

**Maternal Work Hours and Adolescents' School Outcomes  
Among Low-Income Families in Four Urban Counties**

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**ABSTRACT**

We examine how changes in maternal work hours affect adolescent children's school participation and performance outcomes using data from interviews in 1998 and 2001 with 1,700 women who in May 1995 were welfare-reliant, single mothers of adolescents living in the most-disadvantaged neighborhoods in four urban counties. We find unfavorable effects of maternal work hours on several aspects of adolescents' schooling: Full-time maternal employment (31 hours or more per week) increases the likelihood of skipping school, decreases adolescent school performance, and increases the likelihood of parent contact by a school about behavior problems. Sons seem to be particularly sensitive to changes in mothers' average hours of work, with notable increases in incidences of being late for school and declines in school performance when mothers work more hours. These findings hold up controlling for a rich array of mothers' characteristics, including their psychological and physical health and experiences with domestic and substance abuse, as well as unobserved time-invariant characteristics of the adolescent.

## I. Introduction

Low-income youth face an array of barriers to academic achievement, attendance, and high school completion, which in turn affect their opportunities for ongoing secondary education and, ultimately, their labor market success. Indeed, increased human capital among youth is critical to increasing their future economic security and reducing their dependence on cash assistance, both of which are key policy goals related to at-risk youth (Card 1999). Unlike youth from more advantaged families, low-income youth are more likely to be raised by single mothers, live in resource-poor and unsafe neighborhoods, attend low-quality schools, and be members of economically unstable families. Welfare-reliant mothers of these youth are increasingly under pressure to leave the welfare rolls and patch together financial resources through their own wage labor and that of other family members (Blank and Haskins 2001). Many struggle to balance the new opportunities, demands, and limitations associated with Temporary Assistance for Needy Families (TANF) and the exigencies of the low-wage labor market with their children's needs for attention, care, and supervision (London, Scott, and Hunter 2002; London et al. 2004).

How youth in these circumstances fare while mothers change the amount of time they spend in paid employment—and struggle to achieve or maintain independence from cash assistance—is relatively understudied. Most research on this question has focused on young children because they are viewed as especially susceptible developmentally to the potential costs or benefits of maternal employment (Chase-Lansdale et al. 2003; Morris et al. 2001; Waldfogel, Han, and Brooks-Gunn 2002). In this paper, we examine how change in maternal work hours affects adolescent children's school outcomes using a subsample of data from interviews in 1998 and 2001 with 1,700 women who in May 1995 were welfare-reliant, single mothers living in the

most-disadvantaged neighborhoods in four urban counties—Cuyahoga (Cleveland), Los Angeles, Miami-Dade, and Philadelphia.

The analyses have several features that contribute to the extant literature.

Methodologically, we take advantage of a rarely-available, rich set of covariates to control for maternal physical and psychological health, domestic and substance abuse, and several aspects of socio-economic well-being. With two waves of data we also employ a fixed-effects technique that controls for time-invariant unobserved characteristics of the adolescent. Substantively, average hours of employment are assessed linearly as well as dichotomously, depicting part-time work (30 hours or less per week) separately from full-time work (31 hours or more per week). We additionally assess whether or not effects of maternal employment differ for adolescent-aged sons as compared to adolescent-aged daughters (Eccles 1999).

## **II. Background and Conceptual Motivation**

The focus of this study is on the effects of maternal work hours on low-income adolescents. We draw on theories spanning a variety of social science disciplines to inform hypotheses about how changes in parents' economic behavior can affect children's development. From the perspective of economic theory, parental employment and family income can affect children's development by influencing the amount and distribution of resource and time investments (Becker 1981; Bergstrom 1997; Coleman 1988, Ruhm 2006). Economic theory also predicts that older youth assess the likely returns to continued education versus immediate employment--an assessment that might be altered by the parents' ability to support the family without financial support from the child. Among low-income youth, a family-work perspective would further argue that a parent's material and psychological gain from employment might outweigh the long-term benefits associated with continued education and instead encourage

youth to embark immediately in employment activities at the risk of school completion (London and Scott 2003).

Psychological theory emphasizes the ways in which employment and income can affect parental emotional well-being, and, in turn, interactions between parents and their children (Chase-Lansdale and Pittman 2002; McLoyd 1990, 1997, 1998; McLoyd et al. 1994).

Developmental psychology, in turn, pays special attention to the timing of these changes across a child's developmental lifespan. For adolescents, this includes attaining greater independence from parents, such as increased autonomy in decision-making over one's future and exploring new roles and identities (National Research Council 2002).

Empirical studies of the effect of maternal employment on adolescent outcomes that are relevant to discussions of adolescents' school participation and performance have produced somewhat mixed results. Most of the available research examines two-parent or middle-to-higher-income families and generally finds few or slightly favorable effects on adolescent well-being (Bogenschneider and Steinberg 1994; Paulson 1996; Williams and Radin 1993, Aughinbaugh and Gittleman 2003; Orthner 1990; Muller 1995; Lopoo 2004; Ruhm 2006). Consistent with these general findings, the few studies that have explicitly focused on low-income, single mother samples—particularly during the 1990s, a period during which there were dramatic declines in welfare caseloads and increases in the labor force participation of single mothers—have also found neutral to favorable associations between maternal employment and adolescent self-esteem and academic achievement (Allesandri 1992; Dunifon, Kalil, and Danziger 2002; McLoyd et al. 1994). These relationships appear to be quite robust in national, regional, and urban area samples, and are observed regardless of whether prior or current welfare receipt of the parent is considered (e.g. Chase-Lansdale et al. 2003 and Brooks et al. 2002).

Other studies also find positive effects. Among disadvantaged adolescents, Ruhm (2006) reports that increased maternal employment was positively associated with cognitive test scores among more-disadvantaged adolescents, and Lopoo (2005a) finds that maternal employment is negatively related to teenage fertility.

While these studies suggest that transitions into and increases in the number of hours of employment among welfare-reliant and otherwise low-income mothers have neutral to beneficial effects, research based on a synthesis of experimental studies of welfare and work programs finds that welfare and work policies, per se, produce unfavorable effects on a range of schooling outcomes among adolescents, particularly those who have a younger sibling at home (Gennetian et al. 2004). A somewhat complementary finding also emerged in recent work using data from the Panel Study of Income Dynamics (PSID), which showed that stringent welfare policies, measured at the state level over time, increased the rate of dropping out of school (Hao, Astone and Cherlin 2004). Additionally, a recent study that utilized a more-nuanced characterization of maternal work found that adolescents with single mothers who are in “bad” jobs (i.e., full-time jobs with low pay and no health insurance) experienced more grade repetition (Kalil and Zoil-Guest 2005).

We focus in this paper on adolescents’ schooling outcomes because of their significance in educational achievement and attainment for a range of life course trajectories and later-life outcomes and because the available evidence in the literature on the effect of maternal employment on low-income adolescents’ school outcomes is quite mixed. Here, we discuss specifically how increases in maternal work might affect adolescents’ schooling outcomes.

Maternal work hours might affect adolescent schooling outcomes through parents’ knowledge and monitoring of their adolescent’s lives, adult-responsibility sharing, and time and

resources devoted to the adolescent and parental role-modeling. Some working parents may have less time and energy to spend with their children (Kurz 2002), while others may arrange their non-work hours so that time with their children is not reduced (Chase-Lansdale et al. 2003). Working parents may have less time to devote to parenting (Baumrind et al. 1991; Brooks, Hair, and Zaslow 2001; Conger and Elder 1994; Conger et al. 1994; Elder 1974, 1979; McLoyd 1990; McLoyd et al. 1994; Shumow, Vandell, and Posner 1998) or to monitor their children's behavior (Sampson and Laub 1994). Closer parental monitoring, particularly knowledge of daily activities disclosed by children, has been linked to better school outcomes (Baker and Stevenson 1986; Baumrind 1989; Kerr and Stattin 2000; Linver and Silverberg 1997; Patterson, Bank, and Stoolmiller 1990). Moreover, less parental monitoring has been linked to increases in problem behavior, that, for the purposes of this study, might be linked to problem behaviors in school (Mason et al. 1996)

Spending less time at home may also lead parents to expect adolescents to take on new "adult" tasks and this could lead to increased responsibility (Hsueh and Gennetian 2006) and better behavior, or it could lead to resentment, acting out, failure to complete unsupervised tasks (such as homework), and resistance to any kind of control imposed by an adult (Burton, Brooks, and Clark 2002; Grusec, Goodnow, and Cohen 1996). Adolescents in welfare-reliant families may also share in the responsibility of earning income (Brown 2001), which could interfere with attendance at school, studying, or sleep. Gaining employment experience may make adolescents more employable as adults or perform better in school (Lerman, 2000), but it also increases exposure to adult behaviors, such as drinking and drug use (National Academy of Sciences, 1998), especially if employment is more than 20 hours per week (Mortimer et al. 1996; Steinberg and Dornbusch 1991), which may impair adolescents' ability to perform well in school.

Under most current state welfare, work or earned income tax policies, increased employment hours and subsequent earnings among very low-income parents commonly translates into increased income. Thus, to the extent that poverty during adolescence leads to lower high school graduation rates and negative effects on other measures of educational attainment, increased economic resources generated by employment might protect adolescents from some of the above-mentioned processes that could lead to unfavorable outcomes (e.g., see Teachman et al. 1997).

The literature suggests that there are a number of reasons to expect that changes in maternal work affect sons and daughters differently. First, when they increase their hours of employment, mothers may rely more on their adolescent-aged daughters than their sons to help with household chores and responsibilities (Crouter et al. 2001), which may interfere with adolescent girls' school participation and performance. Second, parents may also invest differently in the future education of their sons and daughters. As work hours increase, opportunities for time investment are sometimes constrained, while opportunities for economic investment may sometimes be enhanced. Changes in parental time or material investments may differentially affect the participation and performance of girls and boys (Butcher and Case 1994). Finally, in the absence of attentive supervision or monitoring, boys might be more likely than girls to skip school and engage in risky behaviors that impair their performance in school. Given these considerations, we include in this paper an examination of whether changes in maternal work hours differentially affect adolescent girls' and boys' school participation and performance outcomes.

### **III. Sample, Data and Measures**

Data for this study are from the Project on Devolution and Urban Change (henceforth, Urban Change), a longitudinal study conducted in Cuyahoga (Cleveland), Los Angeles, Miami-Dade, and Philadelphia counties in 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). These four urban counties accounted for approximately 14 percent of the entire U.S. welfare caseload as of 1999 (Allen and Kirby 2000).

The Urban Change survey involved women who, in May 1995, were single mothers between the ages of 18 and 45 years, who 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 percent or the rate of welfare receipt exceeded 20 percent.<sup>1</sup> From administrative records comprising the entire caseload who met these criteria, approximately 1,000 women were randomly sampled in each site. First round interviews were completed between March 1998 and February 1999, with a response rate of 79 percent.<sup>2</sup> An analysis of response bias indicated that whites who were sampled were significantly less likely than African Americans to have been interviewed in 1998 and women with more children in their households were also significantly more likely to have been interviewed; however, in both instances, the differences were small (Polit, London, and Martinez 2001).

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<sup>1</sup> Wilson (1987) and Massey et al. (1994) define neighborhoods of concentrated poverty as those where 20 percent or more of the residents live below the poverty threshold. Urban Change chose a higher threshold of poverty strategically to target the most economically disadvantaged neighborhoods where the impacts of welfare reform would likely to be the most evident.

<sup>2</sup> In the first round interview, the Urban Change project obtained high response in each of the four sites: 80.0 percent in Cuyahoga County, 75.6 percent in Los Angeles, 78.7 percent in Miami, and 80.0 percent in Philadelphia (Polit, London, and Martinez 2001). Overall, 9 percent of those sampled could not be located, 10 percent refused to participate, and 2 percent did not participate for other reasons. For additional details on response bias in the 1998 survey, see Polit, London, and Martinez 2001, Appendix A).

Second round interviews were conducted in the spring of 2001. Of the 3,960 women who were surveyed in 1998, 3,260 were re-interviewed in 2001, for an overall retention rate of 82%. Results of an analysis of attrition bias show that respondents who completed the 2001 interview did not statistically differ from non-responders across a variety of demographic characteristics in Cuyahoga County (Brock et al. 2002). In Miami, however, whites, Hispanics, persons under the age of 25 years, and widows were less likely to complete the 2001 interview (Brock et al. 2004), while in Philadelphia there was differential response by marital status (Michalopoulos et al. 2003). In Philadelphia, separated women were most likely to complete the 2001 interview, followed by single women, and finally married women. In Los Angeles, the full set of demographic predictors did not significantly differentiate responders from non-responders, although Latinas were significantly more likely than African Americans to respond to the 2001 interview and women with a GED but no college were significantly less likely to respond than women with a high school diploma but no college (Polit et al. 2005).

The women who participated in the Urban Change survey provided detailed information about a wide range of topics, including their experiences with welfare reform and use of support and safety net services; employment histories, wages, hours, and income; family configurations, living arrangements, child care, and parenting; perceptions of their neighborhoods; experiences of material hardships; health status; and experiences of domestic violence. In addition to providing information about the well-being of every biological or adopted child in the household, the respondents also provided in-depth information about two pre-designated focal children, a Focal child A (ages 2-6 years in 1998) and a Focal child B (ages 12-18 years in 2001). Information about child care, schooling outcomes, trouble with the police, child bearing, health, and peer groups is available for each of the respondents' children. For the focal children, there is

additional, more extensive information available on academic progress, health, parenting, and absent father involvement.

For this study, we converted the original Urban Change mother-level database for each year into a multi-year child-level database. Because more detailed information was obtained, and because of the relative dearth of rich data on low-income youth and their parents, this study focuses on outcomes for adolescents who are Focal B children. For the analytical sample, we select only those Focal B children who were less than 19 years old and living in their mothers' household at both interviews, whose mothers were interviewed in both 1998 and 2001, and who had information reported at both interviews for at least one of the schooling outcomes. In 1998, the ages of the adolescents range from 12 to 16 years, with the majority being age 14 or less (mean age = 13.2, s.d. = 1.1). In 2001, the ages of adolescents range from 14 to 18 years, with the majority being age 17 or less (mean = 15.9, s.d. = 1.1). Satisfaction of these criteria leaves a maximum potential sample of 1,698 child-year observations: 958 in 1998 and 740 in 2001.<sup>3</sup>

This study examines a set of school-related outcomes that we group broadly into participation and performance outcomes. The participation outcomes include: (1) whether the child had skipped school or cut classes without permission in the prior twelve months; (2) the number of days of school missed in the prior four weeks; and (3) the number of days late to school in the prior four weeks.<sup>4</sup> The performance outcomes are measured by (1) an overall

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<sup>3</sup> Response rates varied across outcomes; therefore, our sample sizes are smaller than the maximum in the models and differ depending on the outcome.

<sup>4</sup> Data are missing for approximately 200 observations for the number of days missed or late outcomes because the survey interview took place during summer months. Wave 1 interviews were evenly distributed over each month between March 1998 and March 1999. Wave 2 interviews were evenly distributed over each month between March 2001 and November 2001. Analyses indicate that respondents who were interviewed during the summer months do not statistically differ on a broad range of observable characteristics from respondents who were interviewed during other months. Further, analyses examining the effects of work hours on the school performance for the subset of adolescents

current school performance variable scaled from “1: Not Well at All” to “5: Very Well”; and (2) whether the mother had been contacted about attendance/behavior/academic problems in the prior twelve months. Although the overall school performance variable can be modeled as a continuous variable, the measure is actually categorical. Thus, we created two indicator variables from this measure to capture thresholds of good and poor performance. We code good performance equal to one if the mother reported a rating of “4: Well” or “5: Very Well,” and 0 otherwise. We set poor performance equal to one if the mother reported a rating of “2: Below Average” or “1: Not Well At All,” and 0 otherwise. All of the above outcomes are measured for only those adolescents who were attending school at both survey waves.

Urban Change collected information on maternal employment for up to four jobs. For each of these positions, respondents were asked, “Including overtime, how many hours per week (do/did) you usually work on this job?” We created the maternal work hours measure by summing the responses to this question for all current jobs. Out of mothers working at the time of the survey, the majority of mothers, 87.4% percent, had one job, and 10.3% percent had two jobs. In the models below, we examine both a linear and nonlinear specifications (i.e., a specification with indicators for working 30 or fewer hours and working more than 30 hours). We focused on a thirty hour threshold to address questions of practical policy significance (as the TANF weekly work or work-related activities requirements are often at 30 or more hours, Parrott et al. 2006).

**Comment [LAG1]:** Add data on number of jobs

The empirical models include the child’s sex, race/ethnicity, and age, as well as the mother’s age, educational attainment, marital status, cohabitation status, and place of birth (i.e., U.S. or not). We also include several indicators of maternal health and well-being, including her

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with missing data on number of days late or missed show a similar pattern of findings as analyses for the full sample of adolescents with school performance information.

SF-12 physical health component score (Ware, Kosinski, and Keller 1996), her score on the Center for Epidemiological Studies-Depression (CES-D) scale (Radloff 1977), an indicator for whether or not a health condition limits her ability to work, indicators for whether or not the mother has been physically or emotionally abused in the past year, and an indicator for whether she reported using a hard drug in the past month.<sup>5,6</sup> We also include measures for the presence of another adult in the household, the presence of a child other than the respondent's own or adopted child, and the number of children in the household. See Table 1 for a list of covariates with values for the study sample.

**Comment [asl2]:** We should define this variable more specifically.

To maximize our sample size, we used ordinary least squares (OLS) regression to impute values for the covariate values that were missing (other than maternal work hours). In the imputation process we included all of the other covariates as well as the year from which the data was drawn. We include a set of indicator variables (one for each covariate with over ten values assigned) in all models, which are set to one if the value for a given variable was imputed. The findings are nearly identical with and without these controls for missing data on the covariates.

#### **IV. Analytic Approach**

Our aim in this work is to capitalize on the longitudinal variation in maternal work hours and adolescent outcomes such that we can estimate the contemporaneous effects of maternal work hours on adolescent schooling performance and participation. We begin with a reduced form specification—using OLS or logit techniques as appropriate—modeling outcome  $y$  for adolescent  $i$  in year  $t$  controlling for a matrix of time-invariant ( $\mathbf{Z}$ ) and time-varying factors ( $\mathbf{X}$ ):

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<sup>5</sup> The maternal health and abuse variables used in this paper were derived from a paper-and-pencil self-administered questionnaire (SAQ). Overall, in the 1998 interview, 90 women who completed the oral, computer-assisted personal interview did not complete the SAQ (Polit, London, and Martinez 2001). SAQ completers and non-completers were comparable on a broad range of variables. Given the small number of non-completers and the fact that they do not appear to differ substantially from completers, non-response to the SAQ does not appear to have biased the results reported in this paper.

<sup>6</sup> Hard drugs were identified as cocaine, crack, heroin, PCP, or ice.

$$y_{it} = \alpha + \beta_1 EMP_{it} + X'_{it} \beta_2 + Z'_i \beta_3 + \varepsilon_{it}, \quad (1)$$

where EMP represents a measure(s) of maternal work hours

Equation (1) yields unbiased and consistent estimates of  $\beta_1$  if  $\text{cov}(\varepsilon, EMP) = 0$ . This condition is unlikely as a variety of unobserved factors are likely to create an association between maternal work hours and adolescent outcomes. For example, increases in maternal work hours might be facilitated when adolescents are highly competent, responsible, or mature. In contrast, persistent emotional/social/problem behavior might reduce maternal work hours. To control for adolescent-level time invariant unobserved characteristics, we remove the time-invariant fixed adolescent effect from the error term ( $\eta_i$ ) and employ an adolescent-level fixed effects model:

$$y_{it} = \mu + \gamma_1 EMP_{it} + X'_{it} \gamma_2 + Z'_i \gamma_3 + \eta_i + \varepsilon_{it}. \quad (2)$$

This model uses variation of adolescent outcomes over time to identify the maternal employment coefficient and should not suffer from bias due to unobserved time-invariant adolescent characteristics. Below, we further discuss the variation over time in maternal employment and the strength of our model in detecting this variation.

While an improvement, fixed effects models have limitations. Identification of the maternal work hours' coefficient comes from intraindividual variation. Individuals who do not have a different value for  $Y$  in the two observed years are omitted from the identification process. If these individuals are different from those who do have variation over time, then our results are not generalizable. In addition, though we are fortunate to have access to a very rich set of covariates at both time points—including maternal physical and psychological health and measures of emotional and physical abuse – other unmeasured omitted factors that vary over

time and are correlated with both maternal work hours and the outcome might continue to produce bias in the maternal work hours coefficients.

## V. Findings

For ease of exposition, we group the educational outcomes into the two categories of school participation and school performance. Table 2 reports results using a linear specification for average hours of maternal work on these outcomes and presents, for comparative purposes, estimates obtained from preliminary OLS or logit models and from the adolescent fixed-effects or fixed-effects logit models.

In Table 2, the preliminary OLS or logit models for all of the participation outcomes show trivial and statistically non-significant effects for maternal work hours. Coefficient values range from -0.001 to 0.003. The fixed effects models, however, illustrate the importance of omitted variable bias. While the maternal employment coefficient remains statistically unrelated to the number of days missed and number of days tardy, the coefficient estimate is positive and statistically significant for skipping school. In addition to the coefficient estimates we also report marginal effects or the change in the probability of the outcome given a one unit change in maternal work hours. The marginal effect for maternal work hours in the skipped school model is 0.4 percentage points.<sup>7</sup>

Preliminary results for the school performance outcomes follow a similar pattern: we find no statistically significant relationship between maternal employment and school performance outcomes in the OLS and logit models. However, we do find statistically significant coefficients

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<sup>7</sup>  $\frac{\partial P}{\partial EMP} = P * (1 - P) * \gamma_1$ , where P is the probability of the outcome. Because we can not predict P with a fixed effects logit model (i.e., the fixed effect is unidentified) we use the sample proportion to estimate P. Hence, one should interpret the marginal effect as the change in the probability of the outcome from the sample proportion given a margin change in maternal employment hours. In this instance,  $(0.180) * (0.820) * (0.0242) = 0.0036 \approx 0.4$  percentage points.

in a few of the fixed effects models. While maternal employment does not appear to influence the probability that a child performs poorly in school, it is related to the probability that the child will perform well in school with a marginal effect of -0.4 percentage points. We also find a positive, statistically significant relationship between maternal employment and parents being contacted for behavior problems. A one-hour increase in maternal work hours is associated with a 0.3 percentage point increase in the probability a parent was contacted by the school.

By using a linear maternal work hours' variable in Tables 2, we are implicitly assuming that each additional hour of work will produce the same change in the outcome. Several researchers have shown the effects of maternal employment on child outcomes are non-linear with marked differences in effects occurring when part-time work is differentiated from full-time work (Casper and Smith 2004; Lopoo 2005a, 2005b; Vandivere et al. 2003). In Table 3, we report results from fixed-effects models that include two indicator variables: one if the mother worked less than or equal to 30 hours per week and another if the mother worked more than 30 hours per week. The omitted category is mothers who were not working.

Changing the measure of maternal work hours does not alter the null findings for "days missed" and "days tardy" outcomes. We do find that maternal employment is statistically significantly related to skipping school regardless of the mother's work status. Compared to the children of nonworking mothers, the children of mothers who work between one and 30 hours are 20 percentage points more likely to skip school (i.e., more than twice as likely as the proportion in the sample). Similarly, compared to the adolescent children of nonworking mothers, the children of mothers who work full-time are 16 percentage points more likely to skip school. The effect of working between one and 30 hours does not statistically differ from the effects of working full-time.

For the performance measures, more specifically, for the “above average performance” outcome, the non-linear specification of employment shows that the negative relationship for maternal employment only surfaces in a statistically discernable way when mothers work more than 30 hours. Compared to the children of non-working mothers, the children of mothers who work more than 30 hours per week are 17 percentage points less likely to perform above average in school. We also find a significant positive coefficient for mothers who worked more than 30 hours in the “parent contacted about problem behavior” model. The marginal effect for these families is 15 percentage points or an increase of 37 percent over the sample proportion.

#### *Gender Differences*

Do the effects of maternal employment on any of these school participation and performance outcomes differ for sons as compared to daughters? Table 4 shows results from fixed-effects models that include interactions between a non-linear specification for work hours and an indicator variable equal to one if the mother’s child is male. Prior findings showed that maternal employment may have some influence on the probability the adolescent skipped school and that the mother was contacted about problem behavior. The results reported in Table 4 suggest that these relationships do not differ by the child’s sex. However, we do find evidence that the relationship between maternal employment and the number of days tardy, overall school performance, and performing above average is different for sons and daughters. Maternal employment is associated with an increase in the likelihood that adolescent males are tardy regardless of the level of mother’s work hours. Compared to male adolescents of nonworking mothers, male adolescents of mothers who worked 1-30 or 31 or more hours were late 1.2 days more in the prior four weeks. With the mean number of days late for males in the sample at 1.57, this represents a 76 percent increase. Both of the maternal employment coefficients in the

school performance model are negative and statistically significant. Compared to the children of mothers who do not work, part-time maternal employment is associated with a 0.59 point drop in the school performance scale, a 17 percent decline for sons in the sample. Working more than 30 hours per week is associated with a 0.37 point drop in school performance or about a 10 percent decline. Our findings also suggest that compared to mothers who do not work, mothers who work part-time had sons who were 28 percentage points less likely to perform above average.

#### **IV. Sensitivity, Decomposition, and Other Supplemental Analyses**

In our preferred models, the fixed effects specification, we identify the relationship between maternal work hours and the adolescent schooling outcomes using adolescent-specific variation over time. Since intraindividual variation is crucial to the model one would be concerned about the generalizability of the model if all of the variation in maternal employment was confined to a particular portion of the distribution of work hours (e.g., if the only changes observed were among mothers increasing work hours from 35 to 40 hours).

In order to assess whether this is a concern in our analyses, we constructed a “transition matrix” for the maternal employment variables in our panel data. Since it has the largest sample size, we broke down the analytical sample from the “contacted parents for problem behavior” model into the proportion of the adolescents with mothers who worked zero, between one and 30, and more than 30 hours in 1998 (results available upon request). In 1998, 52 percent of the mothers did not work, 13 percent worked between one and 30 hours, and 35 percent worked more than 30 hours per week on average. Of the mothers who were not working in the first wave, 57 percent were still not working in 2001. Of the 43 percent who were working in 2001, 15 percent were working between 1 and 30 hours and 28 percent were working more than 30

hours. Of the mothers who were working one to 30 hours in 1998, 24 percent were no longer working, 25 percent were still working one to 30 hours, and 51 percent were working more than 30 hours. Finally, of the women working more than 30 hours in 1998, 72 percent were still working more than 30 hours, 20 percent were no longer working, and roughly 9 percent were working one to 30 hours. These results suggest that the transitions in our data occurred throughout the distribution of maternal employment hours. They also show that the variation comes from both increases as well as decreases in maternal employment over time.

Since the fixed effects models show some statistically significant relationships while none of the OLS and logit models using the full sample do, one might ask if these results are influenced by the removal of the fixed effect or by the composition of the analytic sub-sample. As explained earlier, the fixed effects models identify the maternal employment coefficient using only the adolescents who had a change in their schooling outcomes over time. If maternal employment has a different effect on adolescents with relatively stable schooling outcomes, then the fixed effects results might not be generalizable.

In Table 5, we report coefficients estimates for the non-linear work hours specification using both a logit model and a fixed effects model using the full sample and the analytic sub-sample used for the fixed effects models. We confine our results to the three outcomes in which we find statistically significant coefficients. Our results suggest that both the removal of the fixed effect as well as the sample composition changes is important to our findings. For example, in the first set of columns we report results from three different models of the “skipped school/class without permission” **outcome**. Here we see that our removal of the fixed effects seems to be the dominant explanation for the statistical significance of work hours. The change in the “works > 30 hours” coefficients from the full sample to the fixed effects sub-sample does

**Comment [Im13]:** I believe we talked about changing this table. We need to make sure that the text matches the table.

increase the magnitude of the coefficients, but the estimates are not statistically significant. It is only when we remove the fixed effects do they become statistically significant (and increase in magnitude). The sample composition accounts for 34 percent of the increase and the removal of the fixed effect accounts for the remaining change.

In the second set of columns, we report results using a logit model and the full Urban Change sample (N=1,691). Neither maternal work hours coefficient is statistically significant. Next, we report results using a logit model with the sample that has variation in the outcome (i.e., the analytical sample used for the fixed effects logit model, N=476). The coefficient for worked > 30 hours is negative, -0.500, and statistically significant using the logit model. Since we have not removed the unobserved time-invariant characteristics in this model, the change in the coefficient is likely due to the sample composition. In the next set of entries, we remove the fixed effect. The coefficient for “works >30 hours” increases to -0.666 and remains statistically significant. From the logit model to the fixed effects logit model the coefficient estimates changes by 0.564. In this case, 71 percent ( $0.398/0.564$ ) of the change observed is due to sample composition and the remaining 29 percent ( $0.166/0.564$ ) of the change is due to the fixed effects.

The result for “parent contacted about behavior problems” is similar, although the fixed effects are relatively more important to the change in the coefficient estimates from the full sample and the fixed effects model. Fifty-five percent of the change in the coefficient estimates for the “works > 30 hours” variable can be attributed to the sample composition and 45 percent to the fixed effects.

One might also have concerns about the temporal ordering of the maternal work hours’ measure and the schooling outcomes. While the school performance variables were measured contemporaneously, the time reference for the “number of days late” and “number of days

missed” variables is the past four weeks, and for the “skipped school/class” and “contacted about behavior problems” variables the time reference is the past 12 months. If mothers change their work hours in response to these factors, then our coefficient estimates might suffer from simultaneity bias. In other words, a mother may change her work hours in response to schooling outcomes instead of or in addition to the responses we hypothesize.

While a reasonable concern, if such a bias exists then our estimates are conservative. For example, consider the coefficient estimate for “parent contacted about behavior problems.” We find that increases in maternal work hours are positively and statistically significantly related to this outcome. If being contacted by the school is altering the mother’s work hours, it would probably reduce the hours she works, not increase them. If this countervailing influence exists, then our estimates should be biased toward zero. A similar argument can be made for the “performed above average in school” and “skipped school/class without permission” models.

Before concluding, we address one potential mechanism that has been noticeably absent throughout this analysis: income. We first highlight a couple of points on this issue that are pertinent to our analysis. Several authors who have studied parental income and its influence on children advocate using the family’s permanent income, which is fixed over time (Mayer 1997; Solon 1992). Since the fixed effects model removes all factors that are constant within an individual, then the maternal employment estimate should not be biased by the omission of permanent income in the model or by any other factor that is constant over time.

Of course, the maternal employment measure may be capturing changes due to the transitory component of income. Given that income is endogenous, it is difficult to know if one should control for it in the models. If maternal employment is causing income to change and that income change is influencing the outcome, one would not want to include income in the models

as this will over-control for the real effects of maternal work hours. If, however, it is income (or lack thereof) that is causing mothers to work and income influences the outcome, then excluding income from our model might bias the estimates of maternal work hours. It is, of course, possible that both influences are important.

In a final supplemental analysis (results available upon request), we re-estimated the models presented in Table 3 with total family income included in the model. In general, the coefficient estimates and standard errors for maternal employment are nearly identical to those reported in Table 3, sometimes slightly smaller and sometimes slightly larger, with one exception. The coefficient estimate for work more than 30 hours in the “Parent contacted about behavior problems in school” model declines nearly 0.1 and is no longer statistically discernable from zero. These results suggest that the relationship between maternal employment and the schooling outcomes does not derive primarily from the resulting change in economic resources available to a family when a mother works.

## **V. Discussion and Conclusions**

Using a rich longitudinal data file of low-income youth, we find unfavorable effects of maternal work hours on several aspects of adolescent’s schooling: Full-time maternal employment decreases adolescent school performance, increases the likelihood of parent contact by the school about behavior problems, and increases the likelihood of skipping school. In some instances, sons seem to be particularly sensitive to mother’s work with notable declines in school performance and increased incidences of being late for school when mothers work. These findings hold up controlling for a rich array of mothers’ characteristics including their psychological and physical health and experiences with domestic and substance abuse, and unobserved time-invariant characteristics of the adolescent. Supplementary analyses further

show that the fixed effects results are due in part to the analytical sample we rely upon for identifying the fixed effects model, i.e. the sample that has variation over time in our variables of interest, as well as the reduction of the bias caused by omitted variables.

The findings generally align with prior research finding negative effects of welfare and employment policies on adolescent schooling outcomes (Gennetian et al. 2004), even though the latter sample is from an earlier period of time and effects on adolescents are presumably from policy-induced changes in employment (rather than naturally-occurring changes whether by policy or other factors identified in this study). While it appears that our findings differ from those reported in Chase-Lansdale et al. (2003)—who find a positive effect of transitions into work on adolescent self-esteem—such a comparison is difficult because of lack of comparability on the schooling outcomes. In addition, the former analysis examines transitions into work and not the more nuanced aspect of work hours that we examine. Finally, a comparison of this study with recent research by Ruhm (2006) who finds small benefits of maternal employment on the cognitive development of economically disadvantaged 10 to 11 year olds also suggests that the cumulative effects of employment differ from contemporaneous effects that we measure here.

While it is beyond the scope of this paper to isolate the potential range of time-invariant omitted variables that were biasing our baseline regression results, we do offer a potential explanatory factor in an attempt to direct future inquiries into this topic. As an illustrative example, consider findings from the “contacted about behavior problems” estimation. In the baseline model, the coefficient estimate was positive but not statistically significant. In the fixed effects model, the point estimate for the coefficient more than doubles. One potential omitted variable that would produce such a result is neighborhood context, particularly neighborhood safety. If mothers who work are also living in safer neighborhoods, and neighborhood safety is

negatively related to being contacted about problem behavior, then the omission of neighborhood characteristics could explain the results we see. A similar logic can be applied to the school performance and skipping school outcomes.

These findings contribute to a growing body of knowledge about the effects of maternal work hours on adolescents. Although we have not isolated the reasons why such changes in employment occurred--whether because of public policy or because of a variety of other personal or labor market factors—and we can not speak to whether effects occur across other domains of adolescent development such as their socio-emotional and physical health, fertility and work behavior, the findings highlight the importance of considering adolescent development in policy debates about welfare, work, income and out-of-school care.

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## Schooling Outcomes of Low-Income Youth: The Role of Maternal Work Hours

**Table 1**  
**Descriptive Statistics of the Sample<sup>a</sup>**

Variable	Wave 1		Wave 2		Full Analysis Sample	
	Mean	SD	Mean	SD	Mean	SD
<b><u>Maternal employment in survey month</u></b>						
Average weekly hours	17.7	21.0	23.0	21.8	20.2	21.5
% Worked ≤ 30 hours	13.2		14.0		13.6	
% Worked > 30 hours	34.3		45.2		39.4	
<b><u>Child outcomes</u></b>						
Number of days late for school in past 4 weeks	1.4	2.6	1.9	3.1	1.6	2.8
Number of days missed school in past 4 weeks	2.0	2.9	2.0	3.0	2.0	2.9
% Skipped school/class w/o permission	14.0		23.3		18.0	
School performance (scale 1-5)	3.5	1.3	3.6	1.2	3.6	1.2
% Performed above average in school	49.9		55.4		52.3	
% Performed below average in school	19.7		16.3		18.2	
% Parent contacted about behavior problems in school	43.5		36.6		40.5	
<b><u>Characteristics of children</u></b>						
% Male	49.8		50.0		49.9	
Age	13.4	1.2	15.9	1.1	14.5	1.7
<b><u>Characteristics of mothers</u></b>						
Age	36.1	5.0	38.6	5.0	37.2	5.2
% No high school degree or equivalent	48.3		43.4		46.2	
% Currently married	8.3		14.9		11.2	
% Currently cohabiting	9.6		12.1		10.7	
CES-D score <sup>b</sup>	17.9	11.3	16.2	10.5	17.2	11.0
% With health limitation	25.5		24.3		25.0	
SF-12 Physical Component Score <sup>c</sup>	46.2	9.9	46.0	10.2	46.1	10.0
% Physically abused (past year)	8.3		4.5		6.6	
% Emotionally abused (past year)	40.3		26.1		34.1	
% Used hard drugs (past 30 days)	2.4		2.0		2.2	
% Born in the US	78.8		78.1		78.5	
% Black <sup>d</sup>	68.9		68.8		68.9	
% Hispanic	25.0		25.6		25.2	
% White	4.5		3.9		4.3	
% Other	1.6		1.6		1.6	
<b><u>Characteristics of household</u></b>						
% With "other" adult in household <sup>e</sup>	24.0		26.4		25.0	
% With "other" children in household <sup>f</sup>	10.0		14.6		12.0	
Total number of children in household	3.1	1.6	3.1	1.6	3.1	1.6
Total sample size (OLS)	958		740		1,698	
Total number of children	958		740		958	

NOTES: SD = standard deviation, OLS = ordinary least squares regression

<sup>a</sup> The sample is children aged 12 to 18 at wave 1 and less than 19 at wave 2.

<sup>b</sup> CES-D = Center for Epidemiologic Studies Depression Scale; Scores can range in value from 0-60. A score above 23 is considered an indicator of a high risk of depression.

<sup>c</sup> Scores have been standardized in a national sample to a mean of 50 and a standard deviation of 10.

<sup>d</sup> Excluded base category.

<sup>e</sup> Other than mother, spouse, or cohabitating partner.

<sup>f</sup> Other than respondent's own or adopted children.

## Schooling Outcomes of Low-Income Youth: The Role of Maternal Work Hours

**Table 2**

### Estimates of the Effects of Average Maternal Work Hours on Adolescent School Participation and Performance

Outcomes	OLS	FE	Logit	FE Logit
Number of days late for school	0.002	-0.002		
SE:	(0.004)	(0.006)		
N:	1,423	1,030		
Number of days missed school	-0.001	0.008		
SE:	(0.004)	(0.006)		
N:	1,452	1,076		
Skipped school/class w/o permission			0.003	0.024 ***
SE:			(0.004)	(0.009)
ME:			[0.000]	[0.004]
N:			1,668	316
School performance (Scale 1-5)	0.000	-0.002		
SE:	(0.002)	(0.002)		
N:	1,691	1,454		
Performed above average in school			-0.002	-0.015 **
SE:			(0.003)	(0.006)
ME:			[-0.001]	[-0.004]
N:			1,691	476
Performed below average in school			0.000	0.000
SE:			(0.003)	(0.007)
ME:			[0.000]	[0.000]
N:			1,691	310
Parent contacted about behavior problems			0.004	0.011 **
SE:			(0.003)	(0.006)
ME:			[0.001]	[0.003]
N:			1,695	530

NOTES: OLS = ordinary least squares regression; FE = fixed effects; Logit/ FE logit models used to predict the dichotomous outcomes.

Statistical significance levels are indicated at \* p<.10; \*\* p<.05; \*\*\* p<.01.

Standard errors (SE) are in parentheses; the cluster option was used in all of these models to adjust standard errors for the lack of independence between observations (multiple observations per child).

Marginal effects (ME) are in brackets; the formula is:  $\frac{\partial P}{\partial EMP} = P*(1-P)*\gamma_1$ .

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, and the number of children in the household. Also included are indicators flagging missing values for each of the covariates.

**Schooling Outcomes of Low-Income Youth: The Role of Maternal Work Hours**

**Table 3**

**Fixed Effects Estimates of the Effects of Full and Part Time Work on Adolescent Schooling Outcomes**

Variable	Number of Days Late for School	Number of Days Missed School	Skipped School/Class w/o Permission	School Performance (Scale 1-5)	Performed Above Average in School	Performed Below Average in School	Parent Contacted About Behavior Problems in School
Worked ≤ 30 hours	-0.129	-0.056	1.369 **	-0.124	-0.334	0.717	-0.347
SE:	(0.347)	(0.338)	(0.639)	(0.125)	(0.339)	(0.459)	(0.324)
ME:			[0.202]		[-0.083]	[0.107]	[-0.084]
Worked > 30 hours	-0.121	0.518	1.082 **	-0.097	-0.666 **	0.020	0.589 **
SE:	(0.299)	(0.322)	(0.505)	(0.105)	(0.270)	(0.343)	(0.295)
ME:			[0.160]		[-0.166]	[0.003]	[0.142]

NOTES: FE logit models were used to predict the dichotomous outcomes.

Statistical significance levels are indicated at \* p<.10; \*\* p<.05; \*\*\* p<.01.

Standard errors (SE) are in parentheses. The cluster option was used in all of these models to adjust standard errors for the lack of independence between observations (multiple observations per child).

Marginal effects (ME) are in brackets; the formula is:  $\frac{\partial P}{\partial EMP} = P * (1 - P) * \gamma_1$ .

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, and the number of children in the household. Also included are indicators flagging missing values for each of the covariates.

**Schooling Outcomes of Low-Income Youth: The Role of Maternal Work Hours**

**Table 4**

**Fixed Effects Estimates of the Effects of Work Hours Interacted with Child Gender**

Variable	Number of Days Late for School	Number of Days Missed School	Skipped School/Class w/o Permission	School Performance (Scale 1-5)	Performed Above Average in School	Performed Below Average in School	Parent Contacted About Behavior Problems in School
Worked $\leq$ 30 hours	-0.686	-0.386	0.522	0.185	0.296	-0.442	-0.918 *
SE:	(0.495)	(0.495)	(1.461)	(0.175)	(0.548)	(0.920)	(0.519)
ME:			[0.077]		[0.074]	[-0.066]	[-0.221]
Worked > 30 hours	-0.702	0.471	1.531 **	0.085	-0.249	-0.402	0.219
SE:	(0.425)	(0.459)	(0.677)	(0.148)	(0.355)	(0.543)	(0.364)
ME:			[0.226]		[-0.062]	[-0.060]	[0.053]
Worked $\leq$ 30 hours x Male	1.177 *	0.723	1.347	-0.587 **	-1.119 *	1.609	1.012
SE:	(0.696)	(0.669)	(1.781)	(0.243)	(0.677)	(1.121)	(0.676)
ME:			[0.199]		[-0.279]	[0.240]	[0.244]
Worked $\leq$ 30 hours x Male	1.245 **	0.122	-0.926	-0.366 *	-0.850	0.645	0.832
SE:	(0.591)	(0.609)	(1.049)	(0.209)	(0.534)	(0.702)	(0.586)
ME:			[-0.137]		[-0.212]	[0.096]	[0.200]

NOTES: FE logit models were used to predict the dichotomous outcomes.

Statistical significance levels are indicated at \*  $p < .10$ ; \*\*  $p < .05$ ; \*\*\*  $p < .01$ .

Standard errors (SE) are in parentheses. The cluster option was used in all of these models to adjust standard errors for the lack of independence between observations (multiple observations per child).

Marginal effects (ME) are in brackets; the formula is:  $\frac{\partial P}{\partial EMP} = P * (1 - P) * \gamma_1$ .

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, and the number of children in the household. Also included are indicators flagging missing values for each of the covariates.

**Schooling Outcomes of Low-Income Youth: The Role of Maternal Work Hours**

**Table 5**

**Comparing Logit and FE Logit using Full-Sample and Sub-Samples with Outcome Variation**

Variable	Skipped School/Class w/o Permission			Performed Above Average in School			Parent Contacted About Behavior Problems		
		FE Logit	FE Logit		FE Logit	FE Logit		FE Logit	FE Logit
	Full Sample	Sub-Sample	Sub-Sample	Full Sample	Sub-Sample	Sub-Sample	Full Sample	Sub-Sample	Sub-Sample
	Logit		FE Logit	Logit		FE Logit	Logit		FE Logit
Worked ≤ 30 hours	0.106	0.627	1.369 **	-0.171	-0.322	-0.334	0.144	-0.153	-0.347
SE:	(0.201)	(0.392)	(0.639)	(0.160)	(0.283)	(0.339)	(0.161)	(0.280)	(0.324)
ME:	[0.016]	[0.092]	[0.202]	[-0.043]	[-0.080]	[-0.083]	[0.035]	[-0.037]	[-0.084]
Worked > 30 hours	0.099	0.431	1.082 **	-0.102	-0.500 **	-0.666 **	0.147	0.392 **	0.589 **
SE:	(0.166)	(0.305)	(0.505)	(0.124)	(0.199)	(0.270)	(0.123)	(0.188)	(0.295)
ME:	[0.015]	[0.064]	[0.160]	[-0.025]	[-0.125]	[-0.166]	[0.035]	[0.094]	[0.142]
N:	1,668	316	316	1,691	476	476	1,695	530	530

NOTES: Logit/ FE logit models used to predict the dichotomous outcomes.

Statistical significance levels are indicated at \* p<.10; \*\* p<.05; \*\*\* p<.01.

Standard errors (SE) are in parentheses. The cluster option was used in all of these models to adjust standard errors for the lack of independence between observations (multiple observations per child).

Marginal effects (ME) are in brackets; the formula is:  $\frac{\partial P}{\partial EMP} = P * (1 - P) * \gamma_1$ .

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, and the number of children in the household. Also included are indicators flagging missing values for each of the covariates.

