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Long-Run Impact of Welfare Reform on Educational Attainment and Family Structure

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Abstract

In the early 90's, the United States reformed its welfare system through state waivers and the Temporary Assistance for Needy Families program. These changes altered family resources and potential investments for childhood human capital, which in turn could affect later adult outcomes. Using data from the Panel Study of Income Dynamics, I examine the long-run impact of growing up under welfare reform on adult education and family structure through age 28. I find that as children, these individuals have higher reading test scores by an average of 6% of a standard deviation. As adults, I find robust evidence that these treated individuals are on average 9% more like to graduate college. I find some evidence that they are more likely to be married and less likely to have a child out of wedlock. The effects for women are larger than men for college completion, marriage rates, and out of wedlock births.

JEL Classification: I38 J13 J24

1 Introduction

In the economics literature, there is extensive evidence on the importance of childhood well-being on later life outcomes. Events and circumstances in childhood have lasting effects into adulthood. This relationship has been shown for not only intuitively important measures such as childhood health and family income (Case et al., 2005; Duncan et al., 1998), but also interrelated individual, family, and community level factors. These factors include early education, neighborhood quality, and the presence of welfare programs (Heckman et al., 2013; Chetty et al., 2016; Hoynes et al., 2016). The magnitude and extent of these factors should be an important consideration to policy makers when they are designing and implementing programs that are targeted for children, particularly if the goal is improving intergenerational mobility.

In this paper I examine one such program that is centered on the wellbeing of children that has yet to have its long-term impact extensively studied, the Temporary Assistance for Needy Families (TANF) program. Implemented in 1996, TANF, commonly referred to as welfare reform, replaced the Aid to Families with Dependent Children (AFDC) welfare program. Like its predecessor, TANF provides in-kind and financial assistance to low income families with children, typically a single mother household. However, under TANF, individuals now face work requirements, time limits on assistance, stringent sanctions for noncompliance, and family caps for benefits among other conditions. Policy makers sought to decrease welfare dependency by moving recipients towards employment by changing the incentives AFDC recipients faced.

With the new requirements and stipulations, welfare reform potentially affected multiple facets of the home environment of children from low-income households. As mothers are moved to work, this changed their time endowment and possibly their income available to invest in their children. As shown in the literature, this change

in childhood investment could have a significant impact on later life adult outcomes. As TANF passed the twenty year mark, we can just now begin to study the long run impacts of welfare reform on the children raised under TANF. This paper aims to contribute to the emerging literature on the long run effects of the TANF program and explore potential mechanisms for the effects.

Using data from the Panel Study of Income Dynamics (PSID) Child Development Supplement (CDS) and Transition to Adulthood Supplement (TAS) I estimate a model of the technology of human capital, or skills production, similar to the one described by Cunha and Heckman (2007). In this model, skills in the current period are a function of investment in the previous periods. Here, skills as a young adult are a function of fixed family characteristics, endowment of skills at birth, and investments made in childhood. Applying this model to welfare reform, if the change in welfare policies changed the investment decisions of affected mothers, then those affected children should have different levels of skills as adults. To motivate the adult outcomes, I first examine if welfare reform had an effect on childhood cognitive and noncognitive skills. The model is estimated empirically using a triple difference framework that can accommodate family fixed effects by exploiting variation in welfare reform timing and likelihood of TANF participation.

I contribute to the existing literature on the short-run effects of welfare reform by showing that at-risk children who were exposed to welfare reform score higher on reading achievement tests by on average 5-7% of a standard deviation. Turning to long-run outcomes in the adult sample, I find that these same children are on average 9 percent more likely to complete college as well as some evidence of higher rates of marriage and fewer having children out of wedlock, an explicit goal of the TANF program. Overall, these effects tend to be larger in magnitude for women than men. For the whole sample, the effect of welfare treatment on higher reading score and college completion result is robust to the addition of family fixed effects, the sample of non-movers, and the inclusion of state-time fixed effects. Using an event study model I find that first exposure has the largest impact when the individual is in-utero

through the age of one.

2 Literature Review

2.1 Early Childhood

Early childhood, and even in-utero events, have been shown to have important effects on an array of later life outcomes, such as health, income, education, and other aspects of well-being. These childhood events include their health, family income and socio-economic status, and early education, among others. This section briefly reviews the literature on the relationship between childhood circumstance and later life outcomes, and highlights evidence from particular early childhood programs as well as health and income characteristics more generally.

One of the better known segments of the childhood circumstance literature concerns early childhood education programs such as the Head Start Program, the Perry Preschool Project, and the Carolina Abecedarian Project, which all sought to provide high quality child care and education to disadvantaged children. Reanalyzing the data from the literature, Elango et al. (2015) find, across these programs, lasting gains for children that did not have access to another high quality alternative program. Children in the programs experience higher cognitive function, higher educational attainment, lower arrest rates, and less welfare usage as adults.

The long-term effects of education go beyond early childhood education and child care. The quality of a child's elementary classes also has persistent effects into adulthood. In the late 1980's, the state of Tennessee randomly assigned one of cohort children and their teachers into different sized classrooms in grades K-3 within their school. By linking the experiment data to tax return data, Chetty et al. (2011) are able to do a thorough longer-term analysis. Individuals assigned to small classroom

sizes were more likely to have attended college. The authors attribute most of the gain to improvements in the child's noncognitive ability.

Work has also been done on more general conditions such as the long term effects of child health and family income/SES. The literature has shown that throughout all stages of childhood, health plays an important role not only for adult health but other outcomes as well. This relationship holds even after controlling for a variety of confounding factors such as income and education as shown by Case et al. (2005). Looking at a cohort of British adults born in 1958, Case et al. find that having chronic health conditions as a child leads to worse health as an adult. A similar result is shown by Currie et al. (2010). Currie et al study 50,000 children born in Manitoba, Canada between 1979 and 1987, and like Case et al., find that physical health is an important indicator of young adult health. However, Currie et al. also find that early mental health problems lead to higher rates of being on social assistance and lower literacy scores. This relationship between early health and adult outcomes even extends to in-utero conditions as summarized by Almond and Currie (2011). They show that the effects of fetal conditions are persistent and that the health effects can remain latent for many years. For example, fetal conditions such as low birthweight, mother's alcohol or smoking usage are linked to heart disease in middle age.

Lastly, and perhaps most apparently is that the family's income or socioeconomic status in childhood has lasting implications throughout adulthood. However, given the endogeneity issues, the causal evidence for this relationship is more limited. Early evidence from sibling models, as described in Duncan et al. (1998), shows that children who grew up with higher levels of income are more likely to complete more years of schooling. Other work shows the short-term impact of income by studying natural experiments that raised family income. Dahl and Lochner (2012) find that an increase in income, as instrumented by the Earned Income Tax Credit expansion, improved child achievement test scores. The effect was largest for children from disadvantaged households, though the authors don't explore what could be the potential mechanisms. Examining the EITC further, Bastian and Michelmore (2018)

find that the long-run impact of exposure to the EITC as a teenager leads to higher educational attainment and earnings as an adult. They find the primary channel for the improvement is increases to pre-tax family income.

Given the evidence above, welfare programs then can have potentially large impacts on a child's later well-being given that they can affect their health, income, or other facet of their life. There have been recent studies on the long-run effects of social safety net programs. Brown et al. (2017) study expansions to Medicaid and the State Children's Health Insurance Program in the 1980's and 90's and find that children affected by the expansions paid more in taxes, collected less in EITC by the age of 28. This suggests that increased medical coverage improved child health and raised their productivity as adults. Hoynes et al. (2016) examine the county-by-county rollout of the food stamp program in the 1960's to test if having access to food stamps as a young child improves adult outcomes. The authors find that when these children are adults they have better reported health and an increase in the economic self-sufficiency of women.

2.2 TANF

Another program whose long term-effects we can now begin to analyze is the TANF program. TANF was implemented in 1996, and replaced the AFDC welfare program. AFDC was a federal entitlement program that provided financial assistance to low income families with children, typically a low-educated single mother household. In the years prior to PRWORA, welfare caseloads had swelled under AFDC and starting in 1992 states started seeking and receiving waivers to experiment with their state welfare program to deal with the rising caseloads.[1] PRWORA codified many of these changes into federal law. PRWORA sought to decrease welfare dependency

[1]Politically, rising caseloads appeared to be the motivator for welfare reform, with Bill Clinton campaigning in 1992 to "end welfare as we know it." However, Ziliak et al. (2000) show that states with high caseloads were not more likely to request federal waivers.

by moving recipients towards employment by changing the incentives AFDC recipients faced. Under TANF, individuals now face work requirements, time limits on assistance, and family caps for benefits among other conditions.

The year that a state first implemented some type of welfare reform, either a welfare waiver or TANF, is shown in Figure 1, with implementation dates taken from Crouse (1999). Thirty states implemented a major welfare waiver before TANF. Nineteen of those thirty implemented a waiver in the years before TANF was passed, 1992-1995, with the remaining states implementing either a waiver or TANF in either 1996 or 1997. Though not shown on the map, Hawaii and Alaska implemented welfare reform in 1997 as well. The last state to implement any kind of reform was New York in November, 1997. Figure 1 also shows the geographic variation in implementation dates with no region of states all implementing reform at the same time.

As over twenty years have now passed since TANF became law, we can now begin to study its long-term impacts on the children affected. While much has been written on the impact of welfare reform on caseloads, employment, and income, relatively little is known about the long-term effect of welfare reform.[2] Early work on this topic comes from Hartley et al. (2017) who model intergenerational transmission of welfare use from mother to their daughters before and after welfare reform. They find that welfare reform attenuated the transmission of dependence by at least one-third.

There are two main channels that PRWORA could affect the cognitive and noncognitive skills of children, which in turn could affect their livelihood as adults. First, PRWORA could change the income of families. Evidence on this point is somewhat mixed. Early work by Schoeni and Blank (2000) and Grogger (2003) find modest, positive effects of welfare reform on earnings, income, and poverty rates. However, the proceeding work tried to account for the heterogeneity in welfare reform and found varying effects. Work by Bitler et al. (2006a) and Bollinger et al. (2009) shows that PRWORA lowered the income of less skilled mothers in the bot-

[2]See Blank (2002) & Ziliak (2016) for excellent reviews on this literature.

tom half of the income distribution and raised income among more skilled mothers. As outlined above, and by work such as Duncan et al. (2014), income can affect family stress at home. The stress itself is cognitively draining and any stress from the parents may spill over into harsher parenting practices, which could alter the child's personality traits. Less income also means less resources to invest into the children such as high quality child care, education, and other learning experiences.

The second avenue for PRWORA to affect childhood mental traits is the time endowment of the mother. In many states' TANF programs, adults must be engaged in an acceptable work activity, commonly defined as participation in the paid workforce and usually 20-30 hours per week. In addition, states have the option to levy a sanction equal to all or part of the welfare benefit on those who fail to comply with the work requirements. As PRWORA moved mothers to work, they have less time to spend with their children and may choose low-quality child care as a substitute. However, it is possible that attachment to work could increase the subjective well-being of mothers as found by Herbst (2013). This increase in subjective well-being could spillover to the child. Therefore, the effect of welfare reform on child cognitive development is unclear.

The evidence on welfare reform and child mental attributes is slightly mixed. Morris et al. (2009) examine the relationship between welfare reform and the achievement scores of children using 7 different welfare experiments carried out across the United States in the 1990's. For young children, those aged five or less, the programs that were the most effective were the ones that not only boosted employment of the mother but also raised income through an earnings supplement. Young children in these programs saw an increase in their achievement tests by 7 percent of a standard deviation. There was no statistically significant impact for children between 6-9 and a slight negative effect for children older than 10.

Heflin and Acevedo (2011) use panel data from the Fragile Families and Child Well-being Study to examine the non-income effects of TANF participation on child

cognitive development as measured by the Peabody Picture Vocabulary Test. They control for child and mother characteristics, welfare connections, family dynamics, and home environment factors. Their results indicate that welfare receipt is associated with an 11% of a standard deviation decrease in child cognitive score. They find that 7% of the effect of TANF is through maternal stress while income accounts for 18%.

Herbst (2014) also examines child cognitive ability but studies the impact of a specific TANF policy, the age-of-youngest-child exemptions. Following PRWORA there was substantial variation across states in regards to when a mother had to return to work following the birth of a child, ranging from 0 months to as many as 24 months. Herbst uses this variation and panel data from the Early Childhood Longitudinal Study Birth Cohort to estimate the impact of maternal employment on early life cognitive ability as measured by the Bayley Short Form-Research test. His result indicates that each month of maternal work corresponds to a 0.08 standard deviation reduction in cognitive score.

With my sample of young adults, I am able to test the impact of welfare reform on a variety of outcomes relating to educational attainment and family structure. The education outcomes are a natural extension of the test scores examined in childhood and the work so far in the welfare reform literature, suggesting potential improvements to childhood human capital. Educational attainment represents one of the consistently bright spots for children after welfare reform. Offner (2005) uses March CPS data and find that high school drop-out rates among teenagers declined 24 percent after welfare reform. While Miller and Zhang (2012) use both the October schooling supplement of the CPS and administrative Common Core data and find a 20 percent reduction in high school dropout rates. Dave et al. (2012) examines difference by gender and use the October CPS to employ a triple difference model comparing high risk of welfare teenage girls to low risk teenage boys. They find that welfare reform reduced the odds of a teen girl dropping out by 15 percent. In light of these results, I expect higher college attendance and completion rates as adults,

with welfare reform potentially having stronger effects for women.

The family structure outcomes are motivated by two of the explicit goals of TANF, "prevent and reduce the incidence of out of wedlock pregnancies and establish annual numerical goals for preventing and reducing the incidence of these pregnancies" and "encourage the formation and maintenance of two parent families." Early evidence of the effect of welfare reform on family structure is mixed with studies finding no robust effects (Fitzgerald and Ribar, 2004; Graefe and Lichter, 2008; Dunifon et al., 2009; Knab et al., 2009), lower rates of marriage (Bitler et al., 2004), more children living in married families (Bitler et al., 2006b), and more children in blended families (Cherlin and Fomby, 2005). This paper seeks to provide clarity to this literature by estimating the long-run impacts of welfare reform on family structure for the children of welfare reform.

3 Model

Key to this project is modeling the technology of human capital or skills production. My model is similar to the one described by Cunha and Heckman (2007), whereby skills in the current period are a function of skills and investments made previously as well as fixed family characteristics. Specifically, for any period, $t+1 \forall t > 0$, the production function is written as

$$\theta_{t+1} = f(h, \theta_t, I_t), \tag{1}$$

where θ represents a vector of skills or attributes, h denotes time-invariant parental characteristics, and I_t is investment in human capital in the previous period.

Equation 1 can be rewritten in recursive form by substituting for θ_t, θ_{t-1}, ... repeatedly:

$$\theta_{t+1} = g(h, \theta_0, I_1, ..., I_t), \tag{2}$$

where θ_0 is the individual's endowment of skills at birth.

For simplicity, suppose that birth/prenatal is period 0, childhood is period 1, and young adulthood is period 2. In this case, I can rewrite equation (2) as:

$$\theta_2 = g(h, \theta_0, I_1) \tag{3}$$

In words, skills as a young adult are a function of fixed family characteristics, ones endowment of skills at birth, and investments made when in childhood. Applying this framework to welfare reform, the change in welfare policies potentially changes the investment decisions of affected mothers. If the child is young enough, these policy changes could also affect the decision-making of the pregnant mother, thus changing the child's birth endowment as well. Adulthood outcomes are then a function of these changes to childhood endowments and investments.

With some assumptions, equation (3) can be estimated with the use of proxies for each of the production inputs. First, I assume that the production function g is linear in inputs and is constant across time and individuals. Young adulthood human capital, θ_2, can be proxied by educational attainment and family structure. Let birth weight and being breastfed be proxies for initial skill endowment, θ_0. Early childhood exposure to welfare reform, explained in detail below, is a proxy for the family investment decisions in childhood human capital, I_1. A model with siblings and family fixed effects is also estimated to control for time-invariant parental characteristics,h.

With these assumptions, the task is to compare children affected by welfare reform to similar children who were not. Here I exploit the differential rollout of state welfare waivers and TANF implementation between the years of 1992 to 1997 to estimate a triple difference model. I compare the outcomes of adults who were exposed to welfare reform to those who were not, taking likelihood of welfare participation into

account. The model takes the form:

$$Y_{istb} = \beta(W_{isb} * T_i) + \gamma W_{isb} + \delta T_i + \Gamma X_{istb} + \eta_t + \eta_s + \eta_b + u_{istb}, \tag{4}$$

where i denotes the individual, t the interview year, s the state of residence, and b the birth year. Y_{istb} is the outcome of interest, W_{isb} indicates exposure to welfare reform, T_i takes a value of one if the child is from a low-educated single mother household, X_{istb} is a vector of demographic and state level controls and includes measures of birth weight and being breastfed, η_t, η_s, and η_b are interview year, state, and birth year fixed effects, respectively. Lastly, u_{istb} is the error term that is assumed to be uncorrelated with the covariates. All reported standard errors are clustered at the state level. As is common in the literature, low-educated refers to having twelve years of education or less. Here, mother means biological, step, adoptive mother, or grandmother. The comparison group for these at-risk children is the children of higher-educated single mothers and children from two parent families where at least one parent has less than a college degree. Children from households with two college-educated parents are omitted from the analysis.

For the main independent variable, W_{isb}, I follow the approach of Hoynes et al. (2016) and measure how much of the individual's life before the age of five they were exposed to welfare reform. The variable is the share of months between conception and the age of five that either welfare waivers or TANF were in place in their state. Given the evidence from Kaestner and Lee (2005) that welfare reform affects a mother's prenatal decision it is important to account for welfare reform exposure that occurs in-utero. The variable takes a value of 0 if the child turned five before any welfare reform was implemented in their state and a value of 1 if they were conceived after welfare reform.[3] Any in-between value will be some fraction expressed as $x/69$ where x is the number of months they were exposed. Major welfare waiver and TANF implementation dates are taken from Crouse (1999).

[3]I assume a 9 month gestation period between birth and conception

This method is different from most natural experiments that are episodic, in that they "turn on" and then later "turn off." Here, once a state reforms its AFDC program either through welfare waivers or by implementing TANF, it keeps the reform and does not revert or "turn off." This restricts the comparisons that can be made because there will never an adult that was exposed in early childhood, but not later childhood. As such, comparisons are about additional welfare reform exposure earlier in childhood, conditional on having it later in childhood as well.

The parameter of interest is then β and represents the impact of full welfare reform exposure, being exposed from conception to age 5, for someone who's likely to be affected by welfare reform. This means that β is an intent-to-treat estimate. Because going from zero months of exposure to sixty-nine months of exposure can be seen as a drastic change, I also present treatment estimates at the mean level of exposure. Looking at the mean level of exposure gives me an average intent-to-treat effect (AITT). This assumes that all children of single low-educated mothers were affected by welfare reform. The model also assumes that the effect of one additional month of welfare reform exposure is constant regardless of age, an assumption I relax in section 5.2. Note that γ then represents the impact of welfare reform exposure on someone who is not at-risk to take up AFDC/TANF. As such I expect the coefficient to be zero. Identification of β is given by variation in states' passage of welfare waivers and TANF, the birth year of the adults, and their family status when they were children. The model assumes there is no difference in cognitive and noncognitive trends between children of low-educated single mothers and high educated single mothers or children from low-educated two parent families before the implementation of welfare reform.

In the model, the outcomes for both childhood and adulthood are the individual's skills. Ideally, measured skills would be the same between the two periods but in practice this is unfortunately not the case in the data. In childhood, the vector of human capital skills consists of test scores and behavior scales for cognitive and noncognitive skills, respectively. For cognitive skills, I use the Woodcock-Johnson Re-

vised Tests of Achievement (WJ-R) originally developed by Woodcock et al. (1989). My measure of childhood noncognitive function comes from the Behavioral Problem Index (BPI). Because measures of cognitive and noncognitive skills are not available in adulthood, I examine outcomes that are at least partly determined by their cognitive and noncognitive skills. This includes educational attainment and changes to family structure. Education is used because it is a natural extension of the childhood test scores and family structure because it is an explicit goal of the TANF program.

To try to control for unobserved family characteristics, h in equation (2), I also run a model with family fixed effects, meaning u_{istb} is correlated with the $X's$. Here the sample only includes individuals that have a sibling in the data as well. That empirical model can be written as

$$\tilde{Y}_{istb} = \beta(\widetilde{W_{isb} * T_i}) + \gamma\tilde{W}_{isb} + \Gamma\tilde{X}_{istb} + \eta_t + \eta_s + \eta_b + u_{istb}, \tag{5}$$

where $\tilde{}$ indicates the family-time-demeaned variable. This model compares individuals who were exposed to welfare reform to their siblings that were not exposed while sweeping out time-invariant family characteristics.

4 Data

Data for this project comes from two supplements of the Panel Study of Income Dynamics (PSID), the Child Development Supplement (CDS) and the Transition to Adulthood Supplement (TAS). The PSID is longest running longitudinal survey, starting with 4,802 households in 1968 and still follows all members and descendants to this day. In 1997, the PSID supplemented its main data collection with additional information on 3,563 0-12 year-old children and their parents for the CDS. The children were drawn at random from participating core families with the condition that there cannot be more than 2 children from any household. The children were followed

up twice after the 1997 survey, once in 2002 and again in 2007. Information about the children was collected from their Primary Care Giver (PCG), most typically their mother. Once children reached the age of 18 they left the CDS and entered the TAS.

The TAS was first fielded in 2005 with the aim of collecting information on young adults who had not yet formed their own household, a growing group of individuals that many surveys miss. The TAS has been fielded every two years since 2005, with the most recent wave being in 2015, and collects information on schooling, labor force outcomes, and health. Individuals enter the TAS when they turn 18 and stay until they are 28 years old, even if they have formed their own household during that time. The analysis sample includes one observation for each interview year that the individual satisfies these age restrictions. Adults in the TAS were children when welfare reform was enacted.

Because of the longitudinal structure of the PSID, I am able to follow these young adults back to their childhood and measure their welfare reform exposure and investment in their human capital production. This information comes from the core family files and the CDS. I assign family status and state of residency to the child using information from the 1997 wave for computing their welfare exposure and treatment. The TAS sample consists only of children who were interviewed for the CDS. This means I have data on their childhood human capital levels as well as measures of human capital investment. All relevant information on measures of cognitive and noncognitive skill and tables come from the PSID CDS 1997 User Guide by Hofferth et al. (1997). In section 5, I show results from the "first stage" of the model by examining if welfare had an impact on childhood outcomes, to motivate the effects I see on adult outcomes.

For cognitive skills, I use the Woodcock-Johnson Revised Tests of Achievement (WJ-R) originally developed by Woodcock et al. (1989). The WJ-R test contains nine subtests measuring different aspects of academic achievement and was used in the NLSY-Child Study and the Carolina Abecedarian Project as well. The WJ-R

test has been used throughout the psychology literature to measure child achievement (Nelson et al., 2004; Davis-Kean, 2005; Hughes and Kwok, 2007). For the CDS, the PSID administered 3 subtests in each of the three waves that cover the reading and math portions of the test. The three subtests are Letter-Word Identification, Passage Comprehension, and Applied Problems. The letter-word and applied problems tests were administered to children over the age of one, and the passage comprehension test was administered to children ages five and older. A description of each individual subtest is found in Appendix Table A.1.

My measure of childhood noncognitive function comes from the Behavioral Problem Index (BPI). The BPI is a 30-item questionnaire administered to the child's PCG developed by Peterson and Zill (1986). Each question describes a different problematic behavior and asks the PCG whether the child exhibits the problem behavior often, sometimes, or never. Behaviors include having sudden changes in mood or feeling, is fearful or anxious, bullies or is cruel or mean, demands a lot of attention. Behaviors are also divided into two subscales, a measure of externalizing or aggressive behavior and a measure of internalizing, withdrawn or sad behavior. The index is then the total number of affirmative responses among the 30 questions. The BPI has been used to study children across a variety of disciplines in the US and the UK (McCormick et al., 1990; McCulloch et al., 2000; Christakis et al., 2004; Bernal and Keane, 2011). In the CDS, the questions are asked for every child 3 and older. Appendix Table A.2 lists each of the 30 questions and lists if they are external or internal behaviors as well as their reliability taken from Hofferth et al. (1997).

Survey weighted descriptive statistics for the CDS sample can be found in Table 1. Given the age restrictions on the tests, the sample sizes here fluctuate. For the WJ-R subtests the standardized score, which is standardized by age, is the outcome of interest. For BPI, I examine the raw score. The BPI has a maximum score of thirty and a minimum score of zero. A higher BPI score means the child exhibits more problematic behaviors. The average amount of welfare reform exposure is 0.30 which translates to about twenty months. In the sample there are 2,464 observations of

children with no welfare reform exposure, and there are 2,992 observations of children with a nonzero amount of exposure. For these children with exposure the average amount is 0.54 which is about three years. Roughly twenty percent of children are from an at-risk household. Information on state controls comes from University of Kentucky Center for Poverty Research Welfare Data. The child's birth weight and if they were breastfed are included in the models to control for in-utero/birth characteristics, θ_0 from equation (2). State controls are used to try to account for the local macroeconomy. State minimum wage and maximum TANF benefits are measured in 2007 dollars. State EITC is calculated as a percentage of the federal rate.

Survey weighted descriptive statistics for the TAS sample are found in Table 2. The descriptive statistics of the TAS sample show a population that is still finishing school, with almost three-quarters reporting that they have at least attended college but only 27 percent over the age of twenty with a two or four year college degree.[4] For family structure 11 percent of the sample is married and 14 percent have a child out of wedlock. Eighteen percent of them are from an at-risk household. For these adults the average amount of exposure is 0.17 which is approximately one year of childhood was spent in a state that had enacted some kind of welfare reform. There are 4,003 observations of adults with no welfare reform exposure, and there are 2,353 observations of adults with exposure. For those with exposure the average amount is 0.46 or about thirty-two months.

This low rate of exposure is largely an artifact of the way the data is constructed. Those with the least amount of exposure would be those who were the oldest in the CDS, the children who had already turned five before welfare reform was enacted. These children would turn 18 first and thus would be in the TAS before the youngest children that have the most exposure to welfare reform. These older children are then in the TAS for up to five waves while the younger children with the most exposure

[4]Because of the time it takes to complete any college degree is at least two years, all analysis examining college completion is restricted to the sample of individuals twenty years or older.

may only be in the TAS for one or two waves.

5 Results

5.1 Main Results

To help motivate the adult results, I first present results for the childhood sample. If welfare reform affects the livelihood of the adults, I should expect to find some effect of welfare reform on their cognitive or noncognitive skills when they are children. Though as described previously, sometimes these effects can be latent and not manifest themselves until later years. The results are shown in Tables 3 & 4. Table 3 shows least squared results from equation (4) while Table 4 shows results from the family fixed effects model, equation (5).

In these tables the coefficient for welfare treatment corresponds to β, the coefficient for welfare exposure corresponds to γ, and being from an at-risk household corresponds to δ from equations (4) & (5). For welfare treatment, the interpretation of the coefficient is the effect of an at-risk child going from no welfare reform exposure before the age of five to full welfare reform exposure before the age of 5. These results should be interpreted as the total effect of welfare reform treatment. The two tables show that at-risk children exposed to welfare reform experienced better outcomes compared to the comparison group. The magnitudes are generally larger in the fixed effect specification, but both specifications show that fully treated children improved their reading test scores by a statistically significant and fairly large amount, between 23-39 percent of a standard deviation. At the mean level of exposure of twenty months, this translates to a 6-7 percent of a standard deviation increase in reading test scores.

The effect of treatment also has a positive but statistically insignificant effect on

the applied problems mathematics test score. I do not see a statistically significant effect of welfare treatment on my noncognitive measure, the BPI. Though the coefficient is negative in both specifications, suggesting an improvement in behavior. As expected, the coefficients for welfare exposure are statistically not different from zero as apart from one instance, the fixed effect model for letter word score, suggesting there is potentially some kind of cohort effect beyond what is captured by the birth-year fixed effects. The coefficients for being from an at-risk household matches what one would intuitively expect. Children from disadvantaged families have lower test scores and exhibit more problematic behaviors. The results show that the short-run effect of welfare reform treatment suggests improvement to reading test scores with potential gains to mathematics and behavior as well. With gains potentially this large for fully exposed children, I should expect to see improvements in adulthood as well, particularly with regard to educational attainment.

It is helpful to put the magnitude of these effects in the context of the larger literature. For the childhood results, my findings of an average effect of a 5-7 percent of a standard deviation increase in reading scores are right in line with the earlier work of Morris et al. (2009) who found that young children whose family participated in a state welfare experiment that raised earnings and employment saw an increase in their achievement tests by 7 percent of a standard deviation. However, these magnitudes are smaller than what researchers have found examining the Project STAR results. As outlined by Schanzenbach (2006), researchers have consistently found that smaller class sizes increase test scores by 15 percent of a standard deviation, with minority students getting an even larger boost.

I now turn to the TAS sample to test for the long-run impacts of welfare reform. Tables 5 & 6 present the main results for the young adult sample. The results are in line with the childhood results of higher test scores and fewer problematic behaviors. Adults who were treated by welfare reform as children show strong improvements in the likelihood of graduating college, the likelihood they are married, and are less likely to have a child out of wedlock. For educational attainment, the coefficients for

the family fixed effect model are larger in magnitude than the OLS specification but have the same pattern of statistical significance. Interestingly, neither specification finds an effect of welfare reform treatment on the likelihood of attending college, though both are positive, but both find that full welfare reform treatment increases the likelihood of graduating college by about 15 to 20 percentage points. This is an increase of 54 and 70 percent from the baseline means, respectively. At the mean level of exposure of twelve months, this is an average intent-to-treat effect of 9 to 12 percent increase from the baseline means.

The OLS model also shows that the fully treated adults are 8.1 percentage points or 73 percent more likely to be married with the average effect being 12 percent more likely, but this coefficient is not statistically different from zero when controlling for fixed family characteristics. Similarly, the fully treated adults are 15 percentage points less likely to have a child out of wedlock. This effect would be equal to a more than 100 percent decrease from the baseline mean of 14 percent. Considering full welfare reform treatment would be a 3 standard deviation increase from the mean, it seems more appropriate to analyze this effect at the mean level of treatment. Those with the mean level of treatment are 2.6 percentage points or 18 percent less likely to have a child out of wedlock, though this effect is also not statistically different from zero when controlling for fixed family characteristics. As expected, the coefficients for welfare exposure are zero with one exception, for the OLS model of marriage. However, it does not persist once fixed family characteristics are accounted for. The coefficients for growing up in a disadvantaged household match intuition here as well. These young adults have lower rates of educational attainment, less likely to be married, and more likely to have a child out of wedlock.

These results show strong improvements for children who grew up affected by welfare reform. It appears the gains to reading test scores as a child translate to higher educational attainment later in life. Perhaps because they are more educated, they also find themselves in more stable family environments. Treated adults show some evidence of higher rates of marriage and fewer children born out of wedlock,

suggesting that TANF is meeting its goal of more two parent, stable families. However, it should be noted that these are all relatively young adults whose ultimate family structure may yet to be determined, but these early results are consistent with program goals.

Here again, it is helpful to put these effect sizes into context. Bastian and Michelmore (2018) find that teenage exposure to EITC increases the likelihood of completing college by 4.2 percent while Cohodes et al. (2016) find that Medicaid expansion between the 1980 and 1990 birth cohorts increased college completion by 6 percent. While these are both smaller effects than what I find, it should be noted that these papers both focus on completion of a four year college degree, while I examine both two year completion and four year completion. For family structure, Bitler et al. (2004) find that TANF implementation is associated with a 13-21 percent reduction in marriage rates. My estimate for the second generation of welfare reform suggests an almost equal but opposite increase in marriage. For fertility, Garfinkel et al. (2003) and Horvath-Rose et al. (2008) examine specific attributes of welfare reform, state welfare benefits and family caps respectively, and find reductions in non-marital births of 4-6 percent. This suggests that my drops in non-marital births may be driven more by gains to education and increases to marriage.

Given that TANF and its predecessor AFDC primarily benefit single mothers, and the work of Hartley et al. (2017) on the transmission of welfare use from mothers to daughters, I also test if the children of welfare reform have different results by gender as adults. Tables 7 & 8 show results for men and women, respectively. Here I present the results from the model without family fixed effects. The sample size is too small otherwise to reliably draw any inference, as a family fixed effects model by gender would only compare brothers to brothers and sisters to sisters. The effects of welfare treatment are much stronger for women.

Table 7 shows the results for young men. Here the results are much weaker compared to Table 5. I find that treated men are not more likely to complete college

at a statistically significant level. However, the men are still more likely to be married at a rate roughly equal to that for the whole sample, 7.3 percentage points for the fully treated and 1.2 percentage points for those with mean level of exposure. There are no statistically significant effects of welfare treatment on college attendance, starting their own family unit, or having a child out of wedlock. Interestingly, compared to the whole sample men appear to be less affected by growing up in a disadvantaged household, though they are statistically significantly more likely to have a child out of wedlock if they are from a disadvantaged household.

For women however, I find strong effects of welfare reform on educational attainment, marriage, and starting their own family unit. These results are shown in Table 8. Young women who were fully treated by welfare reform are 23 percentage points more likely to graduate college. For the mean level of exposure this is a 13.5 percent increase from baseline. Women with full treatment are 9.2 percentage points more likely to be currently married. At the mean level of treatment, this is a 12 percent increase and a 22 percent reduction, respectively. Women also appear to be deeply affected by growing up in a disadvantaged household. Those women from low-educated single mother households are less likely to attend college, more likely to be a single parent, and are less likely to be married.

It appears that the gains from welfare treatment shown in the OLS model in Table 5 are primarily driven by women. While men do see gains to college completion and are less likely to have a child out of wedlock, the results are much stronger for women. While somewhat surprising, these results do match some of the larger literature. The results for female educational attainment are in line with the literature that finds that welfare reform reduced the rates of female high school dropouts (Offner, 2005; Dave et al., 2012; Miller and Zhang, 2012; Hartley et al., 2017). Other programs such as the Moving to Opportunity experiment, which moved young children to nicer neighborhoods, also found that teenage girls were the largest beneficiary of the improved environment (Chetty et al., 2016).

5.2 Robustness Checks

I now turn my attention to the possibility of endogenous migration. To this point there have been no restrictions on the individuals staying in the same state all throughout childhood. If parents and their children migrated in response to welfare generosity, then the movement would be endogenous and bias the results of the model. To address this, I re-estimate equation (4), for childhood and adult outcomes, on individuals who never moved states during childhood. These results are shown in Tables 9 and 10.

For the childhood results, Table 9, the results are generally similar to the main results shown in Table 3 both in terms of magnitude and percent change. The exception being that the estimates for the effect of full welfare treatment are stronger for the reading tests for the sample of non-movers. The effect of welfare treatment is now positive for the behavior problem index, but still not statistically different from zero. Given the point estimates, this is likely due to the smaller sample size and resulting larger standard errors for the estimates. The own effect of welfare reform exposure persists between specifications as does the effect of being from a disadvantaged household. This trend holds for the young adult results as well, seen in Table 10. The effect of welfare reform treatment on college completion and family structure is robust to the sample of non-movers only and nearly identical in magnitude and percent change. For the family structure outcomes, the results are still statistically insignificant though they are larger in magnitude. The results of the fixed effect specification also hold for the sample of nonmovers. These results are seen in Appendix Tables A.3 & A.4.

One might also be concerned about the effect of changing state policies over these time periods such as Medicaid expansion or SNAP liberalization that won't be captured by state and survey year fixed effects. To control for any state specific time trends I re-estimate equation (4) and include state-year fixed effects. This is done

for both childhood and adult outcomes and the results are seen in Tables 11 and 12. Here again the results are quite similar to the main specifications. This suggests that my results are not driven by other changing state specific policies. I also re-estimate the fixed effect specifications including state-year fixed effects. These results are seen in Appendix Tables A.5 & A.6.

Lastly, I explore an alternative specification for childhood exposure to welfare reform and adult outcomes to examine the effect of the timing of exposure. Though the literature agrees that early childhood is a crucial time, it is possible that welfare reform exposure at all ages matters for later life outcomes. In this alternate specification, I use an event study model that allows me to explore the timing of welfare reform exposure more thoroughly. Specifically, I estimate a modified difference in difference model for the sample of individuals that were raised by a low-educated single mother. The difference in difference model is written as

$$Y_{istb} = \gamma W_{isb} + \Gamma X_{istb} + \eta_t + \eta_s + \eta_b + u_{istb}, \tag{6}$$

where the terms are the same as described in section 3.

In the event study framework, I allow the effect of welfare reform to vary by the individual's age at welfare reform implementation in their state. For example, If a person was eight years old when welfare reform was implemented in their state, they would have an event time of 8. If welfare reform was implemented two years before they were born, they would have an event time of -2. I then replace the exposure measure in the difference in difference model of equation (6) with a series of dummy variables based on the individuals age at welfare reform from two years prior to birth through age 9 with age 10 being the omitted category. The model is written as

$$Y_{istb} = \sum_{a=-2}^{9} \gamma_a D_{isb} + \Gamma X_{istb} + \eta_t + \eta_s + \eta_b + u_{istb}, \tag{7}$$

where $D_{isb} = 1$ if their age at welfare reform implementation is equal to a. I present

the results for college completion in Figure 2.

Here I focus on the college completion outcome as it is the outcome that is consistently significant across specifications. It is important to note that this graph is the opposite of the typical event study graph. Here, exposure decreases as one moves from the left of the graph to the right of the graph. A person with an event time of -1 is exposed from in-utero through all of childhood, while a person with event time of 8 is only exposed from age 8 onwards. The results match the literature which suggests that in-utero and very early childhood exposure will have the largest impact on adult outcomes. The figure shows those exposed pre-birth to the age of one have the largest gains when it comes to college completion as an adult. The effect of welfare reform exposure steadily decreases as the child's age at first exposure increases, though the effects of exposure are still positive through age nine. The relative flatness of the line in negative time to birth also helps rule out the possibility of any pre-trends that could be influencing my results.

6 Conclusion

Childhood circumstance can have wide reaching implications for adulthood. In the economics literature everything from childhood health and income to neighborhood to school has been shown to have effects later in life. This paper is part of a growing section of literature to seeks to answer what are the long-run effects of childhood exposure to the social safety net. As welfare reform passes its twenty year anniversary, I am one of the first to test for the long-run effects of the TANF program. These results are crucial in our understanding of the total impact of the TANF program, and it's implications for policy changes to other programs in the future.

Using data from the PSID, I model the human capital production technology as a function of childhood investment. I estimate the model empirically using a triple

difference framework that can accommodate family fixed effects. I first contribute to the existing literature on the short-run effects of welfare reform by showing that at-risk children who were exposed to welfare reform score higher on reading achievement tests. Turning to the adult sample, I find that these same children are more likely to complete college, more likely to be married, and are less likely to have a child out of wedlock. The latter two results suggesting that PRWORA was successful in its goal of promoting two-parent families.

For adults, women seem to benefit more from this treatment than men. Compared to other men, treated men are more likely to be married. For women affected by welfare reform, they are much more likely to complete college, be married, and not be a single mother. For the whole sample, the effect of welfare treatment on higher reading score and college completion result is robust to the addition of family fixed effects, the sample of non-movers, and the inclusion of state-time fixed effects. Using an event study model I find that first exposure has the largest impact when the individual is in-utero through the age of one.

Finally, putting these results into the context of the larger literature on welfare reform, it is helpful to recall the words of Blank (2009). In her survey chapter, she concludes by saying, "It is perhaps surprising that these very large changes in welfare use, work, and earnings have had at best small effects on other domains of family life among single-mother families . . . It is possible that these other domains will show effects only over time, with longer-term cumulative effects on health, child outcomes, or fertility that are simply not yet visible in the data." The results presented here reflect her belief that the largest effects from welfare reform are not found in the single-mothers themselves but in the lives of their grown children.

The changes to household environment brought on by welfare reform were perhaps felt the strongest by the children of the household during their formative years than by the parents themselves. My work presented here, along with Hartley et al. (2017), suggests this to be the case. Both papers find noticeable effects of welfare reform

on adult outcomes for those who were children at the time of welfare waivers and PRWORA. These results are among the first in an emerging literature on the long-run effect of welfare reform. However, there is still more work to be done. As the sample ages we will be able to examine long-run effects of welfare reform on outcomes such as health, earnings, and family structure.

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Tables and Figures

Figure 1: Welfare Reform Implementation Year, By State

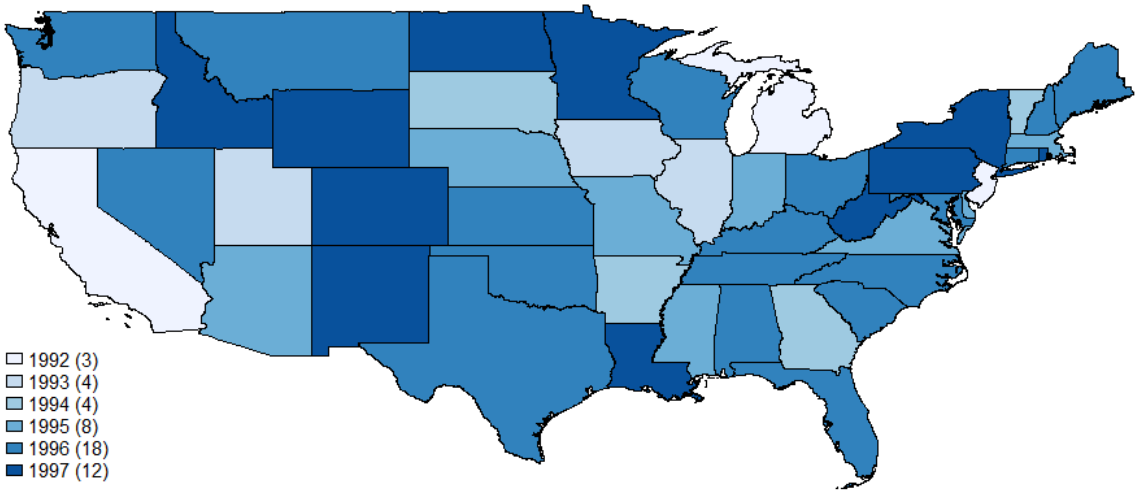

Figure 2: Event Study Estimates of the Impact of Welfare Reform on College Completion

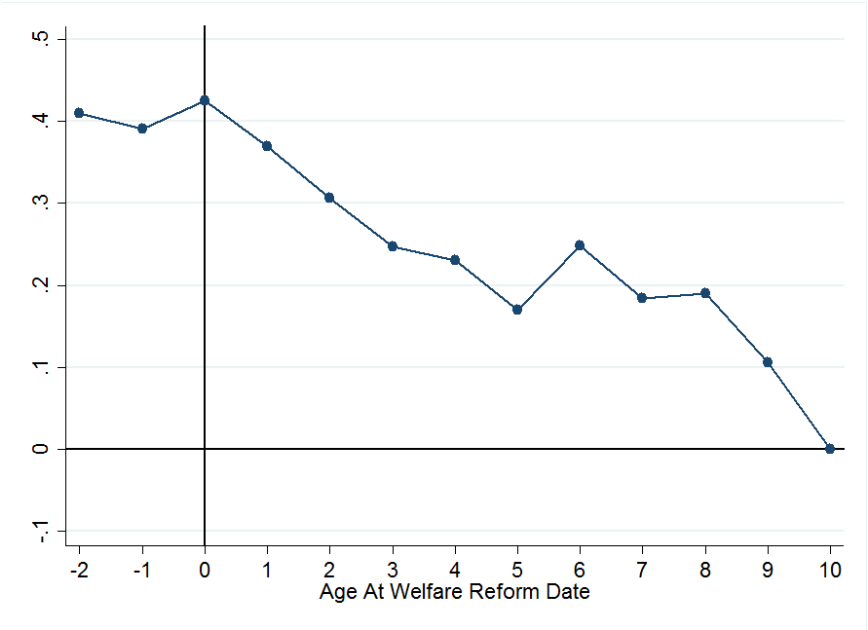

Table 1: Descriptive Statistics - Child Development Supplement

	Mean	SD	Observations
Welfare Exposure	0.30	0.36	5456
Raised by Low-Edu Single Mom	0.17	0.38	5456
Cognitive Outcomes			
Letter Word Score	103.75	18.19	4760
Applied Problems Score	104.05	16.51	4741
Passage Comprehension Score	102.25	16.33	4173
Noncognitive Outcome			
Behavior Problem Index	8.49	6.31	5341
Demographics			
Child Age	11.49	4.04	5456
Male	0.51	0.50	5456
White	0.61	0.49	5456
Black	0.18	0.38	5456
Number of Siblings	1.46	1.14	5456
Birthweight (ounces)	119.01	21.74	5456
Was Breastfed	0.54	0.50	5456
Mother Age	38.90	7.82	5456
Mother Less Than HS Edu.	0.22	0.41	5456
Mother HS Degree	0.36	0.48	5456
Mother Some College Edu.	0.33	0.47	5456
Mother College Degree	0.07	0.26	5456
Mother Postgraduate	0.03	0.17	5456
Raised By Grandparents	0.03	0.16	5456
Urban Residency	0.63	0.48	5456
State Controls			
State Unemployment Rate	5.29	1.05	5456
State Minimum Wage	6.33	0.82	5456
State EITC Rate	0.04	0.08	5456
Maximum TANF Benefit 2-Person	378.97	145.09	5456
Maximum TANF Benefit 3-Person	471.29	181.08	5456
Maximum TANF Benefit 4-Person	552.18	206.44	5456

Table 2: Summary Statistics - Transition to Adulthood Supplement

	Mean	SD	Observations
Welfare Exposure	0.17	0.29	6356
Raised By Low-Edu Single Mom	0.18	0.38	6356
Outcomes			
Some College	0.71	0.45	6278
College Degree	0.27	0.44	4397
Currently Married	0.11	0.31	6356
Single Parent	0.14	0.35	6354
Demographics			
White	0.70	0.46	6356
Black	0.20	0.40	6356
Male	0.50	0.50	6356
Age	21.6	2.73	6356
Number of Siblings	1.61	1.12	6356
Childhood Characteristics			
Birth Weight (ounces)	119.3	22.20	6356
Was Breastfed	0.54	0.50	6356
Mother Less Than HS Edu.	0.23	0.42	6356
Mother HS Degree	0.35	0.48	6356
Mother Some College Edu.	0.32	0.47	6356
Mother College Degree	0.06	0.25	6356
Mother Postgraduate	0.03	0.17	6356
Raised By Grandparents	0.03	0.17	6356
Family Median Income (ten thousands)	5.93	3.94	6356
Letter Word Score	104.88	17.41	6356
Applied Problems Score	105.57	14.78	6356
Passage Comprehension Score	102.81	14.28	6356
Behavior Problem Index	8.41	5.44	6356
Mother Worked	0.58	0.30	6356
Ever Used Formal Child Care	0.18	0.38	6356
Ever Used Informal Child Care	0.31	0.46	6356
State Controls			
State Minimum Wage	7.88	0.78	6356
State Unemployment Rate	7.12	2.24	6356

Table 3: Childhood Human Capital

	Letter Word	Passage Comp.	Applied Problems	BPI
Welfare Treatment (β)	4.305***	3.040**	0.574	-0.068
	(1.122)	(1.390)	(1.250)	(0.673)
Welfare Exposure (γ)	-1.368	-2.233	-2.155	0.396
	(1.991)	(2.086)	(1.839)	(0.644)
At-Risk (δ)	-3.732***	-2.965***	-0.124	1.249***
	(0.695)	(0.863)	(0.818)	(0.305)
Outcome SD	18.14	16.48	16.47	6.31
Percent Change	23.74	18.44	3.49	-1.07
Treatment at Mean W_{isb}	1.280	0.904	0.171	-0.020
Perc. Change at Mean	7.06	5.48	1.04	-0.32
Obs.	4,884	4,267	4,865	5,503

Note: standard errors clustered at the state level, * p <0.10, ** p <0.05, *** p <0.01. Controls include child gender, child race, number of siblings, child age, mother's age, mother education, birth weight, if breastfed, if raised by grandparent, urban residency, state unemployment rate, state minimum wage, state EITC, maximum TANF benefit for 2,3,4 person families. State, interview year, and birth-year fixed effects included.

Table 4: Childhood Human Capital Family Fixed Effects

	Letter Word	Passage Comp.	Applied Problems	BPI
Welfare Treatment (β)	7.135*	3.281	1.952	-1.443
	(3.661)	(2.804)	(2.262)	(1.073)
Welfare Exposure (γ)	-6.188**	-1.160	-4.348	0.503
	(2.479)	(4.280)	(3.917)	(0.996)
Outcome SD	18.11	16.78	16.12	6.37
Percent Change	39.40	19.56	12.11	-22.64
Treatment at Mean W_{isb}	2.082	0.957	0.570	-0.421
Perc. Change at Mean	11.50	5.71	3.53	-6.60
Obs.	3,063	2,705	3,050	3,414
Sibling Pairs	786	777	786	813

Note: standard errors clustered at the state level, * p <0.10, ** p <0.05, *** p <0.01. Controls include child gender, child race, number of siblings, child age, mother's age, birth weight, if breastfed, urban residency, state unemployment rate, state minimum wage, state EITC, maximum TANF benefit for 2,3,4 person families. State, interview year, and birth-year fixed effects included.

Table 5: Adulthood Human Capital

	Attend College	College Degree	Married	Single Parent
Welfare Treatment (β)	0.022	0.146***	0.081***	-0.156**
	(0.074)	(0.036)	(0.021)	(0.062)
Welfare Exposure (γ)	-0.005	0.040	-0.071**	-0.039
	(0.064)	(0.042)	(0.035)	(0.039)
At-Risk (δ)	-0.082**	-0.039*	-0.051***	0.102***
	(0.036)	(0.023)	(0.016)	(0.025)
Sample Mean	0.71	0.27	0.11	0.14
Percent Change	3.07	54.76	73.39	-100.00
Treatment at Mean W_{isb}	0.004	0.024	0.014	-0.026
Perc. Change at Mean	0.51	9.12	12.22	-18.38
Obs.	6,278	4,397	6,356	6,354

Note: standard errors clustered at the state level, * p <0.10, ** p <0.05, *** p <0.01. Controls include gender, race, number of siblings, age, birth weight, if breastfed, mother's education, if raised by grandparent, state unemployment rate, state minimum wage. State, interview year, and birth-year fixed effects included.

Table 6: Adulthood Human Capital Family Fixed Effects

	Attend College	College Degree	Married	Single Parent
Welfare Treatment (β)	0.078	0.199**	0.044	-0.052
	(0.126)	(0.088)	(0.050)	(0.092)
Welfare Exposure (γ)	-0.085	-0.202**	-0.081	-0.051
	(0.095)	(0.083)	(0.056)	(0.109)
Sample Mean	0.73	0.28	0.10	0.14
Percent Change	10.72	70.36	43.04	-36.83
Treatment at Mean W_{isb}	0.014	0.035	0.008	-0.009
Perc. Change at Mean	1.87	12.25	7.49	-6.41
Obs.	3,878	2,689	3,921	3,919
Sibling Pairs	733	680	734	734

Note: standard errors clustered at the state level, * p <0.10, ** p <0.05, *** p <0.01. Controls include gender, race, age, birth weight, if breastfed, state unemployment rate, state minimum wage. State, interview year, and birth-year fixed effects included.

Table 7: Adulthood Human Capital - Men

	Attend College	College Degree	Married	Single Parent
Welfare Treatment (β)	-0.089	0.051	0.073**	-0.066
	(0.104)	(0.064)	(0.029)	(0.065)
Welfare Exposure (γ)	0.025	0.046	-0.042	-0.021
	(0.098)	(0.063)	(0.037)	(0.057)
At-Risk (δ)	-0.042	-0.005	-0.025	0.067**
	(0.048)	(0.032)	(0.016)	(0.029)
Sample Mean	0.67	0.23	0.09	0.10
Percent Change	-13.41	22.13	84.47	-69.24
Treatment at Mean W_{isb}	-0.015	0.008	0.012	-0.011
Perc. Change at Mean	-2.19	3.62	13.80	-11.31
Obs.	2,961	2,055	2,998	2,996

Note: standard errors clustered at the state level, * p <0.10, ** p <0.05, *** p <0.01. Controls include race, number of siblings, age, birth weight, if breastfed, mother's education, if raised by grandparent, state unemployment rate, state minimum wage. State, interview year, and birth-year fixed effects included.

Table 8: Adulthood Human Capital - Women

	Attend College	College Degree	Married	Single Parent
Welfare Treatment (β)	0.126	0.230***	0.092**	-0.230***
	(0.099)	(0.056)	(0.034)	(0.085)
Welfare Exposure (γ)	-0.052	0.034	-0.099*	-0.072
	(0.083)	(0.076)	(0.051)	(0.054)
At-Risk (δ)	-0.110**	-0.067**	-0.067**	0.124***
	(0.048)	(0.029)	(0.026)	(0.040)
Sample Mean	0.75	0.30	0.14	0.19
Percent Change	16.77	76.13	67.61	-100.00
Treatment at Mean W_{isb}	0.022	0.041	0.016	-0.041
Perc. Change at Mean	2.97	13.48	11.97	-21.88
Obs.	3,317	2,342	3,358	3,358

Note: standard errors clustered at the state level, * p <0.10, ** p <0.05, *** p <0.01. Controls include race, number of siblings, age, birth weight, if breastfed, mother's education, if raised by grandparent, state unemployment rate, state minimum wage. State, interview year, and birth-year fixed effects included.

Table 9: Childhood Human Capital - Nonmovers

	Letter Word	Passage Comp.	Applied Problems	BPI
Welfare Treatment (β)	4.651***	3.349**	0.327	0.027
	(1.507)	(1.610)	(1.277)	(0.753)
Welfare Exposure (γ)	0.388	-0.017	-2.556	0.134
	(2.083)	(2.080)	(2.099)	(0.792)
At-Risk (δ)	-3.512***	-2.938***	0.100	1.436***
	(0.918)	(0.928)	(1.025)	(0.338)
Outcome SD	18.31	16.73	16.48	6.30
Percent Change	25.40	20.02	1.98	0.43
Treatment at Mean W_{isb}	1.409	1.014	0.099	0.008
Perc. Change at Mean	7.69	6.06	0.60	0.13
Obs.	4,125	3,652	4,110	4,539

Note: standard errors clustered at the state level, * p <0.10, ** p <0.05, *** p <0.01. Controls include child gender, child race, number of siblings, child age, mother's age, mother education, birth weight, if breastfed, if raised by grandparent, urban residency, state unemployment rate, state minimum wage, state EITC, maximum TANF benefit for 2,3,4 person families. State, interview year, and birth-year fixed effects included.

Table 10: Adulthood Human Capital - Nonmovers

	Attend College	College Degree	Married	Single Parent
Welfare Treatment (β)	-0.005	0.138***	0.073***	-0.152**
	(0.081)	(0.042)	(0.020)	(0.074)
Welfare Exposure (γ)	0.009	0.087	-0.068*	-0.054
	(0.075)	(0.053)	(0.038)	(0.042)
At-Risk (δ)	-0.081*	-0.032	-0.053***	0.106***
	(0.041)	(0.023)	(0.017)	(0.032)
Sample Mean	0.72	0.27	0.11	0.14
Percent Change	-0.76	50.44	66.57	-100.00
Treatment at Mean W_{isb}	-0.001	0.024	0.013	-0.026
Perc. Change at Mean	-0.13	8.78	11.59	-18.58
Obs.	5,278	3,682	5,344	5,342

Note: standard errors clustered at the state level, * p <0.10, ** p <0.05, *** p <0.01. Controls include gender, race, number of siblings, age, birth weight, if breastfed, mother's education, if raised by grandparent, state unemployment rate, state minimum wage. State, interview year, and birth-year fixed effects included.

Table 11: Childhood Human Capital - Time Trends

	Letter Word	Passage Comp.	Applied Problems	BPI
Welfare Treatment (β)	4.493***	3.152**	0.768	-0.016
	(1.170)	(1.418)	(1.285)	(0.676)
Welfare Exposure (γ)	-1.857	-2.158	-2.263	0.311
	(2.106)	(2.401)	(1.897)	(0.706)
At-Risk (δ)	-3.754***	-2.931***	-0.140	1.204***
	(0.694)	(0.869)	(0.833)	(0.304)
Outcome SD	18.14	16.48	16.47	6.31
Percent Change	24.77	19.12	4.66	-0.26
Treatment at Mean W_{isb}	1.336	0.937	0.228	-0.005
Perc. Change at Mean	7.37	5.68	1.39	-0.08
Obs.	4,884	4,267	4,865	5,503

Note: standard errors clustered at the state level, * p <0.10, ** p <0.05, *** p <0.01. Controls include child gender, child race, number of siblings, child age, mother's age, mother education, birth weight, if breastfed, if raised by grandparent, urban residency, state unemployment rate, state minimum wage, state EITC, maximum TANF benefit for 2,3,4 person families. State, interview year, and birth-year fixed effects included.

Table 12: Adulthood Human Capital - Time Trends

	Attend College	College Degree	Married	Single Parent
Welfare Treatment (β)	0.015	0.141***	0.084***	-0.157**
	(0.076)	(0.042)	(0.020)	(0.063)
Welfare Exposure (γ)	-0.008	0.016	-0.083**	-0.033
	(0.060)	(0.056)	(0.039)	(0.040)
At-Risk (δ)	-0.084**	-0.038	-0.050***	0.101***
	(0.036)	(0.024)	(0.016)	(0.025)
Sample Mean	0.71	0.27	0.11	0.14
Percent Change	2.08	53.15	76.05	-100.00
Treatment at Mean W_{isb}	0.003	0.024	0.015	-0.027
Perc. Change at Mean	0.36	9.16	13.10	-19.18
Obs.	6,278	4,397	6,356	6,354

Note: standard errors clustered at the state level, * p <0.10, ** p <0.05, *** p <0.01. Controls include gender, race, number of siblings, age, birth weight, if breastfed, mother's education, if raised by grandparent, state unemployment rate, state minimum wage. State, interview year, and birth-year fixed effects included.

Appendix A

Table A.1: Description of Woodcock-Johnson-R Subtests

Subscale	**Description**
Letter-Word Identification	Tests for symbolic learning (matching pictures with words) as well as reading identification skills (identifying letters and words).
Applied Problems	Measures skill in analyzing solving practical problems in mathematics
Passage Comprehension	Measures comprehension and vocabulary skills using multiple-choice and fill-in-the-blank format

Table A.2: Behavior Problems Index Factors and Reliabilities

For the next set of statements, decide whether they are not true, sometimes true, or often true, of (CHILD)s behavior.	External	Internal	Total
(He/She) has sudden changes in mood or feeling	X		X
(He/She feels or complains that no one loves him/her		X	X
(He/She) is rather high strung and nervous	X		X
(He/She) cheats or tells lies	X		X
(He/She) is too fearful or anxious		X	X
(He/She) argues too much	X		X
(He/She) his difficulty concentrating, cannot pay attention for long	X		X
(He/She) is easily confused, seems to be in a fog		X	X
(He/She) bullies or is cruel or mean to others	X		X
(He/She) is disobedient	X		X
(He/She) does not seem to feel sorry after (he/she misbehaves)	X		X
(He/She) has trouble getting along with other children	X	X	X
(He/She) is impulsive, or acts without thinking	X		X
(He/She) feels worthless or inferior		X	X
(He/She) is not liked by other children		X	X
(He/She) has difficulty getting (his/her) mind off certain thoughts		X	X
(He/She) is restless or overly active, cannot sit still	X		X
(He/She) is stubborn, sullen, or irritable	X		X
(He/She) has a very strong temper and loses it easily	X		X
(He/She) is unhappy, sad, or depressed		X	X
(He/She) is withdrawn, does not get involved with others		X	X
(He/She) breaks things on purpose or deliberately destroys things	X		X
(He/She) clings to adults	*	*	X
(He/She) cries too much	X		X
(He/She) demands a lot of attention	X		X
(He/She) is too dependant on others		X	X
(He/She) feels others are out to get (him/her)		X	X
(He/She) hands around with kids who get into trouble	*	*	X
(He/She) is secretive, keeps things to (himself/herself)		X	X
(He/She) worries too much		X	X
Number of Items	16	13	30
Cronbach's alpha	0.86	0.81	0.9

Table A.3: Childhood Human Capital Family Fixed Effects - Nonmovers

	Letter Word	Passage Comp.	Applied Problems	BPI
Welfare Treatment (β)	6.805*	3.713	2.655	-1.086
	(4.040)	(3.258)	(2.218)	(1.108)
Welfare Exposure (γ)	-4.927*	0.668	-3.656	-0.254
	(2.456)	(4.558)	(3.826)	(1.021)
Outcome SD	18.15	16.90	16.10	6.37
Percent Change	37.49	21.96	16.49	-17.06
Treatment at Mean W_{isb}	1.979	1.080	0.772	-0.316
Perc. Change at Mean	10.91	6.39	4.80	-4.96
Obs.	2,793	2,475	2,782	3,087
Sibling Pairs	716	709	716	736

Note: standard errors clustered at the state level, * p <0.10, ** p <0.05, *** p <0.01. Controls include child gender, child race, number of siblings, child age, mother's age, birth weight, if breastfed, urban residency, state unemployment rate, state minimum wage, state EITC, maximum TANF benefit for 2,3,4 person families. State, interview year, and birth-year fixed effects included.

Table A.4: Adulthood Human Capital Family Fixed Effects - Nonmovers

	Attend College	College Degree	Married	Single Parent
Welfare Treatment (β)	0.015	0.202**	0.075	0.051
	(0.135)	(0.086)	(0.053)	(0.078)
Welfare Exposure (γ)	-0.086	-0.231***	-0.110	-0.114
	(0.095)	(0.078)	(0.068)	(0.107)
Sample Mean	0.72	0.28	0.10	0.14
Percent Change	2.04	72.21	73.47	35.62
Treatment at Mean W_{isb}	0.003	0.035	0.013	0.009
Perc. Change at Mean	0.35	12.44	12.66	6.14
Obs.	3,544	2,470	3,586	3,584
Sibling Pairs	673	625	674	674

Note: standard errors clustered at the state level, * p <0.10, ** p <0.05, *** p <0.01. Controls include gender, race, age, birth weight, if breastfed, state unemployment rate, state minimum wage. State, interview year, and birth-year fixed effects included.

Table A.5: Childhood Human Capital Family Fixed Effects - Time Trend

	Letter Word	Passage Comp.	Applied Problems	BPI
Welfare Treatment (β)	7.396*	3.341	2.318	-1.496
	(3.746)	(2.871)	(2.285)	(1.074)
Welfare Exposure (γ)	-6.482**	-1.052	-5.104	0.634
	(2.511)	(4.906)	(3.955)	(1.188)
Outcome SD	18.11	16.78	16.12	6.37
Percent Change	40.84	19.92	14.39	-23.47
Treatment at Mean W_{isb}	2.158	0.975	0.676	-0.436
Perc. Change at Mean	11.92	5.81	4.20	-6.85
Obs.	3,063	2,705	3,050	3,414
Sibling Pairs	786	777	786	813

Note: standard errors clustered at the state level, * p <0.10, ** p <0.05, *** p <0.01. Controls include child gender, child race, number of siblings, child age, mother's age, birth weight, if breastfed, urban residency, state unemployment rate, state minimum wage, state EITC, maximum TANF benefit for 2,3,4 person families. State, interview year, and birth-year fixed effects included.

Table A.6: Adulthood Human Capital Family Fixed Effects -Time Trends

	Attend College	College Degree	Married	Single Parent
Welfare Treatment (β)	0.059	0.224**	0.055	-0.058
	(0.139)	(0.095)	(0.055)	(0.094)
Welfare Exposure (γ)	-0.068	-0.218*	-0.085	-0.054
	(0.109)	(0.126)	(0.070)	(0.100)
Sample Mean	0.73	0.28	0.10	0.14
Percent Change	8.06	79.32	53.16	-41.12
Treatment at Mean W_{isb}	0.010	0.039	0.010	-0.010
Perc. Change at Mean	1.40	13.81	9.25	-7.16
Obs.	3,878	2,689	3,921	3,919
Sibling Pairs	733	680	734	734

Note: standard errors clustered at the state level, * p <0.10, ** p <0.05, *** p <0.01. Controls include gender, race, age, birth weight, if breastfed, state unemployment rate, state minimum wage. State, interview year, and birth-year fixed effects included.