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CHILDREN'S WELFARE EXPOSURE AND SUBSEQUENT DEVELOPMENT

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ABSTRACT

We examine the extent to which children are exposed to the welfare system through their mother's receipt of benefits and its impact on several developmental outcomes. Using data from the matched mother-child file from the National Longitudinal Survey of Youth (NLSY), we find that children's welfare exposure is substantial. By age 10 over one-third of all children will have lived in a welfare household; black, non-Hispanic children face a much higher rate of exposure. Simple correlations suggest a strong negative relationship between maternal welfare receipt and children's outcomes. In this paper we implement three alternative strategies (instrumental variables, sibling difference, and child fixed effects models) designed to identify whether this correlation can be attributed to the mother's welfare receipt directly or to other characteristics of mothers who receive welfare, regardless of whether or not those characteristics are observable to the researcher. Based on the results of all three estimation strategies, we find little evidence of any causal link between maternal welfare receipt and children's developmental outcomes.

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I. INTRODUCTION

The issue of welfare dependency became a focal point in the recent debate over welfare reform. Indeed, many policy makers pointed to dependency as a compelling reason to completely overhaul the nation's system for transferring income to poor mothers. The new emphasis on work brought about by the sweeping welfare reform legislation of 1996, they argued, would promote self-sufficiency among the mothers (Mead, 1992; Rector, 1997). Others have criticized these reforms because they may exacerbate already disturbing levels of child poverty, which tends to be linked to inferior outcomes for children (Bane, 1997; Edelman, 1997; and Duncan and Brooks-Gunn, 1997).

If welfare expenditures necessitate a difficult tradeoff between parental dependency and child poverty, it is critical to know the terms of the tradeoff. Although a large body of scholarly research has considered the impact of welfare on adult recipients (c.f. Moffitt, 1992), relatively little research has considered the issue of how maternal welfare receipt impacts the well-being of children. This paper addresses the question, is children's development affected by their mothers' welfare receipt?

The main methodological problem that any research in this area faces is determining causality. Differences in children's outcomes are the result of a myriad of factors, many of which may be correlated with the family's welfare history. The identification of a causal link between the mother's welfare receipt and the child's outcomes requires the researcher to carefully control for these other factors. Neglecting to do so would result in an estimated welfare effect that was, in fact, an amalgam of both welfare influences and the influences of variables correlated with welfare receipt.

This research uses three distinct methods that can control for differences among families, including those that cannot be observed by the researcher, which could confound the estimation of a welfare effect. First, we implement an instrumental variables estimator where parameters of state welfare systems and local labor market conditions represent the instruments. Second, we consider differences in outcomes between siblings, who have the same fixed family background, but who may have been exposed to different amounts of maternal welfare receipt during their childhood. Finally,

we use repeated observations on children to estimate individual fixed effects models that identify changes in outcomes over time for an individual child as a function of changes in the degree to which the child has been exposed to welfare.

Data matched between mothers and children from the National Longitudinal Survey of Youth (NLSY) enable us to implement these strategies. These data follow 6,283 women initially between the ages of 14 and 21 in 1979 and have subsequently tracked all of the children born to these women. Importantly, these data provide an event history of welfare receipt going back to January of 1978 that encompasses most of these women's adult lives and virtually all of their children's lives. We use these event histories to calculate the extent to which each child in the sample was exposed to the welfare system. In addition, these data provide biannual assessments of these children's development beginning in 1986 that are the focus of much of this analysis.

We find that children's welfare exposure is extensive. By age 10 over one-third of all children will have lived in a household in which their mothers received welfare at some point in their lives. For those whose mothers have received some welfare, these children will have spent one-third of their lives on welfare. Statistics for black, non-Hispanic children are considerably higher than that. Moreover, we find a strong negative correlation between maternal welfare receipt and these children's outcomes in the raw data. However, introducing statistical controls for both observable and unobservable differences between mothers completely eliminates this differential.

II. BACKGROUND

Although the effects on children of maternal welfare receipt have received considerable attention in the literature, the vast majority of this research focuses on children's outcomes in adulthood or nearing adulthood. These papers examine issues such as whether children from welfare households are more likely to become teen mothers (c.f. An, Haveman, and Wolfe, 1993), acquire fewer years of education (c.f. Butler, 1990), or receive welfare themselves (c.f. Duncan, et al. 1988, Gottschalk, 1990; Antel, 1992; and Levine and Zimmerman, 1996).

In this literature, the link between maternal welfare receipt and children's outcomes is typically hypothesized to stem from two sources. First, children reared in a household that received welfare may come to attach less stigma to participating in the welfare system. Second, their exposure to the welfare system may make the children more aware of how it functions, thus reducing the transaction costs associated with participation. Both of these effects could make children exposed to maternal welfare receipt more likely to participate in the welfare system or less likely to invest in human capital than children who were not exposed to welfare participation in their home. Notice that both of these effects are possible in an environment where other things (particularly household income) are held constant.

Far less research has considered the impact of welfare on children while they are still very young. Since these years are critical in their subsequent development (c.f. Duncan, et al., 1994), identifying whether maternal welfare receipt has any effect on children's outcomes during these years becomes an important research question. Yet, the mechanism by which maternal welfare receipt may affect children when they are young is somewhat different from the mechanism linking maternal welfare receipt and the children's outcomes when they are adults. In this case, reductions in stigma or transaction costs are less plausible.

Instead, the connection could stem from the impact welfare receipt has on the environment in which the child is reared. If, for example, maternal welfare receipt reduces the motivation of parents to invest in the human capital or developmental needs of their children then we may see effects in any children's outcomes sensitive to these parental inputs. Suppose that children's behavior and early success in school are determined by such character traits as self control, the ability to defer gratification, curiosity, etc. If these traits in adults are adversely affected by welfare participation and are transmitted across generations then we would expect to see a negative connection between parental welfare receipt and children's outcomes.[1] Alternatively, parental

[1]In simple terms, it is sometimes alleged that welfare participation breeds a kind of complacency in parents that is reflected in the home environment (c.f. Rector and Fagan, 1999).

welfare participation could benefit younger children. In particular, it could allow the mother to spend more time with her child or it could help smooth transitory fluctuations in the family's income and help stabilize consumption (c.f. Gruber, 2000). In this paper we do not attempt to distinguish between competing theories on the mechanisms underlying any potential link between parental welfare receipt and children's outcomes. Rather, we focus on providing a causal reduced form estimate of any correlation that might exist.

Although research regarding the impact of welfare on children is limited, we were able to identify three papers on the topic. Currie and Cole (1993) examine the intergenerational linkage between maternal welfare receipt and children's birth weight. The paper applies an instrumental variables model and sibling differences in much the same manner we do here to control for the fact that AFDC families are different from other families in ways which are often unobservable to the researcher. In the IV models, parameters of states' welfare systems are used as the excluded instruments in these models, as suggested by Moffitt (1992). In both sets of results, they find that the observed raw differential in the probability of low birth weight by maternal welfare receipt disappears once they control for unobservable family background characteristics.

Hill and O'Neill (1994) and Driscoll and Moore (1997) conduct analyses similar to those presented in this paper using the same data and examining some of the same outcome measures. One potential problem with these papers is that they include family income as an explanatory variable. Yet Currie (1994) notes that income, like maternal welfare receipt, may be endogenous and bias the results. In addition, the Driscoll and Moore paper includes as instruments individual-level variables like age and marital status at first birth that, one could argue, are also endogenous in the same way as family income and maternal welfare status. The Hill and O'Neill paper faces another potential form of bias related to sample selection. Although they use the same data set as we do,

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Empirically, this complacency would exhibit itself in through reduced investments in the human capital of the child by way of reductions in time spent reading versus watching television, etc. Again, these effects may occur even holding constant differences in family income.

their paper was written several years ago and the survey respondents who had become mothers did so at quite a young age. These women may not be representative of all mothers. Our analysis also utilizes sibling differences and individual fixed-effect models that neither of these papers employs.

III. METHODOLOGY

We implement three alternative strategies to estimate the relationship between maternal welfare receipt and children's outcomes abstracting from both observable and unobservable differences between welfare and non-welfare mothers. Each strategy offers different strengths and weaknesses, which we will describe here. Nevertheless, comparing results across the alternative models should allow us to draw stronger conclusions than those that could be drawn from any single approach.

We first implement an instrumental variables (IV) strategy. Such an estimator allows identification of the causal linkage between maternal welfare receipt and children's outcomes if there exists some variable(s) that is correlated with the mother's welfare receipt, but uncorrelated with any unobservable family characteristics. We use parameters of state welfare systems (as past research has) along with local labor market conditions, as measured by the unemployment rate, assuming that they satisfy these conditions.

Formally, the model we estimate may be specified as:

$$(1) \qquad O_i^c = \alpha + \beta W_i^m + \gamma Y_i + \delta X_i^p + \phi X_i^c + v_i^c.$$

where: O represents child outcome measures for child c, W represents a measure of maternal welfare receipt, Y is average family in the years since the child was born, and X^p and X^c are vectors of parents' (p) and children's characteristics, including things like demographics, educational attainment, and the like. We estimate this model using both OLS and IV.

This model, which is similar to that used in previous research, does have an important shortcoming. It includes measures of family income and parents' characteristics that may be endogenous to differences in welfare receipt (i.e. Y and X^p may be a function of W^m). For instance, welfare receipt may alter one's labor market activities and educational attainment, which could have additional implications for children's development. Because variables like these could capture part of the intergenerational effects of welfare receipt, the coefficient on maternal welfare receipt may be downward biased. On the other hand, excluding these variables from the model may introduce an upward omitted variable bias because difficulties experienced by children growing up in poverty, for instance, would appear to be related to welfare receipt since all welfare mothers are poor. As a result, we estimate specifications that both include and exclude a set of potentially endogenous covariates.[2] This enables us to determine the sensitivity of our estimates (and those of previous studies) to this problem.

The second technique we employ is to utilize the family structure of the NLSY data, described below, and estimate differences in outcomes between siblings who may have differed in their exposure to the welfare system. For example, a mother may not have needed the support of the welfare system until a second child was born. Therefore, the first born would have lived for some number of years with no maternal welfare receipt while the mother may have been on welfare throughout the second born's early childhood. The difference in outcomes between these two siblings would control for any fixed, mother/family specific characteristics, including those that cannot typically be observed.

Specifically, equation (1) may be rewritten in the following form for siblings i and j, respectively, in family f:

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[2]Estimating an IV model that treats income as endogenous as well as maternal welfare receipt would be preferable to the approach taken here because the impact of income on these outcomes is of independent interest. Unfortunately, no variables exist that are obviously related to family income, but not children's outcomes.

$$O_{if}^{c} = \alpha_0 + \alpha_f + \beta W_{if}^{m} + \gamma Y_{if} + \delta X_{if}^{p} + \phi X_{if}^{c} + v_i^{c}. \quad (2)$$

$$O_{jf}^{c} = \alpha_0 + \alpha_f + \beta W_{jf}^{m} + \gamma Y_{jf} + \delta X_{jf}^{p} + \phi X_{jf}^{c} + v_j^{c}. \quad (3)$$

These equations indicate that a fixed family effect, equal to α_f, is present. Although parents' characteristics do not differ between siblings at a point in time, they may differ somewhat in the interval between the births of the younger and older siblings as, say, the mother's remarriage led a younger child to live a larger share of years since birth in a two-parent household. Therefore, these equations are specified with sibling subscripts on parental characteristics.

Based on these equations, we estimate a model of sibling differences of the form:

$$\Delta O^{c} = \beta^{*}\Delta W_f^{m} + \gamma\ \Delta Y_f + \delta^{*}\Delta X_f^{p} + \phi^{*}\Delta X_f^{c} + \Delta v^{c} \quad (4)$$

where all differences are estimated by subtracting characteristics of the younger child from those of the older child.[3] The advantage of this model is that all observable and unobservable family-specific fixed effects are differenced out. The effect is identified from the difference in children's outcomes as a function of the difference in welfare exposure between the two siblings. This model is also sufficiently flexible to control for observable differences in family characteristics that have taken place over time.

A disadvantage of this model is that unobservable family characteristics that change between siblings cannot be controlled for. For instance, a mother who gave birth to a second child after she recovered from a period of depression may be less likely to require public assistance and may be better equipped to invest in her child. In addition, changes within the family over time may be endogenous to the welfare system, such as a woman who works her way off welfare and becomes

[3]In this specification, we allow average family income since birth to vary between the two siblings, but if investments in children are based on permanent income, then this observed difference over a relatively short time span should be excluded. Therefore, we estimate models that both include and exclude this variable, as reported below.

a more attractive candidate for marriage.[4] Another difficulty in this model is that it cannot control for the fact that siblings may also differ within the family and bias the estimated effect of maternal welfare receipt. Consider one child in a family who has Attention Deficit Disorder. His/Her difficulties would be observed in the form of low scores on tests of cognitive development, while behavior problems may make it more difficult for the mother to work and force her to rely on welfare.

A third approach that we employ uses the longitudinal nature of the NLSY data, which provides repeated observations for several outcome measures, to estimate individual fixed effects models. Again, equation (1) can be modified to represent two observations, one at time s and the other at time t, for the same individual.

$$(5) \qquad O_{is}^{c} = \alpha_0 + \alpha_i + \beta W_{is}^{m} + \gamma Y_{is} + \delta X_{is}^{p} + \phi X_{is}^{c} + v_{is}^{c}.$$

$$(6) \qquad O_{it}^{c} = \alpha_0 + \alpha_i + \beta W_{it}^{m} + \gamma Y_{it} + \delta X_{it}^{p} + \phi X_{it}^{c} + v_{it}^{c}.$$

The term, α_f, represents the individual-specific fixed effect. Again, parental characteristics are allowed to change over time even though some of them may be constant.[5] To estimate this model we take the deviation between each observation and the person-specific mean for each variable:

$$(7) \qquad (O_{it}^{c} - \overline{O}_{i}^{c}) = \alpha_0 + \beta(W_{it}^{m} - \overline{W}_{i}^{m}) + \delta(X_{it}^{p} - \overline{X}_{i}^{p}) + \gamma(Y_{it} - \overline{Y}_{i}) + \phi(X_{it}^{c} - \overline{X}_{i}^{c}) + (v_{it}^{c} - \overline{v}_{i}^{c})$$

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[4]We attempted to use an IV approach similar to that reported earlier, but use differences between siblings in state welfare parameters and unemployment rates as the excluded instruments. Unfortunately, this approach was unsuccessful due to a very poor fit in the first stage regression.

[5]Consistent with our approach in the sibling differences model, we allow for differences between average family income since birth and "permanent income" in this specification. The empirical work below reports estimates from models that includes and excludes this difference.

This approach of taking deviations from the mean will successfully control for those observable or unobservable family characteristics that do not change over time. It provides the additional advantage of being able to control for unobservable *individual* characteristics, including things like Attention Deficit Disorder, which was referred to earlier. As with the family-fixed effects model, any of these characteristics that change over time may present problems. We can control for those changes that we can observe, but those that remain unobserved may introduce bias.

IV. DATA

The ability to estimate these models is facilitated by the depth of information provided by the National Longitudinal Survey of Youth (NLSY). This data source initially surveyed 12,686 men and women between the ages of 14 and 21 in 1979 and has been repeated annually through 1994 and biannually since then. In 1979, the survey obtained detailed characteristics of the respondent's parents, including things like their level of education. In each subsequent year, the survey then obtains detailed records for each respondent regarding welfare receipt, family income, educational attainment, state of residence, and a wide variety of other characteristics. Importantly for the purposes of this study, the survey has tracked all of the 10,507 children born to the 6,283 female respondents.

These data provide the necessary information to compare the developmental outcomes of children with their welfare exposure and to estimate the models presented in equations (1), (4), and (7). For each mother, a complete event history of her welfare receipt exists back to January of 1978, when she was between the ages of 13 and 20, and through the 1996 survey date, when she was between the ages of 31 and 38. In other words, most periods of welfare receipt in her adulthood to that point would be captured. We can use this event history combined with each child's date of birth to derive a comparable event history for each of these mothers' children. Since very few of them were born before January 1, 1978, we have virtually complete histories for the children.

Moreover, starting in 1986, in every other year these children were administered a variety of assessments to measure their level of development. The measures we examine are the age-specific percentile scores on the Peabody Picture Vocabulary Test (PPVT), the Peabody Individual Achievement Test in math (PIAT-M), reading comprehension (PIAT - RC), and reading recognition (PIAT - RR), and the Behavior Problems Index (BPI). Other research has also considered these child outcomes in other contexts, such as the work by Geronimus, et al. (1994) in their analysis of the effects of young maternal age. An appendix to this paper provides a brief description of each these measures.

The data employed in this paper employs an important advantage compared with earlier analyses using the same data (c.f. Currie and Cole, 1993; and Hill and O'Neill, 1994). In earlier research, the women in the NLSY were younger and those who had already had children, and particularly children above a certain age, were likely to be a highly selected sample of all mothers. By 1996, the women in the NLSY were between the ages of 31 and 38, so the majority of their childbearing had already taken place. Age-specific birth rates from Vital Statistics suggest that perhaps 80 percent of the children who will be born to these women have already by born (Center for Human Resource Research, 1998). Therefore, statistics presented for younger children are close to representative to all children who will be born to this cohort. For children at older ages, the sample becomes less and less representative. For instance, we only observe children at ages 5, 10, and 15 who were born to mothers between the ages of 26 to 33, 21 to 28, and 16 to 23, respectively. In other words, our sample is restricted to children of very young mothers only for those children in their teens by 1996. Although some selection problems exist, over time they have become less important. To the extent that these problems remain, the econometric techniques we employ to counteract the biases introduced by unobservable heterogeneity should address this as well.

V. DESCRIPTIVE ANALYSES

Before presenting the results of our econometric analysis described earlier, we first examine the extent to which children are exposed to the welfare system and the degree of correlation in the raw data between welfare exposure and developmental outcomes.[6] Figures 1 through 3 provide two different measures of welfare receipt, the percentage of children who have lived in a welfare household and the percentage of their lives in which benefits were received for those who have ever lived in a welfare household, by exact age and race/ethnicity. Figure 1 displays these statistics for the population as a whole. It shows that by exact age 1 (i.e. the child has been alive for 12 months), 16 percent of children have lived in a welfare household and their mothers were recipients for most (71 percent or 8.5 months) of that year. By exact ages 5 and 10, 27 percent and 38 percent of these children had ever lived in a welfare household, respectively, and their mothers have received it for 46 and 37 percent of their lives, respectively. These findings are consistent with past studies of maternal welfare receipt which shows that mothers of young children are more likely to collect benefits. As indicated earlier, sample selection becomes more of a problem at older ages, indicating that part of the increase in any welfare receipt by age is likely due to changing sample composition. A similar argument would suggest that the percentage of a child's life on welfare would probably decline more rapidly for a representative sample. Nevertheless, these statistics provide reasonably accurate pictures of welfare receipt among younger children and rough estimates for the age-profile.

With that caveat in mind, an examination of patterns in welfare receipt by race/ethnicity presented in Figures 2 and 3 provides particularly striking findings. Rates of welfare exposure for black, non-Hispanic children are staggering. By their first birthday, fully 40 percent of these children have lived in households in which the mothers received welfare for an average of 75 percent, or 9

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[6]There is a large body of evidence on child poverty in the United States that help to put the following results in context. For example, in 1995 (before welfare reform), the rate of poverty for children under age three was 15 percent for white children, 52 percent for black children, and 44 percent for Hispanic children (National Center for Children in Poverty, 1997). Further, the poverty rate for children under age three living in a single mother household was about 60 percent.

months, of that year. By exact ages 5 and 10, 56 percent and 68 percent of black, non-Hispanic children have been exposed to welfare for about half (54 percent and 45 percent) of their lives, respectively. Again, these numbers at older ages are probably somewhat biased by sample selection. Nevertheless, they would be extremely high even if overstated by, say, 10 percentage points. These figures also show that the comparable rates for white, non-Hispanic children are far lower and Hispanic children are between the other two groups.

Now that we have shown that many children spend a considerable amount of time living in households in which welfare is received, we turn our attention to the raw correlation between levels of welfare receipt and measures of child development. Tables 1 and 2 report such a descriptive analysis, which shows that this correlation is substantial.[7] Table 1 reports mean values of the outcomes we consider by the percentage of a child's life in which his/her mother received AFDC. The estimates indicate a strong negative correlation between welfare receipt and all of the developmental measures. For instance, the average child who spends most of his/her young life in an AFDC household scores roughly 20 percentile points lower on all three sections of the PIAT exam and 27 percentile points lower on the PPVT compared to a child whose household received no welfare since s/he was born. Moreover, this relationship appears to be roughly linear, with test scores falling the greater the child's welfare exposure. Behavioral problems also appear to be greater for children exposed to welfare, but these problems do not seem to increase along with the share of the child's life his/her mother received benefits.

Table 2 provides analogous statistics for the sample disaggregated by race/ethnicity of the mother. As highlighted earlier, the first result that should be noted is the large difference in welfare receipt among children in the different groups. Moreover, holding constant the amount of welfare

[7]Although the general patterns of welfare exposure are the same as those reported in Figures 1 through 3, the samples used are not exactly the same. In Figures 1 through 3, the full event history of welfare receipt for each child is used to calculate statistics at each exact age. In this, and all subsequent analyses, welfare exposure is measured at the date of each of the child assessments to correspond with the timing of the developmental tests. Therefore, these samples are restricted to those children who have a valid test score in the child survey years.

receipt, significant disparities in children's outcomes are observed. For instance, among those children never exposed to welfare, scores on all three components of the PIAT and PPVT are higher for whites than for blacks and Hispanics. Within each group, however, greater welfare exposure is correlated with lower test scores and greater behavior problems. Because of the vast differences across groups and the potential interaction that may exist between race and maternal welfare receipt in determining children's outcomes, in the econometric analysis presented below we estimate all models for the full sample as well as separately by race/ethnicity.

Of course, mothers who receive welfare are different from other mothers in a multitude of ways that may also contribute to the raw differences in developmental outcomes that we observed. Table 3 highlights this point by presenting a series of family characteristics for the same categories of welfare receipt as presented in Table 1 and 2. For instance, compared with others who received no welfare since their children were born, welfare mothers completed fewer years of education, scored lower on a standardized test of aptitude/achievement (the Armed Forces Qualifying Test or AFQT), and were more likely to be raised in a single mother household themselves.

Perhaps the most important difference is that their family income was considerably lower. Family income since birth averaged about $47,000 for those children never exposed to welfare versus less than $20,000 for children whose mothers received any welfare and only about $14,000 for those children whose mothers received welfare over all or most of the child's life. This last group of children has spent virtually their entire lives in poverty. Based on the relationship between family income and childhood outcomes shown elsewhere (Duncan and Brooks-Gunn, 1997), it may come as no surprise that children in welfare households perform worse on the developmental measures considered here. The remainder of this analysis is geared to identify whether it is the welfare itself which leads to their disadvantage or these other differences in family characteristics, including family income, that are the main causal factors.

Toward that end, Tables 4 and 5 present descriptive statistics that replicate in spirit the sibling difference and individual fixed-effects models presented in equations (4) and (7). In Table

4, sibling pairs are categorized by the difference in the share of time since birth that each sibling was exposed to welfare. Taking differences across siblings should eliminate any family-specific factors that are constant over time which could explain differences in outcomes. As a frame of reference, Column (3) presents the difference in each outcome measure between the older and younger sibling for those pairs in which each was exposed to similar amounts of maternal welfare receipt. On the PIAT-math test, for instance, the older sibling scored 1.2 percentile points higher than the younger sibling, on average, among this group.

We then consider two other sets of sibling pairs, those where the younger sibling spent a higher share of time (greater than 10 percent more) since birth in a welfare household (Column 2) and those where the older sibling experienced greater welfare exposure (Column 4). These differences would emerge if, for instance, welfare receipt did not commence until after the birth of a second child or ended before a second child was born. An independent detrimental effect of welfare exposure would be supported if the differences in Columns (2) and (4) were bigger and smaller, respectively, than the differences in Column (3) for positive outcomes, like higher test scores. The opposite would hold true for a negative outcome, like behavioral problems. These patterns would all be reversed if welfare was beneficial to a child's development. Columns (5) and (6) report these "difference-in-differences" estimates.

The results that are presented in Table 4 provide little evidence consistent with any pattern of a causal effect of maternal welfare receipt. We do find that point estimates are all consistent with a detrimental effect of welfare exposure when comparing differences for those sibling pairs in which the older sibling faces greater welfare exposure compared to the control group in which there is little difference (Column 6). In those comparisons, all five differences indicate that the sibling who has spent more time living in a welfare household has inferior outcomes. However, only three of the five comparisons are statistically significant. Moreover, little support for a causal impact in this direction is found in sibling differences when the younger sibling had greater welfare exposure compared to

the control group (Column 5). In these estimates, only two of the five estimates are consistent with a detrimental effect of welfare exposure and neither of them is statistically significant.

An analogous exercise is reported in Table 5 using repeated observations on the same children over time to control for individual fixed effects. Columns (3) reports differences in outcomes between the first and second observation in which the share of the child's life in which his/her mother received welfare was relatively unchanged (no more than 10 percent higher or lower). These estimates provide a frame of reference that can identify the effects of aging on these outcome measures holding welfare receipt roughly constant. Columns (2) and (4) represent differences over time for those individuals who experienced a reduction or increase, respectively, in welfare exposure of greater than 10 percent. Difference-in-difference estimates that can identify the effect of welfare exposure over time are reported in Columns (5) and (6). The patterns we are interested in here are identical to those identified in the context of sibling differences. This exercise also finds little support for an independent effect of welfare receipt on child development. No clear pattern in the difference-in-difference estimates are observed that would support either a positive or negative impact of maternal welfare receipt.

VI. MULTIVARIATE ANALYSIS

Results presented so far show a strong negative correlation in the raw data between mothers' welfare receipt and children's outcomes. A similar relationship is also observed between mothers' welfare receipt and many personal characteristics that are likely related to children's outcomes, however, indicating the need to control for these other factors. In the descriptive analysis of sibling and panel data, we have found little relationship between maternal welfare receipt and the development of children, but those estimates were somewhat crude, relying on the definition of arbitrary categories of welfare receipt and ignoring other covariates that might affect children's outcomes. This section will report a set of results based on estimates of equations (1), (4), and (7) that will strengthen the conclusions we can draw.

Table 6 presents our estimates of these models for the full sample of children. Each row in this Table represents a separate regression for each of the dependent variables we consider. In this and subsequent tables a distinction is made between those control variables that are purely exogenous to the mother, like her race and her parent's characteristics as opposed to those that may be endogenous, potentially influenced by her own welfare receipt, like marital status, number of children, and family income.

The first column reports OLS estimates of child outcomes on the percentage of a child's life in which his/her mother received welfare with no other covariates. It provides a summary statistic for the raw differentials reported in Table 1, which showed a negative correlation between maternal welfare receipt and child outcomes. Here, we find that a child who spent an additional 10 percent of his/her life in a welfare household is observed to score about 2.4 percentile points lower on the three components of the PIAT, 3.2 percentile points lower on the PPVT, and 1.4 percentile points higher on the BPI.

Columns 2 and 3 of Table 6 also estimate OLS models, but include a set of exogenous control variables (like mother's race, child's birth order, and mother's characteristics at age 14) and then a full set of control variables, including some that may be endogenous (like family income and mother's education). In all cases, including these control variables reduces the correlation, but the reduction is relatively small in those models that only include exogenous control variables. Here, the possibility of omitted variable bias suggests that these estimates may be too large in absolute value. In those models including all control variables, we find that the raw correlation is generally reduced by three-quarters or more, but we still find the children's outcomes are negatively correlated maternal welfare receipt (recall the BPI is a negative outcome, so a higher score is worse). As a representative example, the raw differential on the PIAT-math test is 24 percentile points between a child whose mother received AFDC during his/her entire life compared to a child who has never been exposed to welfare. This gap falls to 14 points after purely exogenous controls are added and

only 6 points after including the entire vector of covariates. Largely comparable findings are observed for the other outcomes.

The remainder of the table provides estimates of instrumental variables, sibling differences, and child fixed effect models that are intended to control for the possibility of unobservable heterogeneity that may plague the OLS estimates. In the IV models reported in Columns 4 and 5, the excluded instruments used to predict maternal welfare receipt during a child's life are the average unemployment rate and generosity of AFDC benefits in the mother's state in the years since the child was born.[8] Results obtained from this approach indicate little evidence of a negative effect of maternal welfare receipt. Most of the point estimates indicate that maternal welfare receipt actually improves child outcomes, although many are not statistically significant. For no outcomes do we observe a statistically significant detrimental effect of maternal welfare receipt.

Columns 6 and 7 present our results estimating models of sibling differences to eliminate the contribution of family-specific fixed effects.[9] This approach provides us the only two negative and statistically significant relationships between maternal welfare receipt and child outcomes that we find in any of the models we estimate that correct for different forms of unobservable heterogeneity. Results here indicate that PIAT-math scores for those exposed to welfare for 10 percentage points more of their lives than their sibling score 1.2 percentile points lower. Similarly, percentiles on the behavior problems index are found to be 1.6 to 1.7 percentile points for the sibling with 10 percentage points greater welfare exposure over their lives. In the other two components of the PIAT and the PPVT, however, most of the point estimates are positive, although none are statistically significant.

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[8]It is possible that these instruments are inadequate because the timing of the child's birth may be endogenous as well. To examine this, we also experimented with using the unemployment rate and benefit generosity in the years since 1979 when the survey began since the timing of the start of the survey is exogenous to the individual. We found that results from both sets of instruments yielded similar parameter estimates.

[9]Because many of the purely exogenous control variables included in the OLS regressions are fixed within families, they drop out of the model when we take differences between siblings.

The estimates obtained from models with child fixed effects are reported in Columns 8 and 9. These estimates are also generally small and inconsistent in sign. In fact, estimates for the PIAT-math and BPI outcomes, for which estimates from the sibling differences models showed a statistically significant detrimental effect of welfare receipt, now indicate a statistically significant beneficial effect in three of the four models. Overall, the results presented in Table 6 provide little evidence that maternal welfare receipt has any effect in either direction on the children's outcomes considered here.

Results from the same set of model specifications separately for non-Hispanic whites, non-Hispanic blacks, and Hispanics are reported in Table 7. Estimates in Column 1 demonstrate that the raw correlation between maternal welfare receipt and children's outcomes is strongest among non-Hispanic whites and weakest among blacks. An examination of Table 2 suggests that the smaller correlation for blacks is largely attributable to the inferior performance on these dimensions among blacks compared to whites who have never received welfare. The gap in scores between whites and blacks declines as welfare receipt increases. Moreover, including a full vector of control variables leave a small and statistically insignificant estimate effect of maternal welfare receipt for blacks, but not for whites, for all three components of the PIAT. In those specifications that control for unobservable heterogeneity in different ways, for each racial group there appears to be little systematic impact of maternal welfare receipt on children's outcomes.

One potential limitation of the analysis reported so far is that welfare receipt is aggregated into a measure of lifetime exposure. However, the impact of welfare exposure may differ by the child's age, and particularly at very young ages which have been shown in the past to be critical to child development (c.f. Duncan, et al., 1994). Moreover, the effects of welfare exposure may dissipate over time if the family no longer receives benefits, suggesting that more recent receipt would have an additional impact along with lifetime receipt on contemporaneous developmental measures.

To address these potential issues, Table 8 presents estimates from statistical models where the extent of lifetime welfare exposure has been included along with measures of receipt by age three and in the 12 months preceding assessment. Estimates are provided only for OLS and sibling difference models. Instrumental variables estimation proved troublesome because using local unemployment rates and state welfare benefits at different stages of life provided insufficient power in the first stage regressions, yielding highly imprecise estimates in the second stage. Child fixed effect models, which are only identified by variation in the timing of welfare receipt over a child's life, cannot be estimated in this context. In addition, sibling difference models cannot identify the impact of maternal welfare receipt over the last 12 months because this measure would be identical between the two siblings at a point in time.

The first panel of Table 8 provides evidence on the raw correlation between maternal welfare receipt at different stages of the child's life and the developmental measures previously considered. The results provide some indication that welfare receipt in the first three years of life and in the past 12 months may be more important than at other times. For instance, on all three of the PIAT tests, an additional 10 percent of lifetime welfare exposure is related to about a one percentile point lower score. If that additional exposure occurred in the first three years of life or in the last 12 months, the estimated reduction would be about an additional percentile point or an additional 0.6 percentile points, respectively.

The second panel of the table provides estimates of OLS models comparable to Columns 3 in Tables 6 and 7, which include the full set of control variables, including those which are potentially endogenous. Including these controls reduces all the welfare exposure coefficients, but less so for early childhood and recent welfare exposure. In fact, welfare exposure at other points in a child's life are no longer found to be significantly related to child outcomes. Nevertheless, a negative and significant relationship is still observed for welfare exposure in the first three years of life and in the past 12 months (except for early exposure on BPI). This finding is strengthened by the fact that lifetime welfare exposure is also included in the model because this variable may

capture some of the unobservable family/child characteristics that are fixed over the child's life and are related to welfare receipt.[10]

Sibling difference models fully captures the effects of any fixed characteristics of mothers; estimates from such models are reported in the bottom panel of Table 8. These results provide little evidence of any effect of welfare exposure, either over the child's entire life (except for the BPI) or in the first three years. Although this part of the analysis employs a subset of the tools presented earlier, based on the available evidence it would be difficult to conclude that a large incremental effect of early welfare exposure exists.

VII. CONCLUSIONS

This research documents the great extent to which children are exposed to welfare receipt and confirms that a negative raw correlation exists between maternal welfare receipt and children's outcomes. Children who grow up in households headed by welfare mothers, and particularly those who receive welfare for a good deal of the child's life score lower on tests of cognitive development and experience greater behavioral problems than other children. In this paper we have implemented three alternative strategies designed to identify whether this correlation can be attributed to the mother's welfare receipt directly or to other characteristics of mothers who receive welfare, regardless of whether or not those characteristics are observable to the researcher. Based on these results of all three estimation strategies, we find no evidence of any causal link between maternal welfare receipt and these children's outcomes.

This conclusion is made in a context in which income differences between mothers who have received welfare and other mother is held constant. Our results can be interpreted as indicating that welfare receipt does not affect a mother's tastes/preferences for making investments in her children.

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[10]It may not capture all of these unobservable characteristics because, for example, women who give birth and go on welfare immediately may have different attributes than women who do not receive benefits until the loss of a job when the child is older.

Yet welfare receipt plays a more direct role in changing the constraints faced by families by providing income supplements. To the extent that welfare increases family income, evidence suggests that children's outcomes are improved (Duncan and Brooks-Gunn, 1997). Unfortunately, because the availability of these supplements may alter individuals' behavior in ways that affect other sources of family income (like paid employment), the relationship between observed family income and that which would be received in the absence of the welfare system is ambiguous. Under the circumstances, making definitive statements regarding the effect of welfare income on children's outcomes requires additional research.

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Appendix: Description of Child Outcome Measures

This description of the child outcome measured used is based on the discussion in Center for Human Resource Research (CHRR), October 1993 and December 1998.

PEABODY INDIVIDUAL ACHIEVEMENT TEST (PIAT)

The PIAT is a standard test of academic achievement that is administered to children age 5 and over and to the children of NLSY respondents in each of the child-survey years in which they were age-eligible. Of the five subcomponents of the PIAT, three were used in these data. In the math section, the assessment begins by testing ability to recognize numbers and increases in difficulty to knowledge of geometry and trigonometry. Achievement in reading is measured along two dimensions, reading recognition and reading comprehension. The reading recognition subtest assesses a child's ability to match letters, name names, and read words aloud, increasing in difficulty from preschool to high school levels. The reading comprehension subtest measures a child's ability to identify the meaning of a what s/he reads. The child reads a sentence silently and then points to a picture that best depicts what the sentence means. This subtest is only given to those age-eligible who meet a minimum level on the reading recognition exam; scores for those who do not surpass this level are assigned reading comprehension scores equal to their reading recognition score.

PEABODY PICTURE VOCABULARY

In this test, a child is told to identify the picture that best represents the meaning of a word that is spoken to him/her and provides an indicator of the child's verbal ability. Children age 3 and over were eligible to take the test. In 1986 and 1992, all age-eligible children were administered the exam and in 1988, 1990, and 1994, only those age-eligible children who had not previously taken the exam took it.

BEHAVIOR PROBLEMS INDEX

This index is designed "to measure the frequency, range, and type of childhood behavior problems for children age four and over" (CHRR, 1997, p. 42). The behaviors examined include antisocial behavior, anxiousness/depression, headstrongness, hyperactivity, immature dependency, and peer conflict/social withdrawal. All age-eligible children were assessed in each child-survey year.

Table 1: Children's Outcomes, By Share of Child's Life That Mother Spent on AFDC

OUTCOME MEASURES	Sample Size	Share of Time Mother Spent on AFDC since Child's Birth: no AFDC	any AFDC	1% to 25%	26% to 50%	51% to 75%	76% to 100%
PIAT - math (percentile)	19,600	57.1	43.1	47.6	41.6	39.1	38.3
PIAT - reading recognition (percentile)	19,445	63.4	50.0	54.6	49.4	45.5	44.4
PIAT - reading comprehension (percentile)	15,696	61.2	46.0	49.8	44.0	42.6	41.8
PPVT (percentile)	14,746	46.8	28.6	35.2	28.8	23.9	20.0
BPI (percentile)	22,591	58.5	68.7	67.7	68.6	71.0	69.2
PERCENT IN CATEGORY		70.0	30.0	12.6	5.9	4.7	6.9

Notes: A unit of observation for this analysis is a child between the ages of 3 and 15 in a survey year for which data is available. The data appendix indicates the ages for which the child development measures are available. Estimates are weighted by the NLSY child sampling weight in each year.

Table 2: Children's Outcomes, By Share of Child's Life That Mother Spent on AFDC and Race

OUTCOME MEASURES	Sample Size	Share of Time Mother Spent on AFDC since Child's Birth: no AFDC	any AFDC	1% to 25%	26% to 50%	51% to 75%	76% to 100%
		WHITE, NON-HISPANIC					
PIAT - math (percentile)	9,352	59.3	48.2	52.0	46.6	41.4	43.3
PIAT - reading recognition (percentile)	9,281	64.6	53.7	57.7	53.3	47.1	46.3
PIAT - reading comprehension (percentile)	7,407	62.6	49.5	52.6	47.5	45.2	44.0
PPVT (percentile)	7,286	50.8	38.5	42.3	38.9	33.7	30.8
BPI (percentile)	11,049	58.4	69.9	68.7	69.5	74.4	70.4
PERCENT IN CATEGORY		78.1	21.9	11.0	4.2	2.9	3.8
		BLACK, NON-HISPANIC					
PIAT - math (percentile)	6,598	45.0	36.7	39.4	36.0	36.0	34.7
PIAT - reading recognition (percentile)	6,555	57.6	46.0	49.4	46.2	44.4	43.0
PIAT - reading comprehension (percentile)	5,442	53.3	41.7	44.4	40.7	40.4	40.0
PPVT (percentile)	4,716	23.3	16.4	21.9	16.8	14.6	11.8
BPI (percentile)	7,240	60.2	66.9	65.6	66.2	67.6	68.2
PERCENT IN CATEGORY		38.0	62.0	19.5	11.8	10.7	20.0
		HISPANIC					
PIAT - math (percentile)	3,650	46.0	37.9	38.2	36.3	40.1	37.1
PIAT - reading recognition (percentile)	3,609	56.6	43.9	45.9	41.3	43.3	44.4
PIAT - reading comprehension (percentile)	2,847	55.1	41.6	44.3	38.3	40.2	42.5
PPVT (percentile)	2,744	29.9	19.0	21.7	18.9	17.7	16.3
BPI (percentile)	4,302	58.1	68.5	66.7	70.9	68.2	69.1
PERCENT IN CATEGORY		62.2	37.6	12.2	8.9	8.4	8.3

Notes: A unit of observation for this analysis is a child between the ages of 3 and 15 in a survey year for which data is available. The data appendix indicates the ages for which the child development measures are available. Estimates are weighted by the NLSY child sampling weight in each year.

Table 3: Other Characteristics of Mothers, By Share of Child's Life That Mother Spent on AFDC Since Child's Birth

	Share of Time Mother Spent on AFDC Since Child's Birth					
	no AFDC	any AFDC	1% to 25%	26% to 50%	51% to 75%	76% to 100%
MOTHER'S CHARACTERISTICS						
Current Age	32.2	30.9	31.0	30.9	30.6	30.7
Highest Grade Completed	12.8	11.5	11.7	11.6	11.4	11.2
AFQT Score (Percentile)	47.0	25.1	30.0	24.7	22.2	18.2
Percent Black, Non-Hispanic	9.4	35.7	26.7	34.9	39.4	50.1
Percent Hispanic	6.6	9.4	7.2	11.3	13.3	8.9
Average Family Income since Birth	46,756	19,560	24,952	17,976	15,068	14,136
Percent of Years in Poverty Since Birth	9.0	58.4	37.7	60.8	75.4	82.5
Percent of Years Married Since Child's Birth	83.8	36.5	53.3	35.1	25.3	14.7
Current Number of Children	2.4	2.9	2.6	2.8	3.0	3.3
CHILD'S CHARACTERISTICS						
Child'sAge	7.6	8.9	9.3	9.0	8.9	8.0
Percent Female	48.0	49.9	51.5	49.1	49.5	47.8
Birth Order	1.7	1.9	1.7	1.8	1.9	2.3
Percent First Born	51.6	46.1	52.1	48.1	43.0	35.5
MOTHER'S BACKGROUND						
Percent Mother Present in Household at age 14	94.6	87.6	89.0	87.1	88.8	84.7
Percent Father Present in Household at age 14	79.7	56.1	61.1	57.7	53.3	47.7
Mother's Education (if mother present)	11.4	10.2	10.6	10.1	10.0	9.6
Father's Education (if father present)	11.6	9.9	10.4	10.1	9.4	9.0
CHARACTERISTICS OF LOCAL AREA/STATE OF						
Unemployment Rate (local area)	7.4	8.3	8.1	8.4	8.5	8.3
Maximum AFDC Benefit, Family of Three (1996 $)	464	509	483	519	533	533
SAMPLE SIZE	16,042	10,828	3,919	2,150	1,875	2,884

Notes: A unit of observation for this analysis is a child between the ages of 3 and 15 in a survey year for which data is available. The reported sample size is the maximum number of observations available; a small percentage of observations contain missing data for some variables. Estimates are weighted by the NLSY child sampling weight in each year.

Table 4: Difference in Sibling's Outcomes (Older Minus Younger), By Difference in Mother's Welfare Status During Each Sibling's Life
(standard error in parentheses)

		Difference in Share of Time Mother Spent on Welfare (Older Sibling Minus Younger Sibling)			Difference-in-Difference Estimates	
OUTCOME MEASURES	Number of Sibling/Year Pairs (1)	Greater Welfare Exposure for Younger Sibling (2)	Similar Exposure to Welfare for Both Siblings (3)	Greater Welfare Exposure for Older Sibling (4)	Column (2) - Column (3) (5)	Column (4) - Column (3) (6)
PIAT - math (percentile)	9,764	1.8	1.2	-3.7	0.6	-4.9
					(1.4)	(1.7)
PIAT - reading recognition (percentile)	9,634	0.4	2.5	-0.1	-2.1	-2.6
					(1.6)	(1.7)
PIAT - reading comprehension (percentile)	6,510	-12.3	-2.8	-10.1	-9.5	-7.3
					(1.7)	(2.0)
PPVT (percentile)	5,720	5.7	6.3	4.3	-0.6	-2.0
					(1.4)	(1.9)
BPI (percentile)	11,816	2.8	4.4	8.5	-1.6	4.1
					(1.1)	(1.4)
PERCENT IN CATEGORY		6.6	88.1	5.3		

Notes: A unit of observation for this analysis represents a sibling pair in a survey year in which data for both siblings is available. Greater welfare exposure for a sibling is defined as at 10 percent more of that the mother received welfare for at least 10 percent more of one child's life compared to his sibling.

Table 5: Difference in Children's Outcomes over Time, By Difference in Mother's Welfare Status over Time

(standard error in parentheses)

		Change in Share of Time Mother Spent on Welfare			Difference-in-Difference Estimates	
OUTCOME MEASURES	Sample Size	Reduction in Welfare Exposure	Little or no Difference in Welfare Exposure	Increase in Welfare Exposure	Column (2) - Column (3)	Column (4) - Column (3)
	(1)	(2)	(3)	(4)	(5)	(6)
PIAT - math (percentile)	23,963	-1.4	0.9	1.4	-2.3	0.6
					(0.7)	(0.8)
PIAT - reading recognition (percentile)	23,623	-3.0	-1.3	-2.6	-1.7	-1.3
					(0.7)	(0.8)
PIAT - reading comprehension (percentile)	17,004	-12.9	-7.6	-11.7	-5.3	-4.1
					(0.9)	(1.0)
PPVT (percentile)	9,601	5.2	4.2	4.3	1.0	0.1
					(1.0)	(1.1)
BPI (percentile)	29,327	3.0	1.5	-0.8	1.5	-2.3
					(0.6)	(0.7)
PERCENT IN CATEGORY		6.4	88.7	5.0		

Notes: A unit of observation for this analysis is a matched observation between an earlier and later interview for the same individual for which data is available from both interviews. The percent in category is estimated for all observations, and differs when using each dependent variable because of missing observations. An increase (decrease) in welfare exposure is defined as at least a 10 percent increase (decrease) in the share of a child's life in which his/her mother received welfare.

Table 6: Estimates of Impact of Maternal Welfare Receipt on Children's Health and Development, Full Sample (Standard Errors in Parentheses)

	OLS			IV		SIBLING DIFFERENCES		CHILD FIXED EFFECTS	
Dependent Variable	no other control variables (1)	exogenous control variables (2)	all control variables (3)	exogenous control variables (4)	all control variables (5)	exogenous control variables (6)	all control variables (7)	exogenous control variables (8)	all control variables (9)
PIAT - math (percentile)	-0.236	-0.135	-0.063	-0.032	0.080	-0.124	-0.117	0.071	0.042
	(0.007)	(0.008)	(0.010)	(0.037)	(0.049)	(0.059)	(0.063)	(0.036)	(0.038)
PIAT - reading recognition (percentile)	-0.234	-0.149	-0.069	0.007	0.139	0.022	0.010	0.032	0.010
	(0.008)	(0.009)	(0.011)	(0.038)	(0.051)	(0.073)	(0.077)	(0.035)	(0.036)
PIAT - reading comprehension (percentile)	-0.247	-0.143	-0.068	-0.023	0.064	0.041	0.144	0.025	-0.018
	(0.009)	(0.010)	(0.012)	(0.042)	(0.055)	(0.088)	(0.088)	(0.046)	(0.047)
PPVT (percentile)	-0.320	-0.144	-0.043	0.156	0.413	0.010	-0.019	-0.019	-0.010
	(0.009)	(0.009)	(0.011)	(0.049)	(0.068)	(0.051)	(0.055)	(0.035)	(0.036)
BPI (percentile)	0.138	0.120	0.030	-0.021	-0.171	0.172	0.159	-0.072	-0.065
	(0.007)	(0.008)	(0.010)	(0.039)	(0.054)	(0.043)	(0.045)	(0.031)	(0.032)

Notes

OLS, IV, and Fixed Effect Models: Estimates represent the coefficient on the percentage of a child's life that the family received welfare. A unit of observation is a child between the ages of 3 and 15 in a survey year for which data is available. Estimates are weighted by the NLSY child sampling weight in each year. Exogenous control variables included race/ethnicity, child's age and age squared, birth order, a variable indicating whether the child was first born, living arrangements of the respondents (mothers) at age 14, and years of education for the respondent's parents. Other control variables include mother's age, years of education, number of children, AFQT score, average family income and percentage of years married since the child was born. In the child fixed effect models, many of these variables are eliminated because they do not change over time for a particular child.

Sibling Difference Models: Estimates represent the coefficient on the difference between older and younger sibling's percentage of life that the family received welfare. A unit of analysis is a sibling pair where both siblings are between the ages of 3 and 15 in a survey year for which data is available. Estimates are weighted by the average of the NLSY child sampling weights for the two siblings in each year. Exogenous and other control variables are listed as above, except the child's age is treated as endogenous because of the mother's control over birth spacing. Those variables that do not differ between two siblings are eliminated from the model.

Table 7: Estimates of Impact of Maternal Welfare Receipt on Children's Development, by Race/Ethnicity of Mother (Standard Errors in Parentheses)

Dependent Variable	OLS			IV		SIBLING DIFFERENCES		CHILD FIXED EFFECTS	
	no other control variables (1)	exogenous control variables (2)	all control variables (3)	exogenous control variables (4)	all control variables (5)	exogenous control variables (6)	all control variables (7)	exogenous control variables (8)	all control variables (9)
WHITE, NON-HISPANIC									
PIAT - math	-0.227	-0.178	-0.111	-0.054	0.076	-0.174	-0.185	0.073	0.037
	(0.013)	(0.014)	(0.017)	(0.061)	(0.079)	(0.106)	(0.111)	(0.060)	(0.062)
PIAT - reading recognition	-0.237	-0.176	-0.095	0.038	0.205	-0.061	-0.132	0.013	-0.008
	(0.015)	(0.015)	(0.018)	(0.064)	(0.083)	(0.130)	(0.131)	(0.056)	(0.058)
PIAT - reading comprehension	-0.253	-0.179	-0.109	-0.024	0.083	-0.151	-0.028	0.025	-0.019
	(0.017)	(0.017)	(0.020)	(0.072)	(0.092)	(0.160)	(0.161)	(0.080)	(0.081)
PPVT	-0.250	-0.169	-0.051	0.274	0.648	0.043	0.008	-0.031	-0.030
	(0.016)	(0.016)	(0.019)	(0.083)	(0.115)	(0.100)	(0.105)	(0.060)	(0.062)
BPI	0.181	0.153	0.035	-0.095	-0.329	0.280	0.240	-0.070	-0.060
	(0.012)	(0.013)	(0.016)	(0.064)	(0.877)	(0.079)	(0.082)	(0.051)	(0.052)
BLACK, NON-HISPANIC									
PIAT - math	-0.104	-0.075	0.000	0.037	0.109	-0.159	-0.165	0.078	0.070
	(0.009)	(0.010)	(0.012)	(0.029)	(0.037)	(0.072)	(0.077)	(0.046)	(0.048)
PIAT - reading recognition	-0.145	-0.102	-0.021	0.001	0.067	-0.002	0.014	0.029	0.040
	(0.010)	(0.010)	(0.013)	(0.030)	(0.039)	(0.091)	(0.096)	(0.044)	(0.045)
PIAT - reading comprehension	-0.130	-0.078	0.002	0.023	0.076	0.038	0.092	-0.028	-0.037
	(0.011)	(0.010)	(0.013)	(0.030)	(0.038)	(0.107)	(0.111)	(0.051)	(0.052)
PPVT	-0.129	-0.104	-0.038	0.025	0.116	-0.094	-0.139	0.002	0.014
	(0.008)	(0.009)	(0.010)	(0.031)	(0.039)	(0.045)	(0.047)	(0.034)	(0.035)
BPI	0.074	0.072	0.030	0.091	0.073	0.016	0.034	-0.075	-0.079
	(0.088)	(0.097)	(0.013)	(0.028)	(0.039)	(0.050)	(0.053)	(0.042)	(0.043)
HISPANIC									
PIAT - math	-0.101	-0.100	-0.026	-0.191	-0.101	0.161	0.166	-0.016	-0.037
	(0.015)	(0.016)	(0.022)	(0.071)	(0.095)	(0.115)	(0.126)	(0.073)	(0.082)
PIAT - reading recognition	-0.165	-0.157	-0.065	-0.313	-0.225	0.244	0.195	-0.061	-0.065
	(0.017)	(0.018)	(0.024)	(0.080)	(0.104)	(0.131)	(0.141)	(0.073)	(0.075)
PIAT - reading comprehension	-0.182	-0.158	-0.062	-0.267	-0.152	0.446	0.453	-0.042	-0.051
	(0.020)	(0.019)	(0.025)	(0.086)	(0.117)	(0.149)	(0.153)	(0.091)	(0.097)
PPVT	-0.168	-0.145	-0.063	-0.119	0.082	0.239	0.237	0.027	0.043
	(0.018)	(0.018)	(0.022)	(0.093)	(0.130)	(0.083)	(0.095)	(0.055)	(0.061)
BPI	0.136	0.118	0.091	0.150	0.084	0.144	0.153	-0.074	-0.072
	(0.014)	(0.015)	(0.020)	(0.069)	(0.097)	(0.079)	(0.088)	(0.066)	(0.073)

See notes to Table 6.

Table 8: Estimates of Impact of Maternal Welfare Receipt on Children's Development, by Timing of Welfare Receipt (Standard Errors in Parentheses)

	PIAT-Math	PIAT-Reading Recognition	PIAT-Reading Comprehension	PPVT	BPI
			OLS - NO COVARIATES		
Percent of Life Exposed to Welfare	-0.088	-0.101	-0.099	-0.145	0.085
	(0.023)	(0.028)	(0.027)	(0.032)	(0.025)
Percent of First 3 Years Exposed to Welfare	-0.092	-0.080	-0.099	-0.112	0.025
	(0.015)	(0.018)	(0.017)	(0.021)	(0.016)
Percent of Last 12 Months Exposed to Welfare	-0.066	-0.062	-0.059	-0.069	0.030
	(0.012)	(0.014)	(0.014)	(0.016)	(0.012)
			OLS		
Percent of Life Exposed to Welfare	-0.029	-0.006	0.014	0.000	0.038
	(0.024)	(0.028)	(0.026)	(0.031)	(0.026)
Percent of First 3 Years Exposed to Welfare	-0.069	-0.045	-0.057	-0.041	-0.027
	(0.016)	(0.019)	(0.017)	(0.021)	(0.017)
Percent of Last 12 Months Exposed to Welfare	-0.035	-0.032	-0.036	-0.011	0.038
	(0.012)	(0.014)	(0.014)	(0.015)	(0.013)
			SIBLING DIFFERENCES		
Percent of Life Exposed to Welfare	-0.011	0.051	0.093	-0.031	0.166
	(0.068)	(0.087)	(0.100)	(0.054)	(0.047)
Percent of First 3 Years Exposed to Welfare	-0.002	0.013	0.113	0.047	-0.019
	(0.064)	(0.074)	(0.085)	(0.068)	(0.044)

Notes: Each column within an estimation method represents results from a model with the three welfare measures as well as all other regressors (i.e. both "exogenous" and "potentially endogenous" regressors). Also see the notes to Table 6.

Figure 1: Children's Welfare Exposure

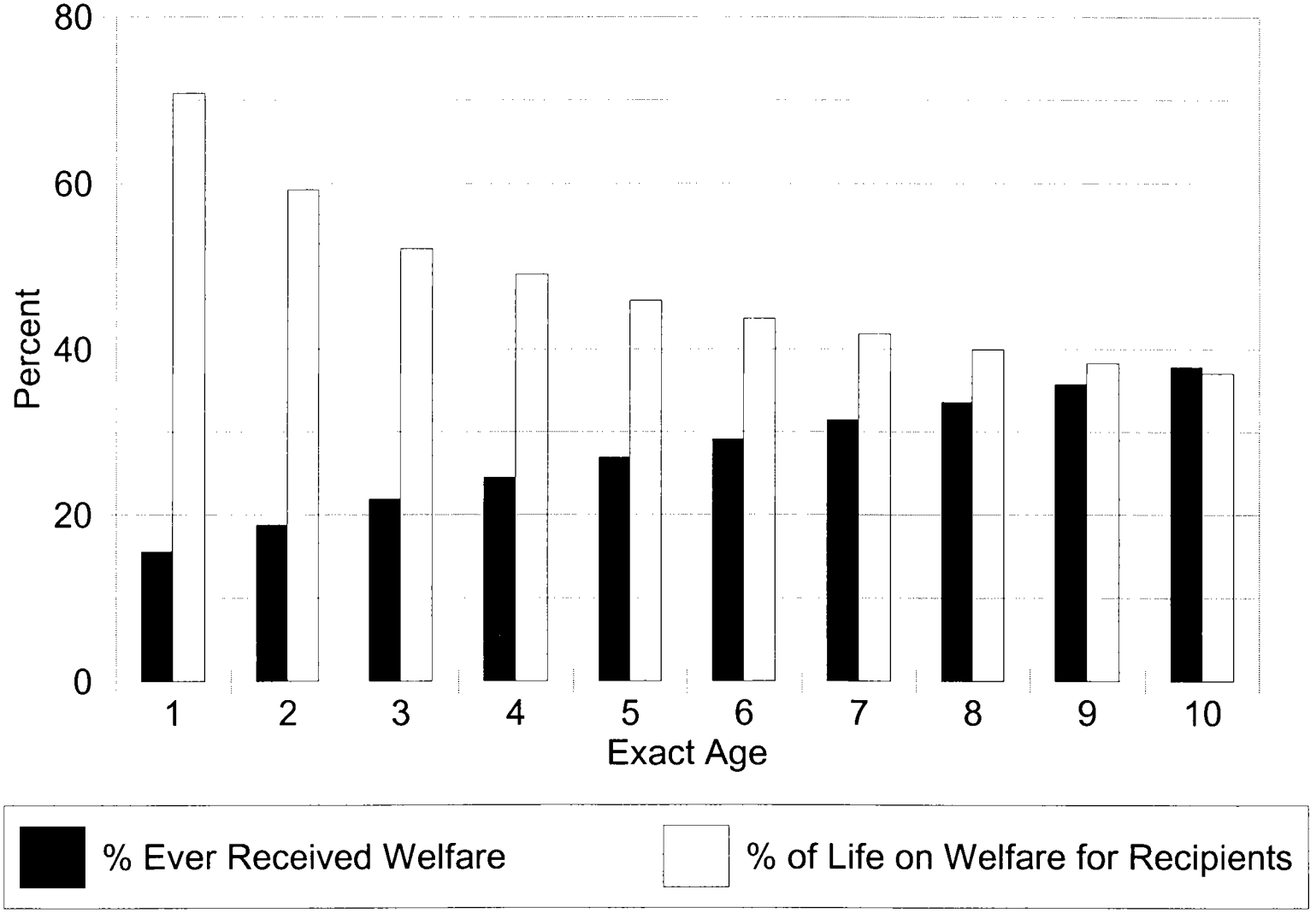

Figure 2: Percentage of Children who have Ever Received Welfare, by Race/Ethnicity

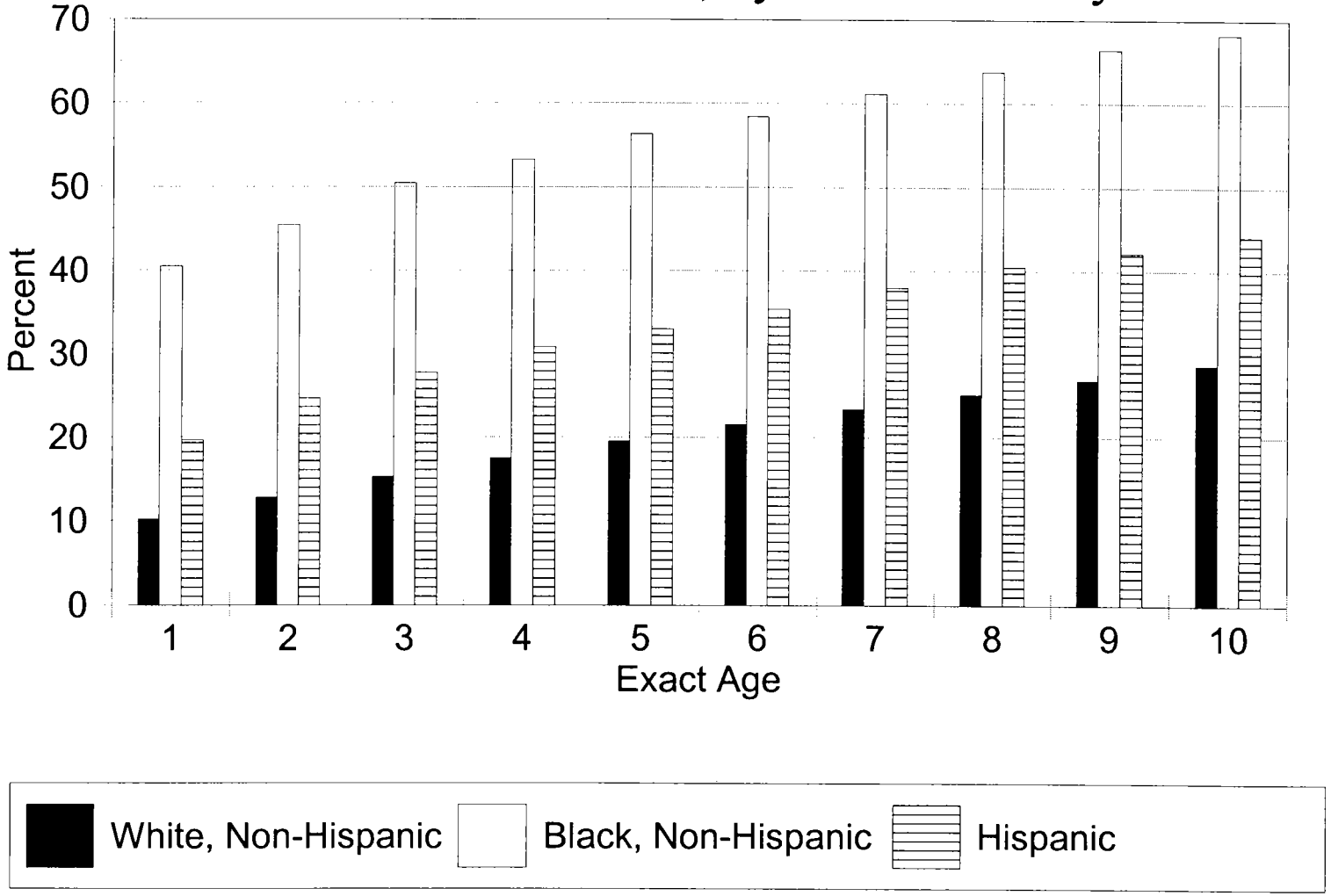

Figure 3: Percentage of Months Since Birth on Welfare for those Ever Receiving Benefits, by Race/Ethnicity