

A dynamic perspective on maternal employment and early childhood overweight: Evidence from the German Socio-Economic Panel

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INTRODUCTION

Throughout the industrialized world, the prevalence of overweight and obesity among children has risen in recent decades (Anderson and Butcher, 2006; OECD, 2010). The simultaneous expansion of mothers' labor force participation, primarily in the United States, but also in a number of European countries, has turned the spotlight on maternal employment as a likely cause of children's overweight and obesity (Anderson and Butcher, 2006; Gwozdz et al., 2013). Empirical evidence is mixed, however, with a number of studies, mainly with US data, finding a positive association between maternal work hours and self-reported indicators of body weight (e.g. Anderson et al., 2003; Brown et al., 2010; Cawley and Liu, 2012; Datar et al., 2014; Ruhm, 2008; Scholder, 2008; Ziol-Guest et al., 2013). In a study with 16 European countries, including Germany, no association of mothers' work with objective weight measures and diary data regarding nutrition and physical activity was found (Gwozdz et al., 2013). Moreover, data from the German Micro Census showed that between 1991 and 2002 part-time and full-time employment rates of mothers were dropping (Kreyenfeld and Geisler, 2006) and have not increased since (OECD, 2012).

The missing association on the micro level and the opposing trends in maternal employment and child overweight make Germany an interesting case for studying the relationship between mothers' work decisions and child body weight. In addition, most earlier research has measured maternal employment at a particular point in time, thereby neglecting the dynamic character of children's development where outcomes at one time are likely to depend on current as well as on past context conditions. Studies that did consider complete employment histories used simple duration measures that do not capture important aspects of employment history like timing and (in)stability. Moreover, studying the effects of time-varying predictors such as maternal employment poses specific analytical challenges that standard methods cannot readily address, particularly if time-varying confounders of the relationship of interest are themselves affected by earlier values of the predictor. In the present study, I use sequence analysis to derive measures that identify typical timing patterns and (in)stability of early maternal employment in addition to duration measures used in previous research. Furthermore, I use inverse probability weighting of marginal structural models to estimate the association of these different measures with body mass index and overweight at age six, a method developed specifically for studying the effects of time-varying exposures (Robins, 1999; Robins et al., 2000).

THEORETICAL BACKGROUND

On the physiological level, body weight depends on the balance between energy intake and energy consumption. The former results from the amount and quality of nutrition and the latter from the frequency and intensity of physical activity. Both are connected with maternal employment

through time restrictions and financial resources (Anderson and Butcher, 2006). Reduced availability of working mothers then implies a detrimental effect of maternal employment on the physiological development of children, as there is less time for fixing fresh meals (Cawley and Liu, 2012) and to supervise the quality and frequency of children's food intake (Datar et al., 2014). Less maternal supervision may also impair physical activity and sleeping patterns of children (Brown et al., 2010; Datar et al., 2014; Ziol-Guest, 2014; Ziol-Guest et al., 2013). Additional income provided by mothers, in turn, may foster children's physiological development by enabling the purchase of higher quality food and by offering more leisure opportunities and support for sports (Anderson et al., 2003; Brown et al., 2010).

Independent of the direction of a possible effect of maternal employment on child body weight, it should only unfold given a sufficient duration of employment. Prior studies, however, predominately measure maternal employment at a particular point in time. Moreover, the timing of employment matters as children go through different developmental stages in the first few years of their lives, which differ with regard to the degree of autonomy (particularly when it comes to choosing their own food) as well as to establishing daily routines (e.g., physical activity or sleeping patterns) (Heckman, 2007; Ziol-Guest, 2014). Lastly, instability in employment status (through frequent transitions) may prevent the establishment of routines that could foster healthy development. In sum, these arguments suggest a more detailed investigation of the effects of early maternal employment history.

An association between maternal employment (patterns) and child body weight may also be the result of confounding. Factors such as parental education, child health (at birth), marital status and number of siblings, the socio-economic context, among others may affect both mothers' labor market decisions and child body weight. A particular problem is posed by time-varying factors such as household income, maternal health, or marital status, that potentially affect mothers' current employment status while at the same being dependent on previous maternal employment. If such factors are adjusted for by standard statistical methods (such as regression) this may lead to both underestimating the effect of maternal employment on body weight by controlling for variables on causal pathways between the two, while at the same time it may induce spurious association (Elwert and Winship, 2014).

DATA AND METHOD

I use data on a sample of around 900 children born between 2002 and 2006 from the German Socio-Economic Panel, whose health and behavior has been assessed repeatedly since birth. In addition to measures of body weight at age six, these data also provide monthly information on mothers' employment status before and after birth as well as a host of potential confounders.

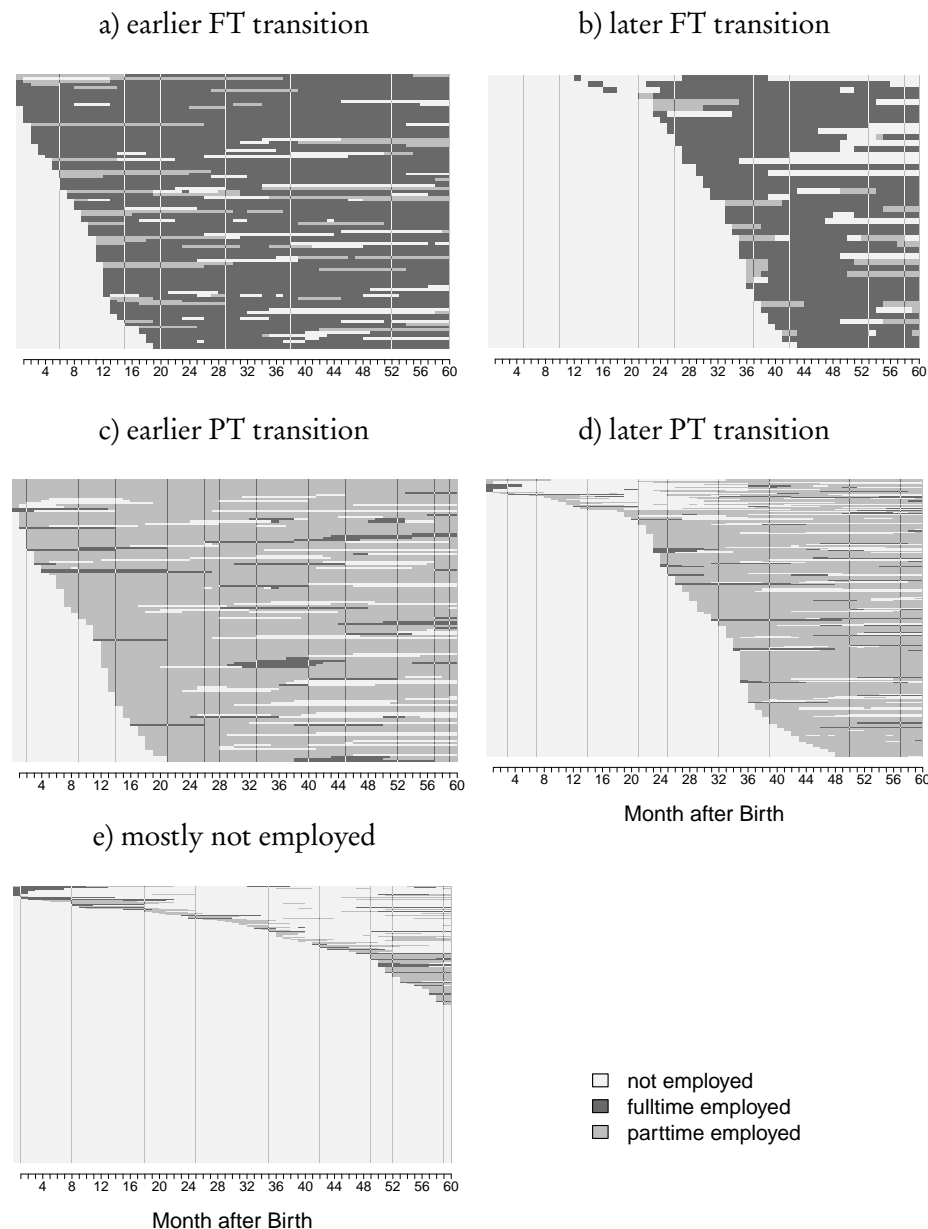
To adequately account for time-varying confounders I estimate marginal structural models by inverse probability of treatment weighting (Robins, 1999; Robins et al., 2000). Instead of explicitly adjusting for covariates in the outcome model, this method creates a weighted pseudo-population in which maternal employment at a given time point is independent of measured covariates, thereby avoiding controlling for variables on causal pathways between maternal employment and child body weight.

For consistent estimation of causal effects, the strong and untestable assumption of no unmeasured confounding is necessary (as would be the case for regression or matching). At the same time, data from controlled or natural experiments that manipulate whole sequences of maternal employment in early childhood are unlikely to become available. The proposed approach, therefore, is the best available for studying the role of timing and duration of maternal employment.

PRELIMINARY RESULTS

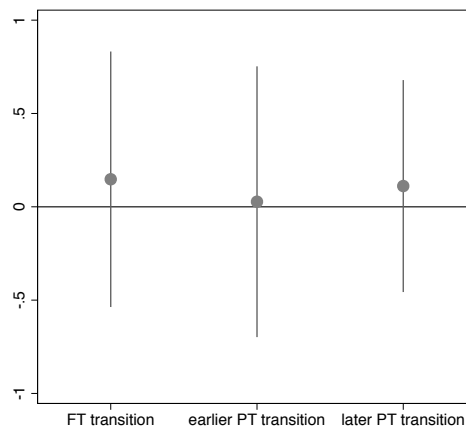
Results from a preliminary sequence analysis depicted in Figure 1 reveal five typical maternal employment patterns: early transition to full-time employment, later transition to full-time employment, earlier transition to part-time employment, later transition to part-time employment, and the largest cluster in which women predominantly are non-working in the first five years after birth.

Figure 1. Clusters of typical maternal employment sequences



These different patterns, however, are not associated with differences in children’s body mass index around age six, conditional on observed covariates that may affect both maternal employment and children’s body weight, such as household income, maternal education, number of siblings or maternal health (see Figure 2).

Figure 2. Estimated mean difference in BMI at age 6 between maternal employment patterns (ref: mostly not employed)



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