

Female Education and Fertility Decline

Recent Developments in the Relationship

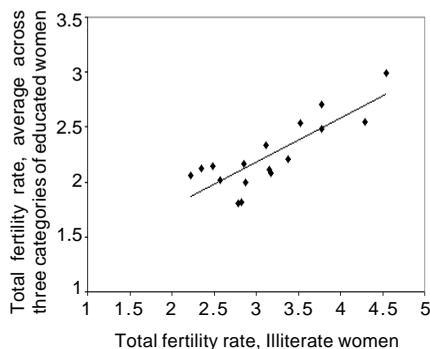
Both recent theory and evidence suggest that female education continues to play an important role in India's fertility decline. Although the bulk of fertility decline is now occurring among uneducated women and may mask the contribution of education to it, studies reveal the role of diffusion mechanisms, including the positive role of others, especially women's education, on the fertility behaviour of the uneducated.

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India's fertility decline continues apace. Between 1990-92 and 1996-98 the total fertility rate fell from 3.39 to 2.85 children per woman per reproductive lifetime [IIPS and Macro International 1995, 2000]. Perhaps surprisingly, it appears that it is uneducated women who have been driving the recent decline. In the most detailed study of recent fertility trends by educational level to date, Bhat (2002) shows that 65 per cent of India's fertility decline during the 1990s was due to the fall among

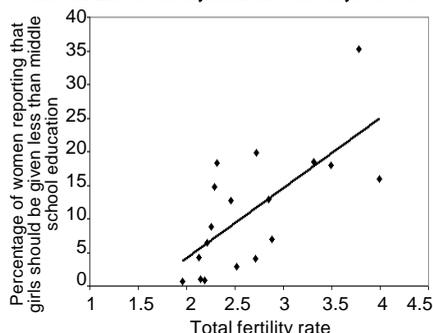
illiterate women. The remainder is attributed to declines among educated women and to changes in the distribution of women by educational level. Inspection of the National Family Health Survey (NFHS) data for 1998-99, shown in the table is revealing. Although the table shows the expected fact that the more years of education women have, the lower is their total fertility, there is also marked variation across the states in the extent to which fertility declines with education. Illiterate women in some southern states have lower fertility than educated women in northern states. At the extreme, illiterate women in Kerala have

Figure 1: Relationship between Total Fertility Rate of Illiterate Women and Educated Women, Indian States, 1998-99



Source: National Family Health Survey, 1998-99, Final Reports, various states and all-India

Figure 2: Relationship between Total Fertility Rate and Percentage of Ever-married Women Who Report that Girls Should be Given Less than Middle School Education, Indian States, 1998-99



Source: National Family Health Survey-2, 1998-99, Final Reports, various states and all-India.

female education is not key to fertility decline.¹

Our argument is that because of their emphasis on the direct relationship between women's education and fertility, both these types of study can offer only a partial assessment of the relationship between the two variables. Whether or not they present evidence that supports the argument that educated women have lower fertility than uneducated women, the focus on this relationship underestimates the contribution of female education to fertility decline because it misses other increasingly important, but less direct mechanisms, through which education may be influencing fertility.

Further investigation of the table shows that although the variation in fertility across states is greater for illiterates than for educated groups, there is nevertheless a positive association between illiterates' and educated women's fertility. This is illustrated in Figure 1, which shows the relationship between the total fertility rate for illiterates and the average total fertility rate for the three educated groups (see the table). Although we should be cautious in our interpretation of the relationship as it shows a simple bivariate association in which some third factor may be influencing the fertility of all women irrespective of their education, it may suggest the possibility of some link between uneducated and educated women's fertility. Perhaps uneducated women are influenced by the fertility behaviour of educated women. If

lower fertility than the most educated women in Bihar and Uttar Pradesh. Corresponding patterns exist for contraceptive use; in general illiterates have lower contraceptive use than more educated groups, but again there is marked variation within educational groups across states, especially for illiterates.

At first glance, these trends seem to imply that female education may no longer be a key prerequisite for fertility decline. In our view, this is too simplistic an interpretation. It may be more accurate to argue that while women's own education, and other socio-economic circumstances, may no longer be accurate predictors of their fertility behaviour, education is nevertheless influencing their behaviour in less direct ways. As India's fertility transition progresses, it may well be that these less direct ways become the principal channels through which education influences fertility. The common emphasis in the literature on the depressing influence of women's education on their own fertility may therefore miss important developments in the nature of the relationship between female education and fertility. In the light of the fertility trends outlined above, this note provides a short review of the literature and evidence for such developments. We focus on two types of developments.

How Education Reduces Fertility

Most of the literature on the relationship between female education and fertility documents that and/or tries to explain why educated women have lower fertility than uneducated women. In the Indian context there are many such studies, undertaken using different methods and at different

levels of aggregation [see Arokiasamy 1998; Drèze and Murthi 2001; Jain 1981; Jejeebhoy 1993; Malhotra et al 1995; Murthi et al 1995; Parasuraman et al 1999]. For example, Parasuraman et al, analyse the 1992-93 NFHS data for the major Indian states and conclude that among all the socio-economic status variables they investigate, women's education has the greatest net effect on their fertility. Similarly, critics of the education-fertility relationship also focus on the direct association between women's education and fertility. For example, in the Indian context a recent paper by Parikh and Gupta (2001) uses cross-sectional regression analysis of 1998-99 NFHS data for Andhra Pradesh and Uttar Pradesh to conclude that

Table: Total Fertility by Women's Educational Level

	Illiterate	Literate, Less than Middle School Complete	Middle School, Complete	High School and Above	Total
<i>North</i>					
Bihar	3.78	2.93	2.69	2.50	3.49
Haryana	3.52	2.97	2.53	2.10	2.88
Himachal Pradesh	2.85	2.19	2.26	2.04	2.14
Jammu	3.17	2.50	1.83	1.91	2.71
Madhya Pradesh	3.78	3.20	2.34	1.92	3.31
Punjab	3.16	2.40	2.24	1.71	2.21
Rajasthan	4.29	3.08	2.41	2.15	3.78
Uttar Pradesh	4.54	3.36	3.12	2.49	3.99
<i>East</i>					
Assam	2.83	2.40	1.78	1.26	2.31
Orissa	2.87	2.42	1.96	1.62	2.46
West Bengal	2.79	2.30	1.71	1.42	2.29
<i>West</i>					
Gujarat	3.38	2.92	1.99	1.71	2.72
Maharashtra	3.12	2.73	2.33	1.95	2.52
<i>South</i>					
Andhra Pradesh	2.35	2.22	1.94	2.20	2.25
Karnataka	2.57	2.09	2.06	1.89	2.13
Kerala	2.22	2.02	2.14	2.02	1.96
Tamil Nadu	2.49	2.37	2.21	1.85	2.19
India	3.47	2.64	2.26	1.99	2.85

Source: National Family Health Survey, 1998-99, Final Reports, various states and all-India.

so, even when fertility decline is driven by the behaviour of uneducated women, female education remains an important explanatory factor, although the mechanism via which its influence is felt is more complex than the direct relationship outlined above. It involves externality or spillover effects to the uneducated in addition to the private benefits that educated women themselves gain from their education.

Ideas about the role of diffusion in fertility decline provide theoretical support for the possibility that uneducated women are influenced by the fertility behaviour of 'educated others'. Diffusion theories argue that innovative behaviour and ideas that promote lower fertility, including the deliberate control of fertility through use of contraception, and the spread of values, attitudes, and preferences that favour fertility decline, can spread through a population [Cleland 2001; Cleland and Wilson 1987; Coale and Watkins 1987]. The educated may be an important influential group that passes on information and knowledge to less educated groups. Despite having relatively poor socio-economic circumstances, these latter groups are influenced by and adopt the behaviour and attitudes of better-off groups so that fertility decline progresses somewhat independently of and faster than socio-economic development.²

Empirically, recent literature endorses these theoretical insights in Indian and other contexts. Quantitative analyses that employ multilevel statistical techniques test diffusion theories via methods that permit an investigation of the "community-level" externality effects of education (and other variables) independently of any individual-level effects. Multilevel techniques are therefore a useful tool that capture both the direct and indirect effects of education. They therefore enable a fuller investigation of its role than methods that model only the direct effects. Writers find significant positive associations between community-level literacy, particularly among women, and individual-level contraceptive use, controlling for other relevant factors at both levels, including women's education at the individual level [Amin, Diamond and Steele 1997; Kravdal 2000; 2001]. Inverse associations between community literacy and measures of individual fertility are also reported [Kravdal 2001, 2002]. Our recent multilevel study [McNay et al 2003] specifically analyses contraceptive use among uneducated women in India using 1992-93 NFHS data.

We find significant positive educational externalities at the community level, indicating that the fertility behaviour of our uneducated sample is influenced by interaction with educated friends and neighbours. Both educated males and females have an important effect, although females seem more influential. Moreover, we find that the relationship is non-linear and that the higher the level of community education, the larger is the spillover effect. Further modelling suggests that the education effect works via increasing the extent to which contraception is used within a community. In our study, the most important direct channel of diffusion seems to be other contraceptive users. Once we include a community-level variable capturing contraceptive use, there is no remaining independent education effect, but its significance prior to accounting for contraceptive use suggests that there are more other users to act as channels of diffusion in communities with higher levels of education. Our study also finds significant negative community effects on uneducated women's contraceptive use for the variable we include to capture son preference, even controlling for each individual woman's number of sons. This finding suggests that cultural characteristics and norms relating to female status are important determinants of contraceptive use. Such cultural characteristics have wide geographical variation across India, and may well also be correlated with the level of female education itself. Recent work by Kingdon et al (2003) discusses three regionally based education supply models in which variation in gender relations, and other cultural characteristics such as the degree of class and caste homogeneity, form an important explanation of regional differences in educational achievement.³

Both recent theory and evidence therefore suggest that female education continues to play an important role in India's fertility decline. Although the bulk of fertility decline is now occurring among uneducated women, and may therefore mask the contribution of education to it, recent studies reveal the role of diffusion mechanisms, including the positive effect of others', particularly women's, education on the fertility behaviour of the uneducated.⁴ These studies signal the importance of now looking beyond the role of the direct relationship between female education and fertility in India's fertility decline and realising the importance of the positive externality effects of education.

More generally, in attempting to explain recent fertility declines in India and elsewhere, the recent multilevel studies point to the need to look beyond the role of factors at the individual- and household-levels [Dev et al 2002]. Community-level factors are shown to have significance over and above these two less aggregate levels. The studies indicate that the influence of community factors helps explain why fertility is now falling even among those individuals and households, such as the uneducated, that do not possess the expected socio-economic characteristics.

However, despite such fertility decline among the uneducated, it is important to note that Bongaarts' recent (2003) analysis of Demographic and Health Survey (DHS) data for a range of developing countries indicates that we should not necessarily presume that it implies that low fertility can be attained in the absence of widespread education. The DHS data show that even at advanced stages of the fertility transition, fertility differentials by education, although smaller than at earlier stages, tend to remain. It is therefore likely that at the end of the transition, women's educational composition continues to play a key role in shaping levels and trends in fertility via its direct effect on women's fertility behaviour. Bongaarts argues that this is especially true in contexts with continuing low levels of female schooling, where it is more likely that the persistence of somewhat higher fertility among uneducated women may contribute to a stalling of fertility decline somewhere above replacement level. Despite the decline in fertility among uneducated women in India, illiterates still constitute 58 per cent of married women [IIPS and Macro International 2000], suggesting that further improvements in female education are required to reach low fertility in India.

Changing Direction of Causality

So far, we have considered possible ways in which female education may lead to lower fertility. In addition to these relationships, recent evidence for India, and elsewhere, suggests that an increasingly important relationship may run in the other direction, i.e., from fertility to education. The idea that parents are motivated to limit the size of their families so that they can afford to send their children to school is not new; Caldwell et al, (1982) reported it for Karnataka long ago. By plotting the correlation between state-level total fertility rates and women's

educational aspirations for girls using 1998-99 NFHS data, Figure 2 illustrates that it continues to hold true today.⁵ The positive relationship suggests that fertility is lower where a smaller proportion of women report low educational aspirations (less than middle school education). What is a recent development is that it now seems that parents' educational aspirations for their children are rising, and that more parents have such rising aspirations. Specifically, Bhat (2002) argues that rising educational aspirations are growing even among uneducated parents. Other recent research is consistent with his claim. For example, the PROBE study (1999) finds that nearly all parents now want to educate their children, and want to educate both sons and daughters. Kabeer (2000) argues that in south Asia as a whole, poor parents' rising educational aspirations for their children reflect a growing perception that rather than being a privilege of the better-off, education is now needed by everybody to get on in a world increasingly based on literacy and numeracy.⁶ She writes that parents therefore feel increasingly obliged to invest in their children's education, while at the same time expecting such investment to ensure reciprocal support of them in their old age by their offspring. In Bhat (2002) view, it is the diffusion of rising educational aspirations rather than the effect of educational externalities that is the primary reason for the recent decline in fertility among the uneducated in India. Moreover, he argues that first-born daughters have the most to gain from this development as in smaller families they are less likely to forgo schooling to take care of younger siblings.⁷

Once again, these arguments suggest that education continues to be central to India's fertility decline, even though the latter is now being driven by the behaviour of uneducated women. These women are now much more likely to want to educate their children, including their daughters, and view fertility limitation as a means to do so.

Conclusion

In a recent review of the education-fertility relationship, Basu (2002) states that "there are many routes to...an education-led fertility transition". We agree with her statement, and in this note have argued that in order to appreciate it, attention should be given to more than the direct relationship between women's education and their own fertility and incorporate more indirect ways in which female education

may influence fertility. That such a diversification of perspective is increasingly required is shown by the fact that although India's fertility decline is now dominated by the behaviour of uneducated women, studies show that education is still central to that decline. Positive educational externalities mean that educated members of a community pass on their knowledge and preferences about fertility to the uneducated. In addition, fertility regulation is increasingly seen as a route to achieving illiterate parents' rising educational aspirations for their children. So although the key role of education in India's fertility decline may now be masked by the nature of the contemporary transition, it has by no means disappeared. **EW**

Notes

- 1 There are some weaknesses in Parikh and Gupta's methodology that relate to the fertility measure they use. They opt for living children per woman instead of the more commonly used number of children ever born per woman. They justify their choice on the basis that the information on the former is more reliable because reporting errors are eliminated. However, the NFHS questionnaire, which includes birth histories, was designed to provide reliable estimates of both births and deaths of children. Indeed, neither the NFHS reports nor a perusal of the actual birth history data indicates that reliability differs between the reporting of living and dead children.
- 2 Most commentators agree that despite some degree of independence between diffusion and socio-economic development, the two processes are complementary and additively provide the most comprehensive theory of fertility decline [Cleland 2001].
- 3 Our study [McNay et al 2003] also finds significant positive community effects on uneducated women's contraceptive use for mass media exposure, operating even when we control for uneducated women's own exposure to media. This result indicates another way in which individuals are influenced by communitywide experiences irrespective of their own circumstances.
- 4 Rather than using multilevel methods, Guilмото and Irudaya Rajan (2001) use a spatial mapping approach to show the importance of diffusion processes in India's fertility transition.
- 5 A similar relationship exists between state-level total fertility rates and educational aspirations for boys. The caveat that applies to the bivariate relationship shown in Figure 1 and noted above also applies to Figure 2.
- 6 Kabeer (2000) cites her own fieldwork in Bangladesh as an illustration; while conducting it, she found that even farmers felt the need for some basic literacy so they could read the instructions on the fertiliser packet. She also cites other examples of studies in different

developing countries in which groups with low socio-economic status cite the necessity of education.

- 7 The physical availability of schools, as well as parent's educational aspirations for their children, also has an important depressing effect on fertility. Recent research in Pakistan [Sathar et al 2000] and Nepal [Axinn and Barber 2001] has shown that the presence of schools and children's actual school attendance significantly reduce parents' fertility. Furthermore, the Pakistan study shows that greater gender equity in primary school access is particularly important in lowering fertility.

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