Welfare Reform and the Intergenerational Transmission of Dependence*

Robert Paul Hartley
School of Social Work
Columbia University

Carlos Lamarche
Department of Economics
University of Kentucky

James P. Ziliak
Center for Poverty Research and
Department of Economics
University of Kentucky

July 2021

Forthcoming, Journal of Political Economy

Abstract

We investigate the effect of welfare reform on intergenerational welfare participation. We first present new descriptive evidence on intergenerational participation, using mother-daughter pairs in the Panel Study of Income Dynamics. We then estimate the effect of welfare reform on the intergenerational transmission of welfare participation, and related economic outcomes. Because states implemented welfare reform at different times starting in 1992, the cross-state variation over time permits us to quasi-experimentally separate out the effect of mothers' welfare participation on daughters' economic outcomes in adulthood in the pre- and post-welfare reform periods. We find that a mother's AFDC/TANF participation increased her daughter's odds of adult participation in that program by roughly 25 percentage points or more, but that welfare reform attenuated this transmission by at least 50 percent. However, there is no diminution of transmission after welfare reform when we consider the wider safety net or other outcomes. The findings suggest that daughters who grew up with mothers on AFDC/TANF were no better off in terms of economic outcomes and mobility after reform, with substitution toward other welfare programs over generations.

* Address correspondence to James P. Ziliak, University of Kentucky, Center for Poverty Research, Gatton Building Suite 234, 550 South Limestone St., Lexington, KY 40506-0034. Email: jziliak@uky.edu. We are grateful for comments from the editor, James Heckman, eight anonymous reviewers, Anna Aizer, Richard Blundell, Chris Bollinger, Paul Devereux, Steven Durlauf, Hilary Hoynes, Mike Keane, Henrik Kleven, Robert Moffitt, Bill Neilson, Lara Shore-Sheppard, Jeff Smith, Lowell Taylor, Genia Toma, Marianne Wannamaker, and participants at the 2015 Summer School on Socioeconomic Opportunity, 2016 NBER Summer Institute, 2016 Barcelona GSE Summer Forum, 2016 APPAM Conference, 2016 Tennessee Empirical Applied Microeconomics Festival, Columbia University, Institute for Fiscal Studies, Lancaster University, London School of Economics, Ohio State University, Nuffield College (Oxford), University College Dublin, University of Oklahoma, University of Oregon, and VATT Institute for Economic Policy. All errors are our own.

I. Introduction

A fundamental goal of the landmark 1996 welfare reform in the United States was to eliminate the dependence of needy families on government assistance. This was premised in part on the belief that dependence is passed down from parent to child through knowledge and values, creating a "culture of welfare" across generations (Murray, 1984; DeParle, 2004; Haskins, 2007). While this belief was bolstered by an empirical consensus documenting a positive intergenerational correlation of welfare use, the literature is much less settled on whether the relationship is causal (Duncan, Hill, and Hoffman, 1988; Solon et al., 1988; Gottschalk, 1992, 1996; Levine and Zimmerman, 1996; Pepper, 2000; Page, 2004; Dahl, Kostøl, and Mogstad, 2014). Instead, the parent-child link in welfare participation could simply be a spurious by-product of incomes that are correlated across generations, by which some persistence in welfare participation could be attributed to a poverty trap as opposed to a welfare trap. That is, low economic mobility across generations means that children of parents with low incomes likely have low incomes themselves in adulthood, and both generations participate in means-tested programs solely because of their shared poverty status and not welfare exposure per se. If true, then we would not expect generational welfare participation to fall after reform unless poverty among the young declined. Scores of papers have been written evaluating welfare reform (see surveys in Blank, 2002; Moffitt, 2003; Grogger and Karoly, 2005; Ziliak, 2016), but to date there has not been research on whether it achieved a key aim of ending generational welfare dependence. In this paper, we estimate the effect of welfare reform on the intergenerational transmission of welfare participation. In addition, because the goal of welfare reform was to reduce dependency more broadly, we also estimate whether reform changed the relationship between parental welfare use and other socioeconomic outcomes of the child in late adolescence and adulthood including human capital attainment, teen fertility, employment, marriage, and poverty status.

The Aid to Families with Dependent Children (AFDC) program was established as a federal-state partnership during the Great Depression to provide cash assistance to low-income families with dependent children. Most rules were federally set, and states had limited flexibility in designing the program beyond setting the maximum benefit guarantee and limits on income eligibility. Because of restrictions on eligibility of two-parent families for AFDC, over 90 percent of AFDC cases were single mother families. While the median spell length on AFDC was under a year, there was a sizable minority with multi-year spells (Moffitt, 1992), and a concern of some policymakers was that prolonged exposure of children to the program could lead them to choose single parenthood and reliance on the program in adulthood. Starting in the early 1990s, states began in earnest requesting waivers from federal rules on their AFDC programs to introduce work requirements, time limits on benefit receipt, and other changes. This reform momentum culminated with passage of the Personal Opportunity and Work Opportunity Reform Act (PRWORA) in 1996 that replaced AFDC with Temporary Assistance for Needy Families

(TANF), which unlike AFDC, is not an entitlement. While the TANF program features are now set primarily by the states, there are other assistance programs for low-income persons that remain under federal control; namely, the Supplemental Nutrition Assistance Program, known as SNAP or food stamps, which is the largest food assistance program in the U.S., and Supplemental Security Income (SSI), which is a disability assistance program with no work history requirement. This means that efforts by states to reduce participation in AFDC/TANF within and across generations may not be met with similar efforts on other programs under federal control. Indeed, while cross-sectional participation rates in TANF plummeted by two-thirds in the wake of welfare reform, there was a concurrent surge in participation in both SNAP and SSI (Schmidt and Sevak, 2004; Ziliak, 2015; Ganong and Liebman, 2018).

With this backdrop of changes in cross-sectional participation in welfare, we begin our analysis by documenting descriptive correlations over time in intergenerational income mobility and welfare participation using rolling cohorts of mother-daughter pairs over the survey period 1968-2013 in the Panel Study of Income Dynamics (PSID). We focus on mother-daughter pairs not only because single mothers make up the preponderance of cases on AFDC/TANF, but also because there has been a large secular increase since the 1960s in the fraction of first births to unmarried women in the U.S. such that more than one third of children were exposed to welfare by age 10 (Levine and Zimmerman, 2005; Cancian and Reed, 2009). The intergenerational correlations highlight that in the period prior to welfare reform, income mobility of daughters declined, while generational persistence in welfare use increased. However, after reform, there was a marked decline in the intergenerational correlation of AFDC/TANF, yet there was neither improvement in income mobility nor intergenerational welfare participation when welfare is more broadly defined to include food and disability assistance. To rule out the possibility that the decline in AFDC/TANF correlations are simply a mechanical by-product of falling cross-sectional participation, we further construct intergenerational correlations of welfare participation by using mother-daughter pairs who are observed either entirely before reform or after. The evidence indicates a substantial decline in the intergenerational correlation of AFDC/TANF use in the post-reform period, suggesting the post-reform decline is not a purely mechanical artifact. Notably, though, when we consider the broader measure of welfare that includes SNAP and SSI, we find that the intergenerational correlation remains unchanged after reform.

We then develop an empirical framework that builds on a canonical Becker-Tomes (1979, 1986) transmission model in order to identify whether welfare exposure causally determines participation in adulthood. Specifically, we employ a difference-in-difference-type specification whereby the economic outcome of the daughter during adulthood is regressed on the prior welfare participation of the mother, a variable reflecting the implementation of welfare reform in the mother's state, and the interaction of the welfare-reform variable with mother's participation. Our identification strategy exploits the quasi-

experimental variation provided by the 1990s reforms to the AFDC program. However, even though welfare reform provides exogenous variation in access to program benefits across welfare eras, identifying whether there is an effect from parent to child in welfare use *within* periods is complicated by two—potentially reinforcing—forms of bias. First, selection bias in welfare participation across generations can arise through unobserved correlations in labor market productivity between the parent and child, perhaps because of latent shared cognitive or noncognitive ability or a lack of human capital investment across generations (Solon et al., 1988; Gottschalk, 1992, 1996; Pepper, 2000). The second threat to identification comes from potential misclassification bias in survey responses (Bollinger and David, 1997; Kreider et al., 2012; Meyer and Mittag, 2017). In transfer programs, this nonclassical measurement error mostly comes in the form of "false negatives" when the respondent states they did not participate in a program when in fact they did. Meyer, Mok, and Sullivan (2015a,b) document a trend increase in misreporting across all major household income surveys in the U.S.

In our empirical model, we address potential endogenous selection into welfare by instrumenting for mother's welfare use with measures of the state maximum AFDC/TANF benefit standard when daughters are ages 12 to 18. The instruments are constructed during a daughter's critical ages of exposure to her mother's potential welfare, which is generally well before she faces a participation decision as an adult. The mother's welfare participation decision is assumed to respond positively to greater state-level AFDC/TANF benefit standards. Fundamentally, this aggregate measure of state-level policies identifies the portion of a mother's participation decision that is related to her welfare status separately from conditions related to her poverty status, and consequently, her daughter's future poverty status. Next, we address the implications of misclassified welfare participation, which may occur in both the dependent variable for daughters as well as the independent variable for mothers. We use a relatively long history to determine whether the mother participated in welfare in the past, and we address misclassification bias in the dependent variable by parametric methods using extra-sample information based on PSID reporting rates estimated in Meyer et al. (2015b).

Our estimates show that there is strong evidence for transmission of AFDC/TANF participation from mother to daughter, and it is economically sizable, on the order of at least 25 percentage points. However, welfare reform significantly attenuated the level of transmission pathway by at least 50 percent. The implication is that of the two-thirds reduction in the cross-sectional rate of participation in AFDC/TANF after reform, at least half of that amount comes from reduced generational transmission. While we also find that exposure to AFDC/TANF substantively increased the use of the wider safety net in adulthood, welfare reform did not affect intergenerational welfare use more generally; that is, daughters who grew up on welfare did not leave assistance after reform as they substituted AFDC/TANF with other welfare programs in the wider safety net. Moreover, we find that exposure to AFDC/TANF increased the

risk of teen birth and lower levels of human capital attainment, employment, and income, but welfare reform did not diminish those generational links, leaving daughters no better off in broader economic status. We find that these results are robust across a variety of specifications, including a generalization of the model to examine the possibility of pre-existing confounders or latent state-specific trends. While we are not able to provide definite conclusions on the possible mechanisms for the main findings, our results are consistent with a model of word-of-mouth transmission from mother to daughter pointing to the costs of participation in TANF outweighing the benefits.

II. Welfare Reform

Welfare in the U.S. through the 1980s was largely defined by the AFDC program, which was established as part of the Social Security Act of 1935 to assist low-income families with children under age 18. Eligibility for assistance was determined by an income test, a liquid asset test, and a vehicle asset test. The program was financed by a federal-state matching grant program, and states had limited authority on program design, such as setting benefit standards (maximum benefit levels increasing with family size) and need standards used in assigning income eligibility. Beginning in the 1960s, states could apply for waivers from federal rules to experiment with program features. Several states filed waiver applications under President George H.W. Bush's administration, which accelerated under the Clinton administration, so that 43 states had waivers by 1996 (Grogger and Karoly, 2005). The waivers were far reaching, including both strengthening and expanding of pre-existing policies (e.g., work requirements and sanctions on benefits for failing to work or participate in a training program), as well as new policies aimed at family responsibility (e.g., caps on the generosity of benefits by family size and time limits on benefit receipt). Some of the new policies actually expanded eligibility, such as higher asset limits and earnings disregards for benefit determination, but the majority were designed to restrict program access. Time-limit waivers, in particular, were introduced to break long-term spells on AFDC, and in turn to reduce exposure of children to parental use of welfare. These waivers were codified into federal law with passage of PRWORA in 1996 that replaced AFDC with TANF. Unlike AFDC, TANF is funded by a fixed block grant to states and eligibility is not an entitlement. Consequently, states were granted much greater authority in program design and there are vast differences across states in TANF policy.

[Figure 1 here]

Figure 1 depicts trends in the number of persons on AFDC/TANF, spanning the AFDC (1960-1991), waiver (1992-1996 shaded in gray), and TANF (from 1997 onward) eras. Participation accelerated throughout the 1960s from about 3 million persons in 1960 to 10 million a decade later. The level of recipients remained stable for nearly two decades, and then increased approximately 30 percent from 1989 to 1994. By 2012, however, the number of recipients had plummeted 67 percent to levels akin to five decades earlier. Numerous studies demonstrated that while the economy accounted for more of the

decline in welfare in the mid-1990s, waivers also reduced participation, especially in those states adopting more stringent responsibility and time limit policies (Ziliak et al., 2000; Grogger, 2003).

Families that received AFDC were categorically eligible for food assistance from the Food Stamp Program, which was renamed SNAP in 2008. Receipt of AFDC was not necessary for eligibility for food stamps, but it was sufficient, and typically about 80 to 90 percent of AFDC recipients took up both. This categorical eligibility remained after the introduction of TANF for those receiving cash assistance. While any given individual on AFDC could not simultaneously receive assistance from the SSI disability program, which began in 1972, families could possibly combine benefits with some members on AFDC and some on SSI (and still also qualify for food stamps). These provisions remain after welfare reform.

Figure 1 also presents trends in the number of recipients on SNAP and SSI. There was a marked drop in SNAP participation in the immediate aftermath of welfare reform, followed by a huge expansion in the subsequent decade, reflecting changes in the macroeconomy, SNAP policies, and take-up rates among those eligible (Ziliak, 2015; Ganong and Liebman, 2018). There was also growth in SSI, notably after the Supreme Court's *Zebley Decision* expanded eligibility for children (Kubik, 1999), and again after welfare reform where some states systematically facilitated the applications of AFDC recipients for SSI program benefits (Schmidt and Sevak, 2004). The implication is that even if welfare reform succeeded in breaking the generational cycle on AFDC/TANF, it is not clear a priori that it improved self-sufficiency or reduced dependence more broadly when additional safety net programs are considered.

These policy changes led to a bevy of research on the effects of the reform on maternal welfare participation, employment, consumption, saving, health, and family structure, as well as child well-being (Blank, 2002; Moffitt, 2003; Grogger and Karoly, 2005; Ziliak, 2016). In surveying that literature two decades later, Ziliak (2016) concluded that welfare reform contributed significantly to the reduction in participation in the TANF program and an increase in employment and earnings among single mothers. However, total after-tax and transfer incomes fell in the bottom half of the income distribution of single mothers; that is, higher earnings were offset by reductions in transfer income, leaving some mothers worse off financially. Ziliak argued that the evidence on other domains of family life, including child well-being, was too scant to draw meaningful conclusions. Importantly, most of this research occurred within five years after passage of PRWORA, and almost all in the first decade. One conjecture for the null effects on young children is that reform may take more time to manifest in child outcomes, perhaps by daughter's exposure to mother's longer attachment to the workforce or by word-of-mouth transmission from mother to daughter on the costs and benefits of various transfer programs (Edin and Lein, 1997; Halpern-Meekin et al., 2015). Whether and to what extent these developments altered the trajectories of daughters in adulthood is the focus of the ensuing sections.

III. Intergenerational Correlations: Cross-Sectional Evidence

We begin our analysis by presenting cross-sectional evidence on intergenerational correlations of income and welfare participation among mothers and daughters. These correlations are of independent interest as much of the literature has either focused on the mobility of sons, has daughter estimates that mostly pre-date welfare reform, or in the case of some of the recent literature, relies primarily on tax data and thus does not capture welfare income because it is generally not taxable (Solon, 1992, 1999; Mazumder, 2005; Black and Devereaux, 2011; Lee and Solon, 2009; Chetty et al., 2017). To estimate the correlations, we use data from the PSID, which was begun in 1968 as a survey of 4,800 American families and has followed the children and grandchildren of original sample parents as they split off to form their own households so that today there are over 10,000 PSID families and 24,000 individuals. As the longest continuously running longitudinal survey, the PSID is ideally suited for the study of intergenerational transmission. The original sample drew about 60 percent of the families from the nationally representative Survey Research Center (SRC) sample, and the other 40 percent from an oversample of low-income and minority families as part of the Survey of Economic Opportunity (SEO). We focus on linked mother-daughter pairs over the entire life of the PSID survey years from 1968 to 2013, and in order to ensure adequate sample sizes, we include observations from both the SRC and SEO subsamples. Therefore, we provide weighted estimates in all of our estimation results to account for the over-sampling of low-income families.[1] The online supplement offers a detailed description of the data.

A. Trends in Intergenerational Economic Status

We initially estimate a series of cross-sectional regressions over time using rolling cohorts of mother-daughter pairs from the PSID similar to that used by Page (2004). Specifically, we adopt a framework akin to that employed in the literature on intergenerational income mobility (Solon, 1999; Black and Devereaux, 2011) such that, in each year, we estimate bivariate regressions of the form

$$(1) \qquad y_i^d = \zeta + \rho y_i^m + \nu_i^d,$$

where i represents the mother-daughter pair, y_i^d is the outcome of the daughter d measured in her adulthood, y_i^m is the corresponding variable of the mother m measured in the daughter's childhood, ρ is the correlation coefficient between mother and daughter, and ν_i^d is the daughter's error term. Higher values of the correlation coefficient imply stronger bonds in mother-daughter outcomes, and thus less mobility across generations. For the first outcome, we focus on income, defined alternatively as: (1) whether the mother-daughter pair have incomes that place them in poverty as measured by a family income-to-needs ratio less than 1, where needs are defined by the official poverty threshold that varies by

[1] We use the daughter's current core longitudinal weight, though the online supplement shows results that are robust to the use of the mother's weight defined over different time periods, as well as to unweighted regression or to using exclusively the SRC subsample (see the online supplement).

family size; (2) low-income status, defined as family income-to-needs less than 2; and, (3) the logarithm of family income. We select the poverty-based measures because they represent the part of the income distribution with the highest chances of welfare use, while log income gives standard estimates of intergenerational elasticities. For each mother-daughter pair, we take the average of annual income-to-needs across the daughter's adult years from the age of 19 through age 27, while the mother's income-to-needs is averaged across all years before the daughter forms her own family unit.[2] The dependent and independent poverty-status variables are dichotomized to equal 1 if any of the average poverty conditions are met, and 0 otherwise. The third outcome measures income continuously as the log of average family income for the respective daughters' and mothers' observation windows.

[Figure 2 here]

Figure 2A presents estimates of the income correlation coefficients starting in 1978, the first year with enough daughters to estimate the correlations. The figure shows that in the two decades from the late 1970s to 2000, the income mobility of daughters declined substantially across all three measures. For example, in the log-log model the elasticity of a daughter's income with respect to her mother's income more than doubled from 0.22 in 1980 to 0.55 in 2000. Over the same period, the odds of a daughter having income under twice the poverty line if her mother also had similarly low income went from about 0.20 to 0.40. Since 2000, the income correlations stabilized, suggesting no further decline in mobility.

Given the strong intergenerational association in incomes between mothers and daughters, we next examine whether that coincides with a strong correlation in welfare participation. Figure 2B uses the same sample as in Figure 2A, but now the correlation coefficient is obtained considering alternatively whether the daughter and mother participated in AFDC/TANF at any time during their respective observation windows, or considering the daughter's average participation rate relative to any exposure from maternal participation. The figure shows that the intergenerational correlation for any participation in AFDC increased throughout the two decades leading up to the passage of welfare reform, and did not peak until the late 1990s when the correlation of 0.37 was about double that of the late 1970s. The correlation between mothers' and daughters' AFDC/TANF use then fell precipitously afterwards to levels comparable to those in the early 1980s. The patterns are similar for a daughter's average welfare participation in adulthood. However, expanding the definition of daughter's welfare to include SNAP or SSI in addition to AFDC/TANF (mother's welfare remains defined by AFDC/TANF use), then we see a very different pattern. The intergenerational correlations for broader welfare participation are relatively constant after welfare reform much like we saw with incomes. These trends are suggestive that daughter's

[2] In order to ensure adequate sample sizes, the daughters' outcomes between ages 19-27 are measured retrospectively among all daughters who are ages 27 and 42. The daughters who formed their own family unit may be single or married, and thus income contains their own income and that of a spouse if present.

overall economic status, whether defined by income status or broad welfare participation, are closely tied to her mother's and did not improve after welfare reform.

B. Regression-Adjusted Intergenerational Welfare Correlations Before and After Reform

The correlations in Figure 2 have mother-daughter pairs crossing the pre- and post-welfare reform regimes (with several mothers participating before reform and daughters participating after), thus potentially confounding a mechanical effect of changing program access over generations and the behavioral effect of changing transmission after reform. Moreover, those correlations do not control for any covariates that influence a daughter's decision to participate in welfare as found in the standard welfare participation literature (Moffitt, 1992; Ziliak et al., 2000; Grogger, 2003; Bitler and Hoynes, 2016). To attempt to rule out the possibility that the mechanical effect of the reform is the primary driver of the declining AFDC/TANF correlation, and to control for potential confounders in the daughter's participation decision, we estimate the intergenerational correlation by constructing a sample of mother-daughter pairs who are observed solely in one welfare regime or the other. Presumably, if the within-regime mother-daughter correlation is the same before and after reform, then the decline in AFDC/TANF participation in Figure 2B likely captures changes in the baseline probability of welfare participation.

Let *r* indicate whether the mother-daughter pair *i* in state *s* is observed pre-reform or post-reform, the timing of which is determined by the earliest date that the daughter's or mother's state either implements a welfare waiver during the period 1992-1996, or TANF in 1997. Rather than estimating the correlation by year as in equation (1), we now estimate the correlation coefficient by regime *r* as follows:

$$y_{isr}^{d} = \alpha_r + \delta_r y_{isr}^{m} + \beta_r' \boldsymbol{x}_{isr}^{d} + \mu_{sr}^{m} + \mu_{sr}^{d} + \nu_{isr}^{d}, \quad (2)$$

where y_{isr}^{d} measures daughter's welfare participation during regime *r*; y_{isr}^{m} measures mother's participation during regime *r*; $\boldsymbol{x}_{isr}^{d}$ is a vector of control variables that includes exogenous demographic characteristics of the daughter, as well as state-level policy and labor-market variables in the daughter's state of residence; and, v_{isr}^{d} is the error term.[3] The state effects μ_{sr}^{m} and μ_{sr}^{d} control for permanent differences in mother's and daughter's states such as policy environments and natural endowments that affect economic opportunities.[4]

[Table 1 here]

As a starting point for our investigation, in Table 1 we present estimates of the regime-specific intergenerational correlation coefficient, δ_r, estimated from eight variants of equation (2). The first four

[3] The control variables are individual averages of mother's age, quadratics in mother's age, and state-level controls for the daughter's AFDC/TANF benefit standard, maximum federal/state EITC, poverty rate, unemployment rate, and AFDC/TANF recipiency rate. Our dates for the implementation of welfare reform are based on Crouse (1999).

[4] Mother's state effect is based on the modal state where the mother resided when the daughter was aged 12-18. If mothers and daughters always co-reside in the same state, then it is not possible to separately identify the mother and daughter state fixed effects.

columns are for daughter's AFDC/TANF participation and the last four columns are for AFDC/TANF, SNAP or SSI participation. For these welfare program outcomes, we consider a daughter's average welfare participation during ages 19-27. In order to compare welfare exposure in childhood to ongoing dependence in adulthood, the average participation measure provides a more meaningful interpretation for the parameter of interest.[5] We measure the mother's AFDC/TANF participation as an indicator for any welfare exposure when the daughter is between the ages of 12-18, the typical age for measuring exposure in the literature. For the pre-reform regime, we use only daughter observations before she or her mother experienced welfare reform, and for the post-reform regime, we use daughters whose entire critical exposure period from age 12 onward is after reform.[6] In columns (3)-(4) and (7)-(8) we also present results of a version that puts the same weight on bigger and smaller families, which is achieved by weighting inversely by the number of daughters for a given mother.

In the first two columns of Table 1, the estimate of the correlation of mother's AFDC participation is 0.210 before the reform, and 0.078 after.[7] These results suggest that if the daughter's mother participated in AFDC, then the daughter is 21 percentage points more likely to participate before the reform, but only about 8 percentage points more likely after reform. For the AFDC/TANF models, there is clear evidence of a decline in the intergenerational correlation in the post-welfare reform period. The effect of the reform implies a reduction of about 0.13 points in the correlation coefficient, or a 63 percent reduction in levels, both of which are significantly different from zero at standard levels of significance. We also see that the change of the correlation coefficient is similar when we compare results that weight differentially by number of daughters. On the other hand, when we expand the definition of welfare to include food and disability assistance, the correlations remain unchanged by welfare regime.

[Figure 3 here]

Figure 3 presents robustness checks on the estimates from Table 1 by considering 64 different variations of equation (2), defined for participation in AFDC/TANF and in the broader safety net. The figure presents point estimates and their associated 95-percent confidence intervals. In panel A, we measure welfare participation as the average participation during a daughter's observation window, and in

[5] Note that the trends in Figure 2B follow similar patterns for daughter's welfare defined as any participation compared to average participation. Reform might be expected to have smaller effects on a daughter's extensive margin welfare participation decision over a period of time relative to intensive margin decisions from year to year.
[6] Moreover, we employ roughly 15 years of data within each regime. Since welfare reform was complete by 1997 (full-year implementation by 1998) and our data continue through 2012, the before-reform regime observations starts in 1985.
[7] In these samples within welfare regime, identification relies on 274 mothers who participated in welfare in the before period out of 867 mothers total, and 66 out of 401 mothers who participated in the after period. Because the sample includes siblings, the corresponding numbers of daughters are 397 whose mothers participated in AFDC out of 1254 daughters pre-reform, and 83 daughters whose mothers participated in TANF out of 476 post-reform.

panel B, we measure welfare participation as an indicator variable for whether the daughter participated in welfare at any time during her observation window. Within each panel, we make samples comparable in age distributions and estimate equation (2) considering the same observation window for all mothers and daughters. We restrict the samples of daughters to ages 19-27, which is consistent with estimates shown in Table 1 and Figure 2. In order to clearly distinguish between generations, we show results defining the daughter's critical welfare exposure years at home alternatively as ages 12-18 and 12-16; however, all of our welfare participation definitions throughout distinguish teenage parents living at home from potential first-generation welfare receipt. Finally, the last 16 variants of the model in each panel present results that reweight the sample based on the number of daughters for a given mother.

Figure 3 provides a clear visual description of the changes in the intergenerational correlation of welfare participation after reform. Consistent with the results in Table 1 and Figure 2B, we see a decline in the intergenerational correlation in AFDC/TANF, and this finding is robust to using alternative welfare definitions (average or any), observations windows of daughter critical ages (12-16 or 12-18), and weighting schemes (sample weights alone or adjusted inversely by number of daughters). The results are not significantly affected by the critical exposure window, which might not be surprising since our definition considers a daughter as an adult at first childbirth or when establishing a new family unit if she is at least age 14. Moreover, we continue to uncover a different pattern when we augment the definition of daughter's welfare to include SNAP or SSI in addition to AFDC/TANF.

While Table 1 and Figure 3 present descriptive correlations only, they do provide suggestive evidence that the decline in the intergenerational correlation in AFDC/TANF is not solely a mechanical artifact of falling cross-sectional participation. On the other hand, we cannot rule out that the decline of the intergenerational correlation in AFDC/TANF could be associated with changes in the characteristics of families after reform. For instance, the average mother who participates in welfare has fewer children and is more educated after reform, suggesting that mothers who participated before and after the reform could share different backgrounds and experiences (see Table S.1-3 in the online supplement). It is clear, however, that these changes are part of a secular trend, as mothers who did not participate in welfare in the period after also have fewer children and have higher educational attainment.[8]

[Table 2 here]

A way to evaluate whether these changes in the composition of families affect the correlations in Table 1 is to estimate equation (2) for different subsets of mother-daughter pairs who share similar educational attainment and family income before and after the reform. Table 2 presents intergenerational correlations similar to Table 1, but now we compare results for daughters with mothers who have high

[8] In the online supplement, we show that nonparticipants made bigger improvements in educational attainment than participants.

school education or less (panel A) or any prior income below 100 percent of poverty (panel B). Following Table 1, we show results for mother's participation during the daughter's critical exposure period of 12-18 years of age, with and without weights to accommodate different family sizes. Interestingly, we observe in columns (1) and (2) of Table 2 larger changes after reform for a daughter whose mother had a high school education or less relative to the after-reform estimates in Table 1. Qualitatively, we also observe a decline in participation in the broader safety net, although the changes are statistically insignificant. When results are obtained by considering a low-income subsample of mothers instead of the lower-education sample, the intergenerational correlation coefficient estimates are smaller pre-reform and larger post-reform, yet the percent change in AFDC/TANF is still over 50 percent.

[Table 3 here]

An important takeaway from the cross-sectional evidence is that AFDC/TANF intergenerational correlations decreased after reform, while SNAP and SSI did not, but this decline in AFDC/TANF generational ties is not mainly associated with changes in the baseline participation or changes in the composition of families after reform. The result, however, can be interpreted in connection to a previous literature that has focused on program substitution in the post-reform era (see, e.g., Garrett and Glied, 2000; Schmidt and Sevak, 2004), although our analysis differs from these studies since we examine intergenerational outcomes. If welfare use did not improve the economic well-being of daughters who grew up on welfare, as Figure 2 seems to suggest, it is natural to expect that daughters switched programs and remained on assistance after reform. Using the sample in Table 1, we examine this hypothesis by presenting the distribution of daughters participating in different welfare programs in Table 3, which compares estimates by mothers' AFDC/TANF participation pre- and post-reform as well as by daughters' educational attainment. While the analysis in Table 3 does not identify mechanisms, several interesting findings emerge: (i) welfare use overall increases after reform (as shown in column (8)); (ii) about 6 percent of daughters who did not grow up on welfare participate in only SNAP or SSI before the reform, while this proportion increases to roughly 22 percent after reform (columns (1) and (2)); (iii) among daughters whose mothers participated in AFDC/TANF, over 35 percent of the increase in SNAP or SSI participation is associated with the reduction of AFDC/TANF participation after reform; and (iv) daughters who grew up on AFDC/TANF and have high school education or less participate much more in the wider safety net while more-educated daughters also increase SNAP or SSI participation largely by substituting programs over generations. Evidence of program substitution shown in Table 3 corresponds to findings in the careful qualitative studies of welfare by Edin and Lein (1997), DeParle (2004), and Halpern-Meekin et al. (2015) that suggest that mothers could inform their adult daughters that certain program benefits are no longer worth the cost of participation (e.g., TANF) while others are (e.g., SNAP).

Although the evidence suggests clear changes in the intergenerational correlation of

AFDC/TANF participation, we remain cautious about interpreting causal welfare transmission effects for several reasons. The within-regime, cross-sectional approach ignores selection bias, that is, the possibility that welfare participation of daughters and mothers are determined by common latent factors associated with persistence of income levels across generations. This endogenous selection can affect both the magnitude of the correlation and the interpretation of whether it reflects a poverty trap or welfare trap. Moreover, the models estimated in Tables 1 and 2 do not directly accommodate non-random misclassification of mother's and daughter's welfare participation, which is a threat to identification that is fundamentally different from traditional measurement error. Another limitation of estimating equation (2) as in Tables 1 and 2 is that it is difficult to control for year effects, which is of fundamental importance given the significant decrease after reform in the probability of participating in AFDC/TANF. Lastly, the aggregation of variables creates additional challenges on inference, including addressing the possibility of clusters. We simultaneously address these issues in the next section by exploiting the panel aspect of the PSID and using repeated observations for daughters.

IV. Identifying Intergenerational Welfare Transmission Pre- and Post-Reform

The framework we employ to causally identify welfare transmission across generations is the dynastic family decision-making model of Becker and Tomes (1979, 1986). In this model, the parent has weighted altruistic preferences over the income of their child along with their own consumption, and allocates lifetime resources toward own consumption and investment in the child. The child's human capital investment likely involves development of both cognitive and noncognitive skills, each of which can influence poverty and welfare status in the next generation (Heckman, Stixrud, and Urzua, 2006). With standard assumptions on the human capital technology, the canonical statistical model involves regressing the outcome of interest of the child on the corresponding outcome of the parent, similar to equations (1) and (2). This model has been used in scores of papers on intergenerational transmission of economic status, whether it is earnings, education, health, income, wealth, or in our case, welfare participation (see Black and Devereux, 2011).

The preliminary evidence presented in Section III suggests a structural break in AFDC/TANF participation starting during the waiver era. This implies a modification to equation (2) for the two regimes in that we now allow for multiple observations per daughter as follows:

$$y_{ist}^{d} = \alpha + \delta y_{is,\forall j<t}^{m} + \gamma R_{st}^{m} + \theta R_{st}^{m} y_{is,\forall j<t}^{m} + \beta' \boldsymbol{x}_{ist}^{d} + \mu_{s}^{m} + \mu_{s}^{d} + \kappa_{t}^{d} + v_{ist}^{d}, \quad (3)$$

where y_{ist}^{d} is a variable that indicates whether the daughter participates in welfare in adult year *t*, $\boldsymbol{x}_{ist}^{d}$ is a vector of control variables, μ_{s}^{m} and μ_{s}^{d} are state fixed effects, κ_{t}^{d} are year fixed effects to control for common shocks that affect all daughters in a given year, and v_{ist}^{d} is the error term. The generalization of equation (2) presented in equation (3) includes two distinct features. Consistent with a difference-in-difference type framework, we include R_{st}^{m} as an indicator variable that takes a value of 1 when the state

of residence of the mother implements welfare reform, and 0 otherwise. This introduces an intercept shift in the daughter's welfare participation after reform. Moreover, we define mother's participation as $y^{m}_{is,\forall j<t}$, indicating whether the mother participates in welfare during daughter's childhood or in any prior period $j = 1, \ldots, t-1$ during daughter's adulthood. Naturally, for many families, $y^{m}_{is,\forall j<t}$ is determined by mother's participation during daughter's childhood, as in equation (2). However, now we allow that mothers might influence adult daughters beyond childhood. This important change accommodates the situation where the mother joins welfare after the daughter becomes an adult because of younger children present in the family, and thus, allows for verbal transmission of program-specific information between mother and adult daughter. Once the mother participates, the $y^{m}_{is,\forall j<t}$ variable remains on for each subsequent observation. The use of any prior welfare for the mother serves two purposes: first, it implies that once the mother participates in welfare it cannot be "unlearned" by the daughter; and second, the any-prior measure captures a longer window and thus attenuates potential measurement error.

In equation (3), δ is the intergenerational effect of the mother's AFDC/TANF participation, and $\delta + \theta$ is the effect after welfare reform. This specification is akin to a difference-in-difference model whereby we exploit the quasi-experimental variation induced by the fact that different states adopted welfare reform at different times starting in the early 1990s.[9] That is, the indicator R^{m}_{st} turns on when state *s* implements a waiver and remains on thereafter. By adopting this functional form, we implicitly assume that the TANF program implemented after PRWORA is a continuation of the reforms begun during the waiver period for those states that were early adopters of reform.[10] If welfare reform succeeded in reducing AFDC/TANF transmission across generations, then we expect that $\theta < 0$. We next discuss two key threats to identification of the transmission parameters.

A. Selection Bias

The quasi-experimental design of using cross-state variation over time in adoption of welfare reform permits us to separate the pre- and post-reform eras, but within the AFDC and TANF eras there still remains a possible convolution of whether transmission reflects a poverty trap or a welfare trap. In the Becker-Tomes framework, a poverty trap can arise if the mother is endowed with low human capital, which translates into weak labor force attachment and her poverty status limits opportunities to invest in her daughter's human capital. This low investment in human capital then perpetuates the cycle of poverty

[9] Ziliak et al. (2000) show that a state's decision to apply for an AFDC waiver was not an endogenous response to caseload size, which supports the use of the waiver reform period as identifying variation for welfare participation. See online supplement Section S.6 for further evidence, which includes robustness to the definition of reform timing (Table S.6-4), correlations of time-varying state policies and reform timing (Table S.6-5), or the randomness of trends around the timing of reform (Table S.6-6).

[10] This has been a standard assumption in the welfare reform literature, though in some cases researchers allow a trend break between the waiver era and TANF era (Blank, 2002). When we include additional controls for welfare reform characteristics in the baseline specification, our transmission estimates are qualitatively unaffected.

and need for assistance. Alternatively, a welfare trap can arise if the mother's welfare receipt directly affects the daughter's human capital (inclusive of program knowledge or social norms), and thus the daughter's take-up of assistance becomes a welfare dependence trap across generations (e.g., Lindbeck, Nyberg, and Weibull, 1999; Durlauf and Shaorshadze, 2014). There have been several efforts over the years to control for endogenous selection in intergenerational welfare participation. Solon et al. (1988) used pairs of sisters in order to control for shared family background, Antel (1992) adopted a version of Heckman's (1978) selection model, and Levine and Zimmerman (1996) used state welfare generosity and county unemployment rate variables as instruments for mother's welfare participation. Gottschalk (1996) addressed unobserved heterogeneity by modeling the event histories of daughters' and mothers' welfare use, and Dahl et al. (2014) used the random assignment of appellate-court judges as an instrumental variable to identify parent's disability participation on child's disability insurance claims.

Our approach to address possible endogenous selection within welfare regimes is to extend the prior point identification literature by exploiting variation in state benefit generosity across mother-daughter pairs during the critical exposure years. Specifically, we instrument for mother's welfare participation using the policy parameter defined by the state AFDC/TANF benefit standard, or maximum benefit guarantee. The AFDC/TANF benefit standard is set by state legislatures and varies across states, time, and family size. This policy variation speaks to the prospect of the welfare trap, since a higher AFDC/TANF benefit standard means that, all else equal, welfare is more attractive to the mother. To ensure that the policy instruments are most salient to the mother's welfare choice, we restrict the time period of the instruments by aggregating over values applicable to the mother when her daughter is in the critical exposure ages of 12-18 years old and not yet an independent adult. Note that because the models are estimated with the mother's modal state effects and daughter's state and year effects, as well as controls for the daughter's contemporaneous benefit policies, these instruments are demeaned variables by state and time, and therefore, they exploit exogenous transitory policy changes at the state level during a daughter's childhood.[11] These welfare policies while the daughter is young should have no effect on her subsequent welfare decisions in adulthood except via the welfare choice of her mother (Antel, 1992; Moffitt, 1992; Levine and Zimmerman, 1996).

We use two measures of welfare generosity for our instruments: the real average and maximum of the state-specific AFDC/TANF benefit standard for families of 2, 3, or 4 or more persons. In equation (3) both mother's welfare participation and its interaction with welfare reform are treated as endogenous, and thus the full set of instruments enter directly and interacted with the welfare reform indicator. Our

[11] Note that different mothers residing in the same state can be affected by different benefit levels. For instance, if a daughter is 12-18 in the years 1972-1978, then her mother will face a different AFDC benefit structure than a mother in the same state whose daughter is aged 12-18 in 1982-1988.

difference-in-difference-type results with continuous instrumental variables can be interpreted in the spirit of Local Instrumental Variables, that is, intergenerational transmission is identified based on low-income mothers whose welfare participation decisions are influenced by policy values (see online supplement Section S.5.4 for derivations and discussion).

[Figure 4 here]

To characterize the state-level program variation we exploit for model identification, in Figure 4 we show percent changes in real AFDC/TANF benefit standards for a family of four after partialling out state and time fixed effects. The box plots show the interquartile range and median, and the extremes indicate the 10th and 90th percentile of states each year with outliers shown by state abbreviations. Although the changes tend to be smaller in more recent years, there is considerable variation across states that does not disappear over time. We provide further evidence on the variation of the instruments in Sections S.1.3 and S.10 of the online supplement, such as a variance decomposition of the within- and between-state components as well as a version that incorporates state-year price indices to better capture local price differences.

B. Misclassification Bias

Misreporting of welfare is present both at the extensive participation margin and the intensive dollar margin, it pervades all social surveys, and has gotten worse over time (Meyer et al., 2015a,b). Misreports can be in the form of false negatives—the respondent states they do not receive assistance when in fact they do— and false positives—the respondent states they receive assistance when in fact they do not. Based on validation studies of food stamps and TANF, most misclassifications are false negatives (Bollinger and David, 1997; Meyer and Mittag, 2017). Because remedies for classification bias are not straightforward in the context of dichotomous variables, we consider several approaches.

First, evidence in Bollinger and David (2005) shows that false negative survey responses decrease with length of panel participation. Since in our sample (described in the online supplement) we follow mothers for at least 13 years on average and daughters for 24 years, correct reporting should be more prevalent than in a sample with short observation windows. Second, for right-hand-side mismeasurement of mother's participation, again recall that we measure if the mother participates in any prior year, which is likely to be less noisy than participation in any given period.[12] Third, for left-hand-side classification error, we consider parametric bias-corrections along the lines proposed in Bollinger and David (1997) and Hausman, Abrevaya, and Scott-Morton (1998). Specifically, the partial effect of mother's participation on daughter's participation from observed data is equal to

$$(4) \qquad \mathrm{P}\left(y_{ist}^{d}=1\middle|y_{is,\forall j<t}^{m}=1,\ \bullet\right)-\mathrm{P}\left(y_{ist}^{d}=1\middle|y_{is,\forall j<t}^{m}=0,\ \bullet\right)=(1-\tau_{0t}-\tau_{1t})(\delta+\theta R_{st}^{m}),$$

[12] The probability of ever misreporting tends to zero as the number of observations increases (see Section S.2 of the supplement).

where • represents other controls, τ_{0t} is the false positive reporting rate at time t, and τ_{1t} is the false negative reporting rate at time t. To implement this correction, we set the false positive rate to 0, and for the linear probability models we rescale all the right-hand-side variables in equation (3) by $(1 - \hat{\tau}_{1t})$, which is based on estimates of AFDC/TANF reporting rates in the PSID by Meyer et al. (2015b) as depicted in Table S.2-1 of the supplement. A convenient aspect of the proposed methodology is that it allows us to estimate models with endogenous variables using instrumental variables. This is an important innovation because, as discussed in the previous section, selection is likely to create biased estimates of the effect of welfare reform on the transmission parameter. Section S.2 of the supplement includes further development of the misclassification model.

V. Estimates of Welfare Reform on Intergenerational Transmission

In presenting the empirical results, we first advance the descriptive analysis presented in Table 1 by correcting for the influence of nonrandom selection and misclassification error on AFDC/TANF participation, and then expand the outcomes to include participation in additional transfer programs. All models control for daughter's age, age squared, mother's average age and its square during her potential welfare observation years. In addition, we include contemporaneous time-varying policy and economic controls for the daughter's state of residence, including the AFDC/TANF benefit standard, Earned Income Tax Credit (EITC) federal/state maximum credit, Supplemental Poverty Measure (SPM) poverty rate, AFDC/TANF recipiency rate, and unemployment rate. We also include mother's modal state effects when the daughter was aged 12-18, daughter's current state effects, and year effects. The standard errors are robust to heteroscedasticity and clustered at the daughter's state level.[13] The number of mother-daughter pairs used in this section are much larger than in Table 1 because we now permit the pairs to cross welfare regimes and include daughter observations at different age profiles and life circumstances.[14]

A. Baseline Estimates

The first four columns of Table 4 contain the baseline estimates of the parameters of interest in equation (3), with and without instrumental variables and corrections for misclassification of the dependent variable. The OLS estimate in column (1) is 0.145, which is smaller, as expected, than the estimate of 0.210 presented in column (1) in Table 1 obtained from a sample restricted to younger daughters. These differences, however, do not lead to meaningfully different percentage changes after reform (-69 percent and -63 percent). The IV estimate of the effect of mother's AFDC participation prior to welfare reform in column (2) is 0.268 (s.e. = 0.049), meaning that if the daughter's mother previously

[13] If we instead cluster using mother's modal state, the standard errors are similar to those reported in the next section. The change has no effect on claims of statistical significance of parameter estimates.
[14] This expanded sample improves inference, but as demonstrated in the online supplement, the point estimates are qualitatively similar if we do not allow welfare-regime crossing.

participated in AFDC, then the daughter is 27 percentage points more likely to participate as an adult.[15] This estimate, which corrects for correlated unobservables between mother and daughter, is economically large and nearly double the OLS estimate in column (1), but is within the range of estimates among studies from that era surveyed in Page (2004). That correlation falls 68 percent after welfare reform to 0.085 (=0.268-0.183). This suggests changes in the probability of AFDC/TANF participation that are similar in magnitude to the descriptive results obtained in Table 1. To put this percent change in context, welfare transmission effects estimated in column (2) correspond to a 44 percent reduction in intergenerational participation if rescaled over baseline participation rates by reform period.[16] The after-welfare reform variable has a positive coefficient, suggesting that, conditional on year effects, in the absence of welfare reform the trend increase in intergenerational AFDC/TANF transmission would have continued.[17] We note, however, that dropping year effects results in a negative coefficient, which aligns with priors based on Figure 1.[18]

[Table 4 here]

While our baseline estimates address misclassification of the mother's welfare participation by design (longer panels measuring any prior participation), they do not directly address the possibility of a binary mismeasured dependent variable. Columns (3) and (4) in Table 4 show the baseline estimates with misclassification bias corrections. As expected, the estimates are larger than those with no correction in columns (1) and (2), and indeed the corrected estimates without instruments in column (3) are on par with the uncorrected IV estimates in column (2). The IV estimates in column (4) suggest that the transmission from mother to daughter is stronger in the pre-reform AFDC period after adjusting for misclassification, but the post-reform reduction is still a large and statistically significant 51 percent. In the middle of Table 4, we present standard tests of instrument strength and exogeneity. The null hypothesis of weak instruments is strongly rejected using the Kleibergen-Paap (2006) rank test, while the Hansen J-test of valid overidentifying restrictions is not rejected.[19]

Given that the baseline AFDC/TANF transmission effect fell two-thirds after reform, the

[15] Since the PSID survey years switch to biennial interviewing after 1997, our data on welfare participation includes both responses for the prior observation year (T-1) and, after 1997, for the two-year retrospective (T-2). See the online supplement for results on the sensitivity to T-2 retrospective sample.

[16] The change over the baseline is defined as $(a/b) - 1$, where a is the post-reform effect $(\hat{\delta} + \hat{\theta})$ rescaled by the average post-reform participation rate, and b is the pre-reform effect $(\hat{\delta})$ rescaled by the average participation over the whole period. See Section S.3 of the supplement for a detailed discussion on interpreting changes after reform.

[17] There is the possibility that the positive coefficient reflects positive entry effects onto welfare among previous nonparticipants as they seek out employment and training (Moffitt, 1996). While some states did offer employment and training as part of their welfare reforms, most adopted a "work first" strategy.

[18] Online supplement Figure S.3-1 shows that year effects in a model for AFDC/TANF participation are negative and decrease after reform, while year effects for SNAP or SSI participation are positive and increasing, as expected.

[19] In Section S.5 of the supplement, we subject the baseline IV estimates to a number of specification checks, and we present the first-stage estimates of the effect of the instruments on the mother's participation decision.

estimates in columns (2) and (4) suggest that one-half or more of the decline in daughters' TANF participation after welfare reform comes from reduced generational transmission on that program.[20] Thus, while restricted access to the program for the daughters is a candidate explanation for some of the cross-sectional decline in participation, the evidence in Table 4 indicates that the behavior of daughters whose mothers participated in AFDC/TANF changed after reform, and this reduced transmission channel was sizable. These behavioral responses could include reduced entry or reentry to the program, which is consistent with the evidence in Grogger, Haider, and Klerman (2003) that shows that the declining cross-sectional participation stemmed more from reduced entry onto welfare than from increased exits.

In all variants of equation (3) estimated in the first four columns of Table 4, we find that the OLS estimate of mother's participation is smaller than the IV estimate, a result that is consistent with other papers in the literature (see, e.g., Dahl et al., 2014). Generally, the OLS estimate can be different from the IV estimate for, at least, three reasons: selection bias, heterogeneous effects, and measurement error. In our setting, it is difficult a priori to predict the sign of the bias of OLS. For instance, we may expect upward-biased OLS estimates under the assumption that unobservables are positively correlated over generations. However, the effects could be heterogeneous, too. Our sample includes a subpopulation of mothers who are not likely to be affected by the instruments because their family income is above the federal poverty line over the entire period of analysis. As our models control for both selection bias and misclassification error, based on the results shown in the online supplement to this paper, we conclude that the difference between IV and OLS estimates are likely attributed to heterogeneous effects.[21]

Even if welfare reform reduced the transmission of AFDC/TANF participation, a relevant policy question is the extent to which reform affects the intergenerational transmission of welfare participation defined more generally. In columns (5)-(8) of Table 4, we examine the effect of mother's AFDC/TANF participation and welfare reform on the daughter's decision to participate in AFDC/TANF, SNAP, or SSI. The specifications exactly parallel those in columns (1)-(4) and include the same regressors and state and year fixed effects. The estimates in columns (5)-(8) show that the magnitude of intergenerational transmission is very similar prior to welfare reform—mother's use of AFDC/TANF increased the odds of the daughter using welfare, food, or disability assistance in adulthood by 23 to 37 percentage points. But

[20] Following the decomposition shown in Section S.3.3 of the supplement, we find that at least one-half of the cross-sectional decline in participation comes from reduced transmission from mother to daughter.

[21] Section S.5.4 of the online supplement shows, as expected, that low-income mothers exposed to higher AFDC/TANF benefits were more likely to participate in welfare. Moreover, IV estimates are increasing for subsamples in which the mother is ever below low percentages of the federal poverty line, yet the OLS estimates are relatively flat across these groups of mothers who are marginally more likely to receive welfare.

this is where the similarity ends as we find no evidence that this transmission channel was changed after welfare reform.[22]

B. Robustness

While our baseline results address selection and misclassification, in this subsection we explore four possible sources of misspecification in equation (3), and we note several other robustness checks available in the online supplement.

B.1. Pre-existing and State-specific Trends

We begin by investigating whether latent trends or other confounders drive identification of the parameter of interest. To this end, we extend equation (3) using a generalized difference-in-difference-type model and estimate transmission effects by years before and after reform. In Figure 5, we plot OLS and IV estimates of the mother's participation effect interacted with years relative to reform, and we also show results of our IV model first with state trends and then with both linear and quadratic state trends.[23] There are three main findings. First, the impact of welfare reform is clear given the absence of pre-trend effects followed by a distinct drop in AFDC/TANF transmission after the implementation of reform. The OLS and IV estimates for the pre-reform years are not significantly different from zero and seem to fluctuate around the flat dashed line. In contrast, we find a significant shift in AFDC/TANF participation within the first years after reform, and the effect of reform does not diminish over time (see panel A). Second, the mother's effect on a daughter's participation in the broader safety net is no different after reform (panel B). Third, the figure also shows that the point estimates in the baseline specification are robust to the inclusion of state-specific trends.

[Figure 5 here]

B.2. Life-Cycle Windows

A data constraint facing most intergenerational research is that full life cycles of daughters and mothers are generally not available, which could lead to two related forms of bias. One form of bias results from the fact that mothers and daughters are typically observed at different points of their life cycles. In the intergenerational income mobility literature, this is known as life-cycle bias (Jenkins, 1987; Haider and Solon, 2006; Lee and Solon, 2009; Nybom and Stuhler, 2016). A second form of bias, frequently referred to as the "window problem" in the welfare literature (Gottschalk, 1992, 1996; Wolfe et al., 1996; Page, 2004), occurs when the length of observation is too short for either, or perhaps both,

[22] In OLS results reported in supplement Table S.6-8 we obtain a similar result if we also define mother's participation as any cash, food, or disability assistance.

[23] The augmented models follow closely the discussion in Wolfers (2006), although an important difference is that we estimate the model using instrumental variables. In Table S.6-1 of the online supplement, we also investigated the sensitivity of the results shown in Table 4 to the inclusion of linear and quadratic state time trends.

generations. Our primary solution to the life-cycle bias and window problem is to utilize the much longer time series now available in the PSID compared to prior studies.

[Table 5 here]

We begin by showing the sensitivity of our previous results to restricting the window of observations by age to be the same for all mothers and daughters. By imposing this restriction, we ensure that within-generation differences in age do not drive the results. Table 5 shows estimates restricted to the observation window of the mother over ages 25 to 45, and of the daughter's adulthood up to age 27. The transmission effects are somewhat larger in magnitude compared to our baseline results, yet the percent reduction in transmission levels in column (2) is about 47 percent.

We next present estimates that implement a life-cycle age adjustment proposed by Lee and Solon (2009) in the context of income mobility. Specifically, we augment the model with a quartic in the average age of the mother during prior (to time *t*) periods of potential welfare participation, a quartic in the detrended daughter's current age, and the interactions between the quartic in daughter's detrended age and mother's participation as well as the indicator for mother's participation after welfare reform.[24] Because fertility rates among low-income women peak in their mid-20s, we detrend around daughter's age of 25. Comparing the OLS and IV estimates in columns (1) and (2) of Table 4 to columns (3) and (4) in Table 5, it is clear that the age adjustments do not influence the results qualitatively, and with only small quantitative differences in the pre-reform era and slightly larger attenuation (in absolute value) in the post-reform era.

B.3. Migration

Our models to this point have allowed for the possibility that daughters reside in a different state than their mothers and/or have moved to another state during adulthood. If such movements are an endogenous response to the welfare climate in the state, then this could lead to biased estimates of welfare reform and the transmission across generations. The evidence on whether there is endogenous internal migration in response to welfare generosity in the U.S. is mixed (Levine and Zimmerman, 1999; Gelbach, 2004; McKinnish, 2007), yet when effects are found, they are very small in magnitude. Also, Ziliak et al. (2000), as well as evidence in the online supplement, show that states' decisions to adopt waivers were not an endogenous response to the growing welfare caseload in the early 1990s. These findings suggest that state-level welfare policies like the maximum guarantee are exogenous to an individual's welfare choice.

[24] Note that the interactions with mother's welfare participation are endogenous in our setting, and therefore, in the IV model of column (4), we instrument the interaction variable using the detrended quartic in daughter's age times the average and maximum of mother's AFDC/TANF benefit standard when the daughter was living with the mother and she was between 12 and 18 years old, and we also use these instruments interacted with reform.

As a test on our baseline sample, we consider two alternatives to our model by restricting the sample of daughters to those who reside in the same state as their birth state, and those who never move during their observed lifetime. Columns (5)-(8) of Table 5 show that both the direct effect of mothers' participation and the interaction with welfare reform are larger in absolute value compared to estimates in Table 4, yet the changes are relatively proportional such that the percent reduction in levels of transmission after welfare reform is roughly the same.[25]

B.4. Attrition

It has been extensively documented that survey weights effectively address non-random sampling, although they may not fully correct for attrition.[26] In Section S.8 of the online supplement, we present results for samples that range from daughters who do not attrit (1,906 daughters) to the full sample of daughters with no condition on attrition behavior (2,961 daughters). We also show results for the full sample based on an estimator that uses inverse probability weighting in addition to survey weights. The baseline estimates are not sensitive to the proportion of daughters who are attriters, and there are only small differences between our baseline results and the results obtained by rescaling survey weights with inverse probability weights.

VI. Broader Impacts of Welfare Reform and Possible Explanations

We continue our investigation by evaluating possible mechanisms related to the main results. The evidence in this section suggests that the reform did not improve economic outcomes of daughters, which can explain the increased participation in the broader safety net. The evidence also suggests that the intergenerational transmission pathway is direct from mother's welfare to daughter's welfare, mainly by exposure during critical years, and to a lesser degree, by word-of-mouth transmission from adult mother to adult daughter. The reform appears to have dramatically affected the latter mechanism.[27]

A. Additional Socioeconomic Outcomes

In addition to reducing welfare participation, the architects of welfare reform aimed to improve the long-term socioeconomic outcomes of children. In Table 6, we present OLS and IV estimates of

[25] In results not shown here to save space, we also estimated the model by restricting the sample of daughters to those residing in the same state as their mothers. Notably, a comparison of estimates suggests that the magnitudes are larger in absolute value as we tighten the geographic link between mother and daughter, and are suggestive that the mobility of daughters across state lines can "undo" some of the intergenerational transmission of welfare.

[26] Fitzgerald, Gottschalk, and Moffitt (1998) suggest weights based on the inverse probability of responding to the survey, and to then use them in a second stage where parameters in the structural model are estimated (see also Wooldridge, 2007).

[27] As suggested by a reviewer, changes in the composition of welfare mothers could also be a potential mechanism. Using Figure S.5-4 in the online supplement, we investigate the effect of changes in the composition of families by re-estimating the model in column (2) of Table 4 by education and income of the mother, with and without inverse weighting by number of daughters per mother. Consistent with the cross-sectional evidence presented in Table 2 columns (1)-(4), the results suggest that changes in maternal composition do not appear to be a leading explanation for the change in the intergenerational transmission parameter.

equation (3) where we replace the dependent variable of daughter's welfare participation with indicators equal to 1 for (a) whether her family currently has zero earnings, (b) whether her current family earnings are below the poverty line, (c) whether the daughter is unmarried and non-cohabiting, and (d) whether the daughter moves to another state.[28] For these adult outcome estimates, we restrict the sample to only daughters at least 19 years old with non-missing data on earnings and marital status, and thus a slightly smaller sample than in Table 4. Here we find a consistent pattern that daughters exposed to welfare are at risk of worse outcomes in adulthood. The IV estimates suggest they are 14 percentage points more likely to have episodes of nonemployment compared to daughters not exposed, and 35 percentage points more likely to have earnings below poverty in a given year. Daughters whose mothers received AFDC/TANF are also 39 percentage points more likely to be unmarried/non-cohabiting, and 3 percentage points less likely to move. We extend the analysis of Table 6 to investigate if there is evidence of pre-existing trends in these other adult daughter outcomes, which we summarize in Figure 6. The figure shows estimates of the interaction between mother's participation in AFDC/TANF and after welfare reform. There is no evidence of pre-existing trends or reform effects in the post period for other daughter outcomes.

[Table 6 and Figure 6 here]

While the reform did not change adult outcomes typically related to welfare participation, we next consider the potential impact of the reform on two outcomes during daughters' teenage years. Following the format used in Table 6, the first four columns of Table 7 present OLS and IV estimates of equation (3) for (a) whether the daughter's educational attainment is less than or equal to high school, and (b) whether she had a child when she was a teenager. Daughters whose mothers participated in AFDC/TANF are 55 percentage points more likely to have lower educational attainment, and 72 percentage points more likely to have a child when aged 19 or under. Similar to the results presented in Table 6, however, welfare reform did not change these outcomes for daughters who grew up on AFDC/TANF assistance. Thus, the evidence in Tables 6 and 7, as well as in Figure 6, indicates that the 1996 reform to welfare did not substantively alter broader socio-economic outcomes for daughters either in adolescence or later in adulthood. We now turn our attention to early exposure and adult learning as possible mechanisms.

[Table 7 here]

B. Co-residency Exposure and Word of Mouth

If daughters' teen and later adult life outcomes are not affected by reform, the reduction of intergenerational AFDC/TANF dependence could be associated with changes in co-residence exposure or

[28] Cohabitation is difficult to measure, particularly with respect to consistency in terms of the definition. Before 1983, over 1 year cohabiting is included with marriage, and after 1983, the PSID separately identifies spouse with cohabiting spouse. Thus, our measure includes both marriage and cohabiting.

updating beliefs through learning as an adult. In the last columns of Table 7, we examine how the base-case IV estimates in Table 4 change if we restrict the daughter's potential welfare exposure to only periods of co-residence. Recall that in Table 4, the daughter could be influenced by her mother's welfare use at any time prior to the current period *t*, including when the daughter no longer lived at home but had younger siblings at home such that her mother was potentially welfare-eligible. In column (5) of Table 7, we find a larger pre-reform transmission effect and a proportional decrease after reform. Transmission falls 67 percent after welfare reform to 0.096 (=0.293-0.197), similar to the 68 percent decrease in column (2) of Table 4.

A daughter's exposure to welfare in periods of co-residence and her resulting propensity for dependence will likely vary as a function of her mother's duration of participation, or otherwise stated, her intensity of treatment exposure.[29] In order to investigate if the mother's effect varies by duration, we redefine a mother's welfare participation as greater than 1 year or greater than 5 years, and we re-estimate the model in column (5) for each variation. Columns (6) and (7) of Table 7 show the effects of a mother's welfare participation differentiated by short- and long-term welfare exposure. The IV estimates indicate, consistent with expectations, that the pre-reform transmission effect of long-term exposure on welfare during co-residency is larger than the effect of short-term exposure. Interestingly, the percent reduction in transmission after reform in column (7) is about 13 percent larger than in column (6), suggesting that the reform had a bigger impact on daughters with high intensity of AFDC/TANF exposure during co-residence. Effectively, welfare reform led to fairly similar levels of intergenerational transmission in the post-reform era such that long-term exposure is no different from short-term exposure relative to the daughter's probability of participation as an adult.[30]

Transmission can also occur via word-of-mouth from mother to daughter after the daughter has left home to form her own family unit. This channel can be associated with verbal transmission, as opposed to exposure during co-residence. As a further exploration of mechanisms, column (8) in Table 7 presents fixed-effects estimates of the welfare transmission.[31] Identification of the direct, pre-reform effect of mother's participation is subtle in the fixed-effects specification. If the mother joins welfare while the daughter co-resides then we cannot separate this from the fixed effect; however, if she joins welfare after the daughter leaves home, which can occur if the daughter has younger siblings still at home with the mother, then verbal transmission of the program can still occur and identify the parameters of

[29] Gottschalk and Moffitt (1994) propose measuring welfare dependence as the total time on welfare or the total percent of income from transfers, and Pepper (2000) models daughters' welfare outcomes depending on categorical definitions of mothers' duration in years.
[30] The transmission effect after reform is 0.091 (0.031) for short-term exposure and 0.107 (0.071) for long-term.
[31] The daughter fixed effect is likely to contain a component common to the daughter and the mother (including health status or attitudes), as well as that which is daughter-specific such as school quality and neighborhood.

interest. The direct effect of mother's transmission in column (8) of Table 7 is about 26 percent of the size of the estimate from column (2) of Table 4, suggesting that word-of-mouth transmission can still be sizable even after the daughter leaves home. Further, the reform effect on the word-of-mouth transmission mechanism implies a net negative influence on daughters' AFDC/TANF participation after reform of -5.5 percentage points (=0.071-0.126). Mothers with experience on welfare may actively discourage their daughters to take up TANF, consistent with Blank and Kovak's (2009) concept of "disconnected mothers" who are neither working nor receiving TANF assistance in the reform era. The fact that welfare reform eliminates word-of-mouth transmission and not co-resident exposure transmission suggests that reform may have affected the relative incentives for welfare program participation more than it addressed self-sufficiency, which may also help explain program switching from AFDC/TANF to SNAP or SSI.

VII. Conclusion

A focal aim of policymakers with the 1990s welfare reform was to end dependence on welfare. In addition to documenting the descriptive changes in welfare dependence across generations, we provide causal estimates of welfare transmission that imply daughters are about 27 to 43 percentage points more likely to participate if their mothers had participated in welfare. These estimates are larger than those found by Dahl et al. (2014), a prominent study of causal welfare transmission, yet our context is public assistance for mothers and daughters in the United States, whereas Dahl et al. examine disability insurance receipt in Norway. Viewed narrowly from the lens of participation in the AFDC/TANF program, we find strong evidence that the level of transmission from mother to daughter was reduced by at least one-half. Despite the statistical challenges we face in this work, one consistent interpretation of these results implies that when AFDC/TANF use fell precipitously after 1996, the reform had a differential impact on TANF participation among adult daughters who were exposed to welfare in their childhood from those who were not. This substantial reduction in the odds of participation suggests that at least one-half of the decline in daughters' cross-sectional TANF participation after welfare reform comes from reduced transmission on that program. This result seems to be associated with, at least, two possible non-exclusive channels: the reform changed incentives making family experience with cash welfare less influential, and it eliminated word-of-mouth knowledge spillovers across generations.

Beyond participation in AFDC/TANF, however, the 1996 welfare reform did not alter the generational economic bonds between mother and daughter. Our findings suggest that welfare reform did not change the transmission of participation in the wider safety net including food and disability assistance, nor did it alter the ties between mothers' welfare use and daughters' later life outcomes of human capital or labor market success. These results expand on previous null effects of welfare reform on intragenerational economic outcomes (Blank, 2002; Moffitt, 2003; Ziliak, 2016). At first blush, this lack of effect on economic success seems surprising given the scale and scope of reform. However, the TANF

program is substantially less target-efficient and does not entail much investment in long-term economic self-sufficiency. A potential consequence is the stagnating mobility of daughters. Daughters were no better off in broader economic status, which contributed to the intergenerational substitution of programs and increasing welfare use in the wider safety net in the period after reform.

We conclude by noting that the socially efficient intergenerational correlation of welfare outcomes is not obvious. In some cases, there may be positive attributes to intergenerational transmission of welfare knowledge if take-up rates are low and learning the welfare system helps needy recipients (Currie, 2006). This suggests a need for future theoretical and empirical research on optimal transfer program design that incorporates knowledge spillovers across generations.

REFERENCES

Antel, J.J. (1992): "The intergenerational transfer of welfare dependency: Some statistical evidence," *Review of Economics and Statistics*, 74, 467–473.

Becker, G.S., and N. Tomes (1979): "An equilibrium theory of the distribution of income and intergenerational mobility," *Journal of Political Economy*, 87, 1153–1189.

——— (1986): "Human capital and the rise and fall of families," *Journal of Labor Economics*, 4, S1–39.

Bitler, M, and H. Hoynes (2016): "The more things change, the more they stay the same: The safety net and poverty in the Great Recession," *Journal of Labor Economics*, 34, S403–S444.

Black, S.E., and P.J. Devereux (2011): "Recent developments in intergenerational mobility," in *Handbook of Labor Economics*, vol. 4, O. Ashenfelter and D. Card (eds.), North Holland, 1487–1541.

Blank, R. (2002): "Evaluating welfare reform in the United States," *Journal of Economic Literature*, 40, 1105–1166.

Blank, R., and B.K. Kovak (2009): "The growing problem of disconnected single mothers," in *Making the Work-Based Safety Net Work Better*, C.J. Heinrich and J.K. Scholz (eds.), New York: Russell Sage, 227–258.

Bollinger, C., and M. David (1997): "Modeling discrete choice with response error: Food stamp participation," *Journal of the American Statistical Association*, 92, 827–835.

——— (2005): "I didn't tell, and I won't tell: Dynamic response error in the SIPP," *Journal of Applied Econometrics*, 20, 563–569.

Cancian, M., and D. Reed (2009): "Family structure, childbearing, and parental employment: Implications for the level and trend in poverty," in *Changing Poverty, Changing Policies,* M. Cancian and S. Danziger, (eds.), New York: Russell Sage Foundation, 92–121.

Chetty, R., D. Grusky, M. Hell, N. Hendren, R. Manduca, and J. Narang (2017): "The fading American dream: Trends in absolute income mobility since 1940," *Science*, 356, 398–406.

Crouse, G. (1999): "State implementation of major changes to welfare policies, 1992-1998," Technical document, U.S. Department of Health and Human Services.

Currie, J. (2006): "The take up of social benefits," in *Public Policy and the Income Distribution*, A. Auerbach, D. Card, and J.M. Quigley (eds.), New York: Russell Sage, 80–148.

Dahl, G.B., A.R. Kostøl, and M. Mogstad (2014): "Family welfare cultures," *Quarterly Journal of Economics*, 129, 1711–1752.

DeParle, J. (2004): *American Dream: Three Women, Ten Kids, and a Nation's Drive to End Welfare*. New York: Penguin Books.

Duncan, G.J., M.S. Hill, and S.D. Hoffman (1988): "Welfare dependence within and across generations," *Science*, 239, 467–471.

Durlauf, S.N., and I. Shaorshadze (2014): "Intergenerational mobility," in *Emerging Trends in the Social and Behavioral Sciences*, R.A. Scott and S.M. Kosslyn (eds.), Sage Publishing, 505–537.

Edin, K., and L. Lein (1997): *Making Ends Meet: How Single Mothers Survive Welfare and Low-Wage Work.* New York, NY: Russell Sage Foundation.

Fitzgerald, J.M., P.T. Gottschalk, and R.A. Moffitt (1998): "An analysis of sample attrition in panel data: The Michigan Panel Study of Income Dynamics," *Journal of Human Resources*, 33, 251–299.

Ganong, P., and J.B. Liebman (2018): "The decline, rebound, and further rise in SNAP enrollment: Disentangling business cycle fluctuations and policy changes," *AEJ: Economic Policy*, 10, 153–176.

Garrett, B. and S. Glied (2000): "Does state AFDC generosity affect child SSI participation?" *Journal of Policy Analysis and Management*, 19, 275–295.

Gelbach, J. (2004): "Migration, the life cycle, and state benefits: How low in the bottom?" *Journal of Political Economy*, 112, 1091–1130.

Gottschalk, P.T. (1992): "The intergenerational transmission of welfare participation: Facts and possible causes," *Journal of Policy Analysis and Management*, 11, 254–272.

——— (1996): "Is the correlation in welfare participation across generations spurious?" *Journal of Public Economics*, 63, 1–25.

Gottschalk, P.T., and R.A. Moffitt (1994): "Welfare dependence: Concepts, measures, and trends," *American Economic Review: Papers and Proceedings*, 84, 38–42.

Grogger, J. (2003): "The effects of time limits, the EITC, and other policy changes on welfare use, work, and income among female-headed families," *Review of Economics and Statistics*, 85, 394–408.

Grogger, J., S.J. Haider, and J. Klerman (2003): "Why did the welfare rolls fall during the 1990s?" *American Economic Review: Papers and Proceedings*, 93, 288–292.

Grogger, J., and L.A. Karoly (2005): *Welfare Reform: Effects of a Decade of Change*. Cambridge, MA: Harvard University Press.

Haider, S.J., and G. Solon (2006): "Life-cycle variation in the association between current and lifetime earnings," *American Economic Review*, 96, 1308–1320.

Halpern-Meekin, S., K. Edin, L. Tach, and J. Sykes (2015): *It's Not Like I'm Poor: How Working Families Make Ends Meet in a Post-Welfare World.* Oakland, CA: University of California Press.

Haskins, R. (2007). *Work over Welfare: The Inside Story of the 1996 Welfare Reform Law*. Washington, DC: Brookings Institution Press.

Hausman, J.A., J. Abrevaya, and F. Scott-Morton (1998): "Misclassification of the dependent variable in a discrete-response setting," *Journal of Econometrics*, 87, 239–269.

Heckman, J.J. (1978): "Dummy endogenous variables in a simultaneous equation system," *Econometrica*, 46, 931–959.

Heckman, J.J., J. Stixrud, and S. Urzua (2006): "The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior," *Journal of Labor Economics*, 24, 411–482.

Jenkins, S. (1987): "Snapshots versus movies: 'Lifecycle biases' and the estimation of intergenerational earnings inheritance," *European Economic Review*, 31, 1149–1158.

Kleibergen, F., and R. Paap (2006): "Generalized reduced rank tests using the singular value decomposition," *Journal of Econometrics*, 133, 97–126.

Kreider, B., J.V. Pepper, C. Gundersen, and D. Jolliffe (2012): "Identifying the effects of SNAP (food stamps) on child health outcomes when participation is endogenous and misreported," *Journal of the American Statistical Association*, 107, 958–975.

Kubik, J. (1999): "Incentives for the identification and treatment of children with disabilities: The Supplemental Security Income program," *Journal of Public Economics*, 73, 187–215.

Lee, C., and G. Solon (2009): "Trends in intergenerational income mobility," *Review of Economics and Statistics*, 91, 766–772.

Levine, P.B. and D.J. Zimmerman (1996): "The intergenerational correlation in AFDC participation: Welfare trap or poverty trap?" Discussion paper, Univ. of Wisconsin Institute for Research on Poverty.

——— (1999): "An empirical analysis of the welfare magnet debate using the NLSY," *Journal of Population Economics*, 12, 391–409.

——— (2005): "Children's welfare exposure and subsequent development," *Journal of Public Economics*, 89, 31–56.

Lindbeck, A., S. Nyberg, and J. W. Weibull (1999): "Social norms and economic incentives in the welfare state," *Quarterly Journal of Economics*, 114, 1–35.

Mazumder, B. (2005): "Fortunate sons: New estimates of intergenerational mobility in the United States using Social Security earnings data," *Review of Economics and Statistics*, 87, 235–255.

McKinnish, T. (2007): "Cross-border welfare migration: New evidence from micro data," *Journal of Public Economics*, 91, 437–450.

Meyer, B., and N. Mittag (2017): "Misclassification in binary choice models," *Journal of Econometrics*, 200, 295-311.

Meyer, B., W. Mok, and J. Sullivan (2015a): "Household surveys in crisis," *Journal of Economic Perspectives*, 29, 199–226.

——— (2015b): "The under-reporting of transfers in household surveys: Its nature and consequences," NBER working paper 15181. Updated version June 2015.

Moffitt, R.A. (1992): "Incentive effects of the U.S. welfare system: A review," *Journal of Economic Literature*, 30, 1–61.

——— (1996): "The effect of employment and training programs on entry and exit from the welfare caseload," *Journal of Policy Analysis and Management*, 15, 32–50.

——— (2003): "Temporary Assistance for Needy Families," in *Means-Tested Transfer Programs in the United States*, R.A. Moffitt (ed.), Chicago: University of Chicago Press.

Murray, C. (1984). *Losing Ground: American Social Policy, 1950-1980*. New York: Basic Books.

Nybom, M., and J. Stuhler (2016): "Heterogeneous income profiles and life-cycle bias in intergenerational mobility estimation," *Journal of Human Resources*, 51, 239–268.

Page, M.E. (2004): "New evidence on the intergenerational correlation in welfare participation," in *Generational Income Mobility in North America and Europe*, Cambridge University Press, 226–244.

Pepper, J.V. (2000): "The intergenerational transmission of welfare receipt: A nonparametric bounds analysis," *Review of Economics and Statistics*, 82, 472–488.

Schmidt, L., and P. Sevak (2004): "AFDC, SSI, and welfare reform aggressiveness: Caseload reductions vs. caseload shifting," *Journal of Human Resources*, 39, 792–812.

Solon, G. (1992): "Intergenerational income mobility in the United States," *American Economic Review*, 82, 393–408.

——— (1999): "Intergenerational mobility in the labor market," in *Handbook of Labor Economics*, vol. 3A, O. Ashenfelter and D. Card (eds.), Amsterdam: North Holland, 1761–1800.

Solon, G., M. Corcoran, R. Gordon, and D. Laren (1988): "Sibling and intergenerational correlations in welfare program participation," *Journal of Human Resources*, 23, 388–396.

Wolfe, B.L., R. Haveman, D. Ginther, and C.B. An (1996): "The 'window problem' in studies of children's attainments" *Journal of the American Statistical Association*, 91, 970–982.

Wolfers, J. (2006): "Did unilateral divorce raise divorce rates? A reconciliation and new results," *American Economic Review*, 96, 1802–1820.

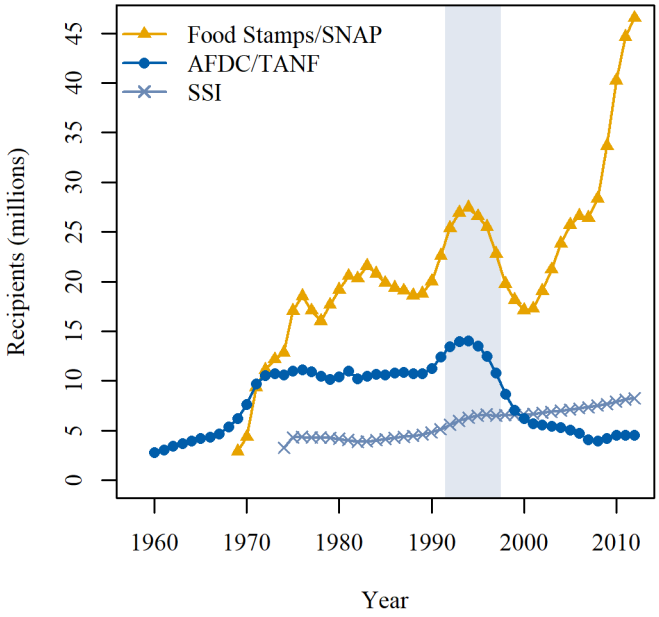
Wooldridge, J.M. (2007): "Inverse probability weighted m-estimation for general missing data problems," *Journal of Econometrics*, 141, 1281–1301.

Ziliak, J.P. (2015): "Why are so many Americans on food stamps? The role of the economy, policy, and demographics," in *SNAP Matters: How Food Stamps Affect Health and Well Being*, J. Bartfeld, C. Gundersen, T. Smeeding, and J.P. Ziliak (eds.), Stanford, CA: Stanford University Press, 18–48.

——— (2016): "Temporary Assistance for Needy Families," in *Economics of Means-Tested Transfer Programs in the United States*, vol. 1, R.A. Moffitt (ed.), University of Chicago Press.

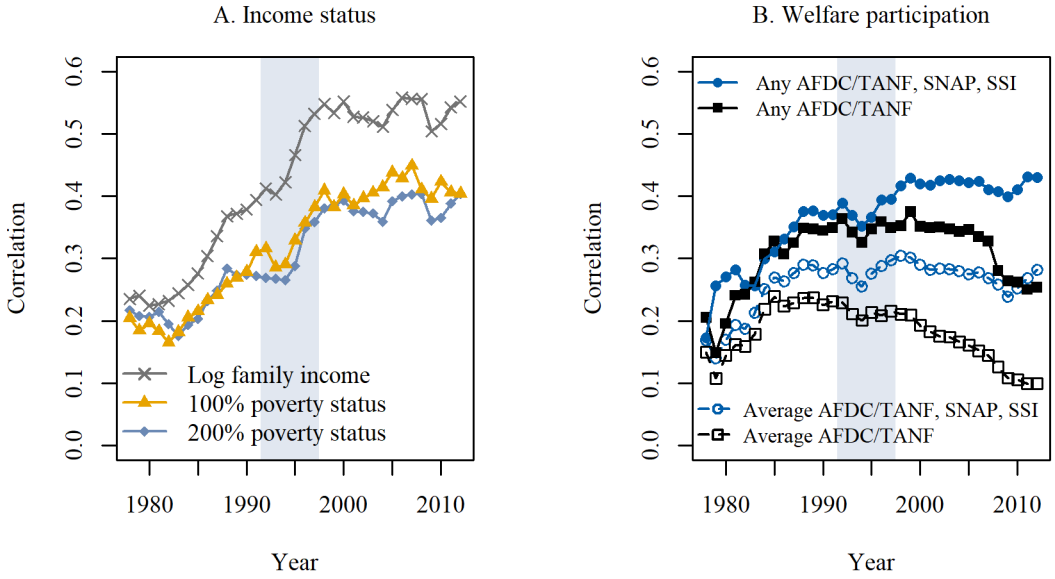
Ziliak, J.P., D. Figlio, E. Davis, and L. Connolly (2000): "Accounting for the decline in AFDC caseloads: Welfare reform or the economy?" *Journal of Human Resources*, 35, 570–586.

FIGURE 1. TRENDS IN AFDC/TANF, FOOD STAMP/SNAP, SSI RECIPIENTS



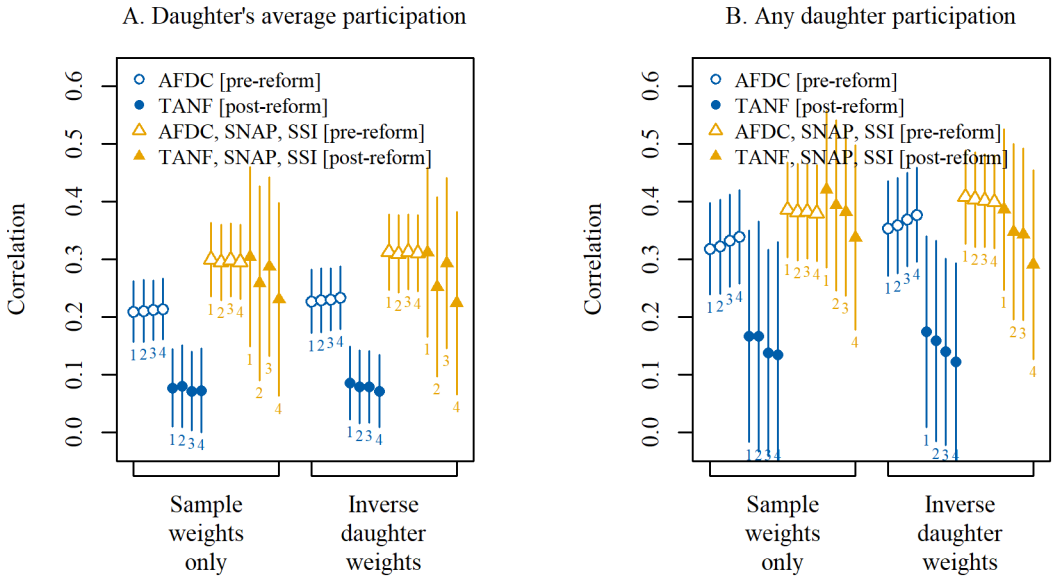
Notes: The welfare reform waiver period is indicated by the shaded region. Abbr.: Aid to Families with Dependent Children/Temporary Assistance for Needy Families, AFDC/TANF; Supplemental Nutrition Assistance Program, SNAP; and Supplemental Security Income, SSI. Authors' tabulations of data collected from the Departments of Health and Human Services, Agriculture, and the Social Security Administration.

FIGURE 2. TRENDS IN INTERGENERATIONAL CORRELATIONS OF INCOME STATUS AND WELFARE PARTICIPATION



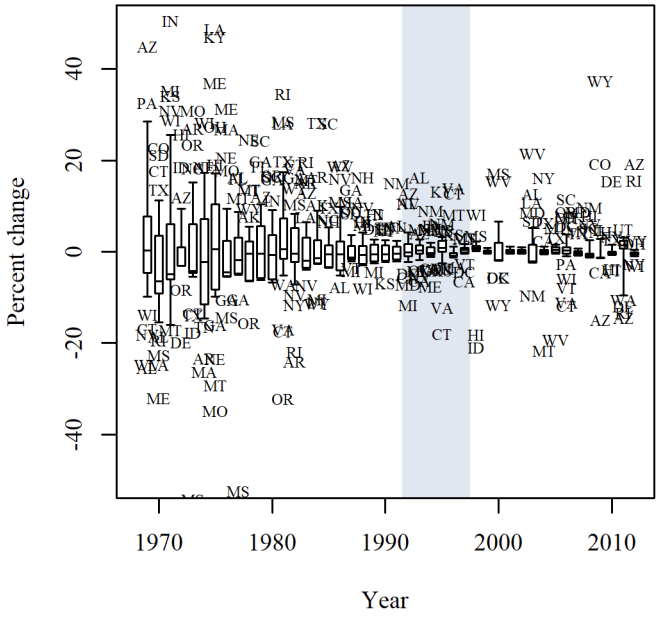
Notes: The welfare reform waiver period is indicated by the shaded region. The outcomes include the log of family income, whether an individual's mean family income is below 100 or 200 percent of the mean federal poverty line, and participation in AFDC/TANF (or, AFDC/TANF, SNAP, or SSI). Daughter outcomes are observed during adulthood for ages 19-27, and mother outcomes before the daughter becomes an adult. The trends are obtained for daughters aged 27-42 in each year.

FIGURE 3. INTERGENERATIONAL CORRELATIONS WITHIN PRE-/POST-REFORM REGIMES, BY WELFARE DEFINITION



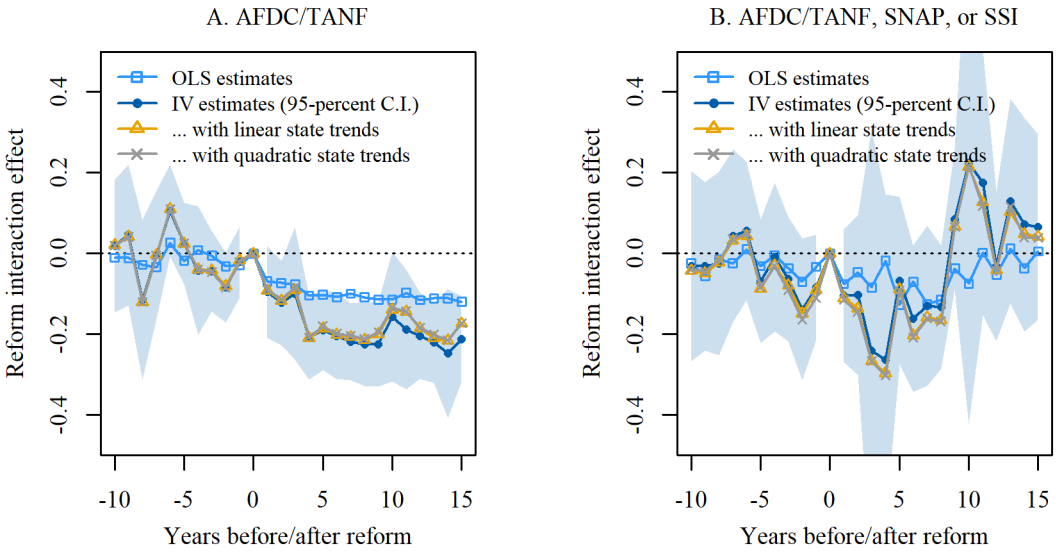
Notes: The outcomes include participation in AFDC/TANF or AFDC/TANF, SNAP, or SSI by participation defined as average probability in panel A or any participation in panel B. The observation windows vary by daughter's exposure ages (12-16 or 12-18) for mother's participation and daughter's adult observation ages (through age 27 or 19-27). The windows are denoted: 1) ages 12-18 for exposure and 19-27 as an adult; 2) ages 12-16 for exposure and 19-27 as an adult; 3) ages 12-18 for exposure and through age 27 as an adult; or, 4) ages 12-16 for exposure and through age 27 as an adult. Daughter exposure observations are restricted to pre-adult years, and adulthood is conditional on beginning a new family unit through childbirth or leaving home; observations do not overlap across generations by construction.

FIGURE 4. YEAR-TO-YEAR PERCENT CHANGES IN DEVIATIONS FROM STATE AND YEAR AVERAGES OF REAL AFDC/TANF BENEFIT STANDARDS FOR A FAMILY OF FOUR, BY STATE



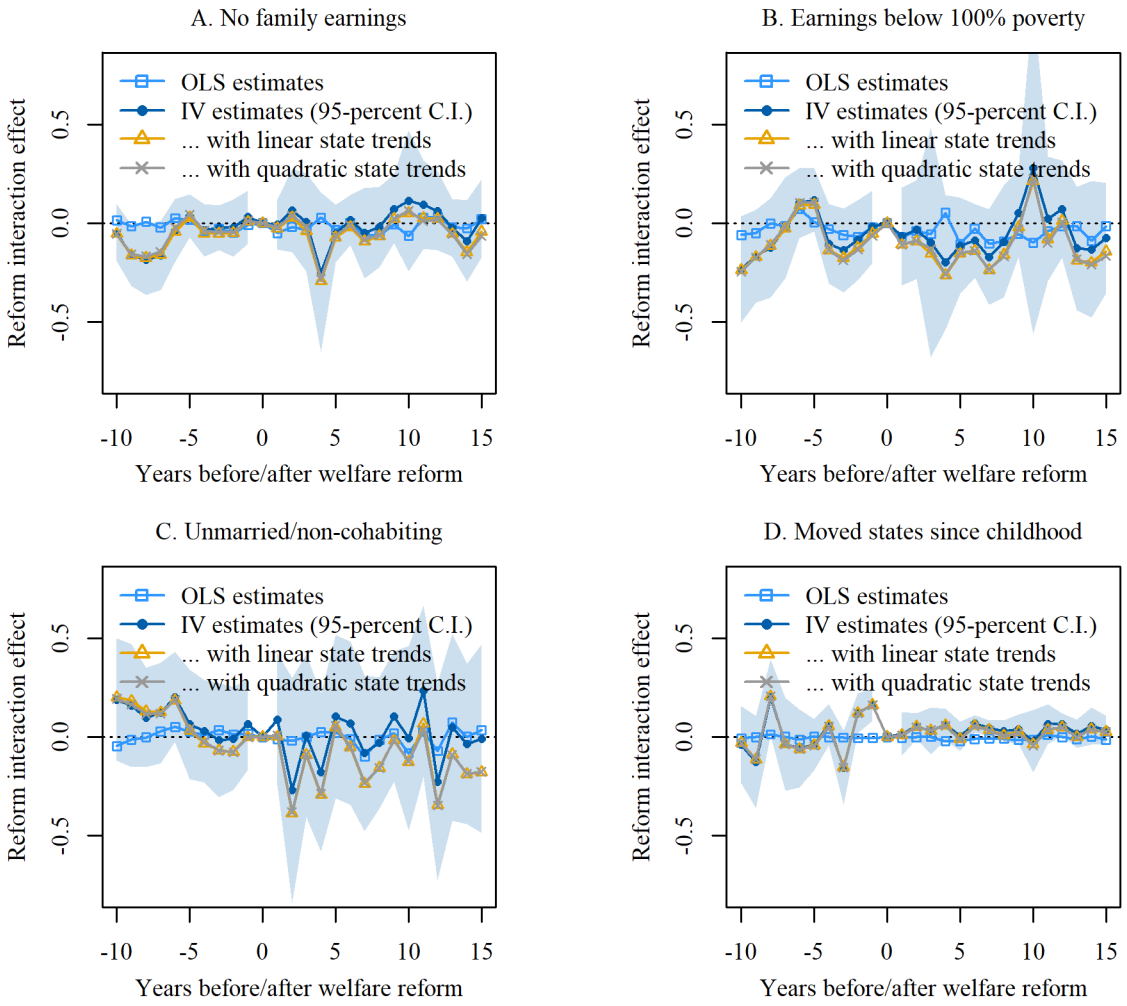
Notes: The percent changes are shown yearly for all 50 states and the District of Columbia based on real AFDC/TANF maximum benefits for a family of four (in 2012 dollars) after partialling out state and year effects. The box plots show the interquartile range and median, and the extremes indicate the 10th and 90th percentile of states each year. States outside of the 10-90 range are indicated by their abbreviations. Some data points (13) are out of range and thus not shown: 1969-1978; AL, AK, AR, DE, FL, ME, MS (x5), MO, and WV.

FIGURE 5. TIMING OF WELFARE REFORM EFFECTS ON INTERGENERATIONAL TRANSMISSION



Notes: Estimates are shown with the baseline set of control variables reported in notes to Table 4 and mother's prior AFDC/TANF participation interacted with reform indicators by year before/after implementation. For IV estimates, the instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with welfare reform indicators by year before/after implementation. A 95-percent pointwise confidence interval is shown based on state-clustered estimates for the main IV effects without additional controls for state-specific trends.

FIGURE 6. TIMING OF WELFARE REFORM EFFECTS FOR ADDITIONAL DAUGHTER OUTCOMES OF INTEREST



Notes: See Figure 5 notes. Estimates correspond to outcomes shown in Table 6.

TABLE 1. INTERGENERATIONAL WELFARE PARTICIPATION CORRELATIONS WITHIN WELFARE REGIMES PRE- OR POST-REFORM

Daughter outcome, ages 19-27:	AFDC/TANF				AFDC/TANF, SNAP, SSI			
Welfare reform timing:	Before	After	Before	After	Before	After	Before	After
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother's participation	0.210	0.078	0.228	0.087	0.300	0.305	0.313	0.313
when daughter aged 12-18	(0.027)	(0.034)	(0.028)	(0.032)	(0.033)	(0.079)	(0.034)	(0.074)
Inverse daughter weights?	No	No	Yes	Yes	No	No	Yes	Yes
Effect of welfare reform		-0.132		-0.141		0.005		0.000
p-value		0.004		0.002		0.909		0.966
Percent change in levels		-63%		-62%		2%		0%
p-value		0.001		0.000		0.873		0.993
Number of mother-daughter pairs	1254	476	1254	476	1254	476	1254	476

Notes: Robust standard errors are shown in parentheses. Estimation is restricted to daughters who can be observed at least 5 years during the critical exposure period, ages 12-18. Daughters observed before reform include only those mother-daughter pairs in which neither experiences welfare reform through the daughter's age 27. The after-reform sample is defined by daughters who are observed during the welfare reform era from age 12 onward. Estimates are conditional on a quadratic in mother's age and daughter's state-level controls averaged over the daughter's adult observation years. Daughter's welfare participation variable is the average participation during ages 19-27, and mother's welfare participation is 1 if she participates in any year when the daughter is aged 12-18 and 0 otherwise. P-values are obtained by a bootstrap procedure with 1000 replications.

TABLE 2. INTERGENERATIONAL AFDC/TANF PARTICIPATION WITHIN WELFARE REGIMES
PRE- OR POST-REFORM BY SUBSAMPLES FOR LOW MATERNAL EDUCATION AND INCOME

Daughter outcome, ages 19-27:	AFDC/TANF				AFDC/TANF, SNAP, SSI			
Welfare reform timing:	Before	After	Before	After	Before	After	Before	After
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	A. Low-educated mothers							
Mother's participation when daughter aged 12-18	0.228 (0.030)	0.027 (0.034)	0.240 (0.031)	0.024 (0.032)	0.323 (0.037)	0.129 (0.116)	0.323 (0.037)	0.143 (0.106)
Inverse daughter weights?	No	No	Yes	Yes	No	No	Yes	Yes
Effect of welfare reform		-0.201		-0.216		-0.194		-0.181
p-value		0.000		0.000		0.320		0.334
Percent change in levels		-88%		-90%		-60%		-56%
p-value		0.000		0.000		0.330		0.343
Number of mother-daughter pairs	968	200	968	200	968	200	968	200
	B. Low-income mothers							
Mother's participation when daughter aged 12-18	0.190 (0.035)	0.088 (0.037)	0.224 (0.036)	0.097 (0.037)	0.272 (0.042)	0.266 (0.087)	0.293 (0.043)	0.277 (0.082)
Inverse daughter weights?	No	No	Yes	Yes	No	No	Yes	Yes
Effect of welfare reform		-0.103		-0.127		-0.006		-0.016
p-value		0.055		0.021		0.968		0.839
Percent change in levels		-54%		-57%		-2%		-5%
p-value		0.038		0.008		0.966		0.903
Number of mother-daughter pairs	727	373	727	373	727	373	727	373

Notes: See Table 1 notes. The low-educated mothers sample is defined for those with high school or less educational attainment, and the low-income sample is defined by those with any prior income below 100 percent of poverty.

TABLE 3. DAUGHTER'S WELFARE PARTICIPATION PROBABILITY PRE- AND POST-REFORM
BY MOTHER'S AFDC/TANF PARTICIPATION AND DAUGHTER'S EDUCATIONAL ATTAINMENT

Daughter's welfare participation:	SNAP|SSI only		AFDC/TANF only		Both AFDC/TANF and SNAP|SSI		Either AFDC/TANF or SNAP|SSI	
Welfare reform timing:	Before	After	Before	After	Before	After	Before	After
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
No welfare exposure when young	0.064	0.224	0.014	0.005	0.106	0.095	0.185	0.324
Change after reform		0.160		-0.009		-0.011		0.139
Mother participated in AFDC/TANF	0.150	0.440	0.029	0.005	0.413	0.330	0.592	0.774
Change after reform		0.290		-0.025		-0.083		0.181
Selection by educational attainment status conditional on mothers who participated in AFDC/TANF								
Daughter: More than high school	0.051	0.298	0.041	0.000	0.337	0.211	0.429	0.509
Change after reform		0.247		-0.041		-0.126		0.080
Daughter: High school or less	0.179	0.513	0.026	0.007	0.435	0.391	0.640	0.910
Change after reform		0.334		-0.019		-0.044		0.270

Notes: Daughters observed before reform include only those mother-daughter pairs in which neither experiences welfare reform through the daughter's age 27. The after-reform sample is defined by daughters who are observed during the welfare reform era from age 12 onward. Daughter's welfare participation variable is based on any receipt during adult ages 19-27, and mother's welfare participation is based on any receipt when the daughter is aged 12-18. The sample corresponds to the 1254 mother-daughter pairs observed pre-reform and 476 observed post-reform, as in Table 1.

TABLE 4. INTERGENERATIONAL TRANSMISSION OF MOTHER'S AFDC/TANF PARTICIPATION

Daughter's outcome:	AFDC/TANF				AFDC/TANF, SNAP, SSI			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother's participation	0.145	0.268	0.240	0.425	0.226	0.299	0.296	0.369
	(0.013)	(0.049)	(0.021)	(0.085)	(0.018)	(0.073)	(0.024)	(0.100)
After welfare reform	0.038	0.069	0.053	0.086	0.002	-0.014	-0.013	-0.050
	(0.009)	(0.021)	(0.017)	(0.034)	(0.013)	(0.028)	(0.020)	(0.039)
Mother's participation ×	-0.100	-0.183	-0.135	-0.218	-0.041	0.040	-0.017	0.152
after welfare reform	(0.015)	(0.046)	(0.030)	(0.083)	(0.017)	(0.074)	(0.025)	(0.105)
Instrumental variables	No	Yes	No	Yes	No	Yes	No	Yes
Misclassification correction	No	No	Yes	Yes	No	No	Yes	Yes
Weak IV test statistic		23.157		21.969		23.157		22.273
p-value		0.000		0.000		0.000		0.000
Hansen J statistic		1.315		1.384		2.050		2.271
p-value		0.518		0.500		0.359		0.321
Percent change in levels	-69%	-68%	-57%	-51%	-18%	13%	-6%	41%
p-value	0.000	0.000	0.000	0.000	0.011	0.621	0.480	0.266
Percent change over baseline	-46%	-44%	-40%	-32%	-13%	21%	-5%	42%
p-value	0.001	0.029	0.006	0.105	0.084	0.477	0.544	0.257
Number of daughters	2961	2961	2961	2961	2961	2961	2961	2961
Observations	56068	56068	56068	56068	56068	56068	56068	56068

Notes: Robust standard errors with state clustering are shown in parentheses. All models control for daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, the daughter's state AFDC/TANF benefit standard, EITC federal/state maximum credit, state-level SPM poverty rate, AFDC/TANF recipiency rate, unemployment rate, and state and year effects for the daughter as well as state effects for the mother's modal state when the daughter is aged 12-18. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. The misclassification correction uses reporting rates in the PSID to address potential misreporting for the daughter's welfare participation (see the online supplement for details). Daughters' PSID core longitudinal weights are used in estimation.

TABLE 5. ROBUSTNESS CHECKS FOR MOTHER'S AFDC/TANF PARTICIPATION EFFECT BY ADDRESSING POTENTIAL LIFE-CYCLE BIAS OR GEOGRAPHIC MOBILITY

Daughter's outcome:	AFDC/TANF							
	Life-cycle				Geographic mobility			
	Mothers aged 25-45; daughters up to age 27		Lee-Solon (2009) age adjustment		Daughter in same state as childhood		Daughter never moves states	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother's participation	0.206	0.457	0.113	0.256	0.167	0.318	0.182	0.421
	(0.020)	(0.102)	(0.010)	(0.038)	(0.018)	(0.071)	(0.022)	(0.100)
After welfare reform	0.067	0.115	0.020	0.050	0.044	0.083	0.053	0.116
	(0.021)	(0.045)	(0.008)	(0.022)	(0.011)	(0.031)	(0.014)	(0.050)
Mother's participation ×	-0.125	-0.216	-0.062	-0.144	-0.117	-0.228	-0.131	-0.312
after welfare reform	(0.033)	(0.106)	(0.015)	(0.049)	(0.019)	(0.074)	(0.025)	(0.108)
Instrumental variables	No	Yes	No	Yes	No	Yes	No	Yes
Weak IV test statistic		18.249		19.560		18.087		13.308
p-value		0.000		0.052		0.000		0.004
Hansen J statistic		2.950		15.844		1.068		0.613
p-value		0.229		0.104		0.586		0.736
Number of daughters	2086	2086	2961	2961	2619	2619	1961	1961
Observations	15718	15718	56068	56068	44131	44131	36404	36404

Notes: See Table 4 notes. Additional controls for Lee-Solon-type age adjustments include a quartic on mother's mean age during prior years of potential welfare participation, a quartic on daughter's current age detrended by 25, and mother's participation indicator interacted with the quartic on daughter's detrended age. Instrumental variables for the Lee-Solon-type estimates additionally include the baseline set of instrumental variables interacted with a quartic in daughter's detrended age.

TABLE 6. MOTHER'S AFDC/TANF PARTICIPATION EFFECT ON DAUGHTER'S LABOR MARKET AND ADULT FAMILY OUTCOMES, AGES 19 AND OVER

Daughter's outcome:	No earnings		Earnings below 100% poverty		Unmarried or non-cohabiting		Moved states last year	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother's participation	0.126	0.142	0.246	0.352	0.226	0.387	0.000	-0.033
	(0.017)	(0.059)	(0.022)	(0.089)	(0.027)	(0.128)	(0.003)	(0.015)
After welfare reform	0.005	-0.009	0.003	-0.014	0.012	0.012	0.008	-0.003
	(0.013)	(0.018)	(0.020)	(0.031)	(0.023)	(0.049)	(0.003)	(0.007)
Mother's participation ×	-0.013	0.048	-0.038	0.061	0.004	0.050	-0.007	0.028
after welfare reform	(0.016)	(0.049)	(0.021)	(0.086)	(0.032)	(0.138)	(0.004)	(0.018)
Instrumental variables	No	Yes	No	Yes	No	Yes	No	Yes
Weak IV test statistic		23.225		23.225		23.225		23.225
p-value		0.000		0.000		0.000		0.000
Hansen J statistic		1.174		0.396		1.419		0.985
p-value		0.556		0.820		0.492		0.611
Number of daughters	2960	2960	2960	2960	2960	2960	2960	2960
Observations	54496	54496	54496	54496	54496	54496	54496	54496

Notes: See Table 4 notes. For these adult outcome estimates, we restrict the sample to only daughters at least 19 years old with non-missing earnings or marital status.

TABLE 7. MOTHER'S AFDC/TANF PARTICIPATION EFFECT RELATIVE TO DAUGHTER'S ADOLESCENT OUTCOMES AND EXPOSURE TIMING MECHANISMS

	Daughter's adolescent outcomes				Daughter's AFDC/TANF: Exposure timing mechanisms			
	High school educ. or less		Teenage childbirth		Co-resident exposure	Mother's longest spell > 1 year	> 5 years	Word-of-mouth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother's participation	0.259	0.555	0.282	0.722	0.293	0.252	0.386	0.071
	(0.035)	(0.182)	(0.042)	(0.165)	(0.063)	(0.051)	(0.109)	(0.022)
After welfare reform	0.047	0.084	-0.012	0.033	0.064	0.050	0.055	0.039
	(0.028)	(0.059)	(0.025)	(0.058)	(0.023)	(0.014)	(0.016)	(0.010)
Mother's participation ×	-0.012	-0.066	-0.004	-0.047	-0.197	-0.161	-0.280	-0.126
after welfare reform	(0.035)	(0.145)	(0.042)	(0.112)	(0.059)	(0.045)	(0.088)	(0.018)
Instrumental variables	No	Yes	No	Yes	Yes	Yes	Yes	No
Daughter fixed effects	No	No	No	No	No	No	No	Yes
Weak IV test statistic		23.157		23.157	19.751	20.545	15.891	
p-value		0.000		0.000	0.000	0.000	0.001	
Hansen J statistic		1.394		2.336	1.920	2.424	4.508	
p-value		0.498		0.311	0.383	0.298	0.105	
Number of daughters	2961	2961	2961	2961	2961	2961	2961	2961
Observations	56068	56068	56068	56068	56068	56068	56068	56068

Notes: See Table 4 notes. Co-resident exposure is restricted to any mother's AFDC/TANF participation while the daughter was living at home and had not yet begun a new family unit through childbirth or otherwise. Mother's longest spell in columns (6) and (7) corresponds to consecutive years of welfare participation during co-residence.

For Online Publication Only

Online Supplement to:

Welfare Reform and the Intergenerational Transmission of Dependence*

Robert Paul Hartley
School of Social Work
Columbia University

Carlos Lamarche
Department of Economics
University of Kentucky

James P. Ziliak
Center for Poverty Research and
Department of Economics
University of Kentucky

July 2021

*Address correspondence to James P. Ziliak, University of Kentucky, Center for Poverty Research, Gatton Building Suite 234, 550 South Limestone St., Lexington, KY 40506-0034. Email: jziliak@uky.edu.

List of Tables

List of Figures

This supplementary appendix provides additional information on the data and results reported in our paper "Welfare Reform and the Intergenerational Transmission of Dependence". We begin with data description in Section S.1, and then, in Section S.2, we present our approach to misclassification. Section S.3 discusses in detail the intergenerational changes in program access, while providing formal and numerical answers about its effect on the intergenerational transmission parameter. As referenced throughout the paper, this supplement also introduces additional results that explore the sensitivity of our main findings. In Section S.4, we investigate the role of possible mechanisms for intergenerational welfare participation effects before and after reform. Section S.5 presents first-stage results and detailed sensitivity analysis on the instrumental variables results presented in the manuscript. Section S.6 offers additional empirical evidence obtained by estimating variants of the difference-in-difference-type specification presented in equation (3) as well as a placebo-type test of the randomness of the timing of welfare reform implementation. Section S.7 examines the impact of longitudinal survey weights and biennial interviewing on the main estimates presented in Table 4. Section S.8 investigates the relevance of attrition for estimates of intergenerational transmission of welfare participation. Section S.9 includes extensions of models related to exposure timing and potential life-cycle bias. Lastly, Section S.10 investigates the sensitivity of results to maternal selection based on state-price variation and AFDC/TANF benefit generosity.

To summarize the empirical evidence presented in this supplementary appendix, we find that our results are robust to variations of the model of intergenerational transmission of welfare presented in the manuscript. In particular, the qualitative results of welfare reform are consistent: there is a causal influence from mother's welfare participation to daughter's participation, and reform attenuates this intergenerational transmission for the AFDC/TANF program, but not for participation in the wider safety net or other outcomes of the daughter in adulthood.

S.1. Data Description

We use data from the Panel Study of Income Dynamics (PSID), with a specific focus on linked mother-daughter pairs obtained over the survey years 1968-2013. In addition to being the longest running longitudinal data available, the data have been found to be robust over time to changes in sample composition (Fitzgerald, Gottschalk, and Moffitt, 1998). For our main analyses, we use a sample of 2,961 daughters that can be linked to their mothers' welfare histories over time—before, across, and after welfare reform—and we also focus on a subset of daughters observed *within* welfare regimes, 1,254 before and 476 after. This section provides an overview of the data (S.1.1), followed by a detailed within-regime comparison of daughter and mother characteristics before and after welfare reform (S.1.2), and concluding with a discussion of AFDC/TANF benefit standards over time (S.1.3).

The oversample of low-income families in the PSID allows for more precise estimation of welfare participation, yet this unrepresentative sample will yield biased causal estimates if—after conditioning on control variables—the selection probability remains endogenous to daughter's welfare participation, or if there exist heterogeneous transmission effects relative to the oversampled population (see Solon, Haider, and Wooldridge, 2015).[1] Some examples in the literature have addressed endogenous sampling directly by controlling on observed characteristics (Corcoran et al., 1992; Pepper, 2000), or by restricting the estimation sample to the SRC only (Lee and Solon, 2009). Others have used weights for estimators that are based on frequency counts (Solon et al., 1988; Page, 2004), as a sensitivity check (Solon, 1992), or in the main estimation (Hoynes and Schanzenbach, 2012). A primary concern for our estimates is the potential heterogeneity of welfare participation transmission by race coupled with overrepresented low-income, minority families, and our model maintains a fairly parsimonious structure that may not adequately account for this source of bias. Therefore, we provide weighted estimates in all of our estimation results.[2]

S.1.1. PSID Sample

Our intergenerational sample consists of mother-daughter pairs that are observed for at least five years while the daughter is living in the same household during the critical exposure period spanning the ages of 12-18, and that the daughter is observed at least five years as the head of her own family unit. Selecting adolescence and teenage years as the observation window for childhood exposure pervades the welfare transmission literature (Solon et al., 1988; Gottschalk, 1996; Pepper, 2000; Page, 2004). Part of this stems from data needs; that is, if we require observing early childhood as well as enough years in adulthood, then we will impose greater demands on the data in terms of length of time in the panel and in turn end up with fewer mother-daughter observations. The other reason for focusing on adolescent and teenage years is that cognitive, emotional, and physiological development are sufficiently advanced for the potential of "welfare learning" from the parent.[3] We follow convention and focus on the ages 12-18 as a key period of welfare exposure for our baseline models, and then we explore how the estimates change as the length of exposure changes. A daughter is considered an adult at first childbirth or when establishing a new family unit if she is at least age 14, though she may continue to live at home as a

[1] See PSID documentation for background on survey selection procedures and sample weight construction.
[2] We use the daughter's current core longitudinal weight. Section S.7.1 shows that the main results are robust to use of mother's weight during daughter's childhood. The results are also robust to unweighted regression, or restriction to the SRC subsample.
[3] It remains an open question in the literature which stage of childhood development is most important for the potential of welfare learning. Research shows that economic deprivation in early childhood has more deleterious effects in terms of achievement and health in early adulthood than does similar deprivation during adolescence (Duncan et al., 1998; Ziol-Guest et al., 2012; Elango et al., 2016).

subfamily.[4] This yields a panel sample of 2,961 mother-daughter pairs spanning 56,068 observation years of the daughter as an adult. On average we observe mothers and daughters co-residing for 13 years during childhood, and the daughter for 24 years during her adulthood. These long observation windows help mitigate both measurement error in program participation as well as life-cycle bias in age of participation.

Table S.1-1 contains weighted summary statistics of the key variables from the entire sample of daughters used in estimation, both pooled and separated into the pre- and post-welfare reform eras. We supplement the PSID data with program data from official reports by the U.S. Department of Health and Human Services (USDHHS), and our dates for the implementation of welfare reform are based on Crouse (1999). Unless otherwise noted, dollar amounts of benefits and incomes are deflated by the 2012 personal consumption expenditure (PCE) deflator. While panel A of Table S.1-1 shows all adult observations for daughters before and after reform, note that the generationally-linked data for mothers shown in panel B corresponds to time periods that may cross over welfare reform implementation years. Further, because these samples continuously follow daughter-mother pairs, it is important to recognize that these descriptive statistics are unadjusted for life-cycle comparisons or attrition, which are addressed within our panel estimates and robustness checks throughout this supplement.

While 4.4 percent of daughters receive AFDC/TANF (Aid to Families with Dependent Children, or Temporary Assistance for Needy Families) as an adult in the pooled sample period, the odds of participation are nearly 70 percent lower after welfare reform, falling from 8 percent to 2.5 percent. On the other hand, there is much more stability over time in participation in any of the three means-tested programs, with 13.2 percent receiving AFDC/TANF, food stamps/SNAP (Supplemental Nutrition Assistance Program), or SSI (Supplemental Security Income) before reform and 11.2 percent afterwards. Almost all of the additional uptake in welfare use is from SNAP. Daughters are 28 years old on average before reform and 39 after reform, highlighting the long observation windows we observe families compared to prior research. The average real maximum AFDC/TANF benefit standard facing daughters was $372 before welfare reform but fell to $277 in the post-reform era.

[4] Our estimates are robust to an alternative definition of adulthood using only daughters at least 18 years old.

TABLE S.1-1. DESCRIPTIVE STATISTICS

A. Daughter's characteristics as an adult	Before	After	Pooled
Currently receiving welfare?			
AFDC/TANF	0.080	0.025	0.044
	(0.271)	(0.157)	(0.206)
AFDC/TANF, SNAP, SSI	0.132	0.112	0.119
	(0.338)	(0.315)	(0.323)
Age	28.245	38.666	35.041
	(5.572)	(9.009)	(9.400)
Number of children	1.249	1.186	1.208
	(1.169)	(1.273)	(1.238)
State-level policy/economy measures when daughter observed as an adult			
AFDC/TANF benefit standard	0.372	0.277	0.310
(in thousands of 2012 dollars)	(0.333)	(0.268)	(0.296)
EITC maximum credit	1.280	2.812	2.279
(in thousands of 2012 dollars)	(1.144)	(2.100)	(1.966)
Poverty rate	0.154	0.139	0.144
	(0.041)	(0.033)	(0.037)
Unemployment rate	0.066	0.061	0.062
	(0.019)	(0.022)	(0.021)
AFDC/TANF recipiency rate	0.046	0.019	0.029
	(0.015)	(0.015)	(0.020)
B. Mother's characteristics	Before	After	Pooled
*Any prior welfare?**		*After only; Any prior**	
AFDC/TANF	0.269	0.066; 0.272	0.271
	(0.444)	(0.248); (0.445)	(0.444)
AFDC/TANF, SNAP, SSI	0.428	0.190; 0.437	0.433
	(0.495)	(0.392); (0.496)	(0.496)
Age (average for prior observation years)	42.472	59.357	45.103
	(8.841)	(10.512)	(8.626)
State-level policy/economy measures when daughter observed during ages 12-18			
AFDC/TANF benefit standard, average	0.736	0.393	0.724
(in thousands of 2012 dollars)	(0.334)	(0.213)	(0.336)
AFDC/TANF benefit standard, maximum	0.913	0.476	0.904
(in thousands of 2012 dollars)	(0.363)	(0.226)	(0.365)
Mean daughter-as-child observations			13.164
Mean daughter-as-adult observations			23.828
Number of daughters	2212	2372	2961
Total observations	25331	30737	56068

Notes: Sample averages are weighted by the daughter's PSID core longitudinal weights for both daughters' and mothers' statistics. Mothers' statistics before/after reform reflect her observed history during potential welfare participation years, and the pooled statistics correspond to the daughter's current observation year in the estimation sample. Abbreviations: Aid to Families with Dependent Children/Temporary Assistance for Needy Families (AFDC/TANF), Food Stamps/Supplemental Nutrition Assistance Program (SNAP), Supplemental Security Income (SSI), and Earned Income Tax Credit (EITC).

The bottom panel of Table S.1-1 should be interpreted with caution given the longitudinal nature of the data since every daughter in the before period is also followed after reform unless she leaves the sample, and daughters' observations are linked to the mothers' observations whether or not the mother remains in the sample. Panel B shows that about 27 percent of mothers received any prior AFDC/TANF transfers before welfare reform, and 6.6 percent received any prior AFDC/TANF transfers only during the period after reform, while those figures jump to 43 and 19 percent, respectively, if the mother received any prior AFDC/TANF, SNAP, or SSI. Note that it is possible for the mother to first participate in

welfare after the daughter forms her own family unit. For AFDC/TANF participation, this can occur only if the mother has children (or dependents) under age 18 remaining in the household other than the focal daughter. Learning thus can occur from direct exposure while the daughter resides in the household with her mother, or from indirect "word of mouth" once the daughter forms her own family unit as discussed in the manuscript.

Table S.1-1 is one way of summarizing these data, however, describing data across generations is complicated when grouping observations before/after welfare reform. For example, given the construction of the mother's welfare participation variable as any prior participation, the after-reform statistics shown are not directly comparable with the before period. Therefore, for transparency, we show mother's statistics for "any prior welfare participation" in the after-reform period as any prior within the after period only as well as the cumulative measure of any prior participation. Also, note that daughter observations before/after reform include many daughters observed in both time periods, which differs from showing observations that are contained exclusively within welfare regimes. Of the 2961 daughters observed in Table S.1-1, 589 are observed *only* before reform, 1623 are observed both before and after, and another 749 are observed as adults only after reform. See Section S.1.2 for further refinements of within-regime samples corresponding to a balanced-window comparison of mothers and daughters by reform era.

As discussed in Section II of the paper, states began reforming AFDC in earnest starting in 1992, four years prior to passage of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA). States had to submit requests for waivers from Federal rules to the U.S. Department of Health and Human Services, e.g., to introduce a time limit on benefits or to expand asset limits for eligibility. If the waiver was approved, then there was generally a lag between the time of approval and when the policy was implemented. Indeed, some approved waivers were never implemented (Grogger and Karoly, 2005). We thus use the implementation date of the waiver as the date when reform is first in place, and the variable remains on for each year thereafter. For those states that did not implement waivers we use the implementation date of their TANF program. While the major AFDC waiver implementation period is defined as 1992-1996, the earliest major waivers were officially implemented in Michigan and New Jersey as of October 1992, and the latest implementation of TANF was in New York as of November 1997. In our data, the implementation of welfare reform is encoded as the earliest year in which at least 3 quarters of the year are observed after *state-wide* reform, implying that the reform spans 1993-1998.

S.1.2. Welfare Selection Pre- and Post-Reform by Within-Regime Balanced Observation Windows

Table S.1-2 investigates further whether an expanded set of characteristics for daughters considered in the empirical analysis changed after the reform. We present descriptive statistics that focus on the sample of daughters observed within welfare reform eras, before and after, according to the estimation samples used in Table 1 of the manuscript. The top panel contains sample means of daughters regardless of their mothers' participation status in AFDC/TANF, while the bottom panel is conditional on mothers participating in AFDC/TANF when the daughter was aged 12-18. The first three columns refer to the pre-reform period for daughters who (i) did not receive any welfare in adulthood ages 19-27, (ii) received at least some AFDC/TANF and possibly SNAP or SSI, and (iii) received SNAP and/or SSI but not AFDC/TANF. The second three columns are for the same set of groups, but refer to sample averages in the post-reform era. The last four columns, (7)-(10), show reform differences-in-differences by welfare participation type relative to no welfare participation, both unconditionally and conditional on mother's age and state-level assistance program generosity, unemployment, and AFDC/TANF recipiency. To make the time periods before/after reform more comparable, the before era is restricted to years from 1985 onward. As shown in Table 1, there are 1254 daughters observed before reform and 476 after, and the lower panel highlights that there are 397 daughters whose mothers received any AFDC in the before period and 83 daughters whose mothers received any TANF after reform.[5]

The patterns pre/post reform are similar in that daughters not on any welfare are the most advantaged, followed by those on SNAP or SSI alone, and the most disadvantaged are those with some AFDC/TANF. There are some notable differences in that post reform the fraction married is much lower, though this is true for those never on welfare as well as those on welfare. Daughters who select into welfare participation appear to have more children after reform relative to the pre-/post-reform differences between daughters who did not participate in welfare during ages 19-27. Our main estimates are robust to controlling for both marital status and number of children (see Table S.5-7 in Section S.5.4). There is a secular rise in educational attainment, but there are also increases in below-poverty earnings and non-employment for those not participating in AFDC/TANF. This seems especially true among daughters on SNAP and/or SSI alone, which could help account for the intergenerational mechanism on these programs persisting after reform. It also underscores the importance in our causal model in equation (3) of the manuscript to separate out the poverty trap from welfare trap and motivates the inclusion of control variables and the use of IVs. We present sensitivity estimates in the manuscript and this supplement for daughters' geographic mobility (Tables 5 and 6), educational attainment (Table 7),

[5] Note that the 1254 daughters observed before reform may also remain in the larger panel sample in later years, but these within-regime pre-reform daughters are observed from ages 19-27 prior to reform being implemented in either the mother's or daughter's state of residence.

potential mechanisms of transmission (Section S.4), and controls for her mother's poverty status and education (Table S.5-6).

TABLE S.1-2. DAUGHTER'S AVERAGE PRE- AND POST-REFORM WITHIN-REGIME SOCIOECONOMIC CHARACTERISTICS

	Pre-reform			Post-reform			Difference-in-differences			
	No welfare	Any AFDC	SNAP|SSI only	No welfare	Any TANF	SNAP|SSI only	Any AFDC/TANF		SNAP|SSI only	
							Uncond.	Cond.	Uncond.	Cond.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	A. Unconditional on mother's welfare participation									
Number of children	0.560	1.653	1.222	0.346	2.100	1.313	0.662	0.553	0.305	0.233
	(0.691)	(0.858)	(0.873)	(0.540)	(0.891)	(1.273)	[0.001]	[0.009]	[0.167]	[0.257]
Married/ cohabiting	0.673	0.408	0.637	0.431	0.382	0.117	0.215	0.209	-0.279	-0.300
	(0.415)	(0.410)	(0.419)	(0.435)	(0.418)	(0.254)	[0.104]	[0.087]	[0.001]	[0.001]
Family income, thousands	51.055	20.652	30.457	59.377	30.403	27.188	1.429	1.077	-11.591	-16.253
	(34.055)	(19.416)	(20.368)	(38.434)	(22.070)	(28.236)	[0.857]	[0.954]	[0.148]	[0.063]
No family earnings	0.008	0.302	0.076	0.026	0.223	0.255	-0.096	-0.121	0.162	0.167
	(0.075)	(0.324)	(0.191)	(0.091)	(0.312)	(0.281)	[0.235]	[0.108]	[0.020]	[0.006]
Earnings < 100% FPL	0.068	0.626	0.355	0.120	0.587	0.580	-0.091	-0.101	0.174	0.206
	(0.177)	(0.347)	(0.325)	(0.264)	(0.324)	(0.393)	[0.311]	[0.245]	[0.047]	[0.012]
Earnings < 200% FPL	0.224	0.813	0.664	0.217	0.836	0.712	0.030	-0.004	0.055	0.052
	(0.313)	(0.280)	(0.315)	(0.322)	(0.218)	(0.340)	[0.669]	[0.798]	[0.510]	[0.609]
Same state as birth	0.762	0.792	0.840	0.739	0.964	0.642	0.195	0.223	-0.174	-0.177
	(0.393)	(0.371)	(0.344)	(0.407)	(0.132)	(0.464)	[0.001]	[0.006]	[0.137]	[0.063]
High school or less	0.486	0.827	0.708	0.215	0.686	0.634	0.130	0.132	0.198	0.194
	(0.483)	(0.339)	(0.424)	(0.352)	(0.421)	(0.421)	[0.328]	[0.266]	[0.065]	[0.062]
Observations	730	389	135	247	81	148				
	B. Conditional on mother participating in AFDC/TANF									
Number of children	0.791	1.817	1.472	0.715	2.121	1.285	0.380	0.582	-0.111	0.352
	(0.783)	(0.843)	(0.849)	(0.833)	(0.887)	(1.018)	[0.376]	[0.208]	[0.898]	[0.603]
Married/ cohabiting	0.672	0.289	0.570	0.449	0.481	0.128	0.415	0.561	-0.220	-0.102
	(0.406)	(0.386)	(0.484)	(0.503)	(0.435)	(0.228)	[0.127]	[0.065]	[0.346]	[0.785]
Family income, thousands	43.986	16.404	23.251	49.876	30.403	22.095	8.109	-0.647	-7.047	-16.750
	(22.932)	(18.225)	(15.700)	(16.313)	(22.010)	(7.560)	[0.710]	[0.804]	[0.517]	[0.262]
No family earnings	0.024	0.436	0.123	0.010	0.333	0.381	-0.090	-0.205	0.272	0.292
	(0.126)	(0.358)	(0.243)	(0.056)	(0.315)	(0.334)	[0.494]	[0.182]	[0.073]	[0.108]
Earnings < 100% FPL	0.143	0.740	0.450	0.062	0.746	0.731	0.087	0.021	0.363	0.439
	(0.268)	(0.318)	(0.364)	(0.157)	(0.228)	(0.236)	[0.385]	[0.697]	[0.008]	[0.012]
Earnings < 200% FPL	0.353	0.881	0.771	0.134	0.908	0.790	0.245	0.169	0.238	0.236
	(0.367)	(0.248)	(0.341)	(0.308)	(0.109)	(0.190)	[0.026]	[0.291]	[0.133]	[0.240]
Same state as birth	0.809	0.870	0.844	0.813	0.941	0.482	0.068	-0.079	-0.365	-0.256
	(0.363)	(0.307)	(0.336)	(0.357)	(0.137)	(0.499)	[0.556]	[0.898]	[0.146]	[0.311]
High school or less	0.717	0.850	0.906	0.204	0.819	0.848	0.482	0.550	0.456	0.636
	(0.434)	(0.309)	(0.261)	(0.408)	(0.282)	(0.268)	[0.011]	[0.002]	[0.013]	[0.000]
Observations	109	235	53	19	32	32				

Notes: Sample means (and medians for family income) are shown by daughters observed either before the mother's or daughter's state ever implements welfare reform, or years after reform since the daughter was age 12 at least. Standard deviations are shown in parentheses, and p-values based on 1000 bootstrap replications are shown in brackets. These statistics correspond to the samples used in Table 1 of the manuscript in which daughters are observed during adulthood ages 19-27. Panel B is conditional on any mother's AFDC/TANF participation during the daughter's critical exposure ages 12-18. The difference-in-differences are shown unconditionally based on estimates in columns (1)-(6) as well as conditional on the mother's age and age squared along with average state-level measures of AFDC/TANF and EITC benefit generosity, SPM poverty rates, unemployment rates, and AFDC/TANF recipiency rates.

Table S.1-3 investigates whether mothers' characteristics during the daughters' critical exposure ages 12-18 changed after the reform. This informs whether there was differential selection on observables of mothers onto AFDC versus TANF. We provide characteristics of mothers before and after reform by whether they did not participate in welfare at all when daughters were aged 12-18, or if they participated in any AFDC/TANF versus only SNAP or SSI and not AFDC/TANF (following format in Table S.1-2). Note that there are 274 mothers who participated in AFDC at any time when daughters were aged 12-18 before reform, and 66 mothers receiving any TANF after reform (these counts are lower than the 397 daughters before and 83 after whose mothers participated because some of those daughters were siblings sharing the same mother). Table S.1-3 shows that differences by AFDC/TANF participation and reform regime, shown in columns (7)-(8), are small and statistically insignificant at the 5-percent level with the exception of fewer children under age 18 and economically relevant decreases in marital status, family income, and relatively lower education among cash assistance recipients. We use inverse-weighting by number of daughters in the sample in Tables 1 and 2, Figure 3, and Figure S.5-4, and we explore the role of family structure in Table S.5-7. We evaluate later in Figure S.5-4 whether changes in composition by education or income affect our main results. When we estimate equation (3) by subsets of daughters with mothers who have similar education and income, we find similar results.

TABLE S.1-3. MOTHER'S AVERAGE PRE- AND POST-REFORM WITHIN-REGIME SOCIOECONOMIC CHARACTERISTICS

	Pre-reform			Post-reform			Difference-in-differences			
							Any AFDC/TANF		SNAP|SSI only	
	No welfare (1)	Any AFDC (2)	SNAP|SSI only (3)	No welfare (4)	Any TANF (5)	SNAP|SSI only (6)	Uncond. (7)	Cond. (8)	Uncond. (9)	Cond. (10)
Number of children	2.053	3.114	2.746	1.714	2.420	2.515	-0.355	-0.597	0.109	-0.092
	(1.206)	(1.780)	(1.399)	(0.881)	(0.998)	(1.657)	[0.162]	[0.000]	[0.776]	[0.656]
Married/ cohabiting	0.917	0.593	0.839	0.837	0.326	0.594	-0.187	-0.157	-0.165	-0.111
	(0.241)	(0.451)	(0.333)	(0.333)	(0.446)	(0.460)	[0.061]	[0.094]	[0.067]	[0.217]
Family income, thousands	64.813	28.745	38.435	65.198	20.522	29.848	-8.609	-6.101	-8.972	-9.123
	(35.717)	(20.328)	(23.410)	(46.381)	(21.459)	(15.256)	[0.063]	[0.171]	[0.058]	[0.036]
No family earnings	0.022	0.275	0.071	0.034	0.377	0.227	0.090	0.091	0.144	0.124
	(0.113)	(0.367)	(0.187)	(0.115)	(0.334)	(0.268)	[0.179]	[0.146]	[0.007]	[0.016]
Earnings < 100% FPL	0.080	0.647	0.398	0.096	0.716	0.528	0.053	0.043	0.113	0.114
	(0.200)	(0.392)	(0.378)	(0.203)	(0.332)	(0.376)	[0.462]	[0.537]	[0.197]	[0.161]
Earnings < 200% FPL	0.263	0.855	0.793	0.237	0.860	0.824	0.031	-0.011	0.057	0.044
	(0.359)	(0.273)	(0.294)	(0.320)	(0.257)	(0.270)	[0.596]	[0.925]	[0.403]	[0.550]
Same state as birth	0.901	0.924	0.862	0.732	0.752	0.779	-0.003	-0.013	0.086	0.056
	(0.280)	(0.250)	(0.327)	(0.430)	(0.427)	(0.417)	[0.965]	[0.867]	[0.374]	[0.505]
High school or less	0.633	0.822	0.891	0.283	0.611	0.413	0.139	0.201	-0.128	-0.081
	(0.483)	(0.383)	(0.313)	(0.451)	(0.491)	(0.495)	[0.211]	[0.105]	[0.222]	[0.354]
Observations	480	274	113	251	66	84				

Notes: Sample means (medians for family income) are shown by mother-daughter pairs observed either before the mother's or daughter's state implements welfare reform, or years after reform since the daughter was age 12 at least. Standard deviations are shown in parentheses, and p-values based on 1000 bootstrap replications are shown in brackets. These statistics correspond to the samples used in Table 1 of the manuscript. The difference-in-differences are shown unconditionally based on estimates in columns (1)-(6) as well as conditional on the mother's age and age squared along with average state-level measures of AFDC/TANF and EITC benefit generosity, SPM poverty rates, unemployment rates, and AFDC/TANF recipiency rates.

This evidence is consistent with results found in the literature that shows that there are few substantive differences in the composition of the TANF caseload compared to the AFDC caseload. Moffitt and Stevens (2001) conducted a comprehensive review of this using both national data from the Current Population Survey Annual Social and Economic Supplement, as well as administrative data from Maryland, and conclude (p. 38):

> "Our analysis indicates that, after controlling for the effects of the economy, there is little evidence in national CPS data that welfare reform has affected the composition of the caseload in its labor market skill distribution, indirectly implying therefore that leavers have been equally distributed across all skill types."

S.1.3. AFDC/TANF Benefit Standards

Identification of equation (3) in the paper relies on real cross-state over time variation in the AFDC/TANF maximum benefit guarantee for families of 2, 3, or 4 or more persons in the years when the mother's daughter is in the critical exposure ages of 12-18 years old. This variation is most directly identified using a within- and between-state decomposition of the instruments in our PSID sample families. In Table S.1-4, we present five such decompositions. The first two are based solely on yearly state-level program data for the AFDC/TANF maximum benefit for a 4-person family, while the next three are based on the actual instruments assigned to the mothers in the PSID estimation sample during the daughters' critical years. Panels A, C, and D inflation-adjust the benefits using the 2012 PCE deflator, while panels B and E adjust for state-specific price differences using the panel from 1982 to 2012 from Carrillo, Early, and Olsen (2014), and the state-year price indices for 1967-1981 from Berry, Fording, and Hanson (2000), again with 2012 as the base year.

Panels A and B of Table S.1-4 show the decomposition for state-level, program-driven variation in the maximum guarantee for a 4-person family, which begins to unpack the contribution of exogenous policy changes to our instrument. We see substantial within variation in the pre-reform sample period, but this falls during the post-welfare reform era. Comparing pure program variation to individual-level variation for benefit levels corresponding to a family of 4, panel C shows similar pre-reform variation to panel A, though panel C also suggests that post-reform daughters will have mothers with more instrument variation because the mothers may be observed before, crossing over, or after the timing of reform. Panel D shows that instrument values by family size (instead of using a family of 4 benefits) do not imply more variation necessarily, yet family sources of within-variation in the actual sample play a role for identification in the post-reform period. The table further shows that across all years and mothers in the pre-reform era, 39% of the variation of the instrument is within-state using the aggregate price index, and

this increases to 44% when using the state-over-time price index. The within-share in the estimation sample is actually greater in the post-welfare reform era.

TABLE S.1-4. AFDC/TANF BENEFIT STANDARD DECOMPOSITION BY STATES OVER TIME

	Mean (1)	Std. dev. (2)	Within-state (3)	Between-state (4)
	A. Family of 4 benefits adjusted for inflation (state-level)			
Pre-reform: 1967-1991	849.27	316.62	22%	78%
Post-reform: 1992-2012	562.17	213.60	11%	89%
	B. Family of 4 benefits adjusted for state-year price variation (state-level)			
Pre-reform: 1967-1991	833.80	265.60	26%	74%
Post-reform: 1992-2012	564.34	179.14	14%	86%
	C. Family of 4 benefits adjusted for inflation (PSID)			
Pre-reform: 1967-1991	854.92	353.74	22%	78%
Post-reform: 1992-2012	765.77	346.97	35%	65%
	D. Benefits by family size adjusted for inflation (PSID)			
Pre-reform: 1967-1991	735.94	343.10	39%	61%
Post-reform: 1992-2012	626.22	323.62	53%	47%
	E. Benefits by family size adjusted for state-year price variation (PSID)			
Pre-reform: 1967-1991	744.65	307.92	44%	56%
Post-reform: 1992-2012	631.11	295.87	57%	43%

Notes: The AFDC/TANF benefit standard evaluated in panels C and D is the maximum guarantee for a family of 4, which is adjusted for inflation to 2012 dollars using the PCE or state-index.

To further explore the time-series variation in the maximum benefit guarantees, in Table S.1-5 we provide a summary of nominal and real year-to-year percent changes in 4-person AFDC/TANF benefits during the pre- and post-reform periods. The table shows the smallest, largest, and average year-to-year percent changes, along with the fraction of states with yearly changes in excess of 10% in absolute value.

The AFDC program saw some of the largest changes in real benefit values during the 1970s, with a peak in 1979. During our observation sample, many states experienced large year-to-year changes in benefit levels. For example, Mississippi doubled its maximum benefit from $60 to $120 in 1978, and several states had increases in benefits during the 1970s that were greater than a one-third increase: Alaska, Delaware, West Virginia, Missouri, Kentucky, Indiana, Arkansas, and Wisconsin. Another 15 states had at least a one-fifth increase over that same time period. In addition to our inflation-adjusted estimates throughout, we provide evidence for variation in benefits by state-year adjustments for prices in Table S.1-5 panel C, and we test our main results' sensitivity to state price differences in Section S.10. About 16 percent of states raised nominal benefits in the pre-reform era compared to 4 percent after, and in real state-year-adjusted terms, 10 percent of states had a change of 10% in year-to-year benefit values pre-reform compared to about 3.5 percent after.

TABLE S.1-5. SUMMARY OF YEAR-TO-YEAR CHANGES IN FOUR-PERSON AFDC/TANF BENEFIT STANDARD

	Yearly percent change within state			Percent of states with more than 10% yearly change
	Minimum	Mean	Maximum	
	A. Nominal changes			
Pre-reform: 1967-1991	-28.1%	4.1%	102.7%	15.9%
Post-reform: 1992-2012	-27.7%	0.6%	60.6%	4.3%
	B. Adjusted for aggregate inflation			
Pre-reform: 1967-1991	-33.9%	-1.2%	93.6%	9.3%
Post-reform: 1992-2012	-28.7%	-1.2%	58.8%	3.4%
	C. Adjusted for state-year price variation			
Pre-reform: 1967-1991	-32.8%	-1.0%	95.8%	10.2%
Post-reform: 1992-2012	-31.6%	-1.2%	59.2%	3.5%

Notes: The AFDC/TANF benefit standard evaluated above is the maximum guarantee for a family of 4. The inflation-adjusted values are in 2012 dollars. The aggregate inflation is from the PCE, while state indices are from Berry, Fording, and Hanson (2000) and Carrillo, Early, and Olsen (2014).

While the percent changes in any given year are modest, the table shows that there is wide variation, and importantly, half of all states at some point had at least a 25 percent year-to-year increase in benefits in the sample period, 1967–2012, suggesting substantial within-state variation in the instrument over time that is fundamental to identification of mothers' participation.

S.2. Misclassification Bias Corrections

In this section, we demonstrate that potential misclassification of mother's prior participation does not lead to inconsistent estimates of the intergenerational transmission of welfare participation if (i) the probability that a mother reports accurately is greater than zero, and (ii) the mother is observed over a relatively long period. We also present the reporting rates used for estimation of models with misclassification.

Estimates based on equation (3) rely on self-reported data for a daughter's welfare participation at time t and her mother's self-reported participation at any time prior to t. Consider the main estimation equation,

$$y_{ist}^{d} = \alpha + \beta' \boldsymbol{x}_{ist}^{d} + \delta y_{is,\forall j<t}^{m} + \gamma R_{st}^{m} + \theta R_{st}^{m} y_{is,\forall j<t}^{m} + \mu_{s}^{m} + \mu_{s}^{d} + \kappa_{t}^{d} + v_{ist}^{d},$$

where $y_{is,\forall j<t}^{m} = \max\{y_{is,t-1}^{m}, y_{is,t-2}^{m}, y_{is,t-3}^{m}, \dots\}$. Let the true participation status be denoted $\tilde{y}_{ist}^{d}$ for daughter at time t, $\tilde{y}_{ist}^{m}$ for mother at time t, and $\tilde{y}_{is,\forall j<t}^{m}$ for mother at any time prior to time t.

In principle, both y_{ist}^{d} and y_{ist}^{m} can be affected by misclassification error. However, misclassification in $y_{is,\forall j<t}^{m}$ does not lead to inconsistent results as long as individuals have some positive probability of accurately reporting welfare participation at time t. To fix ideas, consider for simplicity $t =$

3 with $j \in \{1,2\}$ and let the contemporaneous probability of accurately reporting participation be defined as

$$q = \mathrm{P}(y_{ist}^{m} = 1 | \tilde{y}_{ist}^{m} = 1) > 0,$$

for all t. In this case, the mother's measure of any prior participation at $t = 3$ will be accurately reported with probability

$$\begin{aligned}\mathrm{P}\left(y_{is,\forall j<3}^{m} = 1 \middle| y_{is,\forall j<3}^{m} = 1\right) = \mathrm{P}(y_{is1}^{m} = 1 | \tilde{y}_{is1}^{m} = 1) + \mathrm{P}(y_{is2}^{m} = 1 | \tilde{y}_{is2}^{m} = 1) \\ - \mathrm{P}(y_{is1}^{m} = 1 | \tilde{y}_{is1}^{m} = 1)\mathrm{P}(y_{is2}^{m} = 1 | \tilde{y}_{is2}^{m} = 1, y_{is1}^{m} = 1, \tilde{y}_{is1}^{m} = 1).\end{aligned}$$

Denoting $\mathrm{P}(y_{is2}^{m} = 1 | \tilde{y}_{is2}^{m} = 1, y_{is1}^{m} = 1, \tilde{y}_{is1}^{m} = 1) = r$, it follows that,

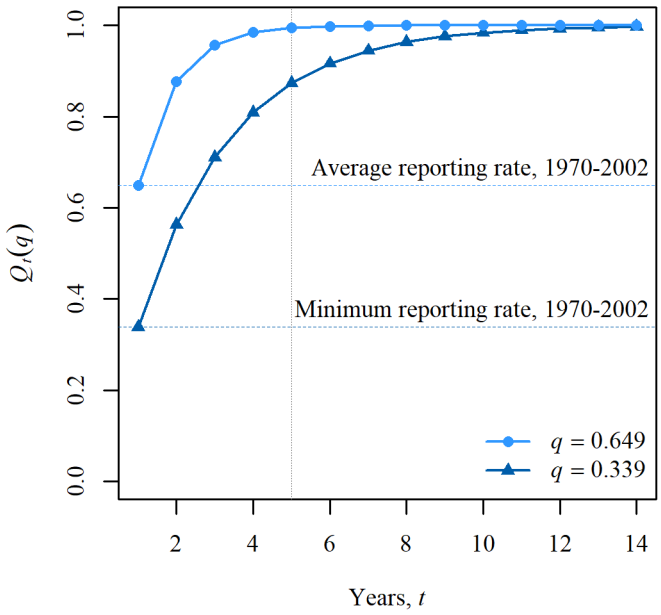
$$\mathrm{P}\left(y_{is,\forall j<3}^{m} = 1 \middle| \tilde{y}_{is,\forall j<3}^{m} = 1\right) = \ q\,(2 - r) > q = \mathrm{P}(y_{is3}^{m} = 1 | \tilde{y}_{is3}^{m} = 1).$$

We can now generalize the argument assuming, again for simplicity in exposition, that $q = r$. The probability of accurately reported welfare participation in any prior period under the above conditions can be expressed (based on the inclusion-exclusion principle for the union of finite events (Billingsley, 1995, p. 24)) as

$$Q_t(q) \equiv \mathrm{P}\left(y_{is,\forall j<t}^{m} = 1 \middle| \tilde{y}_{is,\forall j<t}^{m} = 1\right) = \sum_{j=1}^{t-1} (-1)^{j-1} \binom{t-1}{j} q^{j}, \text{ where } \binom{t-1}{j} = \frac{(t-1)!}{j!\,(t-1-j)!},$$

which is increasing in the number of time periods observed. For our analysis, the mother's minimum number of time periods is five years, and for the average reporting rate for 1970-2002 (see Table S.2-1 and Meyer, Mok, and Sullivan, 2015), the probability is $Q_5(q = 0.649) \approx 0.995$, or for the minimum reporting rate over that time period, $Q_5(q = 0.339) \approx 0.873$. Given that mothers are observed for about 13 years on average prior to the daughter's participation decision, the probability that a mother accurately reports any prior participation tends to 1, as shown in Figure S.2-1.

FIGURE S.2-1. PROBABILITY OF ACCURATELY REPORTING WELFARE PARTICIPATION



Notes: Given a propensity, q, to report welfare participation accurately in a given year, the probability of reporting accurately when questioned over t years is shown by $Q_t(q)$ where the values of q are taken as the average and minimum reporting rates for mothers over the years 1970 to 2002.

We focus instead on misclassification in the binary dependent variable for the daughter's current welfare status. The probability that a daughter reports participating in welfare can be written as

$$\mathrm{P}\left(y_{ist}^{d}=1\right)=\mathrm{P}\left(y_{ist}^{d}=1\middle|\tilde{y}_{ist}^{d}=1\right)\mathrm{P}\left(\tilde{y}_{ist}^{d}=1\right)+\mathrm{P}\left(y_{ist}^{d}=1\middle|\tilde{y}_{ist}^{d}=0\right)\mathrm{P}\left(\tilde{y}_{ist}^{d}=0\right),$$

where false negatives are defined as $\tau_{1,ist}\coloneqq\mathrm{P}\left(y_{ist}^{d}=0\middle|\tilde{y}_{ist}^{d}=1\right)$ and false positives are defined as $\tau_{0,ist}\coloneqq\mathrm{P}\left(y_{ist}^{d}=1\middle|\tilde{y}_{ist}^{d}=0\right)=0$ by assumption. This assumption is standard in the literature as false positive reports are relatively small, and these misreports typically correspond to individuals who mistake the source or timing of actual welfare participation. Note that whereas q is assumed fixed for the purposes of exposition above, false negatives here can be shown equivalently as $\tau_{1,ist}=1-q_{ist}$. Therefore, using equation (3) and $\tau_{1,ist}$, we can rewrite the daughter's probability of reported welfare participation as

$$\mathrm{P}\left(y_{ist}^{d}=1\right)=\left[1-\tau_{1,ist}\right]\left[\alpha+\beta'\boldsymbol{x}_{ist}^{d}+\delta y_{is,\forall j<t}^{m}+\gamma R_{st}^{m}+\theta R_{st}^{m}y_{is,\forall j<t}^{m}+\mu_{s}^{m}+\mu_{s}^{d}+\kappa_{t}^{d}\right].$$

We estimate the previous equation in two steps. The first step estimates misclassification probabilities based on estimates of AFDC/TANF reporting rates in the PSID by Meyer et al. (2015) considering that $\mathrm{E}\left(\tau_{1,ist}\right)=\tau_{1t}$. In the second stage, we estimate the parameters of interest, (δ,γ,θ), by estimating the model of y_{ist}^{d} on weighted independent variables including a weighted intercept $[1-\hat{\tau}_{1t}]\alpha$, $[1-\hat{\tau}_{1t}]\mu_{s}^{m}$, $[1-\hat{\tau}_{1t}]\mu_{s}^{d}$, and $[1-\hat{\tau}_{1t}]\kappa_{t}^{d}$.

Table S.2-1 shows PSID reporting rates for dollar amount in transfers and number of cases for AFDC/TANF and SNAP (obtained from Meyer et al., 2015). The estimation parameter used in misclassification bias correction estimates, $(1 - \hat{\tau}_{1t})$, is the imputed reporting rate (or the greater of the two reporting rates for daughter's broader safety net estimates). This imputed rate is equal to the reporting rate for transfers in the first column inflated by the average ratio of the reporting rates for transfers and cases given the years with available data, which is approximately 1.118 for AFDC/TANF and 0.992 for SNAP. In years where we are missing both rates for amounts and cases, we linearly interpolate between observed years and use a two-year moving average for the last years.

TABLE S.2-1. PSID REPORTING RATES FOR MISCLASSIFICATION BIAS CORRECTION

	AFDC/TANF			Food stamps/SNAP		
	Meyer et al. (2015)		Estimation	Meyer et al. (2015)		Estimation
Year	Transfers	Cases	parameter	Transfers	Cases	parameter
1975	0.646		0.722	0.779		0.773
1976	0.662		0.740	0.734		0.740
1977	0.630		0.704	0.754		0.748
1978	0.661		0.739	0.772		0.766
1979	0.642		0.717	0.782		0.776
1980	0.700		0.782	0.761	0.782	0.782
1981	0.699		0.781	0.761	0.780	0.781
1982	0.679		0.759	0.832	0.841	0.826
1983	0.708		0.791	0.808	0.817	0.802
1984	0.631		0.705	0.830	0.784	0.824
1985	0.594		0.664	0.817	0.786	0.811
1986	0.587		0.656	0.818	0.841	0.812
1987	0.555		0.620	0.871	0.846	0.864
1988	0.620		0.693	0.862	0.847	0.855
1989	0.576		0.644	0.982	0.845	0.974
1990	0.586		0.655	0.857	0.770	0.850
1991	0.612		0.684	0.756	0.681	0.750
1992	0.600		0.671	0.731	0.720	0.725
1993	0.528	0.605	0.590	0.621	0.700	0.616
1994	0.474	0.569	0.530	0.662	0.686	0.657
1995	0.493	0.539	0.551	0.632	0.652	0.627
1996	0.541	0.572	0.605	0.572	0.604	0.605
1997			0.508	0.509	0.522	0.508
1998	0.369	0.403	0.412	0.563	0.561	0.559
1999			0.387	0.654	0.535	0.649
2000	0.323	0.445	0.361	0.617	0.583	0.612
2001			0.350	0.592	0.573	0.587
2002	0.303	0.343	0.339	0.744	0.595	0.738
2003	0.387	0.458	0.432	0.685	0.719	0.680
2004	0.487	0.510	0.544	0.718	0.807	0.712
2005	0.285	0.285	0.318	0.688	0.635	0.683
2006	0.395	0.365	0.441	0.693	0.758	0.688
2007			0.472	0.742	0.794	0.736
2008	0.450	0.497	0.503	0.777	0.791	0.771
2009			0.486	0.704	0.764	0.699
2010	0.419	0.504	0.468	0.648	0.713	0.643
2011			0.477			0.671
2012			0.473			0.657

Notes: PSID reporting rates for dollar amount in transfers and number of cases for AFDC/TANF and food stamps/SNAP are estimated in Meyer et al. (2015).

S.3. Changes in Participation after Reform: Understanding the Mechanical Effect

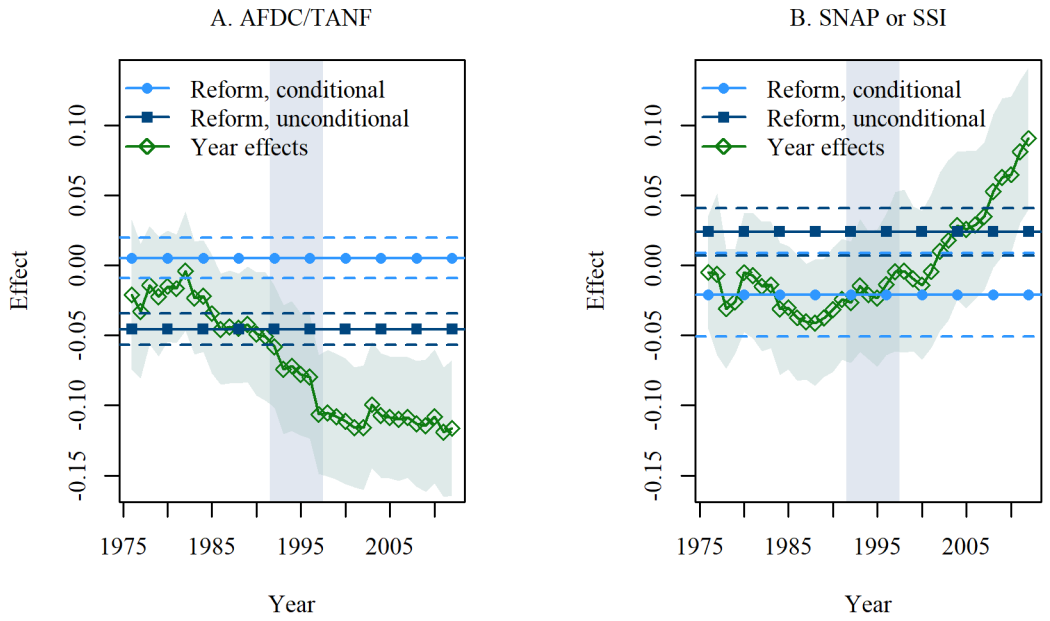
In this section, we carefully review the implications that AFDC/TANF participation decreases after welfare reform. First, we explore the role of welfare reform on daughter's participation in AFDC/TANF apart from the intergenerational component as well as the connections between our empirical approaches in Tables 1 and 4 in the manuscript. Then, we demonstrate (mathematically and by using simulations) that the difference-in-difference parameter that is interpreted as the causal effect of the reform is not affected by intergenerational changes in participation. Lastly, we provide a close comparison between results in Table 1 and Table 4, providing a decomposition of reform effects on AFDC/TANF participation and a detailed interpretation of our main empirical findings.

S.3.1. Models With and Without Year Effects

We first show that the reduction in the probability of participating in the period after is captured by the effect after the reform in our model (3). The left panel in Figure S.3-1 shows that the unconditional effect of welfare reform on daughter's welfare participation is negative, as expected. When we include year effects (also shown in the figure), we see that the estimate of interest becomes positive, and the year effects are negative, in particular after the reform is introduced. Note too that the year effects decrease over time, as expected. If one were to ignore state effects and look at the year effects alone before 1992 and the year effects plus the welfare reform effect after 1997, then the estimates suggest that reform does not matter in the pre-reform period and that the total effect after reform is negative and has a magnitude similar to the expected drop in welfare participation. To illustrate and emphasize this important point more clearly, the right panel shows year fixed effects in a model of participation on SNAP or SSI, and they are positive and increasing, as expected.

Further, we provide complementary evidence for netting out the mechanical effect. Table 1 results show a descriptive before/after comparison to motivate the idea that the policy changes intergenerational correlations within regime such that mothers and daughters face similar welfare policy environments. Table 4 continues to net out the intergenerational differences in program access through the difference-in-difference framework, and the results are consistent across a wide range of specifications, including a quadratic in state trends as well as time-varying state-level policy and macroeconomic variables along with characteristics of mothers and daughters. Tables 1 and 4 of the main paper provide very similar results.

FIGURE S.3-1. ESTIMATES OF THE EFFECT OF REFORM AND YEAR EFFECTS ON DAUGHTERS' AFDC/TANF VERSUS SNAP OR SSI PARTICIPATION



Notes: The reform effects on daughter's welfare participation are shown unconditionally and conditioning on year effects only. Estimates include PSID longitudinal weights, and 95-percent confidence intervals are shown based on state clustering.

To investigate whether changes in intergenerational program access across regimes before and after reform may bias our difference-in-difference specification, we re-estimate the least squares models and provide new evidence in Table S.3-1. Specifically, Table S.3-1 reproduces our within-regime approach from Table 1 applied to our difference-in-difference framework as in Table 4. Because the within-regime restriction limits post-reform daughter observation years, the model is estimated without time effects; however, this specification issue is only relevant to the coefficient on the after-reform indicator.

In Table S.3-1 columns (1)-(3) and (5)-(7), we use the same within-regime restrictions applied to all adult daughter observations for ages 19-27 as in Table 1, first in a before/after setting (1254 daughters before, 476 after), and then pooled together in the difference-in-difference setting (1730 combined daughters observed within-regime, 9678 total observations). In columns (4) and (8), we show the difference-in-difference estimates where we use all mother-daughter pairs, those observed within-regime and those who cross over regime periods, which corresponds to our baseline sample in the manuscript (2961 daughters total, 56068 observations).

TABLE S.3-1. INTERGENERATIONAL TRANSMISSION OF MOTHER'S AFDC/TANF PARTICIPATION BY ESTIMATION SAMPLE: FULL PSID SAMPLE AND WITHIN-REGIME WELFARE REFORM OBSERVATIONS

Daughter's outcome variable:	AFDC/TANF				AFDC/TANF, SNAP, SSI			
			Difference-in-difference				Difference-in-difference	
Estimation sample:	Within-regime: Before	Within-regime: After	Within-regime: Before/after	Within and across regimes	Within-regime: Before	Within-regime: After	Within-regime: Before/after	Within and across regimes
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother's participation	0.170	0.050	0.167	0.145	0.243	0.272	0.233	0.226
	(0.023)	(0.022)	(0.022)	(0.013)	(0.023)	(0.061)	(0.024)	(0.018)
After welfare reform			-0.002	0.038			-0.065	0.002
			(0.024)	(0.009)			(0.044)	(0.013)
Mother's participation × after welfare reform			-0.123	-0.100			0.032	-0.041
			(0.032)	(0.015)			(0.061)	(0.017)
Percent change in levels		-71%	-74%	-69%		12%	14%	-18%
p-value		0.000	0.000	0.000		0.720	0.612	0.011
Number of daughters	1254	476	1730	2961	1254	476	1730	2961
Observations	7703	1975	9678	56068	7703	1975	9678	56068

Notes: Columns (1)-(3) and (5)-(6) correspond to the sample of daughters in Table 1 of the manuscript, which is restricted to only daughters observed within welfare regime yet shown here with multiple observations for daughters at different ages and circumstances. Columns (4) and (8) correspond to the baseline sample in Table 4. All specifications use our baseline set of control variables except for year effects given the gap in crossover years and concentration in post-reform years later in the sample, which has negligible effect on our parameters of interest but changes the after-welfare reform estimate. See notes for Tables 1 and 4 for details.

The table shows two clear results. First, taking advantage of the longitudinal nature of the PSID does not affect the estimate of the AFDC/TANF intergenerational correlation coefficient. The before/after change in columns (1) and (2) is 0.170-0.050 = -0.120, which is similar to the change in estimates in Table 1 columns (1)-(2): -0.132, a -63% change in levels. Second, more importantly, the difference-in-difference specification in column (3)—using only within-regime daughters—offers estimates that are again similar to our baseline sample estimates in column (4). The effect of mothers' AFDC/TANF participation on daughters' participation after reform is 0.044 in column (3) and 0.045 in column (4). If anything, this evidence suggests that using the full panel of daughters attenuates the intergenerational effect given that the percent change falls in magnitude from -74 to -69 percent from column (3) to (4). This difference may be related to window bias in the restricted sample.

In sum, while the evidence strongly suggests that "crossover" mother-daughter pairs do not explain the reduction in AFDC/TANF intergenerational transmission in our difference-in-difference results, these additional observations are important for us to properly address econometric issues such as selection and misclassification. It is also important to note that our model allows for learning and updating information that implies that the welfare reform regime "crossover" observations provide variation to identify our main parameters: daughters can reinterpret the benefits and costs of reform differently based on family experience with welfare. While welfare experience cannot be unlearned (in

the sense of the mother's welfare participation variable being any prior participation), welfare reform can change the influence of that experience on daughters' decisions.

S.3.2. A Mathematical Explanation and Simulation Evidence

We offer now a mathematical explanation why the mechanical effect is not the driver of our transmission results. For simplicity, consider equation (3) and two periods, before and after welfare reform: $R = \{0,1\}$, without independent variables and individual effects. Also, to simplify the exposition, assume that participation is exogenous (e.g., y^m and υ are independent). Thus, the daughter's welfare participation equation can be written as,

$$y^d = \alpha + \delta y^m + \gamma R^m + \theta R^m y^m + \upsilon.$$

The difference-in-differences effect of welfare reform on the intergenerational transmission of welfare participation is given by

$$\theta = \left[E\left(y^d \middle| y^m = 1, R^m = 1\right) - E\left(y^d \middle| y^m = 1, R^m = 0\right)\right] - \left[E\left(y^d \middle| y^m = 0, R^m = 1\right) - E\left(y^d \middle| y^m = 0, R^m = 0\right)\right].$$

It is known that we can rewrite the model as:

$$y_0^d = \alpha + \delta y_0^m + \upsilon_0,$$

for the pre-reform period, and

$$y_1^d = \alpha + \delta y_1^m + \gamma + \theta y_1^m + \upsilon_1 = (\alpha + \gamma) + (\delta + \theta) y_1^m + \upsilon_1,$$

for the post-reform period. Therefore,

$$E\left(y_0^d \middle| y_0^m\right) = \alpha + \delta y_0^m, \qquad \text{and}$$
$$E\left(y_1^d \middle| y_1^m\right) = (\alpha + \gamma) + (\delta + \theta) y_1^m.$$

Suppose now that welfare participation in the post-reform period reduces mothers' participation probability by some fraction c, where $0 < c < 1$, and reduces daughters' probability without changing the intergenerational transmission effect directly. To that end, we assume that $\gamma < 0$. Therefore, $E(y_0^m) = \pi$, $E(y_1^m) = c\pi$, and note that, by the Law of Iterated Expectations,

$$E\left(y_0^d\right) = \alpha + \delta\pi, \qquad \text{and}$$
$$E\left(y_1^d\right) = (\alpha + \gamma) + (\delta + \theta) c\pi.$$

Because of the reform, participation decreased for both mothers and daughters. Note, however, that there is no effect on the intergenerational transmission effect:

$$\left[E\left(y_1^d \middle| y_1^m = 1\right) - E\left(y_0^d \middle| y_0^m = 1\right)\right] - \left[E\left(y_1^d \middle| y_1^m = 0\right) - E\left(y_0^d \middle| y_0^m = 0\right)\right] = \left[\left((\alpha + \gamma) + (\delta + \theta)\right) - (\alpha + \delta)\right] - [(\alpha + \gamma) - \alpha] = \theta.$$

Therefore, as long as our model

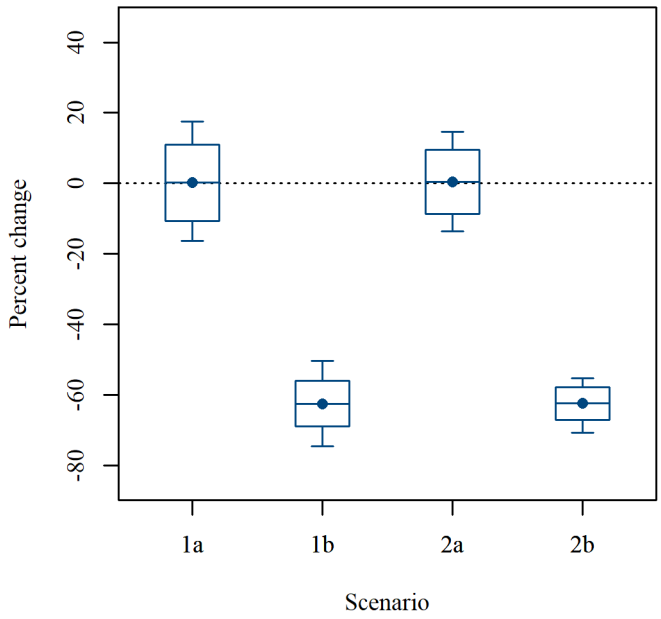
$$y^d = \alpha + \delta y^m + \gamma R^m + \theta R^m y^m + \upsilon,$$

includes R^m to control for the changes in the baseline probability and that the probability of mother's participation is not either 0 or 1, equation (3) can be used to identify the effect of the reform on daughters' welfare participation.

To illustrate the result described mathematically above, we provide a simple Monte Carlo experiment. We simulate welfare participation for the baseline estimation sample using different scenarios for the policy parameter θ and the baseline participation. We present different variations of the data generating process described by the difference-in-difference model. In the first scenario, the participation of both daughters and mothers is lower in the period after reform. In the second scenario, while the participation of daughters is lower in the period after reform, the participation of mothers in the period after is equal to the period before the reform. In scenario 1a, welfare reform reduces both mother's and daughter's participation, and we assume $\theta = 0$. In scenario 1b, we set $\theta = -0.125$. Scenario 2 only changes the daughter's participation probability while keeping the mother's probability constant across periods, and again, 2a corresponds to $\theta = 0$, and 2b corresponds to $\theta = -0.125$. We select parameter values that reasonably approximate the observed statistics of the estimation sample: $\pi = 0.25$, $c = 0.5$, $\alpha = 0.05$, $\gamma = -0.05$, $\delta = 0.2$, and we use the sample values of the welfare reform indicator, R. Moreover, mother's welfare participation is generated as $\tilde{y}^m = 1(u < \pi(1 - R) + c\pi R)$ in Scenario 1, and $\tilde{y}^m = 1(u < \pi)$ in Scenario 2, where u is a uniform random variable, $\mathcal{U}[0,1]$. The daughter's participation is determined by $\tilde{y}^d = 1(v < \alpha + \gamma R + \delta\tilde{y}^m + \theta R\tilde{y}^m)$, where v is also distributed as $\mathcal{U}[0,1]$. Scenario 1b closely represents the case of welfare reform and the other cases are presented for completeness and to emphasize that our framework is general and accommodates different scenarios.

Figure S.3-2 shows simulation results for the true percentage change in intergenerational transmission which is 0 in scenarios 1a and 2a, and $100 \times (\theta/\delta) = -62.5$ percent in scenarios 1b and 2b. In the cases where the true reform effect on intergenerational transmission is assigned a zero parameter value, the difference-in-difference estimates show that there are no mechanical effects confounding the true null result (Scenarios 1a and 2a). However, when we set $\theta = -0.125$, the results, as expected, indicate a clear reduction in intergenerational transmission of about 62.5 percent.

FIGURE S.3-2. PERCENT CHANGE TO THE INTERGENERATIONAL TRANSMISSION OF WELFARE PARTICIPATION: SIMULATIONS GIVEN ASSUMPTIONS ON MECHANICAL REFORM EFFECTS AND DIFFERENCE-IN-DIFFERENCE ESTIMATES



Notes: The estimates shown above are based on 1000 replications using the baseline estimation sample with randomly assigned welfare participation given different model assumptions on the effects of first-generation welfare participation and the impact of welfare reform.

S.3.3. Effect of the Reform: Levels, Baseline Changes, and a Decomposition

When we estimate the percent change in levels of daughters' welfare participation after reform, we use a simple percent-change formula, $\hat{\theta}/\hat{\delta}$ (the estimated difference-in-difference interaction effect of reform and mother's participation, $\hat{\theta}$, divided by the estimated intergenerational effect of the mother, $\hat{\delta}$). In the manuscript, we denote $\hat{\theta}/\hat{\delta}$ as 'percentage change in levels'. To adjust conservatively for mechanical changes in the daughters' welfare participation probabilities before and after reform, we consider alternative ways to express the effect sizes relative to changes in estimated participation probabilities for each time period.

One consideration would be to show how much larger the percent change in intergenerational transmission is relative to the percent change in participation probabilities across welfare regimes:

$$\hat{\Delta}_1 = \frac{\frac{\hat{\theta}}{\hat{\delta}} - \frac{\hat{p}_1 - \hat{p}_0}{\hat{p}_0}}{\frac{\hat{p}_1 - \hat{p}_0}{\hat{p}_0}} = \frac{\hat{\theta}}{\hat{\delta}} \cdot \frac{\hat{p}_0}{\hat{p}_1 - \hat{p}_0} - 1.$$

The daughter's estimated probability of welfare participation is $\hat{p}_1$ in the post-reform period, and $\hat{p}_0$ represents the mean probability over the whole time period, $\hat{p}_0 = \bar{p}$, following the assumptions of the

difference-in-differences model (Table 4). Alternatively, we can rescale the intergenerational effect over baseline probabilities:

$$\hat{\Delta}_2 = \frac{\frac{\hat{\delta}+\hat{\theta}}{\hat{p}_1} - \frac{\hat{\delta}}{\hat{p}_0}}{\frac{\hat{\delta}}{\hat{p}_0}} = \frac{\hat{\delta}+\hat{\theta}}{\hat{\delta}} \cdot \frac{\hat{p}_0}{\hat{p}_1} - 1.$$

(For context, we provide $\hat{\Delta}_2$ in Table 4, 'percent change over baseline'.) Note that these variations on rescaling the intergenerational effects are mathematically very similar.

Table S.3-2 provides estimates of $\hat{\Delta}_1$ and $\hat{\Delta}_2$ for Table 4. Comparing percent changes in transmission relative to participation probabilities, our estimates show that the reform effect on intergenerational transmission was 59 percent larger than relative changes in the participation probability for AFDC/TANF (Table S.3-2 column (4)). Using the percent change over baseline estimates presented in column (5), we obtain a 44 percent decrease over the baseline odds of participation, which is reported in Table 4. If we consider results adjusted for underreported welfare participation, we find a reform effect that was 84 percent larger than relative changes in participation, or a 32 percent decrease over baseline odds. The results, again, are complementary and help illustrate the intergenerational effect sizes.

TABLE S.3-2. PERCENT CHANGE AFTER WELFARE REFORM

	Base period (1)	Post-reform (2)	Change (3)	$\hat{\Delta}_1$ (4)	$\hat{\Delta}_2$ (5)
	Table 4, column (2): Difference-in-difference IV estimates				
Mother's participation effect	0.268	0.085	-0.183	58.67	-44.19
Daughter's participation probability	0.044	0.025	-0.019		
	Table 4, column (4): Misclassification-corrected IV estimates				
Mother's participation effect	0.425	0.208	-0.218	84.27	-32.42
Daughter's participation probability	0.078	0.056	-0.022		

Notes: The estimates in columns (3)-(5) correspond to calculations made before rounding. See Table 4 notes for details.

The daughter's change in participation probability is inclusive of the entire sample of daughters, regardless of whether their mothers participated. The percent change in intergenerational effects is specific to the subset of daughters whose mothers did participate. Therefore, the percent change in levels, $100 \times (\hat{\theta}/\hat{\delta})\%$, is arguably the correct measure for interpreting our difference-in-differences-type estimates.

Finally, we now ask the following important question: How much of the reduction of a daughter's participation probability can be attributed solely to the behavioral effect, as opposed to the mechanical effect? By employing equation (3), we provide a decomposition that implies a quantitative answer, which

complements the findings in Table S.3-2. To that extent, we consider a simple version of equation (3) with two periods, before and after welfare reform. The daughter's welfare participation equation can be written as,

$$y_{ist}^{d} = \alpha + \delta y_{is,\forall j<t}^{m} + \gamma R_{st}^{m} + \theta R_{st}^{m} y_{is,\forall j<t}^{m} + v_{ist}.$$

Using conditional expectation functions, under the established assumptions, we have that

$$E(y_{ist}^{d} = 1|R_{st}^{m} = 1) - E(y_{ist}^{d} = 1|R_{st}^{m} = 0) = \\ \gamma - \delta\, E\left(y_{is,\forall j<t}^{m} = 1\middle|R_{st}^{m} = 0\right) + (\delta + \theta)\, E\left(y_{is,\forall j<t}^{m} = 1\middle|R_{st}^{m} = 1\right),$$

where γ represents the change in the baseline probability over time, affecting all daughters regardless of whether previous generations participated on welfare. Further, the total effect of welfare reform on daughter's participation probability can be decomposed into mechanical effect, reduced exposure, and reduced transmission among those exposed:

$$\underbrace{\gamma}_{\text{Mechanical effect}} + \underbrace{\delta\left(E\left(y_{is,\forall j<t}^{m} = 1\middle|R_{st}^{m} = 1\right) - E\left(y_{is,\forall j<t}^{m} = 1\middle|R_{st}^{m} = 0\right)\right)}_{\text{Reduced exposure}} + \underbrace{\theta\, E\left(y_{is,\forall j<t}^{m} = 1\middle|R_{st}^{m} = 1\right)}_{\text{Reduced transmission}}$$

Considering non-parametric estimates of the conditional moments in Table 1, we have

$$-0.049 = 0.044 - 0.093 = \gamma - \delta\, E\left(y_{is,\forall j<t}^{m} = 1\middle|R_{st}^{m} = 0\right) + (\delta + \theta)\, E\left(y_{is,\forall j<t}^{m} = 1\middle|R_{st}^{m} = 1\right).$$

Moreover, based on columns (1) and (2) of Table 1, $\hat{\delta} = 0.210$, $\hat{\delta} + \hat{\theta} = 0.078$, and

$$\hat{E}\left(y_{is,\forall j<t}^{m} = 1\middle|R_{st}^{m} = 0\right) = 0.181,$$

$$\hat{E}\left(y_{is,\forall j<t}^{m} = 1\middle|R_{st}^{m} = 1\right) = 0.149.$$

Using these estimates, we obtain that $\hat{\gamma}$ is equal to -0.022, which accounts for 46 percent of the reduction of the baseline probability after reform. Further, it follows that,

$$\frac{\hat{\theta}\,\hat{E}\left(y_{is,\forall j<t}^{m} = 1\middle|R_{st}^{m} = 1\right)}{E(y_{ist}^{d} = 1|R_{st}^{m} = 1) - E(y_{ist}^{d} = 1|R_{st}^{m} = 0)} = \frac{-0.132\ \times 0.181}{-0.049} = 0.405,$$

implying that 40 percent of the reduction of welfare participation in AFDC/TANF can be attributed specifically to a reduction of intergenerational transmission after reform. The remaining 13 percent of the total reform effect on daughter participation came from reduced exposure because the mothers were less likely to participate. Using estimates from Table 4 columns (1) and (2), we get analogous results of 50 to

91 percent, respectively, of reduced welfare participation after reform attributed to a reduced transmission across generations.

S.4. An Investigation on Possible Mechanisms

We find that AFDC/TANF participation decreased after welfare reform, while participation in the broader safety net did not. The results in Table 6 of the main text also demonstrate that there is a strong tie between mother's AFDC/TANF participation and other daughter outcomes in adulthood, and this link persisted after welfare reform. A question arises then of whether some of the influence of mother's welfare usage affects the daughter's welfare participation indirectly through other socioeconomic outcomes of the daughter such as labor supply, marriage, fertility, and human capital. A fully structural intergenerational model of mother's welfare participation on the joint choice of these outcomes is beyond the scope of the current analysis. However, we still are interested in identifying some of these potential mediating mechanisms. In this section, we propose a recursive system of equations to identify the direct effect of mother's welfare participation on daughter's participation as well as the indirect effect of mother's participation on daughter's participation choices that could occur through other socioeconomic domains, while controlling for potential endogeneity of those outcomes using the control function approach in a quasi-maximum likelihood framework.

S.4.1. Models and Parameters

Consider a slight modification of our equation (3) in the manuscript of daughter's welfare participation as

$$y_{ist}^{d} = \alpha + \delta y_{is,\forall j<t}^{m} + \gamma R_{st}^{m} + \theta R_{st}^{m} y_{is,\forall j<t}^{m} + \xi M_{ist}^{d} + \varphi R_{st}^{m} M_{ist}^{d} + \boldsymbol{\beta}' \boldsymbol{X}_{ist}^{d} + v_{ist}^{d}, \tag{S.1}$$

where, as before, y_{ist}^{d} indicates whether daughter *i* residing in state s at time period t participates in welfare, $y_{is,\forall j<t}^{m}$ indicates if her mother participates in welfare in any prior period, R_{st}^{m} is an indicator variable for welfare reform, $\boldsymbol{X}_{ist}^{d}$ is the vector of control variables described in Section V, including mother's state effects, daughter's state effects, and time effects, and v_{ist}^{d} is the error term. The variable M_{ist}^{d} represents a possible mechanism through which mother's welfare indirectly influences the daughter's welfare choice, such as the daughter's labor supply choice, marriage, fertility, or human capital. We permit this mechanism to have differential effects after welfare reform, and thus we include the interaction term $R_{st}^{m} M_{ist}^{d}$. In this model we not only have to confront the endogeneity of mother's welfare participation $y_{is,\forall j<t}^{m}$, but also the potential endogeneity of the mechanism M_{ist}^{d}. Moreover, we

wish to isolate the direct effect of the mother's welfare participation on the daughter's welfare decision from the indirect influence operating through the mechanism.

To identify the direct and indirect parameters of interest, we propose the following recursive system of equations:

$$y^m_{is,\forall j<t} = b_{10} + \boldsymbol{b}'_{11}\boldsymbol{Z}^m_{ist} + b_{12}R^m_{st} + \boldsymbol{b}'_{13}\boldsymbol{X}^d_{ist} + V_{1,ist}, \tag{S.2}$$

$$R^m_{st}y^m_{is,\forall j<t} = b_{20} + \boldsymbol{b}'_{21}R^m_{st}\boldsymbol{Z}^m_{ist} + b_{22}R^m_{st} + \boldsymbol{b}'_{23}\boldsymbol{X}^d_{ist} + V_{2,ist}, \tag{S.3}$$

$$\begin{aligned} M^d_{ist} = {} & c_{10} + \boldsymbol{c}'_{11}\boldsymbol{H}^d_{ist} + c_{12}y^m_{is,\forall j<t} + c_{13}R^m_{st} + c_{14}R^m_{st}y^m_{is,\forall j<t} + \boldsymbol{c}'_{15}\boldsymbol{X}^d_{ist} + V_{3,ist} \\ & + \lambda_{31}V_{1,ist} + \lambda_{32}V_{2,ist}, \end{aligned} \tag{S.4}$$

$$\begin{aligned} R^m_{st}M^d_{ist} = {} & c_{20} + \boldsymbol{c}'_{21}R^m_{st}\boldsymbol{H}^d_{ist} + c_{22}y^m_{is,\forall j<t} + c_{23}R^m_{st} + c_{24}R^m_{st}y^m_{is,\forall j<t} + \boldsymbol{c}'_{25}\boldsymbol{X}^d_{ist} + V_{4,ist} \\ & + \lambda_{41}V_{1,ist} + \lambda_{42}V_{2,ist}, \end{aligned} \tag{S.5}$$

$$\begin{aligned} y^d_{ist} = {} & d_{10} + d_{11}y^m_{is,\forall j<t} + d_{12}R^m_{st} + d_{13}R^m_{st}y^m_{is,\forall j<t} + d_{14}M^d_{ist} + d_{15}R^m_{st}M^d_{ist} + \boldsymbol{d}'_{16}\boldsymbol{X}^d_{ist} + V_{5,ist} \\ & + \lambda_{51}V_{1,ist} + \lambda_{52}V_{2,ist} + \lambda_{53}V_{3,ist} + \lambda_{54}V_{4,ist}. \end{aligned} \tag{S.6}$$

Equations (S.2) and (S.3) are the same first stage regressions used in Table 4 of the paper, and equations (S.4) and (S.5) represent a model for outcome variable M^d_{ist} and its interaction with after reform, which each include a vector of state and time-varying policy observables $\boldsymbol{H}^d_{ist}$ to assist with identification along with latent errors controlling for the endogeneity of mother's welfare participation ($V_{1,ist}$ and $V_{2,ist}$). Finally, equation (S.6) is the equation of interest, and it is a rewritten version of equation (3) augmented by latent errors controlling for the endogeneity of mother's welfare and its interaction with welfare reform ($V_{1,ist}$ and $V_{2,ist}$), and the daughter's potential mechanism and interaction with reform ($V_{3,ist}$ and $V_{4,ist}$).

Importantly, the system of equations in (S.2)-(S.6) rests on the recursive structure whereby the decision-making is sequential, with the daughter's decisions on labor supply, marriage, fertility, or human capital preceding her welfare participation choice. However, those decisions are assumed to be correlated with the mother's welfare participation, and thus we include the series of latent unobserved error terms in each of equations (S.4)-(S.6). System of equations methods of this form have a long tradition in economics and other social sciences (Heckman, 1978; Heckman and Robb, 1985; Muller, Judd, and Yzerbyt, 2005; Imbens and Newey, 2009; Blundell and Matzkin, 2014; among others). For example, in the framework considered in Muller et al. (2005), the direct intergenerational effect of mother's participation on daughter's welfare is d_{11}, while the indirect intergenerational effect of mother's participation on daughter's welfare via the outcomes M^d_{ist} and $R^m_{st}M^d_{ist}$ is $c_{12}d_{14} + c_{22}d_{15}$. Then, the total effect of mother's participation on daughter's welfare is the sum of the direct and indirect effects, i.e.,

$d_{11} + c_{12}d_{14} + c_{22}d_{15}$. The Muller et al. model is based on the assumption that the mechanism is exogenous to the outcome of interest, but we extend that framework to the case of endogenous mechanisms. We next discuss the derivation of total, direct, and indirect effects in our model that includes endogenous variables, and then turn our attention to estimation.

After solving for $V_{1,ist}$ and $V_{2,ist}$ in equations (S.2) and (S.3) and replacing them in equations (S.4) and (S.5), we obtain

$$M_{ist}^{d} = \Psi_{30} + \boldsymbol{c}_{11}'\boldsymbol{H}_{ist}^{d} + \Psi_{31}y_{is,\forall j<t}^{m} + \Psi_{32}R_{st}^{m} + \Psi_{33}R_{st}^{m}y_{is,\forall j<t}^{m} + \boldsymbol{\Psi}_{34}'\boldsymbol{X}_{ist}^{d} + \boldsymbol{\Psi}_{35}'\boldsymbol{Z}_{ist}^{m} + \boldsymbol{\Psi}_{36}'R_{st}^{m}\boldsymbol{Z}_{ist}^{m} + V_{3,ist}, \quad \text{(S.7)}$$

$$R_{st}^{m}M_{ist}^{d} = \Psi_{40} + \boldsymbol{c}_{21}'R_{st}^{m}\boldsymbol{H}_{ist}^{d} + \Psi_{41}y_{is,\forall j<t}^{m} + \Psi_{42}R_{st}^{m} + \Psi_{43}R_{st}^{m}y_{is,\forall j<t}^{m} + \boldsymbol{\Psi}_{44}'\boldsymbol{X}_{ist}^{d} + \boldsymbol{\Psi}_{45}'\boldsymbol{Z}_{ist}^{m} + \boldsymbol{\Psi}_{46}'R_{st}^{m}\boldsymbol{Z}_{ist}^{m} + V_{4,ist}, \quad \text{(S.8)}$$

where the Ψ coefficients represent composites of the underlying parameters such that our parameters of interest in these equations can be summarized as $\Psi_{31} = c_{12} + \lambda_{31}$, $\Psi_{33} = c_{14} + \lambda_{32}$, $\Psi_{41} = c_{22} + \lambda_{41}$, and $\Psi_{43} = c_{24} + \lambda_{42}$. We solve for the unobserved errors in equations (S.2), (S.3), (S.7) and (S.8), and then we substitute them in equation (S.6) to arrive at:

$$y_{ist}^{d} = \Phi_0 + \Phi_1 y_{is,\forall j<t}^{m} + \Phi_2 R_{st}^{m} + \Phi_3 R_{st}^{m} y_{is,\forall j<t}^{m} + \Phi_4 M_{ist}^{d} + \Phi_5 R_{st}^{m} M_{ist}^{d} + \Phi_6'\boldsymbol{X}_{ist}^{d} + \Phi_7'\boldsymbol{H}_{ist}^{d} + \Phi_8'R_{st}^{m}\boldsymbol{H}_{ist}^{d} + \Phi_9'\boldsymbol{Z}_{ist}^{m} + \Phi_{10}'R_{st}^{m}\boldsymbol{Z}_{ist}^{m} + V_{5,ist}, \quad \text{(S.9)}$$

where the Φ parameters are reduced form coefficients. It follows that the direct intergenerational effect of mother's welfare participation on daughter's welfare participation is

$$\Phi_1 = d_{11} + \lambda_{51} - \lambda_{53}(c_{12} + \lambda_{31}) - \lambda_{54}(c_{22} + \lambda_{41}).$$

The indirect effect of mother's welfare participation on daughter's welfare participation may depend on some mechanism before/after reform, M_{ist}^{d} and $R_{st}^{m}M_{ist}^{d}$, which is given by

$$\Phi_4\Psi_{31} + \Phi_5\Psi_{41} = (d_{14} + \lambda_{53})(c_{12} + \lambda_{31}) + (d_{15} + \lambda_{54})(c_{22} + \lambda_{41}).$$

Thus, the total intergenerational effect on welfare participation can be written as

$$\Phi_1 + \Phi_4\Psi_{31} + \Phi_5\Psi_{41} = [d_{11} + d_{14}\,c_{12} + d_{15}\,c_{22}] + [\,\lambda_{51} + d_{14}\,\lambda_{31} + d_{15}\lambda_{41}], \quad \text{(S.10)}$$

where the first term in brackets represents the change in the probability of daughter's participation associated with the observed variables and the last term in brackets is the change associated with the latent variables in equations (S.2)-(S.6). In the case of no selection, we have that $\lambda_{31} = \lambda_{41} = \lambda_{51} = 0$, and therefore, the total effect is equal to the first term in brackets, which is interpreted as the total effect in models under exogeneity.

Similarly, one can obtain the total effect of mother's participation after welfare reform on daughter's welfare use:

$$\Phi_3 + \Phi_4\Psi_{33} + \Phi_5\Psi_{43} = [d_{13} + d_{14}\, c_{14} + d_{15}\, c_{24}] + [\, \lambda_{52} + d_{14}\, \lambda_{32} + d_{15}\lambda_{42}], \quad \text{(S.11)}$$

where the direct effect after reform is $\Phi_3 = d_{13} + \lambda_{52} - \lambda_{53}(c_{14} + \lambda_{32}) - \lambda_{54}(c_{24} + \lambda_{42})$, and the indirect effect after reform is $\Phi_4\Psi_{33} + \Phi_5\Psi_{43} = (d_{14} + \lambda_{53})(c_{14} + \lambda_{32}) + (d_{15} + \lambda_{54})(c_{24} + \lambda_{42})$.

S.4.2. Estimation

We adopt a control function approach for estimation of the system of equations (see, e.g., Heckman and Robb, 1985; Imbens and Newey, 2009). However, estimation of the model is not straightforward, because the endogenous variables are dichotomous and the model includes state effects, time effects, and survey weights. To provide results as close as possible to our main estimates in Table 4, we first regress the observed variables on mother's state effects, daughter's state effects, and time effects, weighted by the daughter's longitudinal weight. We then obtain the residuals from those regressions and use the residuals in place of the original variables in equations (S.2)-(S.6).

The system is then estimated in two additional steps. First, we take advantage of the recursive structure of the model to estimate the control functions. Specifically, we first estimate equations (S.2) and (S.3) using a linear probability model to obtain the parameter estimates $\hat{b}_{10}$, $\widehat{\boldsymbol{b}}'_{11}$, $\hat{b}_{12}$, $\widehat{\boldsymbol{b}}'_{13}$, $\hat{b}_{20}$, $\widehat{\boldsymbol{b}}'_{21}$, $\hat{b}_{22}$, and $\widehat{\boldsymbol{b}}'_{23}$, and then we generate $\hat{V}_{1,ist}$ and $\hat{V}_{2,ist}$ using a probit link function. In the same manner, using $\hat{V}_{1,ist}$ and $\hat{V}_{2,ist}$, we estimate equations (S.4) and (S.5) and generate the additional control variates $\hat{V}_{3,ist}$ and $\hat{V}_{4,ist}$. Second, we replace the latent error terms by their estimated counterparts $\hat{V}_{1,ist} - \hat{V}_{4,ist}$ in equation (S.6) and estimate the system of equations by a quasi-maximum likelihood (QML) method with clustered standard errors at the state level, which is consistent with the clustering approach adopted in Section V of the manuscript.

S.4.3. Empirical Results

In selecting daughter outcomes as potential mechanisms, we were motivated by the welfare reform literature to consider: whether the daughter has no family earnings, whether the daughter is unmarried and non-cohabiting, whether the daughter had a child when she was a teenager, and whether the daughter has less than a high school education. In terms of the exogenous variables, we include additional state-level factors that are time-varying, $\boldsymbol{H}^d_{ist}$, which may differ by outcome. For instance, the earnings outcome includes variables for the maximum weekly amount of unemployment benefits, whether the state minimum wage is above the federal minimum, whether there are prevailing wage laws, whether it is a right-to-work state, whether there is a state temporary disability insurance program, and

whether there are fair employment laws. For outcomes related to marriage or childbirth, we use variables for whether there is a no-fault divorce policy, whether the Ten Commandments are allowed in schools, citizen ideology measure, the percentage of evangelical residents, whether counseling is mandated before an abortion, whether pharmacies can dispense emergency contraception without a prescription, whether cities/municipalities are prohibited from passing rent control laws, whether there is a state-level equivalent to the Equal Rights Amendment, and a measure of the median and variance of policy liberalism. For the daughter's high school completion, we control for state-year price-adjusted public education expenses per capita as well as whether the Ten Commandments are allowed in schools. A further description of these variables is included in Section S.6 below.

Table S.4-1 compares IV results for our parameters of interest (panel A) to simultaneous equation model results considering the role of potential mechanisms (panel B). Because some data are missing on the mechanisms, in panel A we replicate our baseline models from Table 4 in the paper but we use the comparison sample of nonmissing mechanism observations for each mechanism. In panel B we present the total effect of mother's welfare participation and its interaction with welfare reform just as in panel A, but under the total effect we also present the direct effect and indirect effect as derived in equations (S.10) and (S.11). The first four columns show results for daughters' participation on AFDC/TANF, while the last four columns show results for participation on AFDC/TANF, SNAP, or SSI.

There are two findings of particular note. First, even with inclusion of the mechanisms and a different estimation procedure in panel B compared to panel A, the results are remarkably similar, underscoring once again the robustness of our baseline results. For example, in panel A using the IV approach as in the main paper, the before-reform effect of mother's AFDC/TANF participation on the daughter's AFDC/TANF participation in column (1) is 0.265, and the reform effect is -0.180, resulting in a 68% decline in transmission levels. The corresponding estimates in panel B including the mechanism variable of no daughter earnings and estimated with the quasi-MLE with control functions approach are 0.233 and -0.169, respectively, resulting in a 72% decline in transmission levels. Second, with the exception of daughter's earnings, the other potential mechanisms of marriage, teen childbirth, and low education have minor indirect transmission effects on daughter's welfare participation decision. There does appear to be an indirect pathway through daughter's labor supply choice, which is consistent with these programs being means-tested transfers. For instance, if the mother participated in AFDC/TANF, the daughter is 23 percentage points more likely to participate on AFDC/TANF as an adult, with 10 percentage points attributed to the indirect intergenerational effect (44 percent of the overall effect). This result implies that a mother's welfare use affects her daughter's welfare use and likelihood of future employment, which also contributes to her dependence on cash assistance. However, welfare reform attenuated that indirect pathway. The total effect of mother's welfare on the daughter after reform is 0.064

(=0.233-0.169), the post-reform direct effect is 0.050 (=0.131-0.081), and the post-reform indirect effect is the difference of the total and direct effects of 0.014, or about 22% of the total effect. A similar result obtains in column (5) when we consider participation in the wider safety net.

TABLE S.4-1. THE POTENTIAL ROLE OF MECHANISMS IN REFORM EFFECTS ON INTERGENERATIONAL WELFARE PARTICIPATION

Daughter's outcome:	AFDC/TANF				AFDC/TANF, SNAP, SSI			
Potential mechanism:	No family earnings (1)	Un-married/ cohabit. (2)	Had teenage childbirth (3)	Less than high school (4)	No family earnings (5)	Un-married/ cohabit. (6)	Had teenage childbirth (7)	Less than high school (8)
	A. Baseline IV estimates for samples with nonmissing mechanism observations							
Mother's participation	0.265	0.265	0.265	0.266	0.295	0.293	0.295	0.297
	(0.049)	(0.049)	(0.049)	(0.049)	(0.073)	(0.073)	(0.073)	(0.073)
Mother's participation	-0.180	-0.179	-0.179	-0.180	0.044	0.045	0.044	0.042
× after reform	(0.046)	(0.046)	(0.046)	(0.046)	(0.074)	(0.074)	(0.074)	(0.074)
Percent change in levels	-68%	-67%	-68%	-68%	15%	15%	15%	14%
p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.595]	[0.588]	[0.592]	[0.609]
	B. Decomposition with potential mechanisms via simultaneous equation models							
Mother's participation								
Total effect	0.233	0.254	0.249	0.306	0.329	0.364	0.350	0.399
	(0.022)	(0.020)	(0.024)	(0.027)	(0.034)	(0.024)	(0.027)	(0.024)
Direct effect	0.131	0.209	0.210	0.335	0.201	0.290	0.282	0.401
	(0.018)	(0.018)	(0.024)	(0.028)	(0.031)	(0.024)	(0.032)	(0.023)
Indirect effect	0.102	0.045	0.039	-0.029	0.128	0.074	0.068	-0.002
	(0.016)	(0.015)	(0.013)	(0.011)	(0.013)	(0.018)	(0.017)	(0.009)
Mother's participation × after reform								
Total effect	-0.169	-0.158	-0.169	-0.192	-0.102	-0.099	-0.107	-0.108
	(0.034)	(0.036)	(0.034)	(0.041)	(0.046)	(0.043)	(0.042)	(0.042)
Direct effect	-0.081	-0.113	-0.161	-0.181	-0.032	-0.047	-0.125	-0.151
	(0.024)	(0.027)	(0.029)	(0.036)	(0.035)	(0.039)	(0.031)	(0.041)
Indirect effect	-0.088	-0.046	-0.008	-0.011	-0.070	-0.053	0.018	0.043
	(0.016)	(0.017)	(0.016)	(0.019)	(0.016)	(0.020)	(0.024)	(0.016)
Number of daughters	2931	2931	2931	2953	2931	2931	2931	2953
Observations	55095	55120	55256	55561	55095	55120	55256	55561

Notes: All models control for daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, controls for the daughter's state AFDC/TANF benefit standard, EITC federal/state maximum credit, state-level SPM poverty rate, AFDC/TANF recipiency rate, unemployment rate, and state and year effects for the daughter as well as state effects for the mother's modal state when the daughter is aged 12-18. Panel A presents IV estimates as in Table 4 based on the subsample of observations with nonmissing mechanism data and control function estimates; robust standard errors with state clustering are shown in parentheses, p-values in brackets. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. The simultaneous equation results in panel B include additional controls for each mechanism; cluster-robust standard errors shown in parentheses are obtained using the delta method. The estimates in panel B are performed after demeaning the variables by state and year effects as well as incorporating control functions for endogeneity of mother's participation and the additional daughter outcome along with their interactions with welfare reform. Daughters' PSID core longitudinal weights are used in estimation.

In conclusion, the investigation of possible mechanisms presented in this section allows the intergenerational dependence parameter to be decomposed into direct and indirect effects, capturing how mother's welfare use impacts daughter's welfare participation via other aspects of daughter's adulthood. We derive intergenerational effects that can be consistently estimated in the presence of selection, a

fundamental challenge to identification we face in our work. Our results suggest that the pathway from mother's welfare participation on the daughter's welfare participation is largely direct, and is not confounded through indirect channels of marriage, fertility, and education choices of the daughter. We do find some evidence of an indirect pathway via daughter's labor supply choice. Interestingly, welfare reform essentially eliminated the contribution of this indirect effect of mother's participation with an 86 percent decrease, meaning post reform mother's direct transmission of knowledge of the program had the greatest influence on the daughter's welfare choice. The role of earnings in the daughter's wider safety net participation followed a similar pattern except that reform did not change the direct effect of mother's welfare participation, a result that could be associated with program substitution. These decomposition estimates should be seen as complementary to, and consistent with, the estimated IV results in the manuscript.

S.5. Instrumental Variables: Additional Results and Sensitivity Analysis

This section presents a detailed analysis on the instrumental variables approach to equation (3). We begin the section presenting first-stage results associated with the estimates shown in Table 4. We then investigate the quality and exogeneity of the instruments, perform a falsification test, and investigate the interpretation of our findings. We end this section by reporting the sensitivity of our IV results to including additional control variables.

S.5.1. First-Stage Results

Table S.5-1 offers first-stage results for the IV estimates of the mother's AFDC/TANF participation decision presented in Table 4 columns (2) and (4) of the paper. These results correspond to a model for daughters' AFDC/TANF participation. The first stage corresponding to the daughter's broader welfare participation (Table 4 columns (6) and (8)) is no different except for small effects when using a different misclassification correction when accounting for SNAP reporting rates as well as AFDC/TANF. As expected, AFDC/TANF is a strong predictor of the probability of mother's welfare participation, and the evidence is consistent with the commonly accepted premise that mother's welfare participation decision responds positively to greater average state-level AFDC/TANF benefit standards.

TABLE S.5-1. FIRST-STAGE INSTRUMENTAL VARIABLES ESTIMATES FOR MOTHER'S AFDC/TANF PARTICIPATION DECISION

Endogenous variable:	Mother's participation		Mother's participation × after reform	
	(1)	(2)	(3)	(4)
Average AFDC/TANF	0.542	0.546	-0.079	-0.051
	(0.091)	(0.098)	(0.031)	(0.023)
Reform × average AFDC/TANF	0.281	0.306	0.885	0.889
	(0.100)	(0.092)	(0.123)	(0.122)
Maximum AFDC/TANF	-0.314	-0.328	0.189	0.132
	(0.142)	(0.141)	(0.061)	(0.046)
Reform × maximum AFDC/TANF	-0.183	-0.202	-0.809	-0.811
	(0.090)	(0.083)	(0.100)	(0.100)
Misclassification correction	No	Yes	No	Yes
F test of excluded instruments	16.522	14.795	21.283	21.806
p-value	0.000	0.000	0.000	0.000
Weak IV test statistic	23.157	21.969	23.157	21.969
p-value	0.000	0.000	0.000	0.000
Number of daughters	2961	2961	2961	2961
Observations	56068	56068	56068	56068

Notes: Robust standard errors with state clustering are shown in parentheses. Both models control for daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, the daughter's state AFDC/TANF benefit standard, EITC federal/state maximum credit, state-level SPM poverty rate, AFDC/TANF recipiency rate, unemployment rate, and state and year effects for the daughter as well as state effects for the mother's modal state when the daughter is aged 12-18. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. The misclassification correction uses reporting rates in the PSID to address potential misreporting for the daughter's welfare participation (see Section S.2 for details). Daughters' PSID core longitudinal weights are used in estimation.

S.5.2. Policy Instruments and Macroeconomic Variables

Table S.5-2 compares estimates for the parameters of interest in equation (3) obtained from using different sets of instrumental variables, which are key to identifying the effect of mother's participation given her possible selection into welfare. In all the variations of the model, we instrument for mother's previous welfare participation using the policy parameters defined by the state AFDC/TANF benefit guarantee. We include instruments defined by family size (as in Table 4) and family of four. The table also shows results by using other state-by-year instruments, including the overall application denial rate for AFDC/TANF, the application denial rate for procedural reasons, the rate at which wrongful denials are overturned through favorable hearing claims, and the state unemployment rate over daughter's critical exposure ages 12-18. The first three of these are indicators for how administratively stringent the states application procedures are and are potentially strong instruments for separating the welfare trap from the poverty trap. Because of missing data on some of the instruments, the sample sizes vary between specifications (1)-(4), and in specifications (5)-(8) we use a restricted sample of daughters who were ages 16-35 in 1991 because of more severe data limitations on instruments. Regardless, across the 8 columns in Table S.5-2, we obtain similar conclusions regarding transmission effects both before and after welfare reform as in Table 4.

TABLE S.5-2. INTERGENERATIONAL TRANSMISSION OF AFDC/TANF PARTICIPATION WITH ALTERNATIVE INSTRUMENTAL VARIABLES

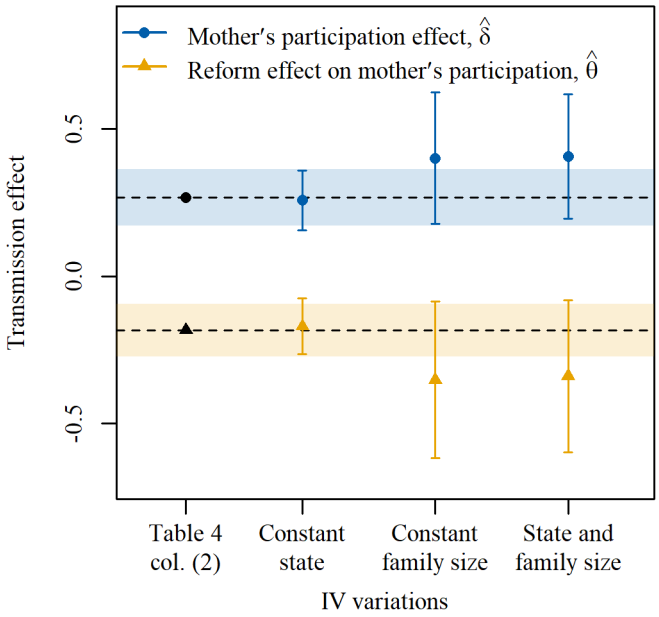
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All daughters				Daughters aged 16-35 in 1991			
Mother's participation	0.268	0.475	0.305	0.326	0.331	0.456	0.297	0.320
	(0.049)	(0.156)	(0.047)	(0.048)	(0.062)	(0.183)	(0.055)	(0.057)
After welfare reform	0.069	0.114	0.080	0.088	0.097	0.114	0.088	0.093
	(0.021)	(0.054)	(0.023)	(0.019)	(0.028)	(0.064)	(0.024)	(0.025)
Mother's participation ×	-0.183	-0.298	-0.217	-0.243	-0.274	-0.315	-0.247	-0.262
after welfare reform	(0.046)	(0.132)	(0.048)	(0.039)	(0.058)	(0.155)	(0.055)	(0.053)
Instrumental variables (measured when daughter aged 12-18):								
AFDC/TANF (by family size)	Yes	No	Yes	Yes	Yes	No	Yes	Yes
AFDC/TANF (for family of 4)	No	Yes	No	No	No	Yes	No	No
AFDC/TANF application denial rate	No	No	Yes	Yes	No	No	No	No
Unemployment rate	No	No	No	Yes	No	No	No	No
AFDC/TANF procedural denial rate	No	No	No	No	No	No	Yes	Yes
AFDC/TANF favorable claims rate	No	No	No	No	No	No	No	Yes
Weak IV test statistic	23.157	6.327	25.680	28.010	17.857	5.061	20.117	22.647
p-value	0.000	0.097	0.001	0.003	0.000	0.167	0.005	0.020
Hansen J statistic	1.315	1.122	10.853	11.902	2.435	3.085	4.459	8.550
p-value	0.518	0.571	0.093	0.292	0.296	0.214	0.615	0.575
Percent change in levels	-68%	-63%	-71%	-75%	-83%	-69%	-83%	-82%
p-value	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000
Number of daughters	2961	2961	2951	2951	1422	1422	1422	1422
Observations	56068	56068	55873	55873	32988	32988	32988	32988

Notes: Given the limited data availability of procedural denial and favorable claims across years, estimates in columns (5)-(8) use a restricted sample of daughters who were ages 16-35 in 1991. Robust standard errors with state clustering are shown in parentheses. All specifications control for daughter's state and year effects and mother's modal state effects in addition to daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, daughter's state AFDC/TANF benefit standard, daughter's EITC federal/state maximum credit, state-level poverty rate, AFDC/TANF recipiency rate, and unemployment rate. Instrumental variables vary by column and include average and maximum [or minimum for denial rates] measures of indicated variables, which are defined over the daughter's critical exposure ages 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. Daughters' PSID core longitudinal weights are used in estimation.

It is natural that the IV measures vary by family size according to state benefit standards because this variation is most closely associated with the mother's welfare participation decision in the first generation. In Table S.5-2, fixing the instrument measurement for a family of four removes some of the identifying variation associated with family differences. Here, we explore how much identifying variation may be associated with potential within-family changes in number of children and state of residence during the critical exposure period when a daughter is aged 12 to 18. For example, a daughter at age 12 may have older siblings that age out of the family unit during this period, or a family may relocate across states (although cross-state mobility is fairly limited among lower-income families). In Figure S.5-1, we provide a comparison of our main IV results from Table 4 column (2) in the manuscript to different IV constructions based on constant family size and state of residence during the critical exposure period. Specifically, we take the family size and/or state when the daughter is aged 12 and construct IV measures of the average and maximum AFDC/TANF benefit standard accordingly over the years when the daughter is aged 12 to 18, that is, based purely on state-level policy changes. Age 12 is the beginning of

the critical exposure period over which our main IVs are defined. Figure S.5-1 shows that holding state of residence constant makes little difference, and point estimates when holding family size constant are generally larger in magnitude and less precise, yet there is no loss in qualitative interpretation for our main results.

FIGURE S.5-1. IV ESTIMATES OF WELFARE TRANSMISSION AND REFORM EFFECTS BY HOLDING FAMILY SIZE AND STATE OF RESIDENCE CONSTANT WHEN DETERMINING AFDC/TANF BENEFIT STANDARD LEVELS



Notes: Estimates corresponding to Table 4 column (2) are represented by dashed lines and shaded regions indicating 95-percent confidence intervals. Estimates for instrument variations are shown for measures that hold constant the number of children or state of residence when the daughter is age 12, and these characteristics are used for determining the average and maximum state-level AFDC/TANF benefit standard in each year during the critical exposure period, daughter's ages 12 to 18.

In a previous version of the manuscript, we also instrumented for mother's prior welfare use with the combined federal and state EITC along with the state AFDC/TANF benefit guarantee. The maximum federal EITC is set by the U.S. Congress to vary by the number of qualifying children in the family and the state portion is set by state legislatures typically as a fixed percentage of the federal credit. A higher EITC means that work is more attractive than welfare since EITC eligibility is work conditioned. However, it is unclear that EITC payments during childhood can be excluded from a daughter's participation decision as an adult. For instance, EITC payments can increase the daughter's likelihood of finishing high school, and that can affect welfare use as an adult. Table S.5-3 demonstrates that when both the AFDC/TANF benefit guarantee and EITC are used as instruments (still controlling for contemporaneous measures for the daughter as an adult), the main conclusions of our study do not change and the results are qualitatively similar to Table 4 in the paper.

TABLE S.5-3. SECOND- AND FIRST-STAGE INSTRUMENTAL VARIABLES ESTIMATES AND THE ROLE OF EITC

	(1)	(2)	(3)	(4)	(5)	(6)
	A. Second-stage estimates for daughter's AFDC/TANF participation					
Mother's participation	0.291	0.290	0.296	0.268	0.341	0.288
	(0.051)	(0.153)	(0.053)	(0.049)	(0.146)	(0.053)
After welfare reform	0.077	0.081	0.079	0.069	0.100	0.078
	(0.020)	(0.048)	(0.021)	(0.021)	(0.046)	(0.021)
Mother's participation ×	-0.204	-0.222	-0.212	-0.183	-0.285	-0.212
after welfare reform	(0.046)	(0.130)	(0.045)	(0.046)	(0.123)	(0.047)
Daughter's welfare benefit standard				0.119	0.105	0.115
(in thousands)				(0.021)	(0.033)	(0.021)
Daughter's maximum EITC credit				-0.005	-0.003	-0.004
(in thousands)				(0.002)	(0.003)	(0.002)
AFDC/TANF instrumental variables	Yes	No	Yes	Yes	No	Yes
EITC instrumental variables	No	Yes	Yes	No	Yes	Yes
Weak IV test statistic	22.459	6.156	23.533	23.157	7.642	24.291
p-value	0.000	0.104	0.001	0.000	0.054	0.001
Hansen J statistic	1.006	3.117	3.696	1.315	2.563	2.953
p-value	0.605	0.210	0.718	0.518	0.278	0.815
Percent change in levels	-70%	-76%	-71%	-68%	-84%	-74%
p-value	0.000	0.000	0.000	0.000	0.000	0.000
	B. First-stage estimates for mother's prior AFDC/TANF participation					
Average AFDC/TANF	0.579		0.576	0.542		0.538
	(0.097)		(0.097)	(0.091)		(0.091)
Reform × average AFDC/TANF	0.247		0.225	0.281		0.265
	(0.098)		(0.103)	(0.100)		(0.108)
Maximum AFDC/TANF	-0.341		-0.342	-0.314		-0.313
	(0.146)		(0.145)	(0.142)		(0.141)
Reform × maximum AFDC/TANF	-0.164		-0.148	-0.183		-0.175
	(0.089)		(0.099)	(0.090)		(0.103)
Average EITC		0.076	0.038		0.091	0.050
		(0.047)	(0.042)		(0.047)	(0.042)
Reform × average EITC		0.034	-0.001		0.016	-0.018
		(0.046)	(0.047)		(0.047)	(0.049)
Maximum EITC		-0.021	-0.016		-0.025	-0.020
		(0.033)	(0.031)		(0.034)	(0.031)
Reform × maximum EITC		-0.019	-0.002		-0.013	0.005
		(0.035)	(0.036)		(0.036)	(0.037)
F test of excluded instruments	16.215	3.723	9.032	16.522	3.558	9.100
p-value	0.000	0.010	0.000	0.000	0.012	0.000
Number of daughters	2961	2961	2961	2961	2961	2961
Observations	56068	56068	56068	56068	56068	56068

Notes: Robust standard errors with state clustering are shown in parentheses. All specifications control for daughter's state and year effects and mother's modal state effects in addition to daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, daughter's state AFDC/TANF benefit standard, daughter's EITC federal/state maximum credit, state-level poverty rate, AFDC/TANF recipiency rate, and unemployment rate. Instrumental variables vary by column and include average and maximum measures of indicated variables, which are defined over the daughter's critical exposure ages 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. Daughters' PSID core longitudinal weights are used in estimation.

S.5.3. Mother's Future Participation and IVs: A Falsification Exercise

As extensively discussed in the manuscript, the OLS evidence of persistence in welfare participation could be attributed to a poverty trap as opposed to a welfare trap. Our consistent approach to estimation of the effect of welfare reform uses the variation of mother's participation that is related to her welfare status separately from conditions related to her poverty status by using policy instruments. Because low-income adult daughters are likely to have low-income mothers, and low-income mothers are likely to have low-income daughters, the "effect" of future participation of mothers on daughter's current participation is likely to be associated with the poverty trap and not with a welfare trap.

We begin this section by presenting results from a falsification exercise that includes mother's future welfare participation in the equation for daughter's current participation. The causal transmission effect of future welfare participation on current participation is zero. However, mother's future participation at $t + s$ for $s > 1$ and daughter's participation at t are likely to be correlated because daughter's and mother's incomes are correlated over time. The poverty trap drives this dependence, and the use of the policy instruments in our difference-in-difference-type specification is expected to consistently estimate a zero effect.

Using Table S.5-4, we investigate whether the mother's future welfare use in any year from $t + 5$ to $t + 11$ correlates with her daughter's welfare use at time t. We created a window for future participation that begins 5 years in the future and spans 7 years. For instance, a daughter's participation in 1990 would be compared to her mother's participation any time from 1995-2001. We only use observations for which the mother is observed for those years, which explains the smaller number of daughters shown in all columns of the table. We present OLS results in columns (1) and (4), and IV results for mothers' AFDC/TANF participation in the other columns. Columns (2) and (5) present IV results based on the set of instruments used in Table 4, in addition to the new instrumental variables used for future mother's participation in column (5). Mother's future instrumental variables are defined by the state AFDC/TANF benefit guarantee considering an equivalent window size to prior instrument measures over the critical exposure period for daughter's ages 12-18. Columns (3) and (6) present IV results based on the set of instruments used in Table 4 in addition to the application denial rate for procedural reasons and the rate at which wrongful denials are overturned through favorable hearing claims (see Table S.5-2). These alternative policy instruments have fewer observations available yet are potentially strong instruments for separating the welfare trap from the poverty trap, and they lead to similar conclusions as our baseline set of IVs in columns (2) and (5).

TABLE S.5-4. INTERGENERATIONAL TRANSMISSION OF AFDC/TANF PARTICIPATION CONTROLLING FOR MOTHER'S FUTURE WELFARE PARTICIPATION

	(1)	(2)	(3)	(4)	(5)	(6)
Mother's prior participation	0.186	0.294	0.274	0.142	0.327	0.314
	(0.023)	(0.093)	(0.086)	(0.022)	(0.121)	(0.119)
After welfare reform	0.023	0.044	0.033	0.017	0.057	0.051
	(0.012)	(0.022)	(0.022)	(0.012)	(0.027)	(0.027)
Mother's prior participation	-0.104	-0.184	-0.135	-0.082	-0.268	-0.238
× after welfare reform	(0.031)	(0.087)	(0.077)	(0.027)	(0.133)	(0.128)
Mother's future participation				0.010	0.410	0.302
				(0.025)	(0.496)	(0.422)
Mother's future participation				-0.018	-0.553	-0.534
× after welfare reform				(0.028)	(0.671)	(0.520)
Mother's prior × future participation				0.255	-0.379	-0.236
				(0.063)	(0.641)	(0.578)
Mother's prior × future ×				-0.041	0.886	0.818
after welfare reform				(0.058)	(0.891)	(0.714)
Baseline instrumental variables	No	Yes	Yes	No	Yes	Yes
Additional instrumental variables	No	No	Yes	No	No	Yes
Weak IV test statistic		16.756	22.783		8.067	13.979
p-value		0.001	0.019		0.327	0.527
Hansen J statistic		2.086	10.734		8.121	18.411
p-value		0.352	0.379		0.229	0.189
Percent change in levels	-56%	-63%	-49%	-58%	-82%	-76%
p-value	0.000	0.000	0.005	0.000	0.000	0.000
Number of daughters	1665	1665	1586	1665	1665	1586
Observations	15034	15034	14828	15034	15034	14828

Notes: Robust standard errors with state clustering are shown in parentheses. All specifications control for daughter's state and year effects and mother's modal state effects in addition to daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, daughter's state AFDC/TANF benefit standard, daughter's EITC federal/state maximum credit, state-level poverty rate, AFDC/TANF recipiency rate, and unemployment rate. The baseline instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard, and interactions of each with an indicator for welfare reform. Column (5) includes additional instruments for the mother's future participation using the baseline instrument measures constructed over future years $t+5$ to $t+11$, and columns (3) and (6) alternatively include instrument measures based on the AFDC/TANF procedural denial and AFDC/TANF favorable claims when the daughter is aged 12-18. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. Daughters' PSID core longitudinal weights are used in estimation.

The OLS estimates suggest that among mothers who previously participated in welfare, future participation significantly increases the likelihood of daughter's current participation by 26 percentage points (column 4). This point estimate is naturally biased and a probable explanation is failure of controlling for a lack of economic opportunities, which creates dependence between mother's and daughter's unobserved characteristics in the specification. On the other hand, using the policy instruments, we find IV estimates equal to -0.379 (column 5) and -0.236 (column 6) that are not statistically significantly different from zero.[6] The results for the broader safety net, which are not

[6] The IV estimates of mother's prior participation effect and the reform effect on transmission remain statistically significant when controlling for future participation, at least at the 10-percent level for the reform effect in column (6), and at the 1-percent level for the transmission effects in columns (4)-(6).

presented here to save space, suggest similar conclusions. Overall, these results offer suggestive evidence that our IV approach seems to attenuate, and possibly eliminate, biases in the estimation of the impact of the welfare reform. That is, the use of policy instruments leads to an approach that is identified by variation in the mother's participation related to her welfare status and not to her poverty status.

S.5.4. Interpretation of Results and Heterogeneous Effects

Recall that in the first columns of Table 4, we find that the IV estimate of mother's participation is larger than the OLS estimate. One explanation of this result is that the model includes heterogeneous effects. Our sample includes a subpopulation of mothers who are not likely to be affected by the instruments because their family income is above the poverty line over the entire period of analysis. As shown below, our estimates do have a causal interpretation in spirit of Local Instrumental Variables (which is LATE as in Imbens and Angrist (1994) for continuous IV).

Let $\boldsymbol{V}^d$ denote a vector of control variables $\boldsymbol{x}$ and effects μ^m, μ^d, and κ^d, say $\boldsymbol{V}^d = (\boldsymbol{x}', 1,1,1)'$. We write equation (3) as

$$y^d = \alpha + \delta y^m + \gamma R^m + \theta R^m y^m + \boldsymbol{\rho}'\boldsymbol{V}^d + \upsilon,$$

where $\boldsymbol{\rho} = \left(\boldsymbol{\beta}', \mu^m, \mu^d, \kappa^d\right)'$. Assume that a mother's participation decision is represented by,

$$y^m = \Pi B^m + \phi R^m + \Phi'\boldsymbol{V}^d + \varepsilon,$$

where B^m denotes the mother's welfare benefit standard during the critical period and Φ is a vector of coefficients. The identifying assumption is that the state benefit for mothers during the critical period is uncorrelated with the residual participation of daughters: $\upsilon = y^d - E\left(y^d \middle| B^m, R^m, \boldsymbol{V}^d\right)$. Consider

$$\Pr\left(y^m = 1 \middle| B^m, R^m, \boldsymbol{V}^d\right) = E\left(y^m \middle| B^m, R^m, \boldsymbol{V}^d\right) = \Pi B^m + \phi R^m + \Phi'\boldsymbol{V}^d.$$

It follows that

$$\begin{aligned} E\left(y^d \middle| B^m, R^m, \boldsymbol{V}^d\right) &= \alpha + \delta E\left(y^m = 1 \middle| B^m, R^m, \boldsymbol{V}^d\right) + \gamma R^m + \theta R^m E\left(y^m = 1 \middle| B^m, R^m, \boldsymbol{V}^d\right) + \boldsymbol{\rho}'\boldsymbol{V}^d \\ &= \alpha + (\delta + \theta R^m)\left(\Pi B^m + \phi R^m + \Phi'\boldsymbol{V}^d\right) + \gamma R^m + \boldsymbol{\rho}'\boldsymbol{V}^d. \end{aligned}$$

We now evaluate $E\left(y^d \middle| B^m, R^m, \boldsymbol{V}^d\right)$ before and after the reform. Consider the following equations:

$$E\left(y^d \middle| B^m, R^m = 1, \boldsymbol{V}^d\right) = \alpha + (\delta + \theta)\left(\Pi B^m + \phi + \Phi'\boldsymbol{V}^d\right) + \gamma + \boldsymbol{\rho}'\boldsymbol{V}^d, \text{ and}$$
$$E\left(y^d \middle| B^m, R^m = 0, \boldsymbol{V}^d\right) = \alpha + \delta\left(\Pi B^m + \Phi'\boldsymbol{V}^d\right) + \boldsymbol{\rho}'\boldsymbol{V}^d.$$

Then,

$$E\left(y^d \middle| B^m, R^m = 1, \boldsymbol{V}^d\right) - E\left(y^d \middle| B^m, R^m = 0, \boldsymbol{V}^d\right) = \theta\left(\Pi B^m + \phi + \Phi' \boldsymbol{V}^d\right) + \delta\phi + \gamma.$$

The partial derivative with respect to the continuous instrument is equal to

$$\frac{\partial\left[E\left(y^d \middle| B^m, R^m = 1, \boldsymbol{V}^d\right) - E\left(y^d \middle| B^m, R^m = 0, \boldsymbol{V}^d\right)\right]}{\partial B^m} = \theta\Pi.$$

Also, considering the participation equation for mothers, we obtain

$$\frac{\partial E\left(y^m \middle| B^m, R^m, \boldsymbol{V}^d\right)}{\partial B^m} = \Pi.$$

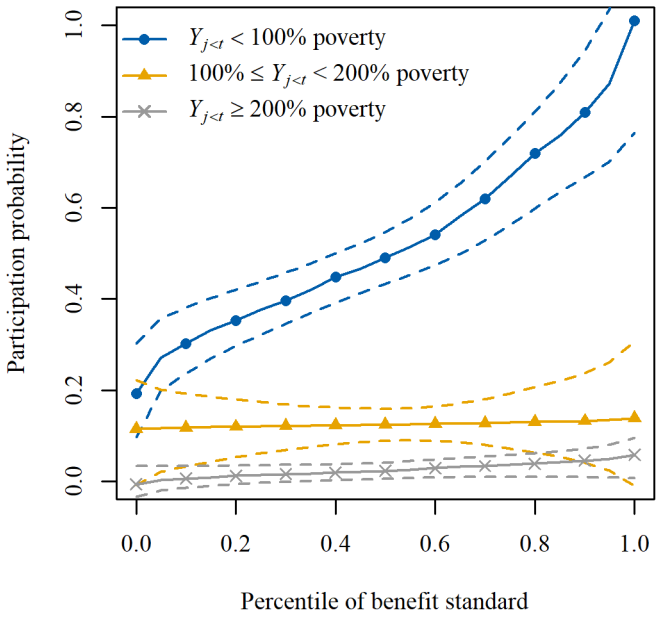
Therefore, the parameter θ can be interpreted in a *causal* way provided that the conditions on B^m are satisfied, because:

$$\theta = \frac{\partial\left[E\left(y^d \middle| B^m, R^m = 1, \boldsymbol{V}^d\right) - E\left(y^d \middle| B^m, R^m = 0, \boldsymbol{V}^d\right)\right] / \partial B^m}{\partial E\left(y^m \middle| B^m, R^m, \boldsymbol{V}^d\right) / \partial B^m}$$

It is interesting to note that the parameter is related to the local instrumental variable (LIV) and marginal treatment effect (MTE, Heckman and Vytlacil, 2005) parameters in program evaluation, although these parameters are derived for a potential outcome framework not applicable here. More recently, Kennedy, Lorch, and Small (2019) investigated the case of continuous instrumental variables and binary endogenous treatments, and they offered an interpretation of the parameter of interest that is consistent with our framework (see remark 3 in Kennedy et al.). The formulation provides a clear interpretation. We estimate the change in the probability of welfare participation of daughters whose low-income mothers are affected by changes in benefits.

Using Figure S.5-2, we investigate empirically the relationship between mothers' welfare participation and the main policy instrument of AFDC/TANF benefit generosity. As expected, mothers exposed to higher ADFC/TANF benefits were more likely to participate on welfare, with the exception of mothers whose average family income is more than twice the poverty line.

FIGURE S.5-2. MOTHER'S WELFARE PARTICIPATION RELATIVE TO AFDC/TANF BENEFIT LEVELS



Notes: Linear probability estimates are shown for the mother's indicator for any prior AFDC/TANF participation conditional on an average measure of AFDC/TANF benefit standard while the daughter is aged 12-18 along with the baseline controls of state and year effects as well as the daughter's quadratic in age. The predicted probabilities are estimated for subsamples by whether the mother had any prior family income below the federal poverty line, no prior income below poverty and any income below 200 percent of the poverty line, or no prior income below 200 percent of the poverty line. Dashed lines represent 95-percent pointwise confidence intervals with state-level clustering.

Based on the groups defined in Figure S.5-2, we show descriptive statistics for three income groups in the first three column of Table S.5-5. We have (1) mothers with any prior income below 100% poverty line, (2) mothers with no prior income below 100% poverty and some income below 200% poverty, and (3) mothers with no income below 200% poverty. Then, we present descriptive statistics by welfare participation status in the last two columns. As expected, the analysis shows that there are some differences in terms of characteristics across income levels and poverty status. However, based on the evidence in Figure S.5-2, the relevant comparison is between mothers with any income below 100% poverty line (column 1), representing the group of mothers mostly affected by the change in benefits, and the average AFDC/TANF welfare participant (column 4). We find that these mothers have a similar number of children, similar family income, they are likely to live in the same state as birth, and their educational attainment is similar. The identified subpopulation for our IV estimates is low-income mothers who are likely to participate, and they do not seem, in general, more advantaged than the average welfare recipient.

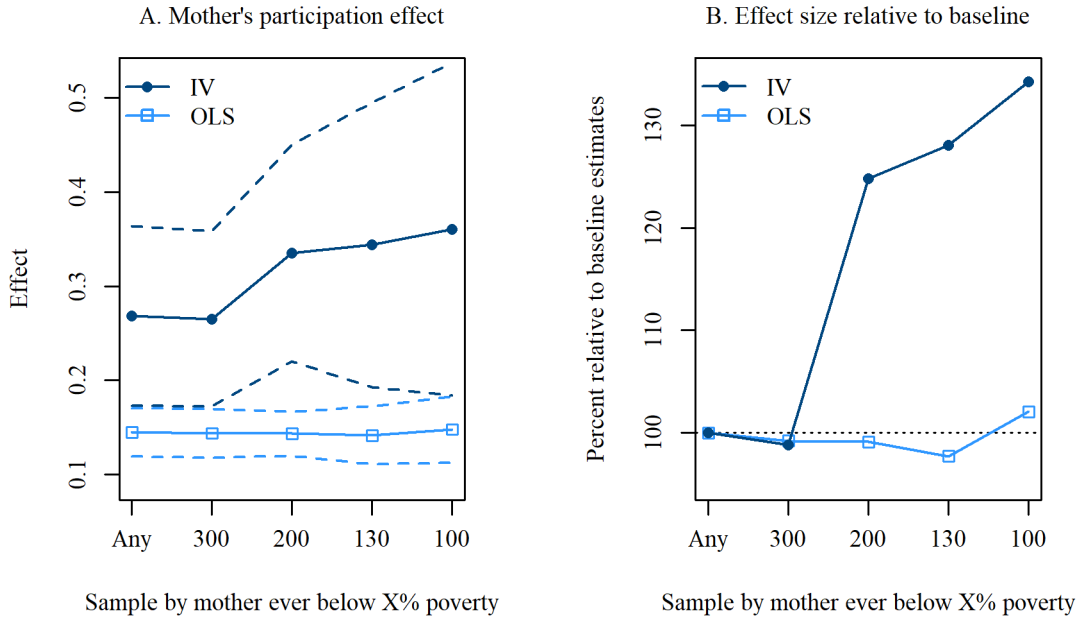
TABLE S.5-5. MOTHER CHARACTERISTICS BY AFDC/TANF POLICY INFLUENCE ON WELFARE PARTICIPATION

	By poverty status			By welfare participation status	
	Any income below 100% poverty	Lowest income between 100-200% poverty	No income below 200% poverty	Any AFDC/TANF	No AFDC/TANF
	(1)	(2)	(3)	(4)	(5)
Years on any welfare	4.481	0.660	0.091	6.166	0.339
	(5.308)	(1.486)	(0.319)	(5.345)	(1.069)
Number of children	2.796	2.639	2.189	3.077	2.367
	(1.404)	(1.386)	(1.221)	(1.645)	(1.185)
Married	0.720	0.891	0.970	0.643	0.928
	(0.379)	(0.242)	(0.125)	(0.405)	(0.197)
Family income (median)	39.226	61.268	91.552	35.131	73.327
	(33.459)	(27.679)	(41.957)	(27.263)	(42.017)
No family earnings	0.147	0.018	0.005	0.188	0.016
	(0.242)	(0.087)	(0.035)	(0.268)	(0.073)
Earnings < 100% poverty	0.437	0.090	0.014	0.503	0.086
	(0.364)	(0.172)	(0.058)	(0.375)	(0.178)
Earnings < 200% poverty	0.687	0.422	0.063	0.770	0.283
	(0.341)	(0.330)	(0.145)	(0.305)	(0.328)
Same state as birth	0.842	0.827	0.903	0.868	0.850
	(0.329)	(0.337)	(0.264)	(0.299)	(0.322)
High school or less	0.633	0.584	0.471	0.719	0.511
	(0.482)	(0.493)	(0.500)	(0.450)	(0.500)
Black, non-Hispanic	0.312	0.072	0.034	0.407	0.056
	(0.463)	(0.259)	(0.181)	(0.491)	(0.229)
White, non-Hispanic	0.611	0.878	0.943	0.498	0.909
	(0.488)	(0.327)	(0.232)	(0.500)	(0.288)
Hispanic	0.067	0.034	0.013	0.086	0.023
	(0.250)	(0.181)	(0.114)	(0.280)	(0.150)
Mother-daughter pairs	1724	739	498	1426	1535

Notes: Standard deviations are shown in parentheses. Columns are defined by the mother's total family income during the years a daughter was a child living at home (column (2) excludes any mothers with prior income below poverty). Years on any welfare includes SNAP or SSI participation. Mothers' average PSID core longitudinal weights are used in estimation.

Another way to illustrate the heterogeneity of intergenerational effects is by comparing OLS and IV results by income status of mothers, where lower income mothers are more likely to be marginal AFDC/TANF participations depending on state benefit generosity. Figure S.5-3 shows that the IV estimates of the mother's transmission effects are increasing in subsamples by mothers having income below lower thresholds of poverty, whereas the OLS estimates are generally flat across these same groups. Once again, the evidence supports the hypothesis of heterogeneous effects, which can explain the differences between the OLS and IV estimates in Table 4 of the manuscript.

FIGURE S.5-3. OLS AND IV ESTIMATES OF WELFARE TRANSMISSION EFFECTS
BY SUBSAMPLES OF INCREASINGLY MARGINAL PARTICIPANTS



Notes: The subsamples are restricted by whether the mother ever previously had income below the given federal poverty thresholds, where "Any" corresponds to the baseline estimates for the full sample as shown in Table 4 columns (1) and (2). The models control for daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, controls for the daughter's state AFDC/TANF benefit standard, EITC federal/state maximum credit, state-level SPM poverty rate, AFDC/TANF recipiency rate, unemployment rate, and state and year effects for the daughter as well as state effects for the mother's modal state when the daughter is aged 12-18. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform. Daughters' PSID core longitudinal weights are used in estimation.

Motivated by the heterogeneity of transmission by mother's characteristics, we return to estimation of the baseline IV model of Table 4 by including mother's variables for race and ethnicity, age at first birth, and variables related to her lifetime earnings ability. The controls for mother's race and ethnicity include indicators for White non-Hispanic, Black non-Hispanic, other non-Hispanic, and Hispanic. The controls for mother's lifetime earnings ability include an indicator if the mother's educational attainment is less than or equal to 12 years, and an indicator for mother's family income has ever been below 200 percent the official poverty threshold by family size. Regarding controls for mother's income and education, Levine and Zimmerman (1996) note that these variables could be endogenous to the daughter's welfare choice for the same reasons that the mother's welfare participation is likely to be endogenous. Table S.5-6 shows that the results presented in Table 4 are little changed when we add controls for mother's background like education and income. Lower income mothers are associated with higher levels of dependence across generations, yet the effect of welfare reform is similar across specifications.

TABLE S.5-6. IV ESTIMATES OF INTERGENERATIONAL TRANSMISSION OF AFDC/TANF PARTICIPATION WITH CONTROLS FOR MOTHER'S CHARACTERISTICS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother's participation	0.268	0.259	0.269	0.271	0.333	0.256	0.334	0.333
	(0.049)	(0.064)	(0.048)	(0.049)	(0.091)	(0.061)	(0.090)	(0.108)
After welfare reform	0.069	0.073	0.070	0.068	0.073	0.073	0.073	0.079
	(0.021)	(0.020)	(0.022)	(0.021)	(0.023)	(0.021)	(0.023)	(0.024)
Mother's participation ×	-0.183	-0.189	-0.183	-0.183	-0.204	-0.187	-0.203	-0.212
after welfare reform	(0.046)	(0.046)	(0.047)	(0.045)	(0.054)	(0.047)	(0.053)	(0.054)
Mother's controls:								
Race/ethnicity	No	Yes	No	No	No	Yes	No	Yes
Age at first birth	No	No	Yes	No	No	Yes	No	Yes
Education	No	No	No	Yes	No	No	Yes	Yes
Poverty status	No	No	No	No	Yes	No	Yes	Yes
Weak IV test statistic	23.157	20.087	24.131	22.956	19.548	21.369	19.346	17.233
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Hansen J statistic	1.315	1.562	1.316	1.293	1.088	1.613	1.080	1.385
p-value	0.518	0.458	0.518	0.524	0.580	0.446	0.583	0.500
Percent change in levels	-68%	-73%	-68%	-67%	-61%	-73%	-61%	-64%
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of daughters	2961	2961	2961	2961	2961	2961	2961	2961
Observations	56068	56068	56068	56068	56068	56068	56068	56068

Notes: Robust standard errors with state clustering are shown in parentheses. Controls for mother's characteristics, used where indicated, include race/ethnicity indicators for White non-Hispanic, Black non-Hispanic, other non-Hispanic, and Hispanic; a quadratic in mother's age at first birth; an indicator if the mother's educational attainment is less than or equal to 12 years; and, an indicator for mother's mean income-to-poverty ratio is below 2 based on prior family income relative to the official poverty threshold by family size. All specifications control for daughter's state and year effects and mother's modal state effects in addition to daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, daughter's state AFDC/TANF benefit standard, daughter's EITC federal/state maximum credit, state-level poverty rate, AFDC/TANF recipiency rate, and unemployment rate. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard, which are defined over the daughter's critical exposure ages 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. Daughters' PSID core longitudinal weights are used in estimation.

As an additional examination of how mother/daughter characteristics can matter for interpreting IV estimates of welfare transmission and reform effects, Table S.5-7 explores the role of family structure in each generation. For our main results, we treat family structure decisions as endogenous (see, e.g., Section VI in the manuscript and Section S.4), yet we momentarily abandon this assumption here to examine changes in the coefficients of interest by introducing mother or daughter marital status and number of children as control variables. Needless to say, these results should be interpreted with caution. Column (1) of Table S.5-7 shows the main IV estimates from Table 4 column (2) in the manuscript, and the remaining 7 columns show how the estimates vary by controlling for family structure. The mother's marital status and number of children under age 18 are measured as averages when the daughter was aged 12-18, and the daughter's measures are an indicator for current marital status and indicators for 1, 2, 3, or 4 or more children. Controlling for the family size corresponding to the daughter's adolescence leads to larger magnitudes in both welfare transmission and the reduction after reform, and the percent change in levels after reform is somewhat attenuated while still around -60 percent.

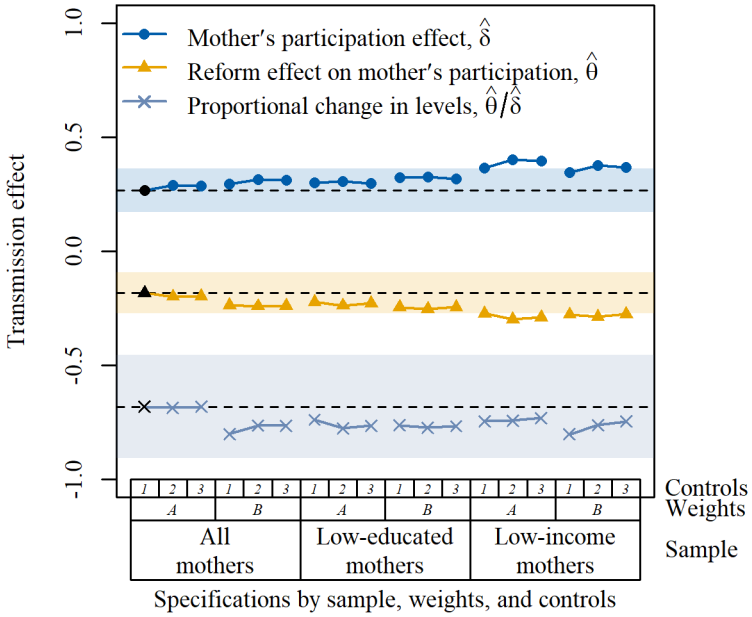
TABLE S.5-7. IV ESTIMATES OF INTERGENERATIONAL TRANSMISSION OF AFDC/TANF PARTICIPATION CONTROLLING FOR FAMILY STRUCTURE IN BOTH GENERATIONS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother's participation	0.268	0.267	0.239	0.239	0.381	0.240	0.371	0.395
	(0.049)	(0.050)	(0.047)	(0.047)	(0.160)	(0.050)	(0.161)	(0.193)
After welfare reform	0.069	0.069	0.067	0.068	0.088	0.061	0.083	0.086
	(0.021)	(0.021)	(0.020)	(0.019)	(0.044)	(0.019)	(0.043)	(0.043)
Mother's participation × after welfare reform	-0.183	-0.184	-0.185	-0.185	-0.231	-0.163	-0.220	-0.234
	(0.046)	(0.046)	(0.044)	(0.043)	(0.097)	(0.043)	(0.097)	(0.097)
Family structure:								
Mother: Marital status	No	Yes	No	Yes	No	No	No	Yes
Daughter: Marital status	No	No	Yes	Yes	No	No	No	Yes
Mother: Number children	No	No	No	No	Yes	No	Yes	Yes
Daughter: Number children	No	No	No	No	No	Yes	Yes	Yes
Weak IV test statistic	23.157	25.222	23.140	25.187	7.399	23.153	7.242	6.605
p-value	0.000	0.000	0.000	0.000	0.060	0.000	0.065	0.086
Hansen J statistic	1.315	1.295	1.894	1.874	0.410	1.605	0.297	0.283
p-value	0.518	0.523	0.388	0.392	0.815	0.448	0.862	0.868
Percent change in levels	-68%	-69%	-77%	-78%	-61%	-68%	-59%	-59%
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of daughters	2961	2961	2961	2961	2961	2961	2961	2961
Observations	56068	56068	56068	56068	56068	56068	56068	56068

Notes: Robust standard errors with state clustering are shown in parentheses. Mother's marital/cohabitation status and number of children are averaged during co-residence years with the daughter before adulthood. The daughter's marital status is in the current year, and her number of children are given by indicator variables for 1, 2, 3, or 4 or more children in the family unit. All specifications control for daughter's state and year effects and mother's modal state effects in addition to daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, daughter's state AFDC/TANF benefit standard, daughter's EITC federal/state maximum credit, state-level poverty rate, AFDC/TANF recipiency rate, and unemployment rate. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard, which are defined over the daughter's critical exposure ages 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. Daughters' PSID core longitudinal weights are used in estimation.

Lastly, Figure S.5-4 reproduces the main results from Table 4 of the manuscript under a variety of modifications to the model represented in column (2) using the same instrumental variables. The figure shows estimates that vary by: subsample (full sample of daughters, daughters of low-educated mothers, or daughters of low-income mothers); weights (PSID sample weights, or sample weights along with inverse weights by number of daughters per mother in the sample); and, control variables (main controls used in Table 4, main controls without daughter's fixed state effects and with daughter's maximum AFDC/TANF or EITC eligibility levels given for a fixed family size instead of varying by daughter's family structure, or main controls without the daughter's fixed or time-varying state-level controls). The main estimates from Table 4 column (2) are shown in black with a horizontal dashed line and shaded 95-percent confidence intervals in order to make easier comparisons across the sensitivity estimates. While the point estimates present some small variation in magnitude from the main results, especially in the low-income sample, the relative effect of welfare reform on intergenerational transmission of AFDC/TANF remains stable.

FIGURE S.5-4. IV ESTIMATES OF WELFARE TRANSMISSION AND REFORM EFFECTS BY VARIATIONS ON MODEL SPECIFICATIONS



Notes: The left-most estimates represent the main IV results in Table 4 column (2), along with the point estimates shown by the dashed lines and shaded regions indicating 95-percent confidence intervals. See Table 4 for details. Instruments are given for mothers' state AFDC/TANF benefit levels by family size. Weights indicate: A. daughters' PSID sample weights, and B. sample weights combined with inverse weights for number of adult daughters per mother in the sample. Control variables indicate: 1) main set of controls used in Table 4; 2) controls without fixed state effects and daughters' AFDC/TANF or EITC benefits by fixed family sizes instead of varying by daughters' family structures; and, 3) controls without any fixed or time-varying state-level variables for the daughters' states of residence.

S.5.5. Daughter's Race and Mother's Transmission

There is a vast literature on the socioeconomic differences between Black and White families (see, for example, Smith and Welch, 1989; Donohue and Heckman, 1991), but with the notable exceptions of Gottschalk (1996) and Pepper (2000), whether or not there are racial differences in the transmission of intergenerational welfare has received less attention compared to other outcomes. The issue is salient in part because the risk of out-of-wedlock births is at least two times higher among Black families than White, as is the risk of poverty in childhood. Further, welfare participation patterns may be influenced by differential transmission of financial security and economic outlook across generations, which are related to structural inequalities in asset-building, education, and labor market outcomes (Darity, Dietrich, and Guilkey, 2001; Darity, 2005; Fryer, 2007).

TABLE S.5-8. HETEROGENEOUS INTERGENERATIONAL TRANSMISSION OF AFDC/TANF PARTICIPATION, BY DAUGHTER'S RACE

Daughter's race:	Black		White	
	(1)	(2)	(3)	(4)
Mother's participation	0.124	0.340	0.068	0.335
	(0.021)	(0.184)	(0.013)	(0.155)
After welfare reform	0.048	0.048	0.021	0.080
	(0.032)	(0.157)	(0.007)	(0.050)
Mother's participation ×	-0.086	-0.090	-0.060	-0.250
after welfare reform	(0.042)	(0.202)	(0.015)	(0.158)
Instrumental variables	No	Yes	No	Yes
Weak IV test statistic		8.887		5.534
p-value		0.031		0.137
Hansen J statistic		5.423		0.147
p-value		0.066		0.929
Percent change in levels	-69%	-27%	-89%	-75%
p-value	0.009	0.635	0.000	0.000
Number of daughters	1331	1331	1147	1147
Observations	25514	25514	19926	19926

Notes: Robust standard errors with state clustering are shown in parentheses. Samples are restricted to daughters whose race is either indicated as Black or White, and whose mothers ever had family income below 200 percent of the federal poverty line. All specifications control for daughter's state and year effects and mother's modal state effects in addition to daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, daughter's state AFDC/TANF benefit standard, daughter's EITC federal/state maximum credit, state-level poverty rate, AFDC/TANF recipiency rate, and unemployment rate. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard, which are defined over the daughter's critical exposure ages 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. Daughters' PSID core longitudinal weights are used in estimation.

Table S.5-8 presents OLS and IV results for the transmission of AFDC/TANF from mother to daughter estimated separately by race where the daughter identifies as either Black or White. Given racial disparities in the propensity to be poor, we compare transmission effects for a subsample in which the mothers ever previously had income below 200 percent of the federal poverty line. The first two columns of Table S.5-8 suggest that the pre-reform effect of welfare transmission was similar in magnitude among Black daughters relative to White daughters. However, the transmission channel was reduced by a greater magnitude among White daughters after welfare reform (-0.250 compared to -0.090, a statistically insignificant difference with a p-value of 0.534). While the IV estimates by race are less precise than full-sample estimates, the results are qualitatively comparable to baseline estimates in Table 4 of the manuscript.

S.5.6. Cross-sectional IV Results Within Welfare Regimes, Pre- and Post-Reform

While the manuscript motivated the main results with cross-sectional correlations within welfare regimes, that is, without mother-daughter pairs that cross over the implementation timing of welfare reform, identifying transmission effects with IV estimation is more complicated. The variables y^d and y^m are likely to depend on a time varying variable that correlates with welfare program access, as suggested

by the evidence in Figure 1. Benefits are also likely to be correlated with this time varying confounder, as suggested by evidence presented in Figure 4. Therefore, the IV estimator in a model without year effects is likely to be biased. On the other hand, the IV approach within a panel model with year effects is consistent, and it allows more precise identification based on the instruments' deviations from fixed state and year effects as well as time-varying macroeconomic and policy changes.

For completeness, we reproduce Table 1 in the manuscript using an IV approach for cross-sectional averages given single observations of mother-daughter pairs (shown here in Table S.5-9). As in Table 1, the estimates are produced without and with inverse weights for the number of daughters per mother. Consistent with the results in the manuscript (see, e.g., Table 4), the IV estimate in column (1) is larger than the corresponding OLS estimate in Table 1. Not surprisingly, the IV estimates are less precisely estimated due to a small number of mother-daughter pairs observed after the reform, and the Hansen J test does not offer support for the validity of the instruments in the period after reform, which is likely to be related to the omission of properly controlling for year effects. Despite the aggregation and small samples, the qualitative pattern that emerges from the cross-sectional IV results clearly suggest that the intergenerational transmission of AFDC/TANF decreased after the reform.

TABLE S.5-9. IV ESTIMATES OF INTERGENERATIONAL WELFARE PARTICIPATION EFFECTS WITHIN WELFARE REGIMES PRE- OR POST-REFORM

Daughter outcome, ages 19-27:	AFDC/TANF				AFDC/TANF, SNAP, SSI			
Welfare reform timing:	Before (1)	After (2)	Before (3)	After (4)	Before (5)	After (6)	Before (7)	After (8)
Mother's participation when daughter aged 12-18	0.407 (0.121)	0.251 (0.156)	0.449 (0.110)	0.269 (0.144)	0.594 (0.155)	0.523 (0.299)	0.611 (0.134)	0.651 (0.316)
Inverse daughter weights?	No	No	Yes	Yes	No	No	Yes	Yes
Effect of welfare reform		-0.156		-0.180		-0.071		0.041
p-value		0.565		0.629		0.978		0.949
Percent change in levels		-38%		-40%		-12%		7%
p-value		0.713		0.752		0.993		0.976
Weak IV test statistic	30.198	6.425	29.635	5.380	30.198	6.425	29.635	5.380
p-value	0.000	0.040	0.000	0.068	0.000	0.040	0.000	0.068
Hansen J statistic	2.354	4.434	2.571	3.847	2.686	10.350	2.060	10.545
p-value	0.125	0.035	0.109	0.050	0.101	0.001	0.151	0.001
Number of daughters/observations	1254	476	1254	476	1254	476	1254	476

Notes: Robust standard errors are shown in parentheses. Estimation is restricted to daughters who can be observed at least 5 years during the critical exposure period, ages 12-18. Daughters observed before reform include only those mother-daughter pairs in which neither experiences welfare reform through the daughter's age 27. The after-reform sample is defined by daughters who are observed during the welfare reform era from age 12 onward. Estimates are conditional on a quadratic in mother's age and daughter's state-level controls averaged over the daughter's adult observation years. Daughter's welfare participation variable is the average participation during ages 19-27, and mother's welfare participation is 1 if she participates in any year when the daughter is aged 12-18 and 0 otherwise. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. P-values are obtained by a bootstrap procedure with 1000 replications.

S.6. Difference-in-Difference-Type Approach: A Sensitivity Analysis

In this section, we re-estimate the main equation (3) of the text under different assumptions. We first examine whether identification of the parameter of interest is driven by latent trends and confounders not controlled for in the baseline model. We then subject the baseline difference-in-difference-type estimates to a number of specification checks, including a placebo-type falsification exercise and further null reform effects on means-tested welfare transmission beyond AFDC/TANF participation.

S.6.1. Robustness to State-Level Trends and Other Confounders

We begin this section by examining whether the identification of the transmission parameter and the effect of the reform are driven by unobserved state-specific time trends or other state-time variables not properly controlled for in equation (3). Following closely Wolfers (2006), we augment the model estimated in Table 4 with linear and quadratic state trends and present the results in Table S.6-1. The table shows that the IV estimates of the AFDC/TANF transmission effect and the welfare reform effect are just slightly attenuated. For instance, the pre-reform transmission estimate in column (2) is only 6.7% smaller than the 0.268 estimate in Table 4. It is clear that controlling for state-specific time trends does not substantively change the results.

TABLE S.6-1. SENSITIVITY OF RESULTS TO THE INCLUSION OF LINEAR AND QUADRATIC STATE-SPECIFIC TRENDS

Daughter's outcome variable:	AFDC/TANF				AFDC/TANF, SNAP, SSI			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother's participation	0.144	0.250	0.240	0.401	0.228	0.318	0.302	0.410
	(0.013)	(0.050)	(0.022)	(0.088)	(0.019)	(0.076)	(0.025)	(0.103)
After welfare reform	0.034	0.055	0.049	0.067	0.004	-0.005	0.006	-0.018
	(0.008)	(0.019)	(0.013)	(0.031)	(0.012)	(0.028)	(0.017)	(0.039)
Mother's participation ×	-0.096	-0.152	-0.131	-0.168	-0.043	0.016	-0.024	0.098
after welfare reform	(0.015)	(0.046)	(0.030)	(0.084)	(0.018)	(0.077)	(0.025)	(0.110)
Instrumental variables	No	Yes	No	Yes	No	Yes	No	Yes
Misclassification correction	No	No	Yes	Yes	No	No	Yes	Yes
Weak IV test statistic		23.288		21.770		23.288		22.149
p-value		0.000		0.000		0.000		0.000
Hansen J statistic		0.537		0.531		1.973		2.125
p-value		0.764		0.767		0.373		0.346
Percent change in levels	-67%	-61%	-55%	-42%	-19%	5%	-8%	24%
p-value	0.000	0.000	0.000	0.008	0.008	0.841	0.326	0.444
Number of daughters	2961	2961	2961	2961	2961	2961	2961	2961
Observations	56068	56068	56068	56068	56068	56068	56068	56068

Notes: Robust standard errors with state clustering are shown in parentheses. All specifications control for daughter's state and year effects and mother's modal state effects in addition to daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, daughter's state AFDC/TANF benefit standard, daughter's EITC federal/state maximum credit, state-level poverty rate, AFDC/TANF recipiency rate, and unemployment rate. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard, which are defined over the daughter's critical exposure ages 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. The misclassification correction uses reporting rates in the PSID to address potential misreporting for the daughter's welfare participation. Daughters' PSID core longitudinal weights are used in estimation.

The results presented in Table S.6-1 complement the evidence presented in Figure 5 in the manuscript in which we performed an event-type investigation for a model of transmission effects interacted with years before and after reform in models with linear and quadratic state-specific trends. We did not find significant differences in the dynamic version of our equation (3) with or without state-specific trends.

Next, we investigate the potential role of additional state-level factors that are time-varying and may be correlated with both welfare generosity and welfare participation. All tables in the manuscript include (along with daughter's and mother's characteristics) daughter's state AFDC/TANF benefit standard, EITC federal/state maximum credit, state-level SPM poverty rate, AFDC/TANF recipiency rate, unemployment rate, daughter's state and year effects, and mother's modal state effects. Moreover, Figures 5 and 6 of the manuscript present results with state-specific trends (linear and quadratic). As an additional robustness check, we investigate whether the omission of other state time-varying factors changes our conclusions. Table S.6-2 provides evidence of how robust our main estimates are to the inclusion of a wide range of state-level controls in addition to our baseline controls:

- population growth rate [population demographics],
- the maximum weekly amount of unemployment benefits [labor market conditions],
- whether the state minimum wage is above the federal [labor market conditions],
- the income share of the top 10 percent of earners [labor market conditions],
- whether there are prevailing wage laws [labor market conditions],
- whether a right-to-work state [labor market conditions],
- whether there is a state temporary disability insurance program [other state policies],
- whether there are fair employment laws (protecting racial status) [other state policies],
- whether counseling is mandated before an abortion [other state policies],
- whether pharmacies can dispense emergency contraception without a prescription [other state policies],
- whether cities/municipalities are prohibited from passing rent control laws [other state policies],
- whether there is a state-level equivalent to the Equal Rights Amendment (protecting gender status) [other state policies],
- whether there is a no-fault divorce policy [other state policies],
- whether the Ten Commandments are allowed in schools [other state policies],
- state sales tax rate and tax on cigarettes [other state policies],
- citizen ideology measure [demographics],
- the percentage of evangelical residents [demographics],
- a measure of the median and variance of policy liberalism [demographics],
- the Gini coefficient,
- total state expenditures per capita, and
- total public welfare expenditures per capita.

These state-level data were obtained from the Correlates of State Policy project at Michigan State University Institute for Public Policy and Social Research (Berry et al., 1998; Caughey and Warshaw, 2015; Frank et al., 2015; Jordan and Grossmann, 2016; Sellers, 2017); and, expenditure data from the U.S. Census Bureau's Annual Survey of State Government Finances.

TABLE S.6-2. INTERGENERATIONAL TRANSMISSION OF MOTHER'S AFDC/TANF PARTICIPATION INCLUDING A WIDE RANGE OF ADDITIONAL STATE-LEVEL CONTROL VARIABLES FOR THE DAUGHTER'S STATE OF RESIDENCE

Daughter's outcome variable:	AFDC/TANF				AFDC/TANF, SNAP, SSI			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother's participation	0.144	0.260	0.238	0.412	0.226	0.298	0.296	0.373
	(0.013)	(0.049)	(0.021)	(0.086)	(0.018)	(0.073)	(0.024)	(0.100)
After welfare reform	0.038	0.065	0.052	0.079	0.002	-0.014	-0.011	-0.047
	(0.009)	(0.020)	(0.017)	(0.033)	(0.013)	(0.028)	(0.020)	(0.039)
Mother's participation × after welfare reform	-0.099	-0.169	-0.133	-0.193	-0.041	0.043	-0.018	0.150
	(0.015)	(0.044)	(0.029)	(0.081)	(0.017)	(0.074)	(0.024)	(0.105)
Instrumental variables	No	Yes	No	Yes	No	Yes	No	Yes
Misclassification correction	No	No	Yes	Yes	No	No	Yes	Yes
Weak IV test statistic		22.556		21.238		22.556		21.472
p-value		0.000		0.000		0.000		0.000
Hansen J statistic		1.048		0.928		1.959		2.016
p-value		0.592		0.629		0.376		0.365
Percent change in levels	-69%	-65%	-56%	-47%	-18%	15%	-6%	40%
p-value	0.000	0.000	0.000	0.001	0.011	0.598	0.467	0.269
Number of daughters	2929	2929	2929	2929	2929	2929	2929	2929
Observations	55197	55197	55197	55197	55197	55197	55197	55197

Notes: Robust standard errors with state clustering are shown in parentheses. All specifications control for daughter's state and year effects and mother's modal state effects in addition to daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, daughter's state AFDC/TANF benefit standard, daughter's EITC federal/state maximum credit, state-level poverty rate, AFDC/TANF recipiency rate, and unemployment rate. Additionally, each specification controls for a wide range of time-varying state-level characteristics described above. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. The misclassification correction uses reporting rates in the PSID to address potential misreporting for the daughter's welfare participation (see Section S.2 for details). Daughters' PSID core longitudinal weights are used in estimation.

The main results from Table 4 of the manuscript are indeed robust when considering either state-specific time trends or controlling for a broad array of time-varying state-level policy characteristics. Our standard specifications control for both the daughter's current state of residence and her mother's modal state of residence during the daughter's childhood, yet it is possible that there is a distinction between state-level policy variation belonging to the mother's state versus daughter's state of residence for those cases where the two are different. Table S.6-2 shows evidence controlling for the daughter's state of residence, which may influence her welfare participation decision or other related outcomes. In Table S.6-3, we repeat a similar exercise considering state-level policy variation with respect to the mother's state of residence. In this case, the state-level variation is occurring relative to the state in which the welfare

reform indicator is defined and the covariates are averaged during the years when the daughter was aged 12-18. Generally, the IV results in Table S.6-3 are somewhat larger in magnitude compared to Table S.6-2, however, the interpretations are consistent with our main results, especially in terms of the percent change in AFDC/TANF transmission after reform.

TABLE S.6-3. INTERGENERATIONAL TRANSMISSION OF MOTHER'S AFDC/TANF PARTICIPATION CONTROLLING FOR A WIDE RANGE OF ADDITIONAL STATE-LEVEL VARIABLES BY MOTHER'S STATE OF RESIDENCE

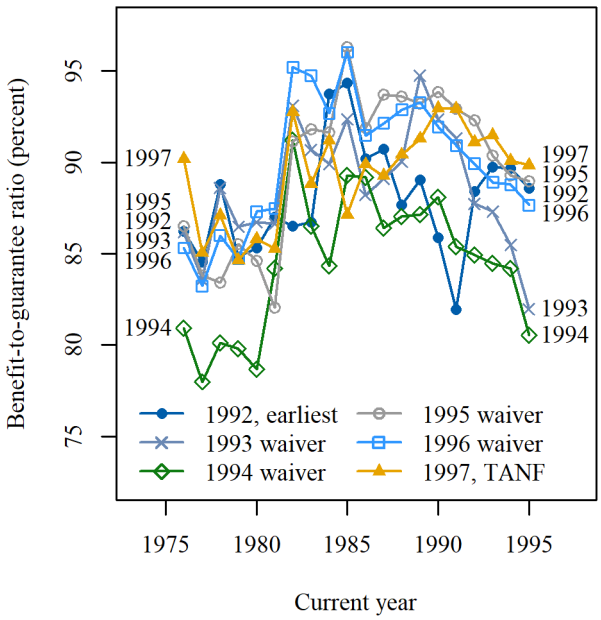
Daughter's outcome variable:	AFDC/TANF				AFDC/TANF, SNAP, SSI			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother's participation	0.142	0.276	0.237	0.446	0.229	0.323	0.299	0.410
	(0.013)	(0.051)	(0.021)	(0.090)	(0.019)	(0.076)	(0.025)	(0.104)
After welfare reform	0.037	0.066	0.053	0.082	0.006	-0.002	-0.007	-0.032
	(0.009)	(0.021)	(0.017)	(0.036)	(0.013)	(0.027)	(0.020)	(0.039)
Mother's participation × after welfare reform	-0.097	-0.172	-0.132	-0.198	-0.045	0.010	-0.023	0.104
	(0.016)	(0.047)	(0.030)	(0.086)	(0.018)	(0.076)	(0.025)	(0.108)
Instrumental variables	No	Yes	No	Yes	No	Yes	No	Yes
Misclassification correction	No	No	Yes	Yes	No	No	Yes	Yes
Weak IV test statistic		23.060		21.735		23.060		22.050
p-value		0.000		0.000		0.000		0.000
Hansen J statistic		0.545		0.452		0.714		0.782
p-value		0.761		0.798		0.700		0.676
Percent change in levels	-68%	-62%	-56%	-44%	-20%	3%	-8%	25%
p-value	0.000	0.000	0.000	0.002	0.005	0.899	0.354	0.416
Number of daughters	2899	2899	2899	2899	2899	2899	2899	2899
Observations	55049	55049	55049	55049	55049	55049	55049	55049

Notes: Robust standard errors with state clustering are shown in parentheses. All specifications control for daughter's state and year effects and mother's modal state effects in addition to daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, daughter's state AFDC/TANF benefit standard, daughter's EITC federal/state maximum credit, state-level poverty rate, AFDC/TANF recipiency rate, and unemployment rate. Additionally, each specification controls for a wide range of average state-level characteristics corresponding to the mother's state of residence when the daughter was aged 12-18 (see description in the text above). Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. The misclassification correction uses reporting rates in the PSID to address potential misreporting for the daughter's welfare participation (see Section S.2 for details). Daughters' PSID core longitudinal weights are used in estimation.

S.6.2. Timing of Welfare Reform

Next, we present a set of figures and tables to investigate the timing of the reforms. We begin by showing changes in the ratio of average benefits to the statutory maximum guarantee for a typical recipient family (single parent with two children). This statistic offers a measure of how much states pay out to families conditional on eligibility, which could vary by state differences in program generosity, perhaps as a proxy for accessibility, or an indication of the depth of poverty among eligible families. Figure S.6-1 shows that there are no discernible differences in trends by groups of states who implemented reform earlier compared to later.

FIGURE S.6-1. STATE AFDC/TANF BENEFIT-TO-GUARANTEE RATIOS BY DATE OF WELFARE REFORM IMPLEMENTATION AND CURRENT YEAR

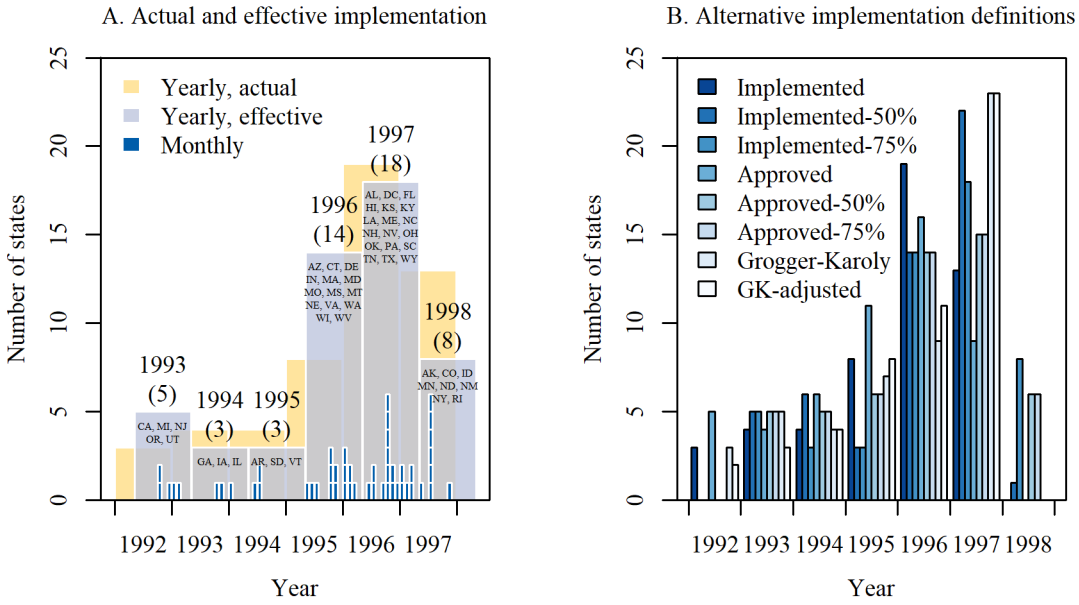


Notes: State-level benefit-to-guarantee ratios represent the average family benefit by state divided by the statutory maximum guarantee for a single-parent family with two children, which are shown grouped by year of state-wide welfare reform implementation.

We next explore the sensitivity of our findings by varying the definition of a post-welfare reform state. Recall that the definition of reform in the baseline specification is that mother's reform indicator only turns on when she is observed in a state-year after reform, though some mothers may have left the sample before reform and thus the indicator remains "before reform" even after the TANF years begin. We consider alternative reform-timing definitions based on dates reported in Crouse (1999) and Grogger and Karoly (2005), as well as using the earliest implementation in either the mother's or daughter's state of residence to define the reform variable.

Figure S.6-2 offers a visualization of the variation in welfare reform implementation dates in panel A, and in panel B, a visualization of reform implementation under various alternative definitions based on Crouse (1999) as well as Grogger and Karoly (2005). In panel A, the effective year of reform implementation represents states that introduced reform for at least 75 percent of the year, which corresponds to the definition used in estimation throughout. In panel B, the number of states with welfare reform by year is compared based on the actual implementation date and the effective implementation as shown in panel A, and additional rules are shown such as at least 50 percent of the year is after implementation, or waiver approval instead of reform implementation, as well as two measures from Grogger and Karoly (2005) based on the first reform implementation (labeled "Grogger-Karoly") or the second implementation if states introduced more than one reform ("GK-adjusted").

FIGURE S.6-2. WELFARE REFORM IMPLEMENTATION DATES AND ALTERNATIVE DEFINITIONS



Notes: In panel A, the actual implementation dates are represented by the "Monthly" and "Yearly, actual" bars, whereas the "Yearly, effective" bars indicate the number of states with at least 75 percent of the year under the implemented welfare reform policies. In panel B, "Implemented" denotes the Crouse (1999) implementation year; "Implemented-50" or "-75" denotes at least 50 or 75 percent of the year after implementation, respectively; "Approved" denotes the Crouse (1999) approval year; "Approved-50" or "-75" denotes at least 50 or 75 percent of the year after approval; "Grogger-Karoly" denotes the first year Grogger and Karoly (2005) list a state reform; "GK-adjusted" denotes the second year a reform bundle is listed if a state introduces reform more than once during the waiver period.

Next, we re-estimate the difference-in-difference-type model based on these varying definitions of reform timing using instrumental variables, with results shown in Table S.6-4. For these estimates, we add two more reform definitions: one defined by at least 75 percent of the year after reform based on the *daughter's* state of residence (DR), and the other defined by the earliest reform by either the daughter's or mother's state of residence (DR/R). Note that column (2) corresponds to our baseline results in Table 4 column (2) with the exception that the reform indicator equals 1 based on the mother's last observed state of residence if her current state variable is missing at the time of reform (otherwise, in the main results, the reform indicator remains 0). The correlation between these alternative measures and the baseline reform ranges between 0.77 and 0.82.

We present results using Table S.6-4, which shows estimates of the parameters of interest by different definitions in the timing of implementation of the reforms. Recall that the effect of mother's participation is 0.268 (s.e. 0.049) and the effect of the reform is -0.183 (s.e. 0.046) in Table 4 column (2) of the manuscript. Looking at the estimates in Table S.6-4, we find that the IV estimates are larger in

absolute value, with no substantive differences in terms of point estimates and the percent change of the transmission effect across all specifications of reform.

TABLE S.6-4. IV ESTIMATES OF WELFARE TRANSMISSION BY VARIATION IN RELEVANT DATE OF REFORM

Reform date:	Impl. (1)	Impl-75 (2)	Approv. (3)	Appr-75 (4)	GK-2005 (5)	GK-adj (6)	DR (7)	DR/R (8)
Mother's participation	0.322	0.301	0.330	0.309	0.319	0.318	0.307	0.310
	(0.077)	(0.069)	(0.081)	(0.072)	(0.076)	(0.075)	(0.071)	(0.070)
After welfare reform	0.075	0.067	0.072	0.067	0.069	0.066	0.069	0.065
	(0.022)	(0.020)	(0.023)	(0.022)	(0.022)	(0.021)	(0.023)	(0.022)
Mother's participation × after welfare reform	-0.235	-0.215	-0.245	-0.222	-0.234	-0.236	-0.223	-0.224
	(0.078)	(0.069)	(0.081)	(0.073)	(0.076)	(0.076)	(0.072)	(0.070)
Correlation with baseline reform	0.790	0.826	0.779	0.814	0.796	0.794	0.811	0.818
Weak IV test statistic	21.500	21.588	21.370	21.450	21.602	21.940	21.560	22.309
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen J statistic	2.377	2.190	2.877	2.624	2.688	2.905	2.857	2.840
p-value	0.305	0.335	0.237	0.269	0.261	0.234	0.240	0.242
Percent change in levels	-73%	-71%	-74%	-72%	-73%	-74%	-73%	-72%
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of daughters	2961	2961	2961	2961	2961	2961	2961	2961
Observations	56068	56068	56068	56068	56068	56068	56068	56068

Notes: See Table 4 notes. All specifications above differ from the baseline reform definition by which the mother's reform indicator only turns on when she is observed in a state-year after reform, though some mothers may have left the sample before reform and thus the indicator remains "before reform" even after the TANF years begin. "Impl." denotes the Crouse (1999) implementation year; "Impl-75" denotes at least 75 percent of the year after implementation; "Approv." denotes the Crouse (1999) approval year; "Appr-75" denotes at least 75 percent of the year after approval; "GK-2005" denotes the first year Grogger and Karoly (2005) list a state reform; "GK-adj" denotes the second year a reform bundle is listed if a state introduces reform more than once during the waiver period; "DR" denotes the first state-year the daughter experiences reform using the Crouse (1999) Impl-75 rule; and, "DR/R" denotes the earliest year either the mother or daughter experiences reform using the Crouse (1999) Impl-75 rule.

The specific definition of welfare reform timing does not make any substantive difference for interpreting the effect of reform on intergenerational transmission. However, we are relying on the assumption that welfare reform timing is exogenous for identifying changes in welfare participation. In Table S.6-5, we explore this assumption by focusing on the waiver time period, 1992-1997, and estimating the effects of various state-level characteristics on either the approval of a welfare reform waiver (see Crouse, 1999) or the implementation of reform (see Grogger and Karoly, 2005). For each definition of reform timing, we use policy and macroeconomic variables corresponding to the baseline estimation controls (AFDC/TANF benefit standard, AFDC/TANF recipiency rate, federal/state EITC maximum, SPM poverty rate, and the unemployment rate). We also show variations that include lags of these variables as well as specifications with a wide range of time-varying state-level policies (see Section S.6.1 for descriptions), and all of the specifications further include state and year fixed effects along with state-specific trends. Relatively few of these variables are statistically significant. For the year of implementation, shown in column (8), there are 2 variables (out of 54) significant at the 5-percent level when additional variables and lags are

included. The results show that the probability that a state adopts the reform is not correlated with contemporaneous and lag values of state time-varying factors and policy changes.

TABLE S.6-5. WELFARE REFORM TIMING CORRELATIONS WITH POLICY AND MACROECONOMY VARIABLES, 1992-1997

	Approval year				Implementation year			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
AFDC/TANF benefit	0.543	-0.656	0.578	-0.735	0.350	0.449	0.553	0.281
standard	(1.181)	(0.831)	(1.085)	(1.029)	(0.873)	(1.059)	(0.994)	(1.468)
	[0.648]	[0.434]	[0.597]	[0.478]	[0.690]	[0.674]	[0.580]	[0.849]
Lagged AFDC/TANF		1.637		1.569		-0.442		-0.486
benefit standard		(0.654)		(0.913)		(1.319)		(1.284)
		[0.016]		[0.092]		[0.739]		[0.707]
AFDC/TANF	0.153	3.826	-0.393	2.372	-13.773	-14.701	-14.689	-11.482
recipiency rate	(8.085)	(10.174)	(8.917)	(12.657)	(7.354)	(10.086)	(8.684)	(13.172)
	[0.985]	[0.708]	[0.965]	[0.852]	[0.067]	[0.151]	[0.097]	[0.388]
Lagged AFDC/TANF		-2.299		-3.397		2.343		-1.911
recipiency rate		(11.435)		(15.132)		(11.113)		(14.622)
		[0.841]		[0.823]		[0.834]		[0.897]
EITC federal/state	0.071	0.117	0.018	0.002	0.059	-0.264	0.022	-0.287
maximum credit	(0.173)	(0.291)	(0.192)	(0.372)	(0.126)	(0.315)	(0.162)	(0.335)
	[0.682]	[0.689]	[0.925]	[0.995]	[0.643]	[0.405]	[0.892]	[0.396]
Lagged EITC federal/		0.011		-0.037		0.402		0.450
state maximum credit		(0.253)		(0.416)		(0.296)		(0.357)
		[0.966]		[0.929]		[0.181]		[0.213]
SPM poverty rate	-2.359	-2.048	-2.022	-1.814	0.596	0.871	0.746	0.730
	(1.627)	(1.730)	(1.689)	(1.658)	(1.530)	(1.668)	(1.764)	(1.897)
	[0.153]	[0.242]	[0.237]	[0.279]	[0.699]	[0.604]	[0.674]	[0.702]
Lagged SPM poverty		-1.120		-1.054		-1.837		-1.763
rate		(1.210)		(1.406)		(1.114)		(1.211)
		[0.359]		[0.457]		[0.105]		[0.152]
Unemployment rate	0.028	0.028	0.014	0.020	0.036	0.051	0.030	0.022
	(0.046)	(0.054)	(0.048)	(0.055)	(0.040)	(0.057)	(0.043)	(0.058)
	[0.542]	[0.609]	[0.769]	[0.714]	[0.372]	[0.377]	[0.481]	[0.709]
Lagged unemployment		-0.019		-0.021		-0.013		-0.013
rate		(0.049)		(0.062)		(0.051)		(0.058)
		[0.694]		[0.732]		[0.798]		[0.817]
Include lagged measures?	No	Yes	No	Yes	No	Yes	No	Yes
Additional state controls?	No	No	Yes	Yes	No	No	Yes	Yes
State-year observations	300	300	300	300	300	300	300	300

Notes: Robust standard errors with state clustering are shown in parentheses. All specifications include controls for fixed state and year effects as well as a state-year trend. AFDC/TANF benefits levels and EITC credits are measured in thousands of 2012 dollars. Approval years in columns (1)-(4) are taken directly from Crouse (1999), and the implementation years in columns (5)-(8) denote the first year Grogger and Karoly (2005) list a state reform. When additional state controls are noted in columns (3)-(4) and (7)-(8), we include a set of 24 time-varying state-level variables and, in columns (4) and (8), their lagged values; some variables are dropped for collinearity. The description of these variables can be found in Section S.6.1.

In order to evaluate our assumption of conditionally random timing of reform implementation, we conclude this subsection on timing by performing a falsification exercise in the form of a placebo-type test. Now, our primary objective is to evaluate the cross-state variation in states implementation of welfare reform, which allows us to quasi-experimentally separate out the effect of a mother's

participation in welfare during her daughter's childhood on the daughter's participation as an adult. Previous work has shown that a state's decision to apply for an AFDC waiver was not an endogenous response to caseload size (see Ziliak et al., 2000), as appears to be the case in Figure S.6-1 and Table S.6-5, but we perform this test for completeness. Moreover, as shown in Table S.6-4, variations in the definition of reform implementation dates do not affect the main findings of our study.

As explained in detail below, we randomly generate welfare reform dates to then estimate the parameters of interest using the same methods within an equivalent class of models. We are not aware of a similar placebo-type test in the literature, although our idea is somewhat related to the recent work of Hagemann (2019). Consider the model introduced in equation (3) for $t \in \{1,2,\dots,T\}$:

$$y_{ist}^{d} = \alpha + \beta' \boldsymbol{x}_{ist}^{d} + \delta y_{is,\forall j<t}^{m} + \gamma R_{st}^{m} + \theta R_{st}^{m} y_{is,\forall j<t}^{m} + \mu_{s}^{m} + \mu_{s}^{d} + \kappa_{t}^{d} + \nu_{ist}^{d},$$

where y_{ist}^{d}, $y_{is,\forall j<t}^{m}$, $\boldsymbol{x}_{ist}^{d}$, μ_{s}^{m}, μ_{s}^{d}, κ_{t}^{d}, and v_{ist}^{d} are defined as before. Recall that R_{st}^{m} is an indicator variable that takes a value of 1 when the state of residence of the mother implements welfare reform and 0 otherwise. Let t_s^* be the year when the reform is implemented in state s. Note that for $t_s < t_s^*$, $R_{st}^{m} = 0$, and for $t_s > t_s^*$, $R_{st}^{m} = 1$. In what follows, we drop the dependence of t_s^* on s for notational convenience. Lastly, we split years before and after the reform into two sets: before-reform years $B = \{1,2,\dots,t^* - 1\}$, and after-reform years $A = \{t^*, t^* + 1, \dots, T\}$.

Let $a_t = \alpha + \kappa_t^d$. Note that for $t \in B$, the parameter δ can be estimated by instrumental variables using the following regression model,

$$y_{ist}^{d} = a_t + \beta' \boldsymbol{x}_{ist}^{d} + \delta y_{is,\forall j<t}^{m} + \mu_{s}^{'m} + \mu_{s}^{d} + \nu_{ist}^{d},$$

while, for $t \in A$, the parameter $\Delta = \delta + \theta$ can be estimated by instrumental variables using the following regression model,

$$y_{ist}^{d} = b_t + \beta' \boldsymbol{x}_{ist}^{d} + \Delta y_{is,\forall j<t}^{m} + \mu_{s}^{'m} + \mu_{s}^{d} + \nu_{ist}^{d},$$

where $b_t = a_t + \gamma$. Consequently, one can identify and consistently estimate θ considering the difference $\Delta - \delta$ obtained by estimating the last two equations. This relies on the assumption that t^* is conditionally random, or alternatively, that the timing of the reform does not depend on the participation of daughters and mothers, and/or there are no latent state-trends that generate dependence between daughter's participation and the timing of the reform. If t^* is conditionally random, the procedure is consistent, and consequently, we should obtain results similar to Table 4.

For the implementation of the approach, consider T^* years indicating the cardinality of the sets B and A, where T^* represents the number of years before and after a state implements welfare reform at

time t^*. We perform our baseline estimation on a sample of daughter-mother pairs randomly drawn from only one time period before welfare reform, $t_b \in B$, and one period after, $t_a \in A$, and we repeat this estimation for randomly drawn years over $R = 1000$ samples. The estimator of our parameters of interest, $\{\delta, \gamma, \theta\}$, can be obtained by averaging $\{\widehat{\delta, \gamma, \theta}\}_r$ for $r = \{1,2, \dots, R\}$. The equations can be estimated separately, as introduced above, or jointly using a difference-in-difference-type specification. Because our interest is to compare the results with Table 4, we adopted the second approach, although the results for δ and θ were similar for both approaches. To further explore the sensitivity of our placebo test, we allow the window of observations before/after reform to vary in length with $T^* \in \{5, 10, 15\}$.

The results are shown in Table S.6-6, where IV test statistics, number of daughters, and observations are taken as mean values across R samples. The table shows that OLS results based on the conditional independence condition on the timing of the reform estimates converge to our Table 4 column (1) estimates as T^* increases. Moreover, the IV estimates are similar to the baseline reform effects. Overall, Table S.6-6 presents evidence that is largely consistent with the estimates presented in columns (1) and (2) of Table 4.

TABLE S.6-6. PLACEBO ESTIMATES FOR A DIFFERENCE-IN-DIFFERENCE-TYPE MODEL

Reform randomization window:	5 years before/after		10 years before/after		15 years before/after	
	(1)	(2)	(3)	(4)	(5)	(6)
Mother's participation	0.123	0.218	0.132	0.220	0.147	0.236
	(0.014)	(0.031)	(0.013)	(0.059)	(0.026)	(0.072)
After welfare reform	0.025	0.040	0.037	0.054	0.046	0.058
	(0.017)	(0.033)	(0.020)	(0.035)	(0.096)	(0.048)
Mother's participation ×	-0.068	-0.111	-0.083	-0.118	-0.101	-0.133
after welfare reform	(0.019)	(0.072)	(0.018)	(0.076)	(0.029)	(0.084)
Instrumental variables	No	Yes	No	Yes	No	Yes
Weak IV test statistic		20.237		20.646		20.362
p-value		0.000		0.000		0.000
Hansen J statistic		2.361		1.777		1.748
p-value		0.409		0.514		0.527
Number of daughters	2958	2958	2760	2760	2495	2495
Observations	4036	4036	3637	3637	3193	3193

Notes: Estimates shown above correspond to our baseline specifications in Table 4 columns (1)-(2) estimated only for daughters observed for a randomly drawn year before and random year after welfare reform within the timespan indicated above, either 5, 10, or 15 years pre-/post-reform. All models control for daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, controls for the daughter's state AFDC/TANF benefit standard, EITC federal/state maximum credit, state-level SPM poverty rate, AFDC/TANF recipiency rate, unemployment rate, and state and year effects for the daughter as well as state effects for the mother's modal state when the daughter is aged 12-18. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. Statistics are constructed based on 1000 bootstrap replications with state-level clustering with standard errors shown in parentheses. Daughters' PSID core longitudinal weights are used in estimation.

S.6.3. Heterogeneity of Policy Effects State Policy Environment

States differed in the timing of implementation and in the degree of aggressiveness in implementation of welfare reform, both in the waiver era and after TANF. Since the Welfare Reform Act was signed into law in 1996, the majority of states implemented reform in 1996 or 1997. Therefore, we define the 19 states that had already implemented waiver reforms by 1995 as early reformers. (See Figure S.6-2 panel A to see which states implemented reform by year.) While there is no agreed upon measure of strictness in the literature, we follow Grogger and Karoly (2005, Table 4.2) and define strict states as those whereby all main studies surveyed agree that the sanctions policy adopted by the state during 1992-1996 was strict (there were 13 states that met this criteria). Ziliak (2007) examined five different categories of welfare reform aggressiveness and concluded that the latter measure was the best proxy for strict policy reforms.

We repeat our main estimation separately by indicators for these measures of welfare reform timing or stringency to test whether there were differences in intergenerational transmission in those states that adopted reforms earlier or adopted relatively stricter reforms. The sets of states whose reforms are defined as early (19 states) or strict (13 states) by these criteria have little overlap: only Mississippi, Nebraska, and Virginia are categorized as both early and strict. Table S.6-7 reports estimates corresponding to the effects of interest based on state reform timing and aggressiveness. The AFDC/TANF transmission mechanisms between mother and daughter before welfare reform were generally smaller in late reform states than in early reform states, and in less-strict-reform states than in strict-reform states, yet these differences are statistically insignificant at all conventional levels. The timing and strictness of welfare reform also do not appear to be related to differential effects on intergenerational welfare participation. If anything, welfare reform may have made states more similar in terms of welfare dependence in the post era. After reform, daughters in early implementation states are about 7.5 percentage points more likely to participate in cash assistance if their mothers did, which is similar to the closer to the 8.7 percentage point effect in late-reform states (columns (2) and (4)). Likewise, the post-reform transmission effect is about 8.1 percentage points in strict-reform states and 8.7 points in less strict states.

TABLE S.6-7. HETEROGENEOUS INTERGENERATIONAL TRANSMISSION OF AFDC/TANF PARTICIPATION BY STATE TYPE

Daughter's outcome:	AFDC/TANF				AFDC/TANF, SNAP, SSI			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	A. Welfare reform timing							
	Early		Late		Early		Late	
Mother's participation	0.154	0.294	0.137	0.253	0.218	0.275	0.234	0.339
	(0.027)	(0.068)	(0.010)	(0.074)	(0.026)	(0.117)	(0.025)	(0.101)
After welfare reform	0.031	0.065	0.045	0.079	-0.012	-0.034	0.021	0.019
	(0.016)	(0.038)	(0.008)	(0.024)	(0.018)	(0.036)	(0.018)	(0.041)
Mother's participation ×	-0.100	-0.219	-0.107	-0.167	-0.023	0.056	-0.062	0.034
after welfare reform	(0.028)	(0.074)	(0.017)	(0.061)	(0.020)	(0.104)	(0.026)	(0.129)
Instrumental variables	No	Yes	No	Yes	No	Yes	No	Yes
Weak IV test statistic		10.027		10.841		10.027		10.841
p-value		0.018		0.013		0.018		0.013
Hansen J statistic		0.517		3.260		4.872		1.192
p-value		0.772		0.196		0.088		0.551
Percent change in levels	-65%	-74%	-78%	-66%	-11%	20%	-27%	10%
p-value	0.000	0.000	0.000	0.002	0.232	0.654	0.008	0.800
Number of daughters	1566	1566	1843	1843	1566	1566	1843	1843
Observations	25870	25870	30198	30198	25870	25870	30198	30198
	B. Welfare reform aggressiveness							
	Strict reform		Less strict		Strict reform		Less strict	
Mother's participation	0.149	0.291	0.143	0.245	0.266	0.409	0.214	0.268
	(0.011)	(0.067)	(0.017)	(0.065)	(0.027)	(0.139)	(0.021)	(0.082)
After welfare reform	0.049	0.089	0.034	0.057	0.017	0.005	-0.004	-0.026
	(0.017)	(0.028)	(0.011)	(0.022)	(0.026)	(0.068)	(0.017)	(0.025)
Mother's participation ×	-0.113	-0.210	-0.100	-0.158	-0.075	0.035	-0.034	0.067
after welfare reform	(0.019)	(0.052)	(0.019)	(0.049)	(0.041)	(0.143)	(0.018)	(0.075)
Instrumental variables	No	Yes	No	Yes	No	Yes	No	Yes
Weak IV test statistic		6.150		20.321		6.150		20.321
p-value		0.105		0.000		0.105		0.000
Hansen J statistic		0.003		1.902		0.465		1.408
p-value		0.998		0.386		0.793		0.495
Percent change in levels	-76%	-72%	-70%	-64%	-28%	9%	-16%	25%
p-value	0.000	0.000	0.000	0.000	0.045	0.817	0.054	0.454
Number of daughters	945	945	2143	2143	945	945	2143	2143
Observations	16933	16933	39135	39135	16933	16933	39135	39135

Notes: "Early" means implementation occurred in years 1992-1995 (19 states) and "Late" in years 1996-1997 (32 states) according to Crouse (1999). Welfare reform aggressiveness is defined by whether state reforms were considered strict (13 states) according to criteria in Grogger and Karoly (2005). Robust standard errors with state clustering are shown in parentheses. All models control for daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, the daughter's state AFDC/TANF benefit standard, EITC federal/state maximum credit, state-level SPM poverty rate, AFDC/TANF recipiency rate, unemployment rate, daughter's state and year effects, and mother's modal state effects. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. Daughters' PSID core longitudinal weights are used in estimation.

S.6.4. Transmission of Other Means-Tested Program Participation

Our difference-in-difference design implies that welfare reform changed transmission of AFDC/TANF participation without reducing transmission of participation in a broader set of means-tested assistance programs (Table 4 in the manuscript). Here we provide further evidence on the transmission patterns across these other welfare programs, which confirms the null effect of the 1990s welfare reform on means-tested programs besides AFDC/TANF. We focus on descriptive correlations without a causal interpretation in order to abstract away from IV complications for each individual

means-tested program (whereas elsewhere we instrument for mother's AFDC/TANF welfare participation effects), and we also provide partial correlations conditioned on our baseline set of control variables used throughout (see, for example, Table 4). Table S.6-8 shows OLS estimates for participation in: 1) AFDC/TANF, SNAP, SSI; 2) SNAP, SSI; 3) SNAP; and, 4) SSI. For all of these categorical definitions of welfare transmission, welfare reform has no statistically significant effect on the correlations. The OLS coefficient estimates of mother's participation after reform are small (compared to AFDC/TANF), and there is little difference between the correlations by SNAP or SSI versus SNAP alone.

TABLE S.6-8. CONDITIONAL AND UNCONDITIONAL INTERGENERATIONAL CORRELATIONS OF WELFARE PARTICIPATION BY PROGRAM

Daughter's outcome:	AFDC/TANF, SNAP, or SSI		SNAP or SSI		SNAP		SSI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	A. Mother's AFDC/TANF participation							
Mother's participation	0.257	0.226	0.239	0.210	0.224	0.196	0.051	0.045
	(0.022)	(0.018)	(0.022)	(0.019)	(0.020)	(0.017)	(0.015)	(0.012)
After welfare reform	-0.012	0.002	-0.010	-0.003	-0.013	0.004	0.006	-0.013
	(0.008)	(0.013)	(0.007)	(0.013)	(0.007)	(0.013)	(0.003)	(0.009)
Mother's participation ×	-0.039	-0.041	-0.029	-0.032	-0.024	-0.031	-0.003	0.005
after welfare reform	(0.021)	(0.017)	(0.021)	(0.016)	(0.019)	(0.015)	(0.015)	(0.012)
Conditional on baseline controls:	No	Yes	No	Yes	No	Yes	No	Yes
Percent change in levels	-15%	-18%	-12%	-15%	-11%	-16%	-6%	11%
p-value	0.053	0.011	0.143	0.039	0.191	0.037	0.825	0.713
Number of daughters	2961	2961	2961	2961	2961	2961	2961	2961
Observations	56068	56068	56067	56067	55891	55891	56058	56058
	B. Mother's welfare participation corresponding to daughter's outcome							
Mother's participation	0.194	0.161	0.191	0.159	0.184	0.154	0.084	0.075
	(0.013)	(0.012)	(0.015)	(0.012)	(0.015)	(0.013)	(0.027)	(0.020)
After welfare reform	-0.017	-0.011	-0.014	-0.014	-0.014	-0.005	0.005	-0.010
	(0.007)	(0.014)	(0.006)	(0.014)	(0.006)	(0.012)	(0.004)	(0.009)
Mother's participation ×	-0.014	-0.016	-0.010	-0.012	-0.009	-0.014	-0.005	-0.001
after welfare reform	(0.014)	(0.015)	(0.014)	(0.016)	(0.017)	(0.015)	(0.024)	(0.019)
Conditional on baseline controls:	No	Yes	No	Yes	No	Yes	No	Yes
Percent change in levels	-7%	-10%	-5%	-8%	-5%	-9%	-5%	-1%
p-value	0.297	0.273	0.493	0.416	0.589	0.335	0.842	0.961
Number of daughters	2961	2961	2961	2961	2961	2961	2952	2952
Observations	56068	56068	56067	56067	55891	55891	55820	55820

Notes: Robust standard errors with state clustering are shown in parentheses. Estimates in panel A column (2) correspond to Table 4 column (5) in the manuscript. Daughter's and mother's welfare participation are indicators for current or any prior participation, respectively, and the definition of welfare program is for each varies by specification as indicated. Conditional estimates include baseline controls per Table 4: a quadratic in age for both daughter and mother, state-level policy controls for the daughter, and state and year effects for the daughter as well as state effects for the mother's modal state when the daughter is aged 12 to 18. Daughters' PSID core longitudinal weights are used in estimation.

S.7. Survey Weights and Biennial Interviewing

In this section, we investigate the robustness of results to the use of daughters' and mothers' survey weights and the change in the frequency of PSID interviews starting in 1997.

S.7.1. Survey Weights

As mentioned in Section IV of the manuscript, the large number of mothers and daughters linked over the PSID survey years is comprised of both the Survey Research Center (SRC) and Survey of Economic Opportunity (SEO) subsamples. Our sample includes about 52 percent of daughters (48 percent of observations) from the SEO subsample, and 48 percent of daughters (52 percent of observations) from the SRC subsample. We use the core longitudinal weights throughout the analysis to correct for the oversample of low-income and minority families in the SEO. In Table S.7-1, we re-estimate the baseline specifications from Table 4 in the manuscript without using the daughter's PSID core longitudinal survey weights, first for the full baseline sample including the SEO, which oversamples low-income and minority families, and then for only the SRC subsample, which is nationally representative (for detailed discussion related to the SEO sample, see Brown, 1996).

TABLE S.7-1. INTERGENERATIONAL TRANSMISSION OF AFDC/TANF PARTICIPATION ESTIMATED WITHOUT PSID LONGITUDINAL WEIGHTS

Estimation sample:	SRC and SEO (full baseline sample)				SRC sample only			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother's participation	0.203	0.402	0.322	0.650	0.113	0.214	0.181	0.300
	(0.014)	(0.057)	(0.021)	(0.085)	(0.020)	(0.067)	(0.034)	(0.110)
After welfare reform	0.073	0.149	0.090	0.196	0.033	0.059	0.051	0.074
	(0.011)	(0.035)	(0.019)	(0.053)	(0.011)	(0.023)	(0.019)	(0.036)
Mother's participation ×	-0.149	-0.274	-0.192	-0.365	-0.087	-0.180	-0.118	-0.201
after welfare reform	(0.015)	(0.058)	(0.030)	(0.091)	(0.022)	(0.068)	(0.039)	(0.112)
Instrumental variables	No	Yes	No	Yes	No	Yes	No	Yes
Misclassification correction	No	No	Yes	Yes	No	No	Yes	Yes
Weak IV test statistic		21.604		22.023		19.170		18.662
p-value		0.000		0.000		0.000		0.000
Hansen J statistic		1.365		0.968		4.084		4.488
p-value		0.505		0.616		0.130		0.106
Percent change in levels	-74%	-68%	-60%	-56%	-77%	-84%	-65%	-67%
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
Number of daughters	2961	2961	2961	2961	1422	1422	1422	1422
Observations	56068	56068	56068	56068	28917	28917	28917	28917

Notes: Robust standard errors with state clustering are shown in parentheses. All specifications control for daughter's state and year effects and mother's modal state effects in addition to daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, daughter's state AFDC/TANF benefit standard, daughter's EITC federal/state maximum credit, state-level poverty rate, AFDC/TANF recipiency rate, and unemployment rate. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard, which are defined over the daughter's critical exposure ages 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. The misclassification correction uses reporting rates in the PSID to address potential misreporting for the daughter's welfare participation.

Relative to Table 4, the percent change results in Table S.7-1 are qualitatively little changed when we do not weight the estimates in the full sample (columns (1)-(4)) or when we drop the SEO oversample of low-income families and estimate without weights for the SRC (columns (5)-(6)). The unweighted estimates are larger in magnitude when including the SEO low-income oversample, while the SRC-alone

estimates are smaller in magnitude, suggesting that weights are needed for the estimates to be more comparable to the nationally-representative SRC subsample estimates.

Recall that our specifications are based on the fact that the outcome variable is at the daughter level and, importantly, at the daughter's current year, whereas the mother's variables are aggregated over prior observation years with the instrumental variables defined during the daughter's critical ages of 12 to 18 years old. In an intergenerational context, it may be reasonable to compare the sensitivity of estimates to the use of the mother's survey weights. Current-year survey weights for mothers are only available for 79 percent of observations based on their ongoing availability in later surveys. Alternatively, we could use an average of the mother's weights during the critical exposure period when the daughter is aged 12-18, or an average over all of the mother's prior observed weights. Note that the survey weights for mothers are closely correlated with their daughters' longitudinal weights used in our main estimation: 0.708 for contemporaneous years, 0.857 for the critical exposure period average, and 0.916 for averages over all prior years. Table S.7-2 shows that the IV results using mothers' weights are consistent with the main results shown in Table 4 of the manuscript.

TABLE S.7-2. IV ESTIMATES OF INTERGENERATIONAL TRANSMISSION OF AFDC/TANF PARTICIPATION COMPARING THE USE OF DAUGHTERS' VERSUS MOTHERS' PSID CORE LONGITUDINAL WEIGHTS

Daughter's outcome variable:	AFDC/TANF				AFDC/TANF, SNAP, SSI			
Survey weights used:	Daughters' current (1)	Mothers' current (2)	Mothers' critical (3)	Mother's avg. prior (4)	Daughters' current (5)	Mothers' current (6)	Mothers' critical (7)	Mother's avg. prior (8)
Mother's participation	0.268	0.308	0.290	0.282	0.299	0.337	0.315	0.295
	(0.049)	(0.068)	(0.050)	(0.052)	(0.073)	(0.074)	(0.069)	(0.073)
After welfare reform	0.069	0.059	0.072	0.070	-0.014	-0.023	-0.013	-0.015
	(0.021)	(0.018)	(0.021)	(0.021)	(0.028)	(0.019)	(0.026)	(0.025)
Mother's participation ×	-0.183	-0.198	-0.190	-0.190	0.040	0.063	0.074	0.070
after welfare reform	(0.046)	(0.065)	(0.051)	(0.050)	(0.074)	(0.077)	(0.075)	(0.073)
Weak IV test statistic	23.157	19.439	21.907	22.018	23.157	19.439	21.907	22.018
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen J statistic	1.315	2.052	0.706	1.156	2.050	1.109	1.439	1.528
p-value	0.518	0.358	0.702	0.561	0.359	0.574	0.487	0.466
Percent change in levels	-68%	-64%	-65%	-67%	13%	19%	23%	24%
p-value	0.000	0.000	0.000	0.000	0.621	0.477	0.394	0.417
Number of daughters	2961	2894	2961	2961	2961	2894	2961	2961
Observations	56068	44309	56068	56068	56068	44309	56068	56068

Notes: Robust standard errors with state clustering are shown in parentheses. All models control for daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, the daughter's state AFDC/TANF benefit standard, EITC federal/state maximum credit, state-level SPM poverty rate, AFDC/TANF recipiency rate, unemployment rate, daughter's state and year effects, and mother's modal state effects. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic.

S.7.2. Biennial Interviews

The PSID carried out annual interviews from 1968 to 1996, and changed to biennial interviews from 1997 onward. Therefore, our data on welfare participation includes both responses for the prior

observation year (T-1) and, after 1997, for the two-year retrospective (T-2). This might have an impact on the accuracy of answers, and in particular, might exacerbate issues associated with misclassification. Thus, we now examine the sensitivity of our findings to the change in the frequency of PSID interviews.

TABLE S.7-3. TRANSMISSION ESTIMATE SENSITIVITY TO T2-YEAR RETROSPECTIVE DATA AFTER SURVEY YEAR 1997

Observation years:	Even years (T1 only)		Odd years (T1 & T2)		All years	
	(1)	(2)	(3)	(4)	(5)	(6)
Mother's participation	0.149	0.291	0.140	0.244	0.145	0.268
	(0.012)	(0.052)	(0.013)	(0.049)	(0.013)	(0.049)
After welfare reform	0.039	0.073	0.037	0.064	0.038	0.069
	(0.009)	(0.023)	(0.009)	(0.020)	(0.009)	(0.021)
Mother's participation ×	-0.106	-0.201	-0.094	-0.164	-0.100	-0.183
after welfare reform	(0.015)	(0.052)	(0.015)	(0.045)	(0.015)	(0.046)
Instrumental variables	No	Yes	No	Yes	No	Yes
Weak IV test statistic		23.100		23.141		23.157
p-value		0.000		0.000		0.000
Hansen J statistic		0.969		1.807		1.315
p-value		0.616		0.405		0.518
Percent change in levels	-71%	-69%	-67%	-67%	-69%	-68%
p-value	0.000	0.000	0.000	0.000	0.000	0.000
Number of daughters	2961	2961	2961	2961	2961	2961
Observations	28276	28276	27792	27792	56068	56068

Notes: After 1997, biennial PSID survey questions include one- and two-year retrospectives, T-1 and T-2. Columns (1) and (4) represent only the T-1 questions for the even observation years (from odd survey years 1969-2013). Columns (2) and (5) represent the odd observation years, which include T-1 questions for even survey years 1968-1996, and T-2 questions in the biennial survey years 1999-2013. Columns (3) and (6) use all available data and correspond to our baseline estimates in Table 4. The models control for daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, controls for the daughter's state AFDC/TANF benefit standard, EITC federal/state maximum credit, state-level SPM poverty rate, AFDC/TANF recipiency rate, unemployment rate, and state and year effects for the daughter as well as state effects for the mother's modal state when the daughter is aged 12-18. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. Daughters' PSID core longitudinal weights are used in estimation.

Table S.7-3 presents results of comparing T-1 years and T-2 years as applied to the entire PSID time period. Here, we are defining even years as the even observation years corresponding to the odd survey years 1969-2013, which are the T-1 years of reported economic activity in the prior year. The odd years represent observations from the even survey years 1968-1996 and the T-2 retrospective data from survey years 1999-2013. The columns for all years, (3) and (6), correspond to our baseline OLS and IV estimates of Table 4 in the manuscript. If we assume that the T-1 series is more reliable, then using T-2 years attenuates the magnitude of our results toward zero. However, the size of this potential bias is small.

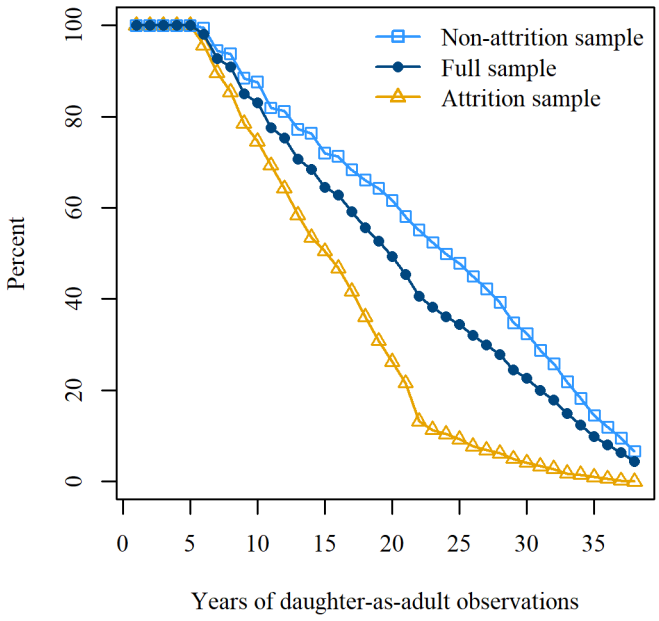
S.8. Sample Attrition

The high annual PSID response rates have been critical to the success and continued use of the survey since its creation. In long panel studies, however, the representativeness of the sample can be

compromised if a significant number of respondents attrit from the survey over time. In studies using the PSID, outcomes for daughter-mother pairs are known to suffer from some degree of attrition bias (Fitzgerald, Gottschalk, and Moffitt, 1998; Ziliak and Kniesner, 1998; and Fitzgerald, 2011), and relatively high attrition rates have been found among low-income adult children with low-income parents (Schoeni and Wiemers, 2015). The core longitudinal weights are designed to address attrition based on selection on observables, and we explore this assumption in more detail here.

We begin our investigation by documenting how attrition affects the number of years an adult daughter is observed in our sample. Figure S.8-1 shows the percentage of daughters who respond to the survey in our sample by the attrition status of the daughter. Recall that the baseline sample restriction requires all adult daughters to be observed at least 5 years (to attenuate measurement issues as discussed in Section IV), so the probability of observing a daughter for 5 consecutive years is 100 percent as shown in the figure. In our sample, daughters are observed for 24 years on average, although a significant number of daughters are observed over a longer period. It is also interesting to see that about half of the daughters who attrit are observed 15 years, which illustrates the relatively high annual response rates and the advantage of using the PSID for the study of intergenerational welfare dependence.

FIGURE S.8-1. UNCONDITIONAL ESTIMATES OF THE PROBABILITY OF RESPONDING TO THE PSID SURVEY BY ATTRITION STATUS



Notes: Daughters in the main estimation sample are restricted to a minimum of five years of observation as an adult. The "Attrition sample" represents daughters who ever attrit compared to those who never attrit.

Although the use of the PSID survey weights can reduce potential biases arising from the attrition of daughters observed in Figure S.8-1, we now investigate if this possibly non-random attrition is an important threat to identification of the parameters of interest. We first provide descriptive evidence for the full sample of daughters and the sample of daughters who never attrit from the PSID sample. We end the section by providing evidence on the transmission effect estimated by inverse probability weighting (IPW) (see, among others, Robins, Rotnitzky, and Zhao, 1995; Fitzgerald, Gottschalk, and Moffitt, 1998; Wooldridge, 2007), and investigate the sensitivity of transmission results to different assumptions on the missing data process.

As it is standard in the literature (see, e.g., Fitzgerald et al., 1998; Schoeni and Wiemers, 2015), we present descriptive statistics associated with the observable characteristics of daughters and mothers. Table S.8-1 shows the sample mean and standard deviation for the full sample of daughters, the sample of daughters who never attrited, and the sample of daughters who attrited anytime between 1968 and 2012. The first three columns show descriptive statistics obtained by PSID survey weights, while the last three columns show values obtained by combining survey weights and inverse probability weighting. The probability model for the binary variable indicating whether the daughter never attrits includes the independent variables used in model (3), an indicator for whether the daughter belongs to the SEO subsample, and the logarithm of daughter's family income (in 2012 dollars). For the weights in Table S.8-1 columns (4)-(6), we estimate a linear probability model that incorporates survey weights to avoid possible biases arising from the overrepresented low-income SEO subsample. Later, for comparison, we show results obtained by estimating first-stage probabilities based on a logit link function and sample averages of the observable variables.

We take two important conclusions from Table S.8-1. First, there are small differences between the group of all daughters and the daughters who never attrit (columns (1) and (2)). Consistent with the literature, survey weights appear to be important when practitioners combine SRC and SEO subsamples, and the use of these weights can help reduce observable differences between pairs of daughters and mothers classified by attrition status. Second, when we consider weighting observations by the inverse probability of remaining in the survey, in addition to using survey weights, the differences remain small for most of the variables, but there are some minor improvements when comparing the full sample to those who do not attrit.

The descriptive evidence presented in Table S.8-1 led us to perform an additional robustness check, although it is reassuring that the composition of the subsample of daughters appears to be similar across groups. We also estimate equation (3) in the paper using the inverse probability of remaining in the survey in addition to using survey weights. These results are reported in detail in Table S.8-2 and also graphically in Figure S.8-2.

TABLE S.8-1. MOTHER AND DAUGHTER CHARACTERISTICS BY DAUGHTER ATTRITION STATUS

	PSID survey weights			PSID survey weights + IPWs		
	All daughters (1)	Never attrited (2)	Ever attrited (3)	All daughters (4)	Never attrited (5)	Ever attrited (6)
	Daughter's characteristics					
Current AFDC/TANF participation	0.044	0.040	0.061	0.045	0.040	0.056
	(0.206)	(0.195)	(0.239)	(0.207)	(0.195)	(0.229)
Age	35.041	36.061	31.242	34.658	35.992	31.824
	(9.400)	(9.543)	(7.747)	(9.273)	(9.519)	(8.021)
Number of children	1.208	1.217	1.173	1.200	1.214	1.169
	(1.238)	(1.248)	(1.201)	(1.236)	(1.247)	(1.212)
Family income	76.576	77.190	74.697	77.384	77.125	77.846
	(106.685)	(90.879)	(144.700)	(120.657)	(91.494)	(159.843)
Same state as birth	0.723	0.714	0.754	0.726	0.716	0.747
	(0.448)	(0.452)	(0.430)	(0.446)	(0.451)	(0.435)
Married	0.682	0.682	0.683	0.682	0.682	0.682
	(0.466)	(0.466)	(0.465)	(0.466)	(0.466)	(0.466)
Non-teen birth	0.806	0.802	0.822	0.809	0.800	0.831
	(0.395)	(0.398)	(0.383)	(0.393)	(0.400)	(0.375)
High school or less	0.484	0.448	0.564	0.493	0.449	0.552
	(0.500)	(0.497)	(0.496)	(0.500)	(0.497)	(0.497)
	Mother's characteristics					
Any prior AFDC/TANF participation	0.271	0.282	0.229	0.262	0.281	0.222
	(0.444)	(0.450)	(0.420)	(0.440)	(0.449)	(0.416)
Age	45.103	45.283	44.433	44.997	45.248	44.462
	(8.626)	(8.846)	(7.717)	(8.513)	(8.831)	(7.770)
Number of children	1.649	1.602	1.823	1.654	1.604	1.760
	(1.125)	(1.095)	(1.216)	(1.122)	(1.092)	(1.175)
Family income	72.169	72.156	72.216	72.599	72.286	73.264
	(83.142)	(89.581)	(52.644)	(80.494)	(90.271)	(54.150)
Same state as birth	0.635	0.619	0.693	0.641	0.621	0.684
	(0.481)	(0.486)	(0.461)	(0.480)	(0.485)	(0.465)
Married	0.804	0.800	0.821	0.808	0.801	0.823
	(0.309)	(0.308)	(0.310)	(0.307)	(0.307)	(0.306)
Non-teen birth	0.712	0.704	0.742	0.718	0.704	0.746
	(0.453)	(0.457)	(0.438)	(0.450)	(0.457)	(0.435)
High school or less	0.630	0.621	0.661	0.630	0.622	0.647
	(0.483)	(0.485)	(0.474)	(0.483)	(0.485)	(0.478)
Survey of Economic Opportunity sample	0.152	0.104	0.329	0.163	0.105	0.286
	(0.359)	(0.306)	(0.470)	(0.369)	(0.306)	(0.452)
Observations	56068	41498	14570	56068	41498	14570

Notes: Standard deviations are in parentheses. Daughters' PSID core longitudinal weights are used to obtain the descriptive statistics in the first three columns and daughters' PSID core longitudinal weights combined with inverse probability weighting (IPW) are used to obtain the last three columns.

Table S.8-2 shows results obtained two different first-stage methods. In columns (3)-(4), we estimate the inverse probability weights by a logit model, while in columns (5)-(6), we estimate the weight using a linear probability model. In each model, we use survey weights in the first stage to correct for possible inconsistencies arising from the overrepresentation of low-income families in the SEO sample, yet this choice is inconsequential to the qualitative findings. The binary response variable in the

first stage is defined as 1 if the daughter never attrits, and 0 otherwise. The independent variables are: mother's welfare participation, a linear and quadratic in age of the mother and daughter, indicators for number of children, policy and economic variables for the daughter, an indicator for whether the daughter belongs to the SEO subsample, the logarithm of the daughter's family income (in 2012 dollars), and indicators for daughter's state and mother's modal state.

The main empirical takeaway from our regression results presented in Table S.8-2 is that the main findings of our investigation are not significantly different if one addresses the possibility of attrition. The results in the last column of Table S.8-2, also shown in Figure S.8-2, demonstrate that the baseline estimates in Table 4 are not sensitive to imposing restrictions in the proportion of daughters who ever attrit that are included in the estimation sample. This can be explained by the large proportion of daughters who are observed over the entire duration of the sample (approximately 65 percent, implying an attrition rate of roughly 35 percent) and by the similar average characteristics of the daughters by attrition status, as shown in Table S.8-1.

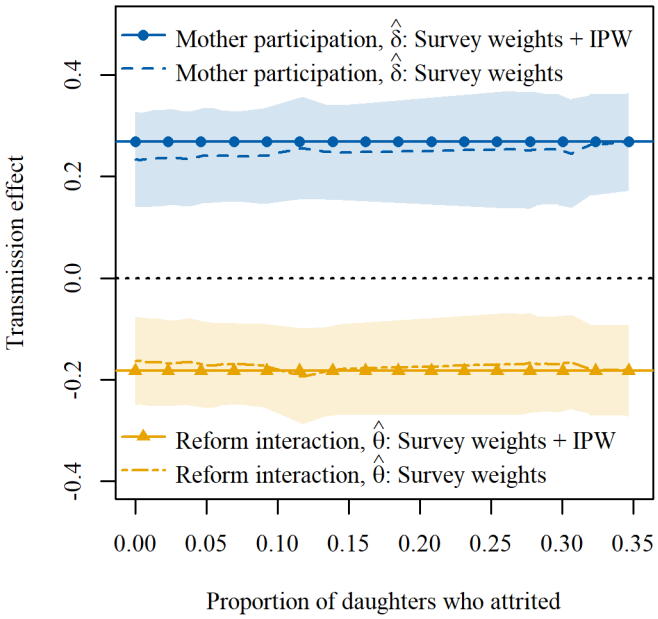
TABLE S.8-2. WELFARE TRANSMISSION ESTIMATES AND THE EFFECT OF ATTRITION

	Baseline Table 4 estimates		Attrition inverse probability weights			
			Logit first stage		LPM first stage	
	(1)	(2)	(3)	(4)	(5)	(6)
Mother's participation	0.145	0.268	0.154	0.373	0.137	0.257
	(0.013)	(0.049)	(0.023)	(0.080)	(0.015)	(0.049)
After welfare reform	0.038	0.069	0.046	0.136	0.036	0.073
	(0.009)	(0.021)	(0.016)	(0.052)	(0.011)	(0.025)
Mother's participation ×	-0.100	-0.183	-0.118	-0.351	-0.091	-0.188
after welfare reform	(0.015)	(0.046)	(0.028)	(0.096)	(0.016)	(0.046)
Instrumental variables	No	Yes	No	Yes	No	Yes
Weak IV test statistic		23.157		19.341		19.159
p-value		0.000		0.000		0.000
Hansen J statistic		1.315		4.081		2.946
p-value		0.518		0.130		0.229
Percent change in levels	-69%	-68%	-77%	-94%	-66%	-73%
p-value	0.000	0.000	0.000	0.000	0.000	0.000
Number of daughters	2961	2961	1935	1935	1935	1935
Observations	56068	56068	41498	41498	41498	41498

Notes: Robust standard errors with state clustering are shown in parentheses. Daughters' PSID core longitudinal weights are used estimates for columns (1)-(2) and in both the first and second stages for columns (3)-(6). All specifications control for daughter's state and year effects and mother's modal state effects in addition to daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, daughter's state AFDC/TANF benefit standard, daughter's EITC federal/state maximum credit, state-level poverty rate, AFDC/TANF recipiency rate, and unemployment rate. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic.

Lastly, in Figure S.8-2, we investigate the sensitivity of our results to attrition by varying the proportion of daughters who attrited over time. We report results on IV estimates of mother's participation and reform interaction based on different samples of daughters based on what proportion have attrited by a certain year up to the 34.6 percent attrition rate observed in the full sample. We also show results for the full sample based on an estimator that uses inverse probability weighting in addition to survey weights. We use the following variables in the first-stage model of the daughter being a panel non-attriter: an indicator for whether the daughter belongs to the SEO subsample, the logarithm of daughter's family income (in 2012 dollars), mother's welfare participation, and the socioeconomic, policy and economic variables used in Table 4. The main estimates are not sensitive to reweighting adjustments for potential attrition bias.

FIGURE S.8-2. SENSITIVITY OF IV ESTIMATES TO ATTRITION IN MODELS WITH INVERSE PROBABILITY WEIGHTS



Notes: Results above using survey weights only are estimated for samples restricted by the proportion of attrition sample allowed where the baseline results correspond to a 34.6 percent attrition rate. These results are compared to an estimate of transmission effects for the baseline sample when using survey weights and inverse probability weights for attrition. 95-percent pointwise confidence intervals are shown based on state-clustered estimates for the estimates with survey weights only. All models control for daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, controls for the daughter's state AFDC/TANF benefit standard, EITC federal/state maximum credit, state-level SPM poverty rate, AFDC/TANF recipiency rate, unemployment rate, and state and year effects for the daughter as well as state effects for the mother's modal state when the daughter is aged 12-18. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform.

S.9. Exposure Timing and Life-Cycle Windows

This section presents two extensions to the empirical analysis presented in our manuscript. We first investigate whether within-generation differences in age drive the baseline results. Lastly, we estimate intergenerational transmission effects by extending the minimum number of mother-daughter observation pairs in our sample.

In Table 5, we showed estimates of the baseline specifications of Table 4 restricted to the observation window of the daughter-as-adult through age 27 and the mother over the age range from 25 to 45. By imposing this restriction, we ensured that within-generation differences in age do not drive the results. In this section, we extend the evidence presented in Table 5 first by reproducing these estimates for the daughter's broader safety net outcome including food and disability participation as well as estimates using Lee-Solon-type (2009) age adjustments (Table S.9-1), and then by restricting the samples to different observation windows of the mother within the span of ages 25 to 45 in eight different specifications (see Table S.9-2). Accounting for life-cycle bias in intergenerational effects on the daughter's broader safety net participation produces findings that are consistent with the main results of the manuscript and the life-cycle-adjusted estimates for AFDC/TANF participation shown in Table 5.

TABLE S.9-1. INTERGENERATIONAL TRANSMISSION FROM MOTHER'S AFDC/TANF PARTICIPATION TO DAUGHTER'S AFDC/TANF, SNAP, OR SSI PARTICIPATION ADJUSTING FOR POTENTIAL LIFE-CYCLE BIAS

	Mothers ages 25 to 45, daughters up to age 27		Lee-Solon-type (2009) age adjustment	
	(1)	(2)	(3)	(4)
Mother's participation	0.253	0.517	0.208	0.267
	(0.022)	(0.109)	(0.022)	(0.078)
After welfare reform	0.003	0.026	-0.002	-0.060
	(0.030)	(0.052)	(0.010)	(0.039)
Mother's participation × after welfare reform	-0.020	-0.029	-0.012	0.161
	(0.039)	(0.133)	(0.023)	(0.107)
Instrumental variables	No	Yes	No	Yes
Weak IV test statistic		18.249		19.560
p-value		0.000		0.052
Hansen J statistic		7.615		11.528
p-value		0.022		0.318
Percent change in levels	-8%	-6%	-6%	60%
p-value	0.588	0.826	0.601	0.272
Number of daughters	2086	2086	2961	2961
Observations	15718	15718	56068	56068

Notes: Robust standard errors with state clustering are shown in parentheses. All models control for a quadratic in age for both daughter and mother, state-level policy controls for the daughter, and state and year effects for the daughter as well as state effects for the mother's modal state when the daughter is aged 12 to 18. Additional controls for Lee-Solon-type age adjustments include a quartic on mother's mean age during prior years of potential welfare participation, a quartic on daughter's current age detrended by 25, and mother's participation indicator interacted with the quartic on daughter's detrended age. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform; Lee-Solon-type estimates additionally include the baseline set of instrumental variables interacted with a quartic in daughter's detrended age. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. Daughters' PSID core longitudinal weights are used in estimation.

In Table S.9-2, we explore the sensitivity of our main estimates to using restricted age windows for observing each generation. The interquartile range for mother's age during critical exposure is 36 to 45 in the full sample, 36 to 45.5 for pre-reform observations, and 35.5 to 43 for post-reform observations. We use the ages 25 to 45 in Table 5 of the manuscript for satisfying weak IV test requirements for this smaller sample, yet the estimates of the effect of reform on transmission are robust to the choice of mother's age range, as can be seen in Table S.9-2. The transmission effects are somewhat larger in magnitude compared to our baseline results (as also seen in columns (1) and (2) of Table 5 in the paper and Table S.9-1 above), yet the percent reduction after reform is fairly consistent around 40 percent in levels.

TABLE S.9-2. IV ESTIMATE ROBUSTNESS TO MOTHERS' AGES AROUND CRITICAL EXPOSURE FOR AFDC/TANF TRANSMISSION TO DAUGHTERS-AS-ADULTS THROUGH AGE 27

Mother's age range:	25-35	25-40	25-45	30-35	30-40	30-45	35-40	35-45
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	A. Ordinary least squares							
Mother's participation	0.194	0.190	0.206	0.196	0.194	0.211	0.233	0.237
	(0.035)	(0.023)	(0.020)	(0.042)	(0.024)	(0.020)	(0.025)	(0.021)
After welfare reform	0.044	0.058	0.067	0.039	0.055	0.065	0.062	0.065
	(0.024)	(0.021)	(0.021)	(0.025)	(0.022)	(0.022)	(0.023)	(0.023)
Mother's participation ×	-0.109	-0.113	-0.125	-0.099	-0.109	-0.123	-0.144	-0.135
after welfare reform	(0.044)	(0.033)	(0.033)	(0.057)	(0.038)	(0.037)	(0.044)	(0.041)
Percent change in levels	-56%	-60%	-61%	-51%	-56%	-58%	-62%	-57%
p-value	0.001	0.000	0.000	0.015	0.000	0.000	0.000	0.000
	B. Instrumental variables							
Mother's participation	0.395	0.434	0.457	0.415	0.480	0.491	0.481	0.527
	(0.104)	(0.118)	(0.102)	(0.114)	(0.129)	(0.108)	(0.121)	(0.113)
After welfare reform	0.053	0.107	0.115	0.052	0.104	0.117	0.085	0.105
	(0.038)	(0.043)	(0.045)	(0.038)	(0.047)	(0.046)	(0.047)	(0.048)
Mother's participation ×	-0.129	-0.207	-0.216	-0.138	-0.202	-0.227	-0.146	-0.209
after welfare reform	(0.102)	(0.093)	(0.106)	(0.116)	(0.105)	(0.108)	(0.146)	(0.144)
Weak IV test statistic	16.741	16.032	18.249	15.214	13.272	13.061	6.402	9.557
p-value	0.001	0.001	0.000	0.002	0.004	0.005	0.094	0.023
Hansen J statistic	1.418	1.652	2.950	1.608	0.935	2.254	0.831	0.893
p-value	0.492	0.438	0.229	0.448	0.627	0.324	0.660	0.640
Percent change in levels	-33%	-48%	-47%	-33%	-42%	-46%	-30%	-40%
p-value	0.169	0.006	0.011	0.191	0.026	0.010	0.281	0.094
Number of daughters	1384	1798	2086	1370	1793	2084	1745	2063
Observations	10433	13504	15718	10330	13461	15697	13123	15547

Notes: Robust standard errors with state clustering are shown in parentheses. All specifications control for daughter's state and year effects and mother's modal state effects in addition to daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, daughter's state AFDC/TANF benefit standard, daughter's EITC federal/state maximum credit, state-level poverty rate, AFDC/TANF recipiency rate, and unemployment rate. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard, which are defined over the daughter's critical exposure ages 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. Daughters' PSID core longitudinal weights are used in estimation.

In Table S.9-3, we examine the windows problem by extending the minimum requirement that the pairs be observed for at least 10 and 15 years, respectively. There we see that the reduction in the level of mother's transmission after welfare reform is at least as large as that reported in Table 4 of the manuscript (and reproduced in column (1) of Table S.9-3). When the minimum number of observations is extended to 15 years, there is still a 62 percent decrease in transmission for IV estimates in column (5).

TABLE S.9-3. IV ESTIMATES OF THE INTERGENERATIONAL TRANSMISSION OF AFDC/TANF PARTICIPATION BY MINIMUM NUMBER OF MOTHER-DAUGHTER FAMILY OBSERVATIONS, N_F

Number of family observations:	$N_F \geq 5$		$N_F \geq 10$		$N_F \geq 15$	
	(1)	(2)	(3)	(4)	(5)	(6)
Mother's participation	0.268	0.425	0.315	0.533	0.264	0.436
	(0.049)	(0.085)	(0.070)	(0.128)	(0.068)	(0.120)
After welfare reform	0.069	0.086	0.096	0.139	0.075	0.096
	(0.021)	(0.034)	(0.030)	(0.048)	(0.027)	(0.046)
Mother's participation × after welfare reform	-0.183	-0.218	-0.261	-0.382	-0.165	-0.205
	(0.046)	(0.083)	(0.068)	(0.121)	(0.061)	(0.108)
Misclassification correction	No	Yes	No	Yes	No	Yes
Weak IV test statistic	23.157	21.969	21.021	18.528	16.132	16.942
p-value	0.000	0.000	0.000	0.000	0.001	0.001
Hansen J statistic	1.315	1.384	3.707	3.396	0.311	0.169
p-value	0.518	0.500	0.157	0.183	0.856	0.919
Percent change in levels	-68%	-51%	-83%	-72%	-62%	-47%
p-value	0.000	0.000	0.000	0.000	0.001	0.028
Number of daughters	2961	2961	2466	2466	1806	1806
Observations	56068	56068	43733	43733	28903	28903

Notes: The minimum number of mother-daughter family observations, denoted N_F, represents years when the mother is observed living with the daughter before her daughter has formed her own family unit (the baseline minimum restriction used throughout is $N_F \geq 5$). Robust standard errors with state clustering are shown in parentheses. All specifications control for daughter's state and year effects and mother's modal state effects in addition to daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, daughter's state AFDC/TANF benefit standard, daughter's EITC federal/state maximum credit, state-level poverty rate, AFDC/TANF recipiency rate, and unemployment rate. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard, which are defined over the daughter's critical exposure ages 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. The misclassification correction uses reporting rates in the PSID to address potential misreporting for the daughter's welfare participation. Daughters' PSID core longitudinal weights are used in estimation.

S.10. State-Price Variation in Benefits and Maternal Selection

Did welfare reform change the participation selection based on benefit generosity? We begin by addressing AFDC/TANF benefit generosity with respect to cost-of-living differences across states and time, and then we explore potential differences in transmission effects and welfare reform by high- and low-generosity states.

In Tables S.1-4 and S.1-5, as well as Figure 4, we showed that there is substantial within-state variation over time in the AFDC/TANF benefit standard. Here we explore whether the baseline estimates using the aggregate personal consumption expenditure (PCE) deflator in Table 4 are robust to the use of

the state-price index. Recall that in the paper we deflate the values by the aggregate price index, under the assumption that state fixed effects, and in some models state trends as well, control for permanent and slowly trending differences across states, including cost-of-living differences.

TABLE S.10-1. INTERGENERATIONAL TRANSMISSION OF MOTHER'S AFDC/TANF PARTICIPATION WITH BENEFIT STANDARDS THAT ARE PRICE-ADJUSTED BY STATE AND YEAR

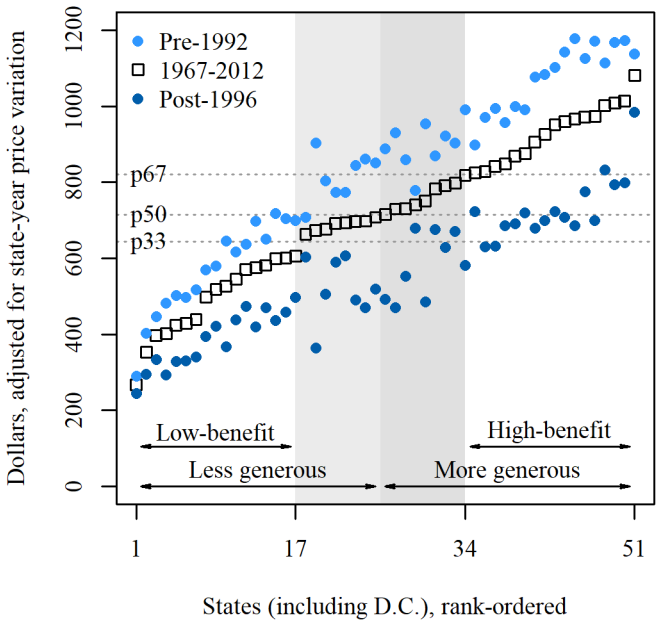
	Baseline estimates [Table 4]				State-price adjusted estimates			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	A. Daughter's outcome variable: AFDC/TANF							
Mother's participation	0.145	0.268	0.240	0.425	0.144	0.259	0.239	0.418
	(0.013)	(0.049)	(0.021)	(0.085)	(0.013)	(0.043)	(0.021)	(0.077)
After welfare reform	0.038	0.069	0.053	0.086	0.038	0.065	0.052	0.084
	(0.009)	(0.021)	(0.017)	(0.034)	(0.009)	(0.019)	(0.016)	(0.032)
Mother's participation × after welfare reform	-0.100	-0.183	-0.135	-0.218	-0.100	-0.173	-0.135	-0.212
	(0.015)	(0.046)	(0.030)	(0.083)	(0.015)	(0.043)	(0.030)	(0.078)
Instrumental variables	No	Yes	No	Yes	No	Yes	No	Yes
Misclassification correction	No	No	Yes	Yes	No	No	Yes	Yes
Weak IV test statistic		23.157		21.969		22.921		21.763
p-value		0.000		0.000		0.000		0.000
Hansen J statistic		1.315		1.384		1.366		1.001
p-value		0.518		0.500		0.505		0.606
Percent change in levels	-69%	-68%	-57%	-51%	-69%	-67%	-56%	-51%
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of daughters	2961	2961	2961	2961	2961	2961	2961	2961
Observations	56068	56068	56068	56068	56068	56068	56068	56068
	B. Daughter's outcome variable: AFDC/TANF, SNAP, SSI							
Mother's participation	0.226	0.299	0.296	0.369	0.225	0.286	0.295	0.356
	(0.018)	(0.073)	(0.024)	(0.100)	(0.018)	(0.071)	(0.024)	(0.097)
After welfare reform	0.002	-0.014	-0.013	-0.050	0.001	-0.018	-0.013	-0.053
	(0.013)	(0.028)	(0.020)	(0.039)	(0.013)	(0.028)	(0.020)	(0.039)
Mother's participation × after welfare reform	-0.041	0.040	-0.017	0.152	-0.041	0.052	-0.017	0.159
	(0.017)	(0.074)	(0.025)	(0.105)	(0.017)	(0.073)	(0.025)	(0.104)
Instrumental variables	No	Yes	No	Yes	No	Yes	No	Yes
Misclassification correction	No	No	Yes	Yes	No	No	Yes	Yes
Weak IV test statistic		23.157		22.273		22.921		22.016
p-value		0.000		0.000		0.000		0.000
Hansen J statistic		2.050		2.271		3.901		4.186
p-value		0.359		0.321		0.142		0.123
Percent change in levels	-18%	13%	-6%	41%	-18%	18%	-6%	45%
p-value	0.011	0.621	0.480	0.266	0.012	0.534	0.498	0.251
Number of daughters	2961	2961	2961	2961	2961	2961	2961	2961
Observations	56068	56068	56068	56068	56068	56068	56068	56068

Notes: Robust standard errors with state clustering are shown in parentheses. All models control for daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, the daughter's state AFDC/TANF benefit standard, EITC federal/state maximum credit, state-level SPM poverty rate, AFDC/TANF recipiency rate, unemployment rate, daughter's state and year effects, and mother's modal state effects. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. The misclassification correction uses reporting rates in the PSID to address potential misreporting for the daughter's welfare participation (see Section S.2 for details). Daughters' PSID core longitudinal weights are used in estimation.

In Table S.10-1 we include price-adjustments for AFDC/TANF benefits that account for both inflation over time as well as state-level variation in purchasing power (for daughters' control variables and for mothers' instrumental variables). The price indices are based on a panel from 1982 to 2012 from Carrillo, Early, and Olsen (2014), and we use a second data source to supplement our state-year price indices for 1967-1981 from Berry, Fording, and Hanson (2000). The OLS results are nearly identical to our main results in Table 4 of the manuscript, and the IV results are as well. In short, our baseline estimates are robust to geographic price differences at the state level.

Next, we identify the top and bottom states by real state-year price-adjusted maximum benefit generosity, both in the full time period and within welfare reform regimes. Our definition of less/more generous is based on the lower/upper half of states by real benefits, and further, low-/high-benefit states denotes the lower/upper third of real benefits. That is, a low-benefit state is one with average real benefits in the lower third of the distribution of all states. Figure S.10-1 shows states' benefit generosity before and after reform, which also shows that the definition of generosity is consistent across regime timing.

FIGURE S.10-1. STATES ORDERED BY AFDC/TANF BENEFIT GENEROSITY ADJUSTED FOR STATE AND YEAR PRICE VARIATION



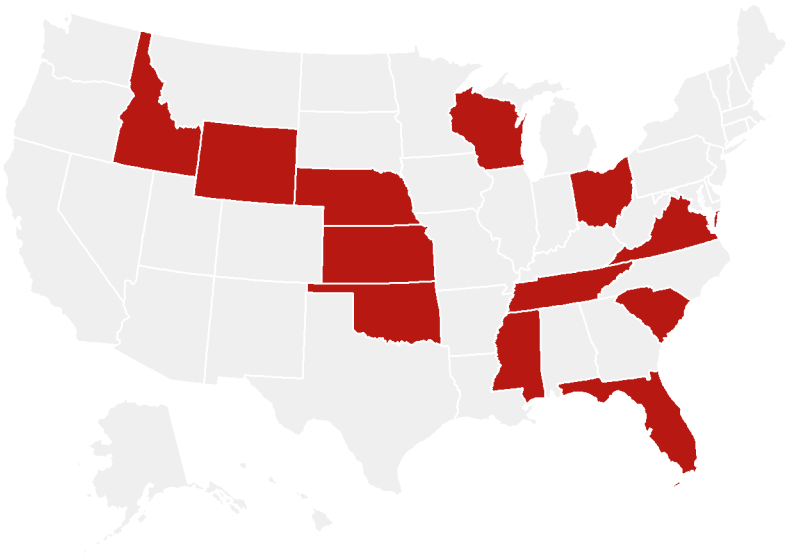
Notes: States with average real benefits below/above the median are considered less/more generous, and states in the lower tercile are considered low-benefit while states in the upper tercile are considered high-benefit.

States that are historically less generous in terms of state-year-adjusted benefit values are predominantly located in the South, which is not the case with our measure of welfare reform strictness based on Grogger and Karoly (2005). Figure S.10-2 illustrates the geographic variation for each type.

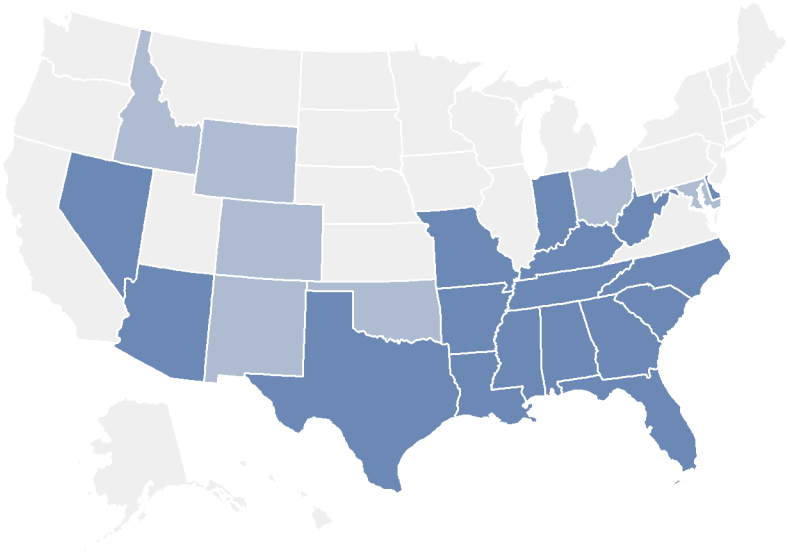
While the 12 strict reform states are relatively dispersed geographically, states with less generous real benefits include all Southern states except Virginia. The majority of Mountain-West states are also less generous, and the Northeastern and Pacific-West states are all categorized as more generous.

FIGURE S.10-2. GEOGRAPHIC VARIATION BY WELFARE REFORM STRICTNESS AND BENEFIT GENEROSITY

A. Stricter reform states



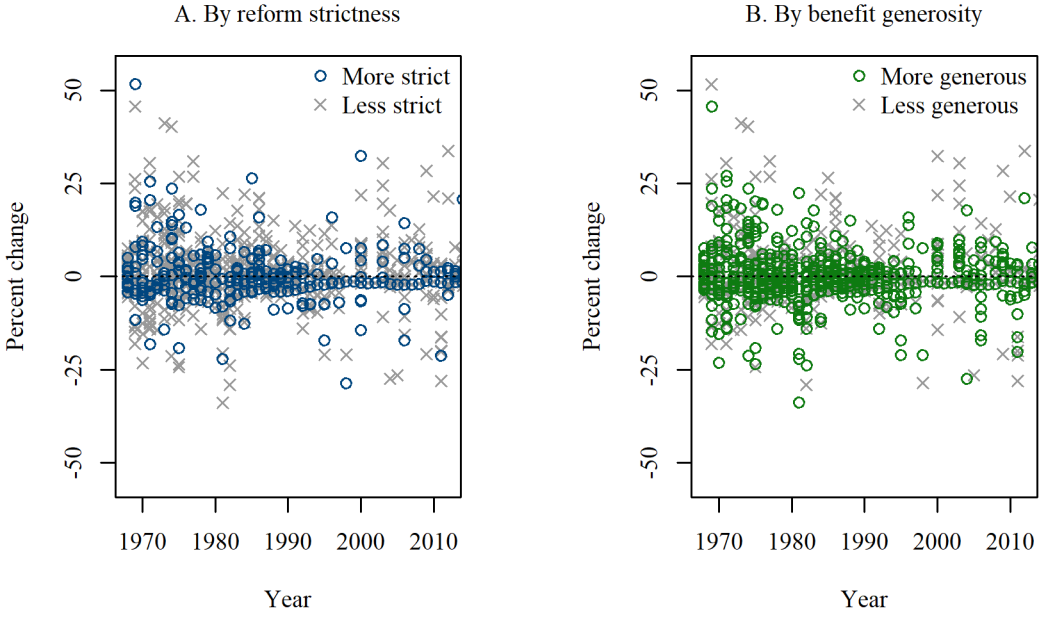
B. Less generous benefit states



Notes: States are classified as implementing strict reforms according to the Grogger and Karoly (2005) definition, and benefit generosity is determined by average benefit standards over the full sample period (adjusted for state and year price variation) above or below the median. In panel B, the darkened states are all in the lower half of states by generosity, and the darkest ones are in the lower third of low-benefit states.

To complement the state variation shown in Figure 4 of the manuscript, we depict benefit generosity and reform strictness over time in Figure S.10-3. The figure shows year-to-year percent changes in real AFDC/TANF benefit standards categorized by state strictness or generosity. The key takeaway from this figure is that the states implementing larger positive or negative changes over time are no more represented by either reform strictness or benefit generosity.

FIGURE S.10-3. YEAR-TO-YEAR PERCENT CHANGE IN REAL (2012 DOLLARS) STATE-LEVEL AFDC/TANF BENEFIT STANDARD FOR A FAMILY OF FOUR, BY REFORM STRICTNESS AND BENEFIT GENEROSITY



Notes: States are classified as implementing strict reforms according to the Grogger and Karoly (2005) definition, and benefit generosity is determined by average benefit standards over the full sample period (adjusted for state and year price variation) above or below the median.

Lastly, we focus on possible maternal selection effects on the intergenerational transmission estimates. The largest average reduction in benefits after reform occurred in the high-benefit states (see Figure S.10-1). It is possible then that this change could have an effect on the composition of mothers in those states. For instance, a smaller proportion of relatively high-income mothers are expected to participate in the period after reform than in the period before reform. To examine the issue of possible selection of mothers, we estimate the model in Table 4 by considering mother-daughter pairs in high-benefit states (i.e., states associated with the largest possible changes in maternal composition by income status) and low-benefit states (i.e., states associated with the smallest changes).

TABLE S.10-2. INTERGENERATIONAL TRANSMISSION OF MOTHER'S AFDC/TANF PARTICIPATION BY STATE BENEFIT GENEROSITY

Daughter's outcome:	AFDC/TANF				AFDC/TANF, SNAP, SSI			
State AFDC/TANF generosity:	Low		High		Low		High	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother's participation	0.153	0.264	0.183	0.391	0.283	0.387	0.207	0.469
	(0.019)	(0.042)	(0.045)	(0.196)	(0.026)	(0.056)	(0.054)	(0.194)
After welfare reform	0.065	0.112	0.007	0.020	-0.033	-0.007	-0.011	-0.013
	(0.017)	(0.038)	(0.016)	(0.038)	(0.037)	(0.060)	(0.024)	(0.042)
Mother's participation × after welfare reform	-0.109	-0.199	-0.101	-0.208	-0.006	-0.030	-0.039	-0.084
	(0.022)	(0.063)	(0.047)	(0.162)	(0.030)	(0.083)	(0.028)	(0.177)
Instrumental variables	No	Yes	No	Yes	No	Yes	No	Yes
Weak IV test statistic		12.336		8.080		12.336		8.080
p-value		0.006		0.044		0.006		0.044
Hansen J statistic		3.546		2.439		2.032		1.685
p-value		0.170		0.295		0.362		0.431
Percent change in levels	-71%	-75%	-55%	-53%	-2%	-8%	-19%	-18%
p-value	0.000	0.000	0.000	0.002	0.830	0.714	0.050	0.565
Number of daughters	1287	1287	701	701	1287	1287	701	701
Observations	24441	24441	13679	13679	24441	24441	13679	13679

Notes: Robust standard errors with state clustering are shown in parentheses. State benefit generosity is determined by average benefit standards over the full sample period (adjusted for state and year price variation) in the lower or upper third of states and DC. All models control for daughter's age, age squared, mother's average age during potential welfare observation years, mother's average age squared, the daughter's state AFDC/TANF benefit standard, EITC federal/state maximum credit, state-level SPM poverty rate, AFDC/TANF recipiency rate, unemployment rate, daughter's state and year effects, and mother's modal state effects. Instrumental variables include average and maximum measures of the mother's AFDC/TANF benefit standard when the daughter is aged 12-18, and interactions of each with an indicator for welfare reform. The weak IV test statistic is a Kleibergen-Paap (2006) rank statistic. Daughters' PSID core longitudinal weights are used in estimation.

Recall that all variants of the model considered in the manuscript include mother's state effects, which controls for permanent state differences including differences between high- and low-benefit states. However, maternal selection is likely to be time varying, as discussed in the previous paragraph. Using Table S.10-2, we evaluate the robustness of our findings to possible changes in maternal composition that may correspond to state benefit generosity. The table shows higher intergenerational dependence in high-benefit states than in low-benefit states, as expected. However, the intergenerational estimates for AFDC/TANF fall by similar amounts across specifications at around 20 percentage points lower daughter participation among those whose mothers received cash assistance. The percent changes after reform are 75 percent in low-benefit states and 53 percent in high-benefit states, which means that high-benefit states have higher dependence still after reform.

REFERENCES

Berry, W.D., R.C. Fording, and R.L. Hanson (2000): "An annual cost of living index for the American states, 1960–95," *Journal of Politics*, 62, 550–567.

Berry, W.D., E.J. Ringquist, R.C. Fording, and R.L. Hanson (1998): "Measuring citizen and government ideology in the American states, 1960–93," *American Journal of Political Science*, 42, 327–48.

Billingsley, P. (1995): *Probability and Measure,* New York: John Wiley and Sons.

Blundell, R. and R.L. Matzkin (2014): "Control functions in nonseparable simultaneous equations models," *Quantitative Economics*, 5, 271–295.

Brown, C. (1996): "Notes on the 'SEO' or 'Census' component of the PSID," Report, Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI.

Carrillo, P.E., D.W. Early, and E.O. Olsen (2014): "A panel of interarea price indices for all areas in the United States 1982–2012," *Journal of Housing Economics*, 26, 81–93.

Caughey, D., and C. Warshaw (2016): "The dynamics of state policy liberalism, 1936–2014," *American Journal of Political Science*, 60, 899–913.

Corcoran, M., R. Gordon, D. Laren, and G. Solon (1992): "The association between men's economic status and their family and community origins," *Journal of Human Resources*, 27, 575–601.

Crouse, G. (1999): "State implementation of major changes to welfare policies, 1992–1998," Technical document, U.S. Department of Health and Human Services.

Darity, W., Jr. (2005): "Stratification economics: The role of intergroup inequality," *Journal of Economics and Finance*, 29, 144–153.

Darity, W., Jr., J. Dietrich, and D.K. Guilkey (2001): "Persistent advantage or disadvantage: Evidence in support of the intergenerational drag hypothesis," *American Journal of Economics and Sociology*, 60, 435–470.

Donohue, J.J., and J.J. Heckman (1991): "Continuous versus episodic change: The impact of civil rights policy on the economic status of blacks," *Journal of Economic Literature*, 29, 1603–1643.

Duncan, G.J., W.J. Yeung, J. Brooks-Gunn, and J.R. Smith (1998): "How much does childhood poverty affect the life chances of children?" *American Sociological Review*, 63, 406–423.

Elango, S., J.L. Garcia, J.J. Heckman, and A. Hojman (2016): "Early childhood education," in *Economics of Means-Tested Transfer Programs in the United States*, vol. 2, R.A. Moffitt (ed.), Chicago: University of Chicago Press and NBER.

Fitzgerald, J.M. (2011): "Attrition in models of intergenerational links using the PSID with extensions to health and to sibling models," *B.E. Journal of Economic Analysis and Policy*, 11, 1–63.

Fitzgerald, J.M., P.T. Gottschalk, and R.A. Moffitt (1998): "An analysis of sample attrition in panel data: The Michigan Panel Study of Income Dynamics," *Journal of Human Resources*, 33, 251–299.

Frank, M., E. Sommeiller, M. Price, and E. Saez (2015): "Frank-Sommeiller-Price series for top income shares by US states since 1917," Technical notes 201507, World Inequality Lab.

Fryer R. (2007): "A model of social interactions and endogenous poverty traps," *Rationality and Society*, 19: 335–366.

Gottschalk, P.T. (1996): "Is the correlation in welfare participation across generations spurious?" *Journal of Public Economics*, 63, 1–25.

Grogger, J., and L.A. Karoly (2005): *Welfare Reform: Effects of a Decade of Change*. Cambridge, MA: Harvard University Press.

Hagemann, A. (2019): "Placebo inference on treatment effects when the number of clusters is small," *Journal of Econometrics*, forthcoming.

Heckman, J.J. (1978): "Dummy endogenous variables in a simultaneous equation system," *Econometrica*, 46, 931–959.

Heckman, J.J., and R. Robb, Jr. (1985): "Alternative methods for evaluating the impact of interventions: An overview," *Journal of Econometrics*, 30, 239–267.

Heckman, J.J., and E.J. Vytlacil (2005): "Structural equations, treatment effects, and econometric policy evaluation," *Econometrica*, 73, 669–738.

Hoynes, H., and D. Schanzenbach (2012): "Work incentives and the Food Stamp Program," *Journal of Public Economics*, 96, 151–162.

Imbens, G.W., and J.D. Angrist (1994): "Identification and estimation of local average treatment effects," *Econometrica*, 62, 467–475.

Imbens, G.W., and W.K. Newey (2009): "Identification and estimation of triangular simultaneous equations models without additivity," *Econometrica*, 77, 1481–1512.

Jordan, M.P., and M. Grossmann (2016): "The correlates of state policy project," v.1.9. East Lansing, MI: Institute for Public Policy and Social Research (IPPSR).

Kennedy, E.H., S. Lorch, and D.S. Small (2019): "Robust casual inference with continuous instruments using the local instrumental variable curve," *Journal of the Royal Statistical Society, Series B*, 81, 121–143.

Kleibergen, F., and R. Paap (2006): "Generalized reduced rank tests using the singular value decomposition," *Journal of Econometrics*, 133, 97–126.

Lee, C., and G. Solon (2009). "Trends in intergenerational income mobility," *Review of Economics and Statistics*, 91, 766–772.

Levine, P.B. and D.J. Zimmerman (1996): "The intergenerational correlation in AFDC participation: Welfare trap or poverty trap?" Discussion paper, Univ. of Wisconsin Institute for Research on Poverty.

Meyer, B., W. Mok, and J. Sullivan (2015): "The under-reporting of transfers in household surveys: Its nature and consequences," NBER working paper 15181. Updated version June 2015.

Moffitt, R.A., and D.W. Stevens (2001): "Changing caseloads: Macro influences and micro composition," *Economic Policy Review*, Federal Reserve Bank of New York, September, 37–51.

Muller, D., C.M. Judd, and V.Y. Yzerbyt (2005): "When moderation is mediated and mediation is moderated," *Journal of Personality and Social Psychology*, 89, 852–863.

Page, M.E. (2004): "New evidence on the intergenerational correlation in welfare participation," in *Generational Income Mobility in North America and Europe*, Cambridge University Press, 226–244.

Pepper, J.V. (2000): "The intergenerational transmission of welfare receipt: A nonparametric bounds analysis," *Review of Economics and Statistics*, 82, 472–488.

Robins, J.M., A. Rotnitzky, and L.P. Zhao (1995): "Analysis of semiparametric regression models for repeated outcomes in the presence of missing data," *Journal of the American Statistical Association*, 90, 106–121.

Schoeni, R.F., and E.E. Wiemers (2015): "The implications of selective attrition for estimates of intergenerational elasticity of family income," *Journal of Economic Inequality*, 3, 351–372.

Sellers, M.D. (2017): "Gubernatorial use of executive orders: Unilateral action and policy adoption," *Journal of Public Policy*, 37, 315–339.

Smith, J.P., and F.R. Welch (1989): "Black economic progress after Myrdal," *Journal of Economic Literature*, 27, 519–564.

Solon, G. (1992): "Intergenerational income mobility in the United States," *American Economic Review*, 82, 393–408.

Solon, G., M. Corcoran, R. Gordon, and D. Laren (1988): "Sibling and intergenerational correlations in welfare program participation," *Journal of Human Resources*, 23, 388–396.

Solon, G., S.J. Haider, and J.M. Wooldridge (2015): "What are we weighting for?" *Journal of Human Resources*, 50, 301–316.

Wolfers, J. (2006): "Did unilateral divorce raise divorce rates? A reconciliation and new results," *American Economic Review*, 96, 1802–1820.

Wooldridge, J.M. (2007): "Inverse probability weighted m-estimation for general missing data problems," *Journal of Econometrics*, 141, 1281–1301.

Ziliak, J.P. (2007): "Making work pay: Changes in effective tax rates and guarantees in U.S. transfer programs, 1983–2002," *Journal of Human Resources*, 42, 619–642.

Ziliak, J.P., D. Figlio, E. Davis, and L. Connolly (2000): "Accounting for the decline in AFDC caseloads: Welfare reform or the economy?" *Journal of Human Resources*, 35, 570–586.

Ziliak, J.P., and T.J. Kniesner (1998): "The importance of sample attrition in life cycle labor supply estimation," *Journal of Human Resources*, 33, 507–530.

Ziol-Guest, K.M., G.J. Duncan, A. Kalil, and W.T. Boyce (2012): "Early childhood poverty, immune-mediated disease processes, and adult productivity," *Proceedings of the National Academy of Sciences*, 109, 17289–17293.