PRELIMINARY – PLEASE DO NOT CITE

The Long-term Effect of the Earned Income Tax Credit on Physical and Mental Health of Women

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and

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Abstract

This study examines the long-term effect of the Earned Income Tax Credit (EITC) on physical and mental health of women using exogenous policy variation. Using data from the NLSY79, we relate lifetime exposure to the EITC policy to measures of health status at age 50. We find that higher EITC exposure led to improvements in physical health by reducing the occurrence of illnesses that limit moderate and work activities and lowering the likelihood of the onset of a severe illness. However, we do not find any significant positive effects of EITC on mental health. Our findings suggest that the EITC improves physical health through multiple channels by raising income and improving health behaviors.

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1. Introduction

The Earned Income Tax Credit (EITC) is the largest anti-poverty program in the United States. The benefit provides significant income support to low- and medium-income working families with eligible children. Having evolved through a series of expansions over the past 40 years, the credit is large: In 2016, the program distributed $67 billion to 27 million low-income households.[1] A long line of research has shown that the EITC has lifted families out of poverty, had positive effects on parental labor supply, and improved outcomes for children (Hoynes & Patel, 2015; Eissa & Liebman, 1996; Meyer & Rosenbaum, 2001; Eissa & Hoynes, 2006; Hoynes, Miller & Simon, 2015; Dahl & Lochner, 2012; Dahl & Lochner, 2017). However, with the exception of women's labor force participation, fewer studies have explored the effects of the policy on mothers. Recent work has begun to fill this gap, with several studies intended to identify the effects of the EITC on the physical and mental health of mothers who receive the credit (Schmeiser 2009; Larrimore 2011; Averett and Wang 2013; Evans & Garthwaite, 2014; Kenkel, Schmeiser and Urban 2014; Hoynes, Miller & Simon 2015; Boyd-Swan et al. 2016; Lenhart 2018). In this paper, we add to this growing literature by testing for long-term effects of the EITC on mothers' health outcomes.

Our approach addresses a fundamental puzzle of this emerging literature – the fact that existing studies on the EITC and mothers' health provide mixed results. While some studies have shown positive health effects on mental and self-reported health measures, others have found null effects, or even negative effects of the policy on health outcomes and behaviors. One potential explanation for these mixed findings is the fact that health is an investment good, meaning that the EITC may only produce demonstrable and consistent health effects in the long-

[1] http://www.eitc.irs.gov/central/press/

run. However, no studies have investigated the long-term effects of the policy on health. We fill this gap by testing for a causal relationship between long-term exposure to the EITC policy and physical and mental health of women measured at age 50.

Theory predicts that increases in household income should improve health outcomes by increasing resources to spend on health inputs like health care or healthy food, by reducing financial and psychological distress, or by changing time preferences. Furthermore, robust descriptive evidence exists demonstrating that higher income individuals tend to exhibit better heath than lower income individuals, a fact that is especially true at low baseline income levels (see Evans, Wolfe and Adler 2012 for a review).

Economists have utilized numerous sources of exogenous variation in income to test for such a causal relationship, including lottery wins (Apouey & Clark, 2015; Cesarini, et al., 2016), receipt of an inheritance (Meer, Miller & Rosen, 2003; Kim & Ruhm, 2012), and political change (Frijters, et al., 2005). In general, these studies detected negligible or very small positive effects of income on physical health and health satisfaction, and on mental health – a surprising result given the large heath-income gradient found in observational studies (Meara, Richards & Cutler, 2008; Cutler, Ileras-Muney & Vogl, 2011; Chetty et al. 2016). The puzzling results of these health-wealth nexus studies might be due to the fact that the income and health connection is not driven by short-run changes in income, but rather longer-term access to resources. The behavioral and physical changes caused by year-over-year income changes may take many years to compound and generate measurable, consistent health improvements. The EITC – a program that has provided income support to tens of millions of Americans over the last four decades – offers a good opportunity to explore the causal effect of income on health outcomes using exogenous variation in income provided over many years.

The EITC has the potential to affect a recipient's health through two main channels: eligible families enjoy increased income through the credit itself, and they are exposed to the labor supply incentives of the program, which may change time use and resources in eligible households. Both of these mechanisms may generate either positive or negative immediate changes in health behaviors.

First, the additional resources that the credit provides could improve mental health by reducing stress due to financial hardship (Jones and Michelmore 2018;). The resources provided through the EITC may also affect health outcomes in the long-term to the extent that they change day-to-day consumption of health inputs. EITC income will change consumption behavior through the income and substitution effects. However, whether these changes will induce immediate improvements in health behaviors depends on whether health inputs are normal or inferior goods. Several studies have demonstrated that EITC recipients respond to benefit income by improving their consumption habits, including increasing consumption of healthy foods in the months they received the credit (McGranahan & Schanzenbach, 2013). Some studies have also shown reductions in smoking when the EITC is expanded (Averett and Wang 2015; Hoynes, Miller & Simon, 2015). However, other studies have shown that more generous EITC benefits lead to increased BMI and increased smoking (Schmeiser 2009; Kenkel, Schmeiser, & Urban 2014), or have found no association between the EITC benefit and smoking (Markowitz et al. 2017).

Second, expansions to the EITC policy may also affect health through labor supply incentives. The program is structured to encourage labor force participation for the lowest income workers. Thus, the EITC may cause income increases beyond the value of the credit if mothers work more in response to the program. In addition to the psychological and

consumption effects generated by additional resources discussed above, working may also affect health by providing access to health insurance (Lenhart 2018). Working may also be good for your health if it encourages active living or cognitive engagement. However, working could worsen long-term health if it is stressful or physically demanding, especially if mothers are forced to take-on low quality jobs with less flexible hours or worse working conditions. In sum, both the resource and labor supply effects of the EITC could induce positive or negative changes in health behaviors in the short-term.

It is difficult to predict how the unique mix of positive and negative behavioral changes induced by the EITC will combine to affect health outcomes. Indeed, existing studies on the short-run effects of the EITC on health outcomes have confirmed this: some studies have shown improvements in health outcomes – especially mental health outcomes (Evans & Garthwaite, 2014; Boyd-Swan et al. 2016; Lenhart 2018); others have found evidence of worse health (Schmeiser 2009) in the short-run, or null effects of the policy (Larrimore 2011). These studies, however, measure the contemporaneous effects of the policy on health outcomes, link changes in outcomes to recent changes in the program structure. Their approach does not account for the fact that health in an investment good. As such, effects of a policy change today may take many years to reveal themselves. This is especially true in the case of the EITC, where families can be eligible for the credit for many years. Even if the immediate net impact of the policy is unstable or difficult to measure in the short-run, the long-term net effect of the credit may be large, stable and measurable.

We extend the exiting literature on the EITC by investigating its cumulative causal impact over 30 years on measures of physical and mental health at age 50. We contribute to the very small existing literature on the impacts of the EITC over the life-course on the parental

recipients (Neumark & Shirley, 2018). Existing studies on the impact of the EITC on maternal health focus on contemporaneous impacts of the program. Our study takes a much longer-term perspective. Since health status, which is an integral part of wellbeing, depends on long-term investments, it is important to quantify the full effect of EITC. Underestimating the health benefits of EITC would lead us to undervaluing the policy from a social perspective.

We find that higher EITC exposure led to improvements in physical health by reducing the occurrence of illnesses that limit activities and lowering the likelihood of the onset of a severe illness. However, we do not find any significant positive effects of EITC on mental health and depression symptoms. Our findings suggest that the EITC improves physical health through multiple channels, including total income and improvements in health behaviors. In particular, life-time income and the likelihood of insurance coverage increase with higher long-term EITC exposure, while the likelihood of being overweight decreases.

2. Brief History of Earned Income Tax Credit

The Tax Reduction Act of 1975 created the EITC as a refundable credit for tax filers with at least one qualifying child (see Nichols & Rothstein, 2016 for a complete history).[2] The main goal of the EITC was to provide an income support program that did not disincentive labor force participation. As such, the credit was linked to work: In order to claim the EITC, tax filers must have some earned income from wages, salary or self-employment. The EITC benefit structure has three regions. For very low earners, the benefit increases as a function of earnings (phase-in

[2] As of 2016, the tax filer's child must meet relationship, residency, and age requirements to be considered a qualifying child for the credit. First, the child must have a specific relationship to the tax filer (son, daughter, step child or foster child, brother, sister, half-brother, half-sister, step brother, step sister, or descendent of such a relative). Second, the child must share a *residence* with the taxpayer for more than half the year in the United States. Third, the child must meet certain *age requirements*; namely, the child must be under the age of 19 (or age 24, if a full-time student) or be permanently and totally disabled.

region). As earnings increase, the schedule flattens such that the benefit does not change as a function of earning in the plateau region. Finally, benefits decrease as a function of earnings in the phase-out region.

The initial EITC was 10 percent of the first $4,000 of earned income, for a maximum credit of $400 in 1975. The credit was phased-out for income between $4,000 and $8,000. Since 1975, several policy changes have expanded both the value and income eligibility range of the credit for differently-sized families. Notably, the Tax Reform Act of 1986 firmly established the EITC as a key element of tax policy. This law increased the credit rate to 14 percent and gradually increased the phase-in and phase-out income ranges. The second large expansion, the Omnibus Budget Reconciliation Act (OBRA) of 1990, gradually increased the subsidy rate and eligible income range, and created separate benefit schedules for one- and multiple-children households. The third expansion occurred through OBRA 1993, which increased the subsidy rates, as well as the phase-in and phase-out income range, at a higher rate for multiple-children households. By 1996, the subsidy rate was 34 percent for families with one child, with a maximum credit of $2,152, and 40 percent for families with multiple children, with a maximum credit of $3,656. The OBRA of 1993 also introduced a smaller subsidy for childless tax filers (7.65 percent).[3] Finally, the American Recovery and Relief Act of 2009 created a new bracket for taxpayers with three or more eligible children (45 percent) while keeping the subsidy rates for families with no child (7.65 percent), one child (34 percent) and two children (40 percent) the same. Appendix Figure A1 presents the major EITCs expansions (in 2014 dollars) generated by TRA86, OBRA90 and OBRA93 by the number of children.

[3] If a tax filer has no qualifying children, she must be between ages of 25 and 64 to be eligible for the EITC. There is no age requirement for tax filer with qualifying children.

In the late 1980s, states started implementing their own EITCs, which "piggyback" on the federal EITC. There has been significant variation in the timing of implementation and expansion of state EITCs, as well as in their generosity. As of 2014, 26 states and the District of Columbia provided EITCs, with rates ranging from 4 to 40 percent. Appendix Table A1 provides a summary of the year of implementation and EITC subsidy rates in 2014 by state.

In sum, since its enactment, the EITC has undergone substantial changes in benefit amounts and eligibility rules that different families face. In our empirical framework, we utilize these changes as a source of policy-induced variation in the exposure to the EITC that mothers faced over the course of their childbearing years. We detail how we exploit this variation in our analysis in the next section.

3. Data and Methodology

3.1 Data

This study uses data from the restricted-access National Longitudinal Survey of Youth 1979 cohort (NLSY79). The NLSY79 is a nationally representative survey of individuals who have been interviewed yearly since 1979 (biannually since 1994). The initial sample of the NLSY79 consisted of 6,403 young men and 6,283 young women, born between 1957 and 1964, who were between the ages of 14 to 22 at the time of the first interview in1979.[4] A Health Module was administered to all respondents in the survey wave during which she turned 50. By the 2014 survey wave – the final wave of data included in the present study – all respondents were at least 49 years old and had been asked to complete a series of Age 50 Module questions. We limit our sample to women who responded to the Health Module. Additionally, we exclude

[4] Two subsamples including military sample (878 respondents) and economically disadvantaged nonblack/non-Hispanic sample (1,643) were dropped in 1984 and 1990, respectively.

women whose health status during childhood is missing and those who missed more than three survey interviews between 1979 and 2014.[5] These restrictions produce a sample of 3,505 women. Out of those, 2,900 women gave birth to at least one child between the ages of 16 and 44.

The NLSY79 data are uniquely suited to investigate our research question. The NLSY collects abundant demographic information in each wave including the state of residence in each year (available in the restricted access file) and the birth year of each child. These are critical factors for assessing cumulative exposure to the EITC policy. Second, standard measures of physical and mental health are included as part of the Age 50 Health Module, which we can use to measure health status. Finally, the female respondents in the NLSY sample were in the middle of their childbearing years, between ages of 32 and 39, at the time of the 1996 expansion. This makes them an ideally sample to test for long-term effects of the policy since exposure varies greatly within the sample.

Outcome measures and descriptive statistics

Both physical and mental health are measured using several questions. First, respondents are asked to self-evaluate their health status at age 50. The responses are coded on a 5-scale item from 1 (poor) to 5 (excellent), and we create an indicator for individuals with fair or poor health, relative to average or better health. Second, we use responses to the Short Form (SF)-12 Health Questionnaire, a 12-item self-administered assessment of health-related quality of life, collected at age 50. The NLSY calculated summary scores for NLSY79 respondents according to the manual by Ware, Kosinski and Keller (1995). The physical component summary (PCS-12) score

[5] Out of 3918 women who responded to health module at age 50, 47 did not provide information regarding their childhood health status and 366 skipped more than three survey waves between 1979 and 2014.

is calculated from questions that ask about the following: i) limitations with moderate activities such as moving a table, pushing a vacuum cleaner or bowling, ii) limitations with climbing several flights of stairs, iii) accomplishing less than you would like as a result of physical health, iv) being limited in the kind of work or other activities, v) pain interfering with normal activities in the past four weeks, and vi), self-assessment of general health. In large surveys of the U.S. populations, the average PCS-12 score is about 50; we therefore construct an indicator of having scored below 50 (Farivar et al. 2007). Finally, we construct measures of whether the respondent has ever been diagnosed with a mild disease (high blood pressure or high blood sugar) or a severe disease (cancer, lung disease, heart problem, heart failure or stroke) at age 50. Table 1 provides the summary statistics for our physical health measures. In our sample, 21 percent of women rated their health fair or worse at age 50. The average PCS-12 score was 48, and 37 percent of women had PCS-12 scores below 50. In addition, 41 percent of women had at least one mild disease and 24 percent of them has at least one severe disease at age 50. The physical health of mothers who did not complete college was worse across all physical health measures.

To measure mental health we used a set of nine questions, which ask respondents how often over the previous week they experiences each of the following: i) I did not feel like eating; my appetite was poor, ii) I could not shake off the blues, iii) I had trouble keeping my mind on what I was doing, iv) I felt depressed, v) I felt that everything I did was an effort, vi) my sleep was restless, vii) I felt sad, viii) I could not get "going" and ix) I felt lonely. Responses were recorded on a 4-point scale, where 0 represented rarely or none of the time (<1 days), and 3 represented most or all of the time (5-7 days). We use the sum of the responses to the 9 questions to create a depression scale out of 27; we also use an indicator variable for being depressed at age 50 equal to 1 if the score is greater than 8.

Next, we use the mental component summary (MCS-12) score. The MCS-12 asks respondents the following: : i) whether they had a lot of energy in the past four weeks; ii) whether they felt calm and peaceful; iii) whether they felt down-hearted and blue; iv) how much of the time physical and emotional problems interfered with their social activities, like visiting friends; v) whether they accomplished less as a result of any emotional problems; and vi) whether they did work or activities less carefully than usual as a result of any emotional problems. Similar to PCS-12, the average MCS-12 score is 50 in large U.S. population surveys (Jenkinson et al., 1997). We use the score of MCS-12, as well as an indicator variable for scores below 50. Finally, we use an indictor variable for having ever been diagnosed with depression. Table 1 also presents the summary statistics for our mental health outcomes. The sample average for the sum of nine questions is 5.26 out of 27, and 22 percent of our sample has a score greater than 8 at age 50. The average MCS-12 score is 51.9, and 29 percent of women in our sample score lower than the U.S. population. Finally, 21 percent of women report to having ever been diagnosed with depression. In general, the mental health of the mothers who did not graduate from college is worse than the rest of the group.

Table 1 also presents the summary statistic for demographic characteristics. In our sample of women, 6 percent report that they had fair or worse health during childhood. One third of woman gave birth to three or more children and one third of the women gave birth to two children. The remaining third of women in our sample is equally divided between childless women and mothers of one child. At age 50, 29 percent of women report having a college degree and 13 percent have some college education. For each respondent, we calculate the proportion of years she was married between ages 21 and 50. On average, respondents were married 60 percent of the time between ages 21 and 50.

3.2 Method

Our goal is to identify the cumulative, causal effect of the EITC on health outcomes. However, relating one's own EITC income and health status will generate biased estimates of the true causal effect because EITC income is endogenous. For example, if those with better health tend to earn higher incomes and receive less EITC income, then a simple OLS regression will reveal a spurious correlation between the EITC and health. To avoid the problem of endogeneity, we use lifetime exposure to the EITC policy as an exogenous source of variation in lifetime EITC income. We construct the lifetime dollar exposure to the EITC, *LifetimeEITC.* We create this variable by summing the annual, inflation-adjusted maximum federal and state benefits for which a woman could have been eligible each year between ages 21 and 50, given the calendar year, her state of residence, and the number of children residing in her household in each year. This measure is independent of other characteristics of women in our sample such as earnings. This measure captures changes in the generosity of the credit due to major expansions of the federal EITC, including TRA86, OBRA90 and OBRA93. It also captures expansions to the state credits that have occurred over the past thirty years.

We estimate the following equation:

$$Y_{i50} = \beta LifetimeEITC_i + \delta Health_{0-17i} + \eta \mathrm{K}_i + +\theta \mathrm{S}_i + \lambda \mathrm{C}_i + \gamma \mathrm{X}_i + \varepsilon_i, \qquad (1)$$

where i indexes women; Y_{i50} represents the outcomes measured at age 50 (physical and mental health); and $LifetimeEITC_i$ is the sum of maximum federal and state benefits (in 2014 dollars).[6] Model (1) controls for fixed effects in the number of children at age 50 (K), state (S) at age 50,

[6] One complication of this approach is the fact that after 1994, the NLSY switched to a biannual interview schedule. Thus, we had to impute state of residence for non-interview years (by contrast, we know the exact birth year of children even if they are born in non-interview years). If the respondent did not move to another state since the previous interview, we assumed that she continued to reside in the state of the previous interview during the non-interview year and generated the state benefits accordingly given the number of qualifying children. If the respondent moved to a new state since the previous interview, we imputed the EITC benefits for the non-interview year by averaging the EITC benefits of the previous and new state.

and mother's birth year (C). It also includes controls for childhood health ($Health_{0\text{-}17i}$) and demographics (X), which include race (three indicator variables for White, Black and Hispanic), the percentage of years married between ages of 21 and 50, and educational attainment at age 50 (four indicator variables for less than high school, high school graduate or holds GED, some college and obtained a college degree or higher). We also estimate our model on the sample of mothers, and on the sample of mothers without college degrees. In these models, we add additional fixed effects for the birth year of her first child (B). Since EITC exposure depends on fertility decisions, including the number of children and timing of births, it is important to hold these factors constant for correct identification of the policy on health outcomes. We interpret the resulting coefficient estimates of β as the change in age-50 health associated with an additional $10,000 in lifetime EITC exposure. Again, this analysis generates an intent-to-treat estimate, and does not reflect women's actual receipt of the EITC.

4. Results

4.1 Variation in Exposure to Policy Variable

Figure 1 shows that women are exposed to a wide distribution of lifetime EITC benefits, which depends on the number of children, birth year of the children, and state of residence. Childless women, who constitute 16 percent of our sample, are exposed to modest amounts of EITC benefits over their lifetime ($8,511). As shown in Table 1, the average lifetime EITC exposure for mothers with one child is $49,607, with two children is $74,804 and with three or more children is $87,014. Mothers residing in states that have more generous EITCs are exposed to the largest EITCs if they had multiple children born after the 1996 expansion.

Figure 2 plots lifetime EITC benefit exposure among mothers in our sample by the year of the first child's birth for three groups of mothers, including mothers with one child, two children and three or more children. Each line in each panel represents a different state, where the highest line represents the most generous EITC state (i.e., Minnesota). This figure verifies that the variation in lifetime EITC exposure is generated by the generosity state EITCs, the number of children and the birth year of the children. The figure reveals that lifetime EITC exposure increases with delayed childbirth until 1996, at which point the trend reverses itself. The reversal is due to the fact that women who had children later in life are still partly through their lifetime ETIC receipt since their children were less than 18 years of age in 2014. Consistent with the policy guidelines, the lifetime EITC benefit exposure increases with the number of children.

We demonstrate how our policy exposure measure varies with the observable demographics of our sample in Figure 3. We plot the average values of EITC exposure against childhood health, education at age 50, and the proportion of years between ages 21 and 50 that each woman was married. There is little observable relationship between lifetime EITC exposure and childhood health or educational attainment. Lifetime EITC exposure increases as the proportion of married years increases because married women on average tend to have more children than the unmarried.

In our narrow age cohort of women (born between 1957 and 1964), the birth year of the first child is highly correlated with the age at which a woman had her first child. Therefore, we expect a strong correlation between the birth year of the first child and the mother's human capital, such as educational attainment and health. We show the average values of our main health outcomes by the first child's birth year in Figure 4. Physical health (score of PCS-12 and indicator variable for PCS-12<50) improves with delayed onset of fertility. Since the fertility rate

drops after age 36, the variation in health outcomes increases at later years. The plots for mental our health outcomes (the score of MCS-12 and the indicator variable generated for MCS-12<50) also show that mothers who had their first children later in life have better mental health. However, the positive association between mother's mental health and later onset of fertility is not as strong as the correlation between mother's physical health and the first child's birth year.

Finally, we plot the average values of our main health outcomes by the lifetime EITC exposure in Figure 5. Both physical health (PSC-12 and indicator variable for PCS-12<50) and mental health (MCS-12 and the indicator variable for MCS-12<50) improve with higher lifetime EITC exposure. In our regressions below, we investigate whether this positive association between EITC exposure and health outcomes still hold after controlling for observable characteristics and other relevant policy demographics.

4.2 Reduced Form Results

Table 2 presents the results of the estimation of our main model with physical health outcomes at age 50. We separately estimate Equation (1) on the sample of all women, the sample of mothers and, in some cases, the sample of low-education mothers. All of the models include fixed effects for state of residence at age 50, mother's birth year, the number of the children that the respondents had by age 50, as well as the demographic controls described above. The models for mothers additionally include fixed effects for first child's birth year.

In column (1) we show that the probability of being in fair or worse health is lower among women exposed to more generous EITCs. A $10,000 increase in lifetime EITC exposure results in a 1.1 percentage point reduction in the likelihood of being in bad health. When we focus on the sample of mothers and include the first child's birth year fixed effects, the estimated effect

decreases in magnitude (0.9 percentage points) and becomes statistically insignificant. The PCS-12 score at age 50 significantly increases with lifetime EITC exposure for all women, as well as for mothers in our sample after we include fixed effects for the first child's birth year. A $10,000 increase in lifetime EITC exposure is associated with a 0.5 point improvement in PCS-12 score. We estimate nearly identical effects among the sample of mothers, and mothers without a college degree. A 0.5 improvement in the PCS-12 score translates into a 1 percent (0.519/48.38) increase at the sample average. Even though we do not know exactly how the PSC-12 score is calculated in the NLSY79, we have information on separate components of the index. We find that the likelihood of health limiting moderate activities, health limiting climbing stairs, and health limiting work activities significantly decreases with lifetime EITC exposure (Appendix Table A2). For instance, the probability of health limiting climbing stairs (moderate activities) decreases by 2.4 (1.8) percentage point with a $10,000 increase in lifetime EITC exposure.

The indicator variable we create from the PSC-12 (PSC-12<50) reveals a similar pattern. We estimate that a $10,000 increase in lifetime EITC exposure is associated with about a 1.6 percentage point reduction in the likelihood of having a below-average PCS-12 score among all women and among mothers. Finally, a $10,000 increase in lifetime EITC exposure is associated with a 2.3 percentage point reduction in the likelihood of having a severe illness: approximately a 10 percent reduction (column (9)). We find that this effect is driven mainly by a reduction in the likelihood of cancer and lung disease diagnoses.[7] We find a similar association between lifetime EITC exposure and the likelihood of having a severe illness for mothers and low-educated mothers. As we show in column (8), We did not detect any statistically significant

[7] The NLSY79 includes information on the part of the body effected by cancer. Women who responded having a cancer were more likely to suffer from breast or ovarian cancer. We did not find one single type of cancer that was negatively associated with EITC benefits (not shown).

association between the EITC and the likelihood of having mild diseases. Overall, our findings suggest that women in our sample who are exposure to a more generous EITC policy exhibit improved physical health relative to less exposed women. Our results also reveal that women who reported bad health during childhood are more likely to have physical health problems at age 50. Also, women with more children are in worse physical health at age 50 as measured by the PSC-12 and the likelihood of severe illnesses.

In Table 3 we report the results of estimating equation (1) on our mental health outcomes. The estimates show that lifetime EITC exposure is not statistically significantly associated with any of our mental health measures. However, in most cases we estimate negative coefficient estimates, and the results for our two binary indicator variables in columns (2) and (7) are marginally insignificant at the 5% level. For example, in column (7) we estimate that a $10,000 increase in lifetime EITC exposure is associated with 0.01 reduction in the probability of having been diagnosed with depression (p-value= 0.062). There is perhaps suggestive evidence of long-term reductions in depression associated with lifetime EITC policy exposure.

4.3 Mechanisms

Our results suggest that exposure to the EITC improves physical health. We investigate four potential mechanisms to help explain this finding: earned income, health insurances status, BMI and smoking. Previous literature has shown associations between health outcomes and all four of these intermediary variables. Also, previous studies of the contemporaneous effects of the EITC have demonstrated an association between exposure to the EITC policy and all four variables. Thus, our goal is to investigate whether the EITC has effects on life-time measures of these four factors. These estimates may differ from existing estimates of the contemporaneous

effects of the policy since behavior changes may build on each other, or take several years to manifest.

We construct four measures: total lifetime pre-tax earnings, which is the sum of earnings in all years; the proportion of years between ages 21 and 50 that the woman had health insurance coverage; the proportion of years between ages 21 and 50 that the woman's BMI classifies her as overweight or obese; and the proportion of years between ages 21 and 50 that the woman indicates smoking daily, or occasionally.[8] We then estimate model (1) on these outcomes. The purpose of this exercise is to capture the effect of the EITC on long-term behavior changes that could add up to significant health effects in the long-run.

First, we explore whether EITC policy exposure is related to lifetime pre-tax earnings. Previous studies have shown that the EITC incentivizes labor force participation for some women in the short-run. Neumark and Shirley (2019) also show that for single women in particular, the EITC has positive long-run effects on labor supple. We explore the relationship using our method, which captures policy exposure in dollar amounts. Unlike our previous models, we estimate this model in logs, and report results in Table 4. We find that a one log-point in increase in lifetime EITC exposure results in a 0.14 log point increase in earnings. The elasticity of lifetime earnings in lifetime EITC exposure is also about 0.15 percent for mothers, but only for low-education mothers.

Second, we examined the relationship between lifetime health insurance coverage and EITC exposure. The EITC might increase health insurance coverage since it incentivizes women to enter labor force. Lenhart (2018) confirms that the EITC does lead to greater health insurance

[8] One challenge in this exercise is the fact that the NLSY switched to a biannual interview schedule in XXXX. As a result, we define each variable as the proportion of *survey responses* between ages 21 and 50 that the woman indicates the behavior in questions.

coverage in the short-term. We explore whether this remains true over many years. In our sample, women had health insurance coverage 85 percent of the time. Our estimates in Table 5 show that the likelihood of health insurance coverage is positively associated with lifetime EITC exposure. A $10,000 increase in lifetime EITC exposure increase the coverage by 1.4 percentage points. For mothers and low-education mothers, we estimate that a $10,000 increase in EITC exposure is associated with a 0.9 percentage point increase in health insurance coverage. On a base coverage rate of 83 percent, this represents about a 1 percent increase.

Third, we investigated the relationship between EITC exposure and BMI. In an analysis of contemporaneous behavior change, Schmeiser (2009) shows that increases to the EITC leads women to increase their BMI. On average, women in our sample were obese 24 percent of the time between the ages of 21 and 50 and were overweight or obese 50 percent of the time. In Table 6 we report results of estimating model (1) on these two outcomes. We find evidence of a negative association between EITC exposure and BMI. We estimate that a $10,000 increase in lifetime EITC exposure is association with a 0.9 percentage point in the probability that a woman in our sample is overweight. We find stronger effects for low-education mothers: a $10,000 increase is EITC exposure is associated with 1.3 percentage point reduction in both the probability of being overweight and the probability of being obese. This amounts to a 5 percent reduction in the proportion of years that a low-education mother is obese.

Finally, we report the results of estimating model (1) on smoking behavior. Previous studies on the effect of the EITC on smoking are mixed, with some studies finding that expansions lead to increased smoking (Kenkel, Schmeiser & Urban 2014), and others showing they led to reduced smoking (Averett and Wang 2015; Hoynes, Miller & Simon, 2015). In our sample, women smoked daily about 20 percent of the time. We show in Table 7 that a $10,000

increase in lifetime EITC exposure is associated with a about a 2.1 percentage point reduction in daily or occasional smoking among the full sample of women. This translates into a large effect, with a $10,000 EITC expansion resulting in a 10 percent reduction in the number of smoking years for women. However, when we focus on mothers or low-education mothers, the estimated effect decreases in magnitude and become insignificant.

4 Discussion

This goal of this study is to analyze the long-term effect of the EITC on physical and mental health using exogenous variation in the generosity of the credit over time. Our measure of EITC exposure captures many federal and state expansions to the credit by summing the potential benefits available to women in our sample between ages of 21 to 50. The measure captures variation by state of residence, time and the number of qualifying children in each year. We find that higher EITC exposure is associated with better physical health: women with more exposure to the policy report better overall health, fewer occurrences of limiting illnesses, and demonstrate less propensity for diagnoses of severe illnesses. However, while we find suggestive evidence of long-run improvement in depression symptoms and diagnoses, we did not find any significant positive effects of EITC on mental health. We find support for the idea that the EITC improves physical health in the long-run through long-term changes in overall income, weight control, health insurance coverage and smoking.

Our physical health results align with several existing studies, including Evans and Garthwaite (2014), and Lenhart (2018). Like them, we find positive health effects of the EITC. Our results also differ from existing studies on several dimensions. First, we find limited evidence of improved mental health measures. This is puzzling given that, among studies on the

contemporaneous health effects of the EITC, those on mental health outcomes show the most consistently positive results (Evans & Garthwaite, 2014; Boyd-Swan et al. 2016). For instance, Evans and Garthwaite (2014) show robust evidence that relative to mothers with one child, mothers with multiple children experienced a significant decline in bad mental health days after the 1993 expansion to the federal credit. Boyd-Swan and coauthors (2016) confirm this finding when they study the 1990 expansion. These studies show how mental health and wellbeing immediately change in response to year-over-year expansions to the EITC. They also both focus on one-time expansions, and rely on differential responses between single-child and multiple-child mothers. Our estimates capture a different margin: whether these year-over-year improvements compound, and whether they last even into years when a woman may no longer be eligible for the credit. They also rely on a wider set of policy changes, including state EITCs. Finally, our result suggest that mental health improvements may not compound in the same way that physical health effects appear to. Second, we find consistent evidence on reduced BMI and smoking behavior among those more exposed to the policy. These results contrast with Schmeiser (2009) and Kenkel, Schmeiser and Urban (2014) who find the opposite. Again, we point to the fact that our results capture life-long behavior changes that are related to the policy. While it may be true that women increase their consumption of calories and cigarettes in response to a year-over-year increase in income, it may also be true that over many years, higher income and lower poverty levels lessen consumption of these health inputs. Our study is the first to use an approach that allows for the compounding health changes, and confirms that in general, the EITC has improved health outcomes for affected women.

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Figure 1. Distribution of lifetime policy EITC exposure

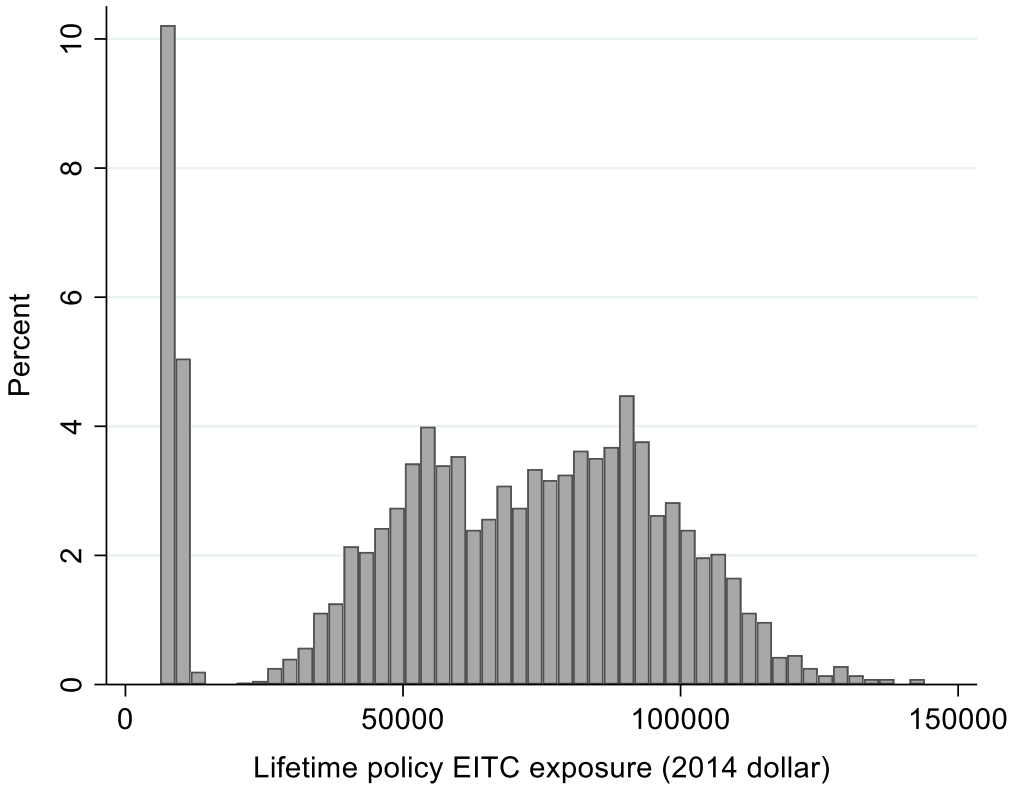


Figure 2: Lifetime policy EITC exposure by state, number of children, and first child's birth year

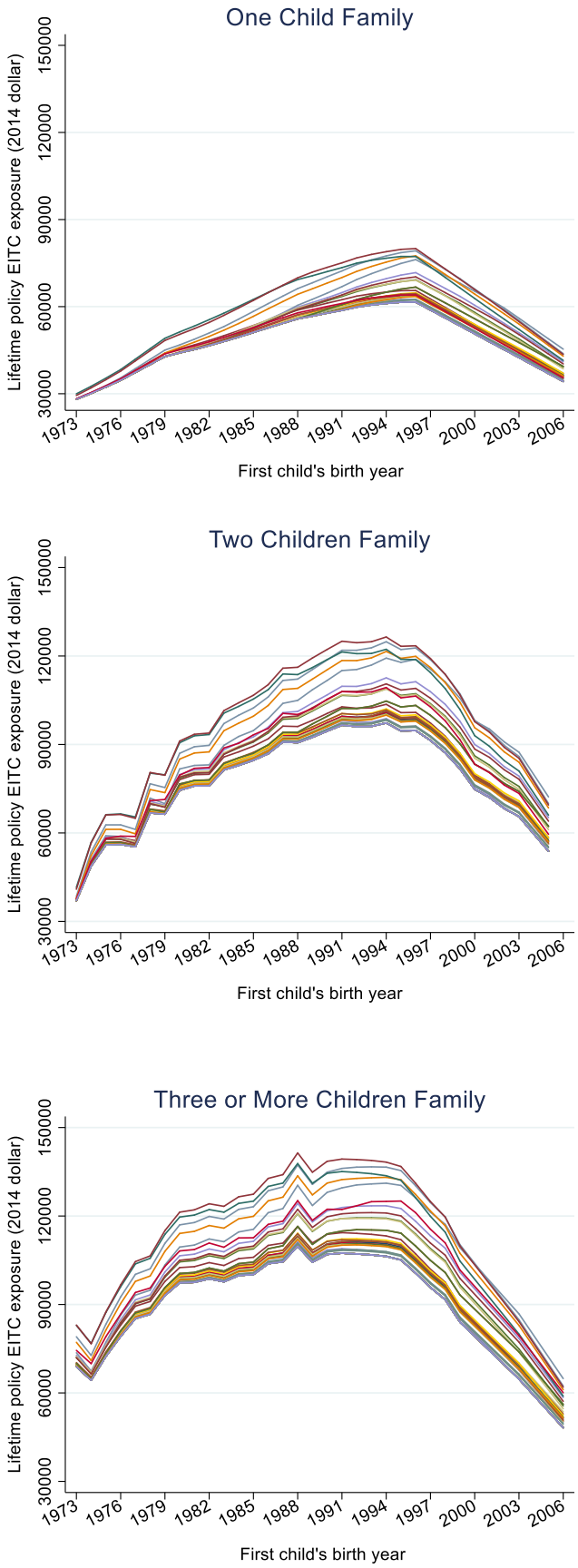


Figure 3. Variation in lifetime policy EITC exposure by demographics

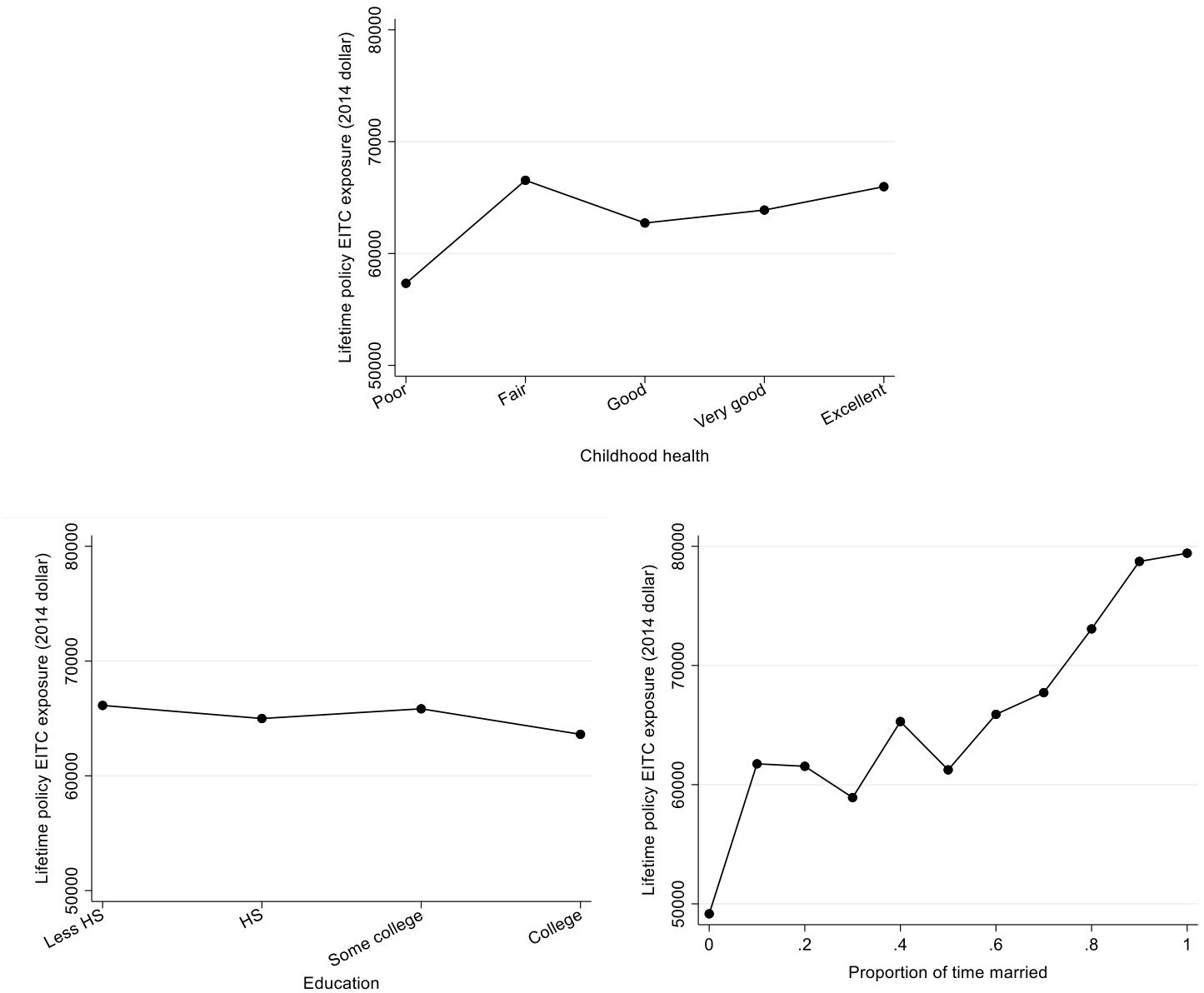


Figure 4: Main health outcomes by the first child's birth year

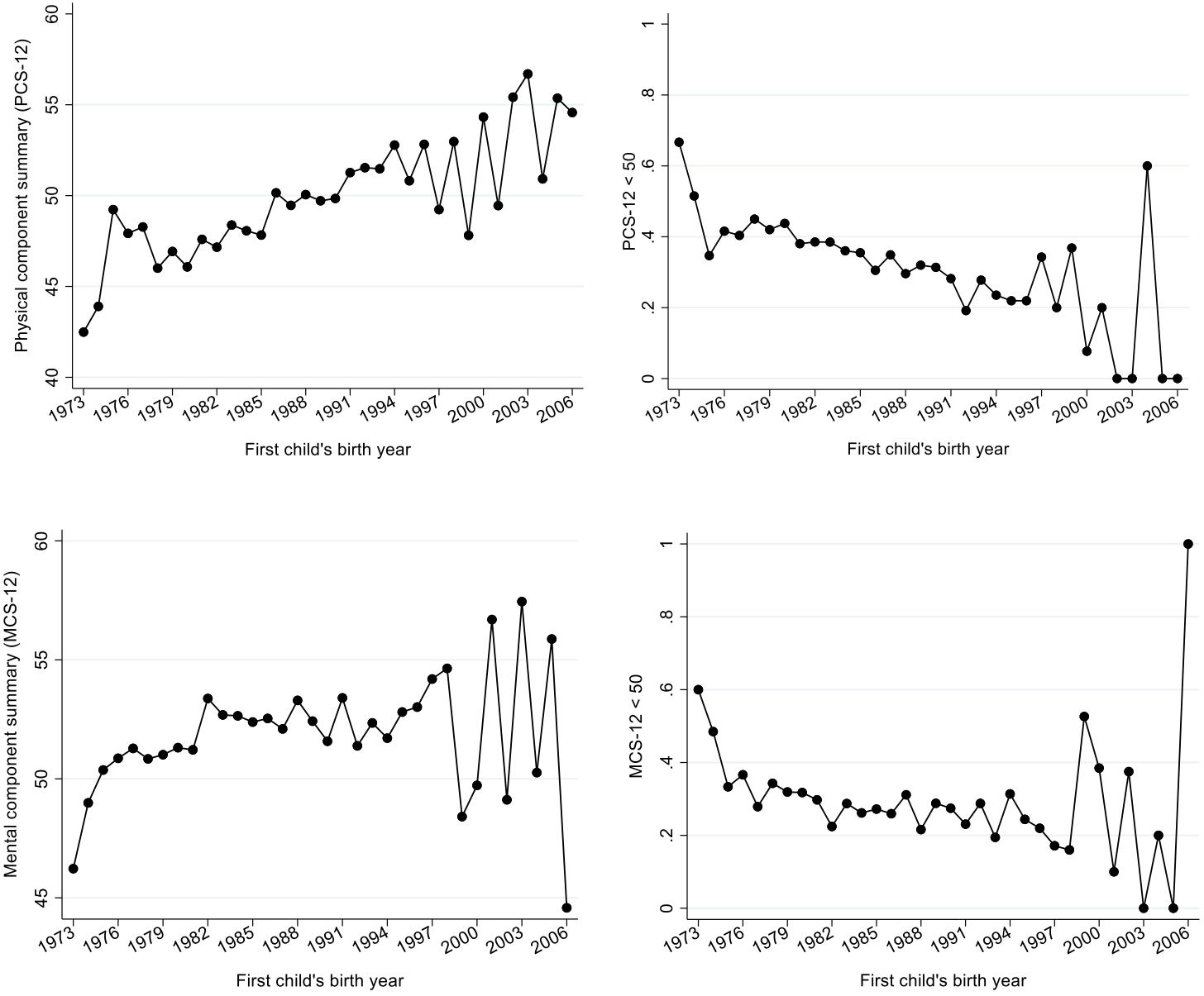


Figure 5: Main health outcomes by the lifetime policy EITC exposure

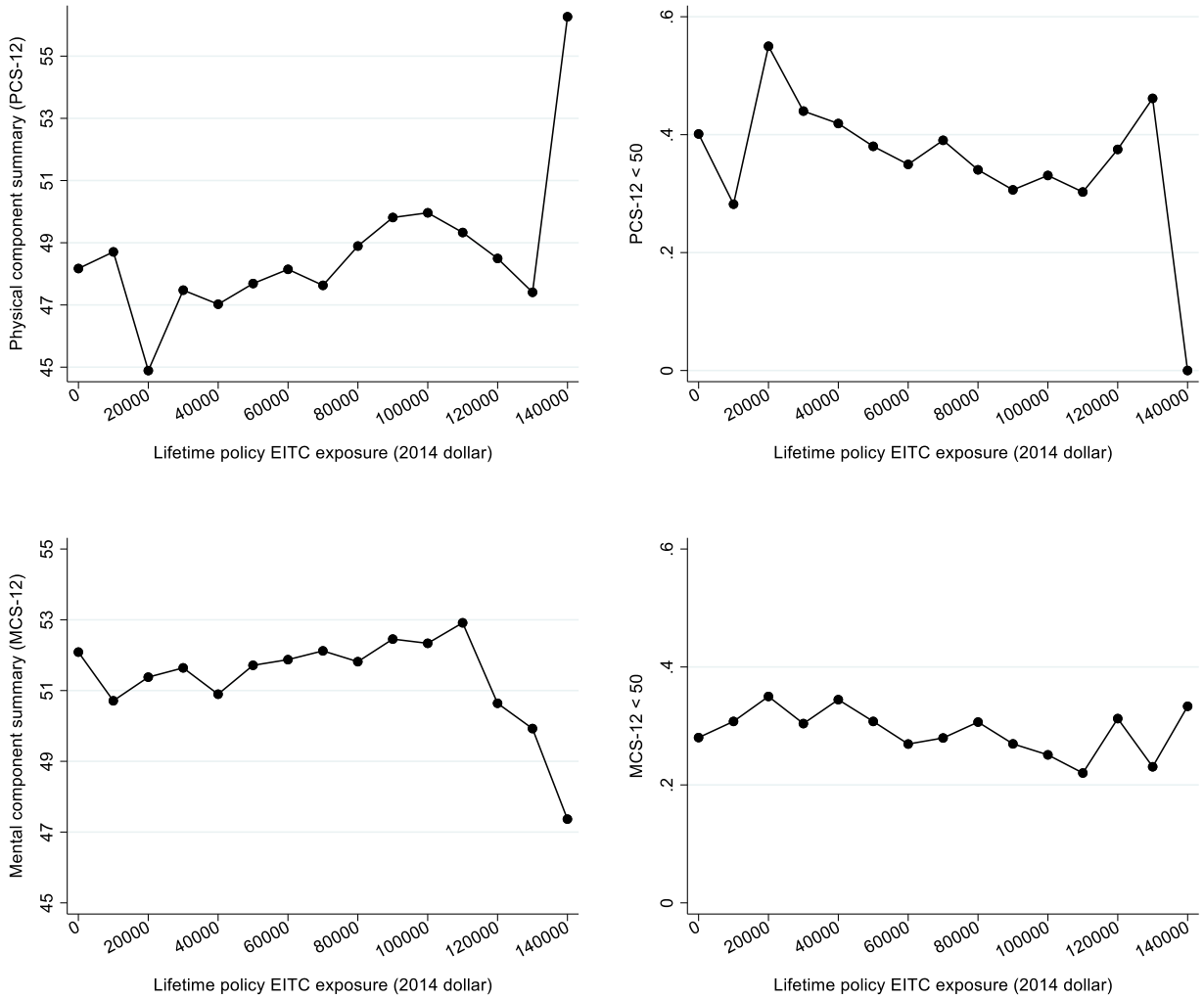


Table 1. Descriptive Statistics

Sample	All women	Mothers	Low educated mothers
Variable	Mean	Mean	Mean
Physical health outcomes			
Fair or worse health at age 50 (=1)	0.21	0.21	0.25
Physical component summary (PCS-12)	48.38	48.55	47.61
PCS-12 < 50 (=1)	0.37	0.36	0.40
Have at least one mild disease by age 50 (=1)	0.41	0.41	0.43
Have at least one severe disease by age 50 (=1)	0.24	0.24	0.25
Mental health outcomes			
Depression at age 50 (scale: 0-27)	5.26	5.23	5.57
Depressed at age 50 (score > 8)	0.22	0.22	0.24
Mental component summary (MCS-12)	51.91	51.97	51.63
MCS-12 < 50 (=1)	0.29	0.29	0.30
Ever diagnosed with depression (=1)	0.21	0.21	0.21
Health behaviors			
Proportion of time had any health insurance (max 14 waves)	0.85	0.85	0.83
BMI at age 50	30.47	30.34	30.77
Proportion of time being overweight or obese (max 20 waves)	0.50	0.50	0.53
Proportion of time being obese (max 20 waves)	0.24	0.24	0.26
Proportion of time smoked daily (max 7 waves)	0.20	0.20	0.24
Proportion of time smoked daily or occasionally (max 7 waves)	0.25	0.25	0.30
Other covariates			
Lifetime income (after-tax)	$1,743,086	$1,783,495	$1,489,789
Proportion of time received own EITC	0.08	0.10	0.12
Lifetime own EITC	$8,009	$9,342	$10,897
Lifetime EITC exposure (federal+state)	$64,797	$75,453	$73,795
Lifetime EITC exposure | No child=1	$8,511	n/a	n/a
Lifetime EITC exposure| One child=1	$49,607	$49,724	$49,104
Lifetime EITC exposure | Two children=1	$74,804	$75,251	$72,279
Lifetime EITC exposure | Three or more children=1	$87,014	$87,849	$86,401
The number of children at age 50			
No child (=1)	0.16	0.00	0.00
One child (=1)	0.16	0.19	0.19
Two children (=1)	0.34	0.41	0.40
Three or more children (=1)	0.34	0.40	0.42
Fair or worse health during childhood (=1)	0.06	0.06	0.07
White (=1)	0.50	0.49	0.45
Hispanic (=1)	0.19	0.20	0.22
Black (=1)	0.31	0.31	0.33
Less than high school (=1)	0.09	0.09	0.13
High school (=1)	0.49	0.51	0.69
Some college (=1)	0.13	0.13	0.18
College degree (=1)	0.29	0.27	0.00
Proportion of married (between age 21-50)	0.60	0.65	0.62
Observations	3505	2900	2110

Note: 1979 to 2014 National Longitudinal Survey of Youth (NLSY). Low educated mothers do not have a college degree. All dollar measures are in 2014 dollars.

Table 2. Estimated Effect of EITC on Physical Health

	Fair or worse health at age 50 (=1)		Physical component summary (PCS-12)			PCS-12 < 50 (=1)		Have a mild disease at age 50 (=1)	Have a severe disease at age 50 (=1)		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Lifetime EITC exposure ($10,000)	-0.011**	-0.009	0.519***	0.464**	0.516**	-0.016***	-0.017*	-0.010	-0.023***	-0.021**	-0.025**
	(0.004)	(0.006)	(0.080)	(0.150)	(0.151)	(0.004)	(0.007)	(0.006)	(0.004)	(0.007)	(0.009)
Number of children (reference: No child)											
One child	0.008	0.000	-1.065	0.000	0.000	0.009	0.000	0.034	0.100*	0.000	0.000
	(0.027)	(.)	(0.620)	(.)	(.)	(0.033)	(.)	(0.033)	(0.038)	(.)	(.)
Two children	0.065*	0.032	-3.517***	-1.756	-1.784	0.079	0.051	0.062	0.176***	0.058*	0.053
	(0.028)	(0.025)	(0.624)	(0.885)	(1.021)	(0.040)	(0.044)	(0.048)	(0.035)	(0.027)	(0.032)
Three or more children	0.081*	0.037	-4.207***	-2.073	-1.999	0.117*	0.080	0.092	0.223***	0.096**	0.092**
	(0.034)	(0.035)	(0.869)	(1.242)	(1.348)	(0.047)	(0.061)	(0.050)	(0.038)	(0.035)	(0.034)
Fair or worse health during childhood	0.282***	0.284***	-5.443***	-5.320***	-5.492***	0.192***	0.207***	0.127***	0.234***	0.227***	0.225***
	(0.034)	(0.038)	(1.044)	(1.271)	(1.374)	(0.027)	(0.040)	(0.032)	(0.036)	(0.039)	(0.041)
Controls											
State fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Cohort fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
First child's birth year fixed effects		yes		yes	yes		yes			yes	yes
Demographic Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sample											
All women	3505		3478			3478		3505	3505		
Mothers		2900		2882			2882			2900	
Low educated mothers					2097						2110
Sample mean	0.21	0.21	48.38	48.55	47.61	0.37	0.36	0.41	0.24	0.24	0.25
R-squared	0.120	0.129	0.102	0.115	0.117	0.078	0.093	0.080	0.050	0.068	0.090

Note: Standard errors in parentheses are clustered at state level. * p<0.05 ** p<0.01 *** p<0.001. Demographic controls include race, the percentage of years married between ages of 21 and 50, and educational attainment at age 50.

Table 3. Estimated Effect of EITC on Mental Health

	Depression at age 50 (continuous)	Depressed at age 50 (=1)	Mental component summary (MCS-12)			MCS-12 < 50 (=1)	Ever diagnosed with depression (=1)
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lifetime EITC exposure ($10,000)	-0.080	-0.009	0.029	-0.243	-0.206	-0.004	-0.010
	(0.067)	(0.005)	(0.092)	(0.167)	(0.171)	(0.004)	(0.005)
Number of children (reference: No child)							
One child	0.183	0.030	-0.172	0.000	0.000	-0.009	0.047
	(0.615)	(0.042)	(0.948)	(.)	(.)	(0.035)	(0.038)
Two children	1.183	0.126*	-0.678	0.276	0.683	-0.045	0.115**
	(0.643)	(0.051)	(0.977)	(0.622)	(0.707)	(0.033)	(0.042)
Three or more children	1.203	0.115*	-0.639	0.976	1.062	-0.035	0.130**
	(0.647)	(0.050)	(0.995)	(0.999)	(1.113)	(0.037)	(0.047)
Fair or worse health during childhood	2.349***	0.161***	-4.498***	-4.276***	-4.508***	0.189***	0.131**
	(0.430)	(0.028)	(0.845)	(1.040)	(1.264)	(0.031)	(0.038)
Controls							
State fixed effects	yes	yes	yes	yes	yes	yes	yes
Cohort fixed effects	yes	yes	yes	yes	yes	yes	yes
First child's birth year fixed effects				yes	yes		
Demographic Controls	yes	yes	yes	yes	yes	yes	yes
Sample							
All women	3505	3505	3478			3478	3497
Mothers				2882			
Low educated mothers					2097		
Sample mean	5.26	0.22	51.91	51.97	51.63	0.29	0.21
R-squared	0.086	0.079	0.061	0.074	0.084	0.057	0.046

Note: Standard errors in parentheses are clustered at state level. * p<0.05 ** p<0.01 *** p<0.001. Demographic controls include race, the percentage of years married between ages of 21 and 50, and educational attainment at age 50.

Table 4: Mechanism-Income

	Lifetime pre-tax income (log)			
Variables	(1)	(2)	(3)	(4)
Lifetime EITC exposure (log)	0.142**	0.147**	0.083	0.149*
	(0.045)	(0.051)	(0.060)	(0.063)
Number of children (reference: No child)				
One child	-0.215*	0.000	0.000	0.000
	(0.083)	(.)	(.)	(.)
Two children	-0.333**	-0.122**	-0.054	-0.070
	(0.102)	(0.036)	(0.042)	(0.049)
Three or more children	-0.418***	-0.198***	-0.090	-0.153*
	(0.119)	(0.043)	(0.056)	(0.058)
Fair or worse health during childhood	-0.208**	-0.237**	-0.216**	-0.263**
	(0.073)	(0.079)	(0.078)	(0.095)
Controls				
State fixed effects	yes	yes	yes	yes
Cohort fixed effects	yes	yes	yes	yes
First child's birth year fixed effects			yes	yes
Demographic Controls	yes	yes	yes	yes
Sample				
All women	3505			
Mothers		2900	2900	
Less educated mothers				2110
Sample mean	$1,735,078	$1,774,153	$1,774,153	$1,478,892
R-squared	0.485	0.525	0.538	0.490

Note: Standard errors in parentheses are clustered at state level. * p<0.05 ** p<0.01 *** p<0.001. Demographic controls include race, the percentage of years married between ages of 21 and 50, and educational attainment at age 50.

Table 5: Mechanism-Health Insurance

	Proportion of time had any health insurance		
Variables	(1)	(2)	(3)
Lifetime EITC exposure ($10,000)	0.014***	0.009***	0.009**
	(0.003)	(0.002)	-0.003
Number of children (reference: No child)			
One child	-0.059**	0.000	0.000
	(0.020)	(.)	(.)
Two children	-0.100**	-0.017	-0.012
	(0.029)	(0.011)	(0.011)
Three or more children	-0.142***	-0.043**	-0.045*
	(0.033)	(0.016)	(0.018)
Fair or worse health during childhood	-0.001	0.004	0.006
	(0.016)	(0.016)	(0.017)
Controls			
State fixed effects	yes	yes	yes
Cohort fixed effects	yes	yes	yes
First child's birth year fixed effects		yes	yes
Demographic Controls	yes	yes	yes
Sample			
All women	3505		
Mothers		2900	
Low educated mothers			2110
Sample mean	0.85	0.85	0.83
R-squared	0.217	0.241	0.210

Note: Standard errors in parentheses are clustered at state level. * p<0.05 ** p<0.01 *** p<0.001. Demographic controls include race, the percentage of years married between ages of 21 and 50, and educational attainment at age 50.

Table 6: Mechanism-BMI

	Proportion of time being overweight or obese			Proportion of time being obese		
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Lifetime EITC exposure ($10,000)	-0.009*	-0.009	-0.013*	-0.006	-0.009	-0.013*
	(0.004)	(0.005)	(0.006)	(0.004)	(0.005)	(0.006)
Number of children (reference: No child)						
One child	-0.003	0.000	0.000	-0.016	0.000	0.000
	(0.024)	(.)	(.)	(0.033)	(.)	(.)
Two children	0.032	0.015	0.020	-0.002	0.012	0.025
	(0.031)	(0.023)	(0.025)	(0.037)	(0.021)	(0.025)
Three or more children	0.058	0.035	0.048	0.011	0.027	0.048
	(0.037)	(0.031)	(0.030)	(0.042)	(0.026)	(0.030)
Fair or worse health during childhood	0.029	0.010	0.009	0.043*	0.026	0.017
	(0.019)	(0.020)	(0.026)	(0.018)	(0.019)	(0.023)
Controls						
State fixed effects	yes	yes	yes	yes	yes	yes
Cohort fixed effects	yes	yes	yes	yes	yes	yes
First child's birth year fixed effects		yes	yes		yes	yes
Demographic Controls	yes	yes	yes	yes	yes	yes
Sample						
All women	3505			3505		
Mothers		2900			2900	
Low educated mothers			2110			2110
Sample mean	0.50	0.50	0.53	0.25	0.24	0.26
R-squared	0.115	0.127	0.111	0.096	0.099	0.091

Note: Standard errors in parentheses are clustered at state level. * p<0.05 ** p<0.01 *** p<0.001. Demographic controls include race, the percentage of years married between ages of 21 and 50, and educational attainment at age 50.

Table 7: Mechanism-Smoking

	Proportion of time smoked daily (=1)			Proportion of time smoked daily or occasionally (=1)		
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Lifetime EITC exposure ($10,000)	-0.021***	-0.004	-0.006	-0.023***	-0.004	-0.007
	(0.004)	(0.005)	(0.006)	(0.004)	(0.006)	(0.006)
Number of children (reference: No child)						
One child	0.142***	0.000	0.000	0.152***	0.000	0.000
	(0.023)	(.)	(.)	(0.026)	(.)	(.)
Two children	0.170***	-0.037	-0.037	0.187***	-0.030	-0.027
	(0.032)	(0.027)	(0.030)	(0.035)	(0.031)	(0.032)
Three or more children	0.209***	-0.047	-0.033	0.228***	-0.041	-0.020
	(0.033)	(0.034)	(0.033)	(0.036)	(0.039)	(0.037)
Fair or worse health during childhood	0.002	0.004	-0.003	-0.001	0.003	-0.006
	(0.019)	(0.022)	(0.026)	(0.021)	(0.025)	(0.029)
Controls						
State fixed effects	yes	yes	yes	yes	yes	yes
Cohort fixed effects	yes	yes	yes	yes	yes	yes
First child's birth year fixed effects		yes	yes		yes	yes
Demographic Controls	yes	yes	yes	yes	yes	yes
Sample						
All women	3505			3505		
Mothers		2900			2900	
Lower educated mothers			2110			2110
Sample mean	0.20	0.20	0.24	0.25	0.25	0.30
R-squared	0.154	0.187	0.168	0.154	0.192	0.169

Note: Standard errors in parentheses are clustered at state level. * p<0.05 ** p<0.01 *** p<0.001. Demographic controls include race, the percentage of years married between ages of 21 and 50, and educational attainment at age 50.

APPENDIX

Table A1. State EITC Generosity (as a share of the federal EITC)

	Year of Implementation	EITC rate in 2014
Colorado	1999	10%
Connecticut	2011	28%
District of Columbia	2000	40%
Delaware	2006	20%
Illinois	2000	10%
Indiana	2003	9%
Iowa	1990	14%
Kansas	1998	17%
Louisiana	2008	4%
Maine	2000	5%
Maryland	1998	25%
Massachusetts	1997	15%
Michigan	2008	6%
Minnesota	1991	33%
Nebraska	2003	10%
New Jersey	2000	20%
New Mexico	2007	10%
New York	1994	30%
North Carolina	2008	5%
Ohio	2014	5%
Oklahoma	2002	5%
Oregon	1997	8%
Rhode Island	1986	25%
Vermont	1988	32%
Virginia	2006	20%
Washington	2008	10%
Wisconsin	1989	4% - one child
		11% - two children
		34% - three children

Source: Tax Policy Center http://www.taxpolicycenter.org/statistics/state-eitc-based-federal-eitc

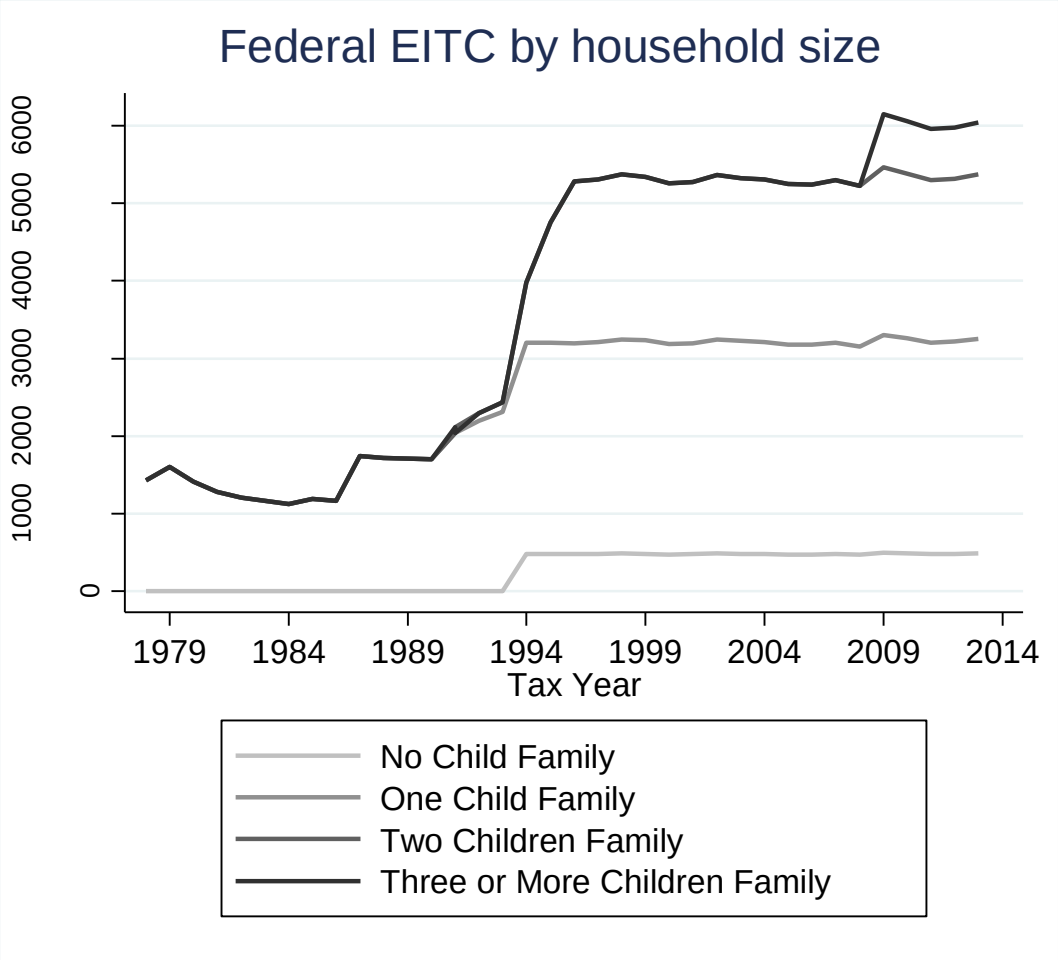
Table A1: PCS-12

	Health limit moderate activities (=1)			Health limit climbing stairs (=1)			Accomplished less than would like in past 4 weeks (=1)	Health limit work or other activities (=1)		Pain interfered with normal work in past 4 weeks (=1)
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Lifetime EITC exposure ($10,000)	-0.018***	-0.015*	-0.016*	-0.024***	-0.021**	-0.020*	-0.007	-0.012***	-0.009	-0.010
	(0.003)	(0.006)	(0.007)	(0.005)	(0.007)	(0.008)	(0.003)	(0.003)	(0.005)	(0.006)
Number of children (reference: No child)										
One child	0.037	0.000	0.000	0.039	0.000	0.000	0.021	0.015	0.000	-0.005
	(0.029)	(.)	(.)	(0.038)	(.)	(.)	(0.028)	(0.021)	(.)	(0.044)
Two children	0.140***	0.072*	0.075	0.140**	0.069*	0.057	0.055*	0.093***	0.057	0.059
	(0.032)	(0.035)	(0.041)	(0.045)	(0.033)	(0.034)	(0.026)	(0.021)	(0.030)	(0.044)
Three or more children	0.158***	0.077	0.066	0.187***	0.093*	0.074	0.074*	0.114***	0.065	0.069
	(0.041)	(0.049)	(0.054)	(0.053)	(0.046)	(0.044)	(0.032)	(0.029)	(0.040)	(0.058)
Fair or worse health during childhood	0.172***	0.179***	0.194***	0.199***	0.203***	0.191***	0.155***	0.133**	0.125**	0.175***
	(0.034)	(0.041)	(0.049)	(0.033)	(0.044)	(0.041)	(0.033)	(0.038)	(0.045)	(0.037)
Controls										
State fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Cohort fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
First child's birth year fixed effects		yes	yes		yes	yes			yes	
Demographic Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sample										

All women	3504			3500			3503	3501		3505
Mothers		2900			2897				2898	
Lower educated mothers			2110			2107				
Sample mean	0.21	0.20	0.23	0.30	0.29	0.33	0.22	0.20	0.19	0.41
R-squared	0.081	0.097	0.102	0.085	0.105	0.077	0.056	0.068	0.076	0.062

Note: Standard errors in parentheses are clustered at state level. * p<0.05 ** p<0.01 *** p<0.001. Demographic controls include race, the percentage of years married between ages of 21 and 50, and educational attainment at age 50.

Figure A1.


Federal EITC by household size
0
1000
2000
3000
4000
5000
6000
1979
1984
1989
1994
1999
2004
2009
2014
Tax Year
No Child Family
One Child Family
Two Children Family
Three or More Children Family