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Children's Health and Maternal Work Activities

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Abstract

I estimate the effect of poor child health on maternal labor force participation. Mothers of health-impaired children may decide not to work and stay at home to take care of their children. Alternatively, mothers may choose to enter the labor force to pay for these children's additional resources. Which action dominates is the empirical question I answer in this paper. I control for the potential endogeneity of a child's health status by using an instrumental variables approach. I find that if mothers have a child in poor health, the probability that the mother works is decreased by thirteen percentage points, and the work hours of employed mothers are reduced by approximately nine percent.

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Chapter One: Introduction

Childhood health problems entail a range of immediate and long-term economic costs that have important implications for the well-being of the child, the family, and society. People with disabilities remain overrepresented among Unites States's undereducated and poor. According to the U.S. Department of Labor's Office of Disability Employment Policy (2017), the labor force participation rate for people with disabilities aged 16 and over is 20.1% compared to 68.6% for people without disabilities of the same age. Thus, the prevalence of child health problems puts children at high risk of future poor outcomes across the life course.

Health problems among children have been rising over the past several decades in the United States, negatively affecting physical health, socio-emotional development, and educational achievement. Furthermore, it may affect entire families' socioeconomic standing. Since 1980, when 3.8 percent of children had health-related activity limitations (Newacheck et al., 1986), the rate has risen to 7.9 percent in 2010 (Houtrow et al., 2014). In addition to the enduring effects across the life span and generations, childhood health problems significantly burden society communities and families.

Parents, specifically mothers, face serious difficulty balancing daily activities such as employment, child care, and parent-child relationships because they need to invest a considerable amount of time and economic resources in these children.

The presence of an ill child influences the labor supply decisions of a mother. On the one hand, a child's illness may be expensive to treat, which might increase maternal work incentives. On the other hand, the sick child may have special needs difficult to fulfill while the mother is at work. In this paper, I aimed to establish the net effects of these child health-related pushes and pull factors on mothers' labor supply.

In this study, I present new estimates of the influence of children's health on maternal work activity with data from the Fragile Families and Child Wellbeing Study. This longitudinal survey follows nearly 5,000 children born between 1998 and 2000 and their parents from birth to age 15. I leverage the longitudinal aspect of the Fragile Families Study to examine the effects of poor child health on one potential resource available to the child -the mother's labor supply. The amount of time needed to take care of a disabled child may decrease the mother's ability to work, resulting in reduced family income and lower investment in the child's health. Therefore, children born with poor health may be at risk for adverse long-term health and economic outcomes, both directly because they have health problems and indirectly due to reducing the mother's ability to sustain paid employment.

This topic is important and needs more considerations for several reasons. First, child disability rates have grown substantially over the past decade. A significant fraction of families contains at least one child with a severe health problem. Evidence from the 2016 Disability Statistics Annual Report indicates that 7.7 percent of people under 18 years old are disabled in the United States (Kraus, L., 2017). Second, as poorer households are

more likely to have an unhealthy child (for example, Spencer, N., 2018), this may increase income inequality. Finally, maternal earnings losses are an important justification for providing benefits to families with disabled children; understanding how child health problems reduce mothers' labor market activity is critical to formulating an appropriate child disability policy.

In this study, I present several key findings. First, a high share of children from urban families has a chronic medical condition or disability. By the time the children reach age 3, about 3.4 percent have some kind of chronic condition or disability. By age 15, that number rises to as high as 40 percent. Second, child poor health status is associated with decreased labor market participation of the mother; my result shows that if mothers have a child in poor health, the probability that the mother works decreases by 13 percentage points and significantly reduces the number of hours employed mothers work. Finally, I find heterogeneous effects in maternal labor market activity. At the second follow-up interview, married mothers or college graduated mothers tend to experience fewer changes in hours worked or labor force participation in comparison with other groups. This result suggests that their labor supply is less elastic.

The rest of this paper is written as follows. Section II briefly surveys the related literature. Section III describes the data, followed by a discussion of the empirical strategy in Section IV. Section V reports and discusses the key findings. Section VI provides the conclusion.

Chapter Two: Literature Review

Childhood poor health negatively affects physical health, socio-emotional development, and educational achievement. It is not surprising that the evidence points to significantly high direct and indirect costs for families with disabled children. A crucial indirect cost for these families involves employment decisions.

The economics literature examines parents' labor force and consumption decisions and the implications of having a child with poor health on these decisions. Jacob Mincer and Gary Becker[1] explored labor supply models. Their models explicitly introduced the costs of time and household responsibilities into the labor allocation decision. Others have expanded this literature noticeably to consider the specific issue of maternal labor supply and the effects of having a child with poor health on the mother's labor supply decisions.

On the labor supply side, mothers decide whether and how much to work based on the broad needs of the family, both financial and uncompensated home needs. Mothers choose how much to work based on the wage they can earn, how much time they would like to spend on leisure activities, and how much time they need to spend with their children. A mother's choice about whether to work will then depend on the perceived benefit of working another hour versus the benefit of staying home conditional on the other

[1] Mincer, J. (1962). Labor force participation of married women: A study of labor supply. In *Aspects of labor economics* (pp. 63-105). Princeton University Press; Becker, G. S. (1965). A Theory of the Allocation of Time. *The economic journal*, *75*(299), 493-517.

variables in play, importantly, the quality of their child's health. The literature examines that the impact of having a disabled child on a mother's labor supply. The mother's labor supply might increase because the child's poor health places significant financial pressures on the family or decreases because of the increased time required to care for the child.[2]

Human Capital Theory: its origin and links to labor force participation

In the 1950s, physical capital, labor, land, and management were the main factors of production. However, in the early 1960s, economists had found it difficult to explain the growth of the United States economy in terms of these four traditional factors of production. The gap, known as residual factors, was identified as human capital. In general, human capital corresponds to any stock of characteristics or knowledge workers have either innate or acquired that contributes to their productivity. While increases in health status and educational attainment-human capital- appear to contribute to economic growth, it was unclear to what extent and how they are related.

Studying these relations is traditionally guided by Human Capital Theory, the foundations of which have been laid by the seminal works of Becker (1964) and Mincer (1974). This theory explains both individuals' decisions to invest in human capital and the pattern of individuals' lifetime earnings. The fundamental principle of Human Capital Theory is the belief that peoples' learning capacities are of comparable value to other resources involved in producing goods and services.

[2] Stabile, M., & Allin, S. (2012). The economic costs of childhood disability. *The future of children*, 65-96.

Jacob Mincer (1958) developed a model to examine the nature and causes of inequality in personal incomes. Mincer maintained that training and skill (human capital) significantly affected personal income dispersions. Through his studies, Mincer found that years of work foregone to pursue education were rationally compensated with higher earnings. Occupations demanding high levels of schooling should offer higher compensation sufficient enough to ensure that lifelong receipts equalized the present value of compensation received by workers with less education. Mincer also showed that age-earnings profiles revealed two distinct correlations: "As more skill and experience are acquired over time, earnings rise" (p. 287), and "in later years, aging often brings about a deterioration of productive performance and hence a decline in earnings" (p. 287).

Gary Becker (1960) studied differentials in personal incomes accrued to college graduates in the United States. Becker attempted to determine if national expenditure on higher education was adequate and if college student quality could improve. The methodology developed by Becker compared the personal incomes of college graduates with those of high school graduates. Income differences between the two groups were then related to costs of attending college so that Becker could mathematically derive a rate of return on investments in college education. His research hypothesis stated, "If this rate of return were significantly higher than the rate earned on tangible capital, there would be evidence of underinvestment in college education" (p. 347). Conversely, if the rate of return were lower than the rate of return on investments on tangible capital, there would be evidence of overinvestment in college education.

According to his research hypothesis, Becker was compelled to report that the "direct returns alone do not seem to justify increased college expenditures" (p. 354). He qualified this statement by asserting that investments in college education provided indirect returns in addition to direct returns. Therefore, he concluded, "a firm judgment about the extent of underinvestment in college education is not possible" (p. 354). [3]

Human Capital Theory seeks to explain the benefit of investment in human resources. The central proposition is that people are considered a form of capital for development. From this point of view, schooling, on-the-job training, medical care, vitamin consumption, acquiring information about the economic system, etc., are seen as deliberate investments that affect individuals' future well-being and real outcome and increase the productivity of organizations (Becker 1962).

What the canonical human capital model does not deny is that human capital is multidimensional. Education and health are considered the most critical components of human capital (Schultz, 1961; Grossman, 2000). While they share the defining characteristic of human capital, investing in them makes individuals more productive; there are several significant differences between them. Perhaps most importantly, Becker (1964) observes that investments in human capital should decrease with age as the remaining period over which benefits can be accrued decreases. While this is the case for education and training decisions, investments in health generally increase with age, even after retirement when health has lost its importance in generating earnings. This and other

[3] Sweetland, S. R. (1996). Human capital theory: Foundations of a field of inquiry. *Review of educational research*, *66*(3), 341-359.

distinctions between health and different types of human capital, identified by, e.g., Mushkin (1962), have led to Grossman's so-called health-capital model (1972a,b).

Grossman derives the demand for health from an optimal control model in which health capital is both a consumption and an investment good. In his approach, the individual chooses his level of health and, therefore, his life span. Initially, an individual is endowed with a certain amount of health capital, which decreases over time but can be restored by investments like medical care, diet, exercise, etc. Therefore, he did not treat the level of health as exogenous but depends on the number of resources the individual decides to allocate to the production of health capital. The production of health capital also depends on variables that modify the efficiency of the production process, therefore changing the shadow price of health capital.[4]

The Grossman model makes several predictions. First, health stock may depreciate faster as people age. In response, people will invest more in their health as they age. Second, the model predicts individuals with high income will invest more in health by spending on medical goods and services than their time investments since the cost of time is higher. Third, "if education increases the efficiency with which gross investments in health are produced, then the more educated would demand a larger optimal stock of health." (Grossman 1972).

Using the Human Capital Theory, I will examine the labor force decisions of mothers and the impact of having a child with poor health on these decisions. The idea is that the

[4] Hren, R. (2012). Theoretical shortcomings of the Grossman model. *Bulletin: Economics, Organisation and Informatics in Healthcare*, *28*(1), 63-75.

child's health contributes to the family's overall well-being or utility. Mothers decide what to purchase, whether and how much to work, and how much time spend on caring for their disabled child to increase the family's overall well-being.

A Theoretical Framework

The conceptual framework for the analysis in my study is based on a simple static labor supply model where the mother maximizes her utility subject to time and financial constraints.[5] The mother's utility is a function of leisure and consumption, and she is responsible for the health care needs of her child. The child's health depends on the time investment or effort devoted to caring for the child (I) and the medical care provided to the child (m). Let h denote maternal market work time; L is maternal time that she neither work nor taking care of the child (leisure). Variable T represents the total time available. Thus, the maternal time constraint is $T = I + L + h$. The mother binding expenditure constraint is $w + y \geq c + P\,m$. y is the potential level of unearned income either from the husband, transfers from the government, or other non-labor income. The w is the mother wage, c is purchased nonmedical goods and services (consumption), P is the price of m (m is and the medical care provided to the child), and the price of c is assumed to equal one (c is the numeraire good).

Now consider the mother's optimization problem. Let x equal a vector of individual characteristics that affect offered wage (e.g., education, age, and experience), and s is a

[5] I developed my model by reading the following article; Gould, E. (2004). Decomposing the effects of children's health on mother's labor supply: is it time or money?. *Health economics*, *13*(6), 525-541.

severity level of child health problems. The mother chooses h and m to solve the following problem:

maximize $U(c, L)$

subject to $w + y \geq c + P\,m$

$T = I + L + h$

$w = w(x, h)$

$I = I(m, s)$

$h \geq 0$

$m \geq 0$

Assuming the budget constraint binds at the optimum and substituting the constraints into the maximization problem, we get

max $U(w = w(x, h) + y - P\,m,\ T - Z - I(m, s))$

subject to $0 \leq h \leq T,\ m \geq 0$

Given that some mothers choose zero hours of work and some children require zero medical care expenses, we must consider both interior and corner solutions. The first-order conditions are as follows:

$$\frac{\varphi U}{\varphi h} = \begin{cases} = 0 \; if \; h^* \succ 0 \\ \leq 0 \quad if \; h^* = 0 \end{cases}$$

$$\frac{\varphi U}{\varphi m} = \begin{cases} = 0 \; if \; m^* \succ 0 \\ \leq 0 \quad if \; m^* = 0 \end{cases}$$

From solving the above equations, the optimal levels of h^* and m^* will be found for which the mother maximizes her utility.

To solve for h^* and m^*, we need to impose functional form assumptions on U(c, L) and w(x, h). U(c, L) must increase if either c or L increases and should ensure some minimum level of consumption and leisure for the mother's basic well-being. For tractability in finding closed-form solutions, I assume that mothers possess the utility function as follow;

U(c, L) = $\beta_1 \log(c - c_0) + \beta_2 \log(L - L_0)$, where β_1 , β_2 , c_0 and L_0 are constants. I also assume that w is increasing in the vector of individual characteristics (x), and h, hours. For tractability, I assume the following form for wage, w = $xh/_{1+\propto}$.

I also should impose functional form assumptions on I(m, s), the function which shows the amount of time needed to care for a sick child for any level of the severity of illness and medical costs. I assume the following form for I, I= $s^{1/\partial} m^{-\gamma/\partial}$. Substituting in the functional forms for U, w, and I, the new maximization problem reads:

max $\beta_1 \log([xh/_{1+\propto}]+y - Pm - c_0) + \beta_2 \log(T-h- s^{1/\partial} m^{-\gamma/\partial} - L_0)$

subject to h ≥ 0 , m ≥ 0

The following Kuhn–Tucker conditions, therefore, define the solution to the maximization problem:

$$\frac{\varphi U}{\varphi h} = \frac{\beta_1 x}{xh+(1+\propto)(y - Pm - c_0)} - \frac{\beta_2}{T-h- s^{1/\partial} m^{-\gamma/\partial} - L_0} \leq 0, \quad h \geq 0, \; h \frac{\varphi U}{\varphi h} = 0$$

$$\frac{\varphi U}{\varphi m} = \frac{-P\beta_1}{h+(1+\propto)(y - Pm - c_0)} + \frac{\gamma \beta_2 s^{1/\partial} m^{-\gamma/\partial - 1}}{\partial (T-h- s^{1/\partial} m^{-\gamma/\partial} - L_0)} \leq 0, \quad m \geq 0, \; m \frac{\varphi U}{\varphi m} = 0$$

This simple model describes the impacts of children's health problems on maternal income. With this simple model, I demonstrated that the mother's work hours depend on

the child's health status (severity of the child's illness, represented by s). As s increases, the child's health status becomes relatively more impoverished; intuitively, we would expect the mother to decrease work hours as s increases.

Children's health problems often require family adjustments in terms of both time and money that may have lasting psychological and economic consequences for all family members. Many mothers choose to stay at home while their children are young and reenter the workforce sometime after their youngest child enters elementary school. However, for families with children who have illnesses, one parent's decision not to work may be more necessary than a choice. As important as this decision is, its economic aspects have not received enough attention in the academic literature. In the rest of my study, I will examine the economic effects of childhood poor health status on single and married mothers' labor supply.

Literature Review

To better understand this paper's contributions, I discuss the existing literature on the influence of children's health on mothers' labor force participation. Several published research has evaluated the effect of a child's health on maternal labor supply, and I presented a summary of the main findings below.

Multiple studies have documented a negative correlation between poor child health and parental labor supply using various datasets. Kuhlthau, K. A., & Perrin, J. M. (2001) conducted a cross-sectional study using data from the 1994 National Health Interview

Survey to show that having a child with poor health status is associated with reduced employment of mothers and fathers.

Yamauchi, C. (2012) investigated the relationship between children's long-term health problems and parental labor supply using the 2004, 2006, and 2008 Longitudinal Study of Australian Children (LSAC). The results indicate that mothers of children aged 0 years in 2004 reduce their labor supply when their children start to show long-term health problems.

Laffers, L., & Schmidpeter, B. (2020) estimated the impact of early child development on parental labor market outcomes. They combined an instrumental variable approach to account for the endogeneity of the development status with a non-random labor force participation model to identify its impact. Their results revealed that a one-unit increase in their poor child development index reduces mothers' weekly work hours by 9 hours and weekly income by $215. They did not find any responses of fathers to early child development.

Earle, A., & S. J. Heymann (2002) used a sample of former welfare recipients from the National Longitudinal Survey of Youth to investigate the effect of poor child health on parents' job loss. They found that former welfare recipients are 33 percent more likely to experience a job loss if they have a child with an activity or school-related limitation.

Several studies have documented a negative correlation between poor child health and maternal labor supply using various datasets. Breslau, N., Salkever, D., & Staruch, K. S. (1982) studied the impact of child disability on maternal labor force activity. They reported that among two-parent families, child disability interacts with race and family

income. It significantly negatively impacted maternal labor force participation of black and low-income families than white and high-income families. The maternal employment participation of female-headed families did not appear to be significantly affected by child disability.

Norberg, K. (1998) used the 1994 wave of the National Longitudinal Survey of Youth to examine mothers' labor force participation one, two, three, four, and five years after their children's birth. After controlling for observed and unobserved differences between families, she found that mothers were 50% as likely to have been employed in the first five years after the birth of a high-risk infant.

Porterfield, S. L. (2002) examines the impact of having a child with disabilities on mather's labor supply by using a sample of single and married mothers with children under the age of 20 drawn from the 1992 and 1993 panels of the Survey of Income and Program Participation. According to her results, young children, with or without disabilities, have a significant negative influence on single and married mothers' work choices. She also found that having a young disabled child is a strong disincentive to working full-time for married and unmarried mothers. It is also a disincentive to working part-time versus not working among married mothers.

Gould, E. (2004) used data from the Panel Study of Income Dynamics to explore how children's health influences their mother's wages and work hours. After controlling for the illness's financial burden, Gould finds that single mothers work fewer hours after their child has a time-intensive disease and married mothers are less likely to work and work

fewer hours if their child has a severe health condition with an unpredictable time component after controlling for the illness's financial burden.

Noonan, K., Reichman, N. E., & Corman, H. (2005) investigated the impact of poor child health on mothers' labor supply using data from the Fragile Families Study. They found that having a child in poor health reduces the mother's probability of working by eight percentage points and hours of work by three hours per week.

Wehby, G. L., & Ohsfeldt, R. L. (2007) used data from the National Maternal and Infant Health Survey to assess the effect of having a young child with disabilities on maternal labor force participation. Their results indicated significant reductions in the likelihood of labor force participation of black single, white single, and married mothers. The work intensity of employed black single mothers was also decreased considerably by child disability. No consistent effects of child disability were observed for black married mothers.

Nicoletti, C., Salvanes, K. G., & Tominey, E. (2018) estimated the effect of childbirth weight on the mother's working hours two years after birth. They showed that an inverted U-shape relationship exists between maternal labor supply and a child's birth weight. Thus, both low and high child's birth weight is associated with a child's health problems that reduce mothers' labor supply.

Luca, D. L., & Sevak, P. (2018) used a 15-year panel from the Fragile Families Study to examine the prevalence of child disability and its association with a wide range of economic and social outcomes in a dynamic context. They showed that child disability is

associated with reductions in maternal labor supply and increases in benefit receipt from Supplemental Security Income and other public assistance programs.

Several studies have controlled for the endogeneity of child disability by using different econometric methods. Powers, E. T. (2003) examines the relationship between maternal labor supply and having a child with a disability using data from the Survey of Income and Program Participation. She considered the possibility that reported child disability is endogenous. She used an instrumental variable (IV) model. She found that child disability is associated with a lower probability of entering the labor force for female heads but not for married mothers.

Frijters, P., Johnston, D. W., Shah, M., & Shields, M. A. (2008) estimated the causal effect of poor early child development on mothers' labor supply. They control for the potential endogeneity of child development by using an instrumental variables (IV) model. They find that one unit increase in poor child development decreases maternal labor force participation by approximately ten percentage points.

Richard, P., Gaskin, D. J., Alexandre, P. K., Burke, L. S., & Younis, M. (2014) estimate the effects of children's emotional and behavioral problems on their mothers' labor force participation by family structure while accounting for endogeneity in children's health. Findings showed adverse effects of children's emotional and behavioral problems on their married mothers' employment and single mothers' work hours.

I advance the literature on the effects of a child's poor health on the mother's labor supply in several important ways. First, I include detailed information about father characteristics in the mother's labor supply equation even when the parents are not living

together. Second, I consider a range of parental relationships rather than only incorporating marital status. Third, I consider whether the mother has children by someone other than the father and the number of people under 18 years old in the household, which may complicate the allocation of mothers' time and financial resources within families. Forth, I account for the potential endogeneity of child health in my model. Fifth, I use a longitudinal data set so that the temporal ordering of events is explicit on a cohort of all the same age children and starting at birth. Thus, differential timing of births or different ages of children did not complicate the analysis. Sixth, I included the health conditions of mothers and local labor market conditions in the mother's labor supply equations.

Chapter Three: DATA DESCRIPTION

Fragile Families and Child Wellbeing Study

To examine how child disability affects mothers' labor supply, I use data from the Fragile Families and Child Wellbeing Study. This rich and longitudinal data set follows for more than fifteen years a cohort of approximately 4700 births in 75 hospitals in 20 cities across the United States between 1998 and 2000. This survey is designed to represent birth in cities with a population of 200,000. The study's goal was to obtain data to understand how children born into families that are more vulnerable to poverty and breakup fare and how policies and environmental conditions affect these families.[6] With about fifty percent of the births in the sample covered by Medicaid, a large proportion of the sample is poor or near-poor. This fact will provide a unique opportunity to study how a child's disability could affect this especially vulnerable population. The survey currently has six waves of data. The baseline interview ("wave 1") took place in the hospital at the time of the focal child's birth. Follow-up interviews occurred when the focal child was age 1 ("wave 2"), 3 ("wave 3"), five ("wave 4"), 9 ("wave 5"), and 15 ("wave 6").

To understand the potential generalizability of the findings from this study, I briefly describe the survey's sampling scheme. The study used a complex, multi-stage clustered

[6] Reichman, N. E., Teitler, J. O., Garfinkel, I., & McLanahan, S. S. (2001). Fragile families: Sample and design. *Children and Youth Services Review*, *23*(4-5), 303-326.

sampling design, with an oversample of unmarried parents. Thus, although non-marital births accounted for only about one-third of U.S. births when the study began, they make up about three-quarters of the sample. The sampling occurred in three stages: first by cities, then by hospitals within cities, and finally by births within hospitals. In the first stage, all U.S. cities with 200,000 or more people were stratified based on welfare generosity, the strength of the child support system, and the strength of the local labor market. Cities in each stratum were then selected randomly, with each city's selection probability proportional to its population. In the second sampling stage, birthing hospitals were sampled within each city to represent non-marital births in that city. Within each hospital, random samples of births by married and unmarried mothers were drawn until preset quotas (based on the percentage of births among unmarried women in the city) were reached. The study provides national-level and city-level weights. Although there was oversampling of births among unmarried females, the data, when weighted or regression adjusted, represent all hospital births in large cities between 1998 and 2000.[7] I used the national weighting scheme, so my results should provide a nationally representative picture of children from urban households and shed light on how to strengthen public supports for families who have a child with a disability.

The Fragile Families data have several features that make it particularly valuable for analyzing the influence of child disability on mothers' labor force participation. First, the survey asks the mother whether the child has any chronic conditions or disabilities in the

[7] Reichman, N. E., Teitler, J. O., Garfinkel, I., & McLanahan, S. S. (2001). Fragile families: Sample and design. *Children and Youth Services Review*, *23*(4-5), 303-326

follow-up interviews. Second, there is rich information on maternal labor market activity, household income, and poverty. Third, the survey asks mothers to report their labor market status, including whether currently working, hours of work, and earnings at each job. Finally, this dataset has information about the parents' characteristics (human capital), relationship status, living arrangements, and other children that parents have together and with other partners.

Definition of child disability

Given its importance as my primary explanatory variable, I provide additional detail on defining child poor health status in my study.

The Fragile Families Study asks the mother in each wave whether the child has any disabilities. The questions and specific conditions vary somewhat from wave to wave, partly to reflect the children's age. In the second and third waves, when the focal child is approximately 1 and 3, respectively, the mother is asked whether the child has any disabilities. After that binary response, the respondent is further requested to classify the disability type among a given list.[8]

I broadly code my child's health variable as one if at least one of the following criteria is met. First, the child weighed less than 5.5[9] pounds at birth (6.2%). Second, the mother reported in the second and third waves that the child had a disability (2.5%). Third, in the

[8] Refer to https://fragilefamilies.princeton.edu/sites/fragilefamilies/files/year_1_guide.pdf for more information.

[9] Low birth weight (LBW) is defined as a birth weight of less than, as per the World Health Organization (WHO).

second and third waves, the mother said that the child has a poor health condition (2.3%). Overall, 11 percent of the children in this sample meet the criterion for having poor health.

Table 1 shows the prevalence of child's health problems by wave and type. Since the list of medical conditions shifts from wave to wave, it is essential to mention that the table lists only the set of disabilities asked consistently across all waves. Hence, it does not include the complete set of medical conditions that are asked in each wave[10]. In wave 2 (the first follow-up), when the children in the sample are approximately one year of age, roughly 2 percent of children in the sample have self-reported health problems. The proportion grows over time and reaches 3 percent of the sample by wave 3. These increasing rates could be driven by the fact that intellectual or learning disabilities tend to emerge in later childhood. Because the primary caregiver can report more than one type of disability and there are other disabilities that are not listed in the table, the percentages for each condition do not add up to the overall prevalence rate. While the prevalence rates may seem high, they are consistent with published estimates of prevalence among or close to poverty groups (Pulcini et al., 2017). These results highlight the vulnerability of these families to chronic child health problems.

[10] Refer to Carlson, B. L. (2008). Fragile families & child wellbeing study: Methodology for constructing mother, father, and couple weights for core telephone public survey data waves 1–4. *Mathematica Policy Research*. for more information.

Table 1: Prevalence of child disability, by wave and type

Disability type	Wave 2	Wave 3
Blindness	0.0	0.1
Deafness	1.8	0.1
Cerebral palsy	0.0	0.0
Down Syndrome	0.0	0.0
Problem with limbs	1.0	0.9
Heart	0.1	0.2
Speech	NA	0.1
Developmental	0.0	0.5
Other	2.5	2.8
More than one(%)	6.4	7.2
Mean child Age(years)	1.1	2.9
Number of observations	4,345	3,258

Notes: NA= not applicable

Descriptive Analysis

In this section, I describe the measures I use to analyze the effects of poor child health on mothers' labor supply. In Table 2, I present summary statistics and point out many salient characteristics of the sample.

I use mother reports for information about the mother and father reports for information about the father. However, in cases where the father's data are missing, I use mother reports about the father if it is available.

I estimate two labor supply outcomes for the mother. First, whether the mother was employed one week before the second follow-up interview (Wave 3). second, the number of hours she worked the week before her second follow-up interview (Wave 3). Table 2-b shows that about half (56%) of the mothers were employed at that time. The average number of work hours per week for all mothers was 20.39.

Table 2-b also presents the children, mothers, and fathers' characteristics and other measures in my models. I consider several measures of both child quality and quantity. I include the gender of the focal child, whether the mother had any other children with the father, and whether she had at least one child with another father. Approximately two-thirds of the mothers had other children; about twenty percent had at least one child with another partner.

Furthermore, I not only considered whether the father was present in the mother's household to characterize the parents' relationship; but also whether the parents were married, cohabiting, romantically involved or friends, or rarely or never talked. About half of the parents were not married at the third interview; about twenty percent lived together. Besides, I included a variable indicating how long the parents had known each other at the time of the child's birth.

I take advantage of the data's longitudinal nature by estimating models that control the mother's labor supply at baseline. In my model, I included whether the mother had worked two years before the child's birth rather than the mother's employment status at the time of childbirth that might temporarily affect employment. I also include whether the

mother rated her health as excellent (vs. good, fair, or poor) at the third interview to disentangle the effects of the child's health from that of the mother.

I had excellent information about the father even when he was not present in the household. Besides his education and race, I have information on his health status. In the third interview, about ten percent of fathers reported a severe health problem limiting their work.

Although my theoretical model does not consider the impact of social capital in mothers' labor force participation, I include it in my model. Social capital is defined as any feature of a social relationship that yields reproductive benefits. In my study, I account for mothers' friendship network, the presence of the focal child's grandparents in the household, and neighborhood safety. I considered my mothers' friendship network as strong if she has at least one friend she can trust. About fifty percent of mothers have a strong friendship network. Almost thirty percent of the focal child lives with their grandparents, and more than half of the mothers live in a safe neighborhood.

The study also contains detailed information about the receipt of different types of public assistance programs. These programs include Temporary Assistance to Needy Families (TANF), Supplemental Nutrition Assistance Program (SNAP), Supplemental Security Income (SSI), Women, Infants, and Children Program (WIC), and other forms of public assistance programs, such as unemployment insurance or Worker's Compensation.

Mothers were asked at the follow-up interviews whether they had received assistance from TANF, SNAP, WIC in the past 12 months. Almost one-quarter (24%) of mothers

received some cash assistance through TANF. About a fourth of mothers (19%) received SNAP. Over half of the mothers (52%) in the sample participated in the WIC program.

Mothers were also asked to specify what other kinds of local state or federal agencies helped them since the child was born and whether they, a child who lived with them or both they and a child who lived with them had received any cash assistance from SSI in the past 12 months. About a third of mothers (34%) received SSI.

Furthermore, mothers were asked whether the government was currently helping them pay their rent and whether they live in a housing project. Housing was the least commonly relied upon source of assistance in this sample; 20 percent of mothers reported receiving housing assistance or lived in a housing project.

Finally, to characterize local labor markets, I include city unemployment rates. I also considered the mother's state of residence to capture state policies and environments that may affect mothers' labor market participation

Table 2-a: Variables, FF 2000-2015

	Measures
Dependent Variables	
Employment	Coded as 1 if the respondent reported "work for pay last week," 0 otherwise
Log work hours	Log of total weekly work
Independent Variables	
Mother Characteristics	
Age	The mother's age at the birth
Black	Coded as 1 if the mother is black non-Hispanic, 0 otherwise.
Education	Coded as 1 if the mother has a college or university degree.
Immigrant	Coded as 1 if the mother is born in the U.S, 0 otherwise.
Worked within 2 years before the birth	Coded as 1 if the mother worked within 2 years before the birth, 0 otherwise.
Father Characteristics	
Age	The father age at the birth
Black	Coded as 1 if the father is black non-Hispanic, 0 otherwise.
Education	

Immigrant	Coded as 1 if the father has a college or university degree.
Parent Health Status	Coded as 1 if the father is born in the U.S, 0 otherwise.
Excellent Health	
Functional impairment	Equals 1 if the respondent reported that he/she is in excellent health Equals 1 if the respondent reported, “have a serious health problem that limits the work you can do.”
Parents’ relationship at baseline	
Years Mother Knew Father	
Married	Number of years that the mother knew the father of the focal child at the time of the child’s birth.
Cohabiting	Coded as 1 if the mother and the father are married at the third interview, 0 otherwise.
Romantic or Friends	Coded as 1 if the mother and the father live together at the third interview, 0 otherwise.
Rarely/Never Talk	Coded as 1 if the mother and the father have a romantic or friendly relationship with each other at the third interview, 0 otherwise.
Child Characteristics	Coded as 1 if the mother and the father rarely or never talked the third interview, 0 otherwise.
Gender	
Poor Health	

Household Characteristics	Coded as 1 if the focal child is a boy, 0 otherwise.
Parents have other child(ren) together	Coded as 1 if the focal child has poor health, 0 otherwise.
Mother has child(ren) with other father(s)	Coded as 1 if parents have at other children together, 0 otherwise.
Number of children in the household	Coded as 1 if the mother has at least one child with another partner, 0 otherwise.
Total household income divided by the number of people in the household	Number of people under 18 years old in the household
Social Capital	Total family income earned before tax. The total was divided by the number of people in the household
Friendship network	Coded as 1 if the mother reported that she has at one friend that she can trust
Grandparents	Coded as 1 if the focal child grandparents are present in the household
Neighborhood safety	Coded as 1 if the neighborhood is reported as safe
Instruments	
Child was spanked in the last month	Coded as 1 if the mother spanked in the last month before the interview, 0 otherwise.
Religious activities with mother	Coded as 1 if the mother has religious activities with the child, 0 otherwise.
Child has biological siblings but not in the family unit	

During pregnancy, did the mother smoke cigarettes?	Coded as 1 if the focal child has biological siblings but does not live in the household, 0 otherwise. Coded as 1 if the mother smoked cigarettes during the pregnancy, 0 otherwise.
State Characteristics	
Unemployment Rate	The unemployment rate in the city
Public Assistance	Coded as 1 if the mother is receiving public assistance

Table 2-b: Sample Characteristics (Weighted Means)

Dependent Variables	
Employment	0.5689
Log work hours	3.407
Independent Variables	
Mother Characteristics	
Age	30.51
Black	0.2251
Education	0.2067
Immigrant	0.2452
Worked within 2 years before the birth	0.8097
Medicaid	0.4132
Father Characteristics	
Age	33.26
Black	0.2558
Education	0.2258
Immigrant	0.1724
Mothers Health Status	
Excellent Health	0.6873
Functional impairment	0.07
Fathers Health Status	

Functional impairment	0.08
Parent relationship at baseline	
Years mother knew the father	6.55
Cohabiting	0.1980
Romantic or Friend	0.1601
Rarely/Never Talk	0.0398
Child Characteristics	
Gender	0.5527
Poor Health	0.1156
Household Characteristics	
Parents have other child(ren) together	0.6481
Mother has child(ren) with other father(s)	0.1986
Number of children in the household	2.11
Total household income divided by the number of people in the household	15681.33
Social Capital	
Friendship network	0.1545
Grandparents	0.1231
Neighborhood safety	0.5810
Instruments	
Child was spanked in the last month	0.1337
Religious activities with mother	0.4106

Child has biological siblings but not in the family unit	0.0508
During pregnancy, did the mother smoke cigarettes?	0.1423
State Characteristics	
State Unemployment Rate	5.9

Chapter Four: Methodology

An Econometric Model

I consider the following model to estimate the effect of poor child health on a mother's labor supply:

(1) Mother's Labor supply = f (child health, wage, city labor market characteristics, state policy, μ)

A mother's labor supply is a function of her earnings capacity (wage), her child's health, city labor market characteristics, and state policy. The labor supply function may also contain another set of factors, μ, that are unobserved.

To estimate this model, I need suitable measures or proxies for mothers' wages, the quantity and quality of their children, and their local labor market opportunities and policy environments. I use a set of characteristics for wages, including age, race/ethnicity, nativity, education, work history, and health status. I also include measures of the parents' relationship status, which is likely to play a role in the mother's labor market participation decisions. I focus on the labor supply effects of one measure of child quality—child health. Still, I consider the child's gender. For the number of children, I include whether the parents have other children together and whether the mother has other children with other parents. For local labor markets, I included city unemployment rates. Finally, I included state fixed effects to capture public support availability that may vary by state.

Estimation of Equation (1) would be straightforward if the measured child health were truly random (exogenous). In that case, I was able to estimate Equation 1 using a Probit specification when the labor supply variable is dichotomous and when assessing hours of work, I would use Tobit models. However, despite the best efforts at measuring actual health shocks, non-random components of child health may be captured, which is correlated with unobserved determinants of the mother's labor supply (μ). If so, the measure of child health would be endogenous, and its estimated impact on maternal labor supply would be biased. For example, suppose maternal employment negatively affects the child's health because less time the mother is available in the home. In that case, working mothers' children will be less healthy than non-working mothers, creating a downward bias on the estimated impact. Conversely, if maternal employment positively impacts child health because of more significant family income, then the estimated impact would be biased upward.

Since one may not be entirely successful at characterizing poor child health as a random event, I should consider the possibility of endogeneity. Scenarios can be imagined that unobserved determinants of child health and labor supply positively correlate and other scenarios in which the correlation would be negative. For example, a mother with a strong preference for earnings and labor market participation may experience a high level of prenatal stress (which I cannot measure) that may adversely affect her infant's health. Under this scenario, there would be a positive correlation between poor child health and the mother's labor market participation. On the other hand, a mother with a high rate of time preference may be less likely than other mothers to invest in both the unborn child's

health and a career. This will result in a negative correlation between poor child health and labor supply.

Because I cannot be sure that child health is exogenous, I use an econometric model with two equations as follows;

(i) the endogenous explanatory variable is regressed on one or more suitable instrumental variables that are correlated with the endogenous variable (child's health status) and uncorrelated with the error term of Equation 1;

(ii) the fitted values of the endogenous variable from the first estimation are used to estimate the main equation; as explained below:

Original regression ($x_1$endogenous variable and z_1 is an exogenous instrument for it.)

$$y = \beta_0 + \beta_1 x_1 + \ldots.. + \beta_k x_{k-1} + u$$

1. Estimate the first stage regression

$$x_1 = \alpha_0 + \alpha_1 z_1 + \alpha_1 x_2 + \ldots.. + \alpha_k x_{k-1} + v$$

Find the fitted values

$$\widehat{x_1} = \widehat{\alpha_0} + \widehat{\alpha_1} z_1 + \widehat{\alpha_2} x_2 + \ldots.. + \widehat{\alpha_k} x_{k-1}$$

2. Estimate the second stage regression (use $\widehat{x_1}$in place of x_1)

$$y = \beta_0 + \beta_1 \widehat{x_1} + \ldots.. + \beta_k x_{k-1} + u$$

The two-equation system must be identified either by imposing exclusion restrictions or setting restrictions on the two equations' error terms' correlation coefficient (Altonji, Elder, and Taber 2000). I imposed exclusion restrictions, which required finding

theoretically valid identifiers that satisfied two conditions. First, they had to be significant predictors of poor child health (prediction). Second, they had to be uncorrelated with the mother's labor supply after controlling for poor child health and the other covariates (exclusion).

The two conditions mentioned above were satisfied with the following instruments[11]: 1)during pregnancy, how many cigarettes did the mother smoke? 2) the mother's frequency of attending religious activity with the children in the household. 3) whether the focal child has any biological siblings younger than 18 years old who do not live in the same household 4) whether the mother ever spanked the child in the past month.

The mother's smoking cigarette during pregnancy increases the risk of health problems for developing babies, including preterm birth and low birth weight.[12] Although smoking directly affects the child's health, empirical studies have not demonstrated a significant relationship between smoking and mothers' labor force participation. Waldron, I., & Lye, D. (1989) found that:

> "smoking adoption had begun at young ages before most people have adopted adult roles, which suggests that the differences in smoking adoption were not caused by unemployment or occupation. Rather, it appears that certain personal characteristics or early experiences influenced both smoking adoption and adult unemployment or occupation."[13]

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[11] Richard, P., Gaskin, D. J., Alexandre, P. K., Burke, L. S., & Younis, M. (2014). Children's emotional and behavioral problems and their mothers' labor supply. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, *51*, 0046958014557946.

[12] Knopik, V. S., Maccani, M. A., Francazio, S., & McGeary, J. E. (2012). The epigenetics of maternal cigarette smoking during pregnancy and effects on child development. *Development and psychopathology*, *24*(4), 1377.

[13] Waldron, I., & Lye, D. (1989). Employment unemployment, occupation, and smoking. *American journal of preventive medicine*, *5*(3), 142.

Several studies have found that family environments and the quality of relationships among family members have an essential role in shaping children's well-being. The frequency of attending religious activities[14] and the absence of at least one biological sibling younger than 18 years old [15] are crucial dimensions of family environments involving the interaction and quality of relationships among family members. Varon, S. R., & Riley, A. W. (1999) showed that maternal participation in religious services is associated with children's positive social functioning and well-being. Furthermore, the absence of other biological siblings in the same household reflects a lack of cohesion and environmental circumstances in the family that may impact the child's well-being.

Besides, several studies have documented the adverse effects of spanking on children and adolescent's behavioral and cognitive development[16]. According to the previous studies, children whose families use corporal punishment are more likely to develop mental health issues, behavioral problems, and substance use disorders. Although corporal punishment does not impact every child the same way, and children can be resilient if exposed to potential adversities, it is essential to consider that corporal punishment is a risk that can increase potential problems for children's development. Thus, I hypothesized that children's spankings are adversely affected a child's health.

[14] Varon S, Riley A. Relationship between maternal church attendance and adolescent mental health and social functioning.*Psychiatr Serv*. 1999;50:799-805.

[15] Schenck E, Lyman R, Bodin S. Ethical beliefs, attitudes, and professional practices of psychologists regarding parental use of corporal punishment: a survey. Child Serv Soc Policy Res Pract. 2000 3:23–38.

[16] MacKenzie, M. J., Nicklas, E., Waldfogel, J., & Brooks-Gunn, J. (2013). Spanking and child development across the first decade of life. *Pediatrics*, *132*(5), e1118-e1125.

In sum, all four instruments strongly influence children's health status but are not significantly correlated to mothers' labor supply.

To check for the possibility that the child's health variable is endogenous, I regressed both Equation 1and the second equation that used instrumental variables to estimate poor child health's effect on maternal labor supply. I assume that the error terms in both equations were normally distributed and allowed for the possibility that they were correlated. These estimations allowed me to test child health is endogenous. Child health is endogenous if the correlation between the error terms is significant, and child health is exogenous if the error terms are uncorrelated.

As reported in Table 3, ρ, the coefficient of correlation that measures exogeneity between children's health and mothers' employment status in the IV bivariate probit model, is positive and significantly different from zero ($\rho = .549$). Therefore, the null hypothesis can be rejected that children's health is exogenous in the mothers' labor supply equation. As a result, the bivariate probit model with IV is preferred to the univariate probit model. Thus, I decided to assess the instruments' strength and validity in the bivariate probit model with IV for mothers because weak instruments yield inconsistent estimates.

Table 3 summarizes the results from the joint significance test and shows that the set of instruments perform well using the Staiger and Stock rule of thumb of an F statistic of ten or more ($F = 104.06$). Therefore, I concluded that the instruments did not correlate with mothers' labor supply in the bivariate probit model with IV.

As indicated in Table 4, the correlation coefficient that measures exogeneity between children's health and mothers' employment in the IV Tobit model is positive and

significantly different from zero ($\rho = .487$). Therefore, the null hypothesis can be rejected that children's health is exogenous in the mothers' labor supply equation. The results from the joint significance test show that the set of instruments perform well using the Staiger and Stock rule of thumb of an F statistic of ten or more ($F = 107.09$). Therefore, I concluded that the instruments did not correlate with mothers' labor supply in the Tobit model with I

Chapter Five: Results

This section presented the multivariate estimates of the mothers' employment status and work hours' equations. For a more straightforward interpretation, the estimates from the models were converted to marginal effects. For binary independent variables, marginal effects represent the estimated effect of a change in the value of an indicator from zero to one on the percentage of mothers. The marginal effects of continuous independent variables such as age represent the estimated effects of a one-unit increase in mothers' expected percentage value. In the logarithm work hours regression models, the marginal effects on a continuous variable such as income represent the proportional change in work hours of employed mothers. I estimated Variances using complex sampling design commands as available in STATA16 to account for heteroskedasticity. As suggested by the Fragile Families and Child Wellbeing Study (FF), I used the mother weights provided by the FF because mothers are the unit of analysis in this study.

Tables 3 and 4 present multivariate results for mothers for our two outcomes; labor force participation and work hours.

I begin by predicting the conditional likelihood that mothers are employed. Table 3 shows Probit estimation results with conditioning variables partitioned into four categories: mother's characteristics, regional variables, family variables, and child health measures.

According to the previous section, I estimated this model using a bivariate probit specification to test for child health's endogeneity. The results I presented in Table 3 indicate child health is endogenous in the mother's labor force participation equation, as shown by the significance of ρ.

I found that having a child in poor health decreases the likelihood that a mother will work by thirteen percentage points. This estimate is in the range of that found by other researchers (Powers, E. T. (2003); Noonan, K., Reichman, N. E., & Corman, H. (2005)).

The coefficient estimates for mother's characteristics are generally significant and consistent with the literature. For example, mothers who have graduate degrees were more likely to work, increasing the likelihood by twenty percentage points. Also, mothers who worked in the two years before the child's birth were more likely to work; it increases the likelihood by forthy percentage points.

I included father characteristics even when the mother was neither married nor cohabiting with the father for several reasons. First, eighty percent of the parents in the sample were in some type of relationship with one another. Second, more than half of unmarried mothers receive financial support from the father a year before the interview. Third, relationships among unmarried parents tend to be quite fluid. Some new parents start to live together or form more serious relationships after the child's birth.

I find that father's education has a more significant impact on the mother's labor force participation among the father's demographic characteristics, decreasing the likelihood by twenty percentage points.

The parents' relationship status is significantly associated with the mother's labor force participation. Married and co-residence mothers, respectively, are about six and three percentage points less likely to work than the other relationship status categories.

The estimates on the family variables follow the literature with negative coefficients and thus lower the estimated probability of working for the number of children and presence of other children. Suppose the mother and father have other children together. In that case, the likelihood that the mother works is decreased by twenty-five percentage points. If she has at least one child with another partner, the probability is reduced by eight percentage points.

States characteristics variables control for location-specific labor market conditions. Mother's labor force participation and the state's unemployment rate are positively related. This positive association may reflect an added worker effect, which means that mothers may be working to compensate for the earnings of unemployed family members. According to the results, the state assistance program does not significantly affect a mother's decision to work. Additionally, public assistance program has a statistically significant effect on a mother's decision to work, decreasing the likelihood by three percentage points.

I also controlled for the child's characteristics. I found that the gender of the child was not a significant predictor of the mother's labor force participation.

Finally, social capital is significantly associated with the mother's labor force participation. Mothers who have a strong friendship are about ten percentage points more

likely to work. The presence of grandparents in the household and living in a safe neighborhood increase the likelihood by two and five percentage points.

The second column of Table 4 presents Tobit model parameter estimates. The dependent variable is the logarithm of the number of hours the mother works per week for the fifty-seven percent of working mothers. Marginal effects indicate that children's health significantly reduces the work hours of employed mothers by approximately nine percent; this result is consistent with that found by Bednarek & Hudson (2003).

As in the earlier probit specification, the estimated coefficients on the mother's characteristics and family variables have the expected signs. For example, a college degree increases the work hours of employed mothers by fifteen percent. Having a job two years before the focal child's birth increases employed mothers' work hours by almost ten percent compared to those who had not worked. The fact that the signs were unchanged supports one of the assumptions of the basic Tobit model; factors that influence whether or not the mother works also influence her decision about work hours in the same manner.

The parents' relationship status significantly affects the mother's work hours. Married mothers are predicted to worked five percent less than single mothers, holding all else constant.

Similar to the Probit model, the estimated effect of the number of children and the presence of young children on mothers' work hours is negative and significant. Having other children with the same father reduces the mother's weekly work hours by eight percent. Having at least one child with another partner reduces her work hours by four percent.

Unsurprisingly, several father's characteristics have a significant effect on the mother's work hours: father's race, his education, and if he is limited by health. If the father has a college degree, the mother is predicted to work fifteen percent less.

The results from both the Probit and Tobit specifications suggest that mothers have a lower probability of working, and if the mother decides to work, she will work fewer hours if their child has an illness. These results are consistent with the theory put forth in this paper and highlight the need to decompose the effect of child health on the mother's employment.

Finally, I examined whether the effects of having a child with poor health status on the mother's labor force participation interacts with some of the other covariates. I estimated the probit model for several subgroups according to marital status, age, and education. The results are presented in Table 5. According to the results, poor child health decreases the likelihood of employment by over eight percent among unmarried mothers but has a minimal effect on employment among married mothers. Similarly, poor child health reduces the likelihood of employment by over fourteen percentage points among mothers age 21 or older but has no considerable effect among younger mothers. Finally, poor child health has a more significant impact on employment among mothers with high school education but does not significantly affect mothers who have attended at least some college. These results show that the effect of poor child health is more significant among older mothers with adequate job skills, and the effect is relatively modest among college-educated mothers.

The empirical results presented above provide consistent evidence that children's chronic health problems negatively affect mothers' labor force participation. A possible explanation for this finding was suggested by our simple theoretical model earlier. This finding, which is consistent with the previous studies, indicates that children's chronic health problems have substantial economic impacts, particularly in reducing maternal labor supply.

Sensitivity Analyses

I perform sensitivity analyses to ensure the robustness of my results. In the sensitivity analyses, I experiment with alternate definitions of disability. I re-estimate the model when only including families with children with a disability that is likely to be permanent. I define this variable as disability types consistently reported in subsequent waves after the wave of onset, including blindness, deafness, cerebral palsy, Down Syndrome, heart diseases, and developmental disorder. These exercise results are similar to the main results, except household income decreases, suggesting that persistent disabilities are associated with more significant changes among the household (Table 6).

Table 3: Marginal Effects of Independent Variables on Mothers' Employment.

	IV-probit
	Marginal Effect
Mother Characteristics	
Age	-0.0648* (0.0349)
Age squared	-0.000885*** (0.000559)
Black	-0.256** (0.0825)
Education	0.208*** (0.0597)
Immigrant	-0.0714 (0.0870)
Worked within 2 years before the birth	0.385*** (0.0729)
Father Characteristics	
Age	0.00669** (0.00310)
Age squared	-0.000209** (9.89e-05)
Black	0.212** (0.0825)
Education	-0.227** (0.0921)
Immigrant	0.00825 (0.00661)
Mothers Health Status	
Mother has excellent health	0.528*** (0.0655)
Functional impairment	-0.539*** (0.0854)
Fathers Health Status	
Functional impairment	0.127* (0.0751)
Parent relationship at baseline	
Married	0.0571** (0.131)
Cohabiting	0.0371*** (0.130)
Friend	-0.0262

	(0.133)
Rarely/Never Talk	-0.166*** (0.135)
Child Characteristics	
Gender	0.0317 (0.0443)
Poor health	-0.137** (0.101)
Parents Have Other Child(ren) Together	-0.247*** (0.0518)
Mother Has Child(ren) With Other Father(s)	-0.0742*** (0.0560)
Number of children in the household	-0.0426** (0.0176)
Total household income divided by household size	0.0109*** (0.00204)
Public Assistance	-0.038*** (0.0738)
Social Capital	
Friendship network	0.107*** (0.0285)
Grandparents	0.0143** (0.134)
Neighborhood safety	0.0514* (0.0733)
State Characteristics	
State Unemployment Rate	0.0517** (0.0634)
Strength and validity of instruments	
F	104.06**
Blundell and Smith test of exogeneity (p-value)	0.549***
n	3,747

* Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level
Notes: All models include state fixed effects (results not presented).

Table 4:Marginal Effects of Independent Variables on Mothers' Log Work Hours.

	IV-Tobit
	Marginal Effect
Mother Characteristics	
Age	-0.00916* (0.0144)
Age squared	-0.000124 (0.000230)
Black	-0.0630** (0.0318)
Education	0.1407** (0.0287)
Immigrant	-0.0312 (0.209)
Worked within 2 years before the birth	0.0763** (0.0384)
Father Characteristics	
Age	0.00368* (0.00126)
Age squared	0.000482 (0.00184)
Black	0.0477** (0.0320)
Education	-0.151*** (0.0343)
Immigrant	0.0211 (0.00264)
Mothers Health Status	
Mother has excellent health	0.310* (0.0192)
Functional impairment	-0.5966** (0.0423)
Fathers Health Status	
Functional impairment	0.0172* (0.0321)
Parent relationship at baseline	
Married	0.0531* (0.0573)
Cohabiting	0.0289*

	(0.0511)
Friend	-0.0453 (0.0516)
Rarely/Never Talk	-0.0673** (0.0522)
Child Characteristics	
Gender	0.0289 (0.0511)
Poor health	-0.0937*** (0.0444)
Parents Have Other Child(ren) Together	-0.0840* (0.0208)
Mother Has Child(ren) With Other Father(s)	-0.0360** (0.0229)
Number of children in the household	-0.0150* (0.00846)
Total household income divided by household size	0.0312*** (0.000766)
Public Assistance	-0.0166*** (0.0405)
Social Capital	
Friendship network	0.107*** (0.0285)
Grandparents	0.02998* (0.0259)
Neighborhood safety	0.0541*** (0.0205)
State Characteristics	
State Unemployment Rate	0.0298* (0.0178)
Strength and validity of instruments	
F	107.09**
Blundell and Smith test of exogeneity (p-value)	0.487**
n	2,160

* Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level
Notes: All models include state fixed effects (results not presented).

Table 5: Marginal Effects of Poor Child Health on Mothers' employment status

	Child in Poor Health
Married	0.012** (0.103)
Not Married	-0.0746** (0.118)
Less than High School Education	0.0154* (0.120)
High School Education	-0.151*** (0.181)
More than High School Education	-0.0549** (0.120)
Younger than 21	-0.0250* (0.0887)
21 and older	-0.134** (0.0511)

* Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level
Notes: All models include state fixed effects (results not presented).

Table 6: Sensitivity analyses: using different definitions of child disability

	IV-Probit
	Marginal Effect
Mother Characteristics	
Age	-0.0413*** (0.0801)
Age squared	-0.000373*** (0.00124)
Black	-0.436* (0.175)
Education	-0.0602** (0.180)
Immigrant	0.0860 (0.182)
Worked within 2 years before the birth	0.333*** (0.161)
Father Characteristics	
Age	-0.0285 (0.0628)
Age squared	0.000475 (0.000851)
Black	0.0535*** (0.200)
Education	-0.1340* (0.154)
Immigrant	0.00477 (0.156)
Mothers Health Status	
Functional impairment	-0.940*** (0.243)
Fathers Health Status	
Functional impairment	0.1209* (0.222)
Parent relationship at baseline	

Married	0.0599* (0.241)
Cohabiting	0.0708** (0.213)
Friend	0.0644 (0.271)
Rarely/Never Talk	0.0379*** (0.210)
Child Characteristics	
Gender	0.0254 (0.0958)
Poor Health	-0.1301** (0.168)
Parents Have Other Child(ren) Together	-0.239* (0.0662)
Mother Has Child(ren) With Other Father(s)	-0.074** (0.133)
Number of children in the household	0.0429*** (0.113)
Total household income divided by household size	-0.0231* (0.00118)
Public Assistance	-0.268** (0.204)
State Unemployment Rate	0.048** (0.05)

* Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level
Notes: All models include state fixed effects (results not presented).

Chapter Six: Conclusion

It has been documented that the proportion of children who have health problems has increased considerably in the United States in recent decades. Childhood illness often requires family adjustments in terms of both time and money that may have lasting psychological and economic consequences for all family members. A child's health is an important obstacle to employment participation and the work intensity of mothers since children with significant disabilities often require extensive health care and rehabilitation services.

In this paper, I contribute to the general literature on child development by estimating the effect of having a child with poor health status on the mother labor force participation. To address this question, I have analyzed data from a 15-year panel from the Fragile Families Study. This study offered a unique examination of a child's poor health effects on the mother's work activities. I show that having a child in poor health decreases the mother's labor force participation.

I also showed the adverse effects of poor child health on maternal labor supply are most substantial for unmarried, over age 21, and high school graduates mothers, a profile of many mothers who face increasing pressure to rely on earnings from work. Consequently, these results suggest that families' ability to reallocate time in response to their child's poor health is a luxury that not all families can access.

These results show that the child's disability has an adverse impact on their mother's ability to invest financially in their health. This can place these children at increased risk for adverse health and economic outcomes in the future, which highlights the complexities underlying the financial and health trajectories of children in fragile families.

These findings have important policy implications; the states must shape support for families with disabled children through transfers to families with children and work-family policies meant to bolster mothers' employment.

The employment challenge is especially difficult for mothers of disabled children with high financial and time burdens. Current workforce policies to support families, such as employer-provided paid sick days, federal Family and Medical Leave Act (FMLA), and flexible work schedules, do not provide adequate support for working mothers (Benson and Mokhtari 2011; Gault et al. 2014). Efforts are required to improve programs designed to help mothers have the freedom to make labor market choices in their children's best interest.

Developing an effective strategy to help mothers and their families requires a comprehensive approach through the right mix of social policies, including transfers, parental leave, childcare, education, and labor market policies that help to engage mothers in well-paying jobs.

In April 2021, President Biden announced the American Families Plan, a once-in-a-generation investment in America. American Families Plan consists of three main parts. First, providing direct support to children and low- and middle-income families by creating a paid family and medical leave program, increasing access to child care, and providing

nutritional assistance and health programs to reduce childhood hunger. Second, adding at least four years of free public education through quality universal prekindergarten and free community college. Third, extending tax cuts for low- and middle-income families with children and American workers.

All three aspects of the American Families Plan will increase mothers' ability to balance employment and child care. Paid leave enables mothers to take the time they need, so they do not have to choose between their job and taking care of their disabled children. Additionally, more access to child care, affordable health care, and more generous public benefits programs will ensure mothers with disabled children have access to any needed long-term services and supports

All children bring both joy and expense to their parents. However, the monetary costs associated with raising disabled children are significantly higher than those associated with raising nondisabled children. One measure of social development is how we choose to support and enhance opportunities for all society members, not just for those considered able persons. As the incidence of children with disabilities increases, decisions must be made by both families and society as a whole concerning disability-related policies and services. A better understanding of the influence of family structure, income, the severity of child disability, and the availability of support services on the work decisions of parents with disabled children will enable policymakers to tailor services more effectively to families struggling to make the right decisions for all their children.

The provision of moderate family allowances, parental leaves, and extensive childcare provisioning for families can help mothers balance daily activities such as

employment, child care, and parent-child relationships. The American Family Plan strategy of comprehensive childcare and well-paid leaves help promote mothers' employment while also limiting the risk of financial problems for most families.

The current analysis can be expanded and improved in two aspects: empirically and theoretically. I plan to capitalize on the longitudinal nature of the disability to estimate the effect of child's disability on mother's future wages. It would be useful to study how child disability affects mothers' work as their children age to identify possible gaps in public services for disabled children. Second, it can be argued that the mother's income affects her ability to substitute for financial resources. In the empirical model, an interaction term between income and measures of child health could represent the varying substitution rates, or the sample could be split into income categories and re-estimated. Third, employing a larger panel data set with higher prevalence rates of child disability would be better to examine the impact of child's disability.

In the theoretical model, the time and financial requirements for the child's illness could be a function of the family's income. Second, the human-capital theory falls short of providing a comprehensive framework to study the effects of social capital in my models. To consider the impact of social capital, I plan to include a more comprehensive list of variables to present the features of social organization in my models.

Last, I wish to examine family composition more closely. I can improve the model by jointly modeling the father's and mother's work decisions. It is also possible that marital status is endogenous to the child's illness. Single mothers are not only those who were never married but also those who are divorced. Evidence suggests that child illness could

increase the probability of divorce.[17] These may be steps to understanding the significant differences in results between married and single women.

[17] Reichman, N. E., Corman, H., & Noonan, K. (2004). Effects of child health on parents' relationship status. *Demography*, *41*(3), 569-584.

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