Caught in the Middle: Educational Differentials in the Relationship between Work, Time with Children and Child Development

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Abstract

This study seeks to test the two assumptions underlying the claim that maternal employment negatively affects children by reducing maternal time investments: (1) maternal employment reduces time investments in children and (2) time investments affect child outcomes. Moreover, we explicitly examine educational disparities in these relationships. We analyze longitudinal time diary data and employ OLS, fixed effect and instrumental variable estimation to better account for unobserved heterogeneity. For the most highly educated, work has no affect on time investments and time has no effect on children. For the least educated, work also has no effect on time investments but time actually increases the likelihood of behavioral problems. For those in the middle, work is negatively related to time yet time is positively related to child outcomes. Time may be a mechanism linking maternal employment and child outcomes for families in the "middle." Their children benefit the most from maternal time but their mothers have the greatest difficulty balancing work and family life.

Introduction

One of the most dramatic changes to the American family during the later half of the 20th century is the entry of women with children into the labor market. In 1965, approximately 45% of mothers with children under 18 years old worked outside of the home. That percentage increased to 71% by 2010 (Bianchi and Raley 2005; 2011 Bureau of Labor Statistics). Social critics, politicians and parenting "experts" have voiced concern about the potential negative effects these changes may have on children. Popular books, like *Mommy Wars* (Steiner 2006) and *Life's Work: Confessions of an Unbalanced Mom* (Belkin 2002), chronicle the anxieties and fears of working and stay-at-home mothers in their attempt to balance employment and childcare concerns.

Academics too have sought to tackle this issue. In general, they have focused on identifying the consequences of maternal employment on child wellbeing. Overall, the findings show that maternal employment has a negative affect on children's cognitive development when it occurs during the first year of life (Baum 2003; Baydar and Brooks-Gunn, 1991; Bernal 2008; Waldfogel et al. 2002; Hill et al. 2005; Ruhm 2004). The effects of later employment, however, are less conclusive, but some negative effects have been found for children's cognitive outcomes (Bogenschneider and Steinberg, 1994; Ruhm 2008), educational attainment (Ermisch and Francesconi 2001; Baum 2004; Schildberg-Hoerisch, forthcoming), and child health (Ruhm 2008; Fertig et al. 2008).

Underlying both the popular and scholarly debate is the assumption that working outside the home reduces the amount of parental time children receive and that parental time matters for child development. Scholars from sociologists (Coleman 1993; Presser 1989; Waite 1995) to psychologists (Belsky 2001) to economists (James-Burdumy 2005 and Ruhm 2004) have also speculated that parental time investments are the main causal mechanism linking maternal employment to child outcomes.

This study seeks to test the assumptions that underlie this conjecture. To accomplish this task, we ask and answer two questions. First, does maternal employment actually reduce maternal time investments in children? Second, does maternal time affect child development? We analyze time diary data from the Child Development Supplement of the Panel Study of Income Dynamics (PSID-CDS). We

improve upon prior work by employing several estimation techniques to account for unobserved heterogeneity such as ordinary least square regressions with extensive controls, individual fixed effect and instrumental variable regressions.

Moreover, we explicitly consider how the relationship between work and time investments, on one hand, and time investments and child outcomes, on the other, might vary by mothers' education. Growing inequality between how skilled and unskilled workers are rewarded in the labor market means that the work-family problems faced by contemporary American families fundamentally differ by socioeconomic status (Bianchi 2011; Williams and Boushey 2010). The wages, work hours, benefits and working conditions associated with the jobs are highly dependent on an individual's educational credential (Autor et al. 2008; Felfe and Hsin, 2011; Jacobs and Gerson, 2001). As such, one might expect to see educational disparities in how maternal employment affects the quantity and type of time mothers can devote to their children. In the same vain, differences in the unique dilemmas faced by working families, coupled with the stark educational disparities in parenting practices (Lareau 2003; Brooks-Gunn and Duncan 1997; Bornstein and Bradley, 2003), may lead to educational disparities in how maternal time affect children's cognitive and behavioral development.

THEORETICAL AND METHODOLOGICAL ISSUES

MATERNAL EMPLOYMENT AND TIME INVESTMENTS

The question of whether working outside the home reduces the amount of time mothers can devote to children is not as trivial as one might initially think. The rich descriptive picture offered by time use studies is that there is not a simple one-for-one trade-off between time at work and time with children (Bryant and Zick, 1996; Gershuny and Robinson, 1988; Sandberg and Hofferth, 2001; Sayer, Bianchi, and Robinson 2004; Bianchi, Robinson and Milkie 2006). These studies show that while work does reduce childcare time, working mothers have also gone to great lengths to prevent work from fully reducing their time with children by sleeping less, reducing leisure activities, and doing less housework.

More importantly, working does not imply less time spent on the types of childcare activities that might more directly foster human capital development (i.e., reading, playing, arts and crafts, etc.). In fact,

Nock and Kingston (1988) find that the bulk of the time stay-at-home mothers spend with their children takes place while mothers are cooking, cleaning or doing other types of housework. They find that the difference in direct childcare time (i.e. playing or performing educational activities) between working and nonworking mothers of preschool children was less than one hour per day. No differences were found in the time dedicated to direct childcare activities between employed and non-employed mothers of school-age children.

What is still unknown is whether these observed relationships are causal. A variety of factors simultaneously determine decisions regarding how much time one might dedicate to work and how much time one might dedicate to children. These factors may include observable/measurable characteristics, such as mothers' education and family income, as well as unobservable/non-measurable characteristics, such preferences or attitude towards family and career. For example, a "family-oriented" woman might choose to stay at home to spend more time with her child. Alternatively, a "career-oriented" woman who chooses to pursue a professional life outside the home may spend less time with her child overall but also reallocate time use in such a way that she ends up spending as much or even more educationally oriented time than her "stay at home" counterpart. If this is true then the story is not about work interfering with childcare but about different types of women selecting into different types of work-family lifestyles. The failure to control for unobservable confounders leads to biased estimates of the effect of maternal work on maternal time investments. Understanding the causal relationship between work and childcare is crucial for understanding whether time serves as a causal pathway through which employment might affect children.

We know of only one paper that explicitly attempts to establish a causal relationship between work and time investments (Cawley and Liu, 2007). Using local labor market conditions as an instrument for maternal employment, the authors find that employed women spend significantly less total time with children, as well as less time reading and performing educationally-oriented activities relative to non-employed women. They, however, do not explore how time use influences child outcomes nor do they examine educational differences in the effect of employment on time investments.

Education may affect the social and economic opportunities faced by families, which may go to influence the relationship between work and time investments in children. Scholars have argued that the work-family dilemma faced in contemporary American society varies across three distinct groups (Bianchi 2011; Williams 2010, Williams and Boushey 2010): highly skilled, less skilled (i.e. the middle), and the least skilled. The problems faced by the highly skilled revolve around balancing highly paid but highly demanding jobs with childcare responsibilities. In contrast, the problems faced by the least skilled families involve raising children in single-parent households while facing persistent unemployment due to the bleak job prospects available to those without the proper educational credentials. Families in the middle, on the other hand, eke out a semblance of stability by working two full-time jobs to make ends meet, often working different shifts to reduce childcare costs (Bianchi 2011). These differences in employment opportunities and work conditions may influence how employment affects maternal time investments across mothers' skill level.

TIME INVESTMENTS AND CHILD OUTCOMES

Theories in sociology, developmental psychology and economics all emphasize the importance of mother-child time for child development. Along with financial and material investments, the time mothers spend with children are inputs into the production of human capital (Becker, 1991). Mother-child interactions create social capital or the social interactions that facilitate the intergenerational transmission of knowledge, skills and human capital (Coleman 1988). The developmental psychologist, Jay Belsky, goes even further to suggest that maternal employment is detrimental for children primarily because it deprives children of the type of mother-child interactions that are essential for children's sense of security and attachment (2001).

However, the few studies that have used large-scale time diaries to identify the relationship between maternal time investments in children and child outcomes find no significant relationships. Analyzing time diaries administered to mothers with 7-month old infants from the NICHD Study of Early Child Care, Booth et al. examined a sub-sample of 326 mothers and find that the amount of time mothers spend with their infants is not significantly correlated with measures of child outcomes assessed when

children are 15-months old (2002). Also analyzing the NICHD Study, Huston and Aronson studied a sample of 1,053 mothers and utilize tests of cognitive skills measured at 24 and 36 months (2005). Like Booth et al., they found no significant relationship between maternal time and children's cognitive or behavioral development.

Neither of the two time-diary studies cited above explicitly considered potential heterogeneous effects of maternal time by mothers' education. The literature points to socioeconomic disparities in the content and type of mother-child interactions—both in terms of the verbal interactions that occur and the type of activities that are performed during shared time that suggest that children are socialized in ways that reinforce existing inequalities. For example, better-educated women are more verbally engaged with their children (Hart and Risley 1995) and provide more cognitive stimulation at home (Brooks-Gunn and Duncan 1997; Menaghan and Parcel 1991). Better-educated parents are also more actively involved in structuring children's day-to-day activities (Lareau 2002). These disparities in parenting practices raise the question of whether time with the least-educated mothers are as productive for children's cognitive and behavioral development as time with better educated mothers.

ANALYTICAL PLAN

In this paper, we test two assumptions. The first assumption that we test is the assumption that maternal employment reduces both the total time mothers devote to children and the amount of time she spends on educationally oriented activities with children. To better identify the causal relationship between working outside the home and time investments in children, we adopt a three-step estimation strategy. First, we use ordinary least square (OLS) regressions to control for a comprehensive set of observable characteristics of children and families that might correlate with both employment and time. Second, we estimate individual-level fixed effects to account for time invariant sources of unobserved heterogeneity. Third, we incorporate various instrumental variables for maternal employment to further account for time varying sources of unobserved heterogeneity. We compare our results across all three specifications as a check for robustness. Additionally, we stratify all our analyses by mother's education in order to capture potential heterogeneous effects by mother's socioeconomic status.

To better estimate the causal effect of time investments on child outcomes, we first estimate OLS regressions controlling for a comprehensive set of observable characteristics of children and families. We then exploit the longitudinal nature of our data to estimate individual level fixed effects, which allows us to consider unobserved heterogeneity. Because we were unable to find strong instruments for maternal time, we do not perform instrumental variable analysis in this section. Again all analyses are stratified by mother's education.

DATA

Panel Study of Income Dynamics (PSID) is a longitudinal study of a nationally representative sample of individuals and families in the United States, with over-samples of low-income and immigrant families. Starting in 1997, the PSID conducted the Child Development Supplement (CDS) in order to collect data on child developmental outcomes. A unique aspect of the PSID-CDS is its children's time use module[1]. Detailed information on children's time use was collected for up to two children within each family. Like other time use surveys, information was collected on the type of activity performed and the amount of time spent on each activity over the duration of a specified 24-hour period. Unique to the PSID-CDS, additional questions such as "who was doing the activity with the child?" and "who (else) was there but not directly involved in the activity?" were also included in the questionnaire (PSID-CDS User's Guide, 1997). From this question, the researcher can obtain information on the amount of time mothers spend with children during a 24-hour period. Diaries for a random weekday and a random weekend were collected for each child.

In 1997, approximately 2,600 children between the ages of 0 and 12 completed time diaries. Approximately 60% of those children who completed 1997 time diaries also completed 2002 time diaries. Our analysis is restricted to children who completed both weekend and weekday 1997 and 2002 time

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[1] Time diaries focus on capturing the chronology of events over a short period of time. This approach has been shown to be more reliable and less subject to social desirability bias than data collected from traditional, survey-based questions that ask individuals how much time they spend performing specific activities (PSID-CDS User Guide, 1997). While there are no baseline studies that have tested the consistency, validity, and reliability of time use reports from survey-based methods, substantial research has shown the time diary approach to be reliable and valid (Juster, 1985; Robinson, 1985).

diaries (N=1,721). We also restrict our sample to children who received verbal and applied problem solving assessments in both 1997 and 2002, leaving us with a final analytical sample of 1,618 children. In order to preserve our sample size, we impute missing values on all other covariates by setting them to the sample mean. Because up to two siblings were interviewed, we adjust all standard errors in our analysis by clustering by mothers' identification.

Measures

Maternal Time Investments

Using the un-aggregated time diary module of the 1997 and 2002 PSID-CDS, we create two measures of maternal time investments: 1) total quantity of time mothers spend with children and 2) total quantity of time mothers spend on educationally oriented activities. Educationally oriented activities include a broad range of activities that might more directly foster human capital development, such as reading, playing, doing arts and crafts, playing sports and doing homework together. Both weekday and weekend diaries were used to construct a representative week by multiplying weekday time use by 5 and weekend time use by 2.

All time use measures are age-standardized to account for age effects in time investments. This is accomplished by subtracting the quantity of maternal time each child receives from the average time other children his or her age receive and dividing the total by the standard deviation. By age adjusting time use in this way, the dependent variable can be interpreted as deviations from the age-adjusted mean. This approach normalizes measures so that age effects are less likely to complicate interpretations.

Because we lack reliable information on the amount of time children spend with anyone else besides their mothers, we cannot obtain accurate measures of the time children spend with fathers or other caregivers. Because approximately 80% of time diaries were completed by mothers alone or by mothers with their children, time diary estimates of the time children spend with mothers are reasonably reliable. Fathers' time with children, however, would be based on mothers' reports. To complicated matters, approximately 26% of children in the sample have non-resident fathers which would further reduce the

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reliably of measures of fathers' time. As a result, we only focus on mothers' time with children in this study.

Maternal Employment

Information about maternal employment is taken from the main questionnaires of the PSID in 1997 and 2002. Household heads and their partner were asked to report the total weekly work hours on all main jobs in the last year. Based off of these reports, we construct two measures of maternal employment status. The first is a dichotomous variable measuring labor participation (=1 if working; =0 if not working). The second is a continuous variable indicating the average weekly hours worked. We construct these employment variables for 1997 and 2002[2].

Child Outcomes

The PSID-CDS provides detailed information on both children's cognitive and behavioral development. We use the Woodcock Johnson Revised Test of Achievement (WJ-R) to measures children's cognitive outcomes. The WJ-R is a widely recognized measure of cognitive ability. Verbal ability is measured using two subtests: vocabulary and reading comprehension. Analytical/math ability is measured using tests of applied problem solving skills. We only present results for vocabulary tests and not reading comprehension tests in order to reduce the number of tables presented and because the results do not vary substantially across the 2 types of tests.

Children's behavioral development is measured using the Positive Behavioral Scale, which was originally developed by the New Chance Evaluation (Polit, 1998). The scale consists of 10 questions asked of children's primary caregivers and aim to capture aspects of children's self-esteem, self-control, obedience and persistence. Cronbach's alpha for this scale is 0.82.

Covariates of Time Use and Child Outcomes

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[2] Starting in 1997, the PSID changed to biennial interviews. Therefore, we do not have information regarding the working hours in 1997 (1997 respondents were asked to report work hours in the previous year). Therefore, we use 1996 work hours as a proxy for 1997 work hours.

We control for the standard set of child and family characteristics that is commonly used in the child development literature. These variables include children's gender, age, race, birth weight and child's initial health status. Maternal characteristics include mothers' education, mothers' verbal skills, as well as mothers' age at child birth. Father's characteristics include a dummy variable for whether they reside in the household, age at childbirth, education, employment status, work hours, and labor earnings. We also include a dummy variable to measure the presence of a grandparent living at home. To capture the material resources available to the household, we include measures of both mother' and father's wage, logged total household income and accumulated assets and savings. We include an index measuring the cognitive stimulation available at home (i.e. number of toys, books at home, frequency of theater, museum visit, etc).

Finally we also account for differences in children's neighborhoods by including measures of neighborhood safety, the size of the next bigger city and the degree of urbanicity. To adjust for quality of children's schooling environment, we include controls for the age when the child starts to attend extra-familiar care and the different types of non-parental childcare arrangement used for children who were of pre-school age in 1997. For school-age children, we control quality of schools by using measures of pupil-teacher ratio in 1997 and average teacher salary in 1997. We include all available current (2001) and past (1997) measures of the control variables mentioned above.

EMPIRICAL APPROACH

In this section, we describe in detail our estimation strategy. Our first task is to identify the causal effect of maternal employment on the quantity and type of time investments mothers devote to their children alternatively using OLS, fixed effect and IV estimation. Our second task is to identify the link between maternal time investments and children's cognitive skills and behavioral development using OLS and fixed effect estimation. Below we discuss the empirical approach in detail.

Estimating the Effect of Employment on Time Investments

The following equation may help explain the causal relation between maternal employment and maternal time investment - represented by β_1:

$$T_{it} = \beta_0 + \beta_1 W_{it} + \beta_2 \Phi_{it} + \gamma_i + \varepsilon_{it} \tag{1}$$

where T_{it} measures the time investments each mother makes in child i at time t. W_{it} measures maternal employment in time t. Φ captures characteristics of the mother and her child that might simultaneously influence employment decisions and time allocation (e.g., on the one hand, time invariant characteristics such as child's race, sex, or health at birth, as well as mother's education, verbal skills, or age at birth; on the other hand, time varying characteristics such as child's previous skills or mother's previous labor earnings). Notice that Φ_{it} represents only observable/measurable mother or child characteristics. γ_i captures unobserved, time invariant characteristics of the mother that might influence time and employment decisions, such as family or career orientation. ε_{it} represents unobserved, time varying maternal or child characteristics, such as unexpected leaps in a child's development, changes in mother's attitude towards family or work.

When all confounding characteristics are controlled for, estimation of equation (1) using ordinary least square method (OLS) should provide consistent estimates for the impact of maternal work on maternal time devoted to their children. If the numerous controls for child, mother, and family background characteristics do not fully capture unobservable/unmeasured, confounding variables, OLS estimates may be biased.

To address this concern, we employ two different empirical strategies. The first strategy, fixed effect (FE) estimation, allows us account for unobserved, time-invariant confounding variables. The second strategy, instrumental variable (IV) method, allows us to additionally correct for any bias due to time varying confounders ε_{it}. Both strategies are explained in turn.

The first strategy, FE, exploits the longitudinal nature of the data. In contrast to the OLS strategy, which relies on data measured in levels, FE uses data measured in deviations from the individual mean. Specifically, each observation is transformed by subtracting the individual average across the available time periods. Thus, FE allows us to eliminate any bias arising due to individual preferences or tastes for "career ambition" or "family orientation," to the extent that these traits do not change over time. The

limitation of FE analysis is that it cannot eliminate any bias due to time varying unobserved heterogeneity. For example, potential bias may remain due to changes in preferences over time towards career ambitions that may affect employment decisions and time use.

The second alternative estimation strategy, IV estimation, allows us to additionally tackle potential bias due to time varying confounders. The underlying intuition behind IV estimation is to find a variable that strongly correlates with the independent variables of interested but has no direct effect on the dependent variable. Such a variable has to be "unpolluted" by any confounding factors that bias OLS and FE estimates. In our specific case, a plausible instrument must fulfill two conditions: (1) correlate with maternal employment and (2) have no direct effect on parental time investments in children except via maternal employment. If a variable meets these two conditions then it would be considered a valid instrument.

Following previous studies, we use local labor market characteristics, such as county-level female employment rate and income distribution, as instruments for maternal employment (Hoynes, 2000; Baum, 2003; James-Burdumy, 2005; Cawley and Liu, 2008). In doing so, we implicitly make the following assumptions: 1) local economic conditions strongly affect maternal employment decisions, and 2) all the effect of local economic conditions on maternal time investments work through maternal employment decisions.

The first assumption is straightforward to test. We estimate the first stage regression where the maternal employment is the dependent variable and the independent variables include the instruments and all controls used in the main regression. We test for the joint significance of the instrumental variables (e.g. local labor market characteristics) on the dependent variable in order to gauge the strength of this relationship thereby indicating the strength of the instruments. An F-statistics of 10 or higher is generally accepted as an indicator of a sufficiently stronger instrument (Stock and Yogo, 2001). By in large, all our instruments pass this test of strength.

The universal problem with instrumental variables is that there is no definitive method of testing the second assumption, otherwise, known as validity. It is left to the researcher to make a convincing case

that the instrument has no direct effect on the dependent variable of interest. In our case, we must make the claim that the main channel through which local labor market conditions affect maternal time investment decisions is through maternal labor market conditions. We must argue that there is no direct effect of local economic conditions on maternal time investments except via maternal employment or any of the covariates that are controled for. For this reason, we include controls for fathers' employment, maternal stress and quality of the local schools in the event that local labor market conditions affect mothers' time investments through these channels, as well as the rich set of covariates described earlier.

Estimating the Effect of Maternal Time Investments on Child Development

The effect of maternal investments on child outcomes can be estimated using the equation below:

$$CD_{it} = \delta_0 + \delta_1 T_{it} + \delta_2 \Phi_{it} + \eta_i + v_{it} \qquad (2)$$

where CD_{it} represents child's development and T_{it} mother's time investment in her child i. The parameter to be identified is thus δ_1. Again, the identification of the causal relationship between maternal time investment and child development is challenged by the fact that there are not only observable factors, Φ_{it}, but also unobservables factors, η_i and v_{it}, which simultaneously determine the allocation of maternal time and child's cognitive skills and behavior.

As before, our first strategy is to employ a "selection-on-observable" strategy. In other words, we use ordinary least squares (OLS) and control for a rich set of control variables to capture the main determinants of maternal time and child development. Our second strategy is to use fixed effects (FE) estimation. This strategy allows us to eliminate potential sources of bias due to all unobserved time constant characteristics, such as child's innate ability or mother's parenting skills. As pointed out above, the FE method does not eliminate any time varying unobserved characteristics, such as unexpected changes in child's development or changes in mothers' career plans, which may in turn affect the time investments.

In an optimal case one would also like to employ an instrumental variable strategy to control for time varying sources of endogeneity. For instance, if a mother observes that a child is under-performing,

she may devote more time to compensate for any developmental delays. The failure to account adequately for compensatory effects in parental time investments may lead to under-estimates of the impact of maternal time on child development. The direction of how unanticipated changes in mothers' career plans might bias estimate is a priori unclear. If career opportunities relate negatively to parental investments in children, the resulting estimate may also under-estimate the effect of maternal time on child development. On the other hand, if career opportunities lead to decreased financial constraints, or improved access to higher quality childcare, the resulting estimate might over-estimate the true effect.

We explore potential instruments for maternal time investments in children, such as local public transportation options, commuting time and characteristics of grandparents. Unfortunately, all are weak instruments (i.e. all have F-statistics sizably less than 10). Thus, none of the mentioned instruments would yield precise or informative estimates. For this reason, we abstain in the second part of our estimation from using instruments and rely only on OLS and FE estimates. As in the previous case, we stratify all our analysis by mother's education.

RESULTS

Descriptive Statistics

Table 1 shows the weighted means and standard deviations of key variables for the full sample and by mothers' education. We also report the results of t-tests that compare the means across mother's educational levels. As expected, we see that test scores increases with mothers' education. Children of high school dropout have below average letter-word scores and applied problem solving scores. Children of mothers with some college education have the highest test scores. Positive behavior, however, does not significantly differ across educational categories.

Interestingly, we see that the total amount of time mothers spend with children in 1997 and 2002 does not differ by mother's education. In 1997, when children are between the ages of 0 and 12, mothers spend on average approximately 48 hours per week with their children. In 2002, mothers spend on average approximately 37 hours per week. This decline in total time is expected because time with children declines with child's age (Bianchi 2000). Unlike total time, the amount of time spent on

educationally oriented activities (e.g., reading, playing together and doing activities sports and arts/crafts) varies significantly by mothers' education. In 1997, mothers who graduated high school but did not attend college and mothers who attended some post-secondary schooling dedicated approximately 30 and 31 hours per week to educationally oriented time, respectively. Mothers who did not graduate from high school, however, devoted only 26.61 hours per week to educationally oriented activities. The educational gradient in educational time becomes even more apparent when children are between the ages of 5 and 18 years old in 2002. While high school dropouts dedicate only 18.14 hours per week to performing educationally oriented activities with children, high school graduates who did not attend college dedicate 23.36 hours per week and those with at least some college education spend nearly 27 hours per week on educational activities.

Effect of Maternal Employment on Maternal Time Investments

Table 2 presents the estimated effects of maternal employment, measured alternatively as labor force participation and weekly hours worked, on maternal time investments from ordinary least square regression (OLS), individual fixed effect models (FE) and models using instrumental variables (IV). We present the estimated effect of maternal employment on two dependent variables, total time spent with children and educational time with children. Both measures of time use are age-standardized and should be interpreted as deviations from an age-adjusted mean.

OLS estimates show that both measures of maternal employment, participation and hours worked, are negatively associated with both total and educational time. Accounting for time invariant unobserved heterogeneity in FE analysis, we see that the negative and significant relationships between employment and time investments remain. The relationship between work—both participation and hours worked—and total time investments persist when we account for time varying sources of heterogeneity in IV estimation. The relationship between work and educational time, however, does not.

In Table 3, we stratify our analysis by mothers' education. Panel A presents the results for mothers who did not complete high school, panel B for those who graduated high school but did not continue for further schooling and panel C for those with at least some college education. The results for

high school dropouts show that the significant negative relationship between employment and time investments obtained from OLS estimates are not robust to FE and IV analysis. Therefore, the negative relationship obtained from OLS estimation among mothers without a high school diploma is likely to be driven by either time invariant or time varying sources of heterogeneity.

Turning to panel B, we see the relationship between work and time use is more robust across the different specifications for mothers who are high school graduates. OLS results show a clear negative relationship between work and time investments. When accounting for time invariant heterogeneity in FE estimation, the estimated effect of labor market participation remains negative and marginally significant. IV estimations also show that working mothers are significantly more likely to spend less total and educational time than stay-at-home mothers at the 90% confidence level. In terms of the effect of work hours on time investments, both FE and IV estimation show a significant and negative effect on total time. The marginally significant effect of work hours on educational time obtained in FE analysis is not robust to IV estimation.

Like the results for high school dropouts, the results for mothers with some college education show a weak causal relationship between employment and time investments. OLS estimates show a strong negative association between employment and time use. However, only the effect of work hours on time investments is robust to FE estimation. Once time varying sources of heterogeneity are accounted for in IV estimation, we see no significant relationship between employment and time investments among mothers with some college education.

The overall findings presented in Tables 2 and 3 demonstrate the following. First, there is an overall negative causal relationship between maternal employment, both in terms of work status and work hours, and the total time mothers devote to their children. The relationship between employment and educational time, however, is less robust. Stratifying by mothers' education reveals a weak effect of maternal employment on time investments among those with the least amount of schooling and those with the most. For high school dropouts, both FE and IV estimation show no significant effect of employment on time investments. For those with some college education, the statistically significant effect of work

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hours on time investments obtained from FE analysis is not robust to IV estimation. On the other hand, across all three specifications, the results show a consistent significant relationship between maternal employment and time use among high school graduates with no further schooling.

Effect of Maternal Time Investments on Child Outcomes

Table 4 presents the estimated effect of maternal time investments on three indicators of child wellbeing—letter word scores, applied problem solving skills, and positive behavior—using the full un-stratified sample. Controlling for an extensive set of individual and contextual characteristics, OLS estimates show that both total and educational time are positively associated with letter word scores but not applied problem solving scores nor positive behavior measures. Once time invariant sources of unobserved heterogeneity are accounted for in FE analysis, we see that neither total nor educational time is significantly correlated with any indicator of child outcome. These results are consistent with past studies time diary studies (Booth et al. 2002; Huston and Aronson, 2005) that also find that time is not significantly associated with child cognitive outcomes, net of child and family characteristics.

Stratifying by mothers' education, however, reveals interesting socioeconomic differentials in the relationship between maternal time and child outcomes in Table 5. Panel A is for high school dropouts, panel B for those who graduated high school but did not continue for more schooling, and panel C is for those with some college education. OLS estimates for high school dropouts show that time investments are not significantly correlated with cognitive outcomes or indicators of positive behavior. FE estimates show that total time is negatively associated with positive behavior for mothers who did not graduate high school. Results in Panel B show a more significant relationship between time investments and child outcomes among mothers with only a high school diploma. OLS estimates show that both total and educational time is positively correlated with letter word scores. Only the relationship between total time and letter work scores persists when time invariant sources of biased are eliminated in FE analysis. Panel C shows that only total time is positively associated with positive behavior indicators in OLS analysis. This relationship, however, is not robust to FE estimation.

Overall, the results from Table 4 and 5 demonstrate an overall weak relationship between the amount of time mothers spend with their children and children's verbal, analytical and behavioral outcomes. These findings are consistent with prior time diary studies. Stratifying by mothers' education reveals heterogeneous effects of time investments. Time with the most educated mothers have no marginal effect on child outcomes, net of child characteristics and family background. Time investments, however, do have some effect among less educated mothers. While total time is associated with worse child behavioral outcomes among high school dropouts, total time is positively associated with children's letter word scores among high school graduates.

Discussion

It is commonly assumed in the popular press and in the academic literature that maternal time investments in children are a mechanism through which maternal employment affects children. To date, however, the assumptions underlying this claim have not been systematically tested. To address this gap in the literature, we use a nationally representative child development survey to test the two assumptions that must hold in order for time investments to mediate the relationship between employment and child outcomes. The first assumption tested is whether maternal employment actually reduces time investments. The second assumption tested is whether maternal time affects child outcomes. In each case, we stratify our analysis by mothers' education in order to better capture possible heterogeneity in the effect of employment on time, on one hand, and the effect of time on child cognitive outcomes, on the other.

Our analysis, which incorporates more direct consideration of causality relative to previous time use studies, highlights how dependent work-family conflicts and their subsequent effects on children are on socioeconomic status. In identifying the relationship between maternal employment and time investments, we find an overall small negative effect of employment on both total and educational time. Stratifying by mother's education shows that there is no significant effect of employment on maternal time investments for women at the top and at the bottom of the educational distribution, namely those with some college education and those without a high school diploma. However, for those in the

middle—mothers who graduated from high school but did not pursue further schooling—employment has a sizable negative effect on both total and educational time.

In testing the second assumption underlying claims that time investments mediate the relationship between maternal employment and child outcomes, we find an overall weak relationship between time investments and children's cognitive outcomes. This finding is surprising given the central role time plays in child development and human capital theories but is consistent with other time diary studies by Huston and Aronson (2005) and Booth et al. (2002).

While there is a weak effect for the population as a whole, we show that there are important educational differences in the relationship between work and time investments. We find that among the best-educated mothers, neither total nor educational time is significantly related to child outcomes. Among those in the middle, we find a positive relationship between the total time mothers spend with their children and children's verbal development. Among the lowest skilled mothers, we find a negative relationship between time and indicators of positive behavior.

Some caveats apply to our findings. First, we do not have reliable data on children's time with caregivers other than mothers. This is unfortunate because fathers have drastically increased their involvement in childrearing over the last several decades, especially married fathers with children (Bianchi 2000; Sandberg and Hoefferth 1999; Sayer et al. 2004). It is likely that the small negative effect of maternal employment that we find would be reduced if fathers' time were included in our analyses. Moreover, inclusion of fathers' time would likely exacerbate the observed socioeconomic disparities in the relationship between maternal employment and time investments. This is because lower-educated mothers are more likely to be single parents, and non-resident fathers spend less time with children than resident fathers (Casper and O'Connell 1998; Cooksey and Craig 1998; McLanahan and Sandefur, 1994). Additionally, better-educated fathers tend to be more involved parents than less-educated fathers (Berger and Langton 2011; Goldscheider and Waite 1991). As such, the inclusion of father's time would likely increase socioeconomic disparities in parental time investments in children.

While time diaries from the PSID-CDS offer a unique opportunity to obtain information on the total amount of time children spend with mothers as well as detailed information on how that time is spent, time diaries cannot capture the nuances of parent-child interactions. For example, they cannot capture the quality and content of verbal exchanges that occur between parents and children nor can they capture how responsive or attentive parents are during their time together. These important aspects of parent-child interactions may be effected by maternal employment and may go on to affect the productivity of parents' time with children in terms of their influence on child development. Moreover, while time diaries provide the best measures of the actual amount of time parents spent with children, they are likely to underestimate the true amount of energies devoted to childcare. For example, time diaries do not measure the effort devoted to organizing children's daily activities nor do they measure the time and energy spent searching, selecting and managing various childcare options. In this sense, our measure of time use serves as valuable but incomplete proxies for parental time investments.

Despite these limitations, our paper offers the first systematic attempt to test the two assumptions underlying commonly held claims regarding the relationship between maternal employment, time investments in children and child outcomes. Both the popular narrative (Belkin 2003; Steiner 2006) and evidence based on national surveys (Milkie et al. 2004) paint a picture of working parents who feel as if they are not able to devote "enough" time to children as they juggle competing obligations to their work and family lives. Moreover, discussions in the popular press regarding the consequences of maternal employment for children are characterized by anxious debates regarding how employment might deprive children of much needed parental time. If these stories are to be believed then working mothers, particularly the most highly-educated and privileged ones, struggle with lingering guilt over their choice to work outside of the home while painstakingly weighing the perceived costs and consequences of their employment decisions for their children's current and future wellbeing.

We show that the particulars of the work-family conflict and how it goes on to affect children varies substantially by mothers' education. Among the best-educated mothers, the picture that we provide is that much of the concern regarding how work interferes with childcare is unfounded for the very people

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who seem to be the most vocal about their fears. Our findings show that the most highly educated mothers are largely able to navigate work and family obligations in ways that prevent work from reducing this childcare time. Moreover, their time has no marginal effect on child outcomes. That the children of the most educated are the least likely to be harmed by maternal employment is not surprising, given that these children are already benefiting from living in safer communities and attending safer schools (Brooks-Gunn et al 2003), being enrolled in after-school enrichment activities that supplement their formal education (Condron 2009; Downey et a1. 2004; Lareau 2002), and living in a more cognitively stimulating home environments (Menaghan and Parcel 1991; Davis-Kean 2005).

In contrast, the least skilled mothers face the bleakest job prospects because low-skilled jobs that pay a living wage have become increasingly scarce. Moreover, unskilled mothers are the most likely to be balancing work and family issues as single parents. Unlike the highly skilled who struggle with long work hours but are also highly paid, the conflict faced by the least skilled revolves around the struggle to find stable employment while simultaneously trying to adequately care for children (Bianchi 2011). Our finding that employment has little effect on maternal time investments and that spending too much time with the least skilled mothers may increase behavioral problems is consistent with recent studies showing positive links between maternal employment and child outcomes among low-income families. These studies show that young children benefit when their mothers obtain stable employment, particularly if jobs are well paid and mothers have sufficient social support (Chase-Ciabattari, 2007; Johnson et al., 2011; Lansdale 2003; Raver 2003). Our findings are also consistent with recent studies that show that high quality center-based care can offer children the cognitive stimulation and enriching interactions that many over-worked and over-stressed parents of little means cannot provide their children at home (Felfe and Lalive 2011; Tarjei and Magne 2010).

We find that parents and children from the "middle" are the most vulnerable to work-family conflicts. Children of the working-poor or lower middle-class clearly benefit from spending more time with their mothers yet their mothers have the greatest difficulty balancing work obligations with childcare responsibilities. Women who hold a high school diploma but do not have post-secondary schooling

comprise approximately one-third of the female labor force (U.S. Bureau of Labor Statistics, 2010). Those in the middle are not highly paid like the highly educated. Therefore, both parents must work to financially support household necessities. Yet unlike the least skilled, families in the middle do not qualify for government subsidies such as Head Start. These families describe their situation as being one paycheck, one sick child or one job loss away from slipping into poverty (Williams and Boushey 2010; Williams 2010). Our findings contribute to the growing evidence that middle-class families are findings themselves in an increasingly vulnerable and precarious place in American society.

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Table 1. Weighted Means and Standard Deviations of Key Variables for the Full Sample and by Mothers' Education

	Full Sample	High School Dropouts	High School Only	Some College
Letter Word (z-score)	0.17	-0.15	0.04	0.38 ***
	(0.90)	(0.70)	(0.85)	(0.96)
Applied Problem Solving (z-score)	0.25	-0.39	0.06	0.50 ***
	(0.99)	(1.00)	(0.90)	(0.97)
Positive Behavior (Range 1-5)	4.11	4.19	4.07	4.14
	(0.57)	(0.62)	(0.63)	(0.53)
Total Time in 1997 (hrs/wk)	48.17	47.04	49.73	47.58
	(19.11)	(20.35)	(19.16)	(18.79)
Educuational Time in 1997 (hrs/wk)	30.22	26.61	30.00	31.1 **
	(13.63)	(13.82)	(15.21)	(12.52)
Total Time in 2002 (hrs/wk)	37.37	36.61	39.43	36.43
	16.32)	(12.82)	(17.68)	(15.57)
Educuational Time in 2002 (hrs/wk)	24.80	18.14	23.36	26.98 ***
	(12.76)	(11.23)	(11.86)	(12.94)
Labor Force Participation	0.78	0.76	0.75	0.79 **
	(0.41)	(0.33)	(0.43)	(0.40)
Hours Worked per Week	26.65	25.80	26.11	27.3 ***
	(17.53)	(18.70)	(17.46)	(17.59)
Log Total Household Income	10.61	10.03	10.44	10.79 ***
	(1.55)	(1.31)	(0.85)	(1.81)
Mother's education	11.70	8.40	12.00	14.98 ***
	(5.01)	(2.30)	0.00	(1.39)
Father's education	13.70	9.20	12.60	14.80 ***
	(2.60)	(3.70)	(1.73)	(1.85)
Single Parent	0.26	0.40	0.27	0.14 ***
	(0.44)	(0.49)	(0.44)	(0.34)
Child's Age	5.60	5.48	5.88	5.83 ***
	(3.47)	(3.66)	(3.47)	(3.44)
White	0.68	0.55	0.69	0.84 ***
	(0.46)	(0.50)	(0.43)	(0.34)
Black	0.13	0.28	0.20	0.087 ***
	(0.34)	(0.45)	(0.38)	(0.28)
Hispanic	0.18	0.16	0.11	0.07 ***
	(0.39)	(0.37)	(0.25)	(0.21)
N	1618	343	515	760

Notes: Sample restricted to children who completed both weekday and weekend time diaries in 1997 and 2002 and who received assessments for cognitive and behavioral outcomes in 1997 and 2002. Means are weighted. t test compares mean differences across mothers' education levels.
*** p<0.01, ** p <0.05, * p<0.1 (two-tailed test)

Table 2. Effect of Employment on Maternal Time Investments

	OLS		FE		IV	
	Total Time	Educ Time	Total Time	Educ Time	Total Time	Educ Time
Panel A. Full Sample						
Labor Force Participation	-0.321***	-0.292***	-0.168*	-0.183*	-0.868*	-0.387
	(0.043)	(0.045)	(0.075)	(0.075)	(0.366)	(0.380)
Hours Worked (Hrs/wk)	-0.010***	-0.009**	-0.005*	-0.005**	-0.0153*	-0.0065
	(0.001)	(0.001)	(0.002)	(0.002)	(0.006)	(0.006)

Notes: All models control for the full set of covariates described in the text.
*** p<0.001, ** p<0.01, * p<0.05, † p<0.1 (two-tailed test)

Table 3. Effect of Maternal Employment on Time Investments by Mothers' Education

	OLS		FE		IV	
	Total Time	Educ Time	Total Time	Educ Time	Total Time	Educ Time
Panel A. High School Dropout						
Labor Force Participation	-0.381**	-0.304**	-0.0963	-0.0253	-0.157	-0.275
	(0.116)	(0.074)	(0.240)	(0.262)	(0.414)	(0.382)
F-Statistic (First Stage)	-		-		7.830	
Hours Worked (Hrs/wk)	-0.0115***	-0.0109***	-0.0008	-0.0038	-0.0014	-0.0029
	(0.003)	(0.003)	(0.006)	(0.007)	(0.012)	(0.012)
F-Statistic (First Stage)	-		-		5.470	
Panel B. High School Only						
Labor Force Participation	-0.236**	-0.245***	-0.254+	-0.278+	-1.212+	-1.461+
	(0.076)	(0.065)	(0.149)	(0.149)	(0.620)	(0.769)
F-Statistic (First Stage)	-		-		10.810	
Hours Worked (Hrs/wk)	-0.0092***	-0.0082***	-0.0073*	-0.0059	-0.0210*	-0.014
	(0.002)	(0.002)	(0.004)	(0.004)	(0.009)	(0.011)
F-Statistic (First Stage)	-		-		5.780	
Panel C. Some College						
Labor Force Participation	-0.340***	-0.254***	-0.203	-0.173	-0.004	0.766
	(0.061)	(0.064)	(0.181)	(0.124)	(0.489)	(0.577)
F-Statistic (First Stage)	-		-		5.210	
Hours Worked (Hrs/wk)	-0.0098***	-0.0071***	-0.0077*	-0.0063+	-0.0023	0.0114
	(0.002)	(0.002)	(0.003)	(0.004)	(0.008)	(0.009)
F-Statistic (First Stage)	-		-		8.830	

Notes: All models control for the full set of covariates described in the text.
*** $p<0.001$, ** $p<0.01$, * $p<0.05$, † $p<0.1$ (two-tailed test)

Table 4. Effect of Maternal Time on Child Development

	OLS			FE		
	Letter Word	Applied Problem Solving	Positive Behavior	Letter Word	Applied Problem Solving	Positive Behavior
Panel A. Full Sample						
Total Time	0.033*	-0.0055	0.0218	0.0167	-0.0086	0.0075
	-0.0163	-0.0184	-0.0163	-0.0174	-0.0219	-0.0262
Education Time	0.0462**	0.0232	0.00849	0.00595	-0.0103	-0.026
	-0.0151	-0.0173	-0.0165	-0.0173	-0.0214	-0.0261

Notes: All models control for the full set of covariates described in the text.
*** $p<0.001$, ** $p<0.01$, * $p<0.05$, † $p<0.1$ (two-tailed test)

Table 5. Effect of Maternal Time on Child Development by Mothers' Education

	OLS			FE		
	Letter Word	Applied Problem Solving	Positive Behavior	Letter Word	Applied Problem Solving	Positive Behavior
Panel A. High School Dropout						
Total Time	0.0201	-0.0486	-0.0547	0.0331	-0.0505	-0.393***
	(0.054)	(0.057)	(0.058)	(0.068)	(0.094)	(0.107)
Educational Time	0.0284	0.00411	-0.0118	-0.0198	-0.0987	-0.1
	(0.044)	(0.063)	(0.066)	(0.063)	(0.088)	(0.108)
Panel B. High School Only						
Total Time	0.0722**	0.0218	0.0061	0.0659**	0.017	-0.0207
	(0.030)	(0.029)	(0.029)	(0.029)	(0.038)	(0.049)
Educational Time	0.0855***	0.0464+	0.0161	0.041	0.0311	0.00942
	(0.027)	(0.027)	(0.031)	(0.029)	(0.038)	(0.048)
Panel C. Some College						
Total Time	-0.00803	-0.0321	0.0549**	-0.0201	-0.0225	0.0463
	(0.024)	(0.029)	(0.023)	(0.028)	(0.031)	(0.038)
Educational Time	0.0193	-0.00156	0.0181	-0.0309	-0.0336	0.0233
	(0.024)	(0.026)	(0.022)	(0.028)	(0.030)	(0.037)

Notes: All models control for the full set of covariates described in the text.
*** $p<0.001$, ** $p<0.01$, * $p<0.05$, † $p<0.1$ (two-tailed test)