The Anticipation Effect of Marriage on Female Education: Evidence from Nepal

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Abstract

We study the impact of planned age at marriage on female education. We hypothesize that due to a household division of labor that allocates relatively greater responsibility for housework on wives, parents discount their daughters' schooling, and the earlier the anticipated age at marriage the greater the discount. We empirically test this effect using household data from Nepal. We control for potential endogeneity by exploiting variations in cultural norms regarding dowry and differences in average age of female marriage among ethnicities and regions as instrumental variables. The econometric results support the hypothesis that female education is negatively affected by cultural practices that favor early marriage.

Keywords: Education, Marriage, Gender.

JEL Classification : I20, J12, J16.

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1 Introduction

Despite a number of socio-economic benefits attributed to female education (Bayisenge, 2010), females fall behind males in educational attainment in many parts of the world, with the gap increasing in the level of education. The problem is particularly severe in South Asia, where the Gender Parity Index (GPI), which measures the female to male ratio in education, is significantly low. In this region, the GPI for pre-primary, primary, secondary and upper secondary level enrolment is, respectively, .98, .86, .83 and .75 whereas the global average for the same measures stands at .99, .93 , .93 and .92, respectively (UNESCO, 2002). All countries in this region, apart from Sri Lanka and Maldives, lag far behind the global average of girl's school enrolment and this gap increases with levels of schooling.

Existing empirical studies on the gender gap in education can be divided into two strands. The first focuses on household characteristics, such as economic status and parental education, and how these influence gender preferences in schooling. In general these studies find that poverty, lack of social security, credit markets and low levels of parental education all contribute to gender biases in education (see, *e.g.*, Jacoby and Skoufias, 1997; Cameron and Worswick, 2001; Sawada, 1997). The second strand takes into account gender differences in labor market outcomes, especially with respect to returns to education (see, *e.g.* Rosenzweig and Schultz, 1982). The literature has produced mixed results on the pure returns to female education. While, *e.g.*, Kingdom (1998) found on the basis of data from Uttar Pradesh, India that girls face lower economic rate of returns to education, Aslam (2009), Behrman and Deolalikar (1995), Asadullah (2006) found the opposite for, respectively, Pakistan, Indonesia and Bangladesh. Moreover, Munshi and Rosenzweig (2006) found that traditional caste restrictions on occupational mobility can restrict boys' occupational choices and therefore the quality of their education more than that of girls. Thus labor market outcomes do not present an unambiguous explanation for the gender gaps in female education that are observed at the national level in South Asian countries.

An important unexplored dimension of the gender gap in education is marriage. In Asian, particularly South Asian cultures, parents consider a daughter's marriage to be one of the

family's main milestones and start planning for it years in advance. Not much attention has been paid to how parental plans regarding a daughter's marriage might influence their decisions regarding her education. On the theoretical side, some papers have argued that the prospect of marriage alone biases parents against educating their daughters. Lahiri and Self (2007) analyze the impact of patrilocality in post-marital living arrangements on female education. Patrilocality, which is especially widespread in South Asian countries, leads to the anticipation that a daughter's future earnings will accrue to her in-laws' household rather than her natal household and this discourages investment in her education. Jafarey and Maiti (2015) argue that while gender wage inequality directly leads to a discount on female schooling, it also induces a marital division of labor in which females shoulder a disproportionate amount of responsibility for housework and this further lowers the value of girls' education.

Following Becker's seminal work (Becker, 1973) an empirical literature has developed in which marital decisions are treated as endogenous and their determinants studied. However, to our knowledge, only a few empirical papers have so far studied the interaction between marriage and female education. Brien and Lillard (1994) use empirical evidence from Malaysia to study the role of education and enrolment in delaying marriage and first conception, and the role of marriage in delaying first conception and dropping out of school. Mensch, Singh, and Casterline (2006) evaluate the effect of schooling on age at first marriage. Looking at evidence from 73 developing countries, they found that the expansion of schooling has led to a proportional increase in the age at first marriage for females but did not find a similar result for males. These papers, however, did not consider the reverse effect from age at marriage to education.

Field and Ambrus (2008) do look at the effect of early marriage on female schooling and other adult outcomes in Bangladesh. They argue that in impoverished and culturally traditional societies parents have an incentive to marry their daughters young as a form of protection against economic vulnerability. The age of menarche imposes a constraint on how early girls can be married. Thus, the authors use the timing of menarche as an instrument in

identifying the impact of early marriage on female schooling. They find that early marriage significantly lowers female schooling and that each year's delay in marriage would increase female schooling by 0.22 years.

Although an important step in isolating the effects of age at marriage on female education, the relevance of menarche as an instrumental variable to determine the age at marriage is limited to social settings in which child marriage is prevalent. While this might be true of Bangladesh, it is not necessarily true of other South Asian countries.[1] Moreover, while child marriage *directly* hinders a female's schooling by imposing household duties at a young age, our concern is also with the *indirect* disincentive to female education that marriage exerts, via its implications for the returns to schooling of married females, and this applies even post-childhood. Thus, even if a female gets married after the normal age for a particular level of schooling, the sooner she plans to marry after reaching that age, the less likely that she will attain that level in the first place.

Our paper contributes to the analysis of the above effect by empirically testing the causal effect of age at marriage on female education using data from a household survey in Nepal. Longitudinal data that span enough years could account for such anticipation effects, but are unfortunately not available; we only observe *ex-post* and retrospective decisions regarding education and the age at marriage. That is, we observe age at marriage and education several years after the relevant decisions were taken. Given these limitations, ordinary least-squares (OLS) estimates of the effects of age at marriage on education are potentially biased. We thus use an instrumental variables (IVs) strategy.

Nepal is well suited for our study because it has considerable variation in age at first marriage across ethnic groups and regions, a feature that we exploit in implementing our IV strategy. Our first instrument indicates membership of the Maithili community, an ethno-linguistic group whose members speak an eponymous language. The Maithilis belong to a region called Mithila that straddles the Indo-Nepalese border, stretching from Northern Bihar

[1] A report published by UNICEF shows that Bangladesh has a considerably higher ratio of females marrying below the age of 15 years than the other countries in this region. While in Bangladesh, approximately 30% of married females from the age group 20-24 were married below the age of 15, in India the corresponding figure was 18%. The same measure stood at less than 10% in Nepal, Pakistan and Sri Lanka (Asadullah, 2011). Our own survey data from Nepal suggests that about 810 out of 5028 females, or 16%, married before reaching 15.

in North India to Jhanakpur in Southeastern Nepal. According to popular perception as well as ethnographic studies, the Maithili community practices dowry culture more strictly than other communities of Nepal. This is attributed to its spillover into India where traditional Hindu practices are more entrenched than in Nepal. In particular, their custom of *Tilak Pratha*, which links the value of the dowry to the grooms' economic status encourages parents to marry their daughters young.

In the next section and in the discussion of of results, we justify the use of this instrument in greater detail. However we acknowledge that our justification is based on qualitative accounts and indirect empirical evidence, and we cannot statistically rule out two possible sources of bias arising from this variable: first, the possibility of a joint cultural bias in the Maithili community that both favors dowry culture and disfavors female schooling on its own account; second, that the practice of dowry might influence girls' education because of income effects on their families. We therefore employ a second instrument, namely the average age at marriage within a respondent's peer group, which we define as the ethno-regional group into which she was born.

Overall, using the IVs models, we find a positive and significant effect of marriage age on education. However, the IVs estimates are much less precise than the OLS estimates, impeding us to obtain an accurate point estimate. The effect lies in between 0.2 and 0.5 years of schooling per one year increase in age-at-marriage.

The rest of the paper is organized as follows. Section 2 explains the econometric model and discusses the identification assumptions. Section 3 describes the data and presents summary statistics. Section 4 reports the empirical results. The last section concludes.

2 Econometric model and instrumental variables

The main hypothesis of this paper is that the earlier the age of female marriage, the less education a female receives, even in the years prior to her marriage. The basis for this hypothesis is derived from the theoretical findings of Jafarey and Maiti (2015) and Lahiri and Self (2007). The first paper shows that, under conditions of gender wage discrimination

in the labor market, the household division of labor results in a married female sharing a greater responsibility for household chores, thereby working less and earning less than a single female with whom she shares the same educational level and other labor market attributes. An implication of this is that a female's labor market earning potential drops, for each level of schooling, once she enters marriage. The second paper argues that under patrilocal living arrangements, common in South Asia, a wife's earnings accrue to her spousal household rather than her parental one. For both reasons, the earlier a female is likely to marry the greater the discount placed on her education. This is the main hypothesis tested in this paper.

At the same time, establishing a causal relationship between female age at marriage and schooling is not straightforward because of potential endogeneity of age at marriage. This can come from several sources. The first possibility arises from a girl's own unobserved ability to convert education into labor market productivity. A girl with low ability is not expected to earn much even as a single female and this discounts any pecuniary benefits from delaying her marriage. Second, there is the possibility that in traditional South Asian societies, parents are influenced by cultural norms that jointly favor early marriage and disfavor female schooling. Both of these possibilities could induce a positive relationship between the two variables.

Then there are possibilities that lead to the opposite bias. A girl might have traits that both enhance her position within her natal household and make her more marriageable. Physical appearance, personality, social skills would be examples of such traits. These would lead to a reduction in the age at marriage along with a higher level of education. This is specially true if we consider that education is a good in itself, and as discussed below, parents are not inherently biased against educating their daughters *per se*.[2] Another possibility is that a girl's education increases the chances of marrying a groom of higher socio-economic status. These factors would generate the opposite effect from that of educational ability.

[2]The possibility that education is a consumption good in addition to an investment in human capital has its precedents in the education and health literatures. See, for example, early attempts to empirically disentangle these two effects by Schaafsma (1976) and Lazear (1977). Cutler and Lleras-Muney (2006) summarize a large body of evidence that establishes a positive relationship between health and education, even after accounting for the effects of education on income. Their argument is that education leads to better decision-making and information-seeking and thus helps individuals maintain good health.

For all these reasons, there is a possibility of bi-directional causality between these two variables. Longitudinal data that span enough years could account for such anticipation effects, but are unfortunately not available; we only observe *ex-post* and retrospective decisions regarding education and the age at marriage. Given these limitations, OLS estimates of the effects of age at marriage on education are likely to be biased. We address these issues using two instrumental variables (IVs), both of which reflect community norms, to predict a female's age at marriage. In constructing our proposed IVs we have made use of information that, directly or indirectly, reflects social norms regarding age-at-marriage.

The first instrument is a dummy for membership to the Maithili community. Their particular dowry practice, known as *Tilak Pratha*, is effectively a groom price that increases with the educational qualification and social standing of the groom (Das, 2009). The result of *Tilak Pratha* is that parents try to get their daughters married as soon as possible because older girls are more likely to match with more mature and well-educated boys, putting upward pressure on the amount of dowry.[3] One reason for the strong adherence of the Maithilis to dowry culture is their geographical and cultural proximity to India, where groom price dowries are more prevalent than in Nepal. Empirical findings from India also suggest a positive correlation between the size of the dowry and the socio-economic standing of the prospective husband (Jejeebhoy and Halli, 2006).

Our own data show that 63% of Maithili girls were married by the age of 16, compared with 41% of non-Maithali girls (see Table 4). These differences are significant at the 1% level, and provide *prime facie* evidence that *Tilak Pratha* influences marital behavior in Nepal within the Maithali community. Empirical evidence from our survey on household expenditures (see Table 1) show that in fact the dowry and wedding expenses represent

[3]According to Das (2009): "As Tilak is adjusted according to the education, qualifications and social standing of the boy, this compels the parents to marry off their daughters as soon as possible with anybody, without considering if he is eligible or not." In a similar vein, a UN report [UN-ESCAP (2012)] states: "The Maithili speaking people in the Terai have the highest rate of child marriage, with 95.6% girls getting married before the age of 16. The main reason behind this is the widely prevalent dowry system." The report goes on to link *Tilak Pratha* with early marriage: "a younger girl, on the other hand, can get a groom who will be comparatively younger and less qualified, thus demanding less tilak money." Further evidence that public perception blames dowry culture for early marriage in the Maithiil community arises from the fact that reformers and activists belonging to the community itself have recently held demonstrations in which speakers have explicitly made this link [Jha (2014)].

a higher burden on the Maithili households than in non-Maithili (as a proportion of land holding value and household income).

While we are not aware of any evidence, whether anecdotal or academic, that Maithilis are against female education in its own right, from the point of statistical inference we cannot rule out the possibility that this is the case. In addition, the Maithili instrument could suffer from an additional bias, *i.e.* Maithilis marry their daughters young because of the income effects of large dowries. As argued by Dhital (2012), when faced with the choice of paying for their daughters' education or saving up for their dowry, parents choose the latter. By contrast, Dalmia and Lawrence (2005) argue that dowry size is a function of differences in individual and household characteristics between grooms and brides. This suggests that the lower the gap in such characteristics, the smaller will be the dowry payment. This would actually encourage investment in daughters' education. These possibilities have received some attention in the empirical literature and the results are mixed.

Dalmia and Lawrence (2005) employ household survey data from the Indian states of Uttar Pradesh and Karnataka, and find that, contrary to their own argument, brides' human capital was positively correlated with the amount of dowry. The authors themselves pointed to two types of possible confounding biases in their data. First, in a polygamous marriage market, a relatively large number of women might have been competing for a limited number of eligible men, and both the educational level of women and the dowry might have reflected this asymmetry between men and women. Second, both variables might have been positively correlated with household wealth.

Another study carried out by Anderson (2004) estimated the effects of brides' education on dowry payments (parental characteristics and distance to school were used as IVs in the education regression). Employing data from Pakistan this study found a positive relationship between the brides' education and dowry size. However, when the average level of education was controlled for, the estimated coefficient on bride's education became statistically insignificant. These studies suggest that dowry size might not directly discourage female schooling. Nonetheless in light of this and the possibility of a Maithili-specific bias against

female education, we employ a second IV.

Our second instrument is the average age of marriage for the respondent's reference group. This instrument is constructed by calculating the average age of marriage of each female's peer group, which in turn is defined as the intersection of the ethnic and regional community into which the respondent was born. The assumption here is that peer group effects are important in determining an ideal age at which a female marries. Our use of this instrument is based on a long-standing literature in demography and sociology that investigates the existence of social and cultural norms regarding an ideal age at marriage. While sociologists such as Settersten and Hagestad (1996) and Neugarten, Moore, and Lowe (1965) were interested in the broader issue of age norms for various "life-course" transitions, demographers are specifically interested in age at marriage and the length of the reproductive cycle in women (see Billari, Prskawetz, and Furnkranz, 2002). Both Neugarten, Moore, and Lowe (1965) and Billari, Prskawetz, and Furnkranz (2002) cite survey evidence on popular perceptions regarding ideal ages and/or age limits for marriage, the latter from 1960's USA and the former from 1990's Italy.[4]

We now consider the validity of our second instrument. While acknowledging that we cannot directly prove the absence of correlation between a community's norms that affect age at marriage and those that affect female education, we offer two arguments in defense of the assumption of independence. First, even in a society such as Khyber Pakhtoonkhwa in Pakistan, which outwardly appears to be strongly biased against female education, survey evidence suggests that parents generally wish to see their daughters receive at least secondary schooling, albeit under conditions, such as gender segregation in all aspects of the schooling experience, which adhere to their interpretation of religious requirements (Keiko and Yoshinori, 2006). In other words, the idea of a culture being inherently biased against female

[4]According to the data cited by Billari, Prskawetz, and Furnkranz (2002), older women perceived age limits for marriage more frequently than younger ones and all age groups believed more strongly in a minimum age than a maximum. For example, 11% of women born between 1945-1947 believed in an upper age limit but only 5% of women born in 1973 did so. These are results from modern Europe. Casual evidence suggests that such culturally influenced age limits are far stronger in traditional South Asian ones than in modern European ones. Unfortunately we are not aware of similar survey evidence from Asia but even in the 1960s survey data from the USA, Neugarten, Moore, and Lowe (1965) reported that 80% of male and 90% of female respondents believed that men should marry between the ages of 20-25 and 85% of male and 90% of women set the analogous age range for women between 19-24.

education could be as suspect as the idea of a culture being inherently violent. Second, for at least the second instrument, we argue that even if there are cultural norms that are directly opposed to female schooling and therefore indirectly encourage early marriage, these norms are more likely to be based on inherent attitudes of the broader ethno-regional group than on localized peer-group effects. By constructing a localized variable regarding age-at-marriage we are capturing variations arising from peer-group effects, which are unlikely to be driven by a broader dislike for female education amongst the respondent's wider ethno-regional community.

Finally, in defense of our assumption that our IVs are not contaminated by correlation between cultural biases and social norms regarding age at marriage and those regarding female education, note that in all specifications mother's education is included as a direct control. The idea is that any inherent cultural bias against female education will already be captured by a mother's education when it is included along with other household characteristics that determine education. This is particularly true in South Asia where marriage is typically endogamous, so that mother's education would be closely correlated with cultural attitudes towards female education on both sides of the marriage equation. Indeed, our results show that mother's education is only significant for the education regression and not the age at marriage one, which implies that while there are norms affecting female education these are not directly correlated with age at marriage.

Our identification approach is different from Field and Ambrus (2008) who use age of menarche. First, as discussed in the Introduction, child marriage is less prevalent in Nepal, and as such, the direct effect of dropping out of school for household duties is less important. Second, we are mostly concerned with the anticipatory indirect effects on education, which may be decided several years in advance of marriage taking place. Finally, age of menarche is not available in our dataset. It should be noted that our proposed approach of considering community norms that are specifically correlated with age-at-marriage allows estimating the effect of interest in more general set-ups than when age of menarche is used.

We use three different IV models. The models diifer in their choice of instruments: (1)

IV1: a Maithili-community binary variable, (2) IV2: average age of females within the ethnic-regional grouping to which the respondent belongs, and (3) Two IVs: both instruments are used together. In the first-stage of each regression, age at marriage is regressed on the appropriate IV(s) (and other control variables), and in the second-stage, educational attainment is regressed on the predicted age at marriage and other control variables.

The two stage regression model can be written as,

$$Educ_i = \beta_0 + \beta_1 Mage_i + \beta_2 X_i + u_i, \tag{1}$$

$$Mage_i = \delta_0 + \delta_1 Z_i + \delta_2 X_i + v_i, \tag{2}$$

where $Educ$ is years of schooling and $Mage$ is age at marriage associated with female i. X comprises a set of exogenous covariates, representing individual as well as household characteristics such as age dummies, mother's and father's education, household wealth proxied by the value of landholding and income, urban dummy, ethnic dummies as well as regional dummies. See the Appendix for the complete list of variables and their definition. Z is the IV set (IV1, IV2 or Two IVs). u and v are the idiosyncratic error terms associated with female i.

3 Data

This paper employs data from the 2003 National Living Standard Survey of Nepal, carried out by its Central Bureau of Statistics with the technical support of the World Bank and UK Department of International Development. The survey follows the World Bank's Living Standard Measurement Survey Strategy and applies a two-step stratified sampling scheme. It took place over 269 Primary Sampling Units, covering 73 out of a total of 75 districts in Nepal and comprises information related to demography, education and literacy, health and maternity, and other information at the household and individual levels. The data cover the five administrative regions of Nepal: Eastern, Central, Western, Mid-Western and Far-Western, and an additional category of Abroad for those who were not residing in Nepal at

the time of the survey (they were mostly in India). The survey has a total of 5240 households and 28110 individuals.

We restrict the sample to ever-married females (still married, divorced, separated or widowed), which results in 5028 females. This may lead to potential sample selection bias since unmarried females would be systematically excluded. Table 2 reports females' marital status for different age groups. The table shows that the likelihood of marriage increases monotonically until the age of 30 years, after which less than 2.5% females remain unmarried. We thus consider two sub-samples, $Sample2549$ (3670 observations) and $Sample3049$ (2818 observations), representing married women in the age ranges of 25-49 and 30-49 respectively, in order to minimize this potential selection bias. The upper limit of 49 is imposed to exclude potential selection bias because of respondent mortality.

The survey contains two types of educational information on individuals: (1) the highest level of completed schooling, and (2) a categorical question about whether the individual (i) never attended school, (ii) attended in the past and (iii) is currently attending school. Only 28% (from the $Sample2549$ sub-sample) answered question (1). For those respondents who did not answer question (1) but answered question (2-i), we imputed their educational level as zero. This increased the sample size considerably from 1079 to 3670 for $Sample2549$ and from 684 to 2818 for $Sample3049$. We define the measure of educational achievement derived from question (1) as $Educ1$, and the measure derived by including the imputed values for those who answered question (2-i), as $Educ2$.

The variables used in the econometric analysis are presented in Table 3 (see the Appendix for the complete list of variables and their definitions). The average school attainment for married women was 7.51 years using $Educ1$ and fell dramatically to 2.16 years when $Educ2$ is used. Geographically the distribution of married women was 22%, 34%, 25%, 7% , 4% and 8% from the Eastern, Central, Western, Mid-western, Far-western regions and Abroad, respectively, and 80% live in rural areas. They belong to fifteen different ethnicities.

The upper part of Table 4 shows the distribution of marriage age across the sample 2549: 45% were married at or before the age of 16 years. Another 39% were married between

17 and 20. Only 2% of the sample got married after the age of 27 years. There is also a considerably lower age at marriage within the Maithili community as compared to the non-Maithili communities. The lower part of Table 4 reports the educational background of married females. The majority of married women, 71%, do not appear to have any formal schooling. Of the remainder, only 10% attained primary school, 4% secondary school, 7% high school and 8% received higher education.

4 Results

Tables 6 and 8 present the first-stage and Tables 7 and 9 second-stage baseline regressions, for the $Sample2549$ and $Sample3049$ sub-samples, respectively. White robust standard errors are reported. Regional and ethnicity dummy variables are included but coefficients not reported. Education is measured, as explained in Section 3, by both $Educ1$ and $Educ2$. In the discussions below, the results following from each of these two different measures are analogously identified as the $Educ1$ and $Educ2$ samples, respectively. In order to save space, coefficients are not reported for all the explanatory variables that were used in the regressions, but they are available upon request.

The first column in Tables 7 and 9 shows the OLS coefficients. Taken at face value, they imply that increasing age at marriage by 1 year is likely to increase female's educational level by 0.315 years using $Educ1$ and 0.193 years using $Educ2$ for the sample of 25-49 years-old and 0.269 years using $Educ1$ and 0.159 years using $Educ2$ for the sample of 30-49 years-old.

We next consider the IV estimates. In IV1, membership to the Maithili community has the expected negative and significant relationship with age at marriage. The estimated coefficient for the $Educ1$ sample is -1.7 for 25-49 years old, and -1.6 for 30-49 years old. Analogous coefficients of -.89 and -1.13 are estimated for the $Educ2$ sample, for 25-49 and 30-49 years old, respectively.

The first-stage IV2 model shows positive and statistically significant coefficients for $Avmage$. When both IVs are used together the Maithili coefficients are slightly reduced but retain their statistical significance. The calculated F-statistics (reported in Tables 7 and 9) are no less

than 11 for the largest 25-49 years old sample indicating strong joint significance of the estimated coefficients, but this statistic falls in magnitude when the smaller sub-sample of 30-49 years old is used. In the Two IVs model, the p-values for the Sargan over-identifying restriction test (reported in Tables 7 and 9) cannot reject the null hypothesis of validity of the IVs.

Regarding the other explanatory variables, a quick overview shows that the results in the first-stage regression are more or less as expected. Father's education, landholding, household income and living in urban areas increase age at marriage. The effect of mother's education on age at marriage is, contrary to expectation, negative but more importantly, statistically insignificant in all specifications. This supports our hypothesis that cultural attitudes towards female education are not directly correlated with those towards age at marriage.

Turning to the second-stage results, the first column in Tables 7 and 9 shows the OLS coefficients. They imply that increasing age at marriage by 1 year is likely to increase female's educational level by .315 years using $Educ1$ and .193 years using $Educ2$ for the sample of 25-49 years-old and .269 years using $Educ1$ and .159 years using $Educ2$ for the sample of 30-49 years-old.

Each of the IVs models shows a positive impact of delaying age at marriage ($Mage$) on education although the level of significance varies across models and samples. For the 25-49 years old sample, $Educ1$ IV1 model shows a coefficient of age at marriage on education of .335 (not significant), IV2 .456, and Two IVs model .411 (significant at the 5% level). For $Educ2$, $Mage$ also has a positive (statistically significant at 1% level) effect in all models: .564, .324 and .561 for IV1, IV2 and Two IV models, respectively. For the 30-49 years old sample, $Educ1$ model, the coefficients of $Mage$ are not statistically significant. However, for $Educ2$, $Mage$ has a positive effect in all models: .346 (at 5%), .175 (at 10%) and .212 (at 5%) for IV1, IV2 and Two IV models, respectively.

These estimates are roughly in line with but slightly higher than that found by Field and Ambrus (2008) for Bangladesh where increasing age at marriage by one year increases education by 0.22 years. Note, however, that compared to OLS, standard errors are consid-

erably higher, which makes the point estimate less precise. If, however, the point estimates are taken at face value, the IV estimates suggest that unobservables were biasing down OLS. That is, there should be girl's traits that favor both more education and early marriage, and this effect is potentially of a higher order effect than labor productivity unobserved ability and culture biases against education.

In all second-stage specifications, the coefficients on both mother's and father's education are positive and statistically significant. Moreover, as expected, there are significant differences between urban and rural areas.

4.1 Robustness and validity of the estimated results

In this section, we consider potential sources of bias in our estimates and outline our attempts to address them. We present results only for the sub-sample of 25-49 years old females.

One of the main concerns with our instruments, both of which reflect cultural norms and practices regarding female age at marriage, has been the possibility of a positive correlation between these norms and those that underlie female education. The insignificance of the results on mother's education in the first-stage regressions suggests that such norms are independent of each other. Nonetheless other biases might still arise.

First, there is the possibility that poverty drives parents both to keep their daughters out of school and to marry them young so that the burden of maintenance falls on their husbands and in-laws. Moreover, poor parents could be more susceptible to trading off girls' education for the sake of accumulating a sufficient dowry, even in communities that do not practice dowry culture as strictly as Maithilis do.

Second, a potential detrimental effect of early marriage on female education may arise because a significant proportion of females were getting married during childhood and were therefore obliged to abandon schooling and take up household duties. While this would be a valid effect in its own right as stated in the Introduction, our main concern is with the *ex ante* effect of age at marriage on female education, and not its *ex post* effect.

Third, a possible bias affecting only the Maithili instrument, is that this might reflect

regional variations in marriage practice, especially regarding age at marriage, rather than an effect of dowry culture specific to Maithilis. This possibility arises because Maithilis are concentrated in certain regions of Nepal that border India; to be precise in four of the six regions of our survey data: Eastern, Central, Western and Abroad. Since cultural practices in Nepal do vary by region and the concomitant degree of urbanization, this could arise as a source of bias.

We start first by looking at the possibility that poverty underlies the observed relationship between female education and age at marriage. We address this by running our regressions on a restricted sub-sample of households that belong to the upper half of the wealth distribution (proxied by land holding). The results appear in Tables 10 and 11. We shall discuss separately the cases of $Educ1$ and $Educ2$. For $Educ1$, the first-stage coefficients of the instruments increase in value and remain significant at the 1% level across all IV models. In the second-stage regression the coefficient of age at marriage increased for IV1 and dropped in value and/or significance for IV2 and Two IVs models, possibly due to the reduced sample size. For $Educ2$, while a marginal decrease is observed in the second-stage regression across the three IV models, they remain statistically significant. The p-value of the Sargan tests and the F-statistics support the validity of the instruments in this sub-sample. The important point is that by and large our qualitative results continue to hold at similar levels of significance, especially in the larger sample.

Second, we look at the possibility that the detrimental effect of early marriage on female education arises because of child marriage. To filter out this effect, we run regressions on the sub-sample of females who married above the age of 15. Fifteen is the age set by the International Labor Organization (ILO) convention as the minimum age of employment and one reason for this is that it is the age by which most children will have completed secondary school. If child marriage is the main driving force behind low female education we would expect insignificant effects of age at marriage on education in these sub-samples. The results for the first sub-sample appear in Tables 12 and 13. Overall the results are similar in magnitude and significance to the corresponding baseline regression models, showing a positive

effect of age of marriage on education. However, the Sargan test rejects the exogeneity of IV in the $Educ2$ case.

The third potential source of bias is that the Maithili instrument might reflect regional variations in marriage practice rather than the effect of Maithili dowry culture. We estimated our models on a sub-sample that comes from regions in which the Maithali community are concentrated. This sub-sample includes the Eastern, Central, Western and Abroad regions but excludes the Mid-Western and Far Western regions. The results appear in Tables 14 and 15. The estimates reported in Table 15 are similar to the corresponding baseline models.

5 Conclusions

We investigated the impact of planned age at marriage on female education on the basis of a theoretical framework that jointly determines both variables, which we then tested using household data from Nepal. We developed instruments that could control for the potential endogeneity of our main explanatory variable and then employed an instrumental variables procedure for identifying its impact on female education.

Our results suggest that a strong adherence to dowry culture, as in the Maithili community, lowers age at marriage while the average age of marriage of one's ethno-regional group increases it. We then found that marital behaviors that favor early marriage significantly reduce female educational attainment. While the results differed across our different instrumental variables and samples, the estimates indicate that each year's delay in marriage increases female education from 0.2 to 0.5 years. This figure is roughly in line with but slightly higher than that found by Field and Ambrus (2008) for Bangladesh.

We also tested all our models on sub-samples of the data in order to minimize the possibility of potential biases. These were the possibilities that (i) the positive association of female education with age at marriage could reflect the outcome of a coping mechanism amongst the poorest households; (ii) the high incidence of child marriage in Nepal could have induced our estimated coefficients through a more direct *ex post* mechanism rather than the more indirect *ex ante* mechanism stressed by the theory; (iii) the concentration of Maithilis in

certain regions of Nepal could have led to results which reflect regional variations rather than the dowry culture of Maithilis. Overall our robustness results continue to suggest a negative impact of early marriage on female education.

The implied causality has important policy implications. Policies that increase marriage age might increase parent's incentives to spend on girls' education.

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Appendix: Variables definition.

*Educ*1	Years of schooling (highest level completed).
*Educ*2	Years of schooling imputed as 0 for those who did not report highest level completed but reported as they never attended school.
Age:25-29	Taking value 1 if an individual's age was reported between 25-29 years; 0 otherwise.
Age:30-34	Taking value 1 if an individual's age was reported between 30-34 years; 0 otherwise.
Age:35-39	Taking value 1 if an individual's age was reported between 35-39 years; 0 otherwise.
Age:40-44	Taking value 1 if an individual's age was reported between 40-44 years; 0 otherwise.
Age:45-49	Taking value 1 if an individual's age was reported between 45-49 years; 0 otherwise.
Urban	Taking value 1 if respondent was born in urban area; 0 otherwise.
Mage	Age at marriage.
Feduc	Father's the highest level of education.
Meduc	Mother's the highest level of education.
Lnholding	Price of land holdings by a household.
Hincome	Household gross income calculated as farm-earning plus earning from sale of livestocks plus income from non-farm enterprises plus remittance received .
Maithili	Taking value 1 if an individual's language was reported as Maithili; 0 otherwise.
Avmage	Average age at marriage derived from the interaction term between ethnicity and region.
Brahman	Taking value 1 if a respondent's ethnicity was reported as Brahman; 0 otherwise.
Chhetri	Taking value 1 if a respondent's ethnicity was reported as Chhetri; 0 otherwise.
Newar	Taking value 1 if a respondent's ethnicity was reported as Newar; 0 otherwise.
Magar	Taking value 1 if a respondent's ethnicity was reported as Magar; 0 otherwise.
Tharu	Taking value 1 if a respondent's ethnicity was reported as Tharu; 0 otherwise.
Tamang	Taking value 1 if a respondent's ethnicity was reported as Tamang; 0 otherwise.
Kami	Taking value 1 if a respondent's ethnicity was reported as Kami; 0 otherwise.
Yadav	Taking value 1 if a respondent's ethnicity was reported as Yadav; 0 otherwise.
Muslim	Taking value 1 if a respondent's ethnicity was reported as Muslim; 0 otherwise.
Rai	Taking value 1 if a respondent's ethnicity was reported as Rai; 0 otherwise.
Gurung	Taking value 1 if a respondent's ethnicity was reported as Gurung; 0 otherwise.
Limbu	Taking value 1 if a respondent's ethnicity was reported as Limbu; 0 otherwise.
Sarki	Taking value 1 if a respondent's ethnicity was reported as Sarki; 0 otherwise.
Other	Taking value 1 if a respondent's ethnicity was reported as Other; 0 otherwise.
Eastern	Taking value 1 if an individual was residing in eastern development region; 0 otherwise.
Central	Taking value 1 if an individual was residing in central development region; 0 otherwise.
Western	Taking value 1 if an individual was residing in western development region; 0 otherwise.
Mid-western	Taking value 1 if an individual was residing in mid-western development region; 0 otherwise.
Far-western	Taking value 1 if an individual was residing in far-western development region; 0 otherwise.
Abroad	Taking value 1 if an individual was residing in abroad; 0 otherwise.

Table 1: Wedding expenses: Current year (in '000)

	Maithili			*Non-Maithili*		
	Total	*Rural*	*Urban*	*Total*	*Rural*	*Urban*
D-cost	19.39(38.13)	20.84(39.92)	7.04(11.86)	5.66(26.70)	5.55(28.7)	5.99(21.90)
Obs.	57	48	9	764	582	182
Wed-exp	7.62(20.96)	7.75(21.41)	5.38(11.10)	8.41(32.37)	6.43(16.15)	19.31(72.50)
Obs.	232	220	12	1776	1503	273
D-cost/Lnholding	.219	.251	0.060	.020	.029	.015
D-cost/Hincome	.005	.015	.0004	.0005	.0005	.0005
Wed-exp/Lnholding	.088	.092	.041	.044	.040	.054
Wed-exp/Hincome	.004	.004	.003	.001	.001	.0007

Note: D-cost=dowry paid, Wed-exp= marriage, birth and other ceremonies expenses. These figures represent aggregate household data. Standard deviations in parentheses.

Table 2: Females' marital status by age group (in %)

Age group	Married	Divorced	Separated	Widow	Unmarried
<= 15	2.76	0.10	-	0.05	97.09
16-20	42.98	0.19	0.51	0.13	56.20
21-24	76.08	0.10	0.52	0.21	23.09
25-29	90.76	-	0.84	0.65	7.74
30-34	93.74	-	1.76	2.09	2.41
35-39	93.35	0.18	0.72	3.60	2.16
40-44	89.49	0.26	2.37	5.78	2.10
45-49	83.22	0.34	2.37	12.37	1.69
Total*	59.51	0.14	1.15	8.91	30.29

Notes: * all ages, including age> 49.

Table 3: Descriptive statistics

Variable	*Sample2549*	*Sample3049*
*Educ*1	7.51(.106)	7.37(.136)
*Educ*2	2.16(.063)	1.78(.068)
Feduc	2.75(.138)	2.75(.175)
Meduc	.649(.070)	.611(.087)
Urban	.202(.012)	.219(.015)
Lnholding('00000)	3.008(.469)	3.11(.536)
Hincome('00000)	177.54(41.98)	141.93(38.88)
Mage	19.00(.107)	18.97(.144)
Age dummies		
25-29	.366(.014)	-
30-34	.217(.012)	.342(.018)
35-49	.220(.012)	.346(.018)
40-44	.108(.008)	.178(.014)
45-49	.084(.008)	.133(.012)
Ethnic dummies		
Brahman	.255(.013)	.271(.017)
Chettri	.155(.011)	.160(.014)
Newar	.253(.013)	.276(.017)
Magar	.046(.006)	.042(.007)
Tharu	.022(.004)	.017(.005)
Tamang	.021(.004)	.014(.004)
Kami	.012(.003)	.010(.003)
Yadav	.010(.003)	.005(.002)
Muslim	.012(.003)	.010(.003)
Rai	.024(.004)	.016(.004)
Gurung	.032(.005)	.035(.007)
Damai	.010(.003)	.004(.002)
Limbu	.012(.003)	.010(.003)
Sarki	.001(.001)	-
Others	.142(.010)	.124(.012)
Regional dummies		
Eastern	.216(.012)	.192(.015)
Central	.335(.014)	.365(.018)
Western	.253(.013)	.248(.016)
Mid-western	.072(.007)	.077(.010)
Far-western	.033(.005)	.030(.006)
Abroad	.076(.008)	.071(.009)

Notes: Standard deviations in parentheses.

Table 4: Comparison of age at marriage and educational distribution

	Sample2549			*Sample3049*		
Variable	All	Non-Maithili	Maithili	All	Non-Maithili	Maithili
Age at marriage						
Average	17.44(.059)	17.71(.064)	15.78(.127)	17.34(.078)	17.61(.077)	15.48(.157)
Married ≤16	.45(.008)	.42(.008)	.65(.021)	.47(.009)	.44(.009)	.69(.024)
Married 17-18	.25(.007)	.25(.007)	.22(.018)	.24(.008)	.25(.008)	.20(.021)
Married 19-20	.14(.005)	.15(.006)	.09(.012)	.14(.006)	.15(.007)	.08(.014)
Married 21-22	.07(.004)	.08(.004)	.02(.006)	.07(.004)	.07(.005)	.02(.006)
Married 23-24	.04(.003)	.04(.003)	.01(.0050	.03(.003)	.03(.003)	.005(.002)
Married 25-26	.03(.002)	.03(.003)	.005(.002)	.03(.003)	.03(.003)	.005(.002)
Married ≥27	.02(.002)	.02(.002)	.005(.002)	.02(.002)	.03(.003)	.005(.002)
Education						
No formal schooling	.71(.007)	.69(.008)	.87(.014)	.76(.008)	.73(.008)	.92(.014)
Primary [1-5]	.10(.004)	.11(.005)	.06(.010)	.09(.005)	.10(.005)	.04(.009)
Secondary [6-7]	.04(.003)	.03(.003)	.03(.007)	.03(.003)	.03(.003)	.01(.006)
High school [8-10]	.07(.004)	.08(.004)	.02(.006)	.06(.004)	.07(.005)	.01(.005)
Higher education [≥11]	.08(.004)	.09(.004)	.02(.006)	.06(.004)	.07(.007)	.02(.007)
Obs.	3760	3244	516	2818	2460	358

Notes: Grades corresponding to each educational level from variable *Educ*2 are presented in brackets. Standard deviations in parentheses.

Table 5: Distribution of the Maithili community

Ethnicity	*Sample2549*	*Sample3049*
Ethnic distribution		
Bramhin	.02(.005)	.02(.007)
Yadav	.16(.016)	.17(.019)
Muslim	.14(.014)	.13(.017)
Sarki	.03(.007)	.02(.007)
Tharu	.04(.008)	.03(.009)
Other	.61(.018)	.63(.025)
Regional distribution		
Eastern	.38(.021)	.38(.025)
Central	.36(.021)	.36(.025)
Western	.01(.003)	.01(.004)
Mid-western	-	-
Far-western	-	-
Abroad(India)	.25(.018)	.25(.015)
Obs.	516	358

Notes: Standard deviations in parentheses.

Table 6: First-stage regression results: Baseline model (*Sample2549*)

Variable	**IV1**	**IV2**	**Two IVs**
	Dep.var. Mage, sub-sample for *Educ1*		
Avmage	-	.737***(.167)	.705***(.167)
Maithili	-1.70***(.503)	-	-1.58***(.500)
Age:30-34	-.169(.272)	-.083(.270)	-.164(.270)
Age:35-39	-.295(.269)	-.259(.268)	-.305(.267)
Age:40-44	-.135(.341)	-.115(.339)	-.145(.338)
Age:45-49	-.722*(.381)	-.683*(.379)	-.747*(.378)
Feduc	.094***(.025)	.090***(.025)	.094***(.025)
Meduc	-.046(.049)	-.034(.049)	-.039(.049)
Urban	1.22***(.311)	1.09***(.312)	1.05***(.311)
Lnholding	1.33*(.792)	1.28*(.788)	1.26*(.783)
Hincome	.011(.009)	.011(.009)	.011(.009)
Obs.	1079	1079	1079
R^2	.1644	.1704	.1775
	Dep.var. Mage, sub-sample for *Educ2*		
Avmage	-	.997***(.099)	.976***(.099)
Maithili	-.890***(.200)	-	-.790***(.198)
Age:30-34	-.083(.165)	-.108(.163)	-.127(.163)
Age:35-39	-.235*(.154)	-.253*(.152)	-.278*(.152)
Age:40-44	-.439***(.165)	-.446***(.163)	-.478***(.163)
Age:45-49	-.818**(.182)	-.847***(.180)	-.861***(.180)
Feduc	.115***(.021)	.114***(.020)	.115***(.020)
Meduc	-.006(.046)	.002(.045)	-.003(.045)
Urban	1.64***(.238)	1.44***(.237)	1.42***(.236)
Lnholding	1.33**(.673)	1.26*(.669)	1.24*(.665)
Hincome	.014(.011)	.013(.011)	.013(.010)
Obs.	3760	3760	3760
R^2	.1921	.2031	.2063

Notes: Sample of 25-49 years old. Robust standard errors in parentheses. *** significant at 1%, ** significant 5%, * significant at 10% level. Mage is treated as endogenous. IV1: Maithili. IV2: Avmage. Age:25-29 as base category. Regional and ethnicity dummies are included but not reported.

Table 7: Second-stage regression results: Baseline model (*Sample2549*)

Variable	**OLS**	**IV1**	**IV2**	**Two IVs**
		Dep.var. *Educ1*		
Mage	.315***(.028)	.335(.254)	.456**(.199)	.411**(.161)
Age:30-34	-.348*(.236)	-.347*(.235)	-.337(.237)	-.340(.236)
Age:35-39	-.437*(.233)	-.432*(.240)	-.402*(.240)	-.413*(.236)
Age:40-44	-.551*(.297)	-.549*(.295)	-.537*(.298)	-.541*(.296)
Age:45-49	-1.19***(.372)	-1.18***(.368)	-1.10***(.357)	-1.13***(.346)
Feduc	.184***(.020)	.183***(.031)	.172***(.028)	.176***(.026)
Meduc	.091***(.031)	.092**(.044)	.097**(.044)	.095**(.043)
Urban	1.86***(.279)	1.83***(.419)	1.68***(.371)	1.73***(.338)
Lnholding	-.534(.679)	-.563(.729)	-.730(.647)	-.668(.641)
Hincome	.001(.003)	.001(.003)	.001(.003)	.001(.003)
IVs F-statistic		[11.52]	[19.30]	[14.72]
Sargan test p-value				{.7023}
R^2	.3625	.3621	.3458	.3546
		Dep.var. *Educ2*		
Mage	.193***(.017)	.564***(.213)	.324***(.088)	.361***(.083)
Age:30-34	-.649***(.156)	-.627***(.157)	-.641***(.146)	-.639***(.147)
Age:35-39	-1.14***(.141)	-1.07***(.152)	-1.12***(.137)	-1.11***(.137)
Age:40-44	-1.61***(.145)	-1.46***(.179)	-1.56***(.150)	-1.54***(.151)
Age:45-49	-1.64***(.156)	-1.34***(.243)	-1.54***(.176)	-1.51***(.175)
Feduc	.385***(.023)	.343***(.031)	.371***(.021)	.366***(.020)
Meduc	.211***(.041)	.211***(.043)	.211***(.040)	.211***(.040)
Urban	2.64***(.291)	2.02***(.424)	2.42***(.258)	2.36***(.254)
Lnholding	1.06(.807)	.560(.713)	.886(.758)	.836(.742)
Hincome	.010(.010)	.005(.007)	.008(.009)	.008(.009)
IVs F-statistic		[19.76]	[101.17]	[26.43]
Sargan test p-value				{.1419}
R^2	.4314	.2105	.2224	.4282

Notes: Sample of 25-49 years old. Robust standard errors in parentheses. *** significant at 1%, ** significant 5%, * significant at 10% level. Mage is treated as endogenous. IV1: Maithili. IV2: Avmage. Age:25-29 as base category. Regional and ethnicity dummies are included but not reported.

Table 8: First-stage regression results: Baseline model (*Sample3049*)

Variable	**IV1**	**IV2**	**Two IVs**
	Dep.var. Mage, sub-sample for *Educ1*		
Avmage	-	.822***(.203)	.785***(.207)
Maithili	-1.60*(.803)	-	-1.30*(.794)
Age:35-39	-.151(.327)	-.191(.322)	-.162(.323)
Age:40-44	.021(.396)	-.048(.392)	.001(.397)
Age:45-49	-.545(.424)	-.583(.411)	-.567(.415)
Feduc	.108***(.031)	.106***(.031)	.108***(.031)
Meduc	-.063(.065)	-.045(.064)	-.048(.064)
Urban	1.51***(.447)	1.39***(.445)	1.37***(.450)
Lnholding	.720(1.01)	.672(.999)	.651(.995)
Hincome	.029***(.003)	.028***(.003)	.027***(.003)
Obs.	684	684	684
R^2	.1650	.2113	.2148
	Dep.var. Mage, sub-sample for *Educ2*		
Avmage	-	1.00***(.111)	.974***(.111)
Maithili	-1.13***(.221)	-	-1.01***(.219)
Age:35-39	-.145(.162)	-.136(.161)	-.144(.160)
Age:40-44	-.370**(.183)	-.345*(.181)	-.362**(.180)
Age:45-49	-.750***(.209)	-.751***(.207)	-.746***(.206)
Feduc	.112***(.026)	.113***(.026)	.113***(.026)
Meduc	-.024(.060)	-.011(.059)	-.017(.060)
Urban	1.96***(.352)	1.78***(.356)	1.75***(.356)
Lnholding	.719(.789)	.649(.785)	.623(.774)
Hincome	.036***(.003)	.035***(.004)	.035***(.003)
Obs.	2818	2818	2818
R^2	.1956	.2104	.2071

Notes: Sample of 30-49 years old. Robust standard errors in parentheses. *** significant at 1%, ** significant 5%, * significant at 10% level. IV1: Maithili. IV2: Avmage. Age:30-34 as base category. Regional and ethnicity dummies are included but not reported.

Table 9: Second-stage regression results: Baseline model (*Sample3049*)

Variable	**OLS**	**IV1**	**IV2**	**Two IVs**
		Dep.var. *Educ1*		
Mage	.269***(.034)	-.054(.446)	.169(.169)	.125(.161)
Age:35-39	-.140(.268)	-.200(.294)	-.158(.268)	-.167(.269)
Age:40-44	-.264(.324)	-.277(.343)	-.268(.320)	-.270(.323)
Age:45-49	-.990**(.392)	-1.17**(.482)	-1.04***(.401)	-1.07***(.402)
Feduc	.203***(.026)	.238***(.056)	.214***(.031)	.219***(.031)
Meduc	.106***(.040)	.086*(.048)	.100***(.039)	.097***(.039)
Urban	1.81***(.371)	2.31***(.794)	1.97***(.443)	2.03***(.441)
Lnholding	-1.24(.729)	-1.01(1.01)	-1.17*(.794)	-1.14(.825)
Hincome	.006(.005)	.016(.013)	.009(.007)	.011*(.007)
IVs F-statistic		[3.98]	[16.38]	[9.35]
Sargan test p-value				{.6029}
R^2	.2739	.3594		
		Dep.var. *Educ2*		
Mage	.159***(.018)	.346**(.148)	.175*(.098)	.212**(.083)
Age:35-39	-.500***(.149)	-.475***(.152)	-.498***(.149)	-.493***(.149)
Age:40-44	-.964***(.152)	-.898***(.163)	-.959***(.156)	-.946***(.154)
Age:45-49	-1.00***(.162)	.862***(.202)	-.991***(.179)	-.963***(.175)
Feduc	.390***(.029)	.369***(.033)	.388***(.032)	.384***(.031)
Meduc	.233***(.053)	.236***(.052)	.233***(.052)	.234***(.052)
Urban	2.64***(.353)	2.26***(.862)	2.60***(.392)	2.53***(.381)
Lnholding	.936(1.27)	.796(1.19)	.924(1.26)	.897(1.25)
Hincome	.029*(.015)	.023*(.015)	.029*(.015)	.028*(.015)
IVs F-statistic		[26.30]	[80.37]	[51.70]
Sargan test p-value				{.3055}
R^2	.4256	.3939	.4253	.4230

Notes: Sample of 30-49 years old. Robust standard errors in parentheses. *** significant at 1%, ** significant 5%, * significant at 10% level. Mage is treated as endogenous. IV1: Maithili. IV2: Avmage. Age:30-34 as base category. Regional and ethnicity dummies are included but not reported.

Table 10: First-stage regression results: Upper wealth households

Variable	**IV1**	**IV2**	**Two IVs**
	Dep.var. Mage, sub-sample for *Educ1*		
Avmage	-	.964***(.181)	.940***(.184)
Maithili	-2.08***(.581)	-	-1.79***(.586)
Age:30-34	-.223(.374)	-.145(.364)	-.218(.361)
Age:35-39	-.633*(.372)	-.528(.367)	-.598*(.365)
Age:40-44	-.544(.501)	-.676(.496)	-.633(.494)
Age:45-49	-.963*(.569)	-1.13**(.536)	-1.21**(.532)
Feduc	.064(.039)	.066*(.038)	.074(.038)
Meduc	.001(.084)	-.006(.083)	.000(.082)
Urban	1.58***(.578)	1.35***(.595)	1.31***(.593)
Lnholding	1.07(.806)	1.00(.795)	.929(.787)
Hincome	-.003(.003)	-.003(.003)	-.003(.003)
Obs.	530	530	530
R^2	.2036	.2271	.2553
	Dep.var. Mage, sub-sample for *Educ2*		
Avmage	-	.960***(.117)	.927***(.119)
Maithili	-1.22***(.260)	-	-1.09***(.258)
Age:30-34	-.139(.212)	-.177(.209)	-.185(.208)
Age:35-39	-.618***(.192)	-.654***(.189)	-.682***(.189)
Age:40-44	-.671***(.239)	-.706***(.236)	-.727***(.202)
Age:45-49	-1.10***(.272)	-1.14***(.268)	-1.16***(.266)
Feduc	.091***(.031)	.097***(.030)	.100***(.030)
Meduc	.043(.074)	.038(.073)	.038(.072)
Urban	1.96***(.604)	1.77***(.013)	1.70***(.613)
Lnholding	1.45**(.738)	1.27*(.720)	1.26*(.713)
Hincome	-.006(.005)	-.006(.005)	-.006(.005)
Obs.	1877	1877	1877
R^2	.1975	.1997	.2052

Notes: Sample of 25-49 years old. Top 50% households in terms of land holding. Robust standard errors in parentheses. *** significant at 1%, ** significant 5%, * significant at 10% level. Mage is treated as endogenous. IV1: Maithili. IV2: Avmage. Age:25-29 as base category. Regional and ethnicity dummies are included but not reported.

Table 11: Second-stage regression results: Upper wealth households

Variable	**OLS**	**IV1**	**IV2**	**Two IVs**
		Dep.var. *Educ1*		
Mage	.300***(.046)	.500**(.246)	.335**(.157)	.364***(.140)
Age:30-34	-.428(.356)	-.399(.358)	-.435(.347)	-.431(.347)
Age:35-39	-.576*(.339)	-.465(.357)	-.540*(.331)	-.526*(.329)
Age:40-44	-1.03***(.432)	-.916*(.473)	-1.01**(.429)	-.996**(.432)
Age:45-49	-2.02***(.496)	-1.85***(.532)	-2.08***(.492)	-.198***(.492)
Feduc	.174***(.035)	.163***(.036)	.175***(.035)	.173***(.035)
Meduc	.122***(.063)	.124*(.067)	.120*(.062)	.120*(.063)
Urban	1.89***(.553)	1.55**(.699)	1.94***(.577)	1.89***(.569)
Lnholding	-.260(.743)	-.159(.850)	-.316(.724)	-.272(.739)
Hincome	-.005*(.003)	-.005*(.003)	-.005*(.003)	-.005*(.003)
IVs F-statistic	-	[12.90]	[28.31]	[17.31]
Sargan test p-value				{.6935}
R^2	.3622	.3315	.3647	.3628
		Dep.var. *Educ2*		
Mage	.182***(.025)	.384**(.185)	.313***(.118)	.330***(.103)
Age:30-34	-.926***(.238)	-.900***(.239)	-.910***(.236)	-.907***(.236)
Age:35-39	-1.44***(.211)	-1.32***(.235)	-1.36***(.215)	-1.35***(.213)
Age:40-44	-2.09***(.207)	-.196***(.245)	-2.01(.202)	-2.00(.217)
Age:45-49	-2.09***(.216)	-1.88(.298)	-1.95***(.244)	-1.93***(.238)
Feduc	.371***(.037)	.353***(.039)	.359***(.038)	.358***(.037)
Meduc	.272***(.074)	.263***(.074)	.267***(.073)	.266***(.074)
Urban	1.70***(.555)	1.28*(.705)	1.43**(.605)	1.39**(.602)
Lnholding	1.98*(1.02)	1.81*(1.00)	1.75*(.958)	1.76*(.958)
Hincome	-.005(.007)	-.004(.007)	-.004(.006)	-.004(.006)
IVs F-statistic		[22.19]	[66.38]	[40.73]
Sargan test p-value				{.7318}
R^2	.3786	.3464	.3650	.3613

Notes: Sample of 25-49 years old. Top 50% households in terms of land holding. Robust standard errors in parentheses. *** significant at 1%, ** significant 5%, * significant at 10% level. Mage is treated as endogenous. IV1: Maithili. IV2: Avmage. Age:25-29 as base category. Regional and ethnicity dummies are included but not reported.

Table 12: First-stage regression results : Adult marriage (Mage $\geq$ 15)

Variable	**IV1**	**IV2**	**Two IVs**
	Dep.var. Mage, sub-sample for *Educ1*		
Avmage	-	.720***(.171)	.712***(.173)
Maithili	-.895*(.522)	-	-.825*(.524)
Age:30-34	-.001(.259)	.028(.255)	-.006(.258)
Age:35-39	-.145(.269)	-.145(.267)	-.172(.264)
Age:40-44	-.235(.256)	-.244(.356)	-.267(.356)
Age:45-49	-.371(.393)	-.376(.367)	-.410(.372)
Feduc	.078***(.023)	.078***(.023)	.079***(.023)
Meduc	-.016(.045)	-.006(.045)	-.008(.045)
Urban	1.32***(.315)	1.18***(.318)	1.17***(.319)
Lnholding	1.10*(.743)	1.03(.734)	1.02(.732)
Hincome	.009(.009)	.008(.009)	.008(.009)
Obs.	1003	1003	1003
R^2	i293	.1442	.1456
	Dep.var. Mage, sub-sample for *Educ2*		
Avmage	-	.770***(.095)	.751***(.096)
Maithili	-.752***(.166)	-	-.656***(.165)
Age:30-34	.116(.144)	.098(.141)	.082(.141)
Age:35-39	-.057(.138)	-.072(.138)	-.092(.137)
Age:40-44	.038(.164)	.039(.162)	.009(.162)
Age:45-49	-.032(.200)	-.069(.199)	-.091(.198)
Feduc	.085***(.020)	.086***(.020)	.086***(.019)
Meduc	.014(.043)	.022(.044)	.017(.043)
Urban	1.56***(.269)	1.39***(.272)	1.38***(.271)
Lnholding	1.19*(.705)	1.10*(.699)	1.09*(.696)
Hincome	.010(.011)	.010(.010)	.010(.010)
Obs.	3128	3128	3128
R^2	.1512	.1725	.1672

Notes: Sample of 25-49 years old with age of marriage above or equal to 15 years old. Robust standard errors in parentheses. *** significant at 1%, ** significant 5%, * significant at 10% level. Mage is treated as endogenous. IV1: Maithili. IV2: Avmage. Age:25-29 as base category. Regional and ethnicity dummies are included but not reported.

Table 13: Second-stage regression results: Adult marriage (Mage $\geq$ 15)

Variable	**OLS**	**IV1**	**IV2**	**Two IVs**
		Dep.var. *Educ1*		
Mage	.294***(.031)	.365(.486)	.416*(.217)	.410**(.199)
Age:30-34	-.459*(.245)	-.462*(.243)	-.464*(.243)	-.464*(.343)
Age:35-39	-.498**(.242)	-.490*(.245)	-.484*(.243)	-.485**(.242)
Age:40-44	-.632**(.307)	-.617*(.320)	-.606*(.313)	-.607**(.312)
Age:45-49	-1.26***(.410)	-1.24***(.436)	-1.22***(.413)	-1.22***(.411)
Feduc	.187***(.021)	.181***(.043)	.178***(.026)	.178***(.025)
Meduc	.081**(.032)	.082**(.033)	.083**(.033)	.083**(.033)
Urban	1.88***(2.88)	1.79**(.714)	1.72***(.404)	1.73***(.389)
Lnholding	-.606(.603)	-.687(.818)	-.750(.624)	-.742(.620)
Hincome	.001(.003)	.001(.005)	.001(.003)	.001(.002)
IVs F-statistic	-	[2.93]	[17.61]	[10.01]
Sargan test p-value				{.9232}
R^2	.3479	.3441	.3368	.3379
		Dep.var. *Educ2*		
Mage	.198***(.023)	1.01***(.300)	.366***(.129)	.468***(.120)
Age:30-34	-.765***(.175)	-.875***(.210)	-.787***(.176)	-.801***(.178)
Age:35-39	-1.27***(.158)	-1.24***(.189)	1.26***(.158)	-1.26***(.160)
Age:40-44	-1.76***(.168)	-1.82***(.216)	-1.77***(.170)	-1.78***(.174)
Age:45-49	-1.81(.185)	-1.80(.256)	1.81***(.190)	-1.81***(.196)
Feduc	.400(.025)	.330***(.024)	.385***(.027)	.377(.026)
Meduc	.190***(.046)	.174***(.055)	.187***(.045)	.185***(.046)
Urban	2.71***(.310)	1.42**(.593)	2.44***(.367)	2.28***(.360)
Lnholding	1.12(.870)	.139(.771)	.922(.814)	.798(.777)
Hincome	.008(.010)	.001(.006)	.007(.008)	.006(.008)
IVs F-statistic		[20.45]	[64.39]	[38.99]
Sargan test p-value				{.0193}
R^2	.4465	.0997	.4318	.4086

Notes: Sample of 25-49 years old with age of marriage above or equal to 15 years old. Robust standard errors in parentheses. *** significant at 1%, ** significant 5%, * significant at 10% level. Mage is treated as endogenous. IV1: Maithili. IV2: Avmage. Age:25-29 as base category. Regional and ethnicity dummies are included but not reported.

Table 14: First-stage regression results : Four regions

Variable	**IV1**	**IV2**	**Two IVs**
	Dep.var. Mage, sub-sample for *Educ1*		
Avmage	-	.665***(.186)	.660***(.185)
Maithili	-1.55***(.518)	-	-1.53***(.515)
Age:30-34	-.065(.295)	.024(.293)	-.063(.294)
Age:35-39	-.281(.289)	-.233(.289)	-.272(.288)
Age:40-44	-.107(.359)	-.060(.358)	-.086(.356)
Age:45-49	-.708(.413)	-.657*(.412)	-.728(.411)
Feduc	.093***(.027)	.089***(.027)	.094***(.026)
Meduc	-.033(.051)	-.019(.051)	-.023(.051)
Urban	1.15***(.324)	1.05***(.325)	1.01***(.324)
Lnholding	1.23*(.660)	1.18*(.659)	1.14*(.657)
Hincome	.011*(.007)	.011*(.007)	.010*(.007)
Obs.	960	960	960
R^2	.1896	.1928	.2005
	Dep.var. Mage, sub-sample for *Educ2*		
Avmage	-	.921***(.127)	.951***(.127)
Maithili	-.747***(.211)	-	-.838***(.209)
Age:30-34	-.087(.188)	-.077(.186)	-.104(.186)
Age:35-39	-.327*(.176)	-.318*(.174)	-.344*(.174)
Age:40-44	-.467**(.188)	-.452**(.187)	-.489**(.187)
Age:45-49	-.916***(.206)	-.912***(.205)	-.927***(.204)
Feduc	.118***(.022)	.119***(.022)	.120***(.022)
Meduc	-.006(.048)	.006(.048)	.001(.047)
Urban	1.62***(.250)	1.45***(.250)	1.41***(.250)
Lnholding	1.28**(.649)	1.16**(.645)	1.14*(.644)
Hincome	.013*(.007)	.012*(.007)	.012*(.007)
Obs.	3063	3063	3063
R^2	.2067	.2170	.2211

Notes: Sample of 25-49 years old and Eastern, Central, Western and Abroad only. Robust standard errors in parentheses. *** significant at 1%, ** significant 5%, * significant at 10% level. Mage is treated as endogenous. IV1: Maithili. IV2: Avmage. Age:25-29 as base category. Regional and ethnicity dummies are included but not reported.

Table 15: Second-stage regression results: Four regions

Variable	OLS	IV1	IV2	Two IVs
		Dep.var. *Educ1*		
Mage	.316***(.030)	.422*(.287)	.503**(.245)	.469**(.187)
Age:30-34	-.472*(.253)	-.474*(.253)	-.476*(.257)	-.475*(.255)
Age:35-39	-.519**(.249)	-.493*(.258)	-.473*(.260)	-.481*(.255)
Age:40-44	-.522*(.310)	-.513(.310)	-.507*(.314)	-.510*(.312)
Age:45-49	-1.40***(.407)	-1.34***(.400)	-1.28***(.393)	-1.31***(.378)
Feduc	.194***(.021)	.185***(.034)	.178***(.032)	181***(.028)
Meduc	.073**(.031)	.076*(.045)	.078*(.045)	.077*(.045)
Urban	1.86***(.290)	1.73***(.443)	1.64***(.408)	1.68***(.360)
Lnholding	-.639(.656)	-.779(.678)	-.876(.656)	-.837(.621)
Hincome	.001(.003)	.001(.007)	-.001(.007)	-.001(.006)
IVs F-statistic	-	[9.00]	[12.76]	[10.90]
Sargan test p-value				{.8301}
R^2	.3674	.3578	.3377	.3474
		Dep.var. *Educ2*		
Mage	.194***(.019)	.575**(.272)	.316**(.124)	.370***(.109)
Age:30-34	-.845***(.178)	-.820***(.181)	-.837***(.168)	-.833***(.169)
Age:35-39	-1.38***(.164)	-1.27***(.188)	-1.34***(.161)	-1.33***(.162)
Age:40-44	-1.79***(.170)	-1.62***(.216)	-1.74***(.176)	-1.71***(.176)
Age:45-49	-1.94***(.179)	-1.60***(.316)	-1.83***(.216)	-1.78***(.211)
Feduc	.387***(.025)	.342***(.038)	.372***(.025)	.366***(.024)
Meduc	.195***(.042)	.196***(.046)	.196***(.043)	.196***(.043)
Urban	2.64***(.301)	2.01***(.511)	2.44***(.303)	2.35***(.290)
Lnholding	.900(.761)	.400(.724)	.754(.600)	.681(.601)
Hincome	.010(.010)	.005(.008)	.008(.006)	.008(.006)
IVs F-statistic		[12.49]	[52.49]	[34.36]
Sargan test p-value				{.3740}
R^2	.4545	.3538	.4441	.4329

Notes: Sample of 25-49 years old and Eastern, Central, Western and Abroad only. Robust standard errors in parentheses. *** significant at 1%, ** significant 5%, * significant at 10% level. Mage is treated as endogenous. IV1: Maithili. IV2: Avmage. Age:25-29 as base category. Regional and ethnicity dummies are included but not reported.