

Teenage Marriage, Fertility, and Well-being:

Panel Evidence from India

Abhijeet Singh and Patricia Espinoza Revollo



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Abstract

This paper uses a unique dataset from Andhra Pradesh, tracking a cohort of children who were born in 1994–95 from the ages of 8 to 19 years, to ask three key questions about teenage marriage and fertility in India. First, what predicts getting married during the teen years? Second, what predicts having given birth by 19? And third, do the subjective well-being and psychosocial outcomes such as the agency, self-efficacy, and self-esteem of married young women differ from those of their unmarried peers — and to what extent can these differences be accounted for by differing socio-economic status and characteristics of, and investments in, their parental household? Our analysis is novel because such long-term panel data, linking backgrounds and investments in the natal household with welfare outcomes and socio-emotional measures in the marital household, have not previously been available in this setting.

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About Young Lives

Young Lives is an international study of childhood poverty, following the lives of 12,000 children in 4 countries (Ethiopia, India, Peru and Vietnam) over 15 years. www.younglives.org.uk

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Introduction

The age at first marriage for women is an important area of concern for policy in developing countries. Women marrying in teenage years or younger often have little or no choice in terms of when they marry – and whom they marry. Their future outcomes may also be worse as a result: early marriage may lead to lower power, agency, and autonomy for the young women in the marital household; and being married may itself be a significant barrier to the pursuit of education and employment (Jensen and Thornton 2003). An early age at marriage may further translate into a lower age at first childbirth; this prompts additional concerns, because childbirth in teenage years is significantly associated with worse birth outcomes for the child and worse pregnancy outcomes for the mother (Ganchimeg et al. 2014; Fraser et al. 1995; Ashcraft and Lang 2006). These concerns have been especially germane in South Asia, where the mean age at marriage is the lowest in the developing world.

In this paper, we focus on three questions in this area, using a unique longitudinal dataset which has followed a cohort of children, born in 1994-95, from the age of 8 years in 2002 to the age of 19 years in 2014, in the states of Andhra Pradesh and Telangana in India. By the age of 19 years, more than one third of the young women in the sample are married. First, using detailed individual-level panel variation spanning crucial stages of childhood and adolescence, we ask which childhood factors predict teenage marriage in this sample. Second, focusing on the predictors of teenage fertility, we ask what differentiates women who have given birth by 19 from those who have not. Finally, using detailed information at the age of 19, we ask to what extent do the subjective well-being and psychosocial outcomes such as the agency, self-efficacy, and self-esteem of married young women differ from those of their unmarried peers, and the extent to which these differences may be accounted for by differing socio-economic status and characteristics of, and investments in, the natal household.

Although these questions are fundamental for policy purposes and scholarly understanding, quantitative evidence on them remains relatively scarce. This results mostly from a lack of suitable data: rarely is information on the determinants of teenage marriage and the subsequent consequences available in the same dataset. The drivers of early marriage plausibly relate to characteristics of the natal household, individual characteristics of the girls themselves, and the past history of investment through childhood. The consequences, however, are realised only after marriage and, because marriage in South Asia is predominantly patrilocal, with women moving to spousal households after marriage, cross-sectional general-purpose surveys do not observe characteristics of young brides at their natal households for the same individuals.¹ Moreover, general-purpose surveys rarely collect information on several important factors, for example parental and child aspirations and expectations concerning marriage, or relevant social norms that may underlie choices of early marriage. Thus, even though innovative scholars have made important strides in understanding dimensions of this choice using existing datasets – see, for example, Vogl (2013) on the role of sibling sex composition, Desai and Andrist (2010) on district-level factors, and Field and Ambrus (2008) on the consequences of marrying early – our understanding of even basic correlates in this area remains constrained.

¹ This shortcoming is also partly shared by longitudinal household surveys where the unit of observation to be followed over time is defined to be the household of the initial household head. In such cases, unmarried girls in the initial sample household exit the sample once they migrate to spousal households.

The data used in this paper, collected by the Young Lives study in Andhra Pradesh, are ideal for addressing these gaps in our knowledge. Based on a sample of individuals followed over a long period (more than a decade), the dataset contains detailed information both in the natal and spousal homes at key stages of middle childhood, adolescence, and early adulthood. This includes detailed information on investments in individuals through childhood and adolescence, measures of psychosocial skills and individual and parental aspirations about education, and parental expectations about the age at marriage. It also includes, for married women, details about their role in the decision to be married and the choice of spouse, as well as several post-marital outcomes, including subjective well-being, measures of their role in intra-household decision making, and characteristics of the spouse and the spousal household.

Our focus in this paper is specifically on the question of teenage marriage, rather than early marriage (often defined as below 18 years or below 16 years). This is for several related reasons. Conceptually, this relates our analysis and findings to a recent focus on marriage in adolescence which helps to distinguish this from the (partly overlapping) category of early marriage which, at least in its most extreme forms, seems to have much lower prevalence and is in a sharp decline (Raj et al. 2012). Secondly, given the tight bunching in reported age at marriage between 17 and 19 years of age, both in the national data and in Young Lives data, our estimates of early marriage would be particularly sensitive to recall and reporting issues about the time of the marriage and consequently the age at marriage; in contrast, marriage by the age of 19 is much more reliably recorded, given that it is equivalent to assessing marital status at the time of the survey. Finally, our core analysis and motivation are not primarily concerned with the legal position of women married before 18 years of age, but rather with the consequences for their welfare and well-being; there is little reason to believe that this changes discontinuously at the threshold of 18 years of age.

Focusing on the predictors of teenage marriage, we note first that the incidence of marriage before 19 is disproportionately concentrated in disadvantaged groups: girls from poorer households, with less-educated parents, and residing in rural areas are significantly more likely to be married by the age of 19 years. Consistent with the findings of Vogl (2013), we also document an important role played by sibling sex composition and birth order: girls with older sisters are significantly less likely to get married by 19, while girls with older brothers are significantly more likely to be married by the same age. Consistent with the results of Field and Ambrus (2008) from Bangladesh, we also find that an earlier experience of menarche significantly raises the probability of an earlier marriage. We document further that this channel appears to be through parental expectations of the appropriate age at marriage; parents of girls who experience early menarche report lower ages as being appropriate for marriage. Teenage marriage is strongly correlated with parents' expectations, elicited when sample children were aged 12, for their daughters to be married by 19; and strongly correlated also with low aspirations on the part of parents and children concerning the ideal level of education. We find, consistent with these lower reported aspirations for education, that actual investments in girls' education in childhood are lower for women who would eventually be married as teenagers: among many different characteristics controlled for, non-enrolment at 15 appears to be one of the strongest predictors of marriage. Focusing on the predictors of teenage fertility, we document that there seems to be little difference between 19-year-old women who are married and yet to give birth and those who are already mothers. In our sample, we do not observe any births among unmarried young women.

Investigating outcomes for married and unmarried women, we document uniquely that married 19-year-old women, in comparison with their unmarried peers, report significantly lower subjective well-being, lower self-efficacy and agency, and lower perceptions of their relationships with peers. They are also substantially less likely to be enrolled in education. Controlling for a range of individual and parental household characteristics and lagged pre-marriage values of psychosocial indicators, we see a sharp decline in the gap between the outcomes of married and unmarried young women; but a significant gap remains. Thus, although it appears likely that the poorer outcomes for married teenage women reflect at least partly their more deprived background characteristics, our results are consistent with a significant negative consequence of teenage marriage for the outcomes of young women.

Evidence presented in this paper is associational: causal interpretations are neither claimed nor tenable. The key contribution of our analysis lies, instead, in two features. First, even partial correlations using longitudinal data along most of the dimensions that we study have not been available heretofore. Our results present, to our knowledge, the first detailed quantitative investigation linking parental aspirations and expectations through childhood, investments in their daughters' education, and various contextual factors, including socio-economic characteristics of the parental household, to the probability of teenage marriage and fertility in this context. They also present the first quantitative investigation in this context of the differences between the psychosocial outcomes of married and unmarried teenage women. Second, our analysis utilises information from a *current* cohort of young adults. Given rapid social and economic changes in the past two decades in India, including increases in the education levels of girls and the mean age at marriage, it is likely that similar analyses of data from older cohorts will be much less relevant for understanding the drivers and consequences of early marriage for recent cohorts or for identifying potential policy measures.²

The rest of this paper is divided as follows: Section 2 discusses the data and the context of the study; Section 3 presents analyses of the predictors of teenage marriage; Section 4 focuses on a similar analysis of teenage fertility; Section 5 compares outcomes at 19 years of age for married and unmarried young women and assesses the extent to which they may be accounted for by pre-existing differences; and Section 6 concludes.

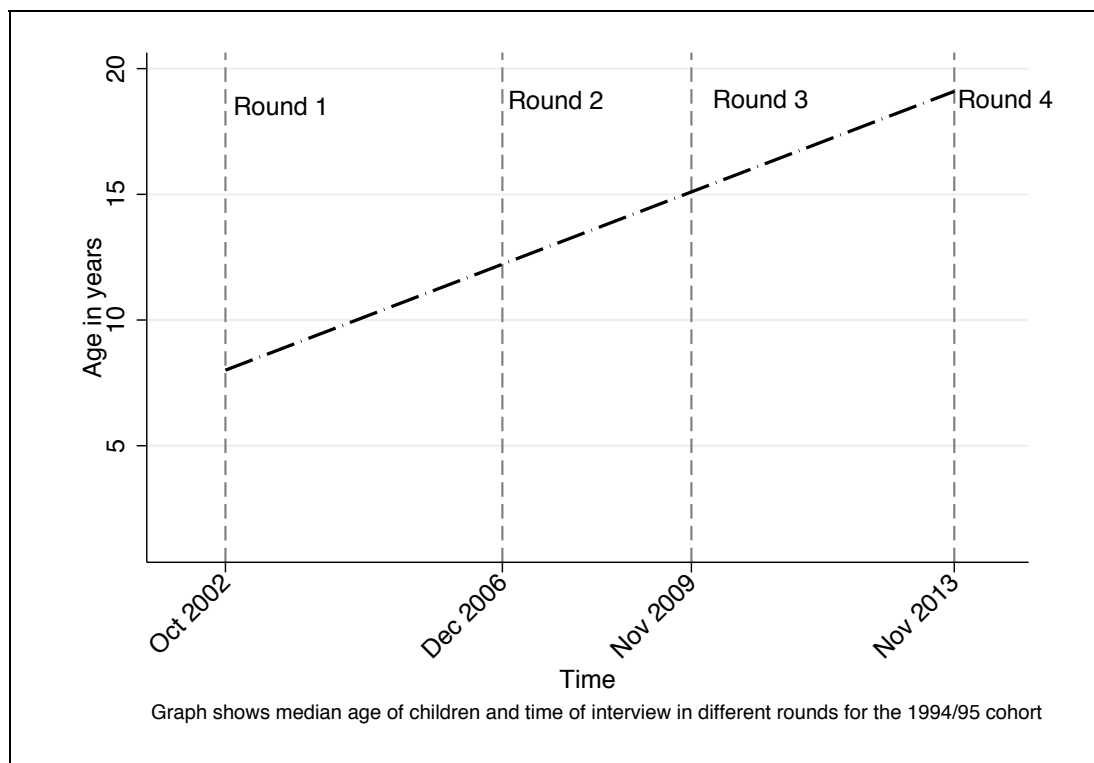
2 For example, Field and Ambrus (2008) use a sample dating to the 1990s. This is also true of many now-classic studies of marriage markets in India, such as Rosenzweig and Stark (1989). It is likely that the social and economic changes that we mention here might also have important implications for the extent to which those results apply also to recent cohorts.

1. Data and context

This paper uses panel data collected by the Young Lives study in Andhra Pradesh on a cohort of approximately 1,000 children, born in 1994-95 and aged around 8 years in 2002, until the age of about 19 years in 2013-14, over four rounds of household data collection.³ Figure 1 presents the age of the sample individuals at the different survey rounds. By the 2013-14 round, more than one third of the women in the sample are married.

The Young Lives sample in Andhra Pradesh is clustered in about 100 communities (villages or urban wards) in 20 mandals (sub-districts), which were purposively selected. The sample is therefore not statistically representative of the state. However, comparison of commonly measured characteristics with representative data from the Demographic and Health Survey (DHS) demonstrates a similar range of variation across various characteristics as representative data for the state (see Kumra 2008), and the data are suitable for statistical analyses of the predictors and determinants of teenage marriage. Attrition in the data is low over a 12-year period of data collection: in the 2013-14 round, 487 of 517 girls surveyed in 2002 (~94%) were still in the study sample.

Figure 1. *Age of sample individuals by survey rounds*



³ Young Lives is a multidisciplinary study which follows two cohorts of children (the other cohort being born in 2001-02) in four countries; in addition to Andhra Pradesh (India), the study collects information in Ethiopia, Peru, and Vietnam. For full details of the study, and to access raw data, please refer to the study website www.younglives.org.uk.

In each round of data collection, the survey collected information through household visits to the household in which the sample individual ('index child') was resident, with extensive data collection of both household-level and individual-level factors. The survey included detailed interviews with the primary caregiver and with the child/young person concerned. Information was collected on a range of factors, of which information on household economic circumstances and socio-economic background, educational investments and outcomes, and caregiver and child aspirations and expectations will be particularly relevant in our analysis as predictors that might affect the probability of teenage marriage, the probability of teenage motherhood, and outcomes after marriage. Our outcome variables all come from the latest 2013-14 round of the survey, when the individuals were aged ~19 years. In the interest of clarity, each variable will be explained at the stage where it is being employed in the analysis.

Finally, in this entire paper, we utilise information only on the girls in the sample. This reflects our research context and also the core policy focus in India. In the Young Lives data, fewer than 1 per cent of the boys in our sample are married by 19 years of age.

1.1 The incidence and characteristics of teenage marriage

Our key variable, teenage marriage, is defined as being married at the time of the survey, by which point individuals were between 18 and 19.5 years of age. Of the women in the sample, 179 out of 487 (36.8 per cent) were married by this time.

The survey collected a range of information on the characteristics of the match for women who had already married. As discussed in the Introduction, a key concern with the age at marriage is that girls marrying early may have little say in their choice of when to marry and whom; they may also be at greater risk of being matched with spouses who are older, a factor which could affect their status and outcomes in the spousal household. Of particular interest to us, therefore, was that the married young women were asked how long they had known the spouse before marriage, who chose their spouse, and various characteristics of the spouse and the spousal household. Descriptive tabulation of the information thus collected is presented in Table 1.

As is evident, a large proportion of women married by the age of 19 report having no say in choosing their spouse (~43%), and nearly half the currently married women report having met their spouse for the first time only on the wedding day. Their spouse is likely to be older, with most women married to someone over 25, and about a tenth to someone over 30. About half the sample women report that their natal family was economically better off than their marital household.⁴

4 Merely noting these statistics does not give us a sense of whether women marrying early are more or less likely than later-marrying women to have a say in their choice of spouse or differ in the characteristics of the match. These outcomes have not yet been realised for the currently unmarried girls and cannot be inferred from current data. An evaluation of the effect of age at marriage on these characteristics of the match may be possible with further rounds of the Young Lives data. Here, we present this information merely as description for context.

Table 1. *Characteristics of the marriage and spouse*

	N	%	Cum%
How long had you known your spouse before marrying him?			
On wedding day	78	43.82	43.82
Less than a year	17	9.55	53.37
More than one year	36	20.23	73.60
Since childhood	47	26.40	100.00
Total	178	100.00	
Who chose your spouse?			
Index child himself/herself	17	9.50	9.50
Index child together with parents	79	44.13	53.63
Index child together with other relatives	6	3.35	56.98
Parents and/or other relatives	75	41.90	98.88
Other people	2	1.12	100.00
Total	179	100.00	
Spouse education			
None	2	1.36	1.36
0–4 years	9	6.12	7.48
5–9 years	49	33.33	40.82
10–12 years	72	48.98	89.80
>12 years	15	10.20	100.00
Total	147	100.00	
Age of spouse			
20–24	66	37.93	37.93
25–29	92	52.87	90.81
30–40	16	9.20	100.00
Total	174	100.00	
Economic situation of natal and spouse's households			
Natal family same or worse off than spouse's	95	53.07	53.07
Natal family better off than spouse's	84	46.93	100.00
Total	179	100.00	

2. Predictors of teenage marriage

2.1 Core predictors investigated

The rest of this section focuses on the predictors of teenage marriage. Identifying these predictors is important for two reasons. First, it is important information in its own right for identifying which girls may be at the greatest risk of the possibility of teenage marriage; this is information that could be useful for a range of programmes which aim to reduce the incidence of this practice. Second, it may yield insights into the likely determinants of marriage in teenage years.

To guard against obvious sources of reverse causality, and in keeping with our general approach of modelling teenage marriage as an outcome of earlier factors, we restrict our focus to those characteristics that are either time-invariant (such as caste) or recorded in earlier rounds of the survey when even currently married women were resident in parental households and that pre-date marriage.

The first set of characteristics that we consider relates to the socio-economic status of the natal household: whether the household is in an urban or a rural location; reported education levels of the primary caregiver; the caste of the child; and the tercile of wealth. It is likely that the prevalence of marriage varies across these different groups; quantifying these differences is useful for identifying vulnerable populations.

A second set of characteristics relates to the household composition – specifically, the number of siblings and whether the sample girl has an older brother or an older sister. These factors may play an important role in determining the probability of marriage, due to the role of social norms. In particular, there is a strong social norm in South Asia, and many other parts of the world historically, of ensuring that elder daughters are married before younger daughters. This leads, at any age, to a (weakly) higher probability of marriage for the eldest girl in a family, compared with girls of identical ages in families where they have an older sister (Vogl 2013). Norms could also apply across sexes: in some Indian communities, for example, it is considered preferable to marry daughters off before marrying off sons of similar ages, even if they happen to be somewhat older. Finally, because norms often dictate that older brothers should make a financial contribution to the marriage of sisters, the presence of economically active brothers may increase the probability of marriage at any age by relaxing the financial constraints of marriage for women.⁵

A third set of characteristics focuses on the aspirations and expectations of caregivers and children. The role of aspirations and expectations has recently been the subject of much research in the social sciences and may be substantively important in explaining future outcomes. Individual-specific aspirations for education are elicited from the caregiver and the child at the age of 12 years, and the aspiration variables, collected from the girls and their caregivers, are categorised into three mutually exclusive categories (up to Grade 10, Grade 12, and post-secondary education). The survey additionally asked the caregiver to report, in the 2006 round of the survey, the age at which they expected that an individual child to be married; at the time, when the index children were aged 12, none of the girls in our sample

⁵ In much of India, the financial burden of marriages is disproportionately borne by the bride's family, both in terms of expenses incurred in the wedding ceremony and also in the dowry and other forms of transfers at the time of marriage between the two families.

was yet married. We dichotomise caregivers' expectations about the age at marriage by whether this was reported as greater than 19 years of age or not. Aspirations of both parents and children are important to consider, because decisions about when to marry probably depend on both in the case of teenage girls.

A fourth set of characteristics relates to the actual schooling of individuals. Specifically, we look at enrolment at 12 and 15 years. The reason for focusing on enrolment at these ages is twofold. First, this is useful for policy purposes in assessing if out-of-school girls are, in fact, at higher risk of early and teenage marriage. Second, it is possible that schooling itself serves to reduce the probability of early or teenage marriage; raising girls' education has variously been proposed as a possible means of increasing the age at marriage.

Finally, we look at whether the sample individual had already undergone menarche by the 2006 round (when she would have been ~12 years on average). Early menarche has been shown to be a significant predictor of being married early in South Asian populations for earlier cohorts (Field and Ambrus 2008; Desai and Andrist 2010) and is worth investigating in our case as well.⁶

2.2 Descriptive statistics

As an initial exploration of factors that might affect the probability of being married by 19, we compare the mean characteristics of the predictors listed above for married and unmarried 19-year-old women. These differences are presented in Table 2 alongside tests for statistical significance. With the exception of a few continuous variables, most variables along which we evaluate differences are categorical and have been dichotomised.

Looking first at the characteristics of households, it is evident that girls in rural areas, with less-educated mothers, and in poorer households are much more likely to be married by the age of 19. Whereas about 30 per cent of unmarried 19-year-old women lived in urban areas at 15 years of age in 2009, only about 14 per cent of married women were urban residents at the same age.⁷ Married women are less likely to have come from natal households in the top tercile of wealth.⁸ Married women are also much less likely to have mothers who were educated at secondary level or above: although maternal education levels are low in our sample in general, almost half (~47%) of the unmarried young women had caregivers who had received some schooling, versus only about 27 per cent of married women. There are also some differences by caste: in particular, young women from Other Backward Classes are more likely to be married than not, while the reverse is true for the 'other castes' category; there is no statistically significant difference in the proportion of Scheduled Caste and Scheduled Tribe categories across married and unmarried young women.⁹

6 The age at menarche would perhaps have been a better predictor but, unfortunately, it is not available in the data.

7 We report urban/rural location at 15 because this pre-dates marriage for most women in the sample. Since women usually move to their spouse's location after marriage, urban/rural location at 19 may be an outcome of marriage and not a predictor.

8 The wealth measure used here was collected when the girls were aged ~15 years and is calculated by a composite index of consumer durables, access to services, and housing quality.

9 The Young Lives data only contain information on caste at the level of aggregated groups as defined by government guidelines: Scheduled Castes, Scheduled Tribes, Other Backward Classes, and Others. While these are the relevant categories for the implementation of various programmes and policies, they consist of many heterogeneous sub-castes (*jatis*) which are more natural units of variation for social networks, marriage customs and practices, and which would have been, therefore, a much more appropriate basis of classification for our purposes (see e.g. Munshi and Rosenzweig 2006, 2009; Mobarak and Rosenzweig 2013). The unavailability of *jati* information precludes a finer analysis of inter-caste variation in the prevalence of teenage marriage.

Table 2. *Characteristics of married and unmarried women at 19*

	Not married Mean	Married Mean	Difference in means	t-statistic	p-value
Urban location – 2009	0.299	0.137	0.162	4.054	0.000
Caregiver education					
--- None	0.523	0.726	-0.204	-4.498	0.000
--- 1–4 years	0.052	0.056	-0.004	-0.185	0.853
--- 5–9 years	0.266	0.184	0.082	2.056	0.040
--- 10–12 years	0.123	0.028	0.095	3.620	0.000
--- More than 12 years	0.036	0.006	0.030	2.073	0.039
Caste					
--- Scheduled Caste	0.205	0.212	-0.008	-0.203	0.839
--- Scheduled Tribe	0.130	0.117	0.013	0.403	0.687
--- Other Backward Classes	0.403	0.514	-0.111	-2.394	0.017
--- Other	0.263	0.156	0.107	2.736	0.006
Wealth terciles – 2009					
--- Tercile 1 (poorest)	0.302	0.446	-0.145	-3.228	0.001
--- Tercile 2 (middle)	0.269	0.384	-0.115	-2.650	0.008
--- Tercile 3 (richest)	0.430	0.169	0.260	6.039	0.000
Household composition					
--- Having older sister	0.419	0.330	0.089	1.954	0.051
--- Having older brother	0.351	0.480	-0.130	-2.838	0.005
--- Number of siblings	1.860	1.922	-0.061	-0.601	0.548
Parental aspirations for education – 12 yrs					
--- Grade 10	0.276	0.565	-0.288	-6.459	0.000
--- Grade 12	0.086	0.112	-0.026	-0.934	0.351
--- Post-secondary	0.638	0.324	0.315	6.887	0.000
Child aspirations for education – 12 yrs					
--- Grade 10	0.151	0.414	-0.262	-6.683	0.000
--- Grade 12	0.095	0.132	-0.037	-1.242	0.215
--- Post-secondary	0.753	0.454	0.299	6.881	0.000
Education					
--- Enrolment in 2006	0.955	0.726	0.228	7.646	0.000
--- Enrolment in 2009	0.886	0.475	0.411	11.040	0.000
--- Years of schooling	11.169	8.274	2.895	12.674	0.000
Parental expectations age at marriage – 12 yrs					
--- Age at marriage >19	0.855	0.638	0.217	5.385	0.000
Menarche by the age of 12	0.225	0.349	-0.124	-2.966	0.003
N	308	179			

Note: Wealth is measured here using a composite index of access to services, consumer durables, and housing quality, collected in the 2009 survey round. Aspirations for education collected from the child and her caregiver, and expectations about age at marriage elicited from the caregiver, were collected at the age of 12 years.

Focusing on household composition, we see important differences across married and unmarried women. Specifically, although the number of siblings does not differ significantly across married and unmarried women, women who are already married are much more likely to have an older sister and much less likely to have an older brother.

Educational aspirations, collected at the age of 12 years through both parental and child reports, are markedly lower for women who are already married by the age of 19: whereas 64 per cent of the caregivers of unmarried women had reported an aspiration for post-secondary education, only 32 per cent of the caregivers of now-married young women had done so; the gap is narrower when considering girls' own aspirations for their education (75 per cent vs. 45 per cent of unmarried and married young women reporting an aspiration for post-secondary education at 12), but still significant. This difference is evident also in the actual enrolment of girls. Women who are already married at 19 were much more likely to have been out of school at both 12 and 15 years of age.

Finally, consistently with previous literature, we see that girls who had already undergone menarche by 2006 are significantly more likely to have been married by the age of 19 years.

2.3 Linear Probability Models predicting teenage marriage

While the differences in mean characteristics across married and unmarried girls presented in Table 2 are instructive, they do not account for partial correlations between the variables themselves and thus preclude an identification of potential risk factors for teenage marriage. For example, girls in rural areas are likely to have less-educated mothers and live in poorer households; in the bivariate set-up of Table 2, it is not possible to separate the potential importance of these variables in increasing the probability of teenage marriage. In this section we extend the analysis of predictors of teenage marriage to a multivariate set-up, estimating linear probability (OLS) models.

Our dependent variable is an indicator variable equalling 1 if the young woman is married in the 2013-14 round and 0 otherwise. We estimate the models with the stepwise addition of controls as follows:

$$\text{Married} = \alpha + \beta_1 X_i \quad (1)$$

$$+ \beta_2 \text{sib}_i + \beta_3 \text{menarche}_{i,12} \quad (2)$$

$$+ \beta_4 \text{expagemar}_{i,12} \quad (3)$$

$$+ \beta_5 \text{edaspirations}_{i,12} \quad (4)$$

$$+ \beta_6 \text{enrolment}_{i,12} + \beta_7 \text{enrolment}_{i,15} \quad (5)$$

$$+ \lambda_{i,8} \quad (6)$$

Here, X_i is a vector of fixed or pre-determined characteristics of individual i that includes indicator variables for the tercile of household wealth in the 2009 survey round (with the poorest tercile being the omitted category), the caste of the child, the location of the household and the household size in 2009, and the age of the child at the time of the 2013-14 survey round; the vector sib_i includes three variables: the number of siblings, and dummy variables for having an older sister and for having an older brother; $\text{menarche}_{i,12}$ is a dummy variable indicating if girl i had already reported menarche by the age of 12 in the 2006 round; $\text{expagemar}_{i,12}$ is a dummy variable for whether the caregiver reported an expected age at marriage of greater than 19 years for child i when she was aged 12 years; $\text{edaspirations}_{i,12}$ is a vector which includes indicator variables for categories of parental and child aspirations for education as reported at 12 (up to Grade 10 being the omitted category); the enrolment variables are dummy variables which denote whether the sample child was enrolled at 12 and 15 or not; finally, $\lambda_{i,8}$ is a set of sub-district dummies from the first round of the survey in 2002.

Table 3. Predictors of teenage marriage

	(1)	(2)	(3)	(4)	(5)	(6)
	Dep var: married in R4					
Wealth terciles – 2009						
— Tercile 2 (middle)	0.00158 (0.0534)	-0.00681 (0.0539)	-0.0166 (0.0630)	-0.00408 (0.0691)	-0.0223 (0.0739)	-0.0319 (0.0741)
— Tercile 3 (richest)	-0.208*** (0.0501)	-0.207*** (0.0528)	-0.168*** (0.0584)	-0.137** (0.0627)	-0.133* (0.0642)	-0.0807 (0.0629)
Caregiver education						
— 1–4 years	-0.0118 (0.107)	-0.0355 (0.103)	-0.0606 (0.0810)	-0.00577 (0.0799)	0.0222 (0.0800)	0.0137 (0.0763)
— 5–9 years	-0.0740 (0.0614)	-0.0881 (0.0614)	-0.100 (0.0613)	-0.0709 (0.0684)	-0.0229 (0.0635)	0.00389 (0.0705)
— 10–12 years	-0.144** (0.0624)	-0.173** (0.0712)	-0.169** (0.0709)	-0.0990 (0.0702)	-0.0617 (0.0702)	-0.0502 (0.0843)
Household size – 2009	0.0102 (0.0146)	0.0146 (0.0124)	0.0125 (0.0124)	0.0105 (0.0147)	0.0100 (0.0127)	0.00806 (0.0142)
Caste						
— Scheduled castes	-0.0302 (0.0825)	-0.0329 (0.0846)	-0.0239 (0.0819)	-0.0661 (0.0757)	-0.0351 (0.0705)	-0.00907 (0.0833)
— Scheduled tribes	-0.0375 (0.0917)	-0.0332 (0.0815)	-0.0744 (0.0952)	-0.101 (0.0901)	-0.0693 (0.0745)	0.0227 (0.0804)
— Other Backward classes	0.0669 (0.0483)	0.0657 (0.0491)	0.0405 (0.0538)	0.00502 (0.0541)	0.0232 (0.0508)	0.0419 (0.0511)
Age	0.137 (0.0837)	0.0849 (0.0788)	0.136* (0.0760)	0.134* (0.0738)	0.109 (0.0767)	0.142* (0.0801)
Urban location - 2009	-0.0573 (0.0602)	-0.0597 (0.0625)	-0.0373 (0.0759)	-0.0387 (0.0667)	-0.0479 (0.0659)	
Household composition						
– Has an older sister		-0.0390 (0.0483)	-0.0655 (0.0499)	-0.112* (0.0545)	-0.110** (0.0516)	-0.109* (0.0519)
– Has an older brother		0.0899** (0.0353)	0.0894** (0.0370)	0.0539 (0.0384)	0.0681* (0.0386)	0.0467 (0.0382)
– Number of siblings		-0.0133 (0.0235)	0.00401 (0.0260)	0.00478 (0.0325)	-0.0185 (0.0303)	-0.0224 (0.0326)
Menarche by the age of 12		0.150** (0.0612)	0.116* (0.0590)	0.109* (0.0595)	0.0695 (0.0557)	0.0801 (0.0589)
Parental aspirations for education – 12 yrs						
– Grade 12				0.0882 (0.0963)	0.119 (0.0952)	0.0882 (0.0938)
– Post-secondary				-0.105* (0.0574)	-0.0337 (0.0496)	-0.0592 (0.0456)
Child aspirations for education – 12 yrs						
– Grade 12				-0.172 (0.105)	-0.145 (0.0888)	-0.123 (0.0922)
– Post-secondary				-0.187** (0.0804)	-0.104 (0.0716)	-0.0930 (0.0723)
Parental expectation for age at marriage – 12 yrs yrs						
— Age at marriage >19			-0.203*** (0.0477)	-0.107* (0.0515)	-0.0928* (0.0468)	-0.0869 (0.0526)
Education						
— Enrolment 2006					-0.00712 (0.0878)	0.0260 (0.0887)
— Enrolment 2009					-0.337*** (0.0665)	-0.322*** (0.0724)
Constant	-2.208 (1.593)	-1.262 (1.499)	-2.086 (1.475)	-1.902 (1.471)	-1.241 (1.548)	-1.946 (1.618)
Observations	479	474	424	407	406	409
R-squared	0.106	0.140	0.171	0.212	0.277	0.317

Robust standard errors in parentheses, clustered at the site level.*** p<0.01, ** p<0.05, * p<0.1.

Wealth is measured here using a composite index of access to services, consumer durables and housing quality collected in the 2009 survey round. Aspirations for education collected from the child and her caregiver, and expectations about age at marriage elicited from the caregiver, were collected at the age of 12 years. Column (6) also includes dummy variables for the mandals that individuals were recruited in the 2002 round; coefficients for these are not reported.

Our intention with this exercise is not to estimate causal effects, and the vector of coefficients β should not be interpreted causally; in the absence of plausibly exogenous variation in the regressors, such interpretations are untenable. Rather, these should be interpreted as partial correlations which may, when carefully interpreted in light of other variables being controlled for (and those omitted but still potentially relevant), be revelatory about potential drivers of teenage marriage and the channels through which such effects may be mediated.

Results from this exercise are presented in Table 3. Column (1) highlights the important influences of the socio-economic background of young women on the probability of teenage marriage: girls from the richest tercile are about 21 percentage points less likely to marry than girls from the bottom two-thirds of the wealth distribution, even conditional on other socio-economic covariates in specification (1); a similarly sized, additional association is also observed for girls whose caregivers had received secondary education themselves; being resident in an urban community when aged 15 still has a negative association with the probability of getting married, but this is imprecisely estimated and not statistically significant.

Sibling sex and age composition and an early experience of menarche have effects similar to those those documented in the descriptive statistics. The presence of an older brother increases the probability of marriage by 19, while the presence of an older sister reduces it (although is not statistically significant). Much like previous research, we also find that an earlier experience of menarche significantly raises the probability of getting married.

In column (3) we further include an indicator variable for whether the caregiver reported an expectation, when the child was 12, of whether she would be married by 19 years of age. Three patterns are notable in this column. First, such an expressed aspiration is very strongly linked to the probability of the child being married by 19, and this simple binary variable has substantial explanatory power. Second, it reduces the coefficients both for the top tercile of wealth and for caregivers with secondary education; this suggests that one channel by which these socio-economic variables affect the age of marriage is through the parental expectations of when their daughters should marry. Third, it also reduces the coefficient on menarche, indicating that caregiver expectations adapt in response to experiencing menarche, thus partly validating the key hypothesised channel in the literature that menarche is seen as an indicator for achieving womanhood and marriageability.

Column (4) further includes parental and child aspirations for education. It is apparent that aspirations for education, both of caregivers and children, have significant predictive power for teenage marriage. After including these aspirations, we see a decline in the coefficient on the richest tercile and a halving of the coefficient on post-secondary education for caregivers; similar to expectations about age at marriage, we interpret this pattern as suggestive of the channels through which maternal education and household wealth affect the probability of teenage marriage. We notice also that the coefficient on having an older brother is halved and is now statistically insignificant; this suggests that perhaps the reason for the bivariate positive correlation between having an older brother and marrying early lies, at least in part, in lower aspirations by parents and children, and presumably lower investments.¹⁰ Finally, note that including parental and child aspirations halves the coefficient on caregiver expectations about the age of marriage. This indicates an important correlation between the

¹⁰ The connection between sibling composition and various investments is noted in the past literature. See for example Jayachandran and Kuziemko (2015) and Jayachandran and Pande (2015), who document important variations in nutritional investments and outcomes in children, depending on their sex and the sex/birth-order composition of their siblings.

two sets of variables and, although we cannot here distinguish the direction of causality, it highlights that parents frequently see post-secondary education and teenage marriage as substitutes in this sample.

Column (5) further includes dummy variables for whether the index girl was enrolled in school at the ages of 12 and 15 years. The coefficient on enrolment at 15 is strongly statistically significant and of substantial magnitude; it also adds significant additional predictive power, over and above variables previously included, as evidenced by the increase in the R-squared. Conditional on actual enrolment, coefficients on the aspirations variables reduce substantially; this is expected and in line with aspirations affecting actual enrolment. Conditional on enrolment at 15, enrolment at 12 does not predict teenage marriage; the coefficient is very close to zero and statistically insignificant, suggesting that dropping out earlier than 15 does not represent an additional risk factor for marrying in teenage years in this sample. As is evident from looking at the partial correlations in Column (5), whether a child was enrolled at the age of 15 is quantitatively the most important single predictor of teenage marriage. This cannot, of course, be causally interpreted on the basis of this regression alone: for example, parental preferences may well explain both early drop-out and teenage marriage (although note that we are controlling for parental expectations and aspirations), or perhaps girls are led to drop out precisely because their households intend for them to marry early. However, as a *predictor* of teenage marriage, useful for example when targeting interventions aimed at providing support to girls most at risk of teenage marriage, this stands out in its predictive power.¹¹

Finally, controlling for mandal-specific heterogeneity helps to explain some additional variation but does not alter the coefficients meaningfully for any particular variable.

3. Understanding teenage fertility

As noted in the Introduction, a major reason for policy concern about teenage marriage relates to the increased risk of teenage fertility. This is particularly the case in India, since in many, perhaps most, cases pregnancy very soon follows marriage. For many purposes, for example identifying target groups for information campaigns on family-planning methods, the predictors of teenage fertility are of more direct relevance than predictors of teenage marriage.

11 Using enrolment at 15 as a predictor for teenage marriage for policy purposes necessitates caveats which hinge upon the interpretation of the coefficient. If the relationship is in fact causal; i.e. if early dropout causes earlier marriage, then this would indicate that keeping girls in school might be a particularly efficacious tool for delaying the age at marriage. We cannot advance this conclusion definitively, because we cannot here establish causality. However, regardless of whether the estimated coefficient represents (entirely or in part) a causal relationship, our results do indicate that it is a robust proxy variable for being at risk of teenage marriage and therefore likely to be a robust basis for targeting support programmes for this population, for example interventions aimed at improving various life skills or information on sexual-health practices and family planning (see e.g. Bandiera et al. 2014 for an example of such a programme in Uganda).

3.1 Differences between young mothers and other young women

In our data, 102 of the 179 married women have already given birth; the data do not contain any incidence of fertility outside marriage.¹² Table 4 presents descriptive statistics of various background variables, comparing all women who have not given birth by 19 (including unmarried young women) and women who have given birth with married women who have not given birth yet.

Table 4. *Differences in mean characteristics between young mothers and other 19-year-olds*

	A. All young women in sample					B. Married young women				
	No birth	Birth	Diff.	t-stat	p-val	No birth	Birth	Diff.	t-stat	p-val
Urban location - 2009	0.266	0.140	0.126	2.647	0.008	0.133	0.140	-0.007	-0.126	0.900
Caregiver education										
--- None	0.556	0.755	-0.199	-3.688	0.000	0.688	0.755	-0.067	-0.986	0.325
--- 0-4 years	0.049	0.069	-0.019	-0.769	0.442	0.039	0.069	-0.030	-0.853	0.395
--- 5-9 years	0.255	0.167	0.088	1.861	0.063	0.208	0.167	0.041	0.700	0.485
--- 10-12 years	0.109	0.010	0.099	3.168	0.002	0.052	0.010	0.042	1.698	0.091
--- More than 12 years	0.031	0.000	0.031	1.808	0.071	0.013	0.000	0.013	1.152	0.251
Caste										
--- Scheduled Caste	0.200	0.235	-0.035	-0.781	0.435	0.182	0.235	-0.053	-0.863	0.389
--- Scheduled Tribe	0.125	0.127	-0.003	-0.075	0.940	0.104	0.127	-0.024	-0.482	0.630
--- Other Backward Classes	0.426	0.510	-0.084	-1.516	0.130	0.519	0.510	0.010	0.128	0.899
--- Other	0.249	0.127	0.122	2.640	0.009	0.195	0.127	0.067	1.226	0.222
Wealth terciles – 2009										
--- Tercile 1 (poorest)	0.343	0.400	-0.057	-1.061	0.289	0.506	0.400	0.106	1.413	0.159
--- Tercile 2 (middle)	0.285	0.410	-0.125	-2.406	0.016	0.351	0.410	-0.059	-0.802	0.424
--- Tercile 3 (richest)	0.372	0.190	0.182	3.466	0.001	0.143	0.190	-0.047	-0.826	0.410
Household composition										
--- Has older sister(s)	0.403	0.324	0.079	1.459	0.145	0.338	0.324	0.014	0.198	0.843
--- Has older brother(s)	0.358	0.549	-0.191	-3.533	0.000	0.390	0.549	-0.159	-2.128	0.035
--- Number of siblings	1.842	2.039	-0.198	-1.636	0.103	1.766	2.039	-0.273	-1.588	0.114
Education										
--- Enrolment in 2006	0.917	0.696	0.221	6.119	0.000	0.766	0.696	0.070	1.040	0.300
--- Enrolment in 2009	0.818	0.420	0.398	8.610	0.000	0.545	0.420	0.125	1.661	0.099
--- years of schooling	10.657	8.030	2.627	9.101	0.000	8.600	8.030	0.570	1.317	0.190
Parental aspirations for education – 12 yrs										
--- Up to Grade 10	0.329	0.577	-0.248	-4.585	0.000	0.548	0.577	-0.029	-0.380	0.704
--- Grade 12	0.090	0.113	-0.023	-0.695	0.488	0.110	0.113	-0.004	-0.078	0.938
--- Post-secondary	0.581	0.309	0.272	4.887	0.000	0.342	0.309	0.033	0.455	0.649
Child aspirations for education – 12 yrs										
--- Up to Grade 10	0.204	0.410	-0.206	-4.328	0.000	0.419	0.410	0.009	0.117	0.907
--- Grade 12	0.101	0.140	-0.039	-1.126	0.261	0.122	0.140	-0.018	-0.352	0.725
--- Post-secondary	0.696	0.450	0.246	4.659	0.000	0.459	0.450	0.009	0.123	0.902
Parental expectations for age at marriage – 12 yrs										
--- Age at marriage >19	0.802	0.674	0.128	2.621	0.009	0.588	0.674	-0.086	-1.112	0.268
Menarche by the age of 12	0.225	0.440	-0.215	-4.386	0.000	0.227	0.440	-0.213	-2.988	0.003
N	385	102				77	102			

Wealth is measured here using a composite index of access to services, consumer durables, and housing quality, collected in the 2009 survey round. Aspirations for education collected from the child and her caregiver, and expectations about age at marriage elicited from the caregiver, were collected at the age of 12 years. Reported t-statistics and p-values are from two-sided tests for equality of mean characteristics across the two groups

12 Following the standard practice in Indian household surveys, such as the National Family and Health Surveys and the India Human Development Surveys, and given context-specific sensitivity in posing questions about fertility to unwed young women, the Young Lives questionnaire directly collects fertility information only for ever-married women. This could in theory lead to an undercount of the true number of births in the sample. We attempted to verify this indirectly by also looking at the full household roster in the households of the young women where the survey collects the relationship of each member with the Young Lives child. In other Young Lives countries, the survey collected fertility histories regardless of current or previous marital status. A similar exercise reveals 95 per cent of births in Peru and 83 per cent of births in Ethiopia are reported in the household roster, comparing the information from the roster with direct reports from the fertility history. In the Indian sample, in no case do we find a resident child of an unmarried young woman in the household roster; this reassures us that any such exclusions are likely to be rare and do not substantially alter our results.

Comparing young mothers with all other sample women (including unmarried young women) in Panel A reveals stark differences. Young mothers are much more likely to live in rural areas, to have less-educated mothers, to belong to lower terciles of household wealth, and to have been out of school at the ages of 12 and 15. They are further less likely to have expressed aspirations for post-secondary education and to have had earlier experience of menarche. These factors are, expectedly, very similar to the difference in characteristics between married and unmarried young women for the whole sample.

Panel B compares, more interestingly, women who have given birth with the sample of young women who are married but have not yet given birth. To the extent that the core concern for policy relates to age at first birth rather than age at first marriage, these differences are important to distinguish and not yet foreshadowed by our preceding analysis. Even descriptively, the sampled married women who have already given birth seem not to differ significantly in any of the major domains under consideration: the two groups appear remarkably similar in terms of various socio-economic characteristics, in the aspirations that they and their caregivers had expressed for education, and in their actual enrolment status at 12 or 15. The lack of statistical significance of the mean differences is possibly caused by the relatively small sample of married women, but what is remarkable is that the averages also do not differ significantly in size in many important domains: rurality, socio-economic status, or educational aspirations.

Mean differences do appear to favour women who have not given birth in terms of caregiver education, sibling composition, actual enrolment status at 12 and 15, and the experience of menarche by age 12, although rarely with statistical significance. The significant differences in the age at which menarche was experienced, and probably also the differences in whether the young woman had an older brother, may indicate the effect of these variables on the timing of marriage within adolescence, over and above the probability of being married by 19. Given that little else seems to differ between married women who or have not yet given birth, it is likely that the most important determinant of the timing of first birth is the time since marriage. Unfortunately, given the relatively small sample size at our disposal, we are unable to subject this hypothesis to further scrutiny.

3.2 Predictors of teenage fertility

Our strategy for evaluating the predictors of teenage motherhood follows closely the strategy followed for understanding factors contributing to teenage marriage. Specifically we define the dependent variable $birth_{i,19}$ as having given birth by the 2013-14 round of the survey, and we estimate the same relationships as in Specifications (1)–(6) previously used for predicting teenage marriage. Results are provided in Table 5.

Looking at the socio-economic predictors for giving birth, the structure of partial correlations appears somewhat different from the predictors of being married. Specifically, we see little evidence of any correlation between the wealth of the natal household and the probability of giving birth; in contrast, the negative association with the caregiver being educated to secondary-school level appears substantive in magnitude and even more statistically significant. Unlike the probability of marriage, the probability of teenage motherhood does show some correlations in the data with caste of the Young Lives women: compared with the base category of other castes, young women from the 'other backward classes' subcategory seem substantially more likely to have given birth by 19.

Table 5. *Predictors of teenage fertility*

	(1)	(2)	(3)	(4)	(5)	(6)
	Dep var: Given birth by 19					
Wealth terciles – 2009						
--- Tercile 2 (middle)	0.0519 (0.0362)	0.0469 (0.0351)	0.0355 (0.0430)	0.0359 (0.0453)	0.0278 (0.0436)	0.0134 (0.0430)
--- Tercile 3 (richest)	-0.0340 (0.0455)	-0.0349 (0.0459)	-0.0221 (0.0523)	-0.000767 (0.0502)	0.00563 (0.0567)	0.0261 (0.0627)
Caregiver education						
--- 1–4 years	0.0432 (0.0900)	0.0234 (0.0825)	-0.0119 (0.0635)	0.0333 (0.0675)	0.0535 (0.0641)	0.0498 (0.0665)
--- 5–9 years	-0.0544 (0.0398)	-0.0629* (0.0361)	-0.0872** (0.0384)	-0.0643 (0.0449)	-0.0253 (0.0459)	-0.0321 (0.0596)
--- 10–12 years	-0.144*** (0.0451)	-0.138*** (0.0458)	-0.135** (0.0510)	-0.0759 (0.0466)	-0.0469 (0.0508)	-0.0369 (0.0589)
Household size – 2009	0.0163 (0.0144)	0.0113 (0.0158)	0.0124 (0.0180)	0.0106 (0.0175)	0.0108 (0.0151)	0.0116 (0.0160)
Caste						
--- Scheduled Castes	0.0559 (0.0422)	0.0563 (0.0432)	0.0745 (0.0437)	0.0406 (0.0452)	0.0636 (0.0456)	0.0876* (0.0450)
--- Scheduled Tribes	0.0470 (0.0622)	0.0415 (0.0554)	0.0342 (0.0579)	0.00748 (0.0588)	0.0295 (0.0494)	0.105* (0.0518)
--- Other Backward Classes	0.0821** (0.0356)	0.0809** (0.0330)	0.0861** (0.0337)	0.0512 (0.0439)	0.0638 (0.0475)	0.0579 (0.0515)
Age	0.110** (0.0525)	0.0661 (0.0485)	0.0784 (0.0515)	0.0771 (0.0514)	0.0556 (0.0510)	0.0856 (0.0635)
Urban location – 2009	-0.0399 (0.0604)	-0.0493 (0.0577)	-0.0299 (0.0669)	-0.0439 (0.0553)	-0.0498 (0.0557)	
Household composition						
--- Has older sister(s)		-0.0453 (0.0359)	-0.0565 (0.0342)	-0.0902** (0.0347)	-0.0897** (0.0334)	-0.0859** (0.0379)
--- Has older brother(s)		0.0880** (0.0376)	0.0962** (0.0427)	0.0746* (0.0408)	0.0821* (0.0393)	0.0867** (0.0401)
--- Number of siblings		0.0149 (0.0219)	0.0196 (0.0239)	0.0265 (0.0291)	0.00858 (0.0263)	0.00653 (0.0292)
Menarche by the age of 12		0.168*** (0.0581)	0.170*** (0.0575)	0.143** (0.0590)	0.107* (0.0551)	0.106* (0.0591)
Parental aspirations for education – 12 yrs						
--- Grade 12				0.0389 (0.0752)	0.0698 (0.0763)	0.0663 (0.0794)
--- Post-secondary				-0.104* (0.0549)	-0.0449 (0.0498)	-0.0599 (0.0486)
Child aspirations for education – 12 yrs						
--- Grade 12				-0.0892 (0.0943)	-0.0545 (0.0786)	-0.0224 (0.0825)
--- Post-secondary				-0.107* (0.0594)	-0.0292 (0.0525)	-0.00464 (0.0493)

	(1)	(2)	(3)	(4)	(5)	(6)
	Dep var: Given birth by 19					
Parental expectation for age at marriage – 12 yrs						
--- Age at marriage >19			-0.0561 (0.0509)	-0.000827 (0.0575)	0.0113 (0.0533)	0.0195 (0.0589)
Education						
--- Enrolment 2006					-0.0662 (0.0946)	-0.0699 (0.0837)
--- Enrolment 2009					-0.256*** (0.0863)	-0.212** (0.0947)
Constant	-1.993* (1.016)	-1.219 (0.947)	-1.432 (1.022)	-1.287 (1.047)	-0.704 (1.063)	-1.350 (1.277)
Observations	479	474	424	407	406	409
R-squared	0.062	0.116	0.131	0.161	0.223	0.263

Robust standard errors in parentheses, clustered at the site level.*** p<0.01, ** p<0.05, * p<0.1

Wealth is measured here using a composite index of access to services, consumer durables, and housing quality, collected in the 2009 survey round. Aspirations for education collected from the child and her caregiver, and expectations about age at marriage elicited from the caregiver, were collected at the age of 12 years. Column (6) also includes dummy variables for the mandals that individuals were recruited in the 2002 round; coefficients for these are not reported. Including the variables for household composition and menarche by the 2006-07 round yields similarly signed and statistically significant coefficients on these variables as for predicting marriage. We hypothesise that it is primarily through raising the probability of marriage that these variables raise the probability of teenage pregnancy and motherhood.¹³ Somewhat surprisingly, the binary variable for caregiver's expectation of the age at marriage does not have a statistically significant association with the probability of giving birth, nor does its inclusion affect the other coefficients; this is markedly different from Table 3. Parental and child aspirations for education do have the same sign and similar magnitudes as in Table 3; and their inclusion does lead to a decline in the coefficient on caregiver secondary education, as expected.

The inclusion of the enrolment variables reveals starkly similar patterns to Table 3. Being out of school at 15 is very strongly associated with the probability of having given birth by 19; the coefficient implies that girls who had left schooling by 15 were between 21 and 26 percentage points more likely to have given birth by 19. Similar to results on predicting teenage marriage, being out of school at 12 does not, conditional on enrolment at 15, predict a significantly elevated risk of teenage motherhood.¹⁴ The important pattern here, as in Table 3, is that being out of school at 15 is the single most substantive predictor among the variables available for identifying the subgroup of girls most at risk of teenage motherhood.

13 Although note that the coefficient for menarche in particular seems to be larger for predicting teenage fertility than for predicting teenage marriage; if all of the effect was through raising the probability of marriage, we would have expected the coefficient to be smaller for predicting birth than marriage (since not all married women have already given birth). The coefficients are noisily estimated and probably not statistically distinguishable from each other at conventional levels of significance. This pattern does, however, suggest the possibility that early menarche affects the timing of birth not only through being married by 19 but also through other channels. One potential explanation is that early menarche affects not just the probability of teenage marriage but, more precisely, the age at marriage even within the group of teenage brides; if the probability of having given birth depends on the time since marriage (not a variable for which we are controlling), this could account for the greater magnitude of the coefficient on having given birth. An alternative, and not mutually exclusive, explanation is that time since menarche might be an indicator not only for readiness for marriage but also for readiness for motherhood - i.e. menarche might have direct effects on raising the probability of giving birth, even conditional on the age at marriage.

14 Although note that, unlike in Table 3, where the coefficient on enrolment at 12 was very close to zero, the coefficients on enrolment at 12 in Columns (5) and (6) are larger. While these are imprecisely estimated, and we probably cannot reject equality of coefficients, it is possible that there is in fact an additional effect, possibly operating through the time since marriage.

4. Association of teenage marriage with outcomes at 19 years

Although important, concerns about teenage marriage and fertility do not relate solely to outcomes for the children born to young mothers, but also to direct consequences for the young women themselves. In this section, we evaluate associations of various outcome measures collected in the 2013-14 round with having been married by the time of the survey.

4.1 Descriptive differences between married and unmarried young women

We focus on a range of measures collected in the 2013-14 round: individual subjective well-being, a range of psychosocial variables, and the individual's participation in higher education. The first outcome variable is the individual's **self-reported subjective well-being**, collected through Cantril's ladder-of-life scale, familiar from much previous work (for example, the World Values Surveys). The Young Lives survey has collected this measure of subjective well-being on a nine-point scale for the sample individuals since the 2006-07 round, when respondents were aged about 12 years.¹⁵ The second outcome is the **perceived self-efficacy**, defined by Bandura (1997) as people's beliefs in their capabilities to produce given achievements. The scale used to measure this in the Young Lives data in 2013-14 is the Generalized Self-efficacy scale produced by Schwarzer and Jerusalem (1995). The third outcome is an index of **self-esteem** measured using an 8-item scale drawn from the Self-Description Questionnaire – III (Marsh and O'Neill 1984). The fourth outcome variable, a **peer-relations** scale, is based on an 8-item scale also drawn from the Self-Description Questionnaire and seeks to measure individuals' relationships with peers. The fifth outcome variable is an index for **individual's agency and locus-of-control**, using a short scale collected also at the ages of 12 and 15 in the Young Lives study for this cohort. The final outcome variable that we consider is **higher-education attendance**: in the 2013-14 round at the age of ~19, about 38 per cent of women and 42 per cent of men are currently enrolled in higher education.

Table 6 presents the descriptive statistics of the seven outcome variables considered in the section across married and unmarried women. The ladder scale is presented as the raw response provided by the respondent. The psychosocial variables are presented as scales normalised to have a mean of zero and a standard deviation of one in the sample used in this paper. Accessing higher education is coded as 1 if the individual was enrolled in post-secondary education in the school year 2013–2014 and zero otherwise.

Subjective well-being is measured using Cantril's 'ladder of life', with 10 steps from 0 to 9 and reported here as the raw response. Psychosocial outcomes (self-efficacy, self-esteem, peer relations, and agency) are internally normalised and reported in standard deviations. Access to higher education is a dummy variable which equals one if the respondent is in higher education and zero otherwise.

¹⁵ The specific question is posed as follows. There are nine steps on this ladder. Suppose we say that the ninth step, at the very top, represents the best possible life for you and the bottom represents the worst possible life for you. Where on the ladder do you feel you personally stand at the present time?

Table 6. *Consequences of teenage marriage*

	Not married Mean	Married Mean	Difference	t-statistic	p-value
Subjective well-being (ladder)	5.211	4.575	0.635	4.584	0.000
Self-efficacy index	-0.008	-0.217	0.210	3.461	0.001
Self-esteem index	0.049	-0.033	0.082	1.507	0.132
Agency index	0.092	-0.399	0.491	9.577	0.000
Self-esteem index (as measured in 2009)	0.117	0.139	-0.022	-0.345	0.730
Peer- relations index	0.124	-0.126	0.250	3.982	0.000
Attendance higher education 2013–2014	0.529	0.056	0.473	11.948	0.000
N	308	179			

As is evident, there are important differences in these outcome variables across ever-married and unmarried young women in our sample, with outcomes for married women being somewhat lower than for unmarried women across most dimensions. Married women report about half a step lower in the subjective well-being measure, report lower self-efficacy and agency, and are much less likely to be enrolled in higher education. The concern highlighted in the Introduction, that early marriage may lead to worse outcomes for the young women themselves, thus finds some *prima facie* empirical backing in the simple descriptive analysis in Table 6.

In order to understand better the differences in reported psychosocial outcomes between married and unmarried young women, we present the mean response for each question in the generalised self-efficacy, self-esteem, peer relations, and agency indexes. This is presented in Table 7. As can be seen, the differences in aggregated indices of psychosocial functioning are reflected consistently also in the individual statements. They appear not to be artefacts of aggregation but indicate substantive differences in the young women's self-perception in these different domains. Perhaps the most striking are the differences that married and unmarried young women report in self-efficacy and agency. Compared with their unmarried peers, married young women seem much less confident of their ability to solve various problems, cope with problems and difficulties, and improve their situation through their own effort; perhaps reflecting this lower self-efficacy, as well as material constraints, they are also much less likely to report making plans for future work or studies. They also report consistently lower self-perceptions of their relationships with peers.

Table 7. *Differences in psychosocial outcomes between married and unmarried teenagers*

	Not married Mean	Married Mean	Difference	t-statistic	p-value
Self-efficacy index					
I can always manage to solve difficult problems if I try hard enough	0.061	-0.242	0.304	3.122	0.002
If someone opposes me, I can find the means and ways to get what I want	-0.042	-0.100	0.057	0.549	0.583
It is easy for me to stick to my aims and accomplish my goals	-0.024	-0.365	0.340	3.546	0.000
I am confident that I could deal efficiently with unexpected events	-0.030	-0.150	0.120	1.177	0.240
Thanks to my resourcefulness, I know how to handle unforeseen situations	-0.072	-0.150	0.078	0.780	0.436
I can solve most problems if I invest the necessary effort	0.054	-0.273	0.327	3.295	0.001
I can remain calm when facing difficulties because I can rely on my coping abilities	-0.004	-0.231	0.228	2.231	0.026
When I am confronted with a problem, I can usually find several solutions	0.010	-0.330	0.340	3.442	0.001
If I am in trouble, I can usually think of a solution	0.038	-0.188	0.227	2.377	0.018
I can usually handle whatever comes my way	-0.036	-0.164	0.128	1.275	0.203
Self-esteem index					
I do lots of important things	0.012	-0.193	0.204	2.091	0.037
In general, I like being the way I am	0.214	-0.071	0.286	3.021	0.003
Overall, I have a lot to be proud of	0.077	0.002	0.075	0.773	0.440
I can do things as well as most people	-0.037	0.002	-0.039	-0.392	0.695
Other people think I am a good person	0.050	-0.033	0.083	0.846	0.398
A lot of things about me are good	0.051	-0.034	0.086	0.925	0.356
I'm as good as most other people	0.006	0.075	-0.069	-0.738	0.461
When I do something, I do it well	0.064	0.023	0.042	0.416	0.678
Peer-relations index					
I have lots of friends	0.076	-0.236	0.312	3.170	0.002
I make friends easily	0.114	-0.088	0.202	2.052	0.041
Other kids want me to be their friend	0.127	-0.108	0.235	2.388	0.017
I have more friends than most other kids	0.108	-0.262	0.370	3.787	0.000
I get along with other kids easily	0.135	-0.087	0.222	2.370	0.018
I am easy to like	0.158	-0.041	0.199	2.083	0.038
I am popular with kids of my own age	0.164	-0.097	0.261	2.856	0.004
Most other kids like me	0.141	-0.080	0.222	2.332	0.020
Agency index					
If I try hard, I can improve my situation in life	0.106	-0.328	0.434	4.458	0.000
Other people in my family make all the decisions about how I spend my time	-0.220	-0.102	-0.119	-1.289	0.198
I like to make plans for my future studies and work	0.164	-0.702	0.866	9.059	0.000
If I study hard at school I will be rewarded by a better job in future	0.258	-0.736	0.994	10.843	0.000
I have no choice about the work I do – I must do this sort of work	0.115	-0.125	0.240	2.473	0.014
N	308	179			

Cells show the standardised mean response to the individual items in the psychosocial scales used as outcomes for young women.

4.2 Understanding factors leading to worse outcomes for married women

While the average differences in the psychosocial outcomes for married and unmarried young women presented in Tables 6 and 7 are stark, it is not straightforward to interpret these directly as resulting from their marital status. In particular, it is entirely plausible that these differences reflect merely the very different socio-economic profiles and experiences through childhood of these women, some of which have already been pointed out in previous sections. While we cannot isolate fully the causal impacts of marriage on these outcomes for the young women, we can use the rich data at our disposal to nuance our interpretations substantially.

In order to improve our understanding of the contributors of these adverse outcomes for women, we estimate the following specifications:

$$Y_{i,19} = \alpha + \phi_1 \text{married}_{i,19} \quad (7)$$

$$+ \phi_2 X_i \quad (8)$$

$$+ \phi_3 \text{enrol}_{i,12} + \phi_4 \text{enrol}_{i,15} \quad (9)$$

$$+ \phi_5 Y_{i,15} \quad (10)$$

where $Y_{i,19}$ is the relevant dependent variable, one of the seven outcome variables presented in Table 6. X_i and enrol variables are defined as in previous regressions. $Y_{i,15}$ is the nearest proxy for the relevant outcome variable that is available at 15 years of age in the dataset: for subjective well-being, the identical question is available at 15; for self-efficacy and the agency index, we use a lagged value of the agency index (defined identically to agency in 2013-14); for self-esteem, we use a (different) index of self-esteem that was collected at 15 years of age; for enrolment in higher education, the relevant lagged variable is enrolment at 15, which is already controlled for, and so we do not estimate Specification (10) separately. As previously, regressions are clustered at the mandal level from the 2002 round.

Before presenting results of the estimation of Specifications (7)–(10), it is worthwhile to consider the interpretation of coefficients. Specification (7) is simply the difference in means across married and unmarried women. Specification (8) adds the socio-economic characteristics in X_i with an intention to see if these fixed or otherwise pre-determined characteristics that precede marriage explain, in a statistical sense, the difference between married and unmarried women. Specification (9) adds enrolment variables from the age of 12 and 15 to evaluate further if the negative association of being married with these outcomes reflects the education history of the young woman in adolescent years; given how closely enrolment in middle teenage years is associated with marriage, and because education may plausibly be an important determinant itself of psychosocial functioning ('non-cognitive skills'), it is entirely plausible that the differences in outcomes relate not to being married but to the correlation between being married and less education.¹⁶

¹⁶ For examples of the cross-productivity between psychosocial and cognitive skills see, for example, Cunha et al. (2010) and the recent overview article by Heckman and Mosso (2014). Note that the interpretation that we forward here is a particularly conservative one: to the extent that non-enrolment at 15 may result from expectations of early marriage, controlling for it understates the true effect of teenage marriage on these outcomes.

Results from these specifications are presented in Table 8, which documents some interesting patterns.¹⁷ The first column for each indicator reiterates the significant differences between the two groups in subjective well-being, self-efficacy, agency, peer relations, and higher education. For each of these outcomes, we see that controlling for the socio-economic characteristics of the natal household seems to reduce the coefficient on the married dummy variable; this is consistent with the hypothesis that these differences reflect, at least in part, past socio-economic disadvantage – although note that at least the measures of such past disadvantage that we control for here lead to only a relatively small decline in the coefficient, ranging between 15 and 30 per cent of the original point estimate.¹⁸

The inclusion of the indicator variables for having dropped out of school at 12 and/or 15, in contrast, leads to much more significant declines in each of these coefficients. The coefficient on the married variable is driven to about a third of the original mean difference in subjective well-being, about half in self-efficacy and agency and about two-thirds of the original coefficient in peer relations and higher education; with the exception of self-reported subjective well-being, where point estimates are particularly noisily estimated, the married coefficient remains statistically significant elsewhere.

How may this be interpreted? At the simplest level, this seems to indicate that the differences in outcomes between married and unmarried women exist even conditional on past enrolment status, i.e. when comparing married and unmarried women within the groups defined by past enrolment. Past exposure to education, in particular the lower exposure of currently married women, does not therefore seem likely to be the sole determinant of worse outcomes for married women. The correlation, however, between enrolment at 15 and these outcomes at 19 is particularly strong, usually greater than, or at least of similar magnitude to, the correlation of being currently married. This is consistent with the possibility that it is the early withdrawal from school that directly manifests itself in lower welfare outcomes at 19, although it is also consistent with other potential explanations.

In short, our empirical analysis of the short-term outcomes of marriage is consistent with the concerns expressed in past work and policy discussions that teenage marriage manifests itself in lower welfare outcomes for women. We have documented that, on a range of psychosocial outcomes, married women self-report worse outcomes compared with unmarried women, and that this is not fully explained by measures of natal socio-economic status or past education. While this is not sufficient to conclude convincingly that teenage marriage is causally responsible for poorer outcomes, it is suggestive of the possibility.

17 We do not include the regressions for the self-esteem indexes (as outcomes), as they did not show significant differences between married and unmarried teenagers in Tables 6 and 7.

18 Note, of course, that the coefficients are noisily estimated, and we lack sufficient statistical power to reject equality.

Table 8. *Outcomes of teenage marriage*

Married	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	Dep var: Subjective well-being (ladder)				Dep var: Self-efficacy index				Dep var: Agency index				Dep var: Peer relations index			Dep var: Access higher education		
Married	-0.635*** (0.183)	-0.451** (0.171)	-0.185 (0.185)	-0.188 (0.183)	-0.210*** (0.066)	-0.142** (0.053)	-0.070 (0.068)	-0.066 (0.069)	-0.491*** (0.053)	-0.396*** (0.057)	-0.228*** (0.067)	-0.227*** (0.067)	-0.250*** (0.065)	-0.234*** (0.060)	-0.173** (0.068)	-0.473*** (0.041)	-0.393*** (0.039)	-0.310*** (0.037)
Wealth terciles – 2009																		
Tercile 2 (middle)		0.315 (0.201)	0.310 (0.195)	0.215 (0.189)		0.013 (0.080)	0.031 (0.076)	0.033 (0.078)		-0.037 (0.054)	-0.027 (0.051)	-0.026 (0.049)		0.103 (0.087)	0.114 (0.083)		0.050 (0.045)	0.056 (0.052)
Tercile 3 (richest)		0.748*** (0.157)	0.712*** (0.149)	0.551*** (0.134)		0.127 (0.078)	0.123 (0.081)	0.126 (0.079)		0.104 (0.074)	0.077 (0.083)	0.078 (0.083)		0.122 (0.078)	0.117 (0.077)		0.205*** (0.063)	0.190** (0.072)
Caregiver's education																		
0–4 years		0.065 (0.274)	-0.016 (0.281)	-0.066 (0.263)		-0.041 (0.106)	-0.076 (0.106)	-0.066 (0.111)		0.168 (0.130)	0.089 (0.135)	0.093 (0.135)		0.212* (0.116)	0.183 (0.115)		-0.039 (0.083)	-0.083 (0.080)
5–9 years		0.095 (0.126)	-0.011 (0.127)	0.025 (0.128)		0.046 (0.086)	0.012 (0.085)	0.019 (0.083)		0.071 (0.066)	-0.010 (0.069)	-0.007 (0.069)		-0.025 (0.071)	-0.054 (0.072)		-0.003 (0.048)	-0.043 (0.049)
10–12 years		0.453* (0.237)	0.379* (0.211)	0.348 (0.209)		0.129 (0.126)	0.096 (0.118)	0.092 (0.112)		0.249*** (0.077)	0.176** (0.078)	0.174** (0.080)		0.100 (0.124)	0.073 (0.125)		0.188*** (0.052)	0.148** (0.058)
Caste																		
Scheduled Castes		-0.111 (0.185)	-0.107 (0.181)	-0.127 (0.169)		0.079 (0.120)	0.087 (0.115)	0.088 (0.113)		-0.086 (0.083)	-0.059 (0.064)	-0.059 (0.062)		0.054 (0.122)	0.063 (0.117)		-0.216*** (0.067)	-0.207*** (0.061)
Scheduled Tribes		0.145 (0.226)	0.196 (0.234)	0.151 (0.232)		0.088 (0.093)	0.092 (0.099)	0.104 (0.092)		-0.064 (0.071)	-0.046 (0.069)	-0.041 (0.067)		0.239** (0.110)	0.243** (0.107)		-0.166** (0.068)	-0.160** (0.067)
Other Backward Classes		-0.062 (0.181)	-0.027 (0.184)	-0.049 (0.177)		-0.005 (0.072)	-0.001 (0.069)	-0.003 (0.067)		-0.185** (0.082)	-0.170** (0.076)	-0.171** (0.075)		0.168 (0.105)	0.172 (0.103)		-0.233*** (0.041)	-0.227*** (0.039)
Education																		
Enrolled in 2006			0.446 (0.304)	0.431 (0.285)			-0.055 (0.079)	-0.083 (0.088)			0.045 (0.114)	0.030 (0.113)			-0.027 (0.116)			-0.032 (0.039)
Enrolled in 2009			0.420** (0.164)	0.354* (0.171)			0.221** (0.098)	0.193* (0.097)			0.441*** (0.089)	0.427*** (0.093)			0.176** (0.083)			0.258*** (0.046)
Lagged values																		
Ladder (in 2009)				0.100** (0.046)														
Agency index (in 2009)								0.066 (0.052)				0.032 (0.035)						
Constant	5.211*** (0.106)	0.826 (3.450)	-0.188 (3.225)	0.810 (3.217)	-0.008 (0.059)	-4.025*** (1.381)	-4.270*** (1.307)	-4.100*** (1.327)	0.092** (0.038)	0.519 (1.493)	-0.401 (1.406)	-0.307 (1.416)	0.124** (0.051)	-1.277 (2.310)	-1.492 (2.277)	0.529*** (0.038)	0.554 (1.200)	0.002 (1.253)
Observations	483	475	473	473	486	478	476	476	487	479	477	477	487	479	477	487	479	477
R-squared	0.042	0.091	0.124	0.138	0.024	0.074	0.086	0.091	0.159	0.212	0.300	0.301	0.032	0.060	0.068	0.227	0.336	0.373

Robust standard errors in parentheses, clustered at the site level.*** p<0.01, ** p<0.05, * p<0.1

Wealth is measured here using a composite index of access to services, consumer durables, and housing quality, collected in the 2009 survey round. Aspirations for education collected from the child and her caregiver, and expectations about age at marriage elicited from the caregiver, were collected at the age of 12 years. All regressions, except the first for each outcome, also include controls for the age of the child, household size, and urban location; coefficients are not reported for ease of presentation.

5. Discussion

This paper has used a unique dataset to study the predictors of teenage marriage and pregnancy, and its consequences. Linking data over a relatively long period of childhood to observed outcomes at 19, we provide a richer empirical estimation of these relationships than has typically been possible in this context.

Our results are informative both for scholarly understanding in this area and for policy purposes. Our analysis of the predictors of early marriage identifies groups of women particularly vulnerable to teenage marriage; in particular, we are able to quantify the extent to which the probability of teenage marriage co-varies with social and economic disadvantage as exhibited by (for example) household wealth, parental education, and rurality. This is particularly relevant for the geographical and social targeting of programmes. We note further the important roles of social norms and intrahousehold choices, as exhibited, for instance, in the results on sibling sex and birth-order composition, and the aspirations and expectations of caregivers and girls, in determining the probability of early marriage. In this, we join a large literature across the social sciences which studies social determinants of later life outcomes.

We note also that married women who have not given birth by 19 do not significantly differ in observable dimensions from those 19-year-olds who are already young mothers. This suggests to us that, to the extent to which the concern for policy is to discourage teenage motherhood, this is not an outcome for which particularly vulnerable groups can easily be identified after marriage: any interventions in this regard are probably best targeted at adolescent girls before the incidence of marriage. For interventions that seek not to discourage teenage motherhood, but rather to ensure that they (for example) give birth in hospitals and with adequate prenatal care, this suggests that targeting information and programmes at all married women might be better than attempting to identify, conditional on marriage, those women most at risk of becoming teenage mothers.

Finally, and perhaps most importantly and originally, we document that married young women have significantly poorer outcomes at 19 in a range of outcomes – subjective well-being, psychosocial outcomes, and access to education – than their unmarried peers. This disadvantage is not fully removed even upon conditioning on various fixed or pre-determined characteristics and investments or lagged values of the outcomes; while insufficient to demonstrate causality, this is consistent with a causal link between teenage marriage and poorer outcomes and suggestive of such a pattern.

The major limitation of this study is that there is no experimental, or otherwise plausibly exogenous quasi-experimental variation, in the predictors of early marriage or in teenage marriage itself. Thus, while suggestive and partially informative, our results may be interpreted only as associations and not causally.

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Teenage Marriage, Fertility and Well-being: Panel Evidence from India

This paper uses a unique dataset from Andhra Pradesh, tracking a cohort of children who were born in 1994–95 from the ages of 8 to 19 years, to ask three key questions about teenage marriage and fertility in India. First, what predicts getting married during the teen years? Second, what predicts having given birth by 19? And third, do the subjective well-being and psychosocial outcomes such as the agency, self-efficacy, and self-esteem of married young women differ from those of their unmarried peers — and to what extent can these differences be accounted for by differing socio-economic status and characteristics of, and investments in, their parental household? Our analysis is novel because such long-term panel data, linking backgrounds and investments in the natal household with welfare outcomes and socio-emotional measures in the marital household, have not previously been available in this setting.



An International Study of Childhood Poverty

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