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# The Effects of 1993 EITC Expansion on Marginal Tax Rates

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## Abstract

The Earned Income Tax Credit (EITC) expansion affects labor supply and hence wages through changes in marginal tax rates (MTRs). This paper describes the effects of the 1993 EITC expansion on MTRs experienced by unmarried women. To demonstrate changes in MTRs, I use variation in the federal and state EITCs under the 1993 EITC expansion. Results suggest that the 1993 EITC expansion results in differential decreases in MTRs faced by unmarried women. Women with lower education experienced a larger decrease in their MTRs. Moreover, among women with the same education level, those with two or more children faced a larger decrease relative to those with one child and those with no children.

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## **I. Introduction**

The literature suggests that the Earned Income Tax Credit (EITC) expansions substantially increased the labor force participation of unmarried women.<sup>1</sup> In theory, with an increase in labor supply, all else equal, the equilibrium wage will fall unless labor demand is perfectly elastic. With a lower wage cost, theory predicts that employers capture a share of the EITC benefits. Because the effectiveness of EITC of benefiting low-income families depends on its economic incidence, understanding the effect of the EITC on gross wages helps policymakers to have a more complete analysis to evaluate the EITC program.

Interest in whether the EITC incidence is captured by the worker or the employer follows from the EITC's larger role in increasing low-income workers' labor supply. The EITC expansion affects labor supply and hence wages through changes in marginal tax rates. For example, a lower marginal tax rate results in an increase in incentive to work, assuming the substitution effect dominates the income effect. This paper describes the effects of the 1993 EITC expansion on marginal tax rates (MTRs) experienced by unmarried women.<sup>2</sup> To demonstrate changes in MTRs, I use variation in the federal and state EITCs of the 1993 EITC expansion. The 1993 EITC expansion substantially increased the maximum credit available to a family with two or more children as compared to a family with no children and another family with one child. Differential increases in the credits imply that women with different numbers of children also experience differential changes in their MTRs. Using the same identification strategy, recent studies of the labor supply response to the EITC find that the 1993 EITC expansion increased the labor force participation of unmarried women with two or more children as compared to those with no children and those with one child (Hotz, Mullin, and Scholz, 2006; Adireksombat, 2007a).

To identify the population likely to be affected by the EITC, I follow findings from EITC eligibility literature indicating that women with lower education are more likely to be eligible for the EITC (Dahl and Lochner, 2005; Baughman and Dickert-Conlin, forthcoming). Therefore, I stratify my sample by levels of education: *Less than High School*, *High School*, *Some College*, and *College*. I use data from the 1992 to 2001 March Current Population Survey (CPS). The sample includes unmarried women aged 25-55 years.

Using TAXSIM, a tax simulation model prepared by the National Bureau of Economic Research (NBER)<sup>3</sup>, I calculate MTRs under federal and state income tax laws experienced by women in my sample.<sup>4</sup> Results suggest that after 1994, unmarried women with *Less than High School*, *High School*, *Some College* education experienced a significant decrease in their median MTR (approximately 11, 14, and 4 percentage points, respectively). On the other hand, those with a *College* degree faced a very small change in MTRs (one percentage point). Relative to women with a college degree, women in *Less than High School*, *High School*, and *Some College* groups experienced a larger MTR decrease by 10, 13, and 3 percentage points, respectively. In addition, among women with the same education level, those with two or more children (the treatment group) experienced significantly larger decreases in their MTRs relative to those with no children (the comparison group (A)) and those with one child (the comparison group (B)). For example, among high school dropouts, the treatment group experienced a larger MTR decrease by 14 and 4 percentage points relative to the comparison groups (A) and (B), respectively. The treatment groups with *High School*, and *Some College* education also experienced a larger decrease in their median MTR, compared to their comparison groups. However, among women in the *College* group, results suggest that the treatment group did not face a larger

decrease in the median MTRs as compared to the comparison groups (less than a one percentage point).

These differential changes in the MTRs (before and after 1994) provide useful variation for identifying the effects of the EITC expansion on labor supply and wages. Using variation in tax rates, three recent studies consider the incidence of the EITC. They find mixed results. Leigh (2005) and Rothstein (2007) find that the EITC expansions resulted in a wage decrease. Accounting for the sample selection problem and the endogeneity of the EITC, Adireksombat (2007b) finds that the 1993 EITC expansion has no statistically significant effects on the wages of unmarried women.

The paper proceeds as follows: Section II discusses the structure of the EITC and its effects on labor supply. Section III reviews literature on the labor supply response of the EITC. Section IV describes data. Results are presented in Section V and section VI concludes.

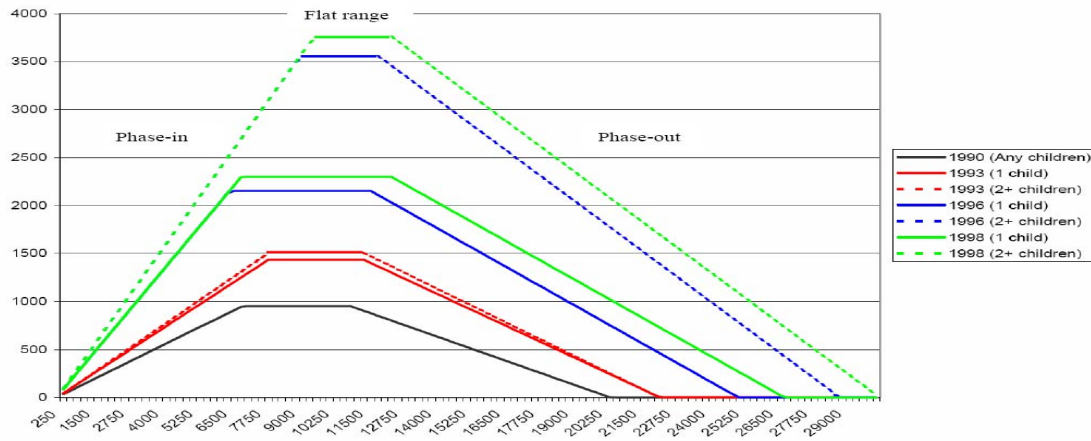
## **II. The EITC and Its effects**

### **A. The EITC Structure and Its History**

Figure 1 presents the EITC structures during the 1990s. The credit equals a specified percentage of earned income up to a maximum dollar amount over the “phase-in range.” Over a range of income termed the “flat range,” taxpayers receive the maximum credit. The credit then diminishes to zero over the “phase-out range.” The EITC is refundable. Claimants are paid regardless of whether the credit-qualified taxpayer has any federal income tax liability. The EITC payment is typically made once a year as an adjustment to tax liabilities or refunds.<sup>5</sup> For those who have children and want to claim the EITC, their children need to pass an age, relationship, and residence tests to qualify. For example, the age test in 2000 requires the qualifying child to be under 19 years old or under 24 years old if she/he is a full-

time student, or any age if she/he is completely disabled. The relationship test requires the claimant to be the parent or the grandparent of the qualifying child.

Figure 1: The EITC structures in 1990, 1993, 1996, and 1998

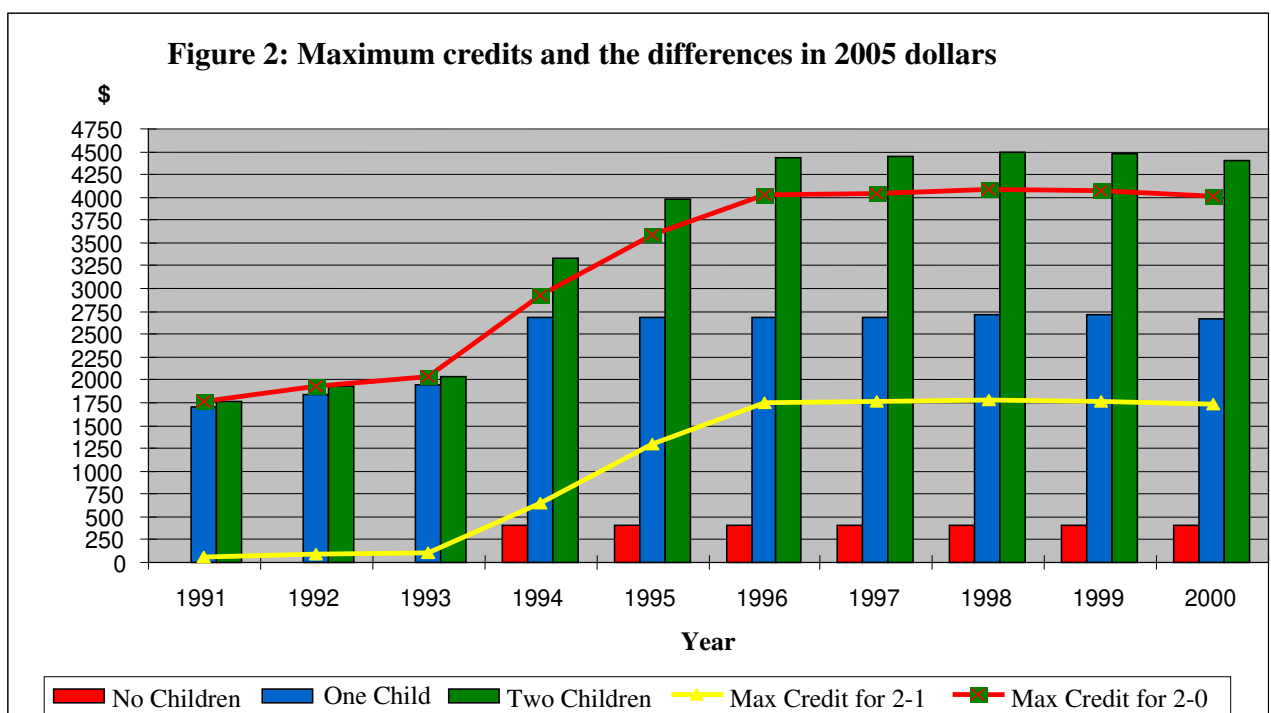


Source: Authors' calculations from the House Ways and Means Committee Green Book (2004)

The EITC has provided tax reductions and earning subsidies for low-income working families since 1975. The EITC payments were eroded by inflation until the Tax Reform Act of 1986 (TRA-86) increased the maximum credit in 1987 to have a real value equal to that of the credit in 1975, and indexed the EITC value for inflation. The Omnibus Budget Reconciliation Act of 1990 (OBRA-90) introduced differential credit rates and maximum credits available to a family with one child and a family with two or more children.

The Omnibus Budget Reconciliation Act of 1993 (OBRA-93) substantially increased the maximum credit available for a family with two or more children, relative to that with no children and that with one child. OBRA-93 also expanded the beginning and ending incomes of the “phase-out range.” Figure 2 presents the maximum credits and the differences between those available to a family with two or more children, a family with no children, and a family with one child in 2005 dollars for the period from 1991 to 2000. The maximum credit available to a family with two or more children increased substantially between 1994 and 1996, becoming fairly constant afterward, as the reform was fully phased in (from \$3,230 to

\$4,400). For a family with one child and a family with no children, the maximum credits increased after OBRA-93 was implemented, and became constant after 1994. The difference between maximum credits available to a family with two or more children and a family with no children rose from \$2,042 in 1993 to \$3,233 in 1996. Relative to the one child group, the difference rose from \$104 to \$1,404. In addition, OBRA-93 introduced the EITC to childless taxpayers aged between 25 and 65 years.



*Source: Authors' calculations from the House Ways and Means Committee Green Book (2004)*

The success of the federal EITC led a number of states to enact their own EITCs during the 1990s.<sup>6</sup> In 1989, only four states had EITCs and by 2000, the last year of my data, fourteen states and the District of Columbia had EITCs: Colorado, Illinois, Iowa, Kansas, Maine, Maryland, Massachusetts, Minnesota, New Jersey, New York, Oregon, Rhode Island, Vermont, and Wisconsin. The state EITCs are very similar to the federal EITC. These states use federal eligibility rules and calculate the state credit as a specified percentage of the federal credit.<sup>7</sup> Therefore, the state EITCs also provide the same incentives to work and

hence the same effects on wages as the federal EITC. The main difference between the federal and state EITCs is the refundable feature. In 2000, five of these states had non-refundable state EITCs.<sup>8</sup> The credit rates also vary across states. For example, in 2000, Kansas's EITC was 10 percent of the federal EITC and Wisconsin's EITC varied with the number of children and was 43 percent of the federal EITC for families with three children.

### **B. The Effects on the Labor Supply of Unmarried Women**

From the static labor-leisure model, the EITC expansion, resulting in changes in the MTR, affects both intensive and extensive margins of the labor supply of unmarried women. Therefore, in theory, the expansion leads to changes in the labor supply of those who were out of and those who were already in the labor force.

For a non-worker who was out of the labor force before the expansion, the EITC expansion results in only a positive substitution effect but no income effect and hence increases the incentive to work.

For a worker who was already in the labor force, the effect of changes in the MTR on her labor supply depends on the EITC range in which her income falls before and after the EITC expansion. If her income falls in the "phase-in range," with a negative MTR, there will be a positive substitution effect and a negative income effect. Thus, when leisure is assumed to be a "normal good," the net effect on labor supply is ambiguous. If her income falls in the "flat range," the MTR is zero. Thus, there will be only a negative income effect. As a result, the effect of the EITC will lead to a decrease in hours of work. If her income falls in the "phase-out range," a positive MTR implies a diminishing available credit and hence a lower effective wage relative to the absence of the EITC. This negative substitution effect results in a reduction in hours of work. Moreover, there is a negative income effect that leads to a



further reduction in hours of work. Finally, if her income is beyond the credit region, she may decide to reduce her hours of work to be eligible for the credit.

### **III. Literature Review**

#### **A. Labor Supply Response of the EITC**

Due to the substantial increase in labor force participation and a desire to avoid the complexity of analyzing the joint labor supply decisions of husband and wife, most studies focus on the labor supply decisions of unmarried women. Using different amounts of credits available to families with children and those with no children as the identification strategy, the early studies of the labor supply response of the EITC find that the EITC expansions increased the labor force participation of single mothers. However, they do not find statistically significant effects on hours worked (Dickert, et al. 1995; Keane 1995; Eissa and Liebman 1996; Keane and Moffitt 1998; Ellwood 2000; Meyer and Rosenbaum 2001; Darragh 2002).

With a substantial increase in the maximum credits available to a family with two or more children under the 1993 expansion, more recent studies compare the labor force participation of unmarried women with two or more children with those with no children and those with one child.

For example, Hotz, et al. (2006) use longitudinal data between 1991 and 2000 from California to examine the effect of the EITC on labor market participation of single-parent families on welfare. Taking advantage of the longitudinal data, their empirical approach controls for covariates and household-specific fixed effects. Their preferred result shows that the 1993 EITC expansion increased employment by as much as 3.4 percentage points for families with two or more children relative to those with one child. In addition, the EITC accounted for 11.8 percent of the average increase in employment over this period.

Using the same identification strategy, Adireksombat (2007a) uses national survey data, the March CPS, from 1991 to 2000 to examine the effect of the 1993 EITC expansion on the labor supply of unmarried women. He finds that the expansion resulted in an increase in the probability of the labor force participation of unmarried women with two or more children by 3.6 percentage points relative to those with no children and 3.0 percentage points relative to those with one child. In addition, Adireksombat examines the effect of the 1993 EITC expansion on hours of work. Like in the participation margin, he finds that unmarried women with two or more children increased their total annual hours worked, compared to those with no children and those with one child. However, when only those who were already in the labor force were included in the sample, he does not find a statistically significant change in their annual hours worked.

#### **IV. Data**

I use pooled cross section CPS data from 1992-2001 (describing data in 1991-2000 tax years). CPS is the United States government's monthly household survey of employment and labor markets. The sample in this study includes unmarried women aged 25-55 who were not self-employed. The resulting sample is 13,245 observations.

Table 1: Summary statistics

	No Children					One Child					Two or more children				
	All	Less than High School	High School	Some College	College	All	Less than High School	High School	Some College	College	All	Less than High School	High School	Some College	College
Wage in 2005 dollars	16.24 [9.31]	9.50 [5.11]	13.01 [6.95]	14.63 [7.04]	20.12 [10.42]	14.59 [7.79]	10.46 [8.22]	12.59 [5.78]	14.27 [6.76]	18.63 [8.83]	13.21 [7.44]	8.84 [3.04]	11.44 [5.84]	13.18 [5.86]	18.40 [9.72]
LBF Participation	0.75 [0.43]	0.43 [0.51]	0.71 [0.45]	0.78 [0.42]	0.85 [0.35]	0.71 [0.45]	0.50 [0.51]	0.69 [0.46]	0.74 [0.44]	0.84 [0.37]	0.59 [0.49]	0.31 [0.46]	0.60 [0.49]	0.69 [0.46]	0.82 [0.39]
Annual hours of work	1637.15 [900.72]	955.54 [985.47]	1543.19 [902.21]	1701.08 [846.84]	1870.96 [787.03]	1497.73 [910.05]	985.69 [977.68]	1454.23 [912.03]	1539.58 [869.07]	1797.96 [769.91]	1229.73 [950.51]	686.43 [881.05]	1225.48 [909.23]	1417.06 [908.21]	1742.76 [804.12]
Education	13.80 [2.85]	8.37 [3.1]	12.00 [0.00]	14.50 [0.00]	16.39 [0.78]	13.27 [2.56]	8.95 [2.38]	12.00 [0.00]	14.50 [0.00]	16.24 [0.66]	12.66 [2.61]	9.46 [2.42]	12.00 [0.00]	14.50 [0.00]	16.21 [0.63]
Other income	3.04 [9.09]	2.52 [4.09]	2.32 [6.21]	3.11 [9.13]	3.72 [11.61]	3.94 [8.03]	3.10 [6.26]	3.17 [7.61]	4.12 [7.44]	5.33 [9.71]	4.12 [9.12]	2.53 [6.13]	3.52 [7.68]	4.20 [7.59]	7.55 [14.73]

Data: Merged Data from the 1992-2001 March CPS and MORG CPS

The numbers showed are the estimates of mean. The numbers in parentheses are standard deviations

The sample is unmarried women aged 25-55 years old.

Means are weighted with CPS MORG weights.

Table 1 presents descriptive statistics for my sample of unmarried women. Compared to the comparison groups (recall those with no children and those with one child), the treatment group (those with two or more children), on average, tends to receive lower hourly wages (13.21 versus 16.24 and 14.59 in 2005 dollars), be less likely to participate in the labor force (0.59 versus 0.75 and 0.71 for the probability of participating in the labor force), work fewer annual hours, attain lower education (12.66 versus 13.80 and 13.27 years of education), and have higher incomes from other sources.

## V. Results

To take advantage of variation in incomes and state tax laws, I use TAXSIM, a tax simulation model prepared by the NBER, with income data from the March CPS to calculate the MTRs under federal and state income tax laws experienced by women in my sample.

Tax rates depend not only on tax laws but also on various characteristics over time. To isolate the effects of the tax reform from the effect of changes in the characteristics and composition of the sample, I use the same sample to calculate tax rates for all years.<sup>9</sup> I use the sample from the 1995 March CPS (describing data on 1994 tax year) and adjust their incomes with the Consumer Price Index to convert them into 1991-2000 dollars. Then, I use the TAXSIM to calculate the MTRs and their changes (before and after 1994) experienced by unmarried women by year, state, education, and number of children.<sup>10</sup>

Table 2: Median Marginal Tax Rates of Unmarried Women Before and After 1994

	Before (1)	After (2)	Change (3)	Change <sub>Treatment</sub> -Change <sub>Comparison</sub> (4)
Less than high school	-5.35	-16.44	-11.09	-10.09
High school	15.00	0.80	-14.20	-13.20
Some college	12.33	7.93	-4.40	-3.40
College	21.00	20.00	-1.00	-----

Sample: unmarried women aged 25-55 excluding those who were self-employed from the 1995 March CPS  
Calculated by The NBER Tax Simulation Model

Table 2 presents the median MTRs and their changes experienced by unmarried women before and after 1994 by education level.<sup>11</sup> Under OBRA-93, the EITC expansion is the tax policy change that is most likely to affect low-income families.<sup>12</sup> Column 3 shows changes in the median MTRs after 1994. Negative values mean that they experienced a decrease in their median MTRs. After 1994, women with *Less than High School*, *High School*, and *Some college* education experienced a significant decrease in their MTR (approximately 11, 14, and 4 percentage points, respectively). However, those with a *College* degree experienced a very small change in MTRs (one percentage point).

Column (4) presents the difference in changes of the median MTRs between those with no college degree and those with a college degree. These estimates suggest that relative

to the *College* group, women in *Less than High School*, *High School*, and *Some College* groups experienced a larger MTR decrease by 10, 13, and 3 percentage points.

Table 2 shows that women with only a high school education experienced the largest decreases in their MTR, primarily due to expansion in the EITC. Because the 1993 EITC expansion favors families with two or more children, in Table 3, I also stratify my sample by number of children.

Table 3: Median Marginal Tax Rates of Unmarried Women Before and After 1994  
(By Level of Education and Number of Children)

		Before (1)	After (2)	Change (3)	Change <sub>Treatment</sub> -Change <sub>Comparison</sub> (4)
<b>Panel I: Less than high school</b>					
Treatment group	TwoPlus	-18.40	-40.00	-21.60	
Comparison group (A)	NoChildren	0.00	-7.65	-7.65	-13.95
Comparison group (B)	OneChild	-16.70	-34.00	-17.30	-4.30
Comparison group (C)	TwoPlus w/ College	21.00	19.15	-1.85	-19.75
<b>Panel II: High school</b>					
Treatment group	TwoPlus	-15.40	-40.00	-24.60	
Comparison group (A)	NoChildren	17.80	17.02	-0.78	-23.82
Comparison group (B)	OneChild	15.00	0.00	-15.00	-9.60
Comparison group (C)	TwoPlus w/ College	21.00	19.15	-1.85	-22.75
<b>Panel III: Some college</b>					
Treatment group	TwoPlus	0.00	-18.05	-18.05	
Comparison group (A)	NoChildren	18.00	17.80	-0.20	-17.85
Comparison group (B)	OneChild	20.77	18.00	-2.77	-15.28
Comparison group (C)	TwoPlus w/ College	21.00	19.15	-1.85	-16.20
<b>Panel IV: College</b>					
Treatment group	TwoPlus	21.00	19.15	-1.85	
Comparison group (A)	NoChildren	20.95	19.25	-1.70	-0.15
Comparison group (B)	OneChild	22.00	21.00	-1.00	-0.85

Sample: unmarried women aged 25-55 excluding those who were self-employed from the 1995 March CPS  
Calculated by The NBER Tax Simulation Model

Table 3 presents the median MTRs and their changes experienced by unmarried women before and after 1994, categorized by levels of education and numbers of children.<sup>13</sup> In each panel, there are three comparison groups (except in Panel IV). Column 3 shows changes in the median MTRs after 1994. Negative values mean that they experienced a

decrease in their median MTRs. After 1994, the treatment groups in all panels experienced smaller MTRs, approximately 22, 25, 18, and 2 percentage points for the *Less than High School*, *High School*, *Some College*, and *College* groups, respectively.

The comparison group (A) that was introduced to a small amount of the credit after 1994 experienced a slight decrease in their median MTRs (less than 2 percentage points with the exception of the *Less than High School* group that faced a 7.65 percentage-point decrease<sup>14</sup>). With an increase in the maximum credit due to the 1993 expansion, the comparison group (B) also experienced a decrease in their median MTRs. These decreases range from 1.0 percentage point for the *College* group to 17.3 percentage points for the *Less than High School* group. The comparison group (C) faced a 1.9 percentage point decline in their MTRs.

In Column (4), the estimates present the difference in changes of the median MTRs before and after 1994 between the treatment and the comparison group. In Panel I (*Less than High School*), the estimates suggest that among high school dropouts, the treatment group experienced a larger MTR decrease: 14, 4, and 20 percentage points relative to the comparison groups (A), (B), and (C), respectively. The estimates in Panel II (*High School*) and III (*Some College*) also suggest a trend of a larger decrease in the median MTR faced by the treatment group. However, the estimates in Panel IV (*College*) suggest that the treatment group did not face a larger decrease in the median MTRs as compared to the comparison groups (less than a one percentage point).

With the EITC expansion that favors families with two or more children, it is not surprising that the treatment groups in Panels I, II, and III faced a substantial decrease in their MTRs as compared to the comparison groups.

## **VI. Conclusion**

Using the 1992-2001 March CPS data, this paper describes changes in MTRs experienced by unmarried women before and after 1994. Results suggest that differential increases in the maximum credits due to the 1993 EITC expansion results in differential decreases in MTRs. Women with lower education experienced a larger decrease in their MTRs. Moreover, among women with the same education level, those with two or more children faced a larger decrease relative to those with one child and those with no children.

In theory, these differential decreases in MTRs will result in differential changes in labor supply and wages. Recent studies of the incidence of the EITC use variation in tax rates due to the EITC expansion to identify the effects. Because the EITC expansion resulted in changes in labor supply, it is especially important to correct for the decision to work in a wage regression, when we examine the effect on wages. In addition, major policy changes, such as welfare reform in 1996, may have had significant effects on the labor force participation and hence the wages.

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## Notes

- <sup>1</sup> For example, Dickert, Houser, and Scholz (1995); Eissa and Liebman (1996); Meyer and Rosenbaum (2000); Darragh (2002); Hotz, Mullin, and Scholz (2006); and Adireksombat (2007a). See Hotz and Scholz (2003) for a summary of labor supply response to the EITC.
- <sup>2</sup> Meyer (2002) examines the effects of the EITC on the labor supply of a variety of demographic groups and concludes that the EITC primarily affected unmarried women.
- <sup>3</sup> See Feenberg and Coutts (1993) for a description of the TAXSIM calculator.
- <sup>4</sup> Marginal tax rates are the effective marginal tax rates, which are calculated by adding a dollar to income.
- <sup>5</sup> An “advance payment” option was added in 1978 so that workers would be able, if they so chose, to receive the credit incrementally throughout the year. However, in 1998, only 1.1 percent of EITC recipients with children used the advance payment option (Hotz and Scholz 2003).
- <sup>6</sup> See Johnson (2000) for a summary of the state EITCs during the 1990s. In 2006 tax year, eighteen states and the District of Columbia had state EITCs (Nagel and Johnson 2006).
- <sup>7</sup> Using federal eligibility rules, Minnesota has its own credit structure that has major elements parallel to the federal structure.
- <sup>8</sup> Those five states were Illinois, Iowa, Maine, Oregon, and Rhode Island.
- <sup>9</sup> This approach is used in several tax studies, for example, Dickert-Conlin and Houser (2002) and Kubik (2004).
- <sup>10</sup> Marginal tax rates are the effective marginal tax rates, which are calculated by adding a dollar to income.
- <sup>11</sup> To avoid the effect of outlier observations, I use median. Using the mean MTR also presents consistent results.
- <sup>12</sup> Other policy changes are more likely to affect high-income taxpayers. For example, OBRA-93 imposed a 36% tax bracket for taxable incomes over \$140,000 for joint filers and \$115,000 for individuals and a 39.6% tax bracket for both joint and individual filers for taxable incomes over \$250,000. See Steuerle (2002) for a summary of tax policy changes under OBRA-93.
- <sup>13</sup> As discussed earlier, the literature suggests that women with a low education are more likely to eligible for the EITC (Dahl and Lochner 2005; Baughman and Dickert-Conlin forthcoming). Therefore, in addition to comparison groups (A) and (B), I include the comparison group (C), those with two or more children who hold a college degree, to compare the treatment group with more educated women who have the same number of children.
- <sup>14</sup> This might be because their incomes are more likely to be in the “phase-in range.”



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