Welfare Reform and the Level and Composition of Income

Christopher Bollinger
Luis Gonzalez
James P. Ziliak

University of Kentucky

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Abstract: We use data from the Current Population Survey to estimate the effects of welfare reform, the business cycle, and the EITC on the level and composition of income and earnings across the distribution of single mothers with dependent children. We admit multiple sources of heterogeneity in policy responses across skill levels and business cycle conditions, and estimate models both at the mean of the income and earnings distributions as well as at several quantiles. Our results show that TANF raised disposable incomes an average of eight percent among higher skilled mothers, and raised earnings among low skilled mothers in the lower half of the distribution by as much as 20 percent, but that it also resulted in a significant equal-size loss of after-tax total income among the low-skilled. Strong local economies accommodated welfare waivers in the mid 1990s that fostered income and earnings gains among the less skilled. The EITC expansions of the 1990s boosted before-tax earnings across the earnings distribution, especially for the low skilled in the bottom half of the distribution, but also resulted in significant losses of total income for the low skilled. The earnings gains among the low skilled a decade after the implementation of TANF and expansions of the EITC have been more than offset by losses in transfer income and have left the most vulnerable single mothers either running in place or falling behind.

* Address correspondence to James P. Ziliak, Department of Economics, University of Kentucky, Lexington, KY 40506-0034; Email: jziliak@uky.edu; Phone: 859–257–2776. We thank Peter Gottschalk and seminar participants at the University of Kentucky Center for Poverty Research conference *Ten Years After*: *Evaluating the Long-Term Effects of Welfare Reform on Children, Families, Welfare, and Work* and at the Upjohn Institute for helpful comments on an earlier draft.

The Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) of 1996 transformed the Aid to Families with Dependent Children (AFDC) program from an entitlement that provided cash benefits to those households who satisfied state and federal eligibility standards into a work-based block-grant program called Temporary Assistance to Needy Families (TANF) that is almost exclusively controlled by the states. PRWORA had many goals, not least of which was ending dependence on government benefits through promotion of work. To realize these goals PRWORA established time limits on benefit receipt, work requirements for adult recipients, and work incentives such as higher earnings disregards and liquid-asset limits, among other policies. Most of the new program rules evolved out of state-level experiments conducted in the early 1990s via waivers from federal regulations granted by the U.S. Department of Health and Human Services. The new welfare program was expected to work in conjunction with the Earned Income Tax Credit (EITC), whose expanded generosity in the early 1990s increased the incentive for low-income families to enter the labor force. A significant body of research was spawned in the wake of welfare reform and EITC expansions, but most of the analyses have relied on data and outcomes prior to 2000 (Hotz and Scholz 2003; Grogger and Karoly 2005), and research on interactions between the macroeconomy and social policy reforms on income levels, as well as on the distribution of income, is scarce (Mills, Alwang, and Hazarika 2001; Blank and Schoeni 2003; Meyer and Sullivan 2006). In this chapter we estimate how welfare reform, the macroeconomy, and the EITC affected the level and composition of income across the distribution of single-mother families.

The target of welfare reform was aimed squarely at low-income single mothers as this demographic group historically comprised over 90 percent of the caseload. Although the typical (non-censored) spell on AFDC for single mothers was only about eight months (Blank and

Ruggles 1996), the public perception of long-term dependence and intergenerational transmission was widespread and not altogether false from a lifetime perspective (Blank 1997). This perception spurred policymakers first at the state level with waivers and then at the federal level with PRWORA to construct a new program that not only discourages long-term use via the 5-year federal lifetime limit on benefit receipt but also discourages entry onto the program altogether via diversion payments and work requirements (Grogger, Haider, and Klerman 2003). The TANF program, unlike AFDC, is less focused on providing cash benefits in favor of in-kind assistance. Indeed, nearly 70 percent of TANF funds are spent on in-kind transfers and 30 percent on cash, which is directly opposite that of the former AFDC program (DHHS, ACF 2006). As a consequence of the policy lens on single mothers, most welfare reform research has been directed at understanding the consequences of the legislation for single mothers.

In a widely publicized study, Primus, et al. (1999) examined changes in the earnings and income of female-headed households from 1993–1995 and 1995–1997 and found that disposable income in the lowest quintile rose from 1993–1995 during a period of rapid economic growth (and state experiments with welfare waivers) but then fell an average of $580 after passage of PRWORA. While the authors attribute more than three-fourths of the income decline to declines in cash-assistance and food stamp income, it is not possible to conclude that welfare reform per se is the reason for the income declines because the authors fail to control for other factors that might have affected earnings for this subpopulation, such as the macroeconomy. Moffitt (1999) provides a more rigorous analysis of the effect of welfare reform on female-headed earnings and concludes that in the period leading up to PRWORA (1977–1995) the state-specific welfare waivers led to an average increase in earnings of $274, although there was no significant increase in earnings of women with less than a high school degree.

Schoeni and Blank (2000) update and extend the analysis of Moffitt (1999) both to 1998 and to other outcomes such as poverty status and family structure. Unlike Moffitt, they find a significant welfare-reform induced increase in own and family earnings for women with less than high school in the pre-PRWORA period; however, there is no additional increase after the passage of PRWORA. They do find strong evidence that welfare reform both in the waiver period and the TANF period reduced the incidence of poverty for the subpopulation of less-skilled women, which is broadly corroborated in Gundersen and Ziliak (2004). These results also appear to be broadly consistent with several welfare "leaver" studies such as Danziger, et al. (1999) and Cancian, et al. (2000), although the latter both emphasize acute post-welfare income declines among women with substantial barriers to employment such as mental health problems and drug dependencies.

Grogger (2003) used data from the 1979–1999 waves of the Current Population Survey to estimate whether and to what extent time limits affected the outcomes of female-headed families. He exploited the fact that families with young children are more likely to be affected by short time limits because of a longer eligibility horizon, and found that time limits reduced welfare use and raised employment, but had no discernable impact on earnings or income. In a break from most papers in the literature, Meyer and Rosenbaum (2001) adopt a quasi-structural approach to model the effect of the tax and transfer system on the employment of single mothers between 1984 and 1995. Although they do find some evidence that waivers encouraged employment, the striking conclusion of their analysis is that expansions in the EITC dominated all other policy reforms in the 1990s and accounted for about 60 percent of the rise in labor force participation of single mothers in the mid 1990s.

In this chapter we use data from the 1980–2005 waves (1979–2004 calendar years) of the March Annual Social and Economic Study of the Current Population Survey (CPS) to update the previous literature on single mother families by incorporating data through the first decade of welfare reform and to extend the literature in two important directions. First, many in the research community believed that the strong macroeconomy of the late 1990s not only had a direct positive effect on employment and earnings of low-skilled workers, it also had a secondary effect of fostering transitions from welfare to work. That is, state and federal efforts to implement welfare reform were aided by the fact that jobs that historically were absent for this demographic group were in abundance in the late 1990s. The literature has been hindered from identifying such an effect because the strong growth of the 90s was shared by all states, thus limiting cross-state variation in economic conditions needed to identify the interaction between the economy and policy. With the onset of the 2001 recession and subsequent recovery it is now possible to exploit cross-state over time variation in the business cycle to aid in identifying the effect of interactions between the economy and welfare reform on income and earnings.[1]

The second extension we consider is estimating heterogeneous effects of welfare reform, the macroeconomy, and EITC expansions on income and earnings at various points of the income and earnings distributions. Bitler, Gelbach, and Hoynes (2006) stress the importance of heterogeneous treatment effects in the evaluation of welfare reform because heterogeneous effects are predicted by the canonical model of labor supply and due to interest in the distributional consequences of major social policy reforms. Virtually all research on welfare reform and the EITC has focused on average impacts, and while this frequently is of first-order

[1] A recent working paper by Herbst (2007) examines interactions between welfare reform and the economy on employment, confirming the widespread conjecture that a strong economy accommodates welfare reform. Our project differs from Herbst by our focus on income and earnings, and by the fact that we examine heterogeneous effects of welfare reform, the macroeconomy, and the EITC across the income distribution.

interest to program evaluation, it limits our understanding of program effects at other points of the distribution.[2] Bitler, et al. use data from a random assignment experiment in Connecticut to examine heterogeneous treatment effects because of concerns that TANF was implemented both in a relatively short time period (about 18 months) and in a period of strong macroeconomic growth. As argued previously, with the added business cycle variation induced by the 2001 recession it is possible to identify heterogeneous effects of welfare reform in nationally representative samples by interacting policy changes with the macroeconomy. This allows us to examine whether the results of Bitler et al. are generalizable, and to our knowledge it also provides a first test of heterogeneous effects of the EITC on income and earnings distributions.

Our results show that TANF raised disposable incomes an average of eight percent among higher skilled mothers, and raised earnings among low skilled mothers in the lower half of the distribution by as much as 20 percent, but also resulted in a significant equal-sized loss of after-tax total income among the low-skilled. Strong local economies in the mid 1990s that fostered income and earnings gains among the less skilled accommodated welfare waivers. The EITC expansions of the 1990s boosted before-tax earnings across the earnings distribution, especially for the low skilled in the bottom half of the distribution, but also resulted in significant losses of total income for the low skilled. The earnings gains among the low skilled a decade after the implementation of TANF and expansions of the EITC have been more than offset by losses in transfer income and have left the most vulnerable single mothers either running in place or falling behind.

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[2] Mills, et al. (2001) use non-parametric density re-weighting techniques to compare the single mother family income distribution in 1993 to 1999, and their counterfactual experiments suggests that most of the income gains in that six year period were from strong economic conditions and not welfare reform. Schoeni and Blank (2000) compare the effects of waivers and TANF across education groups at the 20th and 50th percentiles of family income, and find that waivers did not alter the distribution of income but that TANF raised incomes at the 50th percentile while leaving the 20th percentile unchanged. Our distributional analysis expands on theirs by including seven more years of data, interactions between welfare reform and the economy, the EITC, and more points of the distribution.

II. Data

The data come from the 1980–2005 waves of the March Annual Social and Economic Study of the Current Population Survey. The unit of observation is single female family heads between the ages of 16 and 54 with dependent children present under the age of 18.[3] Single heads include never married women as well as those divorced, separated, or widowed. The mothers are allocated to thirteen different five-year date of birth cohorts (starting in 1919 and ending in 1983), and within each birth cohort, three separate education groups of less than high school, high school graduate, and more than high school, yielding thirty-nine separate birth-education cohorts. The five birth cohorts from 1949 until 1963 provide complete information over the entire sample period, but the earlier and later cohorts only provide partial information for identification much like one would find in a standard unbalanced panel of families. Because the consistency of the grouping estimator described below is based in part on the number of observations per cell being large, we follow Blundell et al. (1998) and drop cohort-education cells with fewer than 50 observations.

Our analysis focuses primarily on disposable family income and its components, especially labor-market earnings. Disposable income is gross income less net tax payments, where gross income is the sum of family income and the value of public food assistance programs. Family income is the same as that used in official Census Bureau calculations of poverty and inequality and includes earnings, Social Security (retirement, disability, and survivors benefits), Supplemental Security Income, Unemployment Insurance, workers' compensation, AFDC/TANF and other forms of public cash welfare, veterans' payments,

[3] Moffitt (1999) and Schoeni and Blank (2000) include the entire population of women because marital choices induced by welfare reform that may endogenously affect the composition of single mothers, while Grogger (2003) only admits single mothers. Although there is some evidence that marriage responds to welfare policies, it is limited in magnitude and scope (Ellwood 2000; Fitzgerald and Ribar 2004; Edin and Kefalas 2006).

pension income, rent/interest/dividend income, royalties, income from estates, trusts, educational assistance, alimony, child support, assistance from outside the household, and other income sources. We define earnings as total family earnings from wage and salary income, non-farm self employment, and farm self employment. Because the Census Bureau defines a family as two or more persons related by birth, marriage, or adoption, family earnings contains earnings of the mother as well as dependent children and other related adults such as a resident grandparent. It does not contain earnings of cohabiting partners or other non-family members in the household. We append to family income the (Census Bureau's) imputed dollar value of public food assistance programs, which includes the Food Stamp Program and the National School Lunch and Breakfast Programs.

To construct after-tax total income we subtract tax payments from gross income and add back refundable EITC income. Tax payments are the sum of Federal, state, and payroll taxes that are estimated for each family in each year using the NBER *TAXSIM* program. The *TAXSIM* module calculates Federal, state, and payroll marginal tax rates and tax payments using basic information on labor income, taxable nonlabor income, dependents, and certain deductions such as property tax payments and child care expenses.[4] The Federal and state taxes include the respective EITC code for each tax year and state, thus allowing for the possibility of negative tax payments. We assume that the family bears only the employee share of the payroll tax rate.

In addition to total disposable income, we examine independently the trends in the components of income. Included in this are family earnings, EITC income, AFDC/TANF income, SSI income, SSDI income, foodstamp and school lunch income, and other non-transfer nonlabor income. The *TAXSIM* program provides only the EITC bundled within the Federal and

[4] The CPS does not have information on certain inputs to the *TAXSIM* program such as annual rental payments, child care expenses, or other itemized deductions. We set these values to zero when calculating the tax liability.

state tax function and does not provide separate estimates. Thus, we rely on the Census Bureau's simulated EITC credit for our analysis of trends in EITC income. Other nonlabor income includes all other government and private transfers and nonlabor income as specified in the above definition of gross income.

If the respondent refuses to supply earnings or transfer information, then the Census Bureau uses a "hotdeck" imputation method to allocate income to those with missing data. Bollinger and Hirsch (2006) argue that including allocated data generally leads to an attenuation bias on estimated regression coefficients based on allocated data. Hence, we follow their recommendation and drop those mothers with allocated earnings or transfer income. In addition, 0.6 percent of the remaining sample has negative or zero values for total income, and we drop these observations. All income sources are deflated by the personal consumption expenditure deflator with 2005 base year. The total number of observations is 94,939 single female-headed families.

III. Trends in the Level and Composition of Income, 1979–2004

We begin with a depiction of trends in income levels and composition. Part of the observed trends described below is a mechanical artifact of the structure of transfer programs. That is, the programs are income conditioned and tax away benefits as other income sources increase. This means that as earnings rise, benefits from TANF, food stamps, and SSI necessarily fall (EITC benefits first rise but then fall with earnings). The other part of the observed trends is a behavioral response to changes in economic conditions, social policies, and possible preferences towards work and welfare. In this section we do not make any claims about causal factors underlying the observed changes; we simply document facts.

In Figure 1 and Table 1 we show average income levels for all single mothers pooled together. The figure shows pre-tax income by source plus food stamps and the EITC, while the table shows the same plus after-tax total income inclusive of food stamps. Through the 1980s and into the mid 1990s average real disposable income of single mothers was fairly constant at about $20,000, but beginning in the mid 1990s there was a sizable increase in average real income, with it reaching a peak of $32,000 before taxes in 2004 (and just over $28,000 after payroll, state, and federal tax payments as shown in Table 1). The composition of income, however, shifted dramatically during this period. Labor market earnings at the mean grew substantially, and, with the rise in employment and earnings and increased EITC program generosity, income from the EITC increased as well. During this period income from SSI also expanded, which could be due in part to both the *Zebley* decision—the 1990 Supreme Court ruling that liberalized child eligibility into SSI—and substitution from AFDC into SSI (Kubik 1999; Schmidt and Purvak 2004). Mean income from TANF fell 85 percent between 1979 and 2004, and income from food stamps fell 40 percent between the peak participation year of 1994 and trough participation year of 2001.

[Figure 1 and Table 1 here]

Figure 2 reveals that much of the change in the level and composition of income in Figure 1 is driven by changes at the extensive margin of work and transfer program participation. The growth in earnings in the late 1980s and again in the late 1990s occurred in part because of strong growth in employment, which in turn led to substantial increases in participation in the EITC. In the late 1990s, the decline in TANF and food stamp income in Figure 1 was largely due to the massive declines in program participation. Although food stamp participation has rebounded somewhat in the 2000s, TANF participation remains fixed at its post welfare-reform

low. Programs such as food stamps and SSI have benefit levels indexed to inflation, which means that changes in income from these sources undoubtedly come from changes in participation. As TANF benefits are largely fixed in nominal terms, except for periodic adjustments among some states, the decline in TANF income reflects both declines in real benefit generosity and program participation, though the latter is the key factor given the relatively low levels of inflation in recent years.

[Figure 2 here]

In Figures 3–5 we depict average pre-tax income sources plus the EITC by three broad groups of education attainment—less than high school, high school graduate with no college, and more than high school. Mean income among mothers with less than high school rose 24 percent in real terms between 1993 and 2004, but this gain simply returned the average low-skilled mother to an income level comparable to the start of the period in 1979. Underlying these trends were large shifts away from TANF and food stamps and towards earnings and the EITC, along with some rise in average SSI income. Indeed, Figure 3 highlights the possible interaction of the business cycle and policy reforms for this demographic group, as earnings are procyclical and transfers are countercyclical. However, social policy reforms can induce a trend shift in these basic relationships, a point that we will attempt to identify more precisely in the regression models below.

[Figures 3–5 here]

It is clear from Figures 4 and 5 that as one moves up the education distribution the role of transfers falls substantially even at the means, and is nearly nonexistent at the median (not depicted). An important exception, especially among single mothers with high school but no college, is the EITC (to a lesser extent food stamps is an exception as well). Unlike mothers with

less than high school, the high school and more than high school groups had real growth of income of nine and 20 percent at the means, respectively. This differential growth is consistent with the inequality literature that emphasizes divergence across education and labor-market experience groups (Lemieux 2006).

[Figures 6–8 here]

Because of evidence that deep poverty in the United States rose in the late 1990s and into the early 2000s (Ziliak 2006), in Figures 6–8 we take a closer look at changes in the level and composition of income at different points of the single-mother income distribution, with a particular emphasis on the bottom half of the distribution at the 10^{th}, 25^{th}, and 50^{th} percentiles. As seen in Figure 6 changes in the average incomes for mothers in the 10^{th} percentile of the income distribution were quite substantial. Income at the 10^{th} percentile ranged from about $6,800 to $8,200 between 1979 and 2004, and for purposes of comparison, the poverty threshold for a family with one adult and two related children in real 2005 dollars is $15,735 so that the 10^{th} percentile falls at about one-half the poverty line for a three-person family. At the 10^{th} percentile mothers rely quite heavily on transfers on average, but post welfare reform fewer than half of mothers even at this low level of income are receiving any cash support from TANF, SSI, Social Security and DI, or earnings except for a few years. It is important to highlight that some of these mothers may be receiving in-kind assistance from TANF such as child care subsidies or transportation assistance that is not recorded in the CPS. Indeed, because about 70 percent of TANF funds are now delivered as in-kind assistance, it is likely that the figures overstate the loss of support of TANF and may in fact reflect the change in delivery of welfare. That said, the figures underscore important changes in financial liquidity among the very poor.

Figures 7–8 depict changes in the mean level and composition of income at the first quartile and median of the income distribution. Real income grew by about one-third at the mean since the mid 1990s for mothers at the first quartile, and unlike the broad group of mothers with less than high school, real income grew about 12 percent overall from 1979 to 2004 at the first quartile. This growth was driven by strong increases in earnings and the EITC. Trends in mean earnings and income at the 50th percentile in Figure 8 are nearly coincident with those of mothers with a high school degree, as seen previously in Figure 4, although there is some evidence of stronger earnings growth at the median in Figure 8. In general, though, the typical single mother with a high school degree falls at about the median of the single mother income distribution.

IV. Interactions between Social Policy, Education, and the Business Cycle on the Level and Distribution of Income and Earnings

The figures make transparent that rising average real incomes beginning in the mid 1990s among single mother families were driven by sizable gains in labor-market earnings, at least at the 25th percentile and higher. During this period welfare was reformed, the EITC was expanded, and the macroeconomy grew at the fastest pace since the late 1960s. The evidence to date on the causal influence of these factors on disposable income and earnings is mixed (Primus et al. 1997; Moffitt 1999; Schoeni and Blank 2000; Grogger 2003), and little attention has been given to identifying interactions between welfare reform and the economy in general and among different skill groups. Moffitt (1999) and Schoeni and Blank (2000) are notable exceptions in that they examined interactions between welfare policies and education attainment. Moffitt also discusses interactions with the business cycle, although he addresses the issue by simply splitting the sample into sub-periods of the 1980s and early 1990s and does not exploit cross-state over time variation in business cycle conditions with direct interactions between the macroeconomy and welfare reform. There has also been little research in national samples on identifying the

heterogeneity of social policy reforms and the macroeconomy across the income distribution (Schoeni and Blank 2000; Alwang et al. 2001; Bitler et al. 2006). Figure 6 shows that single mothers at the 10th percentile of the income distribution had minimal gains in total income in the 1990s and that they have actually retreated backwards in the 2000s, suggesting that the economy and policies likely had differential effects on the economic status of single mothers depending on the mothers' positions in the income distribution. We extend the literature both by estimating interactions between social policy, education, and the business cycle and by estimating the effects of policy interactions on income and earnings levels as well as their distributions.

The reduced form models of income and earnings we estimate are given as

$$(1) \qquad \ln(y_{ijst}) = x_{it}\beta + z_{st}\gamma + (w_{st} * I(e<12))\varphi + (w_{st} * c_{st})\eta + (w_{st} * I(e<12) * c_{st})\chi + \varepsilon_{ijst},$$

where $\ln(y_{ijst})$ is the natural log of real disposable income (or before-tax earnings) for person *i*, in cohort *j*, residing in state *s*, in time period *t*; x_{it} is a vector of observable characteristics of the single mother and her family; z_{st} is a vector of time-varying state level variables including welfare policies w_{st} and business-cycle indicators c_{st}; $I(e<12)$ is an indicator variable equal to one if the mother has fewer than 12 years of schooling and thus $w_{st} * I(e<12)$ is an interaction between welfare policies and education level; $w_{st} * c_{st}$ is an interaction between welfare policy and the business cycle; $w_{st} * I(e<12) * c_{st}$ is a triple interaction between welfare reform, education, and the business cycle; and ε_{ijst} is a five-way error component to capture multiple sources of unobserved heterogeneity. Prior to interacting the welfare indicators with the business cycle we demean the business cycle measure, which implies the coefficient on the direct effect of the cycle yields the average impact and the interactions yield deviations from the mean cycle.

The key policy coefficients of interest are $\gamma, \varphi, \eta, \chi$ which capture the effects on after-tax real income and before-tax earnings of welfare reform, the EITC, and the business cycle, and interactions among the variables. We parameterize welfare reform policies in one of two ways. In the first case we use one binary indicator for the waiver period that takes a value of one in the year the state implements any waiver from its AFDC program during the 1992–1996 period and a value of zero before and after the 1992-1996 period. Our second binary indicator takes a value of one in the year that the state implemented its TANF program and zero in the years leading up to TANF. This specification permits nonlinearity in the effects of waivers and TANF and has been a common approach in much of the welfare reform literature (Blank 2002). A downside of the latter, however, is the fact that states implemented their TANF programs within about 20 months of each other, which may inhibit identification. To this end, the interactions with skill level and business cycle conditions, each of which vary across states and time, will enhance identification of welfare reform. In terms of hypothesized directions of effects, we do not have strong priors on the direct effect of waivers and TANF on disposable income, but we do with regards to earnings. That is, we predict a positive effect of waivers and TANF on earnings because of the explicit work requirements as part of welfare reform, but the net effect on total income could go either direction because it is possible that earnings gains could be more than offset by transfer losses such that total income falls. We do hypothesize that welfare reform has a stronger and more positive effect on earnings and income in states with more robust economic growth as these states are more able to accommodate transitions from welfare to work.

The second approach to modeling welfare reform that we adopt is to use detailed characteristics of states' reform packages. Here we include indicators for whether or not the state has a time limit less than the federal level, exemptions from work requirements, sanctions

on benefits for failing adhere to program rules, expanded earnings disregards, family caps on benefit amounts, and work requirements. We also include an interaction between the time limit and whether there is a child under age 6 in the family. Grogger (2003) hypothesizes that mothers with young children are more likely to bank benefits for a "rainy day" and, thus, if this is true, we should see time limits have a more immediate positive effect on their earnings and income. A concern with the disaggregated waiver approach is that there is too much collinearity to identify individual policies, and because of this we do not allow a nonlinearity pre- and post-TANF. That is, these policies are set equal to one in the year in which it was adopted, whether in the waiver period or in the TANF period, and remain equal to one for the rest of the sample period. We also do not interact these policies with education or the business cycle because of the unwieldy number of coefficients; this specification is best viewed as a check on the base case of no interactions.

The other major policy variable of interest is the EITC. The EITC is a federal policy, and in the absence of any variation aside from time-series it is not separately identifiable from general macroeconomic effects. Hotz et al. (2005), using California administrative data, exploit the fact that after passage of OBRA 1990 the size of the EITC credit varied by family size depending on whether the filing unit had zero, one, or two or more qualifying children in the family. They note that using the across-family size over time variation permits identification of the EITC on welfare use and employment.[5] We adopt a similar strategy using data from the CPS where we assign to each family depending on the number of qualifying children the phase-in rate for the federal credit. The phase-in rate provides a first dollar subsidy to low-wage workers, and thus we also interact the EITC subsidy rate with the indicator variable for less than high school

[5] One could also use the fact that some states of supplemental EITC programs, but this source of variation has not been too successful (Neumark and Wascher 2001; Gundersen and Ziliak 2004).

education to allow for differential effects of the credit across skill levels. We expect the EITC to have a positive effect on earnings based on the positive employment effects identified in Meyer and Rosenbaum (2001) and Hotz et al. (2005), and we expect this effect to be enhanced among the low skilled. The effect on income is less clear for the same reasons as welfare reform; namely, earnings gains induced in part by the expanded generosity of the EITC may result in lower disposable income if other income sources fall more than earnings and the EITC rise.

Our measures of business cycle activity include the state unemployment rate and the log of the state employment to population ratio. Although use of the unemployment rate is common in labor and macroeconomics, the unemployment rate is a convolution of factors affecting the supply-side and the demand-side of the labor market, and thus employment per capita may serve as a better indicator of demand conditions, especially for low-income workers at the margins of being in and out of the labor force (Bartik and Eberts 1999; Hoynes 2001). Indeed, the National Bureau of Economic Research's Business Cycle Dating Committee uses the employment to population ratio as one of its metrics in favor of the unemployment rate. For comparison purposes we conduct our analyses using both measures of the cycle.

Our specification of equation (1) also controls for observed and unobserved heterogeneity. The observed heterogeneity in x_{it} includes variables that are standard in human capital models, such as a quartic in age, the race of the mother, the number of dependent children under age 18, and an indicator variable that equals one if there are children under age six present in the family. For the unobserved heterogeneity we specify a five-way error component as

$$\varepsilon_{ijst} = \alpha_j + \delta_s + \nu_{st} + \lambda_t + \xi_{it}, \quad (2)$$

where α_j is a cohort-specific fixed effect, δ_s is a state-specific fixed effect, ν_{st} is a state-specific trend, λ_t is a year fixed effect, and ξ_{it} is a person-specific random error. The cohort

effects are modeled as indicator variables for whether the mother is in one of 39 5-year birth by education (less than high school, high school, more than high school) cohorts. The idea is that demand-side shocks such as skill-biased technological change may have differentially affected members of different birth cohorts and skill levels (Blundell et al. 1998), and including the birth-education cohort indicators controls for such heterogeneous influences on earnings and income. The baseline effect of education on income and earnings thus comes from the cohort fixed effects. The controls for state fixed effects and trends is fairly standard in the literature—the fixed effects to control for time-invariant (or at least very slow to change) differences across states such as weather, geography, preferences for welfare, education systems, etc, and the trends to control for trending differences across states. There is some debate in the literature on whether state trends are appropriate because of the additional demands for identification placed on variables such as welfare policies—the policy reforms must affect outcomes over and above state fixed and trending effects—and thus we include specifications with and without state trends (Blank 2002). Finally, year effects control for common macroeconomic forces that affect all single mothers the same in a given year. With controls for the number of children and year effects, any estimated effect of the EITC, which varies by year and family size, should be due to the policy itself.

For estimation of the models of income levels we use ordinary least squares (OLS), and for the earnings models we use two-step sample selection methods (Heckman 1979). There is ample evidence that selection into the labor force among single mothers is not random, even after controlling for multiple forms of unobserved heterogeneity, thus rendering least squares estimation inconsistent for the earnings models. The two-step estimators allow for non-random sample selection, and this model is more robust than the Tobit model because of the

proportionality constraint imposed by the Tobit model on the extensive and intensive margins.[6] To assist in identifying the participation margin for the two-step estimator we include in the participation equations but not in the earnings equations family nonlabor income (total income less labor market earnings); the generosity of AFDC/TANF benefits, which vary by state, time, and family size; the generosity of food stamp benefits, which vary by time and family size; and the presence of young children. To identify the effects of the social policies on the distribution of income and earnings among single mothers we use the quantile regression estimator and estimate the models at the 20^{th}, 30^{th}, 40^{th}, 50^{th}, 60^{th}, and 75^{th} percentiles. We report asymptotic standard errors for the quantile regressions.[7]

A. Results on the Levels of Income and Earnings

In Table 2 we present the OLS estimates with robust standard errors for each of our disposable income specifications, where the first four columns include state-specific trends and the second four columns omit state trends. We focus the bulk of our discussion on results inclusive of state trends, except to highlight when important differences emerge. Indeed, the key difference in Table 2 between the models with state trends and those without is the effect of the business cycle on disposable income. With state trends the disposable income of single mothers is unresponsive to changes in the unemployment rate, but strongly procyclical with respect to the

[6] An alternative to the Tobit that breaks the proportionality link is the hurdle model. This model allows variables to have different effects on the extensive and intensive margins, but conditional on having earnings it is assumed that log earnings are normally distributed. The two-step model assumes that log earnings are truncated normal. The difference between the two approaches is that the hurdle model assumes the correlation between the extensive and intensive margins is zero, i.e. there is no selection on unobservables problem. We estimated the hurdle model and the results are broadly consistent with the two-step estimates presented. We also attempted to make use of a less parametric estimator, namely the censored least absolute deviations estimator, but we were unsuccessful in obtaining convergence, most likely due to the large number of parameters to estimate and the fact that median earnings are zero in many years of the 1980s and early 1990s for large subpopulations of single mothers, especially the less skilled.

[7] We experimented with bootstrapped standard errors as well, but the combination of sample size and number of parameters made convergence unstable. In cases where we could compare asymptotic to bootstrapped standard errors, the asymptotic errors on the state policy variables were smaller, but in no case did the coefficient change from being significant with asymptotic errors to insignificant with bootstrap errors. The similarity is likely due in part to the logarithmic transformation of the dependent variable, which reduces the influence of heteroskedasticity.

log employment-population ratio. Just the opposite result obtains for models without state trends. It is surprising that the effect of the business cycle is so sensitive to the inclusion or absence of state trends, and, in the case of the unemployment rate, it is suggestive that it offers no identifying variation for total income beyond a linear trend. Because the dependent variable is in logarithmic form, the coefficient on log employment per capita is an elasticity and implies that a one percent increase in the employment-population ratio leads to a 0.6 percent increase in disposable income. Note that the average growth rate in employment per capita across states and over the two-decade period from 1979 to 1999 was about 0.5 percent, so that within sample this translates to about a 0.3 percent increase in real after-tax income.

[Table 2 here]

In the base case of specification (1), with no interactions between welfare policies and the business cycle, the pre-TANF waivers increased mothers' incomes by about 2.2 percent relative to mothers in states without waivers, and post-TANF disposable income was about six percent higher. Neither effect, however, is statistically significant at usual levels. Likewise, expansions in the EITC do not significantly increase after-tax income on average, and actually result in lower incomes among the less skilled. A one percentage point increase in the EITC subsidy rate lowers after-tax income among mothers with less than a high school education by about one-half percent (0.127–0.604), suggesting that transitions into work induced by the expanded generosity of the EITC results in lower total income among the less skilled. This finding, which is most likely due to lower transfer payments, is robust across all specifications in Table 2 and is explored further in the distributional analysis below.

Specifications (2) and (3) admit interactions between the business cycle and welfare reform, as well as with education. With the added controls for heterogeneity we identify an

economically and statistically significant increase in disposable income of over eight percent after passage of PRWORA. Shown by the equally-sized negative coefficient on the interaction between the TANF and less than high school variables, this effect is concentrated among mothers with 12 or more years of schooling. This result differs from Schoeni and Blank (2000, Table 2), who find evidence of a positive waiver effect on family income among low educated women but no effect of TANF on average income. There are several possible reasons for the discrepancy of our results, including our use of six additional years of data (they only have data until one to two years after the implementation of TANF), our inclusion of interactions between the business cycle and welfare policies, our restriction to single mothers (they include all women), and our broader definition of income (they use before-tax income and exclude food stamps and school lunch). Schoeni and Blank do find that TANF raised incomes at the mean of the distribution and higher, so it is possible, that with the passing of more years post PRWORA, that we are able to identify a more significant mean impact (positive for the high skilled and negative for the low skilled).

The only evidence of interactions between welfare reform and the business cycle is during the waiver period, and this is concentrated among the low skilled. During the waiver period a low-skilled single mother living in a state with an unemployment rate one percentage point below the mean unemployment rate had after-tax income that was 5.3 percent higher. Likewise, that same mother if residing in a state with log employment per capita one percentage point above the mean had income that was 1.5 percent higher. Both estimates provide evidence that strong economic growth accommodated state experiments with welfare programs in the mid 1990s. There is no such corresponding evidence in the TANF era. Finally, we find no evidence that the mean impacts in specification (1) were masking important heterogeneity among types of

welfare policies as we find no statistically significant effects of time limits, exemptions, and the like in specification (4).

[Table 3 here]

In Table 3 we present parallel estimates to the income models for before-tax earnings based on two-step selection estimators. The two-step earnings estimates are similar to the income results in Table 2. The only business cycle indicator that affects earnings, conditional on being in the labor force, is the employment-population ratio. The mean impact of the EITC is zero and, perhaps surprisingly, is economically and statistically negative among the less skilled, and welfare reform has little discernable effect on the intensive margin of earnings (although qualitatively the effect of waivers on the less skilled is about six to seven percent).[8] The welfare reform results are broadly consistent whether one examines the aggregated policy variables or the disaggregated variables, as in specification (4). The EITC effect is not inconsistent with labor supply theory in the presence of nonlinear budget constraints, although the results do suggest a fairly strong behavioral response among the less skilled. The distributional results discussed below help clarify these mean effects.[9]

B. Results on the Distribution of Income and Earnings

The levels models, while admitting some observed and unobserved heterogeneity based on skill level of the mother and on business cycle conditions, nonetheless provide estimates only at the means of the income and earnings distributions. Although there is not much guidance from the welfare reform and EITC literatures on how or whether the signs of the coefficients

[8] In results not tabulated we estimated the Lee (1984) sample selection model that admits deviations from linearity imposed by the Heckman method. The only result that changes is the statistical significance of the interaction between the EITC and less than high school.

[9] Schoeni and Blank (2000) estimate their models with and without zero earnings, and likewise find no statistical evidence of waiver effects when zeros are omitted. They do not treat the zeros as possibly missing nonrandomly as we do here.

may change once we move away from the means of these distributions, we believe that the effects of the policies are likely to be heterogeneous across the distributions as welfare dependence has historically been most concentrated in the lower tails. Moreover, the more highly educated may be better equipped to negotiate the various administrative challenges of applying for and maintaining benefit eligibility.[10] In Tables 4 and 5 we present at six different quantiles of the disposable income distribution results from our preferred specifications of Table 2, that is, specifications (3) and (4).

[Tables 4 and 5 here]

The results in Table 4 show that TANF had an economically and statistically significant effect on after-tax incomes of single mothers across the distribution, yielding a direct positive five to eight percent gain among mothers with at least a high school diploma but a sizable income loss at the 20th and 30th percentiles (12 percent and 3.4 percent, respectively) among mothers with less than high school education. Above the 20th percentile there is robust evidence that strong employment growth enhanced the positive income effects of TANF for the less skilled, although not enough to offset the negative effects of the reform at the 20th and 30th percentiles. There is qualitative evidence of a positive effect of waivers on income at all six points of the distribution, even among the less skilled, but the effects are not statistically different from zero. Likewise with the EITC, the evidence is consistent that the less skilled suffer income losses relative to the more skilled, and it is not until the 75th percentile that the less skilled have positive income gains from an expanded EITC. Indeed, at the 20th percentile all skill levels suffer losses in after-tax income from the higher EITC, and it is not until the median of the distribution that skilled mothers (those with 12 or more years of schooling) obtain

[10] Ribar and Edelhoch (2007) show that over a third of participants in the Food Stamp Program in South Carolina lose benefits even though they remain eligible simply by failing to fill out the paperwork.

significant gains in after-tax income from the EITC. Although the EITC is designed to enhance self-sufficiency of single mothers, it appears that many are "running in place" because of offsetting income losses from other sources.

In Table 5 we focus attention on the disaggregated welfare policy results. At the 20th and 30th percentiles stringent time limits led to higher income levels, perhaps because mothers in these states sought alternative income support (but not because of their own earnings as shown below), but the effect of time limits fades quickly after the 30th percentile. The exception is if a child under age six is present where there is evidence of higher incomes at the median of the distribution and above. Note that Grogger's (2003) hypothesis that single mothers with young children are more likely to bank benefits in the presence of time limits is ambiguous with respect to total income because it is not known if the loss of transfers will be met or exceeded by gains from earnings and other income sources. The results in Table 5 suggest that the gains from possible benefit banking in the upper half of the distribution outweighed the losses. There is also evidence that exemptions and sanctions policies led to lower and higher incomes, respectively, at many points of the distribution. Some of these effects are not obvious from theory, and thus we turn next to earnings models to examine whether the results are theory consistent with labor market earnings or whether the disaggregated policies are largely picking up noise.

[Tables 6 and 7 here]

In Tables 6 and 7 we report the quantile estimates of specifications (3) and (4) for the positive log earnings distribution. These models are best viewed as the distributional analogs to the two-step estimates in Table 3, although, due to convergence problems with the CLAD estimator, we do not correct for the fact that the distribution is censored at zero.[11] The estimates

[11] In the spirit of the sample selection framework, ideally we would employ a quantile regression estimator with random censoring as described by Honore et al. (2002). Although such an estimator is beyond the scope of the

in Table 6 reveal that pre-TANF waivers increased earnings in the 40th percentile and higher for mothers of all skill levels, but the positive earnings effects of TANF were most pronounced among the low skilled at the low end of the earnings distribution—about 20 percent at the 20th percentile compared to nine percent at the 75th percentile. The lack of effect with the two-step estimates of Table 3 suggests that mean impacts do miss a lot of the welfare reform story, and the results here generalize to national samples the heterogeneity found in Bitler et al. (2006). With the business cycle interactions of Table 6 a somewhat complicated picture emerges between the waiver and TANF eras, which help us to understand the lack of business-cycle effects in Table 3. In the waiver period strong local economies, relative to the mean, actually inhibited earnings gains among the high skilled in the bottom half of the distribution but fostered earnings gains among the low skilled, especially at higher points of the distribution. However, in the TANF era there is some qualitative evidence similar to the waiver results for the high skilled in the low end of the distribution, but it is not statistically significant. As in the waiver period, the low skilled at higher points of the earnings distribution experienced higher earnings gains if they lived in states with above-average employment per capita growth.

Tables 6 and 7 both reveal the strong, positive behavioral response of an expanding EITC on the earnings of single mothers, especially in the bottom half of the earnings distribution. There a percentage point increase in the subsidy rate increases before-tax earnings of mothers with at least 12 years of schooling by about 2.5 percent at the 20th percentile, and by just over one percent at the median. For low skilled mothers, the negative effects of the EITC on mean earnings found in Table 3 appear to be driven by those in the top half of the earnings distribution. What these results suggest is that a more generous subsidy rate mechanically increases the

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current project, we are pessimistic that convergence would be attained given the large number of parameters to estimate.

fraction of mothers eligible for the EITC, and those higher up in the earnings distribution then face the phase-out rate of 21.06 percent. Holding before-tax hourly wages constant, then, the low-skilled behaviorally respond by reducing their work effort and, thus, earnings in response to the more generous credit.

In terms of disaggregated waiver effects, Table 7 shows that there is robust evidence in favor of the Grogger (2003) hypothesis of benefit banking resulting in higher earnings, especially at the low end of the distribution. Although Grogger found no evidence in favor of his hypothesis for mean earnings (nor did we in Table 3), Table 7 highlights the importance of examining the distributional consequences of welfare reform and related social policies such as the EITC.

V. Conclusion

We documented dramatic changes in the level and composition of income across the distribution during the welfare reform era. At the 10^{th} percentile mothers still rely quite heavily on transfers, on average, but post welfare reform fewer than half of mothers even at this low level of income receive any cash support from TANF, SSI, Social Security and DI, or earnings. At the same time, average real income at the 25th percentile grew by about 32 percent between 1993 and 2004 and by about 12 percent overall from 1979 until 2004. This growth was driven by strong increases in earnings and the EITC.

We attempted to identify causal effects of welfare reform, expansions in the EITC, and macroeconomic growth across the distributions of disposable income and before-tax earnings. Our regression results showed that TANF raised disposable incomes among higher skilled mothers an average of eight percent, raised earnings among low skilled mothers in the lower half of the distribution by as much as 20 percent, but also led to a significant equal-sized losses of after-tax total income among the low-skilled. Strong local economies in the mid 1990s

accommodated welfare waivers that fostered income and earnings gains among the less skilled, which lends additional credence to the notion that "a rising tide lifts all boats." The EITC expansions of the 1990s boosted before-tax earnings across the earnings distribution, especially for the low skilled in the bottom half of the distribution, but also resulted in significant losses of total income for the low skilled.

Our estimates showed that the earnings gains among the low skilled from the implementation of TANF and expansions of the EITC have been more than offset by losses in transfer income and have left the most vulnerable single mothers either running in place or falling behind. This poses a dilemma for policymakers because, on the one hand, low skilled single mothers have acquired more labor-market experience than they would have in the absence of welfare reform and expanded EITC, and returns to experience accumulate over the life course so that earnings gains are likely to beget more earnings gains provided the mothers remain attached to the labor force. On the other hand, after-tax income including the cash value of food stamps, which is a common barometer for economic well being, has fallen in the wake of the social policy reforms and thus potentially jeopardized the well being of the children in these families. A possible policy response to this outcome of rising earnings but falling total income is to provide more generous work supports through the EITC and food stamp programs. This outcome could also reflect the "work first" strategies adopted by most states in the wake of welfare reform. Recent evidence by Hotz et al. (2006) indicates that welfare programs focusing on human capital developments have a better payoff in the long run, suggesting the longer term policy response is to couple work supports with skill upgrading.

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Figure 1: Mean Income by Source for Single Mothers, Ages 16 to 54, All Education Levels

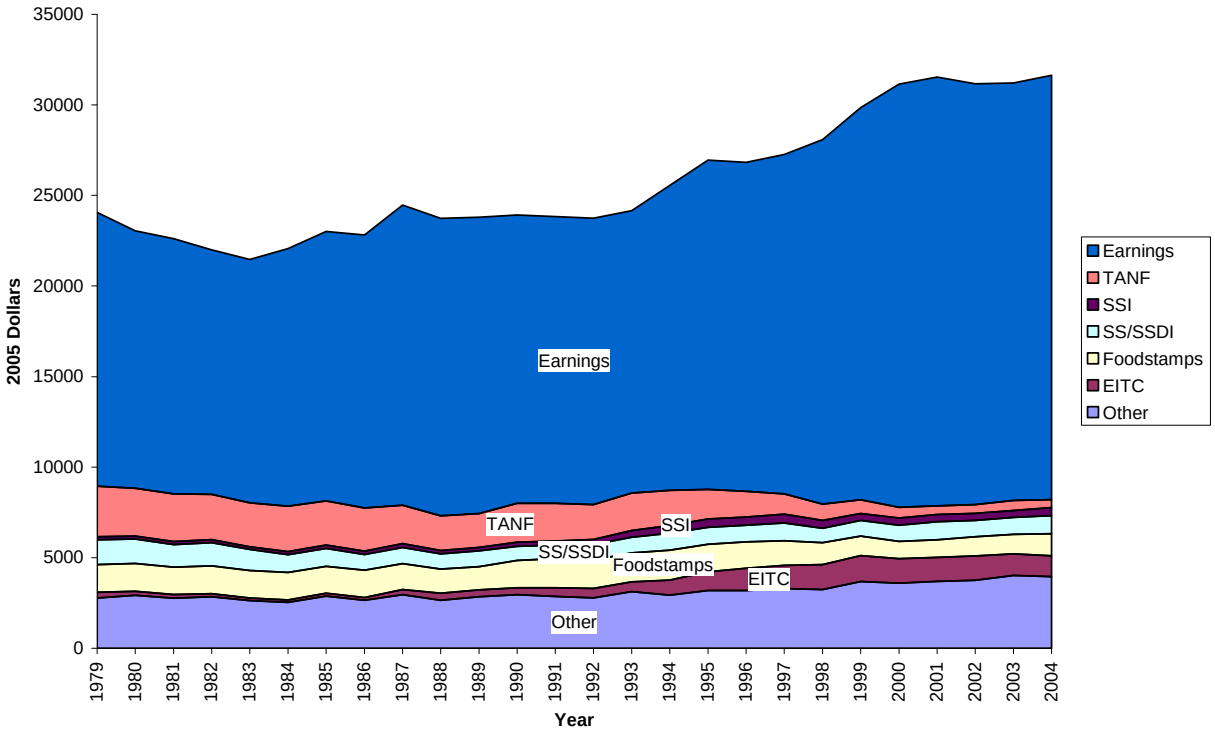

Figure 2: Participation Rates in Work and Welfare of Single Mothers, Ages 16-54

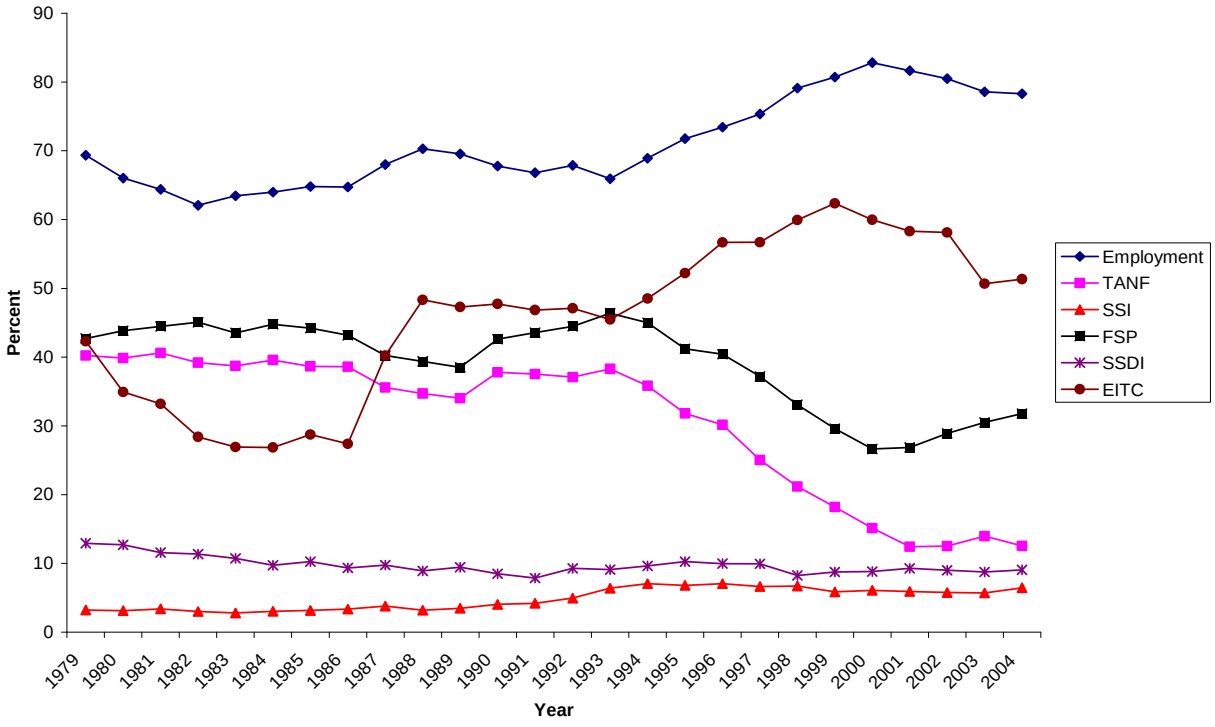

Figure 3: Mean Income by Source for Single Mothers, Ages 16 to 54, Less than High School Education

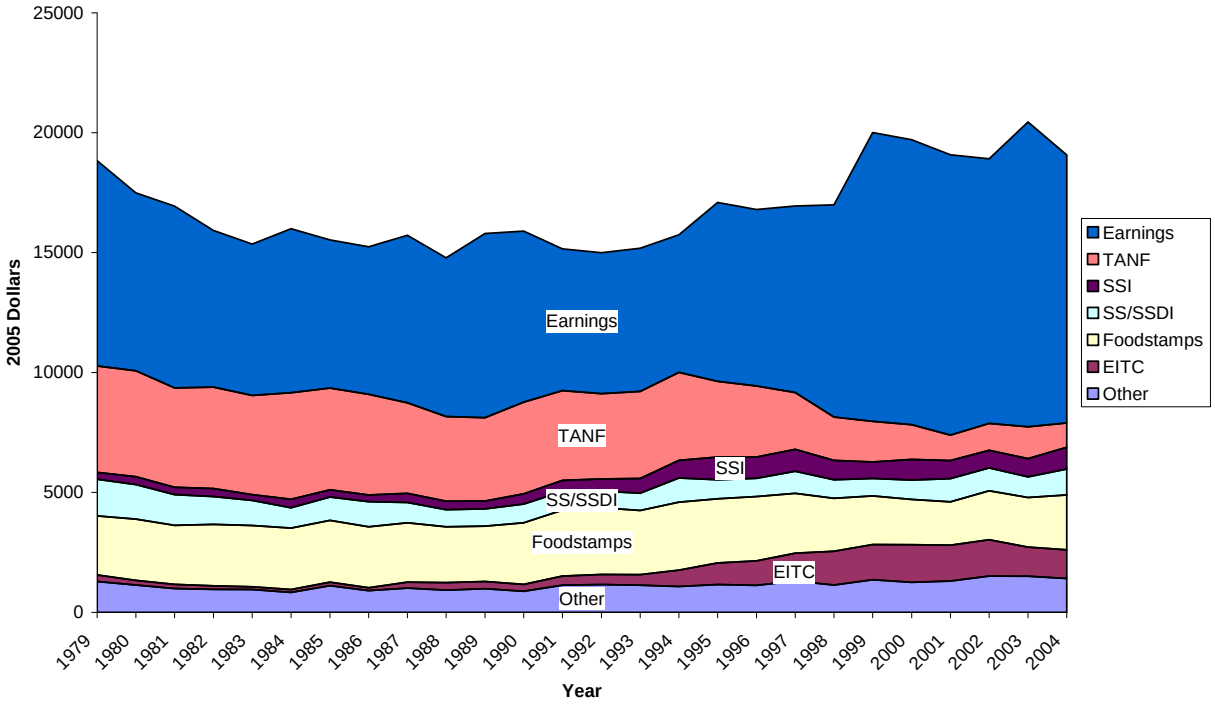

Figure 4: Mean Income by Source for Single Mothers, Ages 16 to 54, High School Education

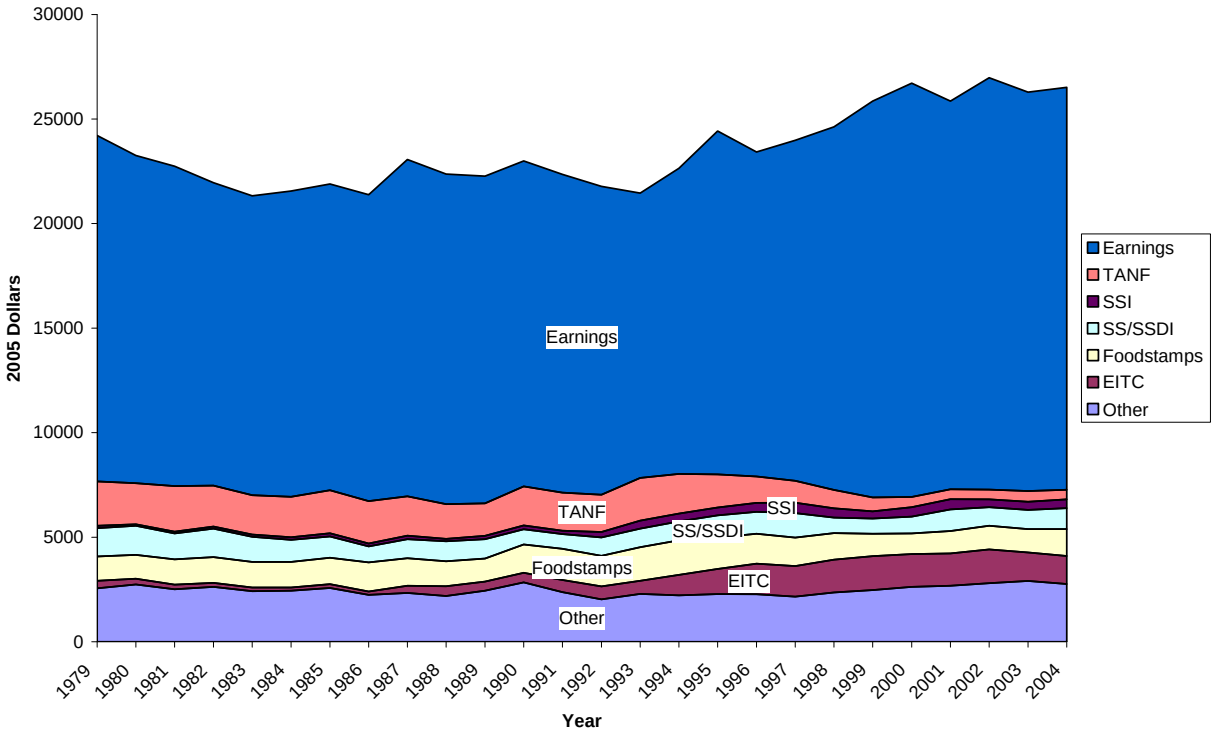

Figure 5: Mean Income by Source for Single Mothers, Ages 16 to 54, More than High School Education

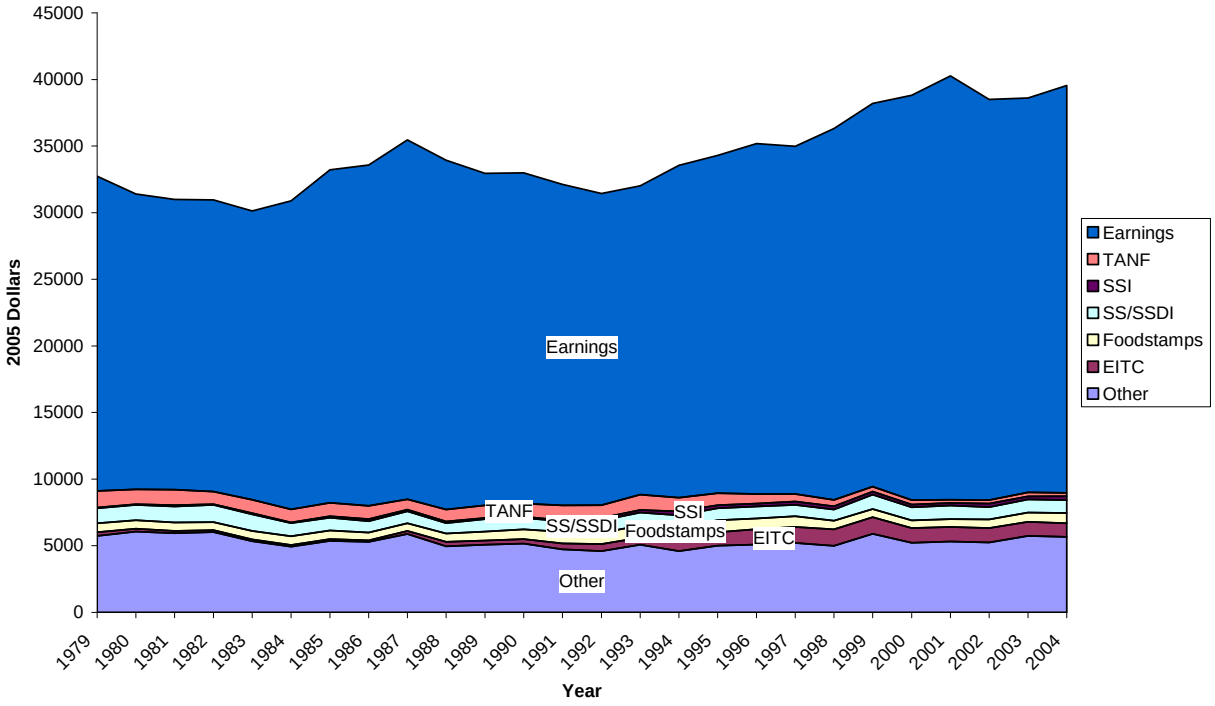

Figure 6: Mean Income by Source for Single Mothers, Ages 16-54, 10th Percentile of Income Distribution

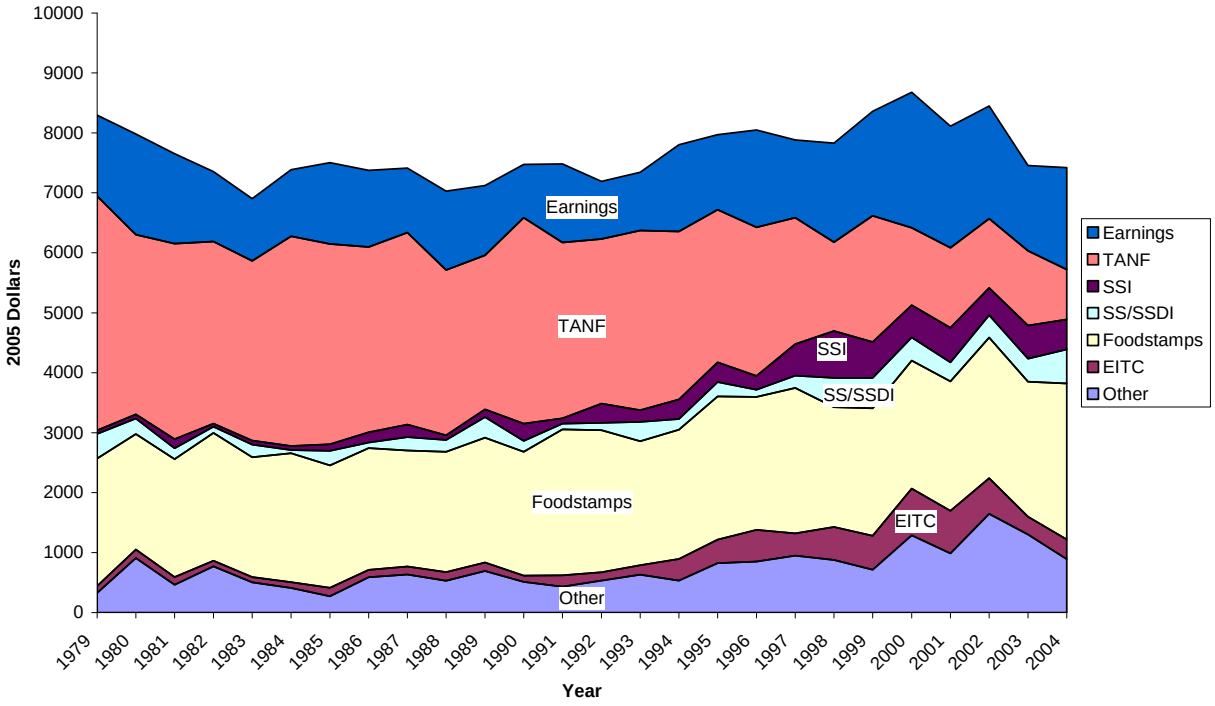

Figure 7: Mean Income by Source for Single Mothers, Ages 16-54, 25th Percentile of Income Distribution

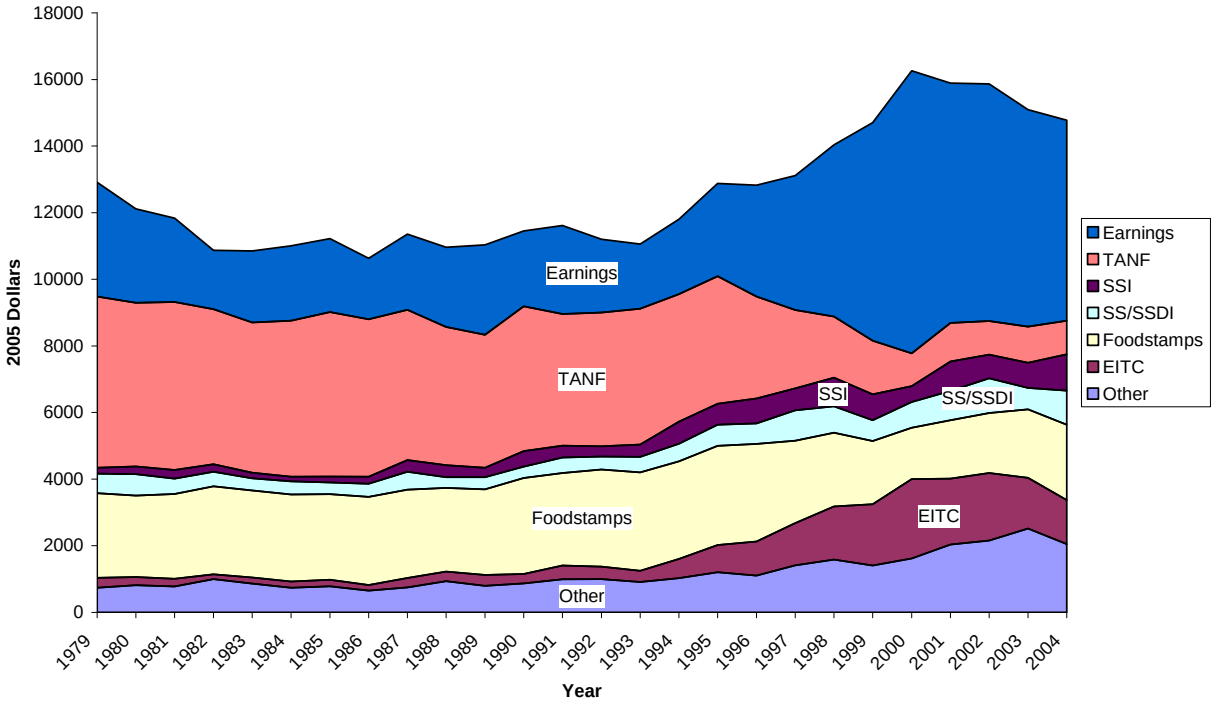

Figure 8: Mean Income by Source for Single Mothers, Ages 16-54, Median of Income Distribution

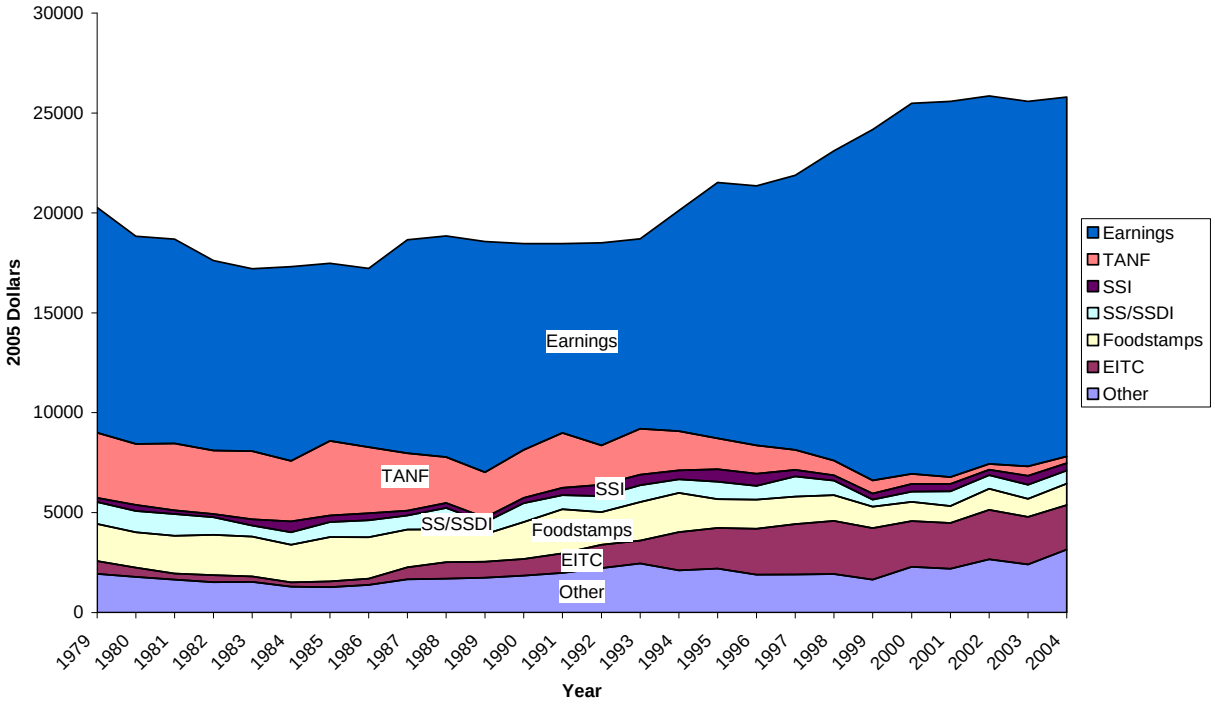

Table 1: Average Income Levels of Single Mothers age 16–54 by Source and Year

Variable Name	1980	1985	1990	1995	2000	2004
Disposable income	$20,159	$19,741	$20,928	$23,310	$26,818	$28,083
Earnings	14,214	14,873	15,909	18,160	23,363	23,418
Earned Income Tax Credit (EITC)	231	155	380	1,041	1,346	1,156
Temporary Assistance to Needy Families (TANF)	2,643	2,436	2,147	1,652	591	448
Supplemental Security Income (SSI)	159	181	226	453	406	443
Social Security/Disability Income (SSDI)	1,355	994	779	929	890	1,001
Food Stamp Program & School Lunch (FSP)	1,530	1,490	1,510	1,518	956	1,210
Other Nonlabor Income	2,921	2,884	2,961	3,189	3,603	3,955
Number of Observations	3,239	3,217	3,667	3,190	5,033	4,930

All income sources are expressed in real 2005 dollars with the personal consumption expenditure deflator

Table 2: The Effect of Welfare Reform, the Macroeconomy, and the EITC on Log Disposable Income

	With State-Specific Trends				Without State-Specific Trends			
COEFFICIENT	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Age	0.588***	0.596***	0.596***	0.587***	0.593***	0.601***	0.599***	0.593***
	(0.075)	(0.075)	(0.075)	(0.075)	(0.075)	(0.075)	(0.075)	(0.075)
Age Squared/100	-2.300***	-2.332***	-2.332***	-2.295***	-2.321***	-2.352***	-2.345***	-2.318***
	(0.327)	(0.326)	(0.327)	(0.326)	(0.327)	(0.326)	(0.327)	(0.326)
Age Cubed/1000	0.414***	0.419***	0.419***	0.412***	0.418***	0.423***	0.422***	0.417***
	(0.062)	(0.062)	(0.062)	(0.062)	(0.062)	(0.062)	(0.062)	(0.062)
Age Quartic/10000	-0.028***	-0.028***	-0.028***	-0.028***	-0.028***	-0.029***	-0.029***	-0.028***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Race=White	0.105***	0.105***	0.105***	0.105***	0.106***	0.106***	0.106***	0.106***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Have Child < 6 yrs	-0.149***	-0.149***	-0.149***	-0.146***	-0.149***	-0.149***	-0.149***	-0.146***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Number of Children	0.043***	0.043***	0.043***	0.043***	0.043***	0.043***	0.043***	0.043***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Governor is Democrat	-0.003	-0.004	-0.004	-0.005	0.002	0.001	-0.000	0.000
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Unemployment Rate	-0.003	-0.002	-0.003	-0.003	-0.007**	-0.006**	-0.010***	-0.007**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Log(Emp/Pop)	0.566***	0.533***	0.536***	0.570***	0.081	0.005	-0.085	0.083
	(0.174)	(0.176)	(0.181)	(0.180)	(0.127)	(0.131)	(0.136)	(0.132)
Pre-TANF Waiver	0.022	0.022	0.023		0.024	0.024	0.022	
	(0.015)	(0.017)	(0.017)		(0.015)	(0.016)	(0.017)	
TANF	0.059	0.087**	0.082**		0.069*	0.086**	0.078**	
	(0.039)	(0.041)	(0.040)		(0.039)	(0.040)	(0.039)	
EITC Subsidy Rate	0.127	0.097	0.094	0.142	0.135	0.108	0.108	0.149
	(0.156)	(0.156)	(0.156)	(0.157)	(0.156)	(0.155)	(0.155)	(0.157)
EITC x Educ < 12	-0.604***	-0.407***	-0.380***	-0.605***	-0.609***	-0.414***	-0.389***	-0.610***
	(0.065)	(0.100)	(0.099)	(0.065)	(0.064)	(0.099)	(0.099)	(0.064)
Waiver x Educ < 12		0.033	0.012			0.034	0.014	
		(0.032)	(0.032)			(0.032)	(0.032)	
TANF x Educ < 12		-0.077**	-0.086***			-0.075**	-0.083***	
		(0.031)	(0.028)			(0.031)	(0.028)	
Waiver x UR		-0.001				-0.008		
		(0.009)				(0.009)		
TANF x UR		-0.002				-0.010		
		(0.009)				(0.006)		
Waiver x UR x Educ < 12		-0.053***				-0.053***		
		(0.016)				(0.016)		
TANF x UR x Educ < 12		0.001				0.001		
		(0.013)				(0.013)		
Waiver x Log(Emp/Pop)			-0.074				0.182	
			(0.241)				(0.225)	
TANF x Log(Emp/Pop)			0.008				0.280***	
			(0.171)				(0.105)	
Waiver x Log(Emp/Pop) x Educ < 12			1.454***				1.487***	
			(0.461)				(0.461)	
TANF x Log(Emp/Pop) x Educ < 12			0.134				0.159	
			(0.235)				(0.234)	
Time Limit				0.011				0.004
				(0.029)				(0.022)
Time Limit x Kid < 6 yrs				-0.010				-0.010
				(0.014)				(0.014)
Exemption				-0.037				-0.021
				(0.036)				(0.035)
Sanctions				0.043				0.047
				(0.034)				(0.033)
Earnings Disregard				0.002				-0.004
				(0.022)				(0.021)
Family Cap				0.018				0.011
				(0.019)				(0.011)

Work Requirement				0.002				0.002
				(0.025)				(0.025)
Constant	4.371***	4.332***	4.349***	4.371***	4.021***	3.964***	3.959***	4.022***
	(0.634)	(0.634)	(0.634)	(0.634)	(0.627)	(0.626)	(0.626)	(0.627)
Observations	94939	94939	94939	94939	94939	94939	94939	94939
R-squared	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

Robust standard errors in parentheses. All models control for cohort fixed effects, year fixed effects, and state fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Two-Step Estimates of the Effect of Welfare Reform, the Macroeconomy, and the EITC on Labor-Market Earnings

	With State-Specific Trends				Without State-Specific Trends			
COEFFICIENT	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Age	0.864***	0.862***	0.864***	0.864***	0.874***	0.871***	0.869***	0.875***
	(0.122)	(0.123)	(0.123)	(0.122)	(0.123)	(0.123)	(0.123)	(0.123)
Age Squared	-3.061***	-3.051***	-3.062***	-3.061***	-3.104***	-3.091***	-3.083***	-3.106***
	(0.538)	(0.538)	(0.538)	(0.538)	(0.538)	(0.539)	(0.539)	(0.538)
Age Cubed	0.492***	0.490***	0.492***	0.491***	0.500***	0.497***	0.496***	0.500***
	(0.102)	(0.102)	(0.102)	(0.102)	(0.102)	(0.102)	(0.102)	(0.102)
Age Quartic	-0.030***	-0.030***	-0.030***	-0.030***	-0.031***	-0.030***	-0.030***	-0.030***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Race=White	0.072***	0.072***	0.072***	0.072***	0.073***	0.073***	0.073***	0.073***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Number of Children	-0.123***	-0.123***	-0.123***	-0.123***	-0.123***	-0.122***	-0.123***	-0.123***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Governor is Democrat	-0.011	-0.011	-0.010	-0.012	-0.000	0.001	-0.001	-0.004
	(0.011)	(0.012)	(0.012)	(0.012)	(0.010)	(0.010)	(0.010)	(0.010)
Unemployment Rate	-0.004	-0.001	-0.003	-0.004	-0.004	-0.004	-0.009	-0.002
	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)
Log(Emp/Pop)	1.039***	1.054***	1.165***	1.143***	0.713***	0.617**	0.539**	0.913***
	(0.329)	(0.334)	(0.346)	(0.341)	(0.235)	(0.240)	(0.250)	(0.244)
Pre-TANF Waiver	0.033	0.027	0.038		0.044	0.038	0.041	
	(0.029)	(0.032)	(0.032)		(0.029)	(0.032)	(0.032)	
TANF	-0.004	-0.036	0.006		0.009	-0.021	-0.008	
	(0.067)	(0.070)	(0.068)		(0.066)	(0.069)	(0.067)	
EITC Subsidy Rate	0.130	0.140	0.132	0.158	0.147	0.153	0.150	0.171
	(0.267)	(0.268)	(0.268)	(0.268)	(0.267)	(0.269)	(0.269)	(0.269)
EITC x Educ < 12	-0.398***	-0.458**	-0.410**	-0.396***	-0.414***	-0.486**	-0.457**	-0.415***
	(0.125)	(0.205)	(0.204)	(0.125)	(0.125)	(0.205)	(0.204)	(0.125)
Waiver x Educ < 12		0.043	0.015			0.045	0.022	
		(0.068)	(0.066)			(0.068)	(0.067)	
TANF x Educ < 12		0.027	-0.001			0.036	0.011	
		(0.054)	(0.051)			(0.054)	(0.051)	
Waiver x UR		-0.003				-0.006		
		(0.017)				(0.016)		
TANF x UR		-0.027*				-0.023**		
		(0.014)				(0.010)		
Waiver x UR x Educ < 12		-0.035				-0.036		
		(0.033)				(0.033)		
TANF x UR x Educ < 12		0.013				0.016		
		(0.017)				(0.017)		
Waiver x Log(Emp/Pop)			-0.581				-0.159	
			(0.475)				(0.450)	
TANF x Log(Emp/Pop)			-0.244				0.408**	
			(0.311)				(0.182)	
Waiver x Log(Emp/Pop) x Educ < 12			0.407				0.442	
			(1.005)				(1.006)	
TANF x Log(Emp/Pop) x Educ < 12			0.016				0.056	
			(0.363)				(0.362)	
Time Limit				-0.111**				-0.061
				(0.053)				(0.040)
Time Limit x Kid < 6 yrs				-0.009				-0.008
				(0.018)				(0.018)
Exemptions				-0.006				-0.011
				(0.069)				(0.068)
Sanctions				0.014				-0.006
				(0.066)				(0.065)
Earnings Disregard				0.026				0.028
				(0.042)				(0.041)
Family Cap				0.037				0.068***
				(0.035)				(0.019)

Work Require				0.036				0.032
				(0.048)				(0.048)
Constant	2.269**	2.232**	2.330**	2.312**	1.842*	1.809*	1.820*	1.933*
	(1.020)	(1.021)	(1.021)	(1.021)	(1.013)	(1.014)	(1.014)	(1.014)
Observations	94939	94939	94939	94939	94939	94939	94939	94939
R-squared	.	.	.	.	.	.	.	.

Standard errors in parentheses. All models control for cohort fixed effects, year fixed effects, and state fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 4: The Effects of Welfare Reform, the Macroeconomy, and the EITC Across the Distribution of Log Income

	Quantile					
COEFFICIENT	20th	30th	40th	50th	60th	75th
Age	0.812***	0.537***	0.522***	0.473***	0.378***	0.341***
	(0.083)	(0.064)	(0.053)	(0.053)	(0.051)	(0.055)
Age Squared	-3.242***	-2.089***	-2.006***	-1.765***	-1.345***	-1.197***
	(0.360)	(0.280)	(0.230)	(0.230)	(0.230)	(0.240)
Age Cubed	0.582***	0.375***	0.360***	0.311***	0.230***	0.206***
	(0.069)	(0.054)	(0.045)	(0.045)	(0.043)	(0.046)
Age Quartic	-0.039***	-0.026***	-0.025***	-0.021***	-0.015***	-0.014***
	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Race=White	0.117***	0.123***	0.119***	0.120***	0.118***	0.114***
	(0.007)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
Have Child < 6 yrs	-0.172***	-0.152***	-0.126***	-0.106***	-0.087***	-0.065***
	(0.008)	(0.007)	(0.0053)	(0.005)	(0.005)	(0.005)
Number of Children	0.081***	0.060***	0.044***	0.032***	0.023***	0.014***
	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Governor is Democrat	-0.008	-0.011*	-0.008	-0.004	-0.008	0.004
	(0.008)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
Unemployment Rate	-0.004	-0.009**	-0.004	-0.004	-0.002	-0.007**
	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Log(Emp/Pop)	0.392	0.233	0.472***	0.613***	0.669***	0.458***
	(0.240)	(0.190)	(0.160)	(0.160)	(0.150)	(0.160)
Pre-TANF Waiver	0.016	0.012	0.024	0.011	0.024	0.022
	(0.023)	(0.018)	(0.015)	(0.015)	(0.014)	(0.015)
TANF	0.069	0.076**	0.083***	0.068**	0.058*	0.053*
	(0.048)	(0.038)	(0.031)	(0.031)	(0.030)	(0.032)
EITC Subsidy Rate	-0.543***	-0.136	0.074	0.265**	0.460***	0.501***
	(0.190)	(0.150)	(0.120)	(0.120)	(0.120)	(0.120)
EITC x Educ < 12	-0.486***	-0.585***	-0.657***	-0.659***	-0.563***	-0.448***
	(0.130)	(0.099)	(0.082)	(0.083)	(0.080)	(0.086)
Waiver x Educ < 12	0.041	0.031	0.008	0.036	0.018	0.033
	(0.042)	(0.033)	(0.027)	(0.027)	(0.026)	(0.028)
TANF x Educ < 12	-0.190***	-0.111***	-0.052**	-0.005	0.016	0.034
	(0.032)	(0.025)	(0.021)	(0.021)	(0.020)	(0.022)
Waiver x Log(Emp/Pop)	-0.174	-0.368	-0.427*	-0.396*	-0.173	-0.144
	(0.340)	(0.260)	(0.220)	(0.220)	(0.220)	(0.230)
TANF x Log(Emp/Pop)	-0.110	-0.092	-0.162	-0.210	-0.104	-0.014
	(0.220)	(0.170)	(0.140)	(0.140)	(0.140)	(0.150)
Waiver x Log(Emp/Pop) x Educ < 12	1.072*	0.690	0.947**	0.967**	0.972**	1.318***
	(0.620)	(0.490)	(0.420)	(0.430)	(0.420)	(0.450)
TANF x Log(Emp/Pop) x Educ < 12	0.125	0.404**	0.467***	0.402**	0.356**	0.509***
	(0.240)	(0.190)	(0.160)	(0.160)	(0.150)	(0.160)
Constant	1.653**	4.171***	4.456***	5.279***	6.139***	7.010***
	(0.680)	(0.530)	(0.440)	(0.440)	(0.430)	(0.450)
Observations	94939	94939	94939	94939	94939	94939

Standard errors in parentheses. All models control for cohort fixed effects, year fixed effects, and state fixed effects and trends.
*** p<0.01, ** p<0.05, * p<0.1

Table 5: The Effects of Disaggregated Welfare Policies Across the Distribution of Log Income

	Quantile					
COEFFICIENT	20th	30th	40th	50th	60th	75th
Age	0.749***	0.528***	0.522***	0.469***	0.380***	0.339***
	(0.080)	(0.071)	(0.058)	(0.049)	(0.049)	(0.054)
Age Squared	-2.947***	-2.051***	-2.016***	-1.756***	-1.361***	-1.195***
	(0.350)	(0.310)	(0.250)	(0.220)	(0.220)	(0.240)
Age Cubed	0.523***	0.368***	0.363***	0.310***	0.235***	0.206***
	(0.067)	(0.060)	(0.049)	(0.042)	(0.041)	(0.046)
Age Quartic	-0.035***	-0.025***	-0.025***	-0.021***	-0.016***	-0.014***
	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Race=White	0.117***	0.122***	0.119***	0.120***	0.117***	0.114***
	(0.007)	(0.006)	(0.005)	(0.004)	(0.004)	(0.005)
Have Child < 6 yrs	-0.162***	-0.153***	-0.132***	-0.116***	-0.0972***	-0.0792***
	(0.010)	(0.009)	(0.007)	(0.006)	(0.006)	(0.007)
Number of Children	0.081***	0.061***	0.045***	0.032***	0.024***	0.014***
	(0.004)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)
Governor is Democrat	-0.011	-0.013*	-0.007	-0.006	-0.007	0.005
	(0.008)	(0.007)	(0.006)	(0.005)	(0.005)	(0.005)
Unemployment Rate	-0.004	-0.009**	-0.005	-0.005*	-0.003	-0.007**
	(0.008)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Log(Emp/Pop)	0.380	0.177	0.409**	0.593***	0.647***	0.497***
	(0.230)	(0.210)	(0.170)	(0.150)	(0.140)	(0.160)
EITC Subsidy Rate	-0.362**	-0.149	0.066	0.218*	0.367***	0.466***
	(0.180)	(0.160)	(0.130)	(0.110)	(0.110)	(0.120)
EITC x Educ < 12	-0.951***	-0.799***	-0.757***	-0.649***	-0.496***	-0.320***
	(0.077)	(0.068)	(0.056)	(0.048)	(0.047)	(0.052)
Time Limit	0.091**	0.063*	0.036	0.024	-0.001	-0.021
	(0.037)	(0.033)	(0.027)	(0.023)	(0.022)	(0.025)
Time Limit x Kid < 6 yrs	-0.044***	0.004	0.017	0.031***	0.031***	0.038***
	(0.016)	(0.014)	(0.011)	(0.0096)	(0.0095)	(0.011)
Exemption	-0.105**	-0.081*	-0.04	-0.072**	-0.055*	-0.043
	(0.047)	(0.042)	(0.034)	(0.030)	(0.029)	(0.033)
Sanctions	0.036	0.034	0.022	0.040	0.057**	0.057*
	(0.046)	(0.041)	(0.034)	(0.029)	(0.029)	(0.032)
Earnings Disregard	0.022	0.020	0.017	0.013	-0.005	0.009
	(0.028)	(0.025)	(0.021)	(0.018)	(0.017)	(0.019)
Family Cap	0.018	0.009	-0.002	0.014	0.005	0.005
	(0.024)	(0.021)	(0.017)	(0.015)	(0.015)	(0.016)
Work Requirement	-0.020	-0.012	-0.001	0.006	0.021	0.003
	(0.032)	(0.029)	(0.024)	(0.020)	(0.020)	(0.022)
Constant	2.014***	4.118***	4.389***	5.321***	6.139***	7.091***
	(0.660)	(0.590)	(0.480)	(0.410)	(0.400)	(0.450)
Observations	94939	94939	94939	94939	94939	94939

Standard errors in parentheses. All models control for cohort fixed effects, year fixed effects, and state fixed effects and trends.
*** p<0.01, ** p<0.05, * p<0.1

Table 6: The Effects of Welfare Reform, the Macroeconomy, and the EITC Across the Distribution of Log Earnings

	Quantile					
COEFFICIENT	20th	30th	40th	50th	60th	75th
Age	1.144***	1.170***	1.129***	1.160***	1.158***	0.758***
	(0.210)	(0.140)	(0.110)	(0.0970)	(0.086)	(0.071)
Age Squared	-3.728***	-3.897***	-3.893***	-4.180***	-4.310***	-2.786***
	(0.910)	(0.630)	(0.500)	(0.430)	(0.380)	(0.310)
Age Cubed	0.548***	0.584***	0.609***	0.682***	0.725***	0.472***
	(0.170)	(0.120)	(0.094)	(0.081)	(0.071)	(0.060)
Age Quartic	-0.032***	-0.034***	-0.037***	-0.042***	-0.046***	-0.031***
	(0.012)	(0.008)	(0.007)	(0.006)	(0.005)	(0.004)
Race=White	0.191***	0.148***	0.115***	0.103***	0.097***	0.085***
	(0.018)	(0.012)	(0.010)	(0.008)	(0.007)	(0.006)
Have Child < 6 yrs	-0.162***	-0.100***	-0.063***	-0.044***	-0.022***	-0.008
	(0.020)	(0.014)	(0.011)	(0.009)	(0.008)	(0.007)
Number of Children	-0.312***	-0.255***	-0.212***	-0.176***	-0.142***	-0.108***
	(0.010)	(0.007)	(0.006)	(0.005)	(0.004)	(0.004)
Governor is Democrat	-0.012	-0.017	-0.006	-0.001	0.003	0.005
	(0.019)	(0.013)	(0.011)	(0.009)	(0.008)	(0.007)
Unemployment Rate	-0.027**	-0.008	-0.004	-0.003	-0.006	-0.006
	(0.012)	(0.008)	(0.006)	(0.005)	(0.005)	(0.004)
Log(Emp/Pop)	1.755***	1.460***	1.303***	1.094***	0.924***	0.744***
	(0.580)	(0.400)	(0.320)	(0.270)	(0.240)	(0.200)
Pre-TANF Waiver	0.061	0.058	0.056*	0.055**	0.050**	0.041**
	(0.055)	(0.037)	(0.029)	(0.025)	(0.022)	(0.018)
TANF	0.137	0.096	0.076	0.029	0.072	0.020
	(0.120)	(0.079)	(0.062)	(0.053)	(0.047)	(0.039)
EITC Subsidy Rate	2.477***	1.881***	1.616***	1.252***	0.927***	0.527***
	(0.450)	(0.310)	(0.240)	(0.210)	(0.180)	(0.150)
EITC x Educ < 12	-0.153	0.0304	-0.143	-0.460***	-0.590***	-0.719***
	(0.360)	(0.250)	(0.190)	(0.160)	(0.150)	(0.120)
Waiver x Educ < 12	0.179	0.090	0.121*	0.006	0.027	-0.054
	(0.120)	(0.080)	(0.063)	(0.053)	(0.047)	(0.039)
TANF x Educ < 12	0.210**	0.233***	0.211***	0.138***	0.095***	0.090***
	(0.090)	(0.061)	(0.048)	(0.041)	(0.036)	(0.030)
Waiver x Log(Emp/Pop)	-1.540*	-1.182**	-0.924**	-0.836**	-0.183	-0.154
	(0.790)	(0.550)	(0.430)	(0.370)	(0.320)	(0.270)
TANF x Log(Emp/Pop)	-0.757	-0.168	-0.282	-0.134	0.0689	0.265
	(0.520)	(0.360)	(0.280)	(0.240)	(0.210)	(0.180)
Waiver x Log(Emp/Pop) x Educ < 12	0.640	0.255	1.425	1.384*	1.629**	0.984*
	(1.670)	(1.190)	(0.940)	(0.800)	(0.710)	(0.580)
TANF x Log(Emp/Pop) x Educ < 12	-0.411	-0.078	0.214	0.205	0.658***	0.519**
	(0.620)	(0.420)	(0.340)	(0.290)	(0.250)	(0.210)
Constant	-2.341	-2.424**	-1.673*	-0.900	-0.131	3.906***
	(1.730)	(1.200)	(0.940)	(0.810)	(0.710)	(0.590)
Observations	73447	73447	73447	73447	73447	73447

Standard errors in parentheses. All models control for cohort fixed effects, year fixed effects, and state fixed effects and trends.
*** p<0.01, ** p<0.05, * p<0.1

Table 7: The Effects of Disaggregated Welfare Policies Across the Distribution of Log Earnings

	Quantile					
COEFFICIENT	20th	30th	40th	50th	60th	75th
Age	1.180***	1.239***	1.144***	1.150***	1.141***	0.745***
	(0.230)	(0.140)	(0.120)	(0.094)	(0.087)	(0.076)
Age Squared	-3.908***	-4.238***	-3.969***	-4.141***	-4.257***	-2.732***
	(1.000)	(0.600)	(0.520)	(0.410)	(0.380)	(0.340)
Age Cubed	0.585***	0.654***	0.624***	0.676***	0.719***	0.462***
	(0.190)	(0.110)	(0.098)	(0.078)	(0.072)	(0.064)
Age Quartic	-0.034***	-0.039***	-0.038***	-0.042***	-0.046***	-0.030***
	(0.013)	(0.008)	(0.007)	(0.005)	(0.005)	(0.004)
Race=White	0.189***	0.144***	0.114***	0.104***	0.096***	0.085***
	(0.020)	(0.012)	(0.010)	(0.008)	(0.007)	(0.007)
Have Child < 6 yrs	-0.214***	-0.130***	-0.081***	-0.058***	-0.035***	-0.016*
	(0.027)	(0.016)	(0.014)	(0.011)	(0.010)	(0.009)
Number of Children	-0.312***	-0.251***	-0.212***	-0.175***	-0.144***	-0.109***
	(0.011)	(0.007)	(0.006)	(0.005)	(0.004)	(0.004)
Governor is Democrat	-0.014	-0.021	-0.011	-0.003	-0.001	0.003
	(0.022)	(0.013)	(0.011)	(0.009)	(0.008)	(0.007)
Unemployment Rate	-0.028**	-0.010	-0.006	-0.004	-0.004	-0.006
	(0.013)	(0.008)	(0.007)	(0.005)	(0.005)	(0.004)
Log(Emp/Pop)	1.509**	1.331***	1.191***	1.060***	0.998***	0.921***
	(0.630)	(0.380)	(0.320)	(0.260)	(0.240)	(0.210)
EITC Subsidy Rate	2.261***	1.642***	1.499***	1.134***	0.894***	0.487***
	(0.490)	(0.300)	(0.250)	(0.200)	(0.190)	(0.160)
EITC x Educ < 12	0.483**	0.844***	0.534***	-0.0235	-0.202**	-0.432***
	(0.230)	(0.140)	(0.120)	(0.096)	(0.088)	(0.078)
Time Limit	-0.087	-0.067	-0.063	-0.051	-0.019	-0.042
	(0.098)	(0.059)	(0.050)	(0.040)	(0.037)	(0.033)
Time Limit x Kid < 6 yrs	0.118***	0.078***	0.043**	0.033*	0.032**	0.023*
	(0.042)	(0.025)	(0.021)	(0.017)	(0.016)	(0.014)
Exemption	-0.175	-0.163**	-0.047	-0.066	-0.005	0.009
	(0.130)	(0.075)	(0.064)	(0.051)	(0.048)	(0.042)
Sanctions	0.110	0.118	0.055	0.038	0.024	-0.016
	(0.120)	(0.072)	(0.062)	(0.050)	(0.046)	(0.041)
Earnings Disregard	0.046	0.030	0.010	0.045	0.031	0.032
	(0.078)	(0.047)	(0.040)	(0.032)	(0.030)	(0.026)
Family Cap	0.018	0.036	0.038	0.017	0.033	0.044**
	(0.064)	(0.039)	(0.033)	(0.026)	(0.024)	(0.021)
Work Requirement	0.132	0.059	0.054	0.019	0.033	-0.004
	(0.089)	(0.054)	(0.046)	(0.036)	(0.034)	(0.029)
Constant	-2.575	-2.887**	-1.700*	-0.728	0.142	4.156***
	(1.890)	(1.150)	(0.980)	(0.780)	(0.720)	(0.630)
Observations	73447	73447	73447	73447	73447	73447

Standard errors in parentheses. All models control for cohort fixed effects, year fixed effects, and state fixed effects and trends.
*** p<0.01, ** p<0.05, * p<0.1