Accelerating fertility decline through education and family planning

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Daphne H. Liu and Adrian E. Raftery find that increasing women's educational attainment and contraceptive prevalence can have an accelerating effect on fertility decline in high-fertility countries, with a larger effect for the latter. For education, it is most effective to increase women's completion of lower secondary education. These accelerating effects hold in sub-Saharan Africa, but are smaller than elsewhere.

The United Nations projects that world population will increase from its present 7.7 billion to 10.9 billion in 2100, with more than half of this increase occurring in sub-Saharan Africa, mostly in high-fertility countries (United Nations 2019), and much of the remainder in Asian and Latin American countries with above-replacement fertility. It is widely thought that these countries would benefit from lower fertility, as rapid population increase is likely to have adverse economic, environmental, health, governmental, and political consequences (Bongaarts 2013). Faster fertility decline would also generate a demographic dividend (Lee and Mason 2006).

This raises the question of how to accelerate fertility decline in high-fertility countries. There is widespread agreement in the literature that education and family planning are the two main factors that can be influenced by policy (Hirschman 1994).

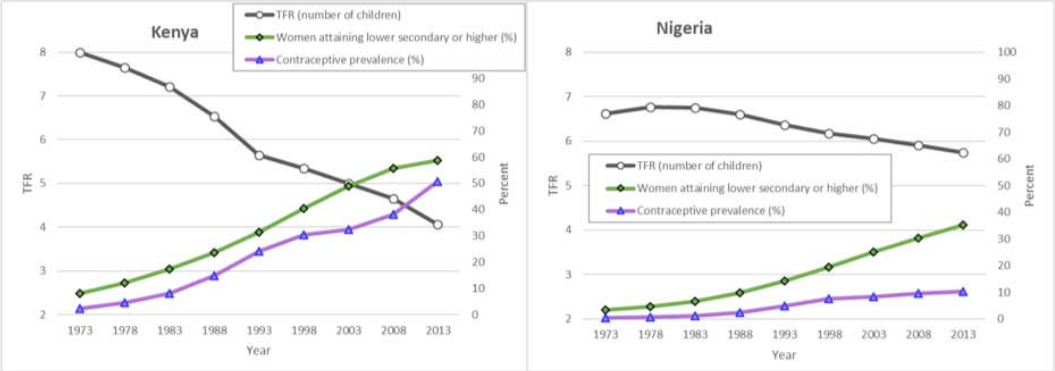
The role of education and family planning

In a recent paper (Liu and Raftery 2020), we investigated whether various education and family planning measures have an accelerating effect on fertility and compared the different mechanisms involved. The effect of education on fertility could operate in either of two ways: either by increasing children's school enrollment or by raising women's educational attainment. Increased enrollment increases the cost of raising children through costs associated with schooling or through their reduced capacity to work, for example, while

women's increased educational attainment increases the opportunity cost of having children. The effect of family planning on fertility could be driven by increasing contraceptive prevalence or by decreasing unmet need for family planning.

Figure 1 shows trends in the total fertility rate (TFR), the percentage of women who have attained lower secondary education or higher, and the prevalence of modern contraceptive methods for Kenya and Nigeria from 1975–80 to 2010–15. The decline in TFR has been faster in Kenya than in Nigeria. Correspondingly, we see faster growth in women's educational attainment and contraceptive prevalence in Kenya than in Nigeria.

Figure 1 - TFR (black), percentage of women who have attained at least lower secondary education (green), and contraceptive prevalence (purple) for Kenya from 1970-1975 to 2010-2015 and Nigeria from 1975-1980 to 2010-2015



Source: Liu and Raftery (2020).

We analysed whether education and family planning measures have an effect on fertility decline beyond what we would already expect based on past fertility trends. We accounted for the expected fertility decline based on the UN model, which projects TFR probabilistically using data on past fertility (Alkema et al. 2011; Raftery, Alkema, and Gerland 2014; Fosdick and Raftery 2014). This allowed us to determine whether any such additional effects can be identified.

Substantial fertility decline is possible

Our analysis focused on high-fertility countries from 1970 to 2015, broken down into nine five-year periods. Countries were considered high-fertility in the time periods where the TFR was higher than 2.5 children per woman, resulting in a dataset of 666 observations from 121 countries. We used UN estimates of TFR and family planning indicators, and education data from the Wittgenstein Centre and the World Bank. We included control variables measuring child mortality, GDP growth, and urbanization in our models, using UN and World Bank data. We also looked at the effect of education and family planning on fertility decline within sub-Saharan Africa (SSA) compared to other regions of the world (non-SSA) using interaction terms.

For education, we found that women's educational attainment was more important for accelerating fertility decline than children's enrollment. Specifically, larger rates of increase in the proportion of women who have completed at least lower secondary education (as defined by the International Standard Classification of Education) corresponded to faster declines in TFR. To give an extreme hypothetical example, the result of a country in SSA going

from 0% to 100% of women attaining lower secondary education or higher in one 5-year time period corresponds to a TFR reduction of 1.22 children (Table 1). The same increase in women's education in a non-SSA country corresponds to a TFR reduction of 1.79 children.

For family planning, we found that increasing contraceptive prevalence, i.e. the proportion of married women using modern contraceptive methods, played a greater role in accelerating fertility decline than decreasing unmet need for family planning, defined as the proportion of married women who want to delay or stop childbearing but are not using contraception. For a country in SSA, the extreme hypothetical example of increasing contraceptive prevalence from 0% to 100% would correspond to a TFR reduction of 1.83 children, compared with 3.38 children for a country in non-SSA (Table 1).

Table 1 - Reductions in TFR corresponding to hypothetical changes in proportion of women attaining lower secondary education or higher, and contraceptive prevalence in one five-year time period for countries not in sub-Saharan Africa and countries in sub-Saharan Africa

Change in One Five-year Time Period	non-SSA	SSA
0% to 100% women attaining lower secondary education or higher	1.79	1.22
0% to 100% contraceptive prevalence	3.38	1.83

Source: Liu and Raftery (2020).

Why are these effects smaller in SSA than elsewhere? We have no definitive answer. However, it has been suggested that high average ideal family size (Bongaarts and Casterline 2013) or lower school quality in SSA (Grant 2015) may be contributing factors.

Policy implications

Our findings suggest several possible implications for policies aimed at accelerating fertility decline in high-fertility countries. In terms of education, it is women's attainment, more than children's enrollment, that leads to accelerated rates of fertility decline. Of the different education levels, we found that lower secondary education has the most important accelerating effect, though all levels of secondary education matter. Lower secondary education is generally considered as the final stage of basic education, and this suggests that making completion of lower secondary education universal throughout the world would accelerate fertility decline.

In terms of family planning, we found that increasing contraceptive prevalence was more important for accelerating fertility decline than decreasing unmet need. This distinction is subtle, but is important to consider when measuring progress of family planning programmes.

Our findings suggest that policies to increase education and family planning in high-fertility countries in SSA may have a smaller effect on fertility decline than was previously seen in other high-fertility regions. However, policies to expand women's educational attainment and contraceptive prevalence are still likely to have a positive effect.

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