Maternal Employment and Parent-Child Interaction

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(Preliminary and incomplete)

Abstract

A number of studies have examined the effect of maternal employment on child outcomes. Many of these studies provide evidence consistent with a negative influence of maternal employment on child outcomes. We explore one of the mechanisms through which these effects may operate: changes in mother-child interactions. Using data from the NLSY (1979 Cohort), the PSID Child Development Supplement (CDS 1997), and the American Time Use Survey (ATUS 2003-2005), we test for differences in mother-child interactions based on the work hours of the mother. Specifically, using multivariate analyses that utilize the different strengths of the three data sources while emphasizing comparability, we estimate the effect of work hours on the total amount of (quality) time the mother spends with her children (PSID-CDS, ATUS) and the frequency she reads to them (NLSY, PSID-CDS, ATUS). Preliminary results suggest that full-time work is associated with substantial declines in quality mother-child interactions. Accounting for differences in family size, age of the youngest child, marital status, and education of the mother in the ATUS sample, the amount of quality time provided by mothers to all children is found to be 47 minutes less per day for women who work full-time compared to non-working women. Among the children surveyed in the PSID-CDS sample, children to mothers who work full-time receive 50 fewer minutes per day in quality maternal time compared to children whose mothers are not working. Evidence from multivariate analysis across surveys, using various measures of maternal reading to the child, consistently shows a negative association between maternal labor supply and reading to the child ("children" in ATUS). Differences in quality mother-child interactions for part-time vs. non-working mothers are less pronounced and are not robust to controls for basic demographic characteristics in some cases. Lastly, the results suggest that college educated mothers provide substantially more quality interaction than mothers with less education but this gap is significantly reduced among women who work full-time.

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1. Introduction

There has been a sizable debate about the consequences of maternal employment on child outcomes. A number of studies have reported evidence consistent with a negative influence of early maternal employment on child cognitive outcomes (Baydar and Brooks-Gunn, 1991; Blau and Grossberg, 1992; Harvey, 1999; Ruhm, 2000; Han et al., 2001; Waldfogel et al., 2002; Baum, 2003).

What is often lacking in the debate about the effect of maternal employment is evidence regarding the mechanisms that link maternal employment to child outcomes. In particular, while it is plausible that maternal employment, especially full-time work, will have adverse effects on child outcomes due to fewer or less stimulating mother-child interactions, the degree to which maternal work hours influence the amount and the quality of parent-child interaction that occurs is not well-understood. In this paper, we draw on a number of approaches to measuring mother-child interaction in order to test for patterns of quality interaction by maternal employment status and hours worked. We look at broad measures of quality time with children as well as measures of the amount of time and the continuity of maternal reading to the children. Reading aloud to the child is well-known to be a key input in the child cognitive development process and a strong predictor of long-term scholastic achievement.

The present study is unique in that it draws on three large surveys to assess mother-child interactions. The surveys are in many ways complementary and provide us with an opportunity to obtain a more comprehensive picture of the quality of mother-child interaction. Specifically, we investigate the factors associated with time read to by mother (PSID-CDS 1997), quality time with the mother (PSID-CDS 1997), reading to

child (NLSY 1979, henceforth: "NLSY79"), total amount of quality time that mothers provide to their children (ATUS), amount of time spend reading to their children (ATUS). We utilize the different design features and measures of the three data sources to investigate the robustness of the estimated effects of maternal employment on quality mother-child interactions. To that end we adopt, to the extent possible, comparable empirical specifications across data sets.

The time diary data from the American Time Use Survey is used to look at how the amount of quality time interaction (as well as specific activities such as reading, eating dinner together, and helping with homework) vary based on the work hours of the mother. We complement the analysis in the ATUS with evidence from PSID child supplement data. The time use measures in the ATUS capture activities between the mother and all children in the household, while the mother-child format of the PSID-CDS allows us to look at activities for a particular child.

The data from the National Longitudinal Survey of Youth (1979 cohort) provide child-specific reports of how often the mother reads to the child measured at two-year intervals over each child's live and across multiple siblings. The longitudinal nature of the NLSY79 mother-child data allows us to control for the family or child specific characteristics and look at how mother-child reading patterns change when the mother is working more hours. While the NLSY79 does not contain measures of the total time amount of quality time that the mothers provides to each child or even overall, it does allow us to look at one important specific type of mother-child interaction – reading aloud to the child.

The results in this paper provide insight into the types of families that are most likely to be affected by increased maternal work hours. If certain mothers are able to successfully reallocate their use of time to minimize the impact that working has on parent-child interaction, then we would expect that for these groups of women, maternal employment would have very little negative consequences (and likely a positive overall effect through increased family income). This reallocation of time may come by either by pursuing less leisure, outsourcing some of the activities involved in managing a household, or allocating more domestic activities to their husband. The time diary data in the ATUS and the PSID-CDS, and the mother-child reading data in all three data sets will allow us to get at this issue by looking at the specific types of activities that get crowded out by maternal work hours.[3]

The remainder of the paper is organized as follows. The next section reviews the theoretical arguments supporting a link between birth order and child outcomes and summarizes the existing evidence. Section 3 presents the statistical approach and the model specification. Section 4 discusses the data sets, samples and key measures used in our analysis. It also provides some basic descriptive information on the key relationship of interest. Section 5 discusses findings from a preliminary multivariate analysis of the relationship between maternal employment and quality mother-child interactions. The final section concludes.

[3] This type of analysis will also provide additional evidence of the contribution of increased work hours to the increasing social isolation documented in Robert Putnam's book "Bowling Alone." The ATUS provides who codes for each activity so we can also test if women protect their parent-child time by decreasing the amount of interaction that they have with their friends. This might create negative consequences for the children if peer networks are important for raising children. One way that this might operate is through the degree to which parents know the parents of their children which is often a question in many of the national surveys.

2. Background

Numerous studies have investigated the effect of maternal employment on various child outcomes. Much of the existing evidence comes from research that looks at child cognitive outcomes, frequently using data from the National Longitudinal Survey of Youth (1979 Cohort). Typically the studies report effects consistent with a negative influence of early maternal employment.

Using pooled samples of white, African American, and Hispanic children from the 1986 wave of the NLSY79, Blau and Grossberg (1992) find sizable negative effects of maternal hours worked during the first year after birth on children's subsequent verbal ability, as measured by the impact on Peabody Picture Vocabulary Test scores. Later studies based on pooled samples recent waves from the NLSY79 report small but statistically significant negative first year effects (Harvey, 1999; Ruhm, 2000; Baum, 2003). Using samples of white (non-Hispanic) children, studies have reported significant negative effects of employment during the first year on child development (Han et al., 2001; Baydar and Brooks-Gunn, 1991, using reentry into the labor force; Waldfogel et al., 2002).[4]

Studies on the link between maternal employment and child outcomes are typically based on observational data and the majority of estimates stem from standard control variable research designs. Several studies go beyond the control variable approach in attempts to address concerns of potential endogeneity of maternal labor supply in models of child outcome. Blau and Grossberg (1992) and Baum (2003) provide estimates from instrumental variables models. Ruhm (2000) and Waldfogel et al. (2002)

[4] A number of related studies have examined the relationship in more selected populations (e.g., Desay et al., 1989; Belsky and Eggebeen, 1991; Vandell and Ramanan, 1992; Parcel and Menaghan, 1994; Greenstein, 1995).

estimate family fixed effects models to account for correlation due to unobserved, family-specific characteristics. Generally, these estimates confirm a negative impact of maternal employment on child cognitive outcomes among white (non-Hispanic) families.[5]

A relatively small literature documents how mother-child quality interaction differs by maternal employment. Bianchi (2000) summarizes much of the past research and notes that most studies indicate that while there are large differences in total time spent with children based on the mother's employment the actual differences in quality interaction are much lower. Nock and Kingston's data show that while nonemployed mothers spend almost twice as much time with their children, the difference in direct child care and play/education activities is less than an hour. Zick and Bryant (1996) find that each extra hour of maternal work is associated with only 3 minutes less direct childcare, though the amount of displacement is likely to depend on the time of day the work is occurring.[6]

There has also been some focus on the degree to which fathers compensate for any drop in mother-child time by taking on more child-care responsibilities. Darling-Fisher and Tiedje (1990) found higher levels of father provided child care when the mother was working more hours.

3. Analytical Framework

Conceptual Background

[5] Two of the studies that find maternal employment to be detrimental for cognitive development during the first year, report a positive impact during the second and third year (Blau and Grossberg, 1992; Waldfogel et al., 2002, among whites).

[6] Nock and Kingston (1988) find that this difference depends on the timing of the mothers work. Each hour of work between 9am and 3pm displaces 22 minutes of total time spent with the child while each hour between 3pm and 6pm displaces 42 minutes.

In the absence of joint production technology that allows the same time input to be used simultaneously, the amount of parental time spent working, if measured accurately, is mechanically (inversely) related to the quantity of time available for non-market activities. However, reductions in the time budget for non-market activities due to increased own market labor supply do not necessarily imply fewer interactions with the child. Parents may look to exploit opportunities to substitute time in other non-child-related "leisure" activities to reduce the impact of greater own labor supply on the time spent with children. The extent to which such substitutions of own time are possible (or even necessary) will depend on the particulars of the family characteristics such as the constraints associated with the affordability of alternative care arrangements (availability of a spouse/partner, other family, market-purchased care).

In addition to allocating time differently between work, children, and other (household) activities, parents who differ in their labor supply may also differ in how they allocate time across various child-related activities. In particular, those who are more pressed for time will concentrate on activities where their time is most productive and hardest to substitute. This could benefit high quality mother-child interactions such as reading to the child, when time becomes more scarce. However, it may not prevent a reduction in quality mother-child interactions for working mothers who are relatively less productive in such activities or who are unable to substitute away from other, non-stimulating child- and home-related tasks that are of greater overall necessity.

Empirical Strategy

The focus of this paper is to document patterns of quality mother-child interactions in relation to maternal employment. We rely on descriptive and multivariate techniques to document potential differences in mother-child interactions experienced by children of working and non-working mothers. Based on the conceptual considerations above, a negative relationship between maternal involvement in the labor market and their time allocated towards quality mother-child interaction is likely. In families where maternal time in quality child-related activities is more easily substitutable, the impact of labor supply on mother-child interaction is expected to be more pronounced. Potential mediating factors include, among others, the presence of a spouse or partner and greater financial security. All else equal, we expect more educated mothers to be more involved in quality interactions with their children as their time is more productive in activities such as reading to the child and hence potentially harder to substitute relative to mothers with less education.

One problem in ascribing a causal interpretation to estimates from standard control variable approaches is that it is possible that the unobservable characteristics that influence a maternal work hours might also affect the amount of time women spent interacting with their children. Researchers examining the effects of maternal employment on child outcomes have dealt with this problem in a number of ways as discussed in the previous section. This paper assesses the robustness of the relationship using a control variable approach and with family and child fixed effects models, two basic strategies described below.

We investigate the robustness of the estimated relationships to sets of demographic controls. In particular, we estimate models accounting for differences in

family size, age of the youngest child, marital status, and education of the mother, as well as models that account for interactions between the employment variables and the educational attainment of the mother. Furthermore, by considering the relationships using multiple data sets, we investigate, to the extent possible, whether the estimated effects are consistent. In the case of the effect of employment on patterns of maternal reading to the child, we utilize the variation within family and within children (across time) using the longitudinal data from the NLSY79. We estimate family and child fixed effect models, addressing the concern of unobserved heterogeneity at the family level influencing maternal labor supply and the choices of child-related activities.

4. Data Sets, Measures and Descriptive Statistics

Our analysis draws on data from three high quality surveys that enable us to study mother-child interactions: the American Time Use Survey (ATUS), the National Longitudinal Survey of Youth (NLSY79), and the 1997 Child Development Supplement of the Panel Study of Income Dynamics (PSID-CDS).

American Time Use Survey

The ATUS is a time diary account of activities for one day of each of the respondents. For each activity throughout the day we know what they were doing, the start and end time, where they were at, and who they were with. This allows us to construct very precise measures of the amount of time mothers spend with their children and the exact nature of how the time was spent. This allows us to identify time spent in

specific activities such as reading, helping with homework, or eating dinner together (all of which have been shown to be associated with better outcomes for children).

The ATUS data also allows us to look at all of the other ways that the mother is using her time and who she spends time with to test for the type of activities that are crowded out by working more hours. In addition, we can also use the men in our sample to test for how maternal employment influences the amount of father-child interaction that occurs. One caveat is that we only observe the time use of one adult in each household which means that we can't look directly at time substitution between couples but can test for overall changes in how both mothers and fathers use their time when mothers work more hours.

The ATUS respondents are drawn from the outgoing rotation group of the CPS and become eligible for the ATUS two months after completing their eighth (and final) CPS interview. The CPS data provides a broad set of characteristics about the respondent including detailed questions about how much they work and the nature of their employment. Thus our measures of maternal employment are likely to be measured with some error for those individuals who change their work patterns over the two month period between the CPS and ATUS. We will address this issue in part by also testing the robustness of our results to the number of hours the mother works on the day of the survey.

National Longitudinal Survey of Youth (1979 Cohort)

In addition to the time-diary data from the ATUS, we also draw on mother reported amounts of how often they read to each of their children that are available in the

NLSY. Starting in 1986 the female respondents in NLSY79 were asked how often they read to each of their children who were between the ages of 0–9. The measure is based on a six-point scale that range from never (0) to daily (6). The average response is about 4 which corresponds to reading to the child once a week. The median response is 5 which corresponds to reading to the child about three times a week. These questions were asked every other year providing up to 5 observations per child in each family as well as observations on multiple siblings in the same family. This data allows us to control for the time-invariant mother and child characteristics that might influence both maternal work hours and frequency of reading to the child.

Panel Study of Income Dynamics-Child Development Supplement (1997)

The CDS is a component of the Panel Study of Income Dynamics (PSID), a longitudinal study of a representative sample of U.S. individuals and the families in which they reside (PSID, 1998). We use data on children from CDS wave I.

Data collection for the CDS began in 1997 when the PSID supplemented its main data collection with additional data on 0-12 year-old children and their parents in order to improve understanding of the socio-demographic, psychological, and economic aspects of childhood from a nationally representative longitudinal perspective. Wave I includes information from 2,394 families and 3,563 children. Children over the age of 18 were not interviewed in the CDS, but the sample does include some 19-year-olds whose birthday occurred before all interviews in a particular wave were complete.

Interviews at each wave include an interview with the primary caregiver (generally the mother of the child), a child interview, assessments, and time diaries. Child interviews were completed with children ages eight and older, and children aged three years and older

were eligible to participate in assessment tests. The primary caregiver must have lived with the child to be considered the primary caregiver. In most cases, this was the child's biological mother. The primary caregiver may also have been the stepmother, adoptive mother, foster mother, other female legal guardian, father (biological, adoptive, step, or foster), male legal guardian of the child, or an adult who lives with the child and takes primary responsibility for caring for him/her (PSID, 1998).

Selected Measures and Sample Descriptives

We measure quality mother-child interactions using total quality time in the ATUS and the PSID-CDS 1997 and total time/frequency mother reads to child in ATUS, NLSY, and PSID-CDS. We construct maternal employment variables from data on employment status and hours worked (in NLSY79). We use binary indicators of maternal employment (not working, working part-time, and working full-time). In the NLSY79 we also use a continuous measure of maternal hours worked. Other explanatory factors included in the analysis are family size, age of the (youngest) child, marital status, presence of spouse/partner, and educational attainment of the mother.

Table 2 presents sample means and standard deviations of the mother-child interaction measures and maternal and family characteristics by work status of the mother for the ATUS 2003-2005. The statistics point to the diversity of family and work arrangements in these data. The average age of the youngest child in the household (not shown) is 6.8 years with a standard deviation of 5.0 years. About 69% of the mothers in the ATUS sample are married; 3% are unmarried and living with a partner. The highest degree is a high school diploma for 57% of the mothers, 32% are college graduates and the remaining 11% did not complete high school. The average of the amount of quality

time spent with all children is 123 minutes per day. The standard deviation of 120 minutes per day points to potentially very different quality interaction patterns in these data. Similarly, we observe substantial variation in the amount of reading time to children per day provided by these mothers.

Looking at the statistics by maternal employment status, we see that part-time and full-time working mothers spent less quality time with their children. For example, mothers who work full-time spent about 95 minutes per day interacting with their children, on average, compared to more than 160 minutes of interaction for mothers who are not working. The average of the quality time of part-time working mothers lies approximately in-between these two numbers. The pattern of less quality time provided by mothers who work full-time is also evident when looking at the amount of time spent reading to the children and the likelihood of providing any reading time to the children. The average time spent reading to the children for full-time working mothers is about half that of non-working mothers (15 vs. 30 minutes per week). The lower average reading time reflects the lower proportion of full-time working mothers who read to their children: 9% of full-time working mothers read to their children compared to 14% of mothers who do not work. There are no significant differences in reading to the children between mothers who work part-time and those who do not work. The mothers who work part-time are more similar in terms of their family situation to the mothers who do not work than to the full-time working mothers. Part-time working mothers, as mothers who do not work, are more likely to be currently married, have younger children and larger families compared to mothers who work full-time. On the other hand, the mothers currently working part-time are more similar in their educational attainment - they are

more likely to be college graduates - to the full-time working mothers, suggesting that their employment status may be temporary and that they may return to full-time employment when the children are older.

Table 2 presents descriptive statistics by work status of the mother for the NLSY79 mother-child sample. The number of observations reflects multiple observations for each child as well as multiple children in the household. Work status is constructed from annual hours worked data with mothers who reported any hours up to 1200 being categorized as part-time. It is important to note that in our present samples, the NLSY79 children tend to be at least one year younger, on average, at the time of the interview, compared to the youngest child in the household in the ATUS. Since reading aloud to the child is especially important in early childhood we expect to find that reading to the child is more prevalent in the NLSY79 than in the ATUS. As shown in Table 2, there is some evidence to that effect as in more than 20% of the cases the children get read to daily. That proportion of cases where mothers read to the child very frequently is smaller when the mother is working full-time but similar between part-time and non-working mothers, consistent with the pattern found in the ATUS. When looking at the average frequency of reading based on the ordinal scale and reading three times a week, there are no significant differences in the sample proportions between mothers who work full-time and mothers who work part-time or not at all.

Table 3 provides the total number of minutes of quality time that mothers spent with their children each day by age of the youngest child in the household and the employment status of the mother. These figures from the ATUS show that mother-child

quality time drops off precipitously as children get older, falling from around 3 to 4 hours per day during the toddler stages to less than one hour in the teenage years.

Non-working mothers spend about 40% more quality time with their children than mothers who work full-time and 16% more than mothers who work part-time. The gap is generally larger, in percentage terms, when the children are older. In absolute terms, the gap in daily total time in active interaction between full-time working and non-working mothers increases with the age of the youngest child up to age 5, then declines in the age of the youngest child up to age 12, after which it is fairly constant at around 20 minutes per day.

5. Main Results

The descriptive statistics discussed in the previous section suggest an inverse relationship between maternal time spent in the labor market and time spent in quality mother-child interactions. To further explore the nature of these relationships, we present evidence from multivariate analysis. We begin by looking at evidence from the ATUS sample. Time use in this survey refers to activities with all children in the household. All models include measures of employment status using dummies for full-time and part-time employment, with the omitted category being not working, and control for the age of the youngest child. The results in Table 4, Model 1, indicate that mothers who work full-time spend about 43 fewer minutes of quality time with their children each day compared to mothers who are not working. Relative to the sample mean of about two hours each day, this represents a sizable difference.

In Model 2, we include additional controls for educational attainment of the mother, family size, marital status, and presence of a partner. Accounting for these factors, we observe that mothers who work full-time spend about 47 fewer minutes of quality time with their children each day compared to non-working mothers. Full-time employment predicts greater reductions in quality time with children when differences in mothers' educational attainment are held constant. The pattern reflects that more-educated mothers are more likely to be working (full-time) compared to less educated mothers, while they are spending more time interacting with their children.[7] The results confirm that maternal educational attainment is a strong predictor of time with children. As shown in Model 2, college educated mothers spend 52 minutes more in quality time with their children compared to mothers who did not complete high school.

The last column in Table 4, Model 3, includes interactions between the employment variables and college and high school attainment. The statistically significant interaction effect between college education and working full-time ("Full-time*college"), and lack of significant effects for full-time and high school, indicates that while, consistent with the results from Model 2 discussed above, college educated mothers generally provide substantially more quality time (about an hour per day relative to mothers without a high school degree) to their children compared to mothers with a high school education or less, among full-time working mothers that gap is reduced by about 25 minutes per day. In other words, among more educated mothers we observe greater reductions in mother-child interaction associated with working full-time.

[7] More educated women also tend to have fewer children, however, we account for the number of children by including the family size variable.

The results in Table 5 focus specifically on maternal time spent reading to all children. The specifications include the same set of explanatory variables (across columns) as in Table 5. The results in Models 1 and 2 show that, on average, mothers who work full-time spend about 1.5 to 2.1 fewer minutes per day (10 to 15 fewer minutes each week) reading to their children. The size of the (negative) association increases when maternal educational attainment is controlled for in Model 2. As in our analysis of total quality time in Table 4, the stronger negative association between full-time employment and mother-child interaction (here through reading time) when education is accounted for reflects the fact that more educated mothers are more likely to be working full-time while they are also allocating more time to reading to the children. As for total quality time, college educated mothers spent significantly more time reading to their children than mothers with a high school degree or less but that gap is reduced among full-time working mothers.

Turning to the NLSY79, Tables 6-8 present estimates from models of reading to the child. Exploiting the (large) longitudinal sample of siblings, we estimate models without fixed effects (Model 1), with family fixed effects (Model 2) and with child fixed effects (Model 3). Table 6 uses the mother reported data on the frequency of reading to each child (thus we control for the age of the child and not the age of the youngest). We find that each additional hour of work each week is associated with a drop of about .05 points on a 6 point scale (with a sample mean of about 4).

In Tables 7 and 8 we show the relationship between maternal work hours and the likelihood that the mother reads to the child either three or more times a week (Table 7) or daily (Table 8). The estimates from linear probability models in Table 7 show that

without fixed effects, Model (1), an additional hour of work is associated with a 2.5 percentage points reduction in the likelihood that the mother reads to the child at least three times a week. The estimated magnitude of this effect is 1.6 points (implying a 1.6 lower likelihood) in the family fixed effect and 2.0 in the child fixed effects models. Looking at the upper tail of the distribution of the continuity of reading to the child in Table 8, we find that an additional hour of work is predicted to decrease the likelihood of reading daily to the child by 3 percentage points (see Model 1). As for the lower cut-off in Table 7, the estimated effects of hours worked are smaller when looking at within-family differences (Models 2) and within child differences (Model 3).

The smaller effect sizes found in the fixed effect models are consistent with the presence of unobserved factors at the family-level that influence both, the reports of maternal labor supply and the likelihood that a mother reads to a child. Otherwise omitted factors that could play this role are maternal characteristics that induce measurement error in the activity reports and labor supply reports and/or characteristics that enable women who, on average, work more to still maintain above-average levels of reading to the child.

Tables 9 and 10 provide estimates from the PSID-CDS. Table 9 reports the factors associated with quality time with ones' mother and Table 10 shows factors associated with minutes read to by mother. Unlike the ATUS data, the interaction in the PSID is based on a mother-child pair rather than the interaction with all children. Accordingly, we interpret the estimates as child-specific effects. Similar to our analysis of the ATUS, all models in the PSID-CDS include measures of employment status using dummies for full-

time and part-time employment, with the omitted category being not working, and control for the age of the child.

The results in Table 9, Model 1, indicate that mothers who work full-time spend about 48 fewer minutes of quality time with the child each day compared to mothers who are not working. In Model 2, we include additional controls for educational attainment of the mother and family size. Accounting for these factors, we observe that mothers who work full-time spend about 50 fewer minutes of quality time with the child each day compared to non-working mothers. The differences in the gap in time spent are not statistically significant. There is no evidence that the education of the mother is associated with time with the child. The last column in Table 9, Model 3, includes interactions between the employment variables and college and high school attainment. There is no evidence that educational attainment modifies the relationship between working and quality time spent with the child.

These findings from the PSID-CDS complement our analysis in the ATUS above (see Table 4). We observed a negative relationship between employment and quality time spent *with all children* in the ATUS. The evidence from the PSID-CDS confirms this relationship in child-specific time use data. The implied reduction in the amount of quality time from working full-time appears stronger in the PSID-CDS, reflecting differences in the measurement of quality time use, such as a broader definition of mother-child interaction, that lead to greater reports of quality time in the PSID-CDS. For example, among non-working mothers with an infant, the amount of quality time with all children is around 200 minutes per day, on average, in the ATUS while the quality time that infants of non-working mothers in the PSID-CDS receive is 402 minutes per day.

Reinforcing that point, we note that a one year increase in the age of the child decreases the quality time with that child by 25 minutes per day in the PSID-CDS, while an increase of the same magnitude in the age of the youngest child reduces time spent with all children by 11 minutes per day in the ATUS.

Table 10 displays the estimates of the factors associated with minutes read to the child by the mother in the PSID-CDS. The specification of the explanatory variables follows the one in Table 9. On average, children with full-time working mothers get 2 to 3 fewer minutes of maternal reading per day compared to children with non-working mothers. The (negative) association becomes stronger in size when maternal educational attainment is controlled for (see Model 2). More educated mothers tend to spend more time reading to their children and are also more likely to work full-time. Looking at the interaction of employment and maternal education in Model 3, we find that while children with college-educated mothers generally get read to about 13 minutes more compared to children with mothers who did not complete high school, there is no statistically significant gap in reading time between children with working and non-working mothers.

6. Conclusion

A number of studies have examined the effect of maternal employment on child outcomes. While many of these studies provide evidence consistent with a negative influence of maternal employment on child outcomes, the mechanism linking hours worked to child outcomes remain poorly understood. The paper provides preliminary descriptive evidence on the relationship between maternal employment and parent-child

interaction. We look at the potential impact of employment on broad measures of quality time with children as well as on measures of maternal reading to the child. A strength of the paper is the use of multiple data sources to document associations between employment modes (part-time, full-time, not working) and mother-child interaction.

Our preliminary findings suggest that full-time work is associated with substantial declines in quality mother-child interactions. Accounting for differences in family size, age of the youngest child, marital status, and education of the mother in the ATUS sample, the amount of quality time provided by the mother to all children is found to be 47 minutes less per day for women who work full-time compared to non-working women. Among the children surveyed in the PSID-CDS sample, a child with a mother who works full-time receives 50 minutes per day less in quality maternal time compared to a child with a non-working mother. Evidence across surveys, using different measures of the frequency and time spent reading to the child by the mother, consistently shows a negative association between time spent in the labor market and maternal reading to the child (all children in ATUS). Differences in quality mother-child interactions for part-time vs. non-working mothers are less pronounced and are not robust to controls for basic demographic characteristics in some cases. Lastly, the results suggest that college educated mothers provide substantially more quality interaction than mothers with less education but this gap is significantly reduced among women who work full-time.

While much further analysis is needed and our research design does not allow us to identify to what extent the relationships are causal, we notice the robustness and consistency of the patterns of maternal labor supply and mother-child interactions documented here. First, the estimates tend to be fairly robust to the inclusions of

demographic controls and, to the extent that they are comparable across data sets, the estimated effects are consistent. Second, in the case of the effect of employment on reading patterns, using data from the NLSY, we continue to observe significant effects when unobserved heterogeneity at the family level is accounted for using family fixed effects. Furthermore, the estimates from corresponding child fixed effects models are of similar magnitude. Lastly, the evidence of greater effects of full-time employment compared to part-time employment suggests a dose-response relationship, consistent with a causal link between time spent working and mother-child interactions.

To the extent that the estimates reflect causal effects, they imply that maternal employment, especially full-time, reduces quality mother-child interaction. Mothers facing the type of time constraints associated with full-time employment, find themselves unable to adjust their time use patterns such that, within this environment of more limited opportunities to interact with the children, they engage in similarly or more intense per unit of time, i.e. higher quality, mother-child interactions.

It is important to note that evidence of fewer (quality) mother-child interactions does not necessarily imply a negative relationship between maternal employment and child outcomes. The production of child quality is complex and mother-child interaction is not the only important input. Any negative impact of maternal employment on mother-child interactions may be offset, either through greater family and relative child care or through market-purchased care. Greater maternal labor supply will result in greater financial resources that may allow the mother's spouse or partner to allocate more time towards childrearing. Consistent with this type of time substitution, Fisher and Tiedje (1990) found higher levels of father provided child care when the mother was working

more hours. Additional income from maternal employment may also be used to provide market-purchased (quality) child care. However, the demand for quality market-purchased child care has been found to be fairly price-sensitive (Blau and Hagy, 1998), raising the concern that parents may substitute own (quality) time with lower quality market care.

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Figure 1. Amount of quality time mother spends with household children (minutes/day) by work status and age of the youngest child (ATUS 2003-2005).

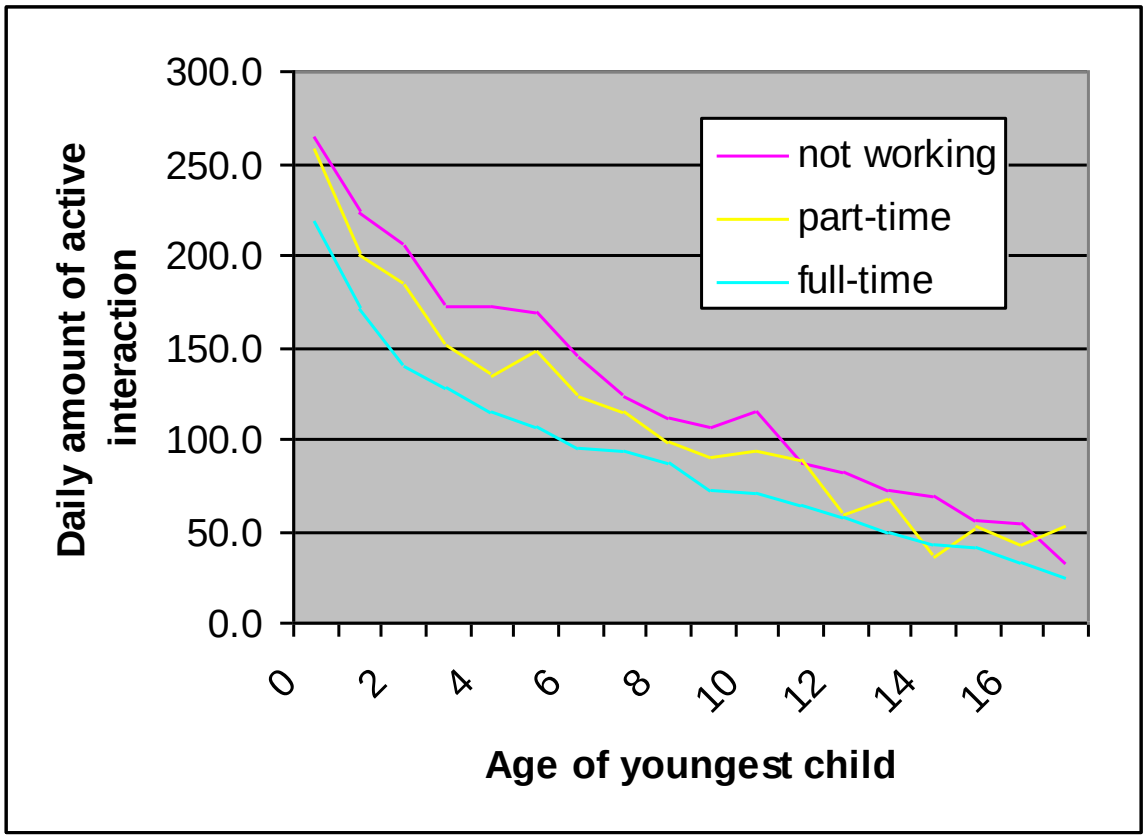

Table 1. Sample Means (Standard Deviations) by work status of the mother (ATUS 2003-2005).

	Not Working	Part-time	Full-time
Quality time	163.0	131.4	94.6
	(136.6)	(120.1)	(99.2)
Reading time	4.8	4.9	2.5
	(15.0)	(15.2)	(10.1)
Any reading time	0.14	0.15	0.09
	(0.35)	(0.36)	(0.29)
Age of youngest	5.5	6.5	7.9
	(4.8)	(4.8)	(5.0)
College degree	0.27	0.36	0.35
	(0.44)	(0.48)	(0.48)
HS grad	0.54	0.58	0.59
	(0.50)	(0.49)	(0.49)
Family size	2.15	2.04	1.83
	(1.04)	(0.94))	(0.87)
Married	0.74	0.76	0.63
	(0.44)	(0.43)	(0.48)
Partner	0.03	0.03	0.03
	(0.18)	(0.16)	(0.17)
Observations (max)	3255	2253	5098

Table 2. Sample Means (Standard Deviations) by work status of the mother (NLSY79).

	Not working (0 hours)	Part-time (0<hours<=1200)	Full-time (1200<hours)
Frequency reading (ordinal 1-6 scale)	4.14 (1.54)	4.26 (1.47)	4.18 (1.44)
Reads to child daily	0.21 (0.41)	0.23 (0.42)	0.19 (0.39)
Reads to child three times a week	0.48 (0.50)	0.51 (0.50)	0.48 (0.50)
Age of child	5.3 (2.7)	5.4 (2.7)	5.7 (2.7)
Mother's years of education	12.0 (2.5)	12.6 (2.4)	13.2 (2.3)
Family size	3.42 (1.61)	3.00 (1.38)	2.63 (1.13)
Spouse present in home	0.60 (0.49)	0.70 (0.46)	0.68 (0.47)
Living with a partner	0.08 (0.27)	0.06 (0.24)	0.06 (0.23)
Observations (child-years, max)	9443	7327	14333

Table 3. Amount of quality time mother spends with household children (minutes/day) by work status and age of the youngest child (ATUS 2003-2005).

Age of youngest Child	Mother not working	Mother working part-time	Mother working full-time
0	264.3	257.7	218.8
1	222.9	200.6	170.4
2	205.2	183.9	140.2
3	172.0	150.0	128.0
4	172.3	133.9	115.5
5	168.9	146.9	107.3
6	144.2	123.0	94.8
7	122.2	114.4	93.0
8	112.1	99.0	86.3
9	106.8	90.9	71.5
10	114.7	93.6	70.5
11	86.2	88.5	64.2
12	81.5	58.6	57.2
13	71.5	67.0	49.9
14	69.4	36.5	42.0
15	56.1	51.7	40.6
16	53.7	42.1	32.6
17	31.8	52.0	23.9
N	3,255	2,253	5,098

Table 4. Factors associated with the amount of quality time (minutes/day) that mothers provide to their children (ATUS 2003-2005).

	(1)	(2)	(3)
Works full-time	-42.911	-47.062	-39.372
	(18.18)**	(19.69)**	(5.56)**
Works part-time	-20.582	-26.721	-40.429
	(7.27)**	(9.48)**	(4.33)**
Age of youngest	-10.980	-10.721	-10.738
	(53.72)**	(52.41)**	(52.54)**
College degree		51.940	62.328
		(14.08)**	(11.62)**
HS grad		23.332	18.911
		(6.81)**	(4.01)**
Family size		1.187	0.999
		(1.11)	(0.94)
Married		13.190	12.935
		(5.75)**	(5.64)**
Partner		-10.706	-10.750
		(1.80)	(1.81)
Full-time*college			-24.983
			(3.04)**
Full-time*HS			0.507
			(0.07)
Part-time*college			8.822
			(0.83)
Part-time*HS			16.873
			(1.68)
Constant	223.821	183.997	184.324
	(104.99)**	(41.12)**	(36.14)**
Observations	10,606	10,606	10,606
R-squared	0.26	0.29	0.29

Notes: Absolute value of t-statistics in parentheses. * significant at 5% level; ** significant at 1% level.

Table 5. Factors associated with the amount of time (minutes/day) that the mother spends reading to their children (ATUS 2003-2005).

	(1)	(2)	(3)
Works full-time	-1.526	-2.054	-0.995
	(5.08)**	(6.68)**	(1.08)
Works part-time	0.439	-0.146	-0.908
	(1.22)	(0.40)	(0.75)
Age of youngest	-0.377	-0.367	-0.368
	(14.17)**	(13.69)**	(13.75)**
College degree		4.904	6.570
		(10.30)**	(9.61)**
HS grad		2.323	1.851
		(5.24)**	(3.07)**
Family size		-0.092	-0.119
		(0.67)	(0.87)
Married		0.447	0.429
		(1.49)	(1.43)
Partner		-1.319	-1.320
		(1.70)	(1.70)
Full-time*college			-3.481
			(3.27)**
Full-time*HS			0.079
			(0.08)
Part-time*college			-0.294
			(0.21)
Part-time*HS			1.265
			(0.97)
Constant	6.853	4.131	4.017
	(25.44)**	(7.15)**	(6.12)**
Observations	10,028	10,028	10,028
R-squared	0.03	0.04	0.05

Notes: Absolute value of t-statistics in parentheses. * significant at 5% level; ** significant at 1% level.

Table 6. Mother reported frequency of reading to each child on 1-6 scale (NLSY79).

	(1)	(2)	(3)
Hours mother works	-0.070	-0.040	-0.052
	(6.83)**	(2.98)**	(3.85)**
Age of child	-0.048	-0.033	-0.040
	(13.23)**	(8.91)**	(13.05)**
Mother's years of education	0.141		
	(30.07)**		
Spouse present in home	0.321	0.064	0.021
	(13.63)**	(1.89)	(0.60)
Living with a partner	-0.017	-0.053	-0.104
	(0.41)	(1.01)	(2.15)*
Constant	2.519	4.375	4.454
	(38.37)**	(126.24)**	(135.65)**
Observations	29,956	30,000	30,000
R-squared	0.08	0.46	0.57
Fixed effects	None	Family	Child

Notes: Robust t-statistics in parentheses. * significant at 5% level; ** significant at 1% level. Frequency of reading is based on a 6-point scale ranging from never (1) to daily (6).

Table 7. Mother reports reading to the child at least three times a week (NLSY79).

	(1)	(2)	(3)
Hours mother works	-0.025	-0.016	-0.020
	(7.22)**	(3.51)**	(3.45)**
Age of child	-0.025	-0.020	-0.022
	(24.72)**	(17.88)**	(15.46)**
Mother's years of education	0.043		
	(29.87)**		
Spouse present in home	0.104	0.025	0.015
	(13.51)**	(2.28)*	(1.06)
Living with a partner	-0.009	-0.010	-0.005
	(0.67)	(0.60)	(0.24)
Constant	0.045	0.600	0.621
	(2.33)*	(54.14)**	(44.05)**
Observations	30,610	30,655	30,655
R-squared	0.09	0.44	0.54
Fixed effects	None	Family	Child

Notes: Robust t-statistics in parentheses.
* significant at 5% level; ** significant at 1% level

Table 8. Mother reports reading to the child daily (NLSY79).

	(1)	(2)	(3)
Hours mother works	-0.031	-0.016	-0.016
	(10.81)**	(4.43)**	(3.48)**
Age of child	-0.020	-0.015	-0.016
	(24.92)**	(17.55)**	(14.46)**
Mother's years of education	0.034		
	(25.71)**		
Spouse present in home	0.082	0.022	0.012
	(14.77)**	(2.66)**	(1.15)
Living with a partner	0.012	-0.010	-0.024
	(1.18)	(0.90)	(1.60)
Constant	-0.145	0.288	0.300
	(8.75)**	(34.70)**	(29.01)**
Observations	30,610	30,655	30,655
R-squared	0.08	0.44	0.53
Fixed effects	None	Family	Child

Notes: Robust t-statistics in parentheses.
* significant at 5% level; ** significant at 1% level

Table 9. Factors associated with quality time with ones' mother (PSID-CDS 1997).

	(1)	(2)	(3)
Works full-time	-47.572	-50.307	-58.771
	(7.09)**	(7.26)**	(4.16)**
Works part-time	-19.223	-18.891	-47.769
	(2.40)*	(2.32)*	(2.75)**
Age of child	-25.330	-24.619	-24.667
	(34.29)**	(32.30)**	(32.33)**
College degree		9.864	-5.851
		(1.09)	(0.36)
HS grad		5.787	-6.032
		(0.78)	(0.49)
Family size		-19.090	-18.999
		(5.39)**	(5.35)**
Full-time*college			15.920
			(0.75)
Full-time*HS			11.503
			(0.68)
Part-time*college			41.394
			(1.67)
Part-time*HS			35.504
			(1.73)
Constant	401.225	431.645	440.429
	(56.96)**	(38.56)**	(34.50)**
Observations	2474	2345	2345
R-squared	0.34	0.35	0.35

Notes: Absolute value of t-statistics in parentheses
* significant at 5% level; ** significant at 1% level

Table 10. Factors associated with minutes read to by ones' mother (PSID-CDS 1997).

	(1)	(2)	(3)
Works full-time	-2.398	-3.288	-1.316
	(2.50)*	(3.35)**	(0.66)
Works part-time	-1.014	-1.519	-1.409
	(0.89)	(1.32)	(0.57)
Age of child	-1.043	-0.953	-0.958
	(9.90)**	(8.83)**	(8.87)**
College		10.195	12.792
		(7.93)**	(5.61)**
HS grad		5.419	6.009
		(5.14)**	(3.44)**
Family Size		-1.689	-1.762
		(3.37)**	(3.51)**
Full-time*college			-5.658
			(1.88)
Full-time*HS			-1.570
			(0.66)
Part-time*college			-0.435
			(0.12)
Part-time*HS			-0.371
			(0.13)
Constant	16.803	14.941	14.374
	(16.72)**	(9.43)**	(7.95)**
Observations	2474	2345	2345
R-squared	0.04	0.07	0.07

Notes: Absolute value of t-statistics in parentheses
* significant at 5% level; ** significant at 1% level