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"Secondary Evasion" and the Earned Income Tax Credit

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ABSTRACT: This paper documents that the earned income of taxpayers claiming the earned income tax credit (EITC) tends to cluster within $800 intervals surrounding the kink points of the EITC benefit distribution. This clustering is especially strong for head of household taxpayers around the kink point of the phase-in range and, to a lesser extent, for married filing joint taxpayers around the kink point of the phase-out range. The results from logit regression models estimated by filing status and kink point location indicate that "secondary evasion" with respect to the EITC is more associated with the characteristics of head of household taxpayers than those of married filing joint taxpayers.

Keywords: earned income tax credit; tax compliance; kink points.

Data Availability: All data used in this research are available from public sources.

JEL Classification: H24; H26.

INTRODUCTION

"Secondary evasion" refers to the tendency among taxpayers using tax tables to cluster at the top of the table brackets (Slemrod 1985; Christian and Gupta 1993). This phenomenon is unique because it allows us to make inferences about potential noncompliance from unaudited tax return data by examining deviations from the expected distribution of taxable income. In this paper, we examine secondary evasion in relation to the structure of the earned income tax credit (EITC) and document an association between our measure of secondary evasion (the presence of earned income within $800 intervals surrounding either of the kink points of the EITC benefit distribution) and certain tax policy variables.

Examining secondary evasion with respect to the EITC is important for a number of reasons. First, Slemrod (1985) demonstrates that secondary evasion is a sure indicator of primary evasion. Second, the structure of the credit and the dispersion of the benefits associated with it leave the EITC highly susceptible to fraud and abuse. Of the estimated $31.3 billion in EITC claims made by taxpayers who filed returns in 2000 for tax year 1999, the IRS (2002) estimates that 27.0 to 31.7 percent of the claims should not have

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been paid.[1] Finally, the IRS is currently expending significant resources to audit EITC returns. Reports of compliance problems and excessive claiming of EITC benefits by ineligible persons led Congress to enact legislation that provided a new five-year appropriation to address EITC noncompliance.[2]

Despite the results from Slemrod (1985) that secondary evasion is an indicator of primary evasion, we readily acknowledge that the concentration of earned income around the kink points of the EITC benefit distribution could also be an artifact of legal behavior. If taxpayers know about the EITC, can understand tax rules, and can calculate their expected adjusted gross income and earned income, then they can determine how the EITC affects their budget constraints (Liebman 1998).[3] Taxpayers familiar with the structure of the EITC can manipulate their earned income around the EITC kink points by adjusting their work schedules or by searching for additional legitimate self-employment deductions.

Regardless of whether this phenomenon occurs because of illegal or legitimate reasons, we are interested in: (1) observing whether secondary evasion exists among low-income taxpayers who receive the EITC and (2) observing the characteristics of these taxpayers. This study differs from Slemrod (1985) and Christian and Gupta (1993) in that neither of those studies examined secondary evasion in relation to income tax credits. In addition, our measure of secondary evasion differs. Slemrod's (1985) and Christian and Gupta's (1993) measure of secondary evasion involves positioning in tax table brackets, whereas our measure of secondary evasion involves positioning around the kink points of the EITC benefit distribution. Specifically, we expect earned income of taxpayers to cluster around the kink points of the plateau range of the credit (see Figure 1) because (1) the EITC is maximized at the plateau range and (2) marginal tax rates significantly increase throughout the phase-out range of the credit. Therefore, our paper broadens the external validity of the concept of secondary evasion.[4]

We find that the earned income of taxpayers who claim the EITC clusters around the kink points of the EITC benefit distribution. This clustering is especially strong for head of household taxpayers around the kink point of the phase-in range and, to a lesser extent, for married filing joint taxpayers around the kink point of the phase-out range. We estimate regression models by filing status and kink point location and find that our measure of secondary evasion is more associated with the characteristics of head of household taxpayers than those of married filing joint taxpayers. For head of household taxpayers, there is a positive association among secondary evasion and marginal tax rates and wages at the phase-in kink point and a positive (negative) association among secondary evasion and wages, Schedule C income, tax prepayment position, and Schedule C deductions at the

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1. In the first year of our sample period (1988), 10.4 million taxpayers claimed the EITC. The Taxpayer Compliance Measurement Program (TCMP) for 1988 estimates that only 7.1 million taxpayers were entitled to the credit. Of the $5.6 billion in EITC claims, the 1988 TCMP estimates that approximately $2 billion (33.6 percent) of the claims were inappropriate (Scholz 1994).
2. See P.L. 105-33, §5702.
3. Liebman (1998) states that interviews conducted by himself and other researchers suggest low awareness and understanding of the credit (see Liebman 1996; Olson and Davis 1994), especially the relationship between reported income and credit amounts. However, one of the authors of the current paper worked as a revenue agent with the IRS for four years, and spent significant time during three filing seasons assisting in the preparation of tax returns for low-income individuals. A surprising number of these individuals "manufactured" income and exemptions, among other items, in order to receive increased EITC benefits. In addition, the Illinois district of the IRS ran a project that examined tax returns of individuals who *overreported* income in order to claim the EITC, primarily by filing fraudulent Schedule Cs.
4. Taxpayers determine their credit amount from the EITC table, which is similar to the tax tables that are used to determine a taxpayer's income tax. Earned income is broken down into $50 intervals, and the credit amount changes as earned income changes.

phase-out kink point. For married filing joint taxpayers, marginal tax rates, wage income, and prepayment position are positively associated with secondary evasion at the phase-out kink point.

We organize the remainder of the paper as follows. In the next section, we discuss the legislative history of the EITC, the EITC eligibility rules, the structure of the EITC, and the use of distributional analysis to detect income management. We then describe the empirical procedures used to test our hypothesis and the associated results. Finally, we present conclusions and discuss potential policy implications.

BACKGROUND

Legislative History of the Credit

The EITC is a refundable credit originally intended to offset the burden of regressive social security taxes for poor working families with children. The EITC started as a temporary provision in 1975; its benefits consisted of a 10 percent credit on earnings up to $4,000 (phased out at a 10 percent rate over the $4,000 to $8,000 income range) for taxpayers with children. Legislation enacted in 1978 made the EITC a permanent tax code provision, added a flat (plateau) range to the phase-in and phase-out ranges, and provided an advance payment option so workers could receive the credit incrementally throughout the year. The Tax Reform Act of 1986 (TRA86) indexed the credit for inflation. The EITC expansion, passed in 1990 and phased in over 1991–93, increased the credit rate and provided additional benefits for taxpayers with more than one child. As a result of the Omnibus Reconciliation Act of 1993 (OBRA93), which was phased in over 1994–96, the credit rate increased sharply (more than doubling to 40 percent for taxpayers with two or more children) and a small credit was made available to childless taxpayers. Congress enacted small legislative changes since OBRA93, but these changes were primarily administrative in nature and were designed to improve compliance.[5]

EITC Eligibility Rules

There are several basic tests for EITC eligibility. First, a taxpayer must have earned income and adjusted gross income (AGI) below a threshold that varies by year.[6] Earned income is the sum of wage and salary income and net earnings from self-employment (i.e., business [Schedule C] and farm [Schedule F] income). In 1988, 1989, and 1990 (the years in our sample period) the earned income and AGI thresholds were $18,576, $19,340, and $20,264, respectively. Until 1991, a taxpayer could claim the EITC only if s/he used a filing status of married filing joint, head of household, or surviving spouse. Until 1994, a taxpayer had to have at least one qualifying child and the qualifying child(ren) had to meet age, relationship, and residency tests.[7] After 1993, a taxpayer with disqualifying income (defined as the sum of taxable and tax-exempt interest, dividends, net capital gains, rents, royalties, and passive income) greater than a certain level ($2,200 in 1994) was no longer eligible for the EITC.

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[5] For example, beginning in 1997, all taxpayers must provide the social security numbers of dependents and EITC-qualifying children claimed on their tax returns.

[6] In 1994, this threshold also began to vary by family size.

[7] The age test requires a child to be under the age of 19 (under the age of 24 if a full-time student). The relationship test requires the EITC recipient to be the parent or grandparent of the child. The residency test stipulates that a child must live with the taxpayer for at least six months of the year in a household located in the United States.

Economic Incentives Associated with the Structure of the EITC

The EITC generally equals a specified percentage of earned income up to a maximum dollar amount. The maximum credit is constant over a certain income range and then diminishes to zero over a specified phase-out range. In 1988, 1989, and 1990 the maximum EITC amount was $874, $910, and $953, respectively. A brief discussion of the three ranges of the EITC structure and its economic effects follows:

(1) *Phase-in (subsidy) range*. Benefits increase with income in the phase-in range; therefore, the EITC provides incentives for taxpayers to enter the workforce by increasing the marginal return to work. At the same time, the benefits increase taxpayers' income, which theoretically allows them to ''purchase'' more leisure. Although the net effect of the income and substitution effects in this range of the credit is ambiguous, a number of empirical analyses find that the income effect outweighs the substitution effect in the phase-in range, so the EITC should encourage taxpayers in this range to work.[8]

(2) *Plateau range.* At a specified income level ($6,240, $6,500, and $6,810 in 1988, 1989, and 1990, respectively), taxpayers receive the maximum EITC benefit available; this benefit remains constant as income increases. There is no substitution effect to counter the income effect in the plateau range, so the EITC may discourage additional work.

(3) *Phase-out range*. Benefits decrease as income increases in the phase-out range, the income and substitution effects unambiguously reinforce each other, and the EITC serves as a disincentive to work.[9] The EITC phase-out rate in 1988, 1989, and 1990 was 10 percent of earned income between $9,840–$18,576, $10,240–$19,340, and $10,730–$20,264, respectively.

In summary, the EITC operates like an earnings subsidy with a negative marginal tax rate in the phase-in range and then becomes a lump sum transfer to individuals in the plateau range. In the phase-out range, the EITC takes on properties of a negative income tax (Browning 1995).[10] Figure 1 illustrates the structure of the EITC during 1988, 1989, and 1990.

Prior Research

Most empirical studies that draw conclusions about tax evasion examine data from the IRS Tax Compliance Measurement Program (TCMP).[11] Few studies have made inferences about tax evasion from unaudited data by examining distributional anomalies, even though it is an accepted methodology for drawing inferences about the tendency to manage income.

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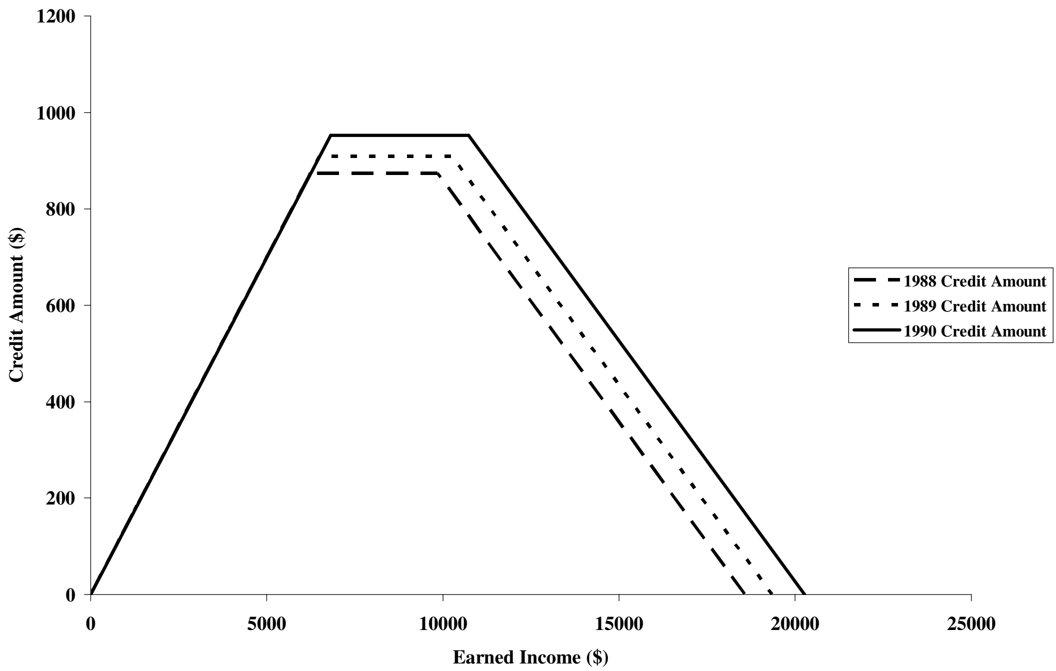
[8] Browning (1995), Hoffman and Seidman (1990), and the U.S. General Accounting Office (1993) all estimate that labor supply increases in the phase-in (subsidy) range of the credit.

[9] Sparse empirical evidence to date suggests that the phase-out range of the EITC has little or no effect on hours of work (Liebman 1998). Eissa and Liebman (1996) found no decline in hours worked among employed individuals when the EITC phase-out range was extended in 1987, although the confidence intervals from their tests could not rule out a small decrease.

[10] A negative income tax (NIT) is a mirror image of the regular tax system. Instead of tax liabilities varying positively with income according to a tax rate schedule, benefits vary inversely with income according to a benefit reduction schedule (i.e., the government provides a certain level of benefits and then gradually withdraws those benefits as earned income rises). The withdrawal of benefits is the defining characteristic of an NIT; the phase-out range is the only portion of the EITC that exhibits this characteristic.

[11] The IRS conducted TCMP audits to obtain data on taxpayers' reporting behavior. Each TCMP return was subject to an intensive line-by-line audit. Therefore, those with access to the TCMP database are able to observe the amount of income reported by the taxpayer and the amount of income, tax, and credits after IRS revenue agents make audit adjustments.

FIGURE 1
Earned Income Tax Credit Benefit Distribution: 1988–1990[a]



[a] This figure presents the EITC benefit distribution for 1988–1990. The left and right kink points, respectively, in each year are as follows: 1988 = ($6,240 | $9,840); 1989 = ($6,500 | $10,240); 1990 = ($6,810 | $10,730). The phase-in range is the area to the left of the left kink point, the plateau range is the area between the left and right kink point, and the phase-out range is the area to the right of the right kink point. We use 1988–1990 data because the structure of the EITC benefit distribution did not change during these years. Specifically, the phase-in, plateau, and phase-out ranges comprised 33.6, 19.4, and 47.0 percent, respectively, of the total EITC benefit distribution during each year of our sample.

Using data from the 1977 IRS public use file, Slemrod (1985) finds that taxpayers who use tax tables to determine their federal tax liability tend to cluster disproportionately at the top of the table brackets. Slemrod (1985) calls this behavior secondary evasion because this phenomenon is consistent with taxpayers misreporting income or deductions just enough to place them into the next lower tax table bracket. Christian and Gupta (1993) examine secondary evasion using data from the Statistics of Income Panel and find that this phenomenon persists over time, under different table structures, and over a larger range of income. They also regress their measure of secondary evasion against various taxpayer demographic characteristics and find that secondary evasion generally increases with marginal tax rates and opportunity, and decreases with income and age.

There is also evidence of bunching at the kink points generated by taxes and transfer programs. Burtless and Moffitt (1984) and Friedberg (1998) observe bunching among elderly taxpayers who received social security benefits while still working. Social security benefits are subject to tax (at rates that vary from 33 to 50 percent) when earned income exceeds a phase-out threshold, which generates large kinks in the budget sets of these taxpayers. Saez (1999) uses a graphical approach to determine whether taxable income bunches at the kink points of the U.S. income tax schedule (i.e., where marginal tax rates change). Saez (1999) finds that the bunching is strongest at the first kink point of the tax schedule (where marginal rates jump from 0 to 15 percent), and the evidence of bunching is stronger for taxpayers who itemize their deductions.[12]

RESEARCH DESIGN

Data and Sample Selection

Data are from the 1988–1990 Statistics of Income Panel of Individual Returns (SOI Panel), which is part of the Ernst & Young/University of Michigan Tax Research Database. The SOI Panel is a subset of the SOI Individual Model File and represents a simple 1 in 5,000 random sample of unaudited individual income tax returns filed each year.

The 1988–1990 SOI Panel years consist of 21,656, 22,352, and 22,863 unaudited individual tax returns, respectively. We choose this period because the structure of the EITC benefit distribution did not change during these years. Specifically, the phase-in, plateau, and phase-out ranges comprised 33.6, 19.4, and 47.0 percent, respectively, of the EITC benefit distribution during each year of our sample.[13]

Our sample begins with all tax returns from the 1988–1990 SOI Panel that meet the statutory requirements for receiving the EITC. We first delete tax returns reporting AGI or earned income above the maximum or minimum allowable for EITC taxpayers. Next, we remove tax returns with (1) erroneous social security number codes, (2) special tax computations, (3) a filing status other than married filing joint (MFJ) or head of household (HH), or (4) no personal dependency exemptions. Finally, we delete tax returns that taxpayers filed outside of the appropriate filing period. Consequently, for 1988, 1989, and 1990 we analyze 2,091, 2,261, and 2,411 EITC returns and 820, 844, and 833 non-EITC returns. We then pool the cross-sectional data for each sample year in order to examine the characteristics of taxpayers engaged in secondary evasion. Table 1 describes the sample selection process.

Univariate Tests

We define secondary evasion as the clustering of taxpayers' earned incomes within an $800 interval surrounding either of the kink points of the EITC benefit distribution. These kink points mark the beginning and end of the plateau range of the EITC. In order to maximize EITC benefits, taxpayers in the phase-in or phase-out ranges of the credit have an incentive to misreport income or deductions just enough to place their earned income in the plateau range of the credit.[14] The test for secondary evasion hinges on the underlying distribution of earned income at the kink points of the credit. Following Slemrod (1985) and Christian and Gupta (1993), we assume a uniform distribution. If the earned income distribution is uniform throughout the range of the EITC, then approximately 4 percent of

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[12] The only paper that mentions taxpayer bunching and the EITC is Liebman (1998), who finds little to no evidence of EITC taxpayers bunching at the phase-out kink point (and does not examine bunching with respect to the phase-in kink point). However, there are two issues that cloud this finding. First, it is unclear what definition of income Liebman (1998) uses in the distributions. The statutory definition of earned income is the most appropriate definition to address the bunching question. Second, the distributions in Liebman (1998, Figure 8) seem to exhibit humps indicative of bunching at the phase-out kink point. Unfortunately, Liebman (1998) does not provide any formal statistical tests regarding the bunching at the phase-out kink point, so inferences appear to be limited to visual inspection.

[13] For example, in 1990 the EITC benefit distribution began at $1 of earned income and ended at $20,264. The ending (beginning) of the phase-in (plateau) range was $6,810 and the ending (beginning) of the plateau (phase-out) range was $10,730.

[14] Taxpayers can also adjust their labor supply to position themselves in the plateau range.

TABLE 1
Sample Selection Criteria: 1988–1990[a]

	1988			1989			1990		
	EITC = 1	**EITC = 0**	**Total**	**EITC = 1**	**EITC = 0**	**Total**	**EITC = 1**	**EITC = 0**	**Total**
Full Sample:	2,153	19,503	21,656	2,348	20,004	22,352	2,500	20,183	22,683
Less:									
AGI Ceiling	0	10,655	10,655	0	10,938	10,938	0	11,063	11,063
EI Ceiling	0	0	0	0	116	116	0	126	126
EI Floor	0	1,966	1,966	6	1,745	1,751	0	1,825	1,825
SSNCODE ≥ 3	0	0	0	1	86	87	2	2	4
FLPDYR ≠ *YR*	60	133	193	78	116	194	86	224	310
SPECTX	2	7	9	2	10	12	1	5	6
MARS = 1, 3, 5, or 6	0	5,922	5,922	0	6,148	6,148	0	6,105	6,105
XTOT = 0	0	0	0	0	1	1	0	0	0
	2,091	820	2,911	2,261	844	3,106	2,411	833	3,244

[a] This table presents the sample selection criteria. Our sample begins with all tax returns from the 1988–1990 SOI Panel that meet the statutory requirements for receiving the EITC. We first delete tax returns reporting *AGI* or earned income (*EI*) above the maximum ($18,576, $19,340, $20,264, in 1988, 1989, 1990, respectively) or minimum ($1 in each year) allowable for EITC taxpayers. Next, we remove tax returns with (1) erroneous social security number codes (*SSNCODE*), (2) special tax computations (*SPECTX*), (3) a filing status (*MARS*) other than married filing joint (MFJ) or head of household (HH), or (4) no personal dependency exemptions (*XTOT*). Finally, we delete tax returns that taxpayers filed outside of the appropriate filing period (*FLPDYR*). Consequently, for 1988, 1989, and 1990 we analyze 2,091, 2,261, and 2,411 EITC returns and 820, 844, and 833 non-EITC returns, respectively.

EITC taxpayers should cluster within an $800 interval surrounding each kink point.[15] Specifically, we test the null hypothesis that the population percentage of returns with earned income that falls within either $800 interval surrounding the kink points of the EITC benefit distribution in 1988, 1989, or 1990 is 4.31, 4.14, and 3.95 percent, respectively.

We first test our hypothesis of no secondary evasion using a graphical approach. Similar to Saez (1999), we estimate earned income densities using the kernel density method in order to document earned income clustering around the kink points of the EITC benefit distribution. Saez (1999) first uses histograms to test whether there are "atoms" of taxpayers at the kink points of the income tax rate schedule. His histograms do not reveal such atoms; therefore, he rejects the hypothesis of a non-negligible number of taxpayers perfectly controlling their taxable income. Since the taxpayers in Saez's (1999) study are not able to perfectly control their taxable income, they tend to cluster around the kink points of the tax rate schedule, rather than bunch perfectly at the kink points. The better taxpayers are at controlling their incomes, the sharper the humps (Saez 1999). By providing a smooth and continuous probability density function shape, kernel density estimates are more appropriate than histograms to identify humps in the distribution (Saez 1999).

We form the kernel density estimate by summing the weighted values calculated with the kernel function K, and calculate the kernel density estimator using the following formula: the probability density function for a random variable (x) as calculated by a kernel density estimator is generally given by the following formula:

$$\hat{f}_K = \frac{1}{nh} \sum_{i=1}^{n} K\left(\frac{x - x_i}{h}\right) \tag{1}$$

where K is the specific kernel function chosen to estimate the probability density function, h is the bandwidth, n is the number of observations, and x is the variable for which we wish to estimate the kernel. We use the Epanechnikov (1969) kernel function:

$$K(z) = \frac{\frac{3}{4}\left(1 - \frac{1}{5} z^2\right)}{\sqrt{5}}, \text{ if } |z| < \sqrt{5} \tag{2}$$

where z is $\left(\frac{x - x_i}{h}\right)$ from Equation (1). The Epanechnikov kernel function is the most efficient kernel density estimator in minimizing the mean integrated squared error (Salgado-Ugarte et al. 1993). However, since there is little difference in efficiency among the various kernel functions, the choice of the kernel function is not crucial to determining the shape of the probability density function estimates (Epanechnikov 1969).

In addition to examining the kernel density estimates of earned income, we also use the Z-statistic, which is a normal approximation to the binomial distribution, to test for a difference between (1) the percentage of returns with earned income that actually falls within the $800 kink-point intervals of the EITC and (2) the percentage of returns with earned income that would uniformly fall within the $800 kink-point intervals of the EITC. We calculate the approximate Z-statistic as follows:

[15] We wanted the majority of the kink point range to lie on the plateau side of the range (where the EITC is maximized) since that is the side of the range that interests us. Therefore, we measure the specific intervals as (−300, +500) around the phase-in kink point and (−500, +300) around the phase-out kink point (e.g., in 1988, when the kink points were $6,240 and $9,840, the intervals we test are $5,940–$6,740 and $9,340–$10,040).

$$Z = \frac{x - (n * p)}{\sqrt{(n * p) * (1 - p)}} \tag{3}$$

where x is the number of successes, n is the number of trials, and p is the probability of observing x successes in n trials (i.e., the probability of success). This measure is reasonable as long as $(n * p)$ and $n * (1 - p)$ are greater than 15 (Bhattacharyya and Johnson 1977).

Regression Model

Slemrod (1985) extends the classic Allingham and Sandmo (1972)/Yitzhaki (1974) tax evasion model to include secondary evasion, where a taxpayer's expected gain in tax revenue comes at a bargain price, which is reflected in a lower probability of detection relative to primary evasion. Slemrod (1985) and Christian and Gupta (1993) document the existence of secondary evasion, and find that it is associated with variables found in the microeconometric tax compliance literature.

It is in the spirit of Slemrod (1985) and Christian and Gupta (1993), as well as the distributional analyses of the accounting earnings management literature, that we examine an alternative specification of secondary evasion. We estimate a pooled logit regression to model the probability of secondary evasion.[16]

$$\Pr(y_{it} = 1) = \frac{e^{x'_{it}\beta}}{1 + e^{x'_{it}\beta}} \; i = 1,\ldots,n; \; t = 1,\ldots,R. \tag{4}$$

We code our dependent measure of secondary evasion 1 if a taxpayer's earned income lies within either of the following $800 intervals surrounding the kink points of the EITC benefit distribution (precise kink-point locations in parentheses):

	Earned Income	
Year	**Phase-In Kink-Point Interval**	**Phase-Out Kink-Point Interval**
1988	$5,940 < (6,240) ≤ $6,740	$9,340 < (9,840) ≤ $10,140
1989	$6,200 < (6,500) ≤ $7,000	$9,740 < (10,240) ≤ $10,540
1990	$6,510 < (6,810) ≤ $7,310	$10,230 < (10,730) ≤ $11,030

and 0 otherwise.

We define and measure the independent variables as follows:

- Marginal tax rate (*MTR*) is the combined statutory, payroll, and credit tax rate (see the Appendix for calculation details).
- Wage income (*WAGE*) is a taxpayer's wage/salary income.
- Schedule C receipts (*CINC*) are a taxpayer's total gross receipts as reported on Schedule C.
- Schedule C deductions (*CDED*) are a taxpayer's total deductions from income as reported on Schedule C.

[16] Since our data likely suffer from two persistent econometric biases, heterogeneity bias and omitted variable bias, we also estimated a fixed-effects logit model using the conditional maximum likelihood estimator developed by Chamberlain (1980). However, we fail to reject the null hypothesis of homogeneity of intercepts using the Hausman (1978) test, which suggests that the pooled logit is the appropriate specification.

- Earned income squared (EI^2) is the sum of wages and self-employment income squared.
- Experience (*EXP*) is a dummy variable set to 1 if a taxpayer received the EITC in the current year and has received the EITC in at least two prior years, and 0 otherwise.
- Number of Dependents (*DEP*) is the total number of dependent exemptions (excluding the primary and secondary taxpayer) reported on Form 1040.
- Balance Due (*BDUE*) is a dummy variable set to 1 if the taxpayer has a balance due to the IRS, and 0 otherwise.
- Region (*MATL*, *MWST*, *NATL*, *SEST*, *SWST*, *WST*) includes a set of six dummy variables set to 1 if the taxpayer files a return in the Mid-Atlantic, Midwest, North Atlantic, Southeast, Southwest, or West IRS regions, and 0 otherwise.
- Marital status (*MS*) is a dummy variable set to 1 for returns with the MFJ filing status, and 0 otherwise.

Prior microeconometric studies of tax evasion use the independent variables in our model:[17]

Marginal Tax Rate. Marginal tax rates (MTRs) are important because they show how government policies affect incentives and reflect the distributional consequences of individual decisions. The layering of multiple income-conditioned phase-outs on top of various income-related taxes represents a potential, substantial loss of income and other benefits to those who claim the EITC.[18] If one accepts that individuals are risk-neutral, then increasing MTRs provide an impetus for noncompliance. However, empirical results concerning the effects of MTRs on noncompliance are mixed. For example, Joulfaian and Rider (1996, 1998) show that high MTRs in the phase-out range of the EITC increase the noncompliance of small business owners, while Erard (1997) finds that MTRs are negatively (positively) associated with noncompliance on paid-prepared (self-prepared) returns.

Wages. Since wages are difficult to misreport, taxpayers can adjust their labor supply in order to influence the amount of EITC they receive.[19] As discussed in the background, the different phases of the EITC provide different incentives toward working. Since approximately 77 percent of EITC taxpayers have incomes that fall in the plateau or phase-out ranges of the credit, Hotz and Scholz (2001) argue that the EITC could lead to a reduction in the labor supplied by low-income workers.

Schedule C Receipts and Schedule C Deductions. As a proxy for business self-employment income, we use two separate measures, Schedule C receipts and Schedule C

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[17] Two additional variables are commonly studied in the compliance literature but are not included in our model: itemized deductions and tax preparer usage. We do not include itemized deductions in the model because itemized deductions do not enter into the calculation of earned income; therefore, taxpayers cannot use itemized deductions to manipulate their position along the EITC benefit distribution. The tax preparer variable is not available in the 1990 SOI Panel File (1990 is the last year in our sample). We included the tax preparer variable in cross-sectional regressions for 1988 and 1989 (not reported), but it is not significant.

[18] In addition to losing EITC benefits, taxpayers in the phase-out range also begin to lose benefits from other government programs, such as AFDC (now TANF), Medicare, Medicaid, and Food Stamps.

[19] A referee was concerned that taxpayers who receive the EITC do not have the financial flexibility to adjust (in particular, forgo) income in order to receive larger EITC benefits. However, taxpayers could work for undocumented wages or work as independent contractors and not report wages paid to them in this capacity. Further, research (e.g., Ayers et al. 1999) shows that low-income taxpayers overwithhold income taxes, essentially providing an interest-free loan to the government. In 1996, approximately 76 percent of U.S. individual taxpayers made excess interim tax payments aggregating to $117 billion (IRS 1998), implying a considerable forfeiture of interest that taxpayers could have earned (Slemrod et al. 1997). In addition, Liebman (1998) reports that less than 0.3 percent of EITC taxpayers took advantage of the EITC advance payment option in 1993.

deductions. Business income, which includes these two measures, is not subject to independent payor reporting by the IRS, as is wage income. Therefore, taxpayers have more discretion in reporting these amounts. Using data from the 1988 TCMP program, both Ho (1994) and Joulfaian and Rider (1998) find that taxpayers understate self-employment income in order to increase the amount of EITC that they receive.[20] However, McCubbin (1999) finds that only 17.6 percent of all EITC filers claim any self-employment income; 54.3 percent of those filers have income in the phase-out range, which suggests that the strategic misreporting of self-employment income may not be a dominant feature of EITC noncompliance (Hotz and Scholz 2001). By separating self-employment income into two variables (receipts and deductions), we hope to isolate the effects of each potential taxpayer income-manipulation tool with respect to the EITC.

Earned Income Squared. This is included in our model to allow for a possible nonlinear income effect.[21] We capture the effect of earned income, which is essentially the sum of wages and net earnings from self-employment, with the *Wages* and *Schedule C Receipts/ Schedule C Deductions* variables (discussed above).[22]

Experience. Liebman (1998) states that taxpayers have limited opportunity to learn about EITC incentives compared to the opportunities to learn about the incentives associated with other welfare programs. Liebman (1998) suggests that working taxpayers may not be able to perceive the marginal incentives from the phase-out of the credit (and adjust their labor supply) until they receive the credit twice.[23]

Balance Due. We motivate the inclusion of a balance due tax prepayment position in part by persuasive evidence of lower compliance from returns reporting a balance due (opposed to those reporting a refund). Clotfelter (1983) first observed this association using 1969 TCMP data. Chang and Schultz (1990) confirmed the finding with a more direct test using voluntary compliance rates from the 1982 TCMP. In addition, tax prepayment position is likely to be associated with other types of taxpayer reporting behavior. For example, taxpayers may owe more taxes than expected or receive a smaller than anticipated refund. Under Kahneman and Tversky's (1979) prospect theory, such taxpayers would interpret their situations as losses and could adopt more aggressive tax reporting positions or search for more deductions to further lower their tax liabilities.

Number of Dependents. Liebman (1998, 2000) and McCubbin (1999, 2000) find that a major source of EITC noncompliance is due to qualifying child errors. McCubbin (2000) finds that the probability of misreporting a child is increasing in the size of the EITC. The number of qualifying children did not affect the amount of EITC benefits until 1991. Therefore, we include number of dependents primarily as an individual-difference control variable.

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[20] Taxpayers may also overstate self-employment income in order to claim EITC benefits. For example, a taxpayer could file a false Schedule C or F with enough gross receipts (and zero deductions) to place them in the plateau range of the EITC distribution in any given year.

[21] Nonlinearity is observed in compliance research by Cox (1984) using micro-TCMP data from 1979 but not by Witte and Woodbury (1985). Christian and Gupta (1993) include an income-squared variable in their models, but no significant nonlinear income effect is found.

[22] Net earnings from self-employment also include Schedule F (farm) income. However, we do not include a separate variable for net earnings from farming because it predicts failure perfectly (and therefore is dropped from the model) in the head of household logit regressions. Net earnings from farming are not significant in the married filing joint regressions.

[23] Liebman (1998, 107) presents the following example to justify this statement: In theory, a taxpayer could work half-time one year with earnings in the plateau range of the credit and full-time in the following year (thereby losing some of the EITC, assuming a constant wage rate), and realize that the benefit from moving from part-time to full-time work was not worth the lost leisure. This requires the taxpayer to receive the EITC twice before adjusting behavior in the third year.

Region. We include region in our model primarily as an individual-difference control variable. It is likely that taxpayers' attitudes and beliefs about tax compliance (among other factors) vary by region. In addition, empirical evidence has documented regional differences in tax compliance. For example, Clotfelter (1983) found lower compliance for nonbusiness returns in the West, Southwest, and Southeast regions.

Marital Status. Taxpayers who receive the EITC are subject to the marriage penalty, therefore we expect these individuals to have incentives to misreport income or deductions in order to maximize their EITC.[24] The empirical evidence on marital status suggests that married taxpayers are more likely to evade (Clotfelter 1983; Feinstein 1991; Erard 1993).

RESULTS

Descriptive Statistics

We present descriptive statistics for both EITC and non-EITC returns in Table 2. EITC taxpayers generally face lower marginal tax rates (*MTR*) than non-EITC taxpayers; however, this relationship reverses for taxpayers in the upper quartile of the sample. Approximately 40 (90) percent of EITC (non-EITC) taxpayers filed as MFJ during our sample period. The percentage of EITC (non-EITC) taxpayers who report a balance due (*BDUE*) varied from 4.2 (22.7) percent in 1988 to 6.5 (22.9) percent in 1990. EITC taxpayers also report higher average wages (*WAGE*) and lower business income (*CINC* − *CDED*) than those who do not receive the EITC. EITC taxpayers on average report higher earned incomes (*EI*) than non-EITC taxpayers. At first glance, this appears to support the notion that the EITC acts as an incentive for taxpayers to work harder by increasing the marginal return to work. However, taxpayers who claim the EITC report dependents, unlike the majority of non-EITC taxpayers, so there is a potential confounding explanation as to the source of the incentive to work harder. The percentage of taxpayers who received the EITC for the third time (*EXP*) increased from 29 percent in 1988 to 52 percent in 1990. t-tests of differences (not tabulated) among the characteristics of EITC and non-EITC tax returns in Table 2 indicate that the means of all variables except Schedule C income (*CINC*) (in 1989 and 1990) and adjusted gross income (*AGI*) (in 1988 and 1990) are significantly different at $p \leq 0.05$

We also report descriptive statistics of sample EITC taxpayers by filing status in Table 3. MFJ taxpayers report higher earned incomes, wages, self-employment incomes, and MTRs than HH taxpayers. On average, HH taxpayers have more experience with the EITC; 44.41 percent of HH taxpayers received the EITC three or more times between 1984 and 1990, compared to 39.49 percent of MFJ taxpayers. HH taxpayers receive about 12 percent more in EITC payments than MFJ taxpayers, while approximately 2.18 (9.76) percent of HH (MFJ) returns report a balance due. Finally, MFJ taxpayers report more dependents on average than HH taxpayers.

Univariate Results

We present the results of the EITC (non-EITC) taxpayers' earned income kernel density estimations in the left (right) column of Tables 4–6. In Table 4, there appears to be earned income clustering among EITC taxpayers, and the clustering is especially strong around the phase-in kink-point. The clustering seems especially pronounced when compared to

[24] The following example illustrates the marriage penalty as it pertains to the EITC. Assume two working individuals in 1990 each have one qualifying child and earned income of $8,500, which would qualify each for the maximum EITC of $953 ($1,906 total). If these individuals were married, their total earned income ($17,000) would place them in the phase-out range of the credit and their EITC would total $326, a $1,580 marriage penalty.

TABLE 2
Descriptive Statistics: 1988–1990 EITC and Non-EITC Returns[a]

Panel A: EITC Returns

	1988 (n = 2,091)					1989 (n = 2,261)					1990 (n = 2,411)				
	Mean	**SD**	**Q1**	**Med**	**Q3**	**Mean**	**SD**	**Q1**	**Med**	**Q3**	**Mean**	**SD**	**Q1**	**Med**	**Q3**
MTR	0.101	0.159	0.000	0.149	0.250	0.093	0.162	−0.017	0.123	0.250	0.094	0.160	−0.017	0.123	0.250
MARS	0.396	0.489	0.000	0.000	1.000	0.387	0.487	0.000	0.000	1.000	0.361	0.480	0.000	0.000	1.000
BDUE	0.042	0.200	0.000	0.000	0.000	0.046	0.209	0.000	0.000	0.000	0.065	0.246	0.000	0.000	0.000
WAGE	9,481	5,372	5,328	9,734	13,990	9,486	5,602	4,923	9,583	14,060	10,037	5,755	5,358	10,250	14,790
CINC	3,807	23,583	0	0	0	5,368	43,727	0	0	0	5,240	37,847	0	0	0
CDED	1,499	8,008	0	0	0	1,826	10,934	0	0	0	1,858	10,762	0	0	0
AGI	10,411	5,753	6,765	10,870	14,680	10,447	7,040	6,700	10,850	15,010	11,040	5,673	7,024	11,310	15,560
EI	10,067	4,903	6,188	10,290	14,170	10,189	5,164	6,038	10,370	14,560	10,657	5,316	6,363	10,780	15,070
DEP	1.720	1.027	1.000	1.000	2.000	1.669	1.003	1.000	1.000	2.000	1.666	0.993	1.000	1.000	2.000
EXP	0.289	0.454	0.000	0.000	1.000	0.447	0.497	0.000	0.000	1.000	0.520	0.500	0.000	1.000	1.000

Panel B: Non-EITC Returns

	1988 (n = 820)					1989 (n = 844)					1990 (n = 833)				
	Mean	**SD**	**Q1**	**Med**	**Q3**	**Mean**	**SD**	**Q1**	**Med**	**Q3**	**Mean**	**SD**	**Q1**	**Med**	**Q3**
MTR	0.114	0.077	0.000	0.150	0.150	0.117	0.078	0.000	0.150	0.150	0.113	0.079	0.000	0.150	0.150
MARS	0.893	0.310	1.000	1.000	1.000	0.882	0.323	1.000	1.000	1.000	0.875	0.331	1.000	1.000	1.000
BDUE	0.227	0.419	0.000	0.000	0.000	0.246	0.431	0.000	0.000	0.000	0.229	0.420	0.000	0.000	0.000
WAGE	7,805	5,801	2,221	7,425	12,760	7,914	5,925	1,936	8,157	12,815	8,359	6,323	2,155	8,207	13,750
CINC	7,568	40,566	0	0	0	8,570	41,743	0	0	0	6,607	27,962	0	0	0
CDED	3,025	12,980	0	0	0	3,266	17,066	0	0	0	2,970	12,630	0	0	0
AGI	10,784	7,079	7,609	11,905	15,165	11,375	7,542	8,763	12,230	15,575	10,855	17,273	8,356	12,540	16,410
EI	9,020	5,378	4,446	8,982	13,425	9,370	5,388	4,890	9,493	13,490	9,763	5,771	5,157	9,634	14,590
DEP	0.239	0.737	0.000	0.000	0.000	0.259	0.736	0.000	0.000	0.000	0.287	0.741	0.000	0.000	0.000

[a] This table presents descriptive statistics tax returns of both EITC (Panel A) and non-EITC (Panel B) taxpayers. We define the variables as follows: *MTR* = combined statutory, payroll, and credit marginal tax rate; *MARS* = dummy variable set to 1 if a taxpayer's filing status is married joint, and 0 otherwise; *BDUE* = dummy variable set to 1 if the taxpayer reports a balance due, and 0 otherwise; *WAGE* = wage income; *CINC* = Schedule C gross receipts; *CDED* = total Schedule C deductions; *AGI* = adjusted gross income; *EI* = earned income; *DEP* = number of dependents; *EXP* = dummy variable set to 1 if the taxpayer received the EITC in the current year and has received the EITC in at least two prior years, and 0 otherwise.

TABLE 3
Descriptive Statistics: 1998–1990 EITC Returns by Filing Status[a]

Panel A: EITC Returns—Married Filing Joint Taxpayers

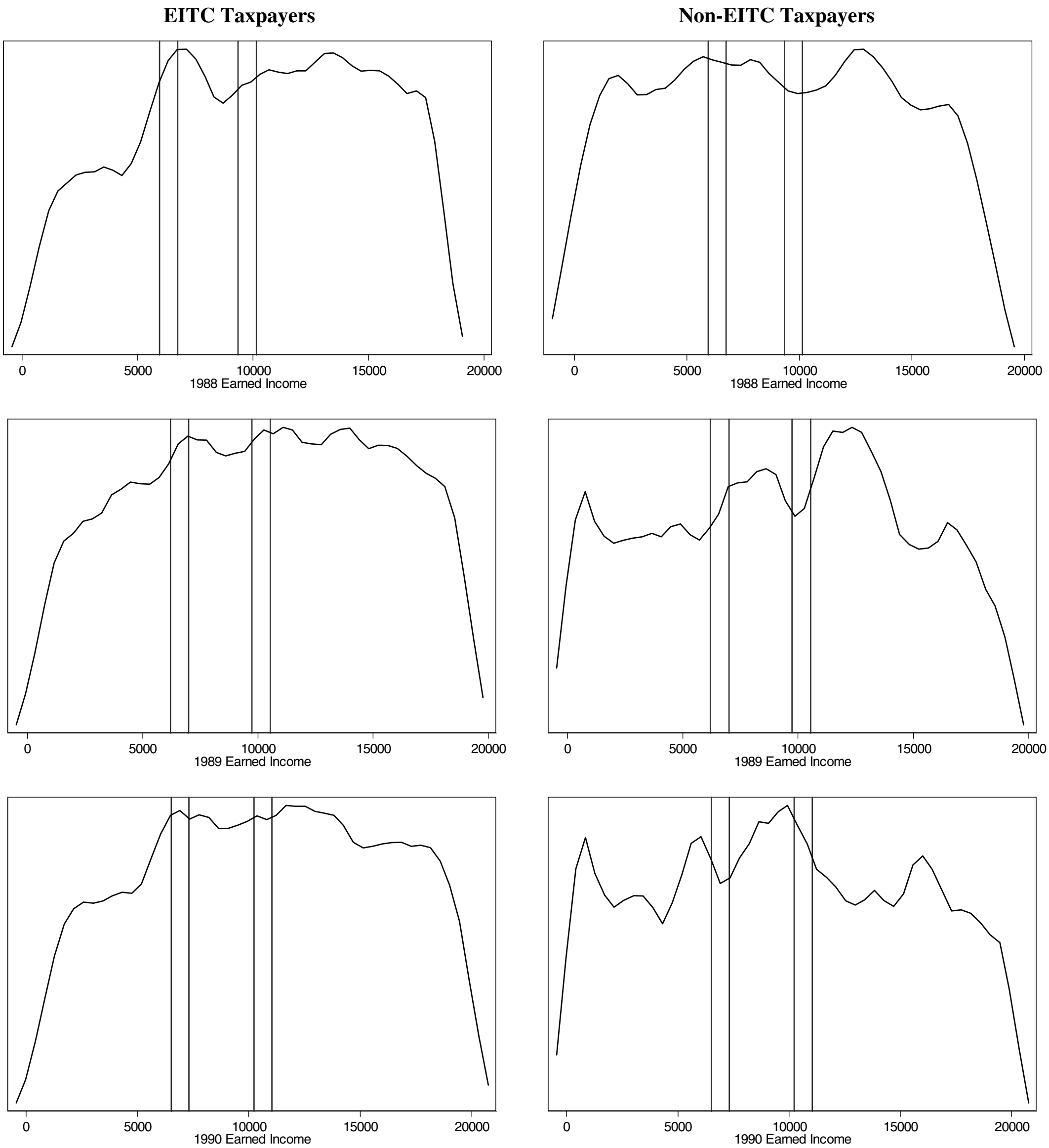
	1988 (n = 828)					1989 (n = 875)					1990 (n = 870)				
	Mean	**SD**	**Q1**	**Med**	**Q3**	**Mean**	**SD**	**Q1**	**Med**	**Q3**	**Mean**	**SD**	**Q1**	**Med**	**Q3**
MTR	0.122	0.144	0.000	0.123	0.250	0.120	0.149	0.000	0.123	0.250	0.111	0.149	0.000	0.100	0.250
BDUE	0.079	0.269	0.000	0.000	0.000	0.087	0.282	0.000	0.000	0.000	0.126	0.333	0.000	0.000	0.000
WAGE	9,999	5,770	5,419	10,900	14,835	9,998	6,101	4,923	10,710	15,050	10,364	6,226	5,250	10,925	15,680
CINC	8,571	36,167	0	0	0	12,523	68,989	0	0	0	12,773	60,841	0	0	0
CDED	3,287	11,778	0	0	0	4,129	16,754	0	0	0	4,334	16,293	0	0	0
EI	11,177	4,693	7,667	11,615	15,210	11,519	4,995	7,734	12,300	15,680	11,816	5,133	7,919	12,230	16,290
EITC	495	282	243	491	773	512	288	261	513	770	563	305	290	584	859
DEP	2.016	1.097	1.000	2.000	3.000	2.002	1.057	1.000	2.000	3.000	1.970	1.057	1.000	2.000	3.000
EXP	0.248	0.432	0.000	0.000	0.000	0.416	0.493	0.000	0.000	1.000	0.514	0.500	0.000	1.000	1.000

Panel B: EITC Returns—Head of Household Taxpayers

	1988 (n = 1,257)					1989 (n = 1,382)					1990 (n = 1,529)				
	Mean	**SD**	**Q1**	**Med**	**Q3**	**Mean**	**SD**	**Q1**	**Med**	**Q3**	**Mean**	**SD**	**Q1**	**Med**	**Q3**
MTR	0.086	0.167	−0.140	0.150	0.250	0.076	0.168	−0.140	0.100	0.250	0.084	0.166	−0.140	0.150	0.250
BDUE	0.017	0.128	0.000	0.000	0.000	0.020	0.138	0.000	0.000	0.000	0.028	0.165	0.000	0.000	0.000
WAGE	9,148	5,060	5,267	9,153	13,350	9,159	5,240	4,908	8,926	13,300	9,863	5,456	5,490	9,916	14,200
CINC	664	6,238	0	0	0	854	7,999	0	0	0	951	10,028	0	0	0
CDED	312	3,407	0	0	0	373	3,539	0	0	0	446	5,075	0	0	0
EI	9,339	4,902	5,580	9,275	13,370	9,347	5,096	5,164	9,128	13,380	10,006	5,304	5,807	9,930	14,200
EITC	557	274	323	587	843	586	284	345	632	875	616	295	365	663	926
DEP	1.524	0.930	1.000	1.000	2.000	1.459	0.907	1.000	1.000	2.000	1.493	0.910	1.000	1.000	2.000
EXP	0.318	0.466	0.000	0.000	1.000	0.468	0.499	0.000	0.000	1.000	0.523	0.499	0.000	1.000	1.000

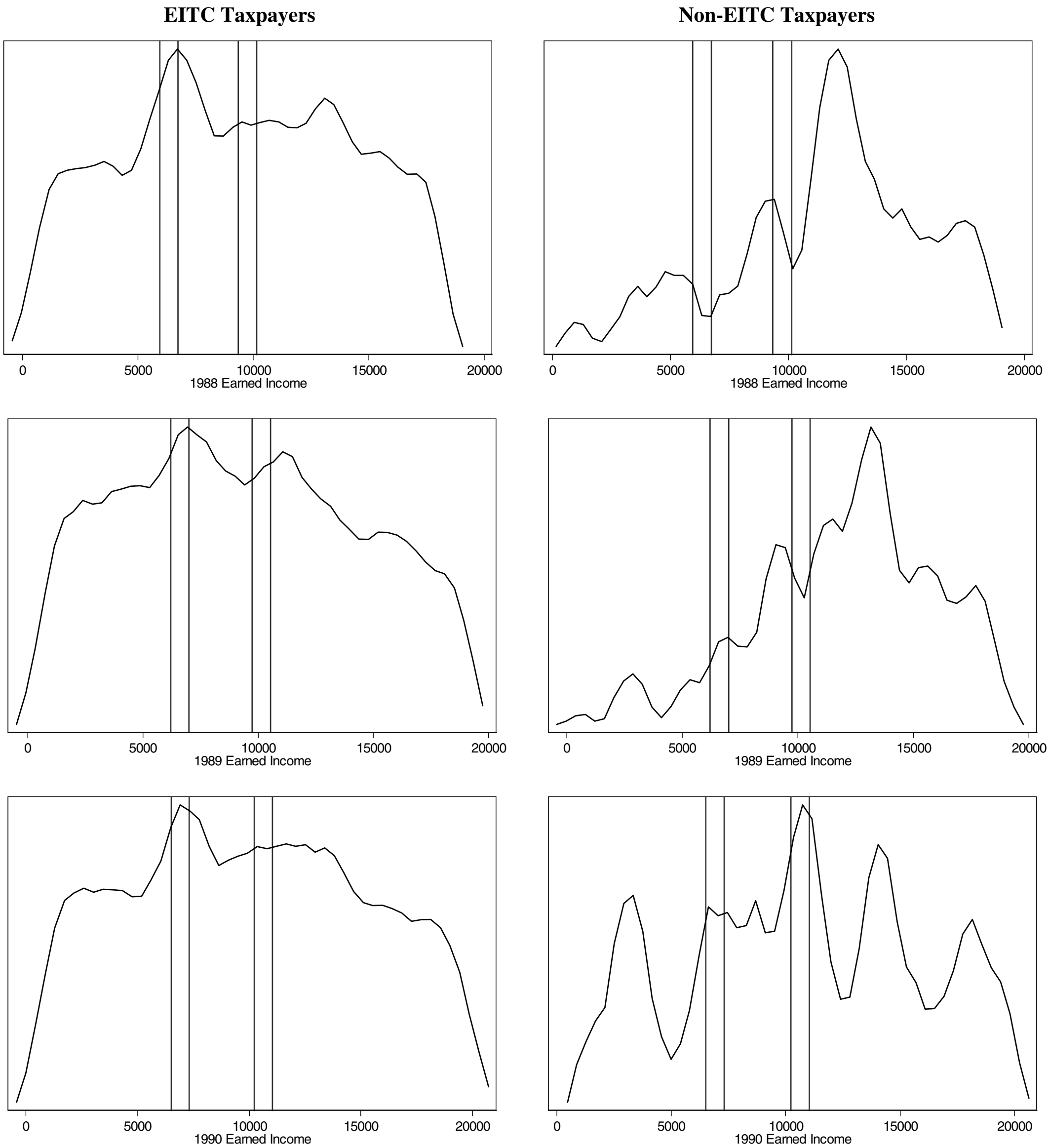
[a] This table presents descriptive statistics tax returns of both married filing joint (Panel A) and head of household (Panel B) EITC taxpayers. We define the variables as follows: *MTR* = combined statutory, payroll, and credit marginal tax rate; *BDUE* = dummy variable set to 1 if the taxpayer reports a balance due, and 0 otherwise; *WAGE* = wage income; *CINC* = Schedule C gross receipts; *CDED* = total Schedule C deductions; *EI* = earned income; *EITC* = earned income tax credit; *DEP* = number of dependents; *EXP* = dummy variable set to 1 if the taxpayer received the EITC in the current year and has received the EITC in at least two prior years, and 0 otherwise.

TABLE 4
Kernel Density Estimates for EITC and Non-EITC Taxpayers: 1988–1990[a]



[a] This table presents kernel density estimates of earned income for EITC taxpayers (left column) and non-EITC taxpayers (right column) for 1988–1990. The pairs of vertical lines in each graph represent $800 intervals surrounding each kink point of the EITC distribution. The bandwidth for all estimations is 500. The total number of EITC (non-EITC) returns in 1988, 1989, and 1990 was 2,091 (820), 2,261 (844), and 2,411 (833), respectively.

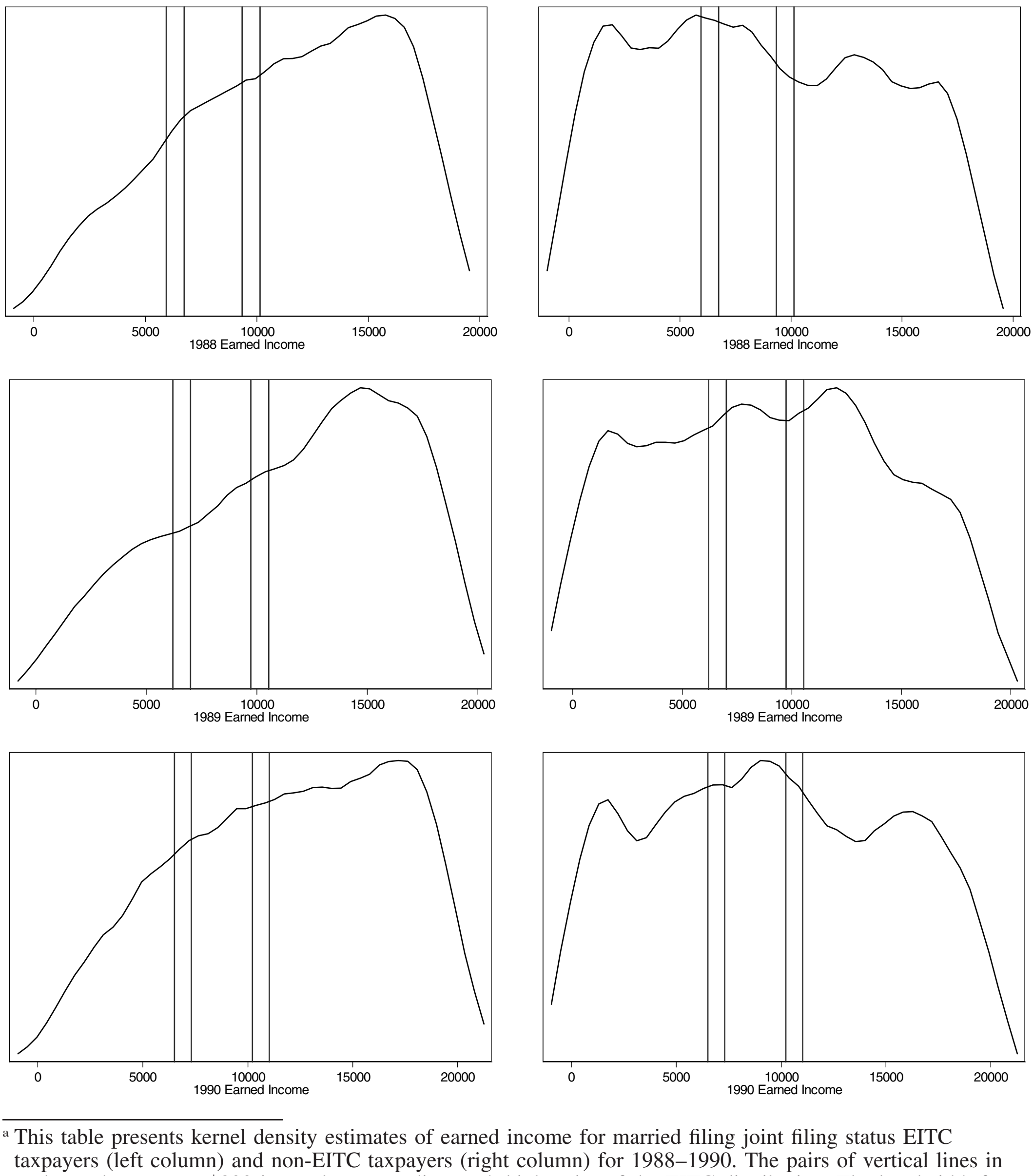
TABLE 5
Kernel Density Estimates for Head of Household EITC and Non-EITC Taxpayers: 1988–1990[a]



[1] This table presents kernel density estimates of earned income for head of household filing status EITC taxpayers (left column) and non-EITC taxpayers (right column) for 1988–1990. The pairs of vertical lines in each graph represent $800 intervals surrounding each kink point of the EITC distribution. The bandwidth for all estimations is 500. The total number of head of household EITC (non-EITC) returns in 1988, 1989, and 1990 was 1,257 (88), 1,382 (100), and 1,529 (104), respectively.

TABLE 6
Kernel Density Estimates for Married Filing Joint EITC and Non-EITC Taxpayers: 1988–1990[a]

EITC Taxpayers | **Non-EITC Taxpayers**



[a] This table presents kernel density estimates of earned income for married filing joint filing status EITC taxpayers (left column) and non-EITC taxpayers (right column) for 1988–1990. The pairs of vertical lines in each graph represent $800 intervals surrounding each kink point of the EITC distribution. The bandwidth for all estimations is 500. The total number of married filing joint EITC (non-EITC) returns in 1988, 1989, and 1990 was 828 (732), 875 (744), and 870 (729), respectively.

that of non-EITC taxpayers. When we examine taxpayers by filing status, it is clear that taxpayers filing as HH drive the clustering. Table 5 (6) contains the results for taxpayers filing as HH (MFJ). For the HH filers, the earned income clustering among EITC taxpayers appears to be confined to the phase-in kink point, although there are also small humps evident around the phase-out kink point. Surprisingly, there is also a pronounced hump around the phase-out kink point of the HH non-EITC taxpayers in 1990. The graphs in Table 6 for MFJ filers offer no evidence of bunching around either kink point, for either EITC or non-EITC taxpayers.

Tables 7–9 present more formal tests for ''secondary evasion,'' which generally confirm the graphical evidence presented in Tables 4–6. The results for HH filers (Table 8) indicate that the earned incomes of taxpayers who receive the EITC tend to cluster within the $800 kink-point intervals of the EITC benefit distribution. The clustering is especially strong at

TABLE 7
Percentage of Returns with Earned Income within $800 of the EITC Benefit Distribution Kink Points[a]

Panel A: EITC Returns

	1988			1989			1990		
	n	%	Z[b]	n	%	Z	n	%	Z
Kink Point									
Phase-in	116	5.55	2.80†	104	4.60	1.11	110	4.56	1.55‡
Phase-out	109	5.21	2.04†	105	4.64	1.21	115	4.77	2.07†

Panel B: Non-EITC Returns

	1988			1989			1990		
	n	%	Z	n	%	Z	n	%	Z
Kink Point									
Phase-in	40	4.88	0.81	34	4.03	−0.16	29	3.48	−0.69
Phase-out	31	3.78	−0.74	32	3.79	−0.50	35	4.20	0.38

Panel C: Difference between EITC and Non-EITC Returns

	1988			1989			1990		
	n	%	Z	n	%	Z	n	%	Z
Kink Point									
Phase-in			1.42‡			1.38‡			2.90*
Phase-out			3.43*			2.12†			1.39‡

*, †, ‡ Denote significance at the 0.01, 0.05, and 0.10 (one-tailed) levels, respectively.

[a] This table presents the results of tests of the null hypothesis that the population percentage of returns with earned income falling within an $800 interval surrounding the kink points of the EITC benefit distribution in 1988, 1989, and 1990 is 4.31, 4.14, and 3.95 percent, respectively. The specific interval measured is (−300, +500) around the phase-in kink point and (−500, +300) around the phase-out kink point. The phase-in kink points in 1988, 1989, and 1990 are $6,240, $6,500, and $6,810, respectively. The phase-out kink points in 1988, 1989, and 1990 are $9,840, $10,240, and $10,730, respectively. The total number of EITC (non-EITC) returns in 1988, 1989, and 1990 was 2,091 (820), 2,261 (844), and 2,411 (833), respectively.

[b] n is the number of tax returns with earned income that falls within the $800 intervals surrounding each kink point of the EITC benefit distribution. Z is the Z-statistic that tests the null hypothesis that the population percentage of returns with earned income surrounding the kink points of the EITC benefit distribution in 1988, 1989, and 1990 is 4.31, 4.14, and 3.95 percent, respectively.

TABLE 8
Percentage of Head of Household Filing Status Returns with Earned Income within $800 of the EITC Benefit Distribution Kink Points[a]

Panel A: EITC Returns

	1988			1989			1990		
	n	%	Z[b]	n	%	Z	n	%	Z
Kink Point									
Phase-in	78	6.21	3.32*	76	5.50	2.54*	87	5.69	3.50*
Phase-out	66	5.25	1.65†	59	4.27	0.25	75	4.91	1.92†

Panel B: Non-EITC Returns

	1988			1989			1990		
	n	%	Z	n	%	Z	n	%	Z
Kink Point									
Phase-in	2	2.27	−0.94	3	3.00	−0.57	7	6.73	1.46‡
Phase-out	4	4.55	0.11	4	4.00	−0.07	10	9.62	2.97*

Panel C: Difference between EITC and Non-EITC Returns

	1988			1989			1990		
	n	%	Z	n	%	Z	n	%	Z
Kink Point									
Phase-in			9.36*			5.45*			−1.62
Phase-out			1.20			0.51			−6.25

*, †, ‡ Denote significance at the 0.01, 0.05, and 0.10 (one-tailed) levels, respectively.
[a] This table presents the results of tests of the null hypothesis that the population percentage of returns with earned income falling within an $800 interval surrounding the kink points of the EITC benefit distribution in 1988, 1989, and 1990 is 4.31, 4.14, and 3.95 percent, respectively. The specific interval measured is (−300, +500) around the phase-in kink point and (−500, +300) around the phase-out kink point. The phase-in kink points in 1988, 1989, and 1990 are $6,240, $6,500, and $6,810, respectively. The phase-out kink points in 1988, 1989, and 1990 are $9,840, $10,240, and $10,730, respectively. The total number of head of household EITC (non-EITC) returns in 1988, 1989, and 1990 was 1,257 (88), 1,382 (100), and 1,529 (104), respectively.
[b] n is the number of tax returns with earned income that falls within the $800 intervals surrounding each kink point of the EITC benefit distribution. Z is the Z-statistic that tests the null hypothesis that the population percentage of returns with earned income surrounding the kink points of the EITC benefit distribution in 1988, 1989, and 1990 is 4.31, 4.14, and 3.95 percent, respectively.

the phase-in kink-point interval. Contrast this result with non-EITC taxpayers. There is little evidence that the earned incomes of these taxpayers cluster around the phase-out kink point interval (only 1990 is significant at $\alpha = 0.05$), and we are unable to reject the null hypothesis of no secondary evasion at the kink-point intervals of the phase-in range in any year. There is virtually no evidence of earned income clustering among MFJ taxpayers (Table 9). The one exception to this is MFJ EITC taxpayers near the phase-out kink point during 1989 ($Z = 1.66$, $p = 0.048$).

Slemrod (1985) and Christian and Gupta (1993) assume a uniform distribution of taxable income in their analysis of secondary evasion among tax table users. The $800 earned income intervals in this study are much larger than the $50 intervals examined in Slemrod (1985) and Christian and Gupta (1993). If the distribution of earned income within the $800 intervals is not uniform, the Z-statistics are meaningless. Therefore, we also perform

TABLE 9
Percentage of Married Filing Jointly Filing Status Returns with Earned Income within $800 of the EITC Benefit Distribution Kink Points[a]

Panel A: EITC Returns

	1988			1989			1990		
	n	%	Z[b]	n	%	Z	n	%	Z
Kink Point									
Phase-in	37	4.47	0.23	28	3.20	−1.39	23	2.64	−1.98
Phase-out	43	5.19	1.26‡	46	5.26	1.66†	39	4.48	0.81

Panel B: Non-EITC Returns

	1988			1989			1990		
	n	%	Z	n	%	Z	n	%	Z
Kink Point									
Phase-in	38	5.19	1.18	31	4.17	0.04	22	3.02	−1.29
Phase-out	27	3.69	−0.82	28	3.76	−0.51	25	3.42	−0.72

Panel C: Difference between EITC and Non-EITC Returns

	1988			1989			1990		
	n	%	Z	n	%	Z	n	%	Z
Kink Point									
Phase-in			−0.94			−1.43			−0.65
Phase-out			2.30*			2.32*			1.71†

*, †, ‡ Denote significance at the 0.01, 0.05, and 0.10 (one-tailed) levels, respectively.
[a] This table presents the results of tests of the null hypothesis that the population percentage of returns with earned income falling within an $800 interval surrounding the kink points of the EITC benefit distribution in 1988, 1989, and 1990 is 4.31, 4.14, and 3.95 percent, respectively. The specific interval measured is (−300, +500) around the phase-in kink point and (−500, +300) around the phase-out kink point. The phase-in kink points in 1988, 1989, and 1990 are $6,240, $6,500, and $6,810, respectively. The phase-out kink points in 1988, 1989, and 1990 are $9,840, $10,240, and $10,730, respectively. The total number of married filing joint EITC (non-EITC) returns in 1988, 1989, and 1990 was 828 (732), 875 (744), and 870 (729), respectively
[b] n is the number of tax returns with earned income that falls within the $800 intervals surrounding each kink point of the EITC benefit distribution. Z is the Z-statistic that tests the null hypothesis that the population percentage of returns with earned income surrounding the kink points of the EITC benefit distribution in 1988, 1989, and 1990 is 4.31, 4.14, and 3.95 percent, respectively.

our tests of secondary evasion with a control group of non-EITC taxpayers (Panel C of Tables 7–9). The Z-statistics indicate that the percentage of HH EITC taxpayers with earned incomes within the phase-in kink-point interval is significantly greater than the percentage of HH non-EITC taxpayers in 1988 and 1989 (Table 8), while the percentage of MFJ EITC taxpayers with earned incomes within the phase-out kink-point interval is significantly greater than the percentage of MFJ non-EITC taxpayers in all years (Table 9). The results in Tables 7–9 are robust to different $800 kink-point intervals. For example, we observe similar results for (−200, +600 | −600, +200) and (−100, +700 | −700, +100) intervals.[25]

[25] We also test for clustering using a simple logit regression where the dependent variable is coded 1 if a taxpayer's earned income lies within either of the $800 intervals (described on p. 35) surrounding the kink points of the EITC benefit distribution and EITC status and marital status are the explanatory variables. The inferences are identical to those drawn from the results presented in Panel C of Tables 7, 8, and 9.

Regression Results

Tables 10 and 11 present the pooled logit results during the 1988–1990 period. Each table presents the results of three secondary evasion regressions. In model 1, we code the dependent variable 1 if a taxpayer's earned income falls within either of the $800 intervals surrounding the kink points of the EITC distribution; in model 2 (3) we code the dependent variable 1 if a taxpayer's earned income falls within the $800 interval surrounding the phase-in (phase-out) kink point of the EITC benefit distribution.[26] We list coefficient estimates (marginal effects), followed by related p-values, in the first (second) column of the table for each model. The marginal effects are analogous to slope coefficients in an OLS regression.[27] We also present the model χ^2 statistic (based on the likelihood ratio test of the null hypothesis that all coefficients other than the intercept are equal to zero), the probability of observing that particular χ^2 statistic, and the likelihood ratio index (LRI) to evaluate the explanatory power of the model. Although the overall model χ^2 statistics are significant at the 0.01 level in each regression, both measures are much stronger for the HH regressions than for the MFJ regressions. Because the univariate results provide evidence that the earned income of HH filers is much more likely than that of MFJ filers to fall within the intervals representing our measure of secondary evasion, we separate the data by filing status (HH or MFJ) to investigate the characteristics associated with secondary evasion.

Head of Household Taxpayers

The results in Table 10 for HH taxpayers indicate that a number of characteristics are associated with secondary evasion. The results in model 1 indicate that MTRs, wages, Schedule C gross receipts, and tax prepayment position are positive and significant, while earned income squared is negative and significant. In model 2, MTRs and wages are positive and significant, while earned income squared is negative and significant. Wages, Schedule C gross receipts, and tax prepayment position are positive and significant in model 3, while earned income squared and Schedule C deductions are negative and significant. Finally, the Southeast and West region dummy variables are positive and significant in model 1 only; all other variables are insignificant in each model.

We use the marginal effects to help interpret the findings. In model 1, a 1 percent change in *MTR* from the HH sample average of 8.21 percent increases the probability of secondary evasion by 36.20 percent. A $1,000 deviation in *WAGE* (*CINC*) from the HH sample mean of $9,414 ($832) increases the probability of a taxpayer's earned income falling within either of the $800 kink point intervals by 22.09 (0.67) percent. *BDUE* increases the probability of a taxpayer's earned income falling within either of the $800 kink point intervals by 21.34 percent.

Model 2 examines secondary evasion with respect to the phase-in kink point of the EITC benefit distribution. A 1 percent ($1,000) change in *MTR* (*WAGE*) from the sample

[26] The predicted signs of the coefficients are also listed in each table. The predicted sign of each variable, except *BDUE*, is the same in all three regressions. *BDUE* should be negative in model 2 (at the phase-in kink point) because these taxpayers have no taxable income. *BDUE* should be positive in model 3 (at the phase-out kink point), as larger EITC amounts reduce a taxpayer's balance due. The predicted sign on *BDUE* in model 1 is ambiguous, since we have no *a priori* prediction regarding the extent of the *BDUE* effect at either kink point.

[27] The marginal effects are computed as $\frac{\partial E[y|x]}{\partial x} = \left\{\frac{dF(x'\beta)}{d(x'\beta)}\right\}\beta = f(x'\beta)\beta$ where $x'\beta$ is computed at the means of the regressors. The marginal effects for a dichotomous variable, denoted d, are computed as the difference in probability when d is equal to 1 versus 0, evaluated at the mean of the other variables: $\Pr[Y = 1|\bar{x}_*, d = 1] - \Pr[Y = 1|\bar{x}_*, d = 0]$, where $\bar{x}_*$ represents the means of all other variables in the model.

TABLE 10
Estimated Coefficients for Pooled Logit Regression Models of Head of Household Taxpayers[a]

Model 1: DV = 1 if a taxpayer's earned income falls within either of the \$800 intervals surrounding the EITC kink points
Model 2: DV = 1 if a taxpayer's earned income falls within the \$800 interval surrounding the phase-in EITC kink point
Model 3: DV = 1 if a taxpayer's earned income falls within the \$800 interval surrounding the phase-out EITC kink point

		Both Kink Points (Model 1)		Phase-in Kink Point (Model 2)		Phase-out Kink Point (Model 3)	
Variables[b]	Predicted Sign	Coefficient (p-value)	Marginal Effect[c]	Coefficient (p-value)	Marginal Effect	Coefficient (p-value)	Marginal Effect
MTR	+	2.3030	0.3620	4.5941	0.0894	0.4597	0.0434
		(0.007)		(0.000)		(0.732)	
WAGE	+	1.4050	0.2209	2.5359	0.0493	4.2157	0.3975
		(0.000)		(0.000)		(0.000)	
CINC	+	0.0426	0.0067	0.0461	0.0009	0.1718	0.0162
		(0.017)		(0.136)		(0.000)	
CDED	+	−0.0382	−0.0060	−0.0086	−0.0002	−0.1946	−0.0183
		(0.436)		(0.902)		(0.027)	
EI^2	?	−0.0937	−0.0147	−0.2154	−0.0042	−0.2101	−0.0198
		(0.000)		(0.000)		(0.000)	
DEP	+	0.0502	0.0079	0.0561	0.0011	0.0187	0.0018
		(0.427)		(0.475)		(0.854)	
EXP	+	−0.0593	−0.0093	0.0578	0.0011	−0.1569	−0.0147
		(0.593)		(0.694)		(0.324)	
BDUE	?/−/+	1.0547	0.2134	0.0262	0.0005	1.4584	0.2267
		(0.050)		(0.975)		(0.029)	
Year Dummies	?	Not Reported		Not Reported		Not Reported	
Region Dummies	?	Not Reported		Not Reported		Not Reported	
Model χ^2 =			572.36		542.70		515.80
$p(\chi^2)$ =			0.000		0.000		0.000
LRI[d] =			0.2033		0.2947		0.3214
n =			4,168		4,168		4,168

(*continued on next page*)

TABLE 10 (continued)

[a] This table reports the results of pooled logit regressions (1988–1990) designed to capture the association between a measure of secondary evasion and variables used in prior microeconometric studies of tax evasion.

[b] We define the variables as follows: *MTR* = combined statutory, payroll, and credit marginal tax rate; *WAGE* = wage income; *CINC* = Schedule C gross receipts; *CDED* = total Schedule C deductions; EI^2 = earned income squared. Earned income is the sum of wages and self-employment income; *EXP* = dummy variable set to 1 if a taxpayer received the EITC in the current year and has received the EITC in at least two prior years, and 0 otherwise; *DEP* = total number of dependent exemptions (excluding taxpayer and taxpayer spouse) reported on Form 1040; *BDUE* = dummy variable set to 1 if the taxpayer reports a balance due, and 0 otherwise. Region dummies are a set of six dummy variables set to 1 if the taxpayer files a return in the Mid-Atlantic, Midwest, North Atlantic, Southeast, Southwest, or West IRS regions, and 0 otherwise.

[c] We compute the marginal effects as $f(x'\beta)\beta$ where $x'\beta$ is computed at the means of the regressors. We compute the marginal effects for a dichotomous variable, denoted d, as the difference in probability when the variable is equal to 1 versus 0, evaluated at the mean of the other variables: $\Pr[Y = 1|\bar{x}_*, d = 1] - \Pr[Y = 1|\bar{x}_*, d = 0]$, where $\bar{x}_*$, represents the means of all other variables in the model.

[d] LRI = Likelihood Ratio Index = [1 – (log likelihood function/restricted log likelihood function)].

mean increases the probability of a taxpayer's earned income falling within the $800 phase-in kink point interval by 8.94 (4.93) percent. Model 3 examines secondary evasion with respect to the phase-out kink point of the EITC benefit distribution. The marginal effect of *WAGE* (*CINC*) in model 3 indicates a 39.75 (1.62) percent increase in the probability of a taxpayer's earned income falling within the $800 phase-out kink point interval for every $1,000 deviation from the HH sample mean of $9,414 ($832). Every $1,000 change in *CDED* from the sample mean of $381 decreases the probability of a taxpayer's earned income falling within the $800 phase-out kink point interval by 1.83 percent. Returns with a balance due (*BDUE*) are 22.67 percent more likely to fall within the phase-out kink point interval.

Married Filing Joint Taxpayers

The results in Table 11 for MFJ taxpayers reveal that there are fewer characteristics of MFJ returns associated with secondary evasion than those of HH returns. The results in model 1 indicate that MTRs and wages are positive and significant, while earned income squared is negative and significant. Earned income squared is negative and significant in model 2. Finally, MTRs, wages, and tax prepayment position are positive and significant, while earned income squared is negative and significant in model 3. The Mid-Atlantic, Southeast, and West region dummy variables are positive and significant in model 1, while the Mid-Atlantic and Southeast region dummies are positive and significant in model 3. All other variables are insignificant in each model.

Similar to the HH models, we use the marginal effects to help interpret these findings. The marginal effect for *MTR* in model 1 indicates a 19.33 percent increase in the probability of a taxpayer's earned income falling within either of the $800 kink point intervals for every 1 percent deviation from the MFJ sample mean of 11.78 percent. Using a similar analysis for *WAGE* in model 1 suggests a 0.71 percent increase in the probability of a taxpayer's earned income falling within either of the $800 intervals surrounding the EITC kink points for a $1,000 deviation from the MFJ sample mean of $10,122.

In model 3, a 1 percent change in *MTR* increases the probability of a taxpayer's earned income falling within the $800 interval surrounding the phase-out kink point of the EITC benefit distribution by 14.99 percent. A $1,000 *WAGE* change increases the probability by 1.10 percent. MFJ returns with a balance due (*BDUE*) are 11.84 percent more likely to fall within the phase-out kink point interval.

Discussion

To the extent that secondary evasion is an indicator of primary evasion as modeled by Slemrod (1985), our results are generally consistent with our expectations and the findings of prior microeconometric tax evasion studies. For example, the positive association reported for *BDUE* at the phase-out kink point is consistent with Clotfelter (1983) and Chang and Schultz (1990), who find a positive association between noncompliance and reporting a balance due. The positive association reported for *MTR* is consistent with Clotfelter (1983), Christian and Gupta (1993), and Joulfaian and Rider (1996), who find that noncompliance increases as MTRs increase.

Two inconsistencies are worthy of discussion. First, HH returns with Schedule C deductions (*CDED*) are less likely to exhibit earned income clustering around the phase-out kink point. Because MTRs increase substantially in the phase-out range and Schedule C deductions represent an opportunity for taxpayers to manipulate their earned incomes, we would expect a positive association. However, HH returns with Schedule C income are

TABLE 11
Estimated Coefficients for Pooled Logit Regression Models of Married Filing Joint Taxpayers[a]

Model 1: DV = 1 if a taxpayer's earned income falls within either of the $800 intervals surrounding the EITC kink points
Model 2: DV = 1 if a taxpayer's earned income falls within the $800 interval surrounding the phase-in EITC kink point
Model 3: DV = 1 if a taxpayer's earned income falls within the $800 interval surrounding the phase-out EITC kink point

		Both Kink Points (Model 1)		Phase-in Kink Point (Model 2)		Phase-out Kink Point (Model 3)	
Variables[b]	Predicted Sign	Coefficient (p-value)	Marginal Effect[c]	Coefficient (p-value)	Marginal Effect	Coefficient (p-value)	Marginal Effect
MTR	+	2.7158	0.1933	2.6085	0.0369	2.9448	0.1499
		(0.005)		(0.093)		(0.014)	
WAGE	+	0.0992	0.0071	−0.0133	−0.0002	0.2154	0.0110
		(0.004)		(0.802)		(0.000)	
CINC	+	0.0008	5.4e–05	0.0012	1.7e–05	0.0005	2.4e–05
		(0.682)		(0.593)		(0.896)	
CDED	+	0.0018	0.0001	0.0040	5.7e–05	−0.0022	−0.0001
		(0.791)		(0.605)		(0.859)	
EI^2	?	−0.0178	−0.0013	−0.0205	−0.0003	−0.0196	−0.0010
		(0.000)		(0.000)		(0.000)	
DEP	+	0.0883	0.0063	0.0897	0.0013	0.0868	0.0044
		(0.192)		(0.366)		(0.320)	
EXP	+	0.2148	0.0156	0.1789	0.0026	0.2315	0.0121
		(0.160)		(0.448)		(0.227)	
BDUE	?/−/+	0.4981	0.0421	−0.4046	−0.0049	1.3863	0.1184
		(0.151)		(0.446)		(0.001)	
Year Dummies	?	Not Reported		Not Reported		Not Reported	
Region Dummies	?	Not Reported		Not Reported		Not Reported	
Model χ^2 =			162.84		143.14		74.90
p(χ^2) =			0.000		0.000		0.000
LRI[d] =			0.1098		0.1866		0.0736
n =			2,573		2,573		2,573

(*continued on next page*)

TABLE 11 (continued)

[a] This table reports the results of pooled logit regressions (1988–1990) designed to capture the association between a measure of secondary evasion and variables used in prior microeconometric studies of tax evasion.

[b] We define the variables as follows: *MTR* = combined statutory, payroll, and credit marginal tax rate; *WAGE* = wage income; *CINC* = Schedule C gross receipts; *CDED* = total Schedule C deductions; EI^2 = Earned income squared. Earned income is the sum of wages and self-employment income; *EXP* = dummy variable set to 1 if a taxpayer received the EITC in the current year and has received the EITC in at least two prior years, and 0 otherwise; *DEP* = total number of dependent exemptions (excluding taxpayer and taxpayer spouse) reported on Form 1040; *BDUE* = dummy variable set to 1 if the taxpayer reports a balance due, and 0 otherwise. Region dummies are a set of six dummy variables set to 1 if the taxpayer files a return in the Mid-Atlantic, Midwest, North Atlantic, Southeast, Southwest, or West IRS regions, and 0 otherwise.

[c] We computed the marginal effects as $f(x'\beta)\beta$ where $x'\beta$ is computed at the means of the regressors. We compute the marginal effects for a dichotomous variable, denoted d, as the difference in probability when the variable is equal to 1 versus 0, evaluated at the mean of the other variables: $\Pr[Y = 1|\bar{x}_*, d = 1] - \Pr[Y = 1|\bar{x}_*, d = 0]$, where $\bar{x}_*$ represents the means of all other variables in the model.

[d] LRI = Likelihood Ratio Index = [1 − (log likelihood function/restricted log likelihood function)].

more likely to exhibit earned income clustering around the phase-out kink point, which lends credence to the explanation that taxpayers *overreport* income for the EITC.

Second, there is no association (we do not reject the null) between experience (*EXP*) and secondary evasion, which suggests that taxpayers do not necessarily need prior experience with the EITC to determine how it affects their budget constraints. Responses from interviews conducted (in part) by Liebman (1998) suggest that taxpayers are not aware of the relationship between reported income and EITC amounts. However, our results suggest that the probability of secondary evasion is greater in certain regions of the country (Mid-Atlantic, Southeast, and West regions) and Liebman conducted interviews in Cambridge, Massachusetts (Liebman 1998, 106), which is part of the North Atlantic region. Therefore, secondary evasion could be region-specific.

Our results could also be consistent with the alternative explanation of secondary evasion that taxpayers adjust their work schedules or search for additional self-employment deductions. For example, the marginal effects in five out of six models suggest that altering wages (*WAGE*) increases the probability of secondary evasion. Additionally, filers with high MTRs or reporting a balance due (*BDUE*) could search for additional self-employment deductions; however, some may argue that this explanation is tenuous given the results presented in Tables 10 and 11.

SUMMARY AND CONCLUSIONS

Our paper documents that earned incomes of taxpayers who claim the EITC tend to cluster within $800 intervals surrounding the kink points of the EITC benefit distribution. The earned incomes of head of household taxpayers tend to cluster within these kink point intervals much more often than those of married filing joint taxpayers, perhaps due to the extreme progressivity and income inequality faced by head of household taxpayers.[28] We estimate regression models by filing status and kink point location and find that our measure of secondary evasion is more associated with the characteristics of head of household taxpayers than those of married filing joint taxpayers.

While we are unable to infer whether this clustering around the kink points of the EITC benefit distribution arises from illegal evasion or from legitimate means, our study contributes to the debate on how tax considerations affect taxpayer behavior. Specifically, by highlighting that such clusters surrounding the kink points do exist, our study presents further evidence that taxpayers are sensitive and responsive to cliffs in the tax code. Our results also broaden the external validity of the concept of secondary evasion by showing that this phenomenon exists with respect to tax credits and different table structures.

APPENDIX

We measure marginal tax rates as:

$$MTR = (\delta \bullet \tau_w) + (1 - \delta) \bullet \tau_s \tag{A.1}$$

if eligible for the EITC, and

$$MTR = (\delta \bullet \tau) + (1 - \delta) \bullet (\tau + \tau_p - 0.5(\tau \bullet \tau_p))^{29} \tag{A.2}$$

otherwise, where:

[28] Young et al. (1999) find that head of household taxpayers face substantially greater tax progressivity and income inequality than other taxpayers.

[29] The term $-0.5(\tau \bullet \tau_p)$ reflects the deduction taxpayers receive for one-half of the self-employment taxes paid.

δ = the percentage of income earned as wages;
τ = the statutory tax rate;
τ_w = the combined statutory and credit tax rate;
τ_p = the payroll tax rate; and
$\tau_s = \tau_w + \tau_p - 0.5(\tau \bullet \tau_p)$.

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