

# The Earned Income Tax Credit and Employment for Childless Adults

Joshua Witter \*

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## Abstract

The Earned Income Tax Credit, a program designed to aid low-income households, and encourage work, lifts millions of families out of poverty every year. I focus on employment effects for childless adults, who have recently been at the center of EITC expansion policy discussions. I use a difference-in-differences (DD) framework with Current Population Survey and American Community Survey data to estimate the impact of expanding state EITCs on the employment of childless adults. Expanding state EITCs led to significant increases in employment and labor force participation for younger childless women and declines for older childless men. Women's work hours increased in response to EITC expansion, but men's hours remained unchanged. These findings have implications for individual employment and health, as well as future EITC and welfare spending.

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\*Texas A&M University; [joshwitter@tamu.edu](mailto:joshwitter@tamu.edu)

# 1 Introduction

Childless adults have increasingly been the center of policy talks aimed at helping low-income workers. In 2014, many states chose to expand Medicaid to low-income childless adults through the Affordable Care Act. More recently, federal and state representatives have had discussions about expanding the Earned Income Tax Credit (EITC) for childless adults by increasing income eligibility limits, raising the maximum credit generosity, and lowering the eligibility age.

Recent estimates suggest that the EITC lifted 8.9 million Americans out of poverty in 2017.<sup>1</sup> The EITC is designed to encourage recipients to work by increasing in generosity as work earnings increase. After reaching a maximum, the credit plateaus over a range of earnings and then gradually phases out until it reaches zero. Childless adults make up over 54% of adults earning less than the poverty level, but receive less than 5% of EITC payments.

<sup>2</sup> Because federal EITC payments are so low for childless adults, they are the only group of workers who whose net income after taxes pushes them below the poverty line.<sup>3</sup> The maximum EITC for adults with dependents is 6.6-12.4 times the size of the EITC for adults without dependents.

Previous literature has documented large increases in the employment of other groups (mostly single mothers) from EITC expansions (Eissa and Liebman, 1996; Meyer, 2002; Meyer and Rosenbaum, 2001; Bastian, 2017a; Leigh, 2010; Wilson, 2018). The EITC has resulted in a number of significant economic and social benefits for eligible groups, such as reductions in recidivism (Agan and Makowsky, 2018), improved mother and infant health (Hoynes et al., 2015; Evans and Garthwaite, 2014; Markowitz et al., 2017), and boosts in educational achievement and attainment (Bastian and Michelmore, 2018; Michelmore, 2013; Chetty et al., 2011). Additionally, Bastian and Jones (2018) show that the EITC is also a

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<sup>1</sup>Working-Family Tax Credits Lifted 8.9 Million People out of Poverty in 2017. CBPP 2019.

<sup>2</sup>I calculate the share of low-income adults that are childless using all 18-64 year old adults in the 2018 CPS ASEC.

<sup>3</sup>All workers are subject to Medicare and Social Security taxes.

very cost-effective policy with a self-financing rate of about 83% when considering increases in tax revenue and reductions in transfer program participation. There are many reasons to think that childless adult employment would be responsive to EITC increases, despite their credit being substantially lower than that of households with dependents. Childless adults have very different housing needs, purchase different product bundles, and do not need to find childcare. They are also categorically ineligible for most transfer programs such as WIC (Supplementary Nutrition for Women, Infants, and Children), SNAP (Supplementary Nutrition Assistance Program), and TANF (Temporary Assistance for Needy Families), and Medicaid.

To my knowledge, no other paper has looked at the direct effects of the EITC on the employment of childless adults. I use a difference-in-differences approach with changes in state EITCs over 1994-2018 and CPS data to estimate the causal effect of EITC expansions on childless adult employment. 29 states implemented their own EITC over this time span.

Childless women increased their employment by 1.22 percentage points (pp) with an increase of \$100 in the maximum state EITC. Women between 25-34 and/or those living with family are the primary drivers of these positive effects (2.0-3.5pp) Childless male employment declined by 1.25pp and this decline was concentrated in older childless men or men living with their parents. Positive employment effects are strongly associated with low baseline employment levels and unemployment reasons. Those who are unemployed because they are entering or re-entering the labor force are much more likely to increase employment than those who are unemployed because they recently lost or left their job. I see this pattern across two dimensions. First, men have initial employment levels almost 10 percentage points higher and are less likely to be unemployed because they are entering or re-entering the labor force. Secondly, while looking at household structure, I find that childless adults living with family have significantly lower baseline employment and are more likely to be unemployed because they are entering or re-entering the labor force. Unmarried women (1.56pp\*) have slightly higher employment increases than married women (0.0083).

Hours worked increases by 1.28% for all women, and these effects are mostly driven by older women age 55-64 (2.29%). Mens' hours do not significantly change conditional on being employed. The only margin men are affected on, as a whole, appears to be the extensive margin of employment.

Declines in male employment might at first seem inconsistent with theory of the incentives of the EITC. But one issue this paper has to contend with is that lots of groups are eligible for the EITC with some groups have larger employment incentives than others. This, combined with different reservation wages and employer-employee match preferences, make this theory less straightforward. Women are entering employment at a high rate which could crowd men out of employment through less available job openings or lower wages through increases in labor market supply.

To supplement my state EITC analysis, I also look at the special case 2015 District of Columbia EITC expansion, the largest state expansion of the EITC to date for childless adults. In addition to its size, another important feature of this DC EITC expansion was that the expansion was solely for childless adults, which is not true of previous state EITC expansions. The DC EITC expansion also extended the maximum earnings eligibility level from about \$15k to \$25k, and also raised the maximum credit from 40% (\$200) to 100% (\$500) of the Federal EITC. The DC EITC expansion led to a 5.78pp increase in employment and a 2.5pp increase in the labor force participation of childless women. Mens' employment and labor force participation declined 1.48pp and 3.71pp respectively. I found that employment changes in DC were consistent with changes I found in other state EITC expansions.

The rest of my paper proceeds as follows. First, I provide background on the history of EITC policy for childless adults and related literature. Second, I describe my data and introduce my empirical strategy for uncovering the causal effects of state EITC expansions for childless adults. Third, I present my main results and consider potential alternate explanations for my results. Fourth, I discuss the District of Columbia EITC expansion, and how effects contrast between this unique expansion or other state EITC expansions. Lastly,

I summarize my results and discuss the implications of my findings.

## 2 Background on the EITC for Childless Adults

The Earned Income Tax Credit was first introduced in 1975 for households with at least one dependent. In 1992, the federal EITC became more generous for families with two or more children relative to one child families. Over 1993-1996, the generosity of the EITC dramatically increased, and remained stable until 2009, when the EITC expanded for families with three or more children relative to families with two or less children. The federal EITC for childless adults was introduced in 1994, and its generosity has not been expanded since, except for annual inflation adjustments. Childless adults are eligible to claim the EITC if they have sufficiently low-income and they (or their spouse) are age 25-64. Figure 1 shows the EITC schedule for single adults with varying numbers of dependents. Both EITC generosity and reach increases substantially with the number of dependents tax filers' claim. To supplement the federal EITC, a number of states have introduced their own EITCs, most of which are available to childless adults. Most states calculate their EITC as a fraction of the federal EITC. Figure 2 shows how state EITC generosity has evolved over time for each state. Only 6 states had an EITC in 1994, growing to 29 states in 2018 with generosity ranging from 3%-100% of the federal EITC.

In 2016, the Speaker of the House of Representatives, Paul Ryan, and President Obama proposed nearly identical plans to expand the EITC for households with dependents. Both plans would have lowered the eligibility age from 25 to 21, expanded the income eligibility range, and almost doubled the maximum credit amount to about \$1000.<sup>4</sup> Despite the similarities in the policy parameters between the two plans and bipartisan support for expanding the EITC for childless adults, the plans stalled because of disagreements on how to fund it.<sup>5</sup>

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<sup>4</sup>Strengthening the EITC for Childless Workers Would Promote Work and Reduce Poverty. CBPP 2016.

<sup>5</sup>President Obama proposed paying for the plan by raising taxes on high income workers and reducing tax benefits for corporations. Conversely, Speaker Ryan proposed cuts to other transfer programs such as "Social Service Block Grant, the Fresh Fruits and Vegetables Program, the Economic Development Admin-

EITC expansion talk has continued with the Cost-of-Living Refund Act (COLRA) of 2019 (Sen. Sherrod Brown, Rep. Ro Khanna), the LIFT Act (Sen. Kamala Harris), and the EITC Modernization Act. These Acts include provisions such as raising the maximum eligible income limit, increasing the maximum EITC generosity, making low-income students or at-home caregivers eligible, and lowering the minimum eligibility age from 25.

Some states have already implemented EITC-type expansions for childless adults. In 2006, New York introduced a non-custodial parent tax credit available to adults who have a child, but do not primarily co-reside with their children. In 2015, D.C. was the first region to expand the EITC exclusively for childless adults (40% to 100% of the federal EITC), while leaving it unchanged for families.

The definition of “childless adult” encompasses a wide range of adults with different fertility histories and household structures. Some examples are adults who have never had children, empty nesters (parents with grown children no longer considered dependents), or non-custodial parents. A 2018 CPS report estimates that 27% of all children had a parent who lived in another household, and at least half of these had some sort of child support agreement in place; many of whom also live below the poverty level.<sup>6</sup> In my analysis looking at household structure and earnings, I find that the majority of low-income childless adults are primary earners in their households. Single childless adults most commonly live alone or with a few family members, rather than with unrelated roommates. Married childless couple households typically do not have other household members.

Most of the academic literature about the EITC focuses on single mothers and finds large positive effects on the extensive margin of employment (employed or not) (Eissa and Liebman, 1996; Meyer, 2002; Meyer and Rosenbaum, 2001; Bastian, 2017a; Leigh, 2010; Wilson, 2018). Intensive margin effects are more nuanced and depend on the freedom that

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istration, and the Farmers’ Market Nutrition Program. It also would reduce fraud in the Additional Child Tax Credit by requiring the use of Social Security numbers.” <https://www.vox.com/2014/7/24/18080430/paul-ryan-poverty>

<sup>6</sup>Custodial Mothers and Fathers and Their Child Support: 2015. US Census Bureau 2018. (<https://www.census.gov/content/dam/Census/library/publications/2018/demo/P60-262.pdf>)

workers have to adjust their hours and earnings. Saez (2010) and Chetty et al. (2013) show that self-employed workers respond to EITC incentives strongly on the intensive margin.

Research looking at the EITC and childless adults is limited. Miller et al. (2018) have studied the effect of an EITC-like payment (up to \$2000) to low-income childless adults in New York City. Employment effects were positive (with the largest effects found in women(2.3-4.6pp) and disadvantaged men (0.6-5.8pp). Results on other outcomes are promising as well. They find increases in after-tax incomes, tax filing rates, and child support payments. But during this time (2015-2017), New York implemented several large minimum wage increases. Neumark and Wascher (2011) show that EITC expansions coupled with minimum wage increases enhance employment effects for eligible groups, but can have adverse effects for ineligible groups. Therefore, the experiment effects might overstate the benefits of the EITC, by exacerbating the difference between the treatment and control groups.

This paper adds to the literature by looking at both extensive and intensive margin employment effects for childless adults, a group that faces substantially different opportunity costs with regards to their time, purchases, and housing than parents, who have been the main focus of previous EITC research.

### 3 Data

My main sample comes from the Annual Social and Economic Supplement of the Current Population Survey (CPS ASEC) covering the years 1994-2018.<sup>7</sup> I limit my sample to all childless adults age 18-64 with no post-high school education.<sup>8</sup>

In Figure 5 I show that the share of childless women with earnings in the range of EITC eligibility steadily declines with age. 22% of childless women are eligible at 25 and this

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<sup>7</sup>My sample begins in 1994 because this is when both federal and state EITCs became available to childless adults.

<sup>8</sup>I also estimated the effects for childless adults with at least some post high school education, and found no evidence of employment effects.

number drops to less than 14% by the time they reach 64. In Figure 6, I show that childless mens eligibility by age follows more of a U-shape; 19% of childless men are eligible which declines to less than 8% at 57 and slightly increases to over 13% between 57 and 64. I define earnings as individual wage earnings for single adults and individual plus spouse wage earnings for married adults.

My treatment variation comes from differences in EITC generosity across and within states overtime. I define my main treatment variable as the maximum state EITC available to childless adults in a given state-year.

Variation in state EITCs over time can be seen in Figure 2. State EITCs in 2018 ranged from 3% (Louisiana) to 100% (DC) of the federal EITC, with a median of 20% of the federal EITC (approximately \$100). The mean childless state EITC between 1994-2018 is \$77, conditional on a state having an EITC. Table 1 shows descriptive statistics for the entire sample, and men and women separately. The most notable differences between men and women are marriage rates, employment levels, work hours, earnings, and wages. The sample of women is also slightly older than the male sample, which is not surprising given that children are more likely to be living with a single mother than a single father, and single parents are excluded from my sample.

## 4 Empirical Strategy

I estimate the employment effects of the EITC for childless adults using a difference-in-differences approach, where treatment variation comes from changes in state EITCs over the years 1994-2018. I use variation in state EITCs rather than the 1994 federal expansion for childless adults for two reasons. First, the treatment and control groups are clearly defined. States that implemented an EITC are in the treatment group, and states that do not are in the control group. Using the federal expansion, it is unclear which group would be a good counterfactual for childless adults. Second, the federal EITC expansion occurred during a



significant economic boom and at the same time as the mid-1990s welfare reform, so it is impossible to rule out that employment effects are entirely driven by the EITC expansion. By using only variation in state EITC expansions, the identification assumption is that in the absence of state EITC expansions, changes in employment would have evolved similarly for expansion and non-expansion states. It's possible to calculate a predicted EITC value that is individual-specific based on their previous years earnings. However, estimates using this method will be biased because predicted EITC values are based on individual income, which is endogenous. Maximum state EITC, on the other hand, is not related to individual income and will capture both the occurrence and magnitude of expansions.

The generalized difference-in-differences framework can be summarized in regression form as follows:

$$Y_{i,s,t} = \theta_0 + \theta_1 StateEITC_{s,t} + State_s \alpha_1 + Time_t \alpha_2 + State_s \cdot Married_i \alpha_3 + Year_t \cdot Married_i \alpha_4 + X_{i,s,t} \delta + \varepsilon_{i,s,t}$$

$Y$  includes the employment outcomes: whether workers were employed, log of hours worked per week (zeros are dropped), where workers were in the labor force, and whether they were unemployed because they left their job.  $StateEITC$  is the maximum state EITC for a state-year measured in \$100s. The vector  $X$  contains individual controls for marital status, and age and race fixed effects, and state-level economic factors such as the log of the real effective minimum wage, state-year indicators for whether pre-1996 welfare reforms were introduced, and state-year indicators for whether a state had expanded Medicaid through the Affordable Care Act. All regressions, unless otherwise indicated, are weighted using CPS ASEC population weights provided by IPUMS. I also allow for state and year fixed effects to differ by marital status by interacting state and year dummies with an indicator for whether someone is married. These controls allow employment to evolve separately for married and unmarried groups. Employment might evolve differently for two reasons. First, married dual-earning couples face a marriage penalty, with regards to the EITC. Second,

the magnitude of this penalty was reduced in 2001 at the federal level which could have changed the trajectory of married employment or marriage itself. Married dual-earning couples typically face a "marriage penalty" since their collective EITC is lower as joint-filers than if they filed their taxes separately. In 2001, the EITC maximum was extended for married households to reduce this penalty, meaning that the maximum EITC for married couples phases out at higher household earnings levels than for single adults.

## 5 Results

In this section, I present my main results, and discuss reasons for differences across age, gender, and household structure.

### 5.1 Main Results

My main results are found in Tables 2, column 1. For childless women with no post-high school education, I find that increasing the generosity of the maximum state EITC by \$100 increases employment by 1.55 percentage points (2.3% increase over a baseline employment rate of 65%). In Table 2 column 2 I show that these effects are largest for youngest childless women age 25-34 (3.53pp). Childless women over the age of 45-64 do not appear to change employment following state EITC expansions. Aggregate employment effects for childless men are negative (-1.28pp). These declines are concentrated in older childless men age 55-64 (-2.93pp). Effects for other mens' age groups are negative, but close to zero in magnitude.

The effect of the EITC on hours worked is insignificant for both men and women, but this is not surprising given that incentives to change hours worked depend on the design of the phase-in and phase-out rates and the length of the earnings range where the EITC reaches its maximum. My identification is based on the maximum state EITC amounts, so I will miss most of these nuanced changes in hours worked. It's possible for me to split my sample into different groups positioned on distinct portions of the EITC schedule, but this

introduces an endogenous income variable that is potentially correlated with the error term and hours worked.

I also look at labor force participation rates and job leaving. In Table 4 I show that for young childless women (age 25-34), labor force participation increased by a significant 2.82pp while job leaving declined by -0.018pp (not significant). These effects get smaller in magnitude by age group. I find effects in the opposite direction for most groups of men. Men's labor force participation declined by 1.15pp (not significant) and rates of job leaving increased by 0.011pp (not significant).

By looking at effects by employment, labor force participation, and job leaving, I show evidence that employment effects are driven from multiple sources including the entry/exit of new workers into the labor force and increases/declines in job exits. Womens' employment and labor force participation increased, and their rates of job leaving decreased after state EITC expansions. The opposite pattern arose for men. Men were less likely to be employed, and more likely to leave their jobs or drop out of the labor force. How entry and exit occurs matters for how policies like the Earned Income Tax Credit are evaluated.

## **5.2 Why are effects different for women and men?**

Treatment should be affecting marginal workers. Workers on the margin would be those who would find employment if their expected wage from employment exceeds their reservation wage, or conversely, would leave their jobs if their wage dropped below their reservation wage. Whether workers are on the margin of employment is not directly observable, so as a proxy I look at workers who report being unemployed. I consider this group on the margin of employment given that they are not employed but interested in finding a job.

Before looking at unemployed workers, I first look at baseline employment levels. The reasoning is that if there are large differences in baseline employment levels, this provides some evidence that one group has more capacity to increase employment, because there is more labor potentially available. I find that mens' employment (74.9%) was approximately

10 percentage points higher than women's employment (65.6%).

Given that workers must first be unemployed to become employed, one other possible way to learn about workers on the margin, would be to look at the reasons for unemployment for the unemployed population. I find stark differences in the reasons for being unemployed between childless men and women. In Table 9, I find that men are much more likely to be unemployed because they lost their job (70.6% for vs. 53.2% for women), whereas women are much more likely to be unemployed because they are entering or re-entering the labor force (33.95% for women vs. 21.38% for men). Just from these statistics, it seems that female marginal workers are more likely to be entering the labor force and willingly searching for jobs, whereas male marginal workers are more likely to be searching because of an involuntary job loss.

Why men experience job loss or lower employment and labor force participation in this setting is up for debate. One possibility is that wages are driven down below men's new reservation wages by the entry of new workers, causing men to leave their jobs. Alternatively, employers might be substituting male workers for female workers. Neumark and Wascher (2011) and Groves (2016) show evidence that welfare reform and EITC expansions caused male employment to be crowded out by single mothers entering the labor force because of these policy changes. This type of substitution could come from either job firings or from declines in hiring. Given that single mothers are the most likely to be claiming the EITC, it's possible that employers use gender as an imperfect signal of who is eligible for a wage subsidy (EITC), and hence would expect a lower wage offer.

One last reason, not unrelated to the previous reason, why men's employment declines is that men's reservation wages are simply higher than women's. This would make them more likely to become unemployed if wages decline and/or EITC incentives are not high enough to induce them into employment. This is difficult to test empirically in the EITC setting, but existing research suggests that men do in fact have higher reservation wages than women (Brown et al 2011; Caliendo et al 2014).

For those that stay employed, I show that wages significantly declined for older males (10% for every \$100 increase in the maximum state EITC), the same group that I see declines in employment, labor force participation, and job tenure. These findings are line with firms either substituting away from older male workers to younger female workers or men leaving jobs as a result of declining wages. I cannot say definitively which is the primary cause, more detail about firm decisions would be necessary.

### **5.3 Do household characteristics matter?**

In addition to considering differences between men and women, I also look at results by household arrangements. I expect results to differ by household arrangement because household arrangement is related to the opportunity cost of getting a job. For example, caregivers of elderly parents or children would have a higher opportunity cost of employment than adults who are not any type of caregiver. Married and unmarried adults will also potentially have different opportunity costs given that unmarried adults are more likely to be receiving support from parents or other family members.

Given the limited amount of research about the EITC and childless adults, I first give a descriptive view of household arrangements. After giving this description, I show that employment results vary substantially by household structure.

To describe household arrangements of childless adults I first limit the sample to adults (25-64) earning in the federal EITC eligible range (less than \$15k for single adults and \$21k for couples that are married and filing taxes jointly), and then I look at household rosters and incomes to determine whether they are the largest contributor to earnings in the household.

As shown in Figure 8, the majority of eligible single childless adults live with zero non-family household members, meaning that most are living either by themselves or with other family members. Going a step further, I break down living arrangements by the number of family members they live with. In Figure 7 you can see that most childless adults in my sample live either alone or with just a few other family members. When looking at

relationships to the householder, childless adults were most likely to be either a child of the householder or the householder themselves (Figure 9). For those living with zero non-family members, 29% were living with either a mother or father (13% live with both).

Given that a large share of childless adults are likely to be living with a parent, policymakers might be interested in knowing if these adults are more getting support from a parent or vice versa. I don't have a measure of this directly, but I can observe income for each household member. I find that 62% of low-income childless adults, conditional on having wage earnings less than \$15k/year, were still the highest earners in their household. For those who are a child of the householder, 41% are the highest earners in the household. Although childless adults living with parents are less likely to be the primary earners than if they were householders, there is suggestive evidence that a significant number of parents might be depending on their low-income childless children for financial support or care.

I don't show figures for married childless adults, but I do find that they exhibit a lot less variation in family members' presence. What I find is that almost all low-income married childless couples live exclusively with their spouse.

In summary, I find that the typical single childless adult lives alone or in a small household with just a few family members where at least one of those family members is most frequently parent. Married childless adults, on the other hand, almost exclusively live in two-person households with their spouse. As far as household earnings goes, there is a substantial amount of heterogeneity in whether childless adults are primary or secondary earners in the household.

### **5.3.1 Married vs. Unmarried**

Results by marital status can be seen in Table 7. I find that on average, unmarried childless women are almost twice as likely to increase employment relative to married childless women (1.56pp\* vs. 0.8pp). Hours worked increases by about 1.2% for both unmarried and married women, but this increase is not significant. Unmarried childless mens' employment declines

by about 1.25pp (significant at the 10% level). Married mens' employment declines by 1.0pp (not significant). Similar to my results by age, mens' hours worked does not change following EITC expansions.

### **5.3.2 Unmarried Childless Adults: Living with parents vs. Living with other family than parents vs. Living with non-family**

Since effects are largest for unmarried childless women, I look at this subgroup by household arrangement. Household arrangement is a potentially strong predictor of whether individuals are on the margins of employment. Childless adults tasked with the frequent care of elderly parents or other household members' children might find it hard to work outside of the home. Potential workers without these constraints might enter employment at a higher rate. To test this hypothesis, I organized single childless adults into three mutually exclusive household arrangements: living with your parents, living with other family than your parents, and living with non-family. Results by household arrangement can be seen in Table 8. I find that the largest employment changes are concentrated in the group of childless adults living with family, particularly those living with their parents. For those living with their parents, childless women's employment increases by 3.08pp and childless men's employment declines by 2.76pp. Hours worked per week does not differ significantly across household arrangement.

Similar to what I did to look at marginal worker characteristics by sex in the previous section, I do the same for household structure for childless women in Table 10. The women with the largest employment increases (living with parents) were most likely to be unemployed because they were new labor force entrants or re-entrants and least likely to be unemployed because they lost job. Furthermore, childless women living with parents have much lower higher baseline employment (65%) relative to those living with other family (73%) or those living with non-family (74%). Altogether, this evidence suggests that the groups that are most responsive to EITC expansions are those who have lower baseline employment overall.

## 6 Exploring Non-EITC Explanations For Employment Effects

The potential pitfalls of using a difference-in-differences strategy is that employment shocks may be correlated with changes in EITC expansions. In the next sections I show that the employment effects I find cannot be explained by state economic conditions, welfare reforms, forward-looking future mothers, or childless adults claiming other adults' children in the same household.

### 6.1 State Economic Conditions

There is some mixed evidence that state EITCs might potentially be endogenous (Bastian and Jones, 2018; Bastian, 2017b; Leigh, 2010). Bastian and Jones (2018) show that state EITCs are correlated with economic expansions or tax increases. Given that I find large positive employment effects for single childless women, my estimates might potentially be biased upward by economic expansions. To address this concern, I implement a triple difference approach (DDD), where in addition to using variation in state EITCs across states and time, I use variation within state-years between eligible and ineligible groups where eligibility is defined by age. Childless adults are only able to receive the EITC if they (or their spouse) were age 25-64 sometime during the tax year. Therefore I call childless adults "Eligible" if they (or their spouse) are age 25-64, and "Ineligible" if otherwise. I restrict my sample to all childless adults with a high school degree or less that are age 18-64 I only include those with no post-high school education because students older than 18 can still be claimed as dependents on their parents' tax return making them ineligible for to claim the EITC for themselves.

If my results hold, then this provides strong evidence that the EITC expansions are driving my results, rather than state economic conditions. The underlying assumption being



made here is that economic expansions and changing tax rates should affect eligible and ineligible childless adults similarly. The DDD approach can be summarized as follows:

$$\begin{aligned}
Y_{i,s,t} = & \theta StateEITC_{s,t} \cdot Eligible_i + State_s \beta_1 + Time_t \beta_2 \\
& + State_s \cdot Time_t \beta_3 + Eligible_i \cdot Time_t \beta_4 + Eligible_i \cdot State_s \beta_5 \\
& + X_{i,s,t} \gamma + \varepsilon_{i,s,t}
\end{aligned}$$

where  $X_{i,s,t}$  contains all controls in equation (1), state-by-year fixed effects and interactions between state dummies and *Eligible*, and year dummies and *Eligible*. I don't include an *Eligible* dummy because age fixed effects are already included in the model. I also do not include *StateEITC* because I include state-by-year fixed effects and *StateEITC* does not vary within state-years.  $\theta$  is the coefficient of interest and measures the effect of expanding the state EITC by \$100 on employment for eligible workers relative to ineligible workers.

In Table 11, I find large positive employment effects for childless women. Expanding the maximum state EITC by \$100 leads to a 1.67 pp increase in employment for eligible childless women relative to ineligible childless women. I also find that eligible childless women increase hours worked per week by 0.646 on average. For childless men, employment declines and work hours increase relative to ineligible childless men, but these differences are small and insignificant.

An alternative way to do this analysis to run the same regressions as I do for childless adults age 25-64 for ineligible childless adults age 18-24. These results can be seen in Table 6. Employment and hours effects are small and insignificant for this group, suggesting that the labor supply changes I find for childless adults cannot be explained by state level factors that are common to younger and older childless adults.

Based on the the results of my triple difference approach and placebo analysis on ineligible groups, it appears that state-level economics shocks correlated with EITC expansions cannot explain the employment effects I find.

## 6.2 State Employment Trends

To supplement my difference-in-difference employment results, I also conducted a state-year panel event study to test whether my results appear to be driven by pre-existing trends in employment that are correlated with state EITC expansions. I estimate the following specification and plot the coefficients separately for men and women:

$$Y_{s,t+j} = \beta_0 + \beta_1 StateEITC_{s,t} + State_s \beta_2 + Time_t \beta_3 + \beta_4 Y_{\{s,j=-1\}} + X_{s,t} \beta_5 + \varepsilon_{s,t}$$

for  $j \in [-5, 5]$ . Each  $j$  represents a different regression. Including  $Y_{\{s,j=-1\}}$  controls for employment in the year prior to EITC expansion ( $j = -1$ ), which means that  $\beta_1$ , the coefficient of interest, is interpreted as the effect of a \$100 increase in the maximum state EITC relative to the year before an EITC expansion. The employment results for women are shown in Figures 10 and 11 and employment results for men are shown in Figures 12 and 13. Labor force participation results can be seen in Figures 14, 15, 16, and 17. Based on these results I do not find significant cause for concern that pre-existing trends are driving the increase in womens' employment or labor force participation. When the older males are included in the sample, the figures show male employment declining prior to expansion. These declines are not statistically significant from zero, but should also not be dismissed. I would caution readers to interpret the results for male employment with the caveat that there might be pre-existing declines in male employment that are not being driven by EITC expansions.

## 6.3 Welfare Reform in the 1990s

Some recent papers have expressed concern with the EITC employment literature using variation in federal expansions occurring in the 1990s (Looney and Manoli, 2016; Mead, 2014). In short, the concern with these large EITC expansions is that many states are also reform-

ing welfare programs between 1992-1996, and then in 1996, the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) was signed into law replacing the Aid to Families with Dependent Children (AFDC) program with the Temporary Assistance for Needy Families program (TANF). TANF's objective was to make welfare temporary and require participants to enter the work force. States were also given more discretion on designing participation rules and how to spend TANF dollars. The Center on Budget and Policy Priorities show that direct cash payments to welfare recipients has declined dramatically since the implementation of TANF. In 2017, only about 23% of the block grants were used for cash assistance. Therefore it's possible that employment effects cannot be solely attributed to EITC changes because of welfare reform occurring simultaneously. Using state expansions alleviates this concern, especially since most expansions occurred after PRWORA was enacted.

In the 1990s, most welfare dollars were targeted towards families with dependents, so childless adults should be largely unaffected by these reforms. If welfare reform did affect childless adults, we would expect the effects to be negative, given the entry of single mothers caused by welfare reform and federal EITC expansions. Groves (2016) shows that welfare reform (including Federal EITC expansions) led to declines in the labor force participation of ineligible low-skilled workers. Therefore any positive effects I find are potentially attenuated by the entry of workers with dependents, most of whom are single mothers.

## **6.4 Forward-looking future single mothers**

Expanding the EITC for childless adults might not have the intended effect on employment if effects are actually due to childless women preparing to collect a larger "single mother EITC" by working now for when they have their own child in future months. This is not a problem for the EITC program in general, but it affects the interpretation of my estimates.

First I use the panel nature of the CPS with National Vital Statistics to calculate the share of single women who intend to have a child in the following year. For a subset of the

interviewees in the CPS, individuals can be linked for up to 2 consecutive March interviews (e.g. March 2017 and March 2018 can be linked) <sup>9</sup>. Based on this linked sample, I find that about 2.3% of single childless adults in the range of household income eligibility for a “single mother” EITC (less than about \$40000/year) will have a child in the following year. Hymowitz (2014) using National Vital Statistics data show that intended births in the US (as a share of all live births) have stayed constant at about 40% since the early 1990s for never married women. A back of the envelope calculation suggests that only about 0.92% ( $0.023 * 0.4$ ) of single childless women expecting the EITC had a planned birth the following year. Given this is such small proportion of single childless women, it seems unlikely this group is driving the effects.

I also look at whether state EITC expansions affect the number of childless women there are in the US. I do this based on the reasoning that childless women who want to take advantage of the more generous single mother EITC will subsequently have children, causing the number of childless women to fall. To do this, I first construct a state-year panel and regress the log of the number of single childless women in a given state-year on the maximum state EITC in \$100s.

$$\text{Log}(\text{NumChildlessWomen})_{s,t} = \theta_0 + \theta_1 \text{StateEITC}_{s,t} + \text{State}_s \theta_2 + \text{Time}_t \theta_3 + X_{s,t} \theta_5 + \varepsilon_{s,t}$$

This regression includes state and year fixed effects and the same state level controls used in my analysis of employment effects. I find that for every \$100 increase in the maximum state EITC, the number of childless women decreases by about 0.02% (p-value = 0.907). Given that the number of single childless women does not significantly decline after treatment, this shows that childless women are increasing their employment as a result of the incentives from the EITC for childless women rather than the EITC for women with dependents.

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<sup>9</sup>For information on CPS linkages see Flood et al (2014)

## 6.5 Childless Adults Claiming Other Dependents in the Household

Given that most of the state EITC expansions affect the generosity of the EITC for adults with and without dependents. There is a possibility that households are optimizing EITC behavior by having the adult or couple with the income that maximizes the EITC, claim the children in the household on their tax return. This is a problem for my identification strategy since they would be responding to the EITC for dependent households rather than non-dependent households. In Table 5, I show my results after dropping households with children, which reduces the sample size by about 16% for both men and women. The results are consistent with my main results in Table 2 showing that younger women's employment increases while older men's employment decreases.

## 7 The 2015 District of Columbia EITC Expansion Solely for Childless Adults

Most federal and state EITC increases have affected EITC amounts for households with and without dependents simultaneously. Additionally, state EITCs expansions have only increased phase-in and phase-out rates, but have not expanded the range of income eligibility.<sup>10</sup> The DC EITC schedule compared to the Federal EITC is shown in Figure 21. Since state EITC expansions have not been specific to childless adults, effects could be different in the case where the EITC expands only for childless adults. Groves (2016) shows evidence that entry of new workers from EITC expansions and welfare reform had negative spillovers onto ineligible or less eligible populations of workers. To test whether the simultaneous expansions are attenuating employment effects, I look at the District of Columbia EITC expansion of 2015. What's unique about the District of Columbia in 2015 is that the

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<sup>10</sup>Since most state EITCs are calculated as a percentage of the federal EITC, phase-in and phase-out rates increase by  $p * s$  where  $p$  is the phase-in rate and  $s$  is the state EITC percent of federal EITC rule.

EITC only increased for childless adults, and not for households with dependents. In more detail, DC expanded its EITC from 40% of the federal EITC to 100%. The annual earnings eligibility range also increased from about \$15k to \$24k. The DC expansion increased the number of childless adult EITC claimants from 2014 to 2015 by 12,490, while the number of claimants with dependents stayed relatively constant (Muhammad, 2019). 76% of new childless claimants were earning in the new range of income eligibility (\$15k-\$24k), and the rest were earning in the Federal EITC eligible range (\$1-\$15k). The 24% of new claimants that are not earning above \$15k could be new workers, but they could also be workers who did not claim the EITC in previous years because the opportunity cost to apply was too high relative to the benefit. Previous research has shown that claiming increases with EITC amounts (Blumenthal et al., 2005).

I use data from the American Community Survey for years 2010-2017 with a difference-in-difference empirical strategy to estimate the effects of the DC expansion without a simultaneous expansion for households with dependents and an extension of the EITC to higher incomes. I use DC as the treatment group and states who have never expanded the EITC as a control group.

Given that I am not using state expansions that occur in different states and times in this framework, I can more easily show evidence of parallel trends in employment between DC and non-EITC states before the 2015 DC EITC expansion. In Figures 19 and 20, it appears that employment between DC and non-EITC states are trending similarly for both men and women until the 2015 expansion. Employment is elevated in the post expansion period for DC women, but it's a little less clear what's going on with men, 2015 and 2017 are elevated, but 2016 is not.

To estimate changes in employment, hours worked, and labor force participation. I estimate the following regression equation:

$$Y_{i,s,t} = \beta_0 + \beta_1 DCexpansion_{s,t} + State_s + \beta_2 + Time_t\beta_3 + X_{i,s,t}\beta_4 + \varepsilon_{i,s,t} \quad (1)$$

where  $X$  is a vector including state, year, age, and race fixed effects, and controls for marital status, education, ACA expansion status, and the log of real effective minimum wage.  $Y$  includes the employment outcomes: employed, labor force participation, and log usual hours worked, which differs slightly from the hours worked variable I use in the CPS. CPS respondents report hours worked the week before their March interview, whereas ACS respondents are interviewed on a rolling basis throughout the entire year.

Results for men and women are shown in Tables 12. I find that the DC expansion of the EITC increased women's employment by 5.78pp and decreased men's employment by 2.59pp. Increases in employment are driven by younger childless women and decreases in employment are driven by older men. This result is consistent with my results using variation in other state EITC expansions with CPS data. Hours increased for the childless women aged 35-44 by 13.6%, and decreased for childless 35 and older (2.6-5.6%). Changes in labor force participation do not exactly mirror employment effects. Women's labor force participation increases less than employment (in percentage points), while men's labor force participation declines more than employment. This is suggestive of the fact that the DC EITC expansion caused women to both enter the labor force and increased their attachment to employment. Men on the other hand exited the labor force or stayed employed, but saw work hours cut by employers and/or voluntarily worked less hours.

The previous approach shows the aggregate effect of the DC expansion on employment. To make estimates more directly comparable with my results from using the CPS, I replace *DCExpansion* with a measure of the maximum DC EITC in 100s of 2017 dollars. These results are shown in Tables 14 and 15. What I find is that for women with a high school degree or less, employment increases for all childless women by 0.065pp, which is about half the magnitude of the estimate I found in my CPS analysis. The differences in the two estimates might be explained by the fact that the DC EITC expansion reached a higher range of income levels and changed where workers earnings fall on the EITC schedule (phase-in, max, or phase-out portion). It could also be that childless adult employment was already

high in 2015, so there was simply less room for employment to grow. In Figure 18, you can see that employment in DC was much higher relative to non-EITC states.

Overall I find large increases (decreases) for employment and labor force participation for women (men) following the expansion of the DC EITC to childless adults. The ACS was the most suitable dataset given the large annual sample available across all states. However, I would caution readers to take the DC results with a grain a salt given that the DC sample is still quite small after conditioning on adults having no post-high school education. There are about 1,687 observations across 4 years, in the DC post-period, which is small enough to cause figures and tables to have some estimates that are quite noisy.

## 8 Conclusion

The effects of the Earned Income Tax Credit for childless adults has been understudied, especially considering the fact that the EITC has been available to this group for a quarter of a century. I find that the EITC significantly increases employment for childless women, particularly younger women. I also find men's employment declines, a potential unintended consequence of policies incentivizing workers into the labor force.

Previous literature has shown that early life work experience for women matters greatly for future labor force attachment and earnings growth (Dahl et al., 2009; Alon et al., 2001). By inducing childless women into the labor force at a relatively low cost (compared to women with children), states can possibly see positive downstream effects on tax revenue and future outlays of government assistance dollars to families, whether they have future children or not.

Employment effects for childless men are insignificant or negative, which I find is an artifact of differences between marginal male and female workers. Men have much higher levels of baseline employment and are more likely to report being unemployed involuntarily. Therefore, at least on the surface, it appears that marginal males out of the labor force



would need higher EITCs to be induced into the labor force; and for those marginal males who are in the labor force, but are involuntarily unemployed, finding a job might be more difficult. This is true within groups of childless women as well. Looking at effects for women by household structure, I find that primary earners living with parents increase employment the most. Not coincidentally, this group's baseline employment is much lower and the share of unemployed workers that are labor force entrants is higher than that of other household types. Therefore, the effectiveness of EITC expansions for childless adults, in terms of finding pro-work effects, depends strongly on the baseline characteristics of marginal workers. States looking to expand EITCs further should at least consider employment levels, reasons for unemployment, and minimum wage levels, all of which are related to these marginal workers.

The DC EITC expansion, the first to expand the EITC solely to childless adults increased the employment of younger women and decreased the employment of older men, consistent my findings associated with other state EITC expansions that did not exclusively affect childless adults.

There are several groups for whom I do not find evidence of employment effects. The absence of employment effects should not necessarily discourage states from expanding EITCs, given the bevy of research that has shown strong societal benefits such as reductions in crime, improved health, increased educational attainment, and increases in child support payments. Future expansions can take many different forms such as lowering the eligibility age to below 25, extending the range of income that is eligible, or raising the maximum credit. There is lots of research that can still be done to understand the effects of these different varieties of expansions, which are nuanced enough, that we would anticipate different effects depending on how the EITC was rolled out. This became more obvious after looking at the DC EITC expansion separately from other state EITC expansion. Additional research should be done looking at how effects differ by expansion types across employment and other outcomes.

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# Tables

Table 1: Descriptive Statistics

	Male	Female	Total
Employed	0.683 (0.465)	0.569 (0.495)	0.631 (0.482)
Hours/wk	40.89 (12.35)	36.86 (11.79)	39.26 (12.29)
Earnings/wk	796.1 (485.1)	594.9 (378.5)	710.3 (453.9)
Hourly Wage	1.488 (5.414)	1.099 (4.126)	1.314 (4.882)
State Effective MW	7.710 (0.833)	7.667 (0.823)	7.690 (0.829)
State Unemployment Rate	0.0622 (0.0213)	0.0617 (0.0208)	0.0620 (0.0211)
Married	0.448 (0.497)	0.569 (0.495)	0.502 (0.500)
White	0.775 (0.417)	0.773 (0.419)	0.774 (0.418)
Age	44.82 (12.03)	49.22 (11.18)	46.79 (11.86)
Live w/ Parent	0.162 (0.369)	0.0879 (0.283)	0.129 (0.335)
State EITC %	5.963 (12.54)	5.732 (12.36)	5.859 (12.46)
Max State EITC	29.60 (62.58)	28.43 (61.62)	29.08 (62.16)
Max Federal EITC	497.1 (8.121)	496.8 (7.974)	497.0 (8.057)
Observations	409347		

The sample is restricted to childless adults age 25-64 with no post-high school education. The sample covers CPS survey years 1995-2018. All variables reported in dollars are adjusted to 2017 dollars using annual CPI-U.

Table 2: Employment Effects of State EITCs: Age 25-64

	Women				Men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
State EITC (\$100s)	0.0122* (0.0071)		0.0122** (0.0057)		-0.0125 (0.0077)		0.0008 (0.0075)	
State EITC (\$100s) x 25-34		0.0351*** (0.0097)		0.0038 (0.0107)		-0.0108 (0.0119)		-0.0018 (0.0126)
State EITC (\$100s) x 35-44		0.0159 (0.0125)		0.0246 (0.0179)		-0.0014 (0.0103)		-0.0001 (0.0089)
State EITC (\$100s) x 45-54		0.0108 (0.0170)		0.0042 (0.0079)		-0.0091* (0.0053)		0.0059 (0.0087)
State EITC (\$100s) x 55-64		0.0020 (0.0100)		0.0185 (0.0124)		-0.0264** (0.0115)		0.0029 (0.0102)
Observations	177155	177155	97338	97338	216495	216495	142684	142684

Standard errors in parentheses

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The sample is restricted to childless adults age 25-64 with a no post-high school education. All specifications include controls for state and year fixed effects, log of state effective real minimum wage, indicator for state participation in ACA medicaid expansion, indicator whether a state has a welfare waiver, marital status, and race and age fixed effects. All columns allow state and year fixed effects to differ by marital status. Columns (2), (4), (6), and (8) allow for state and year effects to differ by age group as well. The sample covers CPS survey years 1995-2018.

Table 3: Labor Force Participation and Job Leaving Effects of State EITCs: Age 25-64

	Women				Men			
	(1) LFP	(2) LFP	(3) Left Job	(4) Left Job	(5) LFP	(6) LFP	(7) Left Job	(8) Left Job
State EITC (\$100s)	0.0069 (0.0060)		-0.0011** (0.0005)		-0.0115 (0.0087)		0.0011 (0.0006)	
State EITC (\$100s) x 25-34		0.0282** (0.0111)		-0.0018 (0.0019)		-0.0092 (0.0111)		0.0013 (0.0020)
State EITC (\$100s) x 35-44		0.0126 (0.0126)		-0.0020 (0.0021)		0.0003 (0.0108)		0.0012 (0.0008)
State EITC (\$100s) x 45-54		0.0023 (0.0123)		-0.0008 (0.0007)		-0.0142** (0.0059)		0.0015 (0.0009)
State EITC (\$100s) x 55-64		-0.0004 (0.0105)		-0.0008* (0.0005)		-0.0203 (0.0134)		0.0002 (0.0008)
Constant	0.7011*** (0.0621)		0.0021 (0.0061)		0.7702*** (0.0533)		0.0189** (0.0074)	
Observations	177092	177092	177155	177155	215937	215937	216495	216495

Standard errors in parentheses

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The sample is restricted to childless adults age 25-64 with a no post-high school education. All specifications include controls for state and year fixed effects, log of state effective real minimum wage, indicator for state participation in ACA medicaid expansion, indicator whether a state has a welfare waiver, marital status, and race and age fixed effects. All columns allow state and year fixed effects to differ by marital status. Columns (2), (4), (6), and (8) allow for state and year effects to differ by age group as well. The sample covers CPS survey years 1995-2018.

Table 4: Wage Effects of State EITCs: Age 25-64

	Women			
	(1)	(2)	(3)	(4)
	log(wage)	log(wage)	log(wage)	log(wage)
State EITC (\$100s)	-0.0122 (0.0138)		-0.0199 (0.0204)	
State EITC (\$100s) x 25-34		-0.0213 (0.0226)		0.0005 (0.0297)
State EITC (\$100s) x 35-44		-0.0118 (0.0318)		0.0153 (0.0239)
State EITC (\$100s) x 45-54		-0.0252 (0.0352)		-0.0374 (0.0233)
State EITC (\$100s) x 55-64		0.0132 (0.0268)		-0.0995** (0.0421)
Observations	13978	13978	18758	18758

Standard errors in parentheses

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The sample is restricted to childless adults age 25-64 with a no post-high school education. All specifications include controls for state and year fixed effects, log of state effective real minimum wage, indicator for state participation in ACA medicaid expansion, indicator whether a state has a welfare waiver, marital status, and race and age fixed effects. All columns allow state and year fixed effects to differ by marital status. Columns (2) and (4) allow for state and year effects to differ by age group by age group as well. The sample covers CPS survey years 1995-2018.



Table 5: Employment Effects of State EITCs: No Child Households Age 25-64

	Women				Men			
	(1) Employed	(2) Employed	(3) Log(Hours)	(4) Log(Hours)	(5) Employed	(6) Employed	(7) Log(Hours)	(8) Log(Hours)
State EITC (\$100s)	0.0115 (0.0076)		0.0146** (0.0057)		-0.0128** (0.0061)		0.0021 (0.0076)	
State EITC (\$100s) x 25-34		0.0353*** (0.0088)		0.0074 (0.0117)		-0.0080 (0.0094)		-0.0018 (0.0125)
State EITC (\$100s) x 35-44		0.0226 (0.0162)		0.0293 (0.0197)		-0.0022 (0.0096)		0.0037 (0.0106)
State EITC (\$100s) x 45-54		0.0087 (0.0167)		0.0025 (0.0082)		-0.0080 (0.0057)		0.0071 (0.0090)
State EITC (\$100s) x 55-64		0.0015 (0.0104)		0.0229* (0.0131)		-0.0293*** (0.0099)		0.0023 (0.0105)
Observations	159320	159320	88373	88373	192856	192856	127104	127104

Standard errors in parentheses

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The sample is restricted to childless adults age 25-64 with no post-high school education and no children in the household. All specifications include controls for state and year fixed effects, log of state effective real minimum wage, indicator for state participation in ACA medicaid expansion, indicator whether a state has a welfare waiver, marital status, and race and age fixed effects. Columns (2) and (4) allow for state and year effects to differ by marital status by interacting state and year indicators with an indicator for whether individuals are married. The sample covers CPS survey years 1995-2018.

Table 6: Placebo Employment Effects of State EITCs: 18-24 year olds

	Women				Men			
	(1) Employed	(2) Employed	(3) Log(Hours)	(4) Log(Hours)	(5) Employed	(6) Employed	(7) Log(Hours)	(8) Log(Hours)
State EITC (\$100s)	0.0027 (0.0075)		-0.0085 (0.0130)		0.0031 (0.0065)		-0.0130 (0.0124)	
State EITC (\$100s) x 18-21		0.0063 (0.0079)		-0.0224 (0.0175)		0.0100 (0.0067)		-0.0232 (0.0139)
State EITC (\$100s) x 22-24		-0.0090 (0.0167)		0.0201 (0.0212)		-0.0126 (0.0124)		-0.0045 (0.0156)
Observations	62468	62468	31435	31435	93885	93885	50925	50925

Standard errors in parentheses

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The outcome is employed. The sample is restricted to childless adults age 18-24 with a high school degree or less. All specifications include controls for state and year fixed effects, log of state effective real minimum wage, indicator for state participation in ACA medicaid expansion, indicator whether a state has a welfare waiver, marital status, and race and age fixed effects. Columns (2) and (4) allow for state and year effects to differ by age group and marital status by interacting state and year dummies with age group dummies and state and year dummies with married dummies. The sample covers CPS survey years 1995-2018.

Table 7: Employment Effects of State EITCs for Childless Adults By Marital Status

	Women		Men	
	(1)	(2)	(3)	(4)
	Employed	Log(Hours)	Employed	Log(Hours)
State EITC (\$100s) x Unmarried	0.0156*	0.0123	-0.0125*	-0.0055
	(0.0086)	(0.0091)	(0.0070)	(0.0081)
State EITC (\$100s) x Married	0.0083	0.0122	-0.0100	0.0096
	(0.0084)	(0.0118)	(0.0100)	(0.0080)
Observations	177155	97338	216495	142684

Standard errors in parentheses

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The sample is restricted to childless adults age 25-64 with no post-high school education. The sample covers CPS survey years 1995-2018.

Table 8: Employment Effects of State EITCs for Childless Adults By Living Arrangement

	Women		Men	
	(1)	(2)	(3)	(4)
	Employed	Log(Hours)	Employed	Log(Hours)
State EITC (\$100s) x Parents	0.0308**	0.0115	-0.0276**	-0.0070
	(0.0140)	(0.0129)	(0.0120)	(0.0134)
State EITC (\$100s) x Family-No Parents	0.0202**	0.0076	-0.0027	-0.0047
	(0.0098)	(0.0125)	(0.0087)	(0.0097)
State EITC (\$100s) x Non-Family	0.0082	0.0125	-0.0107	-0.0044
	(0.0142)	(0.0176)	(0.0084)	(0.0079)
Observations	75891	42276	119166	75136

Standard errors in parentheses

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The sample is restricted to single childless adults age 25-64 with no post-high school education. The sample covers CPS survey years 1995-2018.

Table 9: Marginal Workers: Reason for Being Unemployed (By Sex)

	Male	Female	Total
Unemployed-Lost Job	0.739 (0.439)	0.596 (0.491)	0.696 (0.460)
Unemployed-Left Job	0.0704 (0.256)	0.106 (0.308)	0.0812 (0.273)
Labor Force Re-entrant	0.175 (0.380)	0.266 (0.442)	0.203 (0.402)
Labor Force New Entrant	0.0149 (0.121)	0.0315 (0.175)	0.0200 (0.140)
Observations	21553		

The sample is restricted to unemployed childless adults age 25-64 with no post-high school education. The sample covers CPS survey years 1995-2018.

Table 10: Marginal Workers: Reason for Being Unemployed (By HH Type)

	Parents	Family-No Parents	Non-Family	Total
Unemployed-Lost Job	0.596 (0.491)	0.658 (0.474)	0.688 (0.463)	0.654 (0.476)
Unemployed-Left Job	0.0951 (0.293)	0.110 (0.313)	0.0916 (0.288)	0.0968 (0.296)
Labor Force Re-entrant	0.268 (0.443)	0.212 (0.409)	0.210 (0.407)	0.228 (0.419)
Labor Force New Entrant	0.0409 (0.198)	0.0190 (0.137)	0.0108 (0.103)	0.0217 (0.146)
Observations	25878			

The sample is restricted to unemployed single childless women age 25-64 with no post-high school education. The sample covers CPS survey years 1995-2018.

Table 11: Triple Difference: Use Younger Categorically Ineligible Childless Adults as Third Difference

	Women 18-64		Women 18-34		Men 18-64		Men 18-34	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Employed								
Log(Hours)								
State EITC (\$100s) x Age>24	0.0127 (0.0086)	0.0280*** (0.0088)	0.0249** (0.0118)	0.0209* (0.0116)	-0.0060 (0.0070)	0.0044 (0.0100)	-0.0023 (0.0075)	-0.0023 (0.0097)
Observations	248931	133525	92664	50412	323090	201393	157250	96858

Standard errors in parentheses

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The sample is restricted to childless adults age 18-64 with a high school degree or less. Childless adults are categorically ineligible to receive the EITC until they turn 25. All specifications include controls for state and year fixed effects, state-by-year fixed effects, marital status, and race and age fixed effects, and interactions between age eligible and state and year fixed effects. The sample covers CPS survey years 1995-2018.

Table 12: Employment and Hours Worked: 2015 DC Expansion

	Women				Men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DC Expansion	0.0578*** (0.0097)	Employed	Log(Hours)	Log(Hours)	Employed	Employed	Log(Hours)	Log(Hours)
			0.0119 (0.0098)	-0.0029 (0.0107)	-0.0259 (0.0193)	0.0074 (0.0213)	-0.0148 (0.0121)	-0.0578*** (0.0131)
DC Expansion x 25-34		0.1477*** (0.0094)		0.1367*** (0.0111)		-0.0279 (0.0184)		-0.0082 (0.0128)
DC Expansion x 35-44		0.0285** (0.0110)		-0.0170 (0.0113)		-0.0560*** (0.0200)		0.0217 (0.0129)
DC Expansion x 45-54		0.0810*** (0.0110)		-0.0124 (0.0118)		-0.0266 (0.0188)		0.0134 (0.0117)
DC Expansion x 55-64		-0.0062 (0.0095)						
Observations	630754	630754	371331	371331	834228	834228	547705	547705

Standard errors in parentheses

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The sample is restricted to childless adults age 18-64 with a high school degree or less.

Table 13: Labor Force Participation: 2015 DC Expansion

	Women		Men	
	(1) LFP	(2) LFP	(3) LFP	(4) LFP
DC Expansion	0.0250*** (0.0068)		-0.0371*** (0.0074)	
DC Expansion x 25-34		0.0512*** (0.0073)		-0.0335*** (0.0082)
DC Expansion x 35-44		0.0186** (0.0078)		-0.0005 (0.0084)
DC Expansion x 45-54		0.0413*** (0.0070)		-0.0605*** (0.0071)
DC Expansion x 55-64		-0.0010 (0.0079)		-0.0428*** (0.0069)
Observations	630754	630754	834228	834228

Standard errors in parentheses

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The sample is restricted to childless adults age 18-64 with a high school degree or less.

Table 14: Employment and Hours Worked: 2015 DC Expansion (DC EITC in \$100s)

	Women				Men			
	(1) Employed	(2) Employed	(3) Log(Hours)	(4) Log(Hours)	(5) Employed	(6) Employed	(7) Log(Hours)	(8) Log(Hours)
DC EITC (\$100s)	0.0065* (0.0033)		-0.0043 (0.0034)		-0.0085 (0.0066)		0.0054 (0.0040)	
DC EITC (\$100s) x 25-34		0.0196*** (0.0031)		-0.0249*** (0.0038)		0.0021 (0.0071)		0.0050 (0.0047)
DC EITC (\$100s) x 35-44		-0.0052 (0.0037)		0.0195*** (0.0037)		-0.0267*** (0.0064)		-0.0047 (0.0040)
DC EITC (\$100s) x 45-54		0.0232*** (0.0037)		-0.0086** (0.0038)		-0.0032 (0.0071)		0.0011 (0.0042)
DC EITC (\$100s) x 55-64		-0.0090*** (0.0031)		0.0081** (0.0039)		-0.0101 (0.0063)		0.0286*** (0.0038)
Observations	630754	630754	371331	371331	834228	834228	547705	547705

Standard errors in parentheses

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The sample is restricted to childless adults age 18-64 with a high school degree or less.



Table 15: Labor Force Participation: 2015 DC Expansion (DC EITC in \$100s)

	Women			
	(1)	(2)	(3)	(4)
	LFP	LFP	LFP	LFP
DC EITC (\$100s)	0.0068*** (0.0022)		-0.0083*** (0.0025)	
DC EITC (\$100s) x 25-34		0.0030 (0.0029)		-0.0153*** (0.0029)
DC EITC (\$100s) x 35-44		0.0009 (0.0026)		-0.0116*** (0.0028)
DC EITC (\$100s) x 45-54		0.0193*** (0.0021)		0.0001 (0.0026)
DC EITC (\$100s) x 55-64		0.0018 (0.0024)		-0.0045** (0.0020)
Observations	630754	630754	834228	834228

Standard errors in parentheses

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The sample is restricted to childless adults age 18-64 with a high school degree or less.

# Figures

Figure 1: Federal EITC For Single Adults By Number of Dependents: 2018 Tax Year

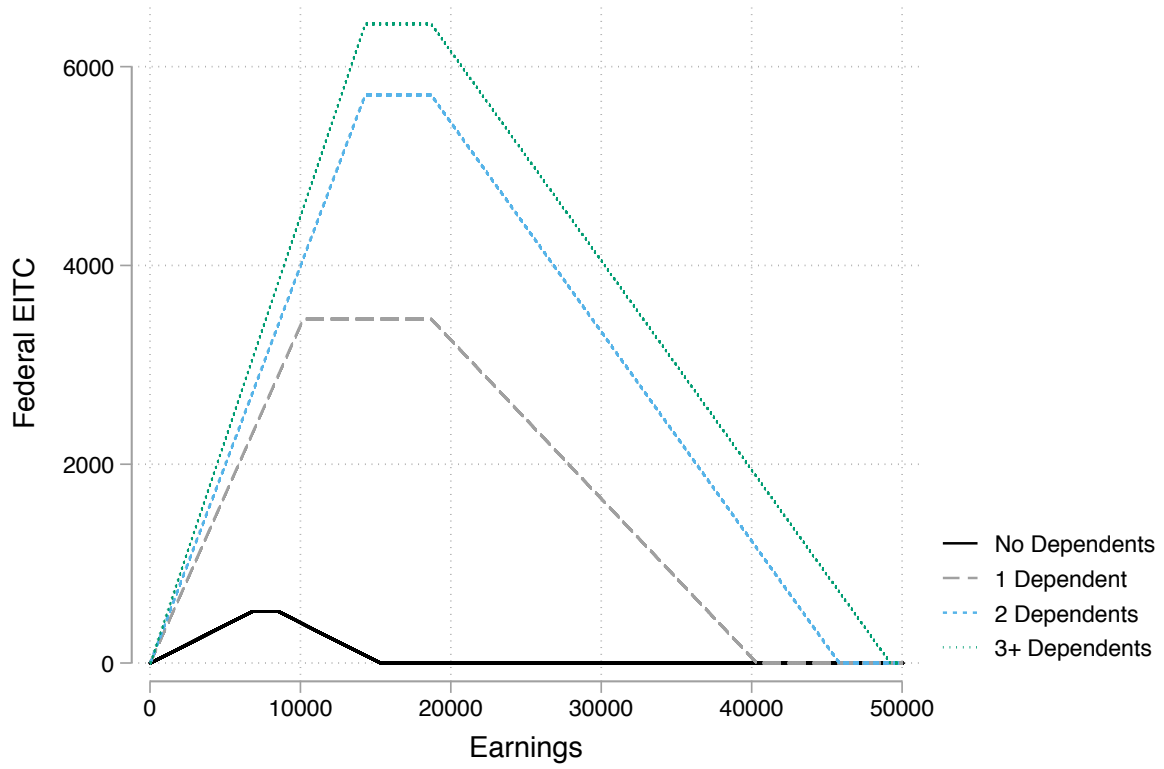


Figure 2: State EITCs as a Percentage of the Federal EITC for Childless Adults

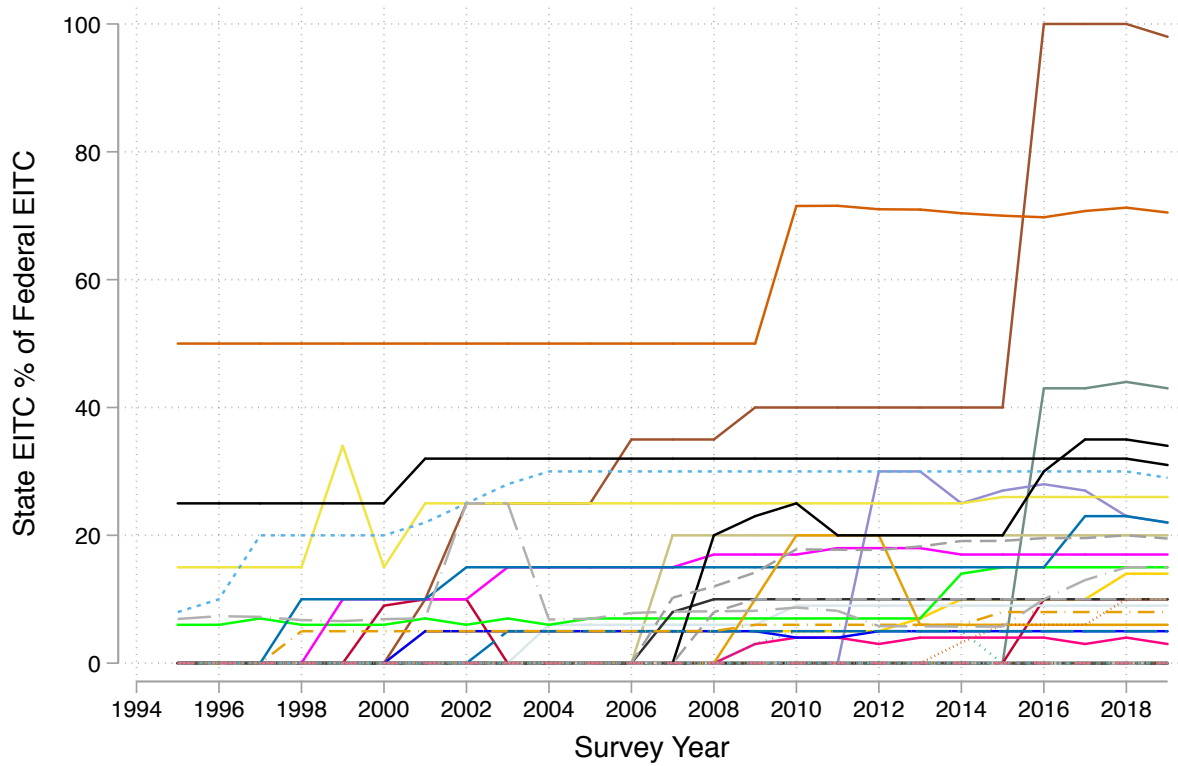
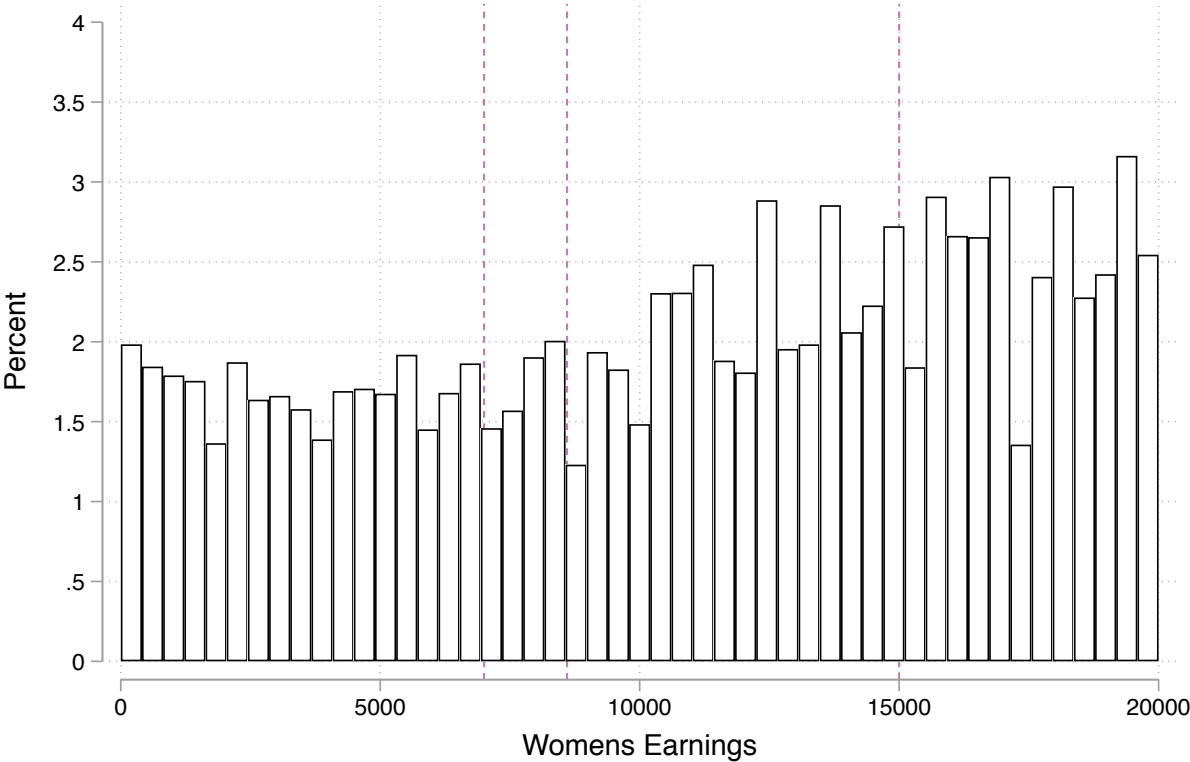
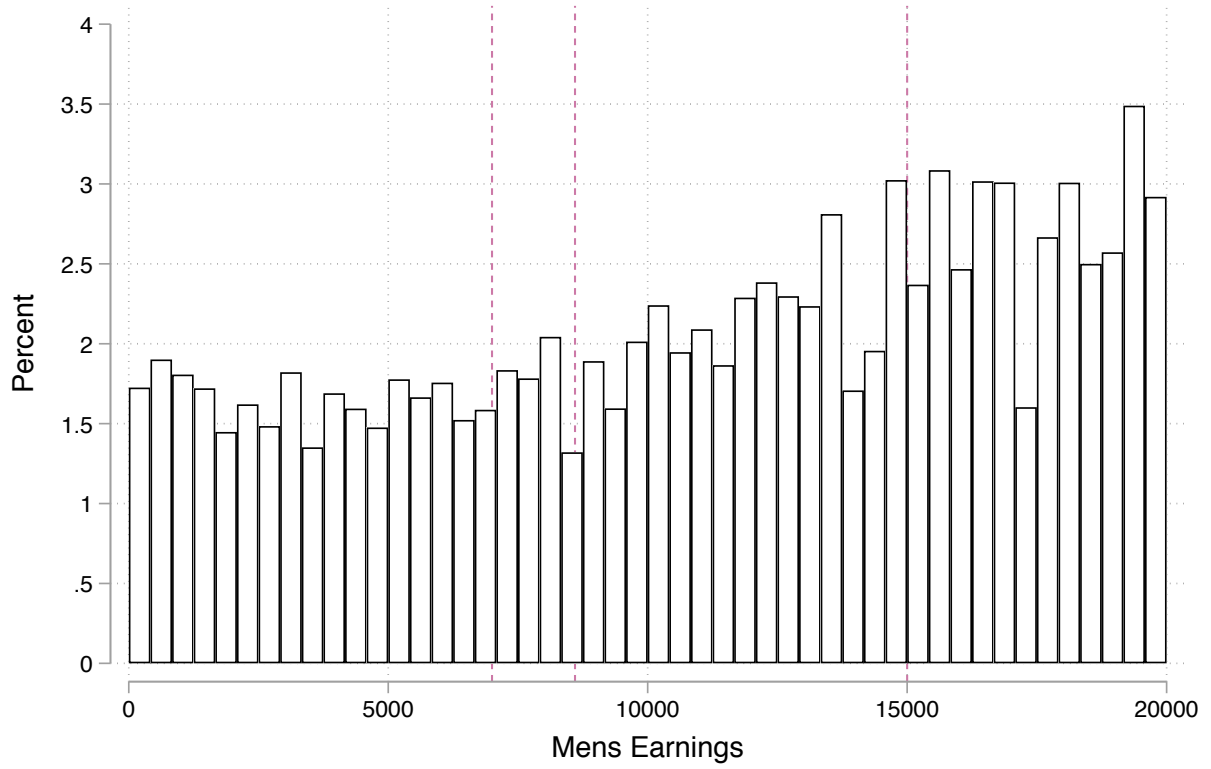


Figure 3: Distribution of Women's Earnings



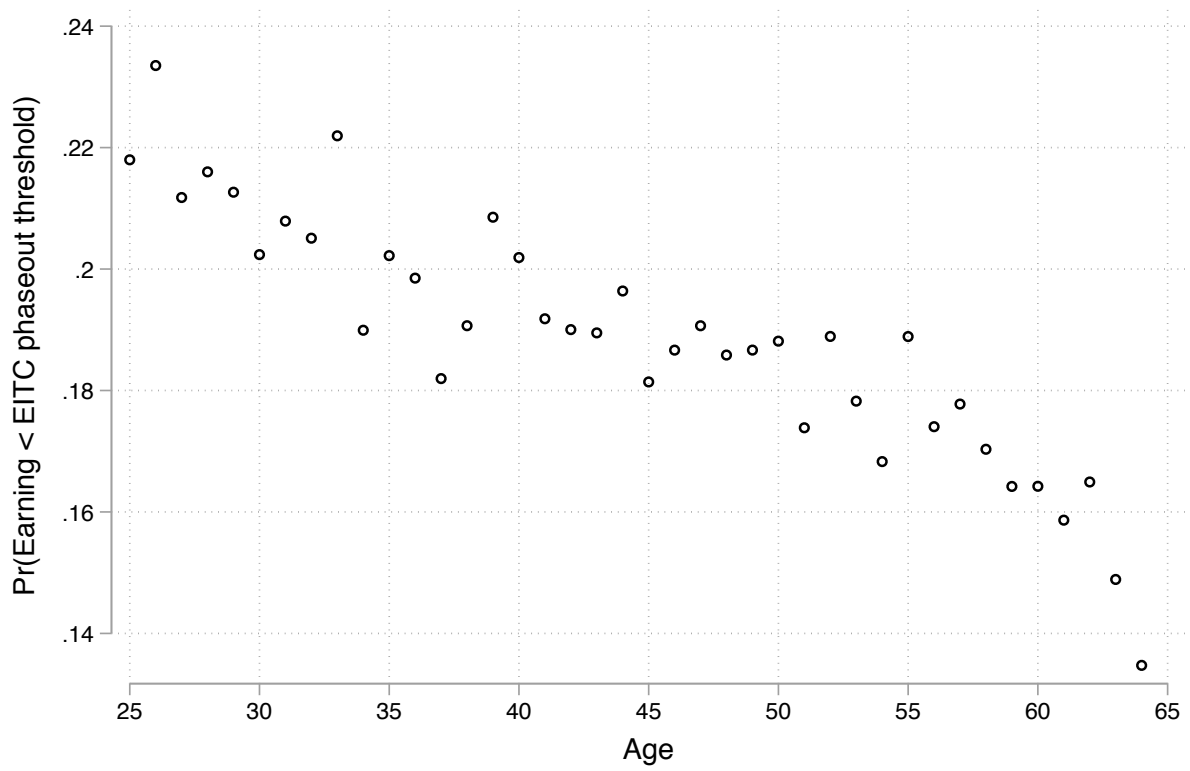
The EITC phases-in up to \$7000, maxes out between \$7000-\$8600, and phases out until it reaches \$0 at \$15000. The vertical denoted lines mark this approximate thresholds.

Figure 4: Distribution of Men's Earnings



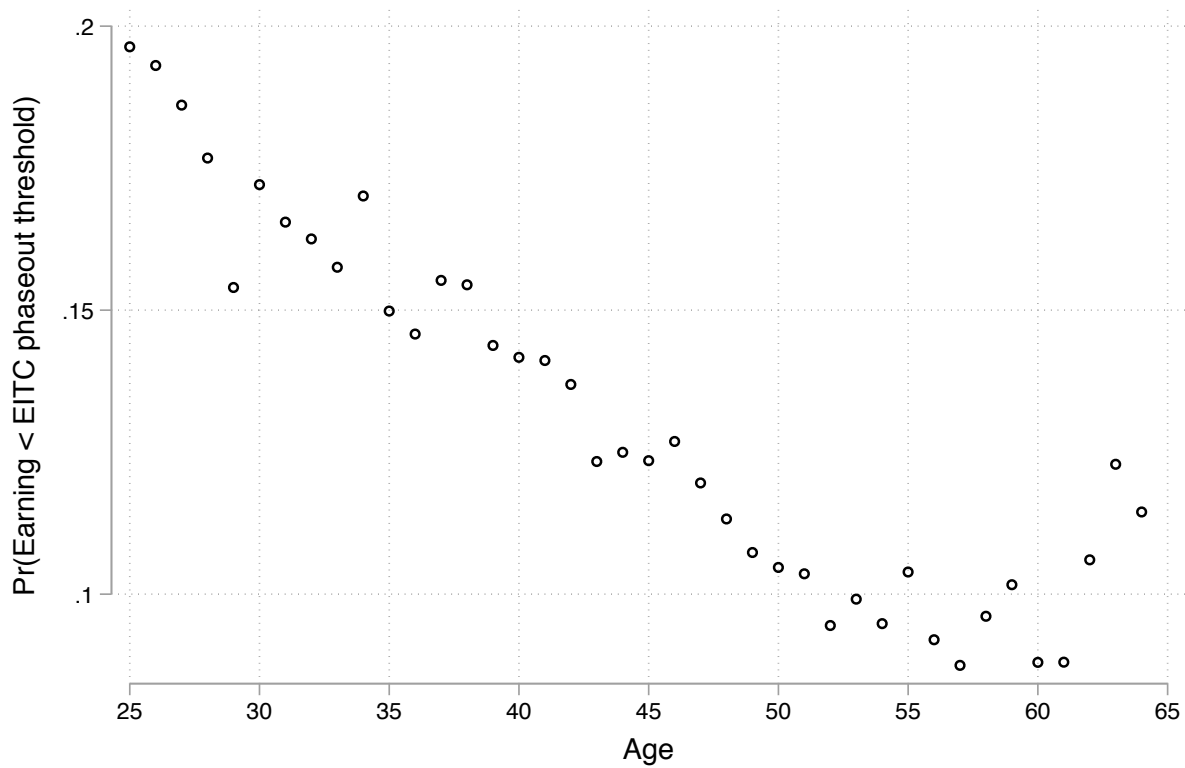
The EITC phases-in up to \$7000, maxes out between \$7000-\$8600, and phases out until it reaches \$0 at \$15000. The vertical denoted lines mark this approximate thresholds.

Figure 5: Share of Childless Women Earning Less than EITC Earning Threshold



Sample is limited to single childless women age 25-64 with no post-HS education. Earnings include spouse earnings if married

Figure 6: Share of Childless Men Earning Less than EITC Earning Threshold



Sample is limited to single childless women age 25-64 with no post-HS education. Earnings include spouse earnings if married

Figure 7: Number of Family Members Present in Household

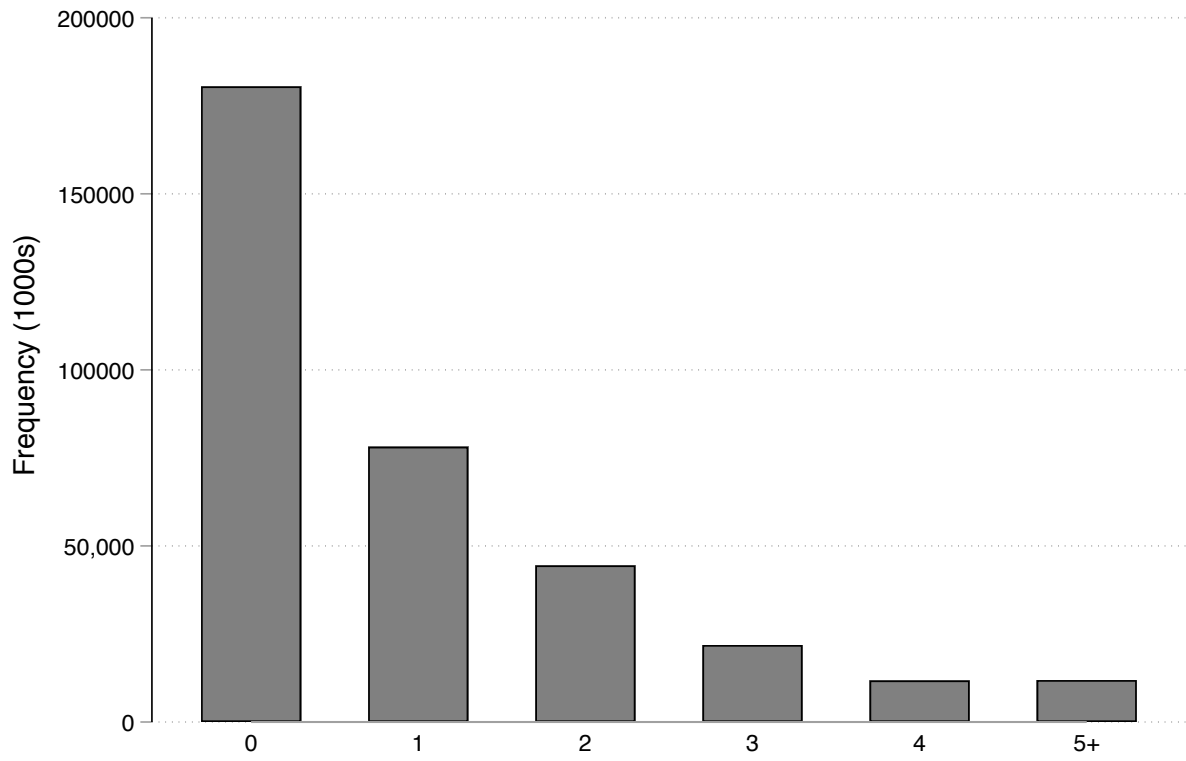




Figure 8: Number of Non-family Members in Household

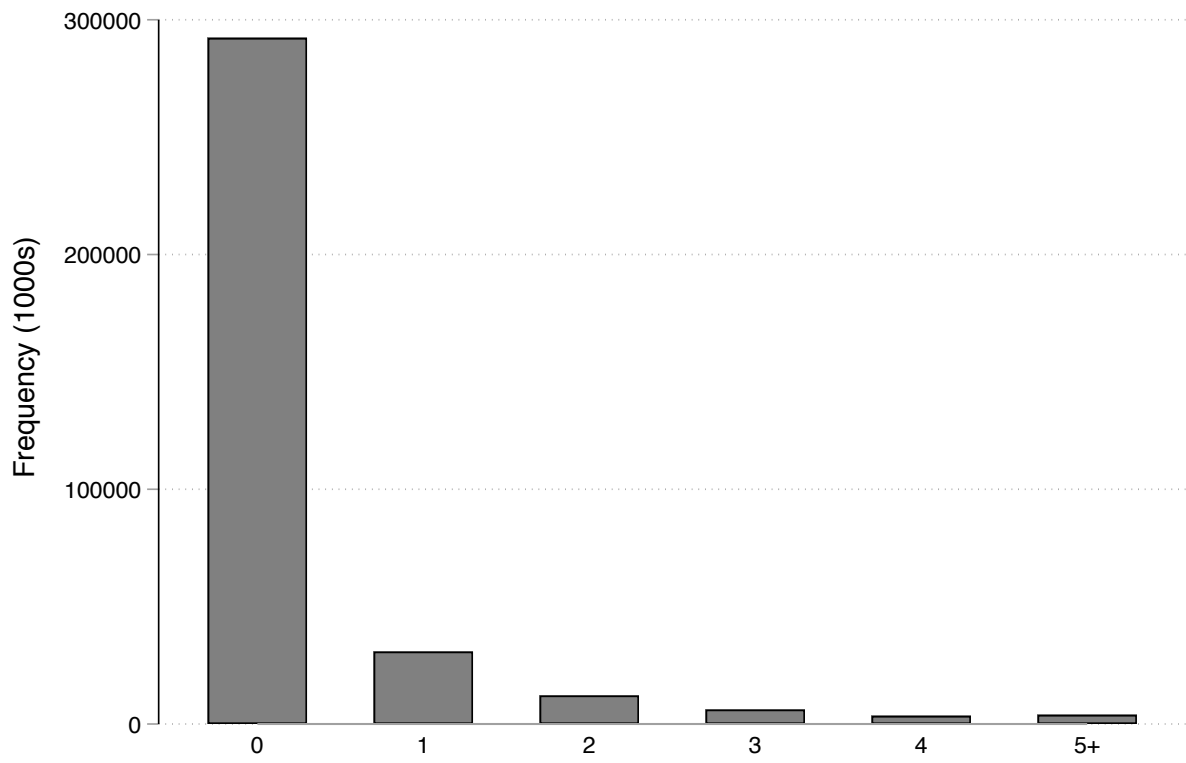


Figure 9: Frequency of Relationship to Householder

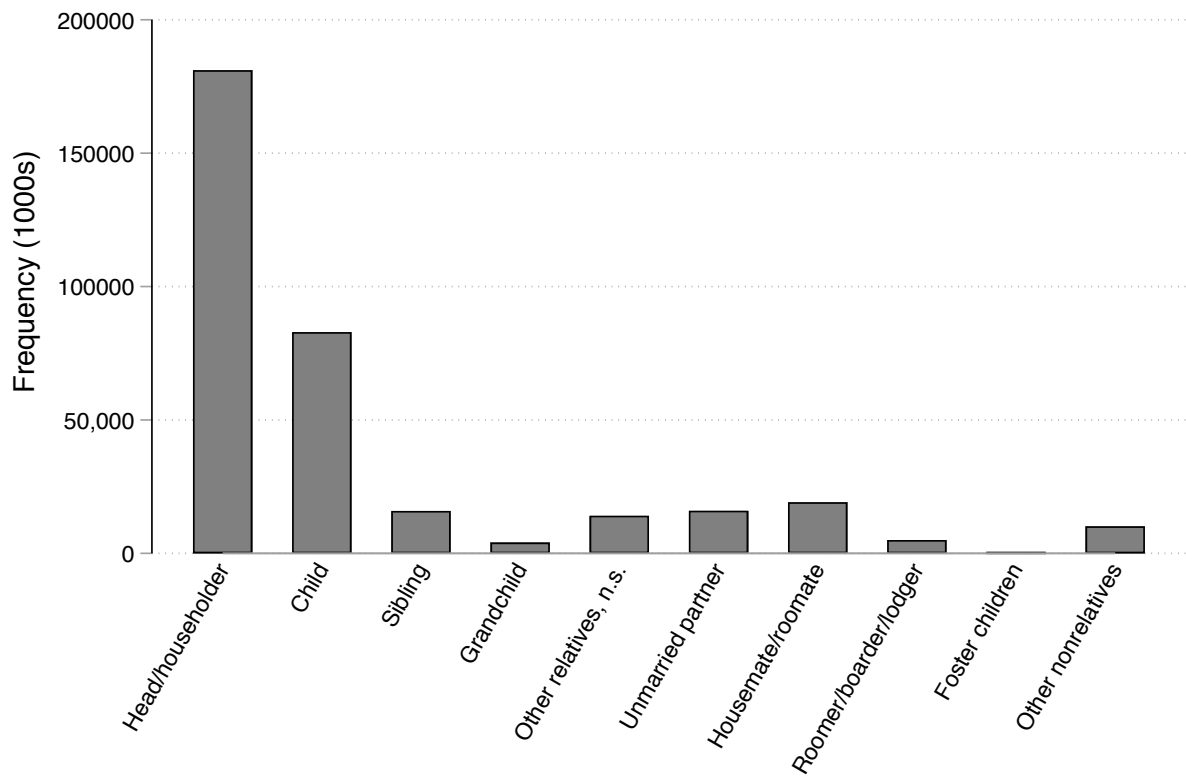


Figure 10: Employment and State EITC Event Study: Women 25-64

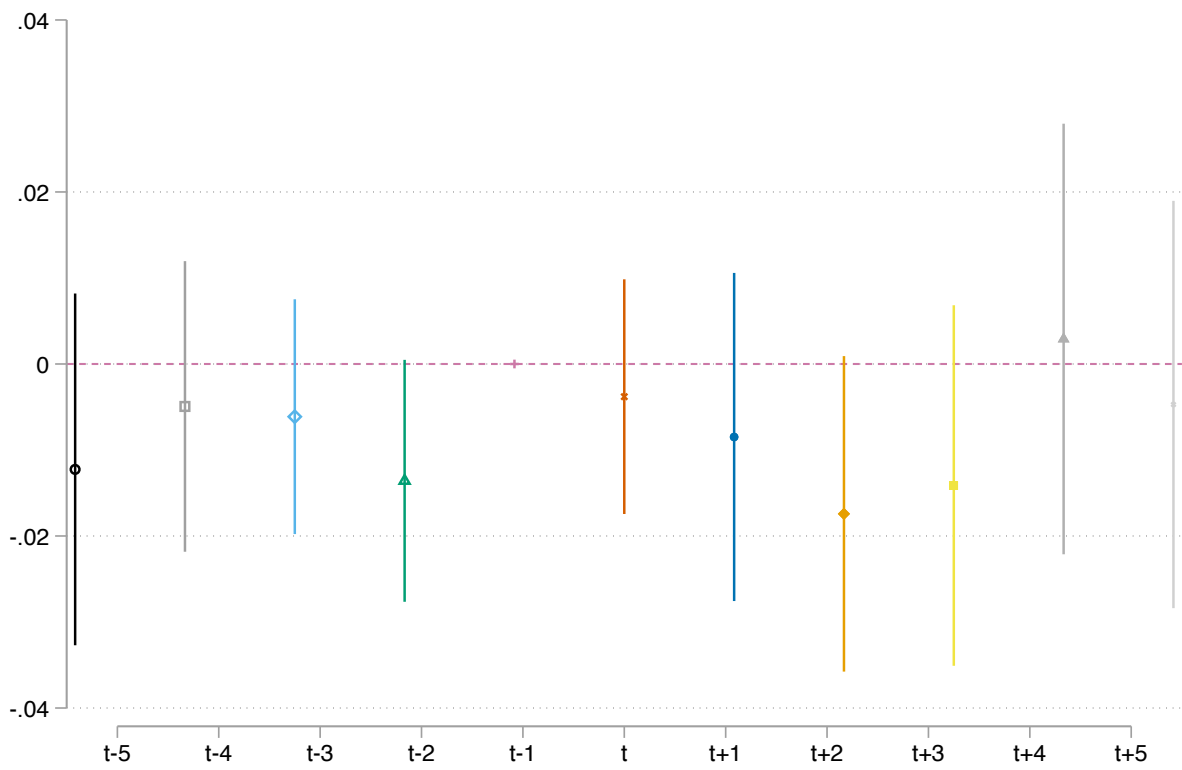


Figure 11: Employment and State EITC Event Study: Women 25-34

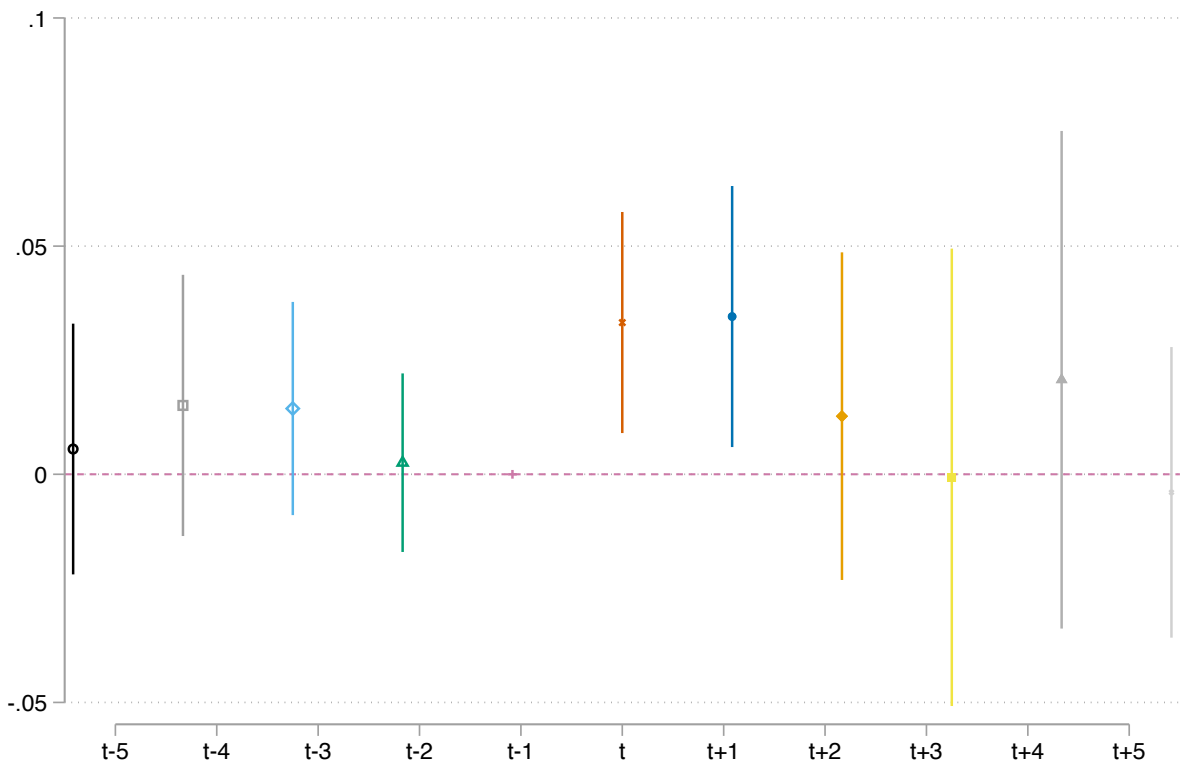


Figure 12: Employment and State EITC Event Study: Men 25-64

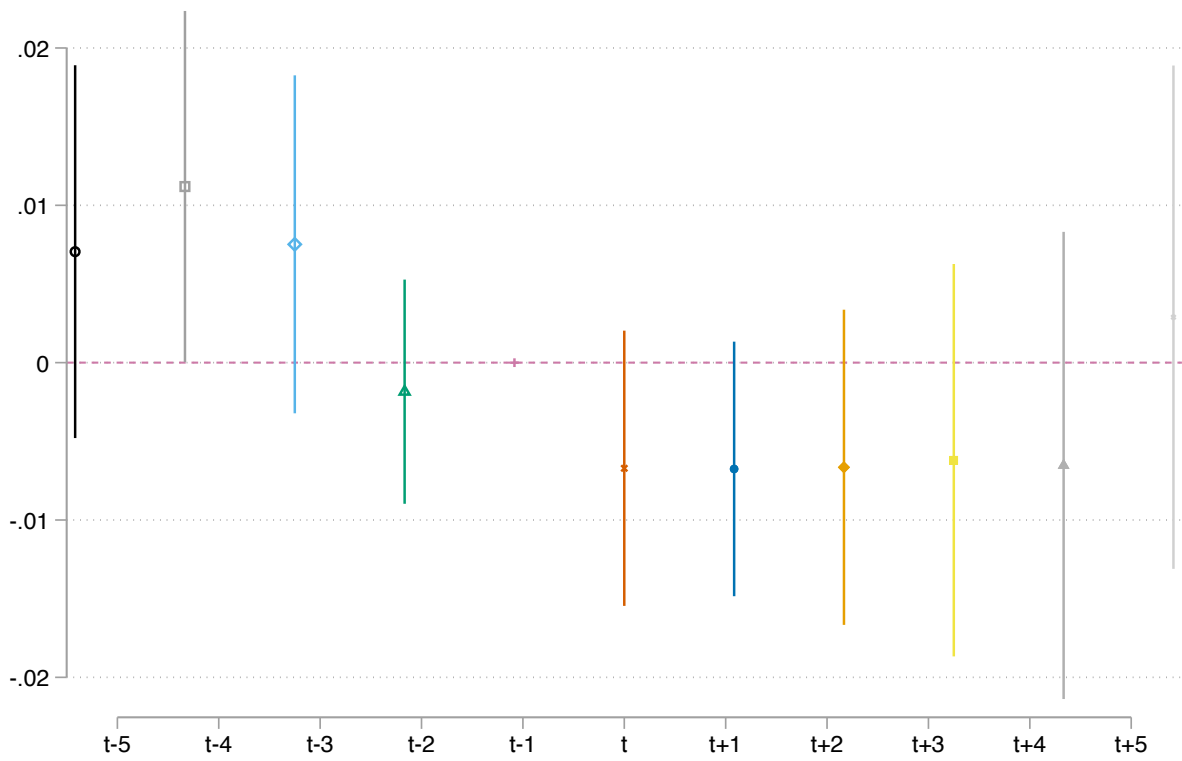


Figure 13: Employment and State EITC Event Study: Men 25-34

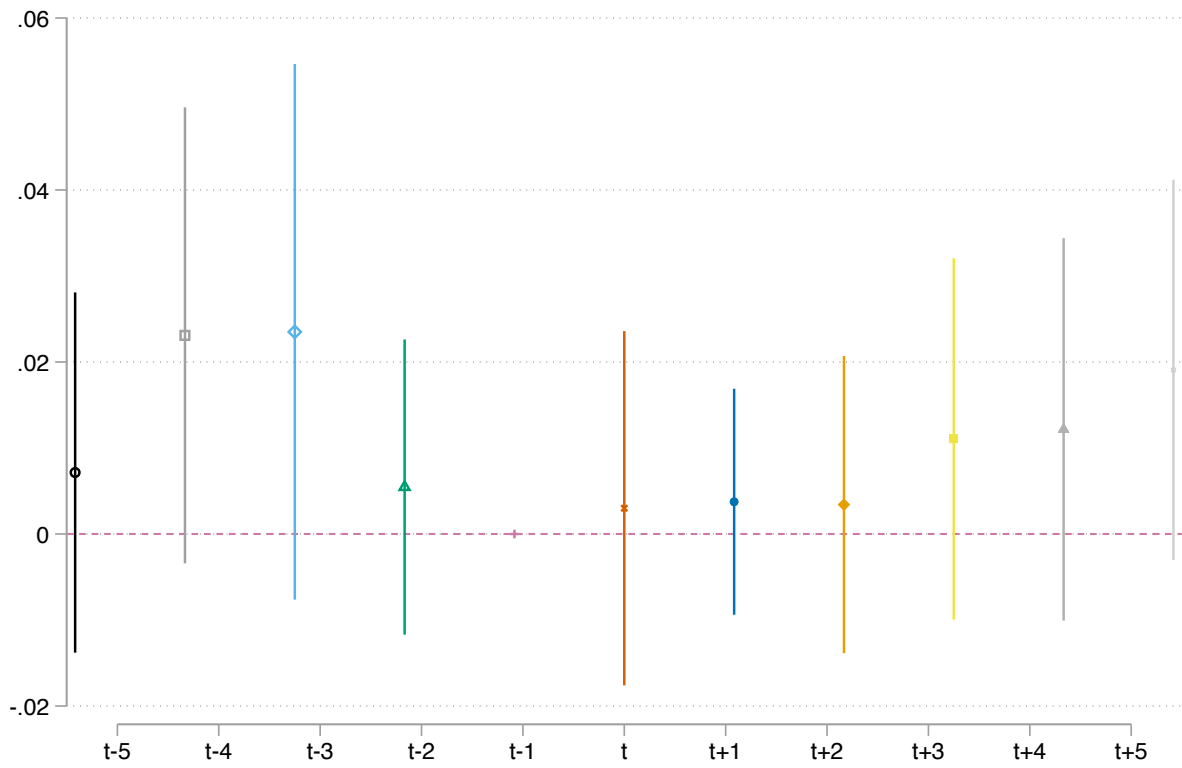


Figure 14: Labor Force Participation and State EITC Event Study: Women 25-64

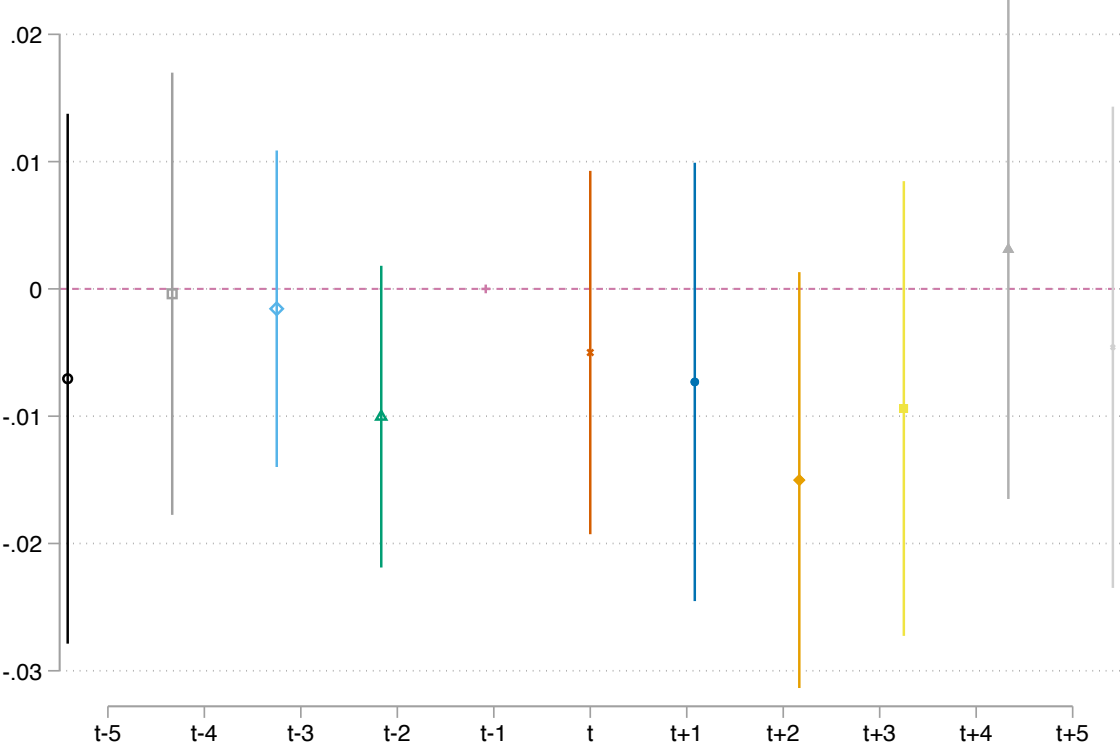


Figure 15: Labor Force Participation and State EITC Event Study: Women 25-34

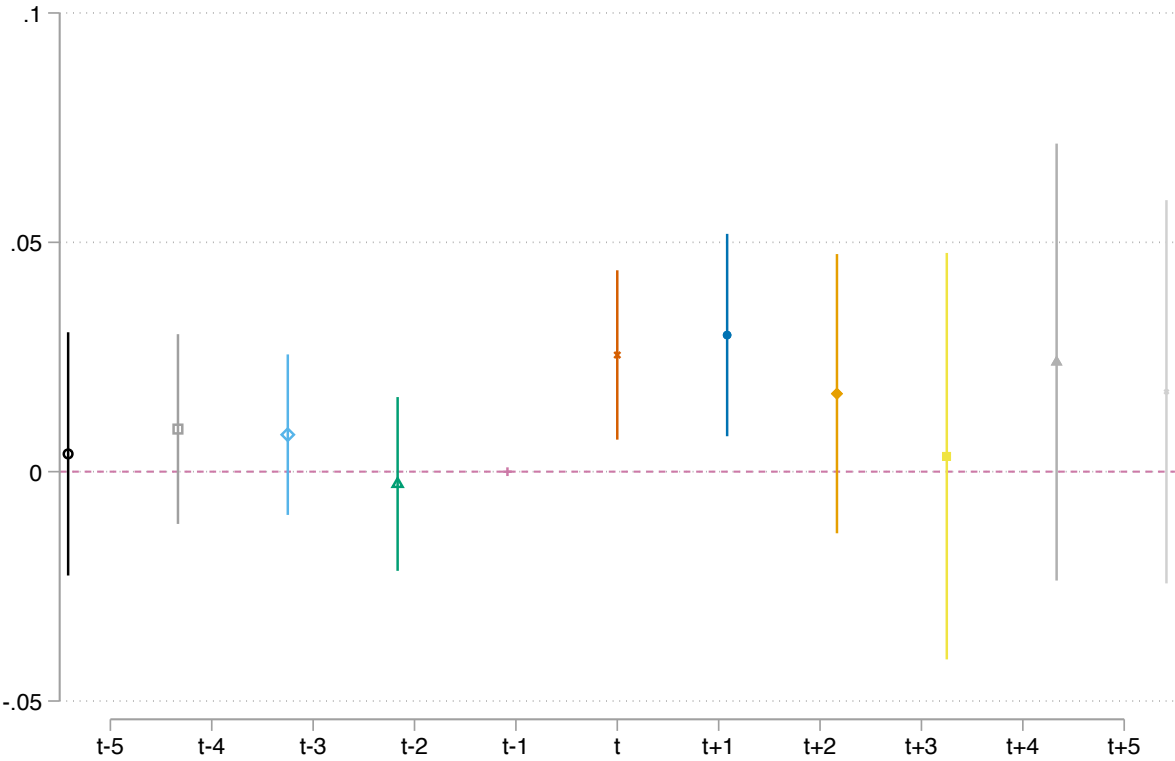




Figure 16: Labor Force Participation and State EITC Event Study: Men 25-64

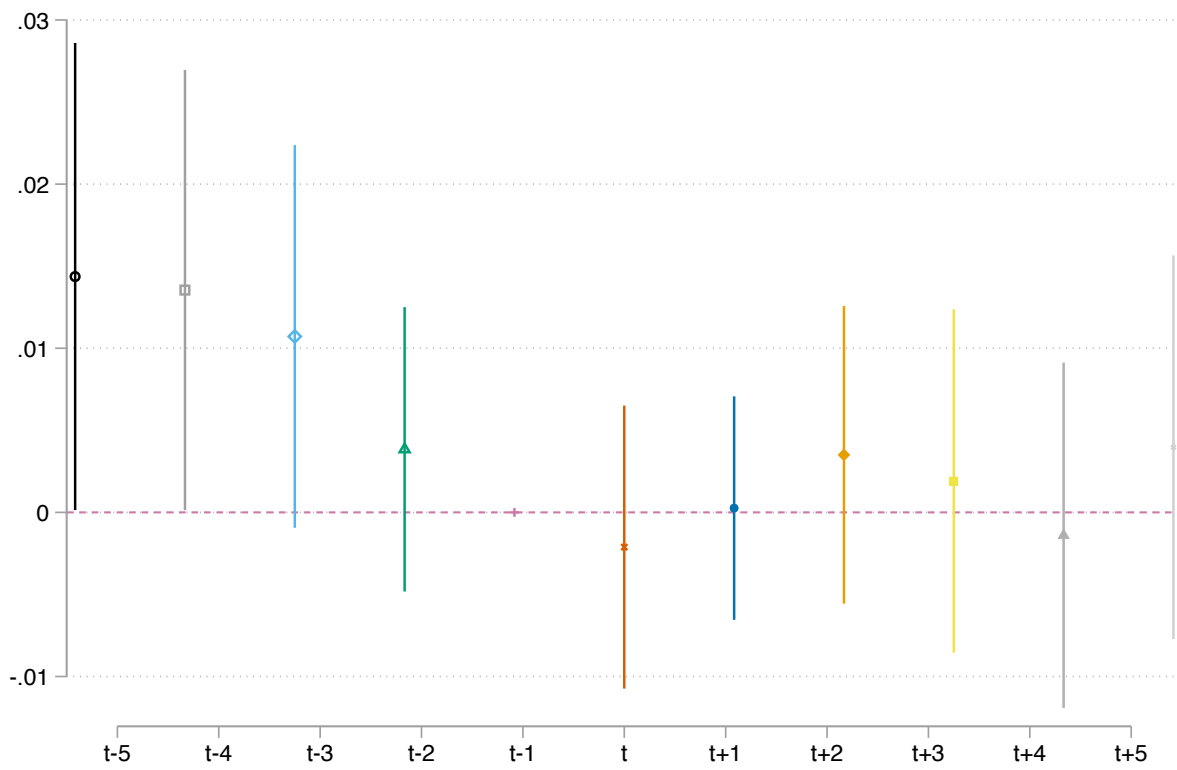


Figure 17: Labor Force Participation and State EITC Event Study: Men 25-34

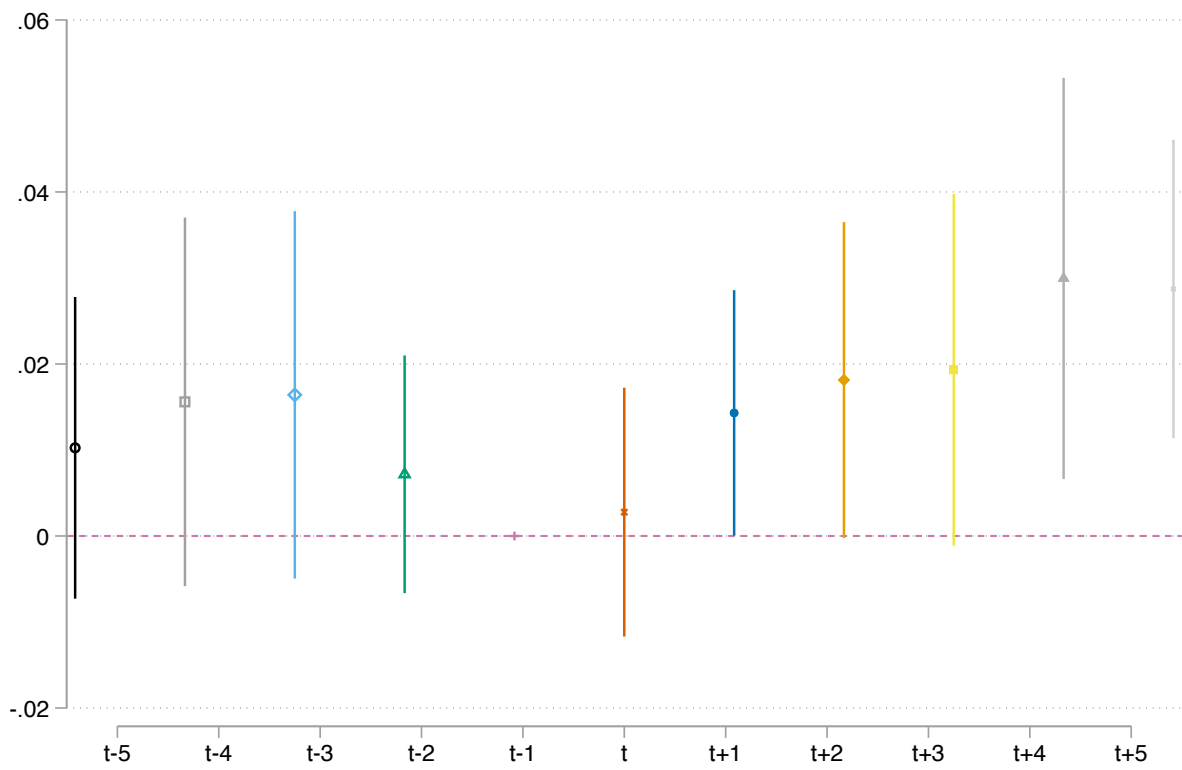
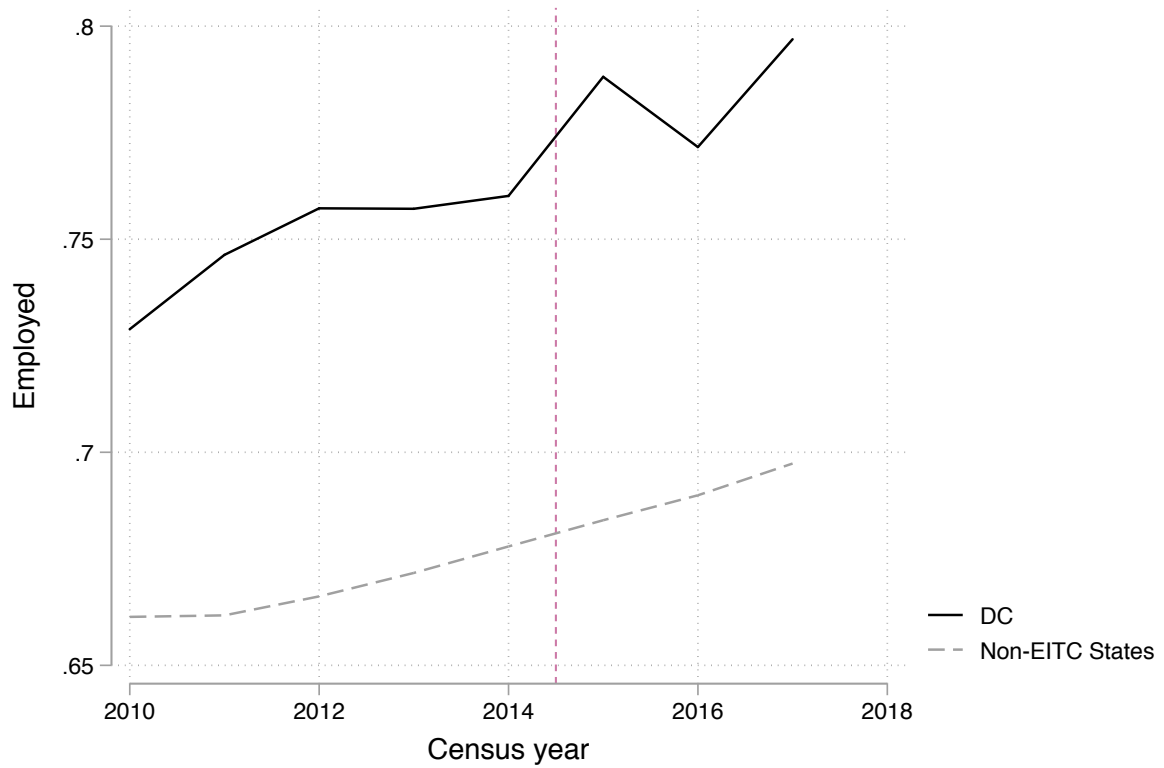
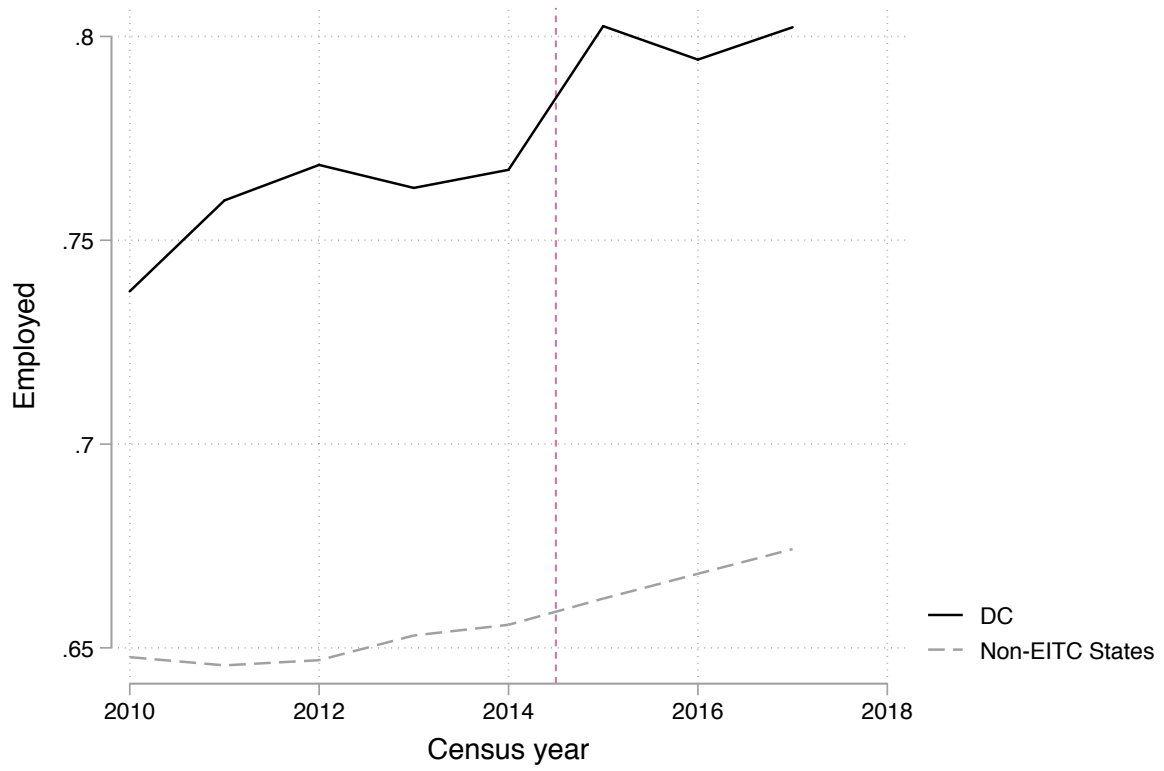


Figure 18: DC and Non-EITC States Employment Trends: All Childless Adults



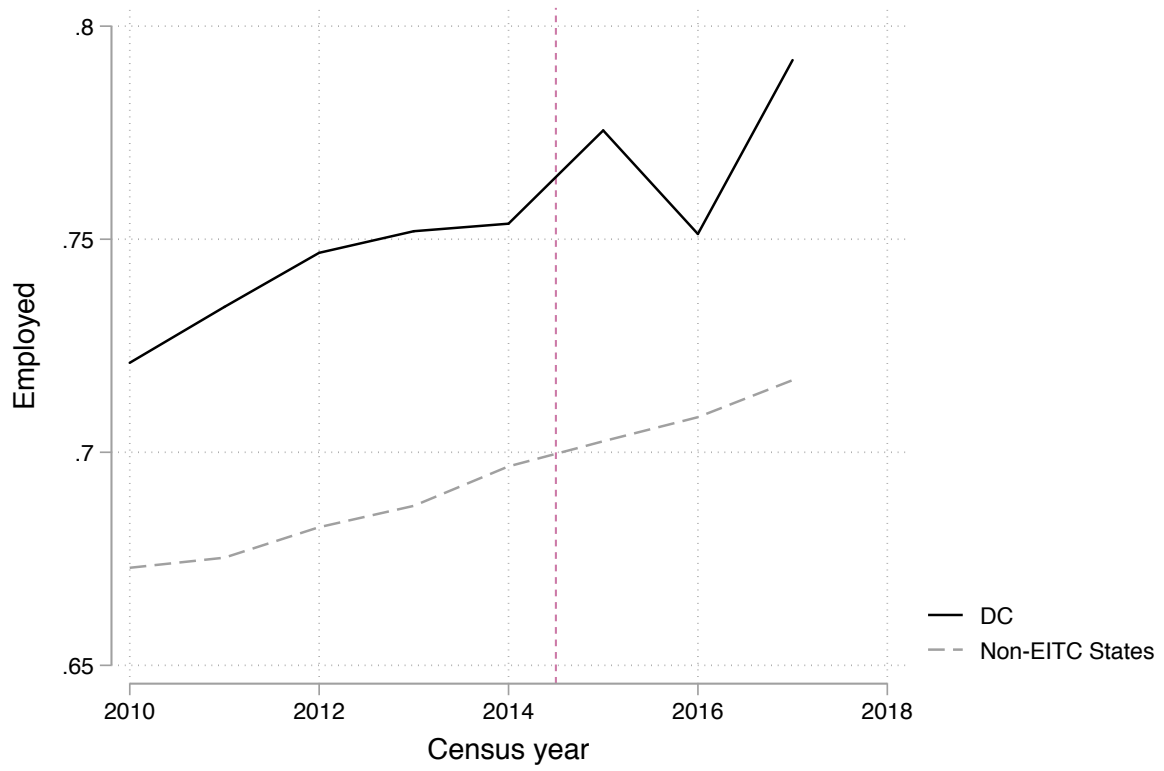
The sample is restricted to all childless adults age 25-64 in the District of Columbia or non-EITC state. The sample covers ACS survey years 2010-2017.

Figure 19: DC and Non-EITC States Employment Trends: Childless Women



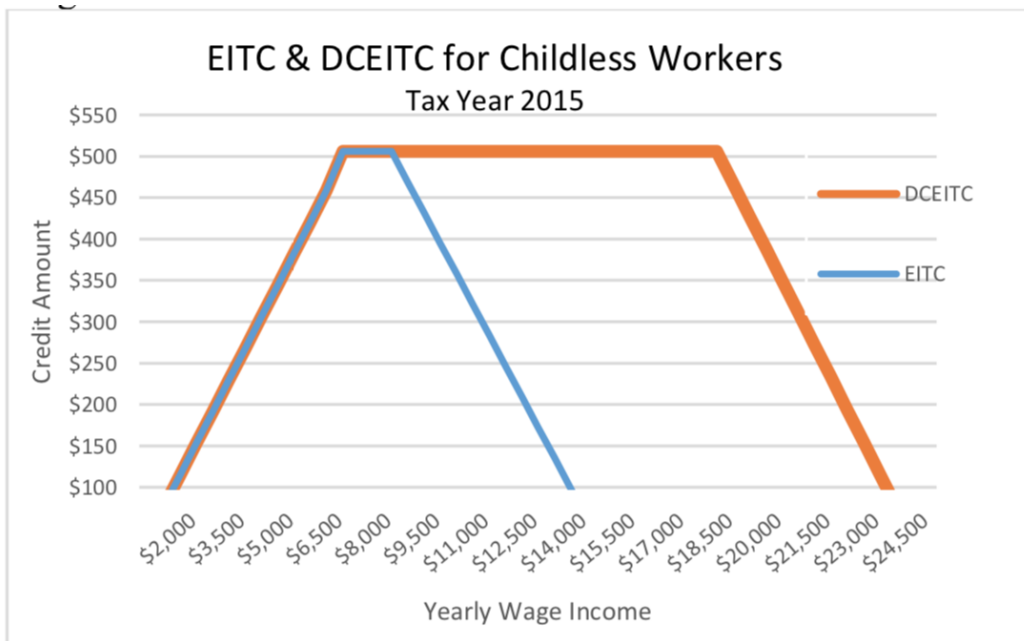
The sample is restricted to all childless women age 25-64 in the District of Columbia or non-EITC state. The sample covers ACS survey years 2010-2017.

Figure 20: DC and Non-EITC States Employment Trends: Childless Men



The sample is restricted to all childless men age 25-64 in the District of Columbia or non-EITC state. The sample covers ACS survey years 2010-2017.

Figure 21: DC EITC Earnings Schedule



Source: Author's calculation derived from the Instructions for Form 1040 (2015), (Internal Revenue Service) and the 2015 District of Columbia Individual Income Tax Forms and Instructions (Office of Tax and Revenue).

This figure is borrowed from Muhammad (2019)

# Appendix A

## 8.1 Testing for Diminishing Marginal Effects

To test whether effects diminish as the EITC gets larger, I use a double residual local linear regression following Cleveland (1979). To start, I take the residual from a regression of employment on my full set of controls (from equation 1) minus the state EITC variable and the residual from a regression of state EITC on my full set of controls. The double residual local linear regression produces a smoothed scatter plot made up the predicted values from a series of local regressions of the employment residuals on the state EITC residuals. Each local regression uses a subset of data points around a central data point, where data points near the central point are weighted highest. In Appendix Figure C.1, I show that across the range of state EITC values, effects are generally linear, which means I can rule out diminishing marginal effects for values within the common range of state EITC generosity. Effects at the extreme values of state EITCs exhibit a large variance, largely a result of the data being thin at these extremes. I would caution readers to take this evidence with a grain of salt. The EITC for childless adults is relatively small, and it's possible that an expansion equal to 2 or 3 times the current federal EITC amount could exhibit diminishing effects. My results can't say much about such a large out-of-sample prediction.

## 8.2 Refundable vs. Non-Refundable State EITCs

Tax filers can receive the federal EITC as a refund if the credit amount exceeds their federal tax liability. Most states offer their EITC as a refundable credit, but about 15% of state-years in my sample have a state EITC that is non-refundable, meaning that these credits can only benefit tax filers if they have positive state tax liability after factoring in state income tax deductions. Refundable EITCs are paid out in excess of state tax liability. Non-refundable EITCs are subtracted from tax liability and once state income tax liability is zero, recipients cannot receive the excess as a refund. State income tax liability for low-income workers depend on income tax rates and the size of the standard deduction.<sup>11</sup> Many childless adults eligible for the EITC have little to no outstanding income tax liability because they earn less than the state standard deductions, so only a subset of childless adults would even benefit from a non-refundable EITC. Additionally, adults might respond differently to credits received in cash versus deducted from a tax liability. For these reasons, I separate treatment

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<sup>11</sup>The standard deduction is the amount of income that is exempt from taxation if tax filers choose to use the standard deduction rather than choosing to itemize their deductions. Standard deductions vary across states, but are most often less than the federal deduction.

status into refundable and non-refundable credits.

In Appendix Tables B.1 and B.2, I show that employment and labor force participation effects are similar in magnitude regardless of whether non-refundable EITCs are coded as a zero (column 6) or as the maximum dollar amount that can be deducted from state tax liabilities (column 1). The results are no longer significant when non-refundable credits are coded as a zero, but I cannot statistically rule out that they are equal. I take this as evidence that the employment results are mostly driven by the refundable credit states, but it's impossible to rule out that non-refundable credits are ineffective given the change in the significance of the employment coefficient.

### **8.3 Intensive Margin Effects**

The lack of evidence finding intensive margin effects suggests that low-income workers are not easily able to adjust their work hours, and consequently their annual earnings. Saez (2010) shows that workers can more easily manipulate their reported earnings (self-employed), do so in order to maximize EITC payments. Chetty et al (2013) build on this finding to show that neighborhoods with a more dense population of self-employed EITC maximizers, results in labor supply changes for wage earners that is consistently with EITC maximization.<sup>12</sup> Therefore intensive margin effects are large a result of workers ability to manipulate intensive margin measures, and their overall knowledge about the EITC schedule.

## **Appendix B. Tables**

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<sup>12</sup>A high treated neighborhood is a neighborhood where workers are more likely to bunch at the kinks in the EITC schedule.



Table B.1: Robustness Check: Employment Effects Across Different Specifications

	(1)	(2)	(3)	(4)	(5)	(6)
	Employed	Employed	Employed	Employed	Employed	Employed
<b>Panel A: Childless Women</b>						
State EITC (\$100s)	0.0123** (0.0048)	0.0120** (0.0047)	0.0112** (0.0046)	0.0122* (0.0071)	0.0185** (0.0074)	0.0112 (0.0070)
Observations	183881	183881	183881	177155	177155	177155
Additional Controls	None	Demographics	Unemp Rates	State Policies	State Trends	Refundable EITC
<b>Panel B: Childless Men</b>						
State EITC (\$100s)	-0.0065 (0.0057)	-0.0081 (0.0053)	-0.0112** (0.0055)	-0.0125 (0.0077)	-0.0237*** (0.0053)	-0.0110 (0.0080)
Observations	225466	225466	225466	216495	216495	216495
Additional Controls	None	Demographics	Unemp Rates	State Policies	State Trends	Refundable EITC

Standard errors in parentheses

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The sample is restricted to childless adults age 25-64 with a high school degree or less. The sample covers CPS survey years 1995-2018.

Table B.2: Robustness Check: Labor Force Participation Effects Across Different Specifications

	(1)	(2)	(3)	(4)	(5)	(6)
	LFP	LFP	LFP	LFP	LFP	LFP
<b>Panel A: Childless Women</b>						
State EITC (\$100s)	0.0082*	0.0078*	0.0081*	0.0069	0.0128**	0.0062
	(0.0047)	(0.0047)	(0.0048)	(0.0060)	(0.0057)	(0.0059)
Observations	183817	183817	183817	177092	177092	177092
Additional Controls	None	Demographics	Unemp Rates	State Policies	State Trends	Refundable EITC
<b>Panel B: Childless Men</b>						
State EITC (\$100s)	-0.0088	-0.0095	-0.0100	-0.0115	-0.0238***	-0.0105
	(0.0073)	(0.0067)	(0.0069)	(0.0087)	(0.0062)	(0.0090)
Observations	224880	224880	224880	215937	215937	215937
Additional Controls	None	Demographics	Unemp Rates	State Policies	State Trends	Refundable EITC

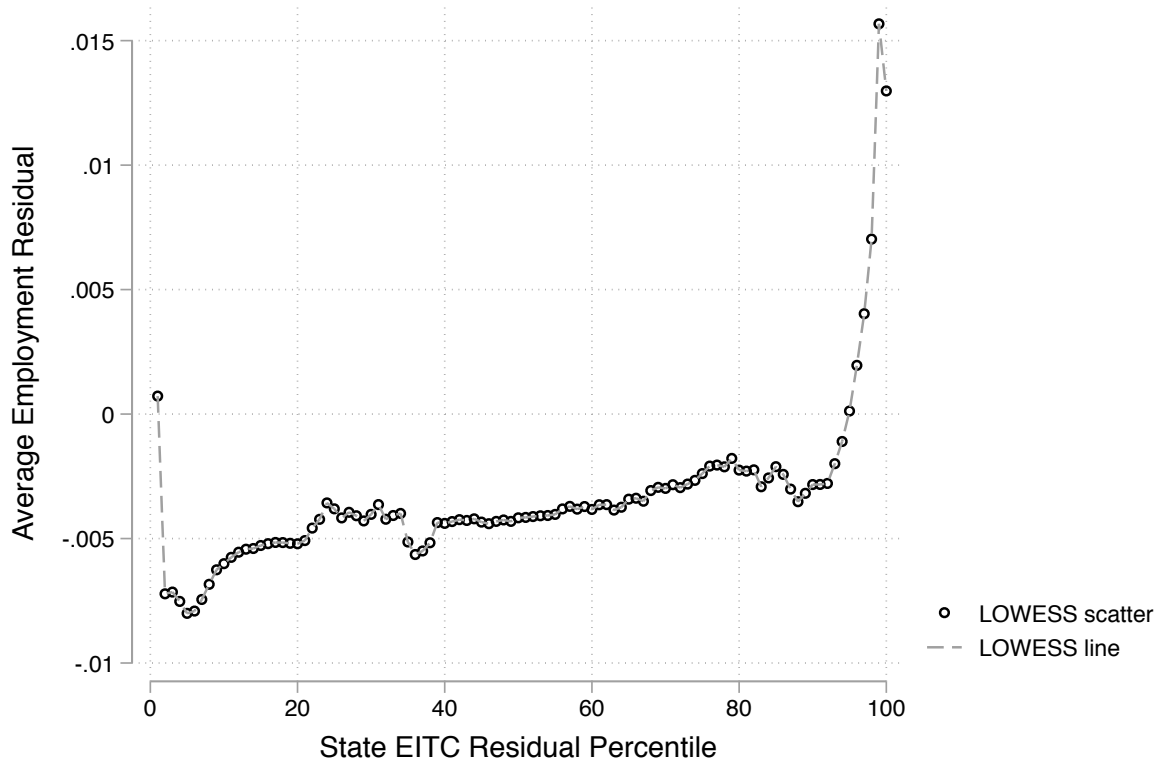
Standard errors in parentheses

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

The sample is restricted to childless adults age 25-64 with a high school degree or less. The sample covers CPS survey years 1995-2018.

# Appendix C. Figures

Figure C.1: Double Residual Local Linear Regression



Sample is limited to single childless women age 25-44 with no post-HS education. The y-axis is the average residual within a percentile from a regression of employed on the full set of controls minus state EITC. The x-axis is the percentile of the residual from a regression of state EITC (2017 dollars) on the full set of controls.

## Appendix D. Data

I use the NBER TAXSIM to calculate state EITCs for all state-years. To do this, I simulate a sample of 500 childless adults with earnings distributed uniformly between \$0-\$25000. Then I copy each observation 51 x 25 times,<sup>13</sup> so I have 500 observations for each state-year combination. I calculate state EITCs for each observation depending on simulated earnings, and then take the maximum of both EITCs within a state-year. Lastly, I merge each state and tax year onto the corresponding CPS state and survey year. I adjust EITC amounts to 2017 dollars. In my main specification I define treatment as the maximum EITC in 2017 dollars. I use a state level generosity variable because the CPS does not record whether someone actually received an EITC, so I do not estimate effects using individual variation in EITC amounts. I follow this simulation approach to extract the state EITC parameters gathered by NBER TAXSIM.

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<sup>13</sup>The number of states times the number of years in my sample.