

The EITC and Self-Employment Among Married Mothers

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Abstract

While the EITC provides a disincentive to work for most married women, previous research suggests that it offers an overall incentive to report self-employment earnings to the IRS when filing taxes (LaLumia 2009). Using the Survey of Income and Program Participation, we use variation in EITC generosity across and within states between 1996 and 2013 to estimate the impact of the credit on married mothers' self-employment behavior. We find the average increase in EITC generosity over this time period led to a 2 percentage point increase in the proportion of married mothers reporting positive self-employment hours in the SIPP. The same increase in EITC results in a 4.3 percentage point decline in the proportion of married mothers reporting positive wage and salary hours. Our results are consistent with previous evidence suggesting that increases in the EITC lead to lower employment among married mothers, but we provide new evidence that the EITC induces married mothers to change their employment type. Building on prior work indicating that the EITC encourages the reporting of self-employment earnings to the IRS, the response in monthly self-employment hours suggests that the EITC induces a real increase in self-employment behavior rather than only a reporting response. This observed shift towards self-employment could arise from an alleviation of credit constraints, a desire for flexible work, or an attempt to maximize the size of the credit through targeted changes in reporting and labor supply.

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Introduction

The Earned Income Tax Credit (EITC) is the largest means-tested cash transfer program in the US. In 2012, the credit paid out over \$64 billion to 27.8 million households.¹ Two decades of research on the EITC find overwhelming evidence that the EITC increases labor supply among single mothers (Eissa and Liebman 1996; Meyer and Rosenbaum 2001; Hoynes and Patel 2015) and lifts millions of households out of poverty each year (Hoynes and Patel 2015).

While the structure of the credit tends to encourage work for single mothers, the majority of married mothers receiving the credit face a disincentive to work.² This is because the EITC is calculated based on household earnings, and up until 2002, the benefit schedule for head of household filers and married filers was the same. That is, married filers were subject to the same income limits as single and head of household filers despite having two potential earners residing in the household. This creates a marriage penalty for many dual-earner households, creating a disincentive for secondary earners to work. Approximately three-quarters of married filers eligible for the EITC have earnings in the phase-out region of the schedule, meaning that each extra dollar of earnings reduces household EITC benefits by around 20 cents. Over the past decade, efforts have been made to reduce the marriage penalty by extending the income threshold for married filers, although many married couples still face marriage penalties associated with the EITC (Holtzblatt and Rebelein 2000; Lin and Tong 2012; Michelmore 2015). This disincentive applies to both work in self-employment and wage and salary employment. Previous work by Eissa and Hoynes (2004) has documented that expansions of the EITC between 1984 and 1996 led married women to decrease their overall employment by around one percentage point, but their work did not distinguish between types of employment.

There are a number of reasons to expect the EITC to influence the choice between self-employment, wage and salary employment, and non-employment among married women. It is well documented that the self-employed are able to manipulate their reported income for tax purposes to maximize their EITC so policy-induced increases in the EITC could encourage individuals to become self-employed to take better advantage of the credit (Saez 2010; le Maire and Schjerning 2013). Increases in EITC generosity could also provide additional income that

¹ Individual Income Tax Returns 2012, IRS, Table A, [http://www.irs.gov/uac/SOI-Tax-Stats-Individual-Income-Tax>Returns-Publication-1304-\(Complete-Report\)](http://www.irs.gov/uac/SOI-Tax-Stats-Individual-Income-Tax>Returns-Publication-1304-(Complete-Report))

² Eissa and Hoynes 2006; Ellwood 2000; Meyer and Rosenbaum 2001

facilitates starting a business either through capital funding or an improved financial situation allowing women to move to an arguably riskier type of employment. Although this income effect influences all EITC-eligible women, we expect it to have a larger impact on married women because it is likely easier for them to become self-employed with a secondary earner in the household to provide income security and health insurance.³

This paper uses a simulated instrument strategy to estimate the effect of EITC expansions at the federal and state level on married women's self-employment behavior, making a number of contributions to the literature. First, we build on prior work that finds a negative relationship between EITC generosity and labor supply among married women (Eissa and Hoynes 2004) by distinguishing between labor supply in wage and salary employment and self-employment. Previous research suggests that self-employed mothers tend to spend more time with their children and are less likely to pay for childcare (Laughlin 2013; Hundley 2000; Lim 2015). This additional time might represent an improvement in the quality of care for children of low-income mothers.

Second, we add to the literature showing that the EITC encourages the reporting of self-employment income for tax purposes by illustrating that work effort in self-employment also increases when EITC generosity increases. LaLumia (2009) uses tax return data to show that the EITC encourages the reporting of self-employment income, however, she is unable to determine whether this represents additional work effort or merely a change in reporting to the IRS. Self-employment earnings are relatively easy to misreport since there is often no third-party reporting to the IRS. Kuka (2013) uses both IRS tax data and the Current Population Survey (CPS) to analyze the impact of the 1993 federal EITC expansions on self-employment, focusing on unmarried individuals, who are less likely to be self-employed. Kuka (2013) finds increases in self-employment as a function of EITC generosity but only in the tax data, suggesting that the response is mainly due to non-compliance among self-employed workers. We use data from the Survey of Income and Program Participation (SIPP), which might have more accurate accounts of self-employment earnings and effort because respondents have no financial gains or losses at

³ Self-employment rates among married women in 2012 are 9.1% compared to 3.2% among never married women. Access to spousal health insurance, a second income to reduce risk from income shocks, and possibly better access to capital all make it easier for married women to become self-employed (see Velamurri 2012; Lombard 2001; Fairlie et al. 2010; Heim and Lurie 2010).

stake.⁴ Further, in contrast to the CPS March Supplement, SIPP respondents are interviewed every four months, which is intended to reduce recall bias among survey respondents. Additionally, we focus on changes in both hours spent working in self-employment and earnings because hours worked are less likely to be impacted by the incentives to evade taxes.

Finally, we are able to corroborate previous evidence on the labor supply of self-employed workers and married women using a new source of variation in EITC generosity: state EITC expansions. Much of the earlier work on the EITC uses a federal expansion of the credit in the early 1990s to analyze how an increase in income affects outcomes for households with children compared to childless individuals. While the expansion was generous and many studies have found positive impacts of the credit on low-income families, the expansion is nearly 20 years old and affected all families with children at the same time. Further, that identification strategy relies on a parallel trends assumption between women with no children and women with at least one child. This might be a particularly strong assumption especially for outcomes like female labor supply, which may differ substantially between households with no children and households with children. Using the implementation and expansion of state EITCs provides multiple sources of variation—variation in the timing of state expansions as well as variation in the generosity of benefits.

Our results indicate that policy-induced increases in the EITC discourage work overall for married mothers, but encourage self-employment. The average EITC for married women with children increased by \$380 over our sample period. We estimate that this increase led to a 2 percentage point increase in self-employment rates as measured by positive hours worked in one's own business. This increase in self-employment hours suggests that the EITC encourages real work effort in self-employment among married women rather than just a shift in reporting of self-employment earnings to the IRS for tax filing. We find a small increase in the number of self-employment hours and a decrease in the number of wage and salary hours. Our results provide important evidence that the EITC influences the type of employment among married women in addition to their overall labor supply. Additionally, our results suggest that relatively small increases in income encourage low-income married mothers to become self-employed.

⁴ Although Hurst, Li and Pugsley (2014) find underreporting of self-employment earnings in the PSID by about 25% relative to wage and salary workers. It's not clear for our sample whether there is an incentive to over-report or under-report.

This could be evidence of credit constraints as a barrier to self-employment or an underlying desire among some women to become self-employed that is enabled by an increase in overall family earning potential. Alternatively, women may choose self-employment over wage and salary employment as a function of EITC generosity because they are able to more precisely adjust their labor supply and earnings, or their reporting of it to the IRS. On average self-employed women tend to work less and spend more time with their children (Hundley 2000; Gurley-Calvez et al. 2009). If increases in the EITC induce women to shift to self-employment, this could have positive implications for their children. On the other hand, because self-employed women tend to have lower earnings than wage and salary employed women (Devine 1994; Hamilton 2000), our findings suggest potentially negative implications for women's earnings trajectories.

The Earned Income Tax Credit

The EITC began as a small, temporary credit in 1975, worth up to \$400 (\$1,750 in 2014 dollars) for households earning less than \$8,000. Since then, the credit has been expanded several times at both the federal and state level, with the federal credit worth up to \$6,000 in 2014 for households earning less than \$53,000. The credit is fully refundable, so households with no tax liability receive the EITC in the form of a tax refund.

The EITC benefit structure is made up of three segments—a phase-in region, plateau, and phase-out region. For a household with two children in the phase-in region, every dollar of earned income increases the EITC benefit by 40 cents. Once earnings reach a certain threshold, benefits remain constant until earned income reaches a second threshold. For incomes above the second threshold benefits are taxed at approximately 20 percent. Figure 1 illustrates the federal EITC benefit structure for the 2014 tax year. The solid lines indicate the benefit structure for a single tax payer, while the dotted lines illustrate the structure for a married couple. Prior to the early 2000s, the benefit structure for married filers and single and head of household filers was the same, such that married filers were subject to the same income thresholds as single-earner households. Beginning in 2002, the plateau region of the benefit structure was extended for married couples in an effort to reduce the marriage penalty associated with the EITC. In 2002, the plateau region was extended for an extra \$1,000 for married couples and by 2014, married couples could earn an extra \$5,430 before the phase-out took effect.

The trapezoidal structure of the EITC benefit schedule creates incentives for individuals on the phase-in portion of the schedule to increase their earnings because each dollar of earnings is associated with a larger EITC benefit, while those in the phase-out region may have incentives to reduce their earnings as each additional dollar of earnings is associated with a decline in EITC benefits. For individuals on the plateau, small changes in earnings will not affect EITC benefits. Workers may move from wage and salary employment to self-employment because self-employment may allow households to more easily target their earnings to maximize their EITC benefit. The self-employed could have more control over their number of hours worked and their income. Further, unlike wage and salary earnings, self-employment earnings are often not verified via third-party reporting to the IRS, making it easier for households to misreport income in order to maximize their tax refunds.

In addition to the federal benefit, 25 states and the District of Columbia have their own EITCs, which increase the total benefit by 3-45 percent of the federal benefit. States implemented their own EITCs beginning in the late 1980s, but the majority implemented credits following welfare reform in the late 1990s and early 2000s. This is because states were given federal block grants after welfare reform with the intention of reducing the number of welfare caseloads. Many states used this funding to implement state EITCs. A list of states and the year of implementation can be found in Appendix Table A1.

We use this plausibly exogenous variation in EITC benefits within states over time to make causal inference about the impact of the EITC on married mothers' propensity to be self-employed. Our variation comes from several sources. We use variation generated by changes in state EITC policies over time, both in the timing of implementation and in the generosity of the state credits. We also exploit federal variation over time, as the federal plateau region was expanded for married couples several times over this time period, allowing married filers to have higher earnings than single and head of household filers and still claim the EITC. This variation will be captured through its impact on state EITCs, as these expansions will be worth more for filers living in states with EITCs than filers in states without EITCs.

By relying on state-level variation in EITC generosity, we assume that there are no other policy changes occurring at the same time as changes to the EITC that have the potential to affect self-employment rates disproportionately for low-income households compared to higher-income households. We test this assumption by regressing state EITC generosity on a number of

state policies and economic conditions. Results are shown in Appendix Table 2. We first run regressions for all state-years between 1992 and 2013, including controls for state GDP, unemployment rates, minimum wage, the top tax bracket, a measure of state welfare generosity, and a measure of spending on higher education. All of these terms are evaluated at the state-year level, and we also include one-year lags of each of these terms. If we include all states in our analysis, we find slight positive correlations between state EITC generosity and spending on welfare and higher education. This provides some evidence that states that implement more generous EITCs also provide other social benefits. When we limit the sample to only states that ever implement EITCs (but including all pre-EITC years), we still find a positive association between state EITC generosity and spending on welfare. We also find a positive correlation between state EITC generosity and state GDP, suggesting that states with larger economies are more likely to have EITCs. To reduce concerns that these state policies and economic conditions are confounding our results, we include controls for all of these measures in our analyses.

Data and Methodology

The data for our study come from the Survey of Income and Program Participation (SIPP) panels from 1996 to 2008, covering the years 1996 through 2013. The SIPP is a nationally-representative panel dataset surveying families for up to 60 months per panel. Households are interviewed once every four months regarding income and household characteristics of the previous four months. Information on all individuals living in the household is collected, although some questions are only asked of individuals 15 years old and older. The SIPP is an ideal data source for this analysis because of its large sample size (roughly 50,000 households per panel), and because it contains monthly information on labor force participation and income.

We focus our analysis on married women between the ages of 18 and 55 who have at least one child living in the household. This captures women during their prime working years, but avoids including self-employment behavior that could be characterized as partial retirement.⁵ For our main analysis, we exclude childless married women because only a small fraction are eligible for the EITC, and they are likely to exhibit very different working patterns than women

⁵ Self-employment rates are much higher among older workers. See Karoly and Zissimopoulos (2007) and Bruce et al. (2000) for evidence on self-employment and partial retirement.

with children.⁶ We focus on married women in this analysis because they are the most likely to alter their decision between wage and salary work and self-employment since they have a potential second earner living in the household. Married mothers are about twice as likely to be self-employed as single mothers in the SIPP (8% of married mothers compared to 4% of single mothers).

To identify the impact of EITC generosity on the self-employment patterns of married women, we compare the labor force participation of EITC-eligible married mothers to that of non-eligible married mothers as a function of state EITC generosity. We identify EITC-eligible households using income and family structure in the first year of each SIPP panel.⁷ The SIPP does not contain reliable information on EITC receipt, so this measure represents an intent-to-treat effect. Take up of the EITC tends to be quite high, often over 80% (Scholz 1994; Currie 2004). We then exclude observations from the first year of each SIPP panel in our analysis to reduce concerns of endogeneity of EITC-eligibility to the outcomes of interest. We focus on the reference month observations since each SIPP wave asks about the usual number of hours worked at the business during the previous four months.⁸ These observations can be thought of as quarterly observations that summarize work activity during the previous four months. This results in a sample of 172,391 quarter-person observations.

Dependent variables

In each interview, respondents are asked whether they have any business income and how many hours they usually spend doing activities for their business. We measure self-employment on the extensive margin by whether the respondent reports any hours worked as part of a business in each month. We construct an alternative measure of self-employment based on whether the respondent reports any positive income from a business during the reference period, which is a subset of individuals reporting any hours worked as part of their business. We construct a similar measure for whether the respondent is working a wage and salary job based on whether they report positive usual hours worked during the month. We also test whether married women are more likely to work in both self-employment and wage and salary employment as a function of

⁶ 10% of married women with no children in our data have income that falls within the EITC-eligible range.

⁷ Results are quite similar if we identify EITC-eligible households as those who earn less than \$50,000 (2011\$) in the first year of the SIPP.

⁸ Results are not sensitive to this restriction.

EITC generosity to understand whether the EITC encourages women to combine types of employment. In addition, we examine the impact of the EITC on quarterly transitions between non-employment, self-employment and wage and salary employment to examine how the credit influences the gross flows of workers between employment types. Finally, we also measure self-employment and wage and salary employment on the intensive margins by analyzing the number of hours worked and earnings in self-employment and wage and salary employment as a function of EITC generosity.

Empirical Strategy

Our goal is to examine how the propensity to work in self-employment is affected by changes in EITC benefits. To estimate this effect, however, we cannot simply regress self-employment behavior on own EITC benefits. Because EITC benefits are determined by family size and family income, working in self-employment is likely to be endogenous to own EITC benefits. Families with higher EITC benefits also have lower incomes than those who are not eligible for the EITC. These individuals may also be less likely to work in self-employment for reasons that are unrelated to their EITC benefits.

To overcome this endogeneity problem, we employ a simulated instruments method, capturing changes in the EITC that are due to policy changes at the federal and state level and unrelated to potentially endogenous decisions within the household. This is similar to the approach employed by Hoynes and Patel (2015), who simulate the impact of policy-induced increases in the EITC on employment and income.⁹ This approach is quite similar to a difference-in-differences methodology, but allows us to capture several policy changes over time. Further, since states implement EITCs of varying degree of generosity, this method also allows us to incorporate variation in the generosity of the treatment over time.

This approach has several advantages over other identification strategies. Using one's own EITC includes both variation in the benefits that is driven by policy changes, which is the variation of interest, and variation due to other household decisions that may be endogenous to the outcomes of interest, such as changes in employment or family structure over the course of the year. Using the maximum potential credit value in a given state and year eliminates concerns

⁹ This method has also been used in the Medicaid literature (Currie and Gruber 1996; Cohodes et al. 2014), as well as in the case of education tax credits (Bulman and Hoxby 2015).

of endogeneity of own eligibility to the outcomes of interest, but not all families are eligible for the maximum credits so this measure might not be relevant to most of the EITC-eligible population. Instead, we calculate the average household EITC in a given state and year, using the National Bureau of Economic Research's (NBER) TAXSIM model. We simulate an average household credit for each state in each year by calculating the value of the EITC for a nationally-representative sample of married filers. Because states have different concentrations of EITC-eligible households and this could induce policy endogeneity if it influences expansions or reductions in EITC generosity, we simulate an average household credit for each state in each year by calculating the value of the EITC for a nationally-representative sample of households rather than using characteristics from the state level population.

To construct the nationally-representative sample of households, we take the sample of married respondents with children in the 1997 year of the SIPP survey, as this is the first full calendar year of data from the 1996 SIPP. We then replicate this sample for each year, adjusting income in each subsequent year using the Consumer Price Index. This avoids concerns that changes in EITC generosity over time reflect changes in the national income distribution over time. We then use this sample to calculate federal and state EITC benefits in each state and year using NBER's TAXSIM. Next, we create measures of the average combined federal and state EITC benefit for each state-year combination. Variation in this term reflects only EITC policy variation across states in a given year and within states over time, eliminating variation due to endogenous household decisions about geographic location, household size, or household income in relation to the outcomes of interest. We then match this information onto our sample of married mothers by year and state of residence.

Figure 2 shows how the average EITC changed over this time period. The average EITC represented by the blue line is calculated using the simulated instruments method described above. The average household tax credit increased over this time period from \$650 in 1996 to \$900 in 2012. Due to the variation in when states began implementing EITCs, there was also significant cross-sectional variation in the average household EITC across states over this time period. Figure 3 illustrates this variation, with each dot representing a different state-year combination. Once again, the variation illustrated here is due solely to differences in tax laws across states, eliminating the variation due to the endogeneity of geographic location. Figure 3

illustrates that, in any given year, the variation in average simulated household tax credits between the most generous and the least generous state was about \$400.

We model the impact of an increase in average household EITC benefits in a state and year on the self-employment patterns of married women using the following form:

$$Y_{ist} = \beta_0 + \beta_1(avgben_{st}) + \beta_2Elig_i + \beta_3(avgben_{st}) * Elig_i + \beta_4X_{ist} + \beta_5Z_{st} + \delta_s + \gamma_t + \varepsilon_{ist}$$

where i indexes individuals, s indexes states, and t indexes years. Y_{ist} is the outcome of interest. These outcomes include an indicator for whether an individual has any self-employment hours, any wage and salary hours, neither, or both. We also examine self-employment earnings, the number of hours worked in self-employment and wage and salary employment per week, and transitions between employment types. We model outcomes as a function of average EITC benefits in thousands of dollars, as measured by our simulated instrument, in a state and year ($avgben_{st}$). We construct a measure of EITC-eligibility using family income and the number of children living in the household during the first year of the SIPP survey. Our coefficient of interest, β_3 , represents the effect of an increase in the value of the average EITC in a state and year for EITC-eligible households relative to non-eligible households on outcome Y_{ist} . This term is identified from variation within states over time, as well as cross-state policy differences in EITC generosity at a single point in time.

By allowing state EITC generosity to have a differential impact on the EITC population compared to the non-eligible population, we control for any other policies or events occurring at the same time as EITC implementation that may also affect the self-employment patterns within each state. Further, since we estimate the main effect of being EITC-eligible in the first year of the SIPP on self-employment outcomes, we allow EITC-eligible married women to exhibit different employment patterns than non-eligible women. The interaction of these two terms therefore captures the effect of state EITC policy changes on the working patterns of the EITC-eligible population relative to the non-eligible population. Our identifying assumptions are that there are no other state policies or factors that differentially impact self-employment behavior by EITC eligibility status that change at the same time as changes in the EITC and that eligible and ineligible women would have similar trends in the dependent variable in the absence of EITC changes. We provide some evidence of that in Appendix Table 2, and we control for these

factors in our specifications. Additionally, interpreting the estimate as the impact of increases in EITC generosity requires that our control group be unaffected by EITC increases. To the extent that married women who have incomes during the first year of the survey that make them ineligible for the EITC are also affected by the policy (or become eligible in subsequent years¹⁰), our estimates would be biased towards zero.

We also include a vector of individual demographic characteristics of the wife including age, race, education level, number of children living in the household; a vector of state-by-year level characteristics such as state unemployment rates, and the state minimum wage; state and year fixed effects; and state specific linear time trends. State fixed effects control for time-invariant differences across states, such as political ideology and industrial makeup that may affect self-employment rates in a given state. Year fixed effects control for national trends such as recessions and state specific time trends control for differences across states in linear trends in our dependent variables. Controlling for state-year unemployment rates and minimum wages accounts for other factors at the state-year level that may be correlated with state EITC generosity that may also impact self-employment rates.

Our main analysis focuses on married women with at least one child under 19 years of age at the start of the survey.¹¹ As previously mentioned, the sample excludes the first calendar year of observations. Table 1 provides summary statistics for our main sample by EITC-eligibility based on family income in the first year of the SIPP panel. The average EITC as calculated by applying state EITC rules to a nationally representative sample of married women with children is around \$775.¹² The average credit is slightly higher for the EITC eligible sample, likely reflecting that more generous states have higher percentages of their population that are EITC eligible. Around 8.4 percent of married mothers have positive self-employment hours and 66 percent have positive wage and salary hours. Women who are not EITC eligible are more likely to be employed than women who are EITC eligible. Overall, roughly a third of the sample have a high school diploma or less, a third have some college experience and a third have a bachelor's degree. The EITC eligible population is much less educated than the ineligible

¹⁰ Approximately 11% of ineligible households in the first year of each SIPP panel become eligible for the EITC in subsequent years. Among those eligible in the first year of each SIPP panel, 72% are eligible in the following year, and 66% are eligible two years later.

¹¹ Women may divorce in later years, but we control for marital status in our analysis.

¹² All figures are in 2011 dollars.

population; around 60 percent of individuals have no more than a high school diploma. Around one in four households are considered EITC eligible; three-quarters of those eligible have family income that places them on the phase-out region of the EITC benefit schedule.

Results

Table 2 presents our main results, which show that increases in state level EITC generosity between 1996 and 2013 raised the proportion of individuals working in self-employment relative to wage and salary employment. The average difference between the highest value of our EITC measure and the lowest value within a state during this time period is \$380. This implies that, on average, increases in the EITC increased self-employment rates by 2.05 percentage points or 24 percent (0.380×0.0536). Although not directly comparable, this estimate is similar in magnitude to the effect found in LaLumia (2009), who finds a 4 percentage point increase in self-employment rates among married mothers during the expansion of the federal EITC between 1994 and 1998.¹³

The same policy-induced increase in the EITC leads to a decline in the share of wage and salary employed individuals by 4.3 percentage points or 6.5 percent. The magnitude of these results suggest that overall employment declines with increases in the EITC. These results are consistent with Eissa and Hoynes (2004) findings that increases in the EITC discourage employment overall among married mothers. On net, we estimate that the average increase in EITC generosity decreased the share of married women working in either type of employment by about 2.6 percentage points, but the estimate is not statistically different from zero.

We find no evidence that married women are more likely to work in both self-employment and wage and salary employment as a function of EITC generosity. This suggests that women are in fact switching between employment types rather than combining both wage and salary employment and self-employment at the same time. In Table 3, we examine quarterly transitions between wage and salary employment, self-employment and non-employment to investigate how the EITC impacts the gross flows of workers across employment types. We find evidence that the EITC increases transition rates from wage and salary to self-employment and from self-employment to wage and salary employment. These findings are consistent with the

¹³ LaLumia's analysis compared mothers to non-mothers, while we compare high-income mothers to low-income mothers.

EITC encouraging wage and salary employed women to switch to self-employment at least temporarily. Interestingly, these results also suggest a reciprocal flow between wage and salary and self-employment, suggesting that married women may be using a combination of wage and salary employment and self-employment over the course of the year (but not at the same time) to maximize benefits. We also see that increases in the EITC discourage married women from entering wage and salary employment from non-employment. We find no evidence that higher levels of the EITC are encouraging married women who are not working to become self-employed.

Our results are not sensitive to the inclusion of the fixed effects or state-specific time trends as shown in Appendix Table A3.¹⁴ Given our implicit triple-difference strategy, this is not entirely surprising. We do find that the coefficient on the main effect of EITC generosity is sensitive to the fixed effects included in the models, which reveals some patterns about the types of states that have more generous EITC benefits. For instance, with no state fixed effects in the model, we find a negative association between EITC generosity and self-employment, implying that more generous states tend to have lower self-employment rates. Once including year fixed effects, we still find a negative relationship between EITC generosity and self-employment, although it is attenuated and no longer statistically significant. Once controlling for state fixed effects, the relationship flips and states with higher average EITC credits have higher self-employment rates, although the coefficient is not statistically significant. EITC eligible individuals have lower self-employment rates, but this difference does not depend on the fixed effect controls. Including state-specific linear time trends does little to change the coefficients on the terms of interest, but an F-test of the joint significance of the state-specific linear time trends rejects the null hypothesis that the coefficients are zero. This suggests that the state-specific linear time trends do improve the fit of the models.

We also investigate an alternative definition of self-employment: positive business earnings, as shown in Appendix Table 4. Around 65 percent of individuals with positive self-employment hours report positive business earnings. Appendix Table 4 shows that the \$380 increase in EITC generosity led to a statistically insignificant 1.0 percentage point increase in the proportion of women reporting positive business income. The percent change for these results is

¹⁴ See Wolfers (2006) and Meer and West (2015) for a discussion of how linear time trends can produce misleading results.

similar to using the positive hours worked at a business definition, suggesting that the marginally self-employed are not necessarily the self-employed with zero business earnings. Across both measures, we find suggestive evidence that increases in the EITC increase the likelihood of having both self-employment hours and earnings among married mothers.

Table 4 shows results for the effect of the EITC on self-employment earnings and hours worked. While we find no significant impact of the EITC on the level of self-employment earnings, we do find a significant increase in the number of self-employment hours as a function of EITC generosity and a decline in wage and salary hours. We find that the increase in the average EITC over our time period increased the hours spent in self-employment by about 0.6 hours per week and decreased the average hours spent in wage and salary employment by 1.8 hours per week. In order to more deeply investigate the intensive margin changes within the self-employed, we run our analysis on individuals who were self-employed during the first wave of the SIPP survey. Unfortunately the results (shown in Table 5) are too noisy to draw any firm conclusions about changes in behavior among those who were self-employed at the beginning of the sample.

We would expect to find different labor supply responses to expansions of the EITC depending on where households lie on the EITC benefit structure. The structure of the EITC produces both disincentives and incentives to work depending on households' level of income. Individuals in the phase-in region have an incentive to increase the number of hours worked when the EITC becomes more generous because each additional dollar of earnings is associated with a larger EITC. Individuals in the phase-out region may have an incentive to decrease the number of hours worked, as each additional dollar of earnings is associated with a lower EITC benefit. For the phase-in region, each dollar of earnings is associated with 34-45 cents in additional EITC benefits depending on the number of children in the household, while benefits phase out at a rate of 21 cents for each dollar of earnings beyond the plateau. Individuals in the plateau region have neither an incentive nor disincentive to change the number of hours worked, as small changes in earnings result in no change in EITC benefits.

Using household income from the first year of the survey, we characterize households as being located in one of these three regions. We acknowledge that households may intentionally 'bunch' at one of these kink points in order to maximize their EITC benefits, so these results should be interpreted in light of potential endogeneity of household positioning on the EITC

benefit structure with respect to self-employment. Table 6 shows our results by EITC region. We find evidence that increases in the EITC lead to increases in self-employment particularly among individuals in the phase-in regions, precisely those who have the most to gain (or the least to lose) in EITC benefits from increasing their work effort. However, we also find positive but insignificant increases in self-employment among married mothers on the plateau and phase-out portions of the EITC schedule. This could imply that the increase in household income generated by the EITC affords women the financial ability to become self-employed. The results for wage and salary hours suggest that increases in the EITC discourage wage and salary employment for married women in the phase-out region of the credit. This result is consistent with Eissa and Hoynes (2004) and with the incentive structure of the EITC.

Conclusion

In this paper, we examined the relationship between the EITC and self-employment among married mothers. Building on prior research (Eissa and Hoynes 2004), we find that increases in EITC generosity result in a decline in wage and salary employment among married mothers, but that some of this decline was recouped by an increase in self-employment. During this time period, the average state EITC benefit for married women increased by about \$380. Our regression estimates suggest that this increase in EITC generosity led to a 2.05 percentage point increase, or a 24 percent increase, in self-employment among married mothers. As self-employment represents a small share of the total labor force, these effects are large relative to the self-employed workforce.

These findings build on prior research that found that the EITC reduces the labor supply of married women overall. Our results suggest a more nuanced labor supply response among married women eligible for the EITC. Rather than completely exiting the labor force, at least some of these women who leave wage and salary jobs actually shift to self-employment work. These findings also corroborate previous work indicating an increase in reporting of self-employment earnings associated with the EITC by showing an increase in work effort as well (LaLumia 2009). This is in contrast to the findings in Kuka (2013), who finds no significant increase in self-employment as a function of EITC generosity. The author's methodology differs from that presented here; the author also focuses on unmarried individuals using CPS data. Unmarried individuals in our sample are far less likely to be self-employed, it may therefore be

more difficult to find a precise estimate using survey data. We are also able to measure self-employment patterns at a more frequent interval (quarterly) than that in the CPS (annual). Because self-employment transitions are relatively common, assessing employment at the annual level may be too crude a measurement for capturing short spells in self-employment.

Finally, we make a methodological contribution with this analysis by confirming prior findings using a different source of exogenous variation in EITC generosity. LaLumia (2009), Kuka (2013), and the Eissa and Hoynes (2004) all utilize federal variation in the EITC from the early 1990s, with different associated treatment and control groups. We are able to replicate some of these findings using variation in state EITC policies, which incorporate variation over time and in treatment size.

Our paper provides evidence that the EITC encourages self-employment among married women with children. Future work should focus on further distinguishing between the tax evasion motivation and the income effect. If the credit induces women to become self-employed to avoid taxes and better maximize their credit that would provide further evidence that the EITC distorts labor supply. However, if it is the increase in income that allows women to pursue self-employment, then these results might suggest the presence of credit constraints. Previous work suggests that self-employed women spend more time with their children than wage and salary employed women (Hundley 2000; Gurley-Calvez et al. 2009). This could have positive effects on future outcomes for these children. In order to truly understand the potential effects, more work is needed on self-employment among the EITC-eligible population since previous research focuses on women across the entire income distribution.

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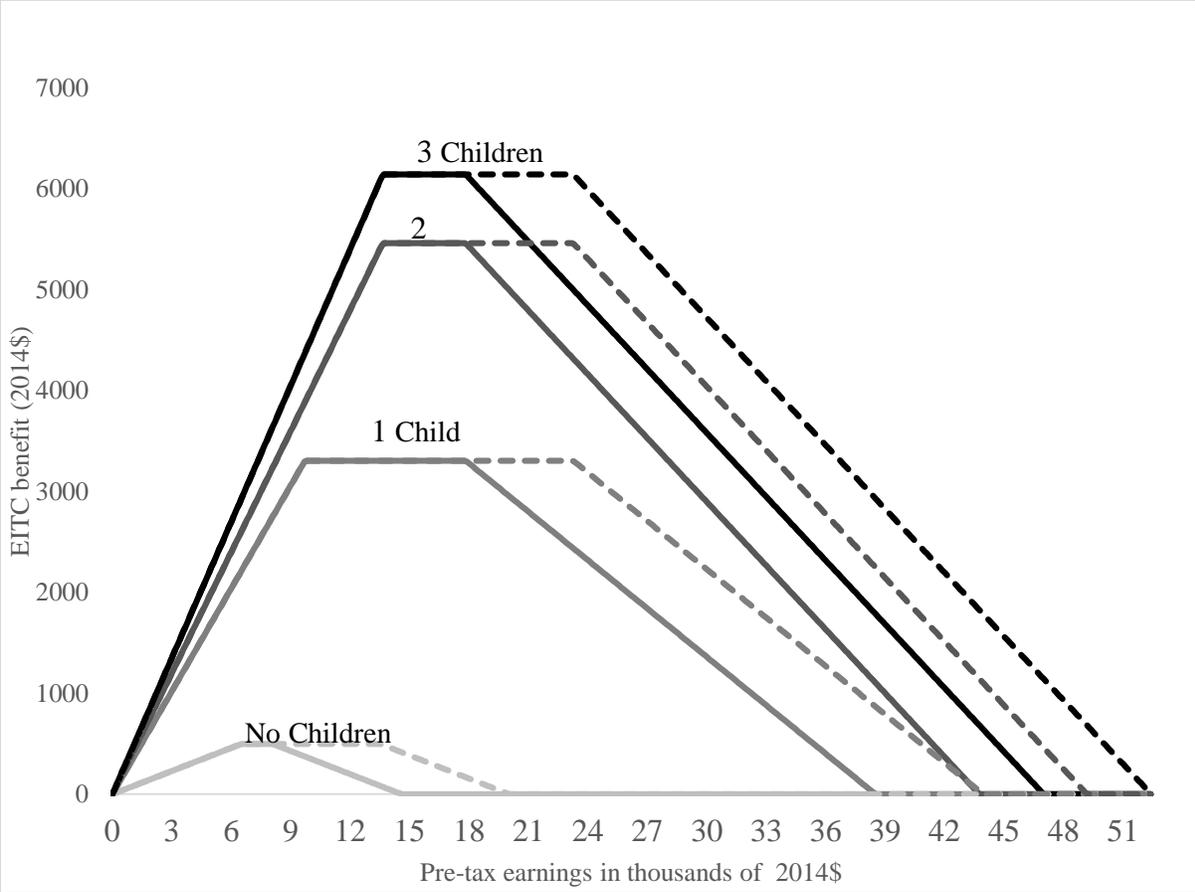


Figure 1: 2014 EITC Benefit Structure by Number of Children

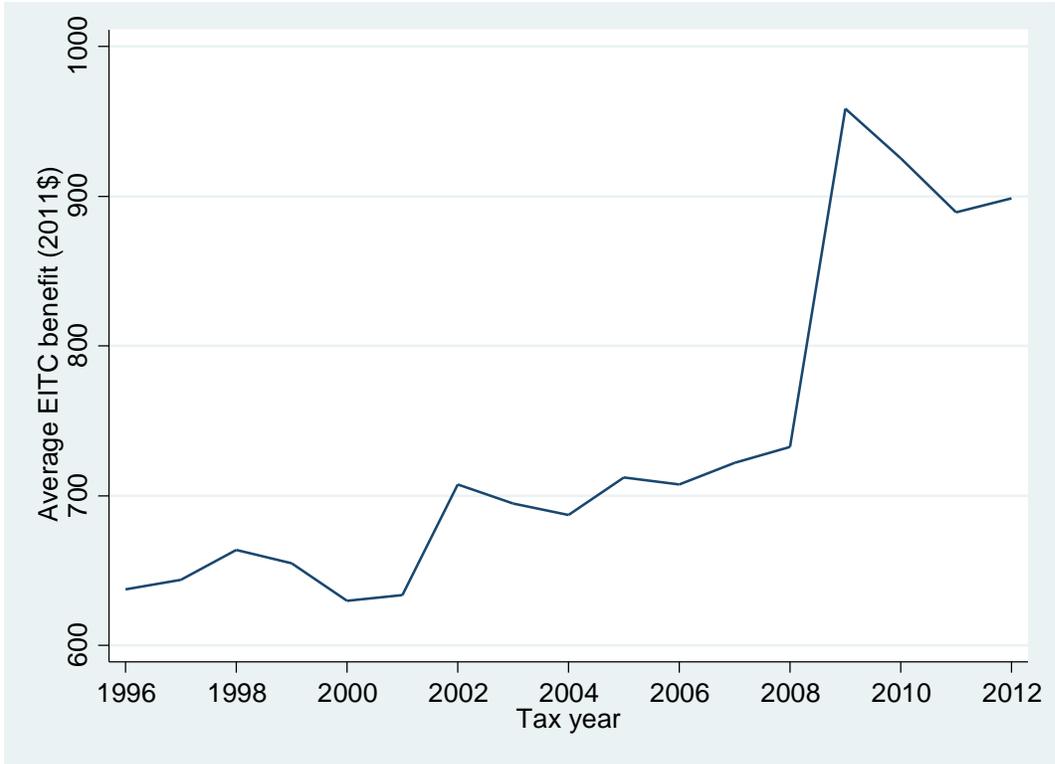


Figure 2: Average Household EITC by Year; Simulated Instrument

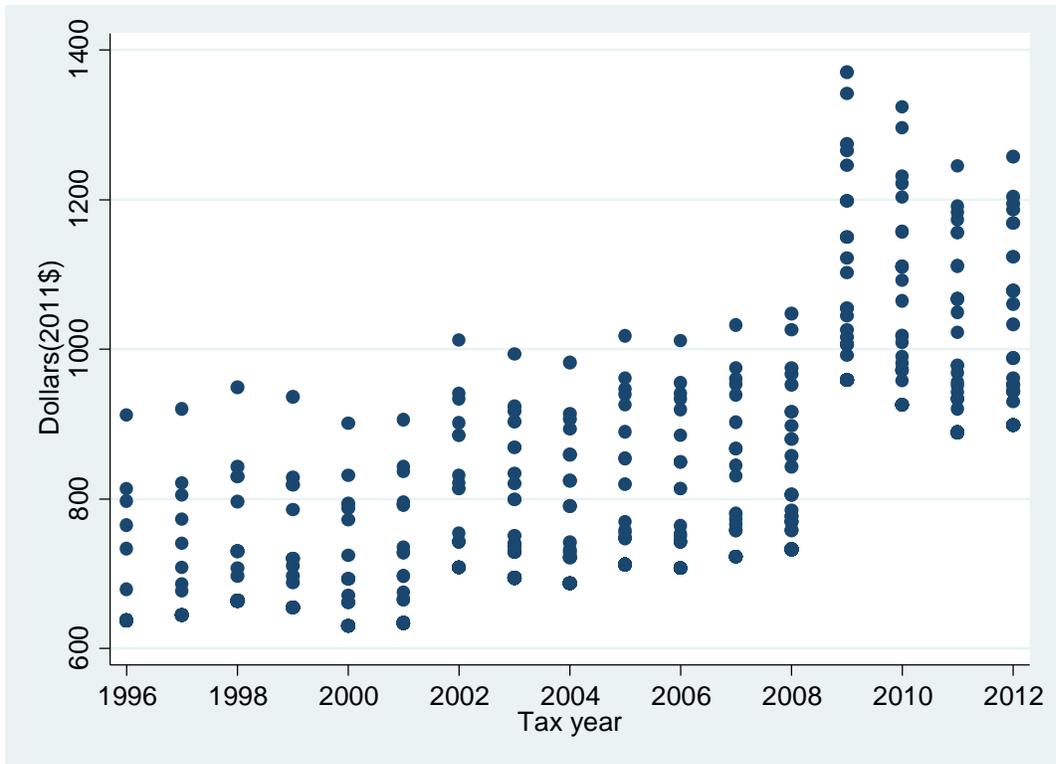


Figure 3: Average Household EITC by State and Year; Simulated Instrument

Table 1. Summary statistics for married mothers 18-55 years old by EITC-eligibility, Reference month only, Excludes 1st calendar year

	All	EITC-eligible	Not EITC-eligible
Average EITC-simulated instrument	775.87	785.36	772.45
EITC-eligible	0.26	1.00	0.00
On Phase-in/Plateau	0.07	0.26	0.00
On Phase-out	0.20	0.74	0.00
Self-employed (hours)	0.084	0.069	0.090
Self-employed (earnings)	0.055	0.042	0.060
Wage and salary employed (hours)	0.658	0.525	0.706
Both self-employed and wage and salary (hours)	0.025	0.017	0.028
Monthly self-employment earnings	0.11	0.05	0.13
Weekly self-employment hours	2.35	1.98	2.48
Weekly wage and salary hours	23.92	18.30	25.94
High School or Less	0.36	0.60	0.27
Some College	0.34	0.30	0.35
College Degree	0.30	0.10	0.38
Number of Children Under 19	2.0	2.1	1.9
Number of Person-Quarter Observations	172,391	46,821	125,570

Notes: Sample includes women who are married and have at least one child under 19 living with them during the first year of the SIPP. Data come from the 1996, 2001, 2004, and 2008 panels of the SIPP. Observations exclude the first calendar year of data and only include the reference month for the survey. Estimates are weighted .

Table 2. Effect of average household EITC (\$1,000s) generosity on likelihood of working in various types of employment, married women 18-55 years old with at least one child

	Has self- employment hours	Has wages and salary hours	Has both self- employment hours and wages and salary hours	Working
Average EITC (\$1,000s) ¹	0.0785 (0.0588)	0.0462 (0.135)	0.0208 (0.0423)	0.104 (0.145)
EITC-eligible ²	-0.0447** (0.0181)	-0.0372 (0.0409)	-0.00839 (0.00627)	-0.0732* (0.0378)
Average EITC*EITC-eligible	0.0536** (0.0222)	-0.113** (0.0511)	0.00739 (0.00705)	-0.0675 (0.0461)
Mean of dep. Var	0.084	0.658	0.025	0.718
State FE	X	X	X	X
Year FE	X	X	X	X
Month FE	X	X	X	X
State-specific linear time trends	X	X	X	X
Number of Observations	172,391	172,391	172,391	172,391

Notes: Sample includes women who are married and have at least one child under 19 living with them during the first year of the SIPP. Data come from the 1996, 2001, 2004, and 2008 panels of the SIPP. Observations exclude the first calendar year of data and only include the reference month for the survey. Estimates are weighted and standard errors are clustered at the state level. All regressions control for the state minimum wage and unemployment rate.

¹ Average EITC is calculated for each state and year using the state level EITC rules applied to a nationally representative sample using TAXSIM.

² Eligibility for the EITC is determined using income and family structure from the first year of the survey.

Table 3. Effect of average household EITC (\$1,000s) generosity on quarterly transitions between employment types, married women 18-55 years old with at least one child

	Wage and Salary to Self- Employment	Wage and Salary to Non- Employment	Self- Employment to Wage and Salary Employment	Self- Employment to Non- Employment	Non- Employment to Wage and Salary Employment	Non- Employment to Self- Employment
Average EITC (\$1,000s)	0.00287 (0.00748)	0.00488 (0.0254)	0.0107 (0.0126)	-0.00598 (0.00569)	0.0402** (0.0161)	0.00744 (0.00602)
EITC-eligible	-0.00474** (0.00180)	0.0121* (0.00675)	-0.00409 (0.00275)	0.000842 (0.00153)	0.0240*** (0.00495)	0.00127 (0.00179)
Average EITC*EITC-eligible	0.00620*** (0.00218)	-0.00250 (0.00856)	0.00652* (0.00360)	-0.000686 (0.00180)	-0.0165** (0.00647)	-0.000365 (0.00221)
Mean of dep. Var	0.004	0.022	0.006	0.003	0.022	0.003
State FE	X	X	X	X	X	X
Year FE	X	X	X	X	X	X
Month FE	X	X	X	X	X	X
State-specific linear time trends	X	X	X	X	X	X
Number of Observations	172,391	172,391	172,391	172,391	172,391	172,391

Notes: Indicators for self-employment and wages and salary labor force participation are dummy variables equal to one if the respondent reports positive hours of work in the respective areas, zero otherwise. Transitions represent quarterly transitions between survey waves. Restricted to married women who never have a child during the SIPP panel. All regressions control for the state minimum wage and unemployment rate.

Source: 1996-2008 Survey of Income and Program Participation, women 18-55 years old with no children

Table 4. Effect of average household EITC (\$1,000s) generosity on self-employment earnings and hours worked, married women 18-55 years old with at least one child

	Monthly self-employment earnings (\$1,000s)	Self-employment hours	Wages and salary hours
Average EITC (\$1,000s) ¹	283.6** (129.6)	1.879 (1.371)	1.273 (4.892)
EITC-eligible ²	-25.15 (45.59)	-1.199* (0.619)	-1.920 (1.604)
Average EITC*EITC-eligible	-9.127 (51.95)	1.448* (0.762)	-4.704** (1.865)
Mean of dep. Var	0.11	2.35	23.92
State FE	X	X	X
Year FE	X	X	X
Month FE	X	X	X
State-specific linear time trends	X	X	X
Number of Observations	172,391	172,391	172,391

Notes: Sample includes women who are married and have at least one child under 19 living with them during the first year of the SIPP. Data come from the 1996, 2001, 2004, and 2008 panels of the SIPP. Observations exclude the first calendar year of data and only include the reference month for the survey. Estimates are weighted and standard errors are clustered at the state level. All regressions control for the state minimum wage and unemployment rate.

¹ Average EITC is calculated for each state and year using the state level EITC rules applied to a nationally representative sample using TAXSIM.

² Eligibility for the EITC is determined using income and family structure from the first year of the sur

Table 5. Effect of average household EITC (\$1,000s) generosity on self-employment trends, married women 18-55 years old with at least one child and report some positive self-employment hours in the first month of the SIPP survey

	Monthly self- employment earnings (\$1,000s)	Self- employment hours	Wages and salary hours
Married			
Average EITC (\$1,000s) ¹	3.758** (1.859)	-4.416 (16.11)	-2.788 (19.39)
EITC-eligible ²	0.256 (0.498)	-2.298 (5.929)	-1.917 (3.888)
Average EITC*EITC-eligible	-0.937 (0.584)	-1.192 (7.043)	2.447 (4.771)
Mean dep. Var	1.07	20.83	10.84
State FE	X	X	X
Year FE	X	X	X
Month FE	X	X	X
State-specific linear time trends	X	X	X
Number of Observations	13,096	13,096	13,096

Notes: Sample includes women who are married and have at least one child under 19 living with them during the first year of the SIPP. Data come from the 1996, 2001, 2004, and 2008 panels of the SIPP. Observations exclude the first calendar year of data and only include the reference month for the survey. Estimates are weighted and standard errors are clustered at the state level. All regressions control for the state minimum wage and unemployment rate.

¹ Average EITC is calculated for each state and year using the state level EITC rules applied to a nationally representative sample using TAXSIM.

² Eligibility for the EITC is determined using income and family structure from the first year of the survey.

Table 6. Effect of average household EITC (\$1,000s) generosity on self-employment trends, married women 18-55 years old with at least one child

	Has self-employment hours	Has wages and salary hours	Has both self-employment hours and wages and salary hours	Working
Average EITC (\$1,000s)	0.0839 (0.0576)	0.0447 (0.137)	0.0222 (0.0419)	0.107 (0.146)
Phase in	-0.0552 (0.0444)	-0.170*** (0.0617)	-0.0266 (0.0194)	-0.198*** (0.0666)
Average EITC*Phase in	0.0997* (0.0553)	-0.0131 (0.0748)	0.0338 (0.0255)	0.0528 (0.0820)
Plateau	-0.115* (0.0663)	-0.150 (0.0919)	-0.0301 (0.0212)	-0.234** (0.101)
Average EITC*Plateau	0.148 (0.0898)	-0.0215 (0.106)	0.0405 (0.0267)	0.0844 (0.121)
Phase-out	-0.0293 (0.0193)	-0.000458 (0.0444)	-0.00113 (0.00824)	-0.0283 (0.0398)
Average EITC*Phase out	0.0268 (0.0232)	-0.140** (0.0573)	-0.00326 (0.00949)	-0.111** (0.0506)
Mean dep. Var	0.084	0.658	0.025	0.718
State FE	X	X	X	X
Year FE	X	X	X	X
Month FE	X	X	X	X
State-specific linear time trends	X	X	X	X
Number of Observations	172,391	172,391	172,391	172,391

Notes: Sample includes women who are married and have at least one child under 19 living with them during the first year of the SIPP. Location on the EITC schedule comes from household income in the first year of the survey. Data come from the 1996, 2001, 2004, and 2008 panels of the SIPP. Observations exclude the first calendar year of data and only include the reference month for the survey. Estimates are weighted and standard errors are clustered at the state level. All regressions control for the state minimum wage and unemployment rate.

¹ Average EITC is calculated for each state and year using the state level EITC rules applied to a nationally representative sample using TAXSIM.

² Eligibility for the EITC is determined using income and family structure from the first year of the survey.

Appendix Table 1. States with Earned Income Tax Credits, year of implementation

	Year of Implementation
Rhode Island	1986
Vermont	1988
Wisconsin ¹	1989
Iowa	1990
Minnesota ²	1991
New York	1994
Massachusetts	1997
Oregon	1997
Kansas	1998
Maryland	1998
Colorado	1999
DC	2000
Illinois	2000
Maine	2000
New Jersey	2000
Oklahoma	2002
Indiana	2003
Nebraska	2003
Delaware	2006
Virginia	2006
New Mexico	2007
North Carolina	2008
Michigan	2008
Louisiana	2008
Connecticut	2011
Washington	2008 (announced)
Ohio	2013

Source: Tax Policy Center

<http://www.taxpolicycenter.org/taxfacts/displayafact.cfm?Docid=293>

1: Wisconsin has a system based on the number of children in the household. Rate shown here is for households with 3 or more children.

2: Minnesota has a system based on whether there are any children living in the household, and after 1997, household earnings. Rate shown here is for households with children and the maximum possible rate given income.

Appendix Table 2: Test of Exogeneity of State EITC benefits

Dependent Variable:	State EITC generosity	
Sample:	All States	Conditional on Ever Having a State EITC
VARIABLES	(1)	(2)
State GDP per Capita (in \$1000s)	0.00 (.)	0.00 (.)
Lagged State GDP per Capita (in \$1000s)	0.03 (.04)	0.25* (.115)
Unemployment Rate	0.00 (.003)	0.02 (.009)
Lagged Unemployment Rate	0.00 (.003)	0.00 (.007)
Top Marginal Income Tax Rate	0.00 (.005)	-0.01 (.013)
Lagged Top Marginal Income Tax Rate	-0.01 (.008)	-0.04 (.03)
Real Minimum Wage	0.00 (.003)	0.01 (.015)
Lagged Real Minimum Wage	0.00 (.005)	-0.01 (.019)
Maximum Monthly Welfare Benefits for a Family of 3 (in \$100s)	.002* (.007)	0.017* (.007)
Lagged Maximum Monthly Welfare Benefits for a Family of 3 (in \$100s)	0.01 (.015)	0.02 (.017)
Spending on Higher Education	.01* (.005)	0.01 (.009)
State and Year Fixed Effects	X	X
R-squared	0.861	0.845
Observations	1000	320

Source: State-level data from 1992-2013. State-level unemployment rates from Bureau of Labor Statistics. State GDP from Bureau of Economic Analysis regional data. State top tax bracket from the National Bureau of Economic Research. State-level minimum wage from the Tax Policy Center's Tax Facts. State-level spending on higher education from the State Higher Education Executive Officers. State-level welfare benefits from the Urban Institute's Welfare Rules Database. *** p<.01 ** p<.05 * p<.10

Appendix Table 3. Impact of EITC on self-employment: different levels of fixed effects

	Has self- employment hours	Has self- employment hours	Has self- employment hours	Has self- employment hours
Average EITC (\$1,000s) ¹	-0.0588** (0.0230)	-0.0369 (0.0389)	0.0325 (0.0324)	0.0785 (0.0588)
EITC-eligible ²	-0.0433** (0.0171)	-0.0424** (0.0173)	-0.0419** (0.0184)	-0.0447** (0.0181)
Average EITC*EITC-eligible	0.0502** (0.0210)	0.0507** (0.0211)	0.0500** (0.0225)	0.0536** (0.0222)
Mean of dep. Var	0.084	0.084	0.084	0.084
State FE			X	X
Year FE		X	X	X
Month FE		X	X	X
State-specific linear time trends				X
Number of Observations	172,391	172,391	172,391	172,391

Notes: Sample includes women who are married and have at least one child under 19 living with them during the first year of the SIPP. Data come from the 1996, 2001, 2004, and 2008 panels of the SIPP. Observations exclude the first calendar year of data and only include the reference month for the survey. Estimates are weighted and standard errors are clustered at the state level. All regressions control for the state minimum wage and unemployment rate.

TAXSIM.

² Eligibility for the EITC is determined using income and family structure from the first year of the survey.

Appendix Table 4. Alternate definitions of self-employment

	Has self- employment hours	Has positive self- employment earnings
Average EITC (\$1,000s) ¹	0.0785 (0.0588)	0.111** (0.0465)
EITC-eligible ²	-0.0447** (0.0181)	-0.0259* (0.0136)
Average EITC*EITC-eligible	0.0536** (0.0222)	0.0265 (0.0176)
Mean of dep. Var	0.084	0.055
State FE	X	X
Year FE	X	X
Month FE	X	X
State-specific linear time trends	X	X
Number of Observations	172,391	172,391

Notes: Sample includes women who are married and have at least one child under 19 living with them during the first year of the SIPP. Data come from the 1996, 2001, 2004, and 2008 panels of the SIPP. Observations exclude the first calendar year of data and only include the reference month for the survey. Estimates are weighted and standard errors are clustered at the state level. All regressions control for the state minimum wage and unemployment rate.

¹ Average EITC is calculated for each state and year using the state level EITC rules applied to a nationally representative sample using TAXSIM.

² Eligibility for the EITC is determined using income and family structure from the first year of the survey.