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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 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 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 violence 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 attendance, achievement, 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; Scott et al. 2004). 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; Weigt 2006).

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 violence, substance abuse, and several aspects of socio-economic well-being and family structure. 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 trichotomously, depicting part-time work (1 to 30 hours) separately from full-time work (31 hours or more per week), with no hours of paid employment as the reference category. We additionally assess whether the effects of maternal employment differ for adolescent-aged sons and 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 can affect children's development by influencing the amount and distribution of parental 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 encourage youth to embark immediately on employment activities at the risk of school completion (London and Scott 2003).

Psychological theory emphasizes the ways in which employment 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 the importance of 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, which, 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). Thus, maternal employment 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., 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.[1] 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.[2] An analysis of response bias indicated that whites who were sampled were significantly less likely than African

[1] 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 be the most evident.

[2] 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 Appendix A in Polit, London, and Martinez (2001).

Americans to have been interviewed in 1998, while women with more children in their households were significantly more likely to have been interviewed; however, in both instances, the differences were small (Polit, London, and Martinez 2001).

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 1998). 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, mother-level Urban Change dataset for each year into a multi-year, child-level dataset. 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 ranged 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.[3] As detailed in the Appendix, the Focal B adolescents who were excluded from the analytic sample because they did not meet the inclusion criteria appear to be worse off across numerous adolescent and maternal indicators than those who were included in our analyses.

This study examines a set of school-related outcomes that we group broadly into participation and performance outcomes. The participation outcomes include maternal reports regarding: (1) whether the child had skipped school or cut classes without permission in the prior

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

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.[4] The maternally-reported performance outcomes are measured by (1) an overall 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. Among the mothers who were working at the time of the 2001 survey, the majority, 87.4% percent, had one job, while 10.3% percent had two jobs. In the models below, we examine both a linear and nonlinear specification (i.e., a specification with indicators for working 30 or fewer hours and working more then 30

[4] 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 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.

hours, with no work as the reference category). We focused on a thirty hour threshold to address questions of practical policy significance, as state TANF programs' weekly work or work-related activities requirements are often at 30 or more hours (Parrott et al. 2006).[5]

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 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.[6,7] 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.

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

[5] In supplemental analyses (available upon request), we considered alternate specifications for the maternal work hours variable. Specifically, we looked at a more fine-grained specification at the high end of the distribution, distinguishing those who worked 30 to 40 hours from those who worked 41+ hours (or 41-50 hours and 51+ respectively). Results from these specifications are consistent with the results we report below.

[6] 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.

[7] Hard drugs were identified as cocaine, crack, heroin, PCP, or ice.

were 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 (**Z**) and time-varying factors (**X**):

$$y_{it} = \alpha + \beta_1 EMP_{it} + X_{it}'\beta_2 + Z_i'\beta_3 + \varepsilon_{it}, \qquad (1)$$

where EMP represents a measure of maternal work hours.

Equation (1) yields unbiased and consistent estimates of β_1 if cov(ε, 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 (η_i) and employ an adolescent-level fixed effects model:

$$y_{it} = \mu + \gamma_1 EMP_{it} + X_{it}'\gamma_2 + Z_i'\gamma_3 + \eta_i + \varepsilon_{it}. \qquad (2)$$

This model uses variation within 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 intra-individual 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, measures of emotional and physical abuse, and substance use – other unmeasured omitted factors that vary over time and that 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 two categories: school participation and school performance. Table 2 reports results using a linear specification for average hours of maternal work on these outcomes and presents estimates obtained from OLS or logit models and from fixed-effects models.

In Table 2, the initial 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 for the logit models. The marginal effect for maternal work hours in the skipped school model is 0.4 percentage points.[8]

Initial 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 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 Table 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 children's developmental 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 1 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.

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[8] $\frac{\partial P}{\partial EMP} = P * (1 - P) * \gamma_1$, 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.

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 non-working mothers, the children of mothers who work between 1 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 non-working mothers, the children of mothers who work 31 or more hours are 16 percentage points more likely to skip school. The effect of working between 1 and 30 hours does not statistically differ from the effect of working 31 or more hours. 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 adolescent 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. Compared to the adolescent children of non-working mothers, the sons of mothers who worked 1 to 30 and those who worked 31 or more hours respectively were late about 1.2 days more in the prior four weeks than the daughters of working mothers. 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, sons with mothers who work 30 or fewer hours score 0.59 points lower in the school performance scale than daughters with mothers who work 1 to 30 hours. Working more than 30 hours per week is also associated with a 0.37 point drop in school performance for sons, relative to comparable daughters. Finally, our findings suggest that compared to the children of non-working mothers, sons of mothers who worked 1 to 30 hours were 28 percentage points less likely to perform above average than daughters of mothers who worked comparable hours.

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 intra-individual variation is crucial to the model, we were 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 25 to 31 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 1998, 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 and decreases in maternal employment over time.

Since the fixed effect models show some statistically significant relationships while none of the OLS and logit models using the full sample do, we conducted a supplemental analysis to ascertain the extent to which the results reflected the removal of the fixed effect or the composition of the analytic sub-sample. As explained earlier, the fixed effect models identify the maternal employment coefficient using only the adolescents who had a change in their schooling outcomes over time. In Table 5, we report coefficients for the non-linear work hours specification using both a logit model and a fixed effect model estimated on the full sample and

the analytic sub-sample that was used for the fixed effects models. We confine our results to the three outcomes for which we find statistically significant coefficients. Our results suggest that both the removal of the fixed effect and the sample composition change are 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. In the first column, we report results using the full Urban Change sample (N=1,668). Neither 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 effect logit model, N=316). The coefficients increase in magnitude but remain statistically insignificant. In the next column, we remove the fixed effect. The coefficient for both measures more than doubles; both are now statistically significant. From the logit model to the fixed effect logit model, the coefficient for "works 1 to 30 hours" increases 1.263 and the coefficient for "works > 30 hours" increases 0.983. In this case, 41 percent of the change (0.521/1.263) in the "works 1 to 30 hours" is due to sample composition and 59 percent is due to the removal of the fixed effect. For the "works > 30 hours" variable, 34 percent is due to sample composition, and the removal of the fixed effect accounts for the remaining change.

In the second set of columns, we report results for a logit model of performance above average . Neither maternal work hours coefficient is statistically significant in the logit model. Next, we report results using a logit model with the sample that has variation in the outcome. 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 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 effect logit model the coefficient estimates changes by 0.564. In this case, 71 percent of the change observed is due to sample composition and the remaining 29 percent of the change is due to the fixed effect.

The result for "parent contacted about behavior problems" is similar, although the fixed effect is relatively more important to the change in the coefficient estimates from the full sample to the fixed effects model in the previous set of results. 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 effect.

In addition to the factors examined above, we also considered 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.

Income

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: 31 or more hours of maternal employment increases the likelihood of skipping school, decreases adolescent school performance, and increases the likelihood of parent contact by the school about behavior problems. In some instances, sons seem to be particularly sensitive to mother's work with notable increases in incidences of being late for school when mothers work and declines in school performance. 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. Supplemental analyses further show that the emergence of statistically significant coefficients in the fixed effect models results in part from changes in the analytical sample we rely upon for identifying the fixed effect model (i.e., the sample that has variation over time in our variables of interest) and in part from 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) and demonstrate convincingly that such unfavorable effects exist under considerably different economic and policy conditions than existed prior to the 1996 welfare reforms. The consistency of findings under pre- and post-welfare reform conditions, and across studies with comparably-aged

adolescents and measured outcomes, is additionally striking in light of differences in the identification strategy in the two studies; Gennetian et al. (2004) relied on pre-welfare reform program-induced changes in employment, while the current study identified naturally-occurring changes produced by some combination of policy, local economic conditions, and time varying personal and family-level characteristics. This study additionally points to effects on school attendance and schooling-related problems that were not available in Gennetian et al. (2004).

The findings in this study appear to differ from those reported in a couple of other recent studies. For example, Chase-Lansdale et al. (2003) find a beneficial effect of maternal transitions into work on adolescent anxiety and psychological distress levels, and that transitions off of welfare are associated with increased reading skills among adolescents. Similarly, Ruhm (2006) finds small benefits of maternal employment on the cognitive development of economically disadvantaged 10 to 11 year olds. Such comparisons are, in our estimation, difficult to make because of a lack of comparability of schooling outcomes, differences in the age groups included in each study, and differences in the assessment periods. In addition, the Chase-Lansdale et al. (2003) study focuses on maternal transitions with a broad differentiation of work hours and the study by Ruhm (2006) focuses on the cumulative effects of employment over the years of a child's early development, rather than the more-nuanced measure of contemporaneous change in maternal work hours that is the focus of the current investigation. Given these differences, it remains unclear to what extent the findings we present are compatible with or contradictory to the findings reported in these other studies.

While it is beyond the scope of this paper to isolate the potential range of time-invariant, omitted variables that were biasing our initial 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 initial 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 skipping school and school performance outcomes.

As carefully documented in Chase-Lansdale et al. (2002), Gennetian et al. (2004), and Ruhm (2006), the current study indicates that low-income adolescents whose mothers were on welfare are at high risk of school participation and performance problems, as well as other behavioral and emotional problems that might influence their ability to participate and perform well in school. Together, the findings from all of these studies contribute to a growing body of knowledge about the effects of maternal work hours on this already high-risk group of adolescents. The findings from the current study suggest that low-income adolescents living in neighborhoods of highly concentrated poverty experience unfavorable effects from their mother's employment in the post-1996 welfare policy and economic context. 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 cannot 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 from this study point to the importance of considering adolescent schooling outcomes in policy debates about welfare, work, income, and out-of-school care. Adolescent-aged children are a group who should not be

forgotten in short- and longer-term studies that are designed to better understand the economic condition and behavior of families.

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Table 1
Descriptive Statistics of the Sample[a]

Variable	Wave 1 Mean	Wave 1 SD	Wave 2 Mean	Wave 2 SD	Full Analysis Sample Mean	Full Analysis Sample SD
Maternal employment in survey month						
Average weekly hours	17.7	21.0	23.6	22.0	20.3	21.6
% Worked ≤ 30 hours	13.4		14.1		13.7	
% Worked > 30 hours	34.2		45.9		39.3	
Child outcomes						
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	
Characteristics of children						
% Male	49.8		50.0		49.9	
Age	13.4	1.2	15.9	1.1	14.5	1.7
Characteristics of mothers						
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[b]	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[c]	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[d]	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	
Characteristics of household						
% With "other" adult in household[e]	24.0		26.4		25.0	
% With "other" children in household[f]	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

[a] The sample is children aged 12 to 18 at wave 1 and less than 19 at wave 2.

[b] 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.

[c] SF-12 is a health survey with 12 questions designed to measure mental and physical health. Physical component scores have been standardized in a national sample to a mean of 50 and a standard deviation of 10.

[d] Excluded base category.

[e] Other than mother, spouse, or cohabitating partner.

[f] Other than respondent's own or adopted children.

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.

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 1 to 30 hrs	-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 hrs	-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.

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 1 to 30 hrs	-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 hrs	-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 1 to 30 hrs 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 > 30 hrs 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.

Table 5

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

	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
Variable	Logit		FE Logit	Logit		FE Logit	Logit		FE Logit
Worked 1 to 30 hrs	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 hrs	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.

Appendix

The analysis sample in this study represents a sub-sample of those adolescents who were enumerated as being present in the households of women in the 1998 (wave 1) Urban Change survey. Here we document the reasons why some children were not included in the current longitudinal analysis. As seen in Appendix Table 1, a total of 951 adolescent children were excluded from the current analysis, most commonly because they were older than 18 years by the time of the 2001 (wave 2) survey (N=415) and no longer met the inclusion criteria for the study (i.e., the child must have been 12-18 years old in 1998 and no older than 18 years in 2001). Of those who were age-eligible in both 1998 and 2001 (N=1,276), an additional 536 were excluded from the analysis for one of three reasons. The first reason is survey non-response; a total of 286 mothers were not re-interviewed in 2001. The second reason is that the children were not living with their mothers at the time of the 2001 survey. A total of 125 children were excluded either because the mother reported that she had no children living with her (N=32), the mother reported that the age-eligible adolescent child, specifically, was no longer living in her household (N=86), and mothers who reported that the age-eligible adolescent child was deceased (N=7). Finally, an additional 125 children were excluded because the age-eligible child was no longer in school, either because they had graduated by age 18 years or they had dropped out of school. A small number of age-eligible adolescents (N=32) were reported to be out of school in 1998 as well. As a result, they too are excluded from the analyses since data are not available on their school participation or performance in 1998.

Although most of the longitudinal school participation and performance outcomes are missing for the groups of adolescents who were excluded in the study, we were able to compare these adolescents to the adolescents in the analysis sample using other survey outcomes and

characteristics of the children and their mothers. Appendix Table 2 shows that all groups of children excluded from the wave 2 survey sample were more likely to have dropped out of school, to have had or fathered a baby, and to have ever been in trouble with the police than the children in the study analysis sample at wave 2. Children excluded because they were no longer living with their mothers or because they were no longer in school also had mothers that were more likely to be depressed, and to be emotionally, psychologically, or physically abused.

These results provide some evidence that children in the worst circumstances and with the poorest outcomes were ineligible for inclusion in the analysis sample. This suggests that the analysis sample represents a slightly better-off or less at-risk sample of adolescents and that our findings of unfavorable effects of maternal employment on adolescent school participation and performance over time might be conservative estimates.

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

Appendix Table 1

Criteria to be Eligible for Cross-Sectional Analysis Sample

	Wave 1	Wave 2	Group of Interest
Total focal B children:	1,691	1,691	
- Children older than 18 by wave 2	(415)	(415)	Age-ineligible Group
- Children whose families were not re-interviewed at wave 2	(286)	(286)	Excluded Group # 1
- Children whose mothers said they had 0 children living with them	-	(32)	Excluded Group # 2
- Children whose mothers said focal B child was not living with them	-	(86)	Excluded Group # 2
- Children who were deceased	-	(7)	Excluded Group # 2
- Children not currently in school[a]	(32)	(125)	Excluded Group # 3
Final Analysis Sample:	958	740	
Total child-year observations:	1,698		

NOTE: [a] When the mother was asked what the child's current grade in school was, these children fell into 1 of the following categories: 1) HS grad or got GED, 2) in college, 3) not in school, or 4) in a GED or ABE program. The Focal B schooling outcomes were then skipped for these children. Please note that we do not know how many children in excluded groups 1 and 2 fell into these groups as these children skipped this question.

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

Appendix Table 2

Comparison of Means for Wave 2 Analysis Sample and Children Excluded from Sample[a]

Variable	Comparison of Characteristics Measured at Wave 1		Comparison of Characteristics Measured at Wave 2		
	Wave 2 Analysis Sample	Excluded Group #1[b]	Wave 2 Analysis Sample	Excluded Group #2[c]	Excluded Group #3[d]
Child outcomes					
% Ever repeat a grade	23.1	22.9	28.0	24.5	38.9 **
% Ever drop out of school	3.0	11.9 ***	2.1	24.4 ***	46.0 ***
% Ever suspended/expelled from school	30.8	29.3	33.5	42.9 *	39.8
% Ever had/fathered baby	0.7	5.6 ***	5.0	16.7 ***	19.4 ***
% Ever in trouble w/police	5.3	9.9 **	12.8	26.2 ***	15.3
Number of days late for school	1.2	0.8 ***			
Number of days missed school	1.7	1.8			
% Skipped school/class w/o permission	9.9	15.2 **			
School performance (scale 1-5)	3.6	3.5			
% Performed above average in school	52.8	50.0			
% Performed below average in school	16.7	16.9			
% Parent contacted about behavior problems	42.2	43.7			
Characteristics of children					
% Male	50.0	51.7	50.0	52.8	47.2
Age	13.6	15.0 ***	16.4	17.3 ***	18.1 ***
Characteristics of mothers					
Age	35.8	36.9 ***	38.6	38.7	40.9 ***
% No high school degree or equivalent	48.1	48.6	43.4	47.2	46.4
% Currently married	8.3	11.5	15.0	13.1	16.3
% Currently cohabiting	9.6	6.6	12.1	13.7	10.4
CES-D score[e]	17.6	17.0	16.2	18.9 **	18.3 *
% With health limitation	23.1	26.6	24.3	27.6	28.8
SF-12 Physical Component Score[f]	46.8	45.9	46.1	45.5	44.4
% Physically abused (past year)	7.3	9.7	4.3	8.6	9.5 *
% Emotionally abused (past year)	39.4	33.3 *	25.2	34.2 *	42.3 ***
% Used hard drugs (past 30 days)	1.8	2.6	1.9	4.3	1.8
% Born in the US	78.1	75.2	78.1	80.0	77.6
% Black	68.8	61.9 **	68.8	69.6	64.8
% Hispanic	25.6	30.1	25.6	25.6	26.4
% White	3.9	6.3	3.9	3.2	8.0
% Other	1.6	1.7	1.6	1.6	0.8
Total number of children	740	286	740	125	125

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

[a]The sample is children aged 12 to 18 at wave 1 and less than 19 at wave 2.

[b]Children missing from the sample because of survey non-response. Because we do not have any wave 2 data for these children or their families, comparisons were made to the analysis sample using wave 1 data.

[c]Children whose families were re-interviewed at wave 2, but who are missing from the wave 2 sample because they were not living with their mother at wave 2 (we do not know if they were in school).

[d]Children whose families were re-interviewed at wave 2, and who lived with their mother at wave 2, but who are missing from the wave 2 sample because they were not in school at wave 2.

[e]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.

[f]SF-12 is a health survey with 12 questions designed to measure mental and physical health. Physical component scores have been standardized in a national sample to a mean of 50 and a standard deviation of 10.