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Mothers' Employment and Health of Low-Income Children

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Abstract

This study examines whether maternal employment affects the health status of low-income, elementary-school-aged children using instrumental variables estimation and experimental data from a welfare-to-work program implemented in the early 1990s. Mother's report of child health status is predicted as a function of exogenous variation in maternal employment associated with random assignment to the program group. IV estimates show a modest adverse effect of maternal employment on children's health. Making use of data from another welfare-to-work program we propose that any adverse effect on child health may be tempered by increased family income and access to public health insurance coverage, findings with direct relevance to a number of current policy discussions. In a secondary analysis using fixed effects techniques on longitudinal survey data collected in 1998 and 2001, we find a comparable adverse effect of maternal employment on child health that supports the external validity of our primary result.

1. Introduction

Labor force participation rates among single mothers in the U.S. remain high at 76% following a spike of nearly 10 percentage points in the late 1990s (U.S. Department of Labor, 2007; Blank, 2002). Although employment is predicted to substantially alter the time and money resources parents invest in children, there is little empirical evidence of consistent positive or negative effects of maternal work on low-income children's achievement or behavior (Baydar and Brooks-Gunn, 1991; Brooks-Gunn et al., 2002; Desai et al., 1989; Waldfogel et al., 2002). Even less is known about any potential influences of maternal employment on children's health outcomes. Maternal employment may benefit children's health by increasing parents' ability to purchase high-quality food, housing, and medical care. But, time spent at work may also decrease mothers' ability to care for and supervise children, leading perhaps to less healthful activities, such as eating poorly or engaging in too many sedentary activities. Low-income children of single mothers may be particularly likely to benefit from increases in family income, but are also more vulnerable to the negative effects of decreased maternal availability depending on the quality of non-parental care.

This study examines maternal employment as one potentially critical influence on the health status of young children in low-income families. We do this by taking advantage of a unique exogenous increase in employment induced by a welfare-to-work experiment called the

National Evaluation of Welfare to Work Strategies (NEWWS). Random assignment to the NEWWS Labor Force Attachment (LFA) program serves as an instrument for maternal employment in models predicting maternal reports of children's overall health status. The validity of the instrument is strengthened by the design of the NEWWS LFA program, which focused almost exclusively on helping participants find jobs, rather than providing education, training, or work supports, such as child care subsidies and health insurance coverage. The NEWWS LFA programs also did not have earnings supplements or an earnings disregard, and therefore, the program did not increase income because as mothers increased their work effort they traded their welfare dollars for earnings. Our use of randomization to an employment program as an instrument controls not only for maternal preferences and ability, but also for child characteristics and the possibility that child health determines maternal work decisions.

The contribution of this work is multi-fold as most studies on the topic of maternal employment use high- or mixed-SES samples, making it difficult to know whether the results can be generalized to low-income families. There is equivalently limited information and ambiguous predictions about the role of socioeconomic status in moderating these relationships. Low-income mothers are often employed in poor quality jobs, characterized by low wages, instability, limited employee benefits, and nonstandard hours (Guyer and Mann, 1999; Johnson and Corcoran, 2003), all of which could exacerbate parents' stress and reduce their ability to do the carework that is necessary to address children's health and health care needs (Parcel and Menaghan, 1994; Parcel and Menaghan, 1997; Presser, 2003; Presser and Cox, 1997; Scott et al. 2004). Family resources and health insurance coverage can actually decline and become less stable as welfare-reliant mothers move from government assistance to paid employment (Angel et al., 2006; Bitler et al., 2005; Heflin, 2006; Kaestner and Kaushal, 2003; Seccombe and Hoffman, 2007) as a result of administrative links between programs, the high marginal tax rates associated with income eligibility rules (Holt and Romich, 2007), and the fact that many low-wage jobs do not provide access to private health insurance as a benefit or an affordable option.

Moreover, few existing studies have an identification strategy that separates the confounding characteristics of family, child, and local environments from parental employment. A handful of recent studies associate maternal employment with increased rates of overweight, contagious illness, and accidents among children (Anderson et al., 2003; Gordon et al., 2007; Phipps et al., 2006; Ruhm, 2008). Although these studies carefully control for a range of correlates of maternal employment and child health, including child fixed effects, the estimates could still be vulnerable to omitted variable bias.

We find adverse effects of maternal employment on child health among young low-income children, particularly boys. The effects are modest in size: A percentage point increase in employment induced by a welfare reform program decreases the probability of a child being in very good or excellent health by 0.6 percentage points. This decrease is meaningful, however, given the strong association between having very good or excellent health and reduced incidence of asthma and other limiting conditions (CDC, 2008). In addition to testing the sensitivity of our estimates to several alternate specifications, and deriving estimates by child gender, we report findings from two complementary analyses. First, we compare NEWWS program impacts to that of another experimental welfare-to-work program, which showed concomitant effects on employment but not on child health. This comparison suggests that adverse health effects of maternal employment may be tempered by increased income or by public health insurance coverage that is accompanied by increased maternal employment. Second, we conduct an analysis using child-level fixed effects techniques on post-welfare reform longitudinal survey data collected in 1998 and 2001, and find a comparable adverse effect of maternal employment on child health that provides support for the external validity of the primary analysis.

Ongoing debates about public investment in child care, early childhood education, and work supports focus on children's cognitive and non-cognitive skills (e.g. Duncan et al., 2007; Cuhna and Heckman, 2009), but children's health has arguably equal if not greater importance for future productivity. Poor health in childhood is increasingly viewed as an important determinant not only of long-term health, and of costly health conditions, but of human capital development and socioeconomic attainment in adulthood (Haas, 2006, 2007; Hayward and Gorman, 2004; Palloni, 2006; Palloni and Milesi, 2006). Low birth weight and chronic health conditions in childhood are both associated with fewer years of completed schooling (Almond et al., 2005; Behrman and Rosenzweig, 2004; Black et al., 2007; Case et al., 2002; Conley and Bennett, 2001), in part because less healthy children miss more days in school and spend more time in bed and in the hospital (Bloom and Cohen, 2007; London et al., 2002). Our findings suggest that additional policy attention be paid to children's health in the context of early childhood programs, supports for low-wage workers to smooth transitions of benefits such as health care, and to barriers that contribute to unmet health care needs among low-income children.

2. Background

We posit a straightforward Becker/Grossman framework for understanding how increased maternal employment might affect the development of low-income children as a function of trade-offs in parental time and resources to invest in children (e.g. Becker and Lewis, 1973; Grossman, 1972; Bianchi, 2000; London et al., 2004; Scott et al., 2004). Employment may increase family income, which can be spent on more or better-quality food products and higher-standard housing, both of which are expected to produce positive health outcomes. In addition, greater employment among single mothers has the potential to improve the health of low-income children and reduce health inequities by increasing parents' abilities to purchase private health insurance and high-quality, regular medical care. Children covered by health insurance, whether private or public, have higher rates of immunization and lower rates of avoidable hospitalizations and mortality (Aizer, 2006; Currie and Gruber, 1996), and, among low-income families, private insurance has been associated with better parent-reported child health (Shook Slack et al., 2007).

Child health also may be adversely affected by maternal employment. Reductions in parent-child time and parental supervision could translate into less parental attentiveness, greater reliance on fast or less nutritious foods, less time outside and engaging in recreational activity, and disruptions of family routines. Observational studies indicate that children in high socioeconomic status families with working mothers are more likely to be overweight (Anderson et al., 2003; Phipps et al., 2006). Working mothers have also been found to spend less time on certain activities related to health and nutrition, such as cooking and grocery shopping, as well as eating with, playing with, and supervising children (Cawley and Liu, 2007; Fertig et al., 2008).

Deleterious effects of maternal employment on child health also stem from children's increased exposure to respiratory, ear, and gastrointestinal infections in the non-parental and group child care settings where children spend more time when their mothers work (Gordon et al., 2007; Johansen et al., 1988; NICHD 2001, 2003). For instance, 10 weekly hours of center-based child care is associated with a 4 percentage point increase in rates of respiratory infections and mediates the effects of maternal work hours entirely (Gordon et al., 2007). Longitudinal, qualitative research also suggests that there is considerable instability in the patchwork of child care arrangements to which low-income children are exposed, and that there is substantial variation in the quality and potential healthfulness of such non-parental care arrangements (Scott et al., 2005).

While prior studies control for a wide range of observed child and parent characteristics, and in some cases include child fixed effects, it is difficult to know whether they capture causal relationships. Of particular concern is the threat from simultaneity bias or reverse causality. Mothers of children with health problems may be more likely to work or to work more hours in order to pay for medical costs, or to work less if the children need more care (London et al., 2002). Without an exogenous shock to employment, the estimate of the effect of maternal employment on child health may actually capture the reverse causality or be an average of bidirectional effects. In an analysis of longitudinal data, Ruhm (2008) assessed the potential for simultaneity bias in models predicting health in one period as a function of maternal employment in the prior periods, by including a control for maternal employment in the year following the health assessment. In his analysis, the likelihood of obesity and overweight were positively and significantly associated with work hours in the following year, suggesting that the direction of causality could be quite complex.

Several recent studies address this concern by exploiting variation in employment related to policy changes, but find inconsistent results. Anderson et al. (2003) use variation in state-level economic and policy contexts to identify the effect of mother's work hours and weeks worked on the probability that a child is overweight. The resulting IV estimates are positive and similar in size to OLS and fixed effects estimates, but they are too imprecisely estimated to be significantly different from zero. Baker and Milligan (2008) examine breastfeeding duration and young children's health measures, such as obesity, allergies, and chronic conditions, as a function of extensions in Canadian maternity leave benefits. While they find substantial positive associations between extended benefits and breastfeeding, the few beneficial associations with children's health outcomes fade quickly. In contrast, a working paper by Morrill (2009) reports large adverse effects on school-aged children's overnight hospitalizations, asthma episodes, and injuries using the child's youngest sibling's eligibility for kindergarten as an instrument for maternal employment. Our study attempts to address selection and simultaneity bias by using participation in an experimental welfare-to-work program as an exogenous shock to maternal employment.

3. Empirical Strategy

To assess the effects of maternal employment on young children's health, we estimate IV models in which random assignment to an experimental welfare-to-work program instruments maternal employment. This application of IV estimation to data from social policy experiments is comparable to recent studies that capitalized on planned variation in aspects of individual behavior (e.g., Kling et al., 2007; Ludwig and Kling, 2007). In the case of Kling et al. (2007), experimentally-induced residential moves led to differences in the quality of neighborhood environments; while in our case, random assignment to a welfare-to-work program produced exogenous changes in maternal employment.¹

In the first stage of the IV procedure, the key independent variable, mothers' employment, is predicted as a linear function of random assignment to the NEWWS LFA treatment in one of three program sites, controlling for individual baseline characteristics. Denoting three interactions between the sites and the experimental LFA group dummy as Z_1 , Z_2 , and Z_3 , our first-stage equation is:

$$Employment_i = \beta_1 + \beta_2 Z_{i1} + \beta_3 Z_{i2} + \beta_4 Z_{i3} + \sum \lambda_j X_{ij} + \sum \delta_k S_{ik} + \varepsilon_i \quad (1)$$

¹For more detail on using this methodology in the context of analyzing experimental data from employment-based interventions, see Gennetian et al. (2005, 2008).

$Employment_i$ is the percentage of follow-up quarters child i 's mother was employed as recorded in state Unemployment Insurance earnings data. Sample members were coded as having been employed in a quarter if their earnings for that quarter were greater than zero. As we describe below, our analyses use data from the two- and five-year follow-ups of the NEWWS evaluation. We have 8 and 20 quarters of unemployment insurance data, respectively, and use these data to construct our measure of employment experienced by the mother prior to when the child health outcome is measured. We also estimated a model in which $Employment_i$ was measured as a dichotomous variable for having been employed during any quarter during the follow-up. Administrative records allow us to measure employment over a considerable time period with minimal error due to recall bias. However, we may underestimate informal, out-of-state, or self-employment. Our supplementary analyses, which are described later and used to support the external validity of the IV estimates, rely on self-reports of employment in survey data that addresses these concerns. X_i is a set of baseline characteristics, measured at the time of random assignment, including: child's age; mother's earnings in the year prior to study entry; earnings squared; length of time of welfare receipt prior to study entry; employment experience prior to study entry; completion of a high school degree or equivalent; marital status; number of children in the family; age of youngest child; race/ethnicity; and whether the mother was less than 18 years old at the time of child's birth. These baseline covariates are included to improve the precision of our estimates. In addition, S_i is a vector of site indicators controlling for unobserved static site-level characteristics.

The second stage model estimates children's overall health status as a function of the predicted values for maternal employment estimated in equation (1) and the same set of baseline characteristics and indicators for each of the three sites. The model is:

$$Health_i = \alpha Employment_i + \sum \lambda_j X_{ij} + \sum \delta_k S_{ik} + v_i \quad (2)$$

where $Health_i$ is an indicator variable signaling a maternal report of better-than-average health for child i assessed two to five years after parents entered the programs. The inclusion of site dummies in both (1) and (2) insures that within-site differences between treatment and control groups drive the identification of the IV model.

Key to the success of this approach is that random assignment of parents to the NEWWS LFA treatment groups serves as a source of variation in our regressor of interest (employment) and that treatment status is unrelated to characteristics of families and children before study entry (see Angrist et al., 1996). Prior analysis of the NEWWS programs suggest that both these conditions are met: random assignment was successfully implemented so that treatment status was uncorrelated with measured characteristics of the population under study and the NEWWS LFA programs generated substantial increases in maternal employment (Hamilton et al., 2001). We further assess the strength of the instruments by examining the partial R-squared and F-statistics for the test of joint significance of the instruments in the first stage equations. These statistics provide a measure of how strongly correlated the instruments are with the endogenous regressors (Bound et al., 1995). Our instruments have moderately strong predictive power, with an F-statistic of 14.93 and a partial R-squared of 0.02. The F-statistic is larger than the Stock-Yogo critical value for producing IV estimates with 5% of the bias present in OLS estimates (Stock and Yogo, 2005).

The identification strategy also assumes that employment is the only mechanism through which the treatment affected child health. In other words, any environmental or parenting changes related to program participation that affected children's health operated through increases in maternal employment. We selected the NEWWS LFA programs precisely because the impacts of the program on parental behavior were limited to increases in employment, while a second

type of intervention, called the NEWWS Human Capital Development (HCD) programs, also affected parental educational attainment. We also tested the exclusion restriction using Sargan's test of overidentification, in which the null hypothesis is that the instruments are uncorrelated with the error term.² The null could not be rejected in any of our models.

Finally, to produce consistent estimates, the effect of the instrument on the endogenous variable must be monotonic (Angrist et al., 1996). Applied to the present study, that assumption means that the LFA program did not induce treatment group members to reduce employment, or to be employed less than they would have if they were assigned to the control group ("defiers" in the language of Angrist et al., 1996). At all points in the employment distribution, LFA group mothers had higher levels of employment than control group mothers from which we infer that violations of the monotonicity assumption are not problematic.

4. Data

Our data come from the National Evaluation of Welfare to Work Strategies Child Outcomes Study (NEWWS-COS). The NEWWS was an experimental evaluation of the Job Opportunity and Basic Skills Training (JOBS) program, which was intended to move welfare recipients toward economic self-sufficiency by requiring that they participate in work and training activities in order to receive full cash benefits. Between 1991 and 1994, approximately 3,700 families in three cities (Atlanta, GA; Grand Rapids, MI; and Riverside, CA) were randomly selected to be enrolled in the NEWWS-COS. Once enrolled, mothers were randomly assigned to one of two JOBS program streams or to a control group. In each COS site, one JOBS program emphasized Human Capital Development (the HCD group), by directing mothers to attend educational and job training programs, and another focused on Labor Force Attachment (LFA), by directing mothers to quickly transition into the labor market. We rely only on data from the LFA treatment and control groups because the LFA programs' primary impact was on our independent variable of interest, maternal employment.

The sample for our analyses uses data from the Child Outcomes Study and consists of 3,435 children who were aged 3 to 5 years old at study entry and aged 5 to 9 years old at the time of the survey either at the two-year follow-up point or the five-year follow-up point.³ Table 1 presents baseline characteristics by site and treatment status of children in the NEWWS study sample. Between two-fifths and three-fourths of the NEWWS COS sample mothers were never married at baseline and over half had completed a GED or high school diploma. Racial/ethnic composition varied across sites with Atlanta serving primarily African-Americans, Riverside having a higher proportion of Hispanic participants, and Grand Rapids serving the largest proportion of whites. The table further shows that the majority of baseline characteristics of mothers within each site (shown in the last three panels of the table) are quite similar across treatment status. Table 1 also shows that the average years of follow-up is 3, with a standard deviation of 1.5. The last panels of the table present descriptive characteristics of the variables of interest in our analysis. More specifically, nearly 75% of the control group in Atlanta, 50% of the control group in Grand Rapids, and 83% of the control group in Riverside was employed for at least one quarter. As will be noted below in our discussion of results, we also separately examine estimates by site to assess the sensitivity of the results to any inter-site differences in baseline characteristics.

²Sargan's test does not conclusively determine the validity of an instrument because it depends on the assumption that at least one of the instruments is valid. However, failing to reject the null hypothesis does lend credence to validity claims regarding the selected instruments (Murray, 2006; Nichols, 2006).

³We lacked sufficient power to test for differential program impacts for early versus later measurements of health status, but the regression models control for the time between random assignment and the follow-up.

We measure child health using a maternal assessment in response to one survey item: “Now I’d like to talk about your child’s health status. Would you say your child’s health in general is: 1=Excellent, 2=Very good, 3=Good, 4=Fair, or 5=Poor?” This ordinal measure is reverse coded so that higher values reflect assessments of better health. Although we report analyses using this continuous measure, we focus the presentation of results on a dichotomous measure of “better-than-average” health coded as “1” if a child is reported to be in “excellent” or “very good” health, a standard that is commonly applied in tracking trends in the population (see for example, Bloom and Cohen, 2007 and U.S. Department of Health and Human Services, 2005).

Approximately 76% to 85% of children in our sample had very good or excellent health at follow-up according to their mothers (Table 1). As points of comparison, the National Health Interview Survey estimates that 82% of children zero to four years old and 68% of all children under age eighteen are in excellent or very good health (Bloom and Cohen, 2007), while the National Survey of Children’s Health estimates that 67% of children under 18 years of age in families with incomes below the Federal poverty level are reported to be in excellent or very good health compared with nearly 94% of similarly-aged children in families with incomes greater than 400% of the Federal poverty level (U.S. Department of Health and Human Services, 2005).

Although parental reports of children’s overall health status do not allow us to capture the subtleties of children’s health, prior research suggests that the measure is both unbiased by parents’ own physical or mental health (Case et al., 2002; Dadds et al., 1995) and correlated with specific health conditions. For example, descriptive data from the National Health Interview Survey show that children in good, fair, or poor health were four times more likely than children in very good to excellent health to have ever been diagnosed with asthma, five times more likely to still have asthma, and three times more likely to have had respiratory allergies (CDC, 2008). In the NICHD Study for Early Child Care and Youth Development, the correlation between a four-point general health status scale and reports of ear, respiratory, or intestinal problems in 3- and 4-year-old children was -0.40 ($p < 0.01$).⁴

5. Results

5.1 OLS and IV Estimates

Table 2 presents our main OLS and IV results. The first panel shows the first stage results from the IV models, the impacts of the NEWWS LFA programs on two measures of maternal employment, ever employed during follow-up and percentage of follow-up quarters employed. Our instruments predict maternal employment: NEWWS Atlanta increased employment by 3.9 percentage points, NEWWS Grand Rapids increased employment by 10.8 percentage points, and NEWWS Riverside increased employment by 12.4 percentage points. The second panel of Table 2 presents OLS and IV models predicting child’s better-than-average (very good/excellent) health as a function of maternal employment. Here we see that there is no relationship between maternal employment, measured as the percentage of quarters employed, and children’s health in the OLS models. However, the IV estimates indicate that each percentage point increase in employment during follow-up is associated with a 0.6 percentage point (coefficient -0.006 ; std. error 0.002) decrease in the probability of very good or excellent child health. This effect size roughly translates into a five percentage point decrease in the probability of very good or excellent health for each additional quarter employed.⁵ IV probit models confirm these results and suggest that the marginal effect of a percentage point change in employment becomes slightly larger as the percentage of quarters employed increases.

⁴Statistic provided by Chantelle Dowsett, University of Texas, Austin on August 23, 2008.

In results not shown here, we find a similar negative effect (coefficient -0.011; std. error 0.004) on the continuous measure of health status. We also tested models predicting fair/poor health. The results of these models mirror those predicting very good/excellent health, such that more maternal employment during the follow-up period is associated with increases in the probability of the child having fair/poor health.

The measure of percentage of quarters employed may confound multiple aspects of employment, including employment entry—when mothers first faced the requirements of the NEWWS LFA programs—and employment stability throughout the follow-up period. To examine the effects of entry into employment, we replaced average quarterly employment with any quarter of employment during the follow-up period. As shown in Table 2, the pattern matches our main results: The OLS results using this measure show a weak positive relationship with better-than-average health (coefficient 0.033; std error 0.018), but the IV results show a negative effect (coefficient -0.446, std error 0.160). This estimate is quite large, indicating that having a mother who worked any quarter during the follow-up period reduces a child's probability of having very good or excellent health by 45 percentage points, relative to children with nonworking mothers. Estimates of the marginal effect from a probit model are slightly smaller (33 percentage points from a base of 76 percent) and the effect on the continuous measure of child health is a one-point decrease (from excellent to very good or good to fair, for instance).

Perhaps the best specification of employment patterns would be one in which we estimate the effect of percentage of quarters employed controlling for job entry, and vice versa. Unfortunately, the NEWWS impacts on these two measures of employment did not differ sufficiently across the three sites to parse out these effects precisely. We also attempted to examine employment stability using a dichotomous variable indicating whether the mother was employed during 75% or more of the follow-up quarters, a threshold associated with earnings growth and job stability in the sample of NEWWS treatment group members who found work (Martinson, 2000). The instruments in this model were weak and produced imprecise estimates (results not shown).

5.2 Sensitivity and Heterogeneity of Results

Our main models assume that the relationship between maternal employment and children's health is similar for each of the NEWWS sites, but this may not be the case. The site indicators in our model control for this in part, but we further checked this assumption by estimating just-identified IV models for all program sites and each program site separately. As Table 3 shows, we obtain a nearly identical estimate in each of these models. In Grand Rapids and Riverside, we see fairly large impacts on employment and concurrent unfavorable effects on children's health. However, as shown in Table 3, our findings are robust to the inclusion and exclusion of the Atlanta site. The IV estimate from the Atlanta data is similar in size, but estimated with much less precision (primarily because the instruments in the first stage are weaker relative to the other sites). Based on these estimates by site, we conclude that the precision of the local average treatment effect (LATE) is influenced by Grand Rapids and Riverside, but the IV estimate is not qualitatively or substantively differentiated by site.

Our final specifications separately estimated the IV models by child age and sex because prior research has suggested that boys are potentially more susceptible than girls to changes in their mother's employment (Brooks-Gunn et al., 2002; Gennetian et al., 2008) and that the timing

⁵Recall that we use data from both two- and five-year follow-up surveys. In the former, a quarter represents 12.5% of the follow-up period, making the approximate effect of an additional quarter of employment $-0.006 \times 12.5 = -0.075$. In the latter, a quarter represents 5% of the follow-up period, making the approximate effect of an additional quarter of employment $-0.006 \times 5 = -0.03$. Five percentage points is the average of these two estimates.

of maternal employment in the context of children's developmental stages matters (for a review, see Waldfogel, 2002). In results not shown, we found no indication of a year-age gradient on the adverse effects of maternal employment on children's health among these groups of young children. This may be in part because the age range of children in our sample is quite narrow and capture one key developmental period of early childhood, as compared to a broader age range spanning multiple developmental transitions. However, IV estimates do suggest that maternal employment has a more pronounced negative effect on reported health status of boys (coefficient -0.008 ; std err 0.003) compared to girls (coefficient -0.003 ; std err 0.002). Indeed, NEWWS program impacts show a statistically significant -0.072 (std error 0.02) effect on better-than-average health for boys, and a small and not statistically significant effect of 0.018 (std error 0.02) for girls. These child sex differences appear despite the fact that NEWWS impacts on maternal employment did not differ for mothers of boys as compared to mothers of girls.

5.3 Possible Mechanisms

We next took advantage of some of the strengths of our data and explore the role, if any, that employment-related changes in income, child care, and health insurance coverage may play in mediating the effect of maternal employment on young, low-income children's health status. This analysis compared the experimental impacts of NEWWS LFA on income, child care, and health insurance outcomes with results from a similar random-assignment study of a welfare, work, and anti-poverty program called the Minnesota Family Investment Program (MFIP).⁶ MFIP implemented similar work requirements just a few years after NEWWS, but unlike NEWWS, the program provided generous earnings disregards to working recipients, making it one of several "earnings supplement" programs tested in the 1990s that increased both employment and family income among single parents (see Bloom and Michalopoulos, 2001; Miller et al., 2000 for more information on MFIP and earnings supplement programs). These differing program effects give us the opportunity to distinguish the effects of one aspect of economic behavior, employment, from another aspect of economic security, income, although we are not able to estimate IV models that can distinguish all of these possible mechanisms using the MFIP data.

Table 4 summarizes the program impacts on NEWWS LFA and MFIP. In these comparisons, income is measured as mother's average annual income, including earnings, public assistance, and earnings supplements recorded in public assistance and Unemployment Insurance records.⁷ We also consider three types of non-parental child care settings—solely home-based, solely center-based, and some combination—and whether the child is covered by private or public health insurance during the month of the follow-up survey. The child care measures capture the child's exposure (any or none) to types of non-parental care: home-based (at the child's home or another home-based setting with a relative or non-relative caregiver) or center-based. Our focus on type of care is partially a limitation of the data—we do not have measures of extent or quality of care, for instance—but is also consistent with prior research suggesting that child health would be most responsive to types of care as they vary by the size of the group and hence exposure to infectious diseases from other children; health practices in the setting, such as nutrition, exercise and play time; and total time in care (where children in center-based

⁶MFIP estimates are based on author calculations using the MFIP data. Note that a comparison of effects of the NEWWS LFA program with the effects of the NEWWS HCD or human capital development program is not nearly as informative as NEWWS HCD did not produce similar changes in employment as NEWWS LFA, nor in income or health insurance.

⁷This income measure omits self-employment and informal earnings, public transfers other than cash assistance and Food Stamps, private transfers from fathers of children or family members, and earnings from family members other than the sample member. Most of the sample is comprised of single parents, so most do not have income from residential spouses. All income amounts have been inflation-adjusted to 2001 prices using the CPI.

settings tend to be in non-parental care for longer hours on average than children in other home-based settings, all else equal; also see Gordon, Kaestner, and Korenman, 2007).

NEWWS LFA programs increased employment and home-based non-parental child care, had no effect on family income, and decreased both children's health insurance coverage and overall child health. In contrast, MFIP increased employment, income, coverage by public insurance, and had no effect on children's health. The fact that both programs increased maternal employment, but only NEWWS LFA adversely affected child health suggests the effects of maternal employment on child health may depend on the consequent changes in family economic resources. Additionally, secondary effects may occur through child care environments (for example, the increase in home-based care in NEWWS) or health insurance coverage (the decrease in NEWWS versus the increase in MFIP). Indeed, the results of MFIP suggest that increases in income or health insurance coverage may buffer the potentially negative effects of increases in maternal employment. This is consistent with findings from a Canadian study of an earnings supplement program (called the Self-Sufficiency Project) that also increased employment and income among welfare recipients and improved children's health status (Morris and Michalopoulos, 2003). A body of qualitative research also that documents mother's concerns about potential loss of health insurance coverage during their welfare to work transitions (Angel, Lein, and Henrici, 2006; Hartley, Seccombe, and Hoffman, 2005; Polit, London, and Martinez 2001; Seccombe and Hoffman, 2007), a phenomenon that the MFIP program avoided because of the earnings disregard, which allowed families to remain on welfare while working.

5.3 External validity

Under certain assumptions, our instrumental variable models produce consistent estimates of the effects of maternal employment on children's health, with reduced bias from omitted variables, simultaneity, and measurement error relative to OLS estimates. However, the opportunity gained by taking advantage of experimental data from a welfare-to-work program may be tempered by the unique circumstances in which this particular sample of mothers was induced to change their employment, in response to an employment mandate implemented during the early 1990s. This raises a question about whether findings from this analysis can be generalized to low-income families more broadly.

To partially address this limitation we derive within-child fixed effects estimates, estimated via Chamberlain's (1980) fixed effects logit model, using longitudinal data on low-income mothers collected from 1998 to 2001 in four urban counties (Cuyahoga, Ohio; Los Angeles, California; Miami-Dade, Florida and Philadelphia, Pennsylvania).⁸ Mothers in this study reported child health using the same five-point scale as in NEWWS, as well as employment status and hours. We rely on contemporaneous measures of employment and child health at two different points in time to identify these models and, as such, used average weekly hours in the month prior to each survey interview as the measure of maternal employment.

Table 5 presents the results of logit and fixed-effects logit models. Similar to the pattern of findings in the OLS and IV models using the experimental data, the estimates are close to zero and not statistically significant, while the fixed effects models controlling for time-invariant family and child characteristics suggest small, but statistically significant, detrimental effects

⁸These data were collected under the auspices of MDRC's Project on Devolution and Urban Change (Quint et al., 1999). The Urban Change data were collected during the early years of the implementation of the welfare reforms brought about by the passage in 1996 of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA). The Urban Change survey sample included single mothers between the ages of 18 and 45 years, who, in May 1995, were receiving cash assistance (Aid to Families with Dependent Children) and/or Food Stamps, and living in census tracts where either the poverty rate exceeded 30% or the rate of welfare receipt exceeded 20%. Of the 3,960 women who were surveyed for information about employment, child care, health insurance, parenting and child outcomes in 1998, 3,260 were re-interviewed in 2001, for an overall retention rate of 82%.

of hours of maternal employment on child health. Here, each additional hour of employment is associated with a 0.2 percentage point reduction in the probability of very good or excellent health from a base probability of 73%. Additional analyses suggest that this effect is driven by full-time work of 31 hours or more. Neither of the coefficients on part- and full-time work is statistically significant, but the negative coefficient of working full-time approaches marginal significance (coefficient -0.365; std error 0.223) and differs statistically from the coefficient on part-time work.⁹

The fixed-effects estimates are vulnerable to bias from omitted child or family characteristics that changed over time and from the possibility that mothers of children in poor health were more likely to be working in the first place. This is addressed in part by our inclusion of a rich set of time-variant characteristics as additional controls in the fixed effects models, including marital status, depressive symptoms, maternal health conditions, and mother's use of alcohol or drugs. Nonetheless, even if there is remaining bias in the fixed effects analysis due to omitted time varying characteristics, the close replication of findings from the IV models and the FE models each using samples of poor families in different geographic and political contexts lends support to the generalizability of the NEWWS results.

6. Discussion and Conclusions

We find that employment among low-income women has a modest adverse effect on the general health status of young children. A percentage point increase in employment induced by a welfare reform program is shown to decrease the probability of a child being in very good or excellent health by 0.6 percentage points. The adverse effects of maternal employment are larger among boys as compared to girls, but do not vary by child age. Although the size of this effect is small, any negative effect on this already vulnerable population of high risk children is notable particularly since health status can interrupt other aspects of children's development, including their cognitive preparation for school. In addition, the timing of this negative effect, early in the life course when it has the potential to shape a range of other consequential life course trajectories, is important to consider. Childhood factors are more predictive of the rate of increased functional limitations in later life than is adult health or socioeconomic status (Case et al., 2005; Haas, 2008).

The strength of this study is that we leverage experimentally-induced variation in employment and thereby address many common threats to the internal validity of causal estimates. Randomization ensures that the treatment group status is not correlated with unobserved characteristics of individuals. In addition, the "work-first" design of the NEWWS LFA program helps meet the requirements of the exclusion restriction, which stipulates that the instrument had no direct effect on child health and that employment is plausibly the only mechanism through which the instrument is associated with child health.

The opportunity gained by taking advantage of experimental data from a welfare-to-work program must be tempered by the unique circumstances in which this particular sample of mothers (who were not exempt from the employment mandates) were induced to change their employment—in response to an employment mandate implemented during the early 1990s—and whether findings from this analysis can be generalized to maternal employment in low-income families more broadly. The IV models produce estimates of the local average treatment

⁹The Urban Change survey did collect information about income during the month prior to the survey. We constructed a measure of total income and added it to the fixed-effects models. The coefficient is positive, but the estimate also has large standard errors. We anticipate that this is because income is measured through respondent reports on various sources of income during the last month and are likely to have a lot of measurement error. In particular, refusals or a response of "don't know" were not followed by an unfolding scale allowing respondents the option to situate their income within some pre-specified discreet categories thereby reducing the likelihood of missing or invalid information.

effect (LATE) among “compliers,” those NEWWS-LFA participants whose employment patterns were responsive to the treatment (Angrist et al., 1996; Heckman, 1991; Moffitt, 2009, for a recent broad exposition on causal estimates in population science). There are several ways in which this group might not represent the broader population of welfare recipients or low-income single mothers, particularly in a more current economic and policy context. For instance, women with very low literacy or severe learning, cognitive, or physical disabilities, and those experiencing extreme domestic abuse were exempted from NEWWS work mandates (for more detail, please see Hamilton, et al, 1997).

The close replication of results in child fixed-effect models using a more recent sample of low-income families suggests that the local average treatment effect may be a good estimate of the overall average effect. Although the intent of our replication exercise is not to carefully examine whether experimentally-based estimates can be replicated in a non-experimental framework, our findings are intriguing in the context of work by Lalonde (1986) and more recently Hollister and Wilde (2007) and Cook et al. (2008) that purposefully and carefully describe the situations in which such a comparison is merited (i.e. using similar samples, in similar time periods, and with very good information about the selection process) and the methodological challenges associated with such efforts.

Even if the IV results are generalizable only to the sub-population of compliers—unemployed single mothers without a limiting disability who would not work (at all or as much) but for their involvement in a labor force attachment program—we argue this is an extremely policy-relevant sub-population. The current set of policies thought of loosely as “work supports,” including the Earned Income Tax Credit and child care subsidies, are designed explicitly to facilitate work among parents who, without mandates and incentives, might choose to work less if at all. In addition, while nearly 20 years have passed since NEWWS was first implemented, most of the employment services currently available through welfare and Workforce Investment Act programs are modeled on the NEWWS LFA approach, emphasizing job search and job entry over education and training.

This is the first study to find adverse effects of maternal employment on children’s overall health status, specifically among low-income families. Experimental and observational studies of preschool children whose mothers moved from welfare-to-work find few consistent effects, positive or negative, on school achievement and behavior (Chase-Lansdale et al., 2003; Hill and Morris, 2008; Morris et al., 2005). This fact has contributed greatly to an apparent consensus among both academics and policy makers that encouraging employment among low income mothers has few pernicious consequences for children’s development (see discussion in Waldfogel, 2006). Our findings insert an important caveat into that consensus, which warrants further investigation.

The context of the labor market opportunities and work supports available to low-income mothers is important for understanding detrimental effects on children’s health. Employment among less-skilled women is characterized by instability, low earnings and rates of benefit coverage, and limited opportunities for advancement (Johnson and Corcoran, 2003; Martinson, 2000; Pavetti and Acs, 2001; Wood et al., 2008). The results of the NEWWS IV models, paired with a comparison of program impacts between NEWWS and MFIP, indicate that interventions that induce employment without increasing family income or the probability of health insurance coverage may be detrimental to young children’s health (though a conclusive assessment of these trade-offs would be premature without a full cost-benefit analysis that also considers, for example, the tax-payer benefit from increased maternal earnings). Expansion of programs such as the EITC and SCHIP in the late 1990s, after NEWWS was implemented, could clearly be helping to mitigate these negative effects. Yet, more can be done to cover the uninsured, limit gaps in coverage during transitions from public to private insurance, and to

increase the financial returns of low-wage employment. An intriguing expansion of this research is to compare results from the U.S. with those of European nations that have experienced somewhat comparable levels of maternal employment, but within the context of more extensive and universal social safety net systems.

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Table 1

NEWWS Sample Characteristics, by Program Site and Experimental Group

Variable	Atlanta		Riverside		Grand Rapids	
	Control	LFA	Control	LFA	Control	LFA
<u>Baseline Characteristics</u>						
<u>Mothers</u>						
% Under 18 at child's birth	6.6	3.5 ***	6.8	5.5	15.0	14.7
% Never married	70.4	75.9 **	43.5	41.4	57.7	60.3
% Separated or divorced	28.4	23.5 **	54.6	56.6	40.0	36.1
% Black	96.1	94.9	19.2	17.1	39.1	41.8
% Hispanic	0.4	1.1	33.4	35.4	6.6	6.5
% White	3.2	3.6	45.2	44.8	51.6	49.3
% Received high school degree or GED	65.2	62.0	50.1	58.3 ***	58.2	62.3
Earnings in year prior to RA (\$1,000s)	1.4 (3.1)	1.1 * (3.0)	1.9 (4.9)	1.9 (4.9)	2.7 (5.1)	2.1 ** (4.0)
% Employed in year prior to RA	38.4	34.1 *	31.5	27.9	60.9	51.4 ***
Years of AFDC receipt prior to RA	2.8 (0.4)	2.8 (0.4)	2.7 (0.5)	2.7 (0.5)	2.7 (0.4)	2.8 (0.4)
Years from RA date to follow-up date	3.1 (1.5)	3.3 * (1.5)	3.3 (1.5)	3.4 (1.5)	3.4 (1.5)	3.4 (1.5)
<u>Family and Child</u>						
Age of youngest child	3.8 (0.8)	3.8 (0.8)	3.6 (0.7)	3.5 (0.7)	3.0 (1.3)	3.0 (1.3)
Number of children in family	2.2 (1.1)	2.3 (1.2)	2.1 (1.2)	2.3 ** (1.2)	2.1 (1.0)	2.1 (0.9)
Child's age	4.3 (0.7)	4.5 *** (0.8)	4.1 (0.9)	4.2 (0.9)	4.3 (0.8)	4.3 (0.8)
% Child is male	49.0	52.2	47.3	51.3	51.4	47.6
<u>Outcomes Measured at Follow-Up</u>						
<u>Child Health</u>						
Parent report of child's health	4.3 (0.8)	4.2 (0.9)	4.3 (0.8)	4.1 *** (0.9)	4.3 (0.8)	4.2 (0.9)
% health is very good/excellent	80.0	78.0	82.9	76.0 ***	84.5	79.3 *
<u>Employment and Earnings</u>						
Average annual income (\$1,000s)	9.2 (4.2)	10.2 (4.3)	10.9 (5.6)	11.4 (6.8)	10.4 (4.7)	10.1 (5.0)
% Employed at least 1 quarter during follow-up	75.1	75.9	49.8	69.9 ***	82.8	90.6 ***
Average % of follow-up quarters employed	41.4	43.8	23.2	36.7 ***	43.9	52.7 ***
<u>Child Care^d</u>						
% Only center-based care	40.9	43.9	23.5	18.6	15.7	10.8

Variable	Atlanta		Riverside		Grand Rapids	
	Control	LFA	Control	LFA	Control	LFA
% Only home-based care	9.1	13.3 **	18.0	25.2 **	21.6	23.0
% Mixed care	36.7	29.8 *	39.4	45.7	59.0	62.4
Sample size	790	663	797	362	407	416

Notes: LFA=Labor Force Attachment program. RA=Random Assignment. Standard deviations for continuous variables shown in parentheses.

Asterisks indicate statistically significant differences between the LFA and control groups at the 1% (***), 5% (**), and 10% (*) levels.

^aThe child care questions were asked of only 1 child per family, making the samples approximately half the size.

Table 2

IV and OLS Coefficients for Maternal Employment and Child Health

Maternal Employment (1st Stage IV Results)		
NEWWS Program Site	Percentage of Quarters Employed	Employed at Least 1 Quarter
Atlanta	3.856 * (2.191) [-0.440, 8.153]	0.015 (0.024) [-0.033, 0.063]
Grand Rapids	10.762 *** (2.619) [5.626, 15.898]	0.096 *** (0.026) [0.044, 0.147]
Riverside	12.449 *** (2.601) [7.349, 17.549]	0.185 *** (0.035) [0.117, 0.253]
F-statistic	14.22	14.11
Partial R ²	0.020	0.019
Child Health is Very Good/Excellent		
	OLS	IV
<u>Model 1</u>		
Percentage of quarters employed	0.000 (0.000) [0.000, 0.001]	-0.006 *** (0.002) [-0.009, -0.002]
<u>Model 2</u>		
Employed at least 1 quarter	0.033 * (0.018) [0.001, 0.068]	-0.446 ** (0.160) [-0.761, -0.133]
Sample size	3435	3435

Notes: Standard errors shown in parentheses; 95% confidence intervals shown in brackets. Baseline covariates included in all models are mother's earnings, employment, and AFDC receipt in the year prior to random assignment; mother's race, marital status, educational attainment, and teen pregnancy; number of children and age of youngest child in the family; length of follow-up, and program site.

* p<.10;

** p<.05;

*** p<.01.

Table 3

First Stage and IV from Just-Identified Models Predicting Child Health is Very Good/Excellent

	All Program Sites	Atlanta Only	Grand Rapids Only	Riverside Only
Maternal Employment (1st Stage IV Results)				
NEWS: Impact on % Quarters Employed	8.22 *** (1.42)	4.31 * (2.20)	10.47 *** (2.61)	13.1 *** (2.61)
F-statistic	33.46	3.84	16.04	25.18
Partial R ²	0.016	0.004	0.032	0.039
IV Coefficients from Just-Identified Models Predicting Child Health is Very Good/Excellent				
Percentage of Quarters Employed	-0.006 *** (0.002) [-0.009, -0.002]	-0.005 (0.006) [-.016, .007]	-0.005 ** (0.003) [-.011, .001]	-0.006 *** (0.002) [-.010, -.001]
Sample size	3,435	1,453	1,159	823

Notes: Standard errors shown in parentheses; 95% confidence intervals shown in brackets. Baseline covariates included in all models are mother's earnings, employment, and AFDC receipt in the year prior to random assignment; mother's race, marital status, educational attainment, and teen pregnancy; number of children and age of youngest child in the family; length of follow-up; and program site.

*
p<.10;

**
p<.05;

***
p<.01.

Table 4

Comparison of NEWWS LFA and MFIP 5-Year Program Impacts

Outcome	NEWWS LFA	MFIP ^a
Child health (scale 1 to 5)	−0.094 *** (0.033)	−0.035 (0.088)
Very good/Excellent health (%)	−0.046 *** (0.015)	0.009 (0.038)
Percentage of quarters employed	8.220 *** (1.421)	6.817 *** (2.600)
Average annual income (\$1,000)	0.162 (0.210)	0.939 * (0.531)
Only center-based child care (%) ^b	−0.011 (0.020)	0.034 (0.031)
Only home-based child care (%) ^b	0.042 ** (0.017)	−0.007 (0.041)
Mixed child care (%) ^b	0.007 (0.025)	−0.014 (0.046)
Any health insurance coverage	−0.025 ** (0.011)	0.052 * (0.030)
Public health insurance coverage (%) ^c	−0.024 * (0.014)	0.115 *** (0.039)
Private health insurance coverage (%) ^c	0.000 (0.013)	−0.035 (0.037)

Notes: NEWWS LFA = National Evaluation of Welfare-to-Work Strategies Labor Force Attachment; MFIP = Minnesota Family Investment Program. Standard errors shown in parentheses. Baseline covariates included in all models are mother's earnings, employment, and AFDC receipt in the year prior to random assignment; mother's race, marital status, educational attainment, and teen pregnancy; number of children and age of youngest child in the family; length of follow-up; and program site.

Asterisks indicate statistically significant differences between the treatment and control groups in each program at the 1% (***), 5% (**), and 10% (*) levels.

^aThe MFIP sample includes urban long-term recipients only.

^bChild care type in the year prior to the survey (collected for 1 child per family).

^cHealth insurance coverage in prior month.

Table 5

Logit Coefficients Predicting the Probability that Child Health is Very Good/Excellent using Urban Change Data

Outcomes	Logit	FE Logit
<u>Model 1</u>		
Average hours worked	0.001 (0.002) [0.000]	-0.011 ** (0.005) [-0.002]
<u>Model 2</u>		
Worked 1 to 30 hrs	0.030 (0.138) [0.006]	0.170 (0.247) [0.033]
Worked > 30 hrs	0.092 (0.101) [0.018]	-0.365 (0.223) [-0.071]
Sample size	2,986	802

Notes: FE=Fixed effects. Standard errors shown in parentheses; Marginal effects shown in brackets. The following controls are included: child's sex and age, mother's age, educational attainment, marital and cohabitation status, race/ethnicity, sf-12 physical health component score, CES-D score, and indicators for: whether or not a health condition limits the mother's ability to work, whether or not the mother was born in the US, whether or not the mother has recently been physically abused, emotionally abused, or has used hard drugs, the presence of another adult in the household, the presence of a child other than the mother's own/adopted child, the number of children in the household, an indicator for the respondent's location either Los Angeles, Miami, and Philadelphia, a set of interactions between each site indicator and the Hispanic indicator, and a set of interactions between the site indicators and whether or not the mother was born in the U.S. indicator. Also included are indicators flagging missing values for each of the covariates.

**
p<.05