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Earned Income Tax Credit Recipients: Income, Marginal Tax Rates, Wealth, and Credit Constraints

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The Earned Income Tax Credit (EITC) has become the federal government's largest cash-assistance program for low-income families, making it the centerpiece of anti-poverty programs in the United States. Approximately 15 percent of households nationwide now qualify for the EITC (Hoffman and Seidman 2002). Moreover, unlike other government programs, the EITC is administered through the income tax filing process, which reduces any potential stigma associated with the program, and aids in ensuring high participation rates (Smeeding, Phillips, and O'Connor 2000). According to Eissa and Hoynes (2009), approximately $43 billion was allocated to 22 million families in the United States in 2007 through the federal EITC. This compares to $16.5 billion that was spent on more traditional welfare programs, such as Temporary Assistance for Needy Children (TANF).

The EITC is designed to augment income while encouraging work: The tax credit increases with earnings for low levels of household income. The size of the credit is such that, for low-income households that qualify, the EITC is a negative tax on earnings that often constitutes a significant portion of after-tax wage income. The EITC does appear to have been successful in both helping the working poor get out of poverty and encouraging work. Neumark and Wascher (2001), Ziliak (2006), and Simpson, Tiefenthaler, and Hyde (2009) provide evidence that the combined federal and state EITC helps

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families rise above the poverty line. In fact, the EITC has been estimated to have helped five million people out of poverty in 2005, including 2.6 million children.[1] Hotz and Scholz (2000) find that, compared to other poverty-reduction programs, the EITC is effective in raising the standard of living for low-income households, while keeping administrative costs relatively low.

However, the EITC phases out with earnings, until eventually a household no longer qualifies for it. The structure of the phase-out means that families earning more than $41,000 in 2008 will not qualify for the EITC, while all those earning less will. In addition, the credit targets families with children, and increases in generosity with the number of children in the household. For example, households with two or more children (in tax year 2008) earning $15,000 could qualify for up to $4,824 in federal earned income credits. In contrast, a childless single filer can receive only one-tenth of this amount, or at most $438. Thus, for those households with children and low earned income, the full refundability of the EITC ensures that it will represent a substantial addition to income.

In this article, we summarize the details of the EITC and describe the population of EITC recipients. Using Current Population Survey data, we estimate earnings and EITC benefits received by EITC recipients at various ages. Naturally, we find that because of the eligibility requirements, the earnings of EITC recipients are relatively similar across the age of recipients, which makes them differ systematically from non-recipients of the same age—whose earnings show a more pronounced "hump shape" with age. We then discuss how the EITC affects marginal taxes in the United States and summarize its theoretical and empirical effects on household labor supply decisions. Finally, we compare wealth levels of EITC recipients with non-recipients using data from the Survey of Consumer Finances (SCF), and find significant differences in their wealth distributions, with EITC recipients being substantially poorer. The fact that EITC recipients have relatively low wealth levels and low earnings relative to others in their age group suggests that they may be more likely to be borrowing-constrained than non-recipients. In fact, we find some evidence for this in our analysis of SCF data.

1. HISTORY OF THE EITC

In Table 1, we briefly summarize the history of EITC legislation. The EITC started as a modest program as part of the Tax Reduction Act of 1975.[2] The program was unique among tax credits as it was refundable so that poor families could utilize its benefits even if they owed little or no taxes. Unlike welfare programs such as Aid to Families with Dependent Children (AFDC), single

[1] Center on Budget and Policy Priorities: www.cbpp.org/cms/?fa=view&id=2505.

[2] For a more detailed history of the EITC, refer to Hotz and Scholz (2003).

Table 1 History of EITC Legislation

Year	Changes to the EITC
1975	Introduced temporary "work bonus" called the EITC
1978	Made EITC permanent
1986	General expansion (largest increase since its inception) and indexed for inflation; part of the Tax Reform Act
1990	General expansion by doubling the maximum credit and increased eligibility; added separate schedule for families with two or more children; part of OBRA
1993	General expansion (larger expansion for families with two or more children); added EITC for childless filers; part of OBRA
1997	Provisions made to improve compliance; part of Taxpayer Relief Act
2001	Changes to provide marriage penalty relief and promoted simplification; part of EGTRRA
2009	Expansion for families with three or more children and expanded eligibility for married couples; part of the American Recovery and Reinvestment Act

Sources: Hotz and Scholz (2003); Holt (2006); Tax Policy Center (2009).

parents as well as married couples were eligible for the program. The EITC went through minor changes in subsequent years, the most important being when it became a permanent provision of the Internal Revenue Code in 1978.

The Tax Reform Act of 1986 indexed the EITC to inflation and liberalized the EITC, helping, by some estimates, to remove over six million Americans from poverty (Ventry 2000). The Omnibus Reconciliation Act (OBRA) of 1990 increased the credit and added separate schedules for families with two or more children. The largest expansion of the EITC occurred in 1993, as part of the OBRA, in which the EITC was increased by an additional 25 percent. Families with two or more children experienced the largest increase in the credit, and childless filers could now qualify for the EITC. Both the size of the credit and the eligible population have grown over time, and were fueled by the passage of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996, which replaced AFDC with Temporary Assistance for Needy Families (TANF). The United States experienced a 50 percent reduction in welfare rolls between 1993 and 2000, and Grogger (2004) finds that much of the drop is attributed to the EITC and reduction in welfare benefits.

Until 2001, the structure of the EITC was identical for single and married filers. However, as part of the Economic Growth and Tax Relief Reconciliation Act (EGTRRA) of 2001, married couples received larger benefits for larger ranges of income levels than single filers. The success of the federal EITC has led to the development of similar programs in 23 U.S. states and the District of Columbia, totaling an additional $2 billion (Levitis and Koulish 2008).

Table 2 EITC Parameters, Tax Year 2008

	Single, No Qualifying Children	Single, One Qualifying Child	Single, Two+ Qualifying Children	Married, No Qualifying Children	Married, One Qualifying Child	Married, Two+ Qualifying Children
Phase-In Rate	7.65%	34.00%	40.00%	7.65%	34.00%	40.00%
Phase-In Ends	$5,720	$8,580	$12,060	$5,720	$8,580	$12,060
Maximum Credit	$438	$2,917	$4,824	$438	$2,917	$4,824
Phase-Out Begins	$7,160	$15,740	$15,740	$10,160	$18,740	$18,740
Phase-Out Rate	7.65%	15.98%	21.06%	7.65%	15.98%	21.06%
Eligibility Ceiling	$12,880	$33,995	$38,646	$15,880	$36,995	$41,646

Source: Minnesota House Research Department.

Table 3 EITC Calculation by Phase

Phase	EITC
Phase-In	= Phase-In Rate * Income
Plateau	= Maximum Credit
Phase-Out	= Maximum Credit − Phase-Out Rate * (Income − Income Where Phase-Out Begins)

Finally, the American Recovery and Reinvestment Act of 2009 increased the credit for families with three or more children and expanded eligibility for married couples. Families making up to $48,250 in annual earnings can now qualify for the tax credit, with the maximum credit as high as $5,657 for a family with three or more children. This EITC expansion is expected to help an additional 650,000 households and 1.4 million children.[3]

2. STRUCTURE OF THE EITC

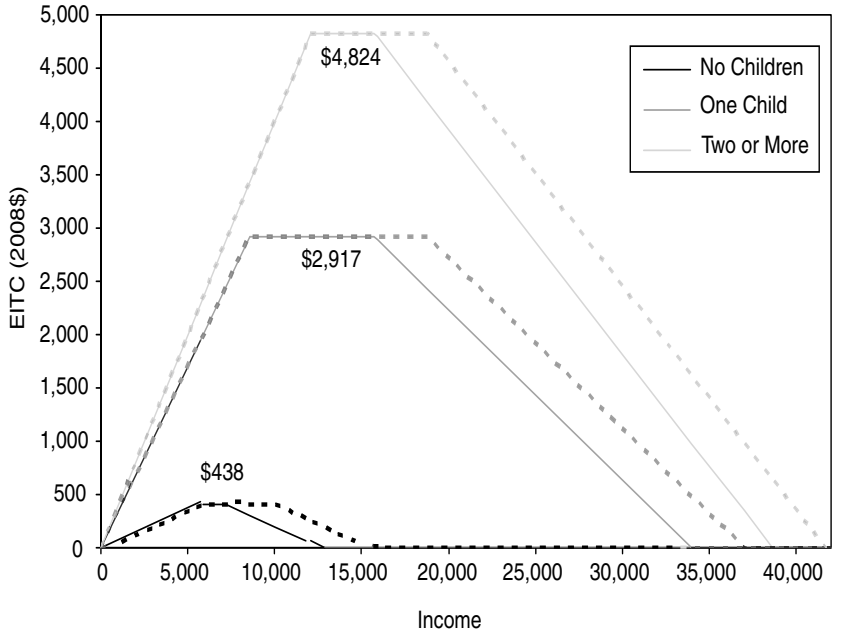
The EITC acts as an after-tax wage subsidy for low-income workers and depends on earned income, number of children, and marital status.[4] Earned income includes wages, salaries, tips, and other employee compensation; union long-term disability benefits received prior to minimum retirement age; and net earnings from self-employment. However, it does not include social security benefits, unemployment compensation, welfare benefits, scholarships, worker's compensation benefits, or pension/annuity income.

The EITC is structured in three phases: In the *phase-in* period, the credit increases with earnings; in the *plateau* period, the credit reaches a maximum and levels off; and in the *phase-out* period, the credit falls as the claimant's earnings rise. At the eligibility limit, the household earns no EITC. The EITC is separated into different levels for claimants with no children, those with one child, and those with two or more children. There are also different tax credits for different types of filers: Married couples filing jointly are eligible for slightly higher credit amounts in the phase-out period than single filers and have slightly larger income eligibility ranges. Table 2 presents the details of the EITC for tax year 2008 for different filing statuses (single or married) and number of children, and includes the maximum credits and earnings limitations. In Figure 1, we plot the amount of federal EITC that single and married households receive across various income levels: single filers are depicted by the solid lines, whereas married filers are depicted by

[3] Tax Policy Center (2009).

[4] Many of the poorest families are ineligible for the EITC since their earnings are too low to qualify and/or they do not have children (Hoffman and Seidman 2002).

Figure 1 EITC Structure by Income, Tax Year 2008



Note: Solid line represents single/head of household filers; dashed line represents married filers.

the dashed lines. To calculate the EITC in each phase, we use the equations in Table 3 along with the EITC parameters in Table 2.

As seen in Figure 1, the EITC significantly varies with the number of children present in a household. Childless filers receive less than one-eighth of the EITC than filers with one child and one-twelfth of filers with two or more children. The federal credit can represent up to 34 percent and 40 percent of income for filers with one and two or more children, respectively. In addition to the federal EITC, many states supplement, or match, with additional credits. As a result, if the taxpayer lives in a state that offers a state EITC, the total EITC (federal plus state) could be much larger; for example, New York residents receive an additional 30 percent of the federal credit. Also interesting is that the slope of the EITC function is steeper in the phase-in range than in the phase-out range. That is, an additional dollar of earned income rewards households in the phase-in range by giving them a credit, which can range from $0.07 (for childless singles) to $0.40 (for married couples with two children). In the phase-out range, an additional dollar of income results in a reduction in the

credit, from $0.07 (for childless singles) to $0.21 (for married couples with two children).

The range of eligible income is much larger as the number of dependent children rises. As of 2008, married households with two children earning less than $41,626 qualify for the EITC, compared to $15,880 for childless couples. The maximum EITC does not vary with marital status, but the income eligibility ranges are slightly larger for married couples. In addition, the range of eligible income is much larger in the phase-out range so that more households are in the phase-out range than in the phase-in range. In fact, recent evidence suggests that married households are more likely to be in the phase-out range than singles, since they are more likely to have higher household income.

3. LABOR MARKET CHARACTERISTICS OF EITC RECIPIENTS

Using Current Population Survey (CPS) data from 2008, we analyze the labor market characteristics of EITC recipients and compare them to non-EITC recipients. We create household-level observations by matching individuals who are married to each other, and we restrict the sample to households where the household head is between the ages of 16 and 64 years. Households are classified into six different types, based on marital status (married or single) and number of children (no children, one child, two or more children). This classification is consistent with the structure of the EITC, as discussed in Section 2. We find that approximately 12.8 percent of households in our sample receive the EITC. Table 4a reports the mean annual wage and salary income, education level, and EITC amount for each household type, while Table 4b reports the fraction of each type in the sample. All of the means represent weighted averages using the household weights supplied by the CPS. It is important to note that 2008 CPS data corresponds to the 2007 tax year and that the CPS only reports estimated federal EITC and does not include any state EITCs.

Approximately 60 percent of EITC recipient households are single, with an equal distribution of single households having zero, one, and two or more children. This contrasts to married couple households, where the majority of EITC recipient households have two or more children. The amount of EITC varies significantly across household types. Single households with two children receive the most EITC ($2,728), which constitutes the largest share of their annual income, at 15 percent. Households without children receive much less EITC, constituting only 6 percent of their annual income.

Table 4 EITC Recipients

4a: Labor Market Characteristics of EITC Recipient vs. Non-Recipient Households

	All	Married, No Kids	Married, One Kid	Married, Two+ Kids	Single, No Kids	Single, One Kid	Single, Two+ Kids
EITC Recipients:							
Mean Household Income	$15,194	$8,325	$18,700	$21,212	$7,024	$15,761	$17,421
St. Dev. of Household Income	$16,132	$8,100	$10,590	$11,225	$5,894	$9,739	$10,409
Percent of High School or Less	61.5%	70.5%	64.1%	68.5%	60.0%	54.1%	58.3%
Percent with Two Earners	26.3%	9.6%	24.6%	30.1%	n/a	n/a	n/a
Average EITC	$1,782	$495	$1,812	$2,623	$423	$1,808	$2,728
EITC as Percent of Income	11.7%	5.9%	9.7%	12.4%	6.0%	11.5%	15.7%
Non-EITC Recipients:							
Mean Household Income	$47,235	$68,549	$83,372	$94,271	$23,696	$32,125	$31,723
St. Dev. of Household Income	$49,653	$67,884	$71,052	$79,822	$32,305	$47,998	$51,997
Percent of High School or Less	39.7%	36.1%	34.2%	29.6%	43.4%	46.6%	48.3%
Percent with Two Earners	65.1%	56.8%	70.5%	71.3%	n/a	n/a	n/a

4b: Distribution of Households in the CPS

	Married, No Kids	Married, One Kid	Married, Two+ Kids	Single, No Kids	Single, One Kid	Single, Two+ Kids	Sum
EITC Recipients:							
Percent of All Households	0.59%	1.21%	3.12%	3.15%	2.32%	2.45%	12.83%
Percent of EITC Recipients	3.9%	9.6%	26.8%	19.8%	19.4%	20.6%	100.00%
Non-EITC Recipients							
Percent of All Households	14.60%	7.91%	12.40%	46.26%	3.81%	2.19%	87.17%
Percent of Non-EITC Recipients	14.77%	10.57%	18.61%	48.16%	4.91%	2.99%	100.00%

Notes: Household data constructed using 2008 CPS; 16–64-year-olds, 2008 dollars. Means are weighted using the household weight "hhwt."

Much of the variation in the EITC across household types is because of differences in annual income. Not surprisingly, married households earn more than single households since there is the potential for two earners. It is interesting to note, however, that the share of married households that have two earners is quite low for EITC recipients, compared to non-recipients. For example, approximately 30 percent of married households with two children who receive the EITC have two earners, while 71 percent of non-recipients have two earners. This could be due to the fact that the majority of two-earner households surpass the income qualifications of the EITC. Or, it could be that EITC-recipient households choose not to have a second income since they receive the EITC.

Another interesting feature is that household earnings for EITC recipients increase with the number of children, and this occurs for both married couple households and single parent households. The difference in annual income between childless households and households with children is much larger for EITC-recipient households than for non-recipient households.

Even though single households that receive the EITC earn less than married households, they tend to be more educated (for married households, we use the education level of the household head). Approximately 10 percent fewer single households have a high school degree or less compared to married households and this is independent of the number of children. This is not the case for non-recipient households: Single households that do not receive the EITC are more likely to only have a high school education than married households.

Thus, the EITC likely has the largest impact on households with children since the EITC is much larger for these households as a share of their annual income and more than 75 percent of EITC recipient households have children. Single households represent the majority (60 percent) of EITC recipient households, and tend to be more educated than married EITC households, which contrasts with the general population. EITC recipient households are much less likely to have two earners than non-recipient households.

4. EITC AND INCOME BY AGE

We now analyze how the EITC changes across recipients of different ages. Since the EITC targets low-income families, it will disproportionately affect younger households of child-rearing age. However, households may qualify for the EITC at any stage of their life, as long as they have earned income that is below the income limit. Importantly, there is no limit to the amount of benefits received over a lifetime nor is there a time limit.

We analyze the pool of EITC recipients between 1992–2008 and catalog how the EITC varies across households of different ages in a shortened panel. Specifically, we estimate the average income/EITC (in 2008 dollars) for each

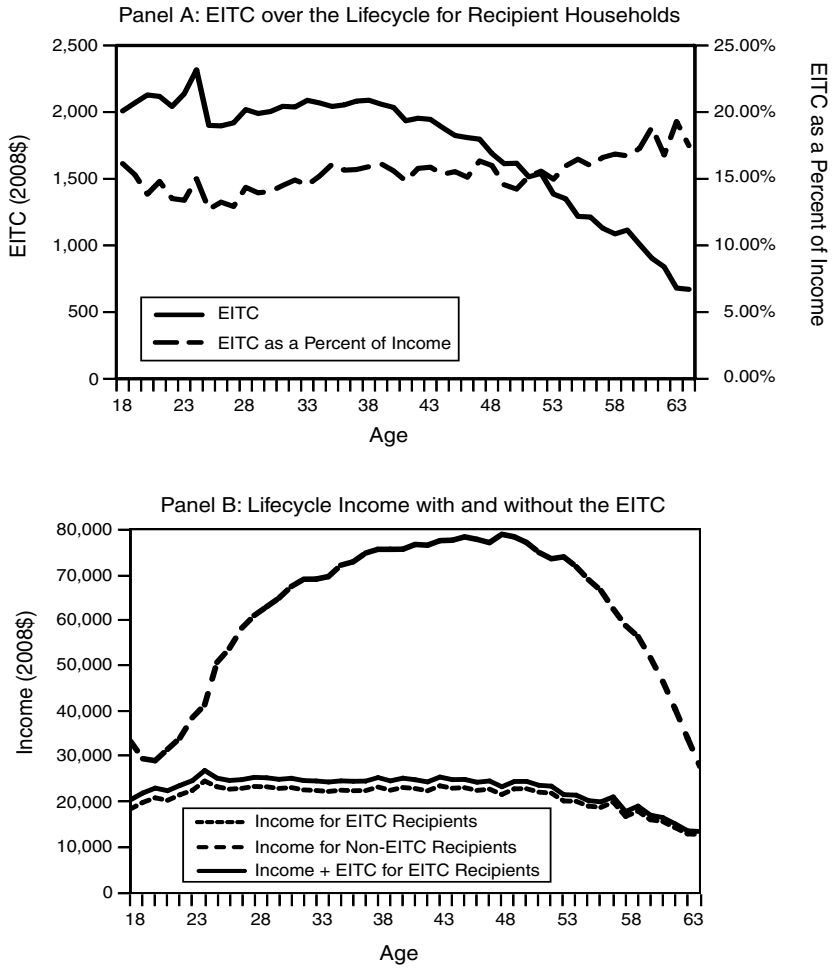
household at each age in each year of the CPS (using the household weights supplied by the CPS). Then, we calculate the average income/EITC across the panel by age; to do this, we account for the distribution of households at each age across the panel. This yields an estimate for income/EITC, conditional on receiving EITC, at each stage in the lifecycle for the typical household in the CPS.

While the preceding is useful, it is an imperfect measure of the effect of EITC on lifetime earnings. It abstracts from any cyclical effects that individuals experience in earnings (such as business cycles, changes in skill premium, or occupational transitions) that occurred prior to 1992 for older cohorts (for example, changes in earnings profiles for individuals born before 1974 are not accounted for prior to 1992). However, our method accurately accounts for the drastic changes that occurred in the EITC during this period. In addition, our estimates provide a sense of how the EITC changes by age and what households can expect as they age, should they qualify at later dates.

In Figure 2a, we plot the average EITC for households that receive the EITC at each age between 18–64 using 1992–2008 CPS data (the age of the household head is used); we also plot the EITC as a percent of earnings (labor earnings and EITC) in the same figure. A few interesting findings emerge. The EITC is high for households headed by very young adults (age 18–25), relatively constant for households in their thirties (at approximately $2,000 in 2008 dollars), and then declines precipitously as we look at households in their late thirties and beyond. By the time households are in their fifties and sixties, the average amount of EITC is just over $500. Thus, the amount of EITC that households receive declines over the course of their lifetimes. However, the interaction of the qualification requirements and the structure of benefits ensure that the EITC remains a relatively constant fraction of recipients' earnings, at approximately 15 percent, for most of their lives. While the typical EITC transfer is largest for the youngest recipients in our sample, the EITC represents a significant fraction of annual earnings (at least 15 percent) throughout most of a recipient's working life. In addition, the EITC represents an even larger proportion of the income of older EITC recipient households. For example, for EITC recipients in their late fifties, the EITC increases as a percent of earnings to approximately 18 percent. This is likely due to the fact that households that qualify for the EITC at this age have very low incomes since they likely face the income thresholds applicable to those with no children.

The patterns in EITC receipt across different age groups arise from two factors: child-rearing stages and fluctuations in income over the lifetime. A typical lifetime earnings profile exhibits a hump shape, where earnings are low early in life, increase dramatically through the twenties and thirties, level off through the forties, and start to decline in the fifties and sixties. This is exactly what we observe for non-EITC recipient households in the CPS sample. In Figure 2b, we plot household earnings (wages and salary) profiles

Figure 2 EITC Recipients and Non-Recipients Across Ages



Notes: Household data constructed using 1992–2008 CPS; 16–64-year-olds, 2008 dollars. Means are weighted using the CPS household weight "hhwt."

for non-EITC recipients and EITC recipients. By construction of the eligibility requirements for EITC, however, those receiving it at various ages are much more similar to each other than are non-recipients of differing ages. Amongst recipients, the highest levels of benefits accrue to the young, typically around age 25. Older recipients generally earn smaller amounts, primarily as the number of dependents they may claim falls.

5. MARGINAL INCOME TAX RATES

The EITC represents a negative income tax for households that qualify for it. Thus, for low income levels, marginal income tax rates are negative. Using data from TAXSIM version 9.0 from the National Bureau of Economic Research,[5] we calculate the marginal income tax rates for all single and married households with no children, one child, and two children (i.e., dependents exemptions) for tax year 2008.[6] The marginal income tax rate is for adjusted gross income only and does not include Federal Insurance Contributions Act (FICA) contributions (i.e., Social Security and Medicaid).

In Figure 3, we plot the marginal tax rates across income levels for single and married filing status earning up to $100,000 and differentiate households based on the number of children they claim as dependents. As you can see in the first panel for married households with two or more children, for low levels of income, the marginal tax rate is −40 percent for both single and married filers, which represents the phase-in rate for the EITC. As incomes reach $13,000, the marginal rate is 0 percent (in the plateau region). For households with income above $13,000, the marginal tax rate becomes positive and gets quite large quickly. For married households with incomes between approximately $19,000–$25,000, the marginal tax rate jumps to 21 percent, which represents the EITC phase-out rate. That is, at the margin, these households are experiencing a 21 percent reduction in their EITC for any additional income they earn in this range. For married households with incomes between approximately $25,000–$40,000, the marginal income tax rate increases to 31 percent, which represents the EITC phase-out rate plus the lowest income tax bracket of 10 percent. For married households with two children earning $41,000, they face the phase-out rate and the next highest tax bracket of 15 percent, making their marginal tax rate 36 percent. Thus, the phasing out of the EITC leads to dramatic increases in the marginal income tax rates for these households. For married households above $41,000, they no longer qualify for the EITC; hence, they face significant reduction in their marginal tax rates, at 15 percent (in the second income tax bracket). As household income approaches $90,000, the marginal tax rate increases to 25 percent for married filers.[7,8] Single taxpayers with two children experience similar jumps in the marginal income tax rates, but for lower levels of income than married households.

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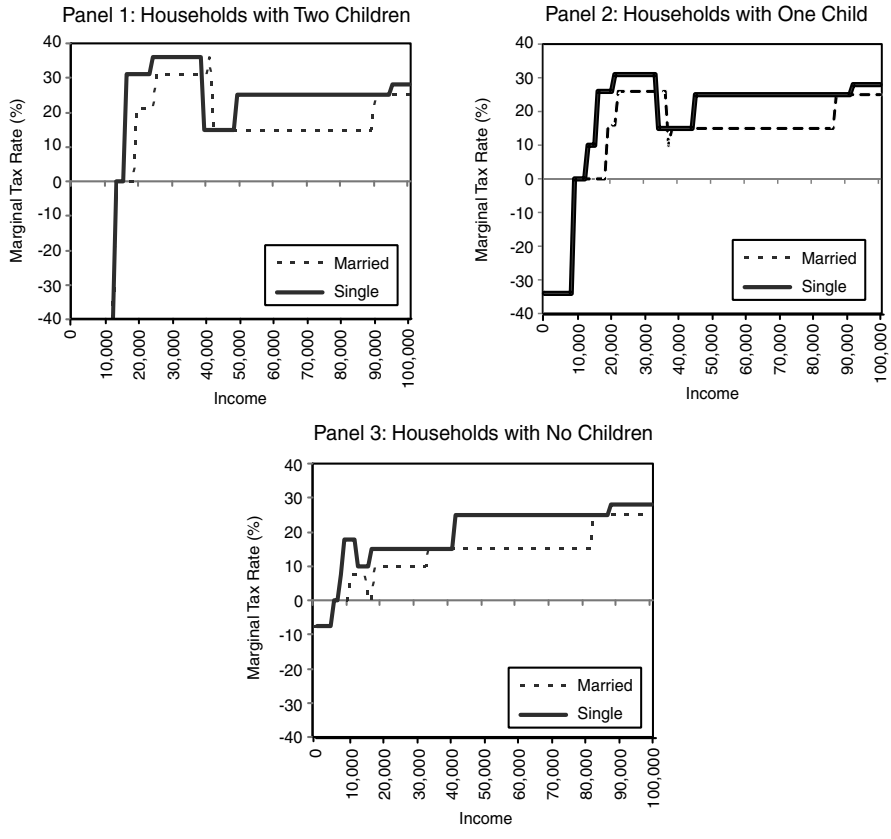
[5] www.nber.org/˜taxsim/taxsim-calc9/index.html.

[6] We follow the methodology of Hotz and Scholz (2003), Romich (2006), and Eissa and Hoynes (2009) in generating the marginal tax rate schedule.

[7] Marginal tax rates in the United States increase up to 35 percent for household incomes up to $357,000 (in 2008). However, we focus on income tax rates for low- and middle-income households.

[8] If we were to include FICA contributions, the entire marginal tax curve would shift upward by 7.65 percentage points across all income levels.

Figure 3 Marginal Income Tax Rates



Source: TAXSIM 9.0, 2008 tax year.

The second panel in Figure 3 shows the marginal income tax schedule for married and single households with one child. The figure is similar for those with two or more children, however, the marginal rates are slightly lower across all income levels. For example, the poorest households with one child face a marginal tax rate of −34 percent (compared to 40 percent for households with two or more children). In addition, marginal tax rates for those earning between $20,000–$40,000 are approximately 5 percentage points lower for those with one child, because of differences in the slope of the phase-out rate (the phase-out rate is steeper for those with more children, as documented in Table 2). As households go beyond EITC eligibility, the marginal income tax schedule does not vary with the number of children. Once again, these

households experience significant reductions in their marginal tax rates as soon as they are ineligible for the EITC.

In the last panel of Figure 3, the income tax schedule is quite different for those with no children compared to those with children. Recall that the EITC is much less generous for childless households. Thus, the negative marginal rates are quite low (in absolute value terms) for the poorest households. Also notice that the increases in the marginal rates are not as extreme for childless singles; as a result, these households do not experience significant reductions in their marginal tax rates as they become ineligible for the EITC (for incomes above $15,800 for married households). Beyond EITC eligibility, they face the same marginal income tax rates as households with children.

Our analysis of the marginal income tax schedule for EITC recipients uncovers a few interesting points. First, the very poorest households with children (those earning below $12,000) experience large negative income tax rates (in absolute value terms) because of the EITC. Second, single parent households that receive the EITC face some of the highest (positive) marginal income tax rates in the United States (Ellwood and Liebman 2000); for example, a single mother with two children earning $35,000 pays a marginal income tax rate of 36 percent (in 2008). These high marginal tax rates can be attributed to the phasing out of the EITC and the progressive income tax schedule (Romich 2006). Married households with children face slightly lower marginal tax rates than single households with children. Third, once households with children no longer qualify for the EITC, their marginal income tax rates drop significantly, and once they surpass EITC eligibility, marginal income tax rates no longer depend on the number of children in the household.

6. LABOR SUPPLY RESPONSE TO EITC

As a wage subsidy, the EITC has the potential to affect both the decision to work (i.e., the extensive margin) and the number of hours worked (the intensive margin). In a static labor-leisure model, the EITC increases the marginal value of working (i.e., the after-tax wage rate). Thus, in theory, the EITC will increase labor market participation because of the substitution of work for leisure. However, the effects of the EITC on hours worked are theoretically ambiguous. We follow the formulation in Eissa and Hoynes (2009) in extending the labor-leisure model to include the EITC.

Consider a representative household within the traditional labor-leisure model, where the household unit decides how much to work. The household could constitute one or more workers, where the tradeoff to working is household leisure. The budget constraint (without the EITC) is depicted by: $c = \tilde{w} * n$, where c represents consumption, $\tilde{w}$ represents after-tax wages, and n represents labor hours. Households have T units of time to devote to labor (n) and leisure (l); $T = n + l$. The slope of the budget constraint, and

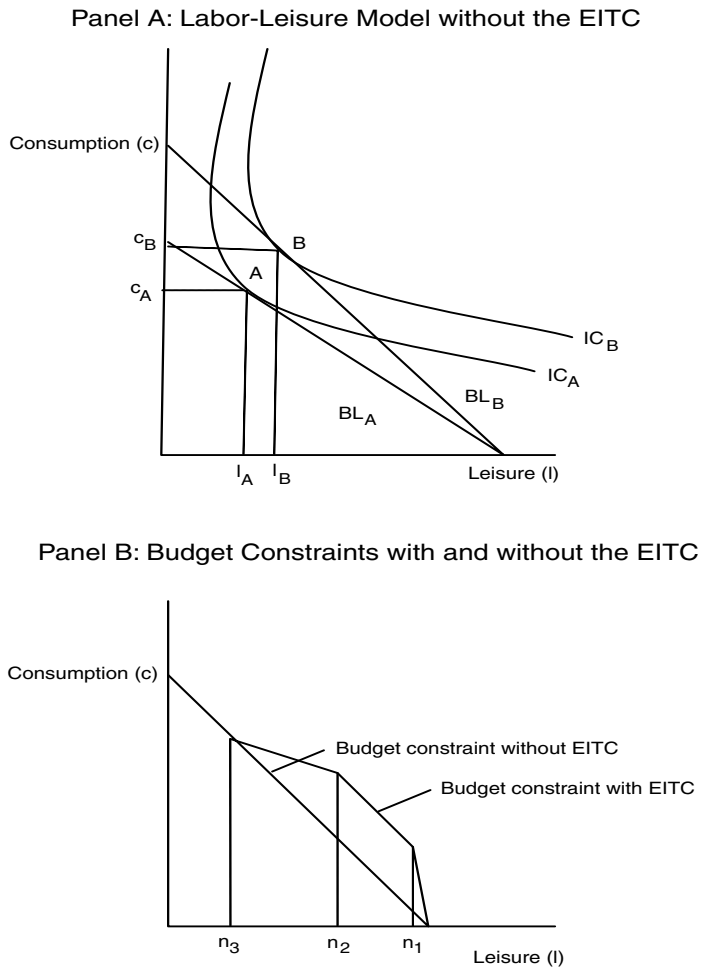
hence the cost of pursuing an additional unit of leisure, is $\tilde{w}$ units of consumption. In Figure 4a, we plot the budget constraint with leisure on the x-axis and consumption on the y-axis (BL_A). Plotting an indifference curve on this graph (with all of the standard assumptions for utility) provides the equilibrium quantity of leisure (l_A) and consumption (c_A), at point A. If after-tax wages rise because of a reduction in the marginal income tax rate, the budget line gets steeper (rotates to BL_B). For the same household, the equilibrium quantity of leisure/labor may rise or fall because of the tax cut. The substitution effect reduces leisure, and hence raises labor supply. The income effect raises leisure and lowers labor. The net effect depends on the relative size of each effect. In the diagram, the income effect dominates such that labor supply falls (leisure increases) in response to a tax cut ($l_B > l_A$).

The EITC changes the after-tax wage rate ($\tilde{w}$) for different levels of leisure/labor. For low levels of labor, when the household receives a tax credit (i.e., a negative tax) for each additional unit of labor, the after-tax wage is $\tilde{w} = w\,(1 + t_s)$, where $t_s > 0$ is the phase-in rate. For higher levels of labor in the plateau region, the after-tax wage is simply w since the EITC is constant in this range; that is, $\tilde{w} = w$ where households receive a transfer, Tr. During the phase-out region, the after-tax wage is $\tilde{w} = w\left(1 - t_p\right)$; the EITC falls for each additional unit of labor at the rate $t_p > 0$. For very high levels of labor, the after-tax wage returns to w once again. Thus, the budget constraint is as follows: $c = w\left(1 + \tau_p\right) * n$ for $n \in (0, n_1)$; $c = w * n + Tr$ for $n \in [n_1, n_2)$; $c = w\,(1 - t_s) * n$ for $n \in [n_2, n_3)$; $c = w * n$ for $n \in [n_3, T)$; where Tr is the maximum EITC and n_i represents different quantities of labor. The EITC budget constraint, as plotted in Figure 4b, is kinked at each quantity of labor n_i in which $\tilde{w}$ changes.

By comparing the budget constraint with and without the EITC in the various ranges of labor supply, we can determine the theoretical effects of the EITC on hours worked. First notice that for households that do not work ($l = T$), the EITC is 0 and has no effect on the household's budget constraint. However, for those households that choose to work very little (i.e., $n = \varepsilon$, where $\varepsilon \in (0, n_1)$), the slope of the budget line gets steeper. Here, there is a positive substitution effect and no income effect. Thus, the EITC may influence some households to enter the labor force, leading to a positive effect on the extensive margin.

However, the effects of the EITC on the intensive margin are more complicated. In the phase-in range, the slope of the budget constraint is higher with the EITC ($\tilde{w} > w$ since $t_s > 0$); thus, a negative income effect and a positive substitution effect are both at play, making the effects on hours worked ambiguous. Those in the plateau region receive the same amount of credit if they earn more income, and hence a pure income effect occurs in which higher income reduces the incentive to work. In the phase-out range, the slope of the budget constraint is flatter than without the EITC ($\tilde{w} < w$ since $t_p > 0$).

Figure 4 EITC and Labor Supply



Here, a negative substitution effect influences households to substitute leisure for hours worked. In addition, a negative income effect may reduce hours worked even more. Thus, households in the phase-out region unambiguously reduce hours worked. Since a majority of EITC recipient households fall in the flat or phase-out region, it is likely that the overall effects of the EITC on hours worked are negative (Hotz and Scholz 2003). For those with income beyond the phase-out region ($n \in [n_3, T)$), their return to an additional hour of work is w, so that some of them may choose to restrict labor hours to be eligible for the EITC, once again leading to a negative extensive margin effect.

Of course, the magnitude of these responses depends on the elasticities of labor supply. High elasticities lead to larger labor supply responses, and labor supply elasticities vary across different types of people. For example, the uncompensated elasticity of labor supply is higher for women than for men and the elasticity on labor force participation is larger than the elasticity of hours (Evers, Mooij, and Van Vuuren 2008). Thus, the quantitative effects of the EITC on both the extensive and intensive margins of labor supply decisions depend critically on the presumed elasticities of labor supply.

There is a large empirical literature that examines the effects of the EITC on labor supply, with most of the work focusing on single mothers. For a more detailed summary of this literature, refer to Holt (2006) and Hotz and Scholz (2003). The evidence indicates that the EITC does in fact increase labor force participation, especially for single mothers (Meyer 2001), leading to positive effects on the extensive margin. In fact, the EITC has led to a dramatic increase in employment rates for single mothers during the 1980s and 1990s (Eissa and Leibman 1996; Meyer 2001; Grogger 2004). However, the effects of the EITC on the intensive margin are less clear in the data, with most studies not finding a significant change in hours worked because of the EITC. The most relevant work here is that of Cancian and Levinson (2005), who study a natural experiment arising from the fact that one U.S. state (Wisconsin) altered the generosity of its matching of the federal EITC. They argue that there is essentially zero effect on hours. There is some evidence, however, suggesting that single mothers may work more in response to the EITC since they are likely to be in the phase-in region where marginal income tax rates are negative (Eissa and Liebman 1996). Married women, however, who typically fall in the phase-out range, may work fewer hours as a result of the EITC rates (Ellwood 2000; Eissa and Hoynes 2004).

Very few studies analyze the labor market effects of the EITC on married couples; notable exceptions include Eissa and Hoynes (2004, 2009). They find that the EITC has small negative effects on both the extensive and intensive margins for married couples. However, the EITC has differential effects on primary and secondary earners. For example, increases in the EITC lower both the participation rates and hours worked for secondary earners since these households are usually being phased out of the EITC, where the returns to working more are relatively low.

There seems to be some consensus in the empirical literature that the EITC has positive effects on the extensive margin for households and little to no effect on the intensive margin. Studies have shown that the labor supply of low-income households is generally unresponsive to high marginal tax rates (Keane and Moffitt 1998; Gruber and Saez 2002); this compares to high-income workers who are quite responsive to tax rates. Perhaps low-income workers cannot adjust their work hours because of their job structure (Romich 2006). Or perhaps these workers do not realize the high marginal tax rates

because of the complexity of the income tax and benefits structure in the United States. Recent theoretical work in a separate but related context suggests that a central force may be that low-income households are typically *low-wealth* households. As a result, these households will often be close to a borrowing constraint. Consumption theory predicts that such households will work in a manner insensitive to current wages, as the value of lowering the likelihood of a binding borrowing limit (by working and reducing consumption) will be high. The work of Pijoan-Mas (2006) suggests that this may be exactly the case, as he is able to rationalize a relatively high willingness of households to substitute labor intertemporally, with a low aggregate correlation between wages and hours. In ongoing work, Athreya, Reilly, and Simpson (2010) utilize this insight and embed households into a setting in which they face uninsurable risks and liquidity constraints, and find that, indeed, the disincentives to labor supply arising from the EITC are not strong.

7. WEALTH DISTRIBUTION OF EITC RECIPIENTS

As documented above, EITC recipients earn much less over their lifetimes than the general population. This will have important effects on their wealth holdings. In addition, their wealth level may affect their labor supply decision, as discussed above. In this section, we use the 2007 SCF to compare the distribution of wealth for EITC recipients and non-recipients, and then analyze differences across the six different types of households. Wealth is defined as household net worth, which is the difference between total assets and total debt.[9] The SCF does not report anything related to the EITC. However, we calculate the imputed EITC level that households would have received in tax year 2006 using the household structure and wage/salary income reported by the SCF. That is, we feed the parameters of the federal EITC program into the SCF to generate a proxy for the amount of EITC each household is eligible to receive. However, it should be made clear that we cannot observe directly if each household received the EITC—we know only whether or not they qualified for the EITC and, if they qualified, how much EITC they should have received.

All of the usual caveats apply when using the SCF data, in that it is a small sample and is not representative of the U.S. population at large. Our sample of the 2007 SCF contains 3,458 households compared to 86,259 households in the 2008 CPS (recall that we restrict the analysis to household heads between 16 and 64 years old and use the individual-level data in the CPS to create household-level observations). It is well-known that the SCF oversamples wealthy and married households. For example, when comparing the

[9] We use the SCF definition of net worth, as used in various Federal Reserve Bulletin articles, including Bucks et al. (2009).

distribution of household types between the CPS (reported in Table 4b) and the SCF (in Table 5b), it is evident that married households are oversampled in the SCF compared to the CPS and that single households are undersampled (and especially childless singles and single parents with one child). Surprisingly, the SCF just slightly oversamples households that are eligible for the EITC; they represent 12.8 percent of the CPS sample and 16.4 percent of the SCF sample. Also, the SCF does surprising well in capturing an accurate distribution of EITC recipients across household types and their mean income and EITC levels, compared to the CPS. This provides support to our use of the SCF to analyze EITC recipients. All of the reported means are reported in 2007 dollars and are weighted using the replicate weights produced by the SCF.[10]

In Table 5a, we report mean net worth (i.e., wealth), assets, debt, and income across household types. Not surprisingly, households that qualify for the EITC have much less net worth, assets, and debt than non-recipient households, and the difference is astounding. Mean net worth of EITC recipients is $103,753 (in 2007 dollars) compared to $580,245 for non-recipients. Some of the difference in net worth between EITC and non-EITC recipients can be explained by differences in income and age: EITC recipients earn 23 percent of what non-recipients earn, on average, and are almost six years younger. Somewhat interesting is that mean debt level for EITC recipients is $45,755, which represents 2.6 times their annual salary, compared to non-recipients whose debt-to-income ratio is approximately 1.7. Thus, debt-to-income ratios are quite high for households that qualify for the EITC.

In Table 6, we report mean wealth by quartiles for both EITC and non-EITC recipients. First, notice that households in the lowest quartile of EITC recipients have average negative wealth of −$16,617. In fact, 18.4 percent of households in the EITC sample have negative net worth. However, there is a significant amount of heterogeneity in the first quartile, as evidenced by the large standard deviation. This compares to the lowest quartile of non-EITC recipients, whose mean wealth level is $1,899 and standard deviation is $324. Second, notice that the wealth distribution for EITC recipients is much tighter than for non-recipients. The ranges of wealth in each quartile are much smaller and the standard deviations are generally lower (with the exception of the first quartile of EITC recipients). Third, the majority of EITC recipients hold very little wealth; those in the third quartile of wealth hold on average only $24,038 in net worth, compared to non-recipients in the third quartile who hold more than $250,000. Only the top quartile of EITC recipients has a significant amount of wealth. In fact, only 20.3 percent of EITC recipients

[10] For a full discussion of the importance of weights in the SCF, refer to Kennickell (1999).

Table 5 Balance Sheets of EITC Recipients and Non-Recipients

5a: Assets, Debt, and Net Worth of EITC Recipient vs. Non-Recipient Households

	All	Married, No Kids	Married, One Kid	Married, Two+ Kids	Single, No Kids	Single, One Kid	Single, Two+ Kids
EITC Recipients:							
Mean Net Worth	$103,753	$284,403	$204,918	$118,468	$67,574	$56,102	$49,837
Mean Assets	$149,507	$359,963	$255,239	$179,050	$86,545	$89,365	$96,465
Mean Debt	$45,755	$75,560	$50,321	$60,582	$18,971	$33,263	$46,628
Mean Household Income	$17,593	$6,199	$21,818	$22,502	$6,990	$18,903	$19,070
Mean (Imputed) EITC	$1,778	$231	$1,440	$2,409	$277	$1,720	$2,726
Mean Age	38.5	46.6	37.2	37.5	37.1	40.4	38.1
Non-EITC Recipients:							
Mean Net Worth	$580,245	$803,447	$621,345	$737,654	$275,437	$351,416	$223,309
Mean Assets	$708,564	$929,270	$790,176	$933,762	$334,930	$448,206	$296,280
Mean Debt	$128,319	$125,823	$168,830	$196,108	$59,493	$96,790	$72,971
Mean Household Income	$76,686	$87,916	$95,962	$105,640	$38,071	$50,373	$35,849
Mean Age	44.3	46.9	43.6	41.3	44.8	47.2	41.5

5b: Distribution of Households in the SCF

	Married, No Kids	Married, One Kid	Married, Two+ Kids	Single, No Kids	Single, One Kid	Single, Two+ Kids	Sum
EITC Recipients:							
Percent of All Households	0.97%	2.20%	4.88%	2.53%	2.46%	3.38%	16.42%
Percent of EITC Recipients	5.9%	13.4%	29.7%	15.4%	15.0%	20.6%	100.00%
Non-EITC Recipients							
Percent of All Households	25.47%	12.66%	22.68%	17.42%	2.83%	2.52%	83.58%
Percent of Non-EITC Recipients	30.47%	15.15%	27.13%	20.84%	3.39%	3.02%	100.00%

Source: Authors' calculations using the 2007 SCF. Means are weighted, in 2007 $.

hold more than the average wealth level for EITC recipients ($103,753). This compares to non-recipients, where 41 percent hold more than the average wealth level of $580,245 and 69 percent have more wealth than the average EITC recipient.

There is significant variation in wealth across household types, as illustrated in Table 5a. Married households have three times as much wealth as single households, with the largest difference for households with no children. It is likely that most of the wealth held by married households with no children is comprised of housing wealth since this group is relatively old. In addition, mean household wealth is smaller for households with more children despite higher earnings, and this effect is particularly large for married households. Thus, mean wealth levels for single households are quite low but are not that different for those with and without children. For married households, households with children have higher earnings but significantly less wealth compared to those without children. This is partially explained by age differences across married households—those without children are approximately nine years older than those with children. In addition, single households without children earn the least income of any group, but are not the poorest type of household in terms of net worth. Single households with two or more children have the lowest net worth in both the EITC and non-recipient samples.

Our analysis documents several interesting findings about the wealth holdings of EITC recipients. Not surprisingly, we find that EITC recipients hold very little wealth: EITC recipients, on average, hold only one-fifth of the wealth of non-EITC recipients. In fact, the bottom quartile of EITC recipients hold negative wealth on average, while the bottom quartile of non-recipient households have small, positive wealth holdings. However, debt-to-income ratios of EITC households are significantly higher than those of non-recipients (2.6 compared to 1.7 on average). We find that married households that are eligible for the EITC hold more wealth than single households, and wealth holdings decrease with the number of children in the household.

8. EITC AND CREDIT CONSTRAINTS

Based on the data presented in Figure 2b, the EITC increases earnings for recipients during every year of their working life and more so in early life. In a typical lifecycle model of savings and consumption, a household would save in periods when income is high, and borrow when income is low. As a result, the EITC allows low-income families to smooth consumption over their lifetimes. At higher frequencies, such as within a given year, the EITC can help, even though most families receive the EITC in lump sum when they

Table 6 Wealth Distributions: EITC Recipients vs. Non-Recipients

	Mean	St. Dev.	Min.	Max.	Mean Income	Mean Age
EITC Recipients:						
Bottom Quartile	−$16,617	$1,860	−$473,700	$170	$14,938	34.0
Lower Middle Quartile	$3,489	$85	$190	$7,560	$15,919	33.7
Upper Middle Quartile	$24,038	$531	$7,630	$51,400	$20,507	38.6
Upper Quartile	$404,272	$24,215	$52,120	$615,000,000	$19,014	47.7
Non-EITC Recipients:						
Bottom Quartile	$1,899	$324	−$118,999	$24,120	$34,055	37.9
Lower Middle Quartile	$75,329	$697	$24,130	$141,500	$51,829	42.6
Upper Middle Quartile	$253,637	$1,467	$141,520	$396,210	$76,599	46.5
Upper Quartile	$1,991,197	$33,646	$396,300	$806,000,000	$144,308	50.4

Source: Authors' calculations using the 2007 SCF. Means are weighted, in 2007 dollars.

file their tax returns.[11] In addition, households may borrow against their EITC, knowing that they will be receiving it later. Alternatively, households may save their EITC for future consumption.

The ability of households to smooth (bring forward) an expected EITC lump-sum payment that is made at the time of one's annual income tax payment depends on the household's ability to borrow. For those who can borrow, the EITC may act as insurance against income, employment, or health shocks, for example. If, on the other hand, households face significant borrowing constraints, they may not be able to borrow against their EITC, and so, while the EITC still provides low frequency smoothing, it may not assist consumption smoothing efforts within shorter periods, for example one calendar year.

Direct evidence on the extent to which EITC recipients are credit constrained is not possible, given current data limitations. Moreover, credit constraints are generally very difficult to identify. Typically, the measurement of credit constraints in any given study relies on a particular theory of consumption to identify consumption or savings movements that appear "anomalous," such as the large "excess sensitivity" literature on the 1980s for the path of aggregate consumption (see Deaton 1992). A handful of articles find evidence that suggests that those who share demographic characteristics with the EITC recipients are likely to be credit constrained. For example, the results of Jappelli (1990) indicate that lower income, wealth, and age are all associated with higher likelihoods of being credit constrained, all key features of the EITC population as documented above. Souleles (1999) finds that households that receive tax refunds and are liquidity constrained experience significant increases in nondurable consumption at the time of refund receipt. Barrow and McGranahan (2000) discover a seasonality of consumption behavior that is consistent with the timing of the receipt of the EITC, especially for durable goods. Berube et al. (2002) discuss the proliferation of paid tax preparation services and refund loans (at relatively high interest rates) for EITC recipients, suggesting that these households lack financial services and, hence, access to credit. Finally, Elliehausen (2005) analyzes survey data from households that use refund anticipation loans (RALs). He finds that EITC recipients who use RALs are less likely to use various types of credit (including car loans, bank and retail credit cards, and mortgages) than other RAL households. In addition, Elliehausen (2005, 52) reports that:

> Nearly half of EITC recipients that obtained RALs reported being turned down or limited by a lender in the last five years, and a little more than half said that they had thought about applying for credit but did not because they thought that they would have been turned down. These

[11] The advance EITC allows them to receive their EITC throughout the year in their paycheck, but very few households participate in this option (Romich and Weisner 2000).

> percentages are more than two times the percentage of all households experiencing turndowns or limitations and more than three times the percentage of all households perceiving limitations in credit availability.

However, no study has provided direct evidence of the extent to which EITC recipients are credit constrained.

Using 2007 SCF data and following Jappelli (1990), we use a set of questions from the SCF that provide a sense of the severity of credit constraints that EITC recipient households face. We use the following four measures:

1. *Bad credit*: For households that do not have a checking account, the SCF asked why. If the response was because of credit problems, bankruptcy, and/or does not meet qualifications for an account, then a value of 1 was assigned.

2. *Credit card balances*: This is the total value of credit card balances held by households. Credit card balances consist of the amount outstanding on all credit cards and revolving store accounts after the last payment. Balances do not include purchases made since the last account statement.

3. *Late payment for 60+ days*: This was assigned a value of 1 if the household had any debt payments more than 60 days past due in the last year.

4. *Has no checking account*: This was assigned a value of 1 if the household did not have a checking account.

Certainly, these four measures are not perfect predictors of being credit constrained. For example, some households choose not to have a checking account for reasons that are unrelated to their credit status. However, not having a checking account will undoubtedly lead them to have less access to credit in the future; without a checking account, many banks are not willing to issue personal loans and/or mortgages. That is, the causality between these measures and the likelihood of being credit constrained is unclear; however, if we find some correlation between these measures and the EITC, it may shed some light on the extent to which EITC households are or will be able to borrow. Similarly, credit card balances are an imperfect measure of credit constraints; lower balances may imply less willingness to use credit cards and/or acquire debt, and not less ability to borrow. But it may also indicate that they have lower credit limits, suggesting tighter borrowing constraints. Of the four measures above, having bad credit and late payments are perhaps the most accurate measures of credit constraints since both will lead to lower credit scores and, hence, worse credit terms.

In the analysis that follows, we compare these four measures for households that receive the EITC versus non-recipient households. As we document

in Section 1, EITC-recipient households are younger, less educated, and have more children than non-recipient households; as a result, they are poorer. Obviously, having fewer current and, especially, future resources to borrow against will make it more difficult for EITC-recipient households to borrow. Nonetheless, it is useful to know the extent to which any household is likely to be constrained as suggested by the criteria above. We therefore do not condition on all possible household characteristics since they would likely explain away any differences between EITC recipients and non-recipients. Instead, we attempt to document the extent to which households that fit the EITC profile face borrowing constraints.

In Table 7, we report the means and standard deviations of these four measures for EITC recipients, non-recipients, and across household types. (Recall that EITC recipients in this context are defined as those who qualify for the EITC.) EITC recipient households report being denied a checking account because of bad credit more frequently than non-recipients (2.3 percent versus 0.5 percent for non-recipients). They also have lower credit card balances ($2,131 compared to $4,174); this could indicate that these households have lower credit limits, or are less willing to use acquire debt, or are less willing to use credit cards. EITC households are twice as likely to have late debt payments as non-recipients (11.2 percent compared to 5.4 percent), which would lead to having less access to credit. In addition, EITC households are three times more likely to not have a checking account (28 percent versus 7 percent).

When looking across households types, we can see that several interesting facts emerge. First, single households have lower credit card balances; they are generally more likely to have late payments; and they are less likely to have a checking account than married households (holding constant the number of children). However, the differences between single and married households are larger for non-recipients than for EITC recipients. For example, married households have much larger credit card balances than single households in the non-EITC sample, but the difference is smaller for married and single EITC recipients.

Second, married households with children that qualify for the EITC report very high late payment frequencies compared to their non-recipient counterparts. Approximately 13 percent of married households with one child have a late repayment, compared to just 5 percent of non-recipients. We do not observe significant differences between single-parent EITC recipients and non-recipients. Thus, EITC recipient households that are married with children will undoubtedly have worse credit statuses and lower borrowing limits than their non-recipient counterparts.

Third, for married households, credit does not seem to be more restricted for those with more children. However, single households seem to be more credit constrained as the number of children increases, and this is true for both

Table 7 Measures of Being Credit Constrained

7a: Measures of Being Credit Constrained: EITC Recipients vs. Non-Recipients

	Mean	St. Dev.
EITC Recipients:		
Bad Credit	2.3%	0.3%
Credit Card Balance (2007$)	$2,131	$140
Late Payment for 60+ Days	11.2%	0.6%
Has No Checking Account	27.9%	0.9%
Non-EITC Recipients:		
Bad Credit	0.5%	0.1%
Credit Card Balance (2007$)	$4,174	$91
Late Payment for 60+ Days	5.4%	0.2%
Has No Checking Account	7.0%	0.3%

7b: Measures of Being Credit Constrained by Household Type

	Married, No Kids	Married, One Kid	Married, Two+ Kids	Single, No Kids	Single, One Kid	Single, Two+ Kids
EITC Recipients:						
Bad Credit	0.0%	0.0%	2.2%	3.0%	3.3%	3.1%
Credit Card Balance (2007$)	$2,541	$2,966	$2,092	$2,419	$1,456	$1,933
Late Payment for 60+ Days	1.9%	13.6%	13.1%	7.0%	10.8%	13.5%
Has No Checking Account	28.7%	25.6%	25.7%	31.6%	27.3%	29.3%
Non-EITC Recipients:						
Bad Credit	0.2%	0.3%	0.0%	1.3%	0.0%	1.3%
Credit Card Balance (2007$)	$4,497	$4,946	$5,502	$2,693	$3,509	$1,401
Late Payment for 60+ Days	3.7%	3.9%	5.3%	6.5%	11.7%	8.5%
Has No Checking Account	5.0%	4.1%	2.1%	11.7%	13.2%	25.7%

Source: Authors' calculations using the 2007 SCF. Means are weighted.

EITC recipients and non-recipients. As documented above, the net worth of single households falls as the number of children increases (from Table 5a).

Our analysis suggests that EITC recipients use credit markets differently than non-recipients, possibly as a direct consequence of their income being currently and perhaps temporarily low, and this may have important implications on their ability to borrow. For example, EITC recipients are less likely to have a checking account and have lower credit card balances. They also more frequently have late debt repayments and are denied checking accounts than non-EITC recipients. Thus, it seems that at the time of receipt of the EITC, households are closer to limits on their ability to borrow than households that do not receive the EITC, and much of this is because of differences in income and household structure between the two groups.

9. CONCLUSION

In this article, we have studied several aspects of the Earned Income Tax Credit (EITC) that have been previously overlooked, including the income of EITC recipients at various ages, their wealth holdings, and the extent to which they are credit constrained. Naturally, we find that average annual earnings for those who receive the EITC are much lower than for non-EITC recipients at every age. In addition, younger households receive more EITC, and the amount of EITC received by these households suggests that the EITC increases lifetime earnings non-negligibly. The EITC in all likelihood provides a nontrivial mechanism for young, working households to smooth their consumption over their lifetimes.

The EITC acts as a negative income tax for recipient households. Specifically, we show that it has important implications on the marginal tax rate that low-income households face at various levels of earned income. Because of the phasing out of tax credits and income-support programs (such as TANF, food stamps, etc.), marginal income tax rates are much higher for low-income households than for middle- and high-income households in the United States. In particular, the marginal tax rate is negative for low levels of income, very high for those with moderate incomes that still qualify for the EITC, and then falls once households no longer qualify. We find that single-parent households that receive the EITC face some of the highest marginal income tax rates in the United States.

We then consider the theoretical and empirical effects of the EITC on the extensive and intensive margins of household labor supply. The EITC has undoubtedly increased labor force participation, but the effects on hours worked are ambiguous. This can be partly explained by the fact that low-income/low-wealth households that face borrowing constraints are insensitive to changes in the returns to working. Existing empirical work supports this conclusion.

Lastly, using data from the Survey of Consumer Finances, we estimate the wealth distribution of EITC households and measure the extent to which EITC households are credit constrained. Not surprisingly, we find that EITC-recipient households are very poor in terms of net worth: The average household has less than 20 percent of the average wealth of the average non-recipient household. In addition, EITC recipients are more likely to have bad credit and are more likely to have late debt payments than the average U.S. household, suggesting that they are more credit constrained.

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