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Female Schooling and Marriage Age in India

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Abstract

This study examines the influence of schooling on entry into marriage for women using panel data from the Indian censuses. Both schooling levels and marriage age increased in India between 1981 and 2001. While results from the cross-sectional data show that schooling is positively associated with delays in entry into marriage, results from the panel models suggest schooling to have a limited influence on marriage timing, especially during the 1981-1991 period. But schooling had significant, though modest, influence during the 1991-2001 period. The findings suggest that the association between schooling and marriage seen in the cross-sectional analyses might have been due to unobserved factors influencing both schooling and marriage. Indeed, secular changes in marriage age were more important than changes in schooling levels in determining the timing of marriage. Further, the results from instrumental variable models suggest that the relationship between schooling and marriage is not endogenous: improvements in schooling levels are independent for the most part from changes in marriage age.

1. Introduction

Schooling has been considered as a catalyst for changes in marriage age in developing countries. A report by the United Nation Commission on Population and Development (2002) attributes schooling as a key factor in the recent changes in nuptiality. However the importance of schooling in bringing about changes in marriage patterns has been questioned by Mensch, Singh and Casterline (2005). There are two key theoretical reasons why the influence of schooling could be weaker than commonly thought. First, it is possible that there are common factors that influence both schooling and marriage age. In such a case, the association between schooling and marriage age would weaken when such common factors are accounted for in the models. In most cross-sectional studies, it is nearly impossible to control for such common factors (e.g. modernization or westernization or diffusion) since they are not easily measured or observed. Second, increases in schooling could have been a response to changes in marriage age (rather than the converse). In such a case a simple model estimating the relationship between schooling and marriage age would be biased. Though the presence of such biases is acknowledged, there have been few studies that have addressed these issues. The temporal and spatial variations in marriage and schooling levels in India provide an ideal opportunity to untangle the complex relationship between schooling and marriage. This paper analyzes the relationship between schooling and marriage using Indian census data from 1981, 1991 and 2001.

2. The Indian context

As in other parts of South Asia, marriage remains universal in India. Only about 2 percent of women age 30-34 were unmarried at the time of the 2001 census. However, the age at marriage has been increasing gradually over the last five decades. As seen in Table 1, Singulate Mean Age at Marriage (SMAM) increased by about one year per decade between 1981 and 2001. Much of the increase has been due to declines in early marriage. As with other

demographic indicators, especially fertility and mortality, nuptiality also shows strong regional patterns. In 1981, SMAM for women varied from a high of 21.8 in Kerala to a low of 16.1 in Rajasthan. By 2001 though marriage age increased in both the states, they still retained their relative position with Kerala having the highest and Rajasthan the lowest marriage age. It should be noted that in the southern states, with the exception of Andhra Pradesh, women married at a comparatively late age. There is, however, no major difference in the timing of marriage between Hindus and Muslims, the two main religious groups in India. The SMAM for Hindus was 20 and Muslims 20.3 in 2001. Marital dissolution through divorce or separation continues to be low. As per the 2001 census, less than one percent of women were divorced or separated and this has been remarkably stable over the last three decades. Other aspects of marriage including spousal choice have also remained relatively unchanged. In 2005, for instance, caste endogamy was still prevalent with nearly 95 percent of women married to men of the same caste as their natal family (IHDS, 2005). In addition, arranged marriages remain the norm with about 5 percent of women selecting their spouse on their own (ibid.)

[Table 1 about here]

While changes in nuptiality have been gradual, other aspects related to family have witnessed substantially changes. Fertility, for instance, declined from 4.9 in 1974-80 to 2.7 in 2003-05 (Bhat, 1996; IIPS and Macro International, 2007). This decline in fertility has occurred in the context of relatively early marriage age and universal marriage. Fertility decline has been achieved by widespread use of contraception, especially sterilization of women, rather than by increases in marriage age. In the southern state of Andhra Pradesh, for instance, fertility declined to below-replacement level while marriage age was relatively early. It appears that changes in fertility rates have been far more rapid than changes in marriage patterns.

There has been a large, though spatially uneven, increase in literacy levels in India in the last five decades since independence. For the period under consideration in this paper, 1981-2001, literacy rates for females nearly doubled, and the increase in literacy rates was

more pronounced between the 1991 and 2001 period. While the reasons for this remain unclear, they could include strong government policy in encouraging universal education and the economic changes beginning in the late 1980s may have provided opportunity and incentive for families to send their children to school. It should be noted that among the literates significant proportion have not completed any schooling (the census defines literacy as merely the ability to read or write in any language as reported by the household head). In 2001 nearly one-third of literate women had not completed primary school (Census of India, 2001). But as with the case of marriage patterns, literacy rates ranged from a low of 34 percent in Bihar to 88 percent in Kerala in 2001.

3. Schooling and marriage

Four general scenarios may be anticipated.

First, schooling dampens marriage rates and increases marriage age. Variety of pathways has been proposed to explain such an influence. It has been observed that marital and student roles are perceived to be incompatible, reflecting the commonly held expectation that individuals do certain activities at certain ages (Raymo, 1998; 2003). Thus with increasing levels of school enrolment, marriage rates for women at school-going ages may decline. Further, for women in contexts where schooling translates into labour force participation getting married when in school will entail significant opportunity costs. This higher opportunity cost in terms of barriers to achieving their educational and career goals may encourage women to postpone marriage (Thornton, Axinn and Teachman, 1995). However in settings where labour force participation is seen as incompatible with married life, women may choose to remain single or drop out of the labour force after marriage (Jones, 2005; Yu, 2005).

Besides role incompatibility and labour force participation, schooling can delay marriage by bringing about ideational changes. Such changes include shift from traditional values to individual-oriented values, secularization, rationality, and greater individual autonomy (Caldwell,

2005). Schooling exposes girls to new ideas, attitudes and aspirations that give them power to question traditional values (Kritz and Gurak 1989). These ideational changes tend to delay marriage as they increase the say of women in marriage decisions, encourage alternative institutions to marriage like cohabitation, and make it more acceptable to remain single. Studies in India at the individual level have generally found schooling to delay marriage, though there has been no consistent causal explanation for these delays (Bloom and Reddy, 1986; Das and Dey, 1998; Dharmalingam, 1994).

Second, marriage age can influence schooling levels. The causal arrow between schooling and marriage age can flow in both directions. In societies where early marriage is the norm the opportunity cost of sending girls to schools would be high. In such contexts, as Amin and Huq (2008) have noted, schooling for girls is often seen as "something they do while they are waiting to get married." If this is true, schooling levels in such situations would be influenced by prevailing normative marriage age for women. Also in South Asia education is rarely continued after marriage and schooling is effectively ended at the time of marriage. Thus, it is possible that changes in marriage age for reasons unrelated to education could influence schooling levels. Studies that have properly modelled the endogenous relationship between schooling and marriage age are rare, a notable exception is Field and Ambrus (2008). Their analysis indicates that in Bangladesh postponement of marriage would substantially increases schooling levels.

Third, changes in both schooling and marriage could be driven by same unobserved factors. Hatti and Ohlsson (1985) have argued that the higher marriage age for educated women in India could be due to exogenous factors that influence both schooling and marriage age. Though they do not elaborate on the extraneous factors, these could include spread of modern ideas and attitudes about women's roles. Audinarayana (1993) reports that in India irrespective of the education level it is now common to get married a year or two after menarche. This shift in marriage age to past menarche reflects shift in thinking about childhood.

In interviews conducted by Caldwell, Reddy and Caldwell (1983) in Karnataka and more recently by Santhya, Haberland and Singh (2006) in Rajasthan, parents often articulate their objection of marrying their daughters before menarche by noting the loss of childhood and concerns about physical and emotional maturity of girls in taking on the responsibilities of married life. While the literature on the influence of ideational factors in explaining changes in attitudes towards early marriage is scant, it is quite possible that there has been a secular change in attitudes and norms regarding marriage age driven by ideational changes.

Fourth, patterns seen at the individual level between education and marriage may be different from those observed at the aggregate level. Besides individual's own education, community schooling levels and other community factors could mediate the relationship between schooling and marriage. In communities where some girls are in school or participate in non-family work, their marital behaviour could bring about normative changes and legitimize late marriage even for those not studying or working. As Amin et al. (1988) have noted marriage age for girls was higher in communities with higher labour force participation of women, irrespective of the individual work or educational status. Thus the influence of schooling can go beyond the individual's own educational attainment and marriage age could be influenced by broader community factors.

Much of the recent studies on schooling and marriage linkages have focussed on individual agents and causes. While such a focus is better suited to identify the nuances of the first scenario, it may not be well suited in investigating the other scenarios outlined above. A pitfall of using individual data is that the individual is removed from the surrounding environment and considered in isolation as a free agent (Voss 2007). And results from such an analysis "are often generalized to country, regional, and even global levels and are used, without justification, to interpret and anticipate time trends at the macro level" (Ni Bhrolchain and Dyson, 2007: 1). By using aggregate panel data, this study investigates the relationship between schooling and

marriage timing. Such an approach complements the current understanding offered by individual-level studies.

4. Data, variables and estimation methods

4.1. Data

District-level data from the Indian census of 1981, 1991 and 2001 are used for the analysis. The 1981 and 1991 census data have been compiled by Vanneman and Barnes (2000) and this version is used. The 2001 data are compiled from the census tables. Two panel datasets are created: one linking 1981 and 1991 districts and the second linking 1991 and 2001 districts. The panel datasets was created using data from fourteen major states that constitute about ninety-six percent of India's population. Three of the fourteen states were bifurcated in late 2000. For this three states, state boundaries refer to the pre-2000 boundaries. The only major state excluded was Assam, where 1981 census was not conducted due to civil unrest. These fourteen states had 326 districts in 1981, 362 districts in 1991 and 469 districts in 2001, owing to partition of some districts. The panel dataset linking 1981 and 1991 districts is constructed by using 1981 districts as the base and linking them with the 1991 districts. For districts that were partitioned between 1981 and 1991, value of a variable is calculated by merging the split districts using the population of relevant 1991 districts as weights (for detailed information on changes to district boundaries between 1981 and 1991, see Murthi, Srinivasan and Subramanian, 2001). This panel dataset has data for 326 districts. A similar procedure is followed for linking 1991 and 2001 districts, with 1991 serving as the base (for information about boundary changes between 1991 and 2001, see Singh and Banthia, 2004). In total the 1991-2001 panel dataset has data for 362 districts.

4.2. Variables

The main dependent variable is the percent never-married women age 15-19 in the district. Changes in marriage behaviour during the time period under consideration (1981-2001) have

been pronounced at younger ages. Between 1981 and 2001, at the national level never-married women age 15-19 increased from about 56 to 75 percent compared with increase from 3 to 6 percent for women age 25-29. The dependent variable is selected to reflect these changes at younger ages.

Schooling is measured using two variables: number of women in the district with primary school as the highest education level, percent; number of women in the district who have completed any level of schooling (primary, middle, matriculation or higher), percent. Primary schooling is used to test whether low level of schooling has the potential to bring about changes in marriage patterns. The variable any level of completed schooling represents all levels of schooling and captures the general educational level in the district.

The models also control for percent agricultural workers, percent Muslim, percent scheduled castes/tribes, percent urban in the district, region and marriage squeeze. Scheduled castes and tribes are maraganilized caste and tribal groups identified by the government for affirmative action programs in education and employment. Since there is no direct measure for the economic status of the district in the censuses, percent agricultural workers is used as a proxy. As Bhattacharya (2006: 270) has noted “districts with higher percentages of agricultural workers, ceteris paribus, would have experienced less change in their economic structure.” Bhat and Halli (1999) have documented the influence of marriage squeeze on marriage patterns in India. To account for this influence a simple measure of marriage squeeze is introduced in the models. The definition of all the variables is presented in Table 2.

[Table 2 about here]

4.3. Estimation methods

Three types of models are used: OLS regression, generalized least square fixed-effect and two-stage least square model. The increase in proportion never married women age 15-19 between 1981 and 1991 (or between 1991 and 2001) could be either due to inter-district variation (i.e.

variation in marriage patterns from one district to the next) or due to intra-district variation (i.e. variation within each district over time). A simple OLS regression would model the inter-district variation. The fixed-effect approach models the intra-district variation over time. Because it models intra-district variation over time, the influence of variables that do not change over time (e.g. geographic location of a district) cannot be estimated. Panel data could also be analyzed using random effect approach that models variations both across and within districts, and allows the estimation of the influence of variables that do not change over time. A key assumption of the random effect model is that the regressors and the random individual effects are exogenous. A Hausman (1978) test indicated that the models from the Indian data violate the above assumption. Thus estimates from only fixed-effect models are presented.

The main advantage of using panel data is the ability to minimize (or eliminate) omitted variable bias (Baltagi (2005: chapter 2 and 4). The equation of the panel model could be expressed as follows:

$$M_{dt} = \alpha + \beta x_{dt} + u_{dt}$$

$$u_{dt} = \mu_d + v_{dt}$$

Where M_{dt} is the percent never-married women age 15-19 in district *d* at time *t*; X_{dt} is the vector of the explanatory variables; β is the vector of the coefficients to be estimated; u_{dt} is the disturbance term; μ_d is the unobserved district specific effect; v_{dt} is the rest of the disturbance term. In the fixed-effect model μ_d is treated as fixed term.

Schooling and marriage may be endogenous. Endogeniety could be addressed using a two-stage least square regression model (Wooldridge 2002: chapter 5). This method involves selecting an instrument variable that is “highly correlated with that explanatory variable it is to replace, but which is uncorrelated with the error term” (Pearce 1992: 209). The mark of a good instrumental variable according to Angrist and Krueger (2001:73) is that it should be “correlated with the endogenous regressor for reasons the researcher can verify and explain, but

uncorrelated with the outcome variable for reasons beyond its effect on the endogenous regressor".

In the case of schooling, it is reasonable to assume that availability of schools influences the decision to attend school. In the absence of direct measure of availability of schools in the districts, number of teachers in the population could be used as proxy. Number of teachers in the population could be further refined to number of teachers to school age (5-19) population. It makes intuitive sense to expect that number of teachers will be correlated with education; but at the same time, it is reasonable to assume that number of teachers in the district has limited or no direct influence on marriage age, i.e. the instrument appears to be uncorrelated with the outcome of interest.

5. Results

Descriptive statistics for the variables that are used in the analyses are presented in Table 2. These measures indicate that women's marriage age has been increasing. Percent never-married women at age 15-19 increased by about 10 percent between 1981 and 1991, and by about 13 percent between 1991 and 2001. Both the indicators of women's schooling show improvement between 1981 and 2001. Percent of women with primary schooling as their highest educational level increased from 7.3 in 1981 to 9.5 in 1991 to 12.4 in 2001. Women with any level of completed schooling doubled between 1981 and 2001, reaching about 28 percent in 2001. The rest of the indicators indicate a slight increase in urbanization, decline in agricultural workers and increase in tribal population.

Table 3 presents the results from multivariate models that analyze the influence of primary schooling on marriage patterns of women age 15-19. The first panel presents the results from OLS models for each year separately. The estimates indicate that primary schooling increases the percent of never-married women age 15-19, and its influence is strongest in 1981. One percent increase in primary schooling at the district level increased

percent never-married women age 15-19 by nearly 2.3 percent in 1981 and by about 2 percent in 2001. The cross-sectional models indicate that schooling is a significant factor in explaining the variations in marriage patterns.

[Table 3 about here]

The second panel presents estimates from the fixed-effect models for 1981-1991 period. There are three models in the panel: the first with all controls except time dummy, the second adds a control for time and the third has an interaction term for time and schooling. The time dummy captures the secular changes in marriage age between 1981 and 1991. The first fixed-effect model indicates a positive influence on schooling on marriage, but the magnitude of the estimates is substantially lower than the OLS estimates. In the next model with a control for time, the estimate for primary schooling is no longer significant. The coefficient of time indicates that the percent never-married women age 15-19 was substantially higher (about 8.5%) in 1991 than in 1981, net of schooling and other controls. In the next model an interaction term of time and education is introduced to test whether the influence of schooling is different in the two time periods. The estimate of the interaction term is negative and significant, suggesting that the influence of primary schooling is about 0.4 percent lower in 1991 than in 1981. Finally the last column in the table presents the estimates from the fixed-effect instrumental variable model. The estimate of primary schooling in this model is also not significant, suggesting the absence of endogeneity.

The next panel presents fixed-effect estimates for the 1991-2001 period. As was the case for 1981-1991 period, the fixed-effect estimate of primary education for the 1991-2001 is weaker than the corresponding cross-sectional estimate. But primary education has a statistically significant influence in predicting percent never-married women even when a control for time is introduced (model II). The estimate of the time dummy suggests that the percent never-married women age 15-19 was substantially higher by about 7 percent in 2001 than in 1991, net of schooling and other controls. However, the influence of time does not wipe out

completely the influence of primary education. In the next model the interaction term for time and primary schooling indicates that the influence of primary schooling is about 0.6 percent lower in 2001 compared to 1991.

Table 4 presents the estimates of the relationship between female schooling (percent of women with any level of completed schooling: primary, middle, matriculation or higher) and percent never-married women age 15-19.The table is arranged in similar fashion as the previous one. Cross-sectional estimates suggest that female schooling increases the percent never-married women in the district. Though the influence is evident in all three time periods, it is stronger in 1981. The panel model for the 1981-1991 period with no control for time (model I) also supports this finding, but the estimate of the fixed-effect model is smaller than the cross-sectional estimates. According to the fixed-effect estimate, one percent increase in female schooling increases percent never-married women age 15-19 by about 0.8 percent. In the next model with time dummy included, schooling is no longer significant. The estimate of time dummy indicates a nine percent increase in percent never-married women age 15-19, net of other factors. As was the case with primary education, the interaction term between schooling and time is significant. The estimate of the interaction term indicates that the influence of schooling was significantly lower in 1991 compared to 1981. The estimates from the instrumental variable model (last column in the table) also show no relationship between schooling levels in the district and marriage patterns.

Estimates for the 1991-2001 period presented in the last panel show that female schooling had a significant influence on entry into marriage for women age 15-19. The influence of schooling is significant even when time dummy is introduced (model II), though the magnitude of the estimate is substantially reduced. This is in contrast with the 1981-1991 panel where schooling does not have a significant influence after the introduction of the time dummy. The estimate of the interaction term for time and schooling in the 1991-2001 panel shows that the influence of education declined between 1991 and 2001.

[Table 4 about here]

6. Conclusion

This paper assessed the influence of schooling on marriage timing in India. While schooling has substantial influence in explaining cross-sectional variations in marriage timing, the relationship is far from causal. When district-specific and time effects are taken into consideration, schooling, irrespective of the level, is no longer an important factor in explaining changes in marriage timing between 1981 and 1991. However, schooling seems to have had a small but statistically significant influence on changes in marriage timing between 1991 and 2001. The interaction estimates for both time periods indicate that the influence of schooling has declined over time. Further, the analysis suggests that increases in schooling for the most part to be independent of changes in marriage age (i.e. the relationship is not endogenous) between 1981 and 1991. The indicator for time has a significant and large influence in explaining changes in marriage timing between 1981 and 1991, and between 1991 and 2001. As was noted earlier, the time dummy captures secular increases in marriage timing. When such secular changes are taken into account, schooling has no longer a significant factor in explaining changes in marriage timing between 1981 and 1991. However schooling seems to have played a role in influencing marriage timing between 1991 and 2001.

The present analysis tests the relationship between schooling and marriage at the aggregate level. It would be erroneous to conclude from the analysis that for individuals schooling does not have a direct influence on marriage timing, as inferences from aggregate data are not necessarily true at the individual level (Schwartz, 1994). Thus women with higher levels of schooling may marry at a later age, even though schooling has no influence at the aggregate level. This discord in the influence of schooling at the individual and aggregate levels is to be expected. Schooling at the aggregate level, in contrast with individual level measure, captures the broader context and social environment of the district. Further, and importantly, the

influence of outside factors may not be the same at both these levels. Changes in schooling and marriage brought about wider societal transformations can only be captured at the aggregate data. Similarly, secular changes in marriage age cannot be detected using a strictly individual-level analysis.

Marriage age has been increasing irrespective of changes in schooling in India. It is clear from the present analysis that broader societal changes are an important factor in explaining marriage change. These changes could have been brought about the spread of modern attitudes and values that promote greater say for women in spousal choice and other matters related to marriage. The nature of the social changes including the role of ideational change in delaying entry into marriage in India remains to be investigated.

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Table 1. Mean marriage age and literary for women in India, 1981-2001

	SMAM			Literacy, percent		
	1981	1991	2001	1981	1991	2001
Andhra Pradesh	17.3	18.3	19.4	24.2	32.7	51.2
Assam	-	21.1	21.7	-	43.0	56.0
Bihar	16.6	17.6	18.6	16.5	22.9	33.6
Gujarat	19.5	19.9	20.4	38.5	48.6	55.6
Haryana	17.8	18.9	19.7	26.9	40.5	56.3
Karnataka	19.2	20.1	20.9	33.2	44.3	57.5
Kerala	21.8	22.3	22.0	75.7	86.1	87.9
Madhya Pradesh	16.6	17.8	19.1	24.0	28.9	50.6
Maharashtra	18.8	19.7	20.6	41.0	52.3	67.5
Orissa	19.1	20.2	21.7	25.1	34.7	51.0
Punjab	21.1	21.0	21.6	39.7	50.4	63.6
Rajasthan	16.1	17.5	18.5	14.0	20.4	44.3
Tamil Nadu	20.2	20.9	21.4	40.4	51.3	64.6
Uttar Pradesh	16.7	18.1	19.6	17.2	25.3	43.0
West Bengal	19.2	19.7	20.0	36.1	46.6	60.2
All India	18.3	19.3	20.2	29.8	39.3	54.0

Source: Singulate Mean Age at Marriage (SMAM), 1981: Registrar General, India, 1988; 1991 and 2001: calculated from the respective census data. Literacy 1981-2001: Government of India, 2002: Table 4.1.

Note: All states refer to the pre-2000 state boundaries.

Table 2. Variable definitions and sample means (standard deviations), 1981, 1991 and 2001

Variable	Definitions	1981	1991	2001
Unmarried women, 15-19	Percent of district's female population age 15-19 who are unmarried	50.8 (21.5)	60.6 (19.6)	73.7 (13.4)
Primary school, women	Percent of women with primary school as the highest educational level	7.3 (4.9)	9.5 (5.6)	12.4 (4.2)
Female schooling	Percent of women with any level of completed schooling (primary, middle, matriculation or higher)	14.2 (10.6)	21.1 (13.3)	28.5 (12.5)
Teachers	Number of teacher per 1000 population age 5-19	14.5 (5.1)	18.1 (6.4)	-
Marriage squeeze	Ratio of unmarried men 20-24 and unmarried women 15-19, percent	100.4 (27.5)	95.2 (22.5)	82.6 (17.1)
Agricultural workers	Percent of a district's main workers age 15 and over categorized as agricultural workers	68.9 (16.3)	67.7 (17.4)	62.4 (18.9)
Urbanization	Percent of population living in urban areas	20.5 (15.1)	22.4 (16.1)	23.1 (16.9)
Scheduled castes	Percent of district's population belonging to a scheduled caste	15.9 (7.0)	16.7 (7.1)	16.8 (7.4)
Scheduled tribe	Percent of district's population belonging to a scheduled tribe	8.9 (15.2)	8.9 (15.5)	10.1 (16.8)
Muslim	Percent of Muslim population in the district	9.8 (9.1)	10.7 (10.1)	10.4 (9.9)
North	Districts in the states of Haryana, Punjab, Madhya Pradesh, Rajasthan, and Uttar Pradesh.	0.46 (0.50)	0.45 (0.50)	0.45 (0.50)
South	Districts in the states of Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu	0.21 (0.41)	0.22 (0.41)	0.20 (0.40)
East	Districts in the states of Bihar, Orissa, and West Bengal	0.18 (0.39)	0.20 (0.40)	0.22 (0.41)
West	Districts in the states of Gujarat and Maharashtra	0.14 (0.35)	0.14 (0.34)	0.13 (0.33)
N		326	362	469

Table 3. Primary schooling and marriage in India: regression estimates (dependent variable: never-married women 15-19, percent)

	Cross-section estimates			Panel: 1981-91			Panel: 1991-2001			Fixed-effect IV -2SLS , 1981-1991
	1981	1991	2001	I	II	III	I	II	III	
Primary schooling, women	2.27 **	1.57 **	2.02 **	0.98 **	0.02	0.32 **	1.33 **	0.91 **	0.88 **	1.10
	(9.8)	(7.5)	(12.5)	(7.7)	(0.2)	(3.1)	(11.6)	(8.4)	(8.6)	(1.1)
Agricultural workers	-0.05	-0.29 **	-0.17 **	-0.15	-0.12	-0.27 **	-0.35 **	0.12 +	0.14 *	0.00
	(0.6)	(3.2)	(4.1)	(1.0)	(1.2)	(2.7)	(6.3)	(1.8)	(2.2)	(0.0)
Urbanization	0.24 **	0.06	0.03	0.50 **	0.05	0.13	-0.16	-0.09	0.05	-0.11
	(3.0)	(0.8)	(0.7)	(3.9)	(0.5)	(1.5)	(1.5)	(1.0)	(0.6)	-(0.6)
Scheduled castes	0.30 *	0.31 **	0.13 +	1.25 **	0.24 +	0.52 **	0.46	-0.03	0.24	0.34 +
	(2.3)	(2.7)	(1.7)	(6.3)	(1.6)	(3.6)	(1.1)	-(0.1)	(0.7)	(1.8)
Scheduled tribe	0.18 **	0.19 **	0.21 **	0.20	0.05	0.07	-0.70 *	-0.47 +	-0.32	-0.16
	(3.2)	(3.6)	(5.8)	(0.6)	(0.2)	(0.3)	(2.2)	(1.7)	(1.2)	(0.4)
Muslim	0.05	0.05	0.09 +	1.95 **	-0.35	-0.22	0.26	0.18	0.25 +	0.22
	(0.6)	(0.7)	(1.7)	(5.1)	(1.2)	(0.8)	(1.6)	(1.2)	(1.7)	(0.4)
Marriage squeeze	-0.31 **	-0.27 **	-0.11 **	-0.26 **	-0.17 **	-0.13 **	-0.45 **	-0.33 **	-0.25 **	-0.19 **
	(11.0)	(8.5)	(3.2)	(10.2)	(9.2)	(6.8)	(17.3)	(12.6)	(9.0)	(6.7)
Time dummy [a] (1991/2001)					8.44 **	10.91 **		7.21 **	15.67 **	6.01 **
					(18.4)	(19.3)		(10.4)	(10.9)	(2.7)
Time*primary schooling						-0.38 **			-0.6 **	
						(6.7)			(6.3)	
South	8.81 **	9.12 **	-0.79							
	(4.1)	(4.5)	(0.6)							
East	7.81 **	7.34 **	0.43							
	(4.2)	(4.0)	(0.3)							
West	11.44 **	8.15 **	2.80 +							
	(4.4)	(3.1)	(1.6)							
R-square	0.72	0.64	0.52	0.65	0.83	0.85	0.79	0.84	0.86	0.77
N	326	362	469	652	652	652	724	724	724	652

Significance level ** p<.01, *p<.05, + p<.10. t-ratios in parenthesis. [a] Time dummy: for the 1981-1991 panel, 1981 is the reference category and for the 1991-2001 panel, 1991 is the reference category.

Table 4. Any level of schooling and marriage in India: regression estimates (dependent variable: never-married women 15-19, percent)

	Cross-section estimates			Panel: 1981-91			Panel: 1991-2001			Fixed-effect IV -2SLS , 1981-1991
	1981	1991	2001	I	II	III	I	II	III	
Female schooling, any level	1.16 **	0.88 **	0.95 **	0.77 **	-0.08	0.34 **	0.88 **	0.60 **	0.59 **	-1.08
	(9.8)	(9.9)	(14.9)	(12.0)	(1.1)	(3.7)	(14.9)	(7.3)	(7.8)	(1.1)
Agricultural workers	0.01	-0.09	0.07	0.08	-0.16	-0.18 +	-0.09	0.10	0.09	-0.53
	(0.1)	(1.1)	(1.5)	(0.6)	(1.4)	(1.8)	(1.6)	(1.5)	(1.4)	(1.3)
Urbanization	0.15 +	0.06	0.04	0.16	0.08	0.12	-0.28 **	-0.17 +	-0.07	0.40
	(1.9)	(0.9)	(1.0)	(1.3)	(0.8)	(1.4)	(2.9)	(1.8)	(0.8)	(1.2)
Scheduled castes	0.43 **	0.41 **	0.17 *	0.58 **	0.26 +	0.46 **	0.10	0.06	0.08	0.55
	(3.4)	(3.6)	(2.3)	(3.0)	(1.8)	(3.2)	(0.3)	(0.2)	(0.2)	(1.6)
Scheduled tribe	0.18 **	0.20 **	0.18 **	0.26	0.06	0.02	-0.55 +	-0.45	-0.37	0.06
	(3.2)	(4.1)	(5.4)	(0.7)	(0.2)	(0.1)	(1.9)	(1.6)	(1.4)	(0.2)
Muslim	0.08	0.07	0.10 *	1.13 **	-0.40	-0.08	0.17	0.17	0.23 +	-0.91
	(1.0)	(1.1)	(2.0)	(3.2)	(1.4)	(0.3)	(1.1)	(1.1)	(1.6)	(1.4)
Marriage squeeze	-0.33 **	-0.30 **	-0.15 **	-0.27 **	-0.16 **	-0.14 **	-0.45 **	-0.39 **	-0.26 **	-0.08
	(12.1)	(9.9)	(4.8)	(11.8)	(8.5)	(7.6)	(19.2)	(15.4)	(9.4)	(1.0)
Time dummy (1991/2001)					8.99 **	9.86 **		4.43 **	13.51 **	15.07 *
					(14.8)	(17.1)		(4.7)	(10.1)	(2.4)
Time*primary schooling						-0.20 **			-0.26 **	
						(7.1)			(8.8)	
South	10.14 **	8.45 **	0.16							
	(4.9)	(4.5)	(0.1)							
East	7.40 **	5.58 **	2.05 +							
	(4.0)	(3.2)	(1.7)							
West	13.67 **	9.24 **	3.70 *							
	(5.5)	(4.0)	(2.3)							
R-square	0.72	0.67	0.57	0.71	0.83	0.85	0.82	0.84	0.86	0.73
N	326	362	469	652	652	652	724	724	724	652

Significance level ** p<.01, *p<.05, + p<.10. t-ratios in parenthesis. a Time dummy: for the 1981-1991 panel, 1981 is the reference category and for the 1991-2001 panel, 1991 is the reference category.