

Childhood Welfare Exposure and Economic Outcomes for Adult Daughters and Sons *

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Abstract: We investigate how the duration of childhood welfare exposure affects welfare use and earnings in early adulthood. We adopt a nonlinear difference-in-differences framework to estimate quantile treatment effects using intergenerationally-linked mother-child pairs from the Panel Study of Income Dynamics. The estimates indicate that additional childhood welfare exposure leads to more adulthood years on the broader safety net, yet this positive relationship only applies below moderate levels of dependency and reverses at greater levels of dependence. Increasing childhood welfare exposure implies lower adulthood earnings for daughters, but not for sons. This earnings penalty for daughters operates primarily through reduced labor supply.

Keywords: intergenerational welfare; nonlinear difference-in-differences; quantile correlations; quantile treatment effects

JEL codes: C21, I38, J62

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I. Introduction

A longstanding concern among some scholars and policymakers is that prolonged exposure to welfare during childhood may alter tastes and expectations for work, and thus diminish human capital investments while young, resulting in low incomes and long-term dependence on assistance in adulthood (Banfield 1970; Murray 1984; Olasky 1992; Himmelfarb 1995). This concern underpinned much of the motivation behind the 1990s welfare reforms (DeParle 2004; Haskins 2007). While the typical spell on relief in the years before reform was under a year (Blank 1989; Moffitt 1992), nearly a quarter of total time on welfare was comprised of a small share of cases lasting over a decade, and one-half lasting four or more years (Blank 1997). This suggests that there might be important heterogeneity in adult economic outcomes depending on length of welfare exposure in childhood (Gottschalk and Moffitt 1994). With few exceptions, however, the intergenerational welfare transmission literature has focused primarily on the participation margin and not length of time on assistance (Duncan et al. 1988; Solon et al. 1988; Antel 1992; Gottschalk 1992, 1996; Levine and Zimmerman 1996; Pepper 2000; Hartley et al. 2022). Moreover, the literature has focused on outcomes for daughters despite the fact that daughters and sons share similar rates of childhood exposure to family participation. In this paper, we use recent methodological advances in conjunction with welfare reform to present novel evidence on the heterogeneous effects of the intensity of childhood welfare exposure on the distributions of adult economic outcomes of both daughters and sons.¹

The prototypical approach in the welfare transmission literature is modeled on the economic mobility research pioneered by Becker and Tomes (1979) whereby the child's welfare participation in adulthood is regressed on their parent's welfare participation when the child was living at home, with the coefficient on the parent's welfare indicator yielding the intergenerational welfare correlation. The evidence from the 1980s and 1990s literature strongly pointed toward a positive correlation, meaning that a child exposed to welfare is more likely to participate as an adult relative to a child not exposed. However, there was

¹ See Bitler et al. (2006), Kline and Tartari (2016), and Hartley and Lamarche (2018) for research examining the contemporaneous heterogeneous effects of welfare reform on adult women's earnings.

no consensus on whether this relationship was causally linked, that is, the parent transmits program knowledge and use across generations, or just spurious because both parent and child generations have low incomes and are thus eligible for assistance. Disentangling these two pathways is challenging because of potential endogeneity of the parent's welfare decision owing to shared unobservable factors across generations (Lindbeck et al. 1999; Durlauf and Shaorshadze 2014). Recently, Hartley et al. (2022) leveraged the welfare reforms of the 1990s that replaced the Aid to Families with Dependent Children (AFDC) program with Temporary Assistance to Needy Families (TANF) to implement a difference-in-differences estimator to identify a transmission channel from mother to daughter. They found that mother's AFDC use increased AFDC participation of the daughter later in adulthood by at least 25 percentage points, but that intergenerational transmission fell by 50 percent under TANF relative to the pre-reform baseline. At the same time, they found no diminution in dependence on the wider social safety net, nor improved earnings in adulthood. Like most of the extant literature, Hartley et al. (2022) focused on the average extensive-margin welfare participation and work decisions of daughters.

We advance the empirical welfare transmission literature in three directions. First, instead of focusing on whether families received welfare, we examine the duration of participation in both childhood and adulthood. This permits us to study the intergenerational effects of growing up in households with short-term versus long-term welfare reliance on the intensity of duration in adult participation. It is well established that families cycle on and off welfare (Bane and Ellwood 1994; Blank and Ruggles 1996). This implies that a dichotomous indicator of currently on welfare can miss some of the longer-term exposure to welfare during childhood from families moving on and off assistance during key stages of child development (Gottschalk and Moffitt 1994). Despite this, few studies have applied measures of total time on welfare to generational contexts, and those that have are decades old, based solely on the former AFDC program, and with limited years of observing children in adulthood (Duncan et al. 1988; Gottschalk 1992; Pepper 2000).

The present study is the first to empirically address the intensity of welfare participation as continuous outcomes in each generation, leveraging the variation offered by the 1990s welfare reforms. The TANF program is vastly different from AFDC in that it is not an entitlement program, it has binding work requirements and time limits for most adults on the program, and it imposes stiff sanctions for failing to meet program rules, often resulting in removal of benefits for either or both the parents and children (Moffitt 2003; Grogger and Karoly 2005; Ziliak 2016). These program reforms were designed to limit time on welfare, and thus it is possible that the distribution of childhood time spent on the program has shifted post reform along with the corresponding distribution of adulthood time on welfare. We focus on the childhood exposure measure of the proportion of time on AFDC/TANF because the 1990s reform period offers a clean policy change that is directly related to whether families participate and for how long if they do participate. For our main welfare outcome in adulthood, we rely on adult participation in the broader safety net — cash assistance from AFDC/TANF, food assistance from the Supplemental Nutrition Assistance Program (SNAP), or disability assistance from Supplemental Security Income (SSI). In the post-reform era, SNAP has become a work support for economically vulnerable families in low-wage jobs (see Ziliak 2015; Ganong and Liebman 2018; Hardy et al. 2018), and child disability cases on SSI grew rapidly in the 1990s, some of whom age out of the program after age 18 (Kubik 1997; Schmidt and Sevak 2004; Deshpande 2016).² Since welfare reform shifted AFDC/TANF participation, our outcomes address welfare dependence in government assistance broadly across these means-tested programs.

A second advance to the literature is that we move beyond second-generation welfare use to also examine how the share of childhood spent on welfare affects the distribution of earnings in adulthood, while also providing first estimates of welfare exposure impacts on next-generation hourly wages and labor supply. A major thrust of welfare reform was toward economic self-sufficiency by redirecting the social safety net to a work-based system using both carrots such as implicit wage subsidies from programs

² Because welfare reform was directed primarily at the AFDC program, and not SNAP or SSI per se, we focus on exposure to AFDC/TANF in childhood as the continuous treatment variable. In the online supplement we also examine exposure to broader welfare programs, and welfare as a share of total income.

like the Earned Income Tax Credit as well as sticks like work requirements and time limits for means-tested cash assistance. Thus, we explore dependence in terms of self-sufficiency through earnings as a percent of the federal poverty level in early adulthood, i.e., earnings-to-needs. We also decompose earnings into its component parts of hourly wage rates and hours worked in the labor market, both conditional on employment as well as unconditionally to capture extensive-margin effects of moving in and out of the labor force.

The third contribution is that we compare daughters and sons who may have had similar childhood exposures but different long-run trajectories. Generational outcomes among men are typically not included in most studies on AFDC/TANF because single-mother families comprise the vast majority of cases. However, there is no reason to expect that sons would have childhood exposure to welfare different from daughters. Moreover, there is more gender parity in terms of early adult participation in other safety net programs like SNAP and SSI, allowing us to address new questions on the efficacy of welfare reform. Indeed, while in a typical year about 90 percent of TANF adults are women (Lichtman-Sadot 2024), nearly 40 percent of nonelderly adults on SNAP are men (Cronquist and Eiffes 2022) and this share is just over 45 percent among adults on SSI (Messel and Trenkamp 2022). If childhood welfare exposure leads to greater participation in the broader safety net in adulthood because of expectations of future eligibility for cash assistance, then daughters' earnings may be more dependent than sons' given their differential probabilities to become single custodial parents. Welfare reform in that case would be expected to weaken the influence of welfare exposure on earnings especially among daughters at the lower end of the earnings distribution, both from an eligibility standpoint as well as via the role of work-conditioned assistance under TANF. For sons, the effect of welfare reform might be more ambiguous, and any implications of intergenerational dependence related to earnings may suggest new considerations for effective income support policy. Recent evidence from Lichtman-Sadot (2024) suggests that male labor supply responded to the introduction of welfare time limits, and we extend that work to the intergenerational setting.

The novel findings presented in this paper are obtained by employing recently developed nonparametric difference-in-differences methods for continuous treatments. The

challenge here is that childhood welfare exposure is continuous and endogenous, and its impact on adult welfare exposure or earnings is likely to depend on the intensity of treatment during childhood. Rather than discretizing the treatment variable or assuming it is exogenous, we follow D'Haultfœuille et al. (2023) to estimate quantile treatment effects of exposure to AFDC/TANF in childhood, which captures a welfare trap separately from a poverty trap where early life disadvantages persist into lesser opportunities in adulthood. To examine the validity of our findings, we test two important conditions associated with the identification of the parameter of interest. First, we find no evidence that ranks shifted after reform relative to the baseline pre-reform period. Moreover, we verify a crossing condition that holds for children spending less than one-quarter of childhood on AFDC/TANF. Rather than testing the validity of instruments in a regression model, or parallel trends in a standard difference-in-differences framework, the ability to differentiate treatment and comparison groups primarily relies on testing whether the cumulative distribution functions of welfare exposure cross before and after reform. The distributional similarity for children with low-intensity exposure before and after reform allows estimation of a common time trend used to construct a counterfactual distribution over the range of differences.

Using the Panel Study of Income Dynamics (PSID) with repeated cross-sections before and after welfare reform, we find that childhood welfare exposure leads both daughters and sons to participate more in the broader safety net at the lowest conditional quantiles of adult welfare exposure, yet the effect declines with intensity, and actually becomes negative for adults at the highest quantiles. An additional percentage point of childhood exposure leads to an equal point increase in time on welfare as an adult at the 0.1 quantile for both daughters and sons, but this effect size falls to zero for daughters and 0.6 for sons at the median, and then to -0.6 for daughters and -0.4 for sons at the 0.9 quantile of the adult distribution of time on the broader safety net. The implication is that as welfare reform reduced childhood exposure, adulthood time on assistance decreased among daughters and sons who spent relatively less of their early adulthood years in the wider safety net. However, time on assistance increased among daughters and sons who

spent much of their young adulthood in the broader safety net, and in particular, among daughters growing up under chronic levels of childhood exposure.

The estimates of childhood welfare exposure effects on earnings reveal greater gender differences. Daughters experience large and significant earnings penalties for those with conditionally lower adult earnings, with the adult earnings relative to the federal poverty level falling one to two points for each percentage point increase in childhood exposure. However, we find no significant earnings penalties for sons across the conditional distribution. Decomposing earnings into its wage and hours components reveals that sons do not experience any negative effects from childhood welfare exposure on wages or hours, while daughters experience an hours penalty from childhood welfare exposure. There is some suggestive evidence of a wage penalty for daughters once we allow for spells of nonemployment, consistent with the importance of experience effects (Blundell et al. 2016). Again, the implication of welfare reform with its reduced childhood exposure is that daughters' earnings and hours appear to be boosted after reform among those in the bottom half of the earnings distribution.

Our work is complementary to, but distinct from, a burgeoning literature examining the long-term consequences of access to the safety net when young (Page 2024). This includes research on human capital investments from the Head Start program (Deming 2009); food assistance from the Food Stamp Program (Hoynes et al. 2016; Bailey et al. 2024); housing assistance from vouchers (Chetty et al. 2016); health insurance from Medicaid (Miller and Wherry 2019; East et al. 2023); refundable tax credits from the Earned Income Tax Credit (Bastian and Micheltore 2018; Barr et al. 2022); cash assistance from the precursor to the AFDC program (Aizer et al. 2016); and disability assistance from SSI (Hawkins et al. 2024).³ Most, but not all, of these papers define welfare exposure as the percent of time in childhood (or age ranges of childhood) eligible for the program, but not actual receipt. That is, the parameter of interest is the intent-to-treat, whereas we seek to identify the treatment-on-the treated. Some of the studies present

³ See Dahl et al. (2014) and Dahl and Giehlen (2021) for related research on the causal transmission of disability insurance across generations in Norway and The Netherlands, respectively.

estimates for both daughters and sons, as we do here, but a key distinction also lies with our focus on distributional outcomes in the intergenerational context.

In the remainder of the paper, Section II provides a brief background on welfare reform and the data used, along with descriptive intergenerational quantile correlations and how these have changed pre- and post-welfare reform. Section III presents an overview of estimating average and quantile treatment effects with a continuous treatment, leveraging welfare reform as our source of identification. Section IV contains our main empirical results. Section V discusses potential mechanisms and offers evidence about the robustness of our results to a variety of specifications, including the inclusion of survey weights, changes in the definition of early adulthood, sample attrition, and misclassification error. Section VI concludes. Further evidence is provided in an online supplement, as referenced throughout.

II. Context and Descriptive Evidence

A. Welfare Reform

The political demand for welfare reform grew from rising caseloads and an effort to return decision-making power to state policymakers (DeParle 2004; Haskins 2007). During the 1990s, welfare reform thus began as a series of state-level waivers from the federal rules of AFDC governing who was eligible for assistance and for how long, which culminated in the passage of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) in 1996, introducing TANF as the new program for cash assistance. Arguably the most salient aspect of welfare reform to affect childhood exposure is time limits. Eligibility for the former AFDC program required low income and asset levels, and the presence of a dependent child under age 18. There was no cap on the number of years of assistance provided those criteria were met, which opened the possibility of long spells on assistance, and the prospect of multigenerational “welfare dynasties”. The intent of time limits was to interrupt those processes, with the federal lifetime limit set at no more than five years of cash assistance (conditional on meeting other eligibility criteria). However, about one-half of states deviated from the federal rules, with most opting to

shorten the lifetime limit — some as low as two years — and others imposing intermittent time limits such as no more than two years in any five-year interval.⁴

These time limits did not operate in isolation to reduce the duration of childhood exposure as TANF also initiated the first binding work requirements for non-disabled custodial parents, and failure to meet these requirements often resulted in sanctioning of the benefit, which in some states included removal of the entire family from the caseload. While the economic upswing of the late 1990s explained much of the initial caseload reductions (Ziliak et al. 2000), work requirements, sanctions, and particularly time-limited assistance all contributed to steep declines in cross-sectional participation (Moffitt 2003; Grogger and Karoly 2005; Ziliak 2016). Participation in the TANF program never rebounded in size from its initial fall —over 7 in 10 children whose family incomes fell below the poverty line were served by AFDC, but that plummeted to just over 2 in 10 two decades later under TANF (Bitler and Hoynes 2016).

Theoretical models of intergenerational transmission such as in Lindbeck et al. (1999), as well as the formation of dynastic poverty traps discussed in Durlauf and Shaorshadze (2014), suggest that attitudes and social norms around work and public assistance are likely to be most affected by long spells of exposure in childhood. Indeed, the concern among policymakers is that extended childhood AFDC/TANF exposure may influence long-run outcomes through early development channels or potentially through learning about program access and expected returns on investing in labor market skills. This could then transmit into early adulthood, which is an economically volatile time period because of the higher probability of unstable income and experiencing a first childbirth, which correlates with means-tested program participation. This suggests that standard dichotomous measures of participation in the prior empirical literature are unlikely to capture notions of dependence at the core of these models, as well as at the fore of policymakers' thinking on welfare reform when designing time limits and work requirements.

⁴ Time limits only affect federal assistance, and a few states opted to use state funds to provide assistance beyond the federal limit. In addition, the time limit only applies to the adult on the case, and thus so-called child-only cases are not subject to the limit.

Gottschalk and Moffitt (1994) were early proponents of more continuous measures of welfare participation. Specifically, they recommended using the number of time periods over a fixed time interval, or the amount of transfer income as a proportion of total income over a given interval. We refer to these measures as the proportion of time on (PTO) welfare and the percent of total income (PTI) from welfare. Since welfare reforms in the 1990s primarily targeted time spent on welfare instead of benefit generosity per se, we focus on the PTO measure of childhood exposure. Further, if the long-run effects of cash welfare participation are related more to program-specific exposure to AFDC/TANF instead of the dollar value of transfers, then PTO is again the more salient measure.⁵

B. Data

In order to understand the pathways of welfare exposure from parent to child, as well as the potential influence of welfare reform on those transmission pathways, it is necessary to have access to data that follows generations of families over a long time horizon, and with rich information on family background, welfare participation, labor-market activity, and incomes. The PSID is the only dataset available in the United States to address intergenerational changes over this time frame. As the longest-running longitudinal panel in the world, it follows families and descendants from the initial 1968 survey onward, which allows us to observe multiple measures of socioeconomic outcomes in both childhood and adulthood over multiple cohorts and, in this setting, welfare reform eras. Our sample includes families from both the PSID core Survey Research Center (SRC) subsample, as well as the Survey of Economic Opportunity (SEO) subsample with an oversample of low-income families and those racialized as Black.⁶ The online supplement offers a detailed description of the data, with summary statistics shown in Table S.1.

To fix ideas, in Figure 1 we first present the time series of childhood PTO for rolling cohorts of adults from survey year 1975 to 2019 using PSID data linking family histories from childhood years into early adulthood. For childhood, we use the mother’s

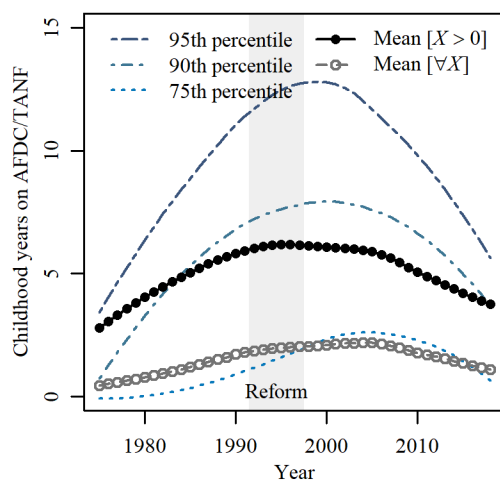
⁵ Most states left nominal welfare benefits unchanged, though about 20 states implemented a policy known as a “family cap” whereby the size of the monthly benefit was capped beyond a certain number of dependents, usually three (Ziliak 2016). As discussed later, we show evidence related to PTI from welfare in Section S.2 of the online supplement.

⁶In Section V.C.1, we examine the robustness of our main results to the inclusion of PSID sample weights.

AFDC/TANF participation from the child’s birth through age 18 and not yet an adult (by forming a separate family unit or by childbirth). We require at least 5 years of observations during childhood. Early adulthood corresponds to ages 19 to 27 when the child has formed their own family unit, and we require at least 3 years of data in adulthood.

Figure 1 shows that on average individuals in early adulthood in 1975 had spent about 3 years of childhood on AFDC conditional on any receipt, or about half of a year unconditionally (i.e., including both participants and nonparticipants). By the first full year of welfare waivers in 1993, the conditional mean exposure rose above 6 years, and about 2 years unconditionally. Twenty years after PRWORA, these means for childhood exposure to TANF fell back to around 4 years conditional on any receipt, or 1 year unconditionally. The figure suggests a significant retrenchment in average childhood exposure to cash welfare from AFDC/TANF in the years after welfare reform. A shortcoming of the average PTO exposure is that it does not capture potential heterogeneity in welfare exposure, which may translate into stronger or weaker long-run dependence intergenerationally. Thus, in Figure 1 we also present the 75th and 95th percentiles of the childhood PTO AFDC/TANF distribution where we see steeper changes occurring at higher ranks in the distribution. The

Figure 1. Trends in Childhood AFDC/TANF Years of Exposure, by Adult Cohorts



Note: Estimates are conditional on observing at least five years during childhood and correspond to current years for rolling cohorts of adults aged 19 to 27. The variable X denotes years of childhood exposure, and the percentiles correspond to the unconditional distribution of childhood years. PSID longitudinal sample weights are used in estimation.

95th percentile of childhood exposure over this period moved from 4 years in 1975 to a peak of 14 years and back down to 6 years in 2018. It was this right tail of long childhood spells that animated much of the policy debate surrounding welfare reform, and below we provide the first causal evidence of welfare transmission in the tails.

Given the changing trends in welfare exposure after the 1990s reforms, we focus the remainder of our analysis on time periods observing both generations either before or after the welfare reform era of 1990s waivers from AFDC through the transition to TANF in 1996. The pre-reform sample corresponds to early adult observations by age 27 within the calendar years 1986 to 1992, and the post-reform sample to adult observations within calendar years 2008 to 2018.⁷ All sample individuals are observed within either the pre-reform or post-reform era for at least 5 years during childhood ages 12 to 18, a time period where “welfare learning” is likely most acute (Hartley et al. 2022), and about 75 percent of those in the post-reform are age 8 or younger at the time of reform.⁸ Childhood exposure is still defined as mother’s AFDC/TANF participation for all child observations at ages 0 through 18, while in adulthood we examine a PTO measure for participation in means-tested programs more broadly (AFDC/TANF, SNAP, or SSI), as well as the ratio of family earnings to the federal poverty level (FPL) — so-called earnings to needs. These variables are sample averages obtained from the first year as an adult up to age 27. Our estimation samples include 703 mother-daughter pairs before welfare reform and 615 after reform, and there are 547 mother-son pairs before reform and 464 after reform.⁹

⁷ By limiting the sample to those years before welfare waivers were introduced for the pre-reform period, and to those years after all states implemented TANF for the post-reform years, we avoid complications associated with staggered timing of welfare reform implementation across states and over time highlighted in the work of Goodman-Bacon (2021) and Callaway and Sant’Anna (2021).

⁸ Figure S.1 in the online supplement shows the ages of the post-reform sample at the time of state implementation, as well as the distribution of these individuals’ childhoods under time limits by type.

⁹ See descriptive statistics in Table S.1 in the online supplement. Note that there are more daughters in our sample than sons. This discrepancy is partly addressed by sample weights suggesting that there are differences by attrition, and there are also gender differences in meeting our sample restrictions by the number of years observed as an adult having formed a new family by moving out or childbirth. In the supplement, and discussed in Section V.C, we provide evidence that our main results are robust to both sample weights and possible sample attrition.

C. Intergenerational Quantile Correlations

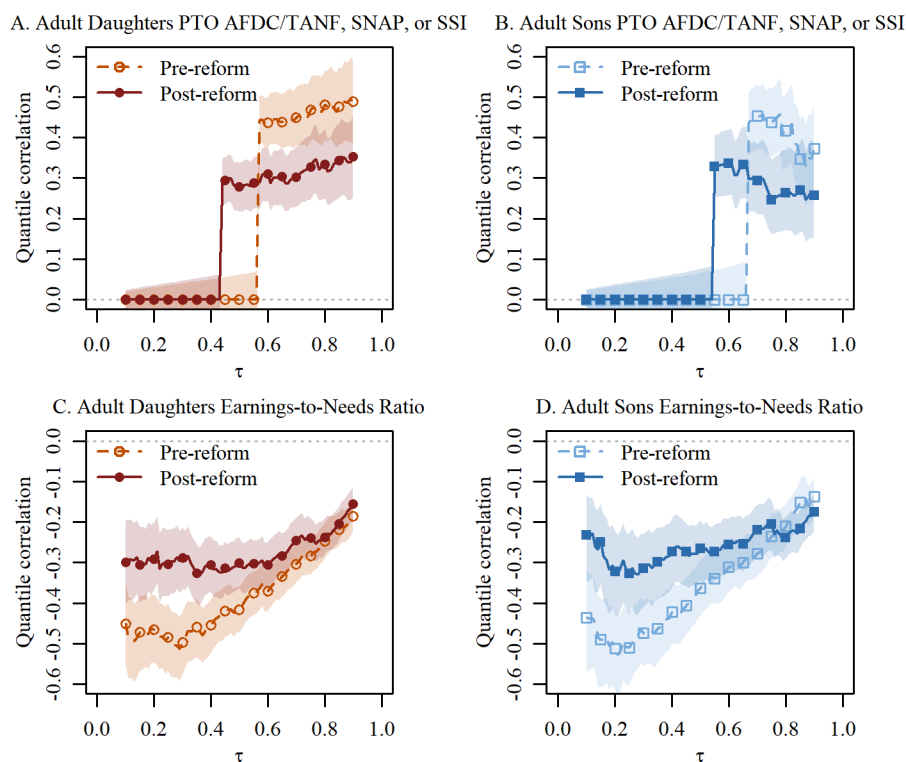
Much of the intergenerational literature focuses on descriptive correlations across parent and child generations. Welfare reform, by design, aims to restrict long-term participation in adulthood through time limits and discourages short-term participation through work requirements, and therefore, to get a more complete portrait of potential heterogeneity it is informative to examine correlations across the distribution.¹⁰ In this section, we present novel intergenerational quantile correlations between childhood PTO AFDC/TANF and economic outcomes in early adulthood.

We consider a correlation coefficient that measures the association between childhood exposure and the event that an adult outcome crosses its marginal τ -th quantile. For instance, if the interest is on childhood exposure and greater-intensity adult welfare duration, say at the 90th percentile, the parameter measures the intergenerational correlation between childhood PTO AFDC/TANF and adulthood PTO AFDC/TANF, SNAP, or SSI that ranks at the 90th percentile of adult participation. Estimation of the quantile correlation coefficient follows the procedure of Li et al. (2015), with confidence intervals based on the generalized bootstrap procedure proposed in Hartley et al. (2023); see Section S.2 of the supplement for more details. A key feature of this estimator is that we are able to map out the intergenerational associations across the full distributions of adult outcomes, including the extensive margins.

Figure 2 illustrates how childhood AFDC/TANF exposure correlates with the event that adult wider safety net participation or earnings-to-needs is higher than a given level determined by the unconditional quantile $Q_Y(\tau)$ of the adult variable. The figure contrasts pre- and post-welfare reform estimates between childhood PTO AFDC/TANF and adulthood PTO AFDC/TANF, SNAP, or SSI in panels A and B, and adult earnings-to-needs ratios in panels C and D. Results for daughters are shown in the left two panels and results for sons shown on the right, displayed at each quantile τ . Thus, the horizontal axis

¹⁰ In recent years, more comprehensive measures of dependence have been proposed, including ranks, quantile correlations, and correlations at the tails (see Dahl and DeLeire 2008; Chetty et al. 2014; Li et al. 2015; Han et al. 2016; Chetty and Hendren 2018; Mogstad and Torsvik 2023).

Figure 2. Quantile Correlations of the Proportion of Time On Childhood AFDC/TANF Exposure and Early Adulthood Outcomes, by Welfare Regime



Note: The child’s early adulthood outcome is indicated by each panel heading. These quantile correlations are estimated unconditionally and without PSID sample weights, and 90-percent confidence intervals are shown based on 1000 bootstrap replications.

corresponds to the distribution of the child’s outcome as an adult, as indicated by each panel subtitle by outcome and child’s gender, and the vertical axis corresponds to the strength of quantile correlation with childhood welfare exposure.¹¹ The shaded area around the point estimates represents a 90-percent pointwise confidence interval obtained after 1000 bootstrap repetitions.¹²

Panel A in Figure 2 shows that, for daughters, the correlation coefficient for the pre-reform period rises from 0.44 at the 0.57 quantile of adult welfare participation to 0.49 at the 0.9 quantile. We continue to observe a slight upward slope of the correlation coefficient

¹¹ These estimates do not use PSID sample weights so that the comparisons between distributions and quantile correlations are more straightforward; some of the percentages may overstate participation given oversamples of lower-income families.

¹² The online supplement presents quantile correlations for PTO versus PTI measures of welfare exposure as well as total family income relative to the FPL in Figures S.2 and S.3.

across quantiles in the period after reform, but the correlation sharply decreases by about one-third from 0.44 to 0.29 at the 0.57 quantile and from 0.49 to 0.35 at the 0.9 quantile. Interestingly, there is a shift toward more extensive-margin participation in the broader safety net among adult daughters after reform, despite a decrease in the magnitude of quantile correlations. Specifically, there is zero correlation for the lower 56 percent of the sample pre-reform, which falls to 43 percent post-reform because more adult daughters participate at some point in the broader safety net.¹³ Both can be true if participation in the broader safety net increases secularly despite decreasing associations between participation intensity and means-tested cash assistance from AFDC/TANF in the prior generation. Supplement Figure S.4 suggests that this decrease in the zero correlation comes from greater participation in SNAP and SSI, as the extensive margin participation in AFDC/TANF fell after welfare reform, consistent with Hartley et al. (2022).

As shown in panel B, the intergenerational correlations for sons experience similar shifts across quantiles. At the highest quantiles, the correlations for sons are around 0.4 pre-reform and 0.3 post-reform, similar to levels for daughters except that sons' correlation magnitudes fade at higher intensities of adult welfare participation and daughters' slightly rise. In another similarity, adult sons are more likely to have any welfare participation post-reform despite slightly lower levels of correlation with childhood exposure. Note that finding similar correlations across quantiles before and after reform does not imply similar distributions of outcomes between daughters and sons. In fact, they differ substantially. For example, Table S.1 in the online supplement shows that the 90th percentile of PTO for the broader safety net implies different intensities of participation. Daughters at the 90th percentile are observed 88 percent of adult years with AFDC/TANF, SNAP, or SSI before welfare reform, and 100 percent after reform. Sons are less likely to participate at such intense levels overall: 67 percent before reform at the 90th percentile and 78 percent after.

Panel C of Figure 2 shows that before welfare reform the earnings of adult daughters had stronger (in absolute value) correlations with childhood welfare exposure

¹³ As expected, if the quantile of adult exposure is zero, then the quantile correlation is zero. Consistent with this finding, Table S.1 in the online supplement shows that the 50th percentile of PTO AFDC/TANF, SNAP, or SSI is 0.0 before reform, and 0.2 after reform.

when adult earnings were below the 30th percentile of the distribution, with quantile correlation estimates around -0.48 , meaning greater childhood exposure is associated with lower adult earnings. For earnings quantiles higher than 0.3, the correlations linearly decrease in magnitude toward a correlation of -0.18 at the 0.9 quantile. After welfare reform, the quantile correlations for daughters' earnings became much flatter at around -0.3 in the bottom half of the distribution up to a correlation at the top of the distribution approximately the same as in the pre-reform era. That is, the stronger association between low-earning daughters and childhood welfare descriptively evens out after reform with the levels of association seen for those with higher earnings; however, a correlation of -0.2 between adult earnings and childhood welfare is still economically significant.

In Figure 2 panel D, the association between sons' earnings and their childhood welfare exposure is again similar to that of daughters' earnings. If anything, correlations for sons exhibit the largest magnitude of association with childhood exposure around the 0.2 quantile of earnings with somewhat weaker associations at the 0.1 quantile, yet the trends across these distributions nearly overlay one another comparing sons to daughters. Again, the underlying levels of distributions differ, as seen in Table S.1. In the pre-reform era, sons in the lower quarter of the distribution of earnings had at least 30 percent higher earnings-to-needs ratios relative to daughters, yet this gap disappeared after welfare reform, with the possible exception for sons around the 10th percentile.

We can compare these quantile correlations to standard intergenerational elasticities at the means of the sample, as presented in Supplement Table S.2. For daughters the welfare elasticities at the mean fall from 0.44 before reform to 0.24 after reform, while for sons they fall from 0.39 to 0.23. The corresponding earnings elasticities are -0.10 and -0.12 for daughters, and -0.08 and -0.07 for sons, respectively. While the patterns of weaker intergenerational associations of welfare use after reform hold at the mean, the levels lie below the quantile correlations, and for earnings, the average correlations lie substantially lower in absolute value than the quantile earnings correlations. Moreover, the average measures miss important developments at the extensive margin.¹⁴ After welfare reform,

¹⁴ The mean regression-based correlations shown in Table S.2 in the online supplement also suggest a

means-tested assistance from the broader safety net became more prevalent on the extensive margin for both daughters and sons, with weaker intergenerational correlations across quantiles for those with any participation. Daughters and sons both experienced an improvement in terms of the negative association of childhood welfare exposure on adult earnings in the post-reform period, and the most important changes were among families with the lowest earnings-to-needs ratios. These distinct patterns only emerge when exploring beyond the mean correlations.

III. Identification and Estimation of Intergenerational Effects

While the quantile correlations presented in Section II are informative, we do not ascribe any causal exposure interpretation. The main variable of interest is endogenous because exposure during childhood and early adulthood can be related to income levels that are correlated across generations. In this section, we introduce a framework for the identification and estimation of the causal effect of additional childhood exposure to welfare use on adult outcomes (separate from unobserved within-family persistence in income status). Because childhood exposure to means-tested cash assistance was directly influenced by welfare reform, this section exploits the variation across welfare regimes induced by time limits and participation disincentives such as work requirements to estimate the causal parameters using a nonlinear difference-in-differences framework. Specifically, we aim to identify and estimate the average treatment effect on the treated (ATT) and the quantile treatment effect on the treated (QTT).

A. Differences-in-Differences with a Continuous Treatment

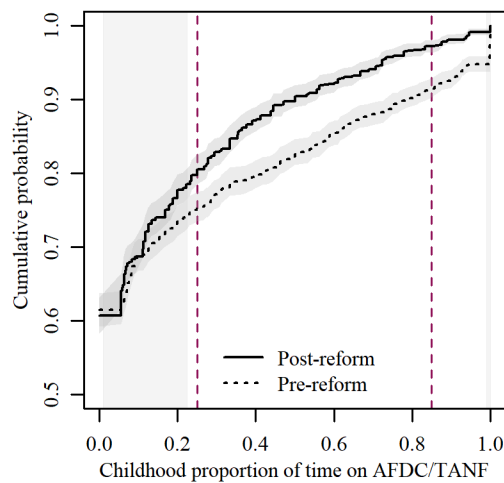
Define the outcome variable as $Y_t(x)$ with $t \in \{0,1\}$ for before and after reform, respectively. The ATT is the difference between the expected value of the outcome $Y_t(x)$, resulting from an exogenous change in exposure to welfare, x , say from x to x' : $\Delta(x, x') := E(Y_t(x')|x) - E(Y_t(x)|x)$. Similarly, the QTT is the difference between the quantiles of the outcome $Y_t(x)$ from an exogenous change from x to x' : $\delta(\tau, x, x') := Q_{Y_t(x')}(\tau|x) - Q_{Y_t(x)}(\tau|x)$. In order to identify these parameters, it is necessary to simultaneously deal

reduction of exposure after reform, but the approach does not allow us to separate out the extensive-margin effect from the effect at the upper tail of the adult distribution.

with potential differential time trends of the counterfactual outcomes and endogeneity of welfare exposure. D’Haultfœuille et al. (2023) address these issues, offering identification results and consistent estimation of the ATT and QTT parameters.

If the change in childhood exposure to welfare by the reform is heterogeneous across regimes, then there may exist both distributional differences as well as potential common points where $X_0 = X_1 = x^*$. These points are shown in Figure 3, where we compare the empirical cumulative distribution functions (CDFs) for childhood PTO AFDC/TANF by welfare reform regime. The figure shows that for positive welfare exposure below one-quarter of childhood years, the distributions appear similar pre-reform and post-reform with evidence of the distributions crossing in areas of equivalence. Distributional differences become evident above one-quarter of childhood on AFDC/TANF. The higher CDF post-reform is expected if welfare reform implies less participation because each point on the curve indicates the probability that childhood exposure was less than a given proportion of time on TANF. For example, the evidence implies that 17.1 percent of children were exposed to AFDC for more than half of their

Figure 3. Empirical Cumulative Distribution Function for Childhood Proportion of Time On AFDC/TANF, by Welfare Regime



Note: The shaded regions of childhood PTO AFDC/TANF values from 0.01 to 0.225 and 0.99 to 1 highlight distribution crossing regions, and the distributional equivalence by reform between PTO values of 0.25 to 0.85 is rejected based on a one-sided Kolmogorov-Smirnov test p-value of 0.001. Pointwise 90-percent confidence intervals are shown. The shaded area denotes childhood observations with overlapping distributions.

childhood in the pre-reform era compared to 9.5 percent exposed to TANF for more than half of their childhood in the post-reform era. These common points on the x -axis below the shaded regions, coupled with the distributional crossing, provide identifying information to recover the underlying time trend and construct a comparison group.

Specifically, D'Haultfœuille et al. (2023) show that under the three assumptions discussed below in Section III.B, $P(Y_1 \leq y | X_1 = x^*) = P(Y_0 \leq g_0(y) | X_0 = x^*)$, where $g_0(\cdot)$ is a time trend function. The equality holds for the same distribution of unobservables and the same value of the treatment, allowing us to solve for the trend function as $g_0(y) = F_{Y_0|X_0 \in \mathcal{S}}^{-1}(F_{Y_1|X_1 \in \mathcal{S}}(y))$, where F denotes the CDF and \mathcal{S} is the set that includes all values of exposure before reform such that $X_0 = X_1 = x^*$. Moreover, the function $q_0(x) = F_{X_0}^{-1}(F_{X_1}(x))$ represents the exogenous change in exposure; namely, it captures the value of childhood PTO AFDC/TANF before the reform, X_0 , for a daughter (or son) who is at the same rank as another daughter (or son) whose childhood PTO AFDC/TANF after reform is $X_1 = x$.

The ATT and QTT parameters, $\Delta(x, x')$ and $\delta(\tau, x, x')$, respectively, are identified for any pair (x, x') such that $(x, x') = (x, q_0(x))$. Then, the ATT and QTT parameters can be redefined as:

$$\begin{aligned} \Delta(x, q_0(x)) &= E(g_0(Y_0) | x = q_0(x)) - E(Y_1(x) | x), \\ \delta(\tau, x, q_0(x)) &= Q_{g_0(Y_0)}(\tau | x = q_0(x)) - Q_{Y_1|X_1}(\tau | x). \end{aligned} \tag{3}$$

It is important to emphasize that the ATT and QTT are heterogeneous with respect to different levels of childhood PTO AFDC/TANF. Moreover, the QTT in equation (3) varies by the quantile τ of the conditional distribution of the response variable. For instance, in the case of intergenerational effects of exposure, this implies that one can estimate the effect of a marginal increase in childhood welfare exposure among families with high (or low) welfare exposure during childhood and conditionally high (or low) welfare participation as an adult. We can therefore vary the level of intensity of exposure, x , and have a better understanding of how welfare exposure intergenerationally impacts the τ -th quantile of the adult outcome distribution.

B. Identifying Assumptions

The identifying assumptions are stated in D’Haultfœuille et al. (2023), and they are similar to the conditions developed by Athey and Imbens (2006) for a binary treatment. The first condition requires that unobservables affecting childhood exposure have the same rank before and after reform. They are allowed to be different and move over time, but the relative positions in the distribution are invariant. This would imply, for instance, that any potential stigma associated with a mother’s participation during childhood — while potentially shifting in levels in response to changing social norms — is similarly distributed before and after reform.¹⁵ We check for potential violations of rank similarity by testing against the null hypothesis that unobserved characteristics have the same conditional distribution in either treatment status. Specifically, we follow the approach suggested by Frandsen and Lefgren (2018) where we test a triple interaction model for the within-treatment-group rank of earnings as a function of a treatment indicator, post-welfare reform, and an exogenous “shifter” variable. If the rank differs across levels of this potential shifter variable, then a significant interaction coefficient would suggest rejecting rank similarity. In Table S.3 of the supplement, we conduct the test using four different shifter variables, each dichotomized at the median into low or high levels: state-level AFDC/TANF benefit standards, the maximum federal/state level of the Earned Income Tax Credit (EITC), the Supplemental Poverty Measure (SPM) poverty rate, and the state unemployment rate. For this exercise, we define treatment as an indicator for AFDC/TANF exposure from 25 to 85 percent of childhood relative to no exposure, dropping smaller values in between or values at more extreme dependence. The p-values for the full interactions range from 0.185 to 0.906 for daughters, and from 0.694 to 0.885 for sons, and thus we do not find evidence against the null of rank similarity.

The second identification condition is that trends are not group specific, creating changes in the distribution of potential outcomes. This condition is likely to hold in our setting, since it has been documented that the decline in cross-sectional participation in

¹⁵ For example, if stigma increased after reform for chronic welfare recipients, this would not be an issue unless the distribution of stigma changed the rank order relative to participation intensity. See Chan and Moffitt (2018) for a recent discussion of the role of stigma in welfare participation decisions.

AFDC/TANF is associated with reduced program access over time (Grogger and Karoly 2005; Ziliak 2016). The rank test above helps address both conditions, as does the inclusion of control variables throughout our main estimation discussed in the next section.

The third and key condition relates to the construction of the comparison group. The empirical evidence presented in Figure 3 suggests that welfare reform affected the distribution of childhood exposure to welfare use and its impact has been heterogeneous. The existence of common points, where $X_0 = X_1 = x^*$, can be tested because childhood PTO AFDC/TANF is observed before and after reform. Figure 3 supports the requirement that the CDFs of childhood PTO AFDC/TANF before and after reform cross. Kolmogorov-Smirnov tests fail to reject the null hypothesis of equality of CDFs in the shaded regions. For childhood PTO AFDC/TANF in the range of 0.25 to 0.85, an area with a substantial mass of the distribution away from extremes such as chronic exposure, we reject distributional equivalence based on a one-sided Kolmogorov-Smirnov test with a p-value of 0.001.¹⁶ Whereas a standard difference-in-differences approach relies on parallel time trends, in this nonlinear setting identification comes through the crossing condition used to estimate the distributional time trends by outcome.

C. Estimating the ATT and QTT parameters

We estimate the quantile treatment effects in two main steps. In a first stage, we obtain the counterfactual exposure $\hat{q}_0(x) = \hat{F}_{X_0}^{-1}(\hat{F}_{X_1}(x))$ and outcome $\hat{g}_0(y) = \hat{F}_{Y_0|X_0 \in \mathcal{S}}^{-1}(\hat{F}_{Y_1|X_1 \in \mathcal{S}}(y))$ with the conditional distribution estimated by $\hat{F}_{Y_t|X_t \in \mathcal{S}}(y) = (\sum_{i=1}^n \mathbf{1}(Y_{it} \leq y) K((x - X_{it})/h_n)) / (\sum_{i=1}^n K((x - X_{it})/h_n))$, where the kernel function $K(\bullet)$ has bandwidth h_n .¹⁷ In the second stage, we obtain $\hat{\Delta}(x, \hat{q}_0(x))$ and $\hat{\delta}(\tau, x, \hat{q}_0(x))$ to estimate the ATT and QTT defined in equation (3).

For ease of interpretation, we report in Sections IV and V the average marginal effect (AME) and quantile marginal effect (QME), obtained by dividing the sample analog

¹⁶ Moreover, we apply the testing procedure proposed in Goldman and Kaplan (2018) to find values of childhood PTO AFDC/TANF for which the equality of CDFs is rejected. The result of the test indicates that the null hypothesis is rejected at the 10 percent level in the interval [0.272, 0.944], providing additional evidence consistent with the existence of crossing points, and thus the ability to construct comparison groups.

¹⁷ The conditions on the Kernel function and the bandwidth are standard. We use a triweight kernel and the bandwidth is selected as $h_n = 1.06 \hat{\sigma} n^{-1/5}$, where σ is the standard deviation of childhood exposure.

estimators of the ATT and QTT parameters in equation (3) by the change between childhood welfare exposure and the rank-adjusted variable:

$$\widehat{AME}(x, \hat{q}_0(x)) = \frac{\hat{\Delta}(x, \hat{q}_0(x))}{\hat{q}_0(x) - x}, \quad \widehat{QME}(\tau, x, \hat{q}_0(x)) = \frac{\hat{\delta}(\tau, x, \hat{q}_0(x))}{\hat{q}_0(x) - x}. \quad (4)$$

Using (4), we estimate the intergenerational marginal effect of a percentage-point increase in PTO AFDC/TANF in childhood at a point between x and $\hat{q}_0(x)$, where x is normalized to points along the distribution of exposure in the post-reform period and $\hat{q}_0(x)$ is the counterfactual transformation of the distribution of pre-reform exposure. In practice, we focus on a midrange of childhood welfare exposure for the PTO AFDC/TANF interval $[0.25, 0.85]$, because it is the range of PTO AFDC/TANF where distributional differences in Figure 3 are the greatest between welfare reform regimes, and away from extreme values, especially in the upper tail. This strategy improves our ability to detect effect sizes using welfare reform as an exogenous change to exposure. We estimate 500 points along these distributions yielding smooth, marginal changes with $\hat{q}_0(x) - x > 0$.

Lastly, to keep the notation simple, we did not include covariates in the definition of the parameters and their corresponding estimation procedures above. However, all models estimated below condition on a vector of controls that include mother's age and its square during childhood, along with averages of time-varying policy and economic controls for the daughter's state of residence, including AFDC/TANF benefit standard, maximum federal/state Earned Income Tax Credit, poverty rate (Supplemental Poverty Measure), AFDC/TANF participation rate, and unemployment rate. D'Haultfœuille et al. (2023) discuss the potential use of control variables in their model, and our empirical application incorporating controls is an extension to their work, which may address concerns about other time differences across welfare regimes. Section S.4 in the online supplement shows that the empirical evidence presented in the next section is robust to variations of the nonlinear difference-in-differences specification with respect to the inclusion or choice of control variables as well as sample weighting.

IV. Estimates of the Intergenerational Effect of Welfare Exposure

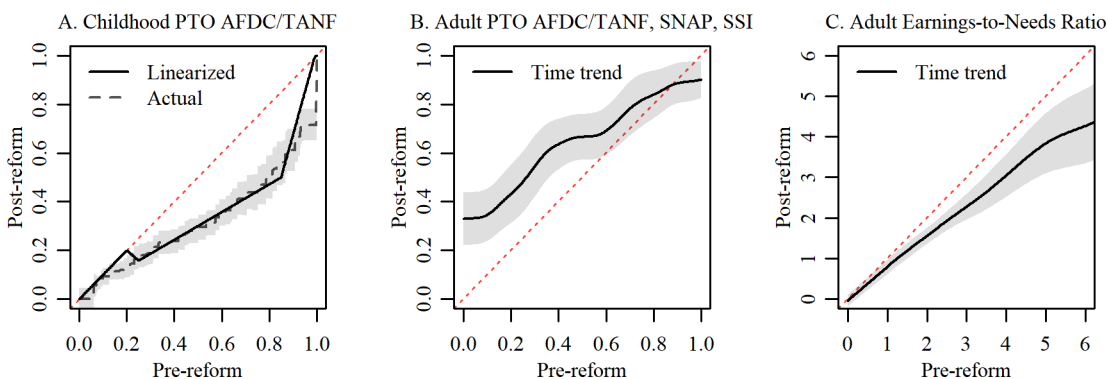
This section presents results of the intergenerational effect of childhood PTO AFDC/TANF from equation (4). We focus our discussion primarily on the QME estimates as this is the major innovation over the prior literature. However, before turning to the main results, we present supporting quantitative evidence on the first stage of the procedure.

A. First Stage Results

Panel A in Figure 4 shows quantile-quantile plots comparing distributions of childhood welfare exposure pre- and post-reform. Points along the dotted 45-degree line demonstrate distributional equivalence between reform eras. The dashed line corresponds to childhood PTO AFDC/TANF estimated as $\hat{q}_0(x) = \hat{F}_{X_0}^{-1}(\hat{F}_{X_1}(x))$, and the continuous line is a piecewise linear function, parameterized by ζ and estimated as $\tilde{q}_0(\hat{\zeta}, x)$, to smooth out potential noise in the estimates and improve the estimation of the parameters in the second stage.¹⁸ The differences between the dashed and continuous lines appear to be inconsequential, and thus, we follow the practical recommendation in D’Haultfœuille et al. (2023) of adopting the piecewise linear function to estimate the parameters of interest. The result in Panel A indicates that childhood welfare exposure is more prevalent in the pre-reform period for PTO AFDC/TANF roughly above 20 percent with little changes by reform for positive exposure levels below this cutoff. The remaining panels B and C in Figure 4 correspond to quantile-quantile plots for the two adult outcomes of interest, broader safety net participation and relative earnings, respectively. The continuous lines show first-stage time trend estimates $\hat{g}_0(y)$ and the grey areas correspond to the 90-percent confidence intervals. Once again, the empirical evidence is consistent with expectations. The time trends for adult outcomes by reform era reveal that broader safety net participation intensified post-reform particularly among all adults participating less than half of the years

¹⁸ The piecewise linear estimate is based on a parameterized estimator of $q_t(x)$ as a function of the limits outside of the crossing-region where the CDF of X is approximately equivalent pre-/post-welfare reform. The relevant limits include the broader range of childhood PTO AFDC/TANF affected by reform as well as an inner range where the distributional differences are greatest, denoted in ascending order as $\bar{x} = (x_a, x_b, x_c, x_d) = (0.20, 0.25, 0.85, 0.99)$. See Figure 3 for illustrations of the regions defined by \bar{x} and Appendix C in D’Haultfœuille et al. (2023) for details on the piecewise linear estimator.

Figure 4. Childhood Exposure and Early Adulthood Outcome Quantile-Quantile Plots



Note: The quantile-quantile plots represent shifts in childhood welfare exposure and adult outcome time trends identified based on the crossing condition shown in Figure 3. Estimates are shown with 90-percent confidence intervals based on 1000 bootstrap replications.

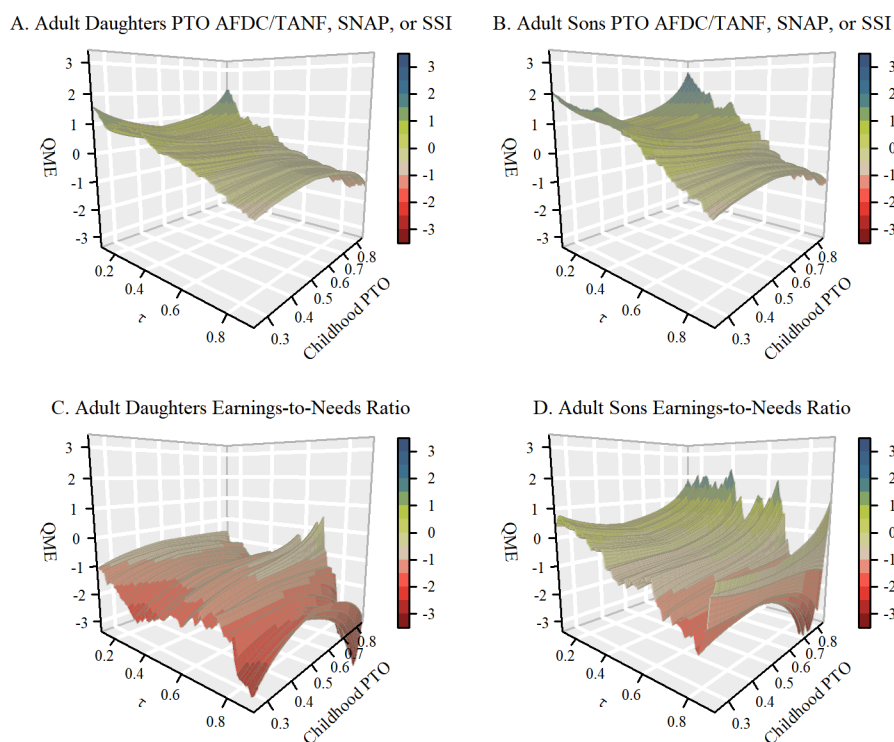
observed, whereas earnings-to-needs ratios were relatively lower post-reform for higher earners.

B. Main Results

An illustrative feature of the QME estimator in equation (4) is that resulting marginal effects vary by the dimensions of childhood heterogeneity in AFDC/TANF exposure as well as the intensity of outcomes in early adulthood. Figure 5 shows these marginal effects at different points of AFDC/TANF exposure x from 25 to 85 percent of childhood years, and across points in the distribution of the adult outcomes from τ between 0.1 and 0.9. Panels A and B in Figure 5 reveal a positive effect of childhood welfare exposure on broader safety net participation among those who participate less intensely as adults, and these effects diminish at higher levels of adult participation, implying the effect of childhood exposure on adult exposure is asymmetric.¹⁹ The results for daughters and sons follow similar patterns regarding effects on broader welfare participation, yet the patterns diverge more in panels C and D comparing by effects on earnings in early adulthood. The QME estimates for daughters demonstrate negative effects of childhood

¹⁹ Note that marginal effects represent an exogenous increase in exposure comparing the time-trend-adjusted counterfactual pre-reform exposure to expected post-reform exposure such that $\hat{q}_0(x) - x > 0$ for all $x \in [0.25, 0.85]$. For instance, consider $x = 0.4$ and recall that $\hat{q}_0(x) = \hat{F}_{X_0}^{-1}(\hat{F}_{X_1}(x))$. In this case, we find that $\hat{F}_{X_1}(0.4) \approx 0.873$ (see Figure 3), and then $\hat{q}_0(x) = \hat{F}_{X_0}^{-1}(\hat{F}_{X_1}(0.4)) \approx 0.675$ (see Figure 4 panel A).

Figure 5. Heterogeneous Quantile Marginal Effects of the Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Outcomes



Note: Estimates correspond to the QME estimator defined in equation (4). Heterogeneous effects are shown for childhood PTO AFDC/TANF ranging from 25 to 85 percent of observed years. The child’s early adulthood outcome is indicated by each panel heading, which corresponds to the distribution indicated by τ .

exposure on adult earnings over a substantial part of the distribution, while estimates for sons are more centered around zero earnings effects.

Across both dimensions of intensive childhood exposure and distributions of adult outcomes, Figure 5 reveals interesting variation in intergenerational influence. To illustrate these patterns more transparently, in Table 1 and Figure 6 below we provide summary measures of these heterogeneous QMEs and the extent to which they are similar or different by gender. Our main estimates in Table 1 consider the range $\check{X} = [0.25, 0.85]$, which we break down into subintervals for lower welfare exposure in childhood, $\check{X}_{\text{low}} = [0.25, 0.4]$, moderate $\check{X}_{\text{mod}} = [0.4, 0.6]$, high exposure $\check{X}_{\text{high}} = [0.6, 0.75]$, and chronic exposure $\check{X}_{\text{chronic}} = [0.75, 0.85]$.

Table 1. Quantile and Average Marginal Effects of the Proportion of Time On Childhood AFDC/TANF Exposure on Early Adult Economic Outcomes, by Ranges of Childhood Exposure

	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	Average
	(1)	(2)	(3)	(4)	(5)	(6)
Childhood PTO AFDC/TANF	A. Adult Daughters: PTO AFDC/TANF, SNAP, or SSI					
0.25–0.85	1.065 (0.382)	0.570 (0.407)	0.122 (0.399)	-0.341 (0.302)	-0.582 (0.278)	0.254 (0.283)
0.25–0.40	1.167 (0.564)	0.709 (0.426)	0.313 (0.311)	-0.114 (0.273)	-0.551 (0.359)	0.391 (0.249)
0.40–0.60	0.754 (0.286)	0.436 (0.281)	0.176 (0.263)	-0.136 (0.207)	-0.377 (0.198)	0.246 (0.190)
0.60–0.75	1.009 (0.337)	0.510 (0.418)	0.052 (0.438)	-0.416 (0.321)	-0.582 (0.270)	0.201 (0.300)
0.75–0.85	1.617 (0.584)	0.722 (0.758)	-0.171 (0.830)	-0.981 (0.606)	-1.035 (0.498)	0.141 (0.553)
Childhood PTO AFDC/TANF	B. Adult Sons: PTO AFDC/TANF, SNAP, or SSI					
0.25–0.85	1.426 (0.395)	1.072 (0.398)	0.613 (0.425)	-0.292 (0.401)	-0.510 (0.360)	0.525 (0.316)
0.25–0.40	1.533 (0.666)	1.217 (0.555)	0.811 (0.428)	-0.064 (0.369)	-0.479 (0.449)	0.665 (0.340)
0.40–0.60	1.003 (0.306)	0.782 (0.288)	0.516 (0.289)	-0.102 (0.274)	-0.328 (0.257)	0.434 (0.218)
0.60–0.75	1.362 (0.319)	1.001 (0.376)	0.532 (0.449)	-0.368 (0.415)	-0.512 (0.341)	0.466 (0.319)
0.75–0.85	2.206 (0.547)	1.541 (0.682)	0.631 (0.839)	-0.901 (0.759)	-0.919 (0.599)	0.583 (0.579)
Childhood PTO AFDC/TANF	C. Adult Daughters: Earnings-to-Needs Ratio					
0.25–0.85	-0.633 (0.497)	-1.207 (0.551)	-1.468 (0.795)	-1.507 (1.009)	-2.167 (1.571)	-1.419 (0.662)
0.25–0.40	-0.838 (0.482)	-1.373 (0.544)	-1.675 (0.698)	-1.358 (0.796)	-2.410 (1.283)	-1.622 (0.585)
0.40–0.60	-0.559 (0.342)	-1.058 (0.378)	-1.324 (0.549)	-1.382 (0.672)	-1.794 (1.093)	-1.259 (0.457)
0.60–0.75	-0.550 (0.533)	-1.136 (0.589)	-1.382 (0.862)	-1.557 (1.112)	-2.055 (1.745)	-1.334 (0.717)
0.75–0.85	-0.594 (0.996)	-1.364 (1.105)	-1.577 (1.586)	-1.908 (2.095)	-2.719 (3.187)	-1.564 (1.318)
Childhood PTO AFDC/TANF	D. Adult Sons: Earnings-to-Needs Ratio					
0.25–0.85	0.505 (0.571)	0.220 (0.646)	-0.609 (0.892)	-1.630 (1.109)	-0.074 (1.844)	-0.190 (0.753)
0.25–0.40	0.315 (0.559)	0.073 (0.675)	-0.804 (0.724)	-1.482 (0.965)	-0.289 (1.573)	-0.376 (0.634)
0.40–0.60	0.227 (0.391)	-0.072 (0.454)	-0.730 (0.610)	-1.466 (0.752)	-0.348 (1.282)	-0.410 (0.519)
0.60–0.75	0.562 (0.598)	0.260 (0.655)	-0.541 (0.957)	-1.677 (1.187)	-0.008 (1.984)	-0.132 (0.800)
0.75–0.85	1.263 (1.100)	0.965 (1.186)	-0.175 (1.754)	-2.108 (2.195)	0.697 (3.561)	0.441 (1.453)

Note: Estimates correspond to quantile marginal effects in columns (1)–(5) at $\tau = \{0.10, 0.25, 0.50, 0.75, 0.90\}$ for the distribution of adult outcomes with respect to means across varying ranges of childhood PTO AFDC/TANF exposure, from 25 to 85 percent of years. The average marginal effects by range of childhood exposure are shown in column (6). Standard errors, shown in parentheses, are based on 1000 bootstrap replications.

Corresponding to Figure 5 panel A, estimates in Table 1 panel A, columns (1)–(5), show the estimated QMEs on adult welfare ranges from 1.065 (s.e. = 0.382) at $\tau = 0.1$ and decreases to -0.582 (0.278) at $\tau = 0.9$. If we concentrate on results with relatively low childhood exposure, $\check{X} \in [0.25, 0.40]$, the estimated effects in adulthood are similar, ranging from 1.167 (0.564) at $\tau = 0.1$ to -0.551 (0.359) at $\tau = 0.9$. Interestingly, considering all combinations of quantiles and childhood exposure, the most negative QME estimate is found at $\tau = 0.9$ for chronic childhood exposure with a significant estimate of -1.035 (0.498). That is, increased AFDC/TANF exposure in childhood implies that adults are less likely to participate at chronically high levels of welfare intensity. Table 1 panel B summarizes effects on sons' broader welfare participation, which are similar to the asymmetric sloping patterns seen for daughters with the exception of the effect at the $\tau = 0.9$ for $\check{X}_{\text{chronic}}$ childhood exposure which is statistically insignificant (though similar in magnitude).

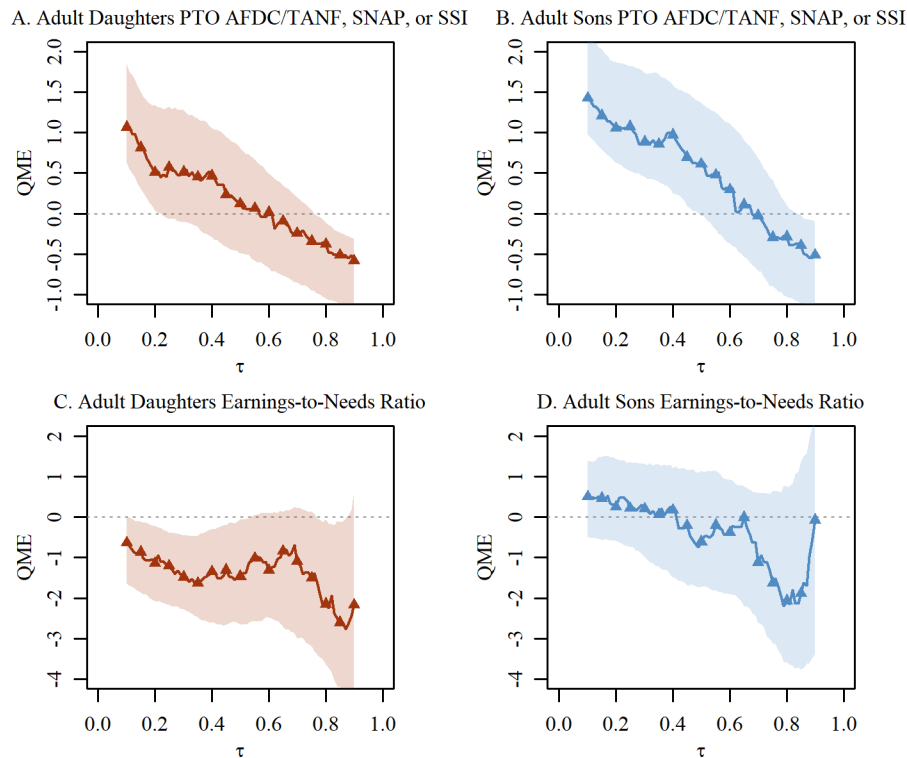
Overall, these findings imply that the intergenerational effects of childhood welfare exposure on adult participation in the broader safety net are positive and economically large in the lower tail of the adult distribution and negative in the upper tail, and the QMEs are generally statistically different from zero. To interpret this result, consider, for instance, the estimated QMEs for daughters at $\check{X} \in [0.25, 0.85]$ in Table 1. Because welfare reform reduced exposure, the results suggest that for a percentage point decrease in PTO AFDC/TANF during childhood, adult daughters decreased their welfare use in the wider safety net slightly over one percentage point at the 0.1 quantile and increased their welfare use about half of a point at the 0.9 quantile.

Panel C of Table 1 shows the point estimates and standard errors for earnings-to-needs by quantile of the adult distribution and intervals of childhood exposure. We find that although all QMEs for daughters are negative, these effects are significantly different from zero mainly at or below the median quantile of adult earnings in the range of low to moderate childhood AFDC/TANF exposure. For \check{X}_{low} exposure, the QMEs reach -1.373 (0.544) and -1.675 (0.698) at adult earnings near the 0.25 and 0.5 quantiles, respectively, meaning that the earnings-to-needs penalty would decrease between 1.4 to 1.7 points for

each percentage point reduction in childhood AFDC/TANF exposure. In contrast with the evidence for daughters, only one QME estimate for sons in Panel D is significant at the 10-percent level (for moderate exposure at the 0.75 quantile).

As a last summary of the main QME findings, Figure 6 presents results by averaging the effects across the different childhood exposure levels shown in Figure 5. Therefore, each point estimate corresponds to the average over $\check{X} \in [0.25, 0.85]$ of the QMEs evaluated at a given quantile of the adult outcome distribution.²⁰ The area around the point estimates represents a 90-percent pointwise confidence interval, obtained considering the 5–95 quantiles of the bootstrap distribution after 1000 replications. The

Figure 6. Quantile Marginal Effects of the Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Outcomes



Note: Estimates correspond to the QME estimator defined in equation (4) shown for childhood PTO AFDC/TANF summarized as the mean for exposure ranging from 25 to 85 percent of observed years. The child's early adulthood outcome is indicated by each panel heading, which corresponds to the distribution indicated by τ . Pointwise 90-percent confidence intervals are shown based on 1000 bootstrap replications.

²⁰ The estimates in Figure 6 correspond directly to the top row within each panel of Table 1 columns (1)–(5).

QMEs in Figure 6 panel A show that an increase in childhood welfare exposure has a large positive effect on adult PTO AFDC/TANF, SNAP, or SSI at the 0.1 quantile, and the estimated effect decreases nearly linearly with negative effects toward the 0.9 quantile. That is, an increase in the time on welfare during childhood leads to higher short-term adult participation in the broader safety net, but it actually appears to reduce high-intensity welfare participation in early adulthood, although the results are weakly significant for sons at the upper tail. Panels C and D of Figure 6 show that childhood welfare exposure implies lower earnings-to-needs in adulthood for daughters, particularly below the median of the outcome distribution where negative effects are estimated more precisely. The estimated effects for sons are statistically insignificant and tend to fluctuate around zero except for the highest quantiles.

For additional context, we compare these quantile treatment effects to more standard average treatment effects in column (6) of Table 1, which shows AME estimates by daughters' and sons' outcomes over specific childhood welfare exposure intervals.²¹ The estimated effects on adult welfare participation vary by exposure, from 0.391 for daughters growing up with low AFDC/TANF exposure to 0.141 for daughters growing up with chronic exposure. These AMEs evaluated at the different levels of AFDC/TANF exposure are statistically insignificant (at conventional levels) for daughters, unlike what we find with the QMEs, and only significant at the 10-percent level for sons growing up with low to moderate levels of welfare exposure, again providing a less nuanced portrait of the effect of childhood exposure found in the QMEs. For the evidence on earnings in panels C and D of Table 1, the AMEs are large, negative and significant for daughters with low and moderate childhood exposure, while the results for sons do not reveal significant intergenerational effects. Although the AME of earnings for daughters is statistically significant at the 5-percent level for the entire interval $\check{X} = [0.25, 0.85]$, this AME masks

²¹ The AME evidence in Table 1 offer further comparison with the descriptive least-squares evidence in Table S.2, while simultaneously allowing the intensity of welfare use during childhood to vary by length. For instance, if we focus on the last column in Panel A of Table 1, the intergenerational effect of PTO AFDC/TANF exposure on PTO AFDC/TANF, SNAP, or SSI in early adulthood is 0.254, which is slightly larger than the post-reform OLS elasticity estimate of 0.235 in Table S.2.

the interesting variation across low and moderate exposure seen in the QMEs of columns (1)–(5) of Table 1 and Figure 6.

V. Potential Mechanisms and Robustness

We continue our investigation by studying in more detail potential mechanisms, including potential substitution across transfer programs, and gender comparisons in the effects of childhood exposure on wages and hours of work, followed by a discussion of the robustness of our estimates.

A. Asymmetries in Intergenerational Program Use and Substitution

Since the QME results in panels A and B of Table 1 and Figure 6 indicate a declining effect of welfare exposure that turns negative at the upper quantiles, the implication is that reducing childhood welfare exposure post reform actually increased the broader safety net participation among adults with long-term welfare reliance. This impact may follow if those with greater welfare dependence are harmed by reducing access to childhood assistance even if AFDC/TANF program participation has negative impacts for those that are not chronic recipients. Interestingly, welfare reform implies an asymmetric response whereby low-to-moderate-use recipients become less likely to participate altogether, yet chronic recipients increase their reliance on means-tested assistance outside of TANF.

The asymmetric marginal effects on broader welfare participation help explain a prominent feature of the descriptive quantile correlations in panels A and B of Figure 2. Among both daughters and sons, welfare reform reduced the strength of intergenerational correlations with childhood AFDC/TANF while at the same time expanding the share of the population with positive correlations. In descriptive evidence, Supplement Figure S.4 shows that reform unambiguously reduced quantile correlations for AFDC/TANF use across generations, both in magnitude and extent, whereas the increased safety net use came from SNAP or SSI participation only, still at lower correlation magnitudes.²²

²² Figure S.5 illustrates the changes in distributions of childhood welfare exposure by varying definitions: PTO and PTI, as well as AFDC/TANF versus the broader safety net. This evidence further supports the main analysis focusing on changes in PTO AFDC/TANF related to the specific policy changes during the 1990s welfare reforms.

It is instructive to also break out the QME evidence by welfare program in adulthood. In Supplement Figure S.6, we focus on estimates for SNAP alone as well as for SNAP or SSI considered together, which show that SNAP participation in adulthood is the critical program driving our main results, consistent with earlier work showing that SNAP has evolved into a key component of a work-based safety net (Hoynes et al. 2016; Ganong and Liebman 2018; Hardy et al. 2018). Relative to our estimates for SNAP alone, considering additional programs improves precision of the estimates, and including AFDC/TANF in adulthood strengthens the negative effects in the upper tail of the distribution of welfare use.

The asymmetric effects of welfare reform on the next generation are evident in adult welfare durations, therefore a related question is the degree to which these effects translate into income measures of self-sufficiency and well-being. The evidence presented in the online supplement suggests that intergenerational substitution effects imply more duration on other assistance programs for chronic recipients without a substantive change in reliance as a share of total income.²³ If SNAP is a major driver of second-generation welfare participation, as noted above, then greater reliance on food assistance among working adults may explain why PTI is less sensitive to PTO as a measure of dependence. Effects on daughters' income relative to needs are consistent with those for earnings, which again does not apply to sons.

B. Wages and Hours

The evidence in the prior section reveals that because of welfare reform daughters' childhood welfare exposure fell and thus earnings below the median were boosted, yet sons did not see similar changes in their earnings. In other words, while Figure 2 suggested a negative intergenerational correlation for both daughters' and sons' earnings, in Figure 5 and Table 1 we only identified a causal earnings penalty of welfare exposure for daughters. What explains these differences? We note that the outcome is family-level earnings-to-

²³ We extend the analysis in Figure S.7 to report the corresponding QME estimates for income-based measures in adulthood. The exposure effect on PTI from the broader safety net in Figure S.7 is smaller in magnitude relative to the outcome of PTO broader safety net in Figure 6, and there is no evidence of negative effects at the upper tail of the distribution.

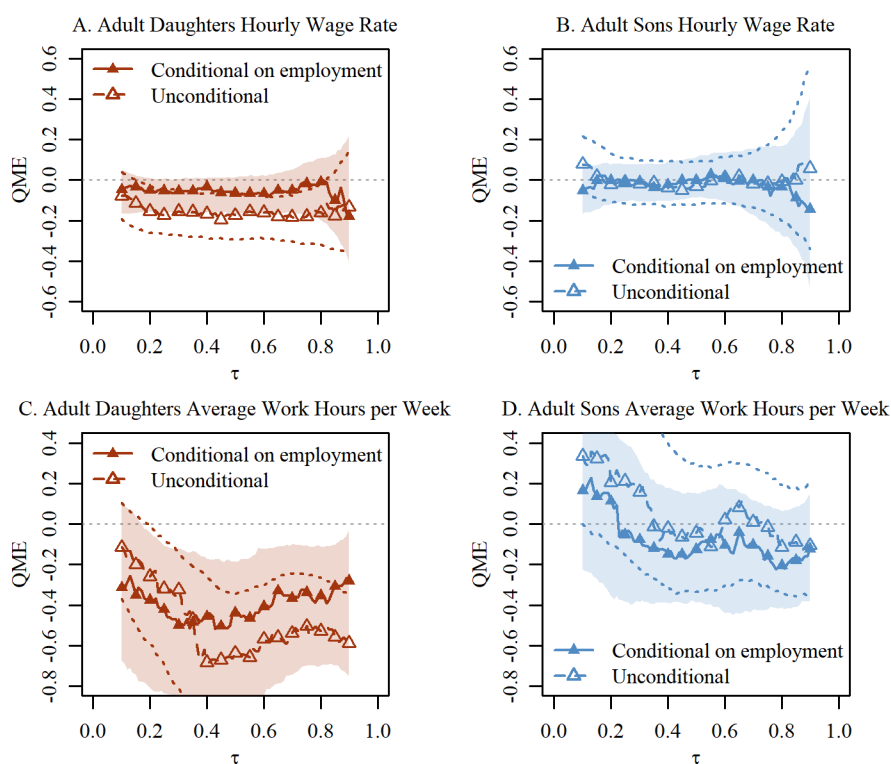
needs ratios, so our findings might be related to the theory of assortative mating (Becker 1973). An extensive literature has found connections between within-economic-status marriage and income inequality (e.g., Atkinson et al. 1983; Lam and Schoeni 1994; Mulligan 1997; Fernández and Rogerson 2001; Greenwood et al. 2014; Eika et al. 2019). Even in the context of welfare reform and contemporaneous outcomes for men, Lichtman-Sadot (2024) finds that spouses explain some of the effects on family welfare participation and earnings. Given that changes to welfare program policy may influence human capital accumulation and work experience (Blundell et al. 2016), earnings differences by gender may be explained by both work experience and the return to experience. For considering potential mechanisms of childhood AFDC/TANF exposure effects, here we turn to effects on individual-level hourly wage and labor supply when daughters and sons are observed as either the family head or spouse.

If daughters and sons set different expectations about their future earnings based on observing AFDC/TANF participation while young, it is possible that daughters could interpret the higher chance of future eligibility as a signal to invest less in human capital for the labor market. Thus, daughters might be more responsive to childhood welfare exposure in terms of wages as a proxy for labor market productivity. Figure 7 panels A and B present the QMEs for wages akin to those in Figure 6. These results show that conditional on employment, there is no welfare exposure penalty on early adulthood wages for either daughters or sons. However, when we count years not employed as zero wages, daughters experience a wage penalty of around \$0.15 per hour. This is consistent with depressed human-capital returns for daughters from reduced labor-market experience as in a learning-by-doing context.

If wages, conditional on employment, do not describe the gender differences in earnings penalties, then the differences are likely to be in hours worked. Indeed, Figure 7 panels C and D imply that daughters have lower work hours as a result of childhood welfare exposure, which is not true for sons.²⁴ Decreased hours worked through the year among

²⁴ For detailed estimates on both wages and hours worked, Figure S.8 and Table S.4 in the supplement show heterogeneous QME estimates by both childhood PTO AFDC/TANF exposure and outcome distribution.

Figure 7. Quantile Marginal Effects of the Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Hourly Wages and Labor Supply



Note: Estimates correspond to the QME estimator defined in equation (4) shown for childhood PTO AFDC/TANF summarized as the mean for exposure ranging from 25 to 85 percent of observed years. The child's early adulthood outcome is indicated by each panel heading, which corresponds to the distribution indicated by τ . Pointwise 90-percent confidence intervals are shown based on 1000 bootstrap replications.

daughters could include intensive-margin changes toward part-time work as well as extensive-margin changes to the number of weeks employed. In the supplement, Figure S.9 shows that the proportion of weeks worked are similarly penalized only among daughters. Women's work behavior may have shifted because of TANF work requirements, negating hours penalties in the lower tail of the distribution, whereas men would generally be less eligible for work-restricted cash assistance because of lower rates of single fatherhood. Since the mechanisms of an earnings penalty differ by gender according to hours worked, it is plausible that the explanation has to do with gendered differences in caring responsibilities for young children. Estimating QMEs among those with children present in early adulthood (Figure S.10), the evidence is consistent with labor supply

disadvantages for daughters and not sons, with daughters more likely to live with children (Figure S.11).

C. Robustness

In the online supplement, we present several extensions and robustness checks. Here, we present a summary of the results.

C.1. Survey Weights, Controls, and Potential State-level Heterogeneity

We first examine the robustness of results to the inclusion of PSID survey weights, which help to balance the samples due to the oversample of low-income and racial-minority families in the SEO. It is important to verify that our results are not affected by the subsamples used for estimation since a large number of mothers and children linked over the PSID survey years are comprised of both the SRC and SEO subsamples. We present the QME results using Figures S.12 and S.13, which correspond to the outcomes of PTO AFDC/TANF, SNAP or SSI and earnings-to-needs ratios for daughters and sons as in Figure 6. There we show that our main QME estimates are not sensitive to including sample weights in our estimation procedure.

We continue our sensitivity analysis by investigating whether the main QME estimates are sensitive to the choice of control variables and use of sample weights. All of the models estimated in Section IV control for quadratics in the child's mean age observed in adulthood and the mother's age during childhood, AFDC/TANF benefit standard, maximum federal/state EITC, poverty rate, AFDC/TANF participation rate, and unemployment rate. In Figures S.12 and S.13, we show estimates of the QMEs corresponding to Figure 6 using only the age profiles of the mother and child, and alternatively without and with survey weights. We find that the results are robust across different specifications. Furthermore, Figure S.14 explores QME heterogeneity for PTO on the wider safety net and earnings-to-needs by state-level characteristics including estimates for low and high measures of AFDC/TANF benefit generosity and SPM poverty rates. Our main results do not vary dramatically by these select measures of heterogeneity, yet the magnitudes of welfare exposure disadvantages tend to be larger for states with above-median AFDC/TANF benefit levels and below-median poverty rates. It is possible that

these results are related to social costs among marginal participants or social norms around participation, as implied by the literature on welfare stigma (e.g., see Lindbeck et al. 1999; Chan and Moffitt 2018).

C.2. Alternative Sample Definitions and Heterogeneous Subpopulations

We examine the sensitivity of the main QME results in Figure 6 to different definitions of early adulthood. In our main estimates, adult outcomes are measured over the ages 19 to 27. However, earnings penalties from childhood welfare exposure may be more pronounced or attenuated given longer periods of observation in adulthood, and thus in Figure S.15 we compare results for adulthood measured from age 19 to 29 as well as 19 to 31. There we see that the effect of childhood exposure on PTO in the wider safety net is robust when including higher ages in early adulthood.²⁵ We also test whether our QME estimates are sensitive to the inclusion of multiple children from the same family, showing in Figure S.16 that the point estimates based on only one child per family are similar to our main results, with slightly less precision.

Although the QME estimator proposed by D’Haultfœuille et al. (2023) addresses trend changes across outcome distributions over time, some may be concerned about the identification through welfare reform that shifts endogenous AFDC/TANF exposure for the lower-income population relative to the inclusion of those likely never eligible for welfare or at very low risk of program take-up. We test the sensitivity of our QME results by restricting the sample to those with mean childhood family income below 300 percent of the FPL, or alternatively to those whose mothers have less than a college education. Figure S.17 shows that our findings are not sensitive to restricting to a lower-income sample, though the QMEs for welfare participation appear somewhat larger in magnitude and steeper when restricted to a sample by lower maternal education.

C.3. Attrition and Misclassification

Lastly, we examine the robustness of our main results to potential biases from attrition in the PSID and misclassification of self-reported program participation. The core

²⁵ While sensitivity by age of exposure in childhood is of great interest, it is unfortunately complicated here by sample size and the continuity of the exposure measure for our QME approach. See Cholli (2025) for an exploration of heterogeneous effects of welfare reform in Denmark by age of exposure.

longitudinal sample weights in the PSID partially address attrition over time (see Figures S.12 and S.13). Fitzgerald et al. (1998) and Fitzgerald (2011) discuss attrition in the PSID and applications to intergenerational settings, and Hartley et al. (2022) show that intergenerational welfare participation estimates are generally insensitive to attrition-adjusted propensity weighting. In Figure S.18, we estimate QMEs using inverse probability weights to directly model attrition for the present sample and research design, and we find no meaningful differences from the results in Figure 6.

Next, we turn to the issue of misclassification. Meyer et al. (2015a) show that self-reported survey data has underrepresented social assistance program participation increasingly over time. For our setting, there is less concern about measuring childhood AFDC/TANF exposure because it is averaged over several years and occurs when reporting rates were relatively more accurate. Our main welfare outcome in adulthood is participation in either AFDC/TANF, SNAP, or SSI, which is also averaged over at least three years, and our main sample benefits from evidence that respondents to multiple panels tend to report more accurately (Bollinger and David 2005). Still, we use two measures to adjust for misclassification (see Figure S.19), one using estimates from Meyer et al. (2015b) extrapolating to recent years, and another that compares estimated participation rates in the PSID to average monthly recipients per year. For both sets of estimates, we very conservatively use the underreporting rates associated with AFDC/TANF despite expecting rates to be less biased for the wider safety net. Still, the results remain qualitatively robust with some loss of precision depending on the choice of reporting rates.

VI. Conclusion

Policymakers in the 1990s introduced fundamental changes in the U.S. safety net to end dependence on welfare. The majority of these new policies were designed to restrict access to the AFDC program. Time limits and work requirements were introduced to restrict long-term spells, and therefore, to reduce childhood exposure to cash assistance. Presumably, the dependence that is passed down intergenerationally from parent to child depends on the length of exposure to welfare when the mother shares knowledge and values with her child. Therefore, measuring how length of time on welfare during childhood

affects early adulthood is of fundamental interest to understand how welfare reform affected families, which can vary heterogeneously with respect to welfare use and intergenerational outcomes. Throughout our study, we estimate average and quantile treatment effects for daughters and sons, who may have had similar childhood exposures but different long-run trajectories. The results here suggest mixed success in meeting those goals for children growing up on welfare, and underscore the importance of studying the distributional consequences of social assistance policies for economic mobility.

We estimate novel intergenerational correlations between childhood welfare exposure and economic outcomes in early adulthood including time spent on programs in the broader safety net and labor-market earnings. Descriptive intergenerational evidence reveals that more daughters and sons have a positive correlation between childhood and adulthood welfare duration after reform, but the correlation falls in magnitude by at least one-third in the top half of the welfare duration distribution. Likewise, the negative earnings correlation in adulthood with welfare exposure in childhood is lower after reform.

In addition to presenting descriptive intergenerational evidence, we employ a nonlinear difference-in-differences framework with continuous treatment to identify a causal relationship between childhood welfare exposure and adulthood dependence. We find that an increase in the time spent on welfare during childhood has an asymmetric effect across the distribution of welfare use in adulthood for both daughters and sons, with increased use among those who spend below median time on welfare and decreased use among those spending more than half of adulthood on welfare. Because welfare reform resulted in a reduction in childhood exposure the implication is that welfare reform lowered dependence on low-intensity users but increased dependence on longer-term users, suggesting a bifurcation in those who were able to move toward self-sufficiency after reform and those who were not. Further, we find that increasing the length of childhood welfare exposure implies lower earnings in adulthood for daughters, however we find no evidence that it depresses the earnings of sons. Conditional on working, this earnings penalty for childhood welfare exposure appears to operate primarily through daughters' labor supply at both the extensive and intensive margins.

The 1990s welfare reforms to AFDC cemented some policymakers' long-term drive to redirect the safety net to a more work-centric, temporary assistance system. Over the past decade there have been calls to expand work requirements and time limits to other programs in the safety net, such as the health insurance program Medicaid, and to additional populations of recipients within the SNAP program such as single mothers with children. Indeed, recent legislation has codified this workfare approach in those two programs. The results of this study suggest that any future reforms affecting access to the safety net may have differential long-term effects on daughters and sons, whether intended or not, underscoring the need for additional intergenerational research that informs optimal program design.

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ONLINE SUPPLEMENT

**Childhood Welfare Exposure and
Economic Outcomes for Adult Daughters and Sons ***

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This online supplement provides additional results not shown in the manuscript. We begin with data description in Section S.1, and then, in Section S.2, we expand the evidence in Section II.C of the manuscript by defining the quantile correlation estimator in more detail and including correlations for additional outcomes. Section S.3 presents evidence that complements the manuscript's Section III.B on causal identifying assumptions, Section V.A on possible mechanisms, and Section V.B on the wage and labor supply components of earnings. Section S.4 offers a comprehensive sensitivity analysis of the main findings in Section IV of the manuscript to changes in the control variables and survey weights, and Section S.5 provides additional robustness checks.

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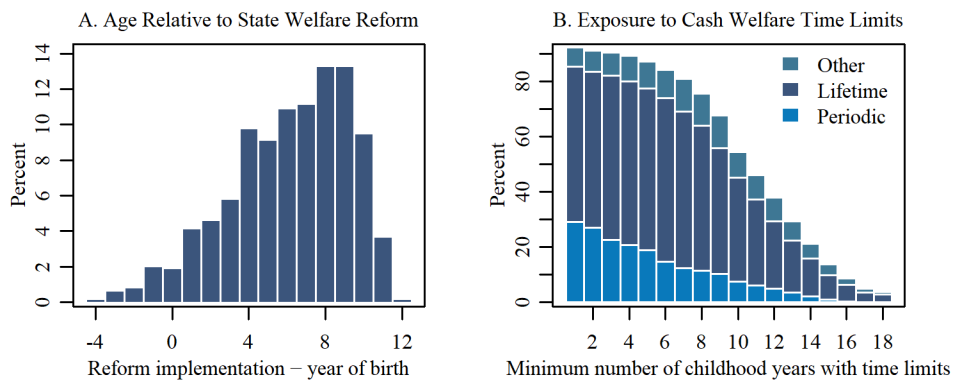
Section S.1. Data Description

We use data from the Panel Study of Income Dynamics (PSID) for survey years 1975–2019. The PSID is the longest-running longitudinal panel in the world that has followed the original sample members' children as well as subsequent generations of grandchildren and beyond as they split off to form their own families. The survey began in 1968 with 4,800 families and today consists of over 10,000 families and 24,000 individuals. The original sample consisted both of a random sample of the population, known as the Survey Research Center (SRC) sample, along with an oversample of low-income and racialized minority families as part of the Survey of Economic Opportunity (SEO) sample. The PSID was conducted annually through 1997, and biennially thereafter, collecting rich information about family demography, labor-market activity, and levels and sources of income.

The sample used in estimating the quantile correlations and the nonlinear difference-in-differences models consists of mother-child pairs that are observed either before welfare reform or after, with the pre-reform sample window of adult daughters measured in the years 1986–1992 and the post-reform sample window measured in the years 2008–2018. We define a child as an individual under age 19 who has not yet had a child of their own or moved out to form their own family unit, while we measure early adult outcomes during the ages of 19–27. To be included in the sample the child must be observed at least 5 years during ages 12–18, which following Hartley et al. (2022) and the prior literature is designated as the critical exposure years when welfare program knowledge transfer is likely most salient. The child as adult must be observed at least 3 years during ages 19–27. Both sample restrictions are designed to mitigate potential measurement error in survey responses to program participation and labor and nonlabor income questions. In order to ensure adequate sample sizes, we include observations from both the SRC and SEO subsamples, with the resulting samples containing 703 daughters before welfare reform and 615 after reform, along with 547 sons before welfare reform and 464 after reform.

For the post-reform sample, we require children to be observed at least 5 years after welfare reform, though we continue to use all child observations for defining AFDC/TANF exposure. This restriction is pragmatic for constructing similar windows of intergenerational observations on either side of the 1990s reform era. Since our causal empirical strategy relies on reform as an instrument that exogenously shifts welfare exposure, we demonstrate how the sample corresponds to reform implementation and time limits in Figure S.1. The adulthood observation window of ages 19 to 27 between years 2008 and 2018 limits the number of children observed who first experience welfare reform at later ages; all individuals are observed at ages 12 onward post reform, though most of our sample first experiences welfare reform at younger ages including some for their entire childhood (see panel A). The lifetime limit on cash assistance under TANF is set federally at 60 months, yet states have been able to set shorter limits as well as introduce periodic limits such as no more than X months of benefits for every Y month intervals. Thus, for our post-reform childhood observations, the earliest time limits could become binding as quickly as 21 months for a lifetime limit in Connecticut, or 6 months out of each 12 months in states like Arizona, whereas other states like New York might extend benefits beyond time limits using non-federal funds. Panel B of Figure S.1 shows that 92 percent of post-

Figure S.1. Post-Reform Sample by Age at Welfare Reform Implementation and Exposure to Time Limits



Note: The relative ages in panel A correspond to the cohort born between 1982 and 1996, with state welfare reform implementation years from 1992 to 1997. Panel B corresponds to the years of childhood exposed to periodic time limits, lifetime limits, or other limits including those associated with waiting periods, reduced benefits, or individualized plans. Some states effectively had no time limits by using alternative funding for cash assistance, yet the preponderance of the post-reform sample experienced at least 5 years with some limits.

reform individuals in our sample face time limits (because of those states extending eligibility with nonfederal funds, those exposed to at least 1 year of time limits is less than 100 percent), with 87 percent seeing at least 5 years of limits and 19 percent with periodic limits for at least 5 years. Beyond the direct effects of time limits, even families not yet limited by program rules exited early because of anticipatory effects (Grogger and Michalopoulos 2003; Grogger 2004). Further, other program rules like work requirements and sanctions could limit both short-term and longer-term participation, with the combined effect of decreased childhood exposure that may vary heterogeneously.

Table S.1 provides summary statistics for childhood PTO AFDC/TANF, defined as the share of years the family received assistance from AFDC before reform or TANF after reform. We use a broader measure of the safety net in adulthood to also include the proportion of time on food assistance from Supplemental Nutrition Assistance Program (SNAP) or on disability assistance from Supplemental Security Income (SSI). Labor-market outcomes in the table are defined by the mean family earnings-to-needs ratio, which we show by daughters and sons in each welfare reform regime. The estimation sample includes only one aggregated observation per mother-child pair within each welfare regime. We construct PTO welfare by averaging across $\{0,1\}$ participation indicators for both mother observations during childhood and child-as-an-adult observations. We similarly construct average earnings-to-needs over those same windows. The table shows summary statistics without sample weights in order to emphasize the distributional differences by reform era given our oversample of lower-income families as of the initial 1968 survey (results are robust to using survey weights in estimation, as shown in Section S.4). The changes in childhood PTO AFDC/TANF are smaller than the welfare reform effects shown in Hartley et al. (2022) because these are unconditional comparisons of the first-generation impacts, which corresponds to mothers without any prior generational learning mechanisms about the tradeoffs of welfare participation post-reform.

At the 90th percentile of childhood exposure to AFDC/TANF, children are observed with 75 to 80 percent of years in participating families pre-reform, and 44 to 53 percent post-reform. Mean adulthood participation in the broader safety net ranges from 16 to 35

Table S.1. Summary Statistics, by Gender and Welfare Regime

	Daughters		Sons	
	Before (1)	After (2)	Before (3)	After (4)
Childhood PTO AFDC/TANF	0.183	0.136	0.189	0.128
s.d.	(0.315)	(0.243)	(0.312)	(0.226)
p10	0.000	0.000	0.000	0.000
p25	0.000	0.000	0.000	0.000
p50	0.000	0.000	0.000	0.000
p75	0.222	0.167	0.286	0.176
p90	0.800	0.533	0.750	0.444
Adulthood PTO AFDC/TANF, SNAP, or SSI	0.246	0.346	0.165	0.236
s.d.	(0.350)	(0.375)	(0.292)	(0.327)
p10	0.000	0.000	0.000	0.000
p25	0.000	0.000	0.000	0.000
p50	0.000	0.200	0.000	0.000
p75	0.444	0.667	0.250	0.429
p90	0.875	1.000	0.667	0.778
Adulthood earnings-to-needs ratio	2.212	1.986	2.310	1.988
s.d.	(1.786)	(1.630)	(1.605)	(1.607)
p10	0.264	0.312	0.474	0.350
p25	0.870	0.829	1.134	0.838
p50	1.932	1.612	2.070	1.650
p75	3.153	2.833	3.247	2.648
p90	4.640	4.132	4.435	4.121
Observations	703	615	547	464

Note: Sample means and related statistics are shown for aggregated mean observations over either childhood or early adulthood for individuals who would be aged 27 in the years 1986 to 1992 pre-reform and 2008 to 2018 post-reform. The sample is restricted to those observed at least 5 years before age 19 living with the mother, at least 5 years during ages 12 to 18, and at least 3 years as an adult aged 19 to 27. The post-reform sample indicates individuals who experienced the welfare reform regime from age 12 onward.

percent of observed years, which corresponds to PTO estimates that are about 40 percent larger in the post-reform era relative to pre-reform, and 30 percent larger for daughters relative to sons. The increase in the post-reform era is related to the SNAP and SSI expansion, that compensates for the declining probability of participating in AFDC/TANF. For family earnings-to-needs ratios in early adulthood, the 10th percentile results correspond to families with earnings lower than half of the federal poverty level (FPL), and the 90th percentile of earnings-to-needs is roughly between 4 and 5 times the FPL. The mean earnings-to-needs ratio fell from about 2.2 or 2.3 pre-reform to 2 post-reform.

To explore the potential associations between welfare reform and intergenerational dependence, in Table S.2 we report the unconditional ordinary least squares (OLS) estimates for childhood PTO AFDC/TANF associations with early adult outcomes, and we

Table S.2. Intergenerational Correlations for Childhood Proportion of Time On AFDC/TANF Exposure and Early Adulthood Outcomes, by Welfare Regime

	Adulthood AFDC/TANF, SNAP, or SSI				Adulthood Earnings-to-Needs Ratio			
	Daughters		Sons		Daughters		Sons	
	Before (1)	After (2)	Before (3)	After (4)	Before (5)	After (6)	Before (7)	After (8)
Childhood PTO AFDC/TANF	0.646 (0.068)	0.583 (0.109)	0.468 (0.077)	0.400 (0.132)	-3.096 (0.285)	-2.721 (0.338)	-2.400 (0.269)	-2.004 (0.421)
Elasticity	0.436 (0.045)	0.235 (0.042)	0.392 (0.062)	0.225 (0.069)	-0.102 (0.009)	-0.116 (0.014)	-0.081 (0.009)	-0.071 (0.014)
Observations	703	615	547	464	703	615	547	464

Note: Childhood exposure measures represent mean AFDC/TANF participation during the years when the child is under age 19 and living with the mother. Mean adult measures are taken for years observed between ages 19 and 27.

also show intergenerational elasticity estimates to put coefficient magnitudes into context. These mean-based estimates provide a baseline for comparison to the distributional analysis in the manuscript. Table S.2 shows that for daughters the elasticity between childhood PTO AFDC/TANF and adult PTO means-tested assistance falls from 0.436 pre-reform to 0.235 post-reform, and for sons the elasticity falls from 0.392 to 0.225 by reform era. The elasticities with earnings-to-needs ratios are negative implying that childhood welfare exposure corresponds to lower earnings in adulthood. For daughters, the association becomes more negative post-reform with a change from -0.102 to -0.116 , and for sons the association becomes less negative from -0.081 to -0.071 , though statistically these mean estimates are not different.

Section S.2. Quantile Correlations: Estimation and Additional Evidence

This section presents a more detailed definition of the quantile correlation estimator and additional empirical evidence. Recall that the correlation coefficient measures the association between childhood exposure and the event that an adult measure crosses its marginal τ -th quantile.

The quantile correlation coefficient is defined as

$$\varphi_{\tau}(Y, X) = \frac{\text{cov}_{\tau}(I(Y > Q_Y(\tau)), X)}{\sqrt{\tau(1-\tau)\sigma_X^2}} = \frac{E[\psi_{\tau}(Y - Q_Y(\tau))(X - E[X])]}{\sqrt{\tau(1-\tau)\sigma_X^2}}, \quad (\text{S-1})$$

where childhood PTO AFDC/TANF is denoted by X , and the variable $I(Y > Q_Y(\tau))$ is an indicator variable that equals 1 if the early adulthood variable Y is greater than its τ -th

quantile, $Q_Y(\tau)$.¹ The parameter σ_x^2 is the variance of X , the function $\psi_\tau(u) = \tau - I(u < 0)$ is the quantile regression score function, and $\tau \in (0,1)$. To estimate the parameter in (1), we use a sample of pairs $\{(Y_i, X_i): i: 1, 2, \dots, n\}$ and adopt the estimator proposed in Li et al. (2015),

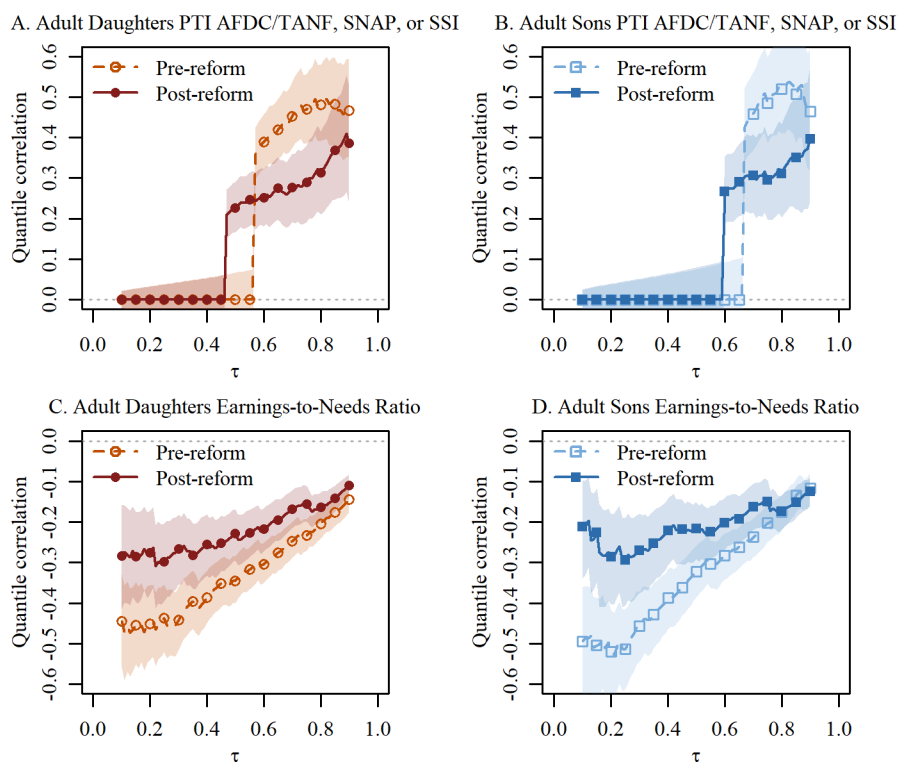
$$\hat{\varphi}_\tau(Y, X) = \frac{1}{\sqrt{\tau(1-\tau)\hat{\sigma}_x^2}} \frac{1}{n} \sum_{i=1}^n \psi_\tau(Y_i - \hat{Q}_Y(\tau))(X_i - \bar{X}), \quad (\text{S-2})$$

where the sample mean $\bar{X} = n^{-1} \sum_{i=1}^n X_i$, the sample variance $\hat{\sigma}_x^2 = n^{-1} \sum_{i=1}^n (X_i - \bar{X})^2$, and the empirical quantile function $\hat{Q}_Y(\tau) = \inf\{y: F_n(y) \geq \tau\}$, with $F_n(y) = n^{-1} \sum_{i=1}^n I(Y_i \leq y)$. We use the generalized bootstrap procedure proposed by Hartley et al. (2023) to construct confidence intervals for the estimator in (2).

The main text Figure 2 presents the correlation between childhood PTO AFDC/TANF and PTO in adulthood on the wider safety net of AFDC/TANF, SNAP, or SSI, as well as earnings to needs in early adulthood. In Figure S.2, instead of the share of time we present the correlation between the percent of total income (PTI) from childhood AFDC/TANF and PTI from the wider safety net in adulthood as well as early adulthood earnings to needs. Both the qualitative level and pattern of correlations in Figure S.2 closely follow those in Figure 2 — higher extensive-margin participation in the wider safety net post reform, but with lower correlations and lower earnings penalties for both daughters and sons. This suggests that the baseline correlations are robust to using share of income in lieu of time. We note that the standard errors around the PTI correlations are slightly wider than those from PTO in Figure 2.

¹ The quantile of Y is defined as $Q_Y(\tau) := \inf\{y: F_Y(y) \geq \tau\}$, where the cumulative distribution is denoted by F_Y . As expected, the quantile correlation parameter is bounded, $-1 \leq \varphi_\tau(Y, X) \leq 1$, and it is equal to zero if Y and X are independent.

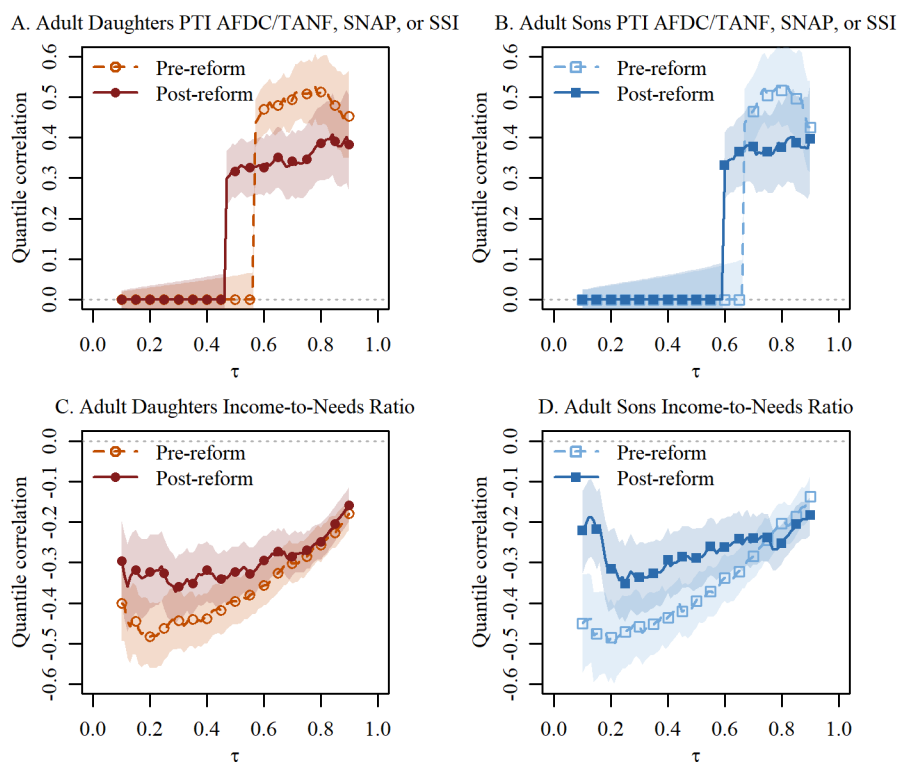
Figure S.2. Quantile Correlations of Childhood Proportion of Total Income from AFDC/TANF and Early Adulthood Outcomes from Ages 19 to 27, by Welfare Regime



Note: The child's early adulthood outcome is indicated by each panel heading. These quantile correlations are estimated unconditionally and without PSID sample weights, and 90-percent confidence intervals are shown based on 1000 bootstrap replications.

We next examine intergenerational correlations of our main PTO AFDC/TANF measure of childhood exposure with income-based measures in adulthood in Figure S.3, first by PTI from the broader safety net in panels A and B, then by total family income relative to the FPL (instead of earnings-to-needs) in panels C and D. The correlations in welfare dependence exhibit similar descriptive implications as the results shown in Figures 2 and S.2, as do the comparisons between family income and earnings in adulthood. The negative income-to-needs correlations before welfare reform range from -0.4 to -0.5 at low levels of early adulthood income, and fall in magnitude to -0.3 after reform. At higher levels of adult income, the welfare exposure penalty is of comparable magnitude around -0.3 to -0.2 both before and after reform.

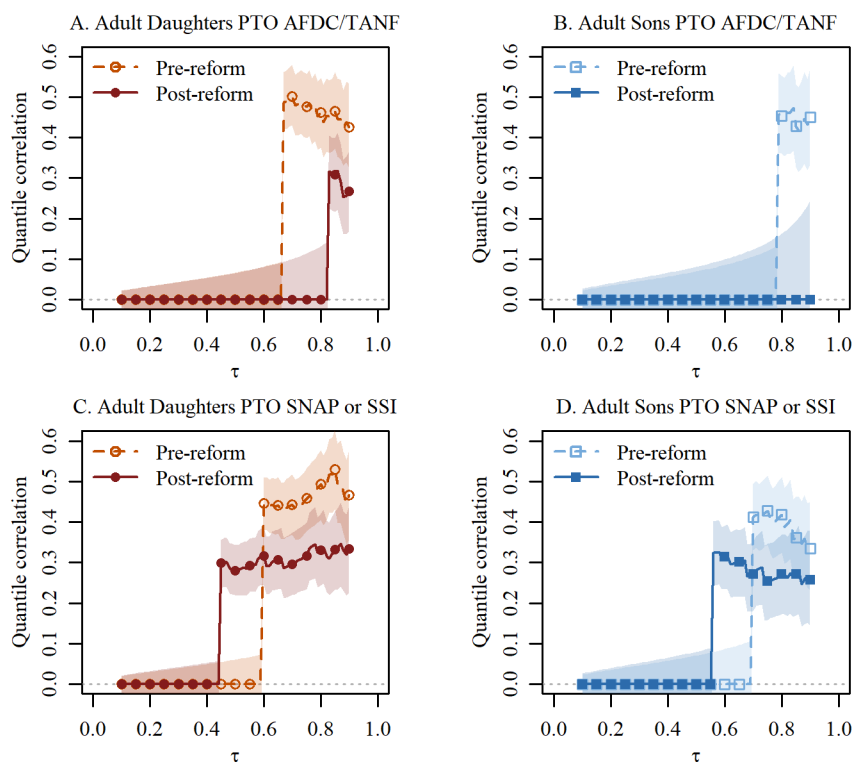
Figure S.3. Quantile Correlations of Childhood Proportion of Time On AFDC/TANF and Early Adulthood Proportion of Total Income from Broader Safety Net and Income-to-Needs, by Welfare Regime



Note: The child's early adulthood outcome is indicated by each panel heading. These quantile correlations are estimated unconditionally and without PSID sample weights, and 90-percent confidence intervals are shown based on 1000 bootstrap replications.

Lastly, Figure S.4 shows quantile correlations comparing the relationship between childhood AFDC/TANF exposure and early adult PTO AFDC/TANF alongside the outcome of PTO SNAP or SSI; that is, separating out cash assistance from the rest of the wider safety net. The figure makes transparent that the reduction in the zero correlation of participation in the wider safety net in adulthood after welfare reform discussed in the main text around Figure 2 is due to secular increases in SNAP and SSI, not TANF. Indeed, the sizable increase in the zero correlations of AFDC/TANF in Figure S.4 panel A is consistent with the analysis presented in Hartley et al. (2022), which was restricted to the extensive margin of daughters, while the correlations in panel B for sons suggest that post reform so few sons receive TANF that identification below the 90th percentile is not possible.

Figure S.4. Quantile Correlations of Proportion of Time On Childhood AFDC/TANF Exposure and Early Adulthood Means-Tested Program Participation, by Welfare Regime



Note: The child's early adulthood outcome is indicated by each panel heading. These quantile correlations are estimated unconditionally and without PSID sample weights, and 90-percent confidence intervals are shown based on 1000 bootstrap replications.

Section S.3. Evidence on Causal Identification and Mechanisms

S.3.1. Support for Identifying Assumptions

Identifying causal intergenerational parameters requires three main assumptions as stated in D'Haultfoeuille et al. (2023). The main condition for identifying a counterfactual distribution of childhood AFDC/TANF exposure (treatment) is satisfied by the crossing condition that parts of the distribution after welfare reform overlap allowing an estimate of time trends identifying exogenous shifts along other points in the distribution. Evidence for the crossing condition is shown in Figure 3 of the manuscript. The other two conditions noted in Section III.B of the manuscript relate to the rank stability of unobserved characteristics and potential outcomes across time periods, in this case, before and after

welfare reform. Here, we provide an exercise testing rank similarity to support these other two conditions, and we show results in Table S.3 following an approach proposed by Frandsen and Lefgren (2018). In the following subsection, Figure S.5 compares the crossing condition evidence from Figure 3 to other welfare measurement settings.

Frandsen and Lefgren (2018) suggest testing rank similarity for a potential outcome based on whether conditional ranks within treatment groups depend on some arguably exogenous or predetermined “shifter” variable interacted with treatment status. Under rank similarity, the distributions of observed and unobserved characteristics remain invariant at a given rank of the potential outcome distribution. Assuming that the condition on unobserved characteristics holds for observationally equivalent individuals, a significant interaction effect for some shifter variable implies a rejection of the null hypothesis of rank similarity. As an analogous exercise in our setting, we estimate a regression-based difference-in-differences test of whether the ranks of earnings, separately by daughters and sons, change for a set of state-level shifter variables, dichotomized at the median. The shifter variables include state-level AFDC/TANF benefit standards, the maximum federal/state level of the Earned Income Tax Credit (EITC), the Supplemental Poverty Measure (SPM) poverty rate, and the state unemployment rate. Our interaction terms are constructed by AFDC/TANF exposure treatment status and an indicator for post-welfare reform, representing our exogenous timing shift to the treatment distribution. In order to focus the testing procedure on our causal range of estimates, we define treatment here as an indicator equal to 1 for AFDC/TANF exposure from 25 to 85 percent of childhood, and 0 otherwise, which drops observations with shorter or chronic welfare exposure and includes those observations identifying our main results. We fail to reject rank similarity in all cases, as shown by the p-values for the full interaction effect in Table S.3. The results in Table S.3 provide suggestive evidence that our identifying conditions hold, even without controlling for additional covariates that are present in our main specifications.

Table S.3. Earnings Rank Similarity Difference-in-Differences by Potentially Influential Shifter Variables

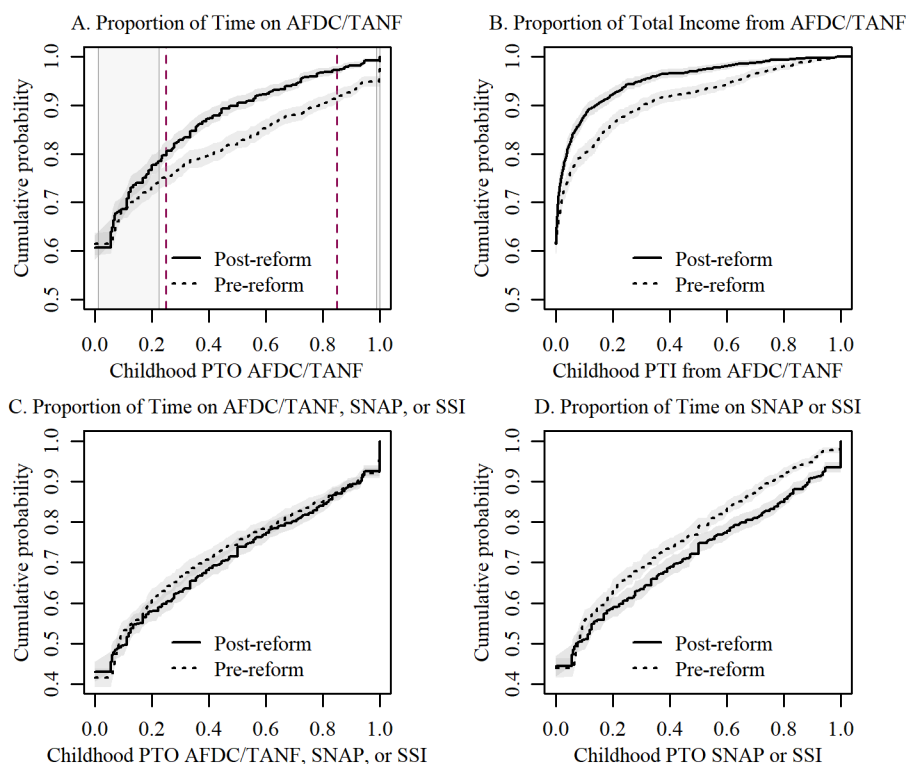
Shifter variable:	State AFDC/TANF benefit standard		State maximum EITC benefit		SPM state-level poverty rate		State-level unemployment rate	
	Daughters	Sons	Daughters	Sons	Daughters	Sons	Daughters	Sons
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	6.749 (0.249)	6.316 (0.204)	6.630 (0.223)	6.012 (0.214)	5.955 (0.265)	5.869 (0.285)	5.757 (0.303)	5.785 (0.282)
AFDC/TANF exposure (25–85% of childhood)	0.126 (0.687)	-0.294 (0.696)	0.263 (0.473)	-0.229 (0.524)	-0.303 (0.547)	-0.391 (0.570)	0.838 (0.373)	-0.040 (0.658)
Post-welfare reform	-0.386 (0.289)	-0.662 (0.287)	0.093 (0.250)	-0.211 (0.332)	-0.190 (0.313)	0.074 (0.339)	-0.063 (0.362)	-0.004 (0.370)
Above median shifter	-2.280 (0.312)	-1.963 (0.313)	-2.685 (0.267)	-2.024 (0.289)	-0.913 (0.357)	-0.663 (0.372)	-0.539 (0.369)	-0.661 (0.444)
AFDC/TANF × reform	0.067 (0.884)	0.019 (0.845)	0.091 (0.833)	-0.344 (0.908)	0.227 (0.510)	-0.076 (1.126)	-0.554 (0.499)	-0.380 (1.176)
AFDC/TANF × shifter	0.713 (0.695)	1.104 (0.786)	0.855 (0.676)	1.420 (0.563)	0.720 (0.662)	0.788 (0.929)	-1.341 (0.548)	0.249 (0.997)
Reform × shifter	0.323 (0.434)	1.353 (0.551)	0.581 (0.338)	1.352 (0.455)	0.378 (0.423)	-0.312 (0.521)	0.184 (0.409)	0.136 (0.638)
AFDC/TANF × reform × shifter	-0.129 (1.081)	-0.131 (0.892)	-0.510 (1.055)	-0.237 (0.902)	-0.547 (0.813)	0.292 (1.363)	0.892 (0.648)	0.567 (1.418)
Full interaction p-value	[0.906]	[0.885]	[0.636]	[0.796]	[0.509]	[0.833]	[0.185]	[0.694]
Observations	1100	854	1100	854	1100	854	1100	854

Note: Point estimates by ordinary least squares are shown with state-level cluster-robust standard errors, where the dependent variable is the within-treatment rank in the adult earnings distribution, by gender. The p-value for the full interaction term offers a test of the null hypothesis of rank similarity, where a higher correlation between the outcome and shifter variable suggests greater testing power. The number of observations includes all individuals with either zero childhood exposure to AFDC/TANF or between 25 to 85 percent of childhood years exposed to AFDC/TANF. See Frandsen and Lefgren (2018) for procedure details.

S.3.2. Means-Tested Program Effects: Program Use and Substitution

Using Figures S.5 and S.6, we investigate the possibility that daughters and sons substitute programs over generations. Figure S.5 shows a comparison of CDFs for childhood PTO and PTI in AFDC/TANF (panels A and B) and CDFs for childhood PTO in AFDC/TANF, SNAP or SSI (panel C) and just SNAP or SSI (panel D). Panel A repeats Figure 3 in the main text, where we identify a clear crossing condition in the CDFs of AFDC/TANF before and after welfare reform below 0.25, which as noted in the text, permits us to construct a counterfactual distribution for the region above 0.25 using the similar distributions below 0.25. Panel B of Figure S.5 suggests a strong separation across most of the distribution in PTI from AFDC/TANF, underscoring the validity of using the reform of AFDC as an instrumental variable. In contrast, the absence of any significant separation across exposure to the broader safety net by reform era, in Panel C, emphasizes the importance of the clean identification provided by the transition from AFDC to TANF

Figure S.5. Empirical Cumulative Distribution Function for Childhood Exposure to AFDC/TANF or the Broader Safety Net, by Welfare Regime

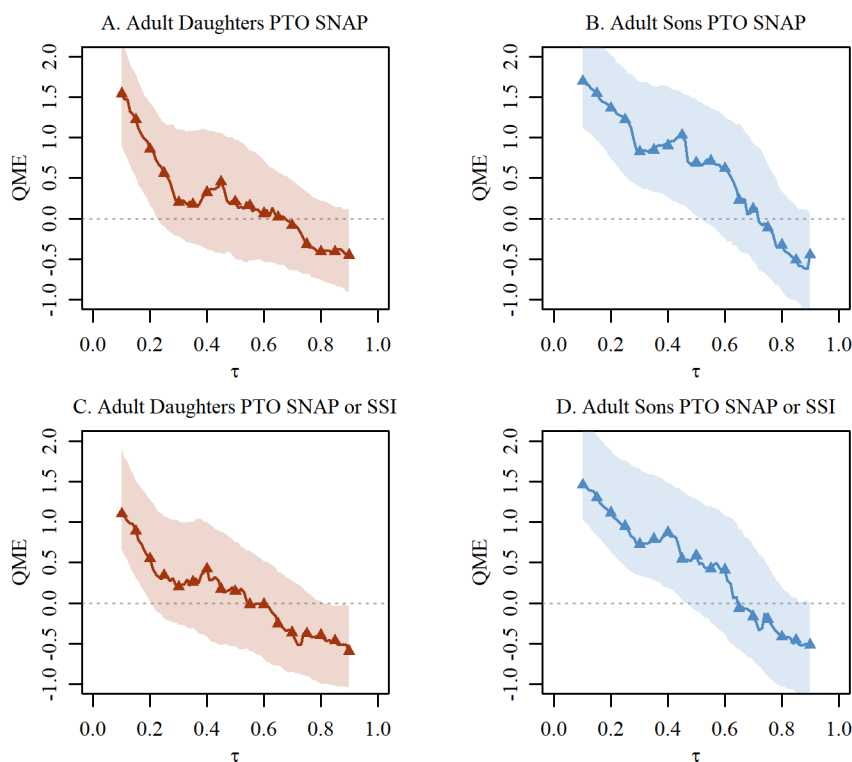


Note: The shaded regions of childhood PTO AFDC/TANF values from 0.01 to 0.225 and 0.99 to 1 highlight distribution crossing regions, and the distributional equivalence by reform between PTO values of 0.25 to 0.85 is rejected based on a one-sided Kolmogorov-Smirnov test p-value of 0.001. We do not show the same regions for panels B–D because of the differences in crossing regions. Pointwise 90-percent confidence intervals are shown.

leveraged throughout our main analysis. Panel D indicates the crossing condition below 0.25 for the SNAP or SSI distribution, and in fact the CDF after reform lies below the pre-reform CDF indicating a greater share of time being spent on those programs after reform, consistent with program substitution.

Figure S.6 presents results for the quantile marginal effect (QME) estimated using equation (4) of the main text for adult PTO SNAP and SSI, instead of adult AFDC/TANF, SNAP, or SSI as depicted in Figure 6 of the paper. The results suggest that there is intergenerational substitution towards SNAP and SSI, predominantly driven by SNAP, possibly related to the fact that young adults face wage penalties associated with time spent

Figure S.6. Quantile Marginal Effects for Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Means-Tested Program Participation

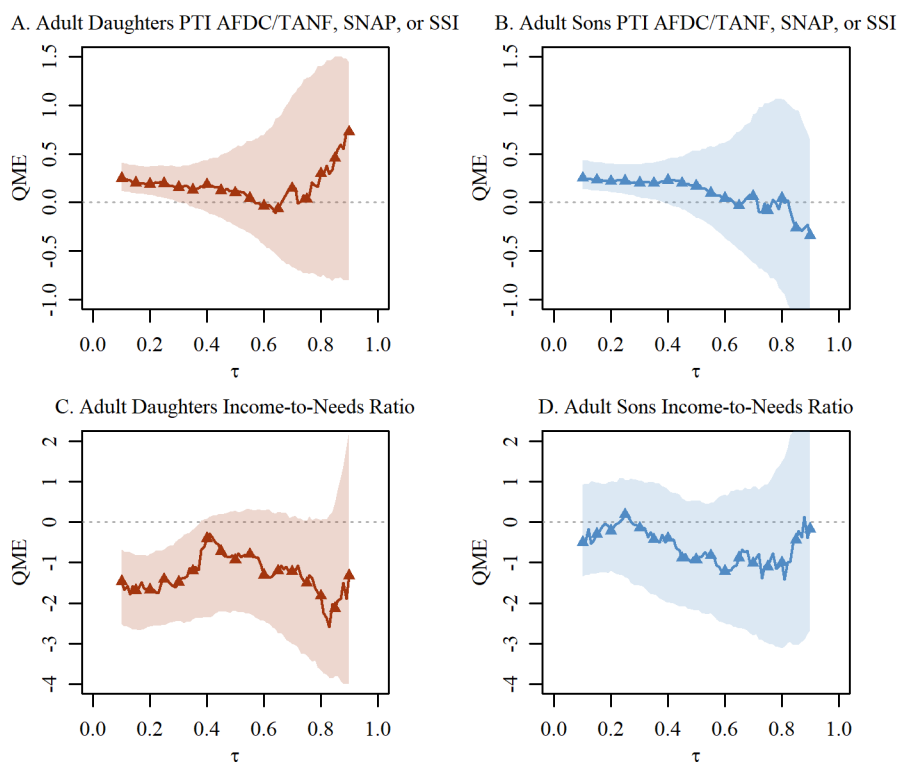


Note: Estimates correspond to the QME estimator defined in equation (4) in the manuscript shown for childhood PTO AFDC/TANF summarized as the mean for exposure ranging from 25 to 85 percent of observed years. The child’s early adulthood outcome is indicated by each panel heading, which corresponds to the distribution indicated by τ . Pointwise 90-percent confidence intervals are shown based on 1000 bootstrap replications.

on welfare in childhood (see Figure 7 of the manuscript), and those with high levels of welfare participation were no better off after welfare reform.

In another variation on the evidence in Figure 6 of the manuscript, Figure S.7 shows QME estimates for income-based measures similar to our main outcomes. Instead of focusing on time on the wider safety net in adulthood, panels A and B of Figure S.7 provide evidence on adult daughters’ and sons’ income from means-tested assistance as a proportion of total income, that is, our PTI from AFDC/TANF, SNAP, or SSI as opposed to the PTO measure used in Figure 6. Childhood welfare exposure implies less dependence in terms of income from the safety net in adulthood than it does for time participating in

Figure S.7. Quantile Marginal Effects for Proportion of Time On Childhood AFDC/TANF Exposure on Adulthood Proportion of Total Income from Broader Welfare Programs and Total Family Income-to-Needs



Note: Estimates correspond to the QME estimator defined in equation (4) in the manuscript shown for childhood PTO AFDC/TANF summarized as the mean for exposure ranging from 25 to 85 percent of observed years. The child's early adulthood outcome is indicated by each panel heading, which corresponds to the distribution indicated by τ . Pointwise 90-percent confidence intervals are shown based on 1000 bootstrap replications.

the safety net. The largest magnitude of effects for PTO were from 1 to 1.5 whereas they are around 0.25 at the lower end of the adult distribution of PTI. The marginal effects decrease in both cases through the median of the adult distribution, but the PTI estimates become much noisier at higher levels of participation in early adulthood. The null marginal effects at the upper tail of PTI from the broader safety net imply that any program substitution for chronic recipients is less associated with reliance on assistance as a proportion of total income relative duration of participation.

Panels C and D of Figure S.7 show QME estimates for income-to-needs rather than earnings-to-needs as shown in Figure 6 of the manuscript. Again, we emphasize the role of

income, here by including non-labor sources in our measure of adulthood economic well-being. The results for income-to-needs are qualitatively and quantitatively quite similar to those considering only earnings — daughters with below-median relative incomes are again penalized in adulthood poverty status from the long-run impacts of childhood AFDC/TANF exposure, yet sons are not. Therefore, the main results still apply more generally, that the welfare dependence for daughters and sons is rather similar while lower-income daughters carry more penalty in well-being, which Figure 7 in the manuscript suggests may be related to differences in hours worked.

S.3.3. Second-Generation Wages and Labor Supply

Since work hours are especially relevant in interpreting our main results, we lastly turn to an extension of the evidence in Figure 7 of the manuscript.

Figure S.8 shows heterogeneous QME estimates evaluated across levels of childhood AFDC/TANF exposure and quantiles of the labor outcome distributions among those employed during the year. Evidence in panels A and B reveals that conditional on working welfare exposure has null effects for daughters' and sons' long-run wages, despite some suggestion of variation toward the upper tails of the distributions. In summary evidence covering ranges of childhood exposure on average and at select quantiles (following manuscript Table 1 layout, not shown here), none of the wage effects would be statistically significant conventional levels. In panels C and D of Figure S.8, the only meaningful effects are for daughters, with penalties on weekly hours worked that are more pronounced at both lower and higher levels of the childhood exposure range, and for quantiles toward the lower half of the adult distribution.

Figure S.8. Heterogeneous Quantile Marginal Effects for Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Hourly Wages and Yearly Hours Worked Conditional on Employment



Note: Estimates correspond to the QME estimator defined in equation (4) in the manuscript. Heterogeneous effects are shown for childhood PTO AFDC/TANF ranging from 25 to 85 percent of observed years. The child’s early adulthood outcome is indicated by each panel heading, which corresponds to the distribution indicated by τ .

In order to summarize the results of Figure S.8, we show marginal and average treatment effects in Table S.4 by ranges of childhood AFDC/TANF exposure. While there is heterogeneity of exposure effects on adult wages apparent in Figure S.8, panels A and B of Table S.4 provide standard errors demonstrating the degree of precision around these estimates. For instance, the AME for high childhood exposure, $\check{X}_{\text{high}} = [0.6, 0.75]$, corresponds to a p-value of about 0.129 for daughters, which is partially driven by the larger QME at $\tau = 0.9$ with a larger-magnitude effect of -0.158 along with greater imprecision with a standard error of (0.195). By comparison, the standard errors for sons in panel B are around 50 percent larger than for daughters at the 0.9 quantile. The only estimates with statistical significance in Table S.4 are in panel C for daughters’ hours

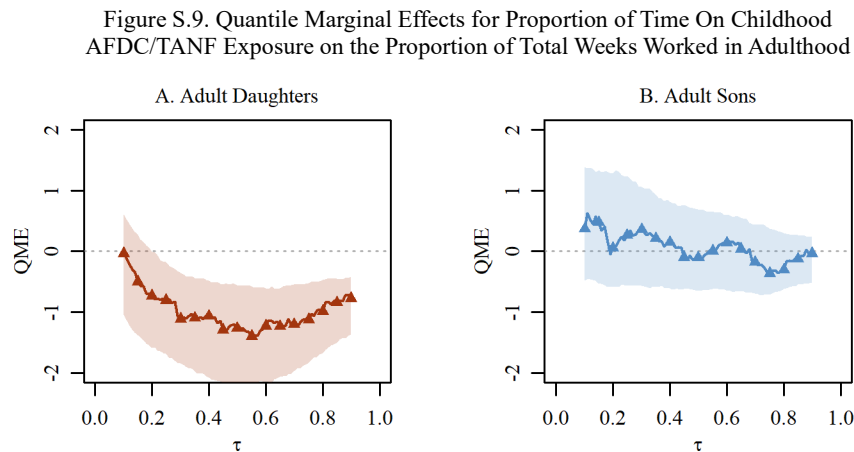
Table S.4. Quantile and Average Marginal Effects of the Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Hourly Wages and Yearly Hours Worked Conditional on Employment

	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	Average
	(1)	(2)	(3)	(4)	(5)	(6)
Childhood PTO AFDC/TANF	A. Adult Daughters: Hourly Wage Rate					
0.25–0.85	-0.047 (0.070)	-0.052 (0.051)	-0.064 (0.055)	-0.016 (0.080)	-0.178 (0.202)	-0.110 (0.073)
0.25–0.40	-0.057 (0.080)	-0.062 (0.067)	-0.065 (0.067)	-0.023 (0.087)	-0.204 (0.253)	-0.098 (0.097)
0.40–0.60	-0.041 (0.060)	-0.045 (0.044)	-0.056 (0.053)	-0.023 (0.066)	-0.146 (0.151)	-0.086 (0.060)
0.60–0.75	-0.041 (0.067)	-0.045 (0.047)	-0.061 (0.053)	-0.015 (0.080)	-0.158 (0.195)	-0.109 (0.072)
0.75–0.85	-0.053 (0.122)	-0.060 (0.085)	-0.082 (0.094)	0.005 (0.147)	-0.234 (0.359)	-0.178 (0.136)
Childhood PTO AFDC/TANF	B. Adult Sons: Hourly Wage Rate					
0.25–0.85	-0.052 (0.071)	-0.013 (0.059)	-0.002 (0.063)	-0.034 (0.114)	-0.143 (0.300)	-0.069 (0.106)
0.25–0.40	-0.062 (0.092)	-0.015 (0.073)	0.010 (0.090)	-0.045 (0.139)	-0.162 (0.315)	-0.049 (0.110)
0.40–0.60	-0.045 (0.057)	-0.015 (0.048)	-0.009 (0.051)	-0.036 (0.092)	-0.119 (0.249)	-0.055 (0.086)
0.60–0.75	-0.045 (0.066)	-0.012 (0.055)	-0.008 (0.055)	-0.030 (0.105)	-0.128 (0.285)	-0.074 (0.101)
0.75–0.85	-0.060 (0.118)	-0.005 (0.099)	0.006 (0.097)	-0.021 (0.188)	-0.184 (0.506)	-0.121 (0.185)
Childhood PTO AFDC/TANF	C. Adult Daughters: Average Work Hours per Week					
0.25–0.85	-0.314 (0.246)	-0.421 (0.234)	-0.438 (0.210)	-0.337 (0.185)	-0.280 (0.216)	-0.364 (0.176)
0.25–0.40	-0.320 (0.274)	-0.405 (0.285)	-0.489 (0.297)	-0.335 (0.253)	-0.400 (0.310)	-0.397 (0.258)
0.40–0.60	-0.256 (0.198)	-0.336 (0.193)	-0.353 (0.185)	-0.265 (0.156)	-0.242 (0.172)	-0.295 (0.148)
0.60–0.75	-0.294 (0.239)	-0.403 (0.216)	-0.392 (0.186)	-0.317 (0.165)	-0.218 (0.195)	-0.329 (0.152)
0.75–0.85	-0.449 (0.429)	-0.640 (0.388)	-0.604 (0.325)	-0.512 (0.287)	-0.270 (0.348)	-0.503 (0.266)
Childhood PTO AFDC/TANF	D. Adult Sons: Average Work Hours per Week					
0.25–0.85	0.166 (0.238)	-0.052 (0.243)	-0.125 (0.171)	-0.157 (0.160)	-0.123 (0.163)	-0.060 (0.141)
0.25–0.40	0.255 (0.319)	0.038 (0.293)	-0.113 (0.178)	-0.119 (0.180)	-0.211 (0.189)	-0.032 (0.149)
0.40–0.60	0.109 (0.191)	-0.056 (0.191)	-0.114 (0.132)	-0.128 (0.125)	-0.122 (0.123)	-0.064 (0.107)
0.60–0.75	0.111 (0.218)	-0.092 (0.225)	-0.127 (0.166)	-0.165 (0.153)	-0.085 (0.161)	-0.073 (0.136)
0.75–0.85	0.227 (0.391)	-0.120 (0.406)	-0.163 (0.298)	-0.259 (0.273)	-0.048 (0.300)	-0.075 (0.245)

Note: Estimates correspond to quantile marginal effects in columns (1)–(5) at $\tau = \{0.10, 0.25, 0.50, 0.75, 0.90\}$ for the distribution of adult outcomes with respect to means across varying ranges of childhood PTO AFDC/TANF exposure, from 25 to 85 percent of years. The average marginal effects by range of childhood exposure are shown in column (6). Standard errors, shown in parentheses, are based on 1000 bootstrap replications.

worked conditional on employment, specifically for the QMEs at the middle of the distribution of hours worked in columns (2)–(4), and for the AMEs in column (6). Panel C also reveals that the effect on daughters’ hours is most precisely estimated for those with greater childhood exposure to AFDC/TANF, though the point estimates tend to be larger in magnitude toward the lower and higher ranges of exposure. Results for sons in Table S.4 are imprecise for all summary estimates, with the smallest p-value of 0.265 in panel D for the QME at $\tau = 0.9$ for exposure $\check{X}_{\text{low}} = [0.25, 0.4]$, an estimated effect of -0.211 (0.189).

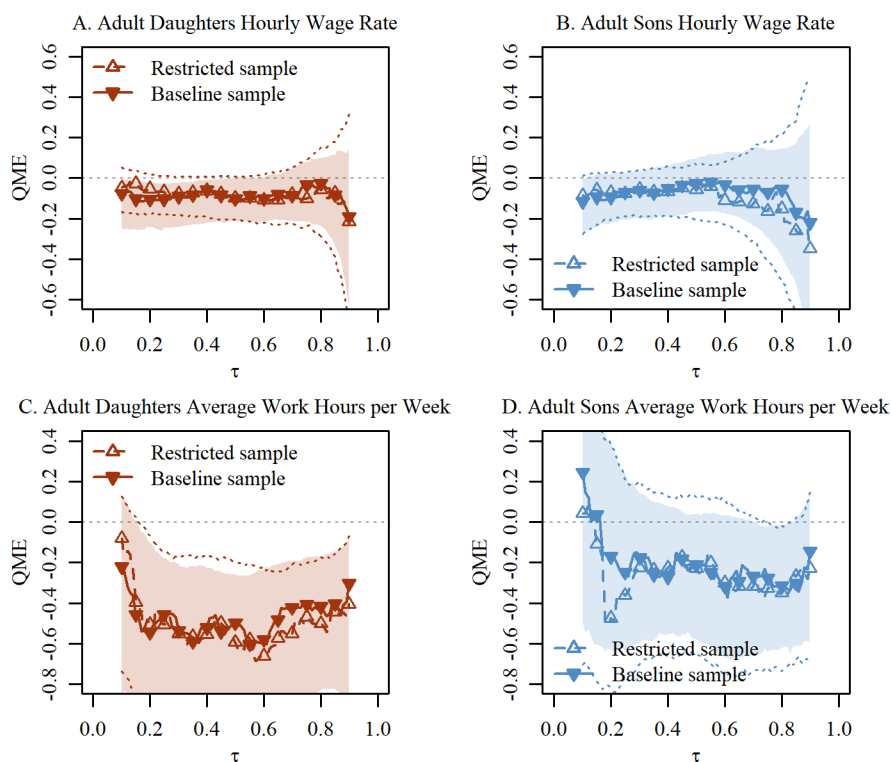
The outcomes shown in Figure S.8 are conditional on some yearly employment. Because we observe a welfare exposure penalty on daughters’ unconditional wages in Figure 7 of the manuscript — that is, including zeros for years not employed — next we explore the degree of extensive-margin effects on the number of weeks worked in early adulthood. Figure S.9 shows QME estimates for an individual’s proportion of total weeks worked, which are consistent with extensive-margin effects on weeks employed among daughters that do not exist for sons. These extensive-margin effects apply over most of the distribution of weeks worked except the far-left tail, similar to yearly hours worked in the main manuscript.



Note: Estimates correspond to the QME estimator defined in equation (4) in the manuscript shown for childhood PTO AFDC/TANF summarized as the mean for exposure ranging from 25 to 85 percent of observed years. The child’s early adulthood outcome, proportion of weeks worked, corresponds to the distribution indicated by τ . Pointwise 90-percent confidence intervals are shown based on 1000 bootstrap replications.

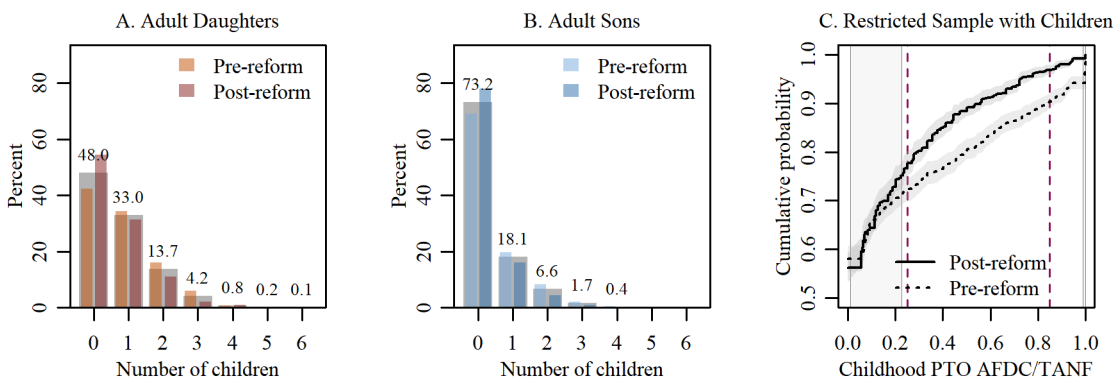
The evidence in Figure 7 of the manuscript, along with Figures S.8 and S.9, implies that childhood welfare exposure penalizes daughters' earnings through hours worked. One candidate explanation for the differences between daughters and sons with respect to welfare exposure effects on labor supply is differential gender expectations for household production such as caring for children. Figure S.10 reexamines our QME estimates for conditional wages and hours worked as shown in Figure 7 by using the presence of children during early adulthood as a potential moderator, both for a restricted subsample with children and an indicator for children interacted with childhood welfare exposure. The estimates for those with children present are consistent with the main results in the manuscript; the daughters' effects are similar to those before, yet now sons exhibit negative hours effects closer to daughters, however statistically no different from zero. In results not shown here, the unconditional version of Figure S.10 closely resembles the analogous estimates in Figure 7 with the same qualitative implications as in the conditional case. Figure S.11 shows that daughters are more likely to have children present in the home with only 48 percent with no children in early adulthood compared to 73 percent of sons with no children. Because the subset of individuals with children may have different trends before and after welfare reform, we confirm that the first-stage crossing condition and distributional differences hold for the same exposure ranges in the restricted sample (Figure S.11 panel C). The point estimates and confidence intervals for the restricted sample with children correspond very closely to those shown for the moderator-interaction results shown in Figure S.10. These findings highlight important differential effects that may be related to the literature on gendered labor roles, both formal and informal, and discrimination (see Blau and Kahn 2017; Goldin 2006).

Figure S.10. Quantile Marginal Effects for Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Hourly Wage and Labor Supply, by Children Present in the Adult Family Unit



Note: Estimates correspond to the QME estimator defined in equation (4) in the manuscript shown for childhood PTO AFDC/TANF summarized as the mean for exposure ranging from 25 to 85 percent of observed years. The child's early adulthood outcome is indicated by each panel heading, which corresponds to the distribution indicated by τ . The restricted sample keeps those with children present, and the baseline sample interacts an indicator for children present with childhood AFDC/TANF exposure. Pointwise 90-percent confidence intervals are shown based on 1000 bootstrap replications.

Figure S.11. Adult Heterogeneity in Children Present and First-Stage Results for the Restricted Sample with Children



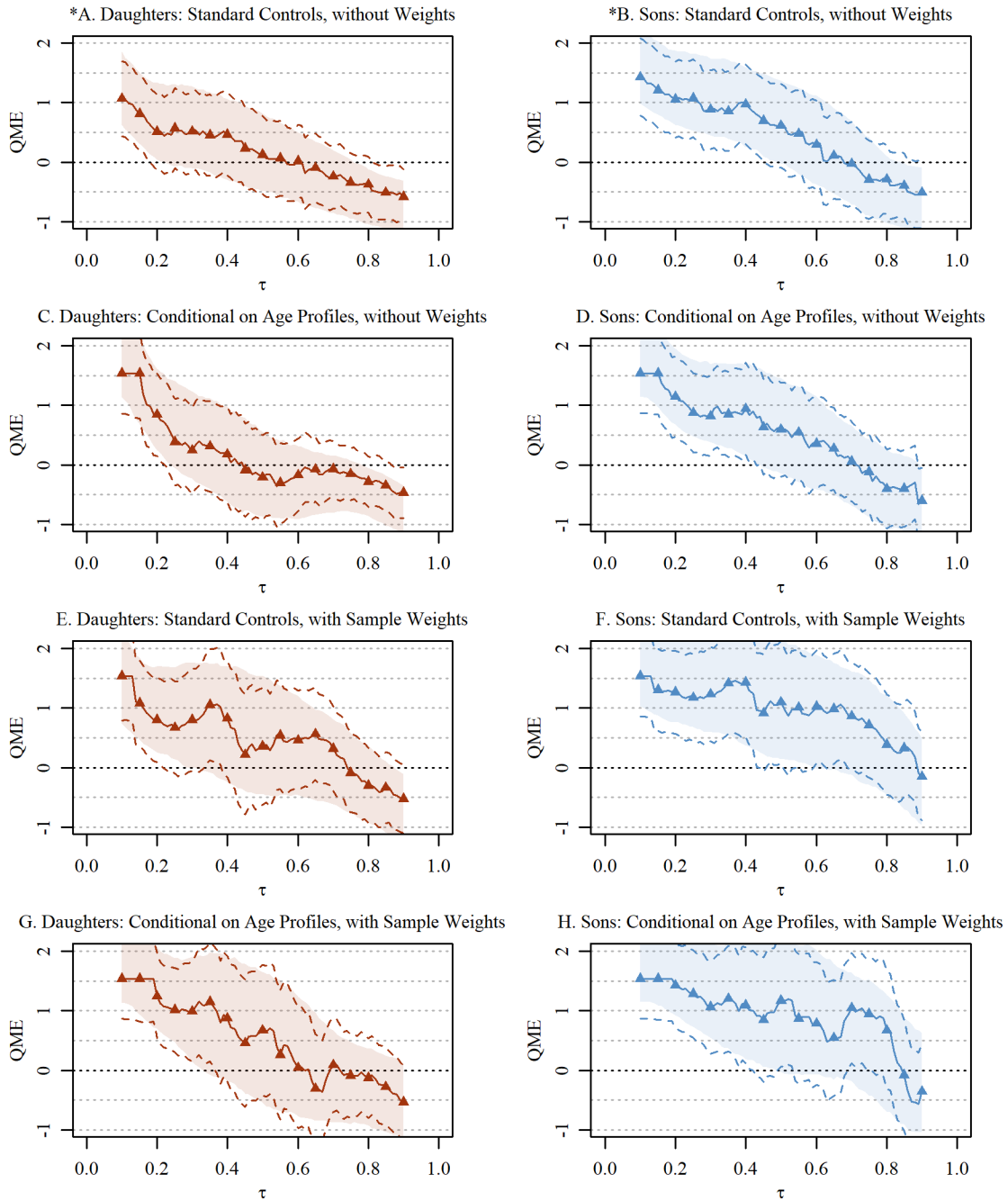
Note: Each measure in panels A and B is averaged across all adult observation years and summarized as the floor integer value, where the gray bars and number labels represent the values summarized across both welfare regimes. In panel C, the shaded regions of childhood PTO AFDC/TANF values from 0.01 to 0.225 and 0.99 to 1 highlight distribution crossing regions, and pointwise 90-percent confidence intervals are shown.

Section S.4. Specification Sensitivity for Sample Weights, Control Variables, and Potential State-level Heterogeneity

This section documents the sensitivity of our main estimates in Section IV of the manuscript to specifications relating to the inclusion of PSID sampling weights and the set of control variables. As mentioned in 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. We examine the robustness of results to the inclusion of PSID survey weights, which help to balance the samples due to the oversample of low-income and minority families in the SEO.

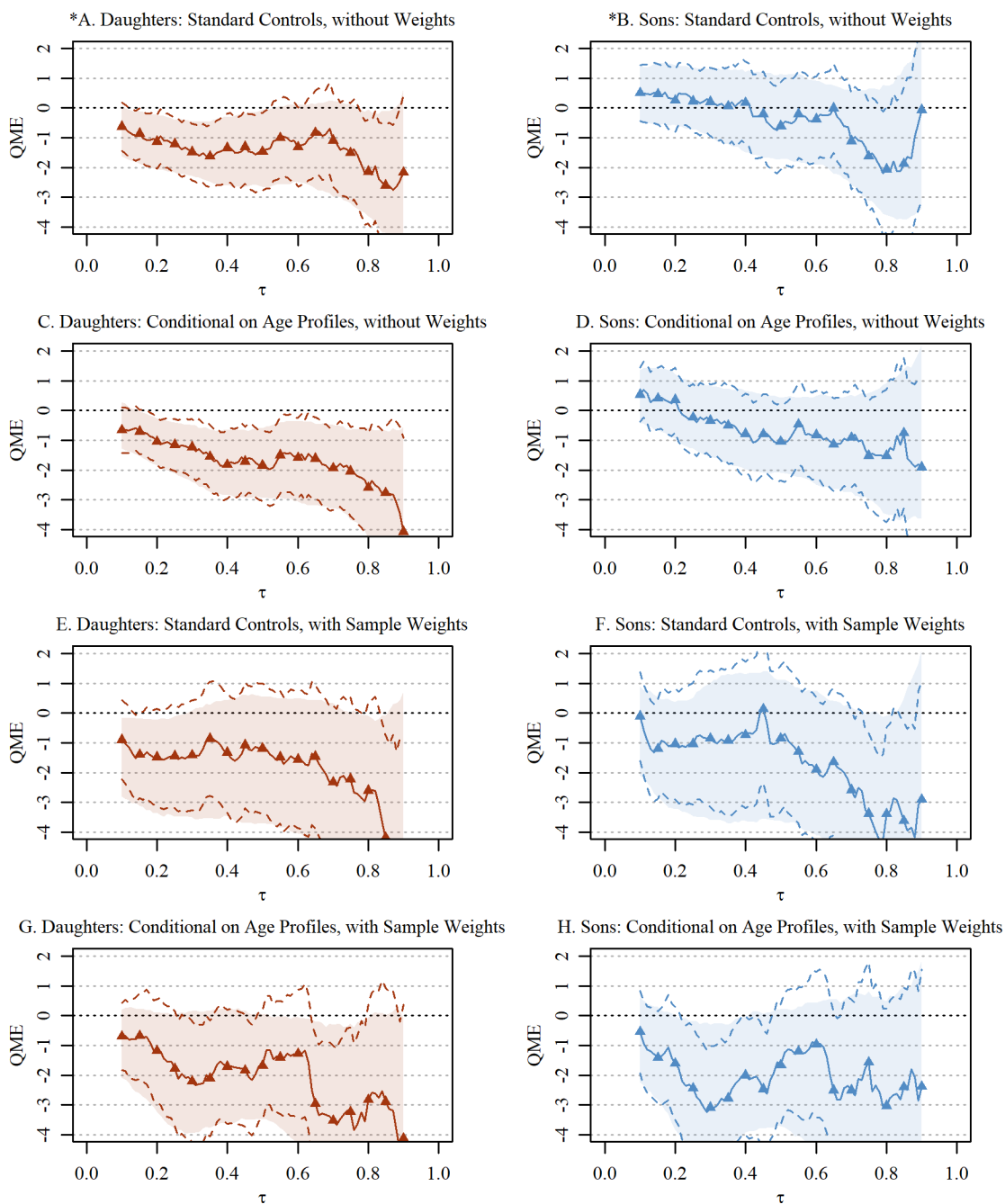
Specifically, in each of Figures S.12 and S.13, we present 8 specifications, with the first 4 in the top two rows without sample weights and the bottom two rows with sample weights. In addition to controlling for sample weights, the set of figures use different variations in the vector of controls. In the first and third rows (panels A, B, E, and F), we use the standard controls in the main analysis: a vector that includes quadratics in child's ages observed in adulthood and the mother's ages during the childhood observations, and early-adulthood averages for the state-level AFDC/TANF benefit standard, maximum federal/state Earned Income Tax Credit, poverty rate (Supplemental Poverty Measure), AFDC/TANF participation rate, and unemployment rate. In the second and fourth rows (panels C, D, G, and H), we show results conditional on age profiles only, using quadratics for both child's and mother's ages. The daughters' results are in the first column of panels and the sons' in the second. We estimate QMEs based on equation (4) of the manuscript for PTO AFDC/TANF, SNAP, or SSI (Figure S.12) and earnings-to-needs ratio (Figure S.13). In addition to the variation in the specifications explained above, we show two different confidence intervals. Gaussian confidence intervals are denoted by the dashed lines and 5-95 quantiles of the empirical distribution of the bootstrap estimator are shown in the shaded regions. The number of bootstrap replications is 1000.

Figure S.12. Quantile Marginal Effect Sensitivity to Covariates and Sample Weights:
 Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Broader Welfare Participation



Note: Estimates correspond to the QME estimator defined in equation (4) in the manuscript shown for childhood PTO AFDC/TANF summarized as the mean for exposure ranging from 25 to 85 percent of observed years. Pointwise 90-percent confidence intervals are shown in the shaded region based on 1000 bootstrap replications, with Gaussian confidence intervals indicated by dashed lines. The asterisks denote the main analysis specification.

Figure S.13. Quantile Marginal Effect Sensitivity to Covariates and Sample Weights:
Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Earnings-to-Needs Ratio



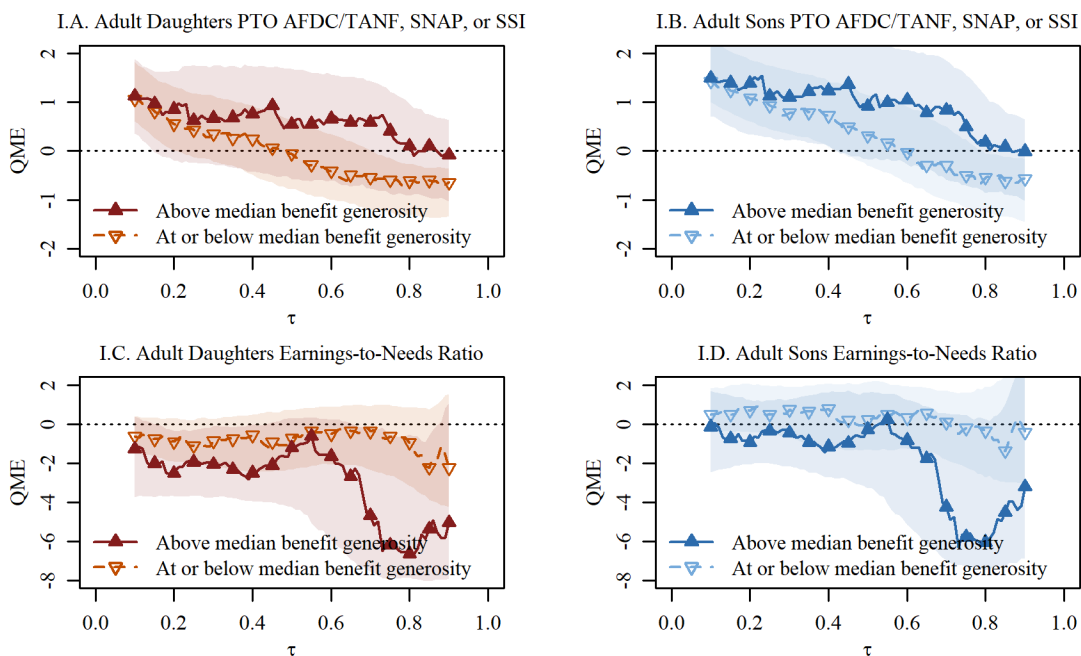
Note: Estimates correspond to the QME estimator defined in equation (4) in the manuscript shown for childhood PTO AFDC/TANF summarized as the mean for exposure ranging from 25 to 85 percent of observed years. Pointwise 90-percent confidence intervals are shown in the shaded region based on 1000 bootstrap replications, with Gaussian confidence intervals indicated by dashed lines. The asterisks denote the main analysis specification.

The pattern of results in Figures S.12 and S.13 mimic those in panels A and B of Figure 6 of the main text, depicting sharp linear declines in the QME as intensity of our adult outcome measure increases, with the QME being positive in the bottom half of the distribution, and negative in the top half of adult daughters and sons. The implication is that the reduction in childhood exposure to TANF after reform results in lower PTO on the wider safety net in adulthood for those with low to moderate adult participation, and to higher PTO in adulthood among those with high intensity adult participation. This relationship holds with and without PSID sample weights except for the negative QMEs for sons that are statistically insignificant when using weights. We likewise find a similar pattern of results on earnings-to-needs in Figure S.13 as in panels C and D of Figure 6 in the main text, albeit with wider confidence intervals when we include sample weights.

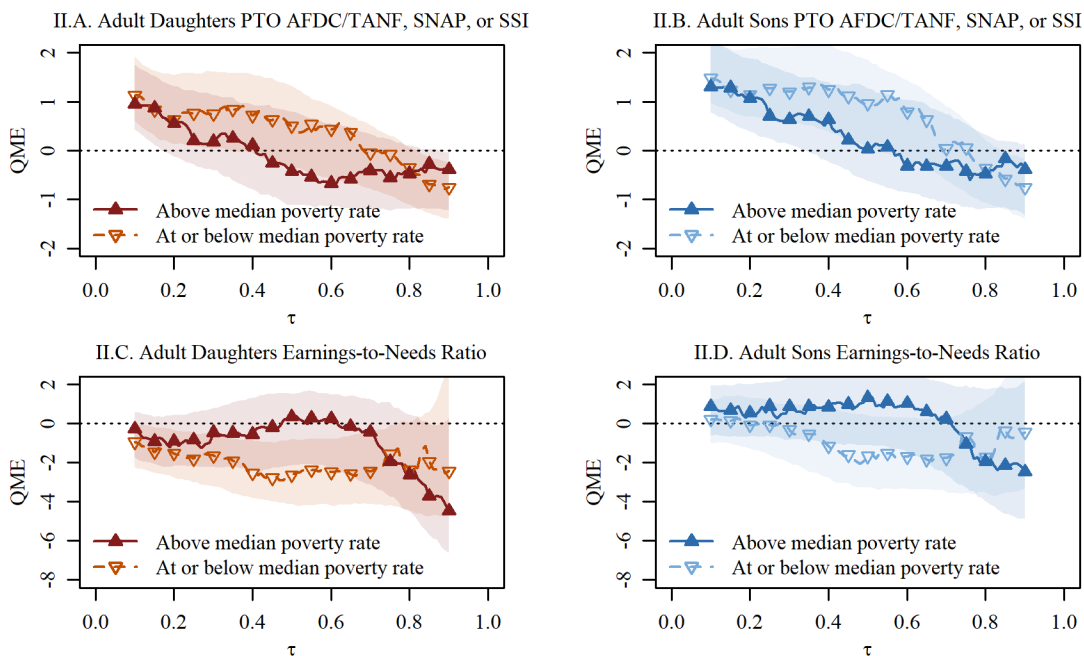
Next, in Figure S.14 we explore heterogeneity in the estimated QME for PTO on the wider safety net and earnings-to-needs. These estimates show the effects of childhood welfare exposure allowing for potential variation depending on conditionally low or high measures of state-level characteristics relative to the median: AFDC/TANF benefit generosity or SPM poverty rates. Our main results do not vary dramatically by these select measures of heterogeneity despite differences where the magnitudes of welfare exposure disadvantages are pronounced for states with higher AFDC/TANF benefit levels and lower poverty rates.

Figure S.14. Quantile Marginal Effect Heterogeneity by State-level Characteristics:
Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Economic Outcomes

I. Heterogeneity by State-level AFDC/TANF Benefit Standard



II. Heterogeneity by State-level SPM Poverty Rate



Note: Estimates correspond to the QME estimator defined in equation (4) in the manuscript shown for childhood PTO AFDC/TANF summarized as the mean for exposure ranging from 25 to 85 percent of observed years. The adulthood outcome corresponds to the distribution indicated by τ , and each panel represents estimates for those with greater than a given cutoff for high values of each characteristic relative to otherwise low values. Pointwise 90-percent confidence intervals are shown based on 1000 bootstrap replications.

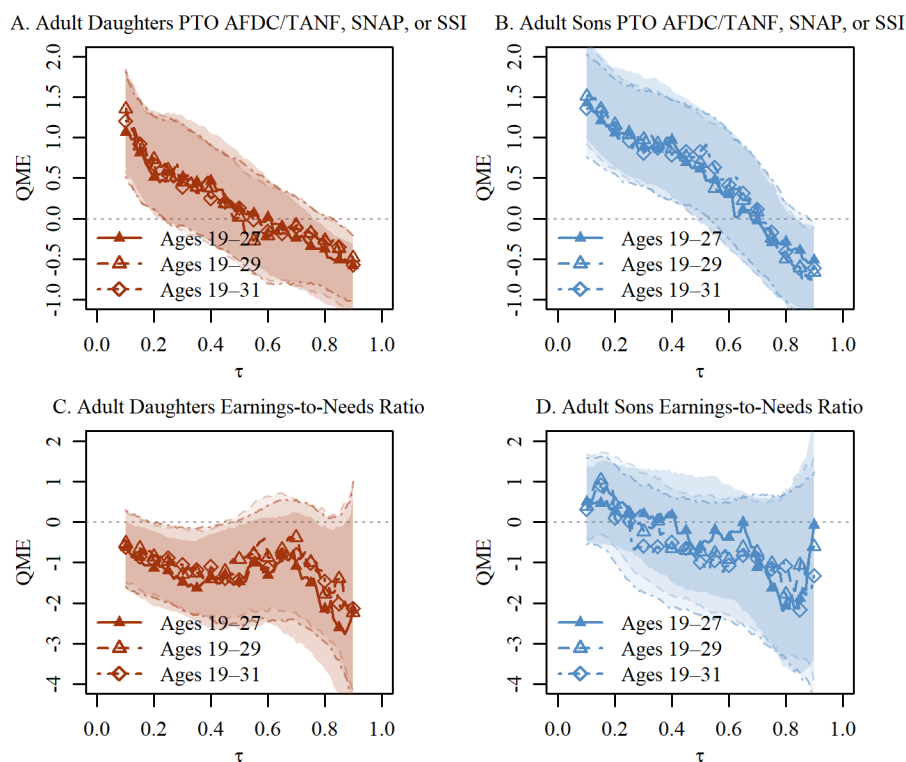
Section S.5. Further Robustness Checks

This section presents results that complement and expand upon the baseline estimates discussed in Section V.C of the paper. The first set of results in Figures S.15 and S.16 includes additional QME robustness estimates on adult age sensitivity and subsamples without siblings, comparable to the main QME results in Figure 6 of the manuscript. Then, we investigate the sensitivity of our main estimates to restricting the sample to those most likely influenced by welfare reform (Figure S.17), followed by estimates showing robustness to issues of sample attrition and underreported welfare participation (Figures S.18 and S.19, respectively).

S.5.1. Sample Robustness and Heterogeneous Subpopulations

We first examine the sensitivity of the results in Figure 6 by varying the age range for defining early adulthood. In Figure S.15, we compare our baseline range of ages 19–27 by extending the upper age included to ages 19–29 as well as ages 19–31. There we see that the effect of childhood exposure on PTO in the wider safety net is unchanged when expanding the top age, yet the QME is estimated less precisely when including higher ages in early adulthood.

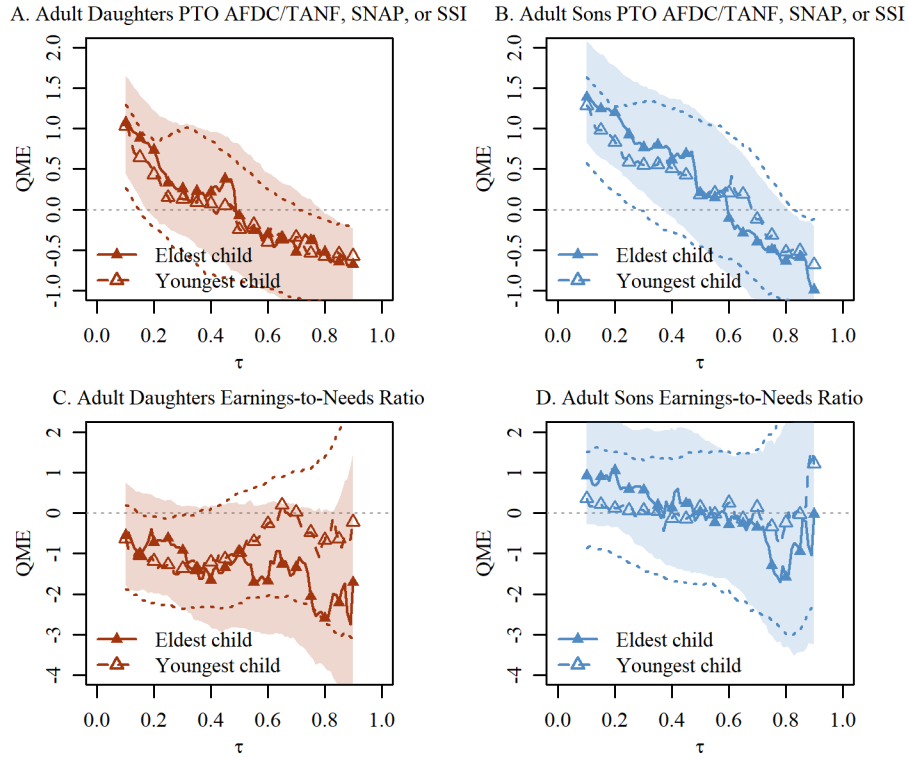
Figure S.15. Sensitivity by Age Range of Early Adulthood: Quantile Marginal Effects for Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Outcomes



Note: Estimates correspond to the QME estimator defined in equation (4) in the manuscript shown for childhood PTO AFDC/TANF summarized as the mean for exposure ranging from 25 to 85 percent of observed years. The child's early adulthood outcome is indicated by each panel heading, which corresponds to the distribution indicated by τ . Pointwise 90-percent confidence intervals are shown based on 1000 bootstrap replications.

The pooled samples by welfare regime may observe more than one child per family. As a check on the prevalence of siblings and sensitivity of our estimates, we reproduce the main QME results with only the eldest or youngest child in each welfare reform era. For daughters, there are 571 unique observations out of 703 in the pre-reform sample and 447 out of 615 post-reform. For sons, there are 456 unique observations out of 547 before reform and 349 out of 464 after. These sample reductions are about 73 to 83 percent of those in the baseline samples. Figure S.16 shows that there are no substantive differences between the main QME estimates and those from estimation samples without siblings except for some small loss of precision.

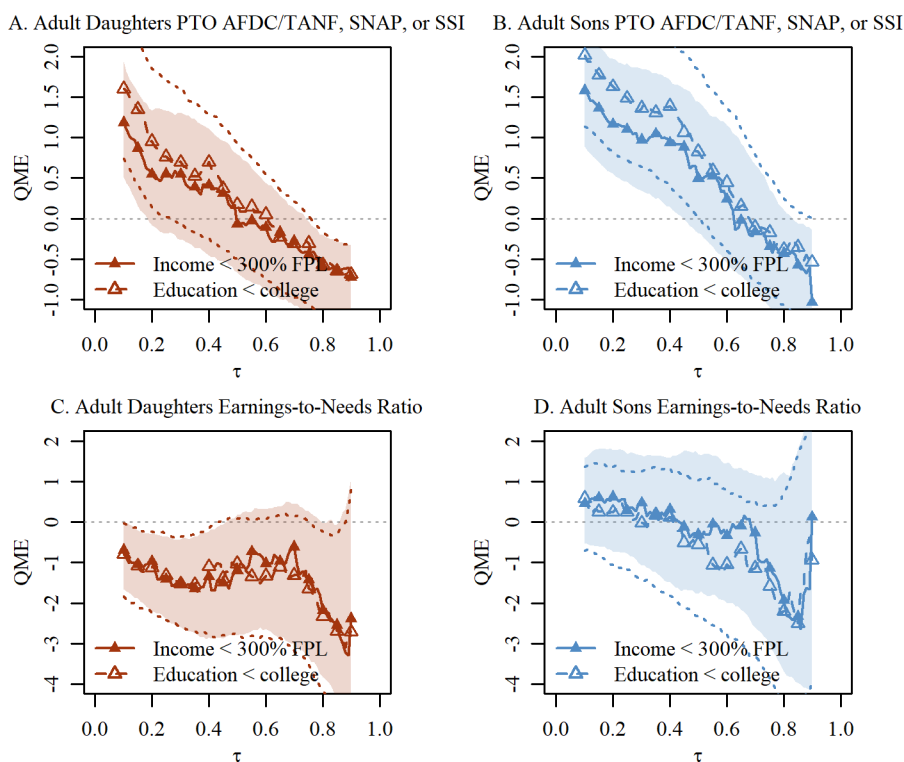
Figure S.16. Subsamples without Siblings: Quantile Marginal Effects for Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Outcomes



Note: Estimates correspond to the QME estimator defined in equation (4) in the manuscript shown for childhood PTO AFDC/TANF summarized as the mean for exposure ranging from 25 to 85 percent of observed years. The child's early adulthood outcome is indicated by each panel heading, which corresponds to the distribution indicated by τ . Pointwise 90-percent confidence intervals are shown based on 1000 bootstrap replications, with the shaded region denoting the eldest-child estimates and the dotted lines the youngest.

One of the conditions for identifying causal estimates following D'Haultfœuille et al. (2023) is that there are no group-specific trend differences in response to the exogenous shift in treatment. For our setting, we assume that welfare reform implies a monotonic decrease in program participation across the population. However, given that our recovery of the time trend function uses reform-induced changes in the distribution of childhood AFDC/TANF exposure, we test whether our estimator is robust to excluding any sample observations that are unlikely to respond to any welfare policy. In Figure S.17, we show QME estimates for two subsamples that only include observations with greater

Figure S.17. Restricted Samples by Lower Income or Education: Quantile Marginal Effects for Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Economic Outcomes



Note: The lower income sample restricts to those with mean childhood family income below 300 percent of the federal poverty level, and the lower education sample to those whose mothers completed less than 16 years of education as a proxy for less than a four-year college degree. Estimates correspond to the QME estimator defined in equation (4) in the manuscript shown for childhood PTO AFDC/TANF summarized as the mean for exposure ranging from 25 to 85 percent of observed years. The child's early adulthood outcome is indicated by each panel heading, which corresponds to the distribution indicated by τ . Pointwise 90-percent confidence intervals are shown based on 1000 bootstrap replications, with the shaded region for lower income and dotted lines for lower education.

probabilities of being eligible for means-tested assistance: those with mean childhood family income below 300 percent of the FPL, or those whose mothers have less than a college education. Relative to the full sample of 2329 daughters and sons across both welfare reform periods, there are 1704 individuals whose mean total income including transfers was less than 3 times the FPL, and 2000 individuals whose mothers had completed no more than 15 years of education. The results indicate no qualitative differences between these subsamples or notable differences from the manuscript evidence in Figure 6.

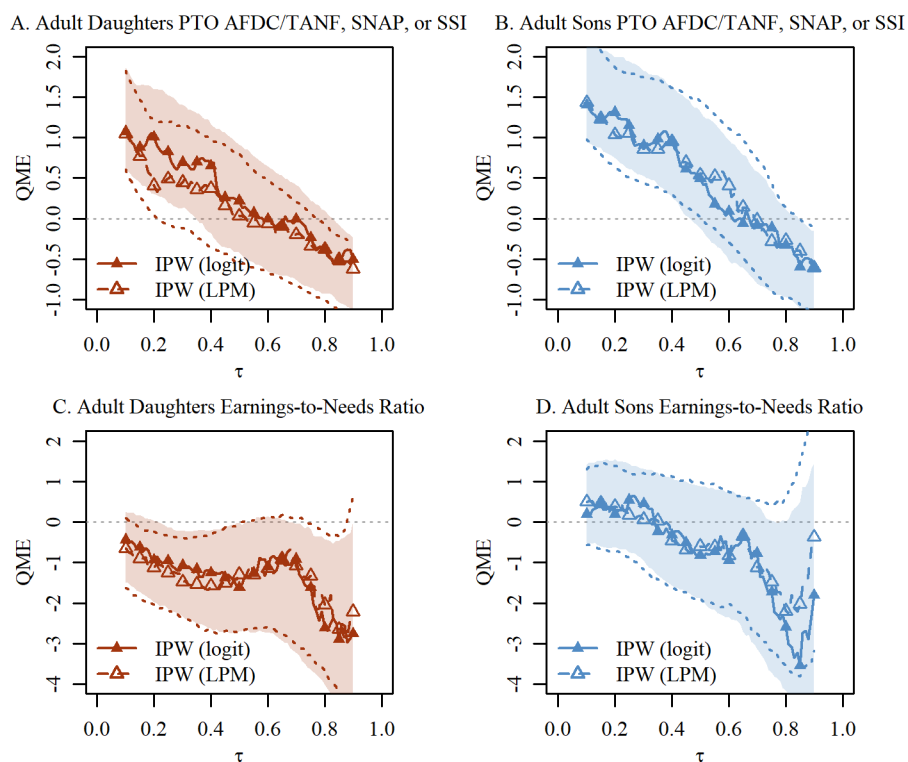
S.5.2. Sample Attrition in the PSID

While the PSID offers rich data following families over time and across generations, nonrandom sample attrition can pose a source of bias. The largest attrition occurred in the earliest survey years, especially after the initial 1968 survey, and the PSID been validated for cross-sectional as well as intergenerational regression-based settings (Fitzgerald et al. 1998; Fitzgerald 2011; Hartley et al. 2022). We explore the sensitivity of our main QME estimates in Figure S.18 based on inverse probability weights constructed based on first-stage estimates of non-attrition, $s \in \{0,1\}$, where \hat{s} is the predicted probability of staying in sample as a parametric function of our main model covariates as well as reported income, welfare participation, race, family size, and survey subsample. We alternatively estimate the first stage by either logit or linear probability model, where the inverse probability weight (IPW) is given by

$$\text{IPW} = s/\hat{s} + (1 - s)/(1 - \hat{s}).$$

The relevance of correcting for attrition appears to be more prominent among the daughters, though the qualitative results are unchanged. Panel C of Figure S.18 suggests that the linear first-stage approach to modeling attrition is associated with an earnings penalty that continues to be statistically significant at the 10-percent level upward in the earnings distribution. The results for a logit first stage of attrition correction still closely resemble the main results in Figure 6 for daughters.

Figure S.18. Attrition-Adjusted Quantile Marginal Effects for Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Economic Outcomes



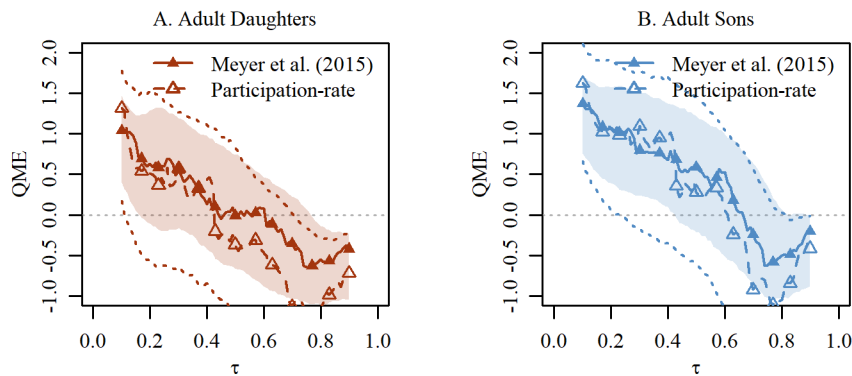
Note: Attrition-adjusted estimates use inverse probability weights (IPWs) estimated with either logit or a linear probability model (LPM) in the first stage. Estimates correspond to the QME estimator defined in equation (4) in the manuscript shown for childhood PTO AFDC/TANF summarized as the mean for exposure ranging from 25 to 85 percent of observed years. The child's early adulthood outcome is indicated by each panel heading, which corresponds to the distribution indicated by τ . Pointwise 90-percent confidence intervals are shown based on 1000 bootstrap replications, with the shaded region for logit first stage and dotted lines for LPM.

S.5.3. Misclassification of Self-Reported Welfare Participation

Another potential bias results from the nonrandom misclassification of welfare participation when respondents tend to underreport because of stigma associated with means-tested programs, which we explore with adjusted QME estimates in Figure S.19. Meyer et al. (2015) show that misclassification of program participation is substantial and a growing problem over time. For our analysis, the childhood welfare exposure is measured in earlier survey years and aggregated across several observations, so we focus our concern on second-generation welfare participation. Our main welfare outcome in adulthood is the PTO AFDC/TANF, SNAP, or SSI, and it is also aggregated across multiple observations.

As a conservative test of the potential bias from underreported participation, we use two corrective measures to the independent variables, each relying on estimated AFDC/TANF underreporting despite the higher likelihood that respondents accurately report any of the three means-tested programs. First, we use the Meyer et al. (2015) estimates by extrapolating the last available year from their results to each of our later years observed. Then, we use a consistent measure of AFDC/TANF recipients relative to the number of people with incomes below the FPL by year. The misclassification-corrected estimates are noisier than the main estimates in the manuscript, yet the point estimates are very similar and consistent with the conclusions in the main analysis.

Figure S.19. Misclassification-Adjusted Average and Quantile Marginal Effects for Proportion of Time On Childhood AFDC/TANF Exposure on Early Adulthood Economic Outcomes



Note: Misclassification-adjusted estimates are reweighted according to estimated reporting rates in Meyer et al. (2015), which are only available in limited years, as well as participation-rate estimates calculated comparing PSID self-reported participation relative to administrative reports of recipients per year. Estimates correspond to the QME estimator defined in equation (4) in the manuscript shown for childhood PTO AFDC/TANF summarized as the mean for exposure ranging from 25 to 85 percent of observed years. The child’s early adulthood outcome is indicated by each panel heading, which corresponds to the distribution indicated by τ . Pointwise 90-percent confidence intervals are shown based on 1000 bootstrap replications, with the shaded region for Meyer et al. estimates and dotted lines for participation-rate estimates.

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