Education and childbearing: what are the links?

The minimum age at which teenagers in England can leave education will rise from 16 to 17 in 2013 and then to 18 in 2015. *Michael Geruso* explores whether the young women who spend longer in school as a result might be more likely to postpone motherhood.

It is a remarkably robust fact of the modern world that within any time and place, women who have attained higher levels of education tend to have fewer children and to postpone childbearing until later in their lives. What is less well understood is whether this correlation is causal.

Women who are more highly educated have lower fertility rates early in life and higher fertility rates later in life

If higher educational attainment causes lower fertility, then policies that promote education can be viewed in light of their likely consequences for childbearing. The impacts on fertility are particularly relevant to long-term planning for the fiscal solvency of social welfare programmes, many of which are sensitive to the age structure of the population and the ratio of working-age people to retired people.

There are many plausible explanations for the association between education and fertility. Beginning with Gary Becker's work in the 1960s, economists have tended to think of wages as one of the primary mechanisms linking education to fertility. Because a higher level of educational attainment endows workers with higher earnings potential, the value of a woman's time, which could potentially be spent in the labour force, increases with her level of education.

This higher implicit value of time makes childbearing and childrearing, which are time-intensive processes, relatively more costly in terms of forgone earnings, compared with women with less education. As a result, the theory goes, women of higher educational attainment may substitute away from having large numbers of children, in favour of investing more financial resources into a fewer number of children or of substituting toward the enjoyment of other types of goods altogether.

Of course, a sensible alternative explanation is that the correlation between education and fertility merely reflects differences in underlying preferences, and that we observe a spurious association between educational attainment and fertility decisions that is not caused by education. In other words, some third factor might drive both a woman's educational choices and her fertility decisions. Family background is an obvious candidate.

In a recent study, I explore the relationship between education and fertility patterns using data from the National Child Development Study (NCDS) with the aim of establishing what part of the observed education-fertility relationship, if any, is causal.

The NCDS is a panel study that has followed a cohort of children born in the UK during one week in March 1958 from childhood to adulthood and on through their own childbearing years. Data are reported from interviews with the cohort members themselves, as well as interviews with their parents and representatives from their schools (during their early years). Importantly, substantial information on family background at various ages is recorded.

Figures 1 and 2 show the basic relationship between education and fertility, in the absence of any controls for family background. Figure 1 displays, for female respondents, the average cumulative number of children born by each age. Separate curves are drawn according to the age at which the woman left full-time education.

A strong relationship between years of education and fertility is apparent, with women of lower educational attainment having children sooner, on average, and ending their childbearing years with a greater number of children.

What is not obvious from Figure 1 is that by the age of 30, patterns of fertility reverse, with more highly educated women having more children at each age. These time-patterns of births are shown more clearly in Figure 2, which displays the age-specific, rather than cumulative, fertility rates: at each age, it shows the average number of children born to women of that age.

Women of higher educational attainment have lower fertility rates early in life and then higher fertility rates later in life, though the magnitude of the reversal is not strong enough to change the ordering of educational groups in terms of cumulative childbearing.

One insight into the causal effect of education on fertility is apparent even from this plot of the raw data: education does not affect fertility

Despite the strong correlation between education and fertility, education seems to have no causal effect on childbearing decisions

Figure 1: Cumulative fertility, by age left education

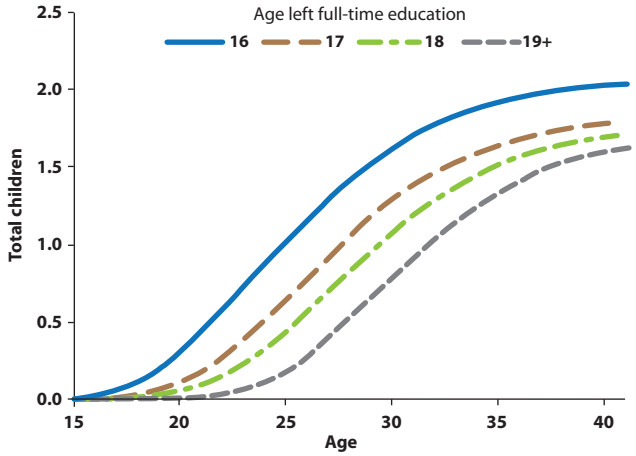
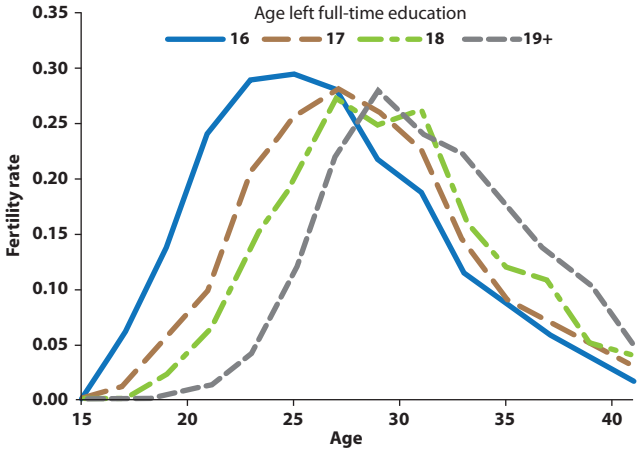


Figure 2: Age-specific fertility, by age left education



merely through an 'incarceration effect', by which fertility is reduced over the period in which a woman is a student. One might expect an incarceration effect simply because a student lacks the opportunity and/or desire to become pregnant while pursuing her education.

Figure 2 shows that the fertility-education correlation remains long after leaving full-time education. Women who left school at age 16 will bear more children between the ages of 20 and 25 on average than women who left at 17, despite full-time education being long since completed for both groups.

Figures 1 and 2 merely confirm for women of the 1958 birth cohort a pattern observed in many other studies: education predicts fertility. But it leaves open the question of whether education causes fertility.

To make headway on that question, I bring the correlations of Figures 1 and 2 into a regression framework and introduce detailed controls for family background, including: mother's and father's education; father's social class; whether parents report financial hardship (at various ages of the child); whether a school reports the child receiving free school meals; religion; number of older and younger siblings; and the cohort member's childhood test scores at various ages. The outcomes I examine are total children ever born and age at first birth, which are intended to capture education's effects on both total fertility and timing.

The results show that controlling for family background and academic ability can account for a significant portion of the education-fertility association. Including the set of controls listed above reduces the estimated effect of education on total children and age at first birth by 30-40%. This result suggests that at least part of the relationship between education and fertility is driven by some third factor, which is either family background or something correlated with family background.

Policies that improve educational attainment will not necessarily lead to reduced fertility or postponed childbearing

To push the analysis further, I use a unique feature of the NCDS data. The NCDS was one of the first cohorts of people to be affected by a 1973 reform that raised the minimum school leaving age from 15 to 16. At age 16, NCDS respondents were asked if they would have left school at age 15 had they been allowed to.

This allows me to analyse a simple question: among women in the NCDS who wished they could have left school at 15 (but who actually left school at 16), do fertility patterns appear more similar to the women prior to the 1973 reform who actually left school at 16 or to the women prior to the 1973 reform who actually left school at 15?

That comparison provides some very stark results. The fertility patterns of women who were forced to leave school at age 16, but who wished to leave school at age 15, are remarkably similar to the fertility patterns of women born just a year earlier who *actually* left school at 15. This implies that an additional year of education had no effect on the fertility choices of the women who were forced to stay in school until age 16. Instead, whatever preferences these women had regarding the size of their families and the timing of their pregnancies were fixed in a way that additional education did not affect.

The result that education seems to have had no causal effect on childbearing decisions in this context is somewhat surprising, given the strong overall correlation between education and fertility in the data. Nonetheless, the evidence here indicates that regardless of whatever else we expect to result from policies that improve educational attainment, we should not necessarily expect reduced fertility or postponed childbearing.

Michael Geruso is at Princeton University.