Understanding the Mechanism of the Return to Delayed First Birth

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Over the last several decades, a rich vein of economic research has established that women with children receive lower wages than those without – the so-called "motherhood wage gap" (*e.g.*, Waldfogel, 1998). Furthermore, in light of the striking increase in the median age at first birth over the past 50 years (Chen and Morgan, 1991), a more recent literature has concluded that the timing of entry into motherhood can affect the magnitude of this effect (*e.g.*, Miller, 2011; Herr, 2012). The goal of this paper is to address the relatively unexplored question of the mechanism by which first-birth timing influences a woman's wage path.

To begin, following Herr (2012) I focus on a woman's "relative timing" of first birth – her year of first birth relative to her year of labor market entry. First, this allows me to tie this question into the wage growth literature, with its focus on experience rather than age. Second, in Herr (2012) I find that the link between first-birth timing and the wage path is distinct for women who have their first birth before versus after labor market entry. In this paper I therefore focus my attention on the population who have their first child after they start working, which makes up the majority of women.

To consider the mechanism by which first-birth timing affects women's wages, I consider how timing affects various economic factors that theory suggest are important in driving wage growth, such as the pattern of human capital accumulation. In particular, I separately assess (*i*) the link between first-birth timing and a set of possible "mechanism" variables (*e.g.*, total hours worked or the length of the longest labor force gap), and (*ii*) the link between these variables and the long-run wage level. When assessing the relative importance of these potential economic pathways, I can therefore consider the extent to which a link between timing and these economic behaviors translates into an effect on the subsequent wage path.

Methods

Using the 1979 cohort of the National Longitudinal Survey of Youth (NLSY79), Herr (2012) shows that among women with their first birth after labor market entry (t_1), a one-year delay of first birth leads to 3.2 and 6.9 percent greater wage growth by t_{20} (approximately 20 years later), for high school and college graduates, respectively.[1] Using this same sample, I consider the following channels through which first birth timing, K_1, may influence the long-run wage level, w_{20}:

[1] I categorize women based on their education level at labor market entry. I focus on the link between first-birth timing and the wage level approximately 20 years after labor market entry (using any wage observed for the calendar years between 19 and 24 years after labor market entry). In Herr (2012) I find no return to delay for high school drop outs.

1. Total hours worked by t_{20};
2. The length of the longest labor force gap between t_1 and t_{20};
3. The number of times a woman exits the labor force, including whether she leaves her pre-birth job at motherhood;
4. The number of job-to-job changes;
5. Her occupational progression between t_1 and t_{20}; and
6. Any additional schooling completed by t_{20}.

For several of these potential mechanisms, the link with K_1 may have both a "real" and "mechanical" element. For instance, since for the vast majority of women the arrival of a first child creates a labor supply interruption, later mothers may have mechanically worked more hours by t_{20} because they have more pre-birth, high-intensity work years. Yet if later mothers also reduce their work hours by less in response to the higher opportunity cost of time off associated with their greater human capital at K_1, this provides a "real" mechanism by which timing may influence total labor supply by t_{20}. In addition, I also consider whether the *timing* of the given mechanism is a key driving factor of the effect of K_1 on w_{20}, for instance the timing of the first, or the longest, labor force exit.

In particular, to estimate the relative importance of these economic pathways, I begin by looking at the effect of K_1 on each of these potential intermediaries, for instance assessing the effect of first-birth timing on total hours worked or total job changes by t_{20}. I then estimate each factor's relative importance by combining this information with the strength of the relationship between each "mechanism variable" and women's long-run wage level, w_{20}.

More specifically, building on the model in Herr (2012), consider estimating the following wage equation, where the wage level at t_{20} (w_{20}) is a function of the starting wage (w_0) and the timing of first birth (K_1):

$$l(w_{20}) = l(w_0) + \theta K_1 + X\beta + \varepsilon \qquad (1)$$

Suppose we believe, however, that K_1 has no direct effect on wages, but instead the relationship captured in θ reflects an indirect effect through two mechanism variables, m_1 and m_2. Thus the true causal model would be

$$l(w_{20}) = l(w_0) + \lambda_1 m_1 + \lambda_2 m_2 + X\beta + \varepsilon \qquad (2)$$

Given the intermediate effect of K_1 on each mechanism variable,

$$m_j = \delta_j K_1 + X\beta_j + \zeta_j, \text{ for } j = \{1,2\} \qquad (3)$$

plugging Equation (3) into Equation (2), we see by rearranging that $\theta = \lambda_1 m_1 + \lambda_2 m_2$. I can therefore calculate the relative importance of each mechanism as:

$$p_j = \lambda_j m_j / \theta = \lambda_j m_j / (\lambda_1 m_1 + \lambda_2 m_2)$$

Thus the importance of each factor in driving the effect of timing on wages depends on both the strength of the initial effect of timing on the given mechanism variable, δ_j, and that variable's effect on the long-run wage level, λ_i.

Following Herr (2012), I estimate these parameters using OLS.[2] In Herr(2012) I show that there is surprisingly little bias captured in the OLS-estimates of θ, suggesting that observed first-birth timing is largely unaffected by endogeneity, and that within education groups, women with later first births are not systematically different. This suggests likewise that the OLS estimates of δ should be largely unaffected by either endogeneity or heterogeneity.[3] My estimates of *p*, however, may be influenced by any bias captured in my estimates of λ. Although this may influence the causal interpretation of these estimates, one key contribution of this paper is simply the exploration of the link between first-birth timing and women's subsequent labor market behavior.

Initial Results

I find that the influence of first-birth timing on women's long-run wages arises primarily through its influence on the pattern of accumulation of human capital. For both high school and college graduates, the most important pathway between K_1 and w_{20} is through the influence of K_1 on total hours worked by t_{20}, and hence general human capital accumulated by this point. Although part of this link may be transitory – as the total hours of earlier mothers start to catch up with those of later mothers, for high school graduates I find a "real" link between K_1 and the magnitude of the change in hours worked at motherhood, following the expected opportunity cost story. By comparison, among college graduates I find no such link – the change in hours worked at K_1 is remarkably invariable. Yet for college, but not high school graduates, I find that the *delay* of the interruption in labor supply that arises from fertility delay is an important mechanism leading to higher long-run wages.

The second-most important pathway driving the link between first-birth timing and wages is through its influence on the incidence of labor force exits. For both education levels I find that fertility delay sharply lowers the probability that a woman leaves her pre-birth job, and in doing so protects her specific human capital. This lower probability may reflect either the increased opportunity cost of exiting the pre-birth job, or the increased probability of being covered by maternity leave policy. For both education levels, this subsequently leads to a significantly higher long-run wage. Furthermore, although for both education groups all additional labor force exits are likewise linked with lower wages, fertility delay only influences the number of such additional exits among high school graduates.

For all women, fertility delay also limits the length of the longest labor force exit during this 20-year span, translating into higher long-run wages. Yet delayed first birth also leads to *delay* in the timing of

[2] I estimate the precision of my estimates p_j via bootstrapping using 1000 replications.

[3] As in Herr (2012), however, I can show that the OLS-estimates of δ are largely unaffected by the inclusion of the rich set of background characteristics available in the NLSY79.

this longest labor force exit, which in turn leads to *lower* long-run wages that more than offsets the benefit of the shorter gap. The relative importance of these two competing effects may depend in part, however, on when one measures the "long run" wage level. As child-related labor force exits become less recent, the negative effect of later exits may wear off.

By contrast, little of the influence of K_1 on long-run wages arises from its influence on the pattern of job changes or occupational progression. Following job match theory (Topel and Ward, 1992), if the arrival of a first child discontinuously increases the transaction costs of job search, one might anticipate that fertility delay can affect a woman's wage path by allowing her to reach a better-quality job match before the transition into motherhood. Yet the link between K_1 and total job changes is surprisingly mild, and only significantly positive for high school graduates, subsequently translating into only a small positive effect on long-run wages for this group. Furthermore, the arrival of the first child has no effect on the occupational progression of women in either education level, thus the effect of K_1 on long-run wages does not come from its influence on women's job or occupational progression over time.

References

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