



The causal effect of family income on child health in the UK[☆]



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ABSTRACT

Recent studies examining the effect of family income on child health have been unable to account for the endogeneity of income. Using data from a British cohort study, we address this gap by exploiting exogenous variation in local labour market characteristics to instrument for family income. We estimate the causal effect of family income on different measures of child health and explore the role of potential transmission mechanisms. We find that income has a very small but significant causal effect on subjective child health and no significant effect on chronic health conditions, apart from respiratory illnesses. Using the panel structure, we show that the timing of income does not matter for young children. Moreover, our results provide further evidence that parental health does not drive a spurious relationship between family income and child health. Our study implies that financial transfers are unlikely to deliver substantial improvements in child health.

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1. Introduction

The literature on the relationship between family income and child health, the so-called ‘income gradient’, has grown substantially in the last 10 years. Following the seminal contribution by Case et al. (2002), a number of studies have examined the relationship between family income and child health for different countries. These studies universally find a positive association between parent-reported child health and family income in the US, the UK, Canada, Australia, and Germany (Currie and Stabile, 2003; Currie et al., 2007; Propper et al., 2007; Khanam et al., 2009; Reinhold and Jürges, 2012; Kruk, 2012; Apouey and Geoffard, 2013).

Examining the income gradient is important for a number of reasons. Several studies show that poor health in childhood correlates

significantly with lower educational attainment, worse health, and lower earnings in adulthood (see, for an overview, Currie, 2009). The strong correlation between child health and adult outcomes is consistent with the theoretical framework on skill development by Cunha and Heckman (2007). The model implies that health capital affects the production of other forms of human capital, such as education or health itself, through self-productivity (e.g., health generated at time t improves health at time $t+1$) and dynamic complementarity (e.g., health produced at time t fosters the production of other skills at $t+1$). Therefore, public policy may improve the educational, health, and labour market trajectories of children with poor health through early intervention policies that reduce inequalities in child health. Furthermore, policies that reduce the socio-economic gradient in child health may ultimately help mitigate the intergenerational transmission of poverty.

Despite the recent contributions to the literature, it remains unclear whether policies that change family income are a cost-effective means of improving child health. So far the literature has been unable to establish whether income has a causal effect on child health, or whether the observed relationship between family income and child health is spuriously driven by unobserved factors. The recent literature for the UK is ambiguous and reaches different conclusions as Propper et al. (2007) find that the relationship between family income and child health becomes insignificant once the authors control for maternal health, whereas Kruk (2012)

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and Apouey and Geoffard (2013) find that income remains significant when controlling for parental health. However, the findings by Propper et al. (2007) suggest that public policy should address maternal health rather than family income to improve child health provided that maternal health does not pick up unobserved maternal preferences that correlate with income.

The purpose of this paper is to address this gap by examining the causal effect of family income on different measures of child health in the UK. The study contributes to the literature in several ways. First and most importantly, given the lack of a natural experiment, we explicitly address the endogeneity of income with an instrumental variables (IV) approach. Income endogeneity is a large concern that could arise for three main reasons: as a result of unobserved heterogeneity, measurement error, or reverse causality. Most studies try to overcome the endogeneity problem by controlling for as many variables as possible to ‘mop-up’ any observed heterogeneity (Gregg et al., 2005). However, this approach does not address unobserved heterogeneity and ignores both reverse causality and measurement error. In a novel contribution to this literature, we exploit exogenous variation in local labour market characteristics to deal with the endogeneity of income.

Second, Currie (2009) points out the need for a closer examination of the transmission mechanisms that translate income into better health. Although it is unlikely that family income has a direct effect on child health, higher incomes may improve child health by relaxing families’ budget constraint on goods and services that enter a child’s production function, such as medical care, nutrition, and housing conditions. As income may systematically correlate with these (and other) unobserved factors that also determine children health, we exploit the rich data and contribute to the literature with a more detailed analysis of potential transmission mechanisms, e.g., nutrition, housing, medication.

Third, the availability of panel data allows us to investigate more carefully the timing of family income. We are able to separate out the effect of current versus permanent income and are the first study to examine the effect once we instrument for income. Furthermore, we examine the effect of lagged income on current child health by instrumenting for these lagged variables.

Our results show that income has a statistically significant but small causal effect on child health in the UK. A doubling of income reduces the probability of poor or fair child health by about 6 percentage points. We show that models that do not account for the endogeneity of income underestimate the size of the effect. Furthermore, we find small and mostly insignificant effects of family income on indicators of specific chronic health conditions, apart from respiratory illnesses. Using the panel structure, we show that the timing of income does not matter for young children. Our analysis provides additional evidence that parental health does not drive a spurious relationship between child health and family income. We conclude that income is not a major causal determinant of child health in the UK. All results pass a wide range of robustness checks.

The paper is organised as follows. In Section 2 we briefly review the relevant literature. Section 3 presents the conceptual framework for the production of child health and discusses the empirical identification strategy. In Section 4 we describe the data and variables used in the analysis. Section 5 presents and discusses the main results. We present a variety of sensitivity tests validating the robustness of our results in Section 6. We conclude and discuss the paper’s policy and general implications in Section 7.

2. Previous literature

The majority of the economics literature on the income gradient examines the relationship between household income and

parent-reported child health. Typically, subjective child health is measured on an ordinal scale (where 1 = excellent, 5 = poor) and an ordered probit model is used to estimate the relationship with the explanatory variables. In their seminal study, Case et al. (2002) examine the relationship between household income and subjective child health using a variety of US datasets for children aged 0–17. The study finds a significant positive association between household income and child health that is robust to different measures of child health and income. The results also reveal an increase in the gradient with the age of the child, implying that the effects of income are larger for older children.

The methodology of Case et al. (2002) was subsequently replicated and slightly modified by other studies for the US (Currie and Stabile, 2003; Chen et al., 2006; Condliffe and Link, 2008; Murasko, 2008), England (Currie et al., 2007; Propper et al., 2007; Kruk, 2012; Apouey and Geoffard, 2013), Australia (Khanam et al., 2009), and Germany (Reinhold and Jürges, 2012). These studies generally confirm the positive relationship between household income and subjective child health, controlling for a similar, or the same, set of explanatory variables.¹ In particular, Currie and Stabile (2003) find a similarly sized income coefficient for Canada and thus provide evidence for a steepening income/health gradient in a country with universal health insurance. This suggests that universal access to health insurance does not reduce the income gradient or prevent the steepening of the gradient. In another US study, Chen et al. (2006) examine the association between income and various measures for child health, and explore whether the relationship changes with the age of the child. Although the authors use the same data as Case et al. (2002), the study finds no increase in the income/health gradient using subjective health. However, Case et al. (2007) show that differences in the selection of the estimation sample can largely explain the differences between the two studies.

For the UK, Currie et al. (2007) use English data for children aged 2–15 and confirm the existence of an income gradient in England, although the size of the income coefficient is considerably smaller than in the US. The study finds no association between income and objective measures of health, such as professional examinations or blood test results. Furthermore, the authors show that nutritional intake and parental physical activity are influential transmission mechanisms in determining child health. The study does not find, however, that the gradient increases with the age of the child. In response, Case et al. (2008) use the same data and exploit three additional years of data to show that the income gradient increases with age in the UK as well, although the income gradient remains smaller than in the US. In another study, Propper et al. (2007) use UK data for children aged 0–7 and find that although an income gradient exists, it does not increase with the age of the child and actually disappears when the authors control for the mother’s self-rated health. The study also explores whether maternal behaviours, e.g., nutrition, time spent with child, or smoking, involved in the production of child health correlate with income, but finds that these factors are largely insignificant. Khanam et al. (2009) use Australian data for children aged 0–7 and also find that the relationship disappears once they control for subjective maternal health. In contrast, the studies by Kruk (2012) and Apouey and Geoffard (2013) both use UK data and show that the correlation between family income and child health does not disappear when including controls for parental health. More specifically, Kruk (2012) focuses on the relationship between income and the prevalence, severity, and

¹ These include controls for parental education, age of the child, child cohort, family size, child’s sex, child’s ethnicity, presence of mother and father in the household, father’s employment status.

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