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The impact of mothers' earnings on health inputs and infant health☆

Naci Mocan [a,*], Christian Raschke [b], Bulent Unel [c]

[a] Louisiana State University, NBER and IZA, United States
[b] Sam Houston State University and IZA, United States
[c] Louisiana State University, United States

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ABSTRACT

This paper investigates the impact of mothers' earnings on birth weight and gestational age of infants in the U.S. It also analyzes the impact of earnings on mothers' consumption of prenatal medical care, and their propensity to smoke and drink during pregnancy. The paper uses census division-year-specific skill-biased technology shocks as an instrument for mothers' earnings and employs a two-sample instrumental variables strategy. About 14 million records of births between 1989 and 2004 are used from the Natality Detail files along with the CPS Annual Demographic Files from the same period. The results reveal that an increase in weekly earnings prompts an increase in prenatal care of low-skill mothers (those who have at most a high school degree) who are not likely to be on Medicaid, and that earnings have a small positive impact on birth weight and gestational age of the newborns of these mothers. Specifically, if a mother's earnings double, this produces a weight gain of the newborn by about 100 g and an increase in gestational age by 0.7 weeks. An increase in earnings does not influence the health of newborns of high-skill mothers (those with at least some college education). Variations in earnings have no impact on birth weight for mothers who are likely to be on Medicaid.

1. Introduction

Child health is an important ingredient in human capital formation, and poor health at birth impacts adult outcomes. For example, low birth weight reduces educational attainment (Case et al., 2005; Currie and Hyson, 1999). Low birth weight also has a negative impact on labor market outcomes (Black et al., 2007; Currie and Hyson, 1999) and on health in adulthood (Behrman and Rosenzweig, 2004).

The seminal work of Grossman (1972) provides the theoretical framework of a human capital model through which the production of health can be analyzed. In this model individuals' health capital depreciates over time and gross investment in health can be produced by a household production function that uses the person's own time, and health inputs such as medical care and healthy diet. Health inputs may include those with negative marginal products such as cigarette and alcohol consumption.[1] The initial health endowment is an important determinant of the future stock of health. This endowment is not only determined by genetics, but it can be impacted by in utero exposure to disease, and detrimental environmental factors such as air pollution (Almond, 2006; Currie and Walker, 2011).

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* Corresponding author.
E-mail addresses: mocan@lsu.edu (N. Mocan), Raschke@shsu.edu (C. Raschke), bunel@lsu.edu (B. Unel).

[1] As described in Almond and Currie (2011), different approaches to health production exist; e.g. Heckman (2007).

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In this context it is important to investigate, both from a scientific and public policy perspective, the extent to which an increase in maternal income during pregnancy impacts infant health. The issue, however, is complicated because of the endogeneity of income. For example, in the analysis of the impact of mothers' income on birth outcomes, it is difficult to find exogenous variations in income that could help identify the causal impact of income on birth weight. Consequently, one line of research has focused on aggregate units such as the rate of low birth weight infants at the state level, and analyzed how this aggregate is impacted by state unemployment rates. For example, Dehejia and Lleras-Muney (2004) found that higher unemployment rates were associated with *improved* health outcomes of infants as measured by the rate of low birth weight. This result is consistent with the findings of Ruhm (2000), who reported that health behaviors improved during bad economic times, leading to better health outcomes.[2]

Birth weight is a key birth outcome, and there are two channels through which pregnant women's earnings may affect birth weight of their newborn. First, if child health is a normal good, then an increase in income increases the derived demand for health inputs. For example, pregnant women may increase the consumption of prenatal care, and they may initiate prenatal medical care earlier during the pregnancy. In this case, increases in prenatal care consumption will lead to increases in birth weight. On the other hand, prenatal care is a time intensive activity and an increase in the opportunity cost of time may result in mothers seeking less prenatal care. Dehejia and Lleras-Muney (2004) show that the average number of prenatal care visits by pregnant women *increases* during times of *high* unemployment and they argue that the decline in the opportunity cost of time during recessions (when incomes go down) is the underlying reason for this decline. They report that a one percentage point *increase* in the unemployment rate results in a 0.26–0.5% *reduction* in the low birth weight rate, and they attribute the improvement of birth outcomes to the implied increase of prenatal care consumption during recessions. However, as pointed out by Lindo (2011), Dehejia and Lleras-Muney (2004) are not able to isolate the impact of income on infant health from the impact of other factors that are associated with periods of high unemployment.

Almond et al., 2011 explained the county-level average birth weight as a function of the introduction of the Food Stamp Program (FSP) in the 1960s. Exploiting the fact that the FSP became operational in different counties in different time periods, they find that FSP had a positive impact on birth weight, with larger impacts among African American mothers. Although food stamps can be used only to purchase certain food items, Hoynes and Schanzenbach (2009) report that the food stamp recipients behave as if the benefits were paid in cash, suggesting that the receipt of food stamps is equivalent to an income transfer. On the other hand, Hoynes and Schanzenbach (2012) find that the food stamp program leads to reductions in employment and hours worked, especially among families headed by single women. They show that the impact on the treated is 500–600 fewer hours of work per year. This suggests that the increase in disposable income due to the food stamp receipt is counterbalanced to some extent by a decline in labor supply triggered by the food stamp program, and therefore the net effect on household income may not be substantial.

Hoynes et al., 2015 use changes in the Earned Income Tax Credit (EITC) policy to identify exogenous changes in income. They use birth certificate data collapsed into cells defined by state, month, parity of birth, education, marital status, race, and age of the mother to identify the amount of EITC for which the family is eligible. Using a difference in difference specification to capture the effect of an expansion of the EITC in 1993, the authors conclude that increases in EITC income resulted in a lower incidence of low birth weight as well as an increase in mean birth weight.

An alternative strategy is to investigate the impact of income on infant health using micro data, and to find arguably exogenous variations in income. One such example is Lindo (2011), who used the job loss of a husband in the past as an exogenous shock to household income. Using data from the Panel Study of Income Dynamics and controlling for individual fixed effects, the paper found that a husband's job loss in the past has a strong negative effect on infant health, reducing birth weight by about 4.5%. Although this is an interesting result, the magnitude of the decline in income due to job loss is unknown, so is the extent to which job loss is correlated with stress in the household, which can also have a detrimental effect on birth outcomes. Along the same lines, Chung et al. (2015) used payouts of dividends from the Alaska Permanent Fund during the 1980s as a source of exogenous variation in family income and found a very small positive effect of family income on birth weight. The magnitude of the estimated effect was only about 18 g of additional birth weight per $2331 additional income in 2011 dollars.

In summary, to get around endogeneity of income, most studies analyzed aggregate indicators of infant health (e.g. county-level low birth weight rates) and tied them to proxies of aggregate income (such as unemployment rates or expansions of the EITC program). There are only a handful of micro-level studies that aim to analyze the impact of personal income on birth weight. This is because of two reasons. First, birth certificates do not contain information on income. Second, data sets that have information on both birth weight and family or personal income are limited in sample size, and more importantly, it is difficult to find exogenous variation in personal income that is not related to birth weight.

In this paper we employ data from the United States Detail Natality files for the period of 1989–2004 and use information on about 14 million births to unmarried mothers to estimate the causal impact of mothers' earnings at the time of conception on the birth weight of the newborns using an instrumental-variables strategy.[3] We focus on unmarried mothers because, as explained below, our instrument is conceptually less relevant for married women.

[2] Although Ruhm (2015) points out the sensitivity of the findings regarding countercyclicality of good health outcomes.

[3] We use birth certificates for births that occurred between 1989 and 2004. Depending on the birth month, this means that conception will have occurred between 1988 and 2004. See Section 3 for details.