



Short communication

What money can buy: Family income and childhood obesity



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ABSTRACT

This paper investigates the relationship between family income and childhood obesity. Using the Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), I report three new findings. First, family income and childhood obesity are generally negatively correlated, but for children in very low-income families, they are positively correlated. Second, the negative association between family income and Body Mass Index (BMI) is especially strong and significant among high-BMI children. Third, the difference in obesity rates between children from low- and high-income families increases as children age. This study further investigates potential factors that might contribute to a rapid increase in the obesity rate among low-income children. I find that their faster weight gain, rather than slower height growth, is a greater contributor to the rapid increase in their BMI over time. On the other hand, I also find that the faster weight gain by low-income children cannot be attributed to any single factor, such as participation in school meal programs, parental characteristics, or individual characteristics. These findings add to the current obesity debate by demonstrating that the key to curbing childhood obesity may lie in factors generating different obesity rates across income levels.

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1. Introduction

This paper investigates the relationship between family income and childhood obesity. The obesity rate in the United States has tripled over the past three decades: Currently, about one third of adults and one fifth of adolescents are obese. A closer look reveals a disproportionately high obesity rate among racial minorities and low-income individuals.¹ Accordingly, public efforts to curb the rising obesity rate are often targeted at low-income families. For instance, an initiative by the U.S.

Department of Agriculture, called “Loving Your Family Feeding Their Future,” aims to help low-income women and their children gain greater access to healthy food through nutrition education (USDA, 2012). Examining the relationship between family income and childhood obesity could provide some useful insights into such programs that specifically target low-income families.

Focusing on childhood obesity has several benefits over investigating adult obesity. It alleviates the issue of reverse causality inherent in studying the relationship between income and obesity. Although obesity can affect one’s own income among adults (Kelly, 2014), this is not the case for children in most developed countries, where children rarely work. Nevertheless, due to the potential endogeneity of income, one must take precautions when inferring causality from the relationship between family income and childhood obesity observed here. On the other hand, findings pertaining to childhood obesity can illuminate our

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¹ 26.8% of Mexican-American adolescent boys are obese, compared to 16.7% of non-Hispanic white boys. 29.2% of non-Hispanic black girls are obese, compared to 14.5% of non-Hispanic white girls (Ogden and Carroll, 2010).

understanding of adult obesity, since the relationship between income and adult weight has a precursor in childhood. In addition, studying the relationship between family income and childhood obesity provides important insights into the intergenerational transmission of wealth. Obesity may be one of the important mechanisms through which intergenerational wealth is transmitted from parents to children: Low parental income may increase the chance of a child being obese, which is likely to reduce a child's future income.²

Previous studies found a negative relationship between income and obesity among youths (Anderson et al., 2009; Murasko, 2009, 2013), as well as a strengthening of that relationship over time (Murasko, 2013). While this paper reaffirms those findings, it contributes to the literature by exploring the heterogeneous nature of the relationship between family income and childhood obesity. More specifically, the paper investigates how the relationship varies by family income levels, Body Mass Index (BMI) levels, race, and gender. Moreover, the paper shows that the difference in obesity rates among children from different income levels is not observed at a young age, but develops over time. Relatedly, I investigate the potential mechanisms behind this widening obesity gap. Several mechanisms, proposed by other researchers to affect the overall obesity rate, are also tested. To my knowledge, no study has investigated why low-income children's weight increases faster than high-income children's.

Using the Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), I provide three new findings. First, family income increases the probability of childhood obesity for very poor families. Only when family income exceeds the tenth percentile does income have a negative relationship with children's obesity rates. Second, quantile regression analysis indicates that the relationship between income and obesity is stronger among children with high BMI than those with lower BMI. Lastly, the relationship between family income and childhood obesity becomes stronger as children age. This phenomenon is exhibited by all racial and gender groups except Hispanics. Further tests show that the faster weight gain by low-income children cannot be attributed to differences in parental employment status or parental behavior. Differences in school lunch participation rates and other individual time-invariant heterogeneities explain only a small portion of the increasing gradient.

The remainder of the paper is as follows. Section 2 describes the main dataset used in this paper. The relationship between family income and childhood obesity is closely examined in Section 3. In Section 4, the main results are presented, and Section 5 discusses the findings in detail. Section 6 concludes.

² Previous studies demonstrate that obese children are more likely to suffer from various illnesses, such as diabetes or hypertension, and to enter adulthood with worse health and less education than their non-obese peers (Cawley and Spiess, 2008). Research also demonstrates that unhealthy and obese individuals tend to fare worse in both job and marriage markets (Hameresh and Biddle, 1994; Averett and Korenman, 1996; Cawley, 2004; Wada and Tekin, 2010).

2. Data

The main source of data is the Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K). The ECLS-K is longitudinal survey data collected by the U.S. Department of Education in an effort to better understand how children's environments affect their development. The study selected a nationally representative sample of children attending kindergarten in 1998 and 1999 through a multistage probability sample design.³ The study began its survey of a cohort in their kindergarten year and continued to collect information from these children, their parents, teachers, and school administrators until the cohort reached eighth grade in 2007. During the nine-year span, the survey was conducted seven times: fall and spring of kindergarten, fall and spring of first grade, spring of third grade, spring of fifth grade, and spring of eighth grade. I use five waves of data collected from spring of kindergarten through eighth grade. Due to the complex survey design, I use sample weights and analytic strategies for a proper estimation of the standard errors. I use longitudinal parental sample weights, since family income is only reported through parent surveys. Furthermore, standard errors are estimated using the paired jackknife replication method in Stata 12.1.⁴

The main strength of the ECLS-K is the reliability of its adiposity measures. In the ECLS-K, the height and weight of each child are directly measured twice by the interviewer during each survey, hence they are more accurate than self-reported information generally available in other large datasets. Obesity status is determined using the 2000 Centers for Disease Control (CDC) sex- and age-specific growth chart.⁵ In Panel A of Table 1, the proportion of obese children increases from 13 percent in kindergarten to 18 percent in eighth grade. The slight decrease in the average obesity rate from fifth to eighth grade is likely due to a growth spurt.

In the ECLS-K, continuous family income is reported only during the children's kindergarten year. Starting with first grade, family income is given in ranges of thirteen categories. Therefore, the inflation-adjusted middle value of the income range is assigned for each child. In kindergarten, the average family income is approximately 57,000 in year 1999 dollars, which is comparable to the national median income level from the 2000 Census.⁶ On the other hand, since family income is self-reported, it

³ See Tourangeau et al. (2009) for a detailed description of the data collection method.

⁴ See Brown et al. (2007), Glenn (2009), and Tourangeau et al. (2009) for more discussions on the standard error estimation.

⁵ Body Mass Index (BMI) is created using a standard formula of dividing weight in kilograms by the square of height in meters (kg/m²). Although some literature categorizes children with BMI between the 85th and the 95th percentile as "at risk of overweight" and those with BMI greater than the 95th percentile as "overweight", I follow a more conventional definition of addressing the former as "overweight" and the latter as "obese".

⁶ The 2000 Census notes that the U.S. median income for 1999 was \$42,000. The median income for head of household aged 35–44 was \$50,654, which is closer to the sample family income in the ECLS-K (with the average father's age of 37).

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