

# **Educational Expansion and Demographic Change: Pathways of Influence**

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Investments in education, particularly in girls' education, can play an important role in promoting demographic changes conducive to slower population growth. Increased education raises the mean length of generation, that is, the amount of time a cohort of women takes to reproduce itself. Increased education is also associated with better utilization of public health and family planning services, higher infant and child survival rates, and reduced fertility preferences. This paper presents the conditions known to stimulate favorable demographic changes, then outlines the role that education can play in creating those conditions. It also highlights lessons learned from empirical studies of the demographic returns on investments in education. Finally, it discusses the implications for educational policymaking in the context of demographic transition.

## **Stimulating Demographic Innovation**

How and why do demographic behaviors change? Societies characterized by high mortality and fertility levels typically have social structures and economic incentives that encourage high fertility. For example, societies that value children's labor and that depend on children as risk and old age insurance support high fertility levels. When infant mortality rates drop, the context in which families make fertility decisions also changes. Falling infant mortality rates reduce the need for "insurance" or "replacement" births, as families no longer need to have more children than they really want to ensure a minimum number of surviving children.

Improvements in infant and child survival provide a basis for rational planning about fertility. Moreover, if a child is likely to survive, the family has a greater incentive to invest more in that child, and to replace "quantity" with "quality." Together with declines in mortality, urbanization and education facilitate changes in the function of the family and in the costs of and demand for children. As the family moves from being a unit of production to a unit of consumption, direct and opportunity costs associated with childbearing and child rearing increase, while the monetary benefits associated with having children decline.

Social changes associated with economic development play an important role in demographic transition, but cultural factors are also important. For example, in Europe fertility decline has been only loosely connected with socioeconomic change, and has occurred at many different stages of economic development. Spatial and temporal patterns of fertility decline have followed observed cultural boundaries (see, for example, Knodel and van de Walle 1979). In the more recent experience of India and other South Asian nations, infant and child survival rates, as well as fertility levels, tend to cluster within cultural domains, and hinge particularly on local kinship systems (Dyson and Moore 1983).

Why does culture matter? Culture affects household structures and the economics of childbearing. Culture affects a society's openness to innovative ideas about contraception, family functions, and the roles of women and children, all of which have an important influence on the onset and pace of demographic change. Cultural boundaries affect the diffusion of ideas and innovations, and it is the flow of information and the impact of demonstration that change the normative context regarding fertility control. Innovation may be necessary to bring thoughts about fertility decision-making into the realm of conscious choice (see Simmons and others 1988 for evidence of the significance of ideational change in Bangladesh). Finally, the cultural (or ideational) context affects the speed with which people recognize and adapt to new economic circumstances surrounding childbearing.

Thus in addition to economic forces, a second stimulus to innovative demographic behavior can be classified under the broad category of "ideational diffusion." Economic realities and ideas about childbearing and the family together provide the context for demographic decision-making. Urbanization, educational expansion, changes in the functions of the family, and changes in women's roles tend to increase the costs of childbearing and decrease the child's potential economic contribution to the family. Fertility control occurs with the reversal of intergenerational wealth flows from an upward flow from children to parents to a downward flow from parents to children. Fertility therefore depends not only on economic development, but also on intergenerational responsibilities, which are influenced by the diffusion of innovative ideas from outside a society and across subgroups within a society (see Caldwell 1980 for a discussion of wealth flows theory).

## **The Role of Education**

As already noted, declining mortality rates, rising costs of having children, and declining value of children as old age insurance all play a role in the adoption of innovative behaviors. In addition, the diffusion of innovative ideas about women, the family, and fertility can also be important influences. As the following paragraphs will show, educational expansion can intensify both economic and ideational influences on demographic outcomes. Educational expansion can influence the number of births, as well as the context in which families determine the timing and desirability of childbearing. The subsequent sections provide examples of the pathways of influence, focusing on the impact of education on infant and child survival, age at marriage, attitudes about the role of women, attitudes toward innovative behavior, and perceptions of the role of children in the family.

### *Maternal Education and Infant and Child Survival*

Improved infant and child survival is a prerequisite to rational decisionmaking about fertility. Moreover, improved infant survival extends the amount of time women lactate and are in the state of postpartum infecundability, and thus reduces the time they are at risk of conceiving additional children.

An important and well-documented relationship exists between maternal education and child health. Compared to uneducated mothers, educated mothers attach a higher value to the health and welfare of their children; have greater decision-making power in health and other matters; are less fatalistic about disease, death, and cures; and are more likely to adopt innovative behaviors related to children's health (see Jejeebhoy 1996 and also Cleland and van Ginnekin 1988). In a concrete example, research in Indonesia has demonstrated higher levels of awareness of childhood immunizations among better educated women (see, for example, Streatfield, Singarimbun, and Diamond 1990). The relationship between maternal education and child health remains after controls for socioeconomic status are incorporated (Jejeebhoy 1996; Schultz 1993b).

### *Women's Education and Age at Marriage*

In societies characterized by early marriage and high rates of fertility at young ages, postponing the age of marriage carries significant potential for reducing population growth, even in the absence of motivation for reducing family size (see Hirschman 1985). This is because later marriage typically increases the time each cohort of women takes to reproduce itself. This increase slows population growth even at constant fertility levels. A second beneficial effect of increasing the age of marriage is to reduce the length of time when women are exposed to the risk of conception within unions. Particularly in societies where fertility control methods are not reliable or are underutilized, fewer years spent in unions translates to fewer years at risk of having children.

Promoting girls' education encourages a higher age at marriage. Weinberger's (1987) analysis of World Fertility Survey data indicated that the mean age at marriage for women with at least seven years of education was four years higher than for women with no education. In a study of five Asian societies, Hirschman (1985) showed that women's schooling had a strong effect on the timing of family formation, with the effect largest at the stage of secondary schooling. In her review of existing evidence on the subject, Jejeebhoy (1996) describes the positive relationship between education and age at marriage as consistent and pervasive.

### *Women's Education and Labor Force Participation*

Rising educational attainment among women increases their access to non-familial roles. Labor force participation rates tend to increase among women with educational attainment, as do incomes. As women's opportunities to engage in higher status and higher paying occupations in the labor market increase, the opportunity cost associated with childbearing and child rearing increases, and the time available for parenting declines. As access to non-familial employment expands with higher levels of education, increasing numbers of women delay or eschew childbearing. For example, evidence from 20 countries participating in the World Fertility Survey showed that female participation in the labor force had a strong, independent effect on fertility (Rodriguez and Cleland 1981; see also Lehrer and Nerlove 1986 for a review of trends in fertility and women's labor force participation in the United States and Sathar and Kazi 1990 for evidence of lower fertility among women employed in the formal sector in urban Pakistan).

### *Women's Education and Decision-making Authority*

In addition to the improvement in women's occupational and financial position that tends to go along with higher levels of education, education tends to increase women's status within the household, and thus to increase their authority for decision-making. Combined with the higher level of general health information available to women with education, increased decision-making power operates on fertility in several ways. First, increased decision-making authority for women is associated with greater utilization of health resources and improved health of children (see Dyson and Moore 1983 for work in India and Jejeebhoy 1996 for a review of the evidence). Improved child health in turn provides the basis for making the decision to restrict fertility.

Increased decision-making authority also means that women are better able to implement fertility preferences. Through a combination of increased knowledge and increased authority to act on the knowledge that they possess, women with higher levels of education have higher rates of contraceptive use and use contraceptives more effectively. In Vietnam, better educated women (and women with better-educated husbands) are more likely to use contraceptives (Dang 1995). In another illustration of the relationship between education and effectiveness of contraceptive use, Castro Martin and Juarez (1995) found that in nine Latin American countries, fertility preferences varied little across education levels, but achieved fertility levels varied substantially.

### *Parental Education and Innovative Behavior*

Education exerts an additional influence by reducing fatalism about fertility and child mortality, and by increasing receptiveness toward innovative behavior. Investigators have noted an association between education and knowledge of health interventions, such as immunizations and contraceptive use. Education may promote an openness to new ideas not only about mortality and fertility, but also about family roles and structures (Caldwell 1980). Insofar as education encourages openness to innovative notions about the family and about the possibility of planning fertility, it works to facilitate openness toward small family norms and to the new behaviors necessary to implement these norms.

### *Children's Education and the Household Economy*

So far this paper has discussed the impact of education largely in terms of its operation on parental, particularly maternal, preferences and decision-making. An additional route of influence lies in the effects of children's education on household structures and subsequent parental decisions about fertility. Caldwell (1980) identifies several mechanisms by which schooling of children affects the household economy. First, education increases the direct costs of raising children through school costs and increased pressures on parents to invest in their children. Second, education reduces a child's availability for working inside and outside the home. Thus a direct consequence of educational expansion is a negative effect on any considerations about the economic benefits associated with childbearing. Third, education creates a dependency of children upon parents. Rather than a situation where all family

members contribute to the family economy, parents become solely responsible for supporting their children for an increased length of time. Fourth, educational expansion speeds cultural change and creates new values, because education systems serve the wider need of the economy instead of the values of family production. New values might include occupational aspirations beyond the household and an increased view of the self rather than the family as the unit of reference.

Empirical evidence supports the notion that alteration of household structures constitutes a route by which education of children dampens fertility. Axinn's (1993) analysis of microdemographic data from a rural community in Nepal indicated that children's schooling exerted a strong influence on parents' fertility preferences and behavior. In a different context, Ogawa and Retherford (1993) cited concerns voiced by women in a national family planning survey in Japan about the economic and psychological costs involved in educating children as an indication of the likely importance of such considerations in fertility decisions.

### **Policy Implications**

The previous sections outlined direct and indirect relationships between education and demographic behaviors conducive to slower population growth. Increased provision of education contributes to slower population growth by reducing the rate at which cohorts of women replace themselves, and by influencing the incentives and the capacity of women (and their partners) to reduce their family size. Infant and child survival, time spent in unions, women's economic status, women's status in the household, receptiveness to innovative behavior, and the value of children are each potentially influenced by educational expansion. How important are these relationships? In particular, how important is educational expansion to demographic change?

Caldwell (1980), in a review of historical evidence from Europe and contemporary data from developing countries, grants paramount and causal importance to the introduction of mass education in setting the stage for fertility decline. London's (1992) cross-national analysis of the effects of school enrollment and of gender differences in school enrollment on crude birth rates reveals a consistent negative effect. Finally, Subbarao and Raney's (1995) analysis of data from 72 developing countries provides evidence of the powerful effect of education, and of combining education and family planning programs, on fertility. Based on their results, the authors conclude: "In countries where the female secondary education base is low, the expansion of female secondary education may be the best single policy lever for achieving substantial reductions in fertility" (Subbarao and Raney 1995, p. 124).

In short, existing evidence indicates that educational expansion can play an important role in facilitating favorable demographic outcomes. Existing evidence also points to three recommendations to improve the effectiveness of educational expansions: providing educational access through secondary levels, ensuring access to girls and poor children, and complementing educational expansion with public health services and interventions. The rationale behind these recommendations is explained below.

### *Expand Education Beyond the Provision of Basic Literacy and Numeracy*

A debate has emerged in the literature about the amount of education needed to produce favorable demographic behavioral changes (Jejeebhoy 1996). Diverging viewpoints on this issue are unsurprising, given the numerous routes through which education affects fertility and fertility-related decisions. The level of education necessary to raise the age of marriage may be different than the level necessary to change parental perceptions about the cost of childbearing. Moreover, education systems differ from country to country in terms of their goals, curricula, costs, and selectivity. The meaning of a given level of educational attainment depends on all these factors, and also on the reference point, or how widespread education is among the overall population. Other local social realities are also important. For example, even relatively low levels of education may be expected to affect the age of marriage in places where that age is relatively low. More education may be necessary to produce the same effect in countries where the age of marriage is higher.

Despite debates about the necessary threshold level of education, it is clear from the various routes of influence described above that access to education beyond the first few primary grades is necessary and access through secondary levels is desirable from the perspective of efficiently promoting demographic change. Higher levels of education will improve the impact on fertility through a stronger positive effect on infant and child survival, through greater increases in the age of marriage, through higher rates of female labor force participation and associated increases in women's status, and through the family restructuring that occurs with child dependence and the reversal of wealth flows.

### *Assure Equity in Access*

An additional necessity from a policy perspective is assuring equitable access. This discussion of the mechanisms by which education influences demographic behaviors points to the extreme importance of assuring girls' access to education. Girls' enrollment in school is necessary to promote late marriage and intensify their capacity to use public health and family planning services. Women must have education to work in the kinds of occupations that are associated with reduced rates of childbearing. Moreover, women must have educational attainments and earning potentials similar to those of their husbands to raise their decision-making status in the household. London's (1992) cross-national analysis of the effects of school enrollments on crude birth rates clearly shows that male-female enrollment ratios, not just overall enrollments, are strongly associated with fertility.

Educating girls can be challenging in societies concerned about the appropriateness of girls' education, particularly as they approach marriageable age. In Nepal, for example, nationally representative survey data provide compelling evidence that secondary school enrollment and marriage are mutually exclusive alternatives for teenage girls (Stash and Hannum 1997). In India, Caldwell, Reddy, and Caldwell (1985) list "menarche" as a reason parents cited for pulling girls from school. Given the key role girls' education plays in facilitating fertility decline, educational planning must incorporate measures that are sensitive to local concerns about gender. Where appropriate, segregating schools, or at least classrooms, by gender, and ensuring the presence of female teachers may help encourage parents to

send their daughters to school. In addition, ensuring that girls do not have to travel long distances to reach schools may prove useful.

Economic concerns can also play a role in the disadvantages girls face. Evidence from around the world suggests a relationship between poverty and gender inequality (see King and Hill 1993; Schultz 1993a). This finding is related to the perception, and sometimes the reality, that sons are better investments than daughters. This is the case in societies where daughters are expected to leave their natal households on marriage, while sons are expected to live with and contribute to the welfare of their parents in their old age. Sons are also a better investment in societies where the labor market is highly segregated by gender, so that parents do not believe that their daughters will be able to translate education into income. Under circumstances where sons are a better investment, poor families without the resources to educate all their children rationally choose to educate their sons first. Thus from the perspective of promoting girls' education, minimizing the costs of education for poor families is important.

An additional point about equity is warranted. Knodel and Jones (1996) have noted that socioeconomic inequality in education must not be overlooked in efforts to promote gender equity. From a demographic perspective, expanding educational access to impoverished and underserved groups is an important task. Although many of the routes to demographic transition are intrinsically tied to issues of gender equity, others are not. Men's education, income, and occupational attainment, like women's, are typically negatively associated with fertility. Improving men's receptiveness to innovative demographic behaviors and family roles clearly requires educational expansion to underserved groups of boys as well as girls. Fortunately, reducing socioeconomic differentials and promoting girls' education are not mutually exclusive endeavors. First, impoverished children include both boys and girls. Second, under family and economic structures that favor educational investment in sons, impoverished girls are probably at highest risk. Expanding educational access and reducing educational costs to poor families can thus play an important role in reducing inequities related to both poverty and gender.

### *Combine Educational Expansion with Public Health Programs*

Jejeebhoy (1996), in her comprehensive review of the evidence about the relationship between women's education and demographic outcomes, has described concerns about the possible negative consequences of educational expansion. An important caveat to the generally positive effect of education on demographic outcomes is the possibility that, in the context of developing countries, education may be associated with innovative behaviors that increase fertility or infant or child mortality. Norms regarding postpartum sexual abstinence and long periods of breast-feeding are important examples of traditional practices that reduce fertility and infant mortality, and which may deteriorate as populations gain education. For example, Oni's (1985) study in urban Nigeria showed that educated women were more likely to bottle-feed their babies than to breast-feed them, and observed shorter periods of postpartum abstinence. In the absence of adequate family planning services, such changes will lead to increased fertility. Not surprisingly, Oni's study population showed higher fertility among more educated women than among less educated women. In the context of developing countries, the decision not to breast-feed can also carry dire implications for infant and child survival. Given such

possibilities, combining educational expansion with public health outreach programs designed both to promote breast-feeding and other healthy behaviors and to provide family planning services in the event that traditional controls on fertility deteriorate is crucial. Subbarao and Raney's (1995) study points to the benefits of a multisectoral approach: educational expansion and reproductive health services together exert a powerful effect on fertility and on infant and child mortality.

### **Conclusion: Challenges for Educational Planning**

This paper has outlined direct and indirect pathways through which education can contribute to favorable changes in demographic outcomes. However, the desired demographic changes present new challenges to education systems. At the early stages of demographic transition, a “ski jump” effect occurs as infant mortality declines, that is, a bulge emerges at the base of the population pyramid. For educational planning purposes, this change means increasing numbers of school-aged children. The financial and human resources for providing education are strained when the working-age cohorts from which teachers and taxes are drawn are small relative to the cohorts in need of education. While the size of young cohorts can be expected to stabilize with continued fertility decline, and has done so in many countries, in many developing countries the pattern of ever-larger cohorts at younger age groups persists. For example, recent U.S. Census Bureau population estimates for Bangladesh, India, Nepal, and Pakistan reveal this pattern (US Census Bureau 1998).

The strain on the education system may also be intensified through the expected relationship between family size and educational attainment. Blake (1989) has established a strong negative relationship between numbers of siblings and educational attainment in the United States. Knodel and Wongsith (1991) found a similar relationship between number of siblings and educational attainment in Thailand. Because fertility decline means an increase in the proportion of children who come from small families, falling birth rates in developing countries are likely to contribute to increasing demands on education systems.

In short, demographic transition can be expected to increase the absolute and relative size of the school-age population and to raise the demand for education. Despite these challenges, timely investment in the education of large, young cohorts of boys and girls is crucial from the perspective of harnessing future labor power and of stabilizing population growth. Population momentum refers to the reality that, even when fertility drops, the effects of high fertility in previous generations will continue to produce population growth as large cohorts pass through the childbearing years. Slowing the rate at which large cohorts will replace themselves and reducing their ultimate family size are thus crucial to promoting sustainable economic and social development. The role that education can play in this endeavor is an important one. Existing evidence suggests that the ideal approach combines three efforts: expanding educational access through secondary levels, ensuring access to girls and poor children, and complementing educational expansion with public health services and interventions.

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