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Maternal Education and the Link between Birth Timing and Children's School Readiness

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Abstract

Objective—This study explored whether mothers' education magnified the benefits of their fertility delays for their children.

Methods—Multiple-group path modeling assessed whether and why the positive association between mothers' age at first birth and children's test scores was greater for children of college educated women than children of other women.

Results—Older age at first birth was associated with higher math and reading test scores among the children of college educated women via their mothers' higher income and cognitive support for children. These mediational paths were less pronounced among the children of high school educated women and were not observed among the children of high school dropouts.

Conclusion—The potential for women's delayed fertility to have benefits for their children's early educational experiences depended on their own educational attainment.

The past several decades have witnessed dramatic demographic changes in the lives of U.S. women. One key change has been the trend toward later childbearing. As age-specific birth rates of women over age 30 have increased, rates among women under age 25 have decreased. In fact, for the first time in U.S. history, the 2009 birth rates for women age 30 to 34 exceeded those for women age 20 to 24 (Martin et al., 2012). Although these trends toward later childbearing have occurred across all groups of women, they have been most pronounced among the most educated women. For example, between the early 1970s and early 1990s, the average age at first birth for college educated women increased by nearly five years. For women without college degrees, it rose by only 1.5 years (Martin, 2004). This divergent pattern in mean age at first birth by maternal education may be a significant source of inequality among children.

According to McLanahan's diverging destinies thesis (2004), children who enjoy the well-documented socioeconomic and socioemotional benefits of having a mother with more education are also disproportionately more likely to experience the same benefits associated with other maternal life course characteristics, such as their mothers being older when they had them (Bornstein et al., 2006; Fergusson and Woodward, 1999; Garrison et al., 1997; Miller, 2009). This array of benefits in early childhood can promote children's school readiness, which in turn, can be magnified by structural and instructional processes of the educational system into much broader advantages in long-term educational attainment (Entwisle, Alexander, and Olson, 1997). In other words, the accumulation of inter-related advantages in the life courses of mothers play out in the divergent life course prospects of their children.

Our goal in this study is to build on the diverging destinies thesis, moving beyond the general issue of how more educated women have children at later ages or how educational attainment delays the transition into parenthood. We aim to explore whether more educated women might also gain more for themselves and their children from doing so because educational attainment magnifies the implications of such delayed fertility. Exploring this issue can potentially elucidate new ways that social status is passed down from mother to child within the diverging destinies framework. This exploration involves testing a conceptual model that highlights the potential mechanisms through which the interplay of fertility timing and maternal education might matter by applying structural equation modeling (SEM) to nationally representative data from the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B).

Maternal Education and the Returns to Fertility Delays

The conceptual model for this study draws on past research and theory emphasizing some basic pathways through which delayed fertility might be associated with children's well-being and, especially, their cognitive development and academic progress. These pathways include 1) financial and human capital returns, 2) greater translation between values of positive parenting and actual parenting behavior, and 3) greater interpersonal/partnership stability. Importantly, these pathways have also been implicated in socioeconomic disparities in children's schooling and related outcomes. We build on these basic pathways by arguing how they are contextualized within the gradient of women's educational attainment.

First, economic theory posits that childbearing entails important opportunity costs for parents, especially mothers. Women often exit the labor force, at least temporarily, when they have children, resulting in the loss of experience and wages (Loughran and Zissimopoulos, 2009; Taniguchi, 1999). Delaying fertility can shift the timing of these losses to a period in which they are less costly, such as when women have accumulated significant work experience, have a more secure position at work, and can afford the high price of child care (Ellwood, Wilde, and Batchelder, 2004). These benefits of delayed fertility, however, may not be equally accessed by all. Instead, they will depend upon women's overall status in the labor market, which itself is strongly predicated on their educational attainment.

In short, delayed fertility may reduce general risks to the accumulation of human and financial capital posed by having young children but only when women are in the kinds of higher-status jobs that may be vulnerable to such risks (Dex et al., 1998; Spain and Bianchi, 1996; Taniguchi, 1999). For example, Amuedo-Dorantes and Kimmel (2005) found that childbearing at older ages was positively associated with the wages of college educated mothers but not mothers without college degrees, and Miller (2011) reported a larger association between age at first birth and work hours, wages, and over-time earnings for women with college degrees than for women with less education. Thus, more educated women are in jobs with more mobility and potential for wage increase (i.e., jobs with higher opportunity costs for exits or stopouts), whereas women with less education start out in careers that have lower wages and fewer opportunities for mobility, leaving less to gain by postponing having children.

Second, delayed fertility may also be important because of its association with the types of parenting that support children's success in the U.S. educational system. Various studies have found that older mothers are more emotionally responsive to the needs of their children and engaged in constructing cognitive stimulating environments for them (Bornstein et al., 2006; Fergusson and Woodward, 1999; Rafferty, Griffin, and Lodise., 2011). Importantly, this link between maternal age and parenting behavior is linear, so that each additional year of life experience begets greater parenting knowledge and maturity (Bornstein et al., 2006; Hofferth, 1987; Ragozin et al., 1982). Again, we argue that this accumulation of parenting-related resources through delayed fertility may be greater among more educated women. These women already have more human capital and financial resources through their own educational attainment; resources which grant them greater access to the social capital and socially-defined experiences that tend to be rewarded in U.S. school system, such as greater knowledge of how the system works, power within the system, and social support (Coleman, 1988; Lareau, 2004). Thus, their children may enter school with a competitive edge over peers when their mothers are older and more educated and, especially, when they are both.

Third, although under-studied relative to the other hypothesized mechanisms, the partnership statuses and histories of women may also be affected by the timing of their fertility (beyond the reverse direction of the association). Indeed, some evidence suggests that older mothers may have more stable and supportive unions, as defined by marital satisfaction and communication among mothers and fathers. These associations tend to occur because parents are more mature, have more life experience, and have become more adept at communicating and negotiating conflict (Cooney et al., 1993; Edin and Kefalas, 2005; Garrison et al., 1997). Given how much is known about the interpersonal, contextual, and structural ways in which women's educational attainment supports the stability and quality of their romantic partnerships (Bramlett and Mosher, 2002; Edin and Kefalas, 2005; Williams, Sassler, and Nicholson, 2008), we argue that the potential for delayed fertility to facilitate stable and supportive relationships may be heightened among more educated mothers.

Study Aims, Approach, and Summary

The conceptual model for this study, therefore, points to educational disparities in the age-related returns to mothers' financial (income) and human (occupation) capital, academically-enriching parenting behavior, and relationship quality and stability. If the general hypothesis underlying this model—that mothers' educational attainment moderates the link between their chronological age at first birth and their children's school readiness—is supported, that will mean that these mechanisms will do more to mediate any maternal age “effects” on children among more versus less educated women.

To test these expectations, we use a multi-group mediated modeling approach in SEM. In this type of model, we estimate the associations between maternal age at first birth and children's early childhood test scores via the mechanisms identified above, *within* groups of women defined by their own educational attainment. By looking within groups, this approach avoids some of the selection and endogeneity concerns that can challenge this line of research, such as the potential for background factors linked to different levels of education to select women into early or later childbearing, for more educated women's career aspirations to postpone their fertility plans, or for early pregnancy to curtail degree attainment among less educated women. We also address many threats to causal inference by controlling for numerous observable sources of selection, such as maternal employment, marital status prior to the child's birth, and characteristics of the mother (e.g., history of deviant behavior, her family of origin) (Blackburn, Bloom, and Neumark, 1993; Caspi and Elder, 1988). For conceptual reasons—for example, because women with lower levels of education have, and historically had, children at earlier ages—we also interpret any benefits of delayed fertility in relation to the norms of fertility for each maternal education group.

In sum, within the diverging destinies framework (McLanahan, 2004), two life course characteristics of U.S. women, their educational attainment and fertility timing, may contribute to the intergenerational transition of inequality (Martin, 2004). We focus on the interplay of these life course characteristics, both the tendency for educational attainment to delay fertility and to magnify any benefits of delayed fertility for children. Empirical support for this double advantage will illuminate how the timely intersection of demographic patterns in one generation differentiates the future life course prospects of the next.

Methods

Data and Sample

Data come from the Early Childhood Longitudinal Study–Birth Cohort (ECLS-B), a nationally representative panel study of U.S. children and their families designed to provide information on children's development from birth through kindergarten. In 2001, approximately 10,400 newborns were selected based on a clustered list frame sample of births registered in the National Center for Health Statistics vital statistics system. The first wave of data collection occurred with an in-home interview of parents when children were nine months old, followed by data collection through a variety of means when children were two years old, in preschool (age four), and in kindergarten.

The analytical sample for this study was restricted to first-time mothers of singletons over aged 15 who lived with their children consistently through the preschool data collection. This subsample includes about 2,550 children (number rounded to nearest 50 per data use guidelines), among whom 40 percent were race/ethnic minorities (vs. 42% of the full preschool sample), 21 percent were poor (vs. 22%), 20 percent were headed by mothers without high school diplomas (vs. 21%), and 60 percent were married at the time of the child's birth (vs. 67%).

Measures

Children's school readiness—We use two composite measures based on children's responses to a subset of questions at the preschool wave and Item Response Theory (IRT). A reading score captured language (e.g., receptive language) and literacy (e.g., letter recognition) skills. A math score captured basic math skills (e.g., patterns, numbers). IRT evaluates patterns of correct and incorrect answers. As such, children's scores convey their probability of correctly answering each question of the test, should they have completed the entire test. Math scores range from 9.8 to 65.7 ($\alpha = .84$) and reading scores range from 11.7 to 80.3 ($\alpha = .89$). Spanish-speaking children not deemed fluent in English completed the assessments in Spanish.

Maternal education—Around the time of their children's birth, mothers reported their number of years of completed schooling. At the 9-month data collection they reported their highest degree. Combining this information, we categorized women into three groups based on their highest degree: no degree (high school drop outs); high school degree/GED and possibly some college experience but no four-year degree; four-year college degree or higher. We include an indicator for whether the mother reported any additional education between the nine-month and preschool data collections as a control.

Maternal age—A chronological measure of mothers' ages in years came from the child birth certificates. We explored using a categorical measure to assess non-linearities in the link between maternal age and child outcomes. Visual inspection of the smoothed scatter plots (age by child math and reading scores), however, revealed no meaningful cut-point. Furthermore, a quadratic term for maternal age was not significant in both the full and stratified samples. Thus, our continuous measure was deemed appropriate. It was group mean-centered in multi-group analyses for each maternal education group.

Mediators—Six variables, all measured at the preschool wave, tapped the hypothesized mechanisms in the conceptual model. The first, *household income*, captured all financial resources available to the mother and child and was available for mothers not working. It was measured on a 1–13 scale based on a scheme constructed by the ECLS-B where values are coded as follows: 1= *less than \$5000 annual household income*; 2–8 correspond to increases in intervals of \$5000 (e.g., 2=\$10,000, 8=\$40,000); 9=\$40,000–\$50,000, 10=\$50,000–\$75,000, 11=\$75,000–\$100,000, 12=\$100,000–\$200,000, and 13=*over \$200,000*. We also included a measure of mothers' *personal income* from employment via their hourly pay. It was derived from mother reports of how much income they made through salary, wage, and/or tips, how often they took home a particular pay amount, and how many hours

they worked for pay in the past week. Models using the measure of mothers' wages necessarily excluded women not working at the preschool wave. Next, mothers' *human capital* was based on 1989 General Social Survey (GSS) prestige scores linked to the 2000 Census occupational codes. Scores ranged from a low of 27.1 to a high of 64.2. Again, in models that include this measure we had to exclude mothers who were not employed at the preschool wave.

For parenting, the Two Bags Task instrument was used to observe and rate semi-structured mother-child interactions on her emotional support, cognitive stimulation, negativity, intrusiveness, and detachment. These five evaluation measures were summed and averaged (intrusiveness, negativity, and detachment were reverse coded) into a scale of mothers' *cognitive support and sensitivity*, with scores ranging from 1 (low) through 7 (high). An additional parenting measure, academic support, was the average of mothers' reports on the frequency at which she engaged in three *educational activities* with her child: reading books, telling stories, and singing songs (*1 = not at all, 4 = every day*).

For relationship experiences, we measured *relationship stability* with mother reports at each wave on who was in the home, whether the current partner was in the home at the previous wave, and her marital status. Any change in marital status or partner resulted in a score of "1", and total number of changes was summed (capturing instability). Mothers with no change in their union statuses were assigned a value of "0." *Relationship quality* was based on mothers' reports of the degree to which they argued with their partners on ten different topics, such as domestic responsibilities or money (*1 = often, 4 = never*). We averaged responses to the ten items, so that "1" reflected the least conflict and "4" the most. We excluded mothers without a partner or spouse from models that included this measure.

Controls—We accounted for maternal sociodemographic characteristics and selection into different educational levels/age at first birth through covariates reported around the child's birth: mothers' race/ethnicity (dummy coded *White, Black, Hispanic, Other*); whether her prenatal care was supported by Medicaid to approximate living in a poor household prior to the child's birth; whether the pregnancy had at least one risk factor; she smoked 10 or more cigarettes a day in the three months prior to pregnancy; she was employed in the months prior to the child's birth; she grew up in a home that received welfare; she exhibited any 'deviant' behavior (e.g., expelled from school, fired from a job) during adolescence; and whether her mother's father and her mother had at least a high school education. All of these measures were coded as dichotomous (*0 = no, 1 = yes*), except for race/ethnicity. Child controls included child gender (*0 = male, 1 = female*) and whether the child was born low birth weight (*0 = no, 1 = yes*). Family controls included dummy measures for family structure at the 9-month interview (*married to child's biological father, cohabiting, single*), dummy measures for the child's father's education (same categories as mother), and a continuous measure of the number of children in the household at the preschool wave. Lastly, we accounted for preschool measures of maternal labor force participation (*not working, part-time, full-time*), an indicator for whether the mother was not partnered, her self-reported health (*excellent/very good = 0, good/fair/poor = 1*), and depression. Maternal depression was based on an average of responses (*1 = rarely or never or less than one day a week, 4 = most of the time or 5 to 7 days a week*) to 12 questions (e.g., feeling anxious).

Analysis Plan

The initial step was estimating the association between mothers' age at first birth and their children's math and reading scores for the full sample, using linear regression in the software Mplus (Muthen and Muthen, 2012). Next, we used multi-group modeling to estimate whether this association differed across subsamples defined by maternal educational attainment. In this framework, we estimated a distinct path coefficient for maternal age predicting children's math or reading scores within each maternal education group and then compared the fit of this model to one in which the age parameter was constrained to be equal across pairs of groups (e.g., college and high school) using the chi-square ratio test (Bollen and Curran, 2005). All models included the covariates described above, holding their path coefficients equal across groups.

In the initial multi-group model, maternal education was examined as a moderator of the association between maternal age at first birth and children's test scores. We expanded this model by incorporating mediators of this association within each group. Formally, this model was a mediational multi-group model (see Preacher, Rucker, and Hayes, 2007). To begin, we entered each of the seven hypothesized mediators into separate models by simultaneously regressing the dependent variable on the mediator and the mediator on maternal age, within multiple groups. Mplus' INDIRECT procedure used the product of the coefficient method and delta method standard errors (MacKinnon, Fairchild, and Fritz, 2007) to assess which mediators indirectly linked maternal age and child test scores in each group. As a final step, all significant mediators were examined at the same time in one model.

Bivariate models included the sampling weight (W31C0), created by the National Center for Educational Statistics to account for the initial sampling and nonresponse, over-time attrition, and differential nonresponse at the preschool wave. Multivariate models were estimated with Mplus' COMPLEX procedure, which adjusted for the complex survey design in which children were clustered within primary sampling units while also allowing the sampling weights to be used. Any missingness on the dependent variable due to attrition was accounted for by the study weights. Other sources of item missingness were handled through full information maximum likelihood estimation (FIML), which estimated a likelihood function for each individual based on the available information so that all cases were used (Allison, 2001).

Results

Bivariate Associations

Table 1 displays mean level estimates of the focal study variables and selected covariates by maternal education group and for the full sample. Overall, the average age at first birth for women in the ECLS-B was 25.1 years—close to the year 2000 estimate (around the time ECLS-B children were born) of 24.9 years based on birth registry data (Matthews and Hamilton, 2002). Yet the average age for women with college degrees was much higher at over 30 years (vs. 20 among mothers who did not have a high school degree and 24.5 for mothers with high school degrees). These patterns are consistent with prior research

showing pronounced differences in age at first birth by women's education (Martin, 2004; Martinez, Daniels, and Chandra, 2012).

These patterns also reflected how mothers' demographic pathways converged to shape current patterns of inequality in both generations. For example, two-thirds of college educated mothers lived in households with incomes over \$75,000, yet less than one percent of mothers without high school degrees did. College educated mothers also had the highest average occupational prestige score ($M = 53.3$), which was 0.77 standard deviations above the sample average. The score for women without high school degrees was 36.0, 0.66 standard deviations below the sample average. A similar pattern extended to the non-socioeconomic factors, with college-educated women's values on measures of cognitive stimulation and academic support for their children being 0.40 and 0.29 standard deviations above the sample average, respectively, as well as higher average relationship stability and fewer union changes overall (although, note the lack of a significant difference in relationship conflict).

Table 2 also revealed preliminary evidence of how age at first birth may distinguish the achievement of children of the college educated mothers more so than children of women with lower levels of attainment. The bivariate associations between children's math and reading scores and categorical measures of maternal age revealed a clear pattern for the college educated group in which children's test scores increased in tandem with their mothers' age at first birth. The reading score difference between children born to mothers age 30 or older versus 22–24 was, on average, 3.6 points. For math, this difference was 4.3 points. For the high school degree group, the pattern of results was similar to the college educated group, but age-related differences were narrower. For example, the difference between the reading scores of the children born to mothers age 30 or older versus 22–24 was 3.4 points. Among the group without a degree, the math and reading scores of children born to women without degrees did not seem to increase in a clear and logical manner.

In the multivariate models that follow, we were able to examine these bivariate linkages together. This multi-group path model assessed whether the linkage between mothers' age at first birth and children's academic scores significantly varied across maternal education groups via differences in mothers' financial and human capital, parenting, and relationship quality.

Multi-Group Path Models

The multivariate analyses began by estimating the associations between mothers' age at first birth and her child's math and reading scores for the full sample, net of the covariates (e.g., mother's race, child gender) except for fathers' education, which was highly correlated with mothers' education. These models also do not include the mediating variables (i.e., those factors hypothesized to be endogenous to age at first birth, such as cognitive support), which are added in the final modeling steps. Excluding parents' education, we found a statistically significant association between mothers' age at first birth and children's test scores ($M = .164$, $SE = .03$, $p < .001$ for reading; $M = .164$, $SE = .03$, $p < .001$ for math). After accounting for both parents' education, this significant association was reduced to non-significance, suggesting that the links between maternal age and children's test scores could

have been spurious. Yet, maternal age at first birth could also have been positively associated with children's school readiness in *some* groups of women but not others. We explored this possibility through a multi-group approach.

The multiple groups models (not shown), however, revealed no evidence that maternal age at first birth was significantly associated with child math or reading achievement for any maternal education group. Still, lack of a *direct* effect of maternal age at first birth on children's test scores—that is, a direct connection between these factors unmediated by other factors—across groups does not discount the possibility that the effect of maternal age at first birth could have been transmitted through an intervening mechanism (see Hayes [2009], MacKinnon, Fairchild, and Fritz [2007], and Shrout and Bolger [2002]). In other words, the association between maternal age at first birth and children's achievement may be *indirectly* linked. This possibility is particularly likely to occur in situations where the independent and dependent variables are temporally distant and, thus, likely to be linked via some intervening factor. The presumption that a direct effect must exist for there to be an indirect effect comes from the tradition causal steps approach to testing mediation (Baron and Kenney, 1986), yet this approach has low power to detect an indirect effect. We now have newer methods involving tests of the indirect effect using the product- of-the-coefficient method, which have much greater power to detect an indirect effect than these traditional ones and which we employ in our investigation.

Moving forward, we estimated seven multi-group models, each including one mediating variable. Neither mothers' occupational prestige nor her relationship quality (reflected in her reports of relationship conflict) formed an indirect link between mothers' age at birth and children's math and reading for any maternal educational group, nor did our indicators of relationship stability, personal income, or educational activities. The two mediators that were significant (cognitive support, household income) were analyzed collectively in one final model for the full analytic sample. This model retained union stability as a covariate to account for (in combination with the control for mothers' marital status at 9-months) mothers' marital status at preschool and any confoundedness between family structure and our family income mediator. Table 3 presents the coefficients for the models predicting children's reading and math scores.

These models revealed some previously obscured patterns. Among women with college educations, a unit deviation from the mean age at first birth in this group of women was associated with increases in their levels of cognitively supportive parenting. This aspect of parenting, in turn, predicted children's math and reading scores and, according to the INDIRECT tests in Mplus, formed a statistically significant link between mothers' age and children's school readiness. For example, if a college educated women were to have her first child at age 32 (two years later than the average college educated women), the associated increase in her engagement in cognitively supportive parenting would be a standardized effect of .22 (larger than the effect associated with the father having a college degree), and this increased engagement would then be associated with an increase in children's math and reading scores. No such pattern was observed in any other maternal education group. Ancillary analyses separating out the women with some college education from those with only a high school degree in the high school group revealed a similar pattern of results; the

coefficients for both groups were insignificant and about the same size. The way in which educational attainment was captured in the ECLS-B meant we could not further distinguish between women with high school diplomas versus GED equivalencies.

Household income also appeared to increase alongside maternal age at first child among women with high school and college degrees but not high school dropouts. These indirect effects were statistically significant. In contrast to our expectation, however, the size of the standardized effects for the high school dropouts and high school graduates exceeded those for the college graduates (.34 versus .22), suggesting that age at first birth may matter more for household income for women with a high school degree than a bachelor's degree. Again, the pattern of results was the same when we looked for heterogeneity within the high school group by distinguishing among women with some college versus a high school degree/GED.

Discussion

The potential for children to do better in many developmental domains, including academics, when their mothers delay having children has generated a great deal of discussion. Much of this supposed advantage, however, is due to selection (Geronimus, Korenman, and Hillemeier, 1994; Turley, 2003). More educated women wait longer to become mothers and their children tend to have more positive developmental trajectories. Thus, maternal education must be controlled when examining the potential benefits to children of delayed fertility. This study goes a step further, incorporating maternal education into the analysis of delayed fertility and child well-being. Certainly, education is a factor that leads to delayed fertility, but it might be a factor that magnifies any "real" returns to delayed fertility, too. This possibility is highly relevant to the diverging destinies framework that has such crucial theoretical and policy significance.

Multi-group analyses of nationally-representative data revealed some evidence for this expectation that age at first birth might confer the greatest benefits to the children of women with college degrees, although not all our hypotheses were supported. We did not find that maternal age at first birth had a stronger or larger association with maternal relationship quality (measured by less conflict and instability) or occupational prestige for the most educated women. In fact, the association between these factors and maternal age at first birth did not significantly vary across any maternal education group. Occupational prestige, at least measured by GSS prestige scores, may have been too stable over time while any association between maternal age and relationship quality seemed to be solely a function of the link between maternal age and marital status (Copen, Daniels, and Vespa, 2012). We also did not find an association between mothers' wages and educational activities for the most educated women. We believe these null patterns reflect the fact that our measure of educational activities, which was mother-reported frequency of three activities (e.g., reading to children), lacked variability, while our measure of maternal wages did not capture all sources of income available to mothers, work related and otherwise.

We did find that each year increase in maternal age at first birth was associated with more cognitively stimulating parenting of their young children, and via parenting, their children's higher achievement, but only for women with college degrees. Notably, this parenting

measure was based on observations, encompassed more indicators, and captured a much wider range of parent behaviors than the educational activities measure. Our interpretation of this finding is that because women with more education have greater access to social and cultural capital across the life course that enhance parenting (Coleman, 1988; Lareau, 2004), when they delay their fertility, they can accumulate even more of it through various social (e.g., volunteering), cultural (e.g., travel), and work-related experiences (e.g., pursuing new responsibilities). Such resources are less accessible for women without college degrees, who do not have the time to participate in many social activities, financial means to participate in many cultural activities, and are in routine work positions, so any delays in their fertility would not provide any additional access to such resources. The implications of this pattern for children's diverging destinies is that children of higher educated women receive a double parenting advantage associated with their mothers' education and delayed fertility that alters their learning trajectories early on.

We also found that for college educated women, each year increase in maternal age at first birth was associated with more income when we accounted for all sources of family income, and via total income, their children's higher test scores. Yet, we found a similar pattern for women with high school degrees. The magnitude of the indirect effects of maternal age via income on children's test scores were roughly the same for both of these maternal education groups. This finding ran counter to our expectation that college educated women would experience more financial returns associated with older ages at first birth than all other groups of women. At the same time, what we did not observe was an increase in children's school readiness associated with an increase in their mothers' age at first birth via greater family income for high school dropouts. In fact, their increased age at first birth did not yield any financial benefit. This pattern extended to women without high school degrees who delayed their first birth beyond the time it would have taken to earn their diploma—as was the case for over 75% of women in this group who first gave birth at age 19 or older.

Despite adding new wrinkles to the diverging destinies thesis in general and the literatures on maternal age at first birth and maternal education more specifically, some limitations to this study must be acknowledged. The main drawback concerned the observational data in ECLS-B, which made it impossible for any exploration or testing of counterfactuals, such as whether we would have observed any increase in family income for women without high school degrees who delayed their fertility into their late 20s or early 30s. In other words, any estimated benefit was constrained by the fact that the difference in mean age at first birth for the least educated and most educated groups was nearly ten years. Thus, comparing groups was challenging, which is one reason why looking within groups was important. The observational data also limits our ability to control for unobservable factors that select women into early vs. later fertility, even with the same educational attainment, although we should point out that some studies (see Miller [2009]) have reported that the effects of maternal age on child outcomes are in fact underestimated by correlational methods (like ours) versus other methods (specifically instrumental variables) that better adjust for non-randomness in motherhood timing. Lastly, data limitations precluded us from testing for differences between women with GEDs versus high school diplomas or assessing the relative importance of mothers' versus fathers' contribution to household income

(information on mothers' and fathers' wages and salary was not captured in a way that allowed for appropriate comparisons with each other, nor against household income).

Overall, the findings of this study reflect the different labor force returns and relative economic mobility enjoyed by mothers with different educational histories, and how these returns may be non-economic in nature. These findings also indicate that maternal education can be incorporated into considerations of the intergenerational consequences of delayed fertility in ways that do not completely discount the possibility that such delays do matter. In terms of policy, delayed fertility may yield benefits for children but only among the families who are generally not the targets of such policy initiatives.

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Table 1

Means and Percentages of Focal Study Measures and Selected Covariates for the Whole Sample, and by Mothers' Education ($n = 2,550$)

	Total Sample	Less than HS	HS/GED	College or more
Average age at first birth	25.1 (6.0)	20.1 (4.5)	24.5 (5.3)	30.3 (4.4)
Age-mediating variables				
Household income				
\$20,000 or less	21.1	47.1	20.4	1.1
\$20,001 to \$40,000	27.0	41.2	32.0	6.6
\$40,001 to \$75,000	24.6	11.0	29.9	26.7
\$75,001 or more	27.3	0.8	17.7	66.7
Average educational activity score	3.1 (0.7)	2.8 (0.7)	3.1 (0.6)	3.3 (0.5)
Average cognitive support score	5.7 (0.5)	5.5 (0.6)	5.6 (0.5)	5.9 (0.4)
Average family transitions	0.3 (0.6)	0.4 (0.7)	0.4 (0.6)	0.1 (0.3)
Average partnership conflict	3.1 (0.6)	3.1 (0.8)	3.1 (0.5)	3.1 (0.5)
Average occupational prestige score	44.0 (12.1)	36.0 (9.1)	41.3 (10.7)	53.3 (10.6)
Average personal income	24.4 (69.7)	9.6 (6.2)	18.8 (31.2)	42.5 (120.1)
Selected background measures				
Mother's race/ethnicity				
Non-Hispanic White	59.6	33.5	60.2	79.4
Non-Hispanic Black	13.0	17.0	15.2	5.1
Hispanic White	21.5	44.8	19.5	7.1
Other race	5.8	3.7	5.2	8.5
Mother's prenatal care through Medicaid	37.8	69.6	41.6	4.7
Mother grew up in a household receiving welfare	9.7	17.2	10.3	3.2
Grandmother has at least a HS education	67.9	39.7	67.9	88.9
Grandfather has at least a HS education	69.3	36.7	69.0	90.4
Family structure at 9 months				
Married biological parents	60.1	29.0	56.1	92.8
Cohabiting biological parents	16.5	30.1	17.9	3.1
Single mother (w/ or w/out non-biological partner)	23.5	41.0	26.0	4.1
Mother employed prior to child's birth	79.8	48.3	84.4	94.8
Selected pre-kindergarten measures				
Mother not working at preschool wave	36.8	55.8	33.5	28.9
Mother working part-time at preschool wave	20.1	14.5	19.4	25.2
Mother working full-time at preschool wave	43.1	29.7	47.1	45.9
Average maternal depression at preschool wave	1.4 (0.4)	1.5 (0.5)	1.4 (0.4)	1.3 (0.3)
Mother in good/great health at preschool wave	65.7	43.1	65.7	83.5
<i>n</i>	2,550	450	1,350	750

Notes: Means and percentages calculated using weights. Standard deviations in parentheses. Ns are rounded to the nearest 50 due to NCES's rounding rules.

Table 2Average IRT Pre-K Scores by Maternal Age and Education ($n=2,550$)

	Total Sample	Less than HS	HS/GED	College or more
IRT reading pre-k scores				
All	26.6 (10.8)	20.2 (7.1)	25.4 (9.6)	33.5 (11.5)
16–18 years	21.5 (7.4)	20.7 (7.0)	23.5 (8.0)	-
19–21 years	23.3 (9.0)	19.7 (6.7)	24.4 (9.3)	-
22–24 years	25.3 (10.0)	20.3 (9.7)	25.0 (9.4)	30.8 (10.6)
25–29 years	28.6 (10.5)	18.1 (6.8)	26.2 (9.4)	33.0 (10.3)
30 years and older	31.2 (12.2)	20.7 (4.1)	27.4 (10.9)	34.4 (12.3)
IRT math pre-k scores				
All	30.3 (9.7)	24.9 (8.6)	29.5 (9.0)	35.9 (9.0)
16–18 years	26.0 (8.7)	25.2 (8.2)	27.8 (9.7)	-
19–21 years	27.7 (9.1)	24.9 (9.6)	28.5 (8.9)	-
22–24 years	29.6 (9.3)	24.5 (8.2)	29.4 (9.2)	34.1 (8.2)
25–29 years	32.0 (9.8)	22.3 (9.1)	30.0 (8.5)	35.9 (9.7)
30 years and older	33.9 (9.3)	26.0 (7.2)	31.2 (9.3)	36.1 (8.7)
<i>n</i>	2,550	450	1,350	750

Notes: Means calculated using weights. Standard deviations in parentheses. Ns are rounded to the nearest 50th due to NCES's rounding rules.

Table 3

Path Coefficients for Multi-Group Path Models Predicting Reading and Math Scores via Significant Mediators ($n=2,550$)

	Reading - Standardized B (SE)			Math - Standardized B (SE)		
	Cognitive Support	Household Income	Reading Score	Cognitive Support	Household Income	Math Score
No Degree						
Mothers' age at first birth	-0.113 (0.098)	0.048 (0.042)	0.001 (0.977)	-0.114 (0.098)	0.048 (0.042)	0.007 (0.061)
Cognitive support	---	---	0.129** (0.041)	---	---	0.143*** (0.034)
Household income	---	---	0.117** (0.034)	---	---	0.090** (0.029)
High School Degree						
Mothers' age at first birth	0.040 (0.040)	0.340** (0.032)	0.043 (0.287)	0.042 (0.040)	0.340** (0.032)	0.037 (0.041)
Cognitive support	---	---	0.088** (0.025)	---	---	0.123*** (0.026)
Household income	---	---	0.102** (0.031)	---	---	0.099** (0.032)
Bachelor's Degree						
Mothers' age at first birth	0.106* (0.043)	0.201** (0.044)	0.032 (0.042)	0.107* (0.043)	0.201* (0.044)	-0.022 (0.043)
Cognitive support	---	---	0.057** (0.017)	---	---	0.094*** (0.022)
Household income	---	---	0.049** (0.016)	---	---	0.056** (0.019)

Notes:

*
 $p < 0.05$,**
 $p < 0.01$,***
 $p < 0.001$

Models included background and preschool wave measures described in Table 1 and controls (fathers' education, geographic region, child's gender, number of siblings in the household at preschool wave, low birth weight, mother attained more education after child's birth, mothers smoking during pregnancy, reports of any deviant behavior, whether mother lived in the same household with her own mother until at least age 16, whether mother was single at preschool wave, and whether mother's pregnancy was high risk).

Reading: $\chi^2=76.74$, $df=70$; $p<.27$; $CFI=.97$; $RMSEA=.011$; Math: $\chi^2=90.33$, $df=70$; $p<.05$; $CFI=.90$; $RMSEA=.019$.