Does Spacing Matter?
The Effect of Child Spacing on the Cumulative Labor Force Outcomes of Mothers

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Abstract

The role of first-birth timing for mothers' economic outcomes has been of considerable interest to researchers, yet research that considers the implications for women's labor force outcomes of the spacing of children, in addition to timing, is sparse. We use longitudinal data from NLSY79 and employ a matching strategy to estimate the effect of long birth intervals on women's cumulative earnings and cumulative work hours over the life course. The expected direction of the effect is unclear. Longer birth intervals may disadvantage women by prolonging the child-rearing period and extending time out of full-time employment, or, alternatively, may advantage women by diminishing the intensity of the child-rearing period, facilitating ongoing attachment to the labor force. Our work contributes to the literature on the intersection between women's fertility and their labor force outcomes, filling a gap in the literature that has disproportionately ignored the implications of decisions about higher-parity births.

Introduction

The majority of mothers in the United States, including those with small children, participate in the labor force (Dye 2008). Yet the time required for childbearing and childrearing provides a competing demand on mothers' time in the labor force. A range of research considers how the timing of childbearing may intensify or mitigate new mothers' labor force outcomes. Studies have typically found negative effects of teenage childbearing on human capital development and later wages (Blackburn, Bloom and Neumark 1993; Klepinger, Lundberg and Plotnick 1999), while delay of childbearing seems to result in higher wages, a result often explained by delay providing additional time to accumulate human capital (Amuedo-Dorantes and Kimmel 2005; Blackburn, Bloom and Neumark 1993; Buckles 2008; Loughran and Zissimopoulos 2007). The

timing research suggests that age at first birth can have long-term economic consequences for women, through both labor supply and wages. Although timing of childbearing has been examined, comparably less attention has been focused on whether the spacing of children matters. In other words, does having one's children close together have a different effect with regard to labor force outcomes than having one's children farther apart? Given that, among women who become mothers, almost 80% will bear two or more children (Dye 2008), the implications of women's fertility spacing for their long-term financial well-being are no less relevant than the question of timing.

The literature on fertility timing typically considers some timing choices to be "better" in terms of facilitating positive long-term outcomes for women. Thus, both sociologists and policy-makers are interested in the conditions under which women can and do combine parenthood and work with the minimum of cost. Investigations of fertility spacing decisions are relatively lacking in existing literature, and the research that has considered spacing typically considers it only as a peripheral issue. Yet spacing, too, could have implications for women's labor force outcomes and, by extension, for sex stratification more generally. In particular, spacing, like timing, could have implications for the gender gap in wages.

Theoretical Framework

Shorter birth intervals could theoretically have positive or negative outcomes with regard to labor force penalties. We assume that spacing will alter women's labor force outcomes primarily through altering their labor supply decisions. In general, women's wages will tend to suffer as a result of time spent out of the labor force, due to either the deterioration of human capital or foregone experience, but it is unclear whether short or long birth intervals will lead to labor

supply decisions that maximize wage growth. We assume that birth spacing may alter women's labor supply decisions both by altering the likelihood and duration of employment interruptions and by altering the hours of employment for employed mothers. Women with short birth intervals will have shorter but more intensive caring periods, which should make them more likely to experience work interruptions, particularly as child care costs relative to the woman's foregone wage will be higher for women with two preschool-aged children at home. Women with longer spacing intervals should be more likely to remain in the labor force, and work interruptions, if any, are likely to be a series of short interruptions. The diminished duration of interruptions may permit women with longer spacing intervals to maintain employment with the same employer, thereby retaining their job-specific social and human capital. On the other hand, long spacing intervals prolong the caring period, which may lead to a greater number of years spent in part-time labor or out of the labor force. The offsetting effects of these decisions are unclear.

At the heart of this uncertainty is a lack of knowledge about the relative costs of the tradeoffs women make when considering strategies to combine work and family over the life course. Is the wage cost of a second job interruption comparable to that of a first interruption? Does the depreciation of human and social capital occur at a constant rate during time out of the labor force? Are the returns to two years of part-time experience greater than or less than returns to a single year of full-time experience? Our research does not attempt to answer each of these questions, but does estimate the net cost or benefit that women receive from longer fertility spacing intervals. With no existing consensus on whether long or short birth intervals advantage women in the labor market, a first step is to answer this most basic question.

The literature that specifically considers the effects of spacing on outcomes is relatively sparse, and many researchers find only small effects. Peltola (2004) suggests that close spacing is associated with a shorter time to labor force re-entry, a result that contradicts the relationship she had hypothesized. Interestingly, she also finds that a longer birth interval reduces one's chances of entering low-hour part-time work upon labor force re-entry (Peltola 2004). Thus, shorter intervals seem to be good for return to the labor force, but these women may be more likely to take up part-time work with low hours than women with longer birth intervals. Although Peltola does not specifically consider these effects by race, earlier work by Calhoun and Espenshade (1988) indicates that the results may be heterogeneous for different racial groups. Specifically, they found that the length of the birth interval affects black and white women in opposite directions (Calhoun and Espenshade 1988). This result indicates that there may be heterogeneous treatment effects of spacing for different subgroups of the population.

Contributions

In this paper, we make three contributions to the literature on the intersection between women's fertility and their labor force outcomes. First, we consider the role of birth spacing as an additional potential contributor to women's labor force penalties. While existing work on the motherhood wage penalty has considered that effects may vary both by timing of first birth (Loughran and Zissimopoulos 2007) and by parity (Anderson, Binder, and Krause 2003; Budig and England 2001), our work further recognizes that women vary not only in the number of children they have and the timing of the transition to parenthood, but also in the spacing between subsequent births.

Second, we follow the perspective that time out of the labor force has long-term consequences for women's lifetime earnings, and we estimate the effects of spacing on women's cumulative earnings across the life course, from labor force entry to mid-career, which is where our data end. This provides a dynamic, life-course approach to understanding the work-family interaction for women. We are interested not only in women's wages at a certain time, but in their cumulative work behavior and financial well-being – what economists might call labor force attachment and permanent income, respectively. If women accept a short period out of the labor force, which earns them no income in that period, in return for higher lifetime earnings than women who spend more time in part-time work, it would be a mistake to believe that the women out of the labor force are disadvantaged in the long-run.

To determine how much of the reduction in women's cumulative earnings is due to reduced labor force attachment, we additionally estimate the effect of spacing on women's cumulative work hours. This allows us to separate the gross effects of spacing on women's cumulative earnings into an effect due directly to changes in labor force participation and an effect that operates through wages[1].

While fixed effects models have been invaluable in estimating the relationship between motherhood status and current wages, they are not well-suited to the present research question, as fixed effects compare within-person outcomes across periods. Both because we are interested in cumulative outcomes and because women do not experience both a short and long birth interval between their first and second child, fixed effects are inappropriate to the question at hand. Thus, we make a third contribution, using the tools of exact matching and propensity score matching to estimate the labor force outcomes of women with long birth intervals, were they to have had short birth intervals. We argue this gives us an improved estimate of the causal effects of

[1] For the present, we ignore the indirect effect of past labor supply on current wages.

spacing, net of other characteristics that may affect labor force attachment and earnings growth, than would conventional ordinary least squares (OLS) estimates, although we intend to compare our results to those obtained from OLS models with a rich set of covariates. We discuss this method in more detail in the next section.

Data and Methods

The data for our analysis come from the National Longitudinal Survey of Youth 1979 (NLSY79). The NLSY79 has been used in much of the literature assessing the motherhood penalty (Amuedo-Dorantes and Kimmel 2005; Budig and England 2001; Loughran and Zissimopoulos 2007) and is also the dataset used in the one recent paper that examines spacing effects (Peltola 2004). It is particularly appropriate for our research because it focuses on the experiences of young adults and captures nearly all of their work experiences up until middle age. Initiated in 1979 as a sample of 12,686 men and women ages 14-22, NLSY79 surveyed respondents annually through 1994 (when respondents were ages 29-37), and biannually thereafter. NLSY79 therefore provides a large sample of young women experiencing the transition to motherhood. By the year of the last publicly-available wave, 2006, the respondents were ages 41-49, which means that most women have completed their fertility.

For our sample, we exclude the military subsample, which was not re-interviewed after 1984, and the poor non-black, non-Hispanic subsample, which was not interviewed after 1990. Because of our focus on cumulative labor force hours and earnings, it is important that we have long work histories available, which is not possible with either of these subsamples. We exclude women who remain childless throughout the entire survey and those who were not in the labor

force prior to the first birth[2]. Furthermore, because we are interested in spacing, we limit the sample to women who have two children at the last observation. We do not include women with more than two children in part because multiple birth intervals increase the complexity of estimating the spacing effect considerably. Unlike previous research (Peltola 2004) we do not exclude women with twins but rather consider the spacing interval to be equal to zero. Finally, we exclude observations with missing data for either the dependent variable or the covariates, although we do not exclude individuals who are missing wage data because they are not in the labor force.

We have two outcome variables—cumulative work hours and cumulative wages. To determine how the spacing of children affects these two outcomes we wish to determine what cumulative work hours and cumulative wages a mother would have achieved if she had a different birth interval within a specified observation period. Specifically we consider whether women with birth intervals of three or more years have different outcomes than those with birth intervals of less than three years, where a long birth interval is considered the "treatment". Although alternative cutoff points are possible, we choose three years because children three years of age are often enrolled in preschool programs, and eligibility for government-supported preschool programs, such as Head Start, also begins at this age. Thus, women with at least three years between births are likely to have at least some time between births when their eldest child is no longer a toddler and may be enrolled in school programs. We intend to experiment with the cutoff point, to test the robustness of our results. We hypothesize that just as delayed childbearing seems to have positive effects for women's later economic outcomes, longer birth intervals will also lead to higher cumulative earnings and labor force attachment than shorter

[2] We consider only births at this time and not becoming a parent through adoption or marriage. This provides homogeneity in method of entry into parenthood, and we argue it is more relevant to the question at hand.

birth intervals. Because we cannot observe the same women with a short birth interval and a long birth interval at the same time, we must match the group with long birth intervals with "untreated" controls, who in this case have shorter birth intervals, in order to obtain the effect of a long birth interval on labor force outcomes. To do this we employ a combination of exact matching and propensity score matching.

We first calculate propensity scores for long birth intervals for the entire group. We then match mothers exactly based on age at first birth and race, and within these strata, match by propensity score[3]. This allows us to designate a treatment and control group. Once the control group has been determined, we compare the cumulative work hours and cumulative earnings of the long-interval and short-interval mothers as attained by the latest available round of the survey collected in 2006. We obtain the average treatment effect on the treated and the average expected effect of the long birth interval for all who eventually have that interval. Thus, we can identify the causal effect of a long birth interval (treatment) by comparing the cumulative work hours and cumulative wages of the treated mother (with the long birth interval) with the hypothetical situation of the same mother had she had a short birth interval.

Conclusion

Although a number of researchers have considered the role of timing of entry into motherhood for women's financial well-being, fewer researchers have considered whether the spacing of one's children plays an additional role in women's outcomes. In this paper we use longitudinal data and a matching strategy to estimate the causal effect of birth intervals of at least three years

[3] We will try matching using both kernel matching and nearest neighbor matching, and will test for robustness. Standard errors will be calculated using bootstrap techniques.

on women's labor force outcomes over the life course, with a specific focus on the effects on cumulative earnings and cumulative work hours. We examine whether longer birth intervals, like delay of childbearing, lead to favorable labor force outcomes for women. Our work contributes to the literature by explicitly examining the role of spacing, applying a life-course approach to the problem, and using matching techniques not previously used to address this question.

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