distribution of Recipients, by Demographic Group	
No Children	21.9%
Single with Children	58.7%
Married with Children	19.4%
Percent Distribution of Expenditures, by Demographic Group	
No Children	2.7%
Single with Children	74.1%
Married with Children	23.2%
Average Credit Amount (2008$), by Demographic Group	
No Children	$253
Single with Children	$2,613
Married with Children	$2,471

Notes: Data are from the 2008 Statistics of Income, which contains information on tax returns for tax year 2008 (income earned during calendar year 2008). The sample excludes high-income earners, individuals living abroad, late filers and married couples filing separately. Statistics are weighted to represent the population of tax filers.

Table 2: Effects of Unemployment Rate on EITC Recipiency Rates and Expenditures per Potential Tax Filer

	(1) All	(2) Children, Married	(3) Children, Single	(4) No Children
A: EITC Recipients per Potential Tax Filer				
Unemployment Rate	0.385*	0.881***	-0.820	0.252*
	(0.220)	(0.270)	(1.306)	(0.133)
Mean Y	0.220	0.144	0.855	0.079
Percent Impact (%)	1.8	6.1	-1.0	3.2
Observations	663	1326	1326	1326
B: Real EITC Expenditures per Potential Tax Filer (2008$)				
Unemployment Rate	547.6	1969.7***	-2168.8	47.2
	(609.2)	(672.9)	(3843.3)	(46.4)
Mean Y	460.5	345.3	2201.6	20.1
Percent Impact (%)	1.2	5.7	-1.0	2.3
Observations	663	1326	1326	1326

Notes: Data are from the 1996–2008 Statistics of Income, with denominators measuring the number of potential tax filers from the CPS ASEC for the corresponding survey year after the tax year. The sample excludes high-income earners, late filers, individuals living abroad and married couples filing separately. The dependent variables are total EITC recipients and real EITC expenditures ($2008), each divided by the total population of potential filers in each cell. All regressions include controls for demographic characteristics, as well as state and year fixed effects. The results are weighted by the population of potential filers in each cell. The unemployment rate is measured in percentage points. Percent impact is calculated as the effect of a 1 percentage point (1 unit) increase in the unemployment rate divided by the mean value of the dependent variable. Standard errors are clustered by state and shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 3: Effect of Unemployment Rate on Filing Propensity and EITC Eligible Filers per Potential Filer, Based on Earned Income

	(1) Children, Married	(2) Children, Single	(3) No Children
A: Total Filers			
Unemployment Rate	0.198	-1.775*	-1.466***
	(0.577)	(1.053)	(0.519)
Share of Filers	1.00	1.00	1.00
Mean Y	0.818	1.135	1.021
Percent Impact (%)	0.2	-1.6	-1.4
Observations	1326	1323	1326
B: Filers in the Eligible Region			
Unemployment Rate	1.035***	-0.537	-0.147
	(0.322)	(1.031)	(0.210)
Share of Filers	0.24	0.74	0.25
Mean Y	0.192	0.839	0.273
Percent Impact (%)	5.4	-0.6	-0.5
Observations	1326	1323	1326

Notes: Data are from the 1996–2008 Statistics of Income, with denominators measuring the number of potential tax filers from the CPS ASEC for the corresponding survey year after the tax year. The sample excludes high-income earners, individuals living abroad, late filers and married couples filing separately. Dependent variable represents the number of filers in the SOI or the number of filers whose earned income puts them in the EITC eligible range, each divided by the population of total potential filers in the demographic group. All regressions include controls for demographic characteristics, as well as state and year fixed effects. The results are weighted by the population of potential filers in each cell. The unemployment rate is measured in percentage points. Percent impact is calculated as the effect of a 1 percentage point (1 unit) increase in the unemployment rate divided by the mean value of the dependent variable. Standard errors are clustered by state and shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 4: Effect of Unemployment Rate on Participation Rate in Other Safety Net Programs

	(1) EITC All	(2) EITC Children	(3) AFDC/TANF	(4) Food Stamps	(5) UI
Unemployment Rate	0.163**	0.108*	0.066*	0.285***	0.135***
	(0.068)	(0.063)	(0.033)	(0.061)	(0.012)
Mean Y	0.072	0.058	0.009	0.034	0.009
Percent Impact (%)	2.2	1.8	7.7	8.4	14.5
Observations	663	663	663	663	663

Notes: Participation rates for years 1996–2008. The dependent variables are EITC, AFDC/TANF, food stamps, and UI recipients, each divided by the state population. Sources for recipients are in text. All regressions include state and year fixed effects. The results are weighted by the state population. The unemployment rate is measured in percentage points. Percent impact is calculated as the effect of a 1 percentage point (1 unit) increase in the unemployment rate divided by the mean value of the dependent variable. Standard errors are clustered by state and shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 5: Effect of Unemployment Rate on Official Poverty Rate: With and Without EITC

	Official Poverty				Add EITC			
	50%	100%	150%	200%	50%	100%	150%	200%
A: Married with Children								
Unemployment Rate	0.262***	0.742***	0.793***	1.024***	0.152**	0.588***	0.744***	1.028***
	(0.062)	(0.120)	(0.138)	(0.187)	(0.057)	(0.107)	(0.127)	(0.186)
Mean Y	0.025	0.077	0.151	0.237	0.020	0.059	0.141	0.235
Percent change in coef. due to EITC					-42.0	-20.8	-6.2	0.4
Observations	1326	1326	1326	1326	1326	1326	1326	1326
B: Single with Children								
Unemployment Rate	1.084***	1.974***	1.822***	1.730***	1.024***	1.775***	1.864***	1.788***
	(0.288)	(0.349)	(0.445)	(0.337)	(0.289)	(0.337)	(0.454)	(0.336)
Mean Y	0.199	0.373	0.526	0.649	0.177	0.317	0.481	0.632
Percent change in coef. due to EITC					-5.5	-10.1	2.3	3.4
Observations	1326	1326	1326	1326	1326	1326	1326	1326
C: Married with Children, SPM Equivalence Scales								
Unemployment Rate	0.256***	0.706***	0.868***	1.054***	0.148**	0.640***	0.837***	1.041***
	(0.058)	(0.124)	(0.145)	(0.190)	(0.063)	(0.124)	(0.139)	(0.191)
Mean Y	0.027	0.081	0.158	0.245	0.021	0.064	0.149	0.244
Percent change in coef. due to EITC					-42.2	-9.3	-3.6	-1.2
Observations	1326	1326	1326	1326	1326	1326	1326	1326
D: Single with Children, SPM Equivalence Scales								
Unemployment Rate	1.263***	1.934***	1.781***	1.731***	1.221***	1.787***	1.941***	1.709***
	(0.303)	(0.345)	(0.466)	(0.322)	(0.301)	(0.335)	(0.469)	(0.345)
Mean Y	0.207	0.385	0.534	0.655	0.183	0.330	0.494	0.639
Percent change in coef. due to EITC					-3.3	-7.6	9.0	-1.3
Observations	1326	1326	1326	1326	1326	1326	1326	1326

Notes: Data are from the CPS ASEC calendar years 1996-2008 and are collapsed at the demographic group, state and year level. Children are defined following the definition for dependent children (same as children for EITC purposes). Panels A and B include the results of regressions for being below various multiples of the official poverty threshold; Panels C and D include the results of regressions for being below various multiples of the official poverty threshold for a family of 4 but incorporate the equivalence scales for families of different sizes from the new Supplemental Poverty Measure. All regressions include controls for demographic characteristics, as well as state and year fixed effects. The results are weighted by the number of families in each cell. The unemployment rate is measured in percentage points. Percent change in the unemployment coefficient due to the EITC is calculated as the percentage change in the coefficient for being below the relevant multiple of the poverty threshold between the specifications for official poverty and official poverty after adding the EITC to income. Standard errors are clustered by state and shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 6: Effect of Unemployment Rate on EITC Recipiency Rates, Sensitivity to Adding State-Year Controls

	EITC Recipients / Population			
	(1)	(2)	(3)	(4)
A: Married with Children				
Unemployment Rate	0.881***	0.888***	0.477*	0.464*
	(0.270)	(0.263)	(0.260)	(0.257)
Observations	1326	1326	1326	1326
B: Single with Children				
Unemployment Rate	-0.820	-0.735	-1.304	-1.504
	(1.306)	(1.266)	(1.585)	(1.617)
Observations	1326	1326	1326	1326
C: Childless				
Unemployment Rate	0.252*	0.257*	0.149	0.118
	(0.133)	(0.135)	(0.147)	(0.149)
Observations	1326	1326	1326	1326
State Policies		Yes		Yes
State Linear Trend			Yes	Yes

Notes: Data are from the 1996–2008 Statistics of Income, with denominators measuring the number of potential tax filers from the CPS ASEC for the corresponding survey year after the tax year. The sample excludes high-income earners, individuals living abroad, late filers and married couples filing separately. The dependent variables are total EITC recipients and real EITC expenditures ($2008), each divided by the total population of potential filers in each cell. All regressions include controls for demographic characteristics, as well as state and year fixed effects. The results are weighted by the population of potential filers in each cell. The unemployment rate is measured in percentage points. Standard errors are clustered by state and shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 7: Effects of the Unemployment Rate on EITC Recipiency Rates, Sensitivity to Treatment of Late Filers

	Tax Year, with Late Filers		Filing Year
	Excluded [Baseline]	Included	Late Filers Included
	(1)	(2)	(3)
A: Married with Children			
Unemployment Rate	0.462*	0.422	0.504*
	(0.273)	(0.293)	(0.291)
Mean Y	0.143	0.147	0.147
Percent Impact (%)	3.2	2.9	3.4
Observations	918	918	918
B: Single with Children			
Unemployment Rate	-1.101	-1.066	-1.002
	(1.563)	(1.578)	(1.648)
Mean Y	0.838	0.856	0.857
Percent Impact (%)	-1.3	-1.2	-1.2
Observations	918	918	918
C: Childless			
Unemployment Rate	0.418*	0.506**	0.416*
	(0.217)	(0.230)	(0.229)
Mean Y	0.074	0.079	0.078
Percent Impact (%)	5.7	6.4	5.3
Observations	918	918	918

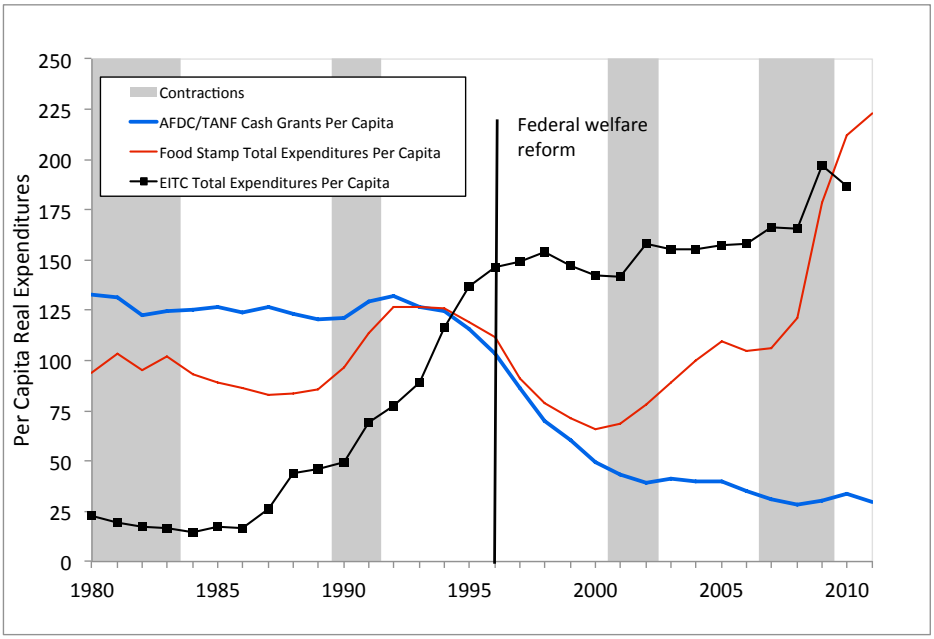
Notes: Data are from the 1996–2004 Statistics of Income, with denominators measuring the number of potential tax filers from the CPS ASEC for the corresponding survey year after the tax year. The sample excludes high-income earners, individuals living abroad and married couples filing separately. The dependent variable is total EITC recipients divided by the total population of potential filers in each cell. All regressions include controls for demographic characteristics, as well as state and year fixed effects. The results are weighted by the population of potential filers in each cell. The unemployment rate is measured in percentage points. Percent impact is calculated as the effect of a 1 percentage point (1 unit) increase in the unemployment rate divided by the mean value of the dependent variable. Standard errors are clustered by state and shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table 8: Effects of Unemployment Rate on EITC Recipiency Rates, Sensitivity to Extending Sample through 2010

	EITC Recipients / Population			
	(1) All	(2) Married	(3) Head of Household	(4) Single
A: Years 1996-2008				
Unemployment Rate	0.385*	0.500***	0.252	-0.041
	(0.220)	(0.166)	(1.215)	(0.249)
Mean Y	0.220	0.097	0.781	0.151
Percent Impact (%)	1.8	5.2	0.3	-0.3
Observations	663	663	663	663
B: Years 1996-2010				
Unemployment Rate	0.269**	0.431***	-0.192	0.111
	(0.128)	(0.115)	(0.827)	(0.134)
Mean Y	0.224	0.101	0.782	0.156
Percent Impact (%)	1.2	4.3	-0.2	0.7
Observations	765	765	765	765

Notes: Data are from the 1996–2008 Statistics of Income, with denominators measuring the number of potential tax filers from the CPS ASEC for the corresponding survey year after the tax year. The sample excludes high-income earners, individuals living abroad, late filers and married couples filing separately. The dependent variables are total EITC recipients and real EITC expenditures ($2008), each divided by the total population of potential filers in each cell. All regressions include controls for state and year fixed effects. The results are weighted by the population of potential filers in each cell. The unemployment rate is measured in percentage points. Percent impact is calculated as the effect of a 1 percentage point (1 unit) increase in the unemployment rate divided by the mean value of the dependent variable. Standard errors are clustered by state and shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Figure 1: Per Capita Expenditures on Cash and Near Cash Transfer Programs for Families (2009$)



Notes: Figures are derived from data in Bitler and Hoynes (2010) and updated data.

Figure 2: EITC Schedule for Single Parents with Two Children (2012) and Predicted Effects

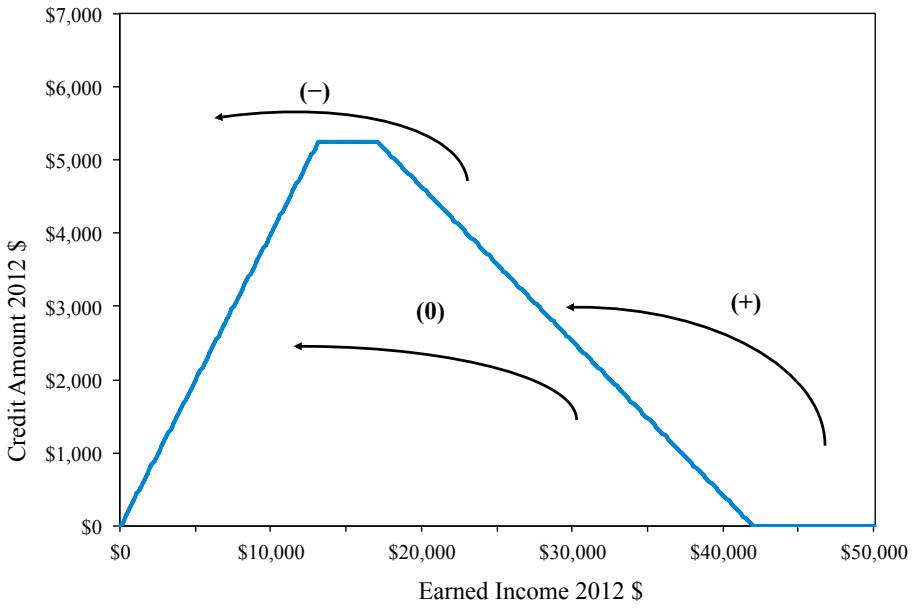
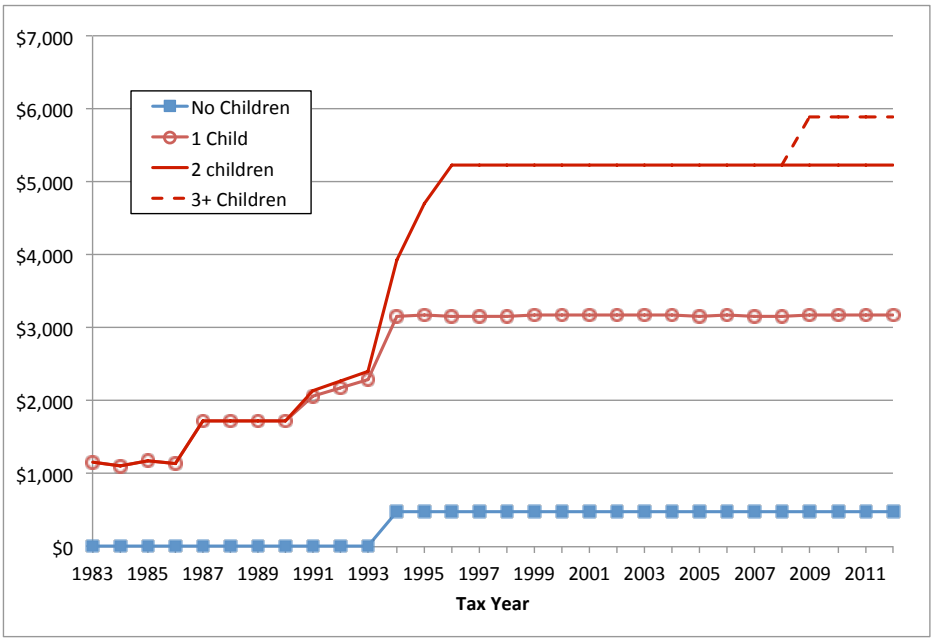


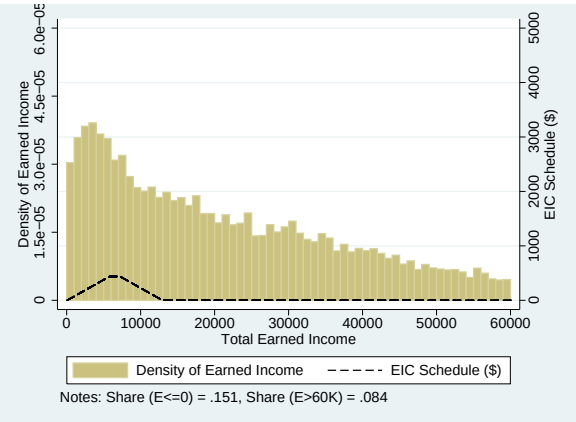
Figure 3: EITC Maximum Benefits By Number of Children (2012$)



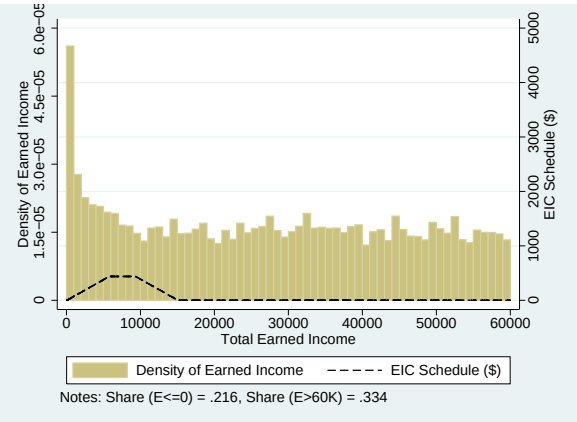
Notes: Data on nominal EITC benefits are from Tax Policy Center. Data on CPI are from the BLS.

Figure 4: EITC Eligibility and the Earned Income Distribution—2006

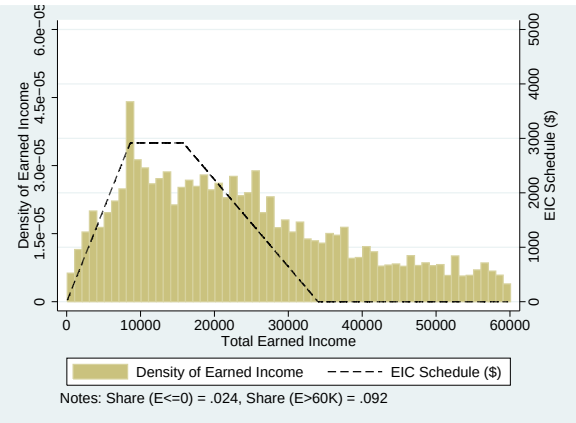
(a) Single, No Children



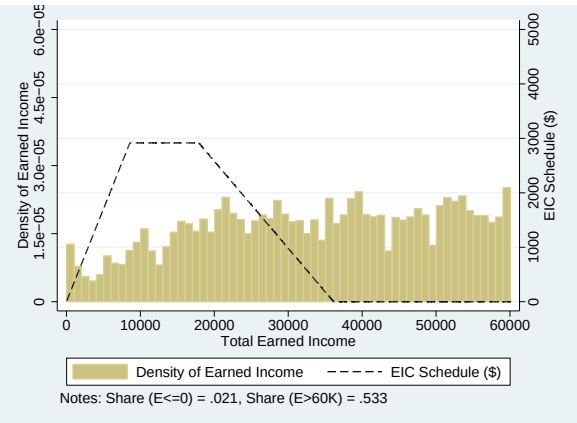
(b) Married, No Children



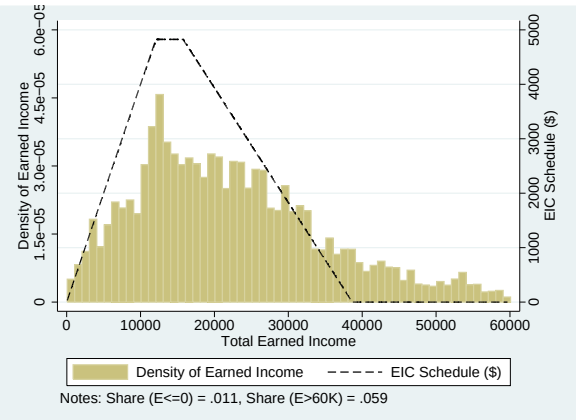
(c) Single, One Child



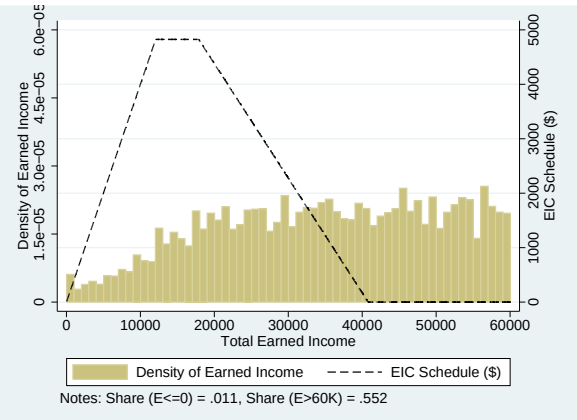
(d) Married, One Child



(e) Single Two+ Children



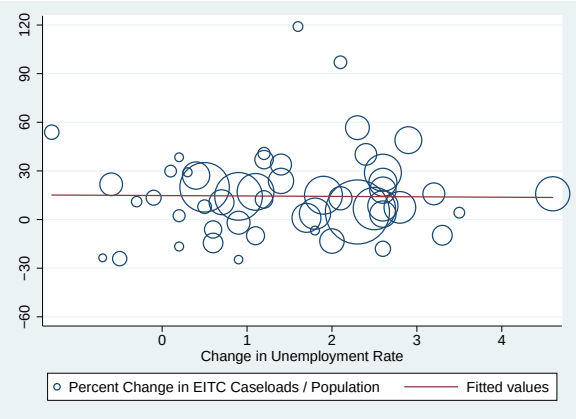
(f) Married, Two+ Children



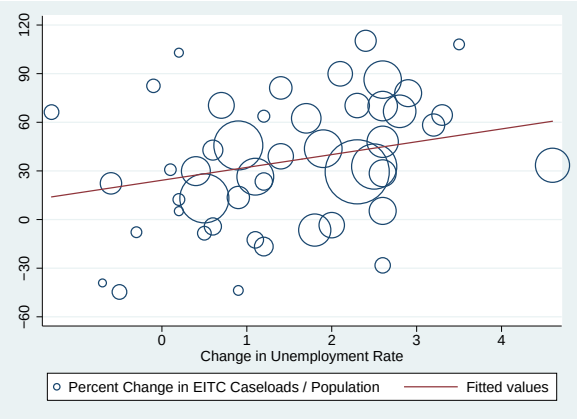
Notes: Figures show the earned income distribution for Tax Year 2006 with the EITC schedule overlaid. Figures on left are for single filers; figures on right are for married filers. Figures in Panels (a) and (b) are for filers with no children; those in Panels (c) and (d) are for filers with one child, and those in Panels (e) and (f) are for filers with 2 or more children. The share of filers with negative or 0 income as well as those with income above $60,000 are in the figure notes. Data are from Statistics of Income for tax year 2006 (income earned during calendar year 2006). The sample excludes high-income earners, individuals living abroad, late filers and married couples filing separately. Histograms are weighted to represent the population of tax filers.

Figure 5: EITC Recipiency Rates and Unemployment Rates, Changes from 2000 to 2008 by State

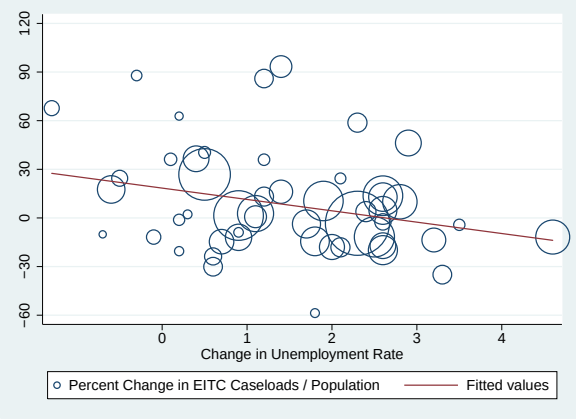
(a) All



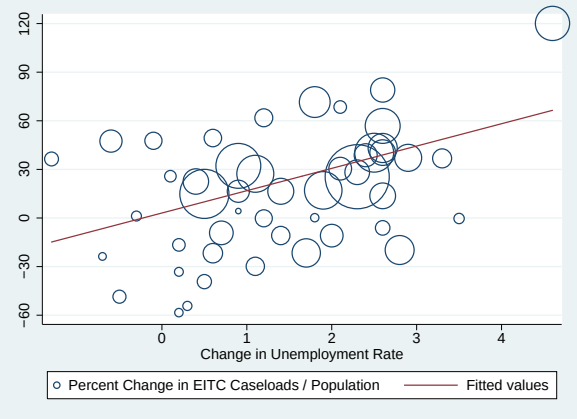
(b) No Children



(c) Single with Children



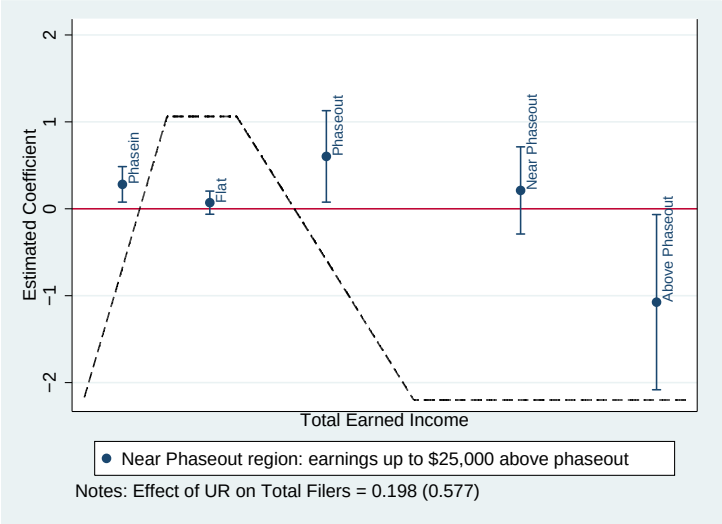
(d) Married with Children



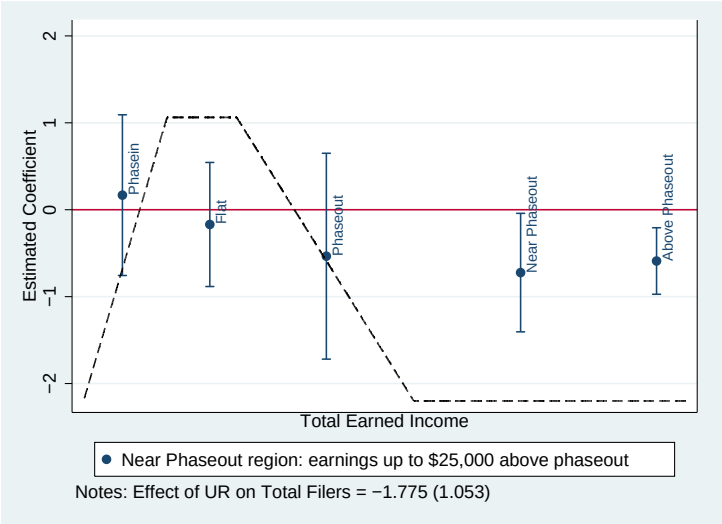
Notes: Data are from the 2000 and 2008 Statistics of Income. Unemployment rate changes measured in percentage points; recipiency rate changes measured in percent. The sample excludes high-income earners, individuals living abroad, late filers and married couples filing separately. Unemployment rates are from the BLS. Circle sizes are proportional to the population of potential filers in each cell, calculated with CPS ASEC data. In order to present results on the same scale, we drop observations where the percent change in EITC recipients divided by population is larger than 130.

Figure 6: Effect of Unemployment Rate on Location in EITC Schedule According to Earned Income

(a) Married with Children



(b) Single with Children



Notes: Data are from the 1996–2008 Statistics of Income, with denominators measuring the number of potential tax filers from the CPS ASEC for the corresponding survey year after the tax year. The sample excludes high-income earners, individuals living abroad, late filers and married couples filing separately. Each point represents an estimated coefficient where the dependent variable is the number of filers whose earned income puts them in each EITC range, each divided by the population of total potential filers in the demographic group. All regressions include controls for demographic characteristics, as well as state and year fixed effects. The results are weighted by the population of potential filers in each cell. The unemployment rate is measured in percent. Standard errors are clustered by state.

A Appendix: Further Results

Table A.1: Effects of Unemployment Rate on EITC Recipiency Rate and Expenditures per Potential Tax filer, by Marital Status and Number of Children

	Single			Married		
	(1) Zero	(2) One	(3) Two or More	(4) Zero	(5) One	(6) Two or More
A: EITC Recipiency Rate						
Unemployment Rate	0.477**	-1.137	-0.472	-0.102	0.693*	0.986***
	(0.204)	(1.706)	(1.493)	(0.123)	(0.373)	(0.346)
Mean Y	0.115	0.814	0.906	0.023	0.134	0.150
Percent Impact (%)	4.1	-1.4	-0.5	-4.4	5.2	6.6
Observations	663	663	663	663	663	663
B: EITC Dollars/Potential Tax Filer (2008$)						
Unemployment Rate	95.8	-3419.5	-767.7	-31.2	1026.4	2477.1**
	(66.1)	(3906.9)	(5195.9)	(39.2)	(723.8)	(1007.3)
Mean Y	29.2	1647.3	2899.1	6.0	239.2	407.5
Percent Impact (%)	3.3	-2.1	-0.3	-5.2	4.3	6.1
Observations	663	663	663	663	663	663

Notes: Data are from the 1996–2008 Statistics of Income, with denominators measuring the number of potential tax filers from the CPS ASEC for the corresponding survey year after the tax year. The sample excludes high-income earners, individuals living abroad, late filers and married couples filing separately. The dependent variables are total EITC recipients and real EITC expenditures ($2008), each divided by the total population of potential filers in each cell. All regressions include controls for state and year fixed effects. The results are weighted by the population of potential filers in each cell. The unemployment rate is measured in percentage points. Percent impact is calculated as the effect of a 1 percentage point (1 unit) increase in the unemployment rate divided by the mean value of the dependent variable. Standard errors are clustered by state and shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table A.2: Asymmetric Effects of Unemployment Rate on EITC Recipiency Rate, Expenditures per Potential Tax Filer, and and Propensity to File Taxes

	(1) Children, Married	(2) Children, Single	(3) No Children
A: EITC Recipiency Rate			
UR * Expansion	0.956***	-0.333	0.280*
	(0.270)	(1.405)	(0.146)
UR * Recession	0.894***	-0.722	0.257*
	(0.271)	(1.305)	(0.134)
p-value, rec. coef. = exp. coef.	0.288	0.172	0.497
Observations	1326	1326	1326
B: EITC Dollars/Potential Tax Filer (2008$)			
UR * Expansion	2111.6***	-1320.6	53.8
	(679.9)	(4145.0)	(47.7)
UR * Recession	1995.9***	-1998.3	48.3
	(672.5)	(3862.8)	(46.1)
p-value, rec. coef. = exp. coef.	0.463	0.407	0.638
Observations	1326	1326	1326
C: Probability of Filing Taxes			
UR * Expansion	0.266	-1.769	-1.720***
	(0.627)	(1.077)	(0.604)
UR * Recession	0.210	-1.774*	-1.550***
	(0.580)	(1.043)	(0.570)
p-value, rec. coef. = exp. coef.	0.762	0.988	0.307
Observations	1326	1326	1326

Notes: Data are from the 1996–2008 Statistics of Income, with denominators measuring the number of potential tax filers from the CPS ASEC for the corresponding survey year after the tax year. The sample excludes high-income earners, individuals living abroad, late filers and married couples filing separately. The dependent variables are total EITC recipients, real EITC expenditures ($2008) and total filers, each divided by the total population of potential filers in each cell. Expansion (recession) years are defined as years in which a state experienced a decrease (increase) in the state unemployment rate. All regressions include controls for demographic characteristics, as well as state and year fixed effects. The results are weighted by the population of potential filers in each cell. The unemployment rate is measured in percentage points. Percent impact is calculated as the effect of a 1 percentage point (1 unit) increase in the unemployment rate divided by the mean value of the dependent variable. Standard errors are clustered by state and shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table A.3: Effects of Employment on EITC Recipiency Rate and Expenditures per Potential Tax Filer

	(1) All	(2) Children, Married	(3) Children, Single	(4) No Children
A: EITC Recipiency Rate				
Log (Employment)	-0.127**	-0.163**	-0.054	-0.070***
	(0.049)	(0.061)	(0.272)	(0.026)
Mean Y	0.220	0.144	0.855	0.079
Observations	663	1326	1326	1326
B: EITC Dollars/Potential Tax Filer (2008$)				
Log (Employment)	-241.6	-307.6	-495.8	-16.3*
	(155.5)	(187.1)	(805.9)	(9.2)
Mean Y	460.5	345.3	2201.6	20.1
Observations	663	1326	1326	1326

Notes: Data are from the 1996–2008 Statistics of Income, with denominators measuring the number of potential tax filers from the CPS ASEC for the corresponding survey year after the tax year. The business cycle is measured by the natural log of non-farm employment from the BLS. The sample excludes high-income earners, late filers, individuals living abroad and married couples filing separately. The dependent variables are total EITC recipients and real EITC expenditures ($2008), each divided by the total population of potential filers in each cell. All regressions include controls for demographic characteristics, as well as state and year fixed effects. The results are weighted by the population of potential filers in each cell. Standard errors are clustered by state and shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table A.4: Effect of Cycles on Filing Propensity and EITC Eligible Filers per Potential Filer, By Earned Income

	(1) Total	(2) Eligible	(3) Phasein	(4) Flat	(5) Phaseout	(6) Near Phaseout	(7) Above	(8) Non-positive
A: Married with Kids								
Unemployment Rate	0.198	1.035***	0.281***	0.071	0.602**	0.211	-1.074**	0.027
	(0.577)	(0.322)	(0.104)	(0.068)	(0.268)	(0.256)	(0.514)	(0.044)
Share of Filers	1.00	0.24	0.03	0.04	0.17	0.24	0.52	0.01
Mean Y	0.818	0.192	0.026	0.030	0.142	0.197	0.424	0.012
Percent Impact (%)	0.2	5.4	10.9	2.4	4.2	1.1	-2.5	2.2
Observations	1326	1326	1326	1326	1326	1326	1326	1326
B: Single with Kids								
Unemployment Rate	-1.775*	-0.537	0.168	-0.170	-0.535	-0.723**	-0.590***	0.075
	(1.053)	(1.031)	(0.472)	(0.364)	(0.604)	(0.348)	(0.195)	(0.118)
Share of Filers	1.00	0.74	0.18	0.15	0.41	0.17	0.07	0.02
Mean Y	1.135	0.839	0.195	0.175	0.469	0.192	0.085	0.020
Percent Impact (%)	-1.6	-0.6	0.9	-1.0	-1.1	-3.8	-6.9	3.8
Observations	1323	1323	1323	1323	1323	1323	1323	1323

Notes: Regressions present the effect of the unemployment rate on the total number of filers per potential tax filers (column 1) or the number of filers in various ranges of the EITC schedule according to earnings denominated by the number of potential tax filers (columns 2–8). All regressions include controls for demographic characteristics, as well as state and year fixed effects. The results are weighted by the population in each cell. The unemployment rate is measured in percentage points. Percent impact is calculated as the effect of a 1 percentage point (1 unit) increase in the unemployment rate divided by the mean value of the dependent variable. Standard errors are clustered by state and shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01

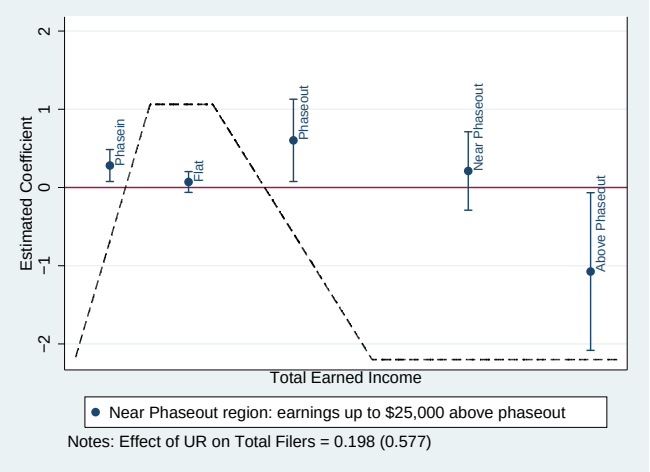
Table A.5: Sensitivity of Effects of Unemployment Rate on Recipiency Rates and Expenditures per Potential Tax Filer to Definition of Population (Denominator)

	(1) Children, Married	(2) Children, Single	(3) No Children
A: EITC Recipients			
a) Kids: 18 and younger	0.935***	-0.828	0.236*
	(0.295)	(1.437)	(0.126)
b) Kids: 19 and younger, or 24 and FT students	0.892***	-0.493	0.244*
	(0.276)	(1.379)	(0.132)
c) Kids: b) and disabled, citizens only	0.938***	-0.794	0.243*
	(0.265)	(1.349)	(0.130)
d) Kids: b) and disabled, and filers maximization	0.856***	-0.636	0.260*
	(0.256)	(1.121)	(0.142)
B: EITC Dollars (2008$)			
a) Kids: 18 and younger	2091.7***	-2511.3	44.1
	(732.9)	(4266.4)	(44.3)
b) Kids: 19 and younger, or 24 and FT students	1991.0***	-1571.4	45.4
	(685.4)	(4057.4)	(46.1)
c) Kids: b) and disabled, citizens only	2088.0***	-2017.9	45.1
	(666.8)	(3964.0)	(45.5)
d) Kids: b) and disabled, and filers maximization	1908.6***	-1786.7	48.3
	(641.4)	(3381.3)	(49.8)
Observations	1326	1326	1326

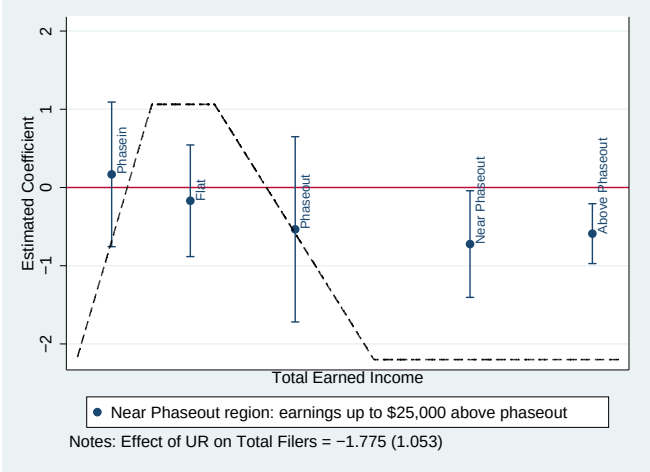
Notes: Data are from the 1996–2008 Statistics of Income, with denominators measuring the number of potential tax filers from the CPS ASEC for the corresponding survey year after the tax year using various definitions of this population. The sample excludes high-income earners, individuals living abroad, late filers and married couples filing separately. The dependent variables are total EITC recipients and real EITC expenditures ($2008), each divided by the total population of potential filers in each cell. All regressions include controls for state and year fixed effects. The results are weighted by the population of potential filers in each cell. The unemployment rate is measured in percentage points. Standard errors are clustered by state and shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Figure A.1: Effect of Cycles on EITC Eligible Filers per Potential Filer, By Earned Income

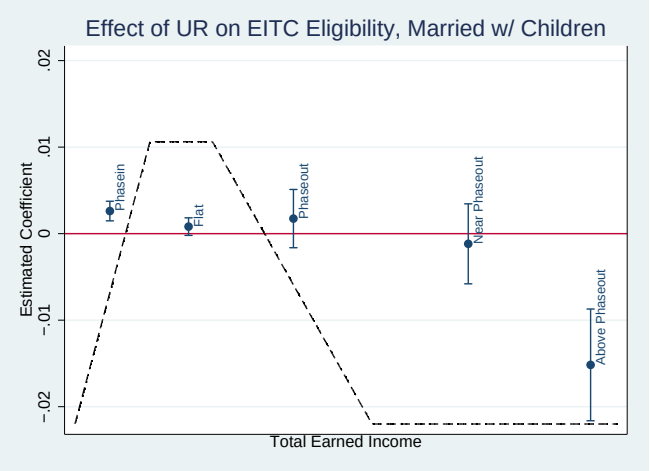
(a) Married with Children—SOI



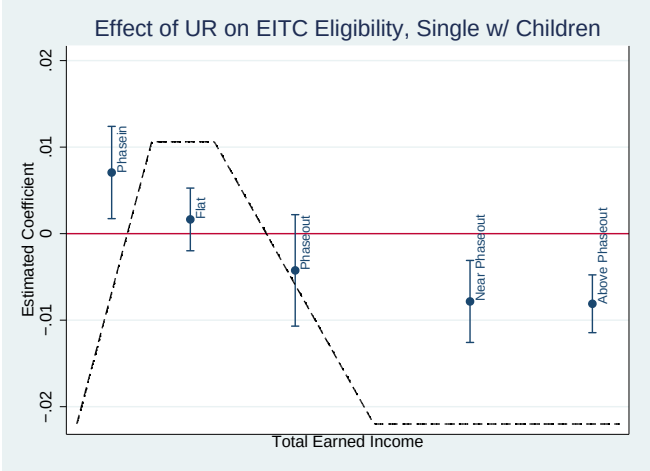
(b) Single with Children—SOI



(c) Married with Children—CPS



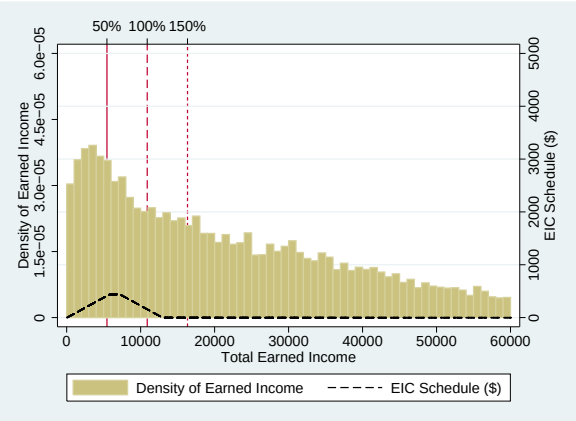
(d) Single with Children—CPS



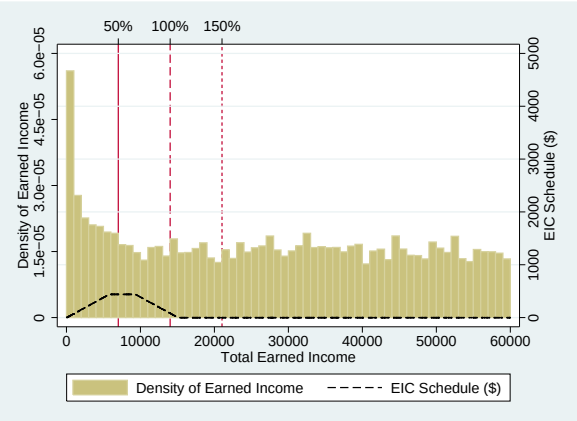
Notes: Data are from the 1996–2008 Statistics of Income and the 1997–2009 CPS ASEC, with denominators measuring the number of potential tax filers from the CPS ASEC for the corresponding survey year after the tax year. The sample excludes high-income earners, individuals living abroad, late filers and married couples filing separately. Each point represents an estimated coefficient where the dependent variable is the number of filers whose earned income puts them in each EITC range, each divided by the population of total potential filers in the demographic group. All regressions include controls for demographic characteristics, as well as state and year fixed effects. The results are weighted by the population of potential filers in each cell. The unemployment rate is measured in percentage points.Standard errors are clustered by state.

Figure A.2: EITC Eligibility, Earned Income Distribution, and Poverty Thresholds—2006

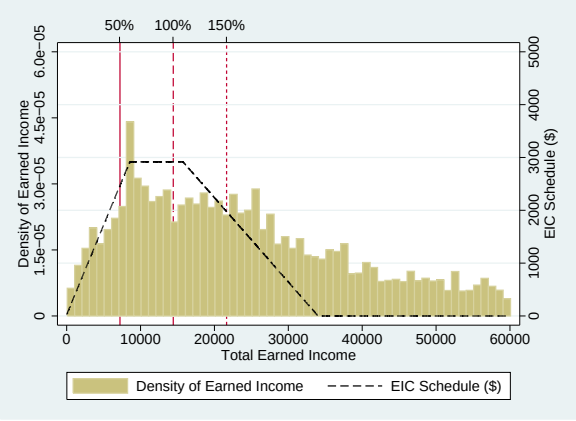
(a) Single, No Children



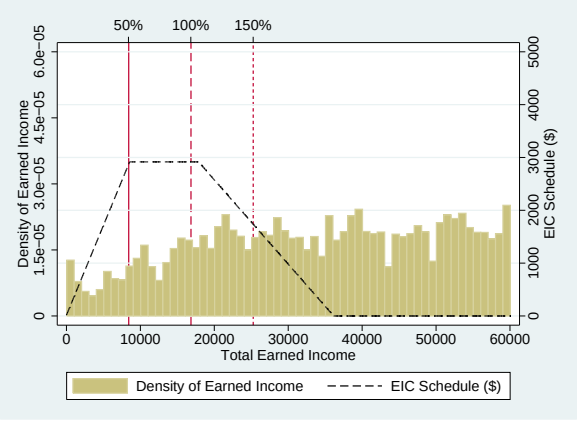
(b) Married, No Children



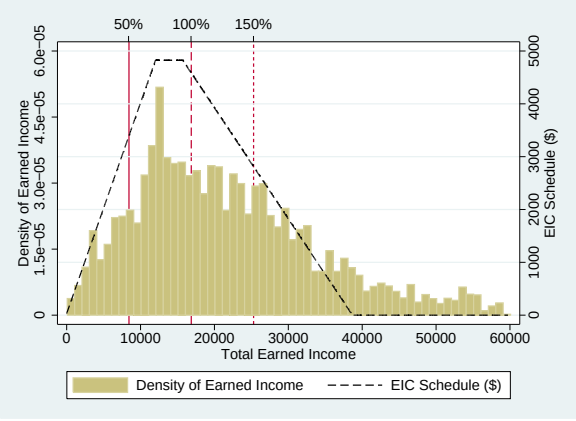
(c) Single, One Child



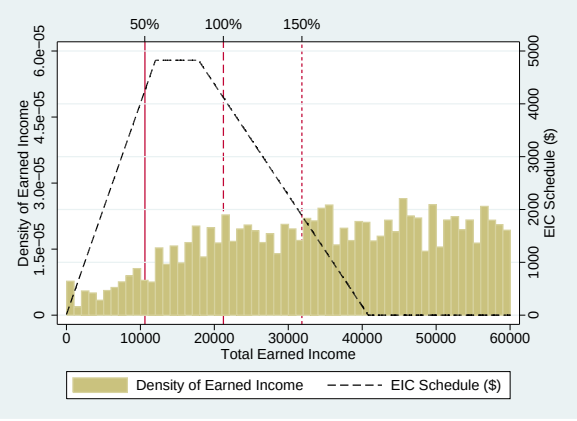
(d) Married, One Child



(e) Single, Two Children



(f) Married, Two Children



Notes: Figures show the earned income distribution and the EITC schedule overlaid with data on poverty thresholds. Figures on left are for single filers; figures on right are for married filers. Figures in Panels (a) and (b) are for filers with no children; those in Panels (c) and (d) are for filers with one child, and those in Panels (e) and (f) are for filers with two children. Data on earned income are from Statistics of Income for tax year 2006 (income earned during calendar year 2006). The sample excludes high-income earners, individuals living abroad, late filers and married couples filing separately. Histograms are weighted to represent the population of tax filers. Data on nominal EITC benefits are from the Tax Policy Center. Data on poverty thresholds are from the US Census Bureau.