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THE EFFECTS OF TIME LIMITS AND OTHER POLICY CHANGES ON WELFARE USE, WORK, AND INCOME AMONG FEMALE-HEADED FAMILIES

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The Effects of Time Limits and Other Policy Changes on Welfare Use, Work, and Income Among Female-Headed Families

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ABSTRACT

Of all of the welfare reforms that were implemented during the 1990's, time limits may represent the single greatest break from past policy. This paper expands on what is known about this important welfare reform measure by exploiting the predictions from Grogger and Michalopoulos (1999) to estimate the effects of time limits on welfare use, employment, labor supply, earnings, and income among female-headed families. Results based on data from the March Current Population Survey suggest that time limits have had important effects on welfare use and work, accounting for about one-eighth of the decline in welfare use and about 7 percent of the rise in employment since 1993. They have had no significant effect on earnings or income, however. The analysis also shows that the collective effects of other reforms have had important impacts on employment and labor supply. Furthermore, it identifies the Earned Income Tax Credit (EITC) as a particularly important contributor to both the recent decrease in welfare use and the recent increase in employment, labor supply, and earnings.

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I. Introduction

Of all of the welfare reforms that were implemented during the 1990's, time limits may represent the single greatest break from past policy. Prior to welfare reform, poor single-parent families with at least one child under age 18 were entitled to receive cash assistance under the Aid to Families with Dependent Children (AFDC) program. Since AFDC was replaced by the Temporary Aid to Needy Families (TANF) program following the passage of the Personal Responsibility and Work Opportunity Restoration Act (PRWORA) in late 1996, eligibility for cash aid has become time-limited. Families generally may receive federally-funded benefits for no more than 60 months during their lifetimes. Indeed many states have imposed even shorter time limits.

Although early evidence from administrative caseload data suggested that time limits had little effect on welfare use[1], Grogger and Michalopoulos' (2000; hereafter, GM) analysis of data from a Florida welfare reform demonstration found them to have substantial effects. This discrepancy was studied by Grogger (2000), who showed it could be explained largely by two factors: the relatively restrictive controls for policy endogeneity that were employed in the caseload studies, and the implicit assumption maintained in the caseload studies that the effects of time limits were invariant with respect to the age of the youngest child in the family.

The effects of time limits should vary by the age of the youngest child in the family for a simple reason. Although all families receive the same time limit, or benefit stock, when time limits are initially imposed, they have different horizons over which to allocate those benefits. The reason for this is that eligibility for aid under TANF, as under AFDC, ends when the youngest child in the family turns 18. Thus families with

younger youngest children have longer eligibility horizons than families with older youngest children. Among forward-looking families facing both wage uncertainty and credit market constraints, families with younger children have longer horizons over which their fixed stock of benefits could be used to cushion adverse wage shocks. Therefore they should be more reluctant to utilize benefits today, preferring to preserve their benefits for the future (GM). Thus, once time limits are imposed, families with younger youngest children should be less likely to use welfare than families with older youngest children.

However, there is one group that is unaffected by time limits: families whose youngest children exceed a threshold age, which is 13 in the case of the federal five-year time limit. A family whose youngest child is 13 or older has five or fewer years remaining before its youngest child turns 18 and renders the family categorically ineligible for aid. For families whose youngest children exceed the threshold age, time limits amount to a non-binding constraint.

GM's model shows that time limits should decrease welfare use, increase employment, and increase work, in each case by the greatest amount among families with the youngest children. In this paper I exploit these predictions to estimate the effects of time limits on a wide range of welfare and labor market outcomes. Although both GM and Grogger (2000) find time limits to have important effects on welfare use, analyses of welfare use alone provide only one piece of the information that is necessary to assess the success of this important welfare reform. Beyond welfare use, it is important to understand the effects of time limits on such outcomes as employment, labor supply, earnings, and family income in order to better assess the success of this important policy

.[1] See Council of Economic Advisors [CEA] (1997); CEA (1999), and Ziliak, et al. (1997).

measure. In this paper I estimate how time limits affect these various measures of behavior among female-headed families.

Although the primary goal of this paper is to estimate the effects of time limits on welfare use, work, and income, I also contribute to the literature on the effects of other anti-poverty measures, particularly the Earned Income Tax Credit (EITC). The EITC provides a wage subsidy to the lowest-income workers. Once a worker's earnings exceed a threshold that depends on the subsidy rate and the maximum credit, the EITC effectively provides a lump-sum transfer. Once earnings exceed a further threshold, the credit is phased out until it reaches zero at the break-even level of earnings. In recent years, the subsidy rate, the maximum credit, and the beginning of the phase-out range have been increased substantially.[2]

Research has shown that the expansions of the EITC have substantially increased the employment of female family heads (Eissa and Liebman 1996; Dickert, Houser, and Scholz 1995; Meyer and Rosenbaum 1999; Ellwood 2000). To date, however, there have been no direct estimates of the effects of the EITC on welfare use, and no estimates at all of the effects of the EITC on earnings or income.[3] I provide such estimates here.

In the next section, I discuss the data that I analyze. Following that, I describe a number of identification issues that arise and how I attempt to solve them in estimating the effects of time limits. Results follow in section IV. In section V I present some estimates of the extent to which time limits, other welfare policies, the EITC, and the business cycle explain the recent decline in welfare use and increase in work among

[2] Hotz and Scholz (2000) provide detailed descriptions of the EITC and its recent expansions.
[3] Dickert, Houser, and Scholz (1995) provide indirect estimates by using observed wages and EITC parameters to construct a net wage measure, then estimating the effect of net wages on welfare use.

female-headed families. I conclude by noting that the different policy changes appear to have affected different aspects of behavior.

II. Data

A. Welfare and Labor Market Data from the CPS

Data from the March CPS provide the key pieces of information required to estimate age-dependent effects of time limits: information on welfare utilization and labor market outcomes and information on family composition, from which I can determine the age of the youngest child. I use data from all March CPS surveys fielded between 1979 and 2000. Since the welfare utilization measure and labor market outcomes are constructed from questions about the family's sources of income over the previous calendar year, I refer to the data by the year to which the information pertains, rather than by the survey year. Therefore the sample period extends from 1978 through 1999.

My unit of observation is the family. I limit the sample to female-headed families because female-headed families are the primary target for cash aid under U.S. welfare law. They accounted for 90 percent of all cash welfare expenditures and constituted 93 percent of the families using welfare in 1993 (Committee on Ways and Means 1994).

Restricting the sample in this way may give rise to a type of sample selection bias because time limits, and welfare reform generally, may alter marriage and childbearing incentives in a way that changes the composition of the women who constitute the population of female family heads. Some researchers have dealt with this issue by studying the effect of welfare reform on the entire population of women rather than female heads of families (Moffitt 1999; Schoeni and Blank 2000). Although this

approach clearly solves the sample selection problem, it introduces a parameter heterogeneity problem, which is another type of specification error.

The parameter heterogeneity problem arises because both married and childless women are ineligible for welfare. Thus, none of the welfare reform variables affects their welfare use or labor market behavior. Put differently, in a regression of welfare use or labor market outcomes on welfare reform measures, all of the welfare reform coefficients should equal zero for married women. Since women who are ineligible for welfare outnumber those who are eligible, analyzing the effect of welfare reform on all women could lead one to conclude that welfare reform had little or no effect on behavior, even if its effect on eligible women were substantial.

Perhaps the ideal way to solve this "targeting" problem (Ellwood and Bane 1985) would be to fit a sample selection model that predicted whether a woman was a female family head and then use those predictions to obtain consistent estimates of the effects of welfare reform from the sample of female-headed families. However, this approach would require an instrumental variable, that is, a variable that predicted female headship but did not predict welfare use or labor market behavior conditional on headship. Lacking any plausible candidates for such an instrument, it may be useful to discuss the bias that is likely to result from limiting the analysis to female-headed families.

Moffitt and Pavetti (1999) have noted that time limits reduce the generosity of the welfare system, and as such may result in fewer women forming female-headed families, either by increasing marriage or reducing out-of-wedlock childbearing. Presumably, the women who are induced to marry (or forego out-of-wedlock childbearing) as a result of time limits are the most "marriageable" of those at risk of female headship. If

marriageability and labor market productivity are positively correlated, then the women who compose the population of female family heads after the imposition of time limits will be more welfare-prone, and less work-prone, than the women who compose the population of female family heads prior to time limits. In other words, the composition effect that results from time limits may actually cause welfare utilization among female-headed families to rise, and their employment and labor supply to fall, all else equal, since the women with the best non-welfare alternatives are no longer observed as female family heads. Thus the sample selection problem may lead me to understate the effects of time limits on welfare use and labor market behavior.

The top panel of table 1 plots recent trends in many of the outcome variables that I analyze below. Over the full 1978-1999 sample period, 30 percent of female-headed families used welfare on average. The welfare utilization rate has fallen greatly in recent years, however. After peaking at 33 percent in the early 1990's, it fell to 15 percent by 1999. This 55 percent decline corresponds reasonably well to figures from administrative data, which show a decrease of 49 percent between fiscal 1994 and fiscal 1999 and a 59 percent decrease between fiscal 1994 and June 2000 (Administration for Children and Families, 2000).

At the same time that welfare use was falling, employment and labor supply were rising. Employment rose by 14 percentage points, or 20 percent, from 1993 to 1999.[4] Weeks worked rose by 7.2 weeks per year, or 24 percent, over the same period.

The family head's earnings and family income, both measured in constant 1998 dollars, rose as well. Earnings increased by over $4260, or 35 percent, between 1993 and

[4] These figures are similar to those reported by Meyer and Rosenbaum (1999).

1999. Income rose by $4240, suggesting that, on average, the income losses due to decreased welfare utilization were just offset by increases in labor market earnings.

An important question is, what roles did welfare reform, the business cycle, and other factors play in these substantial changes in welfare and labor market outcomes? Assessing the contributions of these various factors to the decline in the welfare caseload has been a central focus of the caseload literature on welfare reform.[5] Below I present similar calculations for a broader range of outcomes. In the next section I describe the explanatory variables that I use to measure these effects.

B. Determinants of Welfare Use

To estimate the effects of time limits and distinguish the effects of time limits from the effects of welfare reform more generally, I utilize state-level variation in welfare reform policy. Such polices vary along two important dimensions. First, states vary considerably as to when they initiated welfare reform. Although PRWORA became effective in October, 1996, many states had received waivers prior to the passage of PRWORA that allowed them to adopt welfare reforms similar to those that would be adopted later under PRWORA.

The first row of panel B in Table 1 shows such variation in timing by reporting the number of states first implementing a major statewide welfare reform program for each year between 1990 and 1999. By this measure, states began serious welfare reform activities as early as 1992. By the end of 1995, 19 states had implemented some sort of statewide welfare reform. All states had implemented statewide reform, under either waivers or TANF, by early 1998.

[5] See CEA (1997, 1999); Wallace and Blank (1999); Ziliak, et al. (1997); Moffitt (2000), Schoeni and Blank (2000).

Beyond varying as to the timing of welfare reform, states also varied as to the bundle of specific policy measures that made up their welfare reform packages. Many states decreased their benefit reduction rates, which are the implicit tax rates at which benefits are reduced when welfare families earn labor market income (Blank, Card, and Robins, 1999). Other popular reforms included work requirements and increased sanctions for failing to satisfy them (CEA, 1997). The second row of panel B shows that time limits were first implemented (in Iowa) in 1993; five other states followed suit in 1995. Of the 42 states that implemented time limits in 1996 or 1997, 15 states had previously implemented a welfare reform program that did not include time limits. I use this variation to distinguish the effects of time limits from the effects of welfare reform more generally.[6]

Panel C of Table 1 shows the growth in two key parameters of the EITC: the subsidy rate and the maximum credit. Between 1990 and 1999, the subsidy paid to the lowest-income workers with more than one child rose from 14 to 40 percent; the maximum credit, expressed in constant 1998 dollars, rose from $1209 to $3734. Since 1996, both the phase-in credit rate and the real value of the maximum credit have been constant. Beginning in 1991, families with two or more children faced a higher subsidy rate and a higher maximum credit than families with only one child. I utilize this between-family-size variation to estimate the effects of the EITC.

Panel D shows recent trends in three other variables that are included in the regression models below. In real terms, the maximum welfare benefit for a family of three fell throughout the decade. After falling for some time, the real value of the

[6] There is effectively no time limit in Michigan, since the state has announced that it will use state-only funds to pay for any welfare months in excess of the federal 60-month limit. Vermont continues to operate

minimum wage rose beginning in 1997.[7] The annual state-level unemployment rate rose from 1990 to 1992, then fell substantially thereafter.

III. Identification and Estimation

The variation available in the data to estimate the effects of time limits stems from the variation in the timing and composition of states' welfare reform policies. Using state-level policy variation to estimate the effects of the policy, however, gives rise to an important identification issue. If unobservable characteristics of the state's population of female-headed families both affect welfare use (or labor market outcomes) and the timing or nature of the state's welfare reform effort, then a regression model that fails to control for such unobservables could yield biased estimates of the effects of welfare reform generally and time limits specifically. This "policy endogeneity" problem has received considerable attention in the caseload literature.

Another problem involves distinguishing the effects of time limits from the effects of the business cycle. As shown above, unemployment rose until 1992, then fell sharply. Since these changes in the business cycle occurred at the same time that the states were implementing welfare reform, it is natural to ask whether their independent effects can be disentangled.

A similar problem has to do with distinguishing the effects of time limits from the effects of other provisions of welfare reform. The states did not implement time limits in isolation, but rather in conjunction with other reforms such as work requirements and reduced benefit reduction rates. Ideally, one would like to characterize each of the

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the welfare program that it implemented under waivers, which does not include a time limit.

[7] The minimum wage variable used here is the same as that used in CEA (1999). It is equal to the earnings from a job paying the minimum wage for 30 hours/week and 50 weeks/year, expressed in constant 1998 dollars.

welfare reforms initiated by the states and identify their separate effects. This would allow one to isolate the effects of time limits from the individual effects of each of these other reforms.

Characterizing each reform is a difficult enterprise, however, which in conjunction with significant collinearity issues leads me to take a somewhat less ambitious approach here. Rather than attempting to distinguish the effects of time limits from the specific effects of other reforms, I attempt to distinguish the effects of time limits from the collective effects of other reforms. Essentially, I use the information in the top row of panel B in Table 1 to code states as having implemented welfare reform or not, then use the information from the second row in the panel to code states as having implemented time limits. Thus the question that I address in the regression models below is whether time limits have a significant (and age-dependent) effect that interacts with the effect of welfare reform generally.

A further specification issue arises from the possibility that other determinants of welfare use and labor market outcomes have effects that vary by the age of the youngest child. The theory in GM indicates that time limits should have age-varying effects on welfare use and employment; however, nothing about the theory rules out the possibility that other determinants of welfare use and labor market behavior could have age-varying effects as well. To avoid attributing to time limits the effects of other factors that may vary with age, I interact a number of important determinants of welfare use and labor market outcomes with the age of the youngest child.

My approach to these problems is best explained by way of a regression model, which is given by:

$$y_{ist} = b_{TA}A^{*}_{ist}T_{st} + b_T T_{st} + b_R R_{st} + E_{it}j + Z_{st}g + X_{ist}d + m_{st} + e_{ist} \quad (1)$$

for $i = 1,...,n_{st}$; $s = 1,...,S$; $t = 1,...,N$, where y_{ist} is the dependent variable for the ith family in state s at time t; X_{ist} is a vector of family attributes that influence welfare use; and the data include S states, N time periods, and n_{st} families in the s, t-th state-year cell. The variable T_{st} is the time limit variable. For each state, T_{st} is a "modified dummy" variable equal to one in all years after time limits are implemented. It is equal to zero for all years prior to implementation; in the year of implementation, it is equal to the fraction of the year during which time limits were in effect. The variable R_{st} is the general welfare reform variable. For each state, this variable is a modified dummy that is equal to one in all years after the state first implemented state-wide welfare reform under either waivers or TANF. It is constructed from the "Any waiver" and "TANF" variables used in both CEA (1999) and Schoeni and Blank (2000).[8]

The time limit variable interacts with the age of the youngest child A_{ist} via the variable A^{*}_{ist}, where $A^{*}_{ist} = (A_{ist} - 13)$ if $A_{ist} < 13$ and $A^{*}_{ist} = 0$ if $A_{ist} \geq 13$.[9] With this specification, the age-dependent effect of time limits on families whose youngest children are below the threshold age is a function of b_{TA}.[10] The model from GM predicts that b_{TA} should be positive in the welfare use regressions, indicating that families with older youngest children are more likely to use welfare after time limits are imposed, and negative in the employment and labor supply regressions, indicating that families with

[8] I am grateful to Bob Schoeni for kindly providing me with his data, which I updated with 1999 values.

[9] In preliminary work I also fit the "step-function" specification presented in GM and Grogger (2000). In those models, families are categorized into age groups and the age-group dummies are interacted with the time limit dummy. Results from the step-function specification were not as strong as the results from the "linear-interaction" specification presented here, but in all cases, the linear-interaction specification provided the superior fit to the data as measured by the adjusted R-square.

older youngest children should work less once time limits are imposed. Its sign in the other regressions is not clearly predicted by GM's model.

The effect of time limits on families whose youngest children exceed the threshold age is given by b_T. Because time limits amount to a non-binding constraint for such families, b_T should be zero. The economic logic underlying this prediction suggests that it should hold for all of the outcomes to be analyzed below.

The variable E_{it} measures the generosity of the EITC. It varies among families i at a given time t because subsidy rates and the maximum credit vary by family size.[11] In the regressions reported below, I use the maximum credit to measure the generosity of the program. Although this does not fully capture the complex effect that the EITC has on the family's budget constraint (Meyer and Rosenbaum, 1999; Hotz and Scholz, 2000), this simple specification yields generally similar results as a specification that includes the subsidy rate as the measure of the EITC's generosity, as well as a specification that includes both the subsidy rate and the maximum credit. Moreover, it yields estimates that are similar in an important way to those of Meyer and Rosenbaum (1999), whose approach arguably does a better job of capturing the complex effects of the EITC on the family's budget set. I elaborate this point further in section V.

The vector Z_{st} includes other time-varying state-level variables that influence welfare utilization. These include the (logarithm of the) maximum welfare benefit payable to a family of three, the (logarithm of the) real minimum wage, and the

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[10] This implicitly assumes that all states imposed the federal five-year time limit. Since some states imposed shorter time limits, I discuss in section VI estimates that are based on an age variable that reflects each state's actual time limit.

[11] The EITC measure included in the regressions is based only on the federal program and ignores the tax credit programs in place in about a dozen states. Measures based on both federal and state programs yielded very similar results, however.

unemployment rate. All of these variables appeared in the CEA (1999) analysis of the welfare caseload. The vector X_{ist} includes information on the mother's education level, her age, her race, the number of children in her family, and the age of her youngest child.

The policy endogeneity problem involves the composite disturbance term, which consists of two independent components: a state-year-specific component m_{st} and an idiosyncratic component e_{ist}. If m_{st}, which captures the unobservable determinants of welfare use or labor market outcomes that vary between states and over time within a state, is correlated with the time limit variable T_{st}, then OLS estimates of equation (1) may be biased.

Most studies of welfare reform have offered two potential solutions to this problem. The first is to assume that the state-year error component can be further decomposed as

$$m_{st} = a_s + t_t + n_{st}$$

where the a_s terms are state-fixed effects and the t_t terms are period effects. Under the assumption that the n_{st} terms are independent of the welfare reform variables, adding state dummies (and year dummies) to the regression model controls for the state-fixed effects and solves the policy endogeneity problem. The implicit assumption under which this approach is valid is that the only unobservable determinants of welfare use that influence welfare reform are time-invariant, varying only between states. If time-varying unobservables influence the timing of welfare reform, however, then the state-fixed effects approach may yield inconsistent estimates.

A generalization of this approach allows for state-specific trends, positing that $m_{st} = a_s + q_s t + h_{st}$.

Under the assumption that h_{st} is uncorrelated with T_{st}, adding state dummies and state-specific trends to the regression solves the policy endogeneity problem. This formulation accounts not only for state-specific time-invariant unobservables, but also for state-specific time-varying unobservables that trend smoothly over the sample period. I generalize this approach in the regression models that I estimate, allowing for quadratic as well as linear state-specific trends.

I can also generalize my controls for policy endogeneity further, including an unrestricted set of state-year dummy variables in the model to control for all time varying unobservables that could be correlated with the timing or nature of the state's welfare reform effort. The reason is that, due to age dependence, the effects of time limits vary among families even in the same state and year. Of course, this state-year-fixed effects estimator also absorbs the effects of all other variables that vary only by state and year. Since this includes the variables in Z_{st}, such as the unemployment rate, the state-year-fixed effects model can be thought of as providing more general controls for the business cycle than the state-fixed effects and state-specific trends models. The state-year-fixed effects model also absorbs the effect of other welfare reforms R_{st}.

For the same reason, the state-year-fixed effects approach has one important drawback. Because the time limit variable T_{st} also varies only by state and year, the state-year-fixed effects estimator cannot be used to test whether $b_T = 0$, as predicted by GM's model. Only the estimates from the models that include state-specific quadratic trends can be used to construct these tests.

Although age dependence in the effects of time limits allows me to pursue more general controls for business cycle effects and policy endogeneity than could other

analysts, age-dependence introduces another issue that need to be addressed. As discussed above, the effects of other aspects of the environment besides time limits could depend on age as well. The other reforms could have age-varying effects, as could welfare benefits and the unemployment rate. Thus I generalize equation (1) below by allowing the reform variable R_{st} and all of the variables in Z_{st} to interact with the age of the youngest child.

I construct these other age interactions using the age of the youngest child A_{ist} rather than the transformation A^*_{ist}. The reason for this is that, whereas theory indicates that time limits should have no effect on families whose youngest children exceed the threshold age, no theory imposes any such restrictions on age interactions involving other variables in the model. This affects the interpretation of the results below in two ways. First, the "main effect" for the time limit variable, that is, the coefficient on T_{st}, measures the effect of time limits on families whose youngest children exceed the threshold age. The main effect for the other variables, however, measures the effects of those other variables on families whose youngest children are infants less than one year old. Second, whereas A^*_{ist} is always non-negative, A_{ist} is always non-positive, which affects the sign of the coefficients on the various age interactions.[12]

IV. Estimation Results

A. Welfare Use

Regression results for welfare use, employment, and labor supply appear in Table 2. These estimates, and those in Table 3, are based on the specifications that control for

[12] In preliminary work I also estimated models that relaxed the restriction that the effects of time limits are constant in age among families whose youngest children exceed the threshold age. Estimates from this specification, which is equivalent to an interaction between T_{st} and A_{ist}, were very similar to the results presented below.

policy endogeneity by including state dummies and state-specific quadratic trends. Models that include the full set of state-year-fixed effects are discussed in section VI below.[13]

The welfare use model in column (1) differs from the specifications reported in Grogger (2000) in two ways: it is based on a sample that extends through 1999, and it includes the EITC maximum credit, as discussed above. Including the EITC maximum credit in the model has little effect on the time limit coefficients. The main time limit effect is insignificant and the interaction between the time limit and the age of the youngest child in the family is positive, as predicted by GM's theory. It indicates that the average family whose youngest child is 10 years old reduces its welfare use by 2 percentage points, relative to families whose youngest children exceed the threshold age, after time limits are imposed.[14] Among families whose youngest child is three, the average reduction is 6.6 percentage points. These are fairly sizeable effects.

The main effect of reform generally is somewhat larger and more significant than that reported by Grogger (2000). It indicates that families with infants reduce their welfare use by 3.7 percentage points, on average, after their state implements any sort of welfare reform. The age interaction is positive, suggesting that reforms other than time limits lead to the greatest reductions in welfare use among families with the youngest youngest children. Indeed, the estimates indicate that other reforms lead families with youngest children greater than about seven years old to increase their welfare use, on average. This is plausible because many states reduced their benefit reduction rates as

[13] Because the unit of observation in these regressions is the family, whereas most of the key policy variables vary only by state and year, the standard errors reported here have been corrected for "clustering," or possible dependence, among families within state-year cells.

[14] The calculation is (10-13)*.0066 = -.0198.

part of their welfare reform programs. Unlike many other reform measures, lower benefit reduction rates actually provide an incentive for families to increase their welfare use, all else equal, by providing a greater incentive for the family to combine welfare and work (Blank, Card, and Robins, 2000). The result here is thus roughly consistent with the evidence from GM that reductions in the benefit reduction rate actually raised welfare use among families with older youngest children.

The main effect of the EITC maximum credit is negative but insignificant. The age interaction, however, is quite significant and indicates that the EITC reduces welfare use the most among families with the oldest youngest children. Together, the coefficients indicate that a $1000 increase in the maximum credit would reduce welfare use by an average of 1.5 percentage points among families whose youngest child was three and by 3.1 percentage points among families whose youngest child was ten. To my knowledge, these are the first direct estimates of the effects of the EITC on welfare utilization. They suggest that the EITC has been an important factor in reducing welfare use in recent years.

The effects of benefit levels, minimum wages, and the unemployment rate are similar to those presented in Grogger (2000). Higher benefits raise welfare use, and this effect is greatest among families with the youngest children. Higher minimum wages increase welfare use among families with younger youngest children, but reduce welfare use among families with older youngest children. Higher unemployment rates increase welfare use in a manner that is greater for families with younger youngest children than for families with older youngest children.

B. Employment

Like the results for welfare use, the estimated effects of time limits on employment are also consistent with the simple theory proposed by GM. The time limit-age interaction is at least marginally significant and indicates that families with younger youngest children increase their employment by a greater amount than families with older youngest children once time limits are imposed. The magnitudes of the estimates imply that, relative to families with youngest children age 13 or over, families whose youngest children were three increased their employment by 3.4 percentage points, on average, whereas families whose youngest children were ten increased their employment by only one percentage point. These estimates are smaller, both absolutely and relatively, than the corresponding estimates of the effects of time limits on welfare use; I provide an interpretation of these differences at the end of section V below. The estimated effect of time limits on families whose children all exceed age 12 is insignificantly different from zero, which is consistent with the prediction from GM.

The main effect of other reforms on employment is positive and significant. It indicates that, collectively, the average effect of reforms other than time limits is to increase employment by about 2.6 percentage points. There is some evidence that this effect is actually strongest among families with the youngest children, although the reform-age interaction is of borderline significance.

The main EITC effect indicates that a $1000 increase in the maximum credit results in a 3.6 percentage point increase in employment. The age interaction coefficient is zero to four decimal places and is insignificant. The main effect by itself implies that a $2000 increase in the maximum EITC credit, such as that enjoyed by multiple-child

families between 1993 and 1999, would lead to a 7.2 percentage point increase in employment among female family heads, an amount that corresponds to 10.4 percent of the 1993 employment rate. This corresponds well with the findings of Meyer and Rosenbaum (1999) and Ellwood (2000), both of whom found the EITC to have a sizeable effect on the employment of single mothers.

Higher welfare benefits appear to decrease employment, at least among families whose youngest children are 14 or younger. For families with older youngest children, however, the estimates suggest that higher benefits actually increase employment. This may be reasonable in light of the dual role played by the maximum welfare benefit. On the one hand, it indicates the payment received by families with no other income. In this role, higher benefits should decrease employment. On the other hand, however, for a given benefit reduction rate, the maximum benefit determines the breakeven income level. In this role, higher benefits expand eligibility for aid, since families can earn more income and yet remain eligible for at least a partial benefit payment. This allows more families to combine work and welfare, potentially increasing employment.

Minimum wages appear to have no significant effect on employment among female family heads. The main effect of the unemployment rate on employment is roughly double its effect on welfare use. Whereas a one-percentage-point increase in unemployment reduces welfare use by about .9 percentage points, it increase employment by 1.7 percentage points. The age interaction coefficient indicates that the only families not affected by rising unemployment are those whose youngest children are 15 or older.

C. Labor Supply

The main time limit effect in the weeks worked regression in column (3) is insignificant, which is consistent with the prediction that time limits should have no effect on families whose youngest children exceed the threshold age. Moreover, the interaction between age and the time limit variable indicates that time limits have the greatest positive effect on annual labor supply among families with the youngest children. This estimate is not significant, however.

At first glance, the insignificant age interaction appears to be at odds with the prediction from GM's simple model. The result appears sensible, however, if one allows for a small and fairly intuitive extension to the theory. The transition from welfare to work involves a period of job search which is not accounted for explicitly by GM's model. Allowing for search, one could readily imagine that time limits hasten the process, and lead welfare recipients to take jobs more readily than they would without the pressure of time limits. If so, then one would expect the typical job to be accepted after time limits to provide a worse match for the worker, all else equal, than the typical job accepted prior to time limits. Poorer matches likely would lead to less durable jobs, on average, which could explain the insignificant effect on weeks worked despite the significant effect on employment.

In contrast to the effects of time limits, other reforms have significant effects on labor supply. The main reform coefficient indicates that reforms other than time limit increase labor supply among families with infants by an average of about 2.4 weeks per year. Relative to mean weeks worked over the entire sample period, this amounts to an increase of about 8 percent. This effect is greatest for families with the youngest

children, however, and disappears for families whose youngest children are about eleven years old. Work requirements are an important component of those other reforms; to the extent that women with young children were the least likely to work while on welfare prior to reform, one might expect work requirements to have their greatest effects on such women. In addition, many states increased their funding for child care as part of their welfare reform packages. Presumably, this would also have its greatest effect on women with young children.

The main EITC coefficient shows that each $1000 increase in the maximum credit results in an increase of about 1.2 weeks of work among families with infants, on average. Although the age interaction is insignificant, it is positive, suggesting that this effect may be even greater for families with older youngest children. The main effect by itself implies that a $2000 increase of the EITC maximum credit would have raised labor supply by about 2.5 weeks, or roughly 8 percent of mean labor supply in 1993. Again, these results are roughly consistent with the large labor supply effects that Meyer and Rosenbaum (1999) attribute to the EITC.

The main welfare benefits coefficient shows that higher benefits lead to lower labor supply, albeit by a marginally significant amount. Moreover, the positive age interaction shows that any negative effect that exists obtains only for families with young children. Again, the implied positive effect on families with older children could reflect the eligibility effects of higher benefits.

The main minimum wage effect is negative and marginally significant, suggesting that higher minimum wages reduce the labor supply of female family heads. A one-percentage-point rise in the unemployment rate leads to a decrease in labor supply of

about half a week among single mothers with infants. This effect is statistically significant, but it falls among families with older youngest children.

D. Earnings

Regression results for the family head's earnings and total family income are reported in Table 3. Whereas GM's model provides clear predictions regarding the effects of time limits on welfare use and work, its predictions regarding earnings and income are less obvious. It seems unlikely that time limits should have any effect on the earnings or income of families whose youngest children exceed the threshold age. Their effects on families whose children are younger are less clear, since earnings involves the product of labor supply and wages whereas income involves not only earnings but income from non-labor sources, such as welfare, as well.

Column (1) presents results for which earnings is the dependent variable, whereas column (2) presents results from a log-earnings regression. The estimates in column (1) include families with zero earnings, whereas those in column (2) exclude them. Column (2) captures the effects of the policy variables on families with some labor earnings, whereas column (1) incorporates the effects that stem from the work/no work decision as well.

In both specifications, the main time limit coefficients are insignificant, as expected. However, the age interactions are insignificant as well. Conceivably, this could result from the effects of time limits on search behavior, as discussed above. If the jobs accepted in response to time limits are less durable on average than those accepted previously, then the earnings from such jobs would be lower as well. Moreover, if time limits hasten job search, then they could have an additional effect on wages. Beyond

accepting jobs that provide a poorer match, workers motivated by time limits may accept lower-paying jobs as well. In other words, time limits may affect earnings by affecting both labor supply and wages. This could explain why the effects of time limits are even less significant for earnings than they are for weeks worked.

The main effect of other reforms is marginally significant in the earnings regression in column (1) and significant at the 5 percent level in the log earnings regression in column (2). The coefficients indicate that other reforms increase earnings by $830, on average, which amounts to 6.7 percent of mean earnings in 1993, and by about 10.2 percent among families with positive earnings. There is little evidence of an age interaction in the earnings regression in column (1), although the age interaction in column (2) is marginally significant.

The main EITC effect in column (1) is significant and suggests that each $1000 increase in the maximum credit is associated with an increase in earnings of about $610. The insignificance of the main EITC effect in column (2) suggests that most of the increase in earnings stems from increases among families who previously had zero earnings. The age interactions suggest that such effects increase in the age of the youngest child in the family, although only the coefficient in column (2) is significant.

The welfare benefit coefficients indicate that higher benefits reduce earnings, at least for families with children under age 13. Again, this is consistent with the fact that higher benefits imply higher breakeven levels of income, which in turn could lead to higher earnings among families combining work and welfare.

Minimum wages appear to have a significant positive effect on earnings, albeit one that decreases as the age of the youngest child increases. The main effect in the

earnings regression is significant, whereas the main effect in the log earnings regression is not. This suggests that much of the minimum wage effect works through increases in earnings among families that previously had zero earnings.

The main effects of the unemployment rate on earnings are significant. They imply that each one-percentage-point increase in the unemployment rate decreases earnings by $147 overall and about two percentage points among families with positive earnings. There is a significant age interaction in the log earnings regression but none in the earnings regression, suggesting that any age interactions are limited to families with positive earnings.

E. Income

Columns (3) and (4) of Table 3 report results from income and log income regressions, respectively. This is the broadest measure of the family's economic well-being that is available in the CPS. None of the time limit coefficients is significant. This is somewhat surprising in light of previous results. Time limits appear to have strong effects on welfare use, which presumably reduce welfare income. At the same time, however, they have smaller effects on employment and apparently no effect on earnings. By themselves, these results would lead one to expect time limits to have negative effects on income. The fact that they have no effect suggests that income from other transfer programs, such as Supplemental Security Income (SSI), or earnings from family members other than the head, increase to make up the difference.

The main effects of other reforms are positive, suggesting that other reforms raise income on average among families with infants. The coefficient in the income regression is insignificant, whereas the coefficient in the log income regression is significant and

nearly identical in magnitude to the corresponding coefficient in the log earnings regression in column (2). The interaction term shows that this effect falls with the age of the youngest child, however.

The EITC coefficients in the next two rows are completely insignificant, indicating that expanding the EITC has no net effect on income. This seems plausible, since the estimates discussed above indicate that EITC expansions decrease welfare use while increasing work and earnings. Although this interpretation seems reasonable, however, there may be another explanation for this finding as well. Unlike other sources of income, which are collected in detail on the March CPS questionnaire, EITC income is not reported at all. Nor does the CPS ask any questions regarding the receipt of tax refunds. Families could report their EITC credits as "other" income, but I am aware of no evidence on the extent to which they do so. Before concluding that the net effect of the EITC on income is zero, therefore, it seems important to better understand where EITC income is reported in the CPS, to the extent that it is reported at all.

F. Summary

Given the large number of regression results discussed above, it seems worthwhile to summarize some of the key findings briefly. One prediction from GM's model is borne out throughout the results: time limits have no effect on families whose children exceed the threshold age. Beyond that, time limits appear to have substantial effects on welfare use. They have somewhat lesser effects on employment. In both cases, however, the effects of time limits are greatest among families with the youngest youngest children. The effects of time limits on labor supply and earnings are weaker,

which one might expect if time limits lead to hastened job searches that result in poorer matches and lower wages. Time limits have no significant effect on income.

Other reforms result in reduced welfare use, increased employment, increased labor supply, and greater earnings and income, at least among those with positive earnings and income. The EITC appears to have substantial effects on welfare use, employment, and labor supply. Welfare benefits, minimum wages, and the business cycle also have important effects on the welfare use and labor market behavior of female-headed families.

Because the various policy measures have different metrics, and because the models in tables 2 and 3 involve extensive age interactions, the quantitative importance of some of the recent policy changes is difficult to assess directly from the regression coefficients. It is also difficult to assess the relative importance of each of the various policy changes. To aid in such comparisons and provide some further insights into the effects of the various policy measures, I present some calculations below of the contributions of the policy changes to the decline in welfare use and the improvement in labor market outcomes that have taken place since the early 1990's.

This is not the only way that one could quantify the effects of the different policies and put them on a common footing. Indeed the approach has an important drawback: in principle one could "explain" either more than 100 percent of the observed change or even a negative proportion of it. Nevertheless, the approach has the advantage that it allows me to compare a subset of my results to those from previous studies. Many of the caseload studies have computed the relative contributions of the business cycle and welfare reform in explaining the declining welfare caseload; Meyer and Rosenbaum

(1999) provide similar calculations for the employment rate and add the EITC to the list of potential explanatory factors. In the next section, I engage in a similar exercise for all of the outcomes discussed above.

V. Explaining Recent Changes in the Welfare Use and Labor Market Behavior of Female Family Heads

Panel A of Table 4 reports changes in welfare use, employment, and labor supply between 1993 and 1999 in both levels and percentages. This information largely reiterates what was shown in table 1. Panel B decomposes these changes into components attributable to time limits, other welfare reforms, the EITC, welfare benefits, the minimum wage, and the business cycle. The effect of time limits on welfare use is calculated by multiplying the 1993-1999 change in the mean value of the time limit and time limit-age interaction variables by their respective coefficients and adding the results. The effects of other explanatory factors on the various outcomes are calculated similarly.

The results of this exercise indicate that time limits account for a reduction in welfare use of 2.1 percentage points. This amounts to 6.4 percent of the 1993 welfare utilization rate or 12 percent of the 1993-1999 decline in welfare use. This is smaller than the 16-to-18 percent range reported by Grogger (2000). As noted above, there are two differences between the welfare use regression reported here and that reported in Grogger (2000): this analysis includes data through 1999 and accounts for the EITC, whereas the earlier study included data only through 1998 and included no EITC controls.

Some experimentation revealed that the main reason for the difference in the results is the addition of the 1999 data. In other words, time limits explain more of the

1993-98 decline in welfare use than of the 1993-99 decline. This suggests that time limits had their greatest effects shortly after they were imposed, which is generally consistent with the notion that consumer's responses to time limits involved anticipatory behavior.

Other reforms had a smaller effect on welfare use. This is not altogether surprising. The other reforms include work requirements, which would be likely to reduce welfare use, but also decreased benefit reduction rates, which actually serve to increase welfare use by providing families with an incentive to combine work and welfare. Taken as a whole, other reforms may have had offsetting effects on welfare use.

The EITC expansions, in contrast, had quite important effects. This is largely because the expansions over the 1993-1999 period were so large. Altogether, the EITC expansions explain 15.8 percent of the decline in welfare use over this period.

Real benefit levels were falling over this period, while minimum wages were rising. Together, these two factors explain about 6 percent of the decline in welfare use. The unemployment rate had an important effect on welfare use, explaining about 10 percent of the 1993-99 decline.

It is instructive to compare these estimates with those from the caseload literature. Ziliak, et al. (1997) estimate that welfare reform accounted for 6 percent of the decline in welfare use between 1993 and 1996, whereas CEA (1997) puts the figure at 30 percent. Wallace and Blank (1999) report that welfare reform explains about 20 percent of the 1994-1996 drop in welfare caseloads, whereas CEA (1999) estimates that reform accounted for about one-third of the decline between 1996 and 1998. These include the effects of all reforms, and hence should be compared to the sum of the effects of time

limits and other reforms from my models. My estimate suggests that 14.3 percent of the decline from 1993 to 1999 is explained by welfare reform, which is in the middle of the range provided by previous work.

Regarding the effects of the business cycle, I find that reductions in the unemployment rate explain about 10 percent of the 1993 - 1999 decline in welfare use. CEA (1997), CEA (1999) and Ziliak, et al. (1997) report a range of 26 to 78 percent. Part of this difference may have to do with differences in sample periods. CEA (1999) report that falling unemployment accounts for 26 to 36 percent of the 1993 - 1996 decline in welfare caseloads, but only 8 to 10 percent of the 1996 - 1998 decline. Their estimate for the full 1993 - 1998 period presumably would lie somewhere in between, as does the estimate from Wallace and Blank (1999), who attribute about 20 percent of the 1994-1998 reduction in caseloads to declining unemployment rates.

Turning to the employment results, in columns (4) - (6) of the table, one sees that the most important factors for explaining the changes in welfare use are not always the most important factors for explaining the changes in employment. Time limits have about half the proportionate effect on employment as they have on welfare use. Other reforms, in contrast, explain over 6 percent of the rise in employment, whereas they explained only 2 percent of the decline in welfare use. This is not altogether surprising. Above I argued that two of the most important reforms, work requirements and reduced benefit reduction rates, should have offsetting effects on welfare use. They both encourage employment, however, which could explain why the other reforms are more important for explaining employment than welfare use.

The effect of the EITC on employment is roughly double its effect on welfare use. The decomposition indicates that it explains 34 percent of the observed increase. Indeed, the sizable expansions of this particular anti-poverty tool appear to be the most important single factor in explaining why female family heads increased their employment over the 1993-1999 period.

Although the estimated effects are sizable, they are consistent with other estimates from the literature. Meyer and Rosenbaum (1999) estimate that the EITC accounts for 37 percent of the increase in employment among female-headed families between 1992 and 1996. The similarity between our results is all the more striking when one considers that Meyer and Rosenbaum (1999) pay particular attention to capturing the non-linear effects of the EITC expansions on families' budget constraints, whereas I use a single program parameter to model its effects. Ellwood (2000) also suggests that the EITC explains an important share of the recent rise in employment among single mothers.

Benefit levels and minimum wages had small and partially offsetting effects on employment over this time. In contrast, the business cycle played an important role in driving employment changes. Changes in the unemployment rate account for 21 percent of the change in employment, making it the second-most important observable factor underlying the sharp upward trend in work.

For the most part, the factors that have the relatively largest effects on employment have similarly large effects on labor supply. The only real exceptions include time limits and other reforms. Time limits explain none of the rise in labor supply, whereas other reforms explain a fair amount.

Table 5 presents similar decompositions for earnings and income. In total, the various policy variables included in the regression models account for less of the changes in earnings and income over the 1993-99 period than they explain of the changes in welfare use and work. Whereas 45 percent of the change in welfare use, and 71 percent of the change in employment, can be accounted for by changes in welfare policy, the EITC, and the business cycle, these same factors explain only 24 percent of the corresponding change in earnings and only 21 percent of the change in income over the same time period.

The top row of panel B shows that time limits actually may have detracted from the earnings and income growth that occurred over this period. Relative to 1993 levels, the ceteris paribus effects of time limits decreased earnings by 22 percent and to decrease income by 16 percent. However, one should exercise caution in interpreting these estimates, since they are based on regression coefficients which are completely insignificant. A more conservative interpretation that is consistent with both the regression estimates and the calculations in Table 5 is that time limits did not contribute positively to the growth in earnings or income among female-headed families that took place between 1993 and 1999.

The effects of other reforms account for 13 percent of the increase in earnings and 7 percent of the increase in income that occurred during this time. The EITC expansions account for over one-fifth of the increase in earnings, but for less than 5 percent of the increase in income. Again, this could indicate that the EITC induced roughly offsetting changes in labor and welfare income, or could stem from the reporting issues discussed above. Benefit levels and minimum wages contributed little to the increase in earnings or

income. The business cycle, in contrast, made an important contribution, accounting for about 8 percent of the increase in earnings and about 13 percent of the increase in family income.

A final use for these decomposition estimates is to provide some further insights into the nature of the effects of policy changes on behavior. For this I focus on columns (2), (5), and (8) of Table 4. These present changes in welfare use, employment, and labor supply in relation to their 1993 levels. They thus permit quantitative comparisons of the effects of policy changes across the different outcome variables.

The figures in the first row of panel B in Table 4 show that time limits had sizeable effects on welfare use but relatively small effects on employment and essentially no effect on labor supply. This suggests that time limits reduced welfare use largely by moving women off of the welfare rolls who previously had been working while they were collecting welfare. Such moves evidently involved little change in labor supply.

The second row of the table shows that the proportionate effects of other reforms on welfare use and employment were of the same magnitude but of opposite sign. This suggests that the one effect of the other reforms has been to move families which had only been receiving welfare (i.e., not combining work and welfare) into employment. They may have had an additional effect on families that previously had been working, however, since they had about twice the effect on labor supply that they had on employment. Finally, the EITC had a slightly larger proportionate effect on welfare use than on employment, suggesting that most, but not all, of the effect of the EITC stemmed from moving non-working welfare recipients into the workforce.

VI. Robustness of the Regression Estimates

In this section I discuss the results of some robustness checks, the goal of which is to assess whether the estimates in Tables 2 and 3 above are sensitive to a number of specification issues. I first present results from a set of regression models that include a full set of state-year dummies. As discussed above, these models provide more general controls for policy endogeneity and for the business cycle than the state-specific quadratic trends included in the models above. For brevity I present only the results for the key variables in the analysis: time limits, other reforms, and the EITC. Because time limits and other reforms vary only by state and year, their main effects are unidentified. The main EITC is identified, however, because its parameters vary by family size. With the exception of the EITC, these estimates do not allow me to assess the robustness of the main effects, but they do allow me to assess how sensitive the key age interactions are to the specification of controls for policy endogeneity and the business cycle.

The estimates are presented in Table 6. For the most part, the coefficients are quite similar to the corresponding estimates in Tables 2 and 3. None of the estimates that were significant in Tables 2 or 3 become insignificant; indeed, none of the estimates that were significant above change much at all. The one change worth noting concerns the age-time limit interaction in the labor supply regression, reported in column (3) of panel A. The coefficient is similar to that reported in Table 2, but it is now marginally significant. If anything, the results of this less restrictive specification provide somewhat greater support for the central prediction from GM that time limits should have their greatest effects on the families with the youngest children.

Beyond fitting models that included state-year effects, I also estimated other specifications to further assess the robustness of the estimates. Since the welfare use and employment outcomes are dichotomous, it is natural to ask whether logit estimates of those models yield the same results as the linear regression estimates presented in columns (1) and (2) of Table 2. In both cases, the logit results were generally similar to the linear regression results.

I also estimated models that incorporated information about each state's actual time limit rather than implicitly assuming that all states imposed the federal five-year time limit. To do this, I replaced A^{*}_{ist} with $A^{'}_{ist}$, where $A^{'}_{ist} = A_{ist} - A^{'}_{st}$ and $A^{'}_{st}$ is the threshold age in state *s* in year *t* as defined by the actual length of the state's time limit. For the most part, this change had little effect on the estimates. However, the coefficient (standard error) on the age-time limit interaction in the employment model fell to -0.0025 (0.0017), which is insignificant at conventional levels.

This could arise from the fact that states' time limit policies vary in ways other than the lengths of their time limits. For example, some states drop only the adult from the welfare rolls when the time limit is reached, whereas others drop the entire family. Also, some states are more lenient in granting exemptions and extensions than others. Moreover, it appears that many states that are relatively strict in terms of the length of their time limits are relatively lenient in some of these other dimensions (Administration for Children and Families 1998). Thus the length of the time limit may be proxying for a bundle of policies that have different effects on employment. Ideally, one would want to characterize the various dimensions of states' time limit policies and estimate their separate effects. Since the data appear to be just sufficient to distinguish the effects of

having a time limit at all, however, it will probably be some time before there are enough data to distinguish the individual effects of the components of states' time limit policies.

I also estimated a set of models to check whether the time limit results were being driven by anticipatory responses to the time limit, rather than by families merely reaching their limits and being dropped from the rolls. To do this I estimated a set of models using a sample that excluded all state-year cells that include people who potentially could have exhausted their benefits.[15] Dropping these observations had no substantial effect on the estimates.

Finally, I estimated models that included linear and quadratic terms in an interaction between a time trend and the age of the youngest child in the family. Bavier (1999) reports that underreporting of welfare use may have risen over time in the CPS. If this change in underreporting occurred independently of the age of the youngest child in the family, then it should difference out by age and have no effect on my age-dependent estimates of the effects of time limits. If it occurred differentially by age, however, then the estimates could be biased, although the direction of the bias cannot be assessed a priori. There are no direct measures of the extent of underreporting; to account for this problem at least to some extent I have allowed for differential quadratic time trends by age. The age-time trend interaction terms were jointly significant only in the models for welfare use, income, and log income. Their inclusion had no material effect on the estimates, however.

[15] I dropped 1999 observations from Arkansas, Connecticut, Idaho, Ohio, Texas and Utah and 1998 observations from Connecticut. All of these states have particularly short time limits.

VII. Conclusions

One of the purposes of this analysis is to ask whether the data provide support for the predictions of GM's simple model of work and welfare use under time limits. One of those predictions is that families whose youngest children exceed the threshold age should be unaffected by time limits, because time limits amount to a non-binding constraint for those families. The other prediction, which pertains to welfare use, employment, and labor supply, is that time limits should have the greatest effects on families with the youngest children. These predictions hold for welfare use and labor supply. To the extent that time limits hasten job search and lead to poorer job matches, it may not be surprising that the effects of time limits on labor supply are less significant than their effects on employment.

Another goal of this analysis is to understand the broader effects of time limits. The regression estimates show that they have substantial effects on welfare use and employment, somewhat lesser effects on labor supply, and little if any effect on earnings or income. Relative to families whose children exceed the threshold age, the estimates indicate that the average family whose youngest child is three years old reduces its welfare use in response to time limits by 6.6 percentage points and increases its employment by 3.4 percentage points. Effects on labor supply and earnings are smaller, which again seems reasonable. If time limits hasten job search, the result may be jobs that are both less durable and less remunerative. Time limits have had no significant effect on family income, which involves not only the work of the family head, but also the family's living arrangements and the work behavior of other family members.

The analysis reveals that other recent policy changes have had important effects on the behavior of female-headed families. Other reforms taken collectively have had small net effects on welfare use but important effects on employment, labor supply, and to some extent, earnings and income. The recent EITC expansions have had substantial effects on almost all dimensions of behavior. The EITC may be the single most important policy measure for explaining the rise in work and earnings among female-headed families in recent years.

Comparing the effects of the policy changes across different outcomes suggests that different policies may have affected different components of the welfare caseload. Time limits have substantial effects on welfare use but smaller effects on employment, suggesting that time limits primarily move families off of the welfare rolls who were previously combining work and welfare. Other reforms and the EITC, in contrast, had similar effects on welfare use and employment, suggesting that they primarily moved non-working welfare families into the workforce. This suggests that different policies may be useful for achieving different policy objectives, such as reducing caseloads versus increasing work among welfare recipients. It would be useful to explore this issue further in future work.

Although this analysis contributes in a number of ways to our understanding of the effects of time limits and other recent policy changes, it leaves a number of questions wide open. A full assessment of the effects of welfare reform will require information on its effects on the well-being of children in poor families. It will also require information about the effects of other specific reforms, such as work requirements, sanctions policies,

and reduced benefit reduction rates. The work presented here contributes in only a limited way to our of the broader question of whether welfare reform has been successful.

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Table 1
Descriptive Statistics for Female-Headed Families, by Year

A. Welfare use and labor market outcomes among female-headed families											Total, 1978-
Year	90	91	92	93	94	95	96	97	98	99	1999
Welfare use	0.32	0.33	0.33	0.33	0.31	0.28	0.26	0.22	0.19	0.15	0.30
Employment	0.71	0.69	0.69	0.69	0.72	0.74	0.76	0.78	0.80	0.83	0.71
Weeks worked	29.7	29.6	29.6	29.5	30.7	31.9	32.5	33.9	35.3	36.7	30.4
	(23.0)	(23.2)	(23.4)	(23.5)	(22.9)	(22.9)	(22.5)	(22.2)	(21.6)	(20.9)	(23.1)
Earnings ($1,000's)	12.28	12.29	12.27	12.30	13.05	13.69	13.94	14.28	15.42	16.56	12.79
	(14.46)	(14.47)	(14.77)	(15.48)	(15.67)	(18.45)	(21.23)	(17.63)	(18.72)	(20.08)	(15.91)
Income ($1,000's)	18.66	18.24	18.01	18.62	19.08	20.23	19.90	20.37	21.28	22.86	19.32
	(18.24)	(16.75)	(17.20)	(22.27)	(18.23)	(22.46)	(24.56)	(21.65)	(22.21)	(24.60)	(19.53)
Observations	5091	5185	5273	5211	5066	4537	4582	4445	4424	4387	103,786

B. Number of states newly implementing various state-wide reforms, by year of implementation											
Year	90	91	92	93	94	95	96	97	98	99	Total[1]
Any state-wide reform[2]	0	0	3	4	4	8	19	13	1	0	52
Time limit[3]	0	0	0	1	0	5	21 (7)	21 (8)	2 (2)	0	50

C. Key EITC parameters

1. Phase-in subsidy rate(%)

Year	90	91	92	93	94	95	96	97	98	99
One-child families	14.0	16.7	17.6	18.5	26.3	34.0	34.0	34.0	34.0	34.0
Multiple-child families	14.0	17.3	18.4	19.5	30.0	36.0	40.0	40.0	40.0	40.0

2. Maximum credit ($)

Year	90	91	92	93	94	95	96	97	98	99
One-child families	1209	1431	1549	1625	2253	2251	2252	2245	2271	2262
Multiple-child families	1209	1483	1620	1712	2794	3344	3722	3713	3756	3734

D. Other determinants of welfare use and labor market outcomes											
Year	90	91	92	93	94	95	96	97	98	99	Total
Maximum welfare benefit ($)	492	478	453	443	431	423	404	390	388	387	484
	(207)	(201)	(183)	(173)	(165)	(162)	(156)	(146)	(144)	(151)	(206)
Minimum wage ($1000s)[4]	6.14	6.48	6.44	6.29	6.13	5.99	5.98	6.48	6.71	6.69	6.66
	(0.34)	(0.12)	(0.13)	(0.22)	(0.24)	(0.25)	(0.23)	(0.15)	(0.14)	(0.33)	(0.72)
Unemployment (%)	5.68	6.90	7.53	7.01	6.21	5.67	5.48	5.04	4.59	4.30	6.45
	(0.86)	(1.13)	(1.29)	(1.34)	(1.26)	(1.14)	(1.04)	(0.97)	(0.94)	(0.82)	(1.97)

Notes to Table 1: All monetary magnitudes are expressed in 1998 constant dollars, deflated by the CPI-U. In panels A and D, numbers in parentheses are standard deviations. In panel A, figures are weighted by the CPS supplement weights. In panel D, figures are averages of annual state-level aggregates that are weighted by the number of female-headed families in the sample (which in turn are weighted by the CPS supplement weights). In panel B, numbers in parentheses give the number of states newly implementing time limits that already had some type of state-wide reform in effect. Thus of the 21 states first implementing time limits in 1996, 7 already had other state-wide reforms in place.

1 - Washington, DC is counted as a state.

2 - New Mexico implemented TANF (its first state-wide reform) in 1997 and again in 1998 after its first plan was ruled unconstitutional. Thus it is counted twice, accounting for the totals of 52.

3 - Michigan and Vermont use state funds after federal funds are exhausted. These two states effectively have no time limit. Because New Mexico is counted twice (see note 3), the total is 50.

4 - Expressed in terms of annual income from a job paying the minimum wage for 52 weeks at 30 hours/week.

Table 2
Welfare Use, Employment, and Labor Supply Regressions

Variable	Welfare use (1)	Employment (2)	Weeks worked (3)
Time limit x age^*	0.0066	-0.0034	-0.1161
	(0.0015)	(0.0018)	(0.0978)
Time limit	0.0236	-0.0141	-0.8300
	(0.0157)	(0.0171)	(0.9230)
Reform x age	0.0049	-0.0023	-0.2160
	(0.0011)	(0.0013)	(0.0733)
Reform	-0.0366	0.0262	2.4246
	(0.0109)	(0.0123)	(0.5997)
EITC max credit (000s) x age	-0.0022	0.0000	0.0448
	(0.0006)	(0.0006)	(0.0307)
EITC Max Credit (000s)	-0.0088	0.0359	1.2268
	(0.0063)	(0.0067)	(0.3062)
Log(maximum benefit) x age	-0.0072	0.0065	0.2920
	(0.0007)	(0.0007)	(0.0354)
Log(maximum benefit)	0.0821	-0.0911	-3.5754
	(0.0365)	(0.0379)	(1.9892)
Log(minimum wage) x age	-0.0097	-0.0038	-0.1159
	(0.0032)	(0.0032)	(0.1649)
Log(minimum wage)	0.0891	-0.0127	-4.9048
	(0.0518)	(0.0679)	(2.7370)
Unemployment rate x age	-0.0004	0.0011	0.0254
	(0.0002)	(0.0002)	(0.0094)
Unemployment rate	0.0087	-0.0170	-0.5842
	(0.0022)	(0.0021)	(0.0976)
R-squared	0.229	0.189	0.246

Notes: Sample size is 103,786. Note that $age^* = age - 13$ if $age < 13$ and $age^* = 0$ if $age \geq 13$, where *age* denotes the age of the youngest child in the family. In addition to the variables shown, all regressions include a quartic polynomial in the mother's age, a quartic polynomial in the age of the youngest child, dummies for the mother's education (dropout, some college, college or more), dummies for the mother's race (black, other non-white), dummies for the number of children in the family (2, 3, 4, 5, 6 or more), year dummies, state dummies, and state-specific quadratic trends. Figures in parentheses are standard errors that are corrected for clustering within state-year cells.

Table 3
Earnings and Income Regressions

Variable	Earnings (1)	Log earnings (2)	Income (3)	Log income (4)
Time limit x age^*	0.0386	-0.0017	0.0306	0.0004
	(0.0730)	(0.0047)	(0.0847)	(0.0034)
Time limit	-0.7049	-0.0785	-0.4795	-0.0561
	(0.8622)	(0.0538)	(0.9860)	(0.0395)
Reform x age	-0.0210	-0.0076	-0.0546	-0.0072
	(0.0683)	(0.0043)	(0.0811)	(0.0029)
Reform	0.8299	0.1015	0.7021	0.0976
	(0.5005)	(0.0457)	(0.5702)	(0.0279)
EITC max credit (000s) x age	0.0138	0.0036	0.0096	-0.0006
	(0.0207)	(0.0018)	(0.0270)	(0.0012)
EITC Max Credit (000s)	0.6113	0.0006	0.0972	0.0018
	(0.2266)	(0.0182)	(0.2782)	(0.0136)
Log(maximum benefit) x age	0.2090	0.0113	0.1564	-0.0063
	(0.0233)	(0.0020)	(0.0289)	(0.0014)
Log(maximum benefit)	-2.5454	-0.0303	-2.2937	0.1020
	(1.2314)	(0.1095)	(1.6118)	(0.0976)
Log(minimum wage) x age	-0.4268	-0.0231	0.1093	0.0037
	(0.1093)	(0.0096)	(0.1255)	(0.0066)
Log(minimum wage)	3.7186	0.0944	2.6891	-0.0254
	(2.0232)	(0.2279)	(2.7577)	(0.1433)
Unemployment rate x age	0.0026	0.0014	-0.0174	0.0003
	(0.0060)	(0.0006)	(0.0069)	(0.0004)
Unemployment rate	-0.1466	-0.0209	-0.1084	-0.0160
	(0.0562)	(0.0069)	(0.0695)	(0.0045)
R-squared	0.254	0.219	0.266	0.292
Sample Size	103,786	73,038	103,786	100,039

Notes: Sample sizes vary because logged regressions are conditioned on having positive earnings and income. Note that $age^* = age - 13$ if $age < 13$ and $age^* = 0$ if $age \geq 13$, where *age* denotes the age of the youngest child in the family. In addition to the variables shown, all regressions include a quartic polynomial in the mother's age, a quartic polynomial in the age of the youngest child, dummies for the mother's education (dropout, some college, college or more), dummies for the mother's race (black, other non-white), dummies for the number of children in the family (2, 3, 4, 5, 6 or more), year dummies, state dummies, and state-specific quadratic trends. Figures in parentheses are standard errors that are corrected for clustering within state-year cells.

Table 4

Changes in Welfare Use, Employment, and Labor Supply Attributable to Time Limits, the EITC, and Other Factors

A. Means and changes in welfare use, employment, and labor supply, 1993-1999

	Welfare use			Employment			Weeks worked		
Year	Means	Change, 93-99	Percent change, 93-99	Means	Change, 93-99	Percent change, 93-99	Means	Change, 93-99	Percent change, 93-99
1993	0.331			0.689			29.5		
1999	0.153	-0.178	-0.538	0.829	0.139	0.202	36.7	7.2	0.245

B. Changes in welfare use, employment, and labor supply explained by independent variables

Change in:	Welfare use			Employment			Weeks worked		
Expressed:		As percent of 1993 level	As percent of 93-99 change		As percent of 1993 level	As percent of 93-99 change		As percent of 1993 level	As percent of 93-99 change
Attributable to	In levels (1)	(2)	(3)	In levels (4)	(5)	(6)	In levels (7)	(8)	(9)
Time limits	-0.021	-0.064	0.119	0.009	0.013	0.066	-0.023	-0.001	-0.003
Other reforms	-0.004	-0.013	0.024	0.009	0.013	0.064	0.818	0.028	0.113
EITC	-0.028	-0.085	0.158	0.047	0.068	0.335	1.938	0.066	0.268
Maximum benefits	-0.008	-0.024	0.045	0.010	0.014	0.069	0.359	0.012	0.050
Minimum wage	-0.002	-0.006	0.012	-0.004	-0.006	-0.027	-0.398	-0.013	-0.055
Unemployment rate	-0.017	-0.052	0.097	0.029	0.042	0.205	1.193	0.040	0.165
Total	-0.081	-0.244	0.454	0.099	0.144	0.712	3.887	0.132	0.539

Table 5
Changes in Earnings and Income Attributable to Time Limits, the EITC, and Other Factors

A. Means and changes in earnings and income ($1,000s), 1993-1999

Year	Earnings			Income		
	Means	Change, 93-99	Percent change, 93-99	Means	Change, 93-99	Percent change, 93-99
1993	12.30			18.62		
1999	16.56	4.26	0.346	22.86	4.24	0.228

B. Changes in earnings and income explained by independent variables

Change in:	Earnings			Income		
Expressed:	In levels	As percent of 1993 level	As percent of 93-99 change	In levels	As percent of 1993 level	As percent of 93-99 change
Attributable to	(1)	(2)	(3)	(4)	(5)	(6)
Time limits	-0.934	-0.076	-0.219	-0.665	-0.036	-0.157
Other reforms	0.546	0.044	0.128	0.277	0.015	0.065
EITC	0.900	0.073	0.211	0.200	0.011	0.047
Maximum benefits	0.255	0.021	0.060	0.244	0.013	0.058
Minimum wage	-0.104	-0.008	-0.024	0.254	0.014	0.060
Unemployment rate	0.357	0.029	0.084	0.562	0.030	0.132
Total	1.020	0.083	0.239	0.873	0.047	0.206

Table 6
Regressions with State-Year Effects

A. Welfare Use, Employment, and Labor Supply

	Welfare Use	Employment	Weeks Worked
	(1)	(2)	(3)
Time limit x age^*	0.0067	-0.0033	-0.1170
	(0.0013)	(0.0013)	(0.0640)
Reform x age	0.0045	-0.0022	-0.2104
	(0.0011)	(0.0011)	(0.0526)
EITC max credit (000s) x age	-0.0021	-0.0000	0.0430
	(0.0005)	(0.0005)	(0.0234)
EITC Max Credit (000s)	-0.0097	0.0365	1.2301
	(0.0048)	(0.0049)	(0.2402)
R-squared	0.236	0.196	0.253

B. Earnings and Income

	Earnings	Log Earnings	Income	Log income
	(1)	(2)	(3)	(4)
Time limit x age^*	0.0416	-0.0027	0.0284	0.0003
	(0.0438)	(0.0042)	(0.0533)	(0.0029)
Reform x age	-0.0187	-0.0076	-0.0491	-0.0071
	(0.0361)	(0.0035)	(0.0439)	(0.0024)
EITC max credit (000s) x age	0.0107	0.0037	0.0058	-0.0007
	(0.0160)	(0.0015)	(0.0195)	(0.0010)
EITC Max Credit (000s)	0.6484	-0.0004	0.1368	0.0013
	(0.1646)	(0.0159)	(0.2003)	(0.0108)
R-squared	0.260	0.228	0.273	0.298
Sample Size	103,786	73,038	103,786	100,039

Notes: Sample sizes vary because log regressions are conditioned on having positive earnings and income. Note that $age^* = age - 13$ if $age < 13$ and $age^* = 0$ if $age \geq 13$, where *age* denotes the age of the youngest child in the family. In addition to the variables shown, all regressions include a quartic polynomial in the mother's age; a quartic polynomial in the age of the youngest child; dummies for the mother's education (dropout, some college, college or more); dummies for the mother's race (black, other non-white); dummies for the number of children in the family (2, 3, 4, 5, 6 or more); year dummies; interactions between age and the (log) maximum benefit, (log) minimum wage, and unemployment rate; and state-year dummies. Figures in parentheses are standard errors.