

**Welfare, the Earned Income Tax Credit,
and the Employment of Single Mothers**

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ABSTRACT

During 1984-96 there were enormous changes in welfare and tax policy. In particular, there were large expansions of the Earned Income Tax Credit (EITC) and Medicaid, changes in the Aid to Families with Dependent Children (AFDC) program and related training and child care programs. Many of the program changes were intended to encourage low income women to work. During this same time period there were unprecedented increases in the employment of single mothers, particularly those with young children. In this paper, we first document these large changes in policies and employment. We then examine if the policy changes are the reason for the large increases in single mothers' employment. We find evidence that a large share of the increase in work by single mothers can be attributed to the EITC, with smaller shares for welfare benefit reductions, welfare waivers, changes in training programs, and child care expansions. Our results also indicate that financial incentives through the tax and welfare systems have substantial effects on single mothers' employment decisions.

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1. Introduction

In recent years, there have been enormous changes in many of the tax and transfer programs that affect single mothers. These changes have dramatically increased the incentive to work. Between 1984 and 1996, real dollars received through the Earned Income Tax Credit (EITC), which go primarily to working families with children, increased more than ten-fold. Likewise, between 1984 and 1994 the number of children receiving Medicaid increased 77 percent, while the number of covered adults with dependent children increased 35 percent. These Medicaid expansions primarily affected non-welfare families with incomes near the poverty line, making work more attractive for low-income single mothers. In the last few years nearly every state has experimented with changes in its welfare programs, often under waivers of the existing program rules. Many of these changes have imposed work requirements, time limits, or other measures to encourage single mothers to work. Finally, there have been recent increases in child care funding and job training for single mothers. The combined effect of these program changes has greatly increased the incentive for single mothers to enter the workforce. This paper examines whether these policy changes have been effective in encouraging more women to work. More precisely, we calculate the effect of each of these program changes as well as several others on the employment of single mothers.

During this 1984 to 1996 period in which single mothers experienced a dramatic increase in the incentive to work, their weekly employment increased by about six percentage points, and their annual employment increased by nearly nine percentage points. Over the same time period, both weekly and annual employment for a plausible comparison group, single women without children, decreased by about one percentage point. The increases in employment were larger for single mothers with children under six and occurred primarily after 1991.

Understanding the relationship between the changes in government policies and the increases in the employment of single mothers is important for several reasons. First, there is little previous work which estimates the effects of the EITC, Medicaid, and welfare changes on whether single mothers work. The only paper which directly examines how the EITC affects single mothers' employment is Eissa and Liebman (1996), which examines the effect of the Tax Reform Act of 1986.¹ In his discussion of the labor supply effects of Medicaid, Moffitt (1992) argues that there has been too little work to draw reliable conclusions.² Moffitt describes the labor supply effect of Aid to Families with Dependent Children (AFDC) as being subject to considerable uncertainty and notes that the broader labor supply literature has examined single mothers "only rarely."³ Dickert, Houser, and Scholz (1995) argue that this literature provides little

¹ Several papers use labor supply parameters estimated from the negative income tax experiments and other sources to simulate the effects of the EITC including Hoffman and Seidman (1990), Holtzblatt, McCubbin, and Gillette (1994), Browning (1995), and Dickert, Houser, and Scholz (1995). Dickert, Houser, and Scholz (1995) estimate the effect of the after-tax wage and welfare programs on participation using a cross-section of data from the 1990 panel of the Survey of Income and Program Participation (SIPP). They then apply these results to simulate the effects of the EITC on participation. Eissa and Hoynes (1998) examine the effects of the EITC on the labor supply of married couples.

² See Blank (1989), Winkler (1991), and Moffitt and Wolfe (1992), in particular. The more recent work of Yelowitz (1995) examines the 1988 to 1991 period.

³ See Danziger, et al. (1982) and Moffitt (1992).

guidance as to how the EITC will affect labor market participation, and that this omission is especially important because past work indicates that most of the labor supply response to changes in the return to work occurs on this margin. Furthermore, there is no work that we are aware of that assesses the overall effect of recent changes in training and child care programs.⁴ The work on the effects of welfare waivers has examined program caseloads rather than employment, and has reached conflicting results.⁵

Second, these changes in policies provide a plausible source of exogenous variation with which to identify the effects of tax and welfare parameters on labor supply. The magnitudes of these effects are key determinants of the gains or losses from changes in income redistribution and social insurance policies. The variation across individuals and over time in the after-tax and transfer return to work that we use here to identify labor supply elasticities is due to large changes in federal and state laws. These laws applied to some individuals and not to others, or had differential effects on the incentives of different people. This source of variation is likely to be unrelated to underlying differences across individuals in their desire to work, and is thus potentially exogenous to labor supply decisions.

Third, understanding the effects of government policies has recently taken on more importance due to the passage of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA). In 1997, PRWORA eliminated the main cash assistance program for single mothers, Aid to Families with Dependent Children (AFDC), and allowed states more discretion in designing their programs for low-income single mothers. Future experimentation will be more successful if informed by recent experience.

We examine the major policies affecting the employment of single mothers during the 1984 to 1996 period using two data sets, the Current Population Survey (CPS) Outgoing Rotation Group Files and the March CPS Annual Demographic Files. This paper improves on the common past research strategy of examining changes in one of these policies in isolation over a short time period. By investigating several programs at once, we account for their separate effects and we can directly compare the programs using the same sample, time period, and methods.

The large number of changes over the 1984 to 1996 period allows us to study the employment effects of a wide range of social policies. We examine the federal EITC, as well as other tax changes, and state EITCs. We examine the effects of changes in many aspects of AFDC, Food Stamps, and Medicaid including: changes in AFDC benefit levels, earnings disregards and benefit reduction rates; the expansions of Medicaid coverage to low-income non-AFDC children; and the recent flurry of welfare waivers. We also examine the effects of changes in child care and training programs during this period. The employment responses to many of the more important recent policy changes have not been studied, including the increases in the EITC after 1990, the Medicaid expansions after 1991, the implementation of work requirements and time limits for welfare mothers, and the growth in job training and child care for low-income women.

⁴ See Gueron and Pauly (1991) for a review of training programs for welfare recipients, and Council of Economic Advisers (1997) for a review of work on the effects of child care.

⁵ See Levine and Whitmore (1998), Martini and Wiseman (1997), Blank (1997), and Ziliak et al. (1997) for differing views of the relative importance of welfare waivers, economic conditions and benefit cuts in the recent decline in welfare receipt.

Our base specification compares changes in employment for single mothers to those for single women without children, relying on the differential treatment of these two types of women under welfare and tax laws. These specifications also control for state specific factors common to all single women as well as a number of factors that vary by family composition. The estimates from these specifications suggest that the EITC accounts for over 40 percent of the increase in weekly employment of single mothers between 1984 and 1996 and over 50 percent of the annual employment increase. Welfare waivers appear to account for about one-sixth of the increase for both employment measures. Other changes in AFDC can account for about one-quarter of the weekly employment increase and about one-eighth of the annual increase. Changes in Medicaid, training, and child care programs play a smaller role. In other specifications we use more subtle identification strategies to estimate the effects of policies. In these specifications, we compare changes for single mothers with different numbers of children, with different earnings opportunities, and in states with different living costs. We also examine the effects of changes in welfare programs within a state over time and changes in state income taxes. These specifications often indicate somewhat smaller and less precisely estimated effects of the policies on employment, but the main patterns usually remain.

The structure of the paper is as follows. In Section 2 we outline a theory of the decision to work and state our main modeling decisions. We describe the two data sets used in the empirical work in Section 3. In Section 4 we describe the main program changes over the 1984 to 1996 period that affected the labor supply of single mothers. We also provide summary statistics on program changes, discuss their theoretical impacts on labor supply, and introduce variables which measure particular policies. In Section 5 we report the time pattern of the employment rate of single mothers and investigate how it was affected by the policies we study. In Section 6 we examine alternative explanations for our results and describe additional specifications we have tried. In Section 7 we provide an accounting of the contribution of different policy changes to the overall increase in employment of single mothers in recent years. We then offer conclusions and extensions in Section 8.

2. Modeling the Work Decision

Our modeling approach combines some of the best aspects of structural methods and quasi-experimental or natural experiment type approaches. The structural model clarifies which variables should enter the work decision and the form in which they should enter. The structural model also allows us to test some fundamental economic predictions and more convincingly simulate policy changes. The quasi-experimental methods make transparent the assumptions which allow the identification of our key coefficients. By the appropriate use of control variables and simplifying assumptions we identify our key parameters using only the sources of variation in our explanatory variables that we believe are exogenous. Because of the simplifications we make to improve the model's tractability, one may not want to consider our approach fully structural.

We focus on labor force participation because previous work has found that women are more responsive to wages and income on this margin than in the hours decision (see Heckman, 1993). The probability that a single woman

works is just the probability that the expected utility when working U_w exceeds the expected utility when not working U_{nw} , i.e. $\text{Prob}[U_w > U_{nw}]$. We take utility to be a function of income Y , non-market time L , an indicator for welfare participation P (which captures transaction costs or stigma), other demographic and other control variables X , and an additive stochastic term ε . Thus, the probability of work is just

$$(2.1) \quad \text{Prob}[U(Y_w, L_w, P_w, X) > U(Y_{nw}, L_{nw}, P_{nw}, X)],$$

where the randomness in this event comes from the stochastic term ε .

Income when working is pre-tax earnings minus taxes, plus employer provided health benefits, plus AFDC and Food Stamps, plus Medicaid benefits. Income when not working is the maximum AFDC/Food Stamp benefit and Medicaid benefits. In each case we calculate the earnings, taxes, and benefits for a given individual incorporating family composition (number and ages of children), and characteristics of state and federal policies at the time.

We allow the coefficients on the different components of income to differ, since income from different sources may be valued differently. For example, we allow the coefficient on welfare income (AFDC plus Food Stamps) to differ from the coefficients on labor income, taxes paid, and Medicaid coverage. Welfare income may be valued less than labor income because of a variable component to the transaction costs or stigma of welfare participation (Moffitt, 1983). Medicaid or employer provided health insurance may be valued at less than our calculated cost because it is an in-kind transfer or more than cost because of its insurance component. These separate coefficients on different income terms allow for additional tests of the hypothesis that increases in the return to work make work more likely, and they allow an approach that is less restrictive, i.e. less likely to be wrong.

In equations,

$$\alpha Y_w = \alpha_0 \text{pre-tax earnings} + \alpha_1 \text{taxes} + \alpha_2 \text{AFDC and Food Stamp benefits if work}$$

$$+ \alpha_3 \text{Medicaid coverage if work valued at cost, and}$$

$$\alpha Y_{nw} = \alpha_4 \text{maximum AFDC plus Food Stamp benefit}$$

$$+ \alpha_5 \text{Medicaid coverage valued at cost.}$$

We calculate real income and benefits across states using a cost of living index which depends on state housing costs.

The decision to work should depend on the real return to work, not the nominal return.⁶

A key issue in implementing this approach is the form of the uncertainty about a woman's wage and hours should she work. In the estimates reported here, we take a woman to have no more knowledge of her potential wage and hours than we do as researchers.⁷ Thus, we take her wage to be a random draw from a distribution (to be specified below) and

⁶ Our base specification includes a state cost of living adjustment following the approach of National Research Council (1995). We also estimate equations below without the state cost of living adjustment. One can argue that housing costs largely reflect local amenities. However, to the extent that these amenities are largely fixed benefits of an area, one would still want to account for state differences in housing costs when calculating the value of additional income.

⁷ In other work we have considered two alternatives: 1) a woman knows her wage and hours before choosing to work, and 2) a woman knows her wage, but not her hours before choosing to work. As will become clear below, these alternatives are only identified through distributional assumptions on the error term. Our experiments with these alternatives yielded results qualitatively similar to our main results.

her hours worked to be a random draw from a distribution (also to be specified below) that is conditional on the wage realization. Then the probability of working is just

$$(2.2) \quad \text{Prob}\{ E[U_w] > U_{nw} \},$$

where the expectation here is over the joint wage and hours distribution.

To estimate equation (2.2) we make two additional assumptions. First, we take the distribution of ε to be normal. Second, we make a functional form assumption on utility. Throughout this paper we take U to be linear in income and leisure, though we have relaxed this assumption in other work. In the linear case (2.2) has a very simple form

$$(2.3) \quad \text{Prob}\{\alpha(E[Y_w] - Y_{nw}) + \beta(E[L_w] - L_{nw}) - \rho(E[P_w] - P_{nw}) + X'\gamma > \varepsilon_w - \varepsilon_{nw}\},$$

where X is other variables that may affect the work decision such as demographic variables and characteristics of state welfare waivers, training programs, and child care programs. This specification also allows fixed costs of work which vary across demographic groups. Under the normality assumption (2.3) can be rewritten as:

$$(2.4) \quad \Phi\{\alpha(E[Y_w] - Y_{nw}) + \beta(E[L_w] - L_{nw}) - \rho(E[P_w] - P_{nw}) + X'\gamma\}.$$

We make the simplifying assumption that non-working single mothers participate in welfare and that working single mothers participate if their earnings are low enough to qualify them for aid. This assumption is clearly a simplification as some women who qualify for aid will not participate because of the transaction costs or stigma of doing so. Past work on program takeup indicates that about 75 percent of those eligible for AFDC and about 50 percent of those eligible for Food Stamps participate (for a recent review of past work see Blank and Ruggles, 1997). We also assume that all single women without children *do not* participate in welfare programs.⁸ Then, since $E[L_w]$ and L_{nw} are taken to be constant or to vary with X , and $P_{nw}=1$, these terms are absorbed into X . Substituting the expressions for αY_w and αY_{nw} into (2.4) we obtain

$$(2.5) \quad \Phi\{\alpha_1 E[\text{taxes}] + \alpha_2 E[\text{AFDC and Food Stamp benefits if work}] \\ + \alpha_3 E[\text{Medicaid coverage if work valued at cost}] - \alpha_4 \text{maximum AFDC/Food Stamp benefit} \\ - \alpha_5 \text{Medicaid coverage valued at cost} + \rho E[P_w] + X'\gamma\}.$$

We implement this approach by discretizing the wage and hours distributions to perform the numerical

⁸ The primary program for which single women without children would be eligible is Food Stamps. Single adults with children are more than ten times as likely to receive Food Stamps as single adults without children (authors' calculations and U.S. Department of Agriculture, Food Stamps, 1995). Furthermore, since the Food Stamp program has not changed much over time and does not differ much by state except for interactions with AFDC, our control variables below (particularly year and number of children dummies) should account for most of these differences.

integration required in (2.5). We should emphasize that we allow the hours distribution to vary with the wage level because of the pronounced dependence between the two distributions.⁹ We try two alternative wage and hours distributions, both of which do not vary over time and are just the March CPS empirical distributions.¹⁰ The first distribution differs only by whether or not a women has children. The second distribution differs across 90 cells defined by full interactions of region, age, education, and race. In this second case, we use the distribution for childless women for all observations since this group's wages and hours are unlikely to be affected much by the policies examined in this paper. In both cases we approximate these distributions using cells defined by 50 intervals of the joint wage and hours distribution (see Appendix 1 for details). Our approach is both tractable and yet able to capture the fairly complex and highly nonlinear budget constraints of low income single mothers. These complexities are described in detail in Section 4.

3. Data

The data used in this paper come from the Current Population Survey (CPS), a nationally representative monthly survey of approximately 60,000 households. We use two types of the CPS data, the March CPS Annual Demographic File and the merged Outgoing Rotation Group (ORG) data. In the CPS, a given household is interviewed for four consecutive months, not interviewed for eight months, and then interviewed for four more consecutive months, after which it permanently leaves the sample. During each interview household members are asked whether they worked last week and their hours worked, as well as many other questions. In the March interviews, individuals are asked to provide detailed retrospective information including hours, disaggregated earnings, and weeks worked during the previous year. The data from these March interviews is called the Annual Demographic File (March CPS). The ORG data come from all twelve months of the year and only include those in their fourth and eight interviews. These data files allow one to use the full year of data without including the same person twice. Because the ORG includes one-fourth of the observations from each month, it has close to three times as many observations as the March CPS.

The March CPS data are from the 1985-1997 interviews, and therefore provide information on the years 1984-1996. The ORG data are from all twelve months during 1984-1996. We limit the sample to single women (widowed, divorced, and never married) who are between 19 and 44 years old and not in school. In the March CPS, women who were ill or disabled during the previous year or who had positive earned income but zero hours of work are also excluded. The resulting samples sizes are 373,662 for the ORG and 119,019 for the March CPS.

The determination of whether a woman has children and how many she has is based on the CPS family and subfamily definitions. Children in primary families (both related and unrelated) are assigned to the family head, while

⁹ For example, in our main sample (single childless women with high school education or less), only 17 percent of those with a usual hourly wage over \$10 work less than 1900 hours per year (conditional on working), but 43 percent of such women with a wage under \$10 work less than 1900 hours per year.

¹⁰ Note that the assumptions which led to (3.4) imply no selection, i.e. that the distribution of wages faced by those who work is the same one faced by those who do not work.

children in subfamilies are assigned to the subfamily head rather than to the primary family head. Children are defined as any member of the given family (primary or subfamily) under age 19 (or under 24 and a full-time student) for EITC purposes and under age 18 for all other programs.

4. Policy Changes and Labor Supply

In this section, we describe the major policy changes between 1984 and 1996 that affected the labor supply of single mothers.¹¹ For each policy or program, we first provide some brief background information and outline the major changes between 1984 and 1996 (see Figure 1 for a time line depicting these changes). Next, we describe the policy variables used in the empirical work to summarize the incentive effects of these complex programs. Finally, we analyze the theoretical effects of these changes on labor supply, especially on the choice of whether or not to work. An in depth discussion of the policy changes is in Meyer and Rosenbaum (1999a).

4.1 The EITC and Federal and State Income Taxes

In recent years, the most important change for single mothers in the financial incentive to work has probably come from the Earned Income Tax Credit.¹² EITC credits increased fifteen-fold from \$1.6 billion in 1984 to a projected \$25.1 billion in 1996. Single mothers received about two thirds of these EITC dollars (1996 Green Book, pp. 808-9).¹³ In 1996 a single woman with two children who earned less than \$8,890 (the phase-in range) received a 40 percent credit on dollars earned, up to a maximum of \$3,556. Because the credit is refundable and a mother of two with those earnings was not subject to any federal income tax (due to the standard deduction and personal exemptions), she would have received a check from the IRS for the credit amount. With additional earnings up to \$11,610 the credit amount did not change. Additional earnings beyond \$11,610 and up to \$28,495 (the phase-out range) resulted in a reduction in the credit by 21.06 percent of the additional earnings, until the credit was reduced to zero at earnings of \$28,495. This credit schedule meant that a woman with two children earning between \$5,000 and just under \$19,000 received at least a \$2,000 credit.

The current EITC is the result of several legislative changes (summarized in Figure 1) which greatly expanded the EITC after 1984. Between its beginning in 1975 and the passage of the Tax Reform Act of 1986 (TRA86) the EITC was small and the credit amounts did not keep up with inflation. Beginning with the TRA86, the EITC was expanded in a number of dimensions. First, credit rates, phase-in ranges and phase-out ranges were increased considerably. In 1987 the credit rate rose and in 1988 the beginning and end of the phase-out range were increased. The credit parameters were

¹¹ We do not try to examine every government program that affects single women and their families. Other relevant programs we omit include public and subsidized housing, child support enforcement, food and nutrition programs other than Food Stamps, and Supplemental Security Income.

¹² See Liebman (1998) for a history of the EITC and a survey of many of the key economic issues.

¹³ Most of the remaining dollars are received by married taxpayers.

then unchanged in real terms for several years, but in 1991 through 1993, the credit rates rose in small steps. In 1994 and 1995 there were large increases in the credit rates. Second, in 1991 the credit was expanded to provide a larger credit for families with two or more children, and families with very young children. The increment to the maximum credit for a second child was small through 1993, but beginning in 1994 the difference began to rise sharply; it rose to \$490 in 1994, \$1,016 in 1995, \$1,404 in 1996.¹⁴ Third, in 1991 the requirements for qualifying children were relaxed. Fourth, the interaction of the EITC with other programs has changed over time. Most importantly, effective January 1991, the EITC was not counted as income in most means-tested programs, increasing its value for very low income women.

We should note that there were other changes in federal income taxes during this period that affected single women. In particular, the 1987 increase in the personal exemption and the 1988 increase in the standard deduction for household heads. These changes, in conjunction with the many changes in EITC credit rates, phase-in and phase-out ranges, make it hard to picture the changes in taxes at various earnings levels. To aid this evaluation, we plot in Figure 2 the difference in take home pay (earnings minus federal income taxes plus the EITC) between a woman with two children and a woman with no children for various pre-tax earnings levels in 1984, 1988, 1992, and 1996.¹⁵ We focus on the difference between a woman with two children and a childless woman because this comparison is used in much of our empirical work.¹⁶

Figure 2 illustrates several important aspects of the EITC expansions. First, between 1984 and 1988, single mothers of two with earnings between \$10,000 and \$20,000 experienced increases in take home pay (relative to single women without children) that ranged from \$500 to \$1,500.¹⁷ Most of this increase was due to large increases in both the maximum credit and the earnings level before the credit phase-out began. Between 1988 and 1990, tax and EITC parameters were adjusted only for inflation, so the take home pay difference remained the same. Between 1990 and 1992, the moderate increase in the credit rate is evident.

The most striking feature of Figure 2 is that the effect of the 1994-96 expansions, which dwarfed their predecessors, particularly for women with two or more children.¹⁸ For example, the take home pay difference for women

¹⁴ From 1991 through 1993 there were also small refundable credits for child health insurance premiums and for children under one. In 1993 (the last year of these credits), total credit received for child health insurance premiums were 0.46 billion dollars and for children under one were 0.76 billion dollars, while the value of the basic credit was 14.3 billion dollars (U.S. Department of the Treasury, SOI, 1994).

¹⁵ Note that Figure 2 only illustrates differences in take home pay due to federal income taxes and the EITC. Other programs and work expenses, especially child care expenses, would need to be taken into account to fully characterize differences in take home pay between single women with and without children.

¹⁶ Changes over time in this difference were almost entirely due to changes in taxes paid (or credits received) by single mothers as can be seen in Panel 1 of Table 1. The taxes paid by single women without children hardly changed between 1984 and 1996, especially for earnings levels between \$10,000 and \$20,000.

¹⁷ Unless noted, all dollar amounts here are in 1996 PCED dollars.

¹⁸ Figure 2 does not incorporate the small credit, instituted beginning in 1994, available to taxpayers without qualifying children who were 25 and older. This credit is incorporated in the tax variable used in the empirical work below.

with \$7,500 of earnings increased only about \$600 between 1984 and 1993, but increased over \$1,500 between 1993 and 1996. Unlike the earlier expansions, those since 1993 dramatically increased the take home pay difference for very low income women (earnings under \$10,000) due to large increases in the credit rate and maximum credit.

As well as federal income tax changes, we incorporate the effects of state income taxes including state EITCs. By 1994 seven states had their own EITCs. The largest five of these states began their credit during the period we examine. All of the state EITCs were set as a fraction of the federal EITC and thus increased when it did.¹⁹ There were other state income tax changes during our sample period that reduced taxes for single mothers. More than a dozen states increased their personal exemption, increased their child credit, added a higher standard deduction or added a separate tax schedule for household heads. Quantitatively, these changes were not nearly important though as the institution and expansion of state EITCs.

To summarize these changes in federal and states taxes we calculate a variable we call Income Taxes if Work. This variable is the expected taxes a woman would pay in a given state and year with a given family size and ages of children. The expectation is calculated by integrating over the wage and hours distribution of single mothers as described in Section 2. To illustrate the changes in the Income Taxes if Work variable over time, in Figure 4 we plot the difference in its mean for single women without children minus single mothers by year using the ORG data from 1984-1996.²⁰ Figure 4 illustrates that approximately half of the \$1,674 increase between 1984 and 1996 occurred in the last three years (1994-1996). About a third occurred in 1987 and 1988, with a sixth occurring between 1991 and 1993. Note that only the effects of the 1987 and 1988 increases have been examined in previous research (see Eissa and Liebman, 1996). Almost all of the increase in the tax difference was due to federal tax changes. Only \$48 was due to state taxes, with all but \$11 of this due to state EITCs.

The theoretical effect of the EITC expansions on the annual participation decision of single parents is unambiguously positive. Since the EITC expansions have increased the after-tax return to work at all earnings levels, work is unambiguously more attractive. The effect of the EITC and its expansions on the hours of work among those working is much less clear and depends on where a person would choose to work on the pre- and post-credit budget sets. Overall, the income effect of the credit combined with the negative substitution effect that people face on the phase-out portion of the credit is expected to reduce the hours of those who work.²¹ One might wonder if these income tax incentives for low income households were ineffective because households were unaware of the incentives or did not bother to file tax returns. However, EITC takeup appears to be high and rising. Scholz (1990, 1994) estimates that 75

¹⁹ Wisconsin used a slightly different rule, but only in 1994.

²⁰ Appendix Table 1 gives means for the Income Taxes if Work variable separately for single women with and without children in 1984, 1988, 1992, 1996.

²¹ One should note that even though many more people are in the phase-out range rather than the phase-in range, the phase-in rate is typically much larger than the phase-out rate, dampening the likely negative overall effect on hours for those who already work.

percent of EITC eligibles in 1988 and between 80 and 86 percent of EITC eligibles in 1990 received the credit.²² One of the reasons for this high takeup rate is the common use of paid tax preparers by low income women (Olson and Davis, 1994). With the increases in the EITC after 1990, one might expect that the participation rate rose further.

4.2 AFDC and Food Stamps

The two programs most commonly thought of as welfare are the Aid to Families with Dependent Children (AFDC) and Food Stamps.²³ We discuss Food Stamps along with AFDC because nearly 90 percent of AFDC recipients also receive Food Stamps (U.S. House of Representatives, Green Book, 1996). Both of these programs are large relative to other means-tested programs, but neither has grown much since 1984. Real spending on AFDC increased from \$21.6 billion to \$22.5 billion between 1984 and 1995, even though the number of recipients increased by almost a quarter from 10.9 million to 13.6 million. Food Stamp program expenditures increased by 40 percent during this same period from \$19.5 billion to \$27.4 billion, though most of this increase was due to the number of recipients rising from 20.9 million to 26.6 million. Even if some measures of overall spending did not change a great deal, there have been changes in the benefits and implicit tax rates under these programs over time, and in recent years there has been experimentation with many other features of these programs. Before describing these recent changes it is useful to summarize how the programs work.

The AFDC program provides cash payments to families with children who have been deprived of support due to the absence or unemployment of a parent. The Food Stamp program provides low-income households with coupons to purchase food. AFDC program parameters are set by the states, while most Food Stamp parameters are the same in all states. Nevertheless, because of the interaction of the eligibility and benefit calculations of the two programs there are inter-state differences in the Food Stamps received for people in similar situations.

While much past work has summarized the AFDC and Food Stamp programs using the combined maximum benefit, this measure ignores the large interstate differences and changes over time in earnings exemptions and implicit tax rates. By 1996, 15 states had exemptions and tax rates that differed from the standard \$120 earnings exemption and the 2/3 implicit tax rate. We summarize AFDC and Food Stamps with three variables: the maximum combined benefit, expected benefits if a person works, and the probability of AFDC receipt (which captures transaction costs or stigma). Due to cuts in AFDC, the mean maximum combined AFDC and Food Stamp benefit fell about 7 percent over the sample period. Over the same period mean benefits for a working single mother remained roughly constant as implicit tax rates were reduced.

Theory predicts that the AFDC and Food Stamp programs decrease labor supply for two reasons. First, if

²² Due to these high participation rates, a significant literature (Scholz, 1990; and Liebman 1995a, 1995b) has focused on ineligible EITC recipients.

²³ With the passage of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA), AFDC has been replaced by welfare block grants to states under the Temporary Assistance to Needy Families (TANF) program. See Blank (1997b) for an overview of the likely effects of this new legislation.

individuals value additional income less as income increases, the income effect of the guarantee amount (maximum benefit) should make participation less likely and reduce hours worked if a woman participates. Second, the implicit tax rate resulting from reductions in benefits as earnings increase, i.e. the substitution effect, reduce the return to work. Thus, a higher implicit tax rate should decrease both the likelihood of working and hours conditional on working.

Substantial research indicates that actual exemptions and implicit tax rates differ from these statutory ones. Some research indicates that caseworker discretion leads actual practice to differ from statutory rules, at least as these rules are easily summarized (Fraker, Moffitt and Wolf, 1985; McKinnish, Sanders and Smith, 1997). Other research indicates that few AFDC recipients report their income to state welfare offices (Edin and Lein, 1997 and Edin and Jencks, 1993) or that state welfare offices systematically miscalculate benefits so that working women are cut off from receiving them (Levine, 1997). In addition, monthly administrative data from fiscal year 1996 suggest that only 11 percent of AFDC families report any earned income (U.S. Department of Health and Human Services, AFDC Characteristics, 1996), which is a finding that supports both of these arguments. We should also note that we assume that an individual maintains the same monthly earnings throughout the year and we ignore changes in exemptions and implicit tax rates that occur after the fourth month of work. These observations suggest that, despite our best efforts, our calculations of AFDC benefits for those who work may be fairly rough. We will return to this issue in Section 5.

4.3 Medicaid

Medicaid is the biggest and most costly program which aids single mothers and their children. Medicaid expenditures for those not aged or disabled (those remaining are predominately single mothers and their children) totaled \$30.9 billion in 1994, and went to 24.8 million people (U.S. House of Representatives, Green Book, 1996, pp. 897-902). Unlike the Food Stamp program and especially AFDC, Medicaid eligibility has expanded dramatically since 1984, resulting in a more than three-fold increase in Medicaid expenditures (and a 60 percent increase in the caseload) on families with dependent children between 1984 and 1994.

Prior to 1987, Medicaid eligibility for single mothers and their children required receipt of AFDC, except in the special cases of families with very large medical expenses, those receiving Supplemental Security Income (SSI), and those leaving AFDC and receiving transitional Medicaid.²⁴ In a series of expansions, Medicaid coverage was extended to low income pregnant women and children (again see Figure 1). Beginning in April 1987, states were *permitted* to extend Medicaid coverage to children under age two in families with incomes below 100 percent of the Federal poverty line.²⁵ Subsequently, Medicaid coverage was extended to older children and those in higher income families. In October of 1988, states were *permitted* to cover children under age one in families below 185 percent of the poverty line. Later legislation often replaced state options with state requirements. Hence, since April 1990, states have been *required* to

²⁴ Those with very large medical expenses could receive benefits under the Medically Needy program. Some states also allowed those with incomes below the AFDC cutoff but not on the program to receive Medicaid (Blank, 1989).

²⁵ Medicaid expansions covering children under one typically cover pregnant women for services related to the pregnancy.

cover all children under six living in families with incomes below 133 percent of the poverty line and since July 1991 all children under nineteen (and born after September 1983) with family incomes below 100 percent of the poverty line. This last provision expands the coverage of poor children each year to those one year older so that in the year 2000 even 17-year-olds will be covered if their family income is below the poverty line.

These rules describe what can be done with Medicaid dollars that are matched by the Federal government. Some states expanded medical coverage for children and sometimes adults with their own funds. Furthermore, the differences across states in the extent to which they took advantage of the permitted coverage options generated large differences in who was covered in different years in different states. Moreover, state AFDC rules interacted with the Medicaid expansions to determine the additional families covered.

We measure Medicaid by first calculating the number of total family members and the number of family members that would be covered if a woman works.²⁶ We then convert these numbers to dollar values using Medicaid expenditures per child and adult which we smooth over time and index using the medical care CPI. As can be seen in Table 1, there was a fairly steady increase over our sample period in the number of family members covered under Medicaid if a single mother works.

The theoretical effect of Medicaid expansions on the decision to work is unambiguously positive, since those newly covered are those with earnings that would make them ineligible for AFDC. The Medicaid expansions also could result in some working women increasing their hours, if pre-expansion earnings limits resulted in them reducing their hours of work in order to qualify for Medicaid coverage. Overall, the effect on hours conditional on working is ambiguous, since the expansions also could result in hours decreases for women who choose to reduce their hours in order to qualify for Medicaid coverage for their children.

4.4 AFDC Program Waivers

Under Section 1115 of the Social Security Act, the Secretary of Health and Human Services (HHS) is authorized to waive specified program requirements to allow states to experiment with program changes that are judged to promote the objectives of AFDC. This waiver authority had been rarely used prior to the late 1980s, but its use accelerated during the Bush administration and continued under President Clinton. Between January 1993 and August 1996 HHS approved welfare waivers in 43 states.

While states experimented with changes in nearly every aspect of AFDC, many provisions applied to small parts of states or would not be expected to have a substantial effect on the employment of single mothers. We focus on a few types of waiver provisions that were tried in many states. Some common types of provisions, such as expanded income disregards, have been incorporated in our coding of the AFDC program. Others, such as family caps (which limit the benefits for additional children) or increased resource limits (which loosened the asset restrictions for AFDC eligibility),

²⁶ Note that this variable does not capture transitional Medicaid for women who lose AFDC benefits due to the loss of earnings disregards (effective October 1984) or increased earnings (effective April 1990).

likely have small or ambiguous effects on employment.

Unlike several other recent studies we focus on implementation dates and actual beginning dates of terminations. We also try a variable for application for a major state-wide waiver in case this indicates a tightening of administrative requirements in a state. These variables are interacted with an indicator for whether a woman has children. In Table 1 we report the fraction of single women living in states that have applied for or implemented various types of waivers. Very few women were in states that had implemented significant waivers through at least 1994. The fraction of women in states that had made a major waiver application was much higher, 0.22 in 1992 and 0.85 in 1996.

4.5 Training Programs

To capture the effect of training programs on the probability of work by single mothers we focus on the programs specifically for AFDC applicants and recipients. During the 1980s, the AFDC training program was the Work Incentives (WIN) program. WIN expenditures fell substantially over the early part of our period from \$259 million in 1984 to \$93 million in 1988. In 1988 the Family Support Act was passed which established a new employment, education, and training program called JOBS (Job Opportunities and Basic Skills Training Program), which began in some states in 1989 and others in 1990. Expenditures quickly rose and were already \$804 million in 1991.

WIN and JOBS differed in two key respects. First, JOBS exempted fewer women from work or training requirements. Second, JOBS included high school and post-secondary education, though JOBS also seems to have had a greater emphasis on building job skills and readying people for work. The relative emphasis on particular components of training differ greatly across states and over time. We construct two variables which measure the character and extent of the JOBS and WIN programs in a state and year. Because educational spending is likely to have a different effect than other spending, we split expenditures into education and other, where the other category is mostly job search and related activities. We scale state expenditures by the size of the AFDC mandatory population. These variables are interacted with an indicator for whether a woman would be required to participate in JOBS or WIN (based on the age of her youngest child; these rules differed across states and over time), so that these variables equal zero for single women without children or with children under the age cutoff.

State-level training expenditures under a certain amount (or cap) were matched by the federal government using a modified Medicaid match rate, which was inversely related to the state's per capita income. This cap was partially determined by the number of AFDC recipients in a state. Since AFDC receipt and employment are negatively correlated, one could be concerned about the endogeneity of these training variables. There are several things that make this issue less of a concern here. First, most states do not spend up to the cap, one potentially endogenous part of the training expenditures formula. Second, the Medicaid matching rate varies a fair amount across states and over time (from 50 to 83 percent). Lastly, we calculate expenditures per AFDC mandatory participant to eliminate any dependence on the number of participants. Our conversations with HHS officials have made us less concerned about the potential endogeneity of the training variables. On the other hand, these conversations have suggested that focusing on these

federal dollars misses many state training programs that affected single mothers as well as other federal programs such as JTPA.

The effects of these training programs on labor supply likely depends on the mix of services provided and the stringency of the participation requirements. Job search, job placements, improving job skills and readiness should lower job search costs, thereby increasing the level of work for women trainees. On the other hand, even if it has a beneficial long-term effect on wages and/or employment, secondary or post-secondary education may delay entry into the workforce while women take classes, leading to a short-term negative employment effect. In any case, there is much stronger evidence of employment effects from job search assistance than from education, at least in the short-run.²⁷

4.6 Child Care

The cost and quality of child care is likely to have an important effect on whether a woman works. A large number of Federal and State programs affect the availability and cost of child care.²⁸ Several Federal programs such as the Dependent Care Tax Credit and Title XX Social Services Block Grants have been existence for decades, though have declined in importance in recent years. Another program, Head Start has not declined in expenditures or enrollment, but is usually part day and serves 3 and 4 year-olds almost exclusively.

The federal role in child care for low income women expanded greatly following the Family Support Act of 1988 and the Omnibus Budget Reconciliation Act of 1990. Four large programs started during this period: AFDC Child Care, Transitional Child Care, At-Risk Child Care, Child Care and Development Block Grants. We focus on these programs because they are likely to be particularly important for single mothers. Total expenditures on these four new federal programs by state and year are scaled by the number of single women in a state with children under 6. These numbers can be seen in Table 1 which shows a steep rise in child care expenditures between 1988 and 1992, followed by a slower rise in latter years.

As with training expenditures, we are concerned about the potential endogeneity of child care dollars. AFDC and Transitional Child Care expenditures were not capped and were matched at the Medicaid matching rate (which is inversely related to state per capita income). State allocations for At-Risk Child Care were proportional to the number of children under age 13 in the State. The Federal share of these expenditures was also based on the Medicaid matching rate. Funds for Child Care and Development Block Grants were allocated to the States based on the States' proportion of children under age 5 and the number of children receiving free or reduced-price school lunches, as well as the States' per

²⁷ See Gueron and Pauly (1991) and U.S. Department of Health and Human Services (1997) for comparisons of job training programs that emphasize job search (sometimes called the labor force attachment approach) and those that emphasize education (sometimes called the human capital development approach). If mandatory training is viewed by some women as an additional cost of AFDC participation, then more extensive training and tighter requirements could also encourage work rather than AFDC participation. We should note that the opposite is also possible, i.e. if the training is thought to be valuable and is provided free to AFDC participants, then welfare participation could rise (Moffitt, 1990).

²⁸ The Congressional Research Service identified 46 programs operating in 1994 that were related to child care (U.S. House of Representatives, Green Book, 1996, p. 640). Most of the programs were small; 32 of the 46 provided less than \$50 million in annual funding.

capita income. As with training expenditures, our conversations with HHS officials made us less worried about the potential endogeneity of federal dollars and more worried about the omission of state child care programs.

5. The Determinants of Employment

We use several different econometric methods to identify the impact of the recent policy changes on the employment of single mothers. The methods rely on comparisons between single mothers and single women without children or they rely on changes for some groups of single mothers relative to other groups. We begin with the familiar difference in differences estimator. This approach compares employment rates over time for single mothers to those for single women without children. If the two rates diverge, the difference is taken to be due to changes in the policies faced by the two groups. This approach is the one taken by Eissa and Liebman (1996) in their study of the 1984 to 1990 period.

We then move on to our main approach that uses our structural model to distinguish between the different policies and to provide estimates that have a clearer interpretation. This approach uses a variety of sources of variation in our key explanatory variables besides time. In particular the identifying variation comes from differences in taxes and benefits for families of different sizes as well as changes in these taxes and benefits over time, state cost of living differences, and differences across states in their taxes and benefits, as well as changes over time in these taxes and benefits. We also briefly consider estimates which use differences in wages and hours across different groups interacted with the other sources of variation.

5.1 Employment Rates of Single Mothers and Single Childless Women

As a starting point, we compare the employment rates of single mothers and single women without children. Table 2 reports these rates as well as the employment rate for childless women minus the rate for women with children. We report this difference because many determinants of employment that change over time, in particular wages, might be expected to affect the two groups similarly. Other determinants of employment, in particular the tax and transfer programs that we examine, specifically affect single mothers. The top panel of Table 2 compares all single mothers to single childless women. The bottom panel compares single mothers with children under 6 to single childless women. We pay particular attention to this subsample with young children for two reasons. First, because we expect this group to be more responsive to changes in the rewards to work and second, because employment changes are likely to have greater effects on children, for better or worse, when they are young and their mother likely plays a larger role in their care and education.

We report two different measures of employment: whether a woman worked last week (from the ORG data) and whether a woman worked at all last year (from the March data). Each measure has its advantages. Whether a woman worked last week is probably a better measure of labor supply to use as an input to policy decisions since its

average captures the fraction of women working in a given week. This variable will be especially useful if those who move in or out of the work force on the margin work few weeks during the year. On the other hand, as discussed earlier, the EITC unequivocally increases the probability of working at all in a given tax year, but for some could decrease weeks worked. If our goal is to provide a sharp test of theoretical predictions, whether a woman worked last year is a better outcome measure. We report both measures with the expectation that the effects of many of the recent policy changes on the weekly employment measure will be smaller than those for the annual measure.

The employment rates reported in Table 2 show a striking time pattern. In the ORG sample, weekly employment increased by almost six percentage points for single mothers between 1984 and 1996, but declined by nearly one percentage point for single women without children. For women with young children the increase in employment is even larger: ten percentage points. In the March CPS, annual employment rose by over eight and one-half percentage points for single mothers, but declined by a full percentage point for single women without children over the same time period. Again, for women with young children the increase in employment is even larger: thirteen and one-half percentage points. Furthermore, nearly all of the increase in employment for single mothers took place between 1991 and 1996. These results suggest that the rising employment of single mothers was not a result of better work opportunities for all women, since single women without children had slight declines in employment. Moreover, the timing of the increase in employment suggests that policy changes in the 1990s are likely to have played a role.

5.2 Characteristics of Single Mothers and Single Childless Women

The results in Table 2 rely on the comparability of single women with and without children. In this section we briefly report on some of the characteristics of these two groups. Appendix Tables 1 and 2 report descriptive statistics for single women with and without children. Appendix Table 1 reports characteristics of the ORG sample for each of four years, 1984, 1988, 1992, and 1996. Appendix Table 2 reports a slightly different set of descriptive statistics including earnings and hours measures using both the March and ORG samples. This table can also be used to compare the two CPS samples. The tables indicate that single mothers tend to be older and less educated and are more likely to be nonwhite than single women without children. The age of single women without children rises appreciably over the sample period, as does the education level of single mothers. The fraction of single mothers living with parents is stable, while the rate for single women without children falls. The rates of cohabitation rise for both single women with and without children.

We should not that this table gives some suggestion that single women with and without children are similar in an important dimension: wages. The mean earnings of women with and without children are fairly similar once one conditions on working last year (they are much closer if one controls for education also). The means for conditional hourly earnings are even closer. This similarity is especially important for some of the estimates in Table 6 where we use the earnings distribution for single women without children as a proxy for the earnings distribution of

single women with children.

5.3 Accounting for Individual and State Characteristics

The results in Table 2 could be partly explained by differential changes over time in characteristics such as age and education for single women with and without children. Moreover, business cycles may differentially affect single women with and without children, thereby leading to employment shifts unrelated to policy changes.

Consequently, Table 3 presents probit employment estimates for single women controlling for demographic and business cycle changes.

We include a vast array of controls for differences between the two groups and we include the unemployment rate as well as its interaction with whether or not a woman has children. The specification that we estimate is:

$$(5.1) \quad P(E_{it} = 1) = \Phi\{\alpha X_{it} + \beta_t \text{YEAR}_t + \gamma_t(\text{YEAR}_t * \text{ANYCHILDREN}_i)\},$$

where E_{it} equals one if woman i from year t reports positive hours worked in the reference week for the ORG (or the previous year for the March CPS), X_{it} is a vector that includes demographic and business cycle variables, YEAR_t is an indicator variable for year t , and ANYCHILDREN_i equals one for a woman with children. The year dummies control for labor market trends in overall female employment and the X vector controls for demographic and business cycle effect differences between the groups, especially compositional shifts over time. Thus, differences between γ_t coefficients give difference in differences estimates controlling for these other factors.²⁹ These differences can be interpreted as estimates of the combined effect of changes in all factors affecting the employment of single women with children relative to those without children.

The demographic and business cycle variables included in Table 4 include controls for state, race, ethnicity, age, education, marital status, marital status interacted with a children indicator, the number of children under six and eighteen, the state unemployment rate, the state unemployment rate interacted with a children indicator, (for the March CPS only) controls for pregnancy, central city and unearned income, and (for the ORG only) controls for month and month interacted with a children indicator. For comparison, Table 4 also reports probit estimates without the control variables X . As can be seen in this table, the differences in differences calculated by subtracting one $\text{YEAR} * \text{ANYCHILDREN}$ coefficient from another are hardly affected by including the controls.³⁰ For example, between 1984 and 1996 the weekly employment of single mothers relative to single women without children rises 5.4 percentage points without controls and 5.9 percentage points with controls. For annual employment, the difference in

²⁹ Note that standard errors for these differences in differences cannot be directly calculated from Table 3 since they require covariances which are not reported. For successive years, which share approximately half of their samples, we would expect covariances to be positive. Hence, the standard error for the *difference* between successive years should be smaller than the standard error calculated under an independence assumption. For sample years which are more than one year apart, covariances are likely to be small.

³⁰ Due to the difficulty in gauging the magnitude of probit coefficient estimates, instead we report average derivatives of the probability of working with respect to each of the explanatory variables. Thus, differences in the average derivatives for the $\text{YEAR} * \text{ANYCHILDREN}$ variables give changes over time in the difference in employment between single women with and without children, analogous to the changes that can be calculated from Table 2.

differences estimator for 1984 to 1996 suggests a 7.1 percentage point increase in the relative annual employment of single mothers without controls and 7.3 percentages points with controls. Again, most of the increase occurs between 1991 and 1996. Therefore, these difference in difference estimates suggest a potential role for policy changes, especially since 1991.

5.4 Policy Variables and Employment Using the Structural Model

Table 4 reports estimates of our structural model of the effects of tax and welfare policy on the probability that a woman works. These specifications allow us to examine the separate effects of the different policy changes during the 1984-96 period. These specifications also provide coefficients that can be used to summarize the effects of a wide range of policies and that can be used to simulate other policies. The specifications in Table 4 include all single women and use an earnings distribution which does not vary across individuals, except that it differs for women with and without children. In addition to the variables shown in Table 4, each of these probits include the control variables reported in Table 3 (except for the YEAR*ANYCHILDREN interactions) along with additional variables listed in the table notes. We focus first on the full sample specifications in columns (1) and (5).

All of the coefficients on the income variables have the signs that are implied by our structural model and are significantly different from zero.³¹ Lower taxes and lower maximum welfare benefits increase employment, while higher welfare benefits if a woman works (due to lower implicit taxes on earnings) increase work. Rather than restricting the income variables to enter the work/non-work decision as a single expected income variable we have allowed the coefficients on the different components of income to differ. It is, thus, encouraging that the coefficients on the income tax and welfare variables have roughly the same magnitude, as we expect. However, there is a somewhat larger than expected coefficient on Welfare Benefits if Work in the worked last week equation.

TAXES

The Income Taxes if Work coefficient implies that a one thousand dollar reduction in income taxes if a woman works increases employment last week by 1.7 percentage points, and increases employment last year by 2.7 percentage points. Both of these effects are strongly significant. These coefficients indicate elasticities of the participation rate with respect to the return to work of 0.65 for any employment during the year and 0.51 for work in an average week.³² We also estimated specifications with separate coefficients on state and federal income taxes, though for brevity these full estimates are not reported here. The results for federal taxes were similar to all taxes,

³¹ We checked our standard errors using STATA to allow for correlation among the error terms at the level of state*year*ANYCHILDREN. These standard errors are very close to those without this correction for clustering.

³² These elasticities are calculated using the participation rates and average pre-tax earnings of Appendix Table 2, i.e. $(0.0271/0.759)/(1,000/18,165)=0.65$ and $(0.0168/0.600)/(1,000/18,165)=0.51$.

while the derivative (standard error) for states income taxes was a large and significant -0.0294 (0.0074) in the ORG sample and a small and insignificant -0.0083 (0.0091) in the March sample. Thus, while the state tax estimates are much less precise and differ in the two samples, they give the same message as the other tax coefficients, i.e. that the labor supply of single mothers responds to taxes. In an alternative specification we use the one year lagged tax variable instead of the contemporaneous tax variable to test the hypothesis that women learn about tax changes one year after they are implemented. The results do not show strong support for or against this hypothesis. The coefficients on all of the variables including the tax variable hardly differ from those in our base specification.

WELFARE

The full sample specifications of columns (1) and (5) also indicate substantial effects of welfare on employment. A one thousand dollar reduction in the annual Welfare Maximum Benefit (the AFDC plus Food Stamp benefit a women receives if she does not work) increases employment last week by 3.1 percentage points, and increases employment last year by 1.9 percentage points. We should emphasize that this effect holds constant the other welfare variables, Welfare Benefits if Work and Probability of AFDC Receipt if Work, that generally change with the maximum benefit. The Welfare Benefits if Work effect is somewhat larger than expected, especially for employment last week, implying that a one thousand dollar increase in benefits when one works increases employment last week by 7.5 percentage points and last year by 3.7 percentage points. These estimates suggest substantial positive employment effects of reductions in implicit tax rates and increases in earnings disregards.

The transaction costs or stigma of welfare receipt as measured by the Probability of AFDC Receipt if Work variable is negative and significantly different from zero as expected. The magnitude of this coefficient can be gauged by comparing it to the coefficients on the variables denominated in thousands of dollars. Such comparisons suggest a transaction cost of several thousand dollars, with the exact number depending on the employment measure and the income variable used. For example, using the Welfare Benefits if Work coefficient in the ORG sample yields a transaction cost estimate of \$2,480, while the March sample implies an estimate of \$3,354.³³ This result agrees with past studies as well as ethnographies which have tended to find substantial transaction costs or stigma of welfare receipt. However, the magnitude of this effect is probably larger than expected.

To assess the affect of cutting the AFDC and Food Stamp benefit one needs to incorporate the effects of all three of the welfare variables. When the maximum benefit is cut it not only reduces benefits if one does not work, but also reduces benefits if one does work and decreases the likelihood that a working mother will be on welfare at all and pay its transaction costs. When we do the full calculations, we find that a ten percent cut in the maximum benefit (about \$750 annually) increases the employment rate last week by about 1.3 percentage points, and employment last year by about 1.2 percentage points.

³³ These are calculated as $0.1850/0.0746$ and $0.1241/0.0370$, in the ORG and March samples, respectively.

Despite a more detailed calculation of welfare incentives than most past work and the use of panel data techniques, we think there are important potential sources of bias in these estimates. We should also note that by dividing the effect of welfare into income when working and when not and by estimating a separate term for transaction costs/stigma we are putting the theoretical predictions to a more severe test than most work. As discussed in Section 4, the Welfare Benefits if Work variable and the Probability of AFDC Receipt if Work variable are more difficult to calculate precisely than our other variables. The larger coefficient on the Welfare Benefits if Work variable could also be due the scale of this variable being inappropriately low. The earnings distribution used to calculate expected benefits puts most of the weight on earnings levels where welfare benefits would be low or zero. It is very likely that we should use an earnings distribution which puts greater weight in the left tail, since women who work while on welfare rarely report all of their earnings to the welfare office (Edin and Lein, 1997). The reasons for possible bias in the Probability of AFDC Receipt if Work variable are similar. The coefficients on these two variables tend to both be large in the same specifications with their opposite signs canceling each other out.

MEDICAID

We find little effect of Medicaid on the employment decisions of single mothers. Theory predicts that the Medicaid Maximum (the dollar value of benefits received if a women does not work) will have a negative effect on employment and the Medicaid Coverage if Work variable will have a positive effect. The two variables have the opposite effect from this prediction in both samples, though the Medicaid if Work coefficient in the ORG sample is the only one that is significantly different from zero. These results are not completely unexpected given the weak and conflicting findings in past work. Part of the difficulty must be the uncertainty about individual knowledge of Medicaid rules and their valuation of the benefits. Valuing the offer of Medicaid coverage is not straightforward, because it depends on the likelihood of private coverage for working women, which may vary across individuals, in particular it may differ by state and income level or over time. The likely effect of the Medicaid expansions on employment is diminished by incomplete participation and the displacement of private coverage (Cutler and Gruber, 1996). Furthermore, Medicaid's value also depends on the availability of free clinics and emergency room treatment. We have tried a large number of alternative specifications, none of which indicates a large effect of Medicaid. These alternatives include specifications that account for predicted private coverage, that measure Medicaid in terms of family members covered, that separate out the Medicaid expansions from changes in AFDC rules, and that use methods close to those of Yelowitz (1995). A full accounting of these results can be found in Meyer and Rosenbaum (1999b).

WELFARE WAIVERS

The AFDC waiver variables have the expected effect on employment and their coefficients are significantly different from zero. Both the implementation of a time limit on welfare receipt and the actual termination of benefits

under a work requirement or time limit waiver are predicted to increase employment by between 1.2 and 3.4 percentage points. One should note that until the last years of our sample the overall importance of such waivers is small. Even by 1994, only five percent of single mothers lived in states with a time limit, and less than half of one percent lived in states that had begun to terminate benefits.

One should be cautious in interpreting the waiver coefficients, especially in attributing effects to the implementation of particular provisions of recent waivers or the termination of cases per se. It is likely that the perception of welfare changes by potential welfare recipients and the attitudes of case workers play a large role in influencing the welfare caseload and consequently employment. It is also econometrically difficult to disentangle which provisions of a waiver are the most important, since states typically implemented several changes to their AFDC programs under waivers at the same time. The reported coefficients are partly the effect of the particular actions coded and partly a proxy for other changes going on in the states. It is also problematic to predict the effect of a particular waiver in a particular state based on the reported coefficients since the publicity, provisions, and implementation of the waivers characterized as "time limits" varied greatly across states.

Recognizing these limitations, there are several reasons that the strength of the evidence here for a causal interpretation of the waiver results is much greater than in the studies of welfare caseloads. First, we use implementation dates, rather than application or approval dates which are at best loosely related to when provisions are enforced. Second, when we account for state intentions to reform welfare as indicated by whether or not a state has made a major waiver application, this variable has little effect. Third, one or two year leads of our time limit and termination variables have small and insignificant coefficients. Suggesting that the provisions per se, rather than publicity or administrator attitudes lead to the employment increases. This result contrasts with those of Blank (1998) and Levine and Whitmore (1999) who found strong effects of leads of waiver variables on caseloads.

TRAINING AND CHILD CARE

The last three coefficient estimates in Table 4 measure the effects of expenditures on training and child care. Training expenditures on education have the expected negative effect, that is significant in the ORG sample, that would occur if training draws women out of employment and has only a modest subsequent effect on the probability of employment. On the other hand, other training, which is mostly activities designed to lead to immediate employment such as job search, have the positive and significant coefficient that is expected given the literature on job search programs for the welfare population. The effect of an increase in expenditures of one thousand dollars per training mandatory AFDC recipient (about two-thirds of average expenditures) implied by these coefficients would be an increase in the rate of employment for single mothers without young children of over three percentage points. Since single mothers without children young enough to exempt them from training programs make up about half of all single mothers, the overall effect would be over 1.5 percentage points. One caution in interpreting this result is that a bias would result if states spend more on job search programs and less on education programs when

employment opportunities are good for former welfare recipients.

The last coefficient of Table 4 indicates that higher expenditures on child care are associated with a higher employment rate for single mothers. An increase in federal and state child care expenditures of five hundred dollars per single mother with a child under six (slightly less than the mean) is associated with a 1.3 percentage point increase in employment in a given week and 0.8 percentage point increase in any employment during the year. These effects are quite substantial per dollar expended. The main sources of variation in child care expenditures suggests that it is plausibly exogenous. These sources of variation are the changes in federal expenditures interacted with state/year characteristics, specifically the number of young children, per capita income, and the poverty rate. Nevertheless, further exploration of the determinants of program expenditures would be useful.

RESULTS BY EDUCATION GROUP

Table 4 also reports separate estimates for the effects of the policy variables for three education groups: less than high school, high school, and some college. We would expect a priori that the policy variables, which mostly capture taxes and benefits received by low income women, would have the greatest effect for high school dropouts, less of an effect for those with a high school degree, and even less of an effect for those with some college. We should emphasize that these estimates use a fixed wage/hours distribution (that does not vary by education) to calculate the income and benefit variables so that the explanatory variables are comparable across the columns. Overall, the results by level of education provide a very similar message to those for the full sample. The derivatives tend to be much larger in absolute value for high school dropouts than they are in the full sample, and much smaller for those with some college than in the full sample. For example, a one thousand dollar cut in taxes (or increase in tax credits) for high school dropout single women is predicted to increase their employment by 3.9 percentage points in a typical week and increase work at all during the year by 7.6 percentage points. The corresponding numbers for those with some college education are 0.9 percentage points and 1.1 percentage points. Other policy variable derivatives have similar drops with increased education, though the decline is less pronounced for the training and child care variables.

It might be expected that the derivatives would be lower for groups with higher levels of education, if the coefficients are the same for all groups, since the probit functional form implies that the derivatives will be smaller for groups with an employment rate farther from one half. However, it appears that the drop in the magnitude of the policy variable derivatives with more education is greater than it is for other control variables such as the unemployment rate.³⁴

This is suggestive evidence that the greater responsiveness of the less educated groups to the policies reflects more than their likely greater responsiveness to all factors affecting employment.

³⁴ The probit functional form assumption seems to be reasonable for employment as the coefficients do not vary much with education even though the employment rate varies substantially.

ALTERNATIVE ESTIMATES

Since many of the changes in policy, notably welfare reform, took place in recent years, and a well publicized decline in the welfare rolls began in 1994, we re-estimate the full sample specifications of Table 4, dropping the years 1994-1996 along with the waiver variables (which are nearly always zero through 1993). The estimates from this shorter sample are very close to those over the full sample period. The only exception to this generalization is that the child care variable is much smaller and statistically insignificant over the shorter time span. These results clearly indicate that the flurry of welfare reform measures after 1993 have not falsely led to our main results. This specification also indicates that the extended recovery of the 1990s is also not a spurious explanation for our main results.

In the next three specifications of Table 5, we interact year and/or state with indicator variables for the presence of children.³⁵ These specifications identify the effects of the income variables through variation over time across states and family sizes. In these specifications, children interactions with year do not have a large effect on the coefficients. On the other hand, children interactions with state do appreciably reduce the magnitude and significance of many of the income and welfare coefficients, particularly in the ORG sample.

In Table 6 we try four additional specifications. First, we try a sample of only single mothers. This sample restriction, combined with our continued inclusion of state and year dummy variables implies an identification strategy similar to some of the Table 5 specifications. In the case of the Income Taxes if Work variable, we are largely using the variation from the last few years when the EITC for women with one child was nearly unchanged but the EITC for women with two or more children rose in large steps.³⁶ Thus, identification comes from using women with one child as a control group, and changing the treatment that women with two or more children receive. With single mothers only, the year indicators remove the time trend in welfare receipt, and the state indicators remove time-constant differences in state welfare benefits and much of these state cost of living differences in the income variables. The variation in welfare benefits used to identify the coefficients is now changes in state-level benefits after controlling for changes in the national average. In columns (1) and (5) the standard errors, particularly on the income tax variable, are much larger. The earnings variables tend to have smaller coefficients and much weaker effects. The tax coefficient is no longer significantly different from zero in the ORG sample, but rises a bit and remains significant in the March CPS data. The welfare benefit variable coefficients are now no longer significant. The AFDC transaction cost coefficient, however, remains significant in the ORG data, while the Medicaid coefficients still often have the wrong sign and remain small and insignificant. This identification approach examines the employment response to fairly subtle or short-run features of the welfare and tax laws. In

³⁵ We include separate indicator variables for AFDC eligible children (under 18) and EITC eligible children (under 19 or under 24 but in school).

³⁶ An additional, though smaller, source of variation among single mothers comes from the \$1,058 (1996 dollars) increase in the personal exemption in 1987.

particular, it relies on year to year changes in welfare benefits and changes in the EITC by family size in the last three years. These policy changes may be overwhelmed by other factors in these specifications.

In our second and third specifications of Table 6, we split the sample by the age of the youngest child. To begin assessing the overall social welfare effects of some of the policy changes we study, it is necessary to determine if the policies affect the extent of parental care children receive. Since parental care is likely to be especially important for young children who are not in school, we split the sample into those families with a child under six, and those with only older children. The derivative estimates are often substantially larger in magnitude for families with young children. This difference is particularly apparent for the tax variable in the ORG sample. These results raise the social welfare stakes in these policy changes, since the single mothers that are going to work are leaving young children in the care of others.

The last specification of Table 6 brings in additional variation in the income variables by interacting them with differences in the earnings potential of individuals. We allow the wage/hours distribution for women to depend on full interactions of indicator variables for age, education, race and region. We use the distribution for single women without children rather than the distribution for single mothers to avoid any direct endogeneity from the groups whose employment we study. The sources of variation in the income variables is now that used in our main specifications interacted with the earnings differences across the 90 groups, controlling for the main effects of the 90 groups. The results differ from those in Table 4 as the income tax effects are weaker, though still negative, substantial and significantly different from zero. The welfare coefficients fall slightly and most other variables have similar effects.

We should emphasize that, unlike the earlier estimates, the results of columns (4) and (8) of Table 6 are heavily dependent on the linear utility assumption. In the earlier estimation methods we were not using differences in earnings levels to identify the effects of welfare and taxes, rather we used how state and federal changes have affected a fixed earnings distribution. While misspecification of the utility function certainly could have biased the earlier results, the curvature of the utility function was not central in determining whether one policy was more generous than another. Now this issue is more important. To give an example, we must explicitly determine whether \$500 in taxes has a smaller effect on employment for someone who would earn \$10,000 than \$1000 does for someone who would earn \$25,000. We currently make the strong assumption that the effect in the former case is one-half of that in the latter. This assumption is likely violated here, and moreover, this assumption is important in this case because comparisons like those in the example are what drive identification in these last estimates. This issue is particularly important for the tax variable since it is not monotonic in income, unlike the welfare and Medicaid variables.³⁷ In other work that we do not report here, we have relaxed our assumption of linear utility for the main specifications of Table 4 and found similar derivatives.

³⁷ For example, the EITC payment is about \$2000 for a woman with two children in 1996 who earned either \$5,000 or \$19,000.

6. Alternative Explanations and Additional Specifications

THE CPS REDESIGN

One caveat in interpreting changes in employment for single mothers during the years 1992 to 1994, is that beginning in January 1994 the CPS used a redesigned questionnaire.³⁸ We assess the extent of any bias due to the redesign using two methods. First, we take advantage of the fact that in the March CPS reports retrospective employment information, so the redesign first affects the 1993 employment rates. Conversely, for the contemporaneous employment information used in the ORG, the redesign first affects the 1994 rates. We compare the seam in each of these two datasets to unbroken data from the other dataset to provide an estimate of the bias due to the redesign. One caution regarding this procedure is that the March CPS measures annual employment, while the ORG records weekly employment. However, Table 2 indicates that year to year changes in the two surveys tend to be in the same direction and of a similar magnitude, though the March CPS changes tend to be slightly larger. Note that we focus on the difference in differences, i.e. the one year change in the employment rate for single mothers minus the change for single women without children.

In Table 7, we compare the 1993-1992 March CPS difference in differences (single mothers minus single women without children) that spans the redesign to that in the unbroken ORG data. This comparison suggests that the redesign has led to an understatement of the increase in single mothers' employment in the March CPS, but the bias is small and insignificant. Similarly, we compare the 1994-1993 ORG difference in differences which spans the redesign to that in the unbroken March CPS data. This comparison suggests that the redesign has led to a substantial understatement of the increase in single mothers' employment in the ORG, though the bias estimate is only marginally significant. Since the changes due to the redesign mostly affected questions from the monthly questionnaire (the basis for the ORG data) rather than those from the supplemental questionnaires (the basis for the March CPS data), it is not surprising that the effects are larger in the ORG.

The second method of estimating the redesign bias exploits the parallel survey of 12,000 households which was conducted using the new collection procedures and questionnaire between July 1992 and December 1993. Table 8 reports comparisons of the difference in differences (single mothers minus single women without children) in the parallel survey to those in the ORG. These estimates suggest a small but insignificant positive bias in the ORG due to the redesign. Hence, this analysis suggests that the redesign resulted in a small *overstatement* of the increase in employment of single mothers in the ORG. Overall, these comparisons indicate that the CPS redesign is not the

³⁸ For a description of this CPS redesign, see Cohany, Polivka, and Rothgeb (1996), and Polivka and Miller (1995).

source of the recent employment increases of single mothers.³⁹

ARE SINGLE MOTHERS A GOOD COMPARISON GROUP?

A potential criticism of our results in Table 4 (and some of those in Tables 5 and 6) is that single women without children are not a good comparison group for single mothers. In particular, it might be argued that employment rates are so high for single women without children that it is unreasonable to expect this group to respond to changes in economic conditions in the same way that single mothers do. There are at least two reasons why this argument is not compelling. First, employment rates are not particularly high for low-educated single women, particularly when examining employment last week. Only 33 percent of high school dropout single mothers worked and 48 percent of single women without children worked last week. Nevertheless, our derivative estimates for the policy variables tend to be the largest and most statistically significant for this group. Second, this issue of “ceiling effects” is really one of functional form. A probit model naturally forces the marginal effects of all variables to be smaller in the tails as probabilities approach zero or one. However, the probit functional form may not be the right one, or the linear, additive argument of the probit function may be inappropriate, suggesting that we may want to consider other functional forms, or some type of semiparametric estimation in the future.

One might also wonder if the large increases in employment that we find for single mothers, but not for single childless women, also occur for other demographic groups. We examine whether there are similar employment increases for two other groups with historically low employment rates: black males 16-49 and married women 19-44. We obtain weekly employment from our ORG data over the 1984-96 period, and annual employment over the 1967-96 period from our ADF data. For black males there is no change in either annual or weekly employment rates between 1991 and 1996, the period when single mothers’ employment experiences most of its rise. Over a longer time period, there is a very small rise in black male employment between 1984 and 1996, but the entire increase occurs by 1985. For married women, there is a small increase in employment between 1991 and 1996, but the increase is much smaller than in previous periods of that length. This pattern is evident in both the annual and weekly employment data. Thus, the large increases in employment of single mothers over 1984-96 and particularly since 1991-96 are not mirrored by other groups.

Another potential criticism is that using variation across women in their marital status, number of children, and state of residence, implicitly assumes that marriage, fertility, and migration decisions are exogenous to the policy changes that we examine. The evidence on the effects of policy changes on these decisions is mixed, making the exogeneity assumption more plausible. For example, in her recent review Hoynes (1997) concludes: “Together this evidence suggests that marriage decisions are not sensitive to financial incentives.” She also argues that: “Overall

³⁹ A final source of evidence is the SIPP employment rate change between 1993 and 1994 reported in Liebman (1997). He finds that employment rose 4.5 percentage points over this period. The comparable change in the ORG was 1.8 percentage points, again suggesting that the ORG understates the rise in single mothers employment.

[the effects of welfare on out-of-wedlock births] are often insignificant, and when they are not, they are small.” In addition, during the 1990s, the rate of increase in the fraction of women 19-44 who are single mothers slowed, thereby providing no hint that the large recent increases in work by single mothers are due to working women changing their fertility or marriage behavior. However, there is no strong evidence here to the contrary, since the appropriate counterfactual rate of single motherhood is unclear.

ADDITIONAL SPECIFICATIONS

We try several other sets of estimates which are not reported here in order to examine the benefits of studying many programs at the same time, to check the sensitivity of our results to alternative specifications, and to see if there are particularly large effects for certain subgroups of the population. We find that leaving out some of the program that we study has a substantial effect on the estimates for the remaining programs. When we include the tax variable, but leave out the other policy variables, its coefficient is quite a bit larger. When the only policy variables that we include are Medicaid if Work and the Welfare Maximum Benefit, the Medicaid variable is positive and, in the case of the March CPS, significant. When the other policy variables are not included, the waiver variables are much larger. On the other hand, the tax variable is only slightly larger when the training and child care variables are excluded.

We try a specification where we do not adjust the income variables for state cost of living differences. This modification reduces the magnitude and the significance of the income tax coefficients, though the change is only large in the ORG data. We try samples which include separated women and samples which include women in school. The results in these samples using the March ADF or ORG data are extremely close to those in our base samples. We also try a more stringent definition of employment. In the case of hours last week, we require at least 10 hours, and in the case of hours last year, at least 500 hours. This change has little effect on the results; it tends to give slightly larger coefficients on the policy variables. These results suggest that the increases in the employment of single mothers that we find are not simply due to women who are working a few hours a week in order to satisfy AFDC work requirements. Moreover, this alternative definition (and the resulting lower employment rates) are also further support for the conclusion that “ceiling effects” are not the explanation for our results.

We also try several subgroup analyses, in particular we examine differences between whites and nonwhites, and family heads and subfamily heads. There are not large differences between these groups and there does not seem to be a consistent patterns to the direction of the differences.

7. Which Policies Accounted for the Employment Changes?

Our simultaneous examination of many government policies makes it straightforward to estimate the relative contribution of these policies to the recent increase in employment of single mothers. In Table 9 we decompose the employment increases for both the entire period (1984-1996) and the recent period of rapid employment growth

(1992-1996). Overall, these decompositions indicate a large role for the EITC, modest roles for AFDC benefit cuts and waivers, and smaller roles for Medicaid, training, and child care increases.

Using the parameter estimates from our main specifications (Specification (1) and (5) of Table 4), the EITC explains 41 percent of the increase in weekly employment over the full 1984 to 1996 period, yet only 27 percent of the increase between 1992 and 1996. For annual employment, the EITC plays an even larger role, explaining 54 percent of the 1984 to 1996 increase and 33 percent of the 1992 to 1996 increase.

Changes in the maximum welfare benefit and implicit tax rates and the Medicaid expansions account for between 12 and 17 percent of the increase in weekly employment and between 9 and 13 percent of the increase in annual employment. The effect of the Medicaid expansions themselves is usually small and/or negative. Conversely, the effects of welfare waivers appear to be substantial with the estimates suggesting that policies instituted under waivers account for about one sixth of the increase in employment over the full sample period and 20 percent or more of the increase between 1992 and 1996 for both weekly and annual employment. In general, both job training and child care explain small parts of the employment increase, though in the case of weekly employment over the full period child care can account for over 12 percent of the increase.

In results not shown, we recalculate the shares of the employment increase due to various policies using the parameter estimates from specifications with only single mothers (Specifications (1) and (5) of Table 6). These results suggest a smaller role for the EITC in explaining the changes in weekly employment than in Table 9. Changes in the maximum welfare benefit are also less important. However, the annual employment results for the EITC are similar to those in Table 9. The results for welfare waivers, job training, and child care are also largely unchanged.

8. Conclusions

Over the period 1984-1996, there were enormous changes in many of the tax and transfer programs that affect single mothers. The Earned Income Tax Credit was expanded, welfare benefits were cut, welfare time limit were added and cases were terminated, Medicaid for the working poor was expanded, training programs were redirected, and subsidized or free child care was expanded. All of these changes should have encouraged single mothers to work. We find that unprecedented increases in the employment of single mothers occurred, particularly for women with children under six and after 1991.

To assess the role of these policy changes in causing the employment increases, we examine in great detail the incentives of these programs as well as other federal and state income tax provisions, Food Stamps, and the implicit tax rates and earnings disregards under AFDC. We estimate the effects of these programs using two large micro-datasets. We find evidence that a large share of the increase in work by single mothers can be attributed to the EITC, with smaller shares for welfare benefit reductions, welfare waivers, changes in training programs, and child care expansions.

In our study we estimate a structural model of employment which provides several independent tests of the hypothesis that single mothers respond to economic incentives. Unlike most past work which has analyzed one or two programs in isolation, we examine the major programs affecting single mothers. We rely on less subjective measures of welfare waivers such as implementation dates and the beginning of case terminations. We also provide the first evidence on the effects of waivers on employment. Identification in most of our estimates comes from the differences in incentives faced by women with and without children. However, we also rely on changes in the treatment of family size, state cost of living differences, changes in state income taxes, differences in earnings disregards and implicit tax rates across states and changes in these parameters and welfare benefits within a state over time. Most of the evidence remains when we focus only on changes in the incentives faced by one group of single mothers compared to another. We also provide evidence that single women without children are a reasonable comparison group for single mothers.

There appears to be a payoff to some of the methodological improvements. We find that examining one or two programs in isolation can lead to substantial biases in estimated behavioral effects. Our results indicate that financial incentives through the tax and welfare systems have substantial effects on single mothers' employment decisions and that the different sources of these incentives have effects of plausible magnitudes. We find substantial responses to state and federal income taxes, welfare benefits, and implicit tax rates and earnings disregards under welfare. We find a substantial transaction cost or stigma to welfare. We also find substantial effects of training and child care programs, but little effect of Medicaid.

Appendix 1: Description of Policy Variables

This section describes the construction of our policy variables and lists our information sources. First, we begin with the assumptions that we use to determine taxes, program participation, and benefit levels.

1. In the March CPS sample, the age for tax purposes is the age at the time of the March interview. We subtract one for AFDC and Medicaid purposes. In the ORG sample, we use the age at the time of the interview for AFDC and Medicaid, but for tax purposes, we add one for interviews occurring between January and June.
2. Children under 18 are counted as AFDC children.
3. Children under 19 (or under 24 and students) are counted as dependents and EITC qualifying children for tax purposes and as dependents for employer-provided health insurance purposes.
4. Women have no unearned income (including child support) or assets, and their children have no earned income, unearned income, or assets; hence, earnings determine their program eligibility.
5. Single mothers are assumed to file as head of household and claim their children as dependents, while single women without children file as single. Also, all women take the standard deduction.
6. Women receiving AFDC are in their first four months of work and do not claim child care expenses.⁴⁰
7. Single women without children do not receive Food Stamps.
8. Shelter costs (an input in Food Stamp calculations) vary only by state and over time.

A. TAX, WELFARE, AND MEDICAID VARIABLES

First, for each woman we calculate five quantities: *income tax liabilities* (federal and state income taxes incorporating federal and state EITCs); *welfare benefits* (AFDC plus Food Stamps); *AFDC receipt* (indicator for AFDC eligibility); *Medicaid eligibles* (the number of family members eligible for Medicaid); and *Medicaid dollars* (the dollar value for all family members eligible for Medicaid). Under the assumptions above, these calculations are made at fifty annual earnings levels generated from the cells of a joint hours/wage distribution. The fifty cells come from a combination of five annual hours levels (500, 1000, 1500, 2000, and 2500) and ten hourly wage levels (4, 5, 6, 7, 8, 10, 12, 15, 20, and 25).

Second, we use two different hours/wage distributions to weight the above quantities, both of which allow dependence between hours and wages. Our main specifications use an hours/wage distribution calculated from a sample of single childless women with a high school education or less and more than \$500 of annual earnings. Our second hours/wage distribution is calculated within 90 cells defined by full interactions of region (5),⁴¹ age (19-24, 25-34, 35-44), education (<12, 12, >12), and race (white and non-Hispanic, nonwhite or Hispanic) using a sample of single childless women with more than \$500 of annual earnings.

Using these hours/wage distributions, we construct the following variables.

Income Taxes if Work is the weighted sum of *income tax liabilities* at the various annual earnings points using the hours/wage distributions described above as weights.

Welfare Benefits if Work is the weighted sum of *welfare benefits* at the various annual earnings points using the hours/wage distributions described above as weights.

Probability of AFDC if Work is the weighted sum of *AFDC receipt* at the various annual earnings points using the hours/wage distributions described above as weights.

Medicaid Coverage if Work is the weighted sum of *Medicaid eligibles* at the various annual earnings points using the hours/wage distributions described above as weights.

Medicaid if Work is the weighted sum of *Medicaid dollars* at the various annual earnings points using the hours/wage distributions described above as weights.

Using the welfare and Medicaid data, we also calculate the following variables.

Welfare Maximum Benefit is the *welfare benefit* assuming zero earnings.

⁴⁰ These assumptions are roughly consistent with the facts. In fiscal year 1995, over two thirds of AFDC families with earnings were in their first four months of work, and only about 16% of AFDC families with earnings claimed child care expenses (U.S. Department of Health and Human Service, AFDC Characteristics, 1996).

⁴¹ Region 1 includes ME, NH, VT, MA, RI, CT, NY, NJ, DE, MD, and DC. Region 2 includes PA, OH, IN, IL, MI, WI, and MN. Region 3 includes VA, NC, GA, FL, and TX. Region 4 includes CO, AZ, NV, WA, CA, AK, and HI. Region 5 includes SC, WV, KY, TN, AL, MS, LA, AR, MO, IA, NE, KS, ND, SD, OK, NM, UT, MT, ID, WY, and OR.

Medicaid Maximum is *Medicaid dollars* assuming zero earnings.

AFDC monthly benefits are calculated as follows (setting quantities in parentheses to zero if negative):

- (A.1) $AFDC = \min\{MAXBEN, RR*[PS-BRR*(EI-DIS)]\}$, where
MAXBEN is the maximum benefit,
RR is the ratable reduction,
PS is the payment standard (the dollar amount when benefits end not counting disregards),
BRR is the benefit reduction rate,
EI is earned income, and
DIS is the earnings disregard.

Food Stamp benefits are calculated in two steps (setting quantities in parentheses to zero if negative). First, calculate the monthly shelter cost expense deduction:

- (A.2) $SED = (\min\{SEDC, SE - 0.5*((1-EIDP)*EI + AFDC - SD)\})$.

Second, calculate the monthly Food Stamp benefit:

- (A.3) $FS = (MB - 0.3*((1-EIDP)*EI + AFDC - SD - SED))$, where

EIDP is the earned income deduction percentage (0.18 prior to 1986, 0.20 starting in 1986),
FS is the monthly Food Stamp benefit,
MB is the maximum Food Stamp benefit,
SD is the standard deduction,
SE is shelter expenses,
SED is the shelter expense deduction, and
SEDC is the shelter expense deduction ceiling.

Tax and welfare variables (and earned and unearned income variables) are adjusted for state cost of living differences using the poverty threshold index for 1990 from National Research Council (1995), which we then adjust annually using the PCE deflator. The poverty threshold index accounts for housing cost differences between states using Census housing cost data. Medicaid variables are adjusted annually using the Medical Care CPI.

Sources for Taxes, Welfare, and Medicaid:

We obtain the federal income tax schedules from the U.S. Department of the Treasury (Tax Guide, various years). The state tax information was obtained from four sources: the Advisory Committee on Intergovernmental Relations (various years), the Commerce Clearing House (various years), unpublished data from the Center on Budget Policy and Priorities, and Feenberg and Coutts (1993). The AFDC program parameters are obtained from the U.S. Department of Health and Human Services (AFDC Plans, various years) and unpublished data from the Urban Institute. The Food Stamp parameters come from the U.S. House of Representatives (Green Book, various years) and the U.S. Department of Agriculture (Food Stamps, various years). The Medicaid program information is obtained from three sources: the National Governor's Association (MCH Updates, various dates), the Intergovernmental Health Policy Project (Medicaid Changes, various years), and the U.S. House of Representatives (Medicaid Source Book, 1988 and 1993). Medicaid dollar values (separately for adults and children) come from unpublished tables from the Health Care Financing Administration (HCFA). Five-year moving averages are used to smooth these data which are indexed using the medical care CPI.

B. WELFARE WAIVER VARIABLES

Any Time Limit is one starting with the implementation month of a waiver that imposes mandatory work requirements on families that reach time limits or results in the reduction or total loss of AFDC payments after a certain time limit has been reached (usually 2 years).

Any Terminations is one beginning with the month in which a case is first terminated under a welfare waiver.

Extended Transitional Assistance is one starting with the implementation month of a waiver which extends Medicaid coverage or child care benefits beyond the usual one year period for those leaving welfare for work.

Major Waiver Application is one beginning with the month in which a state first applies for a major state-wide waiver.

Note that these variable are always zero for women without AFDC children.

Sources for Welfare Waiver Variables:

The waiver variables we used are based on our reading of the waiver summaries in General Accounting Office (1997), the U.S. Department of Health and Human Services (Baseline, 1997), and Savner and Greenberg (1997). These sources generally have the implementation dates of waivers. We also consulted American Public Welfare Association (1996), Council of Economic Advisers (1997), and U.S. Department of Health and Human Services (Waiver Fact Sheet, 1997). Our classification scheme follows most closely the classification schemes in General Accounting Office (1997), the U.S. Department of Health and Human Services (Baseline, 1997).

C. TRAINING PROGRAM VARIABLES

These variables measure variation across states and over time in federal and state spending on welfare-to-work programs and on eligibility criteria. These numbers are based on the state level fiscal year WIN (Work Incentive) program expenditures and state level fiscal year JOBS (Job Opportunities and Basic Skills) program expenditures by component (job search, education, etc.). We calculate spending per female AFDC adult that is not exempt from participation based on the age of her youngest child. The dollars are then divided by the state average wage to obtain an amount of services provided.⁴²

We calculate the distribution of the age of the youngest child and we apportion total JOBS spending to women using the fraction of participants who are female adults. We divide spending into two categories: *education* which includes education, post-secondary education, and self-initiated education; and *other* which includes job search, job development and placement, on-the-job training, work supplementation, community work experience, self-initiated training, job skills, job readiness, and assessment and employability plan. For fiscal year 1990 it is necessary to extrapolate WIN expenditures forward and JOBS expenditures backward to the date when the JOBS program began in a given state. We also extrapolate 1985 WIN data back to 1984, and fiscal year 1996 forward to the first three months of fiscal year 1997.

Note that the training variables are zero for women without AFDC children and women with children young enough to exempt the mother from participation in WIN or JOBS.

Sources for Training Variables:

JOBS/WIN expenditure data come from unpublished U.S. Department of Health and Human Services and U.S. Department of Labor tabulations, and the U.S. House of Representatives (Green Book, various years). To calculate the distribution of the age of youngest child for single mothers, we use data from the U.S. Department of Health and Human Services (AFDC Characteristics, various years) and authors' calculations from the March CPS. Wage data come from the Bureau of Labor Statistics web site.

D. CHILD CARE VARIABLE

Child Care Expenditures are actual federal and state expenditures by state on the following four programs: AFDC Child Care, Transitional Child Care, At-Risk Child Care, and Child Care and Development Block Grants. Expenditures are put on a per person basis by dividing through by the number of unmarried women with children under 6. This denominator is calculated using annual data on the number of women by state (from the Census Bureau) and the fraction of women in a state who are unmarried with children under 6, which is calculated from the ORG over the entire 1984-96 period. Like training dollars, the resulting dollar value is then divided by the state average wage to obtain an amount of services provided.

Note that the child care variable is always zero for women without children under 6.

Sources for Child Care Variable:

Child Care expenditures come from unpublished U.S. Department of Health and Human Service tabulations. Annual data on the number of women by state comes from the U.S. Census Bureau. The fraction of women in a state who are unmarried with children under 6 is calculated from the ORG by the authors. Wage data come from the Bureau of Labor Statistics web site.

⁴² The state average wage is average hourly wage for manufacturing in the state. It is normalized so that the 1996 value = 1.00.

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Table 1
Summary Characteristics of Policies Affecting Single Mothers
and Single Women Without Children: 1984, 1988, 1992, 1996

Variable	1984		1988		1992		1996	
	Children	No Children	Children	No Children	Children	No Children	Children	No Children
Annual Federal/State Income Taxes, EITC, and 1/2 OASDHI								
At \$5,000 Earnings	-169	358	-337	398	-533	424	-1,478	213
At \$10,000 Earnings	280	1,226	-286	1,391	-625	1,462	-1,957	1,488
At \$15,000 Earnings	1,832	2,390	898	2,621	603	2,719	-345	2,759
At \$20,000 Earnings	3,020	3,683	2,595	3,875	2,481	4,012	1,828	4,063
At \$30,000 Earnings	5,827	6,824	5,517	6,618	5,637	6,754	5,730	6,784
Annual AFDC and Food Stamp Benefits								
At \$0 Earnings	7,583	0	7,406	0	7,391	0	7,056	0
At \$5,000 Earnings	4,719	0	4,734	0	4,791	0	4,492	0
At \$10,000 Earnings	1,871	0	1,885	0	2,028	0	1,889	0
At \$15,000 Earnings	491	0	485	0	640	0	583	0
At \$20,000 Earnings	80	0	89	0	116	0	113	0
Medicaid: Number of Family Members Eligible								
At \$0 Earnings (Dollars)	4,129	0	4,269	0	4,517	3	3,974	6
At \$0 Earnings	2.65	0.00	2.62	0.00	2.66	0.00	2.68	0.01
At \$5,000 Earnings	2.51	0.00	2.53	0.00	2.56	0.00	2.52	0.01
At \$10,000 Earnings	1.10	0.00	1.41	0.00	1.62	0.00	1.85	0.01
At \$15,000 Earnings	0.27	0.00	0.35	0.00	0.76	0.00	1.00	0.01
At \$20,000 Earnings	0.03	0.00	0.05	0.00	0.31	0.00	0.48	0.01
At \$25,000 Earnings	0.00	0.00	0.01	0.00	0.09	0.00	0.19	0.01
Waivers								
Any Time Limit	0.00	0	0.00	0	0.01	0	0.39	0
Any Terminations	0.00	0	0.00	0	0.00	0	0.20	0
Extended Transitional Asst.	0.00	0	0.00	0	0.01	0	0.12	0
Major Waiver Application	0.00	0	0.01	0	0.22	0	0.85	0
Annual Training/Child Care Dollars Per Eligible Recipient								
Training - Education	0	0	0	0	100	0	126	0
Training - Other	126	0	39	0	166	0	272	0
Child Care	0	0	0	0	246	0	302	0
Number of Observations	9,391	18,914	9,211	18,612	10,333	19,311	8,788	15,846

Source: The data are from the 1984-1996 Current Population Survey Outgoing Rotation Group File (ORG).

Restrictions: The sample includes 19-44 year-old single women (divorced, widowed, and never married) who are not in school.

Notes: These means are calculated using the characteristics of the ORG sample for the given year and are weighted. Women are assumed to be in their first four months of work, to have no unearned income, and to claim no child care expenses. Also, single women with and without children are assumed to file as head of household and single, respectively, and to claim the standard deduction. Taxes and welfare are adjusted for state cost of living differences and all dollar amounts are expressed in 1996 dollars. See Appendix 1 for specific indices used and other details.

Table 2
Employment Rates for Single Mothers, Single Mothers with Children under Six,
and Single Women Without Children, 1984-1996

Year	CPS Outgoing Rotation Group				March CPS			
	(Worked Last Week = 1)				(Worked Last Year = 1)			
	Children	No Children	Difference	Standard Error	Children	No Children	Difference	Standard Error
1984	0.5854	0.8014	-0.2160	0.0059	0.7322	0.9399	-0.2077	0.0083
1985	0.5861	0.8048	-0.2187	0.0058	0.7302	0.9439	-0.2137	0.0083
1986	0.5891	0.8131	-0.2240	0.0057	0.7310	0.9450	-0.2141	0.0082
1987	0.5941	0.8179	-0.2238	0.0056	0.7382	0.9473	-0.2091	0.0081
1988	0.6027	0.8215	-0.2188	0.0058	0.7482	0.9485	-0.2003	0.0084
1989	0.6136	0.8150	-0.2015	0.0058	0.7577	0.9409	-0.1831	0.0080
1990	0.6007	0.8155	-0.2148	0.0056	0.7591	0.9424	-0.1832	0.0079
1991	0.5790	0.8031	-0.2242	0.0056	0.7428	0.9418	-0.1990	0.0079
1992	0.5790	0.7957	-0.2167	0.0057	0.7387	0.9299	-0.1913	0.0081
1993	0.5875	0.7918	-0.2044	0.0057	0.7511	0.9356	-0.1845	0.0080
1994	0.6053	0.7921	-0.1868	0.0057	0.7907	0.9312	-0.1405	0.0078
1995	0.6265	0.7971	-0.1707	0.0058	0.8072	0.9340	-0.1268	0.0080
1996	0.6450	0.7938	-0.1488	0.0060	0.8191	0.9290	-0.1098	0.0079
	Children Under 6	No Children	Difference	Standard Error	Children Under 6	No Children	Difference	Standard Error
1984	0.4382	0.8014	-0.3632	0.0083	0.6122	0.9399	-0.3277	0.0131
1985	0.4328	0.8048	-0.3720	0.0082	0.5966	0.9439	-0.3474	0.0133
1986	0.4362	0.8131	-0.3770	0.0081	0.6227	0.9450	-0.3223	0.0128
1987	0.4437	0.8179	-0.3742	0.0082	0.6096	0.9473	-0.3377	0.0129
1988	0.4634	0.8215	-0.3581	0.0084	0.6277	0.9485	-0.3207	0.0132
1989	0.4790	0.8150	-0.3360	0.0083	0.6282	0.9409	-0.3127	0.0127
1990	0.4569	0.8155	-0.3586	0.0079	0.6369	0.9424	-0.3055	0.0124
1991	0.4289	0.8031	-0.3743	0.0078	0.6092	0.9418	-0.3326	0.0124
1992	0.4330	0.7957	-0.3627	0.0078	0.6273	0.9299	-0.3027	0.0124
1993	0.4557	0.7918	-0.3362	0.0078	0.6428	0.9356	-0.2929	0.0122
1994	0.4796	0.7921	-0.3125	0.0079	0.6934	0.9312	-0.2378	0.0121
1995	0.5147	0.7971	-0.2825	0.0081	0.7221	0.9340	-0.2119	0.0123
1996	0.5396	0.7938	-0.2543	0.0085	0.7476	0.9290	-0.1813	0.0119

Sources: The data are from the 1984-1996 Current Population Survey Outgoing Rotation Group File (ORG) and the 1985-1997 March Current Population Survey (March) and are weighted.

Restrictions: Both samples include 19-44 year-old single women (divorced, widowed, and never married) who are not in school. The March sample excludes disabled or ill women and those with positive earned income but zero hours of work. In the second panel, single mothers without a child under six are excluded. See text for details.

Table 3
Probit Employment Probability Estimates
For Single Women, 1984-1996

Explanatory Variable	Outgoing Rotation Group				March CPS			
	(Worked Last Week = 1)				(Worked Last Year = 1)			
	Specification				Specification			
	(1)		(2)		(3)		(4)	
Average Derivative	Standard Error	Average Derivative	Standard Error	Average Derivative	Standard Error	Average Derivative	Standard Error	
Any Children*1984	-0.1893	0.0052	-0.0695	0.0094	-0.1721	0.0066	-0.0704	0.0104
Any Children*1985	-0.1985	0.0051	-0.0747	0.0091	-0.1876	0.0068	-0.0776	0.0101
Any Children*1986	-0.2021	0.0051	-0.0748	0.0090	-0.1843	0.0067	-0.0740	0.0099
Any Children*1987	-0.2018	0.0051	-0.0768	0.0086	-0.1833	0.0068	-0.0684	0.0093
Any Children*1988	-0.1995	0.0053	-0.0730	0.0084	-0.1744	0.0072	-0.0594	0.0091
Any Children*1989	-0.1827	0.0053	-0.0579	0.0082	-0.1610	0.0066	-0.0482	0.0085
Any Children*1990	-0.1939	0.0051	-0.0687	0.0083	-0.1695	0.0066	-0.0538	0.0088
Any Children*1991	-0.1971	0.0050	-0.0718	0.0089	-0.1741	0.0064	-0.0593	0.0098
Any Children*1992	-0.1930	0.0050	-0.0652	0.0092	-0.1550	0.0063	-0.0457	0.0103
Any Children*1993	-0.1769	0.0050	-0.0524	0.0089	-0.1639	0.0066	-0.0537	0.0099
Any Children*1994	-0.1733	0.0051	-0.0469	0.0085	-0.1374	0.0067	-0.0251	0.0094
Any Children*1995	-0.1601	0.0052	-0.0354	0.0084	-0.1220	0.0071	-0.0100	0.0093
Any Children*1996	-0.1355	0.0055	-0.0106	0.0085	-0.1015	0.0071	0.0027	0.0090
Nonwhite	.	.	-0.0787	0.0017	.	.	-0.0471	0.0021
Hispanic	.	.	-0.0353	0.0026	.	.	-0.0393	0.0025
Age 19-24	.	.	-0.0183	0.0021	.	.	-0.0050	0.0027
Age 25-29	.	.	0.0061	0.0021	.	.	-0.0070	0.0026
Age 35-39	.	.	-0.0043	0.0023	.	.	0.0005	0.0029
Age 40-44	.	.	-0.0095	0.0024	.	.	0.0069	0.0032
High School Dropout	.	.	-0.1886	0.0019	.	.	-0.0978	0.0021
Some College	.	.	0.0760	0.0016	.	.	0.0640	0.0021
Bachelors	.	.	0.1258	0.0022	.	.	0.1136	0.0035
Masters	.	.	0.1130	0.0035	.	.	0.1247	0.0062
Divorced	.	.	-0.0060	0.0024	.	.	0.0040	0.0034
Widowed	.	.	-0.1048	0.0070	.	.	-0.0788	0.0075
Any Children*Divorced	.	.	0.1007	0.0033	.	.	0.0466	0.0041
Any Children*Widowed	.	.	0.0853	0.0084	.	.	0.0743	0.0088
# of Children under 18	.	.	-0.0353	0.0012	.	.	-0.0210	0.0013
# of Children under 6	.	.	-0.0834	0.0017	.	.	-0.0453	0.0017
Pregnant	.	.	.	.	.	.	-0.0863	0.0041
Unearned Income (\$1000s)	.	.	.	.	.	.	-0.0023	0.0002
Central City	.	.	.	.	.	.	-0.0149	0.0019
State Unemployment Rate (%)	.	.	-0.0099	0.0007	.	.	-0.0066	0.0010
Any Children*State UR (%)	.	.	0.0015	0.0008	.	.	0.0021	0.0011
Number of Observations	373,662		373,662		119,019		119,019	

Sources: The data are from the 1984-1996 Current Population Survey Outgoing Rotation Group File (ORG) and the 1985-1997 March Current Population Survey (March CPS).

Restrictions: See Table 2 for sample restrictions.

Controls: In specifications (1) and (3), only indicators for year are included. In specifications (2) and (4), indicators are included for state, year, calendar month and calendar month interacted with any children (ORG).

Notes: The *average derivative* gives the average change in the probability of working when the explanatory variable increases by one unit. *Unearned income* includes interest, dividend, Social Security, veterans' benefits, and retirement income. The omitted group is white, non-Hispanic, age 30-34, never married, and not pregnant (March). She does not live in a central city (March) and has only a high school education. See text for details.

Table 4
Probit Estimates of the Effect of Policy Variables
On the Employment of Single Women
Average Derivative (Standard Error)

Explanatory Variable	CPS Outgoing Rotation Group				March CPS			
	(Worked Last Week = 1)				(Worked Last Year = 1)			
	Years of Education				Years of Education			
	All	<12	12	>12	All	<12	12	>12
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Income Taxes if Work (Annual \$1000s)	-0.0168 (0.0027)	-0.0386 (0.0078)	-0.0217 (0.0047)	-0.0088 (0.0035)	-0.0271 (0.0032)	-0.0762 (0.0133)	-0.0371 (0.0062)	-0.0108 (0.0030)
Welfare Maximum Benefit (Annual \$1000s)	-0.0309 (0.0022)	-0.0462 (0.0062)	-0.0346 (0.0038)	-0.0180 (0.0030)	-0.0186 (0.0025)	-0.0554 (0.0106)	-0.0263 (0.0049)	-0.0029 (0.0024)
Welfare Benefit if Work (Annual \$1000s)	0.0746 (0.0068)	0.0747 (0.0193)	0.0882 (0.0118)	0.0484 (0.0095)	0.0370 (0.0072)	0.1155 (0.0301)	0.0464 (0.0140)	0.0098 (0.0071)
Probability of AFDC Receipt If Work	-0.1850 (0.0200)	-0.3178 (0.0553)	-0.2419 (0.0352)	-0.1047 (0.0277)	-0.1241 (0.0219)	-0.2954 (0.0909)	-0.1610 (0.0430)	-0.0733 (0.0212)
Medicaid Maximum (Annual \$1000s)	0.0033 (0.0018)	-0.0039 (0.0045)	0.0049 (0.0031)	0.0055 (0.0026)	0.0007 (0.0019)	-0.0040 (0.0073)	0.0039 (0.0037)	0.0021 (0.0020)
Medicaid if Work (Annual \$1000s)	-0.0092 (0.0027)	-0.0058 (0.0067)	0.0002 (0.0048)	-0.0125 (0.0041)	-0.0016 (0.0027)	-0.0065 (0.0097)	-0.0001 (0.0054)	-0.0014 (0.0030)
Waiver - Any Time Limit (Indicator Variable)	0.0149 (0.0063)	0.0451 (0.0175)	0.0216 (0.0110)	-0.0031 (0.0082)	0.0125 (0.0081)	0.0251 (0.0324)	0.0056 (0.0159)	0.0088 (0.0079)
Waiver - Any Terminations (Indicator Variable)	0.0212 (0.0097)	0.0413 (0.0283)	0.0343 (0.0167)	0.0114 (0.0127)	0.0331 (0.0145)	0.1295 (0.0599)	0.0419 (0.0285)	0.0078 (0.0133)
Training Program - Education (Annual \$1000s)	-0.0494 (0.0162)	-0.0556 (0.0458)	-0.0458 (0.0280)	-0.0305 (0.0221)	-0.0348 (0.0198)	-0.0208 (0.0820)	-0.0769 (0.0379)	-0.0093 (0.0196)
Training Program - Other (Annual \$1000s)	0.0377 (0.0103)	0.0450 (0.0297)	0.0581 (0.0176)	0.0197 (0.0141)	0.0317 (0.0125)	0.0539 (0.0520)	0.0481 (0.0241)	0.0136 (0.0124)
Child Care (Annual \$1000s)	0.0262 (0.0057)	0.0391 (0.0159)	0.0240 (0.0095)	0.0216 (0.0082)	0.0167 (0.0065)	0.0498 (0.0277)	0.0160 (0.0124)	0.0089 (0.0063)
Number of Observations	373,662	51,146	134,432	188,084	119,019	15,994	41,060	61,965

Sources: The data are from the 1984-1996 Current Population Survey Outgoing Rotation Group File (ORG) and the 1985-1997 March Current Population Survey (March).

Restrictions: See Table 2 for sample restrictions. The following specifications are restricted to high school dropouts (2) and (6), high school graduates (3) and (7), and those with educations beyond high school (4) and (8).

Controls: In addition to the variables in Table 3 (except for the interactions between year and any children), the following controls are included: indicators for state, year, calendar month and calendar month interacted with any children (ORG), whether at least one, two, three, and four or more children are potentially AFDC eligible, whether at least one and at least two children are EITC eligible, and whether at least one child is under 6, under 3, under 2, and under 1. Lastly, continuous variables for the number of children under each age between one and nineteen are included.

Notes: The *average derivative* gives the average change in the probability of working when the explanatory variable increases by one. In all specifications, the tax, welfare, and Medicaid variables are calculated using a joint hours/wage distribution, estimated separately for single women with and without children. Taxes and welfare are adjusted for state cost of living differences and all dollar amounts are expressed in 1996 dollars. See Appendix 1 for specific indices used and other details.

Table 5
Probit Estimates of the Effect of Policy Variables
On the Employment of Single Women, Children Interactions
Average Derivative (Standard Error)

Explanatory Variable	CPS Outgoing Rotation Group				March CPS			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Income Taxes if Work	-0.0141	-0.0084	-0.0205	-0.0033	-0.0247	-0.0232	-0.0254	-0.0156
(Annual \$1000s)	(0.0033)	(0.0030)	(0.0033)	(0.0037)	(0.0040)	(0.0035)	(0.0040)	(0.0046)
Welfare Maximum Benefit	-0.0328	-0.0175	-0.0294	-0.0104	-0.0177	-0.0040	-0.0182	0.0006
(Annual \$1000s)	(0.0026)	(0.0053)	(0.0022)	(0.0057)	(0.0029)	(0.0057)	(0.0025)	(0.0060)
Welfare Benefit if Work	0.0843	0.0160	0.0755	0.0112	0.0397	-0.0055	0.0397	-0.0083
(Annual \$1000s)	(0.0082)	(0.0096)	(0.0067)	(0.0097)	(0.0086)	(0.0095)	(0.0072)	(0.0097)
Probability of AFDC Receipt If Work	-0.1986	-0.0876	-0.2016	-0.0744	-0.1385	-0.0581	-0.1415	-0.0564
	(0.0244)	(0.0279)	(0.0201)	(0.0287)	(0.0262)	(0.0303)	(0.0222)	(0.0317)
Medicaid Maximum	0.0047	-0.0010	0.0037	0.0008	0.0019	-0.0028	0.0008	-0.0022
(Annual \$1000s)	(0.0022)	(0.0022)	(0.0018)	(0.0022)	(0.0023)	(0.0022)	(0.0019)	(0.0023)
Medicaid if Work	-0.0123	0.0025	-0.0092	0.0005	-0.0038	0.0044	-0.0020	0.0037
(Annual \$1000s)	(0.0037)	(0.0029)	(0.0028)	(0.0029)	(0.0034)	(0.0028)	(0.0027)	(0.0028)
Waiver - Any Time Limit	.	0.0217	0.0102	0.0149	.	0.0187	0.0099	0.0143
(Indicator Variable)	.	(0.0067)	(0.0065)	(0.0069)	.	(0.0087)	(0.0085)	(0.0090)
Waiver - Any Terminations	.	0.0181	0.0186	0.0133	.	0.0245	0.0320	0.0230
(Indicator Variable)	.	(0.0099)	(0.0098)	(0.0101)	.	(0.0150)	(0.0148)	(0.0152)
Training Program - Education	-0.0391	-0.0541	-0.0414	-0.0703	-0.0355	-0.0296	-0.0318	-0.0420
(Annual \$1000s)	(0.0202)	(0.0173)	(0.0180)	(0.0194)	(0.0249)	(0.0210)	(0.0217)	(0.0235)
Training Program - Other	0.0604	0.0436	0.0341	0.0390	0.0424	0.0363	0.0286	0.0334
(Annual \$1000s)	(0.0121)	(0.0112)	(0.0106)	(0.0115)	(0.0150)	(0.0135)	(0.0127)	(0.0137)
Child Care	0.0097	0.0214	0.0277	0.0176	0.0000	0.0137	0.0188	0.0113
(Annual \$1000s)	(0.0079)	(0.0058)	(0.0062)	(0.0063)	(0.0088)	(0.0067)	(0.0072)	(0.0073)
1994-1996 Excluded	Yes	No	No	No	Yes	No	No	No
Children*State Interactions	No	Yes	No	Yes	No	Yes	No	Yes
Children*Year Interactions	No	No	Yes	Yes	No	No	Yes	Yes
Number of Observations	292,731	373,662			93,816	119,019		

Sources: The data are from the 1984-1996 Current Population Survey Outgoing Rotation Group File (ORG) and the 1985-1997 March Current Population Survey (March).

Restrictions: See Table 2 for sample restrictions. Specifications (1) and (5) exclude 1994-1996.

Controls: See Table 4 for controls. Indicators for interactions between state and least one AFDC eligible child are included in specifications (2), (4), (6), and (8). Indicators for interactions between year and both at least one AFDC eligible child and at least one EITC eligible child are included in specifications (3), (4), (7), and (8).

Notes: The *average derivative* gives the average change in the probability of working when the explanatory variable increases by one. In all specifications, the tax, welfare, and Medicaid variables are calculated using a joint hours/wage distribution estimated separately for single women with and without children. Taxes and welfare are adjusted for state cost of living differences. Also, all dollar amounts are expressed in 1996 dollars. See Appendix 1 for specific indices used and other details.

Table 6
Probit Estimates of the Effect of Policy Variables
On the Employment of Single Women, Alternative Specifications
Average Derivative (Standard Error)

Explanatory Variable	CPS Outgoing Rotation Group				March CPS			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Income Taxes if Work (Annual \$1000s)	-0.0090 (0.0062)	-0.0226 (0.0034)	-0.0060 (0.0030)	-0.0097 (0.0021)	-0.0306 (0.0094)	-0.0246 (0.0038)	-0.0205 (0.0032)	-0.0181 (0.0026)
Welfare Maximum Benefit (Annual \$1000s)	-0.0124 (0.0066)	-0.0394 (0.0028)	-0.0244 (0.0028)	-0.0211 (0.0013)	0.0001 (0.0094)	-0.0216 (0.0028)	-0.0136 (0.0029)	-0.0160 (0.0015)
Welfare Benefit if Work (Annual \$1000s)	0.0172 (0.0112)	0.0941 (0.0086)	0.0729 (0.0094)	0.0336 (0.0031)	-0.0100 (0.0151)	0.0458 (0.0081)	0.0358 (0.0094)	0.0231 (0.0031)
Probability of AFDC Receipt If Work	-0.0853 (0.0333)	-0.2311 (0.0255)	-0.1593 (0.0271)	-0.1190 (0.0143)	-0.0748 (0.0495)	-0.1444 (0.0249)	-0.1013 (0.0273)	-0.0758 (0.0145)
Medicaid Maximum (Annual \$1000s)	0.0024 (0.0026)	0.0057 (0.0024)	0.0036 (0.0023)	0.0024 (0.0015)	-0.0012 (0.0037)	0.0020 (0.0023)	0.0010 (0.0023)	0.0007 (0.0017)
Medicaid if Work (Annual \$1000s)	-0.0024 (0.0034)	-0.0153 (0.0036)	-0.0095 (0.0041)	-0.0019 (0.0021)	0.0034 (0.0045)	-0.0054 (0.0032)	-0.0004 (0.0037)	0.0006 (0.0021)
Waiver - Any Time Limit (Indicator Variable)	0.0171 (0.0080)	0.0219 (0.0084)	0.0098 (0.0083)	0.0164 (0.0062)	0.0240 (0.0141)	0.0175 (0.0098)	0.0006 (0.0100)	0.0154 (0.0080)
Waiver - Any Terminations (Indicator Variable)	0.0153 (0.0116)	0.0386 (0.0133)	0.0087 (0.0130)	0.0214 (0.0097)	0.0330 (0.0237)	0.0364 (0.0173)	0.0254 (0.0187)	0.0344 (0.0144)
Training Program - Education (Annual \$1000s)	-0.0806 (0.0224)	-0.0446 (0.0319)	-0.0024 (0.0188)	-0.0448 (0.0159)	-0.0635 (0.0366)	-0.0585 (0.0301)	-0.0072 (0.0216)	-0.0258 (0.0195)
Training Program - Other (Annual \$1000s)	0.0465 (0.0133)	0.0113 (0.0193)	0.0351 (0.0121)	0.0467 (0.0103)	0.0584 (0.0214)	0.0397 (0.0190)	0.0098 (0.0137)	0.0403 (0.0125)
Child Care (Annual \$1000s)	0.0214 (0.0073)	0.0224 (0.0070)	.	0.0235 (0.0056)	0.0174 (0.0114)	0.0195 (0.0078)	.	0.0176 (0.0064)
Inc. Women w/o Children	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Inc. Mothers with Children < 6	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Inc. Mothers w/o Children < 6	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Wages/Hours Vary across Groups	No	No	No	Yes	No	No	No	Yes
Number of Observations	122,966	303,396	317,178	373,662	40,818	95,786	99,157	119,019

Sources: The data are from the 1984-1996 Current Population Survey Outgoing Rotation Group File (ORG) and the 1985-1997 March Current Population Survey (March).

Restrictions: See Table 2 for sample restrictions. Specifications (1) and (5) include only single mothers with children eligible for both the EITC and AFDC. Specifications (2) and (6) exclude mothers with no children under six, and specifications (3) and (7) exclude mothers with at least one child under six.

Controls: See Table 4 for controls. In specifications (4) and (8) indicators are included for each individual group for which the joint hours/wage distribution is calculated (90 groups in all).

Notes: The *average derivative* gives the average change in the probability of working when the explanatory variable increases by one. In specifications (1)-(3) and (5)-(7) the tax, welfare, and Medicaid variables are calculated using a joint hours/wage distribution estimated separately for single women with and without children. In specifications (4) and (8) the joint hours/wage distribution is specific to groups defined by full interactions of region, education, age, and minority status, and is calculated using only single women without children. Taxes and welfare are adjusted for state cost of living differences and are in 1996 dollars. See Appendix 1 for specific indices used and other details.

Table 7
Effect of CPS Redesign on the Employment of Single Women,
ORG and March CPS Comparisons

	CPS Outgoing Rotation Group				March CPS	
	(Worked Last Week = 1)				(Worked Last Year = 1)	
	Children	No Children	Difference	Standard Error	Children	No Children
Employment Rate (from Table 2)						
1992	0.5790	0.7957	-0.2167	0.0057	0.7387	0.9299
1993	0.5875	0.7918	-0.2044	0.0057	0.7511	0.9356
1994	0.6053	0.7921	-0.1868	0.0057	0.7907	0.9312
Yearly Differences						
1993-1992	0.0085	-0.0039	0.0124	0.0080	0.0125	0.0057
1994-1993	0.0178	0.0003	0.0175	0.0080	0.0396	-0.0044
Effect of Redesign on March CPS (March-ORG, 1993-1992)					0.0040	0.0096
Effect of Redesign on ORG (ORG-March, 1994-1993)					-0.0218	0.0047

Sources: The data are from the 1992-1994 Current Population Survey Outgoing Rotation Group File (ORG) and the 1993-1995 March Current Population Survey (March) and are weighted.

Restrictions: See Table 2 for restrictions.

Table 8
Effect of CPS Redesign on the Employment of Single Women,
ORG and Parallel Survey Comparisons

	Children		No Children		Difference	
	Mean	Standard Error	Mean	Standard Error	Mean	Standard Error
	1993 Parallel Survey	0.5926	0.0055	0.7915	0.0033	-0.1988	0.0064
1993 ORG	0.5875	0.0048	0.7918	0.0029	-0.2044	0.0057
Effect of Redesign on ORG	0.0052	0.0073	-0.0004	0.0044	0.0055	0.0086

Sources: The data are from the 1993 Current Population Survey Outgoing Rotation Group File (ORG) and the 1993 CPS Parallel Survey and are weighted.

Restrictions: See Table 1 for restrictions.

Table 9
Contribution of Policy Changes to the Changes in the Employment of Single Mothers,
1984-1996 and 1992-1996

Explanatory Variable	1984-1996				1992-1996			
	ORG		March		ORG		March	
	Change in Emp.	% of Total						
Income Taxes if Work	0.0243	41.2%	0.0392	53.6%	0.0114	27.2%	0.0184	32.6%
Welfare Maximum Benefit	0.0163	27.6%	0.0098	13.4%	0.0103	24.7%	0.0062	11.1%
Welfare Benefit if Work	-0.0023	-3.9%	-0.0011	-1.6%	-0.0070	-16.8%	-0.0035	-6.2%
Probability of AFDC Receipt if Work	0.0017	2.8%	0.0011	1.5%	0.0037	8.8%	0.0025	4.4%
Medicaid Maximum	-0.0005	-0.9%	-0.0001	-0.1%	-0.0018	-4.3%	-0.0004	-0.6%
Medicaid Coverage if Work	-0.0052	-8.9%	-0.0009	-1.3%	0.0002	0.6%	0.0000	0.1%
Total Welfare Benefits & Medicaid	0.0099	16.7%	0.0088	12.0%	0.0054	13.0%	0.0049	8.7%
Waiver - Any Time Limit	0.0059	10.0%	0.0049	6.8%	0.0057	13.7%	0.0048	8.5%
Waiver - Any Terminations	0.0043	7.4%	0.0068	9.3%	0.0043	10.4%	0.0068	12.0%
Total Welfare Waivers	0.0102	17.4%	0.0117	16.0%	0.0101	24.1%	0.0116	20.6%
Training Program - Education	-0.0062	-10.6%	-0.0044	-6.0%	-0.0013	-3.1%	-0.0009	-1.6%
Training Program - Other	0.0055	9.3%	0.0046	6.3%	0.0040	9.6%	0.0034	5.9%
Child Care	0.0079	13.4%	0.0050	6.9%	0.0015	3.5%	0.0009	1.7%
Total Training & Child Care	0.0072	12.2%	0.0053	7.2%	0.0042	10.0%	0.0034	6.0%
Other	0.0073	12.5%	0.0081	11.1%	0.0107	25.7%	0.0181	32.1%
Total	0.0589	100.0%	0.0731	100.0%	0.0418	100.0%	0.0564	100.0%

Sources: The data are from the 1984-1996 Current Population Survey Outgoing Rotation Group File (ORG) and the 1985-1997 March Current Population Survey (March).

Notes: *Change in Employment* gives the change in the employment of single mothers over the specified time period that is due to the given explanatory variable(s). *% of Total* gives the percentage of the total employment increase explained by the given explanatory variable(s). The parameter estimates used to calculate these statistics come from Tables 3 and 4, while the change in policy variables comes from Appendix Table 1.

Appendix Table 1
Variable Means for Single Mothers
and Single Women Without Children: 1984, 1988, 1992, 1996

Variable	1984		1988		1992		1996	
	Children	No Children	Children	No Children	Children	No Children	Children	No Children
Age	31.44	26.86	31.97	27.79	31.96	28.83	32.19	29.22
Nonwhite	0.371	0.155	0.363	0.162	0.384	0.178	0.377	0.207
Hispanic	0.086	0.053	0.103	0.072	0.111	0.079	0.136	0.093
High School Dropout	0.262	0.094	0.246	0.091	0.241	0.094	0.211	0.092
Some College	0.211	0.297	0.234	0.305	0.256	0.317	0.311	0.317
Bachelors	0.063	0.192	0.064	0.204	0.061	0.210	0.072	0.233
Masters	0.022	0.059	0.025	0.061	0.023	0.066	0.021	0.064
Divorced	0.564	0.151	0.533	0.161	0.477	0.165	0.460	0.162
Widowed	0.066	0.010	0.055	0.010	0.047	0.012	0.038	0.012
Living with Parents	0.156	0.418	0.151	0.375	0.154	0.347	0.154	0.339
Living with Unrelated Adult Male	0.097	0.135	0.125	0.167	0.148	0.198	0.165	0.218
# of Children under 18	1.681	.	1.664	.	1.707	.	1.707	.
# of Children under 6	0.560	.	0.571	.	0.624	.	0.613	.
Income Taxes if Work	1.751	3.105	1.120	3.003	0.891	3.013	0.182	2.983
Welfare Maximum Benefit	7.583	.	7.406	.	7.391	.	7.056	.
Welfare Benefit if Work	1.482	.	1.478	.	1.545	.	1.451	.
Prob. of AFDC Receipt If Work	0.255	.	0.287	.	0.266	.	0.246	.
Medicaid Maximum	4.129	0.000	4.269	0.000	4.517	0.003	3.974	0.006
Medicaid if Work	1.194	0.000	1.399	0.000	1.786	0.002	1.763	0.004
Any Time Limit	0.000	.	0.000	.	0.010	.	0.394	.
Any Terminations	0.000	.	0.000	.	0.000	.	0.205	.
Extended Transitional Assistance	0.000	.	0.000	.	0.007	.	0.119	.
Major Waiver Application	0.000	.	0.015	.	0.223	.	0.847	.
Training Program - Education	0.000	.	0.000	.	0.100	.	0.126	.
Training Program - Other	0.126	.	0.039	.	0.166	.	0.272	.
Child Care	0.000	.	0.000	.	0.246	.	0.302	.
Number of Observations	9,391	18,914	9,211	18,612	10,333	19,311	8,788	15,846

Source: The data are from the 1984-1996 Current Population Survey Outgoing Rotation Group File (ORG).

Restrictions: See Table 1 for sample restrictions.

Notes: These means are calculated using the characteristics of the ORG sample for the given year and are weighted. Women are assumed to be in their first four months of work, to have no unearned income, and to claim no child care expenses. Also, single women with and without children are assumed to file as head of household and single, respectively, and claim the standard deduction. Taxes and welfare are adjusted for state cost of living differences and all dollar amounts are expressed in 1996 dollars. See Appendix 1 for specific indices used and other details.

Appendix Table 2
Characteristics of Single Mothers and Single Women Without Children
 Mean (Standard Deviation)

Variable	ORG		March	
	Children	No Children	Children	No Children
Age	31.91 (6.88)	28.30 (7.20)	31.49 (6.95)	28.18 (7.29)
Nonwhite	0.375	0.174	0.367	0.172
Hispanic	0.110	0.075	0.110	0.076
High School Dropout	0.237	0.093	0.219	0.076
Some College	0.253	0.308	0.267	0.332
Bachelors	0.064	0.211	0.070	0.219
Masters	0.023	0.064	0.027	0.068
Divorced	0.506	0.164	0.515	0.181
Widowed	0.050	0.012	0.052	0.014
Living with Parents	0.151	0.365	0.143	0.328
Living with Unrelated Adult Male	0.133	0.179	0.137	0.190
# of Children under 18	1.69 (1.00)	. .	1.65 (1.01)	. .
# of Children under 6	0.60 (0.77)	. .	0.62 (0.78)	. .
Pregnant	.	.	0.073	.
Central City	.	.	0.356	0.330
Unearned Income	.	.	803 (4,416)	592 (3,519)
Earned Income	.	.	13,772 (14,871)	19,490 (16,612)
Earnings Conditional on Working	.	.	18,165 (14,557)	20,790 (16,350)
Worked Last Week (ORG) or Last Year (March)	0.600	0.805	0.759	0.939
Hours Last Week (ORG) or Last Year (March)	22.7 (20.4)	31.3 (18.3)	1,319 (959)	1,760 (756)
Hours Conditional on Working	37.8 (11.0)	39.0 (11.0)	1,738 (695)	1,875 (628)
Weeks Worked Last Year	.	.	34.0 (22.5)	45.3 (14.7)
Any Public Assistance Income	.	.	0.281	0.018
Number of Observations	126,750	246,912	43,095	75,294

Sources: The data are from the 1984-1996 Current Population Survey Outgoing Rotation Group File (ORG) and the 1985-1997 March Current Population Survey (March) and are weighted.

Restrictions: See Table 2 for sample restrictions.

Notes: *Unearned income* includes interest, dividend, rental, Social Security, veterans' benefits, and retirement income. All dollar amounts are expressed in 1996 PCED dollars. See text for details.

Figure 1
Major Tax and Welfare Policy Changes Affecting Low Income Women, 1984-1997

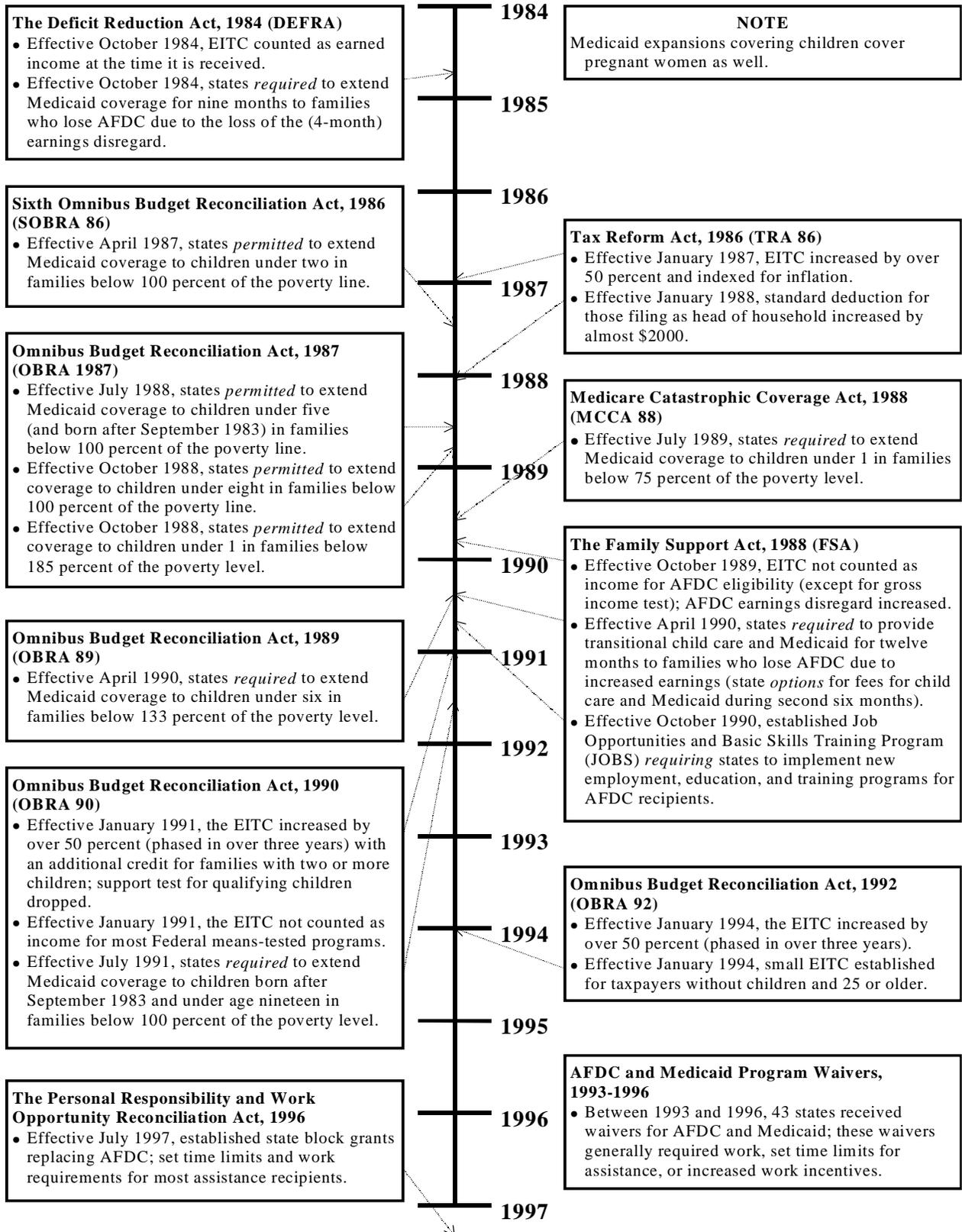
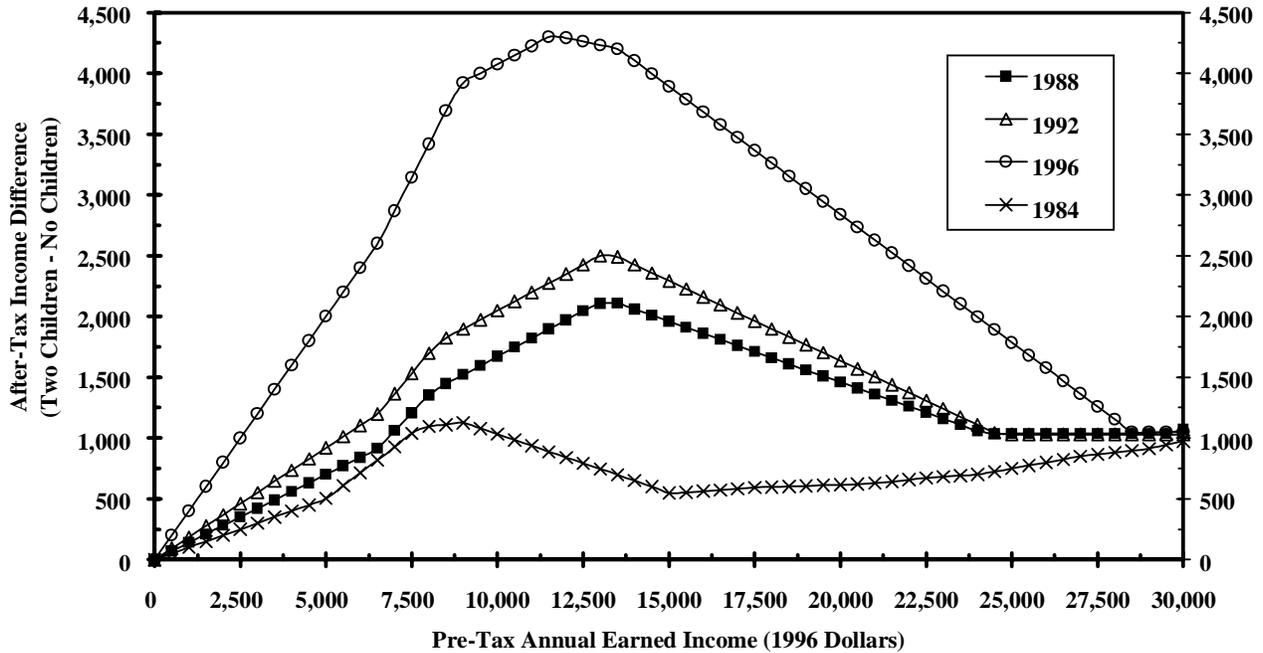
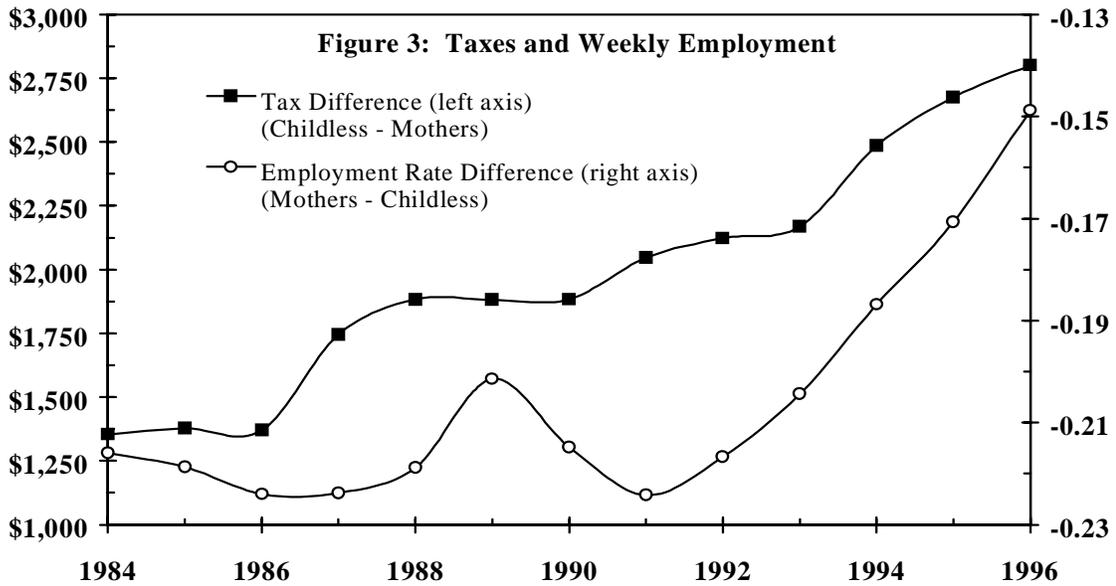


Figure 2
After-Tax Income of a Single Mother with Two Children
Minus a Single Woman Without Children: 1984, 1988, 1992, 1996



Notes: All numbers are in 1996 dollars deflated with the Personal Consumption Expenditures Deflator. All women are assumed to have only earned income and to take the standard deduction. Single women with children and without children are assumed to file as head of household and single, respectively. After-tax income is income after federal taxes or credits.



Source: The data are from the 1984-1996 CPS Outgoing Rotation Group File (ORG).

Notes: *Tax Difference* gives the difference in taxes paid by single women without children minus those paid by single mothers. *Employment Rate Difference* gives the difference in weekly employment for single mothers minus single women without children.