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EFFECTS OF WELFARE REFORM ON EDUCATIONAL ACQUISITION OF YOUNG  
ADULT WOMEN

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**ABSTRACT**

Education beyond traditional ages for schooling is an important source of human capital acquisition among adult women. Welfare reform, which began in the early 1990s and culminated in the passage of the Personal Responsibility and Work Opportunity Reconciliation Act in 1996, has promoted work rather than educational acquisition for this group. Exploiting variation in welfare reform across states and over time and using relevant comparison groups, we undertake a comprehensive study of the effects of welfare reform on adult women's educational acquisition. We first estimate effects of welfare reform on high school drop-out of teenage girls, both to improve on past research on this issue and to explore compositional changes that may be relevant for our primary analyses of the effects of welfare reform on the educational acquisition of adult women. We conduct numerous specification checks and explore the mediating role of work. We find robust and convincing evidence that welfare reform significantly decreased the probability of college enrollment among adult women, by at least 20 %. It also appears to have decreased the probability of high school enrollment on the same order of magnitude. These results suggest that the gains from welfare reform in terms of increases in employment and reductions in caseloads have come at a cost in terms of lower educational attainment among adult women at risk for relying on welfare.

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## Introduction

A major goal of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) of 1996 was to move recipients and potential recipients of cash assistance into the labor force. The legislation ended entitlement to welfare benefits under Aid to Families with Dependent Children (AFDC) and replaced AFDC with Temporary Assistance for Needy Families (TANF) block grants to states. Among the features of TANF and many pre-PRWORA state waiver programs,<sup>1</sup> which together constitute “welfare reform,” were time limits on the receipt of welfare benefits, work requirements as a condition of receiving welfare, and sanctions for non-compliance with program rules. PRWORA also strengthened child support enforcement and made it easier for married and cohabiting couples to qualify for welfare benefits. These sweeping changes ushered in a new “work first” era that de-emphasized education for adult women. The PRWORA legislation granted considerable discretion to states in establishing welfare eligibility and program rules. As a result, there is substantial state policy variation within the broad national regime of time-limited cash assistance for which work is required.

In terms of reducing caseloads, welfare reform (including the pre-PRWORA waivers) has been successful; welfare rolls have declined by over 50% since their peak in 1994 and at least one-third of the caseload decline can be explained by welfare reform (see Grogger & Karoly 2005). At the same time, employment rates of low-skilled mothers rose dramatically (Ziliak 2006), and at least some of that increase was a result of welfare reform (Schoeni & Blank 2000). The effects on family structure are less dramatic. A large literature on the effects of welfare

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<sup>1</sup> Although welfare reform is often dated to the landmark 1996 PRWORA legislation, reforms actually started taking place in the early 1990s when the Clinton Administration greatly expanded the use and scope of “welfare waivers” to allow states to carry out experimental or pilot changes to their AFDC programs, with random assignment required for evaluation. Waivers were approved in 43 states, ranging from modest demonstration projects to broad-based statewide changes, and constituted the first phase of welfare reform. Many policies and features of state waivers were later incorporated into PRWORA.

reform on marriage and a smaller one on cohabitation reveal mixed findings, and the literature on non-marital childbearing and female headship indicates slightly negative but inconsistent effects of welfare reform (Blank 2002, 2007; Moffitt 1992, 1995, 1998; Grogger & Karoly 2005; Gennetian & Knox 2003; Peters, Plotnick & Jeong 2003; Ratcliffe et al. 2002).

The vast majority of mothers on welfare are adults (USDHHS 2008), and education beyond traditional ages for schooling is an important source of human capital acquisition among adult women. Almost 30% of adults in the U.S. engaged in some form of work-related education (broadly defined to include courses at the workplace or courses and degree programs in other locations) in 2004-2005, and those in their childbearing years were more likely than older adults to engage in such activities (O'Donnell 2006). In 2000, 7.7% of females enrolled in grades 9-12 were age 21 or older (U.S. Census Bureau 2008a); in 2005, 80% of females taking vocational courses were age 25 years or older (U.S. Census Bureau 2008b); and in 2006, 40% of all female college students were age 25 years or older (U.S. Census Bureau 2008c).

Postsecondary education is not a rare event among welfare recipients. For the last school year before PRWORA (1995-1996), unpublished Department of Education reports indicate that about 650,000 welfare recipients were enrolled in post-secondary education (Price 2005). Using the 1979 National Longitudinal Survey of Youth (NLSY), a pre-PRWORA cohort, London (2006) found that almost 14% of all welfare recipients and 17% of high school graduate welfare recipients attended college during a spell of welfare receipt. According to U.S. Census Bureau (2000), almost 23% of TANF recipients in 1998 had at least one year of college.

The work first approach under welfare reform has been targeted to adult mothers, for whom education and training generally do not count as required work activities. In contrast, minor mothers are subject to a broader human capital approach. In particular, PRWORA requires

minor mothers to attend high school or training in order to receive TANF and does not impose time limits or work requirements if they are full-time students. On the surface, these differential incentives suggest that welfare reform decreased educational acquisition among adult women and increased school enrollment among teenage girls.

Relatively few studies have investigated the effects of welfare reform on educational acquisition, and all but one of those focused exclusively on teenage girls. Exploiting variation in welfare reform across states and over time and using relevant comparison groups, we undertake a comprehensive study of the effects of welfare reform on adult women's educational acquisition. We first estimate effects of welfare reform on high school drop-out of teenage girls, both to improve on past research on this issue and to explore compositional changes that may be relevant for our primary analyses of the effects of welfare reform on the educational acquisition of adult women. We then conduct comprehensive analyses of the effects of welfare reform on adult women's educational enrollment. A number of alternative models are estimated as specification checks, and the mediating role of work is explored. The results indicate whether the work first approach targeted to adult mothers has increased employment at the possible expense of future earnings and productivity, or whether it has actually encouraged education by making welfare less of a long-term option.

## **Background**

### *Theoretical Framework*

We base our analyses on Becker's classic work, *Human Capital* (1975), in which schooling is an investment undertaken if the present value of the future stream of benefits exceeds the present value of the current and future costs. In Equation 1 below,  $Y^{Ed}$  represents the benefits of education, which may include not only increased wages, but also greater productivity

in the home and increased nonpecuniary benefits in the labor market. Additionally, the extent to which the individual finds schooling enjoyable (or unpleasant) is factored into the net consumption benefits.  $Y^{NoEd}$  denotes the income/benefit stream if the educational activity had not been undertaken. The costs of education,  $C$ , include both the opportunity cost of the individual's time and the out-of-pocket expenses of schooling such as tuition, books, transportation, and child care.  $T$  is the total number of years the woman will benefit from the investment, and  $r$  refers to the discount rate, which incorporates both the market interest rate and individual's rate of time preference. Looking forward, the individual will engage in an educational activity if the net present value ( $PDV$ ) is positive.

$$(1) \quad PDV = \sum_{t=1}^T [(Y_t^{Ed} - Y_t^{NoEd}) - C_t] / (1+r)^t$$

This model implies that individuals are more likely to invest in education when they are young, are likely to be successful in school, enjoy schooling, have a low opportunity cost of time, and have a low rate of time preference (i.e., tend not to “live for today”). Welfare reform could affect several of the arguments in Equation 1. For adult women, work requirements would increase the time cost of attending school (in  $C$ ), which would decrease schooling. However, there are potential opposing effects that could increase schooling: (1) By shortening the length of time a woman can expect to receive welfare and by requiring her to work as a condition of receiving benefits, the length of time ( $T$ ) for which higher market wages associated with schooling (in  $Y^{Ed}$ ) are earned will increase. (2) Welfare reform could result in a lower rate of time preference (which would be consistent with “culture of poverty” arguments). (3) Employment may provide access to educational opportunities, decreasing the costs and increasing the benefits of pursuing education.

*The Evolution of Educational Policy under Welfare*

Traditionally, mothers on AFDC were able to spend their time as they chose; this included attending college, for which tuition assistance was potentially available from Pell grants, scholarships, and student loans. The situation changed for some mothers under the Job Opportunities and Basic Skills Training (JOBS) program, which was created under the Family Support Act of 1988 and required states, to the extent resources allowed, to engage mothers with no children below age 3 in education, work, or training activities. However, many women were exempt from participation in JOBS, and between 1992 (just prior to the first statewide AFDC waiver program) and 1996 (enactment of PRWORA) only 10% of all welfare recipients in the U.S. participated in the JOBS program.<sup>2</sup>

Major statewide AFDC waiver programs, first implemented in late 1992, substantially altered the nature of welfare by imposing time limits, significantly reducing participation exemptions, imposing sanctions, increasing earnings disregards, imposing family caps, and/or implementing work requirements. Compared to JOBS programs, statewide waivers were broad-based in that they applied to large proportions of welfare recipients. While states were required to provide many specifics of their programs in their waiver plans, they were not required to report policies vis-à-vis educational activities. Complicating the picture, states could change their policies without having to amend their waiver plans (U.S. Department of Health and Human Services 1997). The situation changed notably under TANF, which required states to file detailed program specifics (including educational policies) at the outset as well as any intended changes to those policies. That is, under TANF, the extent to which educational activities could count

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<sup>2</sup> Committee on Ways and Means, U.S. House of Representatives, “Overview of Entitlement Programs” for 1994 and 1998 (Green Books). Available at: <http://aspe.hhs.gov/94gb/sec10.txt> and [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=105\\_green\\_book&docid=f:wm007\\_07.105](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=105_green_book&docid=f:wm007_07.105).

toward work requirements was more explicit. Because of the reporting issues under the waivers, it is difficult to compare educational policies under AFDC waivers and TANF, even in a given state. However, it is clear that under both AFDC waivers and TANF, work and other requirements gave women less flexibility in deciding how to spend their time and many welfare recipients could attend college or other schooling only after fulfilling work requirements.

The work first paradigm may have emerged because few evaluations of welfare-to-work experiments indicated that an education based approach was more successful than the work first strategy in advancing self-sufficiency. However, some have questioned whether those results pertained to formal education, particularly college education, as those programs generally provided basic skills, job-seeking skills, or vocational training rather than formal education (Shaw et al. 2006). In a rigorous re-evaluation of a major welfare-to-work program, Hotz, Imbens & Klerman (2006) found that the short-run employment advantages had been over-estimated and that the education-based approach was more effective in the longer-term. The authors concluded that the work first approach appears to provide a "quick fix," but is not necessarily the better long-term strategy for promoting self-sufficiency.

#### *Returns to Education for Adults and Welfare Recipients*

Corman (1983) pointed out decades ago that the human capital literature tended to (incorrectly) assume that individuals attend school as early as possible and that adult education is an anomaly. Since then, there have been several studies focusing on education of non-traditional aged students. Particularly relevant to our study, Boudett, Murnane & Willett (2000) found that almost two-thirds of female high school drop-outs receive some form of education in the decade following drop-out and that adult education has a positive effect on earnings for this group, and Leigh & Gill (1997) found that the returns to community college education (both degree-granting

and vocational programs) are about the same for returning adult students as for traditional-age students.

Welfare recipients are more likely to attend two-year rather than four-year colleges (London 2006). According to a review by Kane & Rouse (1999), each year of credit at a community college yields, on average, a 5 to 8% increase in annual earnings—a return similar to that from one year of a four-year college. Kane & Rouse also found that evaluations of experimental programs supported by the Job Training Partnership Act tended to underestimate the returns to community college education, since many in the control groups also attended school. This finding is consistent with that of Hotz, Imbens & Klerman (2006) in that it suggests that at least some experimental studies that were influential in shaping welfare policy underestimated the value of education to welfare recipients. In sum, the literature suggests that education has been and is a worthwhile human capital investment for many welfare recipients.

#### *Effects of Welfare Reform on Educational Acquisition*

Hao & Cherlin (2004), Kaestner, Korenman & O’Neill (2003), Offner (2005), and Koball (2007) all estimated difference-in-difference models to assess the impact of welfare reform on high-school attendance or drop-out among female teens. Offner, using the March Current Population Surveys (CPS) from 1989 to 2001 and comparing female teens in low and higher income families, found that welfare reform resulted in increased high school attendance. The use of income to define target and comparison groups is potentially problematic, however, because welfare reform could have affected income and therefore changed the composition of the target and comparison groups over time. Kaestner and colleagues, using the NLSY to compare teens in 1979 and 1997, found that welfare reform reduces drop-out. Hao & Cherlin, concerned about cohort effects in the Kaestner study, compared older and younger teens (who had different

exposure to the legislation) in the 1997 NLSY and found no effect of welfare reform on drop-out. Both studies used multiple sets of reasonable target and comparison groups, but the timing of the NLSY makes it less than ideal to study welfare reform, as it predates most reforms by almost 15 years (1979) or takes place very soon after PRWORA (1997). As a result, the comparison groups either have to be from very different cohorts as in the Kaestner study or from very similar cohorts as in the Hao study, likely “contaminating” the control group. Koball examined two cohorts closer in time, by combining a pre-welfare cohort from the National Education Longitudinal Study and a post-welfare cohort from the NLSY. However, she focused on teen mothers rather than all teenage girls. Her results were consistent with those of Offner and Kaestner et al. in that she found that welfare reform significantly reduced drop-out. Overall, the available evidence suggests that welfare reform has had favorable effects on educational enrollment of teenage girls.

The potential effects of welfare reform on education among adult women have been largely neglected by the research community. The lone (published) exception is a study by Jacobs & Winslow (2003) that examined the effect of welfare receipt and parenthood/marital status on college attendance at two points in time, using two different data sets. First, the authors used data from the 1995 and 2000 March CPS to study young (< 25 year old) female high school graduates. A positive feature of this set of analyses is that TANF policies vis-à-vis education were incorporated. A drawback is a data constraint that allowed the authors to study only young women. Second, the authors used data from the 1995 and 1999 National Household Education Surveys (NHES) to study female high school graduates of all ages. Drawbacks of the NHES analyses, which were acknowledged by the authors, are a lack of state identifiers in the data and a poorly measured parenthood status variable. Drawbacks of both sets of analyses are the use of

widely spaced cohorts (increasing the likelihood that the effects of other changes not related to welfare reform are attributed to welfare reform) and the use of 1995 as the base year (when pre-PRWORA waivers had already been implemented in 19 states).

In the CPS analyses, Jacobs & Winslow did not find changes in the effects of welfare receipt on college attendance between 1995 and 2000 but did find that, holding welfare receipt constant, single mothers were less likely to attend college in 2000 than in 1995. Particularly relevant for our analyses, they found that women living in states that were more supportive of college attendance for welfare recipients were more likely to attend college. The NHES results in this study contradict those from the CPS. In the NHES analyses, the authors found that welfare recipients were significantly less likely to go to college in 1999 than in 1995, but that holding welfare receipt constant, single mothers were more likely to attend college in 1999 than in 1995. While this study provides some insights, it only considers college enrollment and does not present definitive findings on the effects of welfare reform on that outcome. Finally, it does not account for major standards-based reforms in education that occurred during the same time period may have changed the composition of high school graduates. The No Child Left Behind Act of 2001 strengthened a two-decade trend in state implementation of minimum standards for high school graduation. By 2005, almost half of the states implemented “exit exams” for high school students. According to Dee & Jacob (2007) these exams resulted in some students dropping out of high school who would have otherwise received a diploma, while improving the academic performance of other students. A rigorous study of the effects of welfare reform on education must account for these changes.

In sum, there is a dearth of existing work on the effects of welfare reform on adult women’s education despite the facts that: (1) the vast majority of mothers on welfare are adults,

(2) educational acquisition is commonplace among young adult women and welfare recipients, (3) economic theory suggests that broad-based work requirements and the de-emphasis on education and training would alter the costs and benefits of pursuing education for this group, and (4) even modest increases in education raise earnings. It is important to investigate not only basic skills programs for long-term welfare recipients, but also enrollment in formal education, including post-secondary school. Finally, relevant trends besides welfare reform must be accounted for when examining the effects of welfare reform on adult educational acquisition.

### **Data**

We use data from the Current Population Survey (CPS), a large-scale nationally representative monthly survey of approximately 57,000 households that is conducted by the Bureau of the Census for the Bureau of Labor Statistics. The CPS is a consistent source of information on employment, demographic factors, education, family relationships and other characteristics of the civilian non-institutionalized population. The October CPS contains information on current high school enrollment, current college enrollment (full- and part-time), and current enrollment in trade school, General Education Development (GED) preparatory programs, and other educational activities. We use October CPS data from 1992 through 2001, which spans the period of welfare reform, to estimate the effects of the reforms on high school enrollment, college enrollment, full time college enrollment, and any educational enrollment (high school, college, trade school, GED preparatory programs, and other educational activities).<sup>3</sup> For analyses of high school drop-out, high school enrollment is the relevant outcome. For analyses of adult women's educational acquisition, we focus on current high school

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<sup>3</sup> We limit our analysis up to 2001 to minimize the potential of introducing confounding differential trends (from the effects of the 2001 recession, No Child Left Behind Act of 2001, etc.) as we increasingly move further away from the AFDC waivers and TANF legislation, since the last set of states implemented TANF in 1997 (CA on January 1, 1998). As a sensitivity check, limiting the analysis up to 2000 or going up to 2005 does not materially change the results (available upon request).

enrollment and any school enrollment (for those with less than a high school degree) and current college enrollment and full-time college enrollment (for those who graduated high school but not college).

Our research design exploits the substantial variation across states in the timing of the enactment of pre-PRWORA waivers and TANF. We follow the convention in the prior literature with respect to the construction of the key independent variables capturing the shifts in welfare-related policies (reviewed in Blank 2002). The welfare reform measures can be classified into two phases. The first represents federal waivers granted to states to experiment with AFDC rules prior to PRWORA. Since 1962, the Secretary of Health and Human Services has had the authority to waive federal welfare rules if a state proposed experimental or pilot programs that furthered the goals of AFDC. Some waivers increased the amount of earnings that recipients were allowed to keep while maintaining welfare eligibility; others expanded work requirements to larger groups, established term limits for cash assistance, permitted states to issue sanctions to recipients who failed to meet work requirements, or allowed states to eliminate increases in benefits to families who had additional children while on welfare.

We construct an indicator to reflect the fraction of the year that a given state in time period  $t$  had a statewide waiver in place that substantially altered the nature of AFDC with regard to time limits, Job Opportunities and Basic Skills training (JOBS) work exemptions, JOBS sanctions, increased earnings disregards, family caps, and/or work requirements.<sup>4</sup> The second welfare reform construct represents the implementation of TANF programs post-PRWORA.

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<sup>4</sup> For instance, the indicator for Maryland, which enacted a major waiver on March 1, 1996, is coded as 0.667 for 1996 to reflect the eight months that the waiver was in place for that year (using October as the reference month, since the analyses are based on the October CPS). 29 states enacted such waivers, across various months, between 1992 and 1996.

Similar to the construction of the indicator for an AFDC waiver, an indicator will reflect the fraction of the year that a given state had implemented TANF in time period  $t$ .<sup>5</sup>

Since the welfare indicators are measured at the state level, we incorporate additional state-specific socioeconomic measures in the analyses to capture time-varying trends within areas. State unemployment rate and per capita personal income are derived from figures provided by the Bureau of Labor Statistics. Welfare caseloads, defined as the total number of welfare recipients in a state, are obtained from the Department of Health and Human Service's Administration for Children and Families Office of Family Assistance.<sup>6</sup> All models further include indicators for whether a given state in a given year had a strict high school exit exam (testing material at or above the 9<sup>th</sup> grade level) or a less strict exam (below the 9<sup>th</sup> grade level), with the reference category being no high school exit exam. For women who completed high school, we use the existence of the exam during their eighteenth year. For those who did not complete high school, we use the contemporaneous existence of the exam in their state. These data are derived from the Appendix provided by Dee & Jacob (2007). Information on the maximum state-mandated age for compulsory school attendance is used to restrict the sample for the models of high school drop-out, and is obtained from the Education Commission of the States and the National Center for Education Statistics.<sup>7</sup> Indicators for the maximum state-mandated age for compulsory school attendance are also included in all models to further capture any shifts in state policies relating to education.

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<sup>5</sup> States enacted TANF differentially throughout 1996 and 1997, with California being the last state to implement on January 1, 1998. Information on state implementation of major AFDC waivers and TANF is obtained from the Assistant Secretary for Planning and Evaluation at the U.S. Department of Health and Human Services: [http://aspe.hhs.gov/HSP/Waiver-Policies99/policy\\_CEA.htm](http://aspe.hhs.gov/HSP/Waiver-Policies99/policy_CEA.htm).

<sup>6</sup> Specifically, the data can be found at: <http://www.acf.hhs.gov/programs/ofa/caseload/caseloadindex.htm>.

<sup>7</sup> Specifically, the data can be found from the Education Commission of the States' Clearinghouse Notes, "Compulsory School Age Requirements," March 1992, March 1994, March 1997, and 2005, and from [http://nces.ed.gov/programs/digest/d04/tables/dt04\\_148.asp](http://nces.ed.gov/programs/digest/d04/tables/dt04_148.asp)

## Methods

The primary aim of this study is to evaluate the impact of welfare reform on adult women's educational acquisition. We employ a difference-in-difference-in-differences (DDD) framework – akin to a pre- and post-comparison with treatment and control groups – in conjunction with multivariate regression methods, which is standard in the economics literature on evaluating the effects of welfare reform and other state policies (e.g., Kaestner & Tarlov 2006; Bitler, Gelbach & Hoynes 2005; Blank 2002). Under certain conditions, described below, this quasi-experimental research design will yield causal estimates of the effects of welfare reform on our outcomes of interest. We conduct various specification and robustness checks to assess the validity of the identification assumptions underlying this methodology.

Consider the following DDD model which relates changes in educational outcomes to state and federal welfare policies for the target group relative to a comparison group:

$$(2) \quad E_{ist} = \alpha' + (\alpha_1 - \alpha_1^*)Target_i + (\pi_1 - \pi_1^*)(AFDCWaiver_{st} * Target_i) + (\pi_2 - \pi_2^*)(TANF_{st} * Target_i) + \pi_1^*(AFDCWaiver_{st}) + \pi_2^*(TANF_{st}) + X_{ist}\beta' + Z_{st}\delta' + State_s\lambda' + Year_t\varphi' + (State_s * t)\phi' + \eta_{ist}$$

Equation 2 posits that the educational outcome ( $E$ ), for the  $i^{th}$  woman residing in state  $s$  during year  $t$ , is a function of welfare policy, measured here by indicators reflecting the fraction of the year that a given state has enacted a major *AFDC Waiver* and *TANF*. In addition, educational acquisition depends on a vector of individual characteristics ( $X$ ) such as age, race, ethnicity, highest grade completed, and urban residence, a vector of time-varying state characteristics ( $Z$ ) such as economic conditions and educational policies, state fixed effects ( $State_s$ ), year fixed effects ( $Year_t$ ), and state-specific time trends ( $State_s * t$ ). The parameter  $\mu$  represents an individual classical error term.

There are several benefits to estimating Equation 2. It bypasses having to estimate the structural model relating welfare reform to welfare caseloads, which has been problematic in the

literature (Kaestner & Tarlov 2006; Blank 2002).<sup>8</sup> Equation 2 is also more policy relevant as it represents the reduced-form model directly linking welfare policy measures to key outcomes, and therefore accounts for any and all mechanisms through which welfare policy may be affecting educational acquisition.

The direct focus on *AFDC Waiver* and *TANF* also underscores the point that the population of interest, that which is affected by welfare reform legislation, is *all* women at risk of being on public assistance, and not just current or former program participants (Kaestner & Tarlov 2006). Welfare reform can affect exit rates as well as entry rates. Considering all women at risk addresses some of the limitations from leavers' studies, which focus solely on individuals who have left welfare. These studies find it difficult to differentiate individuals who leave public assistance voluntarily from those who left because of welfare reform policies. They also do not consider the experiences of individuals who have been diverted from public assistance as a result of policy shifts. *Potential* welfare recipients are shown to behave strategically in their use of welfare benefits when faced with time limits and other regulatory constraints (DeLeire et al. 2006; Grogger 2004). Thus, in order to identify the population effect of welfare reform on key outcomes, the appropriate sample is *all* women at risk of being on public assistance.

Traditionally, the welfare caseload has consisted primarily of low-educated, unmarried mothers. This at-risk population group is the target group, for whom welfare policy would be expected to have the largest behavioral effects. While interactions between the state indicators and linear time trends in general will control for systematically-varying unobserved state-specific factors, the possibility of omitted variables remains. This problem is addressed in the DDD

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<sup>8</sup> Changes in welfare caseloads are not due solely to welfare policy. Research suggests that much of the drop in caseloads, especially prior to TANF implementation in 1996, was not policy-related. While the welfare caseload fell dramatically in the 1990s, only part of the decline ( $\leq 50\%$ ) was due to welfare reform legislation (Blank 2002). Changes in economic conditions and other factors also played an important role.

framework by considering a comparison group – individuals who are similar in many ways to the target group but are unlikely to participate in public assistance programs and therefore not likely to be affected by welfare reform policies. In the above equation, *Target* represents a dichotomous indicator equal to one if the individual is in the target group (population at risk of being on welfare) and zero if the individual is in the comparison group (population not at risk of being on welfare). The DDD estimates of the effects of welfare reform are the coefficients of the interaction terms between the policy measures (*AFDC Waiver* and *TANF*) and the *Target* group indicator.<sup>9</sup> The impact of welfare reform is identified using the substantial variation in the timing and incidence of welfare reform across different states over time, comparing changes in outcomes between target and comparison groups.

The assumption necessary for the DDD effect to represent an unbiased estimate is that in the absence of welfare reform, unobserved state-varying factors would affect the target and comparison groups similarly. We implement several checks to assess the validity of the comparison groups. Ideally, the target and comparison groups would look similar prior to the policy shift, after controlling for all observed individual and state-level characteristics. The adjusted (conditional) difference in the level of educational outcomes for the two groups prior to welfare reform is given by the coefficient ( $\alpha_1 - \alpha_1^*$ ) of the *Target* indicator in Equation 2. Checking the magnitude and statistical significance of this coefficient serves as a test of the similarity between the target and comparison groups prior to the policy shift. By definition, the comparison group should also not be affected by the welfare policies. Thus, the coefficients of

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<sup>9</sup> For parsimony, Equation 2 imposes the restriction that, within states, the effects of the non-welfare reform measures (vectors  $X$ ,  $Z$ ,  $Year$  and  $State^*t$ ) are similar for the target and comparison groups. Thus, the treatment effects ( $\pi_1 - \pi_1^*$ ) and ( $\pi_2 - \pi_2^*$ ) would not be identical to those obtained from estimating specification (2) separately for the target and comparison groups, and then differencing the estimates. We estimated all models allowing the effects of  $X$  and  $Z$  to differ across target and comparison groups, by including interactions between the target indicator and  $X$  and  $Z$ . Coefficient magnitudes are not materially affected, though standard errors are inflated somewhat due to reduced degrees of freedom.

*AFDC Waiver* and *TANF* ( $\pi^*_1$  and  $\pi^*_2$ ), which reflect the impact of welfare reform on individuals who are at low-risk of being on welfare, should also be relatively small in magnitude and insignificant.

The choice of target and comparison groups is integral to a valid implementation of the DDD methodology. Following the literature, we employ target and comparison groups that are conventionally defined. Identifying the target group for our analyses—individuals who are at risk of relying on public assistance—is relatively straightforward. As indicated earlier, welfare reform is likely to have its strongest behavioral impacts on unmarried mothers with low levels of education and their children. The exact specifications of the target and comparison groups that we use for various educational outcomes are described below.

Our analyses consist of several steps. First, we consider how welfare reform affected high school drop-out among teenage girls. PRWORA likely had direct effects through its minor parent provisions requiring school attendance. In addition, the new regime may have encouraged teenage girls from disadvantaged families, who have traditionally been at risk for future welfare receipt, to complete high school in order to reduce their risk of needing cash assistance in the future (Kaestner, Korenman & O’Neill 2003). Finally, we allow for the possibility that welfare reform increased the probability that young women continued schooling even after the age of 18, as they may recognize that there is a lower return to not graduating from high school in the post-reform period. As such, we define the target group as single females between the ages of 15 and 20 living in a non two-parent household (that is, one or no parent) where the highest grade attained by anyone in the household is less than a bachelor's degree. As an alternative, we narrow the age range to 15 to 19.<sup>10</sup> The comparison group consists of similar males.<sup>11</sup> As indicated

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<sup>10</sup> It is possible that some teens and young adults may have left home by the time they are 20. To avoid possible sample selection issues, we include all single youth living in non-two parent households. In additional analyses, not

earlier, while there is some literature on how welfare reform has affected teenage high-school drop-out rates, previous studies have used potentially problematic target groups (Offner 2007) or comparison cohorts that were very widely spaced (Kaestner et al. 2003), very narrowly spaced (Hao & Cherlin 2004), or excluded potential recipients (Koball 2007).

Next, we address the primary research question of this paper: What are the effects of welfare reform on adult women's educational acquisition? To investigate how welfare reform has affected adult women's high school enrollment, we compare unmarried mothers ages 21 to 49 years with less than a high school education (target group) to unmarried women in the same age and education groups who have no children (comparison group). We focus on women ages 21 and older since, as discussed earlier, the incentives to attend and finish high school are very different for this group than for younger women.<sup>12</sup> To investigate how welfare reform has affected college enrollment among adult women who are at risk of being on welfare, we compare unmarried mothers ages 24-49 years with less than a college education (target group) to unmarried women in the same age range and educational group who have no children (comparison group).<sup>13</sup>

The third step of the analysis involves an extensive set of model specification checks and an exploration of potential mechanisms. Before undertaking any of the analyses, however, it was necessary to establish the validity of our comparison groups.

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shown, we include only individuals who live with one parent. In these additional analyses, results are very similar to those shown in Table 3.

<sup>11</sup> For all sample restrictions, unmarried is defined as widowed, divorced, separated, never married, or other non-married; for married, the spouse can be present or absent.

<sup>12</sup> We specifically exclude women who are 19 and 20 years of age from this analysis of older adult women, since some of those young adults may have repeated a grade or enrolled in school at a later age and therefore still be in the process of completing high school. We modify the samples to exclude and include 20 year old women to gauge the sensitivity of our results to the age cut-off.

<sup>13</sup> We omit women between the ages of 21-23 when analyzing college enrollment, as women in that age range may still be in college and erroneously counted as low-educated and at-risk of being on welfare. We explored alternative age restrictions before inferences were drawn.

If the comparison groups are valid counterfactuals, then they should look very similar to the relevant target groups with respect to both levels and trends prior to the policy shift. Table 1 shows the mean educational outcomes for the various target and comparison groups prior to welfare reform. For analyses of teen drop-out, in addition to the baseline periods defined below for adult women, we also examine years prior to the enactment of TANF (1992 to 1995), since welfare policy to discourage teen drop-out was an explicit feature of PRWORA but not of most waivers. For analyses of adult women, we captured pre-reform observations two separate ways: (1) Focusing on the first year of the sample period, 1992, which pre-dated welfare reform,<sup>14</sup> and (2) restricting the sample to state-year cells in which neither AFDC waivers nor TANF had yet been implemented. Panel A compares high school drop-out rates for unmarried females and males ages 15-20 (and 15-19) living in non two-parent low-educated households. Prior to the implementation of major waivers or TANF, high-school drop-out rates were virtually identical between males and females in these households, with no statistically significant differences. Panel B presents means for high-school and college enrollment in 1992 for the relevant target and comparison groups. Differences in the prevalence of current high school enrollment and full-time college enrollment are insignificant between the target and comparison samples. While the difference in current college enrollment is statistically significant at the 10 % level, the magnitude is relatively small. As expected, unmarried women with no children are slightly more likely (about one percentage point) than unmarried mothers of the same age and education to be enrolled in college. This small observed difference in the unconditional means is reduced to zero and becomes insignificant after adjusting for observed covariates (in subsequent multivariate analyses). Panel B also presents the means for any school enrollment (high school or college) for

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<sup>14</sup> Only three states implemented major AFDC waivers in 1992, and they all did so relatively late in the year: CA in December, and MI and NJ in October. We exclude these three states from the reported 1992 means.

the relevant target and comparison groups. The small, statistically significant, difference is also eliminated when adjusting later for observed covariates. Panel C documents the group means using the alternative definition of baseline: all state/year cells prior to the implementation of AFDC waivers or TANF. The results are similar to those reported for 1992.

Figure 1 further validates the counterfactual by documenting very similar *trends* within both the target and comparison groups in the baseline periods. Figure 1a shows that for each of the years prior to TANF, both unmarried males and females from low-educated non two-parent households had similar high school drop-out rates as well as changes in those rates from year to year, and Figure 1b shows that unmarried mothers and the comparison group of unmarried women with no children had similar trends in both high school and college enrollment.

Differences in trends in educational outcomes between the comparison and target groups, prior to welfare reform, are tested for statistical significance in Table 2. For the purposes of this check, reform is defined as the implementation of major waivers to AFDC or the implementation of TANF, whichever occurred first, when considering school enrollment for adult women. For the analysis of high school drop-out, reform is defined as the implementation of TANF since welfare policy to discourage teen drop-out was an explicit feature of PRWORA but not of AFDC waivers. With the reference category being the year of reform, coefficients on the interactions between the various years pre-reform and the target indicator show differences in trends between the target and comparison groups relative to the year of reform. All of these trend differences are jointly insignificant in all models for all sets of target and comparison groups. The coefficient on the target indicator further shows that differences in all of the educational outcome measures between the groups are also insignificant in the year before reform (similar to insignificant baseline differences documented in Table 1). Similarities between the relevant comparison

groups in terms of both *levels* and *trends* in the educational outcomes, even before any adjustment for observed covariates, add a note of confidence to the validity of the assumptions underlying our methodology. We present estimates from DDD specifications utilizing alternate comparison groups in supplementary analyses described later.

## **Results**

### *Effects of welfare reform on high school drop-out among young women*

Table 3 presents estimates from a set of DDD specifications, corresponding to Equation 2, with respect to dropping out of high school. The sample is restricted to individuals who were above the maximum state-mandated age for compulsory school attendance in a given year.<sup>15</sup> Specification 1 indicates that TANF implementation reduced the probability of dropping out of high school by about 3.4 percentage points (15 % relative to the baseline mean for the target group) among unmarried females ages 15-20 living in low-educated non two-parent households. The effect is robust to controlling for state-specific trends (specification 2), lagged measures of the state's economy (specification 3), and lagged measures of the state's welfare caseload (specification 4).

The results indicate that, in contrast to TANF, state AFDC waivers had no significant effect on high school drop-out. This is empirically validating since the AFDC waivers generally did not shift incentives with regards to schooling. This was not the case under PRWORA, which has direct provisions requiring minor mothers to attend school and imposes a strict work-based regime after the age of majority. Since the direct schooling-incentives embedded in TANF specifically target unmarried minor mothers, and unmarried low-educated women are at

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<sup>15</sup> The legal drop-out age ranged from 14 to 18 between 1992 and 2001 and was not constant within states over this period. Four states (CA, MN, MS, and NV) and DC increased the maximum school attendance age over the sample period.

disproportionate risk of relying on public assistance, we may expect that the marginal effect of TANF on high school drop-out would be larger in magnitude among young women who are unmarried. The lower marginal effect in specification 5, which includes married women, confirms this. Among young women (married or unmarried) from low-educated households, welfare reform reduced the probability of dropping out of high school by about 2.3 percentage points (about 10 % relative to the baseline mean for the target group).

The final column presents estimates for the sample of individuals ages 15 through 19, and indicates that the marginal effect of TANF increases in magnitude relative to the sample that also includes women 20 years of age. This likely reflects the differential schooling incentives of welfare reform for minors versus non-minors. For a young adult woman with a low level of education, there are potentially two competing effects at play. On the one hand, the incentives to stay in high school when young may increase the probability that she continues and finishes high school even after crossing the threshold of majority age. On the other hand, being newly subjected to work requirements and time limits in order to receive welfare creates a strong incentive for young adult women to substitute work for schooling. Thus, as the minor transitions into adulthood, the incentives to remain in school are supplanted by incentives to work.

The validity of the maintained counterfactual assumption underlying the DDD analysis can be assessed by examining the coefficient of the *Target* indicator in the multivariate models. The fact that it is statistically insignificant and relatively small in magnitude in all specifications suggests that the target and comparison groups were similar prior to the policy shift conditional on observed covariates. This finding mirrors the figures reported in Tables 1 and 2, which showed that the unconditional differences between the two groups were small and insignificant. Further validation is provided by examining the marginal effects of the policy measures (*AFDC*

*Waiver* and *TANF*). Their insignificance suggests that welfare reform did not have any discernible effect on outcomes for the comparison group, which is reassuring since the comparison groups were defined to be similar to the target groups but unlikely to be affected by the policy.

Overall, we find that welfare reform, specifically TANF, reduced female teen drop-out by between 15 and 19 %. This range is very similar to the estimates in the Offner (2007) study, which used a potentially problematic target group based on income, but lower than those in the Kaestner, Korenman & O’Neill (2003) study, which used less problematic target groups but compared two cohorts very widely spaced over time.

*Effects of welfare reform on educational enrollment among adult women*

Table 4 presents our main estimates of the impact of welfare reform on adult women’s educational enrollment, and Tables 5 through 9 present estimates from alternative model specifications. The results from specification 1 in Table 4 suggest that, among unmarried low-educated mothers between the ages of 21 and 49, TANF reduced the probability of attending high school by 0.8 percentage points (29 % relative to the target group’s baseline mean). The effect magnitude for any school enrollment (which, in addition to high school, includes trade school, GED preparatory programs, and any other type of schooling) is smaller at 0.5 percentage point (16 % relative to the target group’s baseline mean). The point estimates are not sensitive to controlling for state-specific linear trends (specifications 2 and 4).<sup>16</sup> Relatively large standard

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<sup>16</sup> This is not surprising since the DDD specification, with a valid comparison group, already nets out the impact of omitted time-variant factors. The robustness is validating, though, with respect to the appropriateness of the comparison group.

errors render the estimates in specifications 1-4 imprecise, though the estimated effects of TANF on current high school enrollment are on the margin of significance (p-value=0.11).<sup>17</sup>

There is stronger evidence that welfare reform has had an adverse effect on college enrollment among high-school educated unmarried mothers (ages 24-49).<sup>18</sup> Of this group, women in states that implemented major waivers to AFDC had a two percentage point (22 % relative to the baseline target group mean) decrease in the probability of current college enrollment, on average, relative to those in states that did not introduce welfare experiments into their AFDC programs. Similarly, the implementation of TANF reduced the probability of current college enrollment by a significant 1.1 percentage points (12 %) among the target group. The next set of specifications considers full-time college enrollment (with the reference category being not enrolled in college at all). Full-time college enrollment, being a time-intensive pursuit, would be especially responsive to time and work constraints imposed by welfare reform. Estimates suggest that AFDC waivers and TANF reduced full-time college enrollment by about one percentage point (21 % relative to the baseline mean) and about 1.2 percentage points (26 %), respectively, among low-educated unmarried mothers.

The estimates from Tables 3 and 4 underscore the differential schooling incentives embedded in the welfare reform policies. The results indicate that welfare reform has significantly increased the probability of staying in high school among teenage girls from disadvantaged families, by 15-19 %, while it has decreased the probability of school enrollment, especially college enrollment, among low-educated adult mothers, by 12-25 %.

### *Auxiliary analyses*

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<sup>17</sup> Inflated standard errors for the analysis of school enrollment among unmarried women with less than a high school degree are most likely due to the limited sample size combined with the dependent variable being a relatively low probability event.

<sup>18</sup> The results are robust to alternative upper and lower age cut-offs, up to +/- one year for the lower age cut-off and up to +/- 4 years for the upper age cut-off.

We conducted an extensive set of supplemental analyses to explore potential issues of compositional selection (Table 5) and policy endogeneity (Tables 6), to explore the mechanisms underlying our estimated effects (Tables 7 and 8), to explore sensitivity to alternative comparison groups (Table 9), and to account for potential lagged effects of welfare reform (results not shown in tables).

### Compositional Selection

When the target and comparison groups are defined according to characteristics, such as education, parental status, and marital status, which may themselves be affected by welfare reform, potential bias due to compositional selection is a concern. Selection bias with respect to parental and marital status is unlikely since prior research has found weak to no effects of welfare reform on those as outcomes. However, there may be selective composition with respect to classifying an individual as low- or high-educated if educational attainment is affected by shifts in welfare policies, which is the key question addressed in this study. The results from Table 2 suggest that welfare reform has increased high school enrollment among teens. In this case, an analysis of college enrollment among low-educated (high school, but not college, graduates) unmarried mothers may impart a negative bias to the estimated effect of welfare reform on college enrollment due to the selection of women whose high school completion was positively impacted by the reform.

We address the sensitivity of the estimates to selective sample composition by conducting two specification checks. In specifications 1-4 of Table 5, an alternate sample is utilized to bypass compositional selection by limiting the analysis to women whose high school completion would not have been affected by TANF or early state experimentation with welfare reforms. Specifically, the sample is restricted to individuals who are at least 21 years of age in the year

their state implemented an AFDC waiver or TANF, whichever came first. The coefficient magnitudes for the effect of AFDC Waiver decline slightly by about 8-12 % (as expected), but the conclusions are not materially affected; states that implemented major waivers to AFDC witnessed a 20 % decline in the probability of current college enrollment and full-time college enrollment. The effects of TANF decline somewhat more in magnitude.<sup>19</sup> The effects generally remain significant for full-time college enrollment and suggest that TANF implementation reduced full-time college enrollment by about 16 %. The final two specifications in Table 5 integrate and broaden the separate analyses for high school enrollment (among less than high school educated adult women) and college enrollment (among adult women who are high school, but not college, graduates). These models examine enrollment in any type of education (high school, college, or other training programs) among low-educated women, defined broadly as those with less than a college education. This broader definition of low-educated women, based only on college graduation, alleviates compositional selection as a result of the reforms having increased the probability of completing high school (as shown in Table 3).<sup>20</sup> While the models do not separately estimate the effect on high school and college enrollment, the relative magnitudes are robust; AFDC waivers reduced school enrollment by a statistically significant 1.8 percentage points among low-educated adult women with children, which translates into a relative 23 % decline (evaluated at the baseline target group mean), and TANF reduced school enrollment by a

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<sup>19</sup> This may be because the majority of states had experimented with AFDC waivers prior to PRWORA, and therefore the sample restriction (to women who are at least 21 years of age when their state implemented welfare reform) would be more binding for later years of the CPS for these states.

<sup>20</sup> While college completion may also be affected by welfare reform policies, selection on college attainment is less material for two reasons. First, at any point in time, college graduates are at lower risk of being on welfare. Second, the question of how welfare reform affects school enrollment is by definition a question that relates to only a selected group – low-educated women who are at an elevated risk of public assistance. It is not meant to generalize to, and would not be relevant for, women with a college degree or above.

statistically significant 0.8 percentage point (11 % decline). These alternate specifications suggest that overall the inferences are not sensitive to selective sample composition.<sup>21</sup>

### Policy Endogeneity

The DDD research design is a quasi-experimental setup that exploits the natural experiments implicit in the timing of state implementation of welfare reform. While 29 states had implemented major AFDC waivers prior to TANF implementation, it is possible that the specific timing of the implementation may be dependent on the state's economic conditions and welfare history. For instance, Blank (2002) notes that the rapid caseload decline after 1994 was preceded by a strong increase in caseloads in the early 1990s. Part of the earlier increase may be a result of the 1990-1991 recession. Thus, state experimentation with welfare reform through waivers may have been related to prior increases in the caseload and prior economic conditions. This suggests that there may be lagged unobservable time-varying state factors related to the state's economy and its welfare caseloads that may be correlated with the state's decision of whether and when to implement major waivers to AFDC and the timing of TANF implementation.

We address these possibilities by expanding the baseline specifications. Models presented in Table 6 control for lagged state-level economic indicators including one- and two-year lags of the state-level unemployment rate and real personal income per capita and also control for the one- and two-year lags of the state's welfare caseloads.<sup>22</sup> All models control for state-specific linear trends, which account for unobserved systematically-varying factors within each state over the sample period. The marginal effects remain robust with respect to both magnitudes and statistical significance. Among unmarried mothers with less than a high school education, AFDC waivers reduced high school enrollment by 0.6 percentage points (though this

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<sup>21</sup> We are not aware of any prior research that has addressed this potential source of selection, perhaps because scant attention has been paid to the potential effects of welfare reform on educational attainment of adults.

<sup>22</sup> Results are not sensitive to alternate lag structures.

effect is imprecisely estimated as earlier) and TANF decreased high school enrollment by a statistically significant one percentage point (33 % relative to the baseline mean for the target group). Among unmarried mothers with less than a four-year college education, AFDC waivers (TANF) reduced current and full-time college enrollment by 21-22 (12-25) %. Among low-educated unmarried mothers, AFDC waivers (TANF) reduced any school enrollment by 23 (11) %. All of these estimates remain statistically significant.

We further check for potential bias due to policy endogeneity by assessing the importance of lead effects of welfare reform. Models are estimated by extending Equation 2 to include one-year leading measures of welfare reform policy in the same DDD context. Specifically, the models include the interactions between the lead policy variables and the target group indicator, in addition to the other covariates specified in Equation 2. Significant lead DDD policy effects may indirectly inform on specification bias with respect to two sources: 1) changes in outcomes could have driven the implementation of welfare reform policies within states over time, implying that policy is endogenous to the outcomes, and 2) there could have been anticipatory effects wherein individuals modified their behaviors in anticipation of welfare reform. In all specifications (results not shown), the main DDD effects remain robust to adding the leads. Furthermore, the point estimates of the lead DDD coefficients are statistically insignificant and relatively small in magnitude. Since the inclusion of both contemporaneous and lead policy measures may be collinear, an alternative check was also implemented. Equation 2 was re-estimated with all contemporaneous measures of welfare reform substituted with their one-year leads. In the presence of significant lead policy effects, the DDD estimates in this alternative specification should increase in absolute magnitude. If there are no substantial lead effects, then the DDD estimates should be smaller in absolute magnitude. In all specifications

across all samples and outcomes, the marginal effects declined in size, confirming that leading welfare reform measures are not significantly correlated with educational outcomes. These results corroborate the estimates from Tables 6, which also confirm that the effects are not sensitive to additional controls that account for unobserved state-varying factors that may be driving welfare reform policies.

### Lagged Effects

It is possible that there is a lag between welfare reform and the full response on educational outcomes due to adjustments over time in family inputs, binding term limits over time, and learning within the family. To address this possibility, alternative DDD specifications were estimated, substituting the contemporaneous welfare reform measures with their one-year lags. In the presence of a significant lagged effect, the DDD estimates in this recoded specification would be larger in absolute magnitude. If there are no substantial lags in the policy response, then the DDD estimates in these specifications would decline in absolute magnitude. Among less than high school educated women (results not shown), the marginal effect of welfare reform on high school enrollment and other schooling was slightly larger in magnitude (by about 10 %), suggesting a small lagged response to policy. However, among high school graduates with less than a college education, the marginal effect declined in size suggesting no significant lags in the effect of welfare reform on post-secondary educational activities.<sup>23</sup> Overall, the estimates in the lagged-response models remained robust in terms of statistical significance and the direction of the effects.

### The Role of Work

The estimates discussed thus far represent the “reduced-form” effects of welfare reform—that is, the total effect of welfare reform on educational acquisition, operating through a

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<sup>23</sup> Results are available upon request.

variety of potential (and possibly competing) mechanisms. Work is the centerpiece of the policy shift and there is strong consensus that welfare reform has indeed increased employment and decreased caseloads as intended. We broadly test the work mechanism through stratification analyses which exploit (1) how states specifically differ in their treatment of educational activities post-PRWORA and (2) the strength of work incentives in states' TANF plans.

Adverse effects of welfare reform on education that appear to operate through work should be stronger in states that do not permit or limit education as an authorized work activity for adults. To explore this hypothesis, Table 7 presents estimates for states stratified by the degree to which educational activities are permitted to fulfill work requirements. Panel A limits the sample to states that either never allow post-secondary or other education to substitute for work requirements, or impose substantial time limits on the duration of the educational activities.<sup>24</sup> None of these states allow schooling, as a stand-alone activity, to satisfy work requirements. Across all measures of school enrollment, the adverse effects of welfare reform policies on education are strongest for this sample of restrictive states. For instance, specifications 1 and 4 suggest that TANF lowered the probability of high school enrollment by a statistically significant two percentage points (65 %) and lowered the probability of full-time college enrollment by 1.4 percentage points (29 %). For states that support schooling as an authorized work activity in some form (Panel B), the adverse effects of welfare reform on high school, college, or other schooling is much mitigated. These states allow schooling to count fully towards work activities, evaluate schooling in a case-by-case basis, or impose limits on the

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<sup>24</sup> Specifically, we examined these policies at two points in time (1999 and 2002), and designated states as "strict" if they did not allow education as a stand-alone activity and they did not allow schooling to be combined with other work activities for more than one year. Twenty-two states (AZ, CO, CT, FL, ID, IN, KS, LA, MA, MD, MI, MS, ND, NM, NY, OH, OK, OR, SD, TX, WA, WI) and D.C. fall into this category. The data, available on the State Policy Documentation Project website, can be found at: <http://www.spdp.org/tanf/postsecondary.PDF> and [http://clasp.org/publications/postsec\\_table\\_i\\_061902.pdf](http://clasp.org/publications/postsec_table_i_061902.pdf)

duration of schooling that are in excess of one year. Among unmarried mothers with less than a high school education, there is no adverse effect of welfare reform on high school enrollment in these supportive states. With respect to college enrollment, the marginal effects continue to be negative but are much smaller in magnitude. For example, TANF reduced the probability of full-time college enrollment by 0.9 percentage point (18 %). While these educational policies are defined based on TANF, to the extent that they are also reflective of a state's sentiment towards work versus educational incentives in general, the impact of AFDC waivers is also lower for the education-supportive states. For instance, AFDC waivers reduce the probability of school enrollment by 1.4 percentage points (18 %) in these states, versus 2.4 percentage points (31 %) in states that do not support schooling as a work requirement. Waivers do not appear to have any adverse effect on high school enrollment for the more lenient states. These results provide support for the hypothesis that welfare reform reduced schooling among adult women through policies which emphasized work at the expense of education.

The final specifications in both panels of Table 7 stratify the sample based on specific work incentives in a given state as reflected in components of the state TANF program. Specifically, Model 6 in Panel A includes only states that have strong work incentives as measured by low benefit generosity and Model 7 is restricted to states that have strong work incentives by virtue of having strict time limits (Blank & Schmidt 2001).<sup>25</sup> Individuals in both sets of states face a much stronger push towards work (compared to states with relatively generous benefits and lenient time limits, respectively), which may have come at the expense of educational activities. The marginal effects confirm this and suggest that welfare reform (in the

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<sup>25</sup> The educational policy and work incentives measures are based on TANF and not AFDC waivers. Ideally, these detailed state measures would reflect both phases of welfare reform. Unfortunately, uniform data on educational policy and work incentives under AFDC waivers are not available. That said, the relevant TANF provisions are likely reflective of the general sentiment in a state toward work versus educational activities.

form of AFDC waivers) decreased school enrollment by 2.2 to 3.6 percentage points (28 - 46 % relative to the baseline target sample mean). In contrast, among individuals who reside in states with weaker work incentives as reflected by more generous benefits and lenient time limits, the adverse effects of welfare reform on educational activities are also weaker. Specifically, estimates from specifications 6 and 7 in Panel B indicate that welfare reform decreased school enrollment by 9 - 22 % in those states and the effect is not statistically significant for the sample of states with lenient time limits.

The push to work is the key hypothesized pathway by which welfare policies may affect education and social behaviors, and the stratified analyses in Table 7 are consistent with this hypothesis. Associated with changes in employment are changes in personal and household income, though total income post-welfare reform may increase or decrease as earnings substitute for cash benefits. Thus, depending on whether the income effect is negative or positive, the effect of time constraints from market work may be exacerbated or counteracted. In order to shed light on these different pathways, Table 8 presents estimates from models that incorporate the role of time (as proxied by hours worked) and income constraints as mediating factors.

The specifications in Table 8 include indicators of hours worked in the past week (reference category being non-employed) and a continuous measure of household income, as well as interactions between these labor supply measures and the target group indicator to allow the effects of labor supply to differ between the target and comparison groups. The models indicate a significant non-linear relationship between hours worked and school enrollment. Up to about 19 hours of work per week, intensity of labor supply has positive or no effects on school enrollment relative to individuals who do not work.<sup>26</sup> This may be due to potential simultaneity

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<sup>26</sup> Estimating an alternate specification that controls for continuous hours worked and its quadratic term leads to an inflection in the hours worked - school enrollment relationship at about 19 to 20 hours. Thus, the dichotomous

between the labor supply decision and school enrollment. In addition, increases in personal income associated with higher hours worked may, up to a point, lead to a positive income effect on schooling. Individuals who work more than about 19 hours weekly have a lower propensity to attend high school and college; there is also a dose-response relationship, with the negative link between work and schooling becoming stronger with more hours worked. Household income generally has a negative impact on the probability of being currently enrolled in school for the target group.<sup>27</sup>

More importantly, accounting for labor supply, especially hours worked, substantially mediates the impact of welfare reform on education.<sup>28</sup> There is no statistically significant effect of either AFDC Waivers or TANF on school enrollment among unmarried mothers with less than a high school education, with effect magnitudes declining by 36-69 % relative to those reported in Table 6. It is plausible that work constraints are particularly consequential for the group with less than a high school education. For these women, there may be very large costs or minimal benefits to completing high school. For some, linking schooling to welfare by allowing education activities to count towards work may have been the sole motivation for staying in or continuing high school. When the welfare-schooling link was weakened by PRWORA by de-emphasizing schooling as an authorized work activity for adult women, many would have been pushed to substitute work for school. For low-skilled women, high school enrollment is likely a time-intensive activity and would be expected to be quite elastic to work and time constraints.

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indicators for hours worked are defined to account for this inflection and to control for a non-parametric non-linear relationship.

<sup>27</sup> All specifications reported in Table 8 control for interactions between the target indicator and the labor supply measures. The marginal effects of hours worked and household income reported in the table refer to those for the target group. In order to be concise, marginal effects of hours and income are not reported for the comparison group. Generally, the negative link between hours worked and school enrollment is stronger for the target group, and the income effect on school enrollment tends to be positive for the comparison group.

<sup>28</sup> Excluding household income does not significantly increase the magnitudes of the marginal effects, suggesting that the attenuation of the effect is mostly due to the effects of work.

Thus, most or all of the adverse effect of welfare reform on schooling appears to be due to the increase in employment among the target group. It is possible that some of these women may have substituted from formal high school programs to less time-intensive schooling such as other training or GED preparatory programs. However, the diminution of the marginal effect of TANF on any schooling suggests that this substitution from more intensive schooling to less intensive schooling was not a significant outcome.

Among high school graduates with less than a college education, hours worked also mediates the negative effect of welfare reform on college enrollment. In contrast to the less than high school educated women, the diminution of the effect magnitudes is smaller (on the order of 15 – 42 %). Some of the largest diminution of the effects of welfare reform (on the order of 27 – 42 %) occurs for full-time college enrollment, a relatively time-intensive educational activity. While it appears that hours of work and household income explain some of the adverse effects of welfare reform on college enrollment, there are likely to be other effects at play. Personal income, which may be a more relevant indicator than household income of material resources impacted by welfare reform, is not adequately observed in the October CPS. Furthermore, the reforms may have led to changes in living arrangements, such as the formation of extended family households, which may impact the demand for time-intensive activities such as schooling. Overall, these results suggest that at least part of the negative impact of TANF and AFDC waivers on adult women's educational acquisition was due to added time constraints resulting from increased work requirements.

#### Alternative Comparison Groups

The estimates of welfare reform on educational enrollment are based on comparison groups that most validated the DDD research design. Tables 1 and 2 indicated that educational

outcomes were similar for all sets of target and comparison groups we used, both in levels and trends, prior to any welfare reform. To further assess the robustness of our findings, we estimated models using alternative comparison groups. These results are presented in Table 9. For the analysis of high school drop-out, we compare unmarried females (ages 15-20) from low-educated two-parent households to our target group of unmarried females (ages 15-20) from low-educated non two-parent households. Pre-welfare reform baseline high school drop-out rates are expectedly higher for teens from non two-parent households, as indicated by the significant coefficient of the target indicator.<sup>29</sup> TANF implementation reduced high school drop-out among the target group by 2.3 percentage points (11 %) – this compares to the 15 % effect estimated with our primary comparison group of males from low-educated non two-parent households (from Table 3). For the analyses of college and school enrollment among low-educated unmarried adult mothers, we employ married mothers for comparison. In these alternative specifications, the effects of AFDC waivers are not statistically significant and generally close to zero. However, the effects of TANF remain generally robust in both magnitudes and significance. TANF implementation reduced college enrollment by 12 % and full-time college enrollment by 22 % among low-educated unmarried mothers -- this compares to 12 and 25 %, respectively, using our primary comparison group of low-educated unmarried women with no children (from Table 4). TANF implementation reduced school enrollment by 11 %, which is almost the same as the earlier effect. The robustness of the TANF effects, in both magnitude and significance, using these alternative comparison groups reinforces our findings that welfare

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<sup>29</sup> While such observable baseline differences in outcomes do not necessarily invalidate the comparison group as a counterfactual, they raise the specter of differential unobservable factors between the target and comparison groups. We have therefore emphasized estimates based on our primary comparison samples which are most similar to the target samples across all potentially relevant dimensions and therefore most defensible as a valid counterfactual.

reform reduced high school drop-out among girls but adversely affected school enrollment, especially college enrollment, among low-educated adult women.

## **Conclusion**

This study makes three major contributions. First, it contributes to the sparse literature on adult education by identifying welfare policy as a strong determinant of educational acquisition among poor adult women and underscores that policies not specifically focusing on education may be important determinants of educational attainment. That said, it is important to underscore that we have looked at enrollment, not attainment, and it is therefore possible that our effects reflect a slowing down of schooling rather than decreased educational attainment.

Second, we produced the most compelling evidence to date on the effects of welfare reform on teen drop-out. Specifically, we found that welfare reform has significantly increased the probability of young women from disadvantaged families staying in high school, by about 16 %. The opposing effects for teens and adult mothers underscore the differential educational incentives for the two groups that are built into welfare reform.

Third, and most importantly, we found robust and convincing evidence that welfare reform has significantly decreased the probability of college enrollment among adult women, by at least 20 %. It also appears to have decreased the probability of high school enrollment of adult women on the same order of magnitude, although high school enrollment, unlike college enrollment, is a relatively uncommon outcome in the relevant target group. These results fill an important gap in the welfare reform literature and suggest that the gains from welfare reform in terms of increasing employment and reducing caseloads have come at a cost—lower educational attainment among women at risk for relying on welfare. This finding may have negative implications for poor mothers' ability to attain self-sufficiency and experience upward mobility,

given the evidence of substantial earnings gains from even one year of community college and an increasing recognition that we know very little from welfare-to-work experiments about the effects of formal education. It may even have negative implications for their health, as there is a positive association between years of education and health, with no evidence of a “sheepskin effect,” and evidence from quasi-natural experiments suggests that at least part of the association is causal (Cutler & Lleras-Muney 2006). While not every potential welfare recipient would benefit from a high school or a college education, it cannot be assumed that the large negative aggregate effects of welfare reform on formal educational enrollment among adult women are an economically efficient or socially desirable outcome. A comprehensive assessment of the costs and benefits of welfare reform would need to factor in these impacts.

Finally, it is important to point out that the negative effects of welfare reform on educational enrollment may have become even larger under the Deficit Reduction Act of 2006, which raised states’ work participation targets and narrowed the range of welfare-to-work activities that can be counted toward those targets.

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**Table 1**  
**Baseline Means - Target and Comparison Groups**

**Panel A: High School Drop-out**

Sample	Target Group	Comparison Group	Target Group	Comparison Group
	Unmarried Females Age 15 - 20 Non Two-Parent Household Household Education: < College Graduate	Unmarried Males Age 15 - 20 Non Two-Parent Household Household Education: < College Graduate	Unmarried Females Age 15 - 19 Non Two-Parent Household Household Education: < College Graduate	Unmarried Males Age 15 - 19 Non Two-Parent Household Household Education: < College Graduate
	Waiver = 0 & TANF = 0			
Drop-out	0.222	0.232	0.216	0.222
	1992 (Non-Waiver States)			
Drop-out	0.208	0.221	0.211	0.196
	Pre-TANF (1992 - 1995)			
Drop-out	0.215	0.227	0.213	0.213

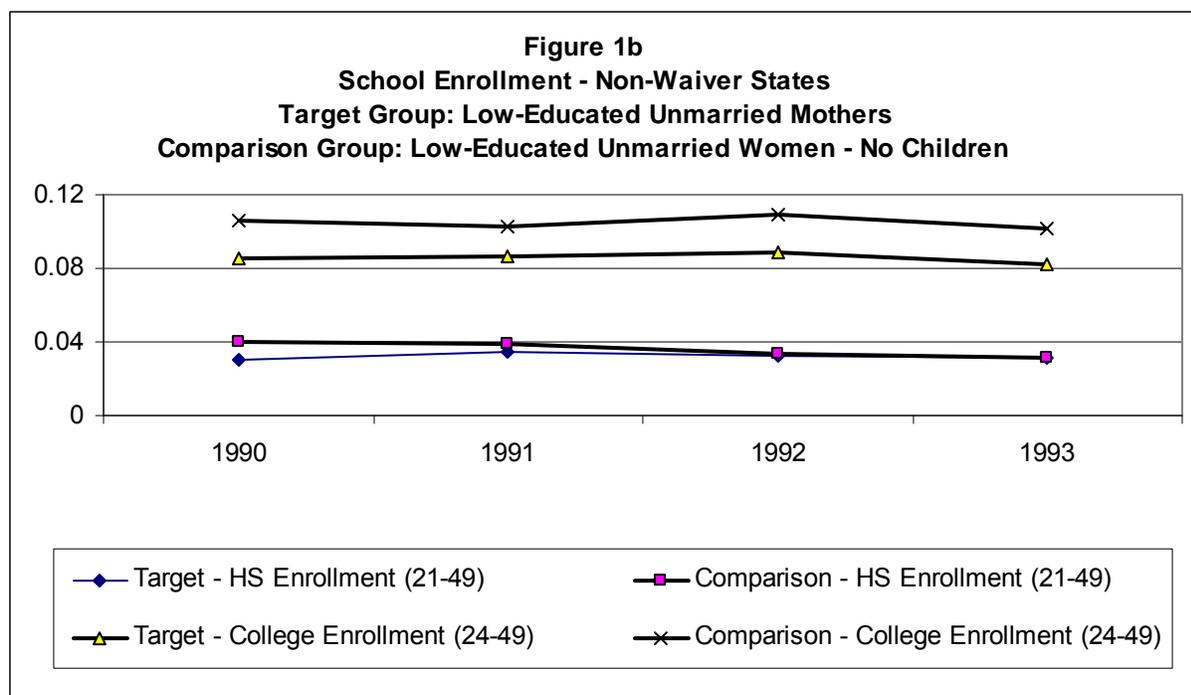
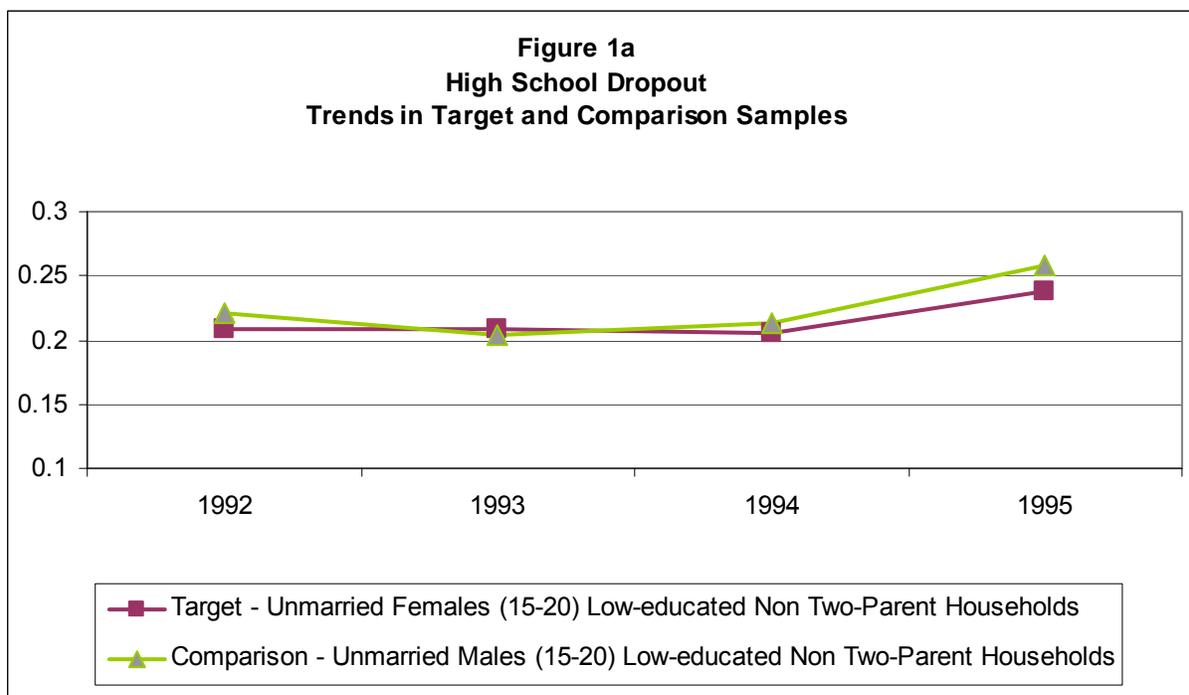
**Panel B: School Enrollment - 1992 (Non-Waiver States)**

Sample	Target Group	Comparison Group
	Unmarried Mothers Age 21-49 < High School Graduate	Unmarried Women - No Children Age 21-49 < High School Graduate
Current High School Enrollment	0.029	0.028
Any School Enrollment	0.035	0.030
Sample	Target Group	Comparison Group
	Unmarried Mothers Age 24-49 High School Graduate < College Graduate	Unmarried Women - No Children Age 24-49 High School Graduate < College Graduate
Current College Enrollment	0.089	0.104*
Full-time College Enrollment	0.047	0.048
Sample	Target Group	Comparison Group
	Unmarried Mothers Age 24-49 < College Graduate	Unmarried Women - No Children Age 24-49 < College Graduate
Any School Enrollment	0.078	0.091**

**Panel C: School Enrollment - Waiver = 0 & TANF = 0**

Sample	Target Group	Comparison Group
	Unmarried Mothers Age 21-49 < High School Graduate	Unmarried Women - No Children Age 21-49 < High School Graduate
Current High School Enrollment	0.034	0.026
Any School Enrollment	0.039	0.031
Sample	Target Group	Comparison Group
	Unmarried Mothers Age 24-49 High School Graduate < College Graduate	Unmarried Women - No Children Age 24-49 High School Graduate < College Graduate
Current College Enrollment	0.092	0.104***
Full-time College Enrollment	0.051	0.051
Sample	Target Group	Comparison Group
	Unmarried Mothers Age 24-49 < College Graduate	Unmarried Women - No Children Age 24-49 < College Graduate
Any School Enrollment	0.082	0.094***

Note: Asterisks denote that the difference in means between the target and the control group is statistically significant as follows:  
\*\*\* p<0.01, \*\* 0.01<p<0.05, \* 0.05<p<0.10.



**Table 2**  
**Differences in Pre-Welfare Reform Trends between Target and Comparison Groups**  
**Sample Restricted to Pre-Welfare Reform Periods (Waiver = 0 & TANF = 0)**

Sample	Unmarried Age 15 - 20 Non Two-parent Household Household Education: < College Graduate	Unmarried Women Age 21 - 49 < High School Graduate		Unmarried Women Age 24 - 49 High School Graduate < College Graduate		Unmarried Women Age 24 - 49 < College Graduate
		Current High School Enrollment	Any School Enrollment	Current College Enrollment	Full-Time College Enrollment	
Outcome	High School Drop-out					
Target	-0.0355 (0.0236)	0.0079 (0.0067)	0.0073 (0.0071)	-0.0101 (0.0084)	-0.0012 (0.0071)	-0.0112 (0.0071)
5 Years Pre-Reform* Target	0.0345 (0.0240)	0.0180 (0.0120)	0.0216* (0.0117)	-0.0006 (0.0100)	-0.0050 (0.0076)	0.0043 (0.0084)
4 Years Pre-Reform* Target	0.0035 (0.0286)	-0.0034 (0.0104)	-0.0063 (0.0113)	-0.0080 (0.0108)	0.0021 (0.0080)	-0.0043 (0.0093)
3 Years Pre-Reform* Target	0.0511 (0.0319)	-0.0076 (0.0141)	-0.0033 (0.0154)	-0.0107 (0.0133)	-0.0016 (0.0084)	-0.0054 (0.0118)
2 Years Pre-Reform* Target	0.0228 (0.0319)	-0.0038 (0.0103)	-0.0032 (0.0104)	0.0131 (0.0138)	0.0075 (0.0092)	0.0035 (0.0133)
Joint F-statistic <sup>1</sup>	1.86 [p=0.132]	1.08 [p=0.376]	1.81 [p=0.143]	1.01 [0.410]	0.96 [0.438]	0.29 [0.882]
Observations	8778	5217	5217	20313	19284	24868

Notes: Coefficient estimates from linear probability models are presented. For high school drop-out, the target group consists of females and the comparison group consists of males. For each of the other outcomes, the target group has children and the comparison group has no children. Reference category is one year pre-reform. Standard errors are adjusted for arbitrary correlation within each state and reported in parentheses. For the high-school drop-out sample ages 15-20, pre-reform is based on TANF implementation. For the adult samples, pre-reform is based on AFDC Waiver or TANF implementation, whichever occurred first. Significance is denoted as follows: \*\*\*  $p < 0.01$ , \*\*  $0.01 < p < 0.05$ , \*  $0.05 < p < 0.10$ .

<sup>1</sup> F-statistics for joint significance of differential pre-welfare reform trends between the target and comparison groups are presented. P-values are presented in square brackets.

**Table 3**  
**High School Drop-out**  
**October CPS 1992 - 2001**

Sample	Unmarried Age 15 - 20 Non Two-Parent Household (HH) Household Education: < College Graduate				Age 15 - 20 Non Two-Parent HH Household Education: < College Graduate	Unmarried Age 15 - 19 Non Two-Parent HH Household Education: < College Graduate
	1	2	3	4	5	6
Specification						
Target	-0.0170 (0.0136)	-0.0176 (0.0137)	-0.0176 (0.0136)	-0.0177 (0.0135)	-0.0145 (0.0128)	-0.0145 (0.0134)
AFDC Waiver	0.0049 (0.0207)	-0.0019 (0.0211)	-0.0036 (0.0218)	0.0005 (0.0228)	-0.0045 (0.0209)	0.0061 (0.0271)
AFDC Waiver*Target	-0.0084 (0.0224)	-0.0082 (0.0221)	-0.0083 (0.0221)	-0.0079 (0.0220)	0.0026 (0.0207)	0.0048 (0.0256)
TANF	0.0128 (0.0339)	0.0114 (0.0384)	0.0107 (0.0363)	0.0141 (0.0326)	0.0095 (0.0330)	0.0115 (0.0524)
TANF*Target	-0.0338** (0.0167)	-0.0331* (0.0169)	-0.0330* (0.0168)	-0.0329* (0.0167)	-0.0229 (0.0163)	-0.0423** (0.0179)
Year Indicators	Yes	Yes	Yes	Yes	Yes	Yes
State Indicators	Yes	Yes	Yes	Yes	Yes	Yes
State Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Lagged State Economic Indicators <sup>a</sup>	No	No	Yes	Yes	Yes	Yes
Lagged State Welfare Caseload <sup>b</sup>	No	No	No	Yes	Yes	Yes
State-Specific Trends	No	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.040	0.043	0.043	0.043	0.044	0.052
Observations	18532	18532	18532	18532	21164	12556

Notes: Coefficient estimates from linear probability models are presented. Standard errors are adjusted for arbitrary correlation within each state and reported in parentheses. All target groups are females and all comparison groups are males. All models include age and age-squared, indicators for race and Hispanic ethnicity, indicator for no parents in household, age and age-squared of the oldest household member, state fixed effects and year fixed effects. State covariates include state-level unemployment rate, real state personal income per capita, indicators for maximum compulsory schooling age, and indicators for state high school exit exam requirements. Significance is denoted as follows: \*\*\*  $p \leq 0.01$ , \*\*  $0.01 < p \leq 0.05$ , \*  $0.05 < p \leq 0.10$ .

<sup>a</sup> Lagged state economic indicators include the one-year and two-year lags of the state-level unemployment rate and real personal income per capita.

<sup>b</sup> Lagged state welfare caseload include the one-year and two-year lags of the number of welfare recipients in the state.

**Table 4**  
**Effects of Welfare Reform on School Enrollment of Adult Women**  
**Baseline DDD Models**  
**October CPS 1992 – 2001**

Sample	Unmarried Age 21 – 49 < High School Graduate				Unmarried Age 24 – 49 High School Graduate < College Graduate			
	Current High School Enrollment		Any School Enrollment		Current College Enrollment		Full-Time College Enrollment	
Specification	1	2	3	4	5	6	7	8
Target	0.0019 (0.0042)	0.0029 (0.0041)	0.0024 (0.0046)	0.0031 (0.0046)	0.0043 (0.0050)	0.0043 (0.0050)	0.0042 (0.0040)	0.0040 (0.0040)
AFDC Waiver	0.0074 (0.0065)	0.0066 (0.0071)	0.0049 (0.0068)	0.0047 (0.0080)	0.0077 (0.0077)	0.0092 (0.0066)	-0.0046 (0.0046)	-0.0019 (0.0048)
AFDC Waiver*Target	-0.0045 (0.0076)	-0.0053 (0.0075)	0.0006 (0.0081)	-0.0001 (0.0081)	-0.0194*** (0.0058)	-0.0200*** (0.0058)	-0.0097* (0.0055)	-0.0100* (0.0055)
TANF	0.0029 (0.0116)	0.0039 (0.0118)	0.0047 (0.0176)	0.0081 (0.0194)	-0.0006 (0.0156)	0.0032 (0.0163)	-0.0011 (0.0084)	0.0026 (0.0087)
TANF*Target	-0.0083 (0.0057)	-0.0094 (0.0058)	-0.0049 (0.0068)	-0.0064 (0.0071)	-0.0106* (0.0054)	-0.0104* (0.0055)	-0.0122*** (0.0041)	-0.0116*** (0.0041)
Year Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-Specific Trends	No	Yes	No	Yes	No	Yes	No	Yes
Adjusted R-squared	0.019	0.025	0.022	0.027	0.097	0.098	0.075	0.076
Observations	13505	13505	13505	13505	56618	56618	53721	53721

Notes: Coefficient estimates from linear probability models are presented. Standard errors are adjusted for arbitrary correlation within each state and reported in parentheses. All target groups have children and comparison groups do not have children. All models include age and age squared, indicators for race and Hispanic ethnicity, indicators for highest grade attended, number of children in the household, residence in a metro area, residence in a center city within a metro area, residence in suburban area, state fixed effects and year fixed effects. State covariates include state-level unemployment rate, real state personal income per capita, indicators for maximum compulsory schooling age, and indicators for state high school exit exam requirements. Significance is denoted as follows: \*\*\*  $p \leq 0.01$ , \*\*  $0.01 < p \leq 0.05$ , \*  $0.05 < p \leq 0.10$ .

**Table 5**  
**School Enrollment of Adult Women**  
**Alternative Specification—Addressing Potential Compositional Selection**  
**October CPS 1992 - 2001**

Sample	Unmarried Age 24 - 49 High School Graduate, < College Graduate Restricted Baseline Age $\geq 21$ <sup>a</sup>				Unmarried Age 24 - 49 < College Graduate	
	Current College Enrollment		Full-Time College Enrollment		Any School Enrollment	
Specification	1	2	3	4	5	6
Target	0.0029 (0.0051)	0.0029 (0.0051)	0.0030 (0.0040)	0.0027 (0.0040)	0.0033 (0.0042)	0.0034 (0.0042)
AFDC Waiver	0.0094 (0.0076)	0.0092 (0.0068)	-0.0019 (0.0046)	-0.0014 (0.0046)	0.0050 (0.0062)	0.0062 (0.0055)
AFDC Waiver*Target	-0.0173*** (0.0060)	-0.0176*** (0.0061)	-0.0089* (0.0054)	-0.0090* (0.0054)	-0.0173*** (0.0054)	-0.0181*** (0.0054)
TANF	0.0010 (0.0164)	0.0046 (0.0170)	-0.0025 (0.0101)	0.0003 (0.0106)	-0.0023 (0.0131)	0.0020 (0.0141)
TANF*Target	-0.0048 (0.0056)	-0.0048 (0.0058)	-0.0073* (0.0044)	-0.0069 (0.0044)	-0.0082* (0.0047)	-0.0081* (0.0048)
Year Indicators	Yes	Yes	Yes	Yes	Yes	Yes
State Indicators	Yes	Yes	Yes	Yes	Yes	Yes
State Covariates	Yes	Yes	Yes	Yes	Yes	Yes
State-Specific Trends	No	Yes	No	Yes	No	Yes
Adjusted R-squared	0.091	0.092	0.070	0.071	0.098	0.099
Observations	54808	54808	52084	52084	68378	68378

Notes: Coefficient estimates from linear probability models are presented. Standard errors are adjusted for arbitrary correlation within each state and reported in parentheses. All target groups have children and comparison groups do not have children. All models include age and age-squared, indicators for race and Hispanic ethnicity, indicators for highest grade attended, number of children in the household, residence in a metro area, residence in a center city within a metro area, residence in suburban area, state fixed effects and year fixed effects. State covariates include state-level unemployment rate, real state personal income per capita, indicators for maximum compulsory schooling age, and indicators for state high school exit exam requirements. Significance is denoted as follows: \*\*\*  $p \leq 0.01$ , \*\*  $0.01 < p \leq 0.05$ , \*  $0.05 < p \leq 0.10$ .

<sup>a</sup> Sample is restricted to individuals who were 21 years of age or older in the first full year that a state implemented an AFDC waiver or the first full year that a state implemented TANF if it did not have an AFDC waiver in place.

**Table 6**  
**School Enrollment of Adult Women**  
**Alternative Specification—Addressing Potential Policy Endogeneity by Controlling for**  
**Lagged Economic Indicators & Lagged Welfare Caseloads**  
**October CPS 1992 - 2001**

Sample	Unmarried Age 21 – 49 < High School Graduate		Unmarried Age 24 – 49 High School Graduate < College Graduate		Unmarried Age 24 - 49 < College Graduate
	Current High School Enrollment	Any School Enrollment	Current College Enrollment	Full-Time College Enrollment	Any School Enrollment
Specification	1	2	3	4	5
Target	0.0031 (0.0041)	0.0032 (0.0046)	0.0042 (0.0050)	0.0040 (0.0040)	0.0034 (0.0042)
AFDC Waiver	0.0037 (0.0074)	0.0013 (0.0080)	0.0074 (0.0071)	-0.0029 (0.0052)	0.0040 (0.0062)
AFDC Waiver*Target	-0.0055 (0.0075)	-0.0003 (0.0081)	-0.0199*** (0.0058)	-0.0100* (0.0056)	-0.0180*** (0.0055)
TANF	0.0003 (0.0146)	0.0060 (0.0208)	0.0038 (0.0144)	0.0020 (0.0082)	0.0031 (0.0127)
TANF*Target	-0.0097* (0.0057)	-0.0068 (0.0070)	-0.0104* (0.0055)	-0.0116*** (0.0041)	-0.0082* (0.0048)
Year Indicators	Yes	Yes	Yes	Yes	Yes
State Indicators	Yes	Yes	Yes	Yes	Yes
State Covariates	Yes	Yes	Yes	Yes	Yes
State-Specific Trends	Yes	Yes	Yes	Yes	Yes
Lagged State Economic Indicators <sup>a</sup>	Yes	Yes	Yes	Yes	Yes
Lagged State Welfare Caseload <sup>b</sup>	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.025	0.027	0.098	0.076	0.099
Observations	13505	13505	56618	53721	68378

Notes: Coefficient estimates from linear probability models are presented. Standard errors are adjusted for arbitrary correlation within each state and reported in parentheses. All target groups have children and comparison groups do not have children. All models include age and age-squared, indicators for race and Hispanic ethnicity, indicators for highest grade attended, number of children in the household, residence in a metro area, residence in a center city within a metro area, residence in suburban area, state fixed effects and year fixed effects. State covariates include state-level unemployment rate, real state personal income per capita, indicators for maximum compulsory schooling age, and indicators for state high school exit exam requirements. Significance is denoted as follows: \*\*\*  $p \leq 0.01$ , \*\*  $0.01 < p \leq 0.05$ , \*  $0.05 < p \leq 0.10$ .

<sup>a</sup> Lagged state economic indicators include the one-year and two-year lags of the state-level unemployment rate and real personal income per capita.

<sup>b</sup> Lagged state welfare caseload include the one-year and two-year lags of the number of welfare recipients in the state.

**Table 7**  
**School Enrollment of Adult Women**  
**Stratified Samples by TANF Educational Policy, Benefit Generosity, and Strictness of Time**  
**Limits**  
**October CPS 1992 – 2001**

Panel A	School Enrollment Not Supported as Work Requirement <sup>a</sup>					Low Benefit Generosity <sup>c</sup>	Strict/Medium Time Limits <sup>c</sup>
Sample	Unmarried Age 21 - 49 < High School Graduate		Unmarried Age 21 - 49 < College Graduate			Unmarried Age 21 - 49 < College Graduate	Unmarried Age 21 - 49 < College Graduate
Outcome	Current High School Enrollment	Any School Enrollment	College Enrollment	Full-Time College Enrollment	Any School Enrollment	Any School Enrollment	Any School Enrollment
Specification	1	2	3	4	5	6	7
Target	0.0073 (0.0050)	0.0043 (0.0064)	0.0083 (0.0085)	0.0083 (0.0072)	0.0075 (0.0074)	0.0088 (0.0071)	0.0063 (0.0047)
AFDC Waiver	0.0271* (0.0148)	0.0215 (0.0215)	0.0077 (0.0117)	-0.0108 (0.0098)	0.0028 (0.0102)	0.0308 (0.0177)	0.0134* (0.0072)
AFDC Waiver*Target	-0.0200 (0.0174)	-0.0093 (0.0179)	-0.0317** (0.0121)	-0.0113 (0.0088)	-0.0244* (0.0126)	-0.0361** (0.0145)	-0.0224*** (0.0080)
TANF	0.0156 (0.0127)	0.0342* (0.0178)	0.0023 (0.0155)	0.0106 (0.0097)	0.0038 (0.0120)	0.0512* (0.0253)	0.0281** (0.0122)
TANF*Target	-0.0197*** (0.0065)	-0.0140 (0.0097)	-0.0123 (0.0091)	-0.0137** (0.0066)	-0.0098 (0.0078)	-0.0148 (0.0084)	-0.0071 (0.0051)
Year Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-Specific Trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lagged State Economic Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.027	0.029	0.098	0.075	0.098	0.099	0.094
Observations	6811	6811	27742	26372	33616	11757	49665

Panel B	School Enrollment is Supported as Work Requirement					High or Medium Benefit Generosity	Lenient Time Limits
Sample	Unmarried Age 21 - 49 < High School Graduate		Unmarried Age 21 - 49 < College Graduate			Unmarried Age 21 - 49 < College Graduate	Unmarried Age 21 - 49 < College Graduate
Outcome	Current High School Enrollment	Any School Enrollment	College Enrollment	Full-Time College Enrollment	Any School Enrollment	Any School Enrollment	Any School Enrollment
Specification	1	2	3	4	5	6	7
Target	-0.0028 (0.0062)	0.0015 (0.0070)	0.0001 (0.0057)	-0.0013 (0.0041)	-0.0015 (0.0042)	0.0026 (0.0049)	-0.0052 (0.0063)
AFDC Waiver	0.0006 (0.0096)	-0.0003 (0.0102)	0.0122 (0.0095)	0.0031 (0.0063)	0.0086 (0.0088)	0.0068 (0.0065)	0.0090 (0.0083)
AFDC Waiver*Target	0.0007 (0.0097)	0.0007 (0.0104)	-0.0149** (0.0060)	-0.0060 (0.0067)	-0.0141** (0.0054)	-0.0172*** (0.0060)	-0.0070 (0.0072)
TANF	-0.0104 (0.0179)	-0.0180 (0.0176)	0.0114 (0.0256)	0.0019 (0.0122)	0.0087 (0.0210)	0.0006 (0.0142)	0.0229* (0.0116)
TANF*Target	0.0024 (0.0083)	0.0016 (0.0093)	-0.0084 (0.0063)	-0.0087* (0.0049)	-0.0059 (0.0055)	-0.0070 (0.0055)	-0.0103 (0.0095)
Year Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-Specific Trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lagged State Economic Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.029	0.030	0.099	0.078	0.100	0.098	0.111
Observations	6694	6694	28876	27349	34762	56621	18713

Notes: See Table 4

<sup>a</sup> Sample is limited to states which do not completely allow post-secondary education to count toward the state's work requirement.

<sup>b</sup> Sample is limited to states which have high earnings disregard, as defined in Blank and Schmidt (2001).

<sup>c</sup> Sample is limited to states which have strict or medium time limits as defined in Blank and Schmidt (2001).

**Table 8**  
**School Enrollment of Adult Women**  
**Assessing Hours Worked & Income as Potential Mediators**  
**October CPS 1992 - 2001**

Sample	Unmarried Age 21 – 49 < High School Graduate		Unmarried High School Age 24 – 49 Graduate < College Graduate		Unmarried Age 24 - 49 < College Graduate
	Current High School Enrollment	Any School Enrollment	Current College Enrollment	Full-Time College Enrollment	Any School Enrollment
Specification	1	2	3	4	5
Hours Worked (1-19) <sup>a</sup>	-0.0057 (0.0102)	0.0024 (0.0116)	0.0401*** (0.0134)	0.0296*** (0.0103)	0.0303** (0.0118)
Hours Worked (20-31)	-0.0240*** (0.0061)	-0.0276*** (0.0068)	-0.0280*** (0.0070)	-0.0403*** (0.0068)	-0.0272*** (0.0055)
Hours Worked (32 - 40)	-0.0254*** (0.0039)	-0.0287*** (0.0042)	-0.0615*** (0.0065)	-0.0754*** (0.0060)	-0.0574*** (0.0056)
Hours Worked (> 40)	-0.0251*** (0.0057)	-0.0343*** (0.0059)	-0.0733*** (0.0073)	-0.0809*** (0.0061)	-0.0705*** (0.0059)
Household Income <sup>b</sup>	-0.0006*** (0.0002)	-0.0007*** (0.0002)	0.00002 (0.0002)	-0.0001 (0.0001)	-0.0002 (0.0002)
Target <sup>c</sup>	0.0204*** (0.0056)	0.0248*** (0.0057)	0.0234** (0.0094)	0.0075 (0.0082)	0.0245*** (0.0079)
AFDC Waiver	0.0016 (0.0084)	-0.0005 (0.0100)	0.0061 (0.0077)	-0.0051 (0.0053)	0.0024 (0.0062)
AFDC Waiver*Target	-0.0017 (0.0114)	0.0019 (0.0121)	-0.0171*** (0.0061)	-0.0073 (0.0053)	-0.0151*** (0.0051)
TANF	0.0020 (0.0141)	0.0072 (0.0199)	-0.0013 (0.0141)	-0.0065 (0.0097)	-0.0008 (0.0119)
TANF*Target	-0.0056 (0.0062)	-0.0032 (0.0080)	-0.0066 (0.0052)	-0.0067* (0.0038)	-0.0037 (0.0047)
Year Indicators	Yes	Yes	Yes	Yes	Yes
State Indicators	Yes	Yes	Yes	Yes	Yes
State Covariates	Yes	Yes	Yes	Yes	Yes
State-Specific Trends	Yes	Yes	Yes	Yes	Yes
Lagged State Economic Indicators <sup>d</sup>	Yes	Yes	Yes	Yes	Yes
Lagged State Welfare Caseload <sup>e</sup>	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.030	0.034	0.116	0.120	0.115
Observations	12423	12423	51529	48854	62336

Notes: Coefficient estimates from linear probability models are presented. Standard errors are adjusted for arbitrary correlation within each state and reported in parentheses. All target groups have children and comparison groups do not have children. All models include age and age-squared, indicators for race and Hispanic ethnicity, indicators for highest grade attended, number of children in the household, residence in a metro area, residence in a center city within a metro area, residence in suburban area, state fixed effects and year fixed effects. State covariates include state-level unemployment rate, real state personal income per capita, indicators for maximum compulsory schooling age, and indicators for state high school exit exam requirements. Significance is denoted as follows: \*\*\*  $p < 0.01$ , \*\*  $0.01 < p < 0.05$ , \*  $0.05 < p < 0.10$ .

<sup>a</sup> Reference category is individuals who are not working. Marginal effects for hours worked are reported for the target group. All models also include interaction terms between the indicators for hours worked and the comparison group indicator to allow the marginal effects to differ between the target and comparison groups.

<sup>b</sup> Household income is measured in thousands of dollars, adjusted by the national consumer price index. Marginal effect for income is reported for the target group. All models also include an interaction term between household income and the comparison group indicator to allow the marginal effect to differ between the target and comparison groups.

<sup>c</sup> In this context, the marginal effect of the target group indicator represents the difference in pre-welfare reform school enrollment between individuals in the treatment and comparison groups who are not currently working and have zero household income.

<sup>d</sup> Lagged state economic indicators include the one-year and two-year lags of the state-level unemployment rate and real personal income per capita.

<sup>e</sup> Lagged state welfare caseload include the one-year and two-year lags of the number of welfare recipients for the state.

**Table 9**  
**High School Drop-out and School Enrollment of Adult Women**  
**Alternative Comparison Groups**  
**October CPS 1992 - 2001**

Sample	Unmarried Females Age 15 – 20 Household Education: < College Graduate	Mothers Age 21 - 49 < High School Graduate		Mothers Age 24 - 49 High School Graduate < College Graduate		Mothers Age 24 - 49 < College Graduate
Target Group	Non Two-Parent HH	Unmarried Mothers		Unmarried Mothers		Unmarried Mothers
Comparison Group	Dual Parent HH	Married Mothers		Married Mothers		Married Mothers
Outcome	High School Drop-out	Current High School Enrollment	Any School Enrollment	Current College Enrollment	Full-Time College Enrollment	Any School Enrollment
Specification	1	2	3	4	5	6
Target	0.1040*** (0.0092)	0.0134*** (0.0038)	0.0161*** (0.0038)	0.0361*** (0.0037)	0.0272*** (0.0031)	0.0340*** (0.0032)
AFDC Waiver	-0.0043 (0.0171)	-0.0047 (0.0056)	-0.0074 (0.0050)	0.0018 (0.0042)	0.0020 (0.0022)	-0.00001 (0.0038)
AFDC Waiver*Target	-0.0071 (0.0190)	-0.0029 (0.0071)	0.0034 (0.0062)	0.0021 (0.0069)	-0.0063 (0.0043)	-0.00003 (0.0056)
TANF	0.0400* (0.0217)	-0.0018 (0.0075)	0.0034 (0.0101)	0.0052 (0.0086)	0.0070* (0.0042)	0.0039 (0.0073)
TANF*Target	-0.0234** (0.0100)	-0.0050 (0.0054)	-0.0022 (0.0059)	-0.0108** (0.0045)	-0.0102*** (0.0033)	-0.0088** (0.0038)
Year Indicators	Yes	Yes	Yes	Yes	Yes	Yes
State Indicators	Yes	Yes	Yes	Yes	Yes	Yes
State Covariates	Yes	Yes	Yes	Yes	Yes	Yes
State-Specific Trends	Yes	Yes	Yes	Yes	Yes	Yes
Lagged State Economic Indicators <sup>a</sup>	Yes	Yes	Yes	Yes	Yes	Yes
Lagged State Welfare Caseload <sup>b</sup>	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.060	0.017	0.017	0.051	0.035	0.050
Observations	18733	18613	18613	98457	95004	115370

Notes: Coefficient estimates from linear probability models are presented. Standard errors are adjusted for arbitrary correlation within each state and reported in parentheses. See notes to Table 3 (for high school drop-out) and notes to Table 4 (for school enrollment among adult women) for other covariates which are included in the models. Significance is denoted as follows: \*\*\*  $p \leq 0.01$ , \*\*  $0.01 < p \leq 0.05$ , \*  $0.05 < p \leq 0.10$ .

<sup>a</sup> Lagged state economic indicators include the one-year and two-year lags of the state-level unemployment rate and real personal income per capita.

<sup>b</sup> Lagged state welfare caseload include the one-year and two-year lags of the number of welfare recipients in the state.