Analyzing the Relationship Between Female Education and Fertility Rate

Abigail Cornett

Abstract

This article examines literature on the connection between female education and fertility rates, with a focus on developing countries. Although developing countries represent a diverse set of cultures and economies, the link between more female education and lower fertility rates seems to hold true around the world. This article also describes and explores possible mechanisms for this connection, including increased participation in the labor force, increased gender equality and social standing, and choice of partner. The most promising mechanism appears to be that of the quantity-quality tradeoff, wherein women given more formal education tend to have fewer total children but dedicate more resources to each child they have. These results indicate that developing countries, as they progress through the demographic transition, should consider implementing some program to encourage education among girls in order to reduce birth rates to match the reduced death rates. Certainly, there are many factors controlling fertility rates, but the effect of female education is significant enough that it should not be ignored.

Introduction

As developing countries go through the demographic transition from high birth rates and high death rates to low birth rates and low death rates, female education becomes an important factor in determining population growth. It has been observed around the world that women who are given primary education and especially women who are given secondary education have a lower total fertility rate than women who have not received any formal schooling (Jain 1981). Because of this, it has been hypothesized that government initiatives to educate women and girls would hasten the demographic transition by lowering birth rates. Nevertheless, even women without formal education are having fewer children today than in decades past; the availability of birth control and family planning services, the empowerment of women in other areas of society, and the increased opportunity cost of having a child are also factors that would affect fertility but are inextricably linked to female education (Basu 2002). In this paper, I will discuss the effects of female education and other related factors on fertility rate and determine whether initiatives aimed at educating women and girls would be a viable option for hastening the demographic transition. There are many other factors that affect how many children a woman may have, but here I choose to focus simply on the relationship between female education and fertility rates.

Analyzing the Relationship

There is no universally agreed-upon definition of a developing country, so in this paper, I will refer to countries with rapidly decreasing death rates as "developing." I use this term because it is convenient for analysis, and I do not use it as a means of expressing any sort of judgement on any country or region. In the demographic transition model (DTM), these developing countries would be in stages two and three of development, wherein rapidly declining

death rates tend to cause a large increase in population - especially young people - only to be followed by declining birth rates. The DTM, widely accepted among the social sciences, is only a model and can not necessarily predict the future. The model itself tends to focus on economic growth and doesn't take into account the influence of social change, which is why it may seem surprising that the increased education of females, a social movement, is so intricately tied with the DTM and has been observed to be so all around the world.

Brzozowska (2015), for example, examined fertility trends of women in Eastern European countries during the time of communism and socialism to determine whether their policies of gender equality in education manifested in a lowered birth rate. Analyzing census data from seven socialist European countries (Croatia, the Czech Republic, Hungary, Poland, Romania, Slovakia, and Slovenia) and applying decomposition and standardization methods, she examined the factors affecting fertility trends, including the essential role of rising levels of education.

Despite the common tendency of treating all socialist European countries as being roughly homogenous, or analogous to each other, Brzozowska could find no evidence for a single "socialist" fertility pattern. The countries varied widely in changing fertility, from already well-developed countries whose already-low fertility rate fell only slightly to poorer countries whose fertility rates were marked by steep decline during this period. Nevertheless, "the general trends appear to have corresponded to those in the West, namely a decline in fertility driven largely by growing educational attainment among women and falling high parity births" (pg. 712).

Similarly, Jain (1981) sought to find an explanation for the lack of uniformity in the female education-fertility relationship across countries, that is, why fertility rates can fall so

sharply in one country while declining gradually in another. He considered eleven countries in his study (Costa Rica, Colombia, Dominican Republic, Panama, Fiji, Korea, Malaysia, Pakistan, Sri Lanka, Thailand, and Indonesia), all with vastly different cultures, politics, and economies, with the only unifying thread being that they were all developing countries as Jain conducted his research.

Analyzing data published in the First Country Reports of the World Fertility Surveys, he concluded that educated women are relatively more homogeneous across countries than women with no education; that is, women with little education have a greater variation in fertility rates, while women with higher education levels have a smaller range of fertility rate. Furthermore, the fertility effect of education within a country depends on the ratio of educated to non-educated women in that country. This study was one of the first that attempted to separate the effects of increased access to labor force and increased education levels on their own, confirming that just having a formal education, even if it did not improve a woman's prospects in the workforce, would impact her fertility rate on average.

Finally, Alam et al. (2003) specifically examined the country of Pakistan, which stands out for having rapidly passed through the first stage of the demographic transition - lowering death rates due to access to advanced medical technologies - thanks to the aid of developed countries. Today, it remains in the beginnings of the second stage - lowering birth rates to slow population growth. The study hoped to determine empirical relationships between the family planning programs in Pakistan and reduced fertility, as well as to develop recommendations for future family-planning policies. The analysis used a multivariate cointegrated Granger-causal framework to show that female education and family-planning programs are causally related to fertility rate. This means that it is the dynamic interplay of female education and contraceptive

use that is the strongest determinant of fertility in the short- and long-term. It recommends that Pakistan implement an affordable but persuasive family planning program coupled with female schooling in order to decrease the nation's fertility rate.

Possible Causes

Education is not only linked to lower fertility rates but also to better child health outcomes. Currie and Moretti (2003) used Vital Statistics Natality data in the United States for 1970 to 1999 to analyze the effect of mothers' education on their children's outcomes. They examined how education induced mothers to have healthier behaviors, such as a decreased probability of smoking, which is the "single most important cause of low birth weight in the United States" (pg. 1498). The study found that a higher level of maternal education was linked to improved "child quality," at least in terms of birth weight and gestational age (pg. 1497). This is perhaps because there exists some tradeoff between child quantity and quality; in other words, mothers who choose to have fewer kids tend to invest more in their outcomes. Using an instrumental variable (IV) model to control for confounding factors, and using data about the availability of colleges at a county level as an instrument for maternal education, Currie and Moretti show that this effect is indeed causal rather than simply correlational.

Mari Bhat (2002) also observed this quality-quantity tradeoff in India, where he examined how the relationship between education levels and fertility evolved as India went through the demographic transition. He argues that India is experiencing a declining fertility and a rise in schooling because parents, even illiterate ones, have begun to make this tradeoff in reproductive matters.

This paper has mainly focused on how educated women are having fewer children, but it is important to note that in many countries, fertility decline, though most prominent among the highly educated, exists at all levels of education. Mari Bhat specifically argues that it is illiterate couples making this quality-quantity tradeoff with their children - that it is not necessarily the education level of the mother that determines fertility but rather the fertility rate which determines the education level of the child. He concedes that most economists are not of this view, rather holding that fertility and child education levels are jointly, not causally, related. However, he argues that, although this may be the case for families that make fertility and child schooling decisions well in advance, with full information on net lifetime returns, couples in developing countries rarely make decisions this way, nor do they have complete control over their fertility.

So why, then, does higher female education lead to lower fertility, and what does the idea of a quantity-quality tradeoff have to do with it? Basu (2002) examined the idea that education reduces fertility because it allows for greater gender equality, in terms of women's control over resources and their own lives. While this hypothesis has been supported by a number of economists, Basu identified some exceptions and explored other measures through which education might affect fertility without impacting change in gender status. For one, access to mass media seemed to hold a strong correlation to smaller family size. This fits with the observed fertility data in that mass media is becoming more prolific in every social class but especially among the educated. Basu hypothesizes that mass media raises the opportunity costs of having children by exposing consumers to different forms of investment and consumption. This, too, fits with the concept of a quality-quantity tradeoff.

Basu examines a few other mechanisms through which education may reduce fertility without changing the status of women in their households. For example, the content of the schooling itself for women tends to emphasize discipline, patience, routine, and obedience, so it may simply be the act of getting out of the house every day or of daily interaction with peers that reduces fertility. On the other hand, declining infant mortality may be a larger predictor of declining fertility, even before there becomes a change in the demand for children. Infant mortality is decreasing around the world but especially for more educated women, who tend to have better access to prenatal care and childcare once the baby is born.

The answer may not even have to do with the women who are becoming educated but in fact lie in the husbands who choose to marry them. Basu notes that well-educated women tend to marry well-educated men, but well-educated men can usually choose women of any education level. There may be something unique about these well-educated men who choose to marry well-educated women - perhaps they come from families who are relatively modern or they hold unique views on the role of women or children - that make them less inclined to have a large number of children. In other words, educated women tend to marry men who share their reproductive preferences, so the number of children may be as much a decision of the husbands as it is of the wives.

Conclusion

There is a strong link between increased levels of education for females and lower fertility rates. That is, the higher the level of a woman's educational attainment, the fewer number of children she is likely to bear, and this effect is shown in countries and cultures around the world. The data support that this relationship is causal (Alam et al. 2003), but there are many

theories as to the mechanisms through which education may reduce fertility (Basu 2002). The most promising economic theory to explain this relationship is a tradeoff between the number, or quantity, of children a woman chooses to have and the "quality" of those children, or how much time and resources the mother invests in each child.

These results indicate that countries that are progressing through the demographic transition should consider implementing some policy encouraging education for girls in order to reduce birth rates to match the reduced death rates. Surely, female education is not the only factor controlling fertility, but it has a significant enough effect that it cannot be ignored. The demographic transition model suggests that as countries develop, they may experience a time of high birth rates and low death rates, which many countries are currently experiencing. During this stage, countries experience high population growth, with a higher proportion of children and young people than adults. This can lead to overcrowding and put a strain on resources as working adults must provide for a large population outside of the labor force. Thus, reducing fertility rates will slow population growth and allow the labor force to meet the demands of the population.

It would be interesting to study how the kind of education of the wife or the husband affects fertility rate. As previously mentioned, a well-educated woman is likely to marry a well-educated man (Basu 2002), but do wives who marry husbands in the sciences have a lower fertility rate than wives who marry husbands in business or politics? Some future study could compare the average total fertility rates, or TFRs, for wives of businessmen, politicians, scientists, and other fields, controlling for the education levels of both the wives and the husbands to see whether the field of study has an effect on fertility rate. Another study could focus on the effects of the age at which girls begin to be educated, even if they are educated for

the same total amount of time. For example, how does the fertility rate of a female who was educated from age 6 to 10 compare to that of a female who was educated from age 8 to 12 and not beyond? A study could compare the TFRs of girls who started school late to those who dropped out early in order to see if maturity levels of girls when they are being educated might also have an effect on fertility rate.

References

Alam, S., Ahmed, M. H., & Butt, M. S. (2003). The dynamics of fertility, family planning and female education in Pakistan. *Journal of Asian Economics, 14*(3), 447-463. doi:10.1016/S1049-0078(03)00037-X

Basu, A. M. (2002). Why does education lead to lower fertility? A critical review of some of the possibilities. *World Development, 30*(10), 1779-1790. doi:10.1016/S0305-750X(02)00072-4

Brzozowska, Z. (2015). Female education and fertility under state socialism in central and eastern europe. *Population, 70*(4), 689. doi:10.3917/popu.1504.0770

Currie, J., & Moretti, E. (2002). Mother's education and the intergenerational transmission of human capital: Evidence from college openings. *Quarterly Journal of Economics, 118*(4), 1495-1532. doi:10.3386/w9360

Jain, A. (1981). The effect of female education on fertility: A simple explanation. *Demography, 18*(4), 577-595. doi:10.2307/2060948

Mari Bhat, P. N. (2002). Returning a favor: Reciprocity between female education and fertility in India. *World Development, 30*(10), 1791-1803. doi:10.1016/S0305-750X(02)00065-7