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THE IMPACT OF THE EARNED INCOME TAX CREDIT ON POVERTY, LABOR SUPPLY, AND HUMAN-CAPITAL ACCUMULATION

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ABSTRACT

THE IMPACT OF THE EARNED INCOME TAX CREDIT ON POVERTY, LABOR SUPPLY AND HUMAN-CAPITAL ACCUMULATION

By

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The Earned Income Tax Credit (EITC) has become the largest public expenditure program aimed at providing support to low-income, working families. This dissertation evaluates how effective both the federal and state EITCs have been at increasing labor-force participation and reducing poverty among adult women from 1982 to 1996. Controls are included for other policies aimed at helping low-income families, such as minimum wages and welfare waivers. Using pooled cross-sectional data from the March CPS, the federal EITC is found to significantly increase labor-force participation and reduce poverty, especially among women with no more than a high school education. In some specifications, refundable state EITCs are correlated with increased labor-force participation, but the results are not statistically significant. The minimum wage is found to be correlated with increased probabilities that single women are out of the labor force and in poverty. The results also indicate that welfare waivers are associated with increased labor-force participation and reduced poverty, although waivers are found to be less effective than expansions of the EITC.

Among women with children, the EITC subsidizes labor-force participation, with the effect particularly large among younger women. It is possible that increased participation will result in reduced school enrollments, especially among younger single mothers. If such a trade-off occurred, it would represent a substitution of experience for

education, a substitution that will potentially affect long-term economic success. This dissertation also uses data from the March CPS to investigate the impact of the EITC on school enrollment among young, single women. Estimates obtained using a multinomial logit model indicate that expansions of the EITC are associated with significant increases in both employment and enrollment. The expansions of the EITC are associated with significant declines in young, single mothers being non-enrolled and non-employed.

To my wife Kendel and the memory of Bernard Scott Darragh

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My parents have always been supporters of my academic endeavors. Their love has been a solid base from which this child could launch many pursuits. My only regret in this pursuit is that my father is not here to see its completion.

No one has paid a greater price to see this project completed than my wife, Kendel. Her persistent encouragement has often provided me with the necessary energy to continue. I will always be grateful to her for her love and support.

"Of making many books there is no end, and much study is wearisome to the flesh" (Ecclesiastes 12:12b). Praise the Lord, this book is complete.

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INTRODUCTION

The earned income tax credit (EITC) has become the largest federal expenditure program aimed at increasing the incomes of the working poor in the United States. The credit began in 1975, but was almost ignored until the mid-1980s. From 1986 to 1993, the credit experienced three large expansions, which put the EITC at the forefront of U.S. welfare policy.

The EITC is available to all low-income families with children. The credit provides an initial wage subsidy that is designed to encourage non-working families to enter the labor market. With increased earnings the credit is phased out, potentially discouraging additional labor supply.

This dissertation investigates the impact of the earned income tax credit on labor supply, poverty, and human-capital accumulation. Consistent with the primary focus of the existing EITC literature, the study focuses on the impact of the EITC among single mothers. Using data from the March CPS, a differences-in-differences framework is employed to estimate the effectiveness of the EITC at raising labor-force participation among single women ages 25 to 50. The estimates imply that the EITC is associated with significant increases in participation, especially among women with no more than a high school education. The results provide strong evidence that the EITC is more effective at increasing labor-force participation than either welfare waivers or increases in the minimum wage.

The EITC is also found to be effective at reducing poverty among single mothers. Once again, the impact is largest among women with lower levels of education. The

results are generally robust across a range of specifications, providing strong evidence that the EITC is not only associated with increased labor supply, but also significant improvement in the economic well being of single mothers. The evidence indicates that the EITC is more effective at reducing poverty than either the minimum wage or welfare waivers.

In Chapter 6, the focus of the study turns to the impact of the EITC on human-capital accumulation, specifically, what effect the EITC has had on the enrollment status of young, single mothers. This investigation used a sample of single women drawn from the March CPS from 1987 to 1996. By use of probit and multinomial logit techniques, the study identifies the impact of the EITC on the labor-market behavior and school attendance for single mothers between the ages of 17 and 24.

The evidence indicates that expansions of the EITC are associated with large increases in labor-force participation among young, single mothers. The results also indicate that the increased labor supply does not reduce school enrollment. Rather, the EITC is associated with both increased participation and enrollment.

This dissertation has six chapters and an appendix. Chapter 1 describes the EITC in detail. Chapter 2 provides a review of the existing literature on taxes, labor supply, and the EITC. Chapter 3 develops the empirical model for estimating the labor-supply effects of the EITC and presents the results. Chapter 4 presents the empirical results for the effect of the EITC on poverty. A comparison between the results in this study with the existing literature is presented in Chapter 5. Chapter 6 contains the estimates for the EITC's effects on labor-market participation and school enrollment. The appendix contains the detailed tables with the estimates discussed in Chapters 3 and 4.

CHAPTER 1

OVERVIEW OF THE EARNED INCOME TAX CREDIT (EITC)

1.1. INTRODUCTION

The federal earned income tax credit (EITC) has become the largest, non-health related expenditure program in the United States targeted explicitly at improving the welfare of the poor. Annual EITC expenditures are nearly equivalent to expenditures for Temporary Assistance to Needy Families (TANF) and Food Stamps combined.[1] The program experienced two dramatic expansions in the 1990s. These have expanded the program from a relatively small $2 billion program in 1986[2] to a program with almost $30.6 billion in expenditures in fiscal year 2001.[3] The EITC is a refundable income-tax credit that can be used to offset federal income-tax liability. If the credit exceeds an individual's income-tax liability, the excess is paid as a refund. Most of the benefits distributed through the earned income tax credit are paid as income-tax refunds. The U.S. Department of Treasury estimates that in fiscal year 2001, the program's benefits will represent $4.8 billion in foregone income-tax revenues, and $25.8 billion in refund payments.[4]

The program is designed to aid the working poor by providing cash assistance to low-income individuals and families with earned income. The credit applies to tax units (either individuals or couples filing a joint return) that have qualifying children living in their home. Since 1993, low-income individuals aged 25 and over without children have been eligible to claim a credit as well.

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[1] FY 2002 Economic Outlook, Highlights from FY 1994 to FY 2001, FY 2002 Baseline Projections, January 2001.
[2] Holtzblatt, *et al.* 1994.
[3] Table 5-3, "Analytical Perspectives", Budget of the United States, 2001.

The EITC's growth reflects its effectiveness as a means of providing assistance to the low-income population. The program has the highest participation rate by the eligible population of all the programs targeting low-income groups, estimated at between 80 to 86%.[5] This compares with estimated participation rates of 50 to 60 percent for the Supplemental Security Income (SSI) program[6] and 54 to 66 percent for Aid to Families with Dependent Children.[7]

A number of factors combine to account for this. The integration of the EITC with the federal income tax enables eligibility to be determined directly each year when the return is prepared. For individuals who do not prepare their own return, a paid income-tax preparer can easily determine whether a client qualifies for the EITC. This compares favorably with the lack of understanding regarding the eligibility standards for other programs designed to assist those on public assistance, such as food stamps.[8] Its integration with the tax system also provides the EITC with an inconspicuous method of distributing benefits. Recipients receive benefits without the stigma potentially associated with receiving other forms of public assistance.

The growth of the EITC may also reflect a growing expectation among the U.S. population that individuals able to work should work to contribute to their own support. President Ronald Reagan championed the first major expansion of the EITC precisely for this reason.[9] When President Clinton took office in 1993, his initial State of the Union address reinforced this objective. "The new direction I propose will make this solemn,

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[4] Table 5-3, "Analytical Perspectives", Budget of the United States, 2001.
[5] Scholz, 1994.
[6] Haveman, 1987.
[7] Blank and Ruggles, 1993, cited in Scholz, 1994.
[8] For example, "Millions Eligible for Food Stamps Aren't Applying" from The New York Times on the Web, February 26, 2001. www.nytimes.com/2001/02/26/national/26FOOD.html.
[9] Johnson, 1999.

simple commitment: by expanding the refundable earned income tax credit, we will make history; we will reward the work of millions of working poor Americans by realizing the principle that if you work 40 hours a week and you've got a child in the house, you will no longer be in poverty."[10]

The EITC is designed to encourage work by increasing the total income received by a participant above the income received in the labor market alone. The credit clearly accomplishes this objective since, for any given number of hours worked, total income is strictly greater than labor income for all workers eligible for the credit. These additional benefits from the credit will increase the resources available to a household. However, if individuals make incremental decisions on labor supply, they are not concerned with the total return to work, but rather with the return to the marginal hour of work, i.e., the net wage for an additional hour of work. As discussed below, the EITC clearly encourages entering the labor market. However, for those who already have earnings, the EITC's effect on additional labor supply is less clear.

The EITC could reduce poverty through a couple of channels. The credit raises a household's disposable income, for any fixed amount of labor income. This will not affect the measured poverty rates, though. EITC payments, almost 85 percent of which are disbursed as tax refunds, are not included in income for the poverty statistics reported by the U.S. Bureau of the Census. The credit either reduces income-tax liability or is paid in a tax refund, and neither of these is included as a source of income in the general poverty statistics.[11] Over time, however, policies like the EITC that encourage labor

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[10] Shapiro and Greenstein, 1993.

[11] For the small number of recipients who receive the credit through the advanced-payment option, the EITC may be included in income. The EITC, while not included in the official poverty statistics, is included as income in some of the broader measures of poverty.

supply may encourage the formation of human capital through work experience and attachment to the labor market. Work experience may increase the probability that a woman is employed in the future, and may reduce the probability that she and her family are in poverty. Most directly, the EITC encourages labor supply, which results in higher current labor income.

In this study I investigate two questions. Among women over age 24 with children, is there evidence that the EITC is effective at encouraging labor supply, especially when compared with other programs and policies designed or advocated to support low-income individuals? This will involve comparisons with welfare benefits, variations in welfare policy, and minimum wages. The intent of this section is to demonstrate whether the estimated impacts of the EITC on labor supply in this population are similar to those reported in previous research by Eissa and Liebman (1996), Meyer and Rosenbaum (2000 and 2001), Ellwood (2000), and Neumark and Wascher (2001). The model used for this investigation is at least slightly different from the techniques employed by each of the studies mentioned above.

With the impact of the EITC on labor supply established, the investigation turns to poverty. Specifically, what effect, if any, has the expansion of the EITC had on the poverty status of single mothers? This is a relatively new question in relation to the EITC, examined in only one other study (Neumark and Wascher (2001)). It is possible that work subsidies like the EITC may increase labor-force participation, but still leave many women and their children in poverty. The impact, if any, of the EITC on poverty seems to be a fundamental question related to the credit's effectiveness. This is the goal behind the most recent expansion of the EITC, as described by President Clinton above.

While connecting work with assistance for low-income families may be important for other reasons, it would seem that one of the underlying goals of any assistance program should be to raise the recipients above poverty.

1.2. FEDERAL EITC

The earned income tax credit was enacted in 1975. When the credit was initially adopted, it was designed to alleviate the burden of the Social Security payroll tax on working parents.[12] The program remained very small until the expansions of the 1990s. The EITC is a refundable income-tax credit, meaning that if the EITC exceeds an individual's federal income-tax liability, the excess is refunded. In the tax calculation, the EITC is treated in the same manner as a payment, such as withheld taxes.

Table 1.1 shows the history of the EITC from its enactment through tax year 2001. The rates in Table 1.1 ignore the supplemental credits, which were instituted in 1991 and continued until 1993. These provided extra benefits for newborn children, as well as for the purchase of health insurance for qualifying children.

The credit has three distinct regions based on the recipient's labor income: the phase-in region, the cash-transfer region, and the phase-out region.[13] For anyone outside the labor market who would be eligible for the EITC, the credit increases the net wage above the market wage. This increase can be quite generous, reaching 40 percent of earned income in the wage-subsidy region following the full implementation of the 1993 expansion. For eligible individuals or families with more than one child, the phase-in

[12] For a thorough discussion of the legislative history of the EITC, see Ventry (2000).
[13] The analysis of the EITC presented here has benefited from the treatment by Holtzblatt, *et al.* (1994), Scholz (1994), and Browning (1995).

rates have nearly tripled from 1989 to 1996 (from 14 to 40 percent). The rates have also risen sharply for those with one child (from 14 to 34 percent).

The cash-transfer region follows. While in this range of income, additional earnings have no effect on the size of a recipient's EITC. So, in this region, the EITC is equivalent to a lump-sum transfer. The subsidy rate and the phase-in range determine the EITC amount received by each recipient within this range.

At higher levels of income, the dollar amount of the credit is reduced by additional labor income. This phase-out of benefits lowers the net wage to a participant below the market net wage, effectively taxing additional income. If labor-market participants have a positive labor-supply elasticity, the credit will reduce the number of hours eligible workers choose to work. So while the credit unambiguously raises the total income of a worker with no change in hours worked, the credit may affect labor supply and labor income.[14]

As mentioned above, the EITC has undergone two major expansions in recent years. During the period between the passage of the Tax Reform Act of 1986 and the passage of the Omnibus Budget Reconciliation Act of 1990 (OBRA 1990), the phase-in rate for the earned income tax credit was 14 percent and the phase-out rate was 10 percent. The passage of OBRA 1990 increased both the phase-in and phase-out rates, created a slightly higher credit for families with more than one child, and provided additional benefits for new-born children and health insurance for children.

OBRA 1993 removed the requirement that a household must have a qualifying child in order to receive an earned income credit. Individuals and married couples with

[14] Some values of the labor-supply elasticity would be sufficient to offset the effect of the EITC, resulting in unchanged or reduced income.

earned income, total income below $10,710, and no children are eligible for a smaller credit. The credit for recipients without children functions in the same manner as the credit for families with children. The subsidy rate is exactly equal to the OASDHI employee payroll tax rate (7.65 percent), and the tax rate in the phase-out range doubles the payroll tax rate for this income group.

By 2001, the goal expressed by President Clinton was closer to reality. Individuals and families with children and adjusted gross incomes below a certain limit ($32,121 in 2001 for a family with more than one child) were eligible for the credit. The limits were lower for families with one child ($28,281) or no children ($10,710). An individual working full-time at the federal minimum wage of $5.15 with one qualifying child would receive the maximum credit of $2,428. Assuming the individual works 2,000 hours per year and is filing as the head of a household, the individual would have no federal income-tax liability, and would receive the entire credit as additional income. The $12,728 in gross income (including the EITC) would raise the two-person family above the poverty threshold for 2001. The credit would increase take-home pay (gross pay less the payroll tax) for those with earnings up to $11,940, before state income taxes. This represents an increase in after-tax income of 25.5 percent. For families with two or more children and one worker employed full-time at the minimum wage, total take-home pay before state taxes would increase to $13,520, an increase of 42.1 percent due to the earned income credit. Total gross income, including the employee portion of Social Security and Medicare, for a family with two or more children and a full-time worker at the minimum wage would increase to $14,308. That total income would raise a family of three above the 2001 poverty threshold of $14,269.

A full-time worker working 2000 hours per year at the current minimum wage of $5.15 would earn $10,300 from his or her employer. Assuming the individual is either single or has a non-working spouse, the EITC would supplement that with an additional $2,428 for the parent with one child, or $4,008 for the parent with two or more children. This equates to a nominal wage of $6.46 for the parent with one child, or $7.32 for the parent with two or more children, adjusting for the employee portion of the payroll tax.

For individuals not currently working, the EITC acts like a wage subsidy, raising the net wage of the potential recipient. There is a constant subsidy rate in the phase-in region, so the absolute size of the credit increases with increases in the recipient's earned income. This is the region between 0 and Y_1 in Figure 1.1. In this region, the net wage including the credit is higher (the budget set is steeper) than without the credit. This wedge between the market wage and the net wage should increase labor-market participation, since the return to work is increased and the labor cost of the worker to any firm is unaffected.[15] The subsidy rates have been increased by the recent changes in the EITC. Families receive a subsidy rate of 34 percent with one child and 40 percent if they have more than one child (see Table 1.1). This should have an unambiguously positive effect on labor supply for those who are not currently in the labor force, if the participation decision reflects a positive wage elasticity. There is no counteracting income effect affecting the participation decision for those not currently in the labor force, since labor supply is beginning at a corner solution with zero hours of work. State-level credits, especially refundable credits, should enhance this effect.

[15] In general equilibrium, the increase in labor supply will lead to a reduced market wage, so the employer's labor cost will be reduced.

The subsidy's effect on labor supply is theoretically ambiguous for those already employed earning below Y_1. A wage subsidy will increase labor supply through the substitution effect, because the increased net wage will increase the cost of leisure, leading individuals to consume relatively less leisure. However, the subsidy produces a counteracting income effect. The additional income provided by the credit will increase the individual's income, enlarging the budget set, and thus leading to an increase in the demand for all normal goods, including leisure. This should reduce labor supply. The magnitudes of the substitution and income effects will determine whether individuals in the phase-in range will increase or decrease their labor supply in response to changes in the level of the credit. It is common for empirical studies to find that the substitution effect outweighs the income effect,[16] but if the magnitude of the income effect increases with income, this could change as higher levels of income remain in the phase-in region.

The cash-transfer region of the earned income tax credit acts as a strict cash grant. This region is shown in Figure 1.1 between Y_1 and Y_2. Note that the two budget sets representing the EITC (federal and state) are parallel to each other and the original budget set between Y_1 and Y_2, reflecting the constant size of the cash grant. This region is for incomes of between $10,000 and $13,100 for recipients with two or more children, with a constant grant of $4,008 for individuals within this income region. The region begins at lower levels for recipients with one child or no children, with lower total cash transfers available for these groups as well. The cash-transfer region for recipients with one child begins at $7,100 and ends at $13,100, while a recipient with no children receives the cash

[16] See Holtzblatt *et al.*, for a summary.

grant with income of at least $4,750 and less than $5,950. The cash grants for recipients with one child or no children are $2,428 and $364, respectively.

Recipients with incomes in the cash-grant range are only influenced by the income effect. The size of the grant is independent of income in this range. Therefore, as long as the recipient's income level remains within the region's boundaries, there is no direct effect on the net wage for the recipient. Additional earnings within the cash-transfer region will leave the amount of the transfer unchanged. The income effect should have a negative impact on labor supply in this region. The additional disposable income the recipient receives due to the grant should increase demand for all normal goods, including leisure. Increased demand for leisure should reduce labor supply.

The final region of the EITC is the phase-out region, where benefits are reduced when earnings increase. Three factors determine the impact the phase-out region will have.[17] The first of these is the cash grant amount. The higher the benefit, the greater will be the phase-out or marginal tax rate in this region, with the other factors remaining unchanged. The higher the tax rate, the greater the substitution effect away from labor supply, since the net return to additional hours of work, i.e., the net wage, is reduced. The second important factor is the length of the income interval chosen for the phase-out of the credit. The level where the credit is zero is commonly called the break-even level of income. The lower the break-even level, and thus the shorter the interval, all other things equal, the higher will be the marginal tax rate required to phase out the credit. The final factor is this tax rate, also known as the benefit-reduction rate. Only two of these

[17] Browning, 1994.

factors are independent, i.e., once two of them are chosen, the third has been chosen by default.

The phase-out range can be described as follows:

$$\text{Benefits} = \{1 - (Y - Y_{CG}) / (B - Y_{CG})\} \times Y_G ,$$

where B is the break-even level of income, Y is the recipient's annual income, Y_{CG} is the income level where the pure cash transfer ends and the phase-out region begins, and Y_G is the maximum EITC benefit (or the income guarantee under a more traditional negative income tax). The benefit-reduction rate for the EITC is the change in benefits for each additional dollar of income, or, assuming the benefit function is continuous,

$$dB / dY = - (B - Y_{CG})^{-1} \times Y_G.$$

A credit of $3,000, which is going to be phased out evenly over the interval of $10,000 to $25,000, will imply a tax rate of 20 percent. Lowering the tax rate will require extending the credit to a higher income level or reducing the level of cash assistance. The phase-out region is shown in Figure 1.1 between Y_2 and B. After-tax income increases by less than the wage for each hour of work, reflecting the phase-out rate of EITC benefits. This can be seen in the figure from the flatter budget set between Y_2 and B.

Theoretically, the phase-out range has an unambiguously negative impact on labor supply, assuming leisure is a normal good. Since the EITC increases the budget set, i.e., it increases income for any positive number of hours worked as long as income is below the break-even level, recipients will demand increased amounts of all normal goods, including leisure. Even though the credit is getting smaller, it is possible the income effect is getting larger as the recipient's total income increases, depending on the

impact of the level of income on the labor-supply decision. The phase-out rate also imposes a wage tax on workers, thus lowering the net wage they receive. By the substitution effect, this should reduce labor supply, since the reduction in the net wage lowers the effective price of leisure. As shown in Table 1.1, the phase-out region begins at income levels of $5,950 and $13,100, for eligible recipients with no children and one or more children, respectively, in 2001. The phase-out region continues until income reaches $10,710 for recipients with no children, until $28,281 for those with one child, or until $32,121 for those with more than one child. The amounts of the cash grants and the lengths of the phase-out regions imply phase-out rates of 7.65 percent for recipients with no children, 15.98 percent for those with one child, and 21.06 percent for those with more than one child, respectively.

The above description of the impact of the earned income credit has ignored the interaction between additional income for the recipient and the amount of other forms of government assistance for which the recipient is eligible. Many studies cite the high marginal tax rates faced by participants when they participate in numerous programs such as AFDC, Food Stamps, or Supplemental Security Income, as well as receiving an earned income credit. When the benefit-reduction rates of all of these programs are combined, they make the marginal tax rate for some recipients of the EITC at least as high as it is for any other group in the country.[18] It is important to know that the earned income credit has not traditionally reduced the recipient's eligibility for other programs such as Aid to Families with Dependent Children (AFDC) and Food Stamps. The benefit-reduction rates of these programs are somewhat offset by the phase-in rate in the wage-subsidy

[18] Holtzblatt, *et al.* (1994); Browning (1995), and Dickert, *et al.* (1994).

region of the EITC, but are accentuated by the benefit-reduction rate of the EITC for those still eligible.

In addition, extra income may make the recipient responsible for paying income tax, both at the federal and state levels. For instance, a head of household claiming the standard deduction with two dependent children would begin to pay federal income tax with adjusted gross income of over $15,350 in 2001, which is well below the end of the phase-out region for the EITC.[19] While EITC benefits are not subject to tax, labor earnings over that threshold would be taxable. In Michigan, this worker would have potentially been paying state income tax on all income above $9,900. Having income subject to state and federal income tax, Social Security payroll tax, and the phase-out rate of the EITC would imply a marginal tax rate of 42.91 percent. This compares to a marginal tax rate of 43.3 percent for the highest tax bracket, which applies to those with taxable incomes over $297,350 for taxpayers filing as the head of a household for tax year 2001. If high tax rates alone significantly reduce labor supply, it should be reflected by the group in the phase-out range of the EITC. The marginal tax rates would be even higher if the recipients participate in the food-stamp program or other government assistance programs, which have been ignored here.

1.3. COMPARISON OF THE EITC WITH OTHER PROGRAMS

The earned income credit is distinct from other methods of transferring income to the poor in that it encourages work, assuming a positive labor-supply elasticity. Specifically, the credit is only available to those with earned income. For those with little

[19] This ignores the child tax credit and the child and dependent care credit, which the taxpayer may be eligible to claim.

or no earned income, the credit increases the return to additional labor. Traditional welfare systems generally reduce benefits when the recipient earns extra income, thus lowering the return to work. For the EITC, this occurs only in the phase-out range, in which it is likely that the worker already has a significant commitment to the labor market. Most in-kind benefit programs reduce the benefits a participant may receive when the participant increases his or her earned income, although small initial amounts of earnings may be ignored for determining benefit eligibility. Compared with these programs, the EITC is distinct in that it rewards participants with extra earned income in the subsidy range. Figure 1.2 presents a graphical example of the EITC increasing labor supply over traditional welfare programs.

In Figure 1.2, the individual is seeking to maximize utility while choosing between leisure and income from the labor market. Traditional welfare programs reduce benefits as the individual earns additional income.[20] This is reflected by the benefit-reduction rate. The result is that the individual achieves a utility maximizing choice of Y_1 in labor income, resulting in utility U_1. By contrast, the EITC initially subsidizes labor supply, resulting in a utility-maximizing choice with higher after-tax income (Y_2) and less leisure (more labor supply).

A benefit of encouraging contemporaneous labor supply may be longer-term connections to the labor market for the affected population. As a worker gains experience, the worker's human-capital investment should generally increase. For workers with low levels of educational attainment, this may consist of very basic skills, such as reliable attendance habits and following directions. As the worker gains

experience on the job, pay and/or hours will potentially increase, resulting in a higher income and reducing the probability the worker and her family will be in poverty. This potential for longer-term benefits is a clear advantage of the EITC when compared to other low-income assistance programs. The long-term benefits of the EITC are not examined in this paper. An evaluation of these benefits would be an important contribution to the literature on the EITC.

The credit also has certain advantages over increases in the minimum wage. In the phase-in range, the EITC creates a wedge between the market wage and the net wage paid to workers. There are increased incentives for workers in this range to participate in the labor market, and for those already participating to work more. There is, however, no additional cost for an employer for this wage subsidy. In fact, new workers entering the labor market result in an outward shift in the labor-supply curve. This is shown graphically in Figure 1.3. The additional workers drawn into the labor market due to the EITC result in a shift in labor supply, from LS_1 to LS_2. To the extent allowed by minimum-wage laws, additional supply puts downward pressure on the equilibrium wage. The market wage falls from W_1 to W_2. This would cause movement along the labor-demand curve, encouraging employers to hire more workers. The result is higher levels of employment due to lower market wages, and higher total labor-market income, due to more workers being employed receiving both the market wage and the EITC.

Increases in the minimum wage, while also raising the net return to workers, mandate an increase in labor costs for employers. This increase in the wage rate lowers the quantity of labor demanded, and thus lowers employment. A higher minimum wage

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[20] A small amount of initial earnings is often allowed before benefits are reduced. This allows for a utility-maximizing solution that has less labor income than the one shown in Figure 1.2, but at a lower level of

would encourage employers to reduce their payrolls and substitute higher-skill workers and advanced production techniques for low-skill workers. The decrease in employment tends to offset the higher incomes some minimum-wage workers receive.

The effects of a minimum wage are shown graphically in Figure 1.4. The minimum wage enacted at a higher rate than the market wage rate results in a reduction in the quantity of hours worked, from H_0 to H_1 in the diagram. The higher wage results in an increase in the quantity of labor supplied, so that LS_1 hours of labor are offered. However, the labor market is constrained by the demand side, with employers choosing to employ fewer workers at the higher minimum wage.

The very groups that are targeted for aid may well be the groups that are injured by the increase in the minimum wage. Lower-skill workers, for whom labor market participation may be more important, are more likely to be displaced, and thus their long-term prospects are adversely affected. The net effect on lower-skill workers will depend on the elasticity of demand for labor. Neumark and Wascher (2002) demonstrate that the elasticity of demand for minimum-wage workers may be near -1 since the disemployment effects of a minimum wage increase are concentrated among the workers affected by the minimum wage. This occurs even with an overall elasticity of labor demand of -0.1 for all workers in the age group. If job losses due to minimum wages are concentrated among low-income families, it is possible (even likely) that increases in the minimum wage will produce offsetting effects. The higher minimum wage will raise the incomes of some families who remain employed with the higher minimum wage. Other families who become unemployed or face reductions in hours worked will see their incomes fall.

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utility than the choice made with the EITC.

The empirical estimates of Neumark and Wascher indicate that minimum wages increase the probability that poor families escape poverty, but also increase the probability that previously non-poor families fall below the poverty line. The net impact of the offsetting effects is insignificant, leading Neumark and Wascher to conclude that minimum wages do not reduce poverty.

A second advantage the EITC enjoys over the minimum wage is its greater concentration of benefits in the target population. The EITC is completely concentrated in filing units with taxable income of no more than $31,152. Alternatively, the minimum wage has no income qualifications, and applies to almost all workers. Burkhauser, Couch, and Wittenberg (1996) report that at least one-third of those working at the minimum wage were in families with incomes higher than double the poverty level. While any annual measure of income may fail to measure accurately the economic well-being of a taxpayer, it would seem the EITC is more concentrated among families that are below median income. In addition, since the EITC is not available to individuals under age 25 without children, it does not subsidize leaving school for most young people, while higher minimum wages may encourage higher-skill students to leave school sooner (see Neumark and Wascher, 1996). However, it is possible that the availability of the EITC could induce young women with children to leave school, take a job, and cease being a dependent.

1.4. STATE-LEVEL EITC

In recent years, the earned income credit has become an attractive policy tool for states as well. By 2000, 14 states and the District of Columbia had their own credits in

operation. Ten states have adopted new credits since 1990.[21] In general, the state-level credits use federal eligibility criteria, and their benefits are determined as a percentage of the federal credit. A refundable state EITC adds to the incentive effects for participation of the federal credit. A refundable state credit also provides additional income support for low-income families.

The current federal subsidy rate for families with two or more children is 40 percent. Since most state EITCs operate as a percentage of the federal credit, a refundable state credit of 10 percent increases that rate to 44 percent. Refundable credits have been adopted by Colorado, Kansas, Maryland, Massachusetts, Minnesota, New Jersey, New York, Vermont, Wisconsin, and the District of Columbia. However, a number of states have adopted nonrefundable credits. A nonrefundable credit has limited incentive effects, because any credit in excess of tax liability goes unused. Nonrefundable credits have been enacted by Illinois, Iowa, Maine, Oregon, and Rhode Island. Maryland has both a refundable and a nonrefundable option, and taxpayers may choose the option that provides the largest benefit.

Wisconsin can be used as an example to compare refundable and nonrefundable credits. With the existing refundable Wisconsin credit, a single mother with two children and earnings of $11,635 would receive a Wisconsin earned income credit of $561 for

[21] Rhode Island (1975), Maryland (1987), Vermont (1988) and Wisconsin (1989) were enacted prior to 1990. Iowa (1990), Minnesota (1991), New York (1994), Oregon (1997), Massachusetts (1997), Kansas (1998), Colorado (1999), Illinois (2000), Maine (2000), New Jersey (2000), and the District of Columbia (2000) have all adopted new credits, and Maryland (1998) revised their credit to grant a refundable option. A 15th state, Indiana, adopted an earned income credit that bears little resemblance to the other state-level credits. The Indiana credit will be discussed later, but is not considered an earned income credit in the above discussion.

2001.[22] If the Wisconsin credit were to be nonrefundable, this single mother would receive no benefit from the nonrefundable state credit with an income of $11,635. Under the 2001 Wisconsin income-tax law, the standard deduction, allowable personal exemptions, and renter's property-tax credit would eliminate all tax liability for this hypothetical taxpayer. This analysis assumes this hypothetical mother pays $500 per month in rent. So a nonrefundable credit would provide no effective benefit for this mother unless she earns more than $11,635 in 2001. With an income of $11,635, the hypothetical family described above has no income-tax liability, making a nonrefundable credit of no value.

State income taxes generally have exemptions and/or standard deductions that provide an income threshold below which tax filers pay no income tax. A nonrefundable credit will generally raise that threshold. By contrast, a refundable credit actually adds to the federal subsidy, providing an additional incentive to a nonworker to begin working. The excess earned income credit above any income-tax liability is refunded to the worker.

The federal earned income credit is often heralded as an incentive program designed to encourage labor supply. In the phase-in region, the credit increases the net-of-tax wage above the market wage, thus increasing the reward for market labor. This should increase labor market participation. A state-level credit would increase this subsidy even more, so it would be proper to adopt a state-level credit in the hopes of increasing labor-market participation.

[22] The Wisconsin credit for families with two children is 14 percent of the federal credit. More detail on the Wisconsin credit will be given below.

All state earned-income credits are not created equal. The size of the state affects the absolute amount a state would have to pay for any particular credit. For 1998, a 10-percent credit in California would have cost $380 million, while a 10-percent credit in Delaware would cost $8 million.[23] However, states also differ in the relative size of the EITC credit population. On average, 20 percent or more of federal income-tax returns filed from southern states claim an EITC, while the national average is only 15.5 percent. In 1998, 29.8 percent of all returns filed from Mississippi claimed an earned income tax credit. States in the upper Midwest have smaller EITC populations, with 10-12 percent of federal returns filed by residents of these states claiming a credit. With states generally basing their credits on a percentage of the federal credit, variation in the proportion of taxpayers claiming the federal credit will mean that a credit of any given percentage results in different relative expenditures for various states. A state with a low proportion of claimants will find its credit inexpensive relative to a state with a higher proportion of claimants. This may in part explain the generous credit rates in states like Minnesota and Wisconsin, and the fact that state-level EITCs have not been adopted in the South. Appendix Table A-1 shows the distribution of credits for 1998 by state.

A brief sketch of the history and framework of the existing state-level EITCs is given below. Existing state credits are also summarized in Table 1.2.

Rhode Island

The Rhode Island credit is the oldest state-level credit. The Rhode Island credit is embedded within the state's income-tax calculation, and not separately reported by

[23] Data on federal EITC payments by state are taken from the 1998 *Statistics of Income*, Internal Revenue Service.

taxpayers. The Rhode Island income tax is based on 26.5 percent of the federal income tax after certain federal credits, including the earned income credit, so an extra $1 in federal credit reduces the tax liability of a Rhode Island resident by $0.265. This credit is nonrefundable, so if the net federal income-tax liability is negative due to refundable credits, the Rhode Island tax liability is zero. This credit has been in place since the beginning of the federal credit in 1975.

Wisconsin

The Wisconsin credit is unique in that the percentage of the federal credit an eligible taxpayer may claim depends on the number of qualifying children in the household. Wisconsin's experience with an earned income credit began in 1984 as a nonrefundable credit. This credit was then eliminated following the 1985 tax year. In 1989 Wisconsin adopted a new refundable credit that has been modified numerous times in the years following. Since its return, the credit has varied in size based on the number of qualifying children. Currently the state credit works as follows:

Number of qualifying children	Percentage of the federal credit
1	4%
2	14%
3 or more	43%

Maryland

Maryland was the third state to adopt an earned income credit, in 1987. The credit was equal to 50 percent of the federal credit and was nonrefundable. In 1998, Maryland added a refundable alternative. The new refundable portion is 10 percent of the federal credit, and taxpayers may choose the alternative offering them the best advantage. The refundable credit percentage increased to 15 percent for tax year 2001.

Vermont

Vermont has a refundable credit equal to 25 percent of the federal credit. The credit has varied in its percentage since its inception in 1988. In 1988 and 1989, the credit equaled the current 25 percent rate. From 1990 through 1992, the credit was 28 percent, and in 1993 it was 31 percent. In 1994 the credit was returned to its current 25 percent rate.

Iowa

The Iowa credit began in 1990 as 5-percent nonrefundable credit. The credit was increased to 6.5 percent of the federal credit in 1991. This was the smallest among the state-level credits prior to 1997.

Minnesota

Minnesota's credit was adopted in 1991 as a refundable credit equal to 15 percent of the federal credit. In 1998, the credit was revamped. An eligible taxpayer without a

qualifying child receives a Minnesota credit equal to 15 percent of the federal credit. The credits for taxpayers with children have a tiered approach. There is an initial subsidy rate, a zero rate, a higher subsidy rate, a zero rate, and then the credit phases out. Minnesota's approach is unique among states with EITCs.

New York

New York created a refundable credit in 1994 that was phased in over a 4-year period. In 1994, the credit was 7.5% of the federal credit. It increased to 10% in 1995, 15% in 1996, and 20% after 1996. The credit increased to 25% in 2001.

Massachusetts

Beginning in 1997, Massachusetts adopted a 10% refundable credit. The credit rate increased to 15% in 2001.

Kansas

Beginning in 1998, Kansas adopted a 10% refundable credit.

Oregon

Beginning in 1997, Oregon adopted a 5% nonrefundable credit.

Colorado

In 1999, Colorado adopted a refundable credit equal to 8.5% of the federal credit. The continuance of the credit is dependent upon Colorado maintaining a budget surplus.

Indiana

Beginning in 1999, Indiana created a different kind of earned income credit. The credit does not work like other piggy-back credits. The credit applies to households with total federal income of $12,000 or less. The Indiana credit is equal to the 3.4 percent of the difference between $12,000 and total federal income. This means the Indiana credit operates like a cash grant of $408 (3.4 percent of $12,000) and has a benefit-reduction rate, i.e., an income tax rate, of 3.4 percent. This particular version of the earned income credit does not feature any wage subsidy, unlike the federal credit or the credits adopted by most states. It would seem that this program is designed to provide income maintenance, since the program imposes a tax on additional earnings for low-income workers.

Beginning in tax year 2000, 3 additional states and the District of Columbia added earned income tax credits. New Jersey adopted a 10% refundable credit that will increase to 20% by 2003. The District of Columbia has also adopted a 10% refundable credit. Illinois and Maine began offering 5% nonrefundable credits.

A quick look at some summary statistics presented in Tables A-2 through A-5 would seem to indicate that the state-level earned income credits, with the exception of New York and the District of Columbia, were not adopted by states experiencing acute labor-market difficulties. As shown in Table A-2, in the year before adoption, the unemployment rate in states that enacted their own credit was 0.6 percentage points below the national average. The unemployment rate would be 0.9 percentage points below the national average if New York and the District of Columbia were excluded. The numbers are very similar if the annual average for the two prior years is considered.

A similar pattern emerges when considering poverty rates, as shown in Table A-3. States that enacted EITCs averaged 2.3 percentage points less poverty than the national average in the year prior to adoption. That number grows to 3.1 percentage points when New York and the District of Columbia are excluded.

As can be seen in Tables A-4 and A-5, a similar situation exists for labor-force participation and AFDC/TANF caseloads. States adopting credits were an average of 2.5 percentage points above the national average in labor-market participation. Excluding New York and the District of Columbia would increase that number to 3.3 percentage points. In the year before the state adopted an EITC, the number of AFDC/TANF cases per 1,000 residents was 0.5 higher than the national average. However, that number drops to –2.1 per 1,000 residents when New York and DC are excluded.

These four measures of economic well-being indicate that the states adopting credits were, with the two notable exceptions, not suffering from dire economic times relative to the U.S. as a whole. That does not exclude the possibility that there may be regional differences in the tolerance of unemployment, poverty, and active welfare policies. Thus, earned income credits may have been adopted to provide additional resources for low-income working families, or to balance tax relief across income groups, but it would not seem they were adopted to address serious labor-market problems. New York and the District of Columbia may be exceptions. Both areas were characterized by relatively high unemployment, poverty, and large proportions of their population on either AFDC or TANF, while having relatively low labor-market participation. In these areas, an EITC may have been viewed as a way to encourage work and reduce the need for future public support. The credit will also provide a measure of support to low-

income workers, helping to alleviate poverty.

From this simple examination of the more recently created earned income credits, it can be observed that New York may have adopted an earned-income credit for different reasons than other states. The high unemployment and poverty rates, as well as the low participation rate in New York, may indicate that the New York EITC was viewed as a policy tool to improve labor-market performance. Whatever the motivation, it is clear that the situation in New York is different from the situation in the other states that have adopted an EITC.

The assumption used throughout this paper is that the adoption of state-level earned income credits is exogenous. A potentially interesting extension would be to relax that assumption and consider the factors that influence states to adopt their own EITCs. An endogenous state-policy regime may provide additional insight into the effectiveness of EITCs. It is possible that the states that adopt EITCs have strong labor-market performance prior to the enactment of the EITC. If state EITCs are assumed to increase labor-market participation, states with high levels of participation, especially among single mothers, might not receive as strong an increase in participation from the new EITC as would states with lower participation. This would potentially bias the measured effect of a state EITC toward zero. However, if EITCs are enacted by states with weak labor-market performance, the measured effect of a state EITC would be biased upward.

The above discussion notwithstanding, for the purposes of this study, state-level credits are assumed to be exogenous policy regimes, so that the natural experiment approach is valid. State-level credits potentially improve the identification of the effects of EITCs on labor supply and poverty. The variance across states in subsidy and tax rates

associated with the various credits may provide more precise controls and better identification of the EITC's overall impact.

FIGURE 1.1
Effect of EITC on Budget Set

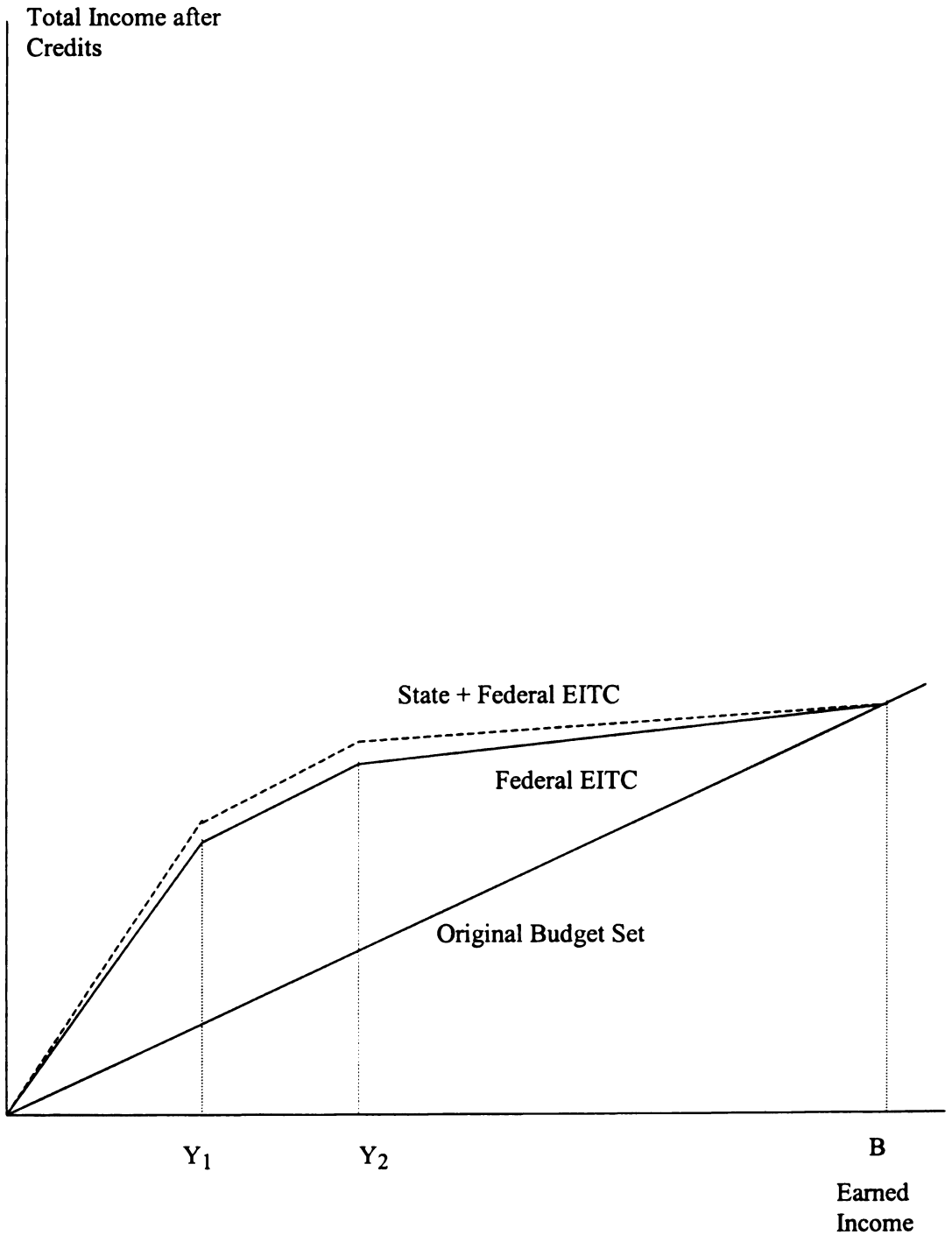

FIGURE 1.2
EITC's Effect on After-Tax Income

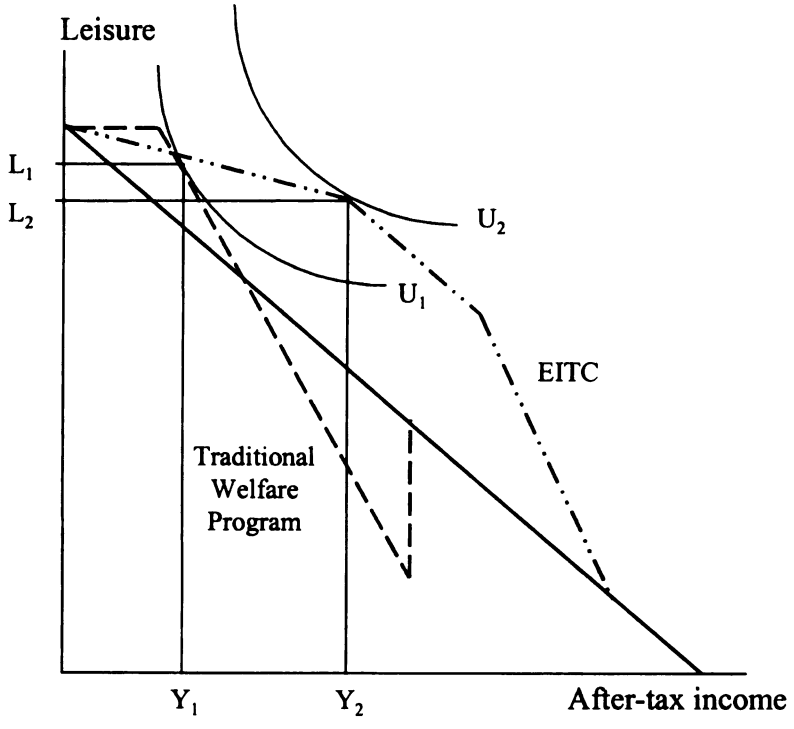

FIGURE 1.3
Effect of EITC on Equilibrium Wage

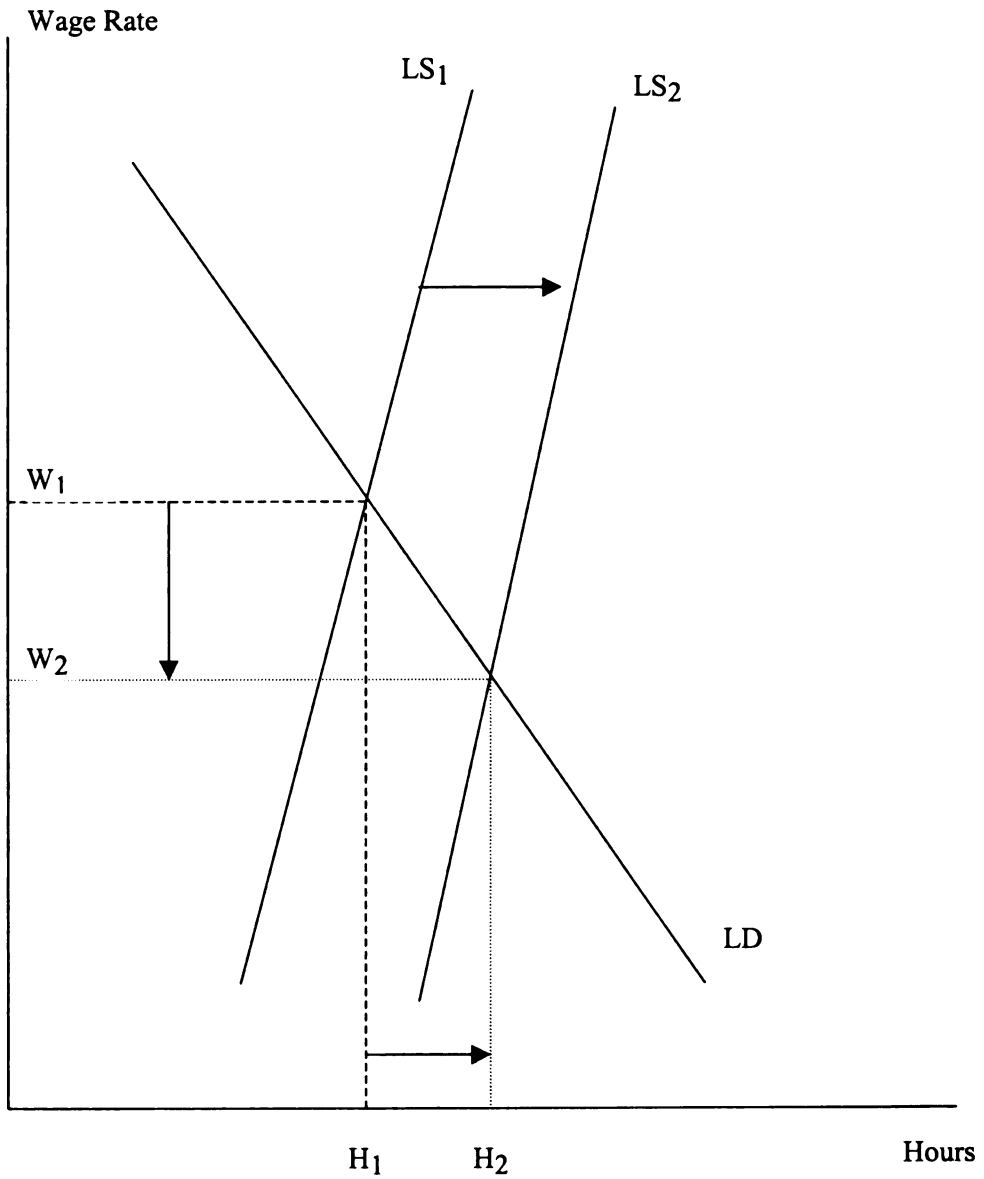

FIGURE 1.4
Effect of Minimum Wage on Employment

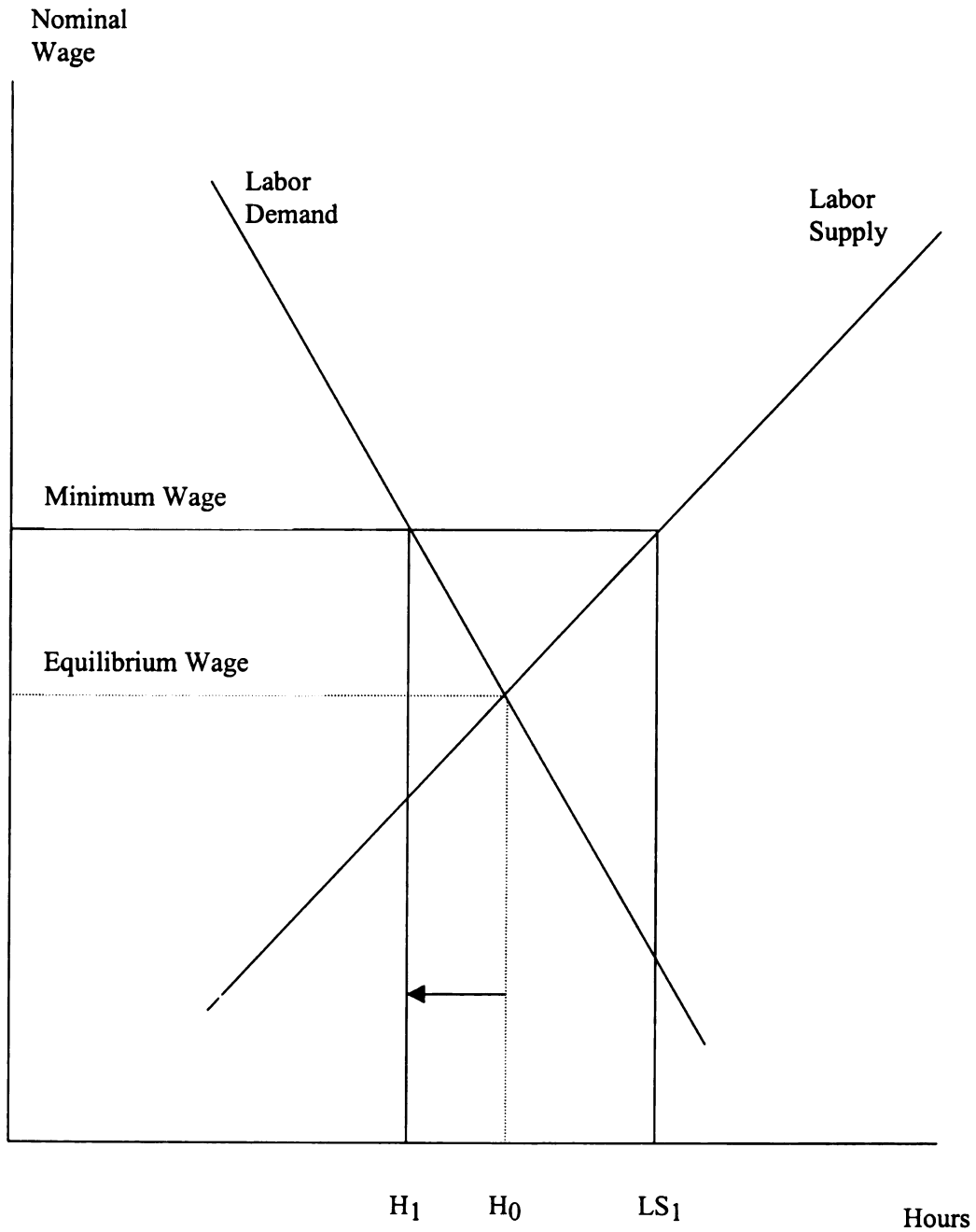

Table 1.1
History of Federal EITC

Calendar Year	Credit Rate (%)	Maximum Credit	Phaseout Rate (%)	Phaseout Income	Breakeven Income
1975-78	10.00	$400	10.00	$4,000	$8,000
1979-84	10.00	$500	12.50	$6,000	$10,000
1985-86	11.00	$550	12.22	$6,500	$11,000
1987	14.00	$851	10.00	$6,920	$15,432
1988	14.00	$874	10.00	$9,840	$18,576
1989	14.00	$910	10.00	$10,240	$19,340
1990	14.00	$953	10.00	$10,730	$20,264
1991					
One child	16.70	$1,192	11.93	$11,250	$21,250
Two children	17.30	$1,235	12.36	$11,250	$21,250
1992					
One child	17.60	$1,324	12.57	$11,840	$22,370
Two children	18.40	$1,384	13.14	$11,840	$22,370
1993					
One child	18.50	$1,434	13.21	$12,200	$23,050
Two children	19.50	$1,511	13.93	$12,200	$23,050
1994					
No children	7.65	$306	7.65	$5,000	$9,000
One child	26.30	$2,038	15.98	$11,000	$23,755
Two children	30.00	$2,525	17.67	$11,000	$25,296
1995					
No children	7.65	$314	7.65	$5,130	$9,230
One child	34.00	$2,094	15.98	$11,290	$24,396
Two children	36.00	$3,110	20.22	$11,290	$26,673
1996					
No children	7.65	$323	7.65	$5,280	$9,500
One child	34.00	$2,152	15.98	$11,610	$25,078
Two children	40.00	$3,556	21.06	$11,610	$28,495
1997					
No children	7.65	$332	7.65	$5,430	$9,770
One child	34.00	$2,210	15.98	$11,930	$25,750
Two children	40.00	$3,656	21.06	$11,930	$29,290
1998					
No children	7.65	$341	7.65	$5,570	$10,030
One child	34.00	$2,271	15.98	$12,260	$26,473
Two children	40.00	$3,756	21.06	$12,260	$30,095
1999					
No children	7.65	$347	7.65	$5,670	$10,200
One child	34.00	$2,312	15.98	$12,460	$26,928
Two children	40.00	$3,816	21.06	$12,460	$30,580
2000					
No children	7.65	$353	7.65	$5,800	$10,380
One child	34.00	$2,353	15.98	$12,700	$27,413
Two children	40.00	$3,888	21.06	$12,700	$31,152
2001					
No children	7.65	$364	7.65	$5,950	$10,710
One child	34.00	$2,428	15.98	$13,100	$28,281
Two children	40.00	$4,008	21.06	$13,100	$32,121

Source: The 2000 Green Book, Ways and Means Committee, U.S. House of Representatives.
2001 information from Instructions for Form 1040, Internal Revenue Service.

Table 1.2
State Earned Income Credits

State	Year Enacted	Refundable	Credit Rate – 2001
Rhode Island	1975	No	26.5%
Wisconsin	1984, 1989	Yes	1 child – 4%
			2 children – 14%
			3 or more – 43%
Maryland	1987	1987-97 – No	Nonrefundable – 50%
		Since 1998 – Both	Refundable – 15%
Vermont	1988	Yes	25%
Iowa	1990	No	6.5%
Minnesota	1991	Yes	Variable
New York	1994	Yes	25%
Massachusetts	1997	Yes	15%
Oregon	1997	No	5%
Kansas	1998	Yes	10%
Colorado	1999	Yes	8.5%
New Jersey	2000	Yes	10%
District of Columbia	2000	Yes	10%
Illinois	2000	No	5%
Maine	2000	No	5%

CHAPTER 2

LITERATURE ON LABOR SUPPLY AND THE EITC

2.1. LABOR SUPPLY AND TAXES

Labor supply among women has increased in every age group in the period following World War II. From 1980 to 1998, participation increased by 8.4 percentage points among all women.[24] Double-digit percentage-point gains occurred among women 25 to 54. The smallest gains were among women 16 to 24, which is possibly due to longer school enrollment. College enrollment among women grew from 1980 to 1998 by 43.3 percent, with an additional 2.6 million women enrolled for degree credit. College enrollment among men over the same period grew 27.8 percent.[25] The overall increases in the labor supply of women have helped to spur research interest, both to describe the changing labor-market behavior of women and to assess the effects of various policies on the labor supply of women.

A deep literature exists on the overall effects of taxation, specifically income taxation, on labor supply. This literature mainly deals with the substitution and income effects of taxes on labor income, and provides intuition on the findings discussed later.

Numerous previous studies have found varying degrees of response in labor supply to tax changes. Triest (1990) finds that, generally, changes in the net wage have almost no impact on the labor supply of men. Small estimated labor-supply elasticities (near zero) for men are common throughout the labor-supply literature. Estimated labor-supply elasticities for women are shown by Triest to depend on the method used for

[24] Fullerton (1999).
[25] Data from the U.S. Census Bureau, *Current Population Reports*, P20-521.

estimation. In particular, conditional on participation in the labor force, the elasticities for women are small, but the participation decision seems quite elastic. This would seem to be good news, especially for those hoping to draw individuals into the labor market with the high wage-subsidy rates in the phase-in portion of the EITC.

In Hausman's survey (1985), the weight of the evidence seems to indicate that low-income individuals have a greater response to tax law changes than do other income groups. Hausman's survey deals mainly with the results of the negative-income-tax (NIT) experiments conducted in the 1970's. In these studies, the expected reduction in labor supply to the NIT was observed. An assistance program with a NIT or benefit-reduction rate will have both the income and substitution effects working to reduce labor supply. The NIT experiments consistently observed this empirically, both for men and women.

Moffitt's (1992) survey of studies does not address the EITC or the income tax specifically, but rather looks at the other components of the U.S. welfare system. Many of these programs have NIT features, which reduce the benefits received by recipients as their incomes increase. Moffitt finds that, because changes in benefit-reduction rates cause changes in the population eligible for benefits by changing income cutoffs, there is no significant effect on overall labor supply from rate changes. By raising the break-even level of income, the benefit-reduction rate is reduced, but individuals formerly ineligible for benefits now become eligible. Those who are newly eligible face an increased tax rate because of the negative income tax structure of the program. Moffitt reports that most studies find that these effects cancel each other. In fact, he reports, "The failure [of] the negative income tax to provide work incentives has also led some analysts to

conclude that work and welfare are inevitably essentially mutually exclusive alternatives. . .. (pg. 41)" The potential implication for the EITC is that while increasing benefits, such as was done in 1990 or 1993, may increase labor-market participation, the increased benefit-reduction rates or expansion of the population subject to the benefit-reduction rate will result in offsetting decreases in labor supply.

Mroz (1987) finds that the labor-supply behavior of married working women is similar to that of prime-age males. The models that produce large income or substitution effects require economic and statistical assumptions that are rejected by Mroz's specification tests. If married women, in fact, exhibit labor-supply behavior similar to males, it would seem reasonable to expect similar behavior from female household heads, the focus group of this study. The success of the recent expansions of the EITC will likely be judged based on the impact these expansions have had on labor supply. If, as a result of increasing the wage-subsidy rate and thus the size of benefits, a larger proportion of the low-income population is drawn into the labor market, the expansions will be viewed as successful to some degree. If the result is to reduce the number of hours worked significantly by those already in the labor force, the expansions will undoubtedly be viewed less favorably.

2.2. EITC AND LABOR SUPPLY

Dickert, Houser, and Scholz (1995) complete a microsimulation of the tax rates faced by low-income households. By comparing the effective tax rates faced by different households, the study projects the expected impact the expanded EITC will have on labor supply. The simulation is quite detailed, and attempts to model the interaction between

the labor market, federal and state tax policy, the EITC expansion, and other government assistance programs. Their projections would seem to indicate that the new expansions of the EITC would lower effective tax rates, due to the expanded phase-in range and higher subsidy rate. Lower tax rates should lead to increased labor supply and earnings for low-income families.

Browning (1995) uses estimates of wage and income elasticities to estimate the potential labor-supply effects of the EITC expansion resulting from OBRA 1993. These estimated elasticities are then used to project the impact the expansion of the EITC would have on households in the different EITC ranges. The most striking finding was the decline in disposable income projected to occur among households in the higher end of the phase-out range. This implies that the decline in labor supply among these households is so great that labor income would decline by enough to offset the higher EITC amount. The estimates imply that the net benefit to households in the phase-out range would be significantly less than the cost of providing the benefit. However, Browning's estimates indicate that the EITC expansion will increase the disposable income of families in the phase-in and cash-grant ranges.

The simulation results above are based on previously estimated elasticities. The responsiveness of non-participants may vary over time, so the current group of non-labor-market participants might not be as responsive, on average, to increased wage subsidies as were those in the past. The pool outside the labor market may lack job skills which, when combined with minimum wage laws, may seriously restrict opportunities for these prospective workers. These workers also may not be strongly attached to the job market.

Some may be involved in underground activities, which could lessen the incentive effects of the EITC.

Eissa (1995) looks at changes in the labor supply of married women in response to the Tax Reform Act of 1986 (TRA). The focus of this study is on women in the upper 25% of the income distribution. The estimated labor-supply elasticity for married women in this study is between 0.6 and 1. It is similar to other findings, but the composition of the results are different. In particular, the estimated elasticity is approximately half due to increased participation and half due to increased hours. This differs from the Triest study above, in that he found that the hours elasticity was almost zero, while the participation elasticity was the driving force behind the overall elasticity. The Eissa study on high-income women is applicable only in the sense that it provides additional evidence of labor supply responses to changes in labor-market incentives. The TRA did not impose a phase-out rate, so the effect was only to increase overall labor supply. The study is of limited applicability to the work presented here because the sample population used by Eissa was high-income, married women. These women are not eligible for the EITC, nor are their incentives affected by changes in welfare policy.

Eissa and Liebman (1996) examine the effects of the changes in the earned income tax credit contained in the TRA on female heads of households which include children. They find that the expansion of the EITC made by the TRA led to an increase of 1.9 to 2.8 percentage points in the labor-force participation of single women with children, relative to single women without children. Eissa and Liebman did not find any significant change in hours worked. This is the kind of response that is expected by policymakers who advocate expanding the EITC, although the recent expansions of the

EITC were larger in scope and more publicized than the earlier changes, and may have different impacts.

The study by Eissa and Liebman was the first to evaluate the EITC using econometric techniques. Previous studies had focused on simulating the outcomes of an expansion of the credit. In recent years, additional studies on the EITC have emerged. The consistent finding throughout this literature is that expansions of the earned income tax credit have been associated with increases in the labor supply of single women. Meyer and Rosenbaum (2000, 2001) have shown in a pair of studies that recent federal expansions of the EITC were effective at raising the labor-market participation of single mothers. Their methodology attempts to incorporate various changes in the EITC, welfare policies, and state-level policies (including EITCs) in a structural model of the work decision, to glean the effects of these policies on the labor-supply decisions of single women. The 2001 study finds that the EITC is the most significant factor accounting for the increase in the labor-force participation of single mothers. They find that welfare waivers also provided a positive influence on participation.

The 2000 paper makes large-sample comparisons, using samples drawn from the March Current Population Survey (CPS) and the CPS Outgoing Rotation Group. The changes in labor-force participation for the group most affected by welfare policy and EITCs, single women with children, were compared with changes to other groups (single women without children, married women with children, and black men). Employment for single mothers, especially mothers with young children and those with multiple children, rose significantly more than employment in the comparison groups.

Ellwood (2000) focuses on the differential incentives created by the EITC and other policy variables. Among the differences investigated in Ellwood's paper are changes in tax policy over time, the erosion of real welfare benefits, and the aggressiveness of state policies in attempting to move individuals from welfare into work. Ellwood's results suggest that, while the EITC increases the labor-market participation of single mothers, there is a small decrease in the participation of married mothers.

Ellwood also considers the EITC's potential impact on marriage. Since low-income taxpayers are less likely to have itemized deductions, it is almost certain that two working individuals whose combined income falls within the EITC range would face a marriage penalty.[26] Since the standard deduction for married couples is lower than either double the standard deduction for single filers, or the sum of the single and head-of-household standard deductions, low-income households will likely pay more tax as a married unit than as two single units. The EITC may exacerbate a marriage penalty on low-income couples that decide to marry. Two workers who are employed at least half-time for the tax year and EITC-eligible, would almost certainly be in the phase-out range of the credit if they were to file jointly. Thus, their income would be taxed at high marginal tax rates. In addition, a marriage between an EITC recipient and another worker may result in the EITC amount being reduced, or even being eliminated. This is because the couple together may have an income that is further in the phase-out range or even outside EITC eligibility. This could lead to reduced marriage and increased

[26] The following discussion on marriage penalties focuses on low-income taxpayers. Marriage penalties on higher income taxpayers are primarily due to the tax rate structure. The higher tax rate brackets for married couples begin at income amounts that are less than double the amounts for single taxpayers.

cohabitation due to expansions of the EITC. However, the Ellwood results suggest that the EITC does not affect the decision to marry.

Eissa and Hoynes (1998) find that the EITC reduces the probability a married woman participates in the labor market. They also find evidence that participants already in the labor market reduced their supply due to the expanded EITC and the higher benefit-reduction rate. The reductions range from –0.6 to –2 percent. This is consistent with higher marginal tax rates discouraging participation, and generally consistent with the projections of Browning discussed above. The effect on married couples with children may be stronger than the effect on single mothers, because a married woman's earnings are more sensitive to tax policy, since the family has two potential workers. The higher tax rates may encourage more substitution to household production.

The policy advocated most commonly to aid the working poor, especially outside of academic economics, is undoubtedly raising the minimum wage. However, most papers discussing the EITC or welfare reform omit references to it. One study incorporating the EITC and minimum wages was from Neumark and Wascher (2001).

Neumark and Wascher was the first paper to investigate empirically the impact of the EITC on poverty status. This study matched CPS households over consecutive years and found that changes in EITCs, especially those enacted by states, were a more powerful tool for raising the incomes of poor families than minimum wages. This is consistent with government wage subsidies being able to raise the return to labor without distorting the labor market by imposing a legal wage floor. The finding that state EITCs have a stronger effect than the federal EITC is different than one might expect theoretically, although the structure of the model used by Neumark and Wascher provides

for better identification of the impact of state EITCs.[27] There is no particular reason that a federal or state EITC should be more effective if both provide the same incentives and are administered in a similar manner. Given that the federal EITC provides a larger wage subsidy to encourage labor-force participation, it would be expected that the federal EITC would have a more significant impact than state EITCs.

The one difficulty with the study framework is that households only have two years to observe the new incentives and respond. Since changes in tax policy may require longer lags than minimum-wage laws, it might be expected that the full minimum-wage effect might be observed within the two-year period, while part of the EITC effect might not occur until after the second year. This would tend to reduce the observed impact of EITCs. The results discussed in Chapter 3 support the hypothesis that the effect of the EITC does occur with a lag. Thus it may be that Neumark and Wascher's results, while favorable to EITCs, understate the final impact.

[27] In fact, for a number of the specifications reported by Neumark and Wascher, only the state EITC is identified.

CHAPTER 3

EFFECT OF THE EITC ON LABOR SUPPLY

3.1. OVERVIEW

The EITC clearly changes the incentives facing low-income individuals in the labor market. The goal for this study is to evaluate how those incentives have affected the labor-market participation and poverty status of single mothers. The quote referenced at the beginning placed two objectives at the heart of U.S. welfare policy; getting people to work and then ensuring that low-income working families are able to escape poverty. It is intended that this study may help evaluate the success of these efforts. This study is similar to studies performed by Eissa and Liebman (1996), Meyer and Rosenbaum (2000 and 2001), and Ellwood (2000). The focus here is on identifying all of the policy variables used to target low-income families, including the EITC, minimum wage, welfare benefits, and welfare waivers such as term limits and work requirements.

The above studies focus primarily on the impact of the EITC on labor supply, especially whether single mothers participate in the labor market. In addition to participation, these studies also investigate the potential effects of the EITC on other economic and social outcomes. Eissa and Liebman investigate whether the EITC is associated with reduced hours of work for those single mothers already in the labor force. In addition to labor-force participation, Meyer and Rosenbaum (2001) investigate the effects of the EITC on the probability a single mother receives welfare benefits. Ellwood includes an analysis of the effects of the EITC on labor supply of low-wage married women and the probability of marriage compared with cohabitation.

While these studies address important issues, poverty is one economic outcome that has not received attention. In this essay, a model similar to those used in the above studies will be used to assess the EITC's effects on poverty status among single women. The impact on poverty is fundamental to the success or failure of the EITC, especially in light of welfare reform. The only previous investigation of the effects of the EITC on poverty status is Neumark and Wascher (2001). The Neumark and Wascher study focused on transitions out of poverty following EITC using matched CPS records. This methodology allowed them to estimate the impact of EITC expansions, at both the state and federal level, on labor supply and poverty. However, the methodology can only capture the effect that takes place in the year of an EITC expansion. Any delayed reaction will not be included in the estimated effect of the expansion.

This study will use pooled cross-sectional data to trace the impact of the EITC over time while allowing for a longer adjustment period. There is a scarcity of empirical work on the impact of the EITC on poverty. The results in Chapter 4 are intended to help address this void in the literature.

This study will use a model based on the differences-in-differences framework to investigate the impact of the EITC on the probability that single mothers work or are in poverty. This study relies on year-to-year variation in the federal and state earned income credits to identify any impact among a sample drawn from the March CPS. The model is shown to produce estimates consistent with the existing literature on labor-market participation. It is important to evaluate whether the increase in work participation results in reduced poverty.

The first set of regressions examines the effects of various policies, including the EITC, on the labor-market participation of single mothers. The second set of regressions examines the effects of the EITC on the poverty status of single mothers, looking at both 100 percent and 150 percent of poverty. The results for poverty status are presented in Chapter 4.

3.2. IDENTIFICATION

Studies of the earned income tax credit have taken a number of approaches.[28] Browning (1995) and Dickert *et al.* (1994) used micro simulations, attempting to look at the structural implications in a sort of general-equilibrium format. Meyer and Rosenbaum (2001) have focused more on a model that is partial equilibrium, focusing on the prices and wages offered in the labor market. The study is rigorous in its inclusion and specification of the various tax, welfare, and health-care policies affecting labor supply.

Eissa and Liebman chose the natural-experiment method, relying on the changes in environment faced by the subject group compared with a control group. This method is less complete in the detailed structure of the model, and relies on the assumption the policy change is the only factor (or at least the predominant factor) driving any change in behavior. One potential source of bias from using this approach would occur if, over time, the probability of the measured outcome (in this study labor-force participation or poverty) becomes greater due to either economic or policy changes for which there are no explicit controls. For example, if having children restricts labor-force participation more

[28] Hotz and Scholz, 2000.

or less as time goes on, the estimated effect on participation of the policy change will be biased.

A difficulty that occurs in these difference-in-differences studies is that there may be influences affecting the measured outcome that are omitted from the study, either through oversight or due to an inability to quantify the desired influence. For example, in studies examining the effect of the earned income tax credit on the labor-market participation of single mothers, any influence of the minimum-wage rate has generally been omitted, with the exception of the study by Neumark and Wascher (2001).

Recent policy has emphasized getting single mothers to work in order to receive public assistance, both at the state and federal levels. Both the popularity of welfare waivers during the 1990s and the push toward welfare reform reflect this. It is difficult to quantify adequately this increased emphasis on work. This study includes controls for minimum wages and the aggressiveness of welfare reform, in an attempt to present a more complete policy framework.

In a natural-experiment framework, any omitted influence due to the increased emphasis on work will likely lead to an upward bias on the estimated effect of other variables. One potential immeasurable source of bias is the impact of the public discussion of welfare reform. It would seem unreasonable to believe that public discussions of revising the welfare state to encourage work in order to receive any assistance would not encourage some recipients to exert extra effort to search for work. However, the quantification of this influence is impossible.

In addition, some states were aggressively pursuing reforms, thanks in part to federal welfare waivers. Wisconsin spent much of the decade of the 1990s attempting to

reform welfare, and likely pursued reform at a level over and above that of most other states (see Ellwood 2000). The state was a leader in designing alternatives to traditional public assistance, was among the first to require work in order to receive benefits, and has the most generous state earned income credit for large families, those with 3 or more children. These policies unique to Wisconsin should raise labor-market participation, and it is likely the natural-experiment framework will attribute more success to the coincident policies that are under examination, even though the unobservable initiative was responsible for some of the effect.

In addition, the simultaneity of the changes in multiple programs in the mid-to-late 1990s has made it difficult to separate out final effects. Since 1993, the minimum wage has increased, the earned income tax credit has almost doubled, states began widespread experimentation with revisions to the AFDC program, and economic growth greatly accelerated, especially after 1995. Given their potential interactions, it is difficult to specify completely a model to control for these simultaneous changes, and thus to identify and estimate their effects.

A strong job market expands opportunities for all potential workers as the demand for workers increases, thus improving the probability of success for almost all job applicants. Higher minimum wages raise the return to work. This will encourage more low-wage workers to look for work at the higher minimum wage. Now combine the above factors with an expansion of the EITC and welfare policy shifts toward encouraging work. It may be difficult to obtain precise estimates of their individual effects if changes occur in these policies coincidentally. The identification of specific effects is more precise if there is variation among states in some of these factors, such as

the addition of state EITCs. State EITCs provide two key sources of identification. First, states that add EITCs present a source of variation from those states that do not add an EITC. Second, because state EITCs usually are implemented as a percentage of the federal credit, an expansion in the federal credit will increase the overall EITC by more in a state that has a separate state EITC. The estimation of the impact of nearly coincident policy changes is also aided if certain policies or economic conditions affect certain groups differently, such as the EITC affecting families with children and the minimum wage affecting all low-wage workers.

Welfare reform may eventually cause the measured response to the expansions of the EITC from the low-income population to be greater than it otherwise would be. As time limits for welfare benefits are imposed, individuals who may not have otherwise entered the labor market may now do so, for reasons separate from the EITC. Near-simultaneous modifications of programs targeting similar groups should result in larger numbers of new labor-market participants than would be attributable to the EITC alone. This will pose challenges for studies evaluating time periods encompassing welfare reform.

Schoeni and Blank (1999) discuss this identification problem while attempting to estimate the effects of welfare waivers and reform. They recognize that attributing any increase in labor-force participation to welfare reform assumes the full impact of the 1993 expansion of the earned income credit was incorporated in behavior prior to welfare reform. To allow clearer identification of the impact of the EITC, the period immediately following federal welfare reform (1997-1999) is excluded from this study. It is intended that this will allow for more precise identification of the effects of the EITC.

For this study, a policy framework is developed that controls for all of the major factors believed to be affecting labor-force participation among the low-income population. There are three sources that allow for specifically identifying the effects of the EITC. The first source of identification is that the EITC is available only to families with children. This was completely true prior to 1994. After 1994, low-income individuals are eligible for a small credit. For the estimates reported here, that variation has been ignored, allowing for continued comparisons between women with children and those women without children. The second source of identification is the variation in the federal EITC over time. The EITC was relatively small (both absolutely and at the margin) during the mid-1980s. The credit was increased three times between 1986 and 1993, making the EITC the largest federal expenditure directed at low-income families. In addition, the credit has gone from a single credit available to all families to separate credits aimed at families of different sizes. The variation in the value of the EITC over the sample period provides a source of identification. The final source of identification is the difference in the value of the EITC across states. By 1994, seven states had adopted their own EITCs. The variation in the value of state credits, both across states and over time, becomes a third source of identification.

To test the robustness of the initial estimates, the data sample was restricted to a couple of subsamples in some of the specifications that are reported. First, the sample was restricted to include only women with a high-school education or less. Restricting the sample to women with no more than a high-school education results in a remaining sample of 41,708 observations. This group has a greater concentration of women eligible

for the credit than the full sample. It would be expected, and prior research has found,[29] that the impact of the EITC on labor supply is greater for single mothers with low educational attainment.

Second, to evaluate whether New York's poor labor market condition at the time of enacting an EITC adversely affects the estimated effects of state-level EITCs generally, estimates were obtained excluding the New York observations. The motivation for these estimates will be discussed below in greater detail. As will be seen below, there is some evidence that the relative size of New York, when compared to the other states with EITCs during this sample period, does reduce the estimated effectiveness of state EITCs at increasing participation and reducing poverty.

3.3. MODEL

The differences-in-differences approach is used here, combined with an attempt to expand the control variables beyond those used previously, most notably by the addition of minimum wages and some controls for changes in state welfare policy. This study will use this approach to assess the impact of the EITC on labor-force participation and poverty. Increased labor-market participation will, it is desired, decrease the reliance single mothers place on public assistance, while allowing them over time to remain out of economic distress or poverty.

The fundamental model that is estimated is the probit equation:

[29] For example, see Eissa and Liebman (1996) and Meyer and Rosenbaum (2000).

$$P(po_{it} = 1) = \mathbf{P}(\alpha + \boldsymbol{\beta}\mathbf{Z}_{it} + \boldsymbol{\gamma}\mathbf{Y}_{it} + \delta_0\text{Number of children} + \delta_1(\text{EITC control}) +$$

$$\delta_2(\text{Children}>0 \text{ x EITC control}) + \delta_3(\text{Minimum wage})) + \varepsilon_{it}$$

where po_{it} is a dummy variable measuring the specific policy outcome under examination, either labor-force participation or poverty status. The dummy variable for labor-market participation is equal to one if a woman reported working one hour or more during the year. The dummy for poverty status is equal to one if the family's income is below the poverty threshold, based on her family's size. ε is a random error term that is assumed to have a standard normal distribution.

$\mathbf{Z}_{it}$ is a vector of control variables that includes age and its square, race, unearned income, total number of children, number of children under 6, and the level of educational attainment. There are also interaction controls for women with low educational attainment who also have children, nonwhite women with children, and nonwhites with low educational attainment. Year dummies are also included in $\mathbf{Z}_{it}$. These variables control for influences independent of government policy changes that are not accounted for otherwise and that may influence the labor-market participation of all women, including both treatment and control groups.

$\mathbf{Y}_{it}$ is a vector of control variables that reflect the labor-market conditions in the state, including the state-level unemployment rate, the growth rate of state personal income, state dummies, and, for women with children only, the maximum grant from AFDC. The minimum-wage variable is the higher of the federal or state minimum wage, divided by the statewide average wage in manufacturing. Using this ratio provides a

measure of minimum wages scaled relative to labor market conditions in individual states. This is similar to a common measure used in studies of the effects of minimum wages (see Leighton and Mincer (1981) and Cunningham (1981)). The difference is that the ratio of minimum to average wages was not multiplied by the ratio of covered workers. This implicitly incorporates an assumption that the coverage rates for each state are identical and constant over time. Estimates from the CPS indicate that between 96.5 percent and 98.2 percent of working women earned more than the federal minimum wage from 1982 to 2000. In addition, the U.S. Department of Labor (DOL) submits a periodic report to Congress entitled *Minimum Wage and Overtime Hours Under the Fair Labor Standards Act.*[30] From 1981 to 1999, the DOL reports a small increase (from 17.4 percent to 18.5 percent) in the percentage of private industry wage and salary workers who are exempt from the Fair Labor Standards Act, which contains the federal minimum-wage provisions.[31] The percentage of private wage and salary workers who were not exempt under the FLSA and not covered by the minimum-wage law declined from 12.0 percent in 1981 to 8.3 percent in 1999. The increase in coverage was larger among all wage and salary employees. This is due to the inclusion of state and local government workers under the FLSA. However, this decline is unlikely to have had much empirical significance, since most government employees are paid more than the federal minimum wage. Given the relatively consistent breadth of the provisions of the FLSA during the period included in this sample, the coverage ratio was not included in the minimum-wage variable. For the purposes of this study, the minimum-wage variable is included to

[30] Earlier editions of the report were entitled *Minimum Wage and Maximum Hours Standards Under the Fair Labor Standards Act.*

[31] Section 13(a)(1) of the FLSA contains exemptions for executive, administrative, or professional employees, as well as outside salespeople.

control for broad variation across states in the relative magnitude of federal and state minimum-wage laws. The theoretical examination and empirical quantification of coverage that is crucial to in-depth research on the minimum wage is less relevant to the goals of this study.

The major welfare program in the U.S. providing cash assistance prior to 1998 was Aid to Families with Dependent Children (AFDC).[32] The program was administered by the states in accordance with federal regulations and requirements. Beginning in the early 1960s, the Secretary of Health and Human Services could waive some of the requirements, to allow states to experiment with changes that would further the goals of the program. At first, little use was made of this authority. During the 1980s, the Reagan administration used this authority, but on a limited basis. Most of the waivers affected small parts of a state's welfare caseload.

The use of waivers accelerated during the first Bush administration, with the first broad statewide waivers being granted in 1992. Statewide waivers were granted in 1992 to New Jersey, Oregon, Michigan, Utah, and California. Over the next four years, 43 new waivers were granted to 33 states. The waivers allowed states to impose limits on the length of time welfare recipients could receive benefits, impose a deadline for recipients to obtain a job, lower benefits when families receiving benefits had additional children, require recipients to participate in training and education programs, and reduce the high rates of benefit reductions.

There is a limited correlation between welfare waivers and state EITCs. Only four of the first seven states to adopt earned income credits had received any statewide welfare waiver by 1997. The state with the most aggressive credit, Wisconsin, had

received two waivers. Vermont, Maryland, and Iowa were the other states with waivers, while Minnesota, New York, and Rhode Island had not received a statewide waiver.

In 1996, the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) was enacted. This landmark legislation of welfare reform repealed the Aid to Families with Dependent Children program. The replacement program, a block-grant system that provides states with great flexibility in providing benefits, began to be implemented in the fall of 1996. Because the focus of this paper is on the EITC, the entire period following the enactment of PRWORA is excluded. Inclusion of this time period would increase the difficulty in identifying the effects of the EITC, by increasing the number of coincident programs aimed at similar populations.

The specification of welfare waivers used here is similar to the one used by Neumark and Wascher (1998), and uses data taken from the Council of Economic Advisors (1997). The variable is equal to the number of months a state had a statewide waiver implemented during the year, divided by 12. This would include earnings disregards, work requirements, or term limits for benefits. The variable is only nonzero for women with children, since it would be expected that welfare waivers might affect the labor-market participation of women with children, but should have no direct effect on women without dependent children. As mentioned above, welfare waivers had become relatively widespread by the end of the period.

The estimated effect of the EITC is modeled through two different controls. The first control quantifies state-specific subsidy rates, incorporating both federal and state-level EITCs. The subsidy rate equals the wage-subsidy rate for which the woman would

[32] Information on AFDC waivers is taken from Council of Economic Advisors, 1997.

be eligible, based on the number of eligible children living with her and her state of residence. If a woman with three eligible children were living in Michigan in 1985, the subsidy rate would equal 0.11. A woman in similar circumstances in 1995 had a subsidy rate of 0.36. A woman with three children living in Wisconsin in 1995 had a subsidy rate of 0.54 when adding in the 50 percent Wisconsin earned income credit in effect at that time.

The second specification uses a variable that measures the federal wage-subsidy rate a woman would face upon entering the labor market. This differs from the first specification by separating the federal and state wage-subsidy rates. This measure increases over time as the EITC expands. Beginning in 1991, the federal earned income credit provided additional benefits to women with multiple eligible children. From 1991 to 1993, the additional credit was very small. The credit rate was slightly higher for multiple-child families. However, the higher credit was applied to the same amount of earnings, resulting in a small additional potential credit ($43 in 1991, $60 in 1992, and $77 in 1993). Since 1994, a higher credit rate and wider subsidy range are available to multiple-child families, so the potential maximum credit for a family with two or more children is more than 50 percent larger than the potential credit for families with one child in 2001. In this specification, separate wage-subsidy rates were included to control for state EITCs.

3.4. DATA

The data used for this investigation are the Annual Demographic and Income Supplement of the Current Population Survey, completed in March of each year. This

file contains complete detail for each household, as well as annual employment history and earnings. The data used for this study encompass all of the major expansions of the federal EITC, covering 1982 through 1996. The initial years of major expansions (1986-87, 1991, and 1994) were not included. The sample period also includes two increases in the federal minimum wage.

The sample consists of all single women between the ages of 25 and 50, inclusive. The total number of records for these years is 83,935. The sample is restricted to women beyond the normal ages of school attendance, in order to refine the focus on labor-market participation. The older population used here should be less likely to exhibit behavioral changes, i.e., a 40-year old woman out of the work force is less likely to enter the work force than a woman who is 20 years old. There are a couple of potential reasons to support this generalization. An older woman is more likely to have been unemployed for a long time, simply because of her age. Longer periods of unemployment would seem to increase the probability that unemployment would become permanent, because of skill deterioration. Also, employers may expect greater labor-market experience from an older applicant than a younger one.

Excluding the younger population also restricts the sample to women more established in their labor-market patterns. Younger women are more likely to attend school than older women, regardless of their maternal situation. While it is entirely possible that an individual over the age of 24 may finish high school or attend college, the younger age groups are far more likely to pursue those options. In addition, the impact of EITCs, welfare policies, and minimum wages on school attendance is the topic of Chapter 6.

Retirement and disability grow in importance as women age. Also, minor children become less common as women exceed 50 years of age. Including older women in the sample, when their labor-market behavior is less likely to be affected by the earned income credit, would potentially obscure the impact of various policies aimed at single mothers.

Annual poverty estimates were taken from the Historical Poverty Tables available from the Bureau of the Census. Unemployment rates, population estimates, and the Consumer Price Index were taken from the Bureau of Labor Statistics data files, and personal income was obtained from *The Survey of Current Business* (U.S. Department of Commerce, (2000)).

State-level minimum wage data were obtained from the annual labor legislation update from *The Monthly Labor Review*. Annual data on maximum AFDC benefits for each state came from *The Green Book* (various years) and *Aid to Families with Dependent Children* (U.S. Department of Health and Human Services, (various years)). Information on welfare waivers was obtained from *Explaining the Decline in Welfare Receipt, 1993-1996*, a technical report published by the Council of Economic Advisers.

Some general statistics on the sample are presented in Table 3.1. Table 3.2 presents a summary of the dependent variables. It is straightforward to see that women with children (thus eligible for the EITC) experienced larger increases in participation and decreases in poverty, especially after 1993.

3.5. ANALYSIS OF THE RESULTS

The full results are presented in Tables A-6 through A-17. The results are reported as partial derivatives evaluated at the sample means. Each specification is estimated once for each of the three different EITC variables. Each appendix table presents the estimates for one specification and one set of EITC controls for each of the three dependent variables: labor-force participation, poverty, and near-poverty status.

The first specification is the basic model.

$$P(po_{it} = 1) = \mathbf{P}(\alpha + \boldsymbol{\beta}\mathbf{Z}_{it} + \boldsymbol{\gamma}\mathbf{Y}_{it} + \delta_0 \text{Number of children} + \delta_1(\text{Children}>0 \text{ x EITC control}) + \delta_2(\text{Children}>0 \text{ x Welfare waivers}) + \delta_3(\text{Minimum wage})) + \varepsilon_{it}$$

The vectors $\mathbf{Z}_{it}$ and $\mathbf{Y}_{it}$ are described above. ε is once again a random error term that is assumed to have a standard normal distribution. There are three specifications of the EITC variable. The first is the combined state and federal EITC subsidy rate faced by a woman with children upon entering the labor market. The second EITC control separates the state and federal subsidy rates into two variables. The third set of EITC variables has separate variables for the federal and refundable state EITCs.

The next specification re-estimates the above model using the subsample of women with no more than a high school education. Year and child interactions were then added to the basic model. The revised model becomes:

$$P(po_{it} = 1) = \mathbf{P}(\alpha + \beta \mathbf{Z}_{it} + \gamma \mathbf{Y}_{it} + \delta_0 \text{Number of children} + \delta_1(\text{Children}>0 \text{ x EITC control}) + \delta_2(\text{Children}>0 \text{ x Welfare waivers}) + \delta_3(\text{Minimum wage}) + \delta_4(\text{Year dummy x Children}>0)) + \varepsilon_{it}$$

where ε is once again a random error term that is assumed to have a standard normal distribution. Finally, estimates were obtained for the model including the year and child interactions using the low-education subsample. A number of variations are then estimated to test the robustness of the estimates obtained using the basic model. The results are reported for the EITC, and occasionally welfare waivers, minimum wages, and welfare reform. However, the full results are omitted.

3.5.1. Estimation Results for General Controls

The results for the basic model are presented in the first set of columns of Tables A-6 through A-8. The estimates are generally consistent with the standard theory from labor economics and are also consistent across the different specifications and with different EITC controls.

Labor-force participation increases with age, but at a declining rate. Nonwhites are approximately 6.9 percentage points less likely to participate in the labor market than whites. The presence of an additional child under 6 years old in the household reduces labor-market participation by about 5 percentage points.

Education level is a strong predictor of labor-force participation. Women who did not graduate from high school participate at much lower rates than women with higher educational attainment. The average participation rate across years for the entire sample

is 87.0 percent, while the average for the sample that includes only women completing a high-school diploma or less formal education is 79.8 percent. Women with less than a diploma, a subset of the high-school-or-less sample, participate at a significantly lower rate. Overall, only 61.9 percent of women with less than a high-school diploma participate in the labor market.

The estimated effect of not completing high school is a reduction of participation of approximately 15.3 percentage points, compared with high-school graduates. Completing at least some college results in higher participation, with single women with some college attendance estimated to be approximately 4 percentage points more likely to participate. College graduates are estimated to be 4 percentage points more likely to participate in the labor market than those with some college. This implies that the probability of labor-force participation for women who have completed at least a bachelor's degree is eight percentage points higher, all else equal, than for women with only a high-school education, and more than 23 percentage points higher than for women without a high-school diploma.

Higher amounts of unearned income (such as interest or transfer payments) lower participation among unmarried women, other factors unchanged. An increase of $1,000 in real non-labor income decreases the probability of labor-market participation by an average of 0.3 percentage points.

Higher levels of public assistance within each state are associated with reduced participation. The coefficient is consistently negative in all specifications and significant at standard confidence levels. However, the coefficient is relatively small, with a $100

increase in real monthly benefits producing less than a 2-percentage point decline in participation.

An increase of one percentage point in the unemployment rate is estimated to reduce the probability of employment by 1.1 percentage points, other factors unchanged. Consistent with the findings of Meyer and Rosenbaum (2001), the effect of higher unemployment is not especially burdensome on single mothers. The estimates indicate that higher unemployment is not associated with any significantly larger effect on women with children.

Higher levels of personal income growth are associated with lower levels of labor-force participation. Personal income growth is measured as the annual percentage change in personal income in each state in the reference year covered by the CPS. One possible reason for this is that personal income growth may be high coming out of a recession, when many people are not employed.

As a rule, the estimated coefficients for the demographic and economic controls are consistent across the different specifications. There are some exceptions for the low-education subsamples (Tables A-9 through A-11). However, in order to focus on the EITC, discussion of the estimates for the general demographic and economic controls will be omitted.

3.5.2. The Impact of the EITC on Participation

Basic Model

Using the basic model, the federal EITC is estimated to increase participation by between 3.5 and 4.9 percentage points in the period after OBRA 1993, depending on the

EITC control variable included in the model. These estimates are significant for the combined federal/state subsidy rate and the separate federal subsidy rate. A summary of the estimated impact of the EITC on participation using the basic model is presented in panel A of Table 3.3. The highest coefficient estimates are from the regressions using only the federal wage-subsidy rate, with the estimated partial derivative of 0.122 implying an increase in labor-force participation of 4.9 percentage points among women with 2 or more children in 1996, all other factors unchanged.

The estimated coefficients imply an increase in labor-market participation of 1.7 percentage points for the TRA-1986 expansion. This result is smaller that the estimates obtained by Eissa and Liebman, who found an estimated effect of between 1.9 and 2.9 percentage points. This may be due to the older sample used for this sample, given the strong effect the EITC has on the participation among women under 25, as reported in Chapter 6. Eissa and Liebman's sample was unmarried women ages 16 to 44, while the sample used here is ages 25 to 50. Estimates on this data set using a model similar to the one used by Eissa and Liebman, and covering a similar time period, produced smaller effects than the results they reported.[33] The estimated effect of the EITC on participation was positive. However, the increase in participation was smaller than the results reported by Eissa and Liebman. For women with no more than a high-school education, the estimated effect of the EITC expansion in 1986 was a 2.2-percentage-point increase, close to the 2.6-percentage-point increase reported by Eissa and Liebman for women with only a high-school education.

[33] The sample period used by Eissa and Liebman was 1984-1986 and 1988-1990. The data used here are from 1982-1985 and 1988-1990.

The estimates for the effect of state EITCs on labor-market participation are negative (-0.137) and insignificant for the basic model. Similar qualitative results (-0.049) were obtained using only refundable state credits. Since state-level credits unambiguously increase the incentives to participate in the labor market, these results are surprising. These results are also contrary to those of Neumark and Wascher (2001). For families without a worker in the first year, Neumark and Wascher found that state-level credits increase significantly the probability there was a worker in year two.

The methodology used here is quite different from that employed by Neumark and Wascher. In this study, control variables are included for the obvious factors that are believed to affect labor supply, including the EITC. The key source of identification is the discrete policy shift that took place each time the federal EITC was increased. However, any omitted influence that is correlated with a variable included in the model will result in biased estimates. Neumark and Wascher attempt to eliminate this potential bias by including an interaction term for women with children by each year of the sample. These year/child interaction terms capture any general influence affecting women with children. In the Neumark and Wascher framework, the identification strategy relies on variation between year one and year two in the federal and state EITCs. However, the year/child interaction variables are going to have a high degree of collinearity with the level of the federal EITC, which is used here. In fact, the year/child interactions are the identification strategy used by Eissa and Liebman to identify the effects of the EITC. Including year/child interactions in this study may reduce the explanatory power of the federal EITC variables.

However, to test whether the estimated effect of state-level EITCs is better identified when year/child interactions are included, the model was re-estimated using these variables. The results are presented in panel B of Table 3.3. The estimate for the combined federal/state subsidy rate becomes smaller (from 0.102 to 0.068) and insignificant. The reason for the insignificant estimate is a large increase in the standard error of the estimated coefficient. When the federal and state subsidy rates are estimated separately, a large increase in the estimated coefficient for the federal EITC more than offsets an increase in the standard error, so the estimated coefficient remains significantly different from zero at all traditional significance levels. The estimated coefficient for the federal EITC is almost three times as large as the estimates reported in panel A.

Contrary to the estimates for the federal EITC, the estimates for state EITCs presented in panel B of Table 3.3 are virtually unchanged from those in panel A. The consistency of the estimated coefficients and standard errors for state EITCs provide additional evidence that state EITCs are not associated with increased labor-force participation. The results from estimating the base specification that are presented in panel A are confirmed by those in panel B.

The increased participation of single mothers in the labor market is an important indicator of the success of the EITC. Another measure of the impact of the EITC is how the EITC affects the earnings of single mothers, compared with single women without children. A traditional measure of the elasticity of earnings with respect to the EITC would be difficult to obtain, since the EITC has a significant effect on the participation decision, and those women entering the labor force will generally earn less than women already in the labor force. Thus estimates of this elasticity conditional on participation in

the labor force are negative. This is consistent with the EITC encouraging labor-force participation among low-wage women with children.

As an alternative measure, the change in average earnings for women with children can be compared with the change in average earnings for women without children. The estimates are presented in Table 3.4. For women in the sample with no more than a high school education, the percentage change in real earnings for women without children was subtracted from the percentage change in real earnings for women with children for each EITC increase (1986, 1990, and 1993). The difference in earnings growth is then divided by the percentage increase in the EITC wage-subsidy rate for a woman with one child. The result represents the percentage increase in the real earnings of women with children, adjusted for any increase accruing to all women, divided by the percentage increase in the EITC.

The results indicate that average real earnings for women with children have increased by a larger percentage than the average earnings of women without children in each period following an increase in the EITC. The elasticity estimates for the periods following the 1986 and 1993 increases in the EITC are around 0.1, indicating that a 10 percent increase in the EITC would raise the average real earnings of single mothers by 1 percent over the earnings growth of single women without children. The elasticity estimate for the 1990 EITC increase is 0.026. This estimate is most likely lower because of the impact of the 1991 recession.

High School or Less Education

The estimated effect of the federal EITC increases when the sample is limited to women with no more than a high-school education. These estimates are presented in panel C of Table 3.3. The expansion of the EITC in 1993 is estimated to have increased participation by from 7.6 to 9.8 percentage points, depending on the specification. This is approximately twice as large as the estimate discussed above for the full sample, where the estimates ranged from 3.5 to 4.9 percentage points. The results for this subgroup reinforce the claim that the EITC is responsible for a significant part of the increase in labor-market participation among single mothers. The sharp increase in the size of the estimated coefficients is consistent with the results of Eissa and Liebman, as well as Meyer and Rosenbaum (2000). Both studies reported significant increases in the estimated impact of the EITC in subsamples with lower educational attainment.

Regressions were also run on the women in the sample with higher educational attainment than a high-school diploma. These estimates are not reported here, but the estimates indicate a general correlation between lower participation and the EITC among women with children and more than a high-school education, the opposite effect from women with no more than a high-school diploma. This implies that more than 100 percent of the effect observed in the entire sample is due to the impact on women with relatively low educational attainment. The estimates for the mothers with more than a high-school diploma are not significant at traditional levels.

Among women with lower levels of educational attainment, all state EITCs continue to have negative coefficient estimates, although the estimates are less precisely measured (have higher standard errors) and statistically insignificant. The estimated

coefficient for refundable state EITCs does become positive, although the coefficient is not statistically significant.

To further investigate the identification of any impact attributable to state EITCs, year/child interactions were included in this specification using the subsample of only women with a high school education or less. The estimates are presented in panel D of Table 3.3. The results are very similar to those presented in panel B. The estimated coefficient on the combined subsidy rate is not significantly different from zero. The coefficient estimates for the separate federal EITC are very close to those presented in panel B, although the standard errors are larger. Consequently, the estimated coefficients are not significant at the 10-percent confidence level. The collinear nature of the federal EITC and the year/child interactions may be more of a problem given the smaller sample size. The estimated effect of state EITCs is not significant for either all state EITCs, or for just refundable EITCs. However, the sign of the estimated coefficient for refundable EITCs is positive, as it was in panel C.

New York Excluded

Questions about the estimated effects of the state EITCs led to a new estimation specification. New York is the largest state to have adopted a credit and, as was mentioned earlier, was facing a much different labor-market situation than were the other states with EITCs. Some comparisons between New York and the national averages for unemployment, poverty, and labor-force participation are presented in Table 3.5. Prior to 1991, New York was below the national average in unemployment for every year since 1981. However, 1991 seems to have marked a deterioration in the labor market in New

York, as unemployment became more prevalent in New York than in the U.S. as a whole. Labor-force participation peaked in 1990 in New York at 62.9 percent, but began to decline throughout the early 1990s. Measured poverty also became more prevalent in New York during the early 1990s, both absolutely and relative to the U.S. average. As the discussion in Chapter 2 highlighted, most of the other states with EITCs adopted an EITC while the state's labor market was performing better than the U.S. averages. New York is clearly unique in that the state labor market was not performing as well as the overall U.S. economy at the time the New York EITC was enacted. Given New York's relative size compared with the other states with EITCs, it is possible that New York exerts a negative influence on the estimated coefficients for state EITCs.

In order to investigate whether New York's economy was responsible for the negative correlation between state EITCs and labor supply, the observations for New York were excluded. By excluding New York, any negative effect on the estimated coefficient for state EITCs resulting from comparisons with New York was removed. In addition, to better assess the impact of state EITCs, the model was first estimated using all state EITCs, and then estimated using only refundable state EITCs (excluding New York in both cases).

The estimates are summarized in panel E of Table 3.3. The estimated effects of the federal earned income credit increased slightly from those presented in panel A. The estimated effect of all state EITCs on labor-force participation, all other factors remaining unchanged, remains negative. The estimate is somewhat smaller in magnitude and remains insignificant. However, the estimated effect of refundable state-level credits became positive, indicating a positive correlation between refundable state credits and

labor-force participation. Although now positive, the coefficient estimates for state credits were not significantly different from zero at traditional levels.

The large shift in the estimates for refundable state EITCs with the New York observations excluded is consistent with the hypothesis that the New York EITC was negatively affecting the estimate. The results with New York excluded are more closely in line with the findings of Meyer and Rosenbaum (2000) and Neumark and Wascher (2001) that state EITCs are at least somewhat effective at increasing labor-force participation among single mothers.

Welfare Reform

It may be true that welfare policy in general leading up to the passage of the PRWORA led to increased participation. The increased use of waivers may have been an indicator or reflector of modifications in state policy toward welfare. While the presence of a waiver would indicate an explicit policy shift, more subtle efforts to reduce the welfare population, or at least to increase work among recipients, may also have been at work. If states were attempting to reduce welfare dependency using less explicit methods, estimates of the effectiveness of EITCs and welfare waivers may be overstated.

In order to control for this, a measure of the emphasis states were placing on reducing caseloads and encouraging working is necessary, beyond controls for waivers and the fixed effects captured by state dummies. Ellwood (2000) estimated a model of welfare participation for each state from 1984 through 1992. Then, using the parameter estimates from the welfare-participation model and the demographic characteristics of women in a sample drawn for the March CPS for 1997 and 1998, Ellwood predicts

welfare-participation rates for each state for 1997 and 1998. Ellwood then subtracts the predicted rate from the actual participation rate in the CPS sample for 1997 and 1998. The resulting difference provides a measure of the aggressiveness of each state in reforming welfare between 1992 and 1998.[34] In order to avoid assuming this difference between the predicted and actual percentage of single mothers receiving welfare benefits represents a precise measure of aggressiveness, Ellwood uses the difference to classify states into three categories. States with an unpredicted decline in welfare participation of 4 percentage points or less were given a value of 1, those states with an unpredicted decline of between 4 and 10 percentage points were given a value of 2, and those states with an unpredicted decline of 10 or more percentage points were given a value of 3. For this study, the measure of aggressiveness for each state is then used as an explanatory variable to control for differences in welfare policy between states during the mid-1990s.

As might be expected, the estimated effect of the federal EITC decreases slightly with the addition of the welfare reform variable, although all the estimates remain significant. The estimate for the combined subsidy rate decreases from 0.102 to 0.100 when the welfare reform variable is included. This implies an estimated increase in labor-force participation of 2.1 percentage points for women with two children after the OBRA-1993 expansion, with the EITC's overall influence amounting to approximately a 4.0-percentage point increase in participation among women with two or more children. A similar decrease occurs when the federal and state EITCs are separated. The estimated coefficient for the federal EITC decreases from 0.122 without welfare reform included (panel A) to 0.120 with welfare reform included (panel F). The estimated coefficient for

[34] More complete explanations of the estimation procedure and the state-by-state estimates are in Ellwood's paper and are not repeated here.

the federal EITC also declines slightly when only refundable state EITCs are included in the regression. The estimated effects of state EITCs are unchanged from the base model when the welfare reform variable is included.

Trends for Women with One Child or Two or More Children

Two trend variables are added to the basic model. These trend variables are created by interacting a time trend with a couple of dummy variables that indicate the number of children each woman in the sample has. The first trend is for women with one child. The second trend variable is for women with two or more children. These variables are included to capture any influence that is affecting these two groups of single mothers over time. One advantage these variables have over year/child interactions is that trends are not as collinear with the federal EITC as year/child interactions. One disadvantage is that a trend variable will only capture those influences that are monotonic over time.

These estimates are presented in panel G of Table 3.3. The inclusion of the trend variables results in virtually no change in the EITC estimates, whether the federal and state wage-subsidy rates are combined or separate. The estimates for the federal EITC remain significant at all traditional confidence levels. The estimates for state EITCs are consistent with those discussed for the basic model, for both all state EITCs and only the refundable credits. To the extent that the trend variables for one and two-or-more children capture any influences that were affecting single mothers during the sample period, these estimates provide additional evidence that expansions of the EITC have resulted in increased participation among single mothers.

Lagged EITC Effects

It was mentioned above that the study by Neumark and Wascher (2001) might understate the final effect of the EITC because of the limited response time allowed by using matched CPS records. If at least some individuals who would be eligible for the EITC take time to learn about legislative changes that expand the credit, estimates based on the one-year response will understate the overall effect. In order to evaluate this hypothesis, a series of regressions were estimated using a two-year lag structure for the EITC variables. For one set of estimates, the concurrent EITC subsidy rate was included. For the second set, the concurrent EITC subsidy rate was excluded.

The results, presented in Table 3.6, provide evidence that the federal EITC has lagged effects on labor-force participation. In panel A, the estimated coefficient for the two-year lag is significant at five percent for the combined federal/state subsidy rate and for the separate federal rate. The estimated coefficients are quite large at approximately 0.25. The estimated coefficients for the current rate are consistently positive but insignificant. The estimated coefficients are not small in magnitude, but the standard errors of the estimates are relatively large. In general, the estimates for the one-year lag on the EITC are negative and insignificant. These estimates imply that, for example, the increase in the federal EITC subsidy rate that occurred in 1994 did not have a significant effect on participation until 1996. The estimates obtained when the concurrent EITC is excluded also have a similar pattern, as shown in panel B of Table 3.6.

State EITCs also seem to be more effective when lagged effects are considered. The estimates presented in Table 3.6 indicate that the concurrent effect of state EITCs is negative, but the lagged effects are positive. For refundable state EITCs, the one-year

lagged effect is positive and significant. When the current state and federal EITC rates are excluded, the one-year lagged effect is estimated to be negative, while the two-year lagged effect is positive.

The use of lagged EITC variables indicates that a significant part of the response to changes in the federal EITC occur two years after the change. In every specification presented in Table 3.6, the estimated coefficient for the federal EITC is positive and significant at 10 percent. The pattern for state EITCs is less clear, but there does appear to be some positive effect on participation over time.

Comparing the EITC with the Minimum Wage and Welfare Reform

The estimated effect of minimum wages on labor-market participation is negative consistently, although the estimates are marginally significant at traditional significance levels. The estimates are summarized in Table 3.7 and presented in detail in Tables A-6 through A-17. While providing limited evidence pointing to negative employment effects from higher minimum wages, this evidence is consistent with the textbook model. The estimates for the base model imply that a 10-percentage-point increase in the minimum wage relative to the average manufacturing wage would reduce the employment of single women by approximately 1.2 percentage points.

The evidence on the effectiveness of welfare waivers is mixed. The estimated effects are summarized in Table 3.7 as well. The estimated coefficients are generally greater than zero. However, the estimates are small, implying less than a one-percentage-point increase in employment for a state with a waiver in place for an entire year. The estimates are statistically insignificant for each specification. There are two explanations

for these estimates. One is that waivers are ineffective at encouraging labor supply. An alternative explanation is that waivers may differ across states by type of waiver, and by the energy with which the state implements the new policy. The estimates presented here fail to provide any evidence that welfare waivers, by themselves, increase labor-force participation.

This evidence is at odds with the evidence presented by Schoeni and Blank (2000). Schoeni and Blank find that waivers significantly increased employment among female high-school dropouts. However, the study does not include controls for the EITC. Since a large expansion of the federal EITC is coincident with welfare waivers becoming more widespread, it is possible that some of the employment effects associated with the EITC's expansion are being captured by waivers in the Schoeni and Blank estimates.

To test the hypothesis that the omission of an EITC control may account for some of the difference between the results reported by Schoeni and Blank, and the results presented here, estimates were obtained with the EITC variables excluded. Table 3.8 shows the estimated coefficients for welfare waivers and the minimum wage when the basic model from this study is used, but the EITC controls are excluded. As shown in panel A of Table 3.8, the presence of a welfare waiver for an entire year, other factors unchanged, increases labor-force participation among single mothers by 2.4 percentage points. Once again, this estimate is obtained when the EITC variables are excluded. This provides evidence that the difference in the estimated effect of welfare waivers between this study and the effect reported by Schoeni and Blank may be due, at least in part, to the omission of an EITC variable from their study.

The estimates reported by Meyer and Rosenbaum (2001) come from a more

complete model than the one employed by Schoeni and Blank. The model used by Meyer and Rosenbaum produces estimates that indicate that state welfare waivers are associated with significant increases in labor supply, although the effects are modest when compared with those of the EITC. The differences between the estimates presented here and those provided by Meyer and Rosenbaum may be due to variations in the specification of welfare policy changes. Meyer and Rosenbaum use two particular aspects of waivers (time limits for benefits and benefit terminations). These variables may speak more closely to policies directed at moving welfare recipients into jobs. The policy variable used here, the presence of any statewide waiver, is more general. A waiver may have included other programs, such as an earnings disregard, which may encourage additional labor supply but has no punitive action associated with labor-market inactivity.

These differences are the exact reason the estimates using Ellwood's measure of the aggressiveness with which a state pursued welfare reform were used in the previous section. That a state received a waiver is not a crucial issue. More important is whether the state attempted to use the waiver to aggressively induce low-income families to work. The results obtained using this control variable seem to provide additional evidence that, at least for this sample, the EITC is a more powerful tool for increasing labor supply.

3.6. CONCLUSION

The results presented thus far are broadly consistent with the existing literature on the EITC. The EITC is associated with increased labor-market participation among single mothers, accounting for an increase of between 3.5 and 9.8 percentage points in

the participation rate of single mothers. There is some evidence that the EITC's impact occurs with a lag. While the EITC is positively correlated with labor supply, other policies aimed at improving the welfare of low-income families do not have a clear correlation. There is no evidence that higher minimum wages are positively correlated with increased participation among single mothers. The evidence here suggests that a 10-percentage-point increase in the relative minimum wage lowers participation (defined as working in the past year) by one percentage point. The evidence presented here for welfare waivers points to small and insignificant effects.

Table 3.1
Sample Characteristics

Variable	Average	Standard Error
Age	35.1	0.0291
Nonwhite	24.5%	0.0018
Kids	42.1%	0.0019
Child < 6	17.1%	0.0019
Degree	25.8%	0.0017
Some College	51.3%	0.0020
Diploma	35.7%	0.0019
Less than High School	13.1%	0.0013
Hours > 0	87.0%	0.0013
Below Poverty	20.4%	0.0016
Minimum Wage as Percent of Hourly Earnings	35.8%	0.0002
Real AFDC Benefit	$479.32	0.7670
Number of Observations	83,942	

Table 3.2
Participation and Poverty Statistics Over Time

	Labor-Force Participation		Poverty	
	Entire Sample	With Children	Entire Sample	With Children
1982	84.4%	75.3%	23.4%	37.8%
1983	84.8%	75.0%	23.0%	38.1%
1984	85.4%	77.1%	22.6%	37.1%
1985	86.3%	77.5%	21.9%	38.1%
1988	87.8%	78.3%	18.8%	32.2%
1989	87.8%	79.7%	18.5%	31.2%
1990	87.9%	79.9%	18.7%	32.0%
1992	86.3%	77.4%	20.8%	35.2%
1993	86.4%	77.8%	21.3%	34.8%
1995	89.0%	82.9%	18.0%	29.6%
1996	88.7%	83.1%	19.0%	31.1%
1982 - 85		76.3%		37.8%
1988 - 93		78.6%		33.1%
1995 - 96		83.0%		30.4%

Table 3.3
Estimated Effects of the EITC on Labor Supply

	Combined	Federal	All State EITCs	Refundable EITCs
A. Basic Model				
Combined Subsidy Rate	0.1018 **			
	(0.0223)			
Separate Federal/State Rates		0.1222 **	-0.1373	
		(0.0244)	(0.1143)	
Refundable State EITC Rate		0.1174 **		-0.0490
		(0.0244)		(0.1710)
B. High School or Less				
Combined Subsidy Rate	0.2239 **			
	(0.0440)			
Separate Federal/State Rates		0.2495 **	-0.0673	
		(0.0483)	(0.2127)	
Refundable State EITC Rate		0.2452 **		0.0469
		(0.0483)		(0.3073)
C. Including Year/Child Interactions				
Combined Subsidy Rate	0.0678			
	(0.0897)			
Separate Federal/State Rates		0.3409 **	-0.1340	
		(0.1348)	(0.1148)	
Refundable State EITC Rate		0.3374 **		-0.0367
		(0.1348)		(0.1730)
D. Including Year/Child Interactions - Low Education Sample				
Combined Subsidy Rate	0.1014			
	(0.1636)			
Separate Federal/State Rates		0.3276	-0.0561	
		(0.2558)	(0.2133)	
Refundable State EITC Rate		0.3258		0.0748
		(0.2557)		(0.3097)
E. Excluding New York Observations				
Combined Subsidy Rate	0.1163 **			
	(0.0238)			
Separate Federal/State Rates		0.1301 **	-0.0931	
		(0.0250)	(0.1193)	
Refundable State EITC Rate		0.1258		0.1954
		0.0248		(0.2268)

Table 3.3 (cont'd).

F. Includes Welfare Reform				
Combined Subsidy Rate	0.0996 **			
	(0.0223)			
Separate Federal/State Rates		0.1196 **	-0.1329	
		(0.0245)	(0.1145)	
Refundable State EITC Rate		0.1147 **		-0.0408
		(0.0245)		(0.1715)
G. Basic Model using Trends for 1 and 2 or More Children				
Combined Subsidy Rate	0.0963 **			
	(0.0267)			
Separate Federal/State Rates		0.1230 **	-0.1390	
		(0.0295)	(0.1144)	
Refundable State EITC Rate		0.1175 **		-0.0499
		(0.0296)		(0.1714)

** Indicates significant at 5% confidence level.
* Indicates significant at 10% confidence level.

Table 3.4
Estimated EITC Elasticity of Real Earnings

For Women with No More Than a High School Education

	Increase in Federal EITC	Increase in Earnings for Women with Children	Increase in Earnings for Women without Children	Difference in Growth of Earnings	Estimated Elasticity
1986 EITC Increase	27.3%	9.6%	6.4%	3.2%	0.117
1990 EITC Increase	32.1%	-13.9%	-14.7%	0.8%	0.026
1993 EITC Increase	83.8%	12.7%	4.8%	7.9%	0.094

Table 3.5
Comparison of New York vs. U.S. Averages

	Unemployment		Poverty		Participation	
Year	U.S.	New York	U.S.	New York	U.S.	New York
1981	7.6%	7.6%	14.0%	14.4%	63.9%	59.8%
1982	9.7%	8.6%	15.0%	14.8%	64.0%	59.4%
1983	9.6%	8.6%	15.2%	15.8%	64.0%	59.4%
1984	7.5%	7.2%	14.4%	16.0%	64.4%	59.3%
1985	7.2%	6.5%	13.6%	15.8%	64.8%	60.7%
1986	7.0%	6.3%	14.0%	13.2%	65.3%	61.2%
1987	6.2%	4.9%	13.4%	14.3%	65.6%	61.7%
1988	5.5%	4.2%	13.0%	13.4%	65.9%	61.8%
1989	5.3%	5.1%	12.8%	12.6%	66.5%	62.9%
1990	5.6%	5.3%	13.5%	14.3%	66.5%	62.9%
1991	6.8%	7.3%	14.2%	15.3%	66.2%	62.2%
1992	7.5%	8.6%	14.8%	15.7%	66.4%	61.7%
1993	6.9%	7.8%	15.1%	16.4%	66.3%	61.7%
1994	6.1%	6.9%	14.5%	17.0%	66.6%	61.3%
1995	5.6%	6.3%	13.8%	16.5%	66.6%	60.9%
1996	5.4%	6.2%	13.7%	16.7%	66.8%	61.6%
1997	4.9%	6.4%	13.3%	16.5%	67.1%	63.1%
1998	4.5%	5.6%	12.7%	16.7%	67.1%	63.2%
1999	4.2%	5.2%	11.8%	14.1%	67.1%	62.9%

Sources: U.S. Bureau of Labor Statistics, U.S. Department of Labor; and U.S. Census Bureau, and U.S. Department of Commerce.

Table 3.6
Estimated Effects of the EITC on Labor Supply
Using Lagged EITC Controls

	Combined	Federal	All State EITCs	Refundable EITCs
A. Including Concurrent and Two Lagged Rates				
1. Concurrent	0.1002			
	(0.1464)			
Lagged One Year	-0.1722			
	(0.2256)			
Lagged Two Years	0.2493 **			
	(0.1416)			
2. Concurrent		0.1748	-0.5876	
		(0.1603)	(0.5168)	
Lagged One Year		-0.2350	0.1838	
		(0.2473)	(0.7997)	
Lagged Two Years		0.2554 **	0.4500	
		(0.1530)	(0.5447)	
3. Concurrent		0.1755		-1.6382 **
		(0.1599)		(0.6432)
Lagged One Year		-0.2505		1.8233 **
		(0.2471)		(1.0925)
Lagged Two Years		0.2735 **		0.1829
		(0.1529)		(0.7748)
B. Including Two Lagged Rates				
1. Lagged One Year	-0.0310			
	(0.0967)			
Lagged Two Years	0.2120 *			
	(0.1320)			
2. Lagged One Year		0.0082	-0.5485 *	
		(0.1045)	(0.4124)	
Lagged Two Years		0.1875 *	0.5676	
		(0.1411)	(0.5199)	
3. Lagged One Year		-0.0057		-0.4650
		(0.1046)		(0.5910)
Lagged Two Years		0.1967 *		0.7874
		(0.1410)		(0.7511)

** Indicates significant at 5% confidence level.
* Indicates significant at 10% confidence level.

Table 3.7
Estimated Effects of Waivers, Welfare Reform, and the Minimum Wage

	Welfare Waivers	Welfare Reform Aggressiveness	Minimum Wage
A. Using Trends for Families with Children			
Labor-Force Participation	0.0074		-0.1199 **
	(0.0072)		(0.0724)
Below Poverty	-0.0157 *		0.0355
	(0.0098)		(0.0992)
Below 150 Percent of Poverty	-0.0035		0.2230 **
	(0.0126)		(0.1212)
B. Controlling for Aggressiveness of Welfare Reform			
Labor-Force Participation	0.0092	0.0065 **	-0.1084 *
	(0.0072)	(0.0036)	(0.0728)
Below Poverty	-0.0177 **	-0.0068 *	0.0253
	(0.0098)	(0.0047)	(0.0995)
Below 150 Percent of Poverty	-0.0090	-0.0130 **	0.2111 **
	(0.0126)	(0.0058)	(0.1219)
C. Excluding New York			
Labor-Force Participation	0.0028		-0.1086 *
	(0.0071)		(0.0703)
Below Poverty	-0.0135 *		0.0333
	(0.0099)		(0.0992)
Below 150 Percent of Poverty	-0.0032		0.2220
	(0.0127)		(0.2169)

** Indicates significant at 5% confidence level.
* Indicates significant at 10% confidence level.

Table 3.8
Estimated Effects of Waivers and the Minimum Wage with no EITC Controls

	Welfare Waivers		Minimum Wage	
A. Base Model				
Labor-Force Participation	0.0237	**	-0.1346	**
	(0.0063)		(0.0721)	
Below Poverty	-0.0341	**	0.0525	
	(0.0087)		(0.0989)	
Below 150 Percent of Poverty	-0.0239	**	0.2445	**
	(0.0110)		(0.1212)	
B. Including Year/Child Interactions				
Labor-Force Participation	0.0083		-0.1176	*
	(0.0072)		(0.0723)	
Below Poverty	-0.0182	**	0.0317	
	(0.0099)		(0.0990)	
Below 150 Percent of Poverty	-0.0067		0.2253	**
	(0.0128)		(0.1211)	

** Indicates significant at 5% confidence level.
* Indicates significant at 10% confidence level.

CHAPTER 4

EFFECT OF THE EITC ON POVERTY

4.1 INTRODUCTION

The focus here now shifts to the EITC's impact on poverty. This subject has only been investigated once in an empirical evaluation (Neumark and Wascher (2001)). The tests for poverty will be similar to the tests for labor-market participation, and will be distinct from the approach in the previous work. Neumark and Wascher used matched CPS records for families. This allowed them to evaluate the impact of expansions in the EITC over a two-year period. The sample here is not matched, and is composed of all single women age 25 to 50. This allows for an evaluation of the impact of the EITC over a longer time period, covering the three EITC expansions between 1986 and 1993. It also focuses attention on the subgroup of the population who are often cited as the target of welfare reform.

Two distinct poverty standards will be used. The model attempts to describe the probability of a woman being below 100 or 150 percent of the poverty threshold. Both the sample and the estimation techniques remain the same as those discussed above for labor supply. The sources of identification for the model remain unchanged as well.

4.2. EFFECT OF GENERAL CONTROLS

The initial estimates of the probability a single woman is in poverty are presented in the center columns of Tables A-6 through A-8. A quick summary of the results for the economic and demographic controls will be followed by discussion of the EITC's

estimated impact. The effects of many factors on poverty are predictable. For example, older women are less likely to be poor, although the effect diminishes with increased age.

Higher educational attainment lowers the probability of being in poverty. The probability that women without a high-school diploma are in poverty is consistently estimated to be more than 20 percentage points higher than the probability for women with a high-school diploma, other factors unchanged. All of the estimates are strongly significant. Education beyond high school is, as would be expected, estimated to reduce the probability of being in poverty. Some college education reduces the probability by an estimated 4.7 percentage points, while the completion of a bachelor's degree or more lowers the probability by an additional 8.1 percentage points.

To assess the impact that completing lower levels of education have on poverty status, interaction terms were included for nonwhites with low educational attainment, defined as no more than high school, and women with children who also completed no more than a high-school education. The effects on nonwhites are discussed below. For women with children, the estimated coefficients are positive consistently and significant. This implies that there is a correlation between motherhood, combined with lower educational attainment, and an increased probability of poverty. This effect is relatively strong, controlling for other factors.

Whites have a lower probability of being poor than nonwhites. Nonwhites are estimated to be 5.8 percentage points more likely to be in poverty than whites, controlling for other factors. This effect increases for nonwhites who have completed relatively low levels of education. The completion of no more than a high-school education is associated with a 3.7-percentage-point increase in the probability of poverty for nonwhite

women, for a cumulative effect of 9.5-percentage-point increase in the probability that a nonwhite woman with no more than a high school education in is poverty. These estimates are statistically significant at traditional levels.

Single mothers, especially those with small children (under age 6), are much more likely to be poor. The evidence here implies that the probability a single woman is in poverty is approximately 7.1 percentage points higher on average for each additional child she has compared to a woman without children. For women with small children, the estimates from this sample imply that, on average, a single woman with a child under 6 years old is 14 percentage points more likely to be in poverty than a woman without children.

Higher unemployment rates have a strong impact on the poverty rate. The average effect of higher unemployment is estimated to be approximately 0.7, with a one percentage point increase in the unemployment rate associated with an increase in the probability of being below poverty of almost 0.7 percentage points. To assess whether higher unemployment affects single mothers more directly, an interaction term between the unemployment rate and having any children was included. The estimated coefficient for the interaction term is generally positive, indicating some correlation between higher state unemployment and increased poverty among single mothers, but the estimates are not statistically significant. These estimates indicate that the overall effect of higher unemployment is felt broadly among all single women, with some indication that the effects might be slightly more acute for single mothers.

The estimates for the effect of higher unemployment rates on poverty are sensitive to the specification of the model. For example, the estimated effect increases by

approximately one-third (to more than 0.9) using the subsample of women with lower educational attainment (Tables A-9 through A-11). It seems clear that economic conditions have a significant impact on poverty status among single women, both those with and those without children.

The estimated effect of a higher real value of monthly welfare benefits generally indicates that higher monthly benefits reduce poverty, although the estimates are not significant. The estimated coefficients are small, negative, and have standard errors much larger than the coefficient estimates. This indicates a mild correlation between higher levels of public assistance and reduced poverty.

However, when the sample is restricted to women with lower levels of education, all of the estimated coefficients are positive, although the estimates are not significant at traditional levels. The coefficient estimates are of similar magnitude to the standard errors, so these estimates are closer to statistical significance. These results point to a stronger correlation between higher benefit levels and increased poverty among women with reduced educational attainment. This evidence is consistent with the concern that higher public-assistance benefits encourage recipients to withdraw from the labor market. As a result, there is an increase in poverty. The expansions of the EITC were intended to combine assistance with work, helping to move families toward self-sufficiency.

4.3. EFFECT OF THE EITC

Basic Model

Increases in the federal earned income credit are correlated with decreases in poverty, as is summarized in Table 4.1. This finding is consistently replicated in most of

the specifications tested. This seems to confirm that using the EITC to encourage labor-force participation is an effective way to reduce poverty. This is consistent with the general evidence discussed above and in previous literature that the EITC has contributed to increased labor-market participation among single mothers, especially those with lower educational achievement. The estimates imply a decrease in the probability a single mother is in poverty of between 3.6 and 4.9 percentage points on average due to the EITC after the 1993 expansion, compared to the estimated effect with no EITC over the entire sample period.

The estimated effect of the EITC is attributable only to the federal EITC in the basic model. This is evident because the estimates for the federal EITC in panel A of Table 4.1 are larger in absolute value than the estimated coefficient for the combined rate. Each control variable for the EITC is significant at traditional levels. The estimated coefficients for the combined and federal subsidy rates need to be multiplied by the existing subsidy rate to evaluate the marginal effect. For example, an increase in the wage subsidy rate of 0.2, which is similar to the magnitude of the 1993 expansion, would, on average, lower the probability of a single mother being in poverty by 2.4 percentage points. Based on estimates presented in Table 4.1, the probability of poverty for a single mother is 3.6 to 4.9 percentage points lower due to the EITC.

In the basic model, state EITCs are not associated with reduced poverty. In fact, the estimated coefficients for state credits are positive. While these estimates are not significant, it would seem a little strange for state EITCs to have the opposite effect on poverty from that estimated for the federal EITC. This result is directly at odds with those reported by Neumark and Wascher (2001).

As with the estimates for participation presented above, year/child interactions were added to the basic model in order to better identify the effects of state EITCs. The estimates, presented in panel B of Table 4.1, are qualitatively similar to the results in panel A. The estimated coefficients for the combined federal/state variable and the separate federal variables are all negative, indicating a correlation between increases in the EITC and reductions in poverty. However, the estimated coefficients are not significant when the year/child interactions are included. This is again due primarily to the collinear nature of the federal EITC variables and the year/child interactions. The inclusion of the year/child interactions has no effect on the estimated effect of state EITCs. The coefficient estimates are slightly smaller, but they remain positive and insignificant, indicating no correlation between state EITCs and reduced poverty.

It should be noted that both federal and state EITC payments are excluded when determining poverty status. Including these payments in income would certainly result in some reduction in measured poverty. To gain some insight as to the additional reductions in poverty that would occur, if EITC benefits were included in income when determining poverty status, an estimate of the amount, if any, which each woman in the sample would receive was calculated. This EITC amount was then added to family income. This new measure of family income was then compared to the corresponding poverty threshold, based on family size.

As expected, including EITC benefits results in lower poverty among women with children. When the EITC is included in income, the estimated poverty rate among women with children is reduced by approximately 2 percentage points in 1992 and 1993,

below the totals reported in Table 3.2. The difference increases to 4.5 percentage points in 1995 and 1996.

Probit estimates were then obtained using income including the EITC, relative to the poverty threshold. As the above paragraph might suggest, the estimated coefficients for the EITC variables increase substantially (in absolute value). The estimated partial derivative for the combined federal and state wage-subsidy rate is -0.179, compared with -0.106 presented in Table 4.1. This implies that, with EITC benefits included in income, the expansion of the EITC in 1993 resulted in a decrease in poverty of approximately 1.5 percentage points over and above the estimate presented in Table 4.1.

As might be expected, the estimated effect of including EITC benefits in income is even larger when the sample is limited to women with no more than a high-school education. The estimated coefficient for the combined federal and state wage-subsidy rate, as well as the estimated coefficient for the federal wage-subsidy rate alone, both increase in absolute value by more than 0.1, from the estimates presented in Table 4.1. The estimates are in the range of -0.33, implying that the EITC expansion in 1993 lowered poverty among single mothers with relatively low levels of education by approximately 6 percentage points, when EITC benefits are included in income.

High School Education or Less

The estimated impact of the federal EITC on the probability of poverty increases significantly in absolute value when the sample is limited to women with no more than a high-school education. The estimates presented in panel C of Table 4.1 almost double from those in the first panel, indicating that the EITC has a larger effect on the subgroup

of the population with lower educational attainment. In every case, the estimates for the federal EITC indicate that the credit was associated with larger reductions in poverty than the estimates obtained using the entire sample. The estimates were also significant at higher confidence levels. This is consistent with expectations *a priori*, since women with a high-school diploma or less are more likely to be in the population affected by the credit, and thus the probability is higher that expansions in the EITC affect the poverty status of these women.

When the basic model including the year/child interactions is estimated using the low-education subsample, none of the EITC variables has estimated coefficients that are significant at any traditional confidence level. This is most likely due to the strong collinearity between the year/child interaction terms and the federal EITC. However, the coefficient estimates for the year/child interactions are negative and approach statistical significance for years after 1988. This is the best example of the EITC's impact being captured by the year/child interactions. When the trend variables for children are added later, the EITC variables regain their magnitude and statistical significance.

New York Excluded

It is possible that state EITCs are not found to have significant effects on poverty due to the poor performance of the New York, similar to the effects discussed above for labor supply. To address this possibility, the observations from New York were excluded. Estimates were obtained using the remaining states, including either all state EITCs or only states with refundable credits. These estimates are presented in panel E of Table 4.1.

State-level credits continue to be correlated with higher levels of poverty, controlling for other factors, even with New York excluded. The estimated coefficients become smaller when compared with the basic model, and the estimates remain statistically insignificant. The results are qualitatively the same, regardless of whether the state EITC variable includes all state EITCs, or just refundable EITCs.

Welfare Reform

The next specification controls for the effect of welfare reform. The welfare system in existence prior to the enactment of the PRWORA created incentives that did not foster independence. The accelerating reform trend, reflected in the fact that the majority of states acquired waivers, was evidence of growing dissatisfaction with the existing system.

The emphasis that many states placed on welfare reform has the potential to bias the estimates of the impact of EITCs. If the influence of welfare reform is omitted, the EITC may capture some of that influence, resulting in biased estimates. In order to control for this influence, the qualitative measure of the intensity of welfare reform constructed by Ellwood was used.

The estimated coefficients are presented in panel F of Table 4.1. From the first panel of Table 4.1, the estimated coefficients for the combined federal and state subsidy rate was –0.106. When the welfare reform variable is added, the estimated coefficients for the combined EITC rate remains essentially unchanged. Similar results are obtained using the separate federal EITC. All the estimates for the federal EITC remain statistically significant. Rather than reducing the estimated effect of the EITC materially,

the reduction in poverty attributable to the EITC remains stable. The state EITC estimate remains positive and insignificant.

Trends for Women with One Child or Two or More Children

Given that the inclusion of year/child interactions resulted in insignificant estimates of the EITC's effect on poverty, and that the year/child interactions are collinear with the federal EITC controls, an alternative method of controlling for additional influences on the poverty status of single mothers over time other than the EITC was desirable. To accomplish this, trends were added to the basic model for women with one child and women with two or more children. These trend variables will capture the influence of factors that are not previously included in the model that affect one of the subsets of single mothers.

The estimates including the trend variables, presented in panel G of Table 4.1, are qualitatively unchanged from the basic model. All of the estimates in panel G are slightly larger in absolute value than the estimates in panel A, and the combined subsidy rate and the federal EITC rates are estimated to be strongly significant. The consistency of these estimates across specifications provide strong evidence of the efficacy of the federal EITC as a poverty reduction tool. The estimates for state EITCs remain positive and insignificant.

Lagged EITC Effects

In Chapter 3, evidence was presented to support the view that the EITC affects labor supply with a lag. Specifically, the estimates indicate that the federal EITC may

significantly increase participation with a two-year lag. Similar estimates were obtained for the impact of the EITC on poverty. These results are presented in Table 4.2.

As a whole, the estimated effects of federal and state EITCs on reducing poverty consistently increase over time. The largest reductions occur after two years, the same length of time indicated by the estimates on participation. While most of the estimates are not statistically significant, all of the estimated coefficients on the lagged federal EITC variables are negative. When the state EITC variable is limited to refundable credits, the estimated coefficient on the two-year lag is negative and significant at the ten percent level. This may indicate that state EITCs do help reduce poverty, but that the impact takes two years.

4.4. COMPARISION WITH MINIMUM WAGES AND WELFARE WAIVERS

The EITC is just one of the policies used to encourage single mothers to work and then support them in the labor market. As discussed above, welfare policy may be altered in ways other than waivers of existing federal regulations. In addition, minimum wages are often cited as an appropriate policy to help low-income families.

In the results obtained here, minimum wages are not associated with reduced poverty. The estimated coefficients, summarized in Table 3.7, are generally positive, implying a correlation between higher minimum wages and increased poverty. None of the estimated coefficients are significant, with test statistics well below 1. The estimates obtained using the low-education subsample become larger in magnitude and are closer to statistical significance. The estimates for this subsample indicate that among the

women most likely to be near poverty, higher minimum wages are at least weakly correlated with higher poverty.

These results pointing to the ineffectiveness of the minimum wage are consistent with two findings in the literature. Burkhauser *et al.* (1996) found that a large percentage of the workers receiving the minimum wage are not poor, leading to a "fuzzy" relationship between wage rates and economic well-being. Second, Neumark and Wascher (1998) found that higher minimum wages result in counter-balancing flows into and out of poverty. Increases in the legal minimum wage allow families with workers at the new minimum to escape poverty, but some families formerly above poverty fall back below the poverty level. This follows from the standard model of the minimum wage. Those workers employed at the new minimum may receive an increase in pay, but those workers who are either laid off or involuntarily underemployed see their incomes fall. In light of the evidence presented here that higher minimum wages are not correlated with reduced poverty, and the strong evidence that the expansions of the EITC are correlated with reduced poverty among single mothers, it would appear that the EITC was a more effective anti-poverty tool during the 1990s.

The implementation of a welfare waiver is associated with reductions in poverty. As a reminder, waivers were controlled for using a variable equal to the fraction of each year a state had a statewide waiver in place, interacted with an indicator variable for children. So the waiver variable would be equal to one if a single woman with at least one child lived in a state that had a waiver in place for the entire year.

The estimated effect of welfare waivers on poverty is negative, signifying a correlation with reduced poverty. As shown in Table 3.7, the estimated coefficients

range from -0.014 to -0.020, with the largest estimates (in absolute value) obtained when the sample is restricted to women with no more than a high school education and when controlling for the aggressiveness of welfare reform. The estimates are generally significant. This would seem to imply that welfare waivers were somewhat effective in reducing poverty, with the average effect around 1.5 percentage points. This result is consistent with the results of Schoeni and Blank (2000), who also found that waivers reduced poverty significantly. However, the model used by Schoeni and Blank excludes controls for the expansions of the EITC, and the results here indicate the EITC had a significant influence both on participation and reduced poverty. Excluding the EITC would bias the estimated impact of waivers upward. The 1993 expansion of the EITC occurred during the acceleration of states receiving waivers. Thus, omitting the significant effect of the EITC would bias the estimate.

To examine the extent to which excluding the EITC variables do bias the estimated effect of welfare waivers, regressions were estimated without any EITC controls. The results, which appear in Table 3.8, indicate that having a waiver in place for an entire year would reduce poverty by 3.4 percentage points, more than double the estimate of 1.6 percentage points from panel A of Table 3.7. This would seem to indicate that omitting the EITC results in a significant bias in the estimated effectiveness of welfare waivers.

Compared with the expansions of the EITC, welfare waivers are correlated with somewhat smaller changes in the probability that single mothers would be in poverty. The estimated effect of the EITC on poverty is also understated in these estimates because the dollar value of the EITC, which has increased for all eligible recipients over

time, has been excluded from income. When EITC benefits are included, the total impact of the EITC on reducing poverty among single mothers is significantly larger. This provides additional evidence that the EITC has been more effective at reducing poverty than either increases in the minimum wage or the enactment of welfare waivers.

4.5. ESTIMATES FOR 150 PERCENT OF POVERTY

The framework used thus far was once again employed to estimate the probability a woman would be near poverty, defined as at or below 150 percent of the poverty level. The results for near-poverty status are qualitatively similar to the results for poverty discussed above. As such, the discussion here will focus on the EITC, both federal and state credits, along with the two policy alternatives, the minimum wage, and welfare waivers.

Effects of EITC on near-poverty status

The estimates for near-poverty status are summarized in Table 4.3, with the full results presented in the far-right columns of the appendix tables. In general, the estimates indicate that the federal EITC is correlated with a decreased probability that single mothers are below 150 percent of the poverty level. Most of the estimated coefficients are smaller in absolute value when the dependent variable is 150 percent of the poverty level than for those obtained in the poverty estimates discussed above. The estimated coefficients for the federal EITC are negative and significant, indicating the federal EITC is effective at helping single mothers move above near-poverty status.

For the basic model, presented in the first panel of Table 4.3, the estimate for the separate federal EITC is -0.101. This implies approximately a 2.1-percentage-point reduction in the probability a single mother is near poverty following the EITC expansion in 1993, and approximately a 4.0 percentage point reduction in the probability overall due to the EITC. The estimated reduction due to the 1993 expansion is -3.2 percentage points using the subsample of women with low educational attainment, and –2.3 percentage points if the New York observations are excluded.

None of the estimates for state EITCs are statistically significant. The coefficients are generally positive, consistent with a correlation between states with EITCs and an increased probability that single mothers in those states are below 150 percent of poverty. The estimated coefficients are insignificant at all standard confidence levels. This could represent women who are in the labor force earning enough to rise above the poverty level, but who remain close to poverty nonetheless.

Overall, the federal EITC is found to have a significant effect on moving single mothers above near-poverty status, defined here as below 150 percent of poverty. The estimated effect on near-poverty status is slightly smaller than the estimated effect on poverty status. Given the significant effects the EITC has been estimated to have on participation and poverty, it would seem reasonable that a portion of the population has moved into the labor force and risen above poverty. The estimates presented in this section seem to indicate that some of these single mothers have been able to rise even further away from poverty. The exclusion of EITC benefits, both federal and state, from the definition of income has likely reduced the measured reduction in near-poverty status.

If the benefits of the EITC were included in income, it is likely that an additional reduction in near-poverty status would be observed in these data.

Comparison with Minimum Wage and Welfare Waivers

The estimated impact of minimum wages is larger and more significant when using the higher income threshold. These results are presented in Table 3.7. The coefficient estimates are positive and significant, with the value of the estimates around 0.22 consistently. This would imply that a 10-percentage point increase in the relative value of the minimum wage would increase the probability a single woman is below 150 percent of poverty by 2.2 percentage points.

The estimated impact of the minimum wage increases again when the sample is reduced to only women with a high school diploma or less. The coefficient estimate of approximately 0.4 implies a larger reduction in income for women with lower levels of schooling when the minimum wage is increased. This finding is consistent with a shift away from low-skilled workers, either to increased technology investment or to higher-skill labor, when minimum wages are increased.

When combined with the estimates obtained for 100 percent of poverty, which were positive and marginally significant, there is evidence that higher minimum wages may restrict the mobility of low-income families out of poverty or near-poverty status. This should be compared with the estimates for the EITC, which imply a significant decrease in the probability that single mothers are in or near poverty. This would indicate that, at least for women with children, the EITC is a more effective tool to reduce poverty than the minimum wage.

The estimated effect of welfare waivers on near-poverty status is insignificant in all specifications. The estimated coefficients range from -0.003 to -0.009, with test statistics well below 1.0. The evidence suggests that welfare waivers are more effective at moving single mothers above the lower poverty threshold.

When compared with increases in the EITC, it appears that welfare waivers are less effective in moving single mothers away from poverty. Since the broad expansion in the use of waivers occurred later in the period covered by this study than did the first EITC expansions, it may take time for the effect of waivers to be as visible. Since the implementation of the PRWORA allowed all states to reform the existing welfare system further, modifications to the old welfare system may have more significant effects after 1996.

Table 4.1
Estimated Effects of the EITC on Poverty

	Combined	Federal	All State EITCs	Refundable EITCs
A. Basic Model				
Combined Subsidy Rate	-0.1057 **			
	(0.0295)			
Separate Federal/State Rates		-0.1195 **	0.0664	
		(0.0318)	(0.1972)	
Refundable State EITC Rate		-0.1219 **		0.1770
		(0.0316)		(0.2444)
B. High School or Less				
Combined Subsidy Rate	-0.2086 **			
	(0.0553)			
Separate Federal/State Rates		-0.2227 **	-0.0403	
		(0.0595)	(0.3673)	
Refundable State EITC Rate		-0.2289 **		0.1761
		(0.0591)		(0.4373)
C. Including Year/Child Interactions				
Combined Subsidy Rate	-0.0086			
	(0.1371)			
Separate Federal/State Rates		-0.0899	0.0529	
		(0.1773)	(0.1980)	
Refundable State EITC Rate		-0.0905		0.1531
		(0.1775)		(0.2458)
D. Including Year/Child Interactions - Low Education Sample				
Combined Subsidy Rate	0.0742			
	(0.2581)			
Separate Federal/State Rates		0.2589	-0.0583	
		(0.3240)	(0.3706)	
Refundable State EITC Rate		0.2549		0.1631
		(0.3245)		(0.4394)
E. Excluding New York Observations				
Combined Subsidy Rate	-0.1162 **			
	(0.0317)			
Separate Federal/State Rates		-0.1268 **	0.0481	
		(0.0328)	(0.2126)	
Refundable State EITC Rate		-0.1270		0.1363
		(0.0326)		(0.3007)

Table 4.1 (cont'd).

F. Includes Welfare Reform				
Combined Subsidy Rate	-0.1037 **			
	(0.0295)			
Separate Federal/State Rates		-0.117 **	0.0614	
		(0.0319)	(0.1971)	
Refundable State EITC Rate		-0.1194 **		0.1685
		(0.0316)		(0.2441)
G. Basic Model using Trends for 1 and 2 or More Children				
Combined Subsidy Rate	-0.1095 **			
	(0.0362)			
Separate Federal/State Rates		-0.1288 **	0.0691	
		(0.0390)	(0.1971)	
Refundable State EITC Rate		-0.1321 **		0.1845
		(0.0390)		(0.2450)

** Indicates significant at 5% confidence level.
* Indicates significant at 10% confidence level.

Table 4.2
Estimated Effects of the EITC on Poverty
Using Lagged EITC Controls

		Combined	Federal	All State EITCs	Refundable EITCs
A. Including Concurrent and Two Lagged Rates					
1.	Concurrent	0.0085			
		(0.1920)			
	Lagged One Year	-0.0243			
		(0.3005)			
	Lagged Two Years	-0.1575			
		(0.1924)			
2.	Concurrent		-0.0407	0.5188	
			(0.2068)	(0.7698)	
	Lagged One Year		-0.0198	0.1294	
			(0.3260)	(1.1139)	
	Lagged Two Years		-0.1128	-0.8454	
			(0.2056)	(0.7342)	
3.	Concurrent		-0.0383		0.4119
			(0.2068)		(0.9290)
	Lagged One Year		-0.0314		1.0184
			(0.3257)		(1.5422)
	Lagged Two Years		-0.1065		-1.7408 *
			(0.2058)		(1.0805)
B. Including Two Lagged Rates					
1.	Lagged One Year	-0.0122			
		(0.1304)			
	Lagged Two Years	-0.1607			
		(0.1780)			
2.	Lagged One Year		-0.0750	0.7971 *	
			(0.1399)	(0.5494)	
	Lagged Two Years		-0.0963	-0.9800 *	
			(0.1882)	(0.7087)	
3.	Lagged One Year		-0.0860		1.6158 **
			(0.1399)		(0.7886)
	Lagged Two Years		-0.0885		-1.9306 **
			(0.1884)		(1.0066)

** Indicates significant at 5% confidence level.
* Indicates significant at 10% confidence level.

Table 4.3
Estimated Effects of the EITC on 150 Percent of Poverty

	Combined	Federal	All State EITCs	Refundable EITCs
A. Basic Model				
Combined Subsidy Rate	-0.1012 **			
	(0.0374)			
Separate Federal/State Rates		-0.1133 **	0.0521	
		(0.0403)	(0.2690)	
Refundable State EITC Rate		-0.1149 **		-0.1371
		(0.0399)		(0.3318)
B. High School or Less				
Combined Subsidy Rate	-0.1561 **			
	(0.0062)			
Separate Federal/State Rates		-0.1975 **	0.3584	
		(0.0668)	(0.4673)	
Refundable State EITC Rate		-0.1884 **		0.2012
		(0.0658)		(0.5006)
C. Including Year/Child Interactions				
Combined Subsidy Rate	-0.0685			
	(0.1838)			
Separate Federal/State Rates		-0.2247	0.0503	
		(0.2255)	(0.2696)	
Refundable State EITC Rate		-0.2252		0.1411
		(0.2258)		(0.3344)
D. Including Year/Child Interactions - Low Education Sample				
Combined Subsidy Rate	0.2512			
	(0.3171)			
Separate Federal/State Rates		0.1265	0.3444	
		(0.3590)	(0.4718)	
Refundable State EITC Rate		0.1353		0.1909
		(0.3600)		(0.5059)
E. Excluding New York Observations				
Combined Subsidy Rate	-0.1133 **			
	(0.0402)			
Separate Federal/State Rates		-0.1223 **	0.0280	
		(0.0416)	(0.2896)	
Refundable State EITC Rate		-0.1221		0.0468
		(0.0412)		(0.4075)

Table 4.3 (cont'd).

F. Includes Welfare Reform				
Combined Subsidy Rate	-0.0975 **			
	(0.0375)			
Separate Federal/State Rates		-0.1086 **	0.0426	
		(0.0404)	(0.2687)	
Refundable State EITC Rate		-0.1101 **		0.1200
		(0.0400)		(0.3310)
G. Basic Model using Trends for 1 and 2 or More Children				
Combined Subsidy Rate	-0.1376 **			
	(0.0462)			
Separate Federal/State Rates		-0.1592 **	0.0651	
		(0.0497)	(0.2688)	
Refundable State EITC Rate		-0.1623 **		0.1774
		(0.0495)		(0.3331)

** Indicates significant at 5% confidence level.
* Indicates significant at 10% confidence level.

CHAPTER 5

COMPARISON TO PREVIOUS RESEARCH AND CONCLUSIONS

5.1. COMPARISON TO PREVIOUS RESEARCH

The results are consistent with previous research for the EITC's effect on labor-market participation. There are three thorough econometric studies of the effects on the labor-market participation of single mothers. These are Eissa and Liebman (1996), Meyer and Rosenbaum (2001), and Ellwood (2000). All of these found the EITC has a positive effect on labor-market participation. Neumark and Wascher (2001) focus more on poverty status, although they also report some evidence that the federal EITC has a significant effect on labor-force participation among CPS families. This study corroborates those findings, while expanding the set of control variables to include interstate variation in minimum wages, state-level EITCs, and welfare policy. While the EITC is correlated with increases in labor-market participation, minimum wages and welfare waivers do not consistently produce increases in participation.

Eissa and Liebman focused on the period prior to OBRA 1990, so they only examined the effect of the expansion due to the Tax Reform Act of 1986. The impact on participation measured here is consistent with the lower end of their results. In the Eissa and Liebman study, the effect on participation for women with less than a high school education is 6.1 percentage points. The largest estimates presented here imply a marginal response of 4.8 percentage points to the 1986 expansion. The lower estimate is due to the older sample used for this study. Eissa and Liebman use a sample of single women ages 16 to 44. The sample here includes single women ages 25 to 50. Older mothers appear

to have increased labor-force participation at a lower, but still significant, rate. The results here build on the Eissa and Liebman study by extending the period of time to encompass the 1990 and 1993 expansions of the EITC as well. The results indicate that the effect on participation is larger as the EITC has increased, with the 1993 expansion resulting in an increase in participation of nearly 5 percentage points among women with a high school education or less.

The results are broadly consistent with the other studies as well. The addition of explanatory variables controlling for the real minimum wage does little to change the qualitative results found by Meyer and Rosenbaum (2000 and 2001) or Ellwood (2000).

In general, the estimated effect of the EITC is smaller, as might be expected in a sample of older women. In the previous studies by Meyer and Rosenbaum, larger participation effects were found than those reported here. Meyer and Rosenbaum include younger women than are included here. If the broader sample of single mothers exhibit larger participation effects than those for the older sample used here, it is reasonable to suppose that the poverty-reducing effects of the EITC reported here may be biased downward.

To test the hypothesis that a younger sample would produce larger estimated effects on participation, a sample of single women ages 18 to 44 was obtained from the March CPS for the years 1983 to 1996. The estimated effects of the EITC on labor-market participation among this younger sample are presented in Table 5.1. When compared with the results presented in Table 3.3, the estimated coefficients for the federal EITC are slightly larger for the basic model including all single women. The estimated coefficient on the combined federal/state EITC for the younger sample is

0.118, compared to 0.102 for the sample used for most of this study. Similar differences are found for the separate federal EITC. Larger differences occur when the sample is limited to women with no more than a high-school education. These provide evidence that at least some of the difference between the participation effect measured by Meyer and Rosenbaum and the estimate presented here is due to the older sample used here.

Ellwood's study also attempts to control for the interstate variation in the relative intensity of moving residents off of public assistance. The addition of a measure of welfare-reform aggressiveness to this study results in relatively small decreases in the measured effectiveness of the EITC, both for increasing participation and reducing poverty. Welfare reform itself is estimated to have small but statistically significant effects on participation and poverty.

This study is the second to attempt to measure the effects of the EITC on the poverty status of single mothers, using a different methodology than Neumark and Wascher (2001). Each expansion of the federal EITC is associated with decreases in poverty. The key difference between the finding here and those of Neumark and Wascher is the effect of state EITCs.

Neumark and Wascher find that the enactment of state EITCs significantly increases the transition of families out of poverty. The impact of the federal EITC is insignificant and generally estimated to be negative, indicating a correlation between the expansion of the federal EITC and increased movement into poverty. Neumark and Wascher attribute the seeming inconsistency of the results for the federal EITC to poor identification. In their specification, state EITCs are better identified than the federal

EITC. The significant results for state EITCs are seen to provide general evidence of the efficacy of EITCs at reducing poverty.

Neumark and Wascher use year/child interactions in their estimation procedures to control for factors affecting families with children that are not otherwise explicitly contained in their model. When these year/child interactions are used here, the effect of the EITC on poverty (but not participation) becomes insignificant. Since that is unique to year/child interactions among the various specifications used here, it is likely that the estimates using year/child interactions are adversely affected by the collinearity between the interaction terms and the federal EITC controls. In the remaining specifications, including estimates obtained using trend variables to capture influences affecting single mothers over time, the federal EITC is found to significantly reduce poverty among single mothers. State EITCs are not found to significantly reduce poverty in any of the estimates presented here.

The significant poverty reductions reported here are contrary to Browning's (1995) predicted effects of the OBRA-1993 expansion. Browning found that the EITC was likely to reduce the disposable income of many recipients. The driving force for this decline was the steep increase in the phase-out rate due to the 1993 expansion of the EITC. The continued decline in poverty after 1993 would seem to contradict this prediction.

However, Browning's estimated overall effects are not refuted by this study. The predicted effects in Browning's paper are driven by labor supply reductions among those already working. The segment of the population most likely to experience these reductions is married couples. In fact, Eissa and Hoynes found that married women did

reduce their labor supply in response to the 1993 EITC expansion. This study covers single mothers. While single mothers are estimated to increase their participation, married families in the phase-out region may reduce their collective labor supply, either through reductions in hours or withdrawal from the labor market altogether. Reductions in labor supply by families in the phase-out range would mitigate the EITC's overall effectiveness.

The evidence presented here on the EITC's effect on poverty can be contrasted with the lack of evidence supporting similar effects from increasing the minimum wage. The evidence on minimum wages presented here indicates that the minimum wage does not have significant effects on either labor-force participation or poverty. These findings are consistent with Neumark and Wascher (1998). Their results indicate that minimum-wage increases are associated with movement both into and out of poverty, resulting in an insignificant overall effect. This is consistent with some reductions in hours worked among low-wage workers. Because the EITC does not affect labor demand negatively, there is no offsetting disemployment effect.

Schoeni and Blank (2000) report significant increases in participation and reductions in poverty due to welfare waivers in advance of the PRWORA. Those findings are only supported here for poverty when controlling for the influence of the EITC. When the EITC variables are excluded from the estimation model used here, as was done in the Schoeni and Blank study, there is evidence that excluding the EITC introduces a significant bias into the estimated effectiveness of waivers. The significant effects of the EITC on poverty and participation remain robust, regardless of whether changes in welfare policy are modeled using waivers or the qualitative measure of reform

intensity created by Ellwood. All of the estimates reveal a strong effect for the EITC, moving single mothers into employment and out of poverty.

5.2. CONCLUSION

In general, the results indicate that the federal EITC has led to both increased labor-market participation and reduced poverty among single adult mothers. After the 1993 expansion of the EITC, labor-market participation has increased by between 3.5 and 4.9 percentage points due to the EITC. For women with a high school diploma or less education, the effect is approximately twice as large. Women with lower levels of education also increased their participation by significant amounts following the earlier EITC expansion in 1986.

The EITC is also found to have contributed to a significant decline in poverty among single women with children. The estimated impact of the EITC on the poverty status of women with no more than a high school education is even larger than the estimates for the entire population. The estimated reduction in poverty among single mothers due to the 1993 expansion of the EITC is approximately 1.9 percentage points.

With increased participation and reduced poverty rates due to the expansions of the EITC, it is no surprise that the EITC is also estimated to have reduced the likelihood a single woman with children is below 150 percent of the poverty level. In general, the estimated effects indicate that the EITC has a smaller impact in moving women away from near-poverty status than away from poverty, although the difference is small.

The estimated impacts of the EITC on participation and poverty are relatively consistent across multiple specifications. The inclusion of minimum-wage controls,

welfare-benefit rates, welfare-reform controls such as waivers, and state-level EITCs leave the basic conclusions unchanged. The older sample used for this study displays a reduced responsiveness to the expansions of the EITC, relative to the estimates obtained using samples that included younger women. Given the larger estimates of increased participation reported using the younger samples, the results presented here may understate the EITC's overall impact on poverty.

Some evidence is presented to indicate that refundable state-level EITCs are marginally effective at increasing labor-force participation. There is also evidence that the full impact of expanding the EITC is not felt for at least two years. The lagged effect was found for both labor-force participation and poverty. There is also some evidence that the overall estimates for state credits are obscured by the New York EITC, enacted in 1994.

Overall, expansions of EITC have increased labor-force participation and reduced poverty among single mothers. Based on the results obtained here, neither the minimum wage nor changes in welfare policy produce similar results. As a result, the EITC should be considered a useful tool in providing assistance to low-income families, encouraging these families to enter the labor market, and then assisting them to rise out of poverty.

Table 5.1
Estimated Effects of the EITC on Labor Supply
Using Sample of Single Women Ages 18 - 44

	Combined	Federal	All State EITCs	Refundable EITCs
A. Basic Model				
Combined Subsidy Rate	0.1182 **			
	(0.0178)			
Separate Federal/State Rates		0.1377 **	-0.0973	
		(0.0193)	(0.0866)	
Refundable State Rate		0.1294 **		0.1371
		(0.0193)		(0.1345)
B. High School or Less				
Combined Subsidy Rate	0.2836 **			
	(0.0378)			
Separate Federal/State Rates		0.3261 **	-0.1896	
		(0.0408)	(0.1804)	
Refundable State Rate		0.3136 **		0.1751
		(0.0409)		(0.2729)
C. Including Year/Child Interactions				
Combined Subsidy Rate	-0.0289			
	(0.0641)			
Separate Federal/State Rates		0.0768	-0.1071	
		(0.0986)	(0.0865)	
Refundable State Rate		0.0719		0.1120
		(0.0985)		(0.1343)

** Indicates significant at 5% confidence level.
* Indicates significant at 10% confidence level.

CHAPTER 6

EFFECT OF THE EITC ON HUMAN-CAPITAL ACCUMULATION

6.1. INTRODUCTION

The earned income tax credit (EITC) is designed to encourage parents to increase their labor-market participation by providing a wage subsidy of up to 40 percent. The EITC is eventually phased out, resulting in relatively high marginal tax rates that may discourage additional labor earnings. After undergoing three expansions between 1985 and 1995, the EITC has become a key component of policy toward the poor and near-poor populations in the United States.

The wage subsidy portion of the EITC is designed to encourage parents who are either outside the labor force, or marginal participants, to increase their labor supply. While the credit is available to all parents who meet the eligibility criteria, the EITC is often thought of as a program for single mothers. Indeed, most of the research on the EITC has focused on the program's effects on single women with children.

Increased labor supply among single mothers may be seen as a measure of the EITC's effectiveness. However, it is possible that, especially for a young parent, additional labor supply will reduce the time available for education. This is not necessarily bad, but it does represent a choice of a particular type of human capital development and accumulation (work experience as opposed to education) that may have long-term ramifications on the woman's income, poverty status, and economic well-being. It is ambiguous, *a priori*, whether additional substitution of work experience for schooling makes a young, single parent better or worse off, but the EITC clearly

subsidizes labor-market participation by single parents. This is especially true for young women, because the probability of being enrolled in school declines with age.

In addition to the time constraint, the high marginal tax rates associated with the phase out of the EITC may reduce the incentive that an EITC recipient has to participate in additional training. The marginal tax rate for an EITC recipient may reach more than 45 percent, and may last over a range of earnings exceeding $15,000. Such high tax rates may discourage additional education for EITC recipients at the margin. The overall effect should depend on the expected wage after the additional education is completed. High tax rates may discourage training that results in an expected future wage, and resulting total labor income, within the EITC phase-out range. However, if the expected net wage after completing additional training is high enough to allow the worker to move beyond the phase-out range, the EITC's impact on the net wage should not affect training decisions.

The EITC may provide the additional income necessary for single parents to pay for additional training and schooling. Since most EITC recipients receive the credit as a tax refund, the EITC may aid some recipients in overcoming possible liquidity constraints in the market for training. The lump-sum payment that recipients receive may provide the necessary funds to pay tuition bills.

Taken together, the impact of the EITC on additional schooling and training is ambiguous. The wage subsidy and high marginal tax rates may discourage additional schooling. However, the additional income may allow a recipient to invest in additional training.

Previous analyses of the earned income tax credit have focused on the short-term impact, i.e., the impact on labor supply. Does the credit encourage labor-market participation among single mothers? Does the credit reduce hours worked by those already participating in the labor market? This paper begins to look at one of the potential longer-term impacts. Does the credit affect the accumulation of human capital? Specifically, is there evidence that the earned income tax credit shifts women with children away from schooling and toward the labor market, resulting in the accumulation of work experience and a reduction in schooling?

6.2. DESCRIPTION OF STUDY

The EITC provides benefits predominantly to families with qualifying children who earn relatively low wages. Benefits from the program have increased significantly over time, taking the program from a small tax credit with relatively few recipients to a major expenditure program that exceeds all direct expenditure programs targeted at the working poor.

This paper will use data from the March Current Population Surveys to examine whether the expansions in the EITC have resulted in reduced enrollments and increased labor supply for young, single mothers, relative to their contemporaries without children. The study will examine the effects of the EITC by controlling for other factors that might affect labor-market participation by young adults, such as increases in the minimum wage and economic growth on the state level.

Evidence has accumulated that the EITC has increased the probability that young mothers work, relative to their childless peers. A number of studies have found that the

expansions of the EITC since 1986 have resulted in increased labor-market participation among single mothers. These studies were discussed in Chapter 2. It is likely that some of this increase has taken place among women who were still in the prime school years, say, younger than 25.

Because of the demands of parenting, it is possible that increased labor-market activity would reduce the amount of time available for schooling. Both work experience and schooling increase the lifetime earnings profile relative to not working or going to school. However, the EITC changes the current set of relative prices, and would change the lifetime discounted present value of the choice of work or school. Given this shift in relative prices, it might be expected that the probability that young mothers remain in school would decline, while the probability that young mothers work would increase.

Human-capital theory describes two primary means of accumulating human capital: schooling and on-the-job training. These have been discussed thoroughly by Becker (1993), Mincer (1974), and Rosen (1977). Wages are generally viewed in this literature as a return to accumulated human capital, reflecting the higher marginal product of workers with larger stocks of human capital. Human capital can be accumulated by investments in schooling (used here to refer to formal primary, secondary, post-secondary, or vocational education), or through investments in on-the-job training. While both types of training result in the accumulation of additional human capital, they do not represent identical investments. Schooling often represents general human-capital investments that are valuable at a large number of firms, often in a range of specific jobs. On-the-job training may tend to be less general, with the majority of its benefits accruing at the current job, although this is not required.

General training applies broadly across many firms and jobs. Because of the possibility for employees to change jobs after receiving general training, firms require employees to pay the cost of general training. Employees can pay the costs explicitly out-of-pocket, or implicitly through lower wages, if their employer provides the general training. Specific training is defined to be firm specific, and provides increased productivity at the current job, but is of little or no use to competing employers. Employers will be willing to share the cost of this training with their employees. In exchange for sharing the cost of training, part of the increased productivity is also shared. Sharing the costs and benefits protects the firm from the worker resigning immediately after the completion of training, by giving the worker an incentive to stay, a higher wage.

Barron, Berger, and Black (1999a, 1999b) present evidence indicating that most training is not general, but rather specific in nature. Their evidence points to small variations in wages due to training. Workers requiring less training are generally paid a higher starting wage, while starting wages do not fall for workers requiring more training. Rather, firms pay for training and recover the cost through increased productivity. This implies that most training is specific in nature, preventing workers from capturing a higher return (wage) from a competing firm.

While most training may be specific, as discussed above, employers would require a worker to pay for any general training the worker receives because such training, once received, allows the worker to seek a higher wage from competing employers. The firm will thus require the worker to pay for this training, either explicitly out-of-pocket, or through lower wages. Government policies, such as minimum wages, may hinder this type of arrangement for training. Higher minimum wages prevent lower-

skilled workers from paying these costs implicitly, resulting in less training being provided by employers.

By contrast, the EITC initially provides a wage subsidy that does not affect the labor costs of employers. If the EITC increases the supply of low-wage workers enough, the market wage may actually fall. This would actually lower the cost of new employees, providing some incentive for employers to provide additional training. With a lower market wage, employers can provide general training and effectively recoup the cost through the lower wage, as long as the "training" wage is above the legal minimum.

There is another possible mechanism through which the EITC could increase training. The EITC is administered almost exclusively between the worker and the government through tax returns. So the EITC should not reduce offers of on-the-job training from employers, because the cost of hiring and employing a new worker is not increased by the EITC. For workers, the EITC effectively raises the net wage, offsetting some or all of the cost of training the employee is paying through a lower wage. To the extent the EITC raises the net wage above the reservation wage of some workers, employment and training both increase. Therefore, through the EITC, it is possible that the government can subsidize general on-the-job training, by "reimbursing" employees through the credit.

So while an employee can acquire some general training at work, and the EITC can subsidize some of this training for low-income workers, the employee will need to arrange for general training that is applicable to a broad range of employers. This is where the EITC may be an impediment to the accumulation of general training. The phase-in range of the EITC encourages work. However, time constraints may prevent a

parent from both working and attending school. Increased labor-market participation due to an expansion of the EITC would potentially imply reduced school attendance, and thus a reduced opportunity set for general training.

As discussed in the introduction, the overall effect of the expansion of the EITC on school enrollment is ambiguous theoretically. Any potential decline in school attendance due to the higher wage subsidy may be offset by the increased disposable income available to credit recipients. A goal of this study is to see if there is clear evidence as to whether the expansion of the EITC has led to higher or lower school enrollments among single mothers.

Preliminary evidence is presented in Tables 6.1 and 6.2. These tables compare the combined school and employment status of single women with and without children, for two age groups over a 10-year period. The first group is ages 17 through 21, while the second is ages 17 through 24.

Single women with children have steep declines in the non-enrolled/non-employed category, while the gains are distributed mainly into employment, with single mothers also showing gains in employed and enrolled status. The strong gains in employment for single mothers are consistent with the EITC increasing labor-market participation through increases in the wage-subsidy rate available in the phase-in range. The gains in school enrollment among single mothers provide some initial evidence that the gain in employment did not occur at the expense of additional schooling, which increased by approximately 10 percentage points for both age groupings. For women without children, the clearest movement over this period was from employment with no schooling, to school with no employment.

6.3. RELATED LITERATURE

While the potential effects of the EITC on school enrollment have not been examined previously, there are two areas of research related to this paper. The first is a rather wide body of research on the effects of minimum wages on school enrollment and human-capital accumulation. In general, it has been reported that minimum wages reduce school enrollment by teenagers (Ehrenberg and Marcus (1982) and Neumark and Wascher (1996)). While there has been some conflicting evidence, the weight of the evidence points to higher minimum wages resulting in reduced enrollment of teenagers. There are two reasons students leave school. Higher-skill students may leave school after minimum-wage increases to pursue work at the higher minimum wage. In addition, the higher minimum induces some students to leave school and queue for full-time work at the higher minimum wage.

A smaller body of literature has examined the effect of minimum wages on training. In general, this literature has reported evidence of reduced training being correlated with higher minimum wages (for example, see Neumark and Wascher (2000), Hashimoto (1982), and Leighton and Mincer (1981)).

Minimum Wages and Enrollment

Mattila (1979) was the first study to investigate seriously the effect of minimum wages on youth enrollment. Using data from the October CPS, Mattila found that displaced teenage workers do return to school. This study finds that minimum wages increase enrollments across males and females in age groups of 16-17, 18-19, and 20-24. Three of the six estimates were significant, while another (females aged 20-24) was

nearly significant. These estimates imply that young workers return to school after the minimum wage increases, in order to increase the probability they will be able to find a job at or above the higher minimum wage.

For some teenagers, the disemployment effects of a minimum wage increase can be offset somewhat by returning to school and raising the student's skill level. To the extent this occurs and is ignored in the analysis of the effects of minimum wages, the negative impact of minimum wages on employment overstates the overall cost. Mattila (1981) presents time-series evidence to support the hypothesis that teens return to school when facing unemployment due to increasing minimum wages. The results indicate that increases in the minimum wage move teenagers away from full-time work. Teens replace the lost work time with additional schooling, perhaps with part-time work. Mattila also addresses the indirect effect that additional teens present to schools. The additional students returning to school increase the average class size, thus lowering the quality of the education received by the median student. Also, unemployed students forego on-the-job training opportunities, instead receiving additional education. This may be a second-best approach to human-capital investment for many teenagers who may learn best in a non-academic, skill-oriented environment.

Mattila's results from time-series data were not supported in cross-sectional studies (for example, Ehrenberg and Marcus (1980) and Neumark and Wascher (1996)). Joint school and work decisions were found to involve higher-skill students taking jobs away from lower-skill workers, as employers sought to increase the productivity of their workforce in response to higher minimum wages. The cross-sectional studies also found some evidence that workers displaced due to increases in the minimum wage are unlikely

to return to school. Overall, more recent research has challenged the validity of Mattila's findings.

Ehrenberg and Marcus (1980) use data from the 1966 National Longitudinal Survey (NLS) younger male sample and the 1970 Census to investigate the effects of minimum wages on educational outcomes. The stylized fact in labor economics is that higher minimum wages reduce the demand for part-time workers. Increases in the minimum wage will cause employers to seek more productive, full-time workers and fewer less productive, part-time workers. Ehrenberg and Marcus find evidence consistent with this, using the NLS data for white male teenagers. Teens from low-income, white families shift from being both enrolled and employed (most likely part-time) to being employed full-time. Teens from higher-income, white families shift away from work toward full-time schooling. However, for nonwhite families, increases in the minimum wage were found to increase the probability a nonwhite male from a low-income family is employed full-time, while reducing the probability they are in school full-time.

Evidence from the 1970 Census supports a different conclusion. Increases in the minimum wage were found to shift jobs away from children from poor families to children from non-poor families. This would suggest that higher minimum wages may displace less-skilled workers (from poor families), and replace them with more-skilled workers (from non-poor families).

A number of studies have investigated whether minimum wages affect the probability a teenager or young adult will be enrolled in school. Cunningham (1981) compared evidence from the 1960 and 1970 Censuses. The results were presented separately for blacks and whites. The study also looked at two age groups, teenagers

aged 16-19 and young adults between 20 and 24. Among whites, Cunningham found evidence that higher minimum wages resulted in reduced school enrollments among teenagers. This is a striking result, given that Cunningham also found that minimum wages have significant negative effects on the employment of teens. However, the result would be supported by future research (Ehrenberg and Marcus (1982) and Neumark and Wascher (1996)). The standard hypothesis had been that newly unemployed teens returned to school. The evidence reported by Cunningham is contrary to that hypothesis. The results were similar for males and females. There was no evidence that minimum wages significantly affected school attendance among young adults.

Cunningham's results are different for blacks. The minimum wage reduces significantly the probability a black teenager will not be in school, i.e., black teenagers are more likely to attend school when minimum wages are higher. Black males were more likely to be employed in jobs not covered by the minimum wage. These findings were consistent with newly unemployed black teenagers returning to school, while white teenagers may queue for jobs at the higher minimum wage without returning to school.

Leighton and Mincer (1981) examined the effects of minimum wages on wage growth, training, and tenure. It is to be expected that increases in the minimum wage will lead employers to substitute either higher-quality labor or capital for lower-skilled workers. As a result, the prevalence of employer-provided training would be expected to decline. Higher minimum wages would also be associated with flatter wage profiles over a worker's career, as the employer adjusts with reduced training. Productivity growth also would be reduced. The predicted results are that less training is provided and that wage growth is slower. In samples of white and black men drawn from the Panel Study

of Income Dynamics and the National Longitudinal Survey of Youth, Leighton and Mincer find both of these effects. The impacts of minimum wages on wage growth and training are negative and significant for men with lower educational attainment (less than high school completion). This is the group most likely to be affected. This is consistent with higher minimum wages reducing the incentive for employers to provide training, thus reducing future productivity growth.

Hashimoto (1982) uses data from the National Longitudinal Survey for 1966 and 1969. These years were chosen to bracket the minimum wage increase and coverage expansion contained in the amendments to the Fair Labor Standards Act in 1967. One way employers could adjust to higher minimum wages is to reduce training. Employees who receive less training will have their productivity increase at a slower rate, resulting in slower increases in wages. Hashimoto uses theoretical and empirical models to evaluate the effect of higher minimum wages on the amount of training received by employees. The theoretical model used by Hashimoto predicts that competition among workers for jobs at the higher minimum wage will result in reduced employer expenditures on training.

The empirical model was developed by Lazear (1979) and was adapted by Hashimoto to test whether wage growth slowed after an increase in minimum wages. Hashimoto finds evidence of reduced training after the increase in the minimum wage that occurred in 1967. The results imply that a 10-percent increase would lower the increase in wages due to additional experience by approximately 28 percent.

Ehrenberg and Marcus (1982) completed a follow-up study of the effects of minimum wages and enrollment, using more sophisticated statistical methods. The

results again differ by race. For whites, teens from low-income families are more likely to leave school for work at higher minimum wages, while teens from higher-income families are more likely to increase their schooling. It is hypothesized that the teens from higher-income families become more committed to school, both because part-time work becomes more scarce with a higher minimum wage, and because the opportunity cost of not being enrolled (a reduction in skill level that makes finding a future job more difficult) is increased. However, black male teens are seen to respond to a minimum-wage increase by shifting from full-time schooling to full-time employment.

Neumark and Wascher (1996) used observations from matched CPS surveys to investigate the response of young workers to minimum wage increases. Their results indicate that lower-skill workers are displaced from their jobs as employers hire higher-skill workers. Some of these higher-skill workers leave school to pursue jobs at the higher wage. The net result is a reduction in teenage enrollment, and the lowest-skill teenagers lose their jobs. These low-skill workers tend to be minorities and younger workers (16 and 17 year-olds) who are displaced and potentially become unemployed and non-enrolled. The result is an increased probability these teenagers become unemployed long-term.

Neumark and Wascher (2001) attempt to examine the effects of minimum wages on an individual's efforts to acquire additional training on the job, or to qualify for a job. The data they use include questions on training included in the January 1983 and 1991 Current Population Surveys. Using interstate variation in the minimum wage rate to identify the impacts of minimum wages on training, they find evidence that higher minimum wages reduce on-the-job training. This is consistent with the findings of

Leighton and Mincer and Hashimoto. Their results imply that formal training is more adversely affected by higher minimum wages. They argue this is to be expected if formal training entails more direct and indirect costs. Informal training is more of a learn-by-doing process, and is thus a joint product of the production process.

Neumark and Wascher also investigate whether higher minimum wages result in increased training in order to obtain a job. Their results indicate there is no such effect. While minimum wages reduce on-the-job training, they do not seem to encourage individuals to acquire additional skills prior to obtaining a job. This would seem to imply that minimum wages reduce the skill-level of workers overall, thus lowering future wage payments. Neumark and Wascher note that their data may not provide complete enough information on very general skill acquisition.

The studies discussed above are summarized in Table 6.3. The evidence on the effects of minimum-wage increases on different demographic groups is mixed. Some of the earlier studies, Mattila for example, indicated that teens returned to school following increases in the minimum wage. This is consistent with teens being displaced from jobs when the minimum wage increases, and those displaced teenagers returning to school in order to increase their productivity.

Later studies by Ehrenberg and Marcus (1980 and 1982) found that higher minimum wages result in an employment/schooling shift. Teens from low-income families tend to move out of school and into full-time work when minimum wages rise, while teens from higher-income families leave the labor market and focus on school. There is also evidence that employers reduce training when minimum wages increase (Leighton and Mincer (1981), Hashimoto (1982), and Neumark and Wascher (2001)).

Taken together, these findings imply that minimum wages draw teens from low-income families away from school, and into jobs that feature less training and slower wage growth. Alternatively, teens from higher-income families return to school to receive additional training.

The adverse effect of the minimum wage may be even higher in light of the findings of Neumark and Wascher (1996). They report that higher minimum wages result in an employment shift from low-skill teens to higher-skilled teens. They do not find evidence that the newly unemployed, low-skill teens return to school.

When the results are combined, they suggest that higher minimum wages lower the skill accumulation of teens currently possessing the lowest skill level in two ways. First, these teens leave school sooner to take jobs with relatively low levels of training. Second, higher minimum wages make them vulnerable to layoff and replacement, resulting in unemployment. This observed outcome would seem to demonstrate that the minimum wage is not a precise tool for improving the long-term prospects of the lowest-skilled teens.

EITC and Capital Accumulation

Eissa and Hoynes (1998) investigated the labor-market effects of the EITC on married couples. From the perspective of this study, the most relevant finding they present is that expansions of the EITC are associated with declines in participation and hours worked by married women. This may be due to the high marginal tax rates faced by families in the phase-out range of the EITC. If the families in this study are in the phase-out range, the results are consistent with the economic theory discussed in Chapter

2. Since the sample used by Eissa and Hoynes only contains couples where the wife has less than a high-school education, it is possible that the reduction in hours could be a result of the wife pursuing additional schooling. The authors do not address the question of how the time no longer spent in the labor market is used. It is possible the additional time is spent in parental activities or in other household production, as well as potentially attending school or vocational training.

The second body of literature concerns how EITC recipients spend the credit they receive. The focus is whether the credit finances increased consumption or capital investment. The interest in the potential impact of the EITC on capital accumulation comes from the fact that the EITC is at least partially available in regular installments or entirely as a lump sum at the end of the tax year. Almost all recipients receive the credit as a lump sum (Barrow and McGranahan, 2000). This is consistent with the possibility that the EITC affords low-income households the opportunity to "save" in order to finance capital investments. These investments might take the form of improved housing, transportation, or education. However, the lump-sum delivery system may also indicate that recipients are unaware of the advance-payment option, or that significant bureaucratic barriers exist to receiving the EITC in this manner.

In general, studies on the use of the EITC consist of surveys of credit recipients. The reported results seem to indicate that the recipients spend a significant portion of the refunded credit to finance current consumption, pay down or catch up on debts, and to finance lump-sum capital expenditures. There are relatively few papers on this subject.

Smeeding *et al.* (2000) surveyed clients of a free income-tax preparation service provided by the Center for Law and Human Services in the Chicago area. The clients

used for the study were both receiving a federal tax refund and claimed the EITC. The survey, among other things, asked recipients about their intended use of the tax refund and EITC. The survey respondents were asked to list and prioritize up to three uses of their refund. The responses were then classified as either expenditures to "make ends meet" or to provide upward social mobility. The first category includes spending on regular bills (e.g., food, rent, utilities), clothing, appliances, and furniture. The second category includes debt repayment, savings, and capital investments for schooling, transportation, and housing. Most of 650 respondents provided at least one spending priority (81 percent) with fewer providing additional responses (46 percent with at least two and 14 percent with three).

The most commonly cited spending plan for the tax refund was paying bills (50 percent listed as their first priority) with current consumption purchases (food, clothing, etc.) second. More than one-half of all respondents indicated they would use the refund to improve their upward mobility. While the expenditure category is defined very broadly, this is consistent with the EITC having longer-term benefits. More to the point of this study, 16 percent of respondents listed tuition payments among their top three choices. This could be tuition for the respondent, spouse, or child. This compares with 22 percent who listed an automotive-related expense among their top three choices.

The study is difficult to generalize because the sample of taxpayers responding to the survey is nonrandom. As the authors point out, the free tax service did not offer "rapid refund", while many professional tax services did. It is likely that EITC recipients most in need of their refund would choose a firm like H&R Block, as opposed to using the free service. This would bias the results toward greater social mobility investments.

It may also be that gathering data from one city in the upper Midwest produces results that are not generally true around the nation.

Romich and Weisner (2000) survey 42 households participating in the New Hope Project in Milwaukee, Wisconsin. This is a community-based program designed to alleviate poverty. The program involves more than 1,300 households, from which a random sample of 60 households was drawn. The study is based on the households agreeing to participate. The results are based on surveys of the remaining households. The two questions addressed by this study are:

1. Which delivery mechanism gives greater utility, the advance payment option or the lump sum?

2. What kinds of purchases will be made with the respective payment forms?

The sample selection and size make it difficult to generalize the results, but this study provides further evidence that families receiving the EITC use the lump-sum payment of the credit to allow them to purchase consumer durables, invest in housing, and pay tuition. The tuition expenses referred to in this study are focused on paying private school tuition for children, not additional schooling for adults. Even if the EITC is associated with reduced enrollments by parents, the credit may allow for increased investments in schooling for the children of the recipients.

Barrow and McGranahan (2000) use data from the Consumer Expenditure Survey to examine the spending patterns of households eligible for the EITC. The authors compare the seasonal spending patterns of households eligible for the EITC with the spending patterns of households that are not eligible. Eligible households show some evidence of increased expenditures in the months of likely receipt of the lump-sum tax

refund (including the EITC), especially for durable goods. The study also finds that spending increases by less than the average EITC. This would indicate that households save part of their credit, at least temporarily, or engage in consumption smoothing. This study does not directly relate to the task here, but given the finding that households do save some of their credit, the study is consistent with EITC recipients using their credit to make human-capital investments.

The results from the EITC literature are summarized in Table 6.4. There is some evidence that some recipients of the EITC may use the EITC for human-capital investments. However, the evidence is not strong.

6.4. MODEL

This study will look at two issues. First, evidence will be presented that is consistent with earlier studies on the effects of the EITC on the labor supply of single mothers. There are a number of studies, including Eissa and Liebman (1996), Meyer and Rosenbaum (2001), and Ellwood (2000), that conclude the expansions of the EITC have led to increased labor-market participation among single mothers. These studies were summarized in Chapter 2.

The purpose for re-examining the topic here is to investigate the EITC's effectiveness in increasing labor supply among younger women. Younger women with children may have family support that allows them to postpone labor-market activities and complete school, especially high school. This study will focus on women between the ages of 17 and 21. These are prime school years where women may complete high school and attend an initial post-secondary program, which could be either vocational or

academic. Many women also either postpone or skip post-secondary education, instead pursuing employment.

Having a child during these years may affect the opportunities available to young women. A very young child requires constant care. A single parent would need to find a child-care provider in order to continue education or work. If a family member cannot provide these services, they will generally be purchased at a significant cost.

In the past, social welfare programs, such as Aid to Families with Dependent Children (AFDC), have provided benefits to single mothers so that they could care for their children.[1] In recent years, support for such programs seems to have eroded. It has been replaced with interest in supporting single parents in the labor market, among other things.[2] Specifically, expansions of the earned income credit and the increased use of welfare waivers allowed families to earn higher amounts of labor income without losing public assistance benefits. This perhaps culminated in the passage of welfare reform, the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA). It seems clear that the policy focus has shifted from solely providing a safety net to encouraging and, in fact, requiring that single parents work to provide their own support.[3]

As mentioned above, the first part of this study will focus briefly on the effects of the expansions of the EITC on the labor supply of young women. The goal is to be able to compare the impact of the EITC expansions on this small subset of all single women with the effects on larger samples reported in the literature. If the EITC has affected the

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[1] Benefits were rapidly phased out with increased labor income, thus making AFDC primarily an income support program.

[2] There has also been an increased focus on maintaining two-parent families, one of the official goals of PRWORA.

[3] Schooling and training programs, while perhaps not as openly discussed as work requirements, often satisfy the work requirements of welfare reform plans.

labor supply of young women in a manner similar to the credit's effects on the larger population of single mothers, it might be expected that increased work activity would come about because of reduced schooling.

It is not necessary that single mothers who increase their labor supply reduce their school attendance. It is possible that increases in the labor supply of young mothers over time have resulted in reduced proportions of young mothers who are neither employed nor enrolled in school. It is also possible that the expansions of the EITC have made it possible for single mothers to both work and attend school. Once the effects on labor supply are estimated, the study will turn to the effects on school enrollment.

In order to estimate the effects of the EITC on labor supply, a probit model is estimated. The model can be expressed as:

$$P(po_{it} = 1) = \Phi(\alpha + \boldsymbol{\beta}\mathbf{Z}_{it} + \boldsymbol{\delta}\mathbf{Y}_{it} + \gamma_0 kids + \gamma_1(\text{EITC control}) + \gamma_2(\text{state EITC control})) + \varepsilon_{it}$$

where is $P(po_{it})$ represents the probability that an individual is employed during the year. $\mathbf{Z}_{it}$ is a vector of individual demographic variables such as age, educational attainment, race, number of children under 6, and non-labor income. $\mathbf{Y}_{it}$ is a vector of state control variables, including the unemployment rate, the maximum AFDC benefit for a family of three, the growth rate of personal income, the ratio of the minimum wage to the average state hourly wage, and adjustments to welfare policy as reflected by the presence of a statewide welfare waiver. ε is a random error term that is assumed to have a standard normal distribution.

The EITC control is the wage subsidy rate each woman would face upon entering the labor market. This is equal to zero if the woman has no children, and up to 40 percent if the woman has two or more children in 1996. The variable is intended to model the policy change over time, and does not reflect the actual subsidy or tax rate faced by individual observations. Two specifications of the state EITC variable are used. The first is the wage subsidy rate upon participation for all states with EITCs. This variable is only nonzero for women with children living in a state with an EITC. The second specification limits the state EITC to the wage-subsidy rate upon participation for states with refundable EITCs. ε is a random error term that is assumed to have a standard normal distribution.

This equation is estimated for a random sample of single women, drawn from the March Current Population Survey for the years 1987 through 1996. The women were between the ages of 17 and 21 when surveyed. This would place the women in an age group where school attendance includes completing high school and beginning post-secondary education, and early in the range of childbearing ages. The estimates are repeated while expanding the sample to include single women between the ages of 17 and 24.

The focus of the study then shifts to estimating the effects of the EITC on school enrollment. With school enrollment added to the study, a woman may now be in one of four possible activity categories. Each woman has an enrollment status and an employment status, as reflected by her answers to the March CPS questionnaire.

This results in four possible outcomes: not in school/not employed (NSNE), not in school/employed (NSE), in school/employed (SE), and in school/not employed (SNE).

Consistent with the Ehrenberg and Marcus (1982) and Neumark and Wascher (1996) studies, a multinomial logit model is used to estimate the effects of the EITC on school/employment status.

The utility from each activity *a* in state *s* and period *t* for individual i is

$$U_{iast} = \alpha + \boldsymbol{\beta}\mathbf{Z}_{ist} + \boldsymbol{\gamma}\mathbf{Y}_{st} + \phi \text{ (Federal EITC)} + \delta \text{ (State EITC controls)} + \varepsilon_{ist} .$$

As described above, $\mathbf{Z}_{ist}$ represents a vector of demographic variables and $\mathbf{Y}_{st}$ represents a vector of state variables designed to control for differences in policy regimes and economic environments across states. Estimates were obtained using state dummies to control for long-term, fixed effects. However, since the results including state dummies are not significantly different, those results are not presented here.

The federal EITC variable is the phase-in rate of the EITC for each woman, depending on the year and the number of children she has. The subsidy rate has increased over time, beginning at 10 percent in 1975 and reaching 40 percent in 1996. State-level EITC controls were again included.

6.5. DATA

The model uses a sample of women between the ages of 17 and 21 drawn from the March Current Population Survey (CPS). The sample covers the period from 1987 through 1996, just following the enactment of the first expansion of the EITC (with the Tax Reform Act of 1986) and concluding as welfare reform is enacted (PRWORA 1996).

The dependent variables were constructed using questions from the March CPS on school enrollment and employment status in the previous year. A young woman was considered enrolled if she reported being either a full- or part-time student. A young woman was considered employed if she reported working at least one week in the prior year.

This young sample is used to focus attention on the potential impact of the EITC on women with a greater probability of being enrolled in school, and for whom having a child is an unusual event. With three-fourths of women 24 and under without children, the women in this sample with children are significantly ahead of the average of their peers in terms of fertility.[4] The regressions were repeated using unmarried women between 17 and 24 without significant qualitative differences.

Demographic variables were included for age, race, education level, unearned income, a dummy variable indicating whether a women had at least one child, and the number of children under 6, all of which came from the CPS. An interaction term was included for race and the child dummy. Variables were used to control for variation across states in economic conditions and environment. These included the state's unemployment rate, the growth in real per-capita personal income, the relative value of the minimum wage, the value of the maximum grant for a family of three from the Aid to Families with Dependent Children program (AFDC), and a variable that indicates the number of months during the year that the state of residence had a statewide welfare waiver in place. An interaction term between waivers and the child dummy was also included. Finally, a time trend was included to capture long-term effects.

Data on unemployment rates were obtained from published data from the Bureau of Labor Statistics, U.S. Department of Labor. Real per-capita personal income data are

from the Bureau of Economic Analysis, U.S. Department of Commerce. The data on state-level minimum wages are from the U.S. Department of Labor. Data on the AFDC program are from the *Green Book* published periodically by the U.S. House of Representatives Committee on Ways and Means. The data on welfare waivers are taken from Council of Economic Advisors (1997).

The federal EITC was modeled using a variable that equaled the maximum wage-subsidy rate for which the woman would have been eligible under the tax credit. For women with no children, the subsidy rate is zero. For women with at a least one child, the variable would equal 14 percent for 1987 through 1989. The two expansions of the federal EITC during the 1990s increased the subsidy rate and created higher subsidy rates for women with two or more children. Controls were also introduced for state-level EITCs, so that interstate variation in the application of these credits would provide additional identification of the credit's effectiveness. The state-level EITC controls were the wage-subsidy rate for each state with an EITC, and a second specification limiting this control to only states with refundable EITCs.

Summary statistics for the sample are presented in Table 6.5. The sample includes data on 43,533 single women between ages 17 and 21. As expected, the average woman in the sample is approximately 19 years old, and has attended some college. Over the course of the sample period, less than 10 percent of the sample reported having had a child. For white women, 6.1 percent had at least one child. For nonwhite women, 20.3 percent had at least one child. Approximately 68 percent of the young women surveyed were currently enrolled in school, while 71 percent were currently employed.

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[4] U.S. Census Bureau, Table 1, Women and Fertility 2000.

Approximately 20 percent of the women in the sample are nonwhite. Of the women in the survey, 47 percent report being both employed and enrolled during the past year. Almost equal proportions, 24 and 21 percent, report working only and school only, respectively. Only 7.7 percent reported being both non-enrolled and non-employed in the past year. Sample statistics are also presented in Table 6.5 for single women between the ages of 17 and 24.

6.6. PROBIT RESULTS ON PARTICIPATION

Estimates are presented for labor-force participation, in order to demonstrate the broad consistency of the sample used for this study with the results from prior studies. Prior studies have focused on labor-force participation as an indicator of the success of the EITC. Estimates of the effect of the EITC on participation are presented here in order to present additional evidence supporting those results using a slightly different policy framework, and to then expand the investigation to the impact the EITC may have on school enrollment.

The first set of probit estimates is presented in Table 6.6, and includes the results for both age groupings. The explanatory variables are age, a dummy variable indicating the presence of a child, number of children under 6, unearned income, years of education, and race. An interaction term is added for race and children. A trend variable was also included. Each equation includes the EITC wage-subsidy rate applicable to each woman. Women without children would not be eligible for the EITC, and would thus have a subsidy rate equal to 0.

The estimates imply a 7.6 percentage-point increase in labor-market participation for an additional year of age. Women closer to 21 are more likely to be employed. This is to be expected, because women complete high school as they pass 18 years old, and a significant percentage do not continue in school beyond high school. The probability of being employed is significantly higher for the women in the sampler who are closer to 21.

The presence of an additional child under 6 reduces labor-market participation by almost 16 percentage points. An additional year of education increases the probability of working by approximately 1.2 percentage points. Women who are not white are less likely to work than white women. The estimates here imply that nonwhites are 22 percentage points less likely to work than white women, all else equal.

The results presented in Table 6.6 are consistent for both age groupings. The sign, general magnitude, and statistical significance of the coefficient estimates are practically the same for both groups. The small variations that occur in the estimates result in estimates that are generally smaller in absolute value for the sample with women ages 17-24. The one exception is for the presence of a child. The results indicate that many factors affect the labor supply of women ages 17-21 to a greater extent than the impact on women just slightly older.

The positive coefficient estimate for the EITC implies that women with children have a greater probability of participating in the labor market later in the sample period than in the early years. The EITC variable increases over time, to reflect the law changes that raised the wage subsidy rate during the 1990s. The estimated partial derivative is 0.748 for women ages 17-21, and 0.674 for women ages 17-24. These coefficient estimates are very large, and imply an increase in labor-force participation of between

11.1 and 12.3 percentage points among young women with children based on the 1993 EITC expansion for women with one qualifying child. Applying the estimated partial derivative of 0.884 to the 1990 EITC expansion, which was much smaller in magnitude, would imply an increase in participation of approximately 2.5 percentage points.

The large coefficient estimates for the EITC may help explain why, in Chapter 3, the estimated effect of the EITC was smaller among older women (ages 25-50) than some estimates in the existing literature obtained with samples that included women between ages 18 and 24. From the estimates obtained here, it appears that the difference is attributable to the large effect on the participation of younger women. The results here imply that the EITC has a strong effect on participation among the youngest single mothers. The estimated increase in participation presented by Meyer and Rosenbaum (2000) was 8.5 percentage points for women ages 19-44. The estimate here is larger, consistent with younger women being more responsive to policies designed to encourage work.

The regressions above were repeated with a set of state variables that are designed to control for interstate variation in economic conditions and policy environments, including two specifications with state EITCs. The results are presented in Tables 6.7 (ages 17-21) and 6.8 (ages 17-24). The results are consistent with those presented in Table 6.6. All of the estimated coefficients presented above retain the same estimated sign, remain strongly significant, and are of similar magnitudes. This is true for both age groupings. There is some small variance in the estimated effects of a child and additional education, but the magnitude of these changes is very small.

Some significant effects are observed among the new state-level controls. Higher minimum wages are estimated to result in higher labor-force participation among this sample of young, unmarried women. The estimates are strongly significant, and imply that a 10-percentage-point increase in the relative minimum wage would increase participation among single women by approximately 4.5 percentage points. This is not consistent with theoretical predictions that higher minimum wages affect younger workers adversely. This result is also different from the results presented in Chapters 3 and 4. Among older women, minimum wages were found to have an insignificant effect on labor-market participation. However, some empirical evidence does exist to indicate that minimum-wage increases have differential effects across demographic groups.[5]

Welfare policy is generally estimated to have a negative effect on labor-market participation. Higher welfare benefits are correlated with reduced participation. However, the estimate is significantly different from zero for the sample with women ages 17-24 only. The estimate for this group implies a $100 increase in monthly benefits would reduce labor-market participation by 1.9 percentage points. The estimate for single women ages 17-21 is very small and negative. The estimates for the variable controlling for waivers are negative, the opposite of the expected sign. Neither estimate is significant at traditional levels. These findings together indicate that welfare policy has not played a statistically significant role in the increased labor-market participation of young single mothers.

Economic conditions are estimated to have a significant effect on the labor-market participation of younger women. As was found in Chapter 3, higher unemployment rates within a state reduce employment among single women. However,

[5] For a summary of the research, see Brown, Gilroy, and Kohen (1982).

the effect is much larger on this younger population. The estimates here imply a 1.2 percentage-point decline in employment for each one-percentage-point increase in the unemployment rate for women between ages 17 and 21. The effect is smaller for the slightly older sample.

Higher per-capita income growth is also associated with lower employment for single women. The estimated effect of a one percentage-point increase in income growth is a 1.1-percentage-point reduction in employment of single women. While this result may not agree with initial expectations, there may be a possible explanation. It may be that single women are less likely to work because they receive greater economic support when economic times are good. Especially for this sample of younger women, greater economic opportunities for members of each woman's support network (e.g., family or household members, boyfriends) could allow more women to participate in non-market activities, such as school or care for a home.

For single women between the ages of 17 and 21, the estimated effects of the federal EITC remain positive and significant, with an estimated partial derivative approaching 0.9. This estimated effect is very large. Based on this estimate, the 1993 expansion of the EITC on average increased the participation of single mothers between the ages of 17 and 21 by 14.8 percentage points. The estimated effect is smaller when the sample is expanded to include all single women age 17 to 24. For the larger sample, the estimate is 0.75. This is still a very large estimate, consistent with the conclusion that the federal EITC has significantly increased labor supply among young single mothers.

The effect of a state EITC is estimated to be negative overall. In both sets of estimates, the impact on participation for all state EITCs (refundable and nonrefundable)

is negative and significant. The estimates are large in magnitude, with an estimated coefficient of –1.8 for women ages 17 to 21, -1.2 for women ages 17 to 24. There is some change when the control variable for state EITCs is restricted to refundable credits. A refundable credit should have a larger positive effect on labor supply because any excess of the credit above state tax liability is refunded. When only refundable state EITCs are used, the estimates become smaller in absolute value and insignificant. This is true for both age groupings.

These estimates imply that state EITCs are not particularly effective at quickly moving single mothers into the work force. This is consistent with most of the estimates in Chapter 3. As discussed there, it is likely that this estimate is influenced strongly by New York's EITC that was adopted in 1994. Given New York's relative size and economic situation in 1994 (also discussed in Chapter 3), this estimate may not reflect the results in other states.

However, this is not found to be the case for younger women. When the observations from New York are removed from the sample, the results are basically identical. While the results are not presented in this paper, the estimated coefficients for state EITCs remain unchanged, both qualitatively and quantitatively. The evidence here indicates that state EITCs do not, on their own, increase labor supply among single mothers under age 25, with other factors unchanged.

The results presented here are consistent with the growing body of economic research on EITCs discussed more fully in the Chapter 2. The expansions of the federal EITC are associated with increased employment among single mothers, and these effects are quite strong among this younger sample. The results are not as positive for state

EITCs, although the estimated effect of refundable credits is statistically insignificant. Economic conditions such as higher unemployment result in large decreases in employment. Welfare policy changes such as waivers are not found to have significant effects in increasing the employment of the single mothers in this sample.

6.7. MULTINOMIAL LOGITS ON ENROLLMENT STATUS

This paper now turns to the core topic to be investigated, whether the expansions of the EITC, which have consistently been estimated to increase labor-market participation among single mothers, have resulted in a shift away from schooling. In order to investigate this question, a multinomial logit model is used. For all of the estimates presented here, the base case was assumed to be non-employed and not attending school (NSNE).

The results are presented in Tables 6.9 through 6.14 for women ages 17 to 21. The results for single women ages 17 to 24 are presented in Tables 6.17 through 6.22. Three specifications are estimated. The first set of estimates was obtained in a manner similar to the results presented in Table 6.6 for labor-market participation. The set of explanatory variables includes only basic demographic variables and the federal EITC variable. The estimates are presented in Table 6.9, with the implied partial derivatives presented in Table 6.10. The partial derivatives were evaluated at the sample means for a woman eligible to receive the EITC.[6] The estimated coefficients presented in Table 6.9 are all significantly different from zero at traditional significance levels.

[6] The partial derivative was calculated using values of 1 for children (dummy), 1 for child under 6, and a value of 0.34 for the EITC subsidy rate.

Additional years of age imply reductions in school attendance. An additional year of age is estimated to result in approximately an 11.8-percentage-point decrease in the probability of being in school. This is predominantly due to an increase in women taking jobs (increases 13.2 percentage points) and a reduction in the probability a woman is attending school exclusively (declines 8.1 percentage points).

As would be expected, women with children have a lower probability of both working and attending school, as reflected by the partial derivatives reported in the third column of Table 6.10. Having at least one child is estimated to reduce the probability of both working and attending school by more than 30 percentage points. There is a strong increase in the probability of being simultaneously out of school and the workforce when a single woman has a child (21 percentage points).

Employment is less likely for women who are not white. Nonwhites are more likely to be attending school but not employed, or neither attending school nor employed, than are white women. For nonwhites with children, the results are different. While having children or being nonwhite are estimated to reduce the probability of simultaneously attending school while working, for nonwhites the probability of participating in both activities increases with the presence of a child. This increase is offset by a decrease in the probability of being non-employed and non-enrolled. This result is difficult to explain, but the estimates are statistically significant, and robust across all specifications and both age groupings. There may be a renewed focus on economic issues once a nonwhite woman becomes a mother, although it is unclear why any change in focus would affect various races differently. This result may reflect differences in the support network available to the average single mother across races.

The federal EITC is estimated to have a significant effect on increasing the probability a single mother will be employed, both with and without attending school. The estimates in Tables 6.9 and 6.10 imply that a large part of the increased work/school activity among single mothers is associated with a decreased probability that a single mother is unemployed and not attending school. The estimated partial derivative implies that a 10-percentage-point increase in the wage subsidy rate would lead to approximately a 2.0-percentage-point increase in the probability a single mother both attends school and works. Similarly, the probability that a woman eligible for the EITC works, but does not attend school, increases by between 2.9 and 3.5 percentage points with a similar 10-percentage-point increase in the wage subsidy rate.

Similar results are obtained for single women ages 17 to 24. For women with children, the federal EITC is estimated to have increased the probability that a single woman is employed, both with and without attending school. The estimates are statistically significant. The largest increase is in the probability that a single mother both works and attends school, although there is not a meaningful difference between this category and working without going to school. The increased work activity comes from a reduced probability that single mothers are both non-employed and non-enrolled. The estimated impact on being enrolled only is not statistically significant.

Given the results from previous research as well as those presented above, it is not surprising that the EITC results in increased labor supply while out of school. However, the estimate that the EITC is associated with a statistically significant increase in the probability a young mother is employed and enrolled is somewhat surprising. Three possible factors could be contributing to this effect. First, increases in the wage-subsidy

rate would provide single mothers, who often work at lower-wage jobs, with a significant potential increase in the resources available to them, assuming there is no significant decrease in the number of hours worked. These additional resources would potentially provide opportunities for the woman to afford to pay for schooling, or for additional childcare so that the mother could attend classes.

A second explanation is that the expansions of the EITC have raised the return to work, so that single mothers now find it less desirable to be out of the work force while attending school. The estimated effect of the EITC on being enrolled but non-employed presented here for both age groups is not statistically significant in any specification. The coefficient estimate is more often positive, indicating some weak correlation between increased school attendance without employment for some single mothers. This may reflect increased opportunities available to single mothers who wish to continue their education, perhaps due to improved social infrastructure (e.g., increased access to daycare).

A third explanation is that if the EITC results in an increase in lifetime labor supply, single mothers may also choose to seek out more schooling in order to make the additional labor supply more profitable. If a worker will spend additional years in the work force, this will provide additional time to recover the cost of investments in education. Also, additional education is more valuable when the length of time the individual will spend working increases. Thus the wage subsidy available to single mothers through the EITC may simultaneously encourage entering the labor force and returning to school.

Tables 6.11 through 6.14 present the coefficient estimates and partial derivatives when the model is estimated using state-specific controls for economic conditions and policy variables. For most of the variables discussed above, the estimates do not change significantly. As such, the estimates will not be discussed again. State dummies were also included to control for state-level fixed effects. Once again, the results for the estimates of interest do not change materially, and the results are not presented here.

The addition of state controls does not result in significant changes in the estimated probabilities for the federal EITC variable with regard to employment. A higher wage-subsidy rate under the federal EITC is estimated to increase the probability that a single mother is employed, and reduce the probability she is non-employed and non-enrolled (NSNE). This is a consistent finding with both sets of economic controls, and is repeated in the estimates for single women ages 17 to 24 (Tables 6.17 through 6.22). This result is also consistent with other studies of the EITC that find the credit leads to increased labor-market participation. The estimates imply that expansions of the federal EITC have increased enrollments as well, although the partial derivative for the EITC is larger (0.35) for SE than for NSE (0.20). This implies the increase in labor market participation due to the EITC has not resulted in decreased school attendance, but rather increased the probability a single mother would be enrolled. The EITC estimates obtained using the sample of single women ages 17-24 are slightly larger for SE than for NSE, implying that the probability that single mothers have moved into both additional schooling and work is slightly higher than the probability they have moved into work alone. This result fits the hypothesis stated earlier that the additional disposable income provided by the EITC could allow for both increased schooling and increased labor

supply. It seems that the EITC provides single mothers with increased options to improve their economic position.

However, state EITCs are not associated with statistically significant increases in the probability of employment. Even refundable state credits are not found to lead to increased employment. The estimate that is most significant statistically is a negative effect on the probability of being employed and enrolled simultaneously.

The apparent disconnect between state and federal EITC policy is not intuitive. It seems unusual to find different results for the federal and state EITCs. It may be that recipients understand federal policy better than they understand state policy. Whatever the reason, the difference between the measured effectiveness of the federal and state EITCs is striking.

6.8. ALTERNATIVE CALCULATIONS

A second method of evaluating the estimates from a multinomial logit model is to present changes in probabilities for each activity, based on changes in the explanatory variables (see Wooldridge (2002), pp. 497-499). This method will produce an estimate of the effect of changes in EITC policies based on the change in the likelihood function. The probabilities are calculated using the coefficient estimates presented in Table 6.11. The probabilities are calculated by evaluating the likelihood function using the coefficient estimates and a set of explanatory variables. Examples are presented in Tables 6.15 and 6.16.

These estimates are going to be similar to the partial derivatives, but provide a simple alternative calculation of the effect of changing the relevant policy variable. For

this analysis, the policy variable is the federal EITC. The effect is measured using the coefficient estimates from the multinomial logit estimation process, along with values for all the explanatory variables. For most explanatory variables, the sample mean is used. These values are then used to generate a probability of each particular employment/enrollment status.

The first example (Case 1 in Table 6.15) is for an increase in the EITC wage subsidy rate from 40 to 45 percent. The example is based on a 17-year old woman with two children under six. This hypothetical woman also has completed the 10^{th} grade. The woman is white and has approximately $200 in annual unearned income. The economic variables are evaluated at their respective sample means. The coefficient estimates imply that the 5-percentage-point increase in the EITC subsidy rate would result in a decline in inactive women (NSNE) of 2.5 percentage points, with an increase in the probability of employment of 2.3 percentage points, comprised of a 1.4 percentage-point increase in no school but employed (NSE) and a 0.9 percentage-point increase in school and work (SE). These imply partial derivatives of 0.28 and 0.18 for the EITC variable for NSE and SE, respectively. These results are generally consistent with those presented in Tables 6.12 and 6.14, although the estimated partial derivatives are smaller. However, the implication remains clear. The EITC is estimated to move single mothers into employment without a significant decline in attending school. However, because this analysis does not evaluate whether single mothers are attending full- or part-time, it is impossible to know whether the amount of time spent in school increases or decreases.

The second example is based on the 1993 EITC expansion, and is Case 2 in Table 6.15. It compares the probability of being in each category in 1992 and 1996 for a

woman without children (and thus ineligible for the EITC) and a woman with two children under 6. These hypothetical women were both 17, had finished 10^{th} grade, had $200 in unearned income, and were white. The results imply virtually no change for women without children, while women with 2 children would be on average 10.0 percentage points more likely to work (obtained by summing the difference for NSE and SE). The implied increase in work would be the result of a 6.4-percentage-point increase in work without school (NSE) and a 3.6-percentage-point increase in work with school (SE). This is also consistent with the EITC increasing employment among single mothers without decreasing the probability a single mother attends school. There is also an estimated increase of 2.4 percentage points in the probability that women attend school without working.

The examples from Table 6.15 are repeated in Table 6.16, with the exception that the single mother only has one child. As a result, the subsidy rate is lower, (0.34 in 1996, as opposed to 0.4 for a mother with two or more children). For Case 1, the policy change being evaluated is an increase in the wage-subsidy rate from 0.34 to 0.40. The results are very similar to those in Table 6.15, perhaps not surprising given the small variation between the subsidy rate, 0.34 versus 0.40. The probability that a single mother works with the higher subsidy rate increases by 2.7 percentage points. This is slightly higher among mothers with one child than the 2.3-percentage-point increase for mothers of two children discussed above. The composition is different, though. Women with one child have a greater probability of both working and attending school (SE), than women with two children. That women with one child have a higher probability of both working and attending school than women with two children is a reasonable result, considering that a

single mother of multiple young children would have increased parental responsibilities. Also, multiple children would require increased childcare expenditures, potentially limiting the resources available to purchase training.

Case 2 in Table 6.16 examines the effect of the 1993 EITC expansion on women with one child compared with women without children. As in Table 6.15, there is a significant increase in the probability that a woman with one child works, either with or without going to school, relative to women without children.

It is important to remember that these estimates are comparing the relative probabilities. For example, the results in Case 2 of Tables 6.15 and 6.16 do not imply that women with children are more likely to work than women without children after the 1993 expansion of the EITC, but rather that the relative probability increased. There was an increase in the probability a woman with at least one child would be working, while the probability for women without children remained unchanged.

6.9. COMPARISON WITH PRIOR LITERATURE

The estimates presented here are the first evidence of the effects of the EITC on the human-capital accumulation of single mothers. Because the credit presents a subsidy to enter the labor market, it might be expected that single mothers do so at the expense of additional schooling. However, the evidence here does not support that.

Instead, the higher wage-subsidy rates provided by the expansions of the EITC in 1990 and 1993 are associated with both increased labor supply and increased participation in both school and work among single mothers. There is no evidence of significant declines in school enrollment.

The case is less clear for state EITCs. The estimated coefficients for state EITC variables are often insignificant. Refundable EITCs are associated with some increased work while not enrolled, with a corresponding small decline in school enrollment. This may represent more intensive effort, among the states with refundable EITCs, to encourage work activity among single mothers.

One might wonder who these women are who respond to the expansions of the EITC by not only increasing their labor supply, but also continuing their education? One possibility is that the change in incentives brought about by the expansions of the EITC, coupled with changing attitudes toward public assistance, may have resulted in behavioral shifts among young women with stronger family connections. These connections may include support with childcare as well as financial assistance. Instead of receiving public assistance and not working, it may be that these women have opted to continue their education while also working part-time in order to claim the EITC.

The prior literature on minimum wages found mixed evidence on the effects that higher minimum wages would have on enrollment and employment. Mattila (1978) found that higher minimum wages were associated with higher enrollments of teenagers. This was due, at least in part, to large disemployment effects among teens formerly not enrolled in school. These non-enrolled students subsequently return to school.

Ehrenberg and Marcus (1980 and 1982) find that minimum wages have mixed effects, depending on income and race. Higher-income, white, teenage males and lower-income, black, teenage males tend to leave school for employment at higher minimum wages, while lower-income, white males return to school. This would suggest some shift

in the quality of labor employers seek to hire following an increase in the minimum wage.

Neumark and Wascher (1996) find that higher minimum wages induce teenagers to leave school. They also find that higher minimum wages result in an increase in the probability that less-skilled teenagers become non-employed and non-enrolled, potentially making it more difficult for them to find successful employment in the future. This result should be compared with the estimates above, that the expansions of the EITC not only result in increased employment, but also increased enrollments, due to a strong reduction in the probability that a single mother between the ages of 17 and 21 is non-enrolled and non-employed. Similar evidence is presented for single mothers between ages 17 and 24. These estimates would seem to present strong evidence of the superiority of the EITC as a policy for assisting low-income parents, especially when compared with the findings of Neumark and Wascher on the minimum wage.

The evidence here is broadly consistent with the findings from the spending patterns of EITC recipients. A minority of the respondents reported in Smeeding *et al.*, and Romich and Weisner claimed to be planning to spend at least a part of their credit on education. The results here seem to support that claim, although the estimates for school enrollment obtained here seem larger than would have been expected from the spending surveys.

6.10. CONCLUSIONS AND EXTENTIONS

This study investigates whether the earned income tax credit, while encouraging labor-market participation, has resulted in decreases in school enrollment. This would be an indication that the EITC encourages labor-market experience at the cost of lower general training in school. It is not clear beforehand if one type of human-capital accumulation is generally better for the long-term economic success of single mothers, but creating a structure of incentives that subsidizes work, but not school, could lead to a shift in the composition of the accumulated human capital within this component of the labor force. The results here strongly suggest that, while the EITC has been associated with increased labor-force participation, the EITC has also been correlated with increased school enrollment.

The study does not control for any potential self-selection bias. It is probable that there are systematic differences between young women who have children before age 22, and those who do not. These may include home environment, relative value of education, aptitude for educational success, and economic opportunity. However, the essential assumption for this study is not that these differences do not exist, but rather that they have not been changing over time, at least not changing significantly between 1987 and 1996.

Structural economic changes have increased the relative importance of education in labor-market success. Because the responsibility of caring for a child makes it more difficult for a mother to continue her own education, it is expected that childbearing would be delayed. Given that women with a higher aptitude for labor-market success would be disproportionately affected by these economic changes, it would seem

reasonable that the remaining women who have children early in their adult years would be more difficult to move into employment. These women are less skilled, will have lower educational attainment, and may have less family support to provide child care and financial support. This would tend to bias the results against the EITC, because the pool of eligible recipients may be becoming less skilled and employable over time.

One possible counter-argument may be that society is generally more accepting and accommodating to single mothers than it has been in the past. It may also be true that the societal expectation of work versus public support for single mothers has changed over time. If these are true, some of the estimated effects of the EITC presented above may be capturing a shift in behavior based upon a shift in overall societal expectations.

As the first evidence on human capital accumulation and the EITC, this study opens up additional questions. The snapshot effects on enrollment and work activity obtained here may or may not allow inference into the long-term effects of the EITC on economic success. Initially maintaining enrollment status while working may not reflect accurately the amount of learning or skill enhancement being received. In addition, simply being employed at some point during the year does not imply long-term success in the labor market. A longitudinal data approach may be best suited to address some of these questions. For example, a panel data approach that follows a group of women over many years would allow for comparisons between the level of economic success attained by women claiming the EITC, and the level attained by childless women.

Another possible avenue to investigate may be to compare the economic success of women who were eligible for the EITC with those who were not eligible (presumably

because they do not have children), and how that relationship has changed over time with the expansions of the EITC. Examples of the potential areas for investigation would be final educational attainment at some specific age, asset and wealth accumulation, employment stability, and earnings.

Finally, additional study into the behavioral and spending patterns of young, single mothers could provide insight into how programs such as the EITC affect decision making. Do such programs that encourage work while providing significant cash benefits provide better long-term solutions than simple public support? Instead of requiring work, the EITC could be structured to provide benefits to single mothers who succeed in school. Would such a program provide a better long-term solution than requiring work in order to receive benefits?

Table 6.1
Employment and Enrollment for Single Women Ages 17 - 21

School/Employment Status
Single Women with Children Ages 17-21, 1987-1996

Year	Observations	Non-School Non-Employed	Non-School Employed	School Employed	School Non-Employed
1987	381	0.409	0.370	0.113	0.108
1988	341	0.378	0.396	0.109	0.117
1989	372	0.382	0.390	0.086	0.142
1990	381	0.360	0.412	0.105	0.123
1991	368	0.389	0.386	0.095	0.130
1992	395	0.403	0.339	0.122	0.137
1993	375	0.349	0.365	0.109	0.176
1994	370	0.289	0.408	0.149	0.154
1995	340	0.271	0.459	0.138	0.132
1996	392	0.255	0.462	0.145	0.138

School/Employment Status
Single Women without Children Ages 17-21, 1987-1996

Year	Observations	Non-School Non-Employed	Non-School Employed	School Employed	School Non-Employed
1987	4,534	0.039	0.265	0.508	0.188
1988	4,074	0.047	0.251	0.510	0.192
1989	4,382	0.047	0.252	0.503	0.199
1990	4,341	0.051	0.238	0.502	0.209
1991	4,003	0.048	0.221	0.494	0.237
1992	3,834	0.057	0.211	0.494	0.237
1993	3,799	0.053	0.194	0.510	0.243
1994	3,824	0.060	0.203	0.490	0.246
1995	3,433	0.061	0.197	0.503	0.239
1996	3,594	0.054	0.213	0.491	0.241

Table 6.2
Employment and Enrollment for Single Women Ages 17 - 24

School/Employment Status
Single Women with Children Ages 17-24, 1987-1996

Year	Observations	Non-School Non-Employed	Non-School Employed	School Employed	School Non-Employed
1987	731	0.378	0.476	0.078	0.068
1988	685	0.366	0.483	0.074	0.076
1989	737	0.368	0.479	0.064	0.090
1990	760	0.362	0.466	0.086	0.087
1991	734	0.369	0.460	0.080	0.090
1992	758	0.375	0.429	0.099	0.098
1993	762	0.350	0.424	0.113	0.113
1994	747	0.301	0.467	0.126	0.106
1995	698	0.297	0.500	0.113	0.090
1996	750	0.241	0.523	0.140	0.096

School/Employment Status
Single Women without Children Ages 17-24, 1987-1996

Year	Observations	Non-School Non-Employed	Non-School Employed	School Employed	School Non-Employed
1987	6,170	0.042	0.381	0.429	0.148
1988	5,540	0.045	0.360	0.444	0.152
1989	6,029	0.049	0.359	0.437	0.156
1990	5,928	0.049	0.347	0.436	0.168
1991	5,637	0.053	0.334	0.427	0.186
1992	5,426	0.057	0.323	0.434	0.185
1993	5,312	0.054	0.305	0.446	0.196
1994	5,376	0.060	0.313	0.433	0.194
1995	4,650	0.060	0.297	0.448	0.195
1996	4,772	0.056	0.302	0.443	0.199

Table 6.3
Summary of Minimum Wage Literature

Author	Year	Data	Findings
Mattila	1979	October CPS	Displaced teens return to school after increase increase in minimum wage
Mattila	1981	October CPS	Full-time employment of teens decreases and enrollment increases after minimum wage increase.
Ehrenberg and Marcus	1980	1966 NLS	White teens in lower-income families move from part-time to full-time, higher-income teens return to full-time school. Nonwhites move from school to full-time work.
		1970 Census	Shift in employment from teens in poor familes to teens in non-poor families.
Cunningham	1981	1960 and 1970 Censuses	Variation between effects on blacks and whites. Probability blacks are employed lower while higher probability black teenagers are enrolled.
Leighton and Mincer	1981	PSID and NLSY	Minimum wages lower productivity and wage growth for men with less schooling.
Hashimoto	1982	NLS 1966 and 1969	Minimum-wage increase of 1967 resulted in slower wage growth.
Ehrenberg and Marcus	1982	1966 NLS Young Male and 1969 Young Female	With higher minimum wages low-income white teens shift from school to work, higher-income white teens increase schooling. Black teens shift from school to work.
Neumark and Wascher	1996	Matched CPS	Higher minimum wages result in low-skill teens becoming unemployed, while higher-skill teens leave school for work at the higher minimum.
Neumark and Wascher	2001	1983 and 1991 January CPS	Minimum wages lower on-the-job training, with the reduction acute for formal training. No evidence of higher pre-employment skill acquisition.

Table 6.4
Summary of EITC Literature

Author	Year	Data	Findings
Eissa and Hoynes	1998	March CPS	Expansions of the EITC are associated with reduced labor supply for wives.
Smeeding *et al*.	2000	Center for Law and Human Services survey of tax filers	Tuition payments listed by 16 percent of respondents as one of the top 3 uses of EITC refund.
Romich and Weisner	2000	Survey of New Hope Project participants	Find evidence that recipients use the EITC for "big-ticket" items, including tuition.
Barrow and McGranahan	2000	Consumer Expenditure Survey	Evidence that households receiving the EITC save at least some of the refund.

Table 6.5
Sample Summary Statistics

	Unmarried Women 17-24	Unmarried Women 17-21
Age	20.072	18.843
	(2.2608)	(1.4088)
Years of Education	14.653	14.429
	(3.1893)	(3.2927)
Nonwhite	0.196	0.190
	(0.3972)	(0.3921)
Kids	0.118	0.085
	(0.3230)	(0.2794)
Kids under 6	0.151	0.105
	(0.4741)	(0.3794)
Enrollment	0.564	0.682
	(0.4959)	(0.4656)
Employment	0.747	0.709
	(0.4345)	(0.4542)
NSNE	0.086	0.077
	(0.2807)	(0.2662)
NSE	0.350	0.241
	(0.4770)	(0.4277)
SE	0.397	0.468
	(0.4893)	(0.4990)
SNE	0.166	0.214
	(0.3725)	(0.4102)
Number of Observations	62,202	43,533

Standard errors in parentheses.

Table 6.6
Probits on Employment

	Single Women Ages 17-21	Single Women Ages 17-24
Age	0.0759	0.0498
	(0.0019)	(0.0010)
Kids	-0.2223	-0.2455
	(0.0350)	(0.0232)
Kids < 6	-0.1594	-0.1295
	(0.0163)	(0.0084)
Unearned Income	-0.0059	-0.0085
	(0.0009)	(0.0007)
Years of Education	0.0117	0.0123
	(0.0009)	(0.0007)
Nonwhite	-0.2206	-0.1961
	(0.0078)	(0.0064)
Nonwhite x Kids	0.1102	0.0961
	(0.0136)	(0.0087)
EITC Subsidy Rate	0.7478	0.6738
	(0.1036)	(0.0667)
Trend	-1.7E-05	9.2E-05
	(8.39E-5)	(6.57E-5)
Number of Observations	43,531	62,200
Log Likelihood	-22,922	-29,985

Sample of unmarried women from 1987-96. Includes full set of state dummies.
Partial derivatives evaluated at sample means. Standard errors in parentheses.

Table 6.7
Probits on Employment
for Single Women Ages 17 through 21

	With State EITCs	Refundable State EITCs
Age	0.0746	0.0746
	(0.0019)	(0.0019)
Kids	-0.2444	-0.2379
	(0.0367)	(0.0373)
Kids < 6	-0.1578	-0.1578
	(0.0162)	(0.0164)
Unearned Income	-0.0059	-0.0059
	(0.0009)	(0.0009)
Years of Education	0.0152	0.0152
	(0.0011)	(0.0011)
Nonwhite	-0.2207	-0.2203
	(0.0079)	(0.0078)
Nonwhite x Kids	0.1110	0.1080
	(0.0136)	(0.0137)
Minimum Wage	0.4266	0.4261
	(0.1409)	(0.1410)
AFDC	-0.0371	-0.0338
	(0.1354)	(0.1354)
Income Growth	-1.0877	-1.0881
	(0.1896)	(0.1897)
Unemployment Rate	-1.2053	-1.2088
	(0.2523)	(0.2524)
Waivers x Kids	-0.0408	-0.0344
	(0.0290)	(0.0290)
EITC Subsidy Rate	0.9057	0.8529
	(0.1289)	(0.1303)
State EITC x Kids	-1.8184	
	(0.4940)	
Refundable State EITC x Kids		-1.0989
		(0.8926)
Trend	-5.5E-05	-5.4E-05
	(9.15E-5)	(9.15E-5)
Number of Observations	43,531	43,531
Log Likelihood	-22,878	-22,889

Sample of unmarried women from 1987-96. Regressions include state dummies.
Partial derivatives evaluated at sample means. Standard errors in parentheses.

Table 6.8
Probits on Employment
for Single Women Ages 17 through 24

	With State EITCs	Refundable State EITCs
Age	0.0486	0.0487
	(0.0010)	(0.0010)
Kids	-0.2572	-0.2561
	(0.0247)	(0.0250)
Kids < 6	-0.1281	-0.1278
	(0.0084)	(0.0084)
Unearned Income	-0.0086	-0.0086
	(0.0007)	(0.0007)
Years of Education	0.0162	0.0162
	(0.0009)	(0.0009)
Nonwhite	-0.1959	-0.1956
	(0.0064)	(0.0064)
Nonwhite x Kids	0.0960	0.0943
	(0.0087)	(0.0088)
Minimum Wage	0.4734	0.4712
	(0.1104)	(0.1104)
AFDC	-0.1895	-0.1888
	(0.1055)	(0.1055)
Income Growth	-1.0954	-1.0975
	(0.1463)	(0.1464)
Unemployment Rate	-0.8586	-0.8623
	(0.1968)	(0.1969)
Waivers x Kids	-0.0144	-0.0113
	(0.0186)	(0.0188)
EITC Subsidy Rate	0.7598	0.7389
	(0.0831)	(0.0845)
State EITC x Kids	-1.2562	
	(0.3576)	
Refundable State EITC x Kids		-0.8989
		(0.6039)
Trend	9.7E-05	9.9E-05
	(7.16E-5)	(0.0007)
Number of Observations	62,200	62,200
Log Likelihood	-29,926	-29,936

Sample of unmarried women from 1987-96. Regressions include state dummies.
Partial derivatives evaluated at sample means. Standard errors in parentheses.

Table 6.9
Multinomial Logits on Employment and Enrollment for Single Women Ages 17 - 21

	No School Employed	School Employed	School Unemployed
Age	0.3432	-0.1782	-0.5600
	(0.0159)	(0.0152)	(0.0168)
Kids	-1.1712	-2.9128	-2.3570
	(0.1458)	(0.2195)	(0.2011)
Kids < 6	-0.6018	-1.2087	-0.5009
	(0.0768)	(0.1427)	(0.1111)
Unearned Income	-0.2004	0.0556	0.0557
	(0.0109)	(0.0084)	(0.0087)
Nonwhite	-0.9244	-1.0767	0.0258
	(0.0583)	(0.0538)	(0.0553)
Nonwhite x Kids	0.5891	1.0323	0.4646
	(0.1013)	(0.1279)	(0.1240)
EITC Subsidy Rate	3.2409	3.8938	2.6524
	(0.5192)	(0.7087)	(0.7003)
Trend	-0.0032	-0.0018	0.0004
	(0.0007)	(0.0006)	(0.0007)
Constant	-4.5287	5.9572	11.7388
	(0.3094)	(0.2940)	(0.3203)
Number of Observations	43,533		
Log Likelihood	-46,781		

Relative to base case of non-enrolled and non-employed. Sample of unmarried women from 1987-96. Standard errors in parentheses.

Table 6.10
Partial Derivatives from Table 6.9

	No School Unemployed	No School Employed	School Employed	School Unemployed
Age	-0.0142	0.1320	-0.0368	-0.0811
	(0.0041)	(0.0037)	(0.0033)	(0.0067)
Kids	0.2096	0.2132	-0.3232	-0.0996
	(0.0126)	(0.0334)	(0.0571)	(0.0408)
Kids < 6	0.1338	-0.0320	-0.1059	0.0041
	(0.0133)	(0.0209)	(0.0209)	(0.0126)
Unearned Income	0.0192	-0.0572	0.0206	0.0174
	(0.0021)	(0.0023)	(0.0017)	(0.0016)
Nonwhite	0.1520	-0.1631	-0.0732	0.0842
	(0.0138)	(0.0109)	(0.0066)	(0.0090)
Nonwhite x Kids	-0.1074	0.0210	0.0966	-0.0101
	(0.0141)	(0.0226)	(0.0198)	(0.0121)
EITC Subsidy Rate	-0.6162	0.3638	0.2259	0.0265
	(0.0699)	(0.1181)	(0.0970)	(0.0748)
Trend	0.0004	-0.0007	-9.20E-06	0.0003
	(0.0001)	(0.0001)	(5.00E-5)	(5.00E-5)
Probability	0.2514	0.4605	0.1566	0.1315

Partial derivatives are evaluated at sample means. Assumes woman has one child and is eligible for an EITC wage subsidy of 34 percent. Standard errors are in parentheses.

Table 6.11
Multinomial Logits on Employment and Enrollment for Single Women Ages 17 - 21

	No School Employed	School Employed	School Unemployed
Age	0.3491	-0.1726	-0.5592
	(0.0160)	(0.0153)	(0.0168)
Kids	-1.0484	-2.7523	-2.2577
	(0.1550)	(0.2296)	(0.2118)
Kids < 6	-0.6061	-1.2107	-0.4936
	(0.0773)	(0.1435)	(0.1110)
Unearned Income	-0.1971	0.0576	0.0574
	(0.0110)	(0.0085)	(0.0088)
Nonwhite	-0.9086	-1.0561	0.0183
	(0.0586)	(0.0541)	(0.0555)
Nonwhite x Kids	0.5790	1.0210	0.4722
	(0.1021)	(0.1287)	(0.1247)
Minimum Wage	-0.8177	-1.2971	0.9173
	(0.4836)	(0.4680)	(0.4980)
AFDC	-0.4437	-0.4224	-0.1766
	(0.1445)	(0.1384)	(0.1465)
Income Growth	-3.0077	-4.9114	-2.0368
	(1.2113)	(1.1693)	(1.2488)
Unemployment Rate	-19.6387	-20.7848	-2.1143
	(1.4738)	(1.4191)	(1.5036)
Waivers x Kids	-0.0280	-0.0059	0.2886
	(0.1483)	(0.1957)	(0.1885)
EITC Subsidy Rate	2.7507	3.2661	1.8525
	(0.6526)	(0.8754)	(0.8735)
State EITC Rate	-4.2075	-7.5209	-0.4572
	(2.5086)	(4.0197)	(3.1606)
Trend	-0.0033	-0.0020	0.0003
	(0.0007)	(0.0007)	(0.0007)
Constant	-2.8170	8.0106	11.7149
	(0.3979)	(0.3817)	(0.4110)
Number of Observations	43,533		
Log Likelihood	-46,443		

Relative to base case of non-enrolled and non-employed. Sample of unmarried women from 1987-96. Standard errors in parentheses.

Table 6.12
Partial Derivatives from Table 6.11

	No School Unemployed	No School Employed	School Employed	School Unemployed
Age	-0.0183	0.1298	-0.0380	-0.0735
	(0.0049)	(0.0044)	(0.0043)	(0.0083)
Kids	0.2108	0.2080	-0.3192	-0.0996
	(0.0156)	(0.0367)	(0.0627)	(0.0435)
Kids < 6	0.1383	-0.0357	-0.1068	0.0042
	(0.0144)	(0.0217)	(0.0223)	(0.0115)
Unearned Income	0.0198	-0.0563	0.0209	0.0156
	(0.0024)	(0.0024)	(0.0022)	(0.0019)
Nonwhite	0.1575	-0.1598	-0.0712	0.0734
	(0.0149)	(0.0121)	(0.0083)	(0.0099)
Nonwhite x Kids	-0.1101	0.0210	0.0963	-0.0071
	(0.0155)	(0.0232)	(0.0204)	(0.0112)
Minimum Wage	0.1245	-0.1588	-0.1286	0.1629
	(0.0878)	(0.0823)	(0.0374)	(0.0380)
AFDC	0.0766	-0.0700	-0.0203	0.0136
	(0.0266)	(0.0248)	(0.0107)	(0.0100)
Income Growth	0.6290	-0.2796	-0.3926	0.0432
	(0.2264)	(0.2041)	(0.0910)	(0.0828)
Unemployment Rate	3.3031	-3.2560	-1.2771	1.2300
	(0.3314)	(0.2958)	(0.1750)	(0.1783)
Waivers x Kids	-0.0052	-0.0222	-0.0040	0.0314
	(0.0258)	(0.0324)	(0.0234)	(0.0157)
EITC Subsidy Rate	-0.5247	0.3456	0.1973	-0.0181
	(0.0913)	0.1461	0.1196	0.0808
State EITC x Kids	0.8335	-0.4738	-0.6790	0.3193
	(0.4269)	(0.5960)	(0.5186)	(0.3041)
Trend	0.0005	-0.0007	-2.58E-05	0.0002
	(0.0001)	(0.0001)	(5.00E-5)	(5.00E-5)
Probability	0.2614	0.4650	0.1567	0.1169

Partial derivatives are evaluated at sample means. Assumes woman has one child and is eligible for an EITC wage subsidy of 34 percent. Standard errors are in parentheses.

Table 6.13
Multinomial Logits on Employment and Enrollment for Single Women Ages 17 - 21

	No School Employed	School Employed	School Unemployed
Age	0.3491	-0.1727	-0.5592
	(0.0160)	(0.0153)	(0.0168)
Kids	-1.0192	-2.7630	-2.2579
	(0.1559)	(0.2304)	(0.2130)
Kids < 6	-0.6096	-1.2073	-0.4934
	(0.0774)	(0.1437)	(0.1114)
Unearned Income	-0.1975	0.0577	0.0574
	(0.0110)	(0.0085)	(0.0088)
Nonwhite	-0.9090	-1.0564	0.0181
	(0.0586)	(0.0541)	(0.0555)
Nonwhite x Kids	0.5767	1.0048	0.4715
	(0.1021)	(0.1287)	(0.1248)
Minimum Wage	-0.8036	-1.2859	0.9246
	(0.4836)	(0.4679)	(0.4980)
AFDC	-0.4608	-0.4297	-0.1838
	(0.1449)	(0.1386)	(0.1468)
Income Growth	-2.9804	-4.8736	-2.0112
	(1.2114)	(1.1694)	(1.2490)
Unemployment Rate	-19.4691	-20.6378	-1.9958
	(1.4711)	(1.4171)	(1.5014)
Waivers x Kids	-0.0016	-0.0091	0.2867
	(0.1481)	(0.1966)	(0.1886)
EITC Subsidy Rate	2.5304	3.2934	1.8512
	(0.6547)	(0.8822)	(0.8765)
Refundable state EITC Rate	2.0897	-16.1461	-1.0569
	(4.5487)	(9.5733)	(6.5143)
Trend	-0.0032	-0.0019	0.0003
	(0.0007)	(0.0007)	(0.0007)
Constant	-2.8287	7.9984	11.7056
	(0.3979)	(0.3816)	(0.4109)
Number of Observations	43,533		
Log Likelihood	-46,443		

Relative to base case of non-enrolled and non-employed. Sample of unmarried women from 1987-96. Standard errors in parentheses.

Table 6.14
Partial Derivatives from Table 6.13

	No School Unemployed	No School Employed	School Employed	School Unemployed
Age	-0.0170	0.1293	-0.0379	-0.0744
	(0.0050)	(0.0044)	(0.0044)	(0.0084)
Kids	0.2159	0.2119	-0.3279	-0.0999
	(0.0158)	(0.0353)	(0.0632)	(0.0446)
Kids < 6	0.1413	-0.0366	-0.1089	0.0042
	(0.0147)	(0.0217)	(0.0227)	(0.0118)
Unearned Income	0.0196	-0.0562	0.0210	0.0156
	(0.0025)	(0.0024)	(0.0023)	(0.0019)
Nonwhite	0.1583	-0.1583	-0.0737	0.0737
	(0.0150)	(0.0121)	(0.0086)	(0.0099)
Nonwhite x Kids	-0.1116	0.0222	0.0960	-0.0066
	(0.0157)	(0.0231)	(0.0205)	(0.0114)
Minimum Wage	0.1229	-0.1557	-0.1325	0.1653
	(0.0889)	(0.0820)	(0.0382)	(0.0387)
AFDC	0.0801	-0.0730	-0.0209	0.0138
	(0.0270)	(0.0247)	(0.0109)	(0.0102)
Income Growth	0.6338	-0.2756	-0.4013	0.0431
	(0.2293)	(0.2033)	(0.0928)	(0.0844)
Unemployment Rate	3.3048	-3.2165	-1.3266	1.2384
	(0.3333)	(0.2953)	(0.1792)	(0.1805)
Waivers x Kids	-0.0086	-0.0152	-0.0066	0.0304
	(0.0262)	(0.0323)	(0.0241)	(0.0161)
EITC Subsidy Rate	-0.5065	0.2876	0.2242	-0.0053
	(0.0946)	(0.1467)	(0.1247)	(0.0837)
Refundable State EITC x Kids	0.4729	1.7483	-2.3063	0.0851
	(0.8563)	(1.1749)	(1.3016)	(0.6623)
Trend	0.0005	-0.0007	-3.06E-05	0.0002
	(0.0001)	(0.0001)	(5.00E-5)	(5.00E-5)
Probability	0.2672	0.4530	0.1604	0.1194

Partial derivatives are evaluated at sample means. Assumes woman has one child and is eligible for an EITC wage subsidy of 34 percent. Standard errors are in parentheses.

Table 6.15
Estimated Changes in Probabilities for Women with Two or More Children

Case 1 -- Increase in subsidy rate from 40 to 45 percent for women with 2 or more children

	NSNE	NSE	SE	SNE
Subsidy at 40 percent	0.317	0.242	0.103	0.338
Subsidy at 45 percent	0.292	0.255	0.111	0.342
Change in probability	-0.025	0.014	0.009	0.003

Case 2 -- Change in probabilities for women with and without children from 1992 to 1996

	NSNE	NSE	SE	SNE
Women with 2 children				
1992	0.468	0.205	0.076	0.251
1996	0.344	0.269	0.112	0.275
Difference	-0.124	0.064	0.036	0.024
Women without children				
1992	0.034	0.087	0.542	0.337
1996	0.035	0.087	0.540	0.339
Difference	0.000	-0.001	-0.002	0.002

Table 6.16
Estimated Changes in Probabilities for Women with One Child

Case 1 -- Increase in subsidy rate from 34 to 40 percent for women with 1 child

	NSNE	NSE	SE	SNE
Subsidy at 34 percent	0.215	0.255	0.193	0.337
Subsidy at 40 percent	0.191	0.267	0.208	0.334
Change in probability	-0.024	0.012	0.015	-0.003

Case 2 -- Change in probabilities for women with and without children from 1992 to 1996

	NSNE	NSE	SE	SNE
Women with 1 child				
1992	0.314	0.247	0.167	0.272
1996	0.233	0.284	0.210	0.273
Difference	-0.081	0.037	0.043	0.002
Women without children				
1992	0.047	0.118	0.731	0.105
1996	0.047	0.117	0.729	0.107
Difference	0.000	-0.001	-0.001	0.002

Table 6.17
Multinomial Logits on Employment and Enrollment for Single Women Ages 17 - 24

	No School Employed	School Employed	School Unemployed
Age	0.2638	-0.1834	-0.4552
	(0.0080)	(0.0081)	(0.0097)
Kids	-1.2124	-2.8453	-2.1926
	(0.0976)	(0.1559)	(0.1609)
Kids < 6	-0.6197	-1.1355	-0.4679
	(0.0431)	(0.0895)	(0.0811)
Unearned Income	-0.1708	0.0311	0.0432
	(0.0066)	(0.0053)	(0.0057)
Nonwhite	-0.9465	-1.0203	0.0722
	(0.0473)	(0.0460)	(0.0482)
Nonwhite x Kids	0.6505	0.8612	0.2221
	(0.0743)	(0.1006)	(0.1038)
EITC Subsidy Rate	2.3402	4.0714	2.4192
	(0.3567)	(0.5252)	(0.5662)
Trend	-0.0027	-0.0006	0.0014
	(0.0005)	(0.0005)	(0.0006)
Constant	-3.0280	5.9799	9.7951
	(0.1685)	(0.1692)	(0.1959)
Number of Observations	62,202		
Log Likelihood	-64,499		

Relative to base case of non-enrolled and non-employed. Sample of unmarried women from 1987-96. Standard errors in parentheses.

Table 6.18
Partial Derivatives from Table 6.17

	No School Unemployed	No School Employed	School Employed	School Unemployed
Age	-0.0139	0.1016	-0.0380	-0.0497
	(0.0022)	(0.0020)	(0.0022)	(0.0036)
Kids	0.2119	0.1887	-0.3397	-0.0610
	(0.0092)	(0.0273)	(0.0402)	(0.0239)
Kids < 6	0.1364	-0.0447	-0.0975	0.0058
	(0.0082)	(0.0125)	(0.0133)	(0.0071)
Unearned Income	0.0190	-0.0471	0.0167	0.0114
	(0.0013)	(0.0014)	(0.0010)	(0.0009)
Nonwhite	0.1644	-0.1709	-0.0657	0.0721
	(0.0114)	(0.0088)	(0.0048)	(0.0067)
Nonwhite x Kids	-0.1071	0.0680	0.0644	-0.0253
	(0.0110)	(0.0165)	(0.0144)	(0.0073)
EITC Subsidy Rate	-0.5228	0.1549	0.3288	0.0390
	(0.0531)	(0.0841)	(0.0777)	(0.0489)
Trend	0.0003	-0.0007	0.0001	0.0003
	(0.0001)	(8.00E-5)	(4.00E-5)	(4.00E-5)
Probability	0.2589	0.4832	0.1602	0.0977

Partial derivatives are evaluated at sample means. Assumes woman has one child and is eligible for an EITC wage subsidy of 34 percent. Standard errors are in parentheses.

Table 6.19
Multinomial Logits on Employment and Enrollment
Single Women Ages 17 - 24

	No School Employed	School Employed	School Unemployed
Age	0.2693	-0.1784	-0.4545
	(0.0080)	(0.0081)	(0.0097)
Kids	-1.0926	-2.6038	-2.1391
	(0.1041)	(0.1642)	(0.1694)
Kids < 6	-0.6210	-1.1301	-0.4634
	(0.0434)	(0.0899)	(0.0811)
Unearned Income	-0.1675	0.0335	0.0450
	(0.0067)	(0.0054)	(0.0058)
Nonwhite	-0.9330	-1.0047	0.0639
	(0.0475)	(0.0462)	(0.0483)
Nonwhite x Kids	0.6240	0.8434	0.2178
	(0.0749)	(0.1011)	(0.1043)
Minimum Wage	-0.6141	-0.9223	1.0202
	(0.3828)	(0.3886)	(0.4260)
AFDC	-0.5498	-0.5670	-0.1865
	(0.1137)	(0.1146)	(0.1248)
Income Growth	-2.6848	-4.8632	-2.2306
	(0.9600)	(0.9681)	(1.0648)
Unemployment Rate	-17.9694	-18.2522	-1.0754
	(1.1611)	(1.1751)	(1.2839)
Waivers x Kids	0.0356	0.2990	0.1631
	(0.1022)	(0.1430)	(0.1547)
EITC Subsidy Rate	1.7622	2.7254	1.9684
	(0.4470)	(0.6578)	(0.7004)
State EITC Rate	-1.6188	-6.9164	0.0836
	(1.9221)	(3.3712)	(2.7592)
Trend	-0.0026	-0.0008	0.0012
	(0.0005)	(0.0005)	(0.0006)
Constant	-1.4707	7.8084	9.6872
	(0.2607)	(0.2639)	(0.2951)
Number of Observations	62,202		
Log Likelihood	-64,110		

Relative to base case of non-enrolled and non-employed. Sample of unmarried women from 1987-96. Standard errors in parentheses.

Table 6.20
Partial Derivatives from Table 6.19

	No School Unemployed	No School Employed	School Employed	School Unemployed
Age	-0.0172	0.1007	-0.0341	-0.0493
	(0.0028)	(0.0025)	(0.0028)	(0.0047)
Kids	0.2144	0.1606	-0.2885	-0.0865
	(0.0111)	(0.0307)	(0.0448)	(0.0296)
Kids < 6	0.1400	-0.0557	-0.0884	0.0041
	(0.0089)	(0.0128)	(0.0132)	(0.0070)
Unearned Income	0.0200	-0.0462	0.0150	0.0112
	(0.0015)	(0.0014)	(0.0013)	(0.0011)
Nonwhite	0.1675	-0.1751	-0.0588	0.0663
	(0.0121)	(0.0095)	(0.0056)	(0.0076)
Nonwhite x Kids	-0.1087	0.0715	0.0598	-0.0227
	(0.0121)	(0.0166)	(0.0135)	(0.0075)
Minimum Wage	0.0918	-0.1371	-0.0837	0.1290
	(0.0732)	(0.0665)	(0.0287)	(0.0282)
AFDC	0.1011	-0.0896	-0.0286	0.0171
	(0.0222)	(0.0201)	(0.0086)	(0.0077)
Income Growth	0.6106	-0.2319	-0.3765	-0.0022
	(0.1878)	(0.1662)	(0.0715)	(0.0624)
Unemployment Rate	3.1605	-3.1806	-0.9674	0.9876
	(0.2574)	(0.2267)	(0.1175)	(0.1258)
Waivers x Kids	-0.0208	-0.0193	0.0317	0.0084
	(0.0192)	(0.0227)	(0.0142)	(0.0120)
EITC Subsidy Rate	-0.3958	0.1610	0.1835	0.0513
	(0.0715)	0.1025	0.0844	0.0606
State EITC x Kids	0.4867	0.0686	-0.7311	0.1759
	(0.3536)	(0.4596)	(0.4052)	(0.2228)
Trend	0.0004	-0.0007	6.95E-05	0.0002
	(0.0001)	(9.00E-5)	(4.00E-5)	(4.00E-5)
Probability	0.2765	0.4863	0.1418	0.0954

Partial derivatives are evaluated at sample means. Assumes woman has one child and is eligible for an EITC wage subsidy of 34 percent. Standard errors are in parentheses.

Table 6.21
Multinomial Logits on Employment and Enrollment
Single Women Ages 17 - 24

	No School Employed	School Employed	School Unemployed
Age	0.2695	-0.1783	-0.4544
	(0.0080)	(0.0081)	(0.0097)
Kids	-1.0812	-2.6083	-2.1256
	(0.1050)	(0.1652)	(0.1707)
Kids < 6	-0.6218	-1.1297	-0.4674
	(0.0434)	(0.0901)	(0.0813)
Unearned Income	-0.1676	0.0335	0.0449
	(0.0067)	(0.0054)	(0.0058)
Nonwhite	-0.9332	-1.0049	0.0637
	(0.0475)	(0.0462)	(0.0483)
Nonwhite x Kids	0.6231	0.8340	0.2201
	(0.0749)	(0.1012)	(0.1043)
Minimum Wage	-0.6086	-0.9163	1.0239
	(0.3828)	(0.3885)	(0.4260)
AFDC	-0.5620	-0.5759	-0.1967
	(0.1140)	(0.1149)	(0.1251)
Income Growth	-2.6776	-4.8447	-2.2268
	(0.9604)	(0.9684)	(1.0650)
Unemployment Rate	-17.8813	-18.1546	-0.9982
	(1.1590)	(1.1734)	(1.2821)
Waivers x Kids	0.0489	0.3046	0.1721
	(0.1024)	(0.1437)	(0.1547)
EITC Subsidy Rate	1.6686	2.7062	1.8941
	(0.4528)	(0.6663)	(0.7047)
Refundable state EITC Rate	1.0981	-8.6026	2.9507
	(3.1719)	(6.2120)	(4.6815)
Trend	-0.0026	-0.0008	0.0012
	(0.0005)	(0.0005)	(0.0006)
Constant	-1.4766	7.7990	9.6820
	(0.2606)	(0.2638)	(0.2951)
Number of Observations	62,202		
Log Likelihood	-64,111		

Relative to base case of non-enrolled and non-employed. Sample of unmarried women from 1987-96. Standard errors in parentheses.

Table 6.22
Partial Derivatives from Table 6.21

	No School Unemployed	No School Employed	School Employed	School Unemployed
Age	-0.0172	0.1004	-0.0341	-0.0491
	(0.0029)	(0.0025)	(0.0028)	(0.0047)
Kids	0.2169	0.1614	-0.2935	-0.0848
	(0.0112)	(0.0307)	(0.0453)	(0.0296)
Kids < 6	0.1415	-0.0563	-0.0888	0.0036
	(0.0090)	(0.0129)	(0.0133)	(0.0070)
Unearned Income	0.0201	-0.0462	0.0150	0.0111
	(0.0016)	(0.0014)	(0.0013)	(0.0011)
Nonwhite	0.1685	-0.1749	-0.0593	0.0657
	(0.0122)	(0.0095)	(0.0057)	(0.0075)
Nonwhite x Kids	-0.1094	0.0726	0.0589	-0.0221
	(0.0123)	(0.0166)	(0.0135)	(0.0075)
Minimum Wage	0.0915	-0.1361	-0.0838	0.1285
	(0.0737)	(0.0666)	(0.0288)	(0.0282)
AFDC	0.1041	-0.0918	-0.0290	0.0167
	(0.0225)	(0.0202)	(0.0086)	(0.0077)
Income Growth	0.6142	-0.2339	-0.3770	-0.0032
	(0.1894)	(0.1666)	(0.0718)	(0.0623)
Unemployment Rate	3.1663	-3.1735	-0.9737	0.9808
	(0.2589)	(0.2271)	(0.1185)	(0.1257)
Waivers x Kids	-0.0233	-0.0166	0.0315	0.0085
	(0.0194)	(0.0228)	(0.0143)	(0.0119)
EITC Subsidy Rate	-0.3838	0.1440	0.1899	0.0499
	(0.0736)	(0.1037)	(0.0862)	(0.0608)
Refundable State EITC x Kids	0.1155	0.7289	-1.1644	0.3200
	(0.6029)	(0.7834)	(0.7479)	(0.3844)
Trend	0.0004	-0.0007	6.90E-05	0.0002
	(0.0001)	(9.00E-5)	(4.00E-5)	(4.00E-5)
Probability	0.2801	0.4826	0.1422	0.0952

Partial derivatives are evaluated at sample means. Assumes woman has one child and is eligible for an EITC wage subsidy of 34 percent. Standard errors are in parentheses.

APPENDIX

Table A-1
EITC and Federal Tax Statistics by State -- 1998

State	EITC Recipients	Population	EITCs as % of population	Returns Filed	EITCs as % returns filed
Alabama	443,441	4,351,037	10.2%	1,879,778	23.6%
Alaska	30,833	615,205	5.0%	328,972	9.4%
Arizona	342,692	4,667,277	7.3%	2,037,046	16.8%
Arkansas	250,174	2,538,202	9.9%	1,095,998	22.8%
California	2,373,809	32,682,794	7.3%	14,196,991	16.7%
Colorado	235,744	3,968,967	5.9%	1,973,524	11.9%
Connecticut	146,219	3,272,563	4.5%	1,625,515	9.0%
Delaware	49,796	744,066	6.7%	364,216	13.7%
District of Columbia	52,638	521,426	10.1%	272,169	19.3%
Florida	1,283,199	14,908,230	8.6%	7,076,098	18.1%
Georgia	702,954	7,636,522	9.2%	3,471,292	20.3%
Hawaii	67,211	1,190,472	5.6%	553,525	12.1%
Idaho	83,836	1,230,923	6.8%	533,886	15.7%
Illinois	753,848	12,069,774	6.2%	5,636,139	13.4%
Indiana	364,171	5,907,617	6.2%	2,765,157	13.2%
Iowa	148,997	2,861,025	5.2%	1,335,353	11.2%
Kansas	146,827	2,638,667	5.6%	1,200,088	12.2%
Kentucky	303,911	3,934,310	7.7%	1,694,158	17.9%
Louisiana	475,701	4,362,758	10.9%	1,847,098	25.8%
Maine	80,815	1,247,554	6.5%	584,019	13.8%
Maryland	324,565	5,130,072	6.3%	2,459,510	13.2%
Massachusetts	280,285	6,144,407	4.6%	3,011,463	9.3%
Michigan	562,121	9,820,231	5.7%	4,497,948	12.5%
Minnesota	217,542	4,726,411	4.6%	2,298,213	9.5%
Mississippi	343,825	2,751,335	12.5%	1,153,947	29.8%
Missouri	385,385	5,437,562	7.1%	2,492,001	15.5%
Montana	65,948	879,533	7.5%	409,958	16.1%
Nebraska	94,016	1,660,772	5.7%	795,895	11.8%
Nevada	125,729	1,743,772	7.2%	873,591	14.4%
New Hampshire	56,003	1,185,823	4.7%	598,913	9.4%
New Jersey	446,071	8,095,542	5.5%	3,924,125	11.4%
New Mexico	179,459	1,733,535	10.4%	767,985	23.4%
New York	1,302,422	18,159,175	7.2%	8,268,276	15.8%
North Carolina	642,853	7,545,828	8.5%	3,516,043	18.3%
North Dakota	36,849	637,808	5.8%	300,297	12.3%
Ohio	687,933	11,237,752	6.1%	5,472,752	12.6%
Oklahoma	283,049	3,339,478	8.5%	1,435,811	19.7%
Oregon	202,177	3,282,055	6.2%	1,522,027	13.3%
Pennsylvania	692,596	12,002,329	5.8%	5,654,094	12.2%
Rhode Island	58,782	987,704	6.0%	472,064	12.5%
South Carolina	373,985	3,839,578	9.7%	1,748,410	21.4%
South Dakota	48,174	730,789	6.6%	344,408	14.0%
Tennessee	479,331	5,432,679	8.8%	2,491,859	19.2%
Texas	1,879,486	19,712,389	9.5%	8,693,863	21.6%
Utah	108,892	2,100,562	5.2%	896,348	12.1%
Vermont	36,032	590,579	6.1%	287,782	12.5%
Virginia	441,337	6,789,225	6.5%	3,197,582	13.8%
Washington	311,202	5,687,832	5.5%	2,669,856	11.7%
West Virginia	138,238	1,811,688	7.6%	739,784	18.7%
Wisconsin	249,342	5,222,124	4.8%	2,513,562	9.9%
Wyoming	32,441	480,045	6.8%	229,223	14.2%
U.S. Total	19,442,159	270,248,003	7.2%	125,393,584	15.5%

Source: Statistics of Income, Internal Revenue Service.

Table A-2
Unemployment Rate

State	Year EITC adopted	Year before adoption	Two years before adoption	Year after adoption	Two years after adoption
Maryland	1987	-2.5%	-2.6%	-1.0%	-1.3%
Vermont	1988	-2.6%	-2.5%	-1.6%	-1.1%
Wisconsin	1989	-1.2%	-0.7%	-1.2%	-1.3%
Iowa	1990	-1.0%	-1.0%	-2.2%	-2.5%
Minnesota	1991	-0.7%	-0.9%	-2.3%	-2.1%
New York	1994	0.9%	1.0%	0.7%	0.8%
Massachusetts	1997	-1.1%	-0.7%	-1.2%	-1.1%
Oregon	1997	0.5%	-0.2%	1.1%	1.3%
Kansas	1998	-1.1%	-1.0%	-1.2%	
Colorado	1999	-0.7%	-1.2%		
Illinois	2000	0.1%	0.0%		
Missouri	2000	-0.8%	-0.6%		
New Jersey	2000	0.4%	0.3%		
District of Columbia	2000	2.1%	3.2%		
Average		-0.6%	-0.5%	-1.0%	-0.9%
Average without NY or DC		-0.9%	-0.9%	-1.2%	-1.1%

Source: Bureau of Labor Statistics, U.S. Department of Labor.

Table A-3
Poverty Rate

State	Year EITC adopted	Year before adoption	Two years before adoption	Year after adoption	Two years after adoption
Maryland	1987	-4.8%	-4.9%	-3.2%	-3.5%
Vermont	1988	-4.1%	-3.6%	-4.8%	-3.7%
Wisconsin	1989	-5.2%	-4.8%	-4.2%	-4.3%
Iowa	1990	-2.5%	-3.1%	-4.6%	-4.0%
Minnesota	1991	-1.5%	-1.6%	-1.8%	-2.7%
New York	1994	1.3%	1.1%	2.7%	2.9%
Massachusetts	1997	-3.6%	-3.2%	-4.0%	-2.1%
Oregon	1997	-1.9%	-2.3%	2.3%	1.6%
Kansas	1998	-3.6%	-3.1%	0.4%	
Colorado	1999	-3.5%	-4.3%		
Illinois	2000	-1.9%	-2.3%		
Missouri	2000	-0.2%	-1.6%		
New Jersey	2000	-4.0%	-4.1%		
District of Columbia	2000	3.1%	6.4%		
Average		-2.3%	-2.2%	-1.9%	-2.0%
Average without NY or DC		-3.1%	-3.2%	-2.5%	-2.7%

Source: Census Bureau, U.S. Department of Commerce.

Table A-4
Labor Force Participation

State	Year EITC adopted	Year before adoption	Two years before adoption	Year after adoption	Two years after adoption
Maryland	1987	4.0%	3.5%	3.9%	4.2%
Vermont	1988	5.8%	6.1%	4.9%	4.6%
Wisconsin	1989	4.5%	3.9%	3.8%	3.8%
Iowa	1990	3.7%	3.8%	3.9%	1.8%
Minnesota	1991	6.5%	5.9%	6.2%	6.8%
New York	1994	-4.6%	-4.6%	-5.7%	-5.4%
Massachusetts	1997	0.7%	0.8%	1.8%	1.7%
Oregon	1997	-1.2%	1.9%	2.0%	1.6%
Kansas	1998	3.4%	3.3%	5.0%	
Colorado	1999	7.4%	6.5%		
Illinois	2000	2.6%	2.0%		
Missouri	2000	1.6%	2.0%		
New Jersey	2000	0.0%	-0.3%		
District of Columbia	2000	0.6%	-1.0%		
Average		2.5%	2.4%	2.9%	2.4%
Average without NY or DC		3.3%	3.3%	3.9%	3.5%

Source: Bureau of Labor Statistics, U.S. Department of Labor.

Table A-4
Labor Force Participation

State	Year EITC adopted	Year before adoption	Two years before adoption	Year after adoption	Two years after adoption
Maryland	1987	4.0%	3.5%	3.9%	4.2%
Vermont	1988	5.8%	6.1%	4.9%	4.6%
Wisconsin	1989	4.5%	3.9%	3.8%	3.8%
Iowa	1990	3.7%	3.8%	3.9%	1.8%
Minnesota	1991	6.5%	5.9%	6.2%	6.8%
New York	1994	-4.6%	-4.6%	-5.7%	-5.4%
Massachusetts	1997	0.7%	0.8%	1.8%	1.7%
Oregon	1997	-1.2%	1.9%	2.0%	1.6%
Kansas	1998	3.4%	3.3%	5.0%	
Colorado	1999	7.4%	6.5%		
Illinois	2000	2.6%	2.0%		
Missouri	2000	1.6%	2.0%		
New Jersey	2000	0.0%	-0.3%		
District of Columbia	2000	0.6%	-1.0%		
Average		2.5%	2.4%	2.9%	2.4%
Average without NY or DC		3.3%	3.3%	3.9%	3.5%

Source: Bureau of Labor Statistics, U.S. Department of Labor.

Table A-5
AFDC/TANF Caseloads Per 1,000 People

State	Year EITC adopted	Year before adoption	Two years before adoption	Year after adoption	Two years after adoption
Maryland	1987	0.2	0.7	-1.62	-1.66
Vermont	1988	-1.2	-1.0	-2.37	-2.18
Wisconsin	1989	3.9	4.5	0.73	0.11
Iowa	1990	-2.3	-1.9	-4.30	-4.70
Minnesota	1991	-2.7	-2.6	-4.01	-4.43
New York	1994	4.6	4.1	6.78	6.84
Massachusetts	1997	-2.4	-1.9	-0.93	-0.84
Oregon	1997	-6.1	-6.0	-6.49	-5.62
Kansas	1998	-6.8	-7.1	-4.91	
Colorado	1999	-6.1	-6.6		
Illinois	2000	0.9	1.7		
Missouri	2000	-0.2	-0.4		
New Jersey	2000	-1.9	-2.1		
District of Columbia	2000	27.8	28.7		
Average		0.5	0.7	-1.90	-1.56
Average without NY or DC		-2.1	-1.9	-2.99	-2.76

Sources: U.S. Department of Health and Human Services and Census Bureau, U.S. Department of Commerce.

TABLE A-6
Probits Using Combined Federal and State Subsidy Rate

	Labor-force Participation		Below Poverty		Below 150% of Poverty Level	
Age	0.0134	(0.0018)	-0.0085	(0.0024)	-0.0135	(0.0030)
Age squared	-0.0002	(2.4E-05)	5.7E-05	(3.3E-05)	0.0001	(4.1E-05)
Nonwhite	-0.0687	(0.0066)	0.0581	(0.0078)	0.0868	(0.0091)
Number of children	-0.0250	(0.0016)	0.0712	(0.0024)	0.1059	(0.0036)
Child under 6	-0.0500	(0.0025)	0.0695	(0.0037)	0.0855	(0.0054)
Nonwhite x kids	0.0140	(0.0048)	0.0159	(0.0075)	0.0200	(0.0094)
< High school	-0.1534	(0.0051)	0.2243	(0.0062)	0.2860	(0.0069)
Some college	0.0411	(0.0043)	-0.0511	(0.0055)	-0.0828	(0.0065)
Degree	0.0404	(0.0034)	-0.0859	(0.0042)	-0.1345	(0.0051)
Low education x Kids	0.0042	(0.0048)	0.0110	(0.0065)	0.0209	(0.0080)
Nonwhite x low education	-0.0112	(0.0057)	0.0373	(0.0081)	0.0421	(0.0097)
Non labor income	-0.0029	(0.0001)				
Subsidy rate	0.1018	(0.0223)	-0.1057	(0.0295)	-0.1012	(0.0374)
AFDC maximum x kids	-8.7E-05	(1.0E-05)	-8.2E-07	(1.4E-05)	-2.0E-05	(1.8E-05)
Unemployment rate	-1.0629	(0.1347)	0.7179	(0.1766)	0.8562	(0.2209)
Unemployment x kids	0.1051	(0.0811)	0.0715	(0.1074)	0.3292	(0.1364)
Personal income	-0.2492	(0.0953)	0.1855	(0.1235)	0.2456	(0.1533)
Welfare waiver x kids	0.0100	(0.0069)	-0.0193	(0.0946)	-0.0089	(0.0122)
Minimum wage	-0.1192	(0.0724)	0.0357	(0.0993)	0.2304	(0.1214)
Year dummy - 1983	0.0019	(0.0061)	-0.0012	(0.0082)	-0.0102	(0.0103)
Year dummy - 1984	-0.0086	(0.0084)	0.0076	(0.0108)	0.0012	(0.0132)
Year dummy - 1985	-0.0172	(0.0079)	0.0143	(0.0099)	0.0088	(0.0121)
Year dummy - 1988	-0.0272	(0.0105)	0.0016	(0.0119)	0.0036	(0.0150)
Year dummy - 1989	-0.0356	(0.0107)	0.0026	(0.0119)	0.0056	(0.0149)
Year dummy - 1990	-0.0312	(0.0094)	0.0030	(0.0105)	-0.0035	(0.0131)
Year dummy - 1992	-0.0281	(0.0073)	0.0177	(0.0089)	0.0095	(0.0107)
Year dummy - 1993	-0.0456	(0.0085)	0.0356	(0.0099)	0.0382	(0.0119)
Year dummy - 1995	-0.0499	(0.0111)	0.0262	(0.0123)	0.0419	(0.0149)
Year dummy - 1996	-0.0667	(0.0124)	0.0496	(0.0137)	0.0586	(0.0160)
Observations	83,935		83,935		83,935	
Log Likelihood	-25,767		-32,570		-39,395	

Standard errors in parentheses. All regressions include full set of state dummies.
Estimates are partial derivatives evaluated at the sample means.

TABLE A-7
Probits Using Separate Federal and State Subsidy Rate

	Labor-force Participation		Below Poverty		Below 150% of Poverty Level	
Age	0.0133	(0.0018)	-0.0084	(0.0024)	-0.0135	(0.0030)
Age squared	-0.0002	(2.4E-05)	5.7E-05	(3.3E-05)	0.0001	(4.1E-05)
Nonwhite	-0.0686	(0.0066)	0.0581	(0.0078)	0.0868	(0.0091)
Number of children	-0.0251	(0.0016)	0.0713	(0.0024)	0.1060	(0.0036)
Child under 6	-0.0500	(0.0025)	0.0696	(0.0038)	0.0856	(0.0054)
Nonwhite x kids	0.0140	(0.0048)	0.0159	(0.0076)	0.0200	(0.0094)
< High school	-0.1532	(0.0051)	0.2243	(0.0062)	0.2860	(0.0069)
Some college	0.0410	(0.0043)	-0.0510	(0.0055)	-0.0828	(0.0065)
Degree	0.0405	(0.0034)	-0.0859	(0.0042)	-0.1345	(0.0051)
Low education x Kids	0.0038	(0.0048)	0.0113	(0.0065)	0.0211	(0.0080)
Nonwhite x low education	-0.0111	(0.0057)	0.0372	(0.0081)	0.0420	(0.0097)
Non labor income	-0.0029	(0.0001)				
Federal subsidy rate	0.1222	(0.0244)	-0.1195	(0.0318)	-0.1133	(0.0403)
State subsidy rate	-0.1373	(0.1143)	0.0664	(0.1972)	0.0521	(0.2690)
AFDC maximum x kids	-8.7E-05	(1.0E-05)	-1.1E-06	(1.4E-05)	-2.0E-05	(1.8E-05)
Unemployment rate	-1.0309	(0.1354)	0.6966	(0.1774)	0.8386	(0.2216)
Unemployment x kids	0.0792	(0.0820)	0.0910	(0.1083)	0.3470	(0.1371)
Personal income	-0.2465	(0.0952)	0.1846	(0.1235)	0.2451	(0.1533)
Welfare waiver x kids	0.0066	(0.0071)	-0.0170	(0.0098)	-0.0069	(0.0126)
Minimum wage	-0.1210	(0.0724)	0.0367	(0.0993)	0.2314	(0.1214)
Year dummy - 1983	0.0018	(0.0061)	-0.0011	(0.0082)	-0.0102	(0.0103)
Year dummy - 1984	-0.0083	(0.0084)	0.0074	(0.0108)	0.0010	(0.0132)
Year dummy - 1985	-0.0169	(0.0079)	0.0141	(0.0099)	0.0087	(0.0121)
Year dummy - 1988	-0.0268	(0.0105)	0.0014	(0.0119)	0.0034	(0.0150)
Year dummy - 1989	-0.0351	(0.0107)	0.0023	(0.0119)	0.0053	(0.0149)
Year dummy - 1990	-0.0306	(0.0094)	0.0027	(0.0105)	-0.0038	(0.0131)
Year dummy - 1992	-0.0283	(0.0073)	0.0178	(0.0089)	0.0095	(0.0107)
Year dummy - 1993	-0.0453	(0.0084)	0.0354	(0.0099)	0.0381	(0.0119)
Year dummy - 1995	-0.0502	(0.0111)	0.0263	(0.0123)	0.0420	(0.0149)
Year dummy - 1996	-0.0665	(0.0124)	0.0495	(0.0137)	0.0584	(0.0160)
Observations	83,935		83,935		83,935	
Log Likelihood	-25,764		-32,570		-39,395	

Standard errors in parentheses. All regressions include full set of state dummies.
Estimates are partial derivatives evaluated at the sample means.

TABLE A-8
Probits Using Separate Federal and Refundable State Rate

	Labor-force Participation		Below Poverty		Below 150% of Poverty Level	
Age	0.0133	(0.0018)	-0.0084	(0.0024)	-0.0135	(0.0030)
Age squared	-0.0002	(2.4E-05)	5.7E-05	(3.3E-05)	0.0001	(4.1E-05)
Nonwhite	-0.0685	(0.0066)	0.0580	(0.0078)	0.0867	(0.0091)
Number of children	-0.0251	(0.0016)	0.0712	(0.0024)	0.1060	(0.0036)
Child under 6	-0.0500	(0.0025)	0.0696	(0.0038)	0.0856	(0.0054)
Nonwhite x kids	0.0138	(0.0048)	0.0161	(0.0076)	0.0202	(0.0094)
< High school	-0.1533	(0.0051)	0.2243	(0.0062)	0.2860	(0.0069)
Some college	0.0410	(0.0043)	-0.0510	(0.0055)	-0.0827	(0.0065)
Degree	0.0405	(0.0034)	-0.0859	(0.0042)	-0.1345	(0.0051)
Low education x Kids	0.0038	(0.0048)	0.0114	(0.0065)	0.0212	(0.0080)
Nonwhite x low education	-0.0111	(0.0057)	0.0372	(0.0081)	0.0420	(0.0097)
Non labor income	-0.0029	(0.0001)				
Federal subsidy rate	0.1174	(0.0244)	-0.1219	(0.0316)	-0.1149	(0.0399)
Refundable state EITC	-0.0490	(0.1710)	0.1770	(0.2444)	0.1371	(0.3318)
AFDC maximum x kids	-8.8E-05	(1.0E-05)	-1.2E-06	(1.4E-05)	-2.0E-05	(1.8E-05)
Unemployment rate	-1.0430	(0.1353)	0.6931	(0.1773)	0.8363	(0.2216)
Unemployment x kids	0.0881	(0.0819)	0.0949	(0.1085)	0.3500	(0.1378)
Personal income	-0.2469	(0.0953)	0.1806	(0.1235)	0.2424	(0.1533)
Welfare waiver x kids	0.0074	(0.0071)	-0.0162	(0.0097)	-0.0063	(0.0125)
Minimum wage	-0.1193	(0.0725)	0.0356	(0.0993)	0.2307	(0.1214)
Year dummy - 1983	0.0018	(0.0061)	-0.0010	(0.0082)	-0.0101	(0.0103)
Year dummy - 1984	-0.0085	(0.0084)	0.0076	(0.0108)	0.0012	(0.0132)
Year dummy - 1985	-0.0170	(0.0079)	0.0142	(0.0099)	0.0087	(0.0121)
Year dummy - 1988	-0.0270	(0.0105)	0.0015	(0.0119)	0.0035	(0.0150)
Year dummy - 1989	-0.0354	(0.0107)	0.0023	(0.0119)	0.0054	(0.0149)
Year dummy - 1990	-0.0309	(0.0094)	0.0027	(0.0105)	-0.0038	(0.0131)
Year dummy - 1992	-0.0284	(0.0073)	0.0179	(0.0089)	0.0096	(0.0107)
Year dummy - 1993	-0.0456	(0.0085)	0.0354	(0.0099)	0.0380	(0.0119)
Year dummy - 1995	-0.0506	(0.0112)	0.0263	(0.0122)	0.0420	(0.0149)
Year dummy - 1996	-0.0671	(0.0124)	0.0493	(0.0137)	0.0583	(0.0160)
Observations	83,935		83,935		83,935	
Log Likelihood	-25,765		-32,569		-39,395	

Standard errors in parentheses. All regressions include full set of state dummies.
Estimates are partial derivatives evaluated at the sample means.

TABLE A-9
Probits Using Combined Federal and State Subsidy Rate with Low-Education Subsample

	Labor-force Participation		Below Poverty		Below 150% of Poverty Level	
Age	0.0176	(0.0034)	-0.0062	(0.0044)	-0.0071	(0.0048)
Age squared	-0.0002	(4.6E-05)	-9.5E-06	(5.9E-05)	0.0000	(6.5E-05)
Nonwhite	-0.1102	(0.0100)	0.1331	(0.0114)	0.1582	(0.0113)
Number of children	-0.0365	(0.0029)	0.1071	(0.0042)	0.1362	(0.0056)
Child under 6	-0.0754	(0.0046)	0.0908	(0.0065)	0.0925	(0.0083)
Nonwhite x kids	0.0097	(0.0098)	0.0148	(0.0131)	0.0041	(0.0144)
< High school	-0.1977	(0.0057)	0.2693	(0.0066)	0.3008	(0.0066)
Non labor income	-0.0057	(0.0005)				
Subsidy rate	0.2239	(0.0440)	-0.2086	(0.0553)	-0.1561	(0.0062)
AFDC maximum x kids	-1.6E-04	(2.0E-05)	2.7E-05	(2.5E-05)	2.7E-05	(2.8E-05)
Unemployment rate	-1.4283	(0.2524)	0.9581	(0.3169)	1.0185	(0.3493)
Unemployment x kids	0.2777	(0.1447)	0.1364	(0.1827)	0.3620	(0.2045)
Personal income	-0.3493	(0.1857)	0.3289	(0.2294)	0.1532	(0.2511)
Welfare waiver x kids	0.0028	(0.0132)	-0.0235	(0.0173)	-0.0169	(0.0199)
Minimum wage	-0.1682	(0.1396)	0.1652	(0.1820)	0.3927	(0.1968)
Year dummy - 1983	-0.0011	(0.0113)	0.0096	(0.0146)	0.0084	(0.0161)
Year dummy - 1984	-0.0158	(0.0158)	0.0226	(0.0196)	0.0230	(0.0210)
Year dummy - 1985	-0.0249	(0.0142)	0.0457	(0.0178)	0.0376	(0.0188)
Year dummy - 1988	-0.0390	(0.0187)	0.0278	(0.0221)	0.0343	(0.0236)
Year dummy - 1989	-0.0493	(0.0189)	0.0323	(0.0221)	0.0441	(0.0235)
Year dummy - 1990	-0.0494	(0.0168)	0.0292	(0.0193)	0.0242	(0.0207)
Year dummy - 1992	-0.0593	(0.0140)	0.0589	(0.0165)	0.0554	(0.0171)
Year dummy - 1993	-0.0749	(0.0155)	0.0915	(0.0180)	0.0817	(0.0182)
Year dummy - 1995	-0.0780	(0.0206)	0.0685	(0.0230)	0.0870	(0.0232)
Year dummy - 1996	-0.1010	(0.0227)	0.1003	(0.0249)	0.1117	(0.0245)
Observations	41,708		41,708		41,708	
Log Likelihood	-17,016		-20,698		-23,017	

Standard errors in parentheses. All regressions include full set of state dummies.
Estimates are partial derivatives evaluated at the sample means.

TABLE A-10
Probits Using Separate Federal and State Subsidy Rates with Low-Education Subsample

	Labor-force Participation		Below Poverty		Below 150% of Poverty Level	
Age	0.0176	(0.0034)	-0.0062	(0.0044)	-0.0071	(0.0048)
Age squared	-0.0002	(4.6E-05)	-9.6E-06	(5.9E-05)	-2.4E-06	(6.5E-05)
Nonwhite	-0.1099	(0.0100)	0.1330	(0.0114)	0.1579	(0.0113)
Number of children	-0.0366	(0.0029)	0.1072	(0.0042)	0.1365	(0.0056)
Child under 6	-0.0754	(0.0046)	0.0908	(0.0065)	0.0925	(0.0084)
Nonwhite x kids	0.0095	(0.0098)	0.0149	(0.0131)	0.0043	(0.0144)
< High school	-0.1976	(0.0057)	0.2693	(0.0066)	0.3008	(0.0066)
Non labor income	-0.0057	(0.0005)				
Federal subsidy rate	0.2495	(0.0483)	-0.2227	(0.0595)	-0.1975	(0.0668)
State subsidy rate	-0.0673	(0.2127)	-0.0403	(0.3673)	0.3584	(0.4673)
AFDC maximum x kids	-1.6E-04	(2.0E-05)	2.7E-05	(2.5E-05)	2.7E-05	(2.8E-05)
Unemployment rate	-1.3868	(0.2537)	0.9364	(0.3184)	0.9577	(0.3503)
Unemployment x kids	0.2436	(0.1465)	0.1562	(0.1840)	0.4207	(0.2054)
Personal income	-0.3487	(0.1857)	0.3297	(0.2293)	0.1564	(0.2510)
Welfare waiver x kids	-0.0012	(0.0136)	-0.0214	(0.0180)	-0.0106	(0.0208)
Minimum wage	-0.1699	(0.1396)	0.1658	(0.1820)	0.3954	(0.1967)
Year dummy - 1983	-0.0011	(0.0113)	0.0096	(0.0146)	0.0083	(0.0161)
Year dummy - 1984	-0.0152	(0.0157)	0.0223	(0.0196)	0.0220	(0.0210)
Year dummy - 1985	-0.0245	(0.0142)	0.0455	(0.0178)	0.0369	(0.0188)
Year dummy - 1988	-0.0386	(0.0186)	0.0276	(0.0221)	0.0337	(0.0236)
Year dummy - 1989	-0.0487	(0.0189)	0.0321	(0.0221)	0.0433	(0.0235)
Year dummy - 1990	-0.0488	(0.0168)	0.0289	(0.0193)	0.0234	(0.0208)
Year dummy - 1992	-0.0595	(0.0140)	0.0590	(0.0165)	0.0554	(0.0171)
Year dummy - 1993	-0.0747	(0.0155)	0.0914	(0.0180)	0.0814	(0.0182)
Year dummy - 1995	-0.0787	(0.0206)	0.0688	(0.0230)	0.0877	(0.0232)
Year dummy - 1996	-0.1010	(0.0227)	0.1004	(0.0249)	0.1116	(0.0245)
Observations	41,708		41,708		41,708	
Log Likelihood	-17,014		-20,698		-23,015	

Standard errors in parentheses. All regressions include full set of state dummies.
Estimates are partial derivatives evaluated at the sample means.

TABLE A-11
Probits Using Separate Federal and Refundable State Rates with Low-Education Subsample

	Labor-force Participation		Below Poverty		Below 150% of Poverty Level	
Age	0.0176	(0.0034)	-0.0062	(0.0044)	-0.0071	(0.0048)
Age squared	-0.0002	(4.6E-05)	-9.7E-06	(5.9E-05)	-2.7E-06	(6.5E-05)
Nonwhite	-0.1099	(0.0100)	0.1329	(0.0114)	0.1578	(0.0113)
Number of children	-0.0366	(0.0029)	0.1071	(0.0042)	0.1365	(0.0056)
Child under 6	-0.0754	(0.0046)	0.0908	(0.0065)	0.0926	(0.0083)
Nonwhite x kids	0.0094	(0.0098)	0.0150	(0.0131)	0.0048	(0.0144)
< High school	-0.1977	(0.0057)	0.2693	(0.0066)	0.3008	(0.0066)
Non labor income	-0.0057	(0.0005)				
Federal subsidy rate	0.2452	(0.0483)	-0.2289	(0.0591)	-0.1884	(0.0658)
Refundable state EITC	0.0469	(0.3073)	0.1761	(0.4373)	0.2012	(0.5006)
AFDC maximum x kids	-1.6E-04	(2.0E-05)	2.7E-05	(2.5E-05)	2.8E-05	(2.8E-05)
Unemployment rate	-1.3979	(0.2534)	0.9222	(0.3183)	0.9822	(0.3502)
Unemployment x kids	0.2514	(0.1462)	0.1682	(0.1844)	0.4011	(0.2064)
Personal income	-0.3506	(0.1858)	0.3256	(0.2295)	0.1516	(0.2511)
Welfare waiver x kids	-0.0003	(0.0137)	-0.0199	(0.0178)	-0.0116	(0.0205)
Minimum wage	-0.1693	(0.1396)	0.1654	(0.1819)	0.3913	(0.1967)
Year dummy - 1983	-0.0010	(0.0113)	0.0097	(0.0146)	0.0084	(0.0161)
Year dummy - 1984	-0.0153	(0.0157)	0.0224	(0.0196)	0.0227	(0.0210)
Year dummy - 1985	-0.0246	(0.0142)	0.0454	(0.0178)	0.0374	(0.0188)
Year dummy - 1988	-0.0387	(0.0187)	0.0275	(0.0221)	0.0342	(0.0236)
Year dummy - 1989	-0.0489	(0.0189)	0.0319	(0.0221)	0.0439	(0.0235)
Year dummy - 1990	-0.0491	(0.0168)	0.0286	(0.0193)	0.0240	(0.0207)
Year dummy - 1992	-0.0596	(0.0140)	0.0589	(0.0165)	0.0560	(0.0171)
Year dummy - 1993	-0.0749	(0.0155)	0.0911	(0.0180)	0.0819	(0.0182)
Year dummy - 1995	-0.0791	(0.0206)	0.0685	(0.0229)	0.0885	(0.0232)
Year dummy - 1996	-0.1017	(0.0227)	0.0996	(0.0249)	0.1126	(0.0245)
Observations	41,708		41,708		41,708	
Log Likelihood	-17,015		-20,698		-23,016	

Standard errors in parentheses. All regressions include full set of state dummies.
Estimates are partial derivatives evaluated at the sample means.

TABLE A-12
Probits Using Combined Federal and State Subsidy Rate with Year/Child Interactions

	Labor-force Participation		Below Poverty		Below 150% of Poverty Level	
Age	0.0133	(0.0018)	-0.0085	(0.0024)	-0.0136	(0.0030)
Age squared	-0.0002	(2.4E-05)	5.8E-05	(3.3E-05)	0.0001	(4.1E-05)
Nonwhite	-0.0684	(0.0066)	0.0578	(0.0078)	0.0865	(0.0091)
Number of children	-0.0251	(0.0017)	0.0708	(0.0025)	0.1054	(0.0037)
Child under 6	-0.0499	(0.0025)	0.0698	(0.0038)	0.0857	(0.0054)
Nonwhite x kids	0.0136	(0.0048)	0.0166	(0.0076)	0.0198	(0.0094)
< High school	-0.1532	(0.0051)	0.2243	(0.0062)	0.2860	(0.0069)
Some college	0.0405	(0.0044)	-0.0510	(0.0055)	-0.0834	(0.0065)
Degree	0.0406	(0.0034)	-0.0858	(0.0042)	-0.1343	(0.0051)
Low education x Kids	0.0031	(0.0049)	0.0112	(0.0067)	0.0195	(0.0081)
Nonwhite x low education	-0.0112	(0.0057)	0.0372	(0.0081)	0.0425	(0.0097)
Non labor income	-0.0029	(0.0001)				
Subsidy rate	0.0678	(0.0897)	-0.0086	(0.1371)	-0.0685	(0.1838)
AFDC maximum x kids	-9.1E-05	(1.2E-05)	-6.1E-07	(1.6E-05)	-2.7E-05	(2.0E-05)
Unemployment rate	-1.0963	(0.1405)	0.7993	(0.1842)	0.9385	(0.2287)
Unemployment x kids	0.1649	(0.1047)	-0.0948	(0.1436)	0.1500	(0.1836)
Personal income	-0.2492	(0.0952)	0.1871	(0.1235)	0.2492	(0.1533)
Welfare waiver x kids	0.0092	(0.0073)	-0.0183	(0.0101)	-0.0075	(0.0131)
Minimum wage	-0.1173	(0.0723)	0.0317	(0.0990)	0.2253	(0.1211)
Kids x Year - 1983	-0.0051	(0.0110)	0.0149	(0.0149)	0.0326	(0.0187)
Kids x Year - 1984	0.0108	(0.0090)	0.0120	(0.0141)	0.0287	(0.0178)
Kids x Year - 1985	0.0042	(0.0098)	0.0332	(0.0156)	0.0424	(0.0188)
Kids x Year - 1988	-0.0123	(0.0135)	-0.0064	(0.0170)	0.0264	(0.0233)
Kids x Year - 1989	0.0144	(0.0105)	-0.0197	(0.0158)	-0.0065	(0.0217)
Kids x Year - 1990	0.0152	(0.0106)	-0.0193	(0.0156)	-0.0051	(0.0216)
Kids x Year - 1992	-0.0027	(0.0141)	-0.0050	(0.0198)	0.0119	(0.0270)
Kids x Year - 1993	0.0008	(0.0148)	-0.0171	(0.0204)	0.0031	(0.0289)
Kids x Year - 1995	0.0102	(0.0270)	-0.0247	(0.0399)	0.0007	(0.0588)
Kids x Year - 1996	0.0151	(0.0281)	-0.0224	(0.0433)	0.0054	(0.0634)
Year dummy - 1983	0.0047	(0.0086)	-0.0091	(0.0112)	-0.0256	(0.0132)
Year dummy - 1984	-0.0156	(0.0109)	0.0005	(0.0131)	-0.0132	(0.0155)
Year dummy - 1985	-0.0196	(0.0104)	-0.0043	(0.0120)	-0.0119	(0.0144)
Year dummy - 1988	-0.0179	(0.0125)	0.0022	(0.0144)	-0.0105	(0.0172)
Year dummy - 1989	-0.0452	(0.0135)	0.0108	(0.0145)	0.0073	(0.0172)
Year dummy - 1990	-0.0412	(0.0123)	0.0110	(0.0131)	-0.0024	(0.0154)
Year dummy - 1992	-0.0247	(0.0096)	0.0155	(0.0114)	0.0016	(0.0132)
Year dummy - 1993	-0.0440	(0.0109)	0.0398	(0.0126)	0.0340	(0.0143)
Year dummy - 1995	-0.0512	(0.0130)	0.0256	(0.0140)	0.0358	(0.0166)
Year dummy - 1996	-0.0712	(0.0141)	0.0460	(0.0151)	0.0495	(0.0174)
Observations	83,935		83,935		83,935	
Log Likelihood	-25,759		-32,559		-39,386	

Standard errors in parentheses. All regressions include full set of state dummies.
Estimates are partial derivatives evaluated at the sample means.

TABLE A-13
Probits Using Separate Federal and State Subsidy Rates with Year/Child Interactions

	Labor-force Participation		Below Poverty		Below 150% of Poverty Level	
Age	0.0133	(0.0018)	-0.0085	(0.0024)	-0.0136	(0.0030)
Age squared	-0.0002	(2.4E-05)	5.8E-05	(3.3E-05)	0.0001	(4.1E-05)
Nonwhite	-0.0684	(0.0066)	0.0578	(0.0078)	0.0865	(0.0091)
Number of children	-0.0262	(0.0017)	0.0712	(0.0026)	0.1063	(0.0038)
Child under 6	-0.0500	(0.0026)	0.0699	(0.0038)	0.0858	(0.0054)
Nonwhite x kids	0.0134	(0.0048)	0.0167	(0.0076)	0.0199	(0.0094)
< High school	-0.1530	(0.0051)	0.2243	(0.0062)	0.2860	(0.0069)
Some college	0.0400	(0.0044)	-0.0509	(0.0055)	-0.0832	(0.0065)
Degree	0.0409	(0.0033)	-0.0859	(0.0042)	-0.1344	(0.0051)
Low education x Kids	0.0018	(0.0050)	0.0115	(0.0067)	0.0201	(0.0082)
Nonwhite x low education	-0.0110	(0.0057)	0.0371	(0.0081)	0.0424	(0.0097)
Non labor income	-0.0029	(0.0001)				
Federal subsidy rate	0.3409	(0.1348)	-0.0899	(0.1773)	-0.2247	(0.2255)
State subsidy rate	-0.1340	(0.1148)	0.0529	(0.1980)	0.0503	(0.2696)
AFDC maximum x kids	-9.5E-05	(1.2E-05)	4.7E-07	(1.6E-05)	-2.5E-05	(2.0E-05)
Unemployment rate	-0.9797	(0.1470)	0.7667	(0.1904)	0.8813	(0.2346)
Unemployment x kids	-0.0101	(0.1229)	-0.0424	(0.1609)	0.2511	(0.2020)
Personal income	-0.2432	(0.0953)	0.1859	(0.1236)	0.2472	(0.1534)
Welfare waiver x kids	0.0081	(0.0073)	-0.0180	(0.0101)	-0.0070	(0.0131)
Minimum wage	-0.0121	(0.0723)	0.0332	(0.0990)	0.2278	(0.1211)
Kids x Year - 1983	-0.0103	(0.0115)	0.0164	(0.0151)	0.0356	(0.0189)
Kids x Year - 1984	0.0028	(0.0100)	0.0147	(0.0147)	0.0338	(0.0184)
Kids x Year - 1985	-0.0078	(0.0115)	0.0371	(0.0166)	0.0496	(0.0199)
Kids x Year - 1988	-0.0395	(0.0190)	0.0004	(0.0197)	0.0402	(0.0264)
Kids x Year - 1989	-0.0083	(0.0154)	-0.0133	(0.0185)	0.0067	(0.0248)
Kids x Year - 1990	-0.0066	(0.0152)	-0.0130	(0.0181)	0.0079	(0.0244)
Kids x Year - 1992	-0.0370	(0.0221)	0.0039	(0.0239)	0.0297	(0.0312)
Kids x Year - 1993	-0.0372	(0.0241)	-0.0075	(0.0249)	0.0228	(0.0337)
Kids x Year - 1995	-0.0864	(0.0633)	-0.0025	(0.0536)	0.0473	(0.0736)
Kids x Year - 1996	-0.0873	(0.0681)	0.0018	(0.0587)	0.0556	(0.0799)
Year dummy - 1983	0.0072	(0.0085)	-0.0098	(0.0112)	-0.0269	(0.0132)
Year dummy - 1984	-0.0103	(0.0106)	-0.0009	(0.0131)	-0.0155	(0.0155)
Year dummy - 1985	-0.0135	(0.0102)	-0.0058	(0.0120)	-0.0145	(0.0145)
Year dummy - 1988	-0.0098	(0.0121)	0.0001	(0.0146)	-0.0140	(0.0174)
Year dummy - 1989	-0.0355	(0.0133)	0.0086	(0.0147)	0.0036	(0.0174)
Year dummy - 1990	-0.0319	(0.0121)	0.0088	(0.0133)	-0.0060	(0.0156)
Year dummy - 1992	-0.0189	(0.0095)	0.0140	(0.0115)	-0.0009	(0.0133)
Year dummy - 1993	-0.0367	(0.0107)	0.0380	(0.0128)	0.0310	(0.0145)
Year dummy - 1995	-0.0419	(0.0128)	0.0234	(0.0142)	0.0321	(0.0168)
Year dummy - 1996	-0.0608	(0.0139)	0.0436	(0.0153)	0.0456	(0.0176)
Observations	83,935		83,935		83,935	
Log Likelihood	-25,754		-32,559		-39,386	

Standard errors in parentheses. All regressions include full set of state dummies.
Estimates are partial derivatives evaluated at the sample means.

TABLE A-14
Probits Using Separate Federal and Refundable State Rates with Year/Child Interactions

	Labor-force Participation		Below Poverty		Below 150% of Poverty Level	
Age	0.0133	(0.0018)	-0.0085	(0.0024)	-0.0136	(0.0030)
Age squared	-0.0002	(2.4E-05)	5.8E-05	(3.3E-05)	0.0001	(4.1E-05)
Nonwhite	-0.0683	(0.0066)	0.0577	(0.0078)	0.0865	(0.0091)
Number of children	-0.0262	(0.0017)	0.0712	(0.0026)	0.1063	(0.0038)
Child under 6	-0.0500	(0.0026)	0.0699	(0.0038)	0.0858	(0.0054)
Nonwhite x kids	0.0132	(0.0048)	0.0168	(0.0076)	0.0200	(0.0094)
< High school	-0.1531	(0.0051)	0.2243	(0.0062)	0.2860	(0.0069)
Some college	0.0400	(0.0044)	-0.0509	(0.0055)	-0.0831	(0.0065)
Degree	0.0409	(0.0033)	-0.0859	(0.0042)	-0.1344	(0.0051)
Low education x Kids	0.0018	(0.0050)	0.0116	(0.0067)	0.0202	(0.0082)
Nonwhite x low education	-0.0109	(0.0057)	0.0371	(0.0081)	0.0424	(0.0097)
Non labor income	-0.0029	(0.0001)				
Federal subsidy rate	0.3374	(0.1348)	-0.0905	(0.1775)	-0.2252	(0.2258)
Refundable state EITC	-0.0367	(0.1730)	0.1531	(0.2458)	0.1411	(0.3344)
AFDC maximum x kids	-9.6E-05	(1.2E-05)	-1.8E-08	(1.6E-05)	-2.5E-05	(2.0E-05)
Unemployment rate	-0.9925	(0.1469)	0.7636	(0.1905)	0.8790	(0.2349)
Unemployment x kids	-0.0007	(0.1228)	-0.0396	(0.1614)	0.2536	(0.2031)
Personal income	-0.2439	(0.0953)	0.1826	(0.1236)	0.2444	(0.1534)
Welfare waiver x kids	0.0091	(0.0074)	-0.0172	(0.0101)	-0.0063	(0.0130)
Minimum wage	-0.1196	(0.0723)	0.0322	(0.0990)	0.2271	(0.1211)
Kids x Year - 1983	-0.0103	(0.0115)	0.0165	(0.0151)	0.0356	(0.0189)
Kids x Year - 1984	0.0029	(0.0100)	0.0149	(0.0147)	0.0340	(0.0184)
Kids x Year - 1985	-0.0076	(0.0115)	0.0374	(0.0167)	0.0498	(0.0199)
Kids x Year - 1988	-0.0390	(0.0190)	0.0007	(0.0197)	0.0405	(0.0264)
Kids x Year - 1989	-0.0080	(0.0154)	-0.0131	(0.0186)	0.0070	(0.0249)
Kids x Year - 1990	-0.0063	(0.0151)	-0.0127	(0.0181)	0.0081	(0.0245)
Kids x Year - 1992	-0.0370	(0.0221)	0.0040	(0.0239)	0.0298	(0.0312)
Kids x Year - 1993	-0.0374	(0.0242)	-0.0076	(0.0249)	0.0228	(0.0337)
Kids x Year - 1995	-0.0868	(0.0634)	-0.0028	(0.0535)	0.0471	(0.0735)
Kids x Year - 1996	-0.0883	(0.0684)	0.0012	(0.0586)	0.0551	(0.0798)
Year dummy - 1983	0.0073	(0.0085)	-0.0098	(0.0112)	-0.0268	(0.0132)
Year dummy - 1984	-0.0105	(0.0107)	-0.0008	(0.0131)	-0.0154	(0.0155)
Year dummy - 1985	-0.0138	(0.0102)	-0.0058	(0.0120)	-0.0145	(0.0145)
Year dummy - 1988	-0.0102	(0.0122)	0.0000	(0.0146)	-0.0141	(0.0174)
Year dummy - 1989	-0.0361	(0.0133)	0.0085	(0.0147)	0.0035	(0.0174)
Year dummy - 1990	-0.0325	(0.0121)	0.0086	(0.0133)	-0.0061	(0.0156)
Year dummy - 1992	-0.0192	(0.0095)	0.0139	(0.0115)	-0.0009	(0.0133)
Year dummy - 1993	-0.0371	(0.0107)	0.0379	(0.0128)	0.0309	(0.0145)
Year dummy - 1995	-0.0424	(0.0128)	0.0233	(0.0142)	0.0320	(0.0168)
Year dummy - 1996	-0.0614	(0.0139)	0.0435	(0.0153)	0.0455	(0.0176)
Observations	83,935		83,935		83,935	
Log Likelihood	-25,755		-32,559		-39,386	

Standard errors in parentheses. All regressions include full set of state dummies.
Estimates are partial derivatives evaluated at the sample means.

TABLE A-15
Probits Using Combined Federal and State Subsidy Rate with Year/Child Interactions and Low-Education Subsample

	Labor-force Participation		Below Poverty		Below 150% of Poverty Level	
Age	0.0176	(0.0034)	-0.0062	(0.0044)	-0.0073	(0.0048)
Age squared	-0.0002	(4.6E-05)	-9.3E-06	(5.9E-05)	0.0000	(6.5E-05)
Nonwhite	-0.1093	(0.0100)	0.1321	(0.0114)	0.1580	(0.0113)
Number of children	-0.0363	(0.0030)	0.1059	(0.0043)	0.1336	(0.0058)
Child under 6	-0.0755	(0.0046)	0.0915	(0.0065)	0.0935	(0.0084)
Nonwhite x kids	0.0084	(0.0099)	0.0163	(0.0132)	0.0047	(0.0145)
< High school	-0.1975	(0.0057)	0.2693	(0.0066)	0.3009	(0.0066)
Non labor income	-0.0057	(0.0005)				
Subsidy rate	0.1014	(0.1636)	0.0742	(0.2581)	0.2512	(0.3171)
AFDC maximum x kids	-1.6E-04	(2.3E-05)	2.2E-05	(2.9E-05)	8.8E-06	(3.2E-05)
Unemployment rate	-1.4790	(0.2642)	1.1146	(0.3340)	1.2535	(0.3681)
Unemployment x kids	0.3747	(0.1865)	-0.1502	(0.2565)	-0.1038	(0.2968)
Personal income	-0.3487	(0.1855)	0.3290	(0.2291)	0.1580	(0.2511)
Welfare waiver x kids	0.0031	(0.0139)	-0.0210	(0.0184)	-0.0118	(0.0214)
Minimum wage	-0.1691	(0.1392)	0.1599	(0.1814)	0.3863	(0.1961)
Kids x Year - 1983	-0.0004	(0.0195)	0.0124	(0.0253)	0.0485	(0.0274)
Kids x Year - 1984	0.0169	(0.0171)	-0.0024	(0.0239)	0.0205	(0.0265)
Kids x Year - 1985	-0.0220	(0.0205)	0.0729	(0.0273)	0.0774	(0.0280)
Kids x Year - 1988	-0.0061	(0.0234)	-0.0096	(0.0313)	0.0060	(0.0365)
Kids x Year - 1989	0.0281	(0.0198)	-0.0487	(0.0288)	-0.0452	(0.0356)
Kids x Year - 1990	0.0412	(0.0186)	-0.0483	(0.0284)	-0.0559	(0.0350)
Kids x Year - 1992	0.0253	(0.0235)	-0.0441	(0.0353)	-0.0631	(0.0436)
Kids x Year - 1993	0.0174	(0.0265)	-0.0493	(0.0380)	-0.0625	(0.0479)
Kids x Year - 1995	0.0360	(0.0467)	-0.0764	(0.0726)	-0.1091	(0.0954)
Kids x Year - 1996	0.0385	(0.0502)	-0.0771	(0.0774)	-0.1059	(0.1014)
Year dummy - 1983	-0.0009	(0.0173)	0.0017	(0.0213)	-0.0191	(0.0219)
Year dummy - 1984	-0.0275	(0.0209)	0.0231	(0.0250)	0.0097	(0.0257)
Year dummy - 1985	-0.0093	(0.0186)	-0.0013	(0.0226)	-0.0092	(0.0238)
Year dummy - 1988	-0.0306	(0.0232)	0.0253	(0.0275)	0.0198	(0.0285)
Year dummy - 1989	-0.0668	(0.0242)	0.0551	(0.0275)	0.0575	(0.0278)
Year dummy - 1990	-0.0778	(0.0226)	0.0516	(0.0249)	0.0436	(0.0253)
Year dummy - 1992	-0.0713	(0.0199)	0.0717	(0.0227)	0.0693	(0.0222)
Year dummy - 1993	-0.0800	(0.0213)	0.1058	(0.0241)	0.0923	(0.0231)
Year dummy - 1995	-0.0834	(0.0246)	0.0719	(0.0271)	0.0871	(0.0268)
Year dummy - 1996	-0.1063	(0.0262)	0.0992	(0.0284)	0.1043	(0.0277)
Observations	41,708		41,708		41,708	
Log Likelihood	-17,007		-20,680		-22,995	

Standard errors in parentheses. All regressions include full set of state dummies.
Estimates are partial derivatives evaluated at the sample means.

TABLE A-16
Probits Using Separate Federal and State Subsidy Rates with Year/Child Interactions and Low-Education Subsample

	Labor-force Participation		Below Poverty		Below 150% of Poverty Level	
Age	0.0176	(0.0034)	-0.0062	(0.0044)	-0.0073	(0.0048)
Age squared	-0.0002	(4.6E-05)	-9.2E-06	(5.9E-05)	0.0000	(6.5E-05)
Nonwhite	-0.1089	(0.0100)	0.1323	(0.0114)	0.1579	(0.0113)
Number of children	-0.0371	(0.0031)	0.1051	(0.0044)	0.1343	(0.0059)
Child under 6	-0.0755	(0.0046)	0.0915	(0.0065)	0.0935	(0.0084)
Nonwhite x kids	0.0080	(0.0099)	0.0160	(0.0132)	0.0048	(0.0145)
< High school	-0.1974	(0.0057)	0.2694	(0.0066)	0.3009	(0.0066)
Non labor income	-0.0057	(0.0005)				
Federal subsidy rate	0.3276	(0.2558)	0.2589	(0.3240)	0.1265	(0.3590)
State subsidy rate	-0.0561	(0.2133)	-0.0583	(0.3706)	0.3444	(0.4718)
AFDC maximum x kids	-1.6E-04	(2.3E-05)	1.9E-05	(2.9E-05)	1.1E-05	(3.2E-05)
Unemployment rate	-1.3689	(0.2806)	1.1983	(0.3476)	1.2013	(0.3776)
Unemployment x kids	0.2229	(0.2280)	-0.2742	(0.2873)	-0.0200	(0.3176)
Personal income	-0.3454	(0.1855)	0.3296	(0.2292)	0.1577	(0.2511)
Welfare waiver x kids	0.0022	(0.0140)	-0.0216	(0.0185)	-0.0114	(0.0216)
Minimum wage	-0.1718	(0.1393)	0.1570	(0.1815)	0.3883	(0.1961)
Kids x Year - 1983	-0.0043	(0.0199)	0.0091	(0.0254)	0.0507	(0.0275)
Kids x Year - 1984	0.0102	(0.0183)	-0.0081	(0.0245)	0.0244	(0.0269)
Kids x Year - 1985	-0.0328	(0.0230)	0.0640	(0.0285)	0.0828	(0.0288)
Kids x Year - 1988	-0.0264	(0.0307)	-0.0249	(0.0342)	0.0166	(0.0390)
Kids x Year - 1989	0.0099	(0.0266)	-0.0631	(0.0316)	-0.0347	(0.0381)
Kids x Year - 1990	0.0246	(0.0248)	-0.0624	(0.0309)	-0.0457	(0.0373)
Kids x Year - 1992	0.0014	(0.0333)	-0.0628	(0.0387)	-0.0497	(0.0465)
Kids x Year - 1993	-0.0104	(0.0381)	-0.0700	(0.0415)	-0.0474	(0.0511)
Kids x Year - 1995	-0.0282	(0.0858)	-0.1201	(0.0762)	-0.0749	(0.1059)
Kids x Year - 1996	-0.0311	(0.0931)	-0.1240	(0.0813)	-0.0692	(0.1142)
Year dummy - 1983	0.0015	(0.0172)	0.0037	(0.0215)	-0.0203	(0.0220)
Year dummy - 1984	-0.0225	(0.0208)	0.0269	(0.0254)	0.0075	(0.0258)
Year dummy - 1985	-0.0040	(0.0186)	0.0027	(0.0230)	-0.0116	(0.0240)
Year dummy - 1988	-0.0229	(0.0235)	0.0309	(0.0282)	0.0165	(0.0288)
Year dummy - 1989	-0.0581	(0.0246)	0.0611	(0.0284)	0.0540	(0.0282)
Year dummy - 1990	-0.0692	(0.0231)	0.0574	(0.0257)	0.0403	(0.0257)
Year dummy - 1992	-0.0654	(0.0201)	0.0759	(0.0232)	0.0670	(0.0223)
Year dummy - 1993	-0.0733	(0.0215)	0.1106	(0.0246)	0.0897	(0.0234)
Year dummy - 1995	-0.0749	(0.0250)	0.0777	(0.0280)	0.0838	(0.0272)
Year dummy - 1996	-0.0970	(0.0266)	0.1054	(0.0293)	0.1009	(0.0281)
Observations	41,708		41,708		41,708	
Log Likelihood	-17,007		-20,680		-22,995	

Standard errors in parentheses. All regressions include full set of state dummies.
Estimates are partial derivatives evaluated at the sample means.

TABLE A-17
Probits Using Separate Federal and Refundable State Rates with Year/Child Interactions and Low-Education Subsample

	Labor-force Participation		Below Poverty		Below 150% of Poverty Level	
Age	0.0176	(0.0034)	-0.0062	(0.0044)	-0.0073	(0.0048)
Age squared	-0.0002	(4.6E-05)	-9.4E-06	(5.9E-05)	0.0000	(6.5E-05)
Nonwhite	-0.1089	(0.0100)	0.1323	(0.0114)	0.1577	(0.0113)
Number of children	-0.0372	(0.0031)	0.1050	(0.0044)	0.1343	(0.0059)
Child under 6	-0.0755	(0.0046)	0.0915	(0.0065)	0.0935	(0.0084)
Nonwhite x kids	0.0080	(0.0099)	0.0160	(0.0132)	0.0054	(0.0145)
< High school	-0.1975	(0.0057)	0.2693	(0.0066)	0.3009	(0.0066)
Non labor income	-0.0057	(0.0005)				
Federal subsidy rate	0.3258	(0.2557)	0.2549	(0.3245)	0.1353	(0.3600)
State subsidy rate	0.0748	(0.3097)	0.1631	(0.4394)	0.1909	(0.5059)
AFDC maximum x kids	-0.0002	(2.3E-05)	1.8E-05	(2.9E-05)	1.2E-05	(3.2E-05)
Unemployment rate	-1.3796	(0.2802)	1.1839	(0.3480)	1.2257	(0.3786)
Unemployment x kids	0.2296	(0.2277)	-0.2627	(0.2885)	-0.0405	(0.3201)
Personal income	-0.3479	(0.1856)	0.3262	(0.2294)	0.1529	(0.2512)
Welfare waiver x kids	0.0033	(0.0141)	-0.0200	(0.0184)	-0.0127	(0.0213)
Minimum wage	-0.1717	(0.1393)	0.1566	(0.1815)	0.3846	(0.1962)
Kids x Year - 1983	-0.0043	(0.0199)	0.0091	(0.0254)	0.0507	(0.0275)
Kids x Year - 1984	0.0103	(0.0183)	-0.0079	(0.0245)	0.0244	(0.0269)
Kids x Year - 1985	-0.0326	(0.0230)	0.0644	(0.0285)	0.0827	(0.0288)
Kids x Year - 1988	-0.0261	(0.0307)	-0.0243	(0.0343)	0.0159	(0.0391)
Kids x Year - 1989	0.0101	(0.0266)	-0.0627	(0.0316)	-0.0353	(0.0382)
Kids x Year - 1990	0.0247	(0.0248)	-0.0620	(0.0310)	-0.0463	(0.0373)
Kids x Year - 1992	0.0014	(0.0333)	-0.0628	(0.0387)	-0.0498	(0.0465)
Kids x Year - 1993	-0.0106	(0.0382)	-0.0701	(0.0415)	-0.0475	(0.0510)
Kids x Year - 1995	-0.0289	(0.0859)	-0.1205	(0.0761)	-0.0751	(0.1058)
Kids x Year - 1996	-0.0322	(0.0935)	-0.1248	(0.0811)	-0.0688	(0.1141)
Year dummy - 1983	0.0016	(0.0172)	0.0038	(0.0215)	-0.0202	(0.0220)
Year dummy - 1984	-0.0226	(0.0208)	0.0268	(0.0254)	0.0081	(0.0258)
Year dummy - 1985	-0.0042	(0.0186)	0.0024	(0.0230)	-0.0111	(0.0240)
Year dummy - 1988	-0.0234	(0.0235)	0.0303	(0.0282)	0.0174	(0.0289)
Year dummy - 1989	-0.0586	(0.0247)	0.0604	(0.0284)	0.0550	(0.0282)
Year dummy - 1990	-0.0697	(0.0232)	0.0567	(0.0258)	0.0412	(0.0257)
Year dummy - 1992	-0.0656	(0.0201)	0.0756	(0.0232)	0.0676	(0.0224)
Year dummy - 1993	-0.0737	(0.0215)	0.1101	(0.0246)	0.0903	(0.0234)
Year dummy - 1995	-0.0754	(0.0250)	0.0771	(0.0280)	0.0847	(0.0272)
Year dummy - 1996	-0.0976	(0.0266)	0.1047	(0.0293)	0.1018	(0.0282)
Observations	41,708		41,708		41,708	
Log Likelihood	-17,007		-20,680		-22,996	

Standard errors in parentheses. All regressions include full set of state dummies.
Estimates are partial derivatives evaluated at the sample means.

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