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Child Health and Mother's Labor Force Participation – Evidence from Taiwan

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1. Introduction

Children with an impairment or disability often require more time and resources from their parents. The added time constraints would reduce parental labor force participation, whereas financial burdens may induce parents enter the labor market. Therefore, the relationship between children's health and parental employment is not very clear. Child care research generally suggests that having a child with poor health status is associated with reduced maternal and paternal employment. Heck and Makuc (2000) use 1994 National Health Interview Survey to find that parents of children with special needs are less likely to have full-time jobs. Based on the same data, Kuhlthau and Perrin (2001) utilize four measures of child health status and reaffirm that poor child health is significantly correlated with reduced parental employment.

Since mothers are usually the primary care providers in most families, literature on this subject focuses on the association between child disability and maternal labor supply. A number of studies provide evidence on the impact of child health problems on maternal work activity. For example, Bednarek and Judson (2003) suggest that the presence of a disabled child decreases the likelihood of labor force participation for mothers with or without a male present. Their findings also confirm that access to health insurance and the presence of a grandparent have significant impact on the work decisions of mothers with disabled children. While most previous literature suggests a negative effect of child disability on married mothers' labor force participation, studies for female heads provide mixed results.

An early study by Salkever (1982) suggests that the presence of children with health problems has a significant negative impact on maternal participation in labor market for white two-parent families, but not for nonwhite two-parent families and female-headed families. Breslau et al. (1982) indicate that child disability interacts with both race and family income. Having a disabled child exerts a greater negative effect on maternal employment for black and low-income mothers than white and high-income mothers among the two-parent families. Consistent with Salkever's (1982) findings, Kimmel (1997) restricts her analysis to single mothers sample from 1987 Survey of Income and Program Participation (SIPP) and finds little association between poor child health and labor force participation. A subsequent study by Kimmel (1998) further compares the effects of child care prices on the employment behavior of both married and single mothers. The results conclude that child care prices significantly impede maternal employment, with single mothers exhibiting less responsiveness in their labor force participation to child care price changes than married mothers.

In contrast, a number of studies find strong negative effects of children's poor health on single mothers' labor force participation. Using the 1984 SIPP data, Wolfe

and Hill (1995) demonstrate that having a disabled child is negatively associated with a single mother's employment status. Porterfied (2002) uses the 1992 SIPP data to confirm that the negative labor supply effect of having a young child with disabilities is stronger for single mothers than for married mothers. Thyen et al. (1999) use a small sample and find single mothers are 15 times more likely to quit a job, compared with mothers in two-parent families. Powers (2001, 2003) also suggest a persistence effect of child disability on single mothers' labor supply.

One of the major concerns in the literature is the potential of estimation bias if child poor status is endogenous to maternal labor force participation. Powers (2001) is the first to employ a two-stage estimation method to account for the potential endogeneity of child disability. Based on 1992 and 1993 SIPP data, she instruments a child's disability status with 11 specific impairments and supports the hypothesis of significant negative effects of child disability on maternal labor force participation for both mothers in two-parent households and female heads. However, there is evidence that simple estimates may overstate the impact of child disability on mothers in two-parent households. Using data from the Fragile Families and Child Wellbeing Study in 20 US cities, Corman et al. (2003) examine the effects of poor child health on parental labor supply. After controlling for the endogeneity of child health, they find that having a child in poor health reduces the probability of working for both parents and a decrease in the work hours of fathers.

Recent studies by Noberg (1998), Case et al. (2002), Dunifon and Taylor (2002) and Powers (2003) further examine the effect of child disability on subsequent maternal labor supply. Noberg (1998) uses the 1994 National Longitudinal Survey of Youth (NLSY) to investigate the influence of newborn health on the timing of mother's first entry to employment after the child's birth. After controlling for observed and unobserved maternal background characteristics, she finds that mothers are 50 percent less likely to enter the labor market in the first five years after the birth of a high-risk infant. In contrast, using the data from Panel Survey of Income Dynamics, Case et al. (2002) conclude that having a child with low birthweight or having child being in a neonatal intensive care unit has little effect on maternal labor force participation or hours of work during the first three years of the child's life. Powers (2003) utilizes a panel structure of SIPP and employs multiple definitions of child disability. The results support the persistent and strong negative effects of child disability on work measures for female heads, but not for married women. Similarly, Dunifon and Taylor (2002) indicate that the impact of children's health and behavior problems on maternal employment only exists for sub-group of the population. Utilizing data from the Mother-Child files of the National Longitudinal Survey of Youth (NLSY), they find that the employment status of single mothers is adversely

affected by children's behavior problems, while the work hours of poor mothers are negatively associated with both children's health and behavior problems.

Gould (2003) and Feng and Reagan (2003) develop a theoretical model of time allocation for mothers with disabled children. Using the Child Development Supplement (CDS) from Panel Study of Income and Dynamics (PSID), Gould (2003) suggests that single mothers with a child having time-intensive illness are less likely to work, whereas married mothers with a child having severe condition and unpredictable time-caring are less likely to enter the labor market and work fewer hours. Feng and Reagan (2003) utilize the Mother-Child files of NLSY to find that the presence of a disabled child by asthma leads to larger reductions in labor force participation and desired hours for married mothers than for single mothers.

The purpose of this study is to examine the relationship between poor child health and mother's labor force participation. We use a nationally representative parents-child merged data from Taiwan to explore the impact of newborn health on subsequent maternal labor supply. After controlling for the endogeneity of child health, we find that having a child with low birthweight significantly reduce the likelihood of mother's labor force participation. This is consistent with the evidence found by Noberg (1998), but at odds with that suggested by Case et al. (2002).

The reminder of the paper is organized as follows. Section 2 describes the data sources. In section 3, we describe the empirical model specification. Section 4 presents the empirical results. Conclusions follow in Section 5.

2. Data

The data in this study is drawn from three sources: the Labor Insurance (LI) wage records from Taiwan Council of Labor Affairs, the birth data from Taiwan Ministry of Interior and the national databank of births and congenital defect births from Bureau of Health Promotion in Taiwan. The LI wage records data collects data for employees in the Taiwanese private sector with population over 7 millions, which includes individual monthly wages and demographic information on age, gender and education attainment for each employee.[1] The birth data from Taiwan Ministry of Interior contain direct information on the child at birth, including the gender of the child, birth weight, the mother's pregnant weeks, whether the birth was a multiple, rank of the birth for the mother, parents' education, and residence area. The limitation of this data is that it collects no further information on health status at birth except birth weight. On the contrary, although the databank of births and congenital defect births from Bureau of Health Promotion in Taiwan does not contains parents' education, it not

[1] One of the limitations of LI data is that it does not include the information on number of hours worked.

only provides us detailed information on congenital birth defects but also contains information about the mother's health condition during pregnancy, whether or not the mother accepts special physical exams or treatments during pregnancy or delivery, and whether the mother experiences any complications during delivery. The major advantage of this data is that the mother's health status during pregnancy and children's congenital birth defects are based upon the doctors' assessments, which provide us objective measures to explore the association between child health and maternal labor force participation.

Our construction of the merged parents-child data is based upon the parents' personal identification codes from the three datasets, covering the period 1998-2002. Since our interest is in examining the relationship between child health and maternal employment in the private sector, we exclude mothers who were employed in the public sector in our analysis. We also restrict our analysis to mothers at the age range of 18-55.[2] After excluding missing information on key variables, approximately 200,000-300,000 observation remain for analysis per year. Our study thus comprises of a total of over 1.5 millions observations.

3. Empirical Model

The basic empirical model can be written as follows. The maternal labor supply equation is

Mother's labor force participation = f (mother and father characteristics, child health, other measures of child quantity and child quality, local labor market characteristics, u). (1)

The child health equation is

Child health = f (mother and father characteristics, other measures of child quantity and child quality, mother's health status during pregnancy, special physical exams or treatments during pregnancy or delivery, prenatal health care availability, v). (2)

The dependent variable of equation (1), the mother's labor force participation, is measured as a dichotomous variable of whether or not the mother is employed at December of the year her child was born.[3] A child with poor health status is measured as a dichotomous variable if the child weighted less than 2,500 g at birth or was diagnosed to have at least one kind of congenital birth defects. We also include

[2] One limitation of our data is that it does not allow us to distinguish between two-parent households and female-headed households.

[3] Since we are interested in the impact of newborn child's health on subsequent maternal employment, to avoid the dates of child birth and maternal employment status we measure are too close, we exclude mothers whose child was born at December each year.

several measures of both child quality and quantity: the gender of the child, whether the birth was a multiple, the order of the birth, and whether the child is a marital child. Parental characteristics include the mother and father's age and its square, education dummies, whether the father is employed in a private sector, and whether the father is employed in a public sector. Finally, we include the unemployment rate measured at city/county level to characterize local labor markets.

Following Powers (2001) and Corman et al. (2003), we consider the potential endogeneity of child health in our analysis. The unobserved determinants of child health and maternal labor supply can be positively or negatively correlated. For example, a mother with a strong preference for labor market participation may experience high level of prenatal stress that would adversely affect her infant's health, which leads to a positive correlation between child health and maternal labor force particiepation. Alternatively, a mother with high time preference rate may invest less on both her career and the unborn child's health, which results in a negative correlation between poor child health and maternal labor force participation. Therefore, we can not exclude the possibility that child health is endogenous.

In equation (2), the probability of a child with poor health status is specified as a function of parental characterisitics, the mother's health status during pregnancy, special physical exams or treatments during pregnancy or delivery, and some other measures of child quantity and quality. We consider the mother to have poor health if she had at least one of the following diseases or symptoms during pregnancy: anemia, heart disease, lung disease, diabetis mellitus (DM), syphilis, gestational DM, polyhydramnios, hemoglolin disease, chronic hypertension, pregnancy induced hypertension, preeclampsia, ceruical incompetence, renal disease, Rh factor hypersensitivity, having experience with child weighted more than 4,000 gram at birth, and having experience with prematurity child. The special physical exams or treatments during pregnancy or delivery are measured as 7 dummies, which are aminocentesis, chorionic villus sampling, induction of labor, oxytocia, bed rest, cervical cercloage, and laparotomy. We also use the number of obstetrical clinics per 10,000 women of childbearing age 15-44 at city/county level as a proxy measure of prenatal care availability. The three set of identification variables: mother's health status during pregnancy, special treatment during pregnancy or delivery, and prenatal health care availability are supposed to influence child health but not maternal labor force participation.

4. Empirical Results

Variable definitions and descriptive statistics are reported in Table 1. As shown from the table, about half of the mothers were employed after their children were born. Of the sample, 60 percent of the fathers were employed in the private sector, whereas only 6 percent of the fathers were employed in the public sector. Approximately 6 percent of the children weighted less than 2,500 gram at birth and only 0.6 percent of the children were diagnosed to have birth defects. The average birth order was around 1.7 and only about 2 percent of the parents had twins or triples. Two percent of the mothers were assessed to have at least one of the 16 specific diseases or symptoms during pregnancy and over half of the mothers accepted special physical exams or treatments during pregnancy or delivery.

Table 2 presents the probit estimates of maternal employment regressions. Column 1 is the results for the total sample and column 2 is those for mothers with their husbands are employed. The basic results are quite similar. The coefficient of child health indicator is negative and statistically significant, suggesting that having a child with poor health at birth significantly reduces the probability of the mother's labor force participation. This result is consistent with the evidence found by Noberg (1998), but somewhat at odds with the findings by Case et al. (2002). With respect to the other child quantity and quality measures, mothers with twins or triples or those with higher order of the birth are less likely to enter the labor market. This finding suggests that the greater number of children is associated with a smaller likelihood of maternal employment. In contrast with the previous evidence, child gender seems to have some effect on maternal employment. We find mothers with male child tend to choose drop out of the labor market. As expected, mothers with more education or whose spouses have a higher education are more likely to work. Finally, the negative coefficients of year dummies show that the female labor force participation is sensitive to the downturn of the business cycles.[4]

(to be continued ….)

5. Conclusions

This paper examines the impact of a child's poor health at birth on subsequent mother's labor force participation in Taiwan. Using a parents-child merged data from 1998 to 2002, a child born with low birthweight has large adverse effects on maternal employment. Our results provide evidence that poor health at birth has strong adverse effects on subsequent maternal employment. After controlling for mother's and father's demographic characteristics, mothers of infants with low birthweight or birth

[4] Mother's past work history may be also a strong predictor of maternal employment after the child's birth. Since we have only 5 years data in our study, we do not include this variable in our estimation.

defects are significantly less likely to work after the child’s birth.

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Table 1 Descriptive Statistics

Variable	Mean	Standard Deviation
Mother is employed	0.493	0.500
Child		
Low birthweight	0.068	0.251
Male child	0.522	0.500
Multiple birth	0.024	0.152
Birth order	1.734	0.841
Marital child	0.972	0.166
Mother		
Age	28.195	4.812
Junior high	0.232	0.422
Senior high	0.455	0.498
Junior college	0.170	0.376
University	0.074	0.262
Graduate school	0.010	0.097
Poor health during pregnancy	0.026	0.159
Father		
Age	31.871	5.532
Junior high	0.254	0.435
Senior high	0.408	0.491
Junior college	0.178	0.383
University	0.092	0.290
Graduate school	0.028	0.164
Employed in the public sector	0.072	0.258
Employed in the private sector	0.609	0.488

Note: 1,349,372 observations.

Table 2 The Impact of Child Health on Mother's Labor Force Participation

Variable	All mothers	Mothers with fathers are employed
Child		
Low birthweight	-0.0349	-0.0222
	(0.0048)***	(0.0062)***
Male child	-0.0065	-0.0067
	(0.0023)***	(0.0029)**
Multiple birth	-0.0408	-0.0405
	(0.0078)***	(0.0098)***
Birth order	-0.0878	-0.0529
	(0.0015)***	(0.0020)***
Marital child	0.1333	0.0614
	(0.0073)***	(0.0160)***
Mother		
Age	0.2554	0.2222
	(0.0024)***	(0.0034)***
Age squared	-0.3061	-0.2433
	(0.0040)***	(0.0057)***
Junior high	0.2527	0.2757
	(0.0055)***	(0.0071)***
Senior high	0.3716	0.3770
	(0.0053)***	(0.0068)***
Junior college	0.5911	0.5809
	(0.0060)***	(0.0076)***
University	0.2731	0.3265
	(0.0070)***	(0.0090)***
Graduate school	0.1550	0.2463
	(0.0133)***	(0.0176)***

Table 2 The Impact of Child Health on Mother's Labor Force Participation (continued)

Variable	All mothers	Mothers with fathers are employed
Father		
Age	-0.0764	-0.0339
	(0.0012)***	(0.0028)***
Age squared	0.0493	-0.0274
	(0.0016)***	(0.0042)***
Junior high	0.0562	0.0327
	(0.0065)***	(0.0085)***
Senior high	0.1741	0.1385
	(0.0064)***	(0.0084)***
Junior college	0.3014	0.2507
	(0.0068)***	(0.0089)***
University	0.2356	0.1894
	(0.0075)***	(0.0099)***
Graduate school	0.1606	0.0525
	(0.0098)***	(0.0129)***
Employed in the public sector	0.0917	-0.1640
	(0.0047)***	(0.0159)***
Employed in the private sector	0.5282	
	(0.0025)***	
Father's monthly wages		0.0000
		(0.0000)***
1999	-0.0282	-0.0236
	(0.0036)***	(0.0046)***
2000	-0.0577	-0.0620
	(0.0035)***	(0.0045)***
2001	-0.0575	-0.0675
	(0.0038)***	(0.0048)***
2002	-0.2388	-0.2198
	(0.0037)***	(0.0048)***
Log likelihood	-832950.50	-513831.05
N	1,349,252	821,290

Note: Figures in the parenthesis are standard deviations. *** and ** represent statistical significance at 1% and 5% level respectively.