

Does the Earned Income Tax Credit Reduce Saving by Low-Income Households?

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August 2014

Abstract

This paper analyzes the effect of the Earned Income Tax Credit (EITC) on investment income. Policy-makers have devoted substantial time and resources toward increasing the saving rate of low-income households, yet the EITC provides a substantial disincentive for individuals to save and realize investment income. I find a one percent increase in the after-tax return to saving causes a 3.05 percent increase in investment income. Nearly 40 percent of the decline over the last two decades in the fraction of EITC recipients with savings in income-bearing accounts can be explained by changing EITC incentives.

A special thanks to my dissertation committee for their invaluable encouragement and comments: Jim Hines, Joel Slemrod (Chair), Jeff Smith, and Kevin Stange. Also, many thanks to anonymous referees, David Agrawal, Dave Cashin, Rob Garlick, Susan Godlonton, Bradley Heim (discussant), Emmanuel Saez, Dan Silverman, Daniel Wilson (discussant), International Institute of Public Finance 2011 participants, National Tax Association conference participants, and numerous seminar participants for helpful comments. All remaining errors are my own.

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JEL Codes: D14, H23, H24.

Keywords: EITC, saving, taxes.

1 Introduction

Policy-makers have devoted substantial time and resources toward increasing the saving rate of low-income households with programs like the Saver’s Credit and Individual Development Accounts. Yet the Earned Income Tax Credit (EITC)—the largest federal cash transfer program in the U.S.—provides a substantial disincentive for individuals to save and realize investment income because EITC benefits decline as investment income rises over certain income ranges. Over the last two decades, an average of 17.6 percent of low-income individuals that claim the EITC have some dividend and interest income, but strikingly, the fraction has declined by more than 50 percent over time, from 26.2 percent in 1988 to just 12.3 percent in 2006. In this paper, I determine the extent to which the disincentive to save created by the EITC has contributed to the decline in saving in income-bearing accounts. I use Individual Public Use Tax Files for 1988-2006, which contain data on a random stratified cross-sectional sample of individual income tax returns.

This paper uses two different sources of variation in the implicit EITC tax rate in the region in which the EITC benefit is declining (known as the phase-out tax rate) to examine the degree to which investment income falls as the phase-out tax rate rises. The first identification strategy examines a narrow region around the second EITC tax kink. Below this tax kink, there is no implicit tax on a marginal dollar of income. Above this tax kink, the phase-out tax rate applies on the margin to all types of adjusted gross income (AGI)—earned income, non-labor income, and deductions—for most individuals. The most prevalent type of non-labor income is investment income. I find that AGI responds to the phase-out tax rate and for wage-earners this response is concentrated in non-labor income, particularly investment income. Investment income declines above the tax kink, where the after-tax return to saving is lower. The implied elasticity of investment income with respect to the after-tax return to saving, which bounds the true elasticity from below, is 1.56.

The main estimates come from a difference-in-differences specification, which exploits differences in tax rate changes between taxpayers with differing numbers of dependents. The

extensive margin estimates imply that nearly 40 percent of the decline over the last two decades in the fraction of EITC recipients with savings in income-bearing accounts can be explained by changing EITC incentives. The elasticity of investment income is 3.05; that is, a one percent increase in the after-tax return to saving increases the amount of investment income by 3.05 percent. Given the increase in the phase-out tax rate over this period, the elasticity estimate implies that the average savings stock would be \$1,030 higher in 2006 for EITC recipients in the phase-out region if the disincentives to save had remained at their 1988 level. This calculation assumes a five percent rate of return on saving, on average; if it is lower, then the decline will be even higher. A key advantage of exploiting both types of variation is that the assumptions required in order to obtain consistent estimates are roughly orthogonal in the two cases. The fact that the results from both are similar provides additional credibility to the estimates obtained.

The paper proceeds as follows. Section 2 provides relevant background information on the EITC as well as a brief literature review. Section 3 discusses the data and provides an overview of the empirical strategies. Section 4 conducts the estimation around the second tax kink. Section 5 conducts the difference-in-differences estimation. Section 6 concludes.

2 Background

2.1 EITC Details

The EITC, which was introduced in 1975, has expanded over time and is now the largest federal cash transfer program in the U.S. The EITC is administered through the tax system, which is not true of other major cash transfer programs in the U.S. This means the credit is received as a lump sum annually and is based on annual income, whereas other transfer programs are administered at a monthly frequency.¹ The federal EITC is refundable, which

¹Individuals can receive their benefits at a monthly frequency using the Advance EITC, but very few people choose this option and it was eliminated in 2010.

allows individuals to receive the benefit even if it is larger than their taxes they owe. Some states also offer a credit, which usually takes the form of a “piggy-back” credit (i.e. it is calculated as a percentage of the federal credit). The state credit is usually refundable.

When determining the EITC amount, several types of income are relevant. Earned income is defined as wage and salary income plus self-employment income (minus one-half the self-employment tax in the years 1990-2006), where self-employment income includes income from a sole proprietorship or a farm.² Non-labor income includes categories such as investment income and unemployment insurance receipts; for a complete list, see Section 3.1. Deductions have varied over time; examples include alimony paid, moving expenses, and IRA contributions.³ I will refer to non-labor income minus deductions as unearned income. AGI, which is a term used on the tax form, is the sum of earned and unearned income.

The EITC schedule consists of three regions—the phase-in region, the plateau region, and the phase-out region—and is depicted in Figure 1. The example shown in Figure 1 is for taxpayers with two children, and reflects the tax schedule in real dollars for unmarried taxpayers in 1996-2006 (it also applies for married filers in 1996-2001). When an individual has no earned income, the EITC credit is zero. In the phase-in region, the implicit marginal tax rate is negative (the benefit is increasing); in the plateau region, the implicit marginal tax rate is zero (the benefit is constant); in the phase-out region, the implicit marginal tax rate is positive (the benefit is declining). When the end of the phase-out region is reached, the credit is again zero. The solid line in the top figure is the EITC schedule as depicted in the existing EITC literature. It applies anytime an individual has no or negative unearned income, which is true for 75 percent of two-child EITC filers in 1996-2006.

When an individual has positive unearned income, it is included as income for the purposes of calculating the EITC when AGI is above the second kink (i.e. the individual is in

²There are a few minor adjustments to the measure of self-employment income for a small number of individuals, but tax return data do not provide these details.

³The term deduction refers to “above-the-line” deductions, not itemized deductions. Because one-half the self-employment tax is included in earned income, it will not be counted as a deduction in this paper (otherwise it would be counted both in earned income and in unearned income).

the phase-out region). When AGI is above the second kink, a filer's EITC is the minimum of the benefit as determined by their earned income and the benefit given by their AGI. In the top, two-dimensional graph, this can be depicted by shifting the solid phase-out region line towards the dashed line (or even past it). The phase-out region is shifted in for 25 percent of two-child filers in 1996-2006; the median amount of unearned income for these taxpayers is \$1,227. Approximately one-fifth of these individuals have unearned income that is sizable enough that they face no plateau region at all, facing a spike instead. Note that the location of the second kink appears to be person-specific only because the horizontal axis in Figure 1 is earned income, while AGI is the variable determining the EITC benefit received for most individuals. The bottom two figures further illuminate the interaction between earned and unearned income in determining an individual's EITC by plotting a three-dimensional graph in earned income, unearned income, and EITC benefit. As earned income rises, the EITC first rises and then falls. As unearned income rises, it first has no effect on the EITC and then causes it to decline at a certain threshold, where the threshold varies based on the individual's earned income.

Households without children became eligible for the EITC after 1994, but the phase-out region occurs at a very low income level (\$6,710 in 2006 dollars), so I do not anticipate these individuals have a substantial investment income response (or have much investment income). They are also a relatively poor comparison group for families with children. Therefore, these individuals are not part of the analysis.

2.2 Related Literature

There is a substantial literature on low-income saving decisions, but the effect of the EITC on saving behavior has never been examined beyond the role played by the lump sum nature of its distribution. This section provides a brief overview of existing work on the EITC and saving decisions of low-income households as it relates to this paper.

The EITC literature has focused almost entirely on the effect of the EITC on labor

supply, the source of true earned income.⁴ The overall effect of the EITC on labor supply is theoretically ambiguous because the phase-in region encourages work and the phase-out region discourages work on the margin. The literature generally finds that the EITC increases work, mostly on the extensive margin, for single individuals.⁵ True earned income may not equal earned income reported to the tax authorities. Studies that make use of tax return data distinguish between wage-earning and self-employed individuals. These studies find that, while the intensive margin response by wage-earning individuals is approximately zero, there is a substantial response among the self-employed and there is a larger response to the phase-in region (LaLumia, 2009; Saez, 2010). This response is a combination of labor supply, tax avoidance, and tax evasion responses.

The literature that uses audit data to examine the likelihood that qualifying individuals claim the EITC and the literature on tax evasion as it pertains to the EITC both have some relevance for interpreting the results in this paper given that tax return data are used. Blumenthal et al. (2005) use data from the Taxpayer Compliance Measurement Program (TCMP) on both filers and non-filers in 1988. The authors estimate that 89 percent of EITC individuals above the filing threshold claimed the EITC credit if eligible.⁶ Thus, most EITC-eligible individuals in the region I examine will be observed in the tax return data.

McCubbin (2000) finds that claiming an extra dependent to which the taxpayer is not entitled increases with EITC generosity and decreases with income using IRS Criminal Investigations Division random audit data for 1994. Given this, I consider possible biases induced in the estimates in Section 5 if individuals manipulate the number of children they report.

Wage-earners don't tend to evade by adjusting their earned income, but self-employed individuals do. Joulfaian and Rider (1996) examine the responsiveness of income reported to the EITC marginal tax rate using 1988 audit data from the TCMP. They find that 94.6

⁴An emerging literature examines other outcomes, including the EITC's effect on fertility (Baughman and Dickert-Conlin, 2003), time use (Gelber and Mitchell, 2012), and children (Dahl and Lochner, 2010).

⁵See Hotz and Scholz (2003) for an extensive review of the EITC literature through 2002. More recently, Chetty et al. (2013) found an intensive margin response among individuals in areas with high EITC awareness.

⁶The fraction was substantially lower if the taxpayer was below the filing threshold. The second EITC kink is near (within \$1,000) or above the filing threshold for all years.

percent of wage-earning individuals accurately report their earned income, and the EITC rate has no effect on the decision to report accurately. For sole proprietors, 19 percent report accurately and they find that a one percent higher EITC rate increases the probability of underreporting by 0.3 percent.

There is a literature on the saving decisions of low-income households, but not about the role played by the EITC.⁷ One strand of this literature examines the effects of other need-based programs, such as AFDC/TANF and Medicaid, on savings. Hubbard et al. (1995) show that these programs affect savings decisions both because they decrease the need for precautionary savings in case of a negative income shock and the asset limits imposed by these programs create a high implicit tax rate when binding. Gruber and Yelowitz (1999) find empirical evidence supporting these theoretical results in the context of Medicaid. In contrast, recent papers examining the effect of AFDC/TANF asset limits (Hurst and Ziliak, 2006; Sullivan, 2006) on liquid assets, such as saving accounts, find no substantial effect. The EITC changes the after-tax return on savings for individuals in the phase-out region, providing a mechanism to decrease savings in addition to asset limits or precautionary savings. This mechanism will be the primary focus of this paper, but precautionary savings motives will be discussed when relevant in Section 5. The asset limits are much more likely to be binding in the case of TANF or Medicaid because those limits are effectively much lower than the limit introduced for the EITC in 1996.

A separate literature examines the effectiveness of programs designed to induce low-income individuals to save more. In addition to providing evidence on the degree to which individuals can be encouraged to save more, this literature also highlights a recent policy focus on increasing low-income saving. One popular program is Individual Development Accounts (IDA), which encourage individuals to save by providing matching funds (up to a

⁷The only evidence of the effect of the EITC on saving decisions is ethnographic and it is interested not in the effect of the EITC schedule, but rather in the lump sum nature of its distribution. Romich and Weisner (2000) conduct extensive interview-based analysis of 42 EITC recipient families in Wisconsin. They find that individuals prefer to receive the credit as one lump sum, rather than using the advance payment option. They find that 32 percent of the individuals in their sample had saved some of their EITC credit in a bank account and kept it in the account at least two months after the receiving their EITC credit.

limit each year) for income saved in these accounts. The individuals receive the matching funds when they withdraw their savings for qualified purposes (e.g. buying a house or paying for college). Over 400 IDA programs existed by 2006, which were funded privately or by states (Mills et al., 2008). Mills et al. (2008) examine a particular IDA program in Oklahoma with a randomized design; they find a large IDA take-up rate among the treated group (almost 90 percent). Those with IDA accounts are more likely to purchase a home, but this is partly offset by a decrease in other assets (this IDA provided a larger match when the funds were withdrawn for home purchases) and a recent follow-up shows that the increase in likelihood of purchasing a home is short-lived (Grinstein-Weiss et al., 2013).

Another program, the Saver's Credit, was implemented through the tax system in 2002 to encourage saving for retirement among low-income individuals. The literature found this credit has little impact on saving; for example, see Ramnath (2010). Duflo et al. (2006) conduct a randomized field experiment of a program similar in spirit to the Saver's Credit, and find that they can induce individuals to save more. They cite differences between their experiment and the Saver's Credit, such as the complexity and non-refundability of the Saver's Credit, as likely reasons for their experiment having a greater effect on saving.

The existing EITC literature has found little effect of the EITC on labor supply decisions along the intensive margin (except perhaps for self-employed individuals). My paper examines the extent to which the EITC has an effect on another margin—non-labor income, particularly investment income—which has not been previously examined. Given the existing literature on low-income saving, the degree to which the EITC will affect low-income saving is not obvious, because the effects of other programs on low-income saving is mixed.

3 Empirical Strategy

This section provides an overview of the empirical strategy used in this paper. Because the methods used in each section are quite different, the details can be found in their respective

sections. Subsection 3.1 provides a detailed description of the data. Subsection 3.2 explains the focus of this paper, the degree to which a change in saving in an income-bearing account reflects an actual change in savings, and the different forms of variation used for identification in each section. Subsection 3.3 discusses the central role of awareness in studying the impact of the EITC on saving, which is key to interpreting the estimates.

3.1 Data

This paper uses the Individual Public Use Tax Files for 1988-2006, which were created by the Statistics of Income Division of the Internal Revenue Service. The sample is stratified, so all estimates are population weighted. Some components of AGI—wage and salary income, alimony paid, and alimony received—are blurred in the tax return data for low-income individuals in the years 1996-2006.⁸ Alimony income was blurred at the national level. Wage and salary income was blurred at the national level in 1996, at the state level for years 1997-1999, and at the state x married level for years 2000-2006. The blurring was done as follows: “for every three records, in descending order, the average...[of a given income type to be blurred] has been determined and that value has been placed in the...field for each of the three records.” (Weber, 2001). This means that earned income for all individuals that have positive wage earnings is measured with noise in the years in which blurring occurred. An alternative measure of earnings can be constructed by backing out earned income from AGI. This measure is also imperfect because most, but not all, types of unearned income are reported in the tax return data, and those that are also blurred must be excluded.⁹ I use the latter measure for all years, so the accuracy of my imputation method can be precisely determined. In years before blurring, the latter measure is within \$15 of the actual wage earnings for 99.5 percent of taxpayers for the sample used in Section 5. In years after blurring, blurred wage earnings are within \$15 of the latter measure 65 percent of the time, indicating that there is substantial noise in blurred wage earnings. Still, the estimates are

⁸Alimony paid and received were blurred beginning in 1995.

⁹The latter affects a relatively small number of individuals in the sample used in this paper.

robust to the use of either measure; for example, the baseline estimates in Section 5 decline by about 2 percent when the blurred wage earnings is used instead.

Table 1 provides descriptive statistics for all EITC-eligible individuals for 1988-2006. The first two rows summarize the components of earned income. Almost 16 percent of individuals have some self-employment income, but it is the sole source of earned income for only 2.8 percent of taxpayers. The third row provides summary statistics for total unearned income, and the next nine rows break out unearned income by type.¹⁰ Note that 33.7 percent of individuals have some unearned income, with a mean of \$563.51. The most frequent type of unearned income is dividend and interest income (18.6 percent). The next three rows—capital gains or losses, partnership income, and other gains or losses—reflect other types of income (or loss), but less than five percent of individuals have these types of income. Taxable refunds only apply to those who itemize deductions and are reported by a small fraction of individuals (3.2 percent). Taxable pension, annuity and IRA distributions are only received by about five percent of the sample and, unlike the previous categories, are unlikely to respond unless individuals adjust the amount received each year, decreasing it if they are temporarily EITC-eligible. Almost no one has taxable Social Security benefits, which also are not expected to be adjusted in response to EITC schedule changes. A substantial number of individuals have unemployment insurance (10.6 percent). Individuals will not adjust this form of income directly in response to the EITC schedule (because it does not pay to give up a dollar of unemployment insurance to obtain 10-20 cents of EITC benefits), but it may be adjusted indirectly if individuals change the number of weeks worked in response to the EITC. About five percent of individuals have deductions and the mean is \$108.24; deductions are likely responsive to the EITC schedule. About 30 percent of the sample is married, and over 60 percent use a tax preparer. Conditional on filing a tax form, approximately 92 percent

¹⁰Unearned income does not include blurred sources (alimony) and unreported sources (other income and a few deductions). Less than one percent of individuals in this sample have alimony income. In the years before the blurring of low-income wage data was instituted, I can back out unearned income directly by subtracting earned income from AGI. The likelihood that individuals have unearned income in these years (1988-1995) is 1.4 percentage points higher using this measure.

of EITC-eligible individuals claim the EITC.¹¹ As noted in Subsection, 2.1, I exclude those with no dependents. For most of the analysis in Section 5, I restrict the sample to those with one and two dependents; for comparability, I impose the same restriction throughout the paper. The mean number of dependents is 1.41.¹²

The analysis of tax return data has several advantages. Most importantly, it provides a precise (or near precise) measure of the reported amount of each type of income, and is not subject to survey non-response, rounding, and other approximations. The main disadvantage of tax return data is that one cannot observe where individuals place the money that they would have held in an income-bearing account in the absence of a positive tax rate or those that do not file. For welfare, both moving the money out of the income-bearing account (assuming this is not costless) and a real decline in saving are relevant. Tax evasion on investment income is also a potential drawback, although I will provide some evidence that evasion is likely not a key mechanism behind the results found.

3.2 Research Design

The research question examined in this paper is whether the design of the EITC has the unintended consequence of distorting non-labor-income decisions in the phase-out region, particularly the decision to save in an income-bearing account. This paper focuses mostly on the decision to save in an interest- or dividend-bearing account. I also analyze a broader measure of investment income, which includes capital gains and losses, partnership income, other gains and losses, and IRA contributions (IRA contributions are a deduction). I focus on a particular part of unearned income because unearned income contains a broad range of income sources. As a result, the coefficient on unearned income does not have much policy

¹¹The actual number is a bit higher; eligibility is not perfectly measured with the data available.

¹²Dependents do not always correspond exactly to the number of children claimed for EITC purposes; the latter is not in this data set for all years. For years in which both are available, the actual measure is about one-tenth of a child lower. In addition to data availability, the advantage of using dependents is that it avoids additional manipulation of claiming children only for the purpose of maximizing the EITC. For years in which I have both measures, the baseline estimates decline slightly when the actual measure is used, but the estimates are not statistically different.

relevance outside of choosing an optimal EITC design. In contrast, examining the effect of the EITC on saving of low-income households fits into the substantial literature on the effect of mean-tested programs on savings. Moreover, unearned income contains both types of income one would expect to be responsive to the tax rate (e.g. interest income) and types that one would not (e.g. Social Security benefits).

The decision to save in an interest- or dividend-bearing account is related, but not identical, to the decision to save, as the EITC could induce individuals to stop saving in interest- or dividend-bearing accounts, instead placing their money in an interest-free account. This paper cannot speak to this mechanism, but this response is distortionary and presumably not a behavior policymakers would like to encourage. There are several other reasons why the measured response may not be identical to the decision to save. First, if two taxpayers are cohabiting, one could save while the other claims the child and gets the EITC. I cannot examine this response because I do not observe tax returns of two separate cohabitators. Second, individuals could save in an interest- or dividend-bearing account, but choose not to report it on their tax return—tax evasion. I argue that tax evasion is unlikely because there is information reporting by financial institutions on interest and dividend income above \$10 per account, but it is possible, particularly for those with dividend or interest income less than \$10. In Section 5, I provide evidence that, under reasonable assumptions, any evasion of taxes on investment income has a minimal effect on the results. Going forward, much of the discussion will proceed as though individuals are altering their real savings decisions, but readers should keep in mind that the estimates in this paper are reduced-form.

To identify the effect of the EITC phase-out tax rate on the decision to save in an income-bearing account, I exploit two different forms of variation in the tax rate faced. Section 4 uses variation in the marginal EITC tax rate just above the second EITC kink, relative to the marginal EITC rate just below. It provides evidence on the overall response in earned and unearned income above the second kink, as well as which types of income are most responsive to the higher tax rate above the second kink, and thus driving the overall response. The

second source of variation used in this paper exploits the feature that the phase-out tax rate has varied depending on the number of dependents an individual claims since 1991. Section 5 exploits this variation using a difference-in-differences estimator.

An advantage of these two different forms of identification is that they require roughly orthogonal identifying assumptions. The key identification assumption for estimating the response of investment income in Section 4 is that investment income as a fraction of AGI would increase at a constant rate, on average, in the region around the second EITC tax kink if no tax kink existed in this region. Broadly speaking, the estimation strategy in Section 5 requires that the composition or secular behavior of those observed with one or two dependents cannot change differentially for one relative to two dependents in a way that is correlated with changes in the tax rate and outcomes. The fact that the results from both are similar provides additional credibility to the estimates obtained.

Individuals receiving the EITC are also subject to the regular tax schedule and may also be receiving subsidies from other cash transfer programs, such as AFDC/TANF, Medicaid and foodstamps/SNAP. These interactions will matter only if changes in these programs coincide with changes in the EITC tax rate and also discourage saving. Often, individuals in the phase-out region are not eligible to receive benefits from these other need-based programs. Moreover, the disincentives to save from these programs declined (while the disincentives from the EITC increased) over the period I examine and the decline in disincentives did not vary by number of children (Hurst and Ziliak, 2006; Gruber and Yelowitz, 1999), which means that these programs are unlikely to bias my results. Regarding the regular tax schedule, interactions between the EITC schedule and the regular tax schedule will be discussed below when they are important for the analysis.

3.3 Awareness

Awareness of the tax system is important in studies where the treatment is the marginal tax rate faced, because individuals must know and respond to the tax rate they will face

in advance; this is in contrast to more standard treatment effect studies (e.g. the effect of a job training program) in which individuals necessarily know the treatment they receive before responding. When individuals are filing their tax return, it is too late to respond, except by engaging in tax evasion or making an IRA contribution.¹³ The literature finds that awareness of detailed features of the EITC schedule is limited (Liebman, 1998; Romich and Weisner, 2000; Chetty and Saez, 2013) and the level of awareness varies by geography across the United States (Chetty et al., 2013).

Awareness matters for several reasons. First, individuals must be aware that their unearned income is taxed if they are in the phase-out region. This fact has often been ignored in the EITC literature; however, it is prominent when taxpayers fill out the form to calculate their EITC.¹⁴ If (and only if) individuals' AGI places them in the phase-out region, they are asked to calculate their credit based on their earned income, and then again based on their AGI. They are then required to take the minimum of the two credit amounts. If individuals' AGI makes them ineligible for the credit, they are stopped before they start to fill in the form. Thus, individuals who are filing for the first time, or even are in the phase-out region for the first time, may be unaware until they file. This is too late for the individuals to respond, unless they decide to engage in tax evasion or make IRA contributions.

Second, individuals must be aware of changes in the phase-out tax rate over time. Third, individuals must know whether they will be in the phase-out region, and thus face the phase-out tax rate, in advance. The EITC schedule is inflation-indexed with a lag. For example, the inflation parameter used to calculate the 2006 tax schedule was the CPI for September 2004 - August 2005. Rounding is then used (usually the values are rounded down to the nearest \$50). For this reason, it is unlikely that individuals' income will naturally move in lock-step with the tax kink. An individual can know at the beginning of the tax year what

¹³IRA contributions can be made up to April 15 to be applied as a deduction to the previous year. However, very few EITC individuals make IRA contributions.

¹⁴These features are less prevalent when individuals use TurboTax, but this type of electronic filing was not too common in the years examined. Only 13 percent of taxpayers filed their returns from home using tax preparation software in 2005 and this was likely not concentrated among low-income households. Free tax prep software for low-income households did not exist until 2006.

the tax parameters will be and respond accordingly, but this requires them to look up the tax kink location each year. As individuals' income gets further away from the tax kink, the amount of awareness necessary for them to know the treatment they face and respond accordingly decreases, because they can more easily guess whether or not they will remain in the phase-out region.

The baseline estimates in Sections 4 and 5 ignore awareness. The estimates in Section 4 are expected to be lower than those in Section 5 precisely because it requires a greater degree of awareness to respond each year in a narrow region around the tax kink, than somewhere in the phase-out region. Several additional specifications in Section 5 will analyze ways in which individuals become more or less aware of EITC-related incentives, including their use of a paid preparer and having unemployment insurance (where unemployment insurance is considered a rough proxy for whether the individual experiences a transitory earnings shock).

4 Estimating Response at Second EITC Tax Kink

This section examines the behavior of people whose income places them in the income region around the second tax kink, exploiting the change in the EITC marginal tax rate at the kink. The most common method in the literature to examine the responsiveness of individuals in the region of the tax kink relies on estimates of bunching in the region around the tax kink, and was first proposed by Saez (2010). In an online appendix, I make some technical improvements to this method, and document small, but statistically significant elasticities at the second EITC kink for *both* wage-earning and self-employed individuals. However, this analysis is not informative regarding which types of income are most responsive, nor does the literature have any precedent for such an examination beyond splitting the sample by those with and without a particular type of income (e.g. self-employed income) and examining whether the elasticity is different across the two groups. When the response is on the intensive margin, this approach is valid. However, when the response is on the

extensive margin, the response of these individuals will be captured in the elasticity of those categorized as not having this type of income, because the researchers will only observe these individuals after they have given up this type of income. This is especially problematic for types of unearned income where the likelihood of an extensive margin response is higher. The rest of this section proposes a new alternative method of examining behavior around the tax kink for different types of income to provide some evidence regarding which types of income are the most responsive and are thus contributing to the elasticities found above.

To explain this method, I use the example of investment income, and assume that a tax kink is introduced as part of a tax reform, such that the reform discretely increases the marginal tax rate above the tax kink. Suppose individuals are able to bunch perfectly at the tax kink, there is no growth in investment income, and investment income is the only type of income that responds to the increase in the marginal tax rate above the kink. Then, investment income will decline above the tax kink as depicted in the top panel of Figure 2. Note that investment income is a part of AGI, and thus a change in investment income moves an individual's location on *both* the horizontal and vertical axes. Below the tax kink, investment income does not respond. At the tax kink, average income is comprised of all those that were at the kink before the reform, plus all those who move to the kink in response to the tax reform (these are all individuals whose desired percent decrease in investment income at the new tax rate is at least as large as the gap between their pre-reform AGI and the tax kink). This point in Figure 2 is located half way between the old and new investment income levels, which occurs when there is a uniform distribution of investment income, everyone holds the same amount of investment income pre-reform, and everyone responds in the same way. In general, this point can be anywhere within the old and new levels, or even above the old level. Above the kink, investment income is at a new lower level. Under these assumptions, one could drop the point at the tax kink and then implement a regression discontinuity design to estimate the effect of the higher tax rate above the kink. Dropping the point at the tax kink effectively eliminates all manipulation of the running

variable, which would otherwise bias the estimates.

With imperfect bunching and investment income growth, the picture changes to look like that in the bottom panel of Figure 2; investment income growth, even without imperfect bunching, mitigates the discrete drop in investment income above the kink if individuals are responding along the intensive margin. This occurs because individuals above the kink respond by decreasing their investment income by a certain percentage, but also started with more. This figure allows other types of income to be growing as well; their rate of growth is a determinant of the slope of investment income. But, it assumes investment income is the only type of income that responds to the tax rate. I discuss what happens when this assumption is relaxed below. Imperfect bunching causes investment income to decline once individuals start responding to the tax kink at $-\delta_b$; that is, for a given level of AGI, investment income will be lower. By the time AGI has exceeded the imperfect bunching region at δ_b , investment income will be at a new, lower growth rate.¹⁵

By calculating the percent change in average investment income in a region above δ_b relative to the counterfactual investment income that would have existed absent the tax change, backing out the elasticity of investment income with respect to the marginal net-of-tax rate is straightforward. The counterfactual is empirically constructed from the region $[z^* - \delta_b - \delta_c, z^* - \delta_b]$; for the counterfactual to be valid, investment income must continue to grow at the same rate in the region in which the elasticity is calculated. However, the standard errors on the counterfactual increase as AGI increases above $-\delta_b$, because the accuracy with which I can predict the counterfactual using investment income in the region $[-\delta_b - \delta_c, -\delta_b]$ decreases as AGI increases. For this reason, I instead calculate the elasticity in the region of the tax kink $[-\delta_b, \delta_b]$, and acknowledge that this is a lower bound on the true elasticity.¹⁶ I will now define some notation, which is depicted in Figure 2.

¹⁵Because imperfect bunching exists and the outcome (investment income) and assignment variable (AGI) are simultaneously realized, calculating the change in slope by taking the limit as AGI approaches the tax kink (Card et al., 2009), would necessarily yield an estimate of approximately zero (i.e. with imperfect bunching, the individuals are approximately the same just on either side of the tax kink).

¹⁶When the former method is used, the results are qualitatively similar, but the standard errors are substantially larger.

Let X_{i+}^* be average investment income for bin i and X_{i-}^* be the counterfactual investment income in the same bin. The elasticity can be calculated as follows:

$$\hat{\varepsilon} = \frac{\sum_{i=1}^{n_b} \ln \left(\frac{X_{i-}^*}{X_{i+}^*} \right) / n_b}{\sum_{j=1}^{n_c} \ln \left(\frac{1-\tau_{jl}}{1-\tau_{jh}} \right) / n_c}, \quad (1)$$

where n_b is the number of bins and n_c is the number of individuals in the region $[-\delta_b, \delta_b]$. Note that this elasticity estimate is also a lower bound on the true elasticity (assuming investment income is increasing, on average, in AGI) because investment income is endogenous with respect to AGI; that is, when investment income declines, so does AGI, pushing down the estimated response at a given AGI level. However, a positive response will be found as long as investment income is not the sole source of growth in AGI. Moreover, this method implicitly assumes that there are no other factors that need to be held fixed in order to obtain a consistent estimate, which makes it possible to obtain a non-causal relationship. For example, suppose earned income decreases in response to the tax rate, but only for those with low investment income. This would lead to a spurious response in investment income. This will be partly ruled out in practice in the discussion that follows.

The elasticity estimates from equation (1) are given in Table 2. Figure 3 provides the corresponding figures. The standard errors are obtained by a nonparametric bootstrap method clustered by state (1000 replications). I exclude those with unemployment insurance from the analysis because a decline in unemployment insurance should be accompanied by an increase in earned income; this method is not designed to address this type of mechanical correlation. The first three columns examine the wage-earning sample. Columns (1) and (2) report the results for the two components of AGI—earned and unearned income—respectively. Both the figure and the elasticity estimate for earned income (-0.015) point to the following fact: earned income grew at a faster rate (although not statistically significant) above the tax kink relative to below. This occurs mechanically if other types of income included in AGI are growing slower in response to the higher tax rate and earned income is not responding, or

responding in a small way, relative to other types of income that do respond. The mechanical response is small because earned income is a much larger share of AGI than unearned income. In contrast, Figure 3 shows a decline in unearned income above the tax kink. The elasticity is 0.516, but it is statistically insignificant, likely reflecting the volatility of unearned income and that only some types of unearned income are expected to respond.

Table 2 Column (3) and the bottom left panel of Figure 3 examine one type of unearned income—investment income.¹⁷ Although capital gains or losses are a lumpy realization of savings, I include these in this analysis of investment income, because most individuals that have capital gains also have dividend or interest income. If capital gains are excluded, and individuals respond to the higher marginal tax rate above the tax kink by decreasing capital gains, this will likely bias the estimates downwards. Both the figure and the elasticity provide evidence that investment income declined substantially above the tax kink—the elasticity estimate is 1.558 and is statistically significant at the 10 percent level. In Table 2 Column (4) and the bottom right panel of Figure 3, I consider whether self-employment income for self-employed individuals declined significantly in the region around the kink. Both the figure and the elasticity estimate suggest that it did; however, the estimates are not significant.

This section has found that AGI responds to the phase-out tax rate and for wage-earners this response is concentrated in non-labor income, particularly investment income. The elasticity of investment income with respect to the marginal net-of-tax rate is 1.56 and can be interpreted as a lower bound on the true elasticity.

5 Difference-in-Differences Estimates

This section examines the responsiveness of investment income to the EITC phase-out marginal tax rate, exploiting differential variation in the phase-out rate between one- and

¹⁷The sample is restricted to those for whom the sum of dividend, interest, positive capital gains, and tax exempt interest income is under \$2,300 in all years, which is \$500 below the investment income asset limit in 1996-2006; this corresponds to my sample restriction in the next section, and is imposed here for comparability. The results are similar when it is not imposed.

two-dependent families. The findings are consistent with the evidence from the last section, pointing to a significant decline in investment income in response to changes in the EITC schedule. There is no evidence that bias-inducing selection or tax evasion are driving the results.

The results from the last section inform the method used here. I define a region based on earned income within the phase-out region and identify the parameters of interest by relying on differential variation in the marginal tax rates between families with one and two children.¹⁸ Defining the region in this way will not necessarily yield consistent estimates if earned income responds to the tax rate. The evidence in the previous section is consistent with the assumption that earned income does not respond to the tax rate for wage-earners, but not for self-employed individuals. Therefore, I restrict the sample to wage-earning individuals. Because I cannot completely rule out a small earned income response among wage-earners, I discuss the conditions under which such a response would induce a bias in the estimates, and provide evidence that this form of selection does not appear to be having a statistically significant impact on the estimates later in this section.

The identifying variation in this section comes from the differential variation in the phase-out EITC rate between one- and two-child families over time. This variation is plotted in Figure 4. There, I plot the marginal net-of-tax rate, which is one minus the marginal tax rate; this is the variable that will be used in the main estimating equation. Given the form of identifying variation, the specifications in this section assume that individuals do not make endogenous fertility decisions or decisions to claim an extra dependent in a way that is correlated with their investment income response. These types of exogeneity conditions are assumed in much of the EITC literature, as most of it relies on differential variation in tax rates across the number of children for identification. I consider this story later in this section and find no evidence that the estimates are biased by individuals selecting the

¹⁸I do not define the window in terms of AGI because if the window were defined in terms of AGI, which includes investment income, there would be selection into the window if there is in fact a positive investment income response.

number of children they have in a way that is correlated with their outcomes.

Before proceeding to the main estimation, I provide graphical evidence of the response in investment income over time by number of children and estimate a binary treatment difference-in-differences equation. For this analysis, I split the years into two groups, pre and post. Pre includes all years through the end of the EITC expansion (1988-1995), and post includes all years after the expansion (1996-2006). I estimate the following difference-in-differences intent-to-treat (ITT) specification for wage-earning individuals with earned income in the range \$18,000-\$30,000:

$$INV_{it} = \alpha + \gamma post * twokids + \beta_1 twokids_{it} + \beta_2 X_{it} + \eta_t + \nu_{it}, \quad (2)$$

where γ is the parameter of interest, INV_{it} is an indicator for whether an individual has positive interest or dividend income, $twokids$ is an indicator for whether the individual has more than one child, $post$ is an indicator for the observation being in 1996-2006, X_{it} are additional covariates, and η_t are year fixed effects. Including $post$ as a separate variable in the regression is redundant because year fixed-effects are included. There are other plausible ways one could specify this binary regression; for example, one could define the pre- period as the years in which there were no differences between one and two child households (1988-1990) or as the years before the 1993 reform that started the phase-in of a much larger difference between the rates for one and two-child households (1988-1993). All these nuances will be captured when we consider a continuous measure of treatment later in this section.

The vector X_{it} includes earnings, earnings squared, married, and an interaction of $twokids$ with earnings, earnings squared and married. I pool data over all years in the sample. All income values are in 2006 dollars.¹⁹ I choose \$18,000 as the lower cutoff because it is at least \$1,000 above the second kink point in all years; thus, the estimates will likely not capture bunching decisions around the kink point. It is above the filing threshold for each type of

¹⁹I use the IRS deflator: the average CPI-U from September year $t - 2$ through August year $t - 1$.

marital status and above the positive tax rate threshold for all single and head of household taxpayers, but not for married individuals. For them, the positive tax rate is implemented part way through the window examined in this section. However, given that families with one dependent face this positive tax rate first, this will bias the estimates downward, because it will make one-dependent families appear more responsive relative to two-child households. Earned income of \$30,000 was chosen as the baseline upper bound, because it is at least \$1,000 below the end of the phase-out region for all years. The baseline estimates are robust to the choice of upper and lower bound, which will be shown in Table 5.

I drop individuals with more than \$2,300 of investment income. The EITC definition of investment income is dividend, interest, tax exempt interest and positive capital gain income. This decision is driven by the fact that there was an asset limit imposed in 1996, excluding those with more than \$2,800 dollars of investment income in 2006 dollars from claiming the EITC.²⁰ Before 1996, 1.1 percent of two-child families held investment income over this limit and were 10 percent more likely to have investment income over the limit than one-child families. Two-child families are also more apt to respond to the limit by decreasing their investment income below the threshold because they will lose more in benefits than an equivalent one-child household. Consequently, estimates that include individuals with investment income over the limit or impose the limit after 1996 will be biased upward. I impose a limit of \$500 less than \$2,800 to avoid differential rates of selection by number of children into having investment income just under the cutoff.

Table 3 provides descriptive statistics for the baseline specification. Average interest and dividend income reported, including all zeros, is \$48.60. About 20 percent of individuals have positive interest and dividend income. Almost one-third of the sample is married, and the average number of children is 1.4. Fifty-nine percent use a paid preparer.

The estimated γ from equation (2) is -0.037 and the p-value is 0.001. The main estimation below defines treatment as $\log(1 - \tau)$. Rescaling γ using two-stage least squares so that it

²⁰There are a few special circumstances when this limit does not hold.

is directly comparable to the main estimates, yields an estimate of 0.745 (p-value: 0.002). This estimate implies that, for a one percent decrease in the marginal net-of-tax rate, the likelihood an individual opens an interest- or dividend-bearing account declines by 0.007. For example, if the saving rate was 0.4 before a 10 percent decline in the marginal net-of-tax rate, it would be 0.33 afterwards.

Figure 5 provides graphical evidence of the changes in the likelihood of holding income in interest- or -dividend bearing accounts in response to changes in the EITC phase-out tax rate over time using the same sample restrictions. The estimated line comes from a cubic in year interacted with post and number of children.²¹ The standard errors are clustered by state. In the early years, when there was no (or a small) difference between the tax rates for one- and two-child households, their investment income was not statistically distinguishable, suggesting that one-child families provide a good comparison group for two-child families. It takes a year or two for individuals to adjust to the new tax rates, which is consistent with other EITC literature (Saez, 2010). In 1996, there is a statistically significant drop in the likelihood that two-child families have investment income and this difference remains statistically significant through 2006. This graphical evidence is consistent with the estimates obtained from the simple difference-in-differences estimates; the gap between the likelihood that taxpayers with one and two children have investment income is about 0.03 in the post period, and this increase is stable over time.

The main specification takes advantage of all the variation in $\log(1 - \tau)$ by including it directly and estimating the following ITT regression:

$$INV_{it} = \alpha + \gamma \log(1 - \tau_{it}) + \beta_1 twokids_{it} + \beta_2 X_{it} + \eta_t + \nu_{it}, \quad (3)$$

²¹Another type of selection could occur if filing increased after the phase-out rate increased (which coincided with an increase in EITC generosity) and these new filers were much less likely to have investment income. I cannot completely rule this out, but while EITC claims were rising, there was no discrete jump at 1996, nor is the pattern consistent with the pattern in Figure 5. Adding a control for the total number of EITC claimants by year has a minimal effect on the estimates.

with the same covariates and sample restrictions as for equation (2). Estimating the response of investment income to the after-tax rate of return $\log((1 - \tau_{it})r_t)$, where r_t is the average annual real interest rate, is equivalent to the specification above because $\log((1 - \tau_{it})r_t) = \log((1 - \tau_{it})) + \log(r_t)$ and there are year fixed-effects.²² The pattern of investment choices over time in Figure 5 suggests a lag in the response to changing tax rates; however, I am not able to statistically quantify the lag effect because there is not enough identifying variation in this sample to estimate the response to both today's and yesterday's tax rate with statistical precision. The estimates given by equation (3) produce ITT estimates because all individuals are included as long as they have earned income in the specified range, regardless of whether they actually decide to claim the EITC, or are eligible based on their overall AGI level.²³

In Tables 4 and 5, the top row estimates the extensive margin effect of the marginal net-of-tax rate on the decision to invest—the dependent variable is an indicator for whether the individual receives any interest or dividend income. These estimates are mean marginal effects from a probit specification. Normally, we think the average tax rate is the relevant rate in the context of extensive margin decisions; in this context, the average and the marginal tax rates are equivalent because all individuals are in the phase-out region based exclusively on their wage income, so all investment income faces the EITC phase-out tax rate. The bottom row estimates the elasticity of dividend and interest income with respect to the marginal net-of-tax rate. These estimates come from a two-tiered model proposed by Cragg (1971); it is also referred to as a hurdle model. The first tier estimates the extensive margin decision using the same probit model from the top row. The second tier estimates the intensive margin effect (i.e. conditional on choosing to save a positive amount, how much does the individual save) using a truncated normal regression, where the dependent variable

²²This assumes that individuals in this population with one and two dependents face the same interest rate, on average.

²³It also ignores other tax rates and credits faced. I choose not to report treatment on the treated (TOT) estimates to address these issues, because the value of such estimates is limited. The estimates are quite similar in practice (only four percent of my baseline sample was not EITC-eligible) and, in this context, given the nature of the selection and its correlation with the ITT measure, Weber (2012) shows that the estimate will be biased.

is the log of interest and dividend income. Taking the log of interest and dividend income is attractive because the specification directly produces an elasticity, and it is necessary because the unscaled dependent variable has a large left skew that, if left untransformed, would violate the assumptions of the estimation method. The reported coefficients are mean marginal effects from this two-tier model. Standard errors were calculated using 1000 bootstrap replications. The second tier is not itself statistically significant, which suggests that the behavioral response occurs along the extensive margin and the elasticities reported in the bottom panel of Table 4 are mostly capturing the average amount by which dividend and interest income changes when individuals open, or close, an interest- or dividend-bearing account. The standard errors in Tables 4 and 5 are clustered by state.²⁴

Table 4 presents results. Baseline estimates are given in Column (1). The extensive margin estimate is 0.612, which means that a one percent increase in the marginal net-of-tax rate increases the probability of having interest or dividend income by 0.006. The phase-out marginal net-of-tax rate decreased by 9.6 percent²⁵ over the last two decades, which implies a 0.058 decrease in the likelihood that individuals had interest or dividend income. The decrease in the likelihood that EITC recipients had interest or dividend income in this population is 0.134; hence, among those examined in this section, 43.5 percent of the decline in the fraction of EITC recipients with savings in income-bearing accounts over the last two decades can be explained by changing EITC incentives. For all wage-earner EITC recipients, 33.7 percent of the decline can be explained by changing EITC incentives.

The elasticity estimate is 3.047, which implies that a one percent increase in the marginal net-of-tax rate increases interest and dividend income by 3.047 percent. For each one percent increase in the marginal net-of-tax rate, this implies that dividend and interest income increases by \$1.18 at the mean for EITC recipients in the estimation sample. Suppose that the interest rate is 5 percent. If individuals spend their income (as opposed to saving it,

²⁴A two-way cluster by state and time (Cameron et al., 2011) is ideal; however, there are likely not enough years to make the year cluster valid. Also, I have computed the two-way standard errors and the state-only clustered standard errors are generally larger.

²⁵All percent changes calculated in this paper are calculated as the log change.

but not placing it in an interest- or dividend-bearing account), this implies a mean increase of \$23.53 in the annual savings stock. In 1988-1990, this implies a \$44.76 mean increase in savings. Because the marginal net-of-tax rate decreased by 9.6 percent over this period, these estimates imply that the annual amount in savings would have been \$1,030 higher in 2006, on average, if the disincentives to save had remained at their 1988 level.

Table 4 Column (2) examines a broader measure of investment income, including capital gains or losses, partnership income, other gains or losses, and IRA contributions;²⁶ this has a minimal effect on the estimates. I exclude capital gains in the baseline estimates because these gains are a lumpy realization of savings, rather than reflective of the annual amount of savings. There is also a large capacity to re-time the sale of an asset to a period in which the tax rate is lower. Very few EITC eligible individuals have capital gains. Column (3) includes the controls X in a more flexible way, by interacting each control with an indicator variable for the observation occurring before 1992 and another for the observation occurring in 1998 or thereafter. The year 1992 is two years before the largest expansions in the gap between one- and two-child families, and 1998 is two years after the last change. This specification allows for different trends in investment income in the years before 1992 and after 1998. The estimates increase slightly and the additional controls have a sizable effect on the standard errors; the estimates remain significant at the five percent level.²⁷ Column (4) adds state fixed-effects to control for differences in state EITC generosity, which has a minimal effect on the estimates and standard errors.

Table 4 Columns (5)-(7) examine heterogeneity in the baseline estimates by taxpayer type. For each type of heterogeneity considered, the indicator of taxpayer type (e.g. married) is interacted with the tax rate, as well as included directly and interacted with all the other covariates to control for underlying differences in investment income across different taxpayer

²⁶Note that all negative values are truncated at zero and estimated using the same two-tier model above to take this truncation into account.

²⁷Alternatively, the specification could be restricted to the years 1992-1997; the estimates from this specification are slightly larger than the estimates in Column (3) and the standard errors are larger as well, although the estimates remain significant at the five percent level.

types. Column (5) estimates the response separately for unmarried and married individuals. Married individuals are slightly less responsive than unmarried individuals and the difference in responsiveness is highly insignificant. The lack of difference between these two types lends credibility to the identification used to separately identify income and substitution effects in Subsection 5.1.

Those who temporarily face the EITC schedule may be less responsive, because savings is often a longer-term decision, and awareness of detailed features of the schedule may be low. Alternatively, if an individual is a temporary EITC recipient because of an unemployment spell, their response could be more elastic, as it is an appealing time to draw down their savings. I use an unemployment insurance indicator as a proxy for temporarily facing the EITC schedule due to a negative shock in earned income; it is not a perfect proxy as an individual could already be in the EITC range before their unemployment spell. The results are reported in Table 4 Column (6).²⁸ They suggest that, on average, those with unemployment insurance receipts do not respond differently; the estimates are not statistically different.

Table 4 Column (7) considers how the response differs among those that do and do not use a paid preparer.²⁹ Those who choose to have a paid preparer may be more responsive to begin with, and the paid preparer may educate them about the costs and benefits associated with having investment income when in the phase-out region. Using a paid preparer in the current year can be interpreted as a proxy for having a paid preparer in the past. Learning in the current year is not helpful unless the tax preparer encourages individuals to engage in tax evasion and this does not appear to be what is occurring because I find no evidence of tax evasion responding to tax rate changes in Section 5.1. The response of those who use a paid preparer is twice as large.

²⁸Unemployment insurance indicators and a complete set of interactions with the other covariates are included in the estimating equation to control for underlying differences in investment income among those with unemployment insurance.

²⁹Paid preparer usage and a complete set of interactions with paid preparer are included in the estimating equation to control for underlying differences among those with a paid preparer.

5.1 Sensitivity Analysis

Table 5 conducts a variety of sensitivity analyses. It begins by considering two possible forms of selection discussed above, which could be biasing the estimates. Column (1) repeats Column (4) in Table 4. The first type of selection occurs when individuals select into or out of the sample by adjusting their earned income in response to the EITC phase-out tax rate. If individuals are moving in and out of the sample and this is correlated with the likelihood they respond along the investment income margin (or have investment income), then the estimates may be biased. The estimates remain unbiased only if this selection is occurring at a constant rate—that is, entry and exit are equal. Assuming a positive correlation among earned and investment income responses, the estimates will be biased downwards (upwards) if exit (entry) is larger. This occurs because those who are entering or exiting will adjust their investment income more to a given change in the marginal tax rate than individuals whose earned income does not respond to the tax change. When exit (entry) is larger, the estimates will exclude (include) more individuals that are highly responsive. The last section found no evidence of a response in earned income; however, a small response among certain taxpayers could exist, particularly for the secondary earner of a married couple (Eissa and Hoynes, 2004) or for those in regions in which awareness of the EITC is high (Chetty et al., 2013). If responsiveness changes monotonically with earned income, the entry and exit rates will converge as the estimation window narrows, making the bias decrease. Table 5 Columns (2) and (3) separately estimate the response over \$18,000-\$24,000 and \$24,000-\$30,000; the estimates are less than 1/4 standard deviation from the baseline estimates and the coefficients move in opposite directions relative to the baseline, providing no support for this type of bias-inducing selection.

Another potential obstacle to obtaining consistent estimates is that individuals can choose the number of children they wish to have (or to claim on their tax return). Empirically, the literature suggests that these responses are relatively small (Baughman and Dickert-Conlin, 2003; McCubbin, 2000). This will bias the estimates upwards if the correlation between

choosing to have a second child to obtain a higher EITC amount and choosing to have lower dividend and interest income is greater than the same correlation for choosing to have a first child. The incentives for having a first child are higher than those for having a second for all years in the sample, but the incentives for claiming a second child have increased over time more than those for having a first child. These changes are correlated with phase-out tax rate changes, which would bias the estimates upwards. While there is an incentive to claim a second child, there is no incentive to claim a third child, except in the state of Wisconsin. Table 5 Column (4) drops two-child families and instead includes three-child families, removing the selection problem for two children, but leaving the selection for one child; now, any selection for one-child families that is correlated with the phase-out tax rate will bias the estimates downwards. There are about four times fewer three-child than two-child families, which increases the standard errors, all else equal. While the estimates are no longer statistically significant, the point estimates are close to the baseline estimates. This provides no evidence that selection into having a second child biases the baseline estimates.

While the existence of tax evasion would not bias the estimates, it would substantially change the interpretation and welfare implications of the results. In general, it is appropriate to assume that the elasticity of tax evasion with respect to the marginal net-of-tax rate is a function of the benefits associated with engaging in tax evasion.³⁰ In this context, this implies that there is more evasion below the information reporting threshold at \$10 and evasion will increase as the marginal tax rate increases. Figure 6 provides evidence on the amount of interest income and dividend income evasion below the information reporting line. The estimates are based on the density test proposed by McCrary (2008). I choose the bandwidth when the data is restricted to \$10 on either side of the tax notch (otherwise, the bandwidth would be too large to obtain a reasonable estimate below the notch). The analysis is done in nominal dollars.

The top panel of Figure 6 examines interest income for years 1988-2006. There is a

³⁰This point is often discussed in the tax evasion literature (e.g., Slemrod and Weber, 2012).

120 percent increase in the density just above the information reporting threshold and this estimate is statistically significant at the one percent level. This suggests there is substantial evasion in interest income below \$10, or alternatively individuals often forget to report their interest income unless they receive a tax form (1099-INT) at the end of the year, which only occurs when there is information reporting. If the evasion elasticity with respect to the tax rate is increasing with an increase in the benefit, the jump should increase after 1996, relative to the small EITC years (1988-1993); but neither of these are statistically different from the estimate for all years, and the post-1996 estimate is lower, not higher. This suggests evasion occurs, but it does not vary with the tax rate. The bottom panel considers dividend income. There does not appear to be evidence of evasion on this margin.

As another check on evasion below \$10, Column (5) of Table 5 replaces all reports less than or equal to \$10 with zeros for all years. This forces the response of all with income less than \$10 to be zero, which eliminates any evasion response of these individuals as well as any other response of these individuals. The estimates are slightly lower, but not statistically different from the baseline estimates.

The analysis conducted so far has estimated a single parameter capturing the response to the marginal tax rate. This parameter encompasses both a substitution and an income effect. In particular, an increase in the phase-out tax rate has two effects: 1) the marginal cost of holding a dollar in an interest- or dividend-bearing account increases (substitution effect), and 2) the individuals' wealth changes because the EITC amount changes (income effect). Wealth increases if the location of the end of the phase-out region is held fixed. Wealth decreases if the location of the beginning of the phase-out region is held fixed. The sign of the income effect is ambiguous. As the EITC increases, individuals have more income, which may lead them to save more. As discussed in Subsection 2.2, a key mechanism considered in the context of other need-based programs is that these programs decrease the need for precautionary savings. This is also true for the EITC because, for individuals in the phase-out region, a negative shock in income is met with an increase in the amount of EITC

received. This suggests that the sign should be negative.

To estimate the two effects separately, I add a log function of after-tax earned income ($earnings + \tau(end - earnings)$), where end is the end of the phase-out region and τ is the EITC phase-out marginal tax rate.³¹ Note that actual after-tax income is defined as ($agi + \tau(end - agi)$) (assuming $agi > earnings$) and τ changes if individuals are not located in the phase-out region given their AGI. In this specification, the individuals that decrease their investment income by the most in response to the tax rate change receive the smallest income treatment by definition because AGI includes investment income. This would create a nontrivial bias in the estimates. Even using earnings in the definition of the proxy for the EITC benefit amount requires a stronger assumption on earnings than before—earnings cannot respond to the marginal tax rate. If earnings respond and the response is positively correlated with the investment income response, this will create a downwards bias in the income effect estimates, but I find no evidence that earnings responds in this paper. Even if earnings responds, this bias is, by definition, smaller than the bias induced by using AGI, because earnings are one component of AGI. The proxy precisely captures the change in the EITC benefit received for a given level of earnings. The income effect term can therefore be interpreted as an ITT estimate.

Empirically, the identification of the income effect separately from the substitution effect comes from two sources. One source is variation in end , which is the end of the phase-out region. The variable end increased for two-child taxpayers in 1996 and married taxpayers in 2002 and 2005. For this analysis to be valid, marital status cannot change endogenously with the changes in end . If more responsive individuals are more likely to get married once end increases, this will bias the income effect estimates upwards. The personal income tax schedule also changed in 2002 and the change affected married, head of household, and single individuals differently. Prior to 2002, all of the individuals who faced a positive personal income tax rate in the EITC sample examined here faced a 15 percent income tax. In 2002,

³¹Gruber and Saez (2002) show that the income effect measure should take this form; however they use actual after-tax income, so their estimates are biased.

a new 10 percent bracket was created. To ensure that all individuals experienced the same tax rate change in 2002 (so there is no differential effect of this tax change which might be attributed to a change in *end*), I drop all single individuals.³² The income effect will also be partly identified from variation in τ ; changes in τ matter for both the substitution and income effect, but they affect each in a different way. Note that without including flexible controls in earnings, identification of the income effect would also come from variation in earnings.³³ However, investment income likely increases with earnings, regardless of the tax rate, making this variation invalid.

The results are presented in Table 5. Column (6) adds the income effect term to the specification from Table 4 Column (1) and Column (7) does the same for Table 4 Column (4). There is not enough variation to separately identify the income effect at a statistically significant level. The substitution effect gets slightly larger when controlling for the income effect, but the difference is not statistically significant. When the income effect is positive and it is ignored, the substitution effect estimates should be biased downwards because an increase in the phase-out tax rate usually coincided with an increase in EITC benefits in the period examined.

6 Conclusion

When designing the EITC, non-labor income was likely included as a determinant of the amount of EITC received to ensure the credit was going to those that were low-wealth. This paper finds that an unintended consequence of this provision is to substantially distort non-labor income, particularly investment income; in fact, along the intensive margin, the non-labor income distortions are far larger than the earned income distortions for wage-earning individuals. Such behavior induces deadweight loss because engaging in such behavior is not

³²Most unmarried individuals with children file as a head of household, so this does not drop many individuals from the sample.

³³A quadratic in earnings is used in the paper; however the results are not sensitive to including a cubic or quartic polynomial in earnings instead.

costless for these individuals regardless of whether a decline in investment income translates into a decline in savings. To the extent that the behavioral response estimates in this paper reflect an actual decline in savings, this creates additional concerns, particularly because the government would like to encourage low-income households to save more, as evidenced by programs like the Saver’s Credit and Individual Development Accounts.

This paper provides evidence that the response in investment income is substantial. Indeed, nearly 40 percent of the decline in saving in income-bearing accounts by EITC recipients over the last two decades can be explained by the changing incentives for saving caused by the EITC schedule. The response is twice as large among those that use a paid preparer, consistent with an increased awareness of the relevant incentives among this group.

The policy implications for EITC design depend on how policymakers weight the dead-weight loss induced by this provision, relative to its original intent—to exclude individuals that were not actually poor from receiving the EITC. Making the EITC amount exclusively a function of earned income would eliminate the distortion found in this paper, but would increase the number of claimants by 8 percent; these additional claimants would receive an average of \$1,178 in benefits, even though their average AGI is \$69,193.

Disclosure

The author of this paper has no financial arrangements that might give rise to conflicts of interest with respect to the research reported in this paper.

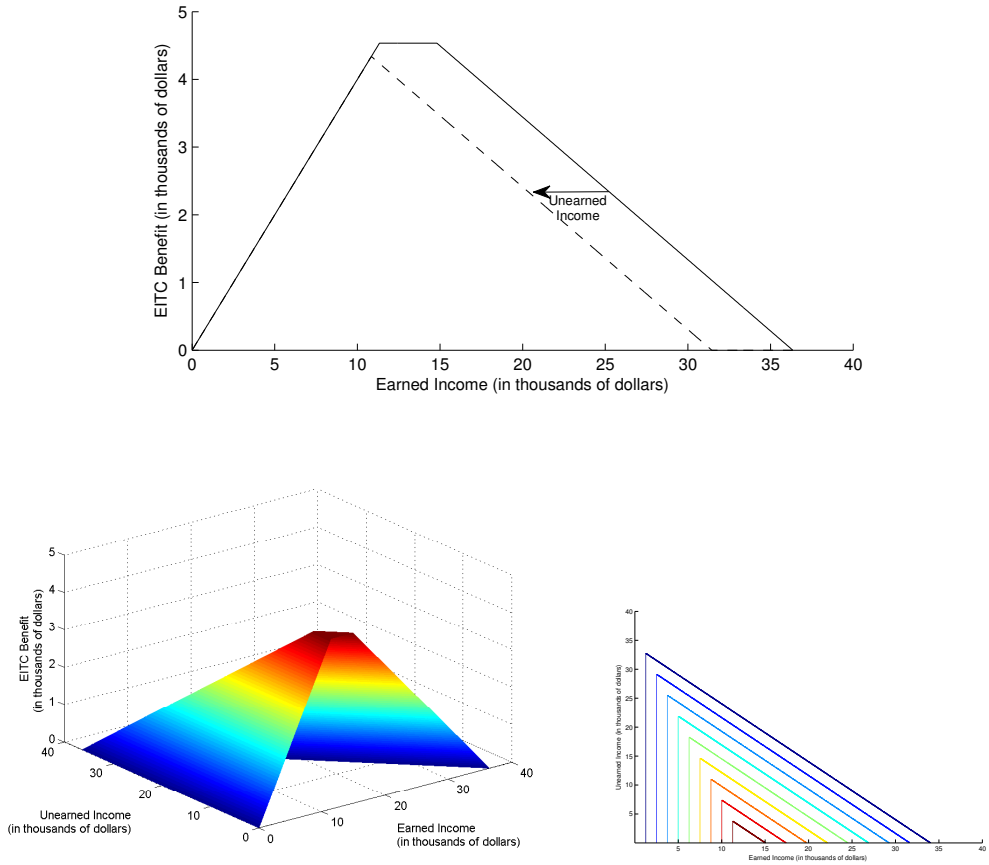
References

- Baughman, R. and Dickert-Conlin, S. (2003). Did expanding the EITC promote motherhood? *The American Economic Review, Papers and Proceedings*, 93(2):247–251.
- Blumenthal, M., Erard, B., and Ho, C.-C. (2005). Participation and compliance with the earned income tax credit. *National Tax Journal*, 58(2):189–213.
- Cameron, A. C., Gelbach, J. B., and Miller, D. L. (2011). Robust inference with multiway clustering. *Journal of Business and Economic Statistics*, 29:238–249.

- Card, D., Lee, D. S., and Pei, Z. (2009). Quasi-experimental identification and estimation in the regression kink design. Princeton University Industrial Relations Section Working Paper No. 553.
- Chetty, R., Friedman, J., and Saez, E. (2013). Using differences in knowledge across neighborhoods to uncover the impacts of the EITC on earnings. *American Economic Review*, 103(7):2683–2721.
- Chetty, R. and Saez, E. (2013). Teaching the tax code: Earning responses to an experiment with EITC recipients. *American Economic Journal: Applied Economics*, 5(1):1–31.
- Cragg, J. G. (1971). Some statistical models for limited dependent variables with applications to the demand for durable goods. *Econometrica*, 39(5):829–844.
- Dahl, G. B. and Lochner, L. (2010). The impact of family income on child achievement: Evidence from the Earned Income Tax Credit. NBER Working Paper No. 14599.
- Dufló, E., Gale, W., Liebman, J., Orzag, P., and Saez, E. (2006). Saving incentives for low- and middle-income families: Evidence from a field experiment with H&R block. *Quarterly Journal of Economics*, 121(4):1311–1346.
- Eissa, N. and Hoynes, H. (2004). Taxes and the labor market participation of married couples: The Earned Income Tax Credit. *Journal of Public Economics*, 88:1931–1958.
- Gelber, A. M. and Mitchell, J. W. (2012). Taxes and time allocation: Evidence from single men and women. *Review of Economic Studies*, forthcoming.
- Grinstein-Weiss, M., Sherraden, M., Gale, W. G., Rohe, W. M., Schreiner, M., and Key, C. (2013). Long-term impacts of Individual Development Accounts on homeownership among baseline renters: Follow-up evidence from a randomized experiment. *American Economic Journal: Economic Policy*, 5(1):122–145.
- Gruber, J. and Saez, E. (2002). The elasticity of taxable income: Evidence and implications. *Journal of Public Economics*, 84(1):1–32.
- Gruber, J. and Yelowitz, A. (1999). Public health insurance and private savings. *Journal of Political Economy*, 107(6, pt. 1):1249–1274.
- Hotz, V. J. and Scholz, J. K. (2003). The Earned Income Tax Credit. In Moffitt, R., editor, *Means-Tested Transfer Programs in the United States*. University of Chicago Press and NBER, Chicago.
- Hubbard, R. G., Skinner, J., and Zeldes, S. P. (1995). Precautionary saving and social insurance. *Journal of Political Economy*, 103(2):360–399.
- Hurst, E. and Ziliak, J. P. (2006). Do welfare asset limits affect household saving? *The Journal of Human Resources*, 41(1):46–71.
- Joulfaian, D. and Rider, M. (1996). Tax evasion in the presence of negative income tax rates. *National Tax Journal*, 49(4):553–572.

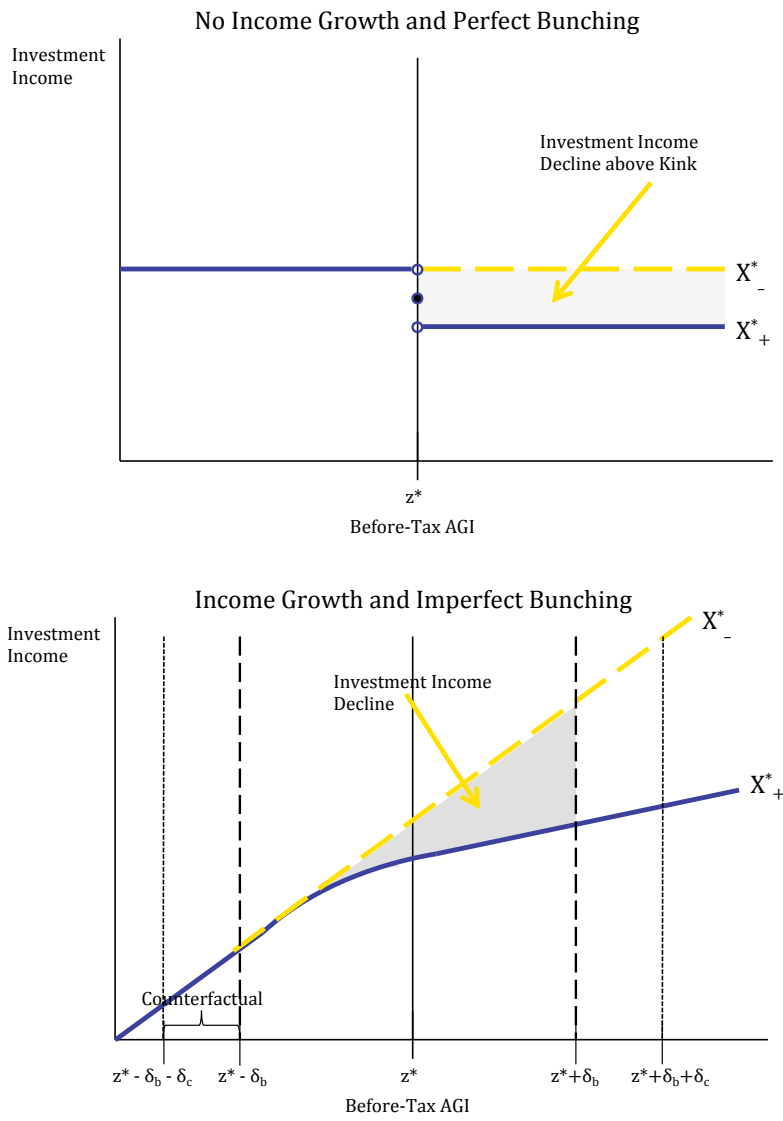
- LaLumia, S. (2009). The earned income tax credit and reported self-employment income. *National Tax Journal*, 62(2):191–207.
- Liebman, J. B. (1998). The impact of the earned income tax credit on incentives and income distribution. In Poterba, J. M., editor, *Tax policy and the economy, volume 12*, pages 83–120. MIT Press, Massachusetts.
- McCrary, J. (2008). Manipulation of the running variable in the regression discontinuity design: A density test. *Journal of Econometrics*, 142:698–714.
- McCubbin, J. (2000). EITC noncompliance: The misreporting of children and the size of the EITC. *National Tax Journal*, 53(4, part 2):1135–1164.
- Mills, G., Gale, W. G., Patterson, R., Engelhardt, G. V., Eriksen, M. D., and Apostolov, E. (2008). Effects of individual development accounts on asset purchases and saving behavior: Evidence from a controlled experiment. *Journal of Public Economics*, 92:1509–1530.
- Ramnath, S. P. (2010). Taxpayers’ response to notches: Evidence from the Saver’s Credit. Working Paper.
- Romich, J. L. and Weisner, T. (2000). How families view and use the EITC: Advance payments versus lump sum delivery. *National Tax Journal*, 53(4):1245–1265.
- Saez, E. (2010). Do taxpayers bunch at kink points? *American Economic Journal: Economic Policy*, 2(3):180–212.
- Slemrod, J. and Weber, C. (2012). Evidence of the invisible: Toward a credibility revolution in the empirical analysis of tax evasion and the informal economy. *International Tax and Public Finance*, 19(1):25–53.
- Sullivan, J. X. (2006). Welfare reform, saving, and vehicle ownership: Do asset limits and vehicle exemptions matter? *The Journal of Human Resources*, 41(1):72–105.
- Weber, C. (2012). The fixed-bracket average treatment effect: A constructive alternative to LATE analysis for tax policy. Working Paper.
- Weber, M. (2001). General description booklet for the 1996 public use tax file. Written under the direction of Peter Sailer, Chief, Special Projects Section, Individual Statistics Branch, Statistics of Income Division, Internal Revenue Service.

Figure 1: EITC Schedule



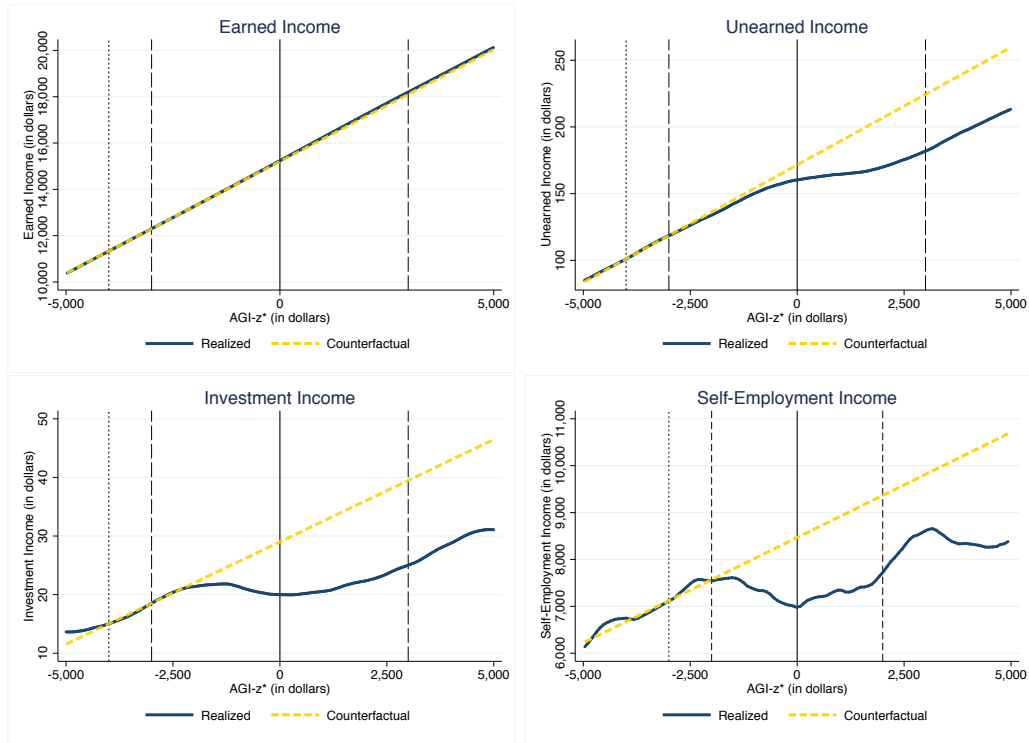
The top figure displays the EITC schedule in earned income for taxpayers with two dependents in 1996-2006. 75 percent of these taxpayers have unearned income less than or equal to zero and thus face the EITC schedule given by the solid line. 25 percent have positive unearned income and face an EITC schedule, such that the phase-out line is shifted in towards the dashed line. For about a quarter of these individuals, the line is shifted far enough that the plateau region is eliminated; they face a spike in their EITC schedule. The bottom left figure plots the entire 3-dimensional surface in earned income, unearned income, and the EITC amount for taxpayers with two dependents in 1996-2006. The bottom right figure provides contour lines of the top figure. When earned income is low, EITC benefits remain low, regardless of unearned income levels. This is because, when earned plus unearned income (AGI) is large enough to reach the second kink, individuals are still forced to take the benefit based on their earned income because it is lower than their AGI benefit. As earned income rises, the EITC first rises and then falls, either with or without a plateau region depending on the amount of unearned income, as was depicted in Figure 1. As unearned income rises, it first has no effect on the EITC and then causes it to decline at a certain threshold, where the threshold varies depending on the individual's earned income amount.

Figure 2: Estimating Elasticity from Change in Average Income Around the Tax Kink



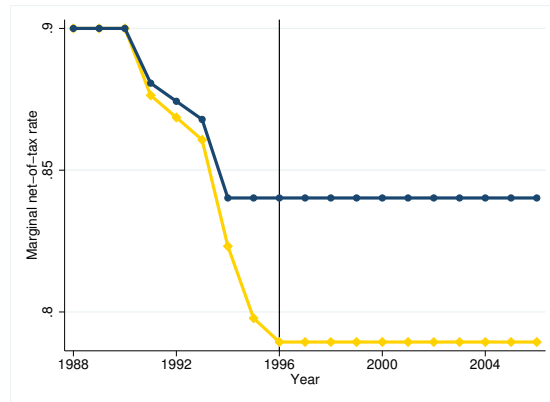
This figure shows how a lower bound on the elasticity of response of a given income type X can be calculated in the region around the tax kink. X_+^* (the solid blue line) gives the realized amount of investment income. X_-^* (the yellow dashed line) gives the counterfactual amount of investment income. The shaded grey region is the implied decline in investment in the region around the tax kink that is due to the increase in marginal tax rate above the kink.

Figure 3: Estimated Average Earned and Unearned Income Around the Second EITC Kink



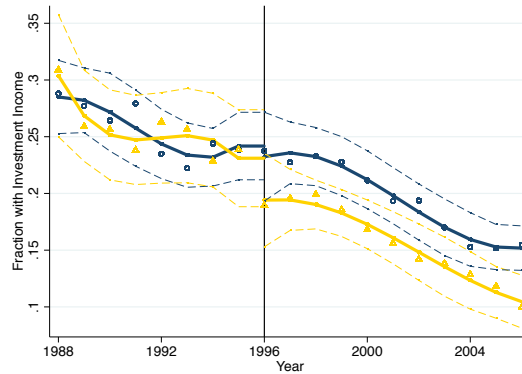
All adjusted gross income (AGI) values are in 2006 dollars, renormalized so that the kink (z^*) is at zero for all years. The estimates are population weighted. The region inside the long-dash vertical lines is used to calculate the elasticity. Realized average income is given by the solid blue line. The implied counterfactual is given by the dashed yellow line and is constructed using income in the region between the short-dashed vertical lines (-4,000 to -3,000 for the top right, top left and bottom left panels and -3,000 to -2,000 for the bottom right panel). The top panels include all wage-earners for years 1988-2006 with no unemployment insurance income. The bottom left panel adds the restriction that investment income is less than \$2,300. The bottom right panel includes all individuals with positive self-employment income and no unemployment insurance income for years 1988-1993. The bin size and bandwidth for earned income are 31 and 2,518 and are 31 and 3,787 for unearned income. The bin size and bandwidth are 31 and 2,417 for investment income and are 88 and 1,384 self-employment income.

Figure 4: Variation in the Marginal Net-of-Tax Rate by Number of Dependents



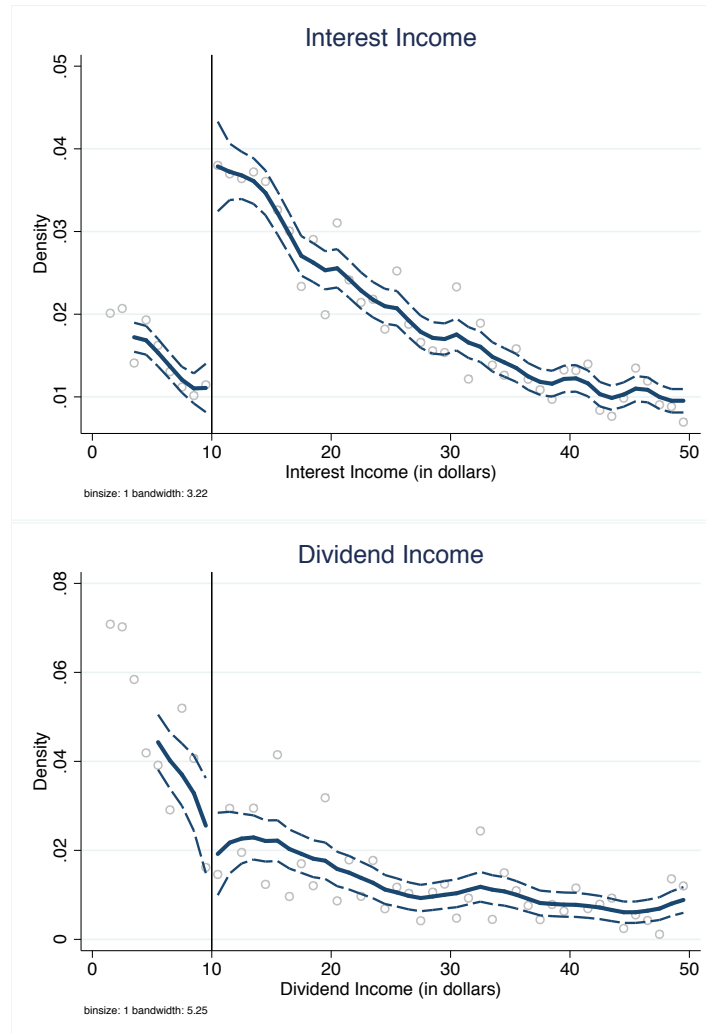
This figure plots the variation in the marginal net-of-tax phase-out rate by year and number of dependents. The marginal net-of-tax rate for one dependent is depicted by the blue line with circles and the marginal net-of-tax rate for two or more dependents is depicted as the yellow line with diamonds. The marginal net-of-tax rate is one minus the marginal tax rate.

Figure 5: Likelihood Individuals have Investment Income by Year and Number of Dependents



This figure plots the likelihood an individual holds investment income by year for one (blue line) and two dependents (yellow line) based on the restrictions used in the baseline estimates, with a break in 1996 (marked by the vertical black line). The thin dashed lines are 95 percent confidence intervals. The scatter plot gives the raw value for each dependent-year pair. The lines are from a cubic polynomial regression in year interacted with a pre/post indicator and number of dependents.

Figure 6: Individuals' Responses to the Informational Reporting Threshold



These estimates include any individual with positive interest or dividend income, subject to the baseline sample restrictions in Section 5. The implied log difference in density at the information reporting threshold for interest income is 1.34 (0.23) and for dividend income is 0.15 (0.42). Years 1996-2006 are included. Interest and dividend income is in nominal dollars because the notch is in nominal dollars. The estimates are population weighted. The density estimates are normalized to integrate to one. The smoothed density estimates do not start at zero because they cannot be estimated accurately (or could, but not with the same bandwidth) until interest or dividend income is greater than or equal to the bandwidth.

Table 1: Descriptive Statistics for EITC Eligible Taxpayers

Variable	Observations	Mean	Std. Dev.	Fraction $\neq 0$	Std. Dev.
Wage Income	106,362	16007.27	9679.17	0.972	0.164
Self-Employment Income	106,362	1089.42	4655.76	0.159	0.365
Unearned Income	106,362	563.51	10642.68	0.337	0.473
Dividend & Interest Income	106,362	104.7	1673.83	0.186	0.389
Capital Gains or Losses	106,362	8.17	1791.77	0.022	0.148
Schedule E Income	106,362	-68.39	10366.48	0.031	0.174
Other Gains or Losses	106,362	-14.63	3172.51	0.005	0.068
Taxable Refunds	106,362	16.45	296.59	0.032	0.176
Taxable Pension & Annuity Distributions	106,362	285.86	2008.37	0.051	0.219
Taxable Social Security Income	106,362	5.10	118.03	0.003	0.055
Unemployment Insurance	106,362	335	1371.34	0.106	0.308
Deductions	106,362	108.24	879.4	0.051	0.22
Married?	106,362	0.29	0.45	-	-
Number of Dependents	106,362	1.41	0.49	-	-
Tax Preparer?	102,661	0.62	0.49	-	-
EITC Claimant	106,362	0.92	0.28	-	-

This table reports summary statistics for all EITC eligible individuals with one or two dependents. Tax preparation variables are missing for 1990 and are occasionally missing in other years. All income values are in 2006 dollars.

Table 2: Change in Average Income Elasticities at Second EITC Kink

	(1)	(2)	(3)	(4)
Elasticity	-0.015 (0.010)	0.516 (0.416)	1.558* (0.947)	1.125 (1.179)
Type	Wage-earner	Wage-earner	Wage-earner	Self-employed
Income Type	Earned	Unearned	Investment	Self-employment
Years	1988-2006	1988-2006	1988-2006	1988-1993
δ_b	3,000	3,000	3,000	2,000
δ_c	1,000	1,000	1,000	1,000

The income elasticity estimates are calculated by first calculating average income of the given income type in the region around the tax kink using a local linear regression as described in the text and the corresponding figures. Then, equation (1) is used to calculate elasticities based on this estimate. The standard errors are calculated via non-parametric bootstrap and clustered by state (1000 replications). These estimates exclude individuals that did not file for the EITC, had no dependents, or had more than two dependents. The wage-earner estimates include only wage-earners and the self-employed include only self-employed individuals. $2\delta_b$ is the width of the imperfect bunching region and δ_c is the width of the counterfactual region.

Table 3: Repeated-Cross-Section Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Fraction $\neq 0$	Std. Dev.
Earned Income	31,480	23,679.15	3,444.38	-	-
Unearned Income	31,480	1,160.53	7,695.71	0.351	0.477
Dividend & Interest Income	31,480	48.60	205.94	0.206	0.404
Capital Gains or Losses	31,480	-10.35	227.29	0.016	0.125
Schedule E Income	31,480	245.71	5,971.41	0.028	0.164
Other Gains or Losses	31,480	-7.32	1,777.94	0.001	0.029
Unemployment Insurance	31,480	316.48	1,389.29	0.100	0.300
Married?	31,480	0.28	0.45	-	-
Number of Dependents	31,480	1.40	0.49	-	-
Tax Preparer?	30,217	0.59	0.49	-	-
EITC Eligible?	31,480	0.96	0.19	-	-

This table reports summary statistics for individuals in the baseline estimates. Tax preparation variables are missing for 1990 and are occasionally missing in other years. All income values are in 2006 dollars.

Table 4: Baseline Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Extensive Margin:							
$\log(1 - \tau)$	0.612*** (0.201)	0.666*** (0.207)	0.868** (0.392)	0.816** (0.380)	0.858* (0.446)	0.824** (0.415)	0.353 (0.356)
$\log(1 - \tau) \times heterogeneity$					-0.092 (0.268)	0.114 (0.541)	0.736** (0.349)
P-value of sum					0.031	0.029	0.017
Elasticity:							
$\log(1 - \tau)$	3.047*** (1.048)	3.288*** (1.150)	3.682** (1.563)	3.435** (1.491)	3.899** (1.792)	3.505** (1.596)	1.292 (1.392)
$\log(1 - \tau) \times heterogeneity$					-0.819 (1.269)	0.171 (2.583)	3.362** (1.330)
P-value of sum					0.028	0.1167	0.008
Broad Measure of Investment Income?	No	Yes	No	No	No	No	No
Covariates x 1992, 1998 included?	No	No	Yes	Yes	Yes	Yes	Yes
State FE included?	No	No	No	Yes	Yes	Yes	Yes
Bandwidth:	18K-30K	18K-30K	18K-30K	18K-30K	18K-30K	18K-30K	18K-30K
Observations	31.480	31.480	31.480	31.480	31.480	31.480	30,217

The extensive margin estimates are mean marginal effects from a probit specification, where the dependent variable is an indicator for whether the taxpayer has interest or dividend income. The elasticity estimates are mean marginal elasticities from a two-tier model, where the dependent variable in the first tier is an indicator for whether the taxpayer has interest or dividend income and the dependent variable in the second tier is the log of interest and dividend income. The dependent variables in the second column are constructed from the sum of dividend, interest, partnership, capital gains and losses, other gains and losses. and IRA contributions. *heterogeneity* is an indicator for being married in Column (5), for receiving unemployment insurance in Column (6) and for using a paid preparer in Column (7). All columns include covariates X (as specified in the paper) and year fixed-effects. Columns (5) - (7) also include *heterogeneity* directly as well as an interaction between *heterogeneity* and all X . All income values are in 2006 dollars. Estimates are population weighted. Estimates are for years 1988-2006. Standard errors clustered by state are in parentheses.

Table 5: Sensitivity Analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Extensive Margin:							
$\log(1 - \tau)$	0.816** (0.380)	0.912** (0.458)	0.711 (0.489)	0.596 (0.748)	0.538* (0.326)	0.810** (0.404)	0.952 (0.672)
$\log(\text{earnings} + \tau(\text{end} - \text{earnings}))$			(0.389)			0.202	0.202 (0.611)
Elasticity:							
$\log(1 - \tau)$	3.435** (1.491)	2.539 (1.870)	4.554** (2.322)	3.063 (3.240)	2.981** (1.467)	4.456** (1.955)	4.501 (3.159)
$\log(\text{earnings} + \tau(\text{end} - \text{earnings}))$						1.543 (1.695)	1.377 (3.091)
Covariates x 1992, 1998 included?	Yes	Yes	Yes	Yes	Yes	No	Yes
State FE included?	Yes	Yes	Yes	Yes	Yes	No	Yes
Bandwidth:	18K-30K	18K-24K	24K-30K	18K-30K	18K-30K	18K-30K	18K-30K
Two dependent taxpayers included?	Yes	Yes	Yes	No	Yes	Yes	Yes
Three dependent taxpayers included?	No	No	No	Yes	No	No	No
Single Filers Included	Yes	Yes	Yes	Yes	Yes	No	No
Observations	31,480	16,828	14,652	22,996	31,480	30,266	30,266

The extensive margin estimates are mean marginal effects from a probit specification, where the dependent variable is an indicator variable for whether the taxpayer had positive interest or dividend income. The elasticity estimates are mean marginal elasticities from a two-tier model, where the dependent variable in the first tier is an indicator variable for whether the taxpayer had positive interest or dividend income and the dependent variable in the second tier is the log of interest and dividend income. The last column replaces all values for interest and dividend income with zero whenever these income types are less than \$10 before constructing the dependent variables. Note that single filers is referring to the taxpayer category; unmarried head of household filers are still always included. All columns include covariates X (as specified in the paper) and year fixed-effects. All income values are in 2006 dollars. Estimates are population weighted. Estimates are for years 1988-2006. Standard errors clustered by state are in parentheses.