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Maternal work and children's diet, activity, and obesity

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ABSTRACT

Mothers' work hours are likely to affect their time allocation towards activities related to children's diet, activity and well-being. For example, mothers who work more may be more reliant on processed foods, foods prepared away from home and school meal programs for their children's meals. A greater number of work hours may also lead to more unsupervised time for children that may, in turn, allow for an increase in unhealthy behaviors among their children such as snacking and sedentary activities such as TV watching. Using data on a national cohort of children, we examine the relationship between mothers' average weekly work hours during their children's school years on children's dietary and activity behaviors, BMI and obesity in 5th and 8th grade. Our results are consistent with findings from the literature that maternal work hours are positively associated with children's BMI and obesity especially among children with higher socioeconomic status. Unlike previous papers, our detailed data on children's behaviors allow us to speak directly to affected behaviors that may contribute to the increased BMI. We show that children whose mothers work more consume more unhealthy foods (e.g. soda, fast food) and less healthy foods (e.g. fruits, vegetables, milk) and watch more television. Although they report being slightly more physically active, likely due to organized physical activities, the BMI and obesity results suggest that the deterioration in diet and increase in sedentary behaviors dominate.

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Introduction

Childhood obesity in the U.S. has increased threefold over the last four decades (Ogden et al., 2012). While the proximate causes are obvious – excess calories in versus calories out – the determinants of such energy imbalance are less well understood. Some have argued that explanations for such large increases lie in other societal trends that occurred contemporaneously (Sturm, 2005a, 2005b). One such candidate is maternal labor supply. According to the Bureau of Labor Statistics (BLS), the labor force participation among mothers with school-age children increased dramatically during the same time period as the obesity epidemic. The proportion of mothers with a youngest child between 6 and 17 years of age who were employed increased from 51% in 1975 to 74% in 2005 (BLS, 2011). It is therefore natural to examine whether maternal labor supply is linked to childhood obesity. Maternal work potentially influences mothers' time allocation toward activities related to children's diet, physical activity, and well-being (Cawley & Liu, 2012). For example, less time spent in household

work (Bianchi, 2000) and meal preparation (Cutler, Glaeser, & Shapiro, 2003) and greater consumption of meals prepared away from home (Kant & Graubard, 2004) have been documented in studies using samples from the U.S. Another recent study shows that maternal employment is associated with reductions in time spent grocery shopping and cooking and with a greater likelihood of purchasing prepared foods (Cawley & Liu, 2012). Foods not prepared at home, in turn, have been linked to a higher risk of childhood obesity (Institute of Medicine, 2005) because they have a higher fat density and lower nutrient density than foods prepared at home (Lin, Guthrie, & Frazao, 1999). Maternal work can also induce mothers to outsource meal preparation. Datar and Nicosia (2012a) find that maternal work decreases the likelihood of eating breakfast provided by the school, but increases the likelihood of eating lunch offered at the school. Recent studies suggest that while school breakfast may improve children's nutritional intake, school lunch may be linked to obesity (Millimet, Tchernis, & Husain, 2010). Finally, greater maternal work is also associated with children spending more time in the care of others or unsupervised, which may influence diet and activity if these children choose unhealthy foods (Klesges, Stein, Eck, & Klesges, 1991) and sedentary activities (Fertig, Glomm, & Tchernis, 2009). Although fathers' time with children has increased in recent decades, research shows that mothers still do more child-related work at home, regardless of

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their work status, and that fathers do not alter their time with children to make up for the time that mothers spend at work (Cawley & Liu, 2012).

In addition to the effects on time allocation, maternal work increases household income, which can affect children's energy balance. On the one hand, higher income enables mothers to purchase fresh high-quality foods and enroll children in organized physical activities. On the other hand, higher income could mean additional pocket money for children to spend on unhealthy foods (e.g. junk food in schools) or greater frequency of the family eating out, which may increase caloric intake.

A growing literature has examined the link between maternal labor supply and childhood obesity, mostly among younger children in the U.S. (Anderson & Butcher, 2006; Anderson, Butcher, & Levine, 2003; Chia, 2008; Fertig et al., 2009; Liu, Hsiao, Matsumoto, & Chou, 2009; Morrissey, Dunifon, & Kalil, 2011; Phipps, Lethbridge, & Burton, 2006; Ruhm, 2008; Ziol-Guest, Dunifon, & Kalil, 2013). The emerging consensus is that maternal work hours are positively associated with children's Body Mass Index (BMI) and obesity, but fathers' hours are not. This relationship is typically stronger among higher socioeconomic families even though their obesity rates are lower. However, very little is currently known about the mechanisms through which maternal work hours influence children's weight. Recent time use studies have begun to shed some light on the potential mechanisms. Fertig et al. (2009) find that maternal employment is associated with fewer meals consumed by children (perhaps due to skipping meals) and more television watching, although these play a small role in explaining the link between maternal employment and childhood obesity. Cawley and Liu (2012) find that working mothers spend significantly less time in grocery shopping, cooking, eating, and playing with their children and are more likely to purchase prepared foods. While these studies suggest that increased maternal work hours could *potentially* affect children's diet and activity behaviors in adverse ways, there is no direct evidence on how children's diet and activity are related to maternal work hours. Our review focuses on the U.S. context because the dataset used in this paper is also U.S. based. However, it should be noted, that the relationship between maternal work and childhood obesity is grounded in cultural, social, and institutional contexts. This relationship has been found to be insignificant in other locations such as Europe (Gwozdz et al., 2013).

In this paper, we use data from the Early Childhood Longitudinal Study – Kindergarten Class (ECLS-K) to first estimate the relationship between maternal work hours and children's BMI and obesity in a national cohort of U.S. children during their 5th and 8th grades. The aim of this first step is to replicate findings from prior studies that use different U.S. data. The main contribution of this paper, however, is to examine the relationship between maternal work hours and children's dietary behaviors, physical activity, and sedentary behaviors in this national sample to gain insight into the potential mechanisms linking maternal work and childhood obesity in the U.S. We also consider whether these relationships differ by socio-economic status (SES) and whether they evolve as children transition into adolescence.

Conceptual framework

Economic models of household behavior suggest that mothers allocate their time across household production, child care, work and leisure/sleep to maximize the household's overall utility, which includes children's health (Becker, 1981). Because available time is fixed, time allocated to market work restricts time spent on household production (e.g. meals), time with children, leisure/sleep or some combination thereof. Mothers may substitute time inputs

for market goods in the production of child health, for example, by purchasing meals or enrolling children in organized activities or child care rather than undertaking these activities themselves. The reallocation would depend upon the net marginal utility of time spent on these competing uses.

In this framework, the relationship between mother's work and BMI is determined through the effects on energy intake and energy expenditure. These effects are complex because the increase in household income due to mother's work (income effect) and the decrease in mother's time (time effect) may have opposing effects.

Time constraints mean that working mothers may have less time to prepare meals and less time to supervise their children's diet, which may be differentially important as children transition into adolescence and make more of their own choices. If mothers choose to reduce meal preparation time, they may increase reliance on pre-packaged or processed foods or by purchasing meals away from home (e.g. Cawley & Liu, 2012; Kant & Graubard, 2004). These behaviors are associated with higher density foods and increased caloric intake (Lin et al., 1999). Even if mothers continue to prepare their own meals, they may have less time to supervise children's snacking because they are busy with other tasks or they substituted purchased child care for their own supervision, which may lead to more frequent or less healthy snacking (Brown, Broom, Nicholson, & Bittman, 2010). The time effect also suggests potentially deleterious consequences on energy expenditure if mothers have less time to supervise their children's activities (Cawley & Liu, 2012). Children may opt to spend more time in sedentary behaviors because they are less supervised or they are supervised by non-parents (Brown et al., 2010; Fertig et al., 2009). The time effect on energy intake and expenditure may be zero if working mothers reduce time spent on other activities such as leisure/sleep (Bianchi, 2000). However, negative consequences can persist if reducing leisure/sleep activities negatively influences the quality of the time that mothers continue to spend with their children.

The income effect is also ambiguous. On the one hand, higher income leads to greater ability to afford fresher and more nutritious foods, which can have beneficial effects because these foods are likely to be lower in fat and less calorie dense (Drewnowski & Specter, 2004). Similarly, working mothers may be more able to afford opportunities for children's physical activity that are costly such as organized sports. On the other hand, higher income may increase opportunities for eating out at restaurants and increase pocket money for in-school junk food purchases, which can increase energy intake. Therefore, ultimately, the overall effect of maternal work on children's BMI and its underlying mechanisms is an empirical question.

Thus far, we have discussed the household allocation decision as revolving around the mother's time and decisions as if holding father's efforts constant. Clearly, fathers may also play a role in generating income and in providing time with the child and we explore this below. The literature, however, suggests that fathers do not substantially adjust their time in response to maternal work hours (Cawley & Liu, 2012) and that their work hours do not influence obesity-related outcomes (Ziol-Guest et al., 2013).

Finally, an important aspect which informs the model is that behavior and health are not solely a function of contemporaneous factors, but rather an accumulation of previous and contemporaneous decisions (e.g. past weight gain, habit formation) (Ruhm, 2008). Because behaviors and health in the current period are dependent on the previous period, parent's and children's choices regarding work, diet and activity have implications throughout children's lifetimes.

Empirical strategy

We start with a basic Ordinary Least Squares (OLS) specification that models BMI (obesity) as a function of mother's work estimated

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