The Effect of Maternal Work Conditions on Child Development

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March 30, 2009

Preliminary Draft
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Abstract

This study goes beyond the much-studied impact of mothers' labor force participation on children's development and investigates how mothers' working environment affects children's cognitive performance. Using data from the Child Development Supplement of the Panel Study of Income Dynamics and Occupational Information Network and applying a value added plus specification we find a negative association between the degree of hazards and stress mothers experience in their jobs and their children's verbal test scores. Nevertheless, accounting for endogeneity and applying an instrumental variable approach shows that most of this negative impact is due to negative selection of mothers into occupation.

1. INTRODUCTION

How does maternal employment structure the day-to-day relations that mothers have with their children? Does the work environment mothers are exposed to affect their parenting behavior and hence go on to affect children's achievement and personality development in ways that may influence later status attainment? These questions are particularly salient in light of fact that early maternal employment is commonplace in modern societies.

Since mothers still remain children's primary caregivers, much attention has been paid to understanding the consequences of maternal employment, especially employment during children's preschool years, on children's cognitive achievement. Studies have focused on understanding whether employment status (Desai et al., 1989; Brooks-Gunn et al. 2002; Baum, 2003; Ruhm, 2004), work hours (Berger, et. al., 2005), timing of maternal work (Brooks-Gunn et al., 2002), and nonstandard work hours (Han 2005) relate to child development. The results of these studies show that the effects are heterogeneous. While some studies show that maternal employment is associated with lower cognitive outcomes among children (Baum 2003, James-Burdumy, 2003), others have also shown that it may improve intellectual performance through increasing household incomes (Blau and Grossberg, 1992). Still others suggest that the effects may depend on the characteristics of mothers and families (see Ruhm 2000 and Brooks-Gunn, Han and Waldfogel, 2002 for full review of the literature).

The impact of maternal employment on child outcomes may also differ by the conditions of mothers' work environment. Jobs vary quite dramatically in terms of the physical and mental toll they place on parents. Jobs that expose caregivers to hazardous conditions may be particularly stressful for parents which may, in turn,

reduce their capacity to provide responsive and consistent childcare. As these types of *bad* jobs have rapidly increased over the years (Kalleberg, et al. 2000), important questions are raised regarding the consequence of work conditions for parenting behavior and child wellbeing.

The goal in this paper is to examine if and how mothers' work environment relates to the quality of parenting behavior and children's cognitive development. We attempt to identify the causal impact of occupational conditions, such as work-related stress or hazards, on children's intellectual performance. Moreover, we want to understand possible mechanisms through which these occupational traits exert its influence on children. For this purpose we investigate how menial jobs influence parent-child dyadic relationships, as measured through time diary data on mother-child interactions.

Using the 1997 and 2002 waves of the Panel Study of Income Dynamics-Child Development Supplement (PSID-CDS) we obtain information on children's cognitive test outcomes, children's time diaries, home, school and neighborhood environment and mothers' occupation. Additionally, linking mothers' occupations, classified according to a 3-digit code, with the Occupational Information Network (O*NET), we obtain detailed information on mothers' occupations. In a first step we estimate children's cognitive production function applying the value-added plus approach introduced by Todd and Wolpin (2006). In other words, we regress children's cognitive test scores on mother's occupational conditions, such as wages, working hours and occupational hazards, and on a comprehensive set of current and lagged home, school and neighborhood environment. Accounting for occupational sorting, we additionally employ an instrumental variable strategy, using grandmothers working conditions as an instrument. In a second step, we shed some light on a

possible mechanism through which menial work characteristics might exert their influence on children's development, namely mothers' time spent with their children.

The results of the analysis suggest that menial jobs are associated with worse parenting behavior and hence, with lower verbal scores among children: an increase in hazards by one standard deviation reduces mothers' time spent with children by more than one hour per week and children's test score by 0.03-0.05 standard deviation. Nevertheless, additionally controlling for mothers' verbal skills as well as applying an instrumental variable strategy, which allows us to control for unobserved characteristics of mothers that relate to both, sorting into bad jobs and parenting quality, shows that most of the negative impact that hazardous jobs exert on children is due to negative selection of mothers into occupation. This study, thus, does not only shed light on the impact of mothers' occupational conditions on children's cognitive development, but also on a possible transmitting mechanism, namely the quantity of mother-child interactions.

The paper is structured in the following way. Section 2 briefly reviews previous literature on the relation between work conditions and parenting behavior on the one hand, and child outcomes on the other hand. Section 3 introduces the estimation strategy and Section 4 the datasets used for the analysis. The results of the regression analysis are presented in Section 5. Section 6 concludes, with some discussion of the policy relevance of our findings.

2. LITERATURE REVIEW

The literature suggests that apart from the pecuniary benefits that occupations can provide, non-pecuniary conditions of the work environment can influence parenting behaviors both positively and negatively. First, occupational conditions

may affect parenting behaviors that may positively influence child development. Namely, parents who work in occupations that are intellectually challenging and that encourage autonomy and free-thinking may be more likely to foster and develop those qualities in their children (Kohn, 1963, 1977; Kohn and Schooler, 1982, 1983). These parents may be more likely to talk to their children, encourage child-initiated conversations and provide more cognitive stimulation at home. Descriptive studies based on observer and self-reports of parent-child relations in the home environment find that parents who work in cognitively stimulating jobs provide more intellectually stimulating and emotionally nurturing home environments for children (Parcel and Menaghan, 1991, 1995).

Questions remain, however, regarding whether these differences in parenting behavior go on to affect child outcomes. Examining how occupational complexity relates to children's verbal scores, Parcel and Mengahan (1990) demonstrate that complexity is positively correlated with children's verbal facility. But once mother's education, verbal skills and other background characteristics are included in the regressions, the estimates fall to zero and becomes statistically insignificant[1]. Estimates of hourly pay and work hours, on the contrary, reduce in magnitude but remain statistically significant. These findings raise some questions as to whether or not there is a causal effect of occupational complexity on child development. Their findings suggest that part of the reason why one might observe a positive relation between complexity and child outcomes is that highly educated and more verbally skilled mothers are also more likely to be employed in occupations that demand higher skills levels.

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[1] Of the 19 items that were used to construct the factor-based scale of occupational complexity many are simply proxies for mother's education and skill, such as measures of the verbal, numerical aptitude and educational level required of jobs.

In addition to the potential positive benefits that non-pecuniary aspects of occupations may provide, there are also important characteristics of occupations that might affect parenting behaviors in ways that negatively affect child outcomes. For example, workplaces can create stressors that can affect parents' capacity to provide children attentive and responsive care when they return home from work. In a study of 30 mother-preschool dyads, Repetti and Wood (1997) found that mothers responded to stress in the workplace by being more withdrawn and irritable during their interactions with children when they returned home.

Larger scale studies also find that work-related stress, as well as stress related to economic deprivation, negatively affect parent-child relations. In studying parenting behaviors during the Great Depression, Elder and colleagues found that fathers who experience heavy economic loss were more irritable and explosive, and were more likely to use violent and arbitrary punishment towards children (Elder 1979; Elder, Nguyen & Caspi, 1985). Likewise, studies using a nationally representative sample of children and families from the National Longitudinal Survey of Youth (NLSY) show that poor mothers are less affectionate and used more physical discipline than nonpoor mothers (Bradley, 2001). In another analysis of the the NLSY, Menaghan and Parcel show that entry into menial jobs is associated with larger drops in the quality of home environment than entry into more complex jobs (1995). Moreover, as shown by a study based on German maternity leave data (Felfe, 2008), mothers seem to dislike job-related hazards and inflexible working schedules and are willing to trade-off higher wages to avoid job-related hazards.

Yet despite the large body of descriptive evidence suggesting that poor work conditions may affect parenting behaviors in ways that may be detrimental for child development, few papers have considered the fact that working in a hazardous or

stressful work environments might affect children's cognitive development. Our paper directly speaks to this gap in the literature and attempts to extend the literature in several important ways. First, using a large nationally representative survey of families and children, the Panel Study of Income Dynamics and its Child Development Supplement, we examine how poor maternal work conditions may affect children's cognitive test scores. We take on the issue of differential selection into types of occupations more seriously by attempting to instrument for maternal occupational conditions. Finally, we examine a possible pathway through which maternal work conditions might influence child outcomes by examining how work conditions might influence the time mothers spend with children.

In the next section we describe our estimation strategy used to identify the impact of mothers work conditions on child outcomes and maternal time investment.

3. ESTIMATION STRATEGY

Todd and Wolpin (2003) summarize the literature on the production function for children's cognitive achievement and provide a guideline for its specification and estimation. Children's cognitive performance is thus determined by current and past inputs combined with a child's genetic endowment of mental capacity:

$$CP_{it} = X_{ijt}\alpha_1 + X_{ijt-1}\alpha_2 + \ldots + X_{ij1}\alpha_t + v_{ijt}\rho_1 + v_{ijt-1}\rho_2 + \ldots + v_{ij1}\rho_t + \varphi n_i + \varepsilon_{it} \quad (1)$$

where CP is a child i's cognitive performance at time, X are current (t) and past (t-1) observed child development determining input factors, v represent current and past unobserved input factors, n stands for child i's genetic endowment and ε_{it} is a residual that includes any type of omitted inputs.

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In order to shed light on the role that mothers' employment and in particular the level of stress and hazards involved in mothers' employment play in shaping children's intellectual development, we estimate the above outlined production function of children's cognitive achievement and add besides mothers' work conditions gradually different input factors. In a first step we analyze the raw correlations between children's cognitive performance, measured by different test scores, and maternal work characteristics without controlling for any further input factor. Second, we introduce maternal characteristics, which allows us to investigate if the impact of occupational disamenities might arise due to selection of certain (observable) types of women into *bad* jobs. Third, we control for a variety of child development determining factors investigated already by the economic literature, such as children's physical status at birth and characteristics of the home, school and neighborhood environment. Additionally, as commonly adopted by the educational production function literature, we estimate a so-called value-added specification and include the lag of the respective cognitive test score. This lagged value is assumed to proxy missing information on lagged input factors and as well children's unobserved genetic endowment. As pointed out by Todd and Wolpin (2006) this specification puts, however, strong assumptions on how the impact of various input factors evolves over time. In order to relax this assumption, we follow Todd and Wolpin's advice and include additionally a set of all available lagged input factors, such as mothers' working conditions, home, school and neighborhood conditions. This final specification, which is called the value-added plus lagged inputs specification, looks the following:

$$CP_{it} = WC_{it}\alpha_1 + MC_i\beta + CC_i\gamma + EC_{ijt}\delta_1 + CP_{it-p}\zeta + WC_{ijt-p}\alpha_2 + EC_{ijt-p}\delta_2 + \varepsilon_{it} \quad (2)$$

where again CP_{it} stands for child i's cognitive performance at time t, measured by the Woodcock Johnson test scores, which are explained in more detail in the next section. CP_{it-p} represents its lagged value. WC contains current (t) and past (t-p) maternal working conditions, such as the wage, working hours and occupational hazards and stress. In practice, we will not estimate the contemporaneous effect of maternal work conditions on children's test score achievements, but the effect one year later, i.e. we regress children's test scores today on mothers' working conditions one year as well as several years before. This shall exclude the immediate feedback effect of children's cognitive achievement on parents' working and childrearing behavior. EC includes a whole set of current (t) and past (t-p) environmental characteristics such as home, school and neighborhood input factors. MC_i represents a variety of maternal characteristics and CC_i includes child i's characteristics at birth.

One might be concerned about mothers sorting into occupations, which differ in the level of hazards and stress. In case a mother chooses a job which involves fewer disamenities in order to take better care of her child, our estimates for the impact of menial jobs on child development might be overestimated. In an effort to correct for this potential source of bias, we apply an instrumental variable approach. Grandmothers' working conditions are used as an instrument as they might influence mothers' occupational choice but might not be directly associated with children's cognitive outcomes[2]. Hence, we estimate equation (2) but applying an instrumental variable strategy: on the first stage we predict mothers' occupational hazards and stress using grandmother's occupations as an exclusive instrument; on the second

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[2] In future versions of this study we attempt to restrict our sample to families whose grandparents are either deceased or live far enough away to prevent regular contact. For this purpose, however, we need confidential geocoded data for which we are currently applying.

stage we estimate children's cognitive production function including the predicted value of mothers' occupational hazards.

One further goal of this study is to shed some light on the underlying mechanism through which mothers' occupational conditions get transmitted onto their children. A key mechanism through which mothers' work might affect children is through its impact on maternal time investment. Hence, we additionally examine the relation between mothers' occupational environment and the quantity of mother-child interactions. For this purpose, in line with the cognitive production function (2), we regress mother-child interactions on mothers' occupational hazards and control additionally for child, mother, home, school and neighborhood characteristics.

In the following section we describe the data and explain how we construct the occupational hazards and match them to the sample of working mothers.

4. THE DATA

In this study, we combine data from the Child Development Supplement (CDS) of the Panel Study of Income Dynamics (PSID) with detailed occupational data from the Occupational Information Network (O*NET)[3]. The Panel Study of Income Dynamics (PSID) is a longitudinal, nationally representative study of individuals and families in the United States. Starting in 1997, the PSID administered the CDS to include assessments of the children of parents included in the original PSID sample. This sample includes approximately 3,600 children between the ages of 0 to 12. In 2002, the PSID-CDS re-contacted 2,907 children for a follow-up survey. The PSID-CDS obtained assessments of children's cognitive and behavioral development, children's time use, and parenting behavior.

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[3] The O*NET is the online replacement of the Dictionary of Occupational Titles (last edition was published in 1991) and is accessible through the O*NET Online website http://online.onetcenter.org/.

While the CDS provides information on maternal occupations, it does not provide information on mothers' work conditions. As a result, we use mothers' 3-digit occupational codes provided in the PSID to link the dataset with the O*NET, which contains comprehensive information on key attributes of 812 occupations.

Matching the two datasets via maternal occupation[4], we create a new dataset disposing information on 1) occupation-specific hazards, 2) children's cognitive outcomes, 3) children's characteristics at birth, 4) maternal time spent with their children on different types of activities and 5) mothers' and fathers' traits and further home, school and neighborhood characteristics. The final sample contains 1446 children, who belong to 1090 mothers and are between 5 and 17 years old in 2002[5].

In the next paragraphs, the main variables and the different categories of control variables are discussed. For an overview of the descriptive statistics of the different dependent and control variables, please refer to Table 1.

OCCUPATION-SPECIFIC CONDITIONS

Occupation-specific characteristics are taken from the O*NET, which collects detailed information on 812 occupations. In this study we focus on a set of features describing the hazards, risks and stress factors involved in mothers' occupation, e.g. requirement of common or special safety equipment, exposure to contaminants, diseases or infections, hazardous conditions or equipment, radiation, whole body vibration, minor burns or bits, very hot or cold temperatures and dangerous positions,

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[4] The two datasets are matched via the occupational code. While the O*Net is based on the 2000 Standard Occupational Classification (SOC) system, which consists on a 6-digit level classification, the PSID provides occupations only for the 3-digit level occupation code from 1970 Census of Population. Nevertheless, the majority of the occupations contained in the PSID have an exact counterpart among the occupations in the SOC. For the remaining more general occupations contained in the PSID, we use the average of the corresponding more detailed occupations contained in the O*NET. A list containing the exact matches between the two classifications is available upon request.

[5] Of the 2,414 children who were present in both waves of the PSID-CDS (1997 and 2002) and of whom we possess cognitive test scores, 629 children were dropped because their mothers were not working in 2000 and some further 324 because their mother's occupation was not reported. Of the 1740 remaining children we lose 333 due to missing test scores in 2002.

frequency of conflict situations, contact to unpleasant or verbally or physically aggressive people, level of competition and time pressure.

In order to summarize the numerous job features, we develop a factor-based scale. For this purpose we estimate a maximum likelihood equation, which enables us to discover the latent structure of our set of variables. Applying varimax rotation to the factors from the first stage allows us to create an index summarizing the various hazards and risks involved in a mother's occupation[6].

For illustrative reasons, let us introduce some common occupations and the amount of hazards involved. Occupations involving an average amount of hazards and stress are, for instance, maids and housekeepers. Jobs in educational administration on the contrary involve one standard deviation less hazards and stress. The health sector exposes workers to most menial conditions: occupations such as nurses or laboratory assistants, mainly represented by women, are some of the most menial jobs.

Aside from hazards and stress, we include two more dimension of mothers' jobs: Mothers' wage, measured in dollars per month and included as its natural logarithm, and the number of working hours per week. In this sample mothers earn, on average, $13.1 per hour and work 35.6 hours per week. Including mothers' wages allows us to relate the impact of non-monetary work characteristics to monetary ones.

CHILD OUTCOMES

As mentioned above, the CDS provides detailed information on cognitive performance of children, measured by the Woodcock Johnson Revised Test of

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[6] We have tried alternative methods to reduce the broad range of occupational characteristics, such as using the most general characteristics, unweighted averages, principal component analysis, unrotated maximum likelihood analysis and last different types of factor analysis selecting a priori the working conditions which are clearly disamenities or amenities. The results, however, do not differ significantly. Hence, we decided to not impose any restriction on the range of job features and apply maximum likelihood with a subsequent varimax rotation.

Achievement (WJ-R). The WJ-R is a widely recognized measure of intellectual development, reading and mathematical competence. Cognitive assessment is composed of three subtests: applied problem solving, letter-word and passage comprehension. All assessments of child performance are taken from the 2002 PSID-CDS, when children are between the ages of 5 and 17 years old. Children in this sample score on average 104.4 points (standard deviation of 18.1) in the letter word, 104.1 points (16.7) in the passage comprehension and 103.1 points (16.4) in the applied problem solving test. For interpretational convenience we standardize all test scores to a 0 mean and a variance of 1.

CHILD CHARACTERISTICS

In order to control for innate conditions that might affect later cognitive and behavioral development, we include children's weight and health status at birth. At the time of birth children in our sample weight 6.9 pounds and 9.6% suffer from poor health conditions. In addition, we control for the standard set of variables that are examined in the child development literature. These variables include child's gender (50.8% are male), race (52.1% are White, 37.9% are Black and the rest represent all other races) and age at the cognitive test assessment (11.1 years in 2002).

MATERNAL TIME

The children's time use module, a unique aspect of the PSID-CDS, provides detailed information on the time use of up to two children per family for a random weekday and weekend. It contains details on the duration and type of activity performed by the mother together with her child. Based on the un-aggregated time diary module of the 1997 PSID-CDS, we create a measure of total hours per week mothers spend with their children. On average mothers spend approximately 44.3 hours per week in 1997 per week with their children and 35.7 hours in 2002.

MOTHERS' CHARACTERISTICS

Mothers' education may simultaneously determine child cognitive development and occupational choice. Better-educated mothers may engage in types of interactions that make them more effective at translating their time with children into positive cognitive outcomes. Additionally, better-educated mothers may have better employment options and be less likely to be employed in unfavorable jobs (e.g. physically demanding, low paying jobs). Mother's education is measured as a continuous variable signifying the total years of completed schooling (average years of schooling are 13.3).

Mothers' may also differ in their verbal proficiency and in how they communicate with children. Like education, mothers' verbal skills may simultaneously influence both children cognitive outcomes and their occupational choice. Verbally proficient mothers may have better employment options. They may also provide more verbally stimulating interactions at home, which may positively influence child outcomes. Several studies have found distinct occupational class and socioeconomic disparities in how parents communicate with children (Hart and Risley, 1995; Lareau 2003; Hoff 2003). Better educated mothers and mothers who work in professional occupations talk more to their children and are more likely to encourage children to participate in conversations relative to mothers who are less educated and who work in lower status occupations. The PSID-CDS administered passage comprehension tests to mothers. We include mothers' passage comprehension scores as a proxy for both her verbal skills and her communication styles. Unfortunately, the PSID-CDS did not also administer tests of mothers' applied problems solving skills. Therefore, we cannot examine how disparities in mothers' mothers' math reasoning skills might influence child outcomes.

Other maternal and household characteristics include mothers' age at child birth (27.9), presence of a partner (73.2%), fathers' education as a proxy for the amount and quality of the time they spent with his children (13.4 years), dad's labor income in 2000 (43826$ per year), other household income sources (6742$ per year) and presence of siblings (47.9% have siblings). Additionally, we control for an index measuring the cognitive support a child experiences at home (discrete scale from 1-14, the average value for families in the sample is 9.7). We furthermore include measures for school quality, signifying the pupil-teacher ratio in 1997 (20.4) and average teacher salary ($34,777 per year). Last we control for the quality of the neighborhood as a place to raise children and control for a discrete neighborhood rating (1-5, where 1 stands for the best and 5 for the worst neighborhood).

The next section presents the results for all different steps of the analysis.

5. RESULTS

Before presenting the regression results, let us first have a look at the raw correlations between the conditions of mothers' occupations, on the one hand, and children's cognitive achievement and parenting behavior, on the other hand (see Table 2). The correlations between wages and child development are, as expected, significantly positive. Correlations between wages and time with children, however, are not significant.

In line with previous literature, we observe a negative correlation between working hours with children's test scores. Also in line with previous research, we observe a negative but relatively small correlation between working hours and maternal time investments. These correlations might suggest that while there is not a one-to-one trade-off between working an additional hour and spend an additional hour

with children, some of the deleterious effects of maternal employment may be attributed to less maternal time investments.

Negative significant correlations are also observed between the amount of hazards and stress experienced at work and children's cognitive test scores. Additionally, the degree of occupational hazards and stress is negatively associated with maternal time. This results suggest that a possible mechanism that links working in a hazardous and stressful occupation and worst child outcomes may be in part due to less maternal time.

These are, however, only first impressions gained from the raw data. In the next subsection we present the results of the multivariate regression analysis which allow for more interpretation.

REGRESSION RESULTS

Table 3 to 5 summarize the estimation results for the impact of maternal work conditions on child cognitive outcomes, measured by the three test scores: passage comprehension (pc) test scores (see Table 3), letter words (lw) test scores (see Table 4), and applied problem (ap) solving test scores (see Table 5). To examine the relationship between work conditions and child test scores, we estimate multivariate models by ordinary least square and successively add in covariates. As outlined in section 3, we first control only for maternal work characteristics such as wages, working hours and hazards (see column 1 respectively). We then successively add in maternal characteristics, such as age and education (see column 2 respectively), thenchild characteristics such as children's birth weight, health, gender and race at birth (see column 3 respectively) and lastly a broad range of home (presence of a partner and of siblings, father's age, labor income and education), school (student-

teacher ratio, average salary of a teacher) and neighborhood characteristics (neighborhood rating; see column 4 respectively).

As seen in the previous sections, maternal work conditions are significantly associated with children's test scores. Wages, on one hand, raise test scores significantly (an increase in one dollar per hour raises the pc score by 0.02 and both, the lw score and the ap score, by 0.03 standard deviations). Occupational hazards and stress, on the other hand, have a significant detrimental impact (an increase in hazards by one standard deviations reduces the different test scores by 0.11-0.12 standard deviations). Working hours are, in line with the results of previous studies, negatively related with children's test scores (one hour more of paid work per week reduces the three test scores by around 0.01 standard deviations).

While the size and the significance of the impact of working hours remain basically unchanged when controlling for maternal characteristics the effect of maternal wages is cut by 50-65% and the effect of menial work conditions by 35-50%. Moreover, those effect lose some significance. The impact is further reduced when controlling for children's birth characteristics and for properties of the home, school and neighborhood environment: an increase in the wage by one dollar per hour increases the different test scores by 0.00 - 0.01 standard deviations; an increase in occupational hazards and stress implies now a reduction of 0.03 - 0.05 standard deviations in the three scores. Notice, the impact of menial work conditions is more than three to five times higher than the impact of wages (this difference is significant at the 5% significance level), which gives us some feeling for the relevance of the occupational conditions that mothers are exposed to.

To put these finding into context, a reduction of hazards and stress by one standard deviation, which is basically the difference between the amount of hazards

and stress involved in the job of a maid in comparison to the job of a teacher, has the same effect as raising the average wage per hour by 3-5 dollars (given a fulltime job this would mean an increase of around 600-800$ per month).

Controlling for an extensive set of home, school and neighborhood characteristics sheds furthermore some light on the much-studied impact of mothers labor force participation on children's cognitive development. As pointed out by Todd and Wolpin (2003, 2006), omitting important determinants of children's cognitive development, might bias the estimated association between maternal working hours and children's test scores. Taking advantage of available information in the PSID-CDS on the home, school and neighborhood environment, shows that it is not maternal labor force participation per se, but the conditions a child is exposed to during this time, which may affect children.

As explained in section 3, children's cognitive production function is not only determined by current but also by past input factors. Hence, in addition to children's lagged test score we also include all available lagged input factors, such as maternal work, home, school and neighborhood conditions. One should interpret the findings in models that include lagged test scores as estimating the effect of the independent variable on changes in children's test score. The results of this so-called valued added plus specification can be found in column 5, respectively.

As expected children's previous performance in the respective cognitive test is a good predictor for children's later achievement: half a standard deviation of current test performance is explained by previous performance. The results of the value added plus specification reveal interesting findings with respect to the impact of maternal work conditions. Putting aside the findings for children's Applied Problem Solving score, we can observe that neither the amount of mothers' working hours nor

additional labor income seem to affect children's cognitive development. The fact that a mother is exposed to stressful and hazardous conditions at her job, has, however, a significant negative impact on their children's verbal achievement.

Before we turn to parenting behavior, let us investigate more on the fact that mothers might differ in their capacity to effect their children's cognitive development. Specifically, mothers may differ in terms of their verbal facilities and in terms of the types of verbal interactions they provide at home. Some mothers are more likely to talk and initiate conversation with their children while others spend less time verbally engaged with their children (Hart and Risley 1996, Lareau 2005). To account for these differences, we include mothers' verbal test scores, which serves as a proxy for both mothers' own verbal skills and how likely she is to verbally engage with her children during their time together. As soon as we control for mothers' verbal test score, the negative impact of working in hazardous and stressful work occupations decreases and remains only marginally significant (at a 15% significance level). This evidence suggests that occupational sorting according to mothers' skill level might in part explain the unfavorable impact of unfavorable working conditions on children's language development. Mothers who are more verbally skilled and are more likely to provide more stimulating verbal interactions with children may select into less stressful or hazardous occupations.

Next, in order to shed more light on this issue we estimate an instrumental variable model (see column 7, respectively). Instrumenting mothers' working conditions allows us to correct for the potential endogeneity caused by occupational sorting. Grandmothers' working conditions, in particular, the level of hazards and stress involved in grandmothers' occupations, serve as an instrument. We know that the intergenerational transmission of occupational attainment is relatively high in the

United States (i.e. sons are more likely to work in the same occupations as their fathers than in any other occupation) (Duncan 1979; Hout 1984). Similarly, grandmothers' working conditions might help shape mothers' occupational choice. On the other hand, we argue that their working environment has no direct affect on children's cognitive development.

First stage regression of mothers' occupational conditions on the level of hazards and stress involved in grandmothers' occupations reveals moreover a strong correlation between these two variables (the F-value is 8.15). In other words, at first glance grandmothers' occupational environment seems to be a valid and strong instrument for mothers' working conditions.

As we can see in column 7 of Tables 3-5, using an instrumental variable approach does not yield contradictive evidence. The impact of menial jobs is still negative, but insignificant. Hence, the findings from the value added plus specification, that the negative correlation between mothers' working conditions and children's cognitive performance is mainly due to occupational sorting of mothers according to their verbal skills, cannot be rejected.

The enormous increase in the standard errors, however, is a sign of weak instruments. Calculating the partial R^2 using the approach suggested by Bound et al. (1995) and the partial F-statistic, suggested by Stock and Staiger (1997) reveals furthermore that the correlation between grandmothers' and mothers' working conditions net of other exogenous regressors is only marginally significantly. One might have further concerns about the validity of grandmothers' working conditions as an instrument. In case grandmothers are taking care of their grandchildren on a regular basis, grandmothers' working conditions might have a direct impact on children's cognitive development. In an effort to exclude this possibility and hence to

guarantee the validity of the chosen instrument, we will restrict our sample to families whose grandparents are either deceased or life far enough away. Given the confidentiality of the data, we currently do not yet have access to information on geographical location of the families.

A last objective of our analysis is to understand the underlying transmitting mechanism, through which mothers' work might affect children. For this purpose we investigate how mothers' occupational conditions affect mother-child interactions. Using ordinary least square method, we estimate the impact of mothers occupational hazards on mothers time spent with their children and successively add child, mother, home, school and neighborhood characteristics as control variables. In order to control for a potential feedback effect of children's cognitive achievement on parenting behavior we control additionally for children's test scores in 1997. Moreover, we include additionally mothers' pc test score and lagged mother-child interactions. These variables shall serve as a proxy for the average quantity and quality of the care provided by the mother. The results can be seen in Table 6.

The impact of mothers work is quite robust over the different specifications. The more hours a mother works, the less time she is available for her child. This impact is negative and significant at the 1% level, no matter which additional control variables we include. There is, however, no complete crowding out between the time spent in unpaid work and in childcare; once controlling for the whole set of control variables one hour spent more at work does not reduce mothers' time investment in their children by one hour, but by only 0.1 hours.

Exposure to menial jobs seems as well to influence parenting behavior: mothers work in poor conditions do spend on average 1 hour per week less with their children. Even when controlling for the lagged dependent variable, in this case

mothers' time spent with her child in 1997, this negative impact remains significant. Comparing the impact of work hours and menial work conditions, provides some intuition for the magnitude of the impact of the level of hazards and stress involved in mothers' jobs: a reduction of hazards and stress by one standard deviation equals the impact of a reduction by 10 working hours. This finding indicates that some of the detrimental effect of menial jobs on children's cognitive development seems to be explained by the fact that mother who work in worse occupations devote less time to their children.

6. DISCUSSION AND CONCLUSION

Do menial working conditions mothers are exposed to go on to affect children's cognitive development? The current study addresses this question by shedding some light on the relation between maternal working conditions and child outcomes as well as on a possible transmitting mechanism, namely mothers' time investment in their children.

Using the 1997 and 2002 waves of the Child Development Supplement of the Panel Study of Income Dynamics we analyze first if mothers' occupational hazards and stress harm children's human capital formation. The results show that children's cognitive development is negatively affected by the fact that their mothers are working in hazardous and stressful jobs. Controlling for a wide range of current and lagged background characteristics, such as child, mothers' and fathers' traits as well as home, school and neighborhood conditions, we find that the test scores of children of mothers who work in this types of unfavorable jobs are on average 0.03-0.05 standard deviations lower. In comparison to the impact of mothers' labor earnings, this effect corresponds to a wage cut by 3-5$ per hour. In other words, one would have to invest

600-800$ per month (given that the mother is working fulltime) in development fostering activities in order to compensate for the detrimental effect of menial jobs.

These results however have to be taken with caution. Once we control for mothers' verbal skills, the impact of occupational conditions loses significance. This finding suggests that at least part of the harmful impact is due to negative selection of mothers into bad jobs; i.e. less skilled mothers are working in worse jobs and also provide less and/or lower quality childcare.

The underlying mechanism through which menial jobs of mothers can exert an effect on children's cognitive development seems to be mothers' time investment in their children. Even when controlling for mother's verbal skills, we can observe that mothers who work in bad jobs devote on average more than one hour per week less to their children. In order to understand better the underlying mechanism, one extension of this study is to investigate not only the quantity but also the quality of maternal time investment by looking at the types of activities mothers perform with their children in greater detail.

One lesson we can learn from these results is that the financial gain from maternal employment seems to be more than offset by its impact on maternal childcare. Nevertheless, the fact that mothers who provide less and less verbally stimulating care, sort into worse jobs, seems to indicate that their children might benefit from extra-familiar care which might provide them with access to more developmentally fostering activities. Hence, this study contributes to the growing body of literature that suggest that high quality center-based care may play a positive role in reducing test score gaps among advantaged and disadvantaged children. In this case, exposure to a well-trained and verbally engaged care provider may offset

some of the negative effects associated with having a mother who works in a high stress environment.

BIBLIOGRAPHY

Baum, C. (2003); Does Early Maternal Employment Harm Child Development? An Analysis of the Potential Benefits of Leave Taking"; Journal of Labor Economics, 21(2)

Berger, L., Hill, J. and Waldfogel J. (2005); "Maternity leave, early maternal employment and child health and development in the US"; The Economic Journal 115

Blau, P. and Duncan, O (1967); The American Occupational Structure. New York: Wiley

Bradley, R.H., Corwyn, R.F., McAdoo, H., García Coll, C. (2001); "The Home Environments of Children in the United States Part I: Variations by Age, Ethnicity, and Poverty Status"; Child Development, 72 (6): 1844–1867

Brooks-Gunn, J., Han, W-J. and Waldfogel, J. (2002); "The effects of early maternal employment on child cognitive development", Demography, vol. 39(2), pp. 369–92.

Brooks-Gunn, J., Han, W-J. and Waldfogel, J. (2002); "Maternal employment and child cognitive outcomes in the first three years of life: the NICHD study of early child care", Child Development, vol. 73(4), pp. 1052–72.

Desai, S., Chase-Landsdale, L. and Micheal, R., (1989); "Mother or Market? Effects of Maternal Employment on the Intellectual Ability of 4-Year-Old Children." Demography 26: 545-61

Elder, Glen H., Jr. (1999) "Beyond 'Children of the Great Depression" Pp. 301-343 (Chapter 11) in Children of the Great Depression: Social Change in Life Experience, by Glen H. Elder, Jr. 25th Anniversary Edition. Boulder, CO: Westview Press

Elder, G. H., Nguyen, J. T. and Caspi, A. (1985) "Linking Family Hardship to Children's Lives." Child Development 56(2): 361-375

Featherman, D.L. and Hauser, R.M. (1978); "Opportunity and Change"; New York: Academic Press

Felfe, C.(2008); "Return to Work - Mothers' Willingness to Pay to Avoid Job-Related Disamenities", University St. Gallen DP 2008-25

Han, W-J. (2005); "Maternal nonstandard work schedules and child cognitive outcomes" Child Development, 76(1): 137-154

Hout, M. (1988); More Universalism, Less Structural Mobility: The American Occupational Structure in the 1980s; American Journal of Sociology 93: 1358-400

Hsin, Amy (2007); Mothers' Time with Children and the Social Reproduction of Cognitive Skills; mimeo

James-Burdumy, S., 2005, "The Effect of Maternal Labor Force Participation on Child Development," Journal of Labor Economics, 23(1): 177-211
Kalleberg, Reskin and Hudson (2000);

Kalleberg, A. L., Reskin, B. F., and Hudson, K. (2000); "Bad jobs in America: Standard and nonstandard employment relations and job quality in the United States"; American Sociological Review, 65: 256-278

Kohn, M.L. and Schooler, C. (1982); Job Conditions and Personality: A Longitudinal Assessment of Their Reciprocal Effects." American Journal of Sociology 87: 1257-86

Menaghan, E. and Parcel, T.L. (1990); Maternal Working Conditions and Children's Verbal Facility: Studying the Intergenerational Transmission of Inequality from Mothers to Young Children; Social Pyschology Quarterly 1990, Vol. 53, 2, 132-147

Menaghan, E. and Parcel, T.L. (1991); Determining Children's Home Environments: The Impact of Maternal Characteristics and Current Occupational and Family Conditions; Journal of Marriage and the Family, Vol. 53, No. 2. (1991), pp. 417-431.

Menaghan, E. G., & T. L. Parcel. 1995. "Social Sources of Change in Children's Home Environments: Effects of Parental Occupational Experiences and Family Conditions Over Time." Journal of Marriage and the Family 57: 69-84.

Repetti, R. L., & Wood, J. (1997). Effects of daily stress at work on mothers' interactions with preschoolers. Journal of Family Psychology, 11(1), 90-108

Ruhm, Christopher (2000). 'Parental leave and child health', Journal of Health Economics, vol. 19(6), pp. 931–60.

Ruhm, Christopher (2004). 'Parental employment and child cognitive development'. Journal of Human Resources, vol. 39(1), pp. 155–92.

Todd, P. and Wolpin, K. (2003); "Towards a Unified Approach for Modeling the Production Function for Cognitive Achievement",*Economic Journal*, Feb, 2003

Todd, P. and Wolpin (2006) "The Production of Cognitive Achievement in Children: Home, School and Racial Test Score Gaps"; mimeo

FIGURES AND TABLES

Variable	Obs	Mean	Std. Dev.	Min	Max

Children's Test Scores					
Std.Passage Comprehension Sccore 2002	1404	0.000	1	-6.2326	4.9743
Std.Passage Comprehension Sccore 1997	690	0.000	1	-4.2286	2.9118
Std. Letter-Word Sccore 2002	1446	0.000	1	-3.8332	4.3082
Std. Letter-Word Sccore 1997	978	0.000	1	-3.0420	5.3150
Std. Applied Problem Solving Sccore 2002	1439	0.000	1	-5.0703	3.9147
Std. Applied Problem Solving Sccore 1997	976	0.000	1	-4.3764	2.9701
Mom's Working Characteristics					
Mom's Working hours 2000	1446	35.628	12.22714	0	70
Mom's Working hours 1996	1268	30.786	15.25829	0	60
Mom's wage 2000	1446	13.091	8.326516	0	48.1700
Mom's wage 1996	1245	9.986	7.685081	0	47.6200
Hazards&Stress of mom's ocupation 2001	1446	0.000	1	-1.2911	3.0425
Hazards&Stress of mom's ocupation 1996	993	0.000	1	-1.3083	3.2232
Mom's Characteristics					
Mom's age at childbirth	1408	27.918	6.021969	15	63
Mom's education	1395	13.250	2.219596	3	17
Mom's pc score 1997	1297	0.068	0.9603417	-4.9580	2.2342
Child's Characteristics					
Child's age in 1997	1446	6.035	3.588255	1	12
Gender (1= female)	1446	0.492	0.5001151	0	1
Birth weight (pounds)	1436	6.907	1.412117	1	13
Race (=1 white)	1446	0.521	0.4997422	0	1
Race (=1 black)	1446	0.379	0.4853001	0	1
Race (=1 all other races)	1446	0.100	0.3004724	0	1
Health better than average	1446	0.267	0.4425155	0	1
Health worse than average	1446	0.096	0.2948676	0	1
Average health	1446	0.637	0.4810513	0	1
Household characteristics					
Partner present	1446	0.732	0.4428793	0	1
# of children in the household	1446	2.257	1.018275	1	9
Dad's age at childbirth	1047	30.374	6.351799	14	63
Dad's education	1020	13.377	2.369184	3	17
Dad's labor income 2000	1020	43826.020	33167.77	0	238000
Dad's labor income 1996	1024	34124.410	24769.6	0	145000
Other family income 2000	1004	6741.764	23550.38	-152180	211430
Other family income 1997	1005	5503.893	11783.71	-70000	145400
Cognitive stimulation scale	1445	9.671	2.269284	3.0000	14.0000
Mom's total time with child in 2002	1149	35.718	15.95725	1.8333	128.4167
Mom's total time with child in 1997	1371	44.276	17.72915	2.2500	109.1667
School Characteristics					
Student ratio in 2002	343	20.401	5.377183	0	35
Avg. teacher salary in 2002	302	24048.660	4086.693	7800	35000
Neighborhood characteristics					
Neighborhood 2002 (=1 very good)	1441	2.207	1.066658	1	5
Neighborhood 1997(=1 very good)	1038	2.305	1.088287	1	5

Table 1: Descriptive Statistics

	Std. passage comprehension score 2002	Std. letter-word score 2002	Std. applied problem solving score 2002	Maternal time spent with the child in 2002
Mom's wage in 2000	0.141	0.211	0.208	0.0336
	(0.000)	(0.000)	(0.000)	(0.256)
Mom's weekly work hours 2000	-0.078	-0.061	-0.078	-0.0794
	(0.003)	(0.020)	(0.003)	(0.007)
Mom's occup. stress & hazards 2001	-0.1376	-0.1402	-0.1408	-0.0528
	(0.000)	(0.000)	(0.000)	(0.073)

Table 2: Raw correlations between maternal work conditions, child outcomes and maternal time

	Stand. PC-Score	Stand. PC-Score	Stand. PC-Score	Stand. PC-Score	Stand. PC-Score	Stand. PC-Score	Stand. PC-Score
Mom Weekly Work hours in 2000	-0.00881***	-0.00710***	-0.00461**	-0.00329	-0.00242	-0.00269	-0.00170
	(0.00217)	(0.00215)	(0.00211)	(0.00213)	(0.00217)	(0.00217)	(0.00299)
Mom's wage in 2000	0.0174***	0.00548	0.00434	0.00265	0.00488	0.00404	0.00235
	(0.00321)	(0.00357)	(0.00346)	(0.00347)	(0.00368)	(0.00367)	(0.00524)
Hazards&Stress of mom's job 2001	-0.119***	-0.0753***	-0.0653**	-0.0454*	-0.0505*	-0.0373	-0.439
	(0.0264)	(0.0268)	(0.0259)	(0.0259)	(0.0277)	(0.0278)	(0.862)
Child's std. LW Score in 1997	-	-	-	-	0.437***	0.418***	0.418***
					(0.0359)	(0.0361)	(0.0388)
Mom's std. PC Score	-	-	-	-	-	0.116***	0.0549
						(0.0318)	(0.133)
Mom's characteristics	No	Yes	Yes	Yes	Yes	Yes	Yes
Child's birth characteristics	No	No	Yes	Yes	Yes	Yes	Yes
Home, school & neighbourhood	No	No	No	Yes	Yes	Yes	Yes
Constant	0.0837	-1.320***	-1.276***	-0.953**	-0.726*	-0.535	-0.353
	(0.0848)	(0.213)	(0.249)	(0.429)	(0.435)	(0.436)	(0.626)
Observations	1404	1404	1404	1404	1404	1404	1404
R-squared	0.045	0.080	0.149	0.175	0.261	0.269	0.156

Column 1: Ordinary least square regression of children's letter word scores controlling only for work characteristics, such as wage, work hours and hazards.
Column 2: Controlling additionally on maternal characteristics such as mom's education and age at childbirth.
Column 3: Controlling additionally for child characteristics such as gender, race, age, health and weight at birth.
Column 4: Controlling additionally for home (single mom, siblings, dad's income, education), school (avg. teacher salary, student teacher ratio) and neighborhood quality
Column 5: Added lagged value plus specification - Controlling additionally for children's lagged passage comprehension score
Column 6: Controlling additionally for mother's passage comprehension score and the lags of all control variables
Column 7: Applying instrumental variable approach using grandmothers' hazard as an instruments

Table 3: Regression results for letter word scores using ordinary least squares and Instrumental variables

	Stand. LW-Score	Stand. LW-Score	Stand. LW-Score	Stand. LW-Score	Stand. LW-Score	Stand. LW-Score	Stand. LW-Score
Mom Weekly Work hours in 2000	-0.00845***	-0.00676***	-0.00431**	-0.00304	-0.000675	-0.000885	0.000437
	(0.00212)	(0.00209)	(0.00208)	(0.00209)	(0.00196)	(0.00195)	(0.00305)
Mom's wage in 2000	0.0257***	0.0129***	0.0108***	0.00899***	0.00516	0.00461	0.00227
	(0.00314)	(0.00349)	(0.00344)	(0.00344)	(0.00334)	(0.00334)	(0.00574)
Hazards&Stress of mom's job in 2001	-0.111***	-0.0640**	-0.0578**	-0.0386*	-0.0477*	-0.0379	-0.699
	(0.0257)	(0.0261)	(0.0255)	(0.0255)	(0.0249)	(0.0250)	(0.979)
Child's std. LW Score in 1997	-	-	-	-	0.582***	0.568***	0.564***
	-	-	-	-	(0.0279)	(0.0282)	(0.0382)
Mom's std. PC Score	-	-	-	-		0.0884***	-0.00701
	-	-	-	-		(0.0287)	(0.144)
Mom's characteristics	No	Yes	Yes	Yes	Yes	Yes	Yes
Child's birth characteristics	No	No	Yes	Yes	Yes	Yes	Yes
Home, school & neighbourhood	No	No	No	Yes	Yes	Yes	Yes
Constant	-0.0361	-1.482***	-1.467***	-1.317***	-0.958**	-0.818**	-0.116
	(0.0828)	(0.206)	(0.245)	(0.424)	(0.404)	(0.405)	(0.764)
Observations	1446	1446	1446	1446	1446	1446	1446
R-squared	0.067	0.106	0.150	0.177	0.380	0.384	0.072

Column 1: Ordinary least square regression of children's letter word scores controlling only for work characteristics, such as wage, work hours and hazards.

Column 2: Controlling additionally on maternal characteristics such as mom's education and age at childbirth.

Column 3: Controlling additionally for child characteristics such as gender, race, age, health and weight at birth.

Column 4: Controlling additionally for home (single mom, siblings, dad's income, education), school (avg. teacher salary, student teacher ratio) and neighborhood quality

Column 5: Controlling additionally for children's lagged letter word score and the lags of all control variables (added lagged value plus specification)

Column 6: Controlling additionally for mother's passage comprehension score

Column 7: Applying instrumental variable approach using grandmothers' hazard as an instruments

Table 4: Regression results for letter word scores using ordinary least squares and Instrumental variables

	Stand. AP-Score	Stand. AP-Score	Stand. AP-Score	Stand. AP-Score	Stand. AP-Score	Stand. AP-Score	Stand. AP-Score
Mom Weekly Work hours in 2000	-0.00992***	-0.00813***	-0.00465**	-0.00275	-0.00199	-0.00208	0.000690
	(0.00212)	(0.00208)	(0.00204)	(0.00203)	(0.00203)	(0.00203)	(0.00464)
Mom's wage in 2000	0.0259***	0.0120***	0.00949***	0.00750**	0.00534	0.00516	-0.00110
	(0.00314)	(0.00347)	(0.00337)	(0.00333)	(0.00344)	(0.00344)	(0.00886)
Hazards of mom's job in 2001	-0.113***	-0.0595**	-0.0467*	-0.0266	-0.0351	-0.0317	-1.529
	(0.0257)	(0.0259)	(0.0250)	(0.0247)	(0.0257)	(0.0259)	(1.482)
Child's std. LW Score in 1997	-	-	-	-	0.429***	0.424***	0.452***
					(0.0292)	(0.0296)	(0.0611)
Mom's std. PC Score	-	-	-	-	-	0.0306	-0.185
						(0.0298)	(0.220)
Mom's characteristics	No	Yes	Yes	Yes	Yes	Yes	Yes
Child's birth characteristics	No	No	Yes	Yes	Yes	Yes	Yes
Home, school & neighbourhood	No	No	No	Yes	Yes	Yes	Yes
Constant	0.0131	-1.526***	-1.361***	-0.993**	-0.484	-0.437	0.436
	(0.0828)	(0.205)	(0.240)	(0.411)	(0.408)	(0.411)	(1.147)
Observations	1439	1439	1439	1439	1439	1439	1439
R-squared	0.070	0.118	0.187	0.229	0.344	0.345	.

Column 1: Ordinary least square regression of children's applied problema solving scores controlling only for work characteristics, such as wage, work hours and hazards.
Column 2: Controlling additionally on maternal characteristics such as mom's education and age at childbirth.
Column 3: Controlling additionally for child characteristics such as gender, race, age, health and weight at birth.
Column 4: Controlling additionally for home (single mom, siblings, dad's income, education), school (avg. teacher salary, student teacher ratio) and neighborhood quality
Column 5: Controlling additionally for children's lagged applied problem solving score and the lags of all control variables (added lagged value plus specification)
Column 6: Controlling additionally for mother's pc score
Column 7: Applying instrumental variable approach using grandmothers' hazard as an instruments

Table 5: Regression results for applied problem solving test scores using ordinary least squares and instrumental variables

	Mom's Time in 2002	Mom's Time in 2002	Mom's Time in 2002	Mom's Time in 2002	Mom's Time in 2002	Mom's Time in 2002
Mom Weekly Work hours 2000	-0.188***	-0.178***	-0.143***	-0.133***	-0.115**	-0.105**
	(0.0440)	(0.0443)	(0.0444)	(0.0448)	(0.0481)	(0.0478)
Mom's wage in 2000	0.129**	0.0640	0.0761	0.0503	0.00869	0.00823
	(0.0653)	(0.0739)	(0.0733)	(0.0735)	(0.0823)	(0.0816)
Hazards of mom's job in 2001	-1.584***	-1.369**	-1.295**	-1.133**	-1.016*	-1.029*
	(0.534)	(0.552)	(0.544)	(0.545)	(0.611)	(0.611)
Child's std. PC Score in 1997	-	-	-	-	0.883	0.756
					(0.944)	(0.937)
Child's std. LW Score in 1997	-	-	-	-	1.374	1.247
					(1.021)	(1.013)
Child's std. AP Score in 1997	-	-	-	-	-0.865	-1.054
					(0.873)	(0.868)
Mom's std. PC Score in 1997	-	-	-	-	-	0.920
						(0.703)
Mom's Time in 1997	-	-	-	-	-	0.146***
						(0.0285)
Mom's characteristics	No	Yes	Yes	Yes	Yes	Yes
Child's birth characteristics	No	No	Yes	Yes	Yes	Yes
Home, school &neighbourhood	No	No	No	Yes	Yes	Yes
Constant	33.39***	25.45***	35.97***	57.84***	61.61***	53.75***
	(1.720)	(4.368)	(5.218)	(9.082)	(9.921)	(10.05)
Observations	1446	1446	1446	1446	1446	1446
R-squared	0.020	0.023	0.060	0.082	0.095	0.113

Column 1: OLS regression of mom's time spent with the child controlling only for work characteristics, such as wage, work hours, hazards and stress

Column 2: Controlling additionally for maternal characteristics such as mom's education and age at childbirth.

Column 3: Controlling additionally for child characteristics such as gender, race, age, health and weight at birth.

Column 4: Controlling additionally for home (single mom, siblings, dad's age, income, education), school (teacher salary, student teacher ratio) and neighborhood

Column 5: Controlling additionally for children's lagged test score

Column 6: Controlling additionally for mother's pc score and the time spent with her child in 1997

Table 6: Regression results for maternal time using ordinary least squares and instrumental variables