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Marriage and Fertility Dynamics in India

It is widely acknowledged that age at marriage has a significant influence on fertility, particularly in the countries where child-bearing occurs within marriage. However, the complexities of marriage/fertility relationship are poorly understood, especially during fertility transitions. This paper investigates the complex relationship between marriage and fertility by examining age at marriage, marital fertility and birth interval dynamics in India, using data collected in nationally representative surveys in 1992/1993 and 2005/2006. The decline in fertility during this period could be attributed to changes in marital fertility rather than to changes in marriage age. Women marrying late tend to have shorter first birth interval than women marrying at a younger age. However, the second and higher birth intervals are longer among those marrying late.

By Premchand Dommaraju*

Malthus in his essay on the Principle of Population advocated “moral restraint” as an effective measure to control population growth. By moral restraint he meant marrying late and remaining celibate before marriage. Ever since this early formulation on the potential of marriage delay in bringing about fertility decline, demographers have investigated the role of marriage on fertility transition in various contexts, including in Europe and Asia. The important role played by late marriage and non-marriage (spinsterhood) in the pre-transition European fertility decline is well documented (Coale, 1973). Similarly, a change in marriage patterns was a significant factor in the transition to low fertility in much of East and South-East Asia (Cho and Retherford, 1974). More recently, Jones (2007) has emphasized the important role played by

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marriage decline and marriage delay in the transition to very low fertility in East Asia. Thus, it is clear that changes in nuptiality have played a significant role in reducing fertility in many contexts.

It is likely that the influence of delayed marriage or non-marriage will be particularly important where non-marital fertility is low or negligible. This paper examines the relationship between marriage and fertility in India, a country where non-marital childbirths are rare and marriage continues to be universal and relatively early. This paper considers the effect of change in nuptiality on fertility decline for India as a whole as well as for major states. It also examines the influence of marriage age on family-building process by investigating the birth interval dynamics.

Overview of nuptiality and fertility in India

The institution of marriage has been remarkably stable in India with universal marriage continuing to be the norm. In 2005/2006, less than one per cent of women and about two per cent of men aged 40 to 44 were never married (International Institute for Population Sciences, IIPS], and Macro International, 2007). Age at marriage has undergone a gradual but steady increase at the national level: Singulate Mean Age at Marriage (SMAM) increased from 16.8 to 20.2 years for women between 1961 and 2001 (Registrar General, India, 2001). However, there are significant regional variations with early marriages continuing to be prevalent in some areas. SMAM for women in 2001 varied from as low as 18.5 years in Bihar and Rajasthan to as high as 24 years in Goa (ibid.).

In parts of India where early marriages are prevalent, cohabitation of the couple after marriage is often delayed. Usually, in such situations, women stay in their natal home and go to their marital home after a second ceremony known as *gauna* (Basu, 1993). An analysis of the National Family Health Survey-3 (NFHS) data from 2005/2006 indicates that for about 75 per cent of women age at cohabitation and marriage were the same and for the rest 13 per cent of women cohabitation occurred within a year of the marriage. A longer waiting time between marriage and cohabitation is common among women, who married early, with nearly 73 per cent of women who married before the age of 17 having two or more years waiting time after marriage.

One of the defining features of the Indian marriage system is arranged marriage. Traditionally a marriage in India was arranged by parents, with a bride having a little say regarding her marriage. Free-choice marriages are still uncommon in India. Recent data indicates that less than five per cent of women selected their spouses (IHDS, 2005). However, it appears that jointly arranged marriages and marriages with the bride's consent are gaining prominence (ibid.). Research from other settings

indicates that free-choice marriages or marriage in which women have a substantial say tend to occur at a later age than traditional marriages (Hong, 2006). Thus, marriage age and marriage type are closely linked. This paper considers the role of marriage age on fertility behaviour irrespective of the type of marriage.

Fertility rates in India have been declining since the 1960s, though the pace of the decline has been gradual and spatially uneven. The total fertility rate (TFR) declined from about 5.8 in 1960-1965 to about 2.76 in the 2005-2010 periods (United Nations, 2009). The national average conceals substantial regional variations. While in the southern states, TFR ranged from 1.79 to 2.13, in many of the northern states TFR was well above 3.0 in 2003-2005 (IIPS and Macro International, 2007). A number of competing explanations have been put forward to explain this remarkable fertility decline in the southern states and the lack of progress in the northern states. These include the effective implementation of family planning policies in the south, diffusion processes, status/autonomy of women and the political and social landscape (Dommaraju and Agadjanian, 2009).

The influence of marriage age on fertility has been investigated using Bongaart's (1978) proximate determinants of fertility framework. Visaria (1999) using data from 1992/1993 noted that the effect of not marrying (or delayed marriage) on total fertility was lower than that of contraceptive use. This may be because, as Basu (1993) argues, while marriage may occur at an early age, cohabitation of the spouses is often delayed until later. This delay in cohabitation, along with a lower level of fecundity at younger ages, means that younger age at marriage does not necessarily lead to an early first birth (Dommaraju, 2009). Besides marriage age, several other factors could determine the length of first and higher-order birth intervals. In the Indian context, as there is a preference for sons in some regions, it has been noted that sex composition of children has an important influence on spacing and stopping behaviour (Clark, 2000). As in other developing settings, the mother's educational level has also played a key role in determining fertility in India (Dreze and Murthi, 2001).

A remarkable feature of fertility decline in India is its over-reliance on sterilization (mainly of women) as a primary contraceptive method. Though targets for sterilization were discontinued, and a target-free approach was adopted in the early 1990s, sterilization still constitutes two-thirds of the total contraceptive use (about 56 per cent of women were using contraceptives, out of which 36 per cent represented sterilizations (IIPS and Macro International, 2007)). In some of the southern states where fertility decline has been rapid, women were typically sterilized immediately after reaching their desired parity of one or two children. In the southern state of Andhra Pradesh, Padmadas et al.

(2004) show that women have births faster and in quicker succession after marriage before going for sterilization at a relatively young age (the median age for sterilization in Andhra Pradesh was 23.6 years). Stopping and spacing behaviour is discussed in more detail in the following sections.

Marriage and fertility process

The presentation so far mentions both delayed marriage and non-marriage. It would be useful to separate them when it comes to their influence on fertility, especially in the context of low non-marital fertility. In the context of low non-marital fertility, the role of non-marriage on fertility reduction is straightforward. However, this is not the case for delayed marriage. Intuitively one could think that marrying late would reduce the reproductive span and thus reduce fertility. While this might be one possibility, the picture is complicated, particularly in the context of India where even though marriage age has increased, it is, nevertheless, early and unlikely to have significantly shortened the reproductive span. In the remaining part of this section, some of the complexities of the relationship between marriage age and fertility are discussed.

There are two components in the relationship between marriage and fertility: marriage age and marital fertility. Declines in fertility rates could be seen as a function of increases in marriage age or as a result of change in marital fertility. The change in marital fertility should not be related just to marriage age. Marital fertility may have been decreasing for secular reasons that are not necessarily linked to changes in marriage age. Thus, the first task in analyzing the relationship between marriage and fertility is to find the mutual influence of marriage age and marital fertility. This task is carried out later in the paper using a simple decomposition technique.

Though the influence of marriage age and marital fertility can be decomposed analytically, it should be noted that they are independent of each other. Marriage age, for instance, could influence marital fertility. Coale (1992) mentions that the main reason for lower fertility among populations marrying late is their higher level of control of marital fertility. This means that the family-building process differs based on marriage age. The second task of this paper is to determine if the family-building process varies by marriage age in the Indian context, and if so, what the characteristics of these variations are.

The relationship between marriage age and the family-building process could be conceptualized using the framework presented in figure 1. This simple drawing demonstrates the possible pathways; however, not all these pathways are examined in the paper. Some of the elements in

figure 1, like physiological factors, are related to biological age. Subfecundity is high at young age and again in old age (Wood, 1994). If marriage occurs during these time periods it could lower the chances of childbirth. Other factors, such as contraception, are not related to biology. In the case of contraception, it could be used either for spacing or stopping further births. The decision to use contraception may also be based on parity (number of children) or be independent of parity. All these factors (stopping versus spacing, parity dependent versus parity independent) could be influenced by marriage age. To illustrate this, women marrying early may have different stopping and spacing patterns than women marrying late. The birth interval dynamics may be different for different marriage age cohorts.

Figure 1. Pathways linking marriage and fertility

The paper focuses on two aspects related to marriage and fertility. First, it examines whether shifts in marriage patterns have had any effect on fertility at both the national and regional (state) level. Second, the paper examines at the microlevel if marriage age has an influence on the family-building process by focusing on the influence marriage age has on birth interval dynamics.

Data and Methods

Data

Data from the two rounds of the National Family Health Survey (NFHS) were used for the analysis. For the decomposition methods, described

in detail in the next subsection, data from NFHS-1 conducted in 1992/1993 and NFHS-3 conducted in 2005/2006 were used. For more detailed analysis of birth intervals, data from NFHS-3, which surveyed 124,385 Indian women aged 15-49, were used. From the dataset, only currently married women who married in the 20 years preceding the survey (1987-2006), were included in the analysis. This choice of women married in the last 20 years instead of considering the entire sample was designed to minimize selection bias. As Rindfuss et al. (1982) note, considering all women from cross-sectional data biases a sample “toward younger ages at initiation, toward the experience of older birth cohorts, and toward the experience of most recent time periods”.

The main independent variable in the present analysis is marriage age. Marriage age here means age at effective marriage (i.e. age at which guana is performed or age at which cohabitation starts with the husband), as discussed earlier. Age at which guana is performed or

Table 1. Descriptive statistics by marriage age cohort, India, 2005-06

	Marriage age (years)		
	13-16	17-19	20-30
Education			
No education	58.1	37.9	17.9
Primary	17.3	16.0	9.7
Secondary	24.2	42.9	47.9
Higher	0.4	3.2	24.5
Wealth Index			
Poorest	28.1	17.2	6.8
Poorer	26.3	18.8	9.5
Middle	22.0	20.6	14.7
Richer	15.9	23.9	23.7
Richest	7.6	19.5	45.2
Current residence			
Urban	20.0	31.2	49.7
Rural	80.0	68.9	50.3
Religion			
Hindu	82.1	80.7	79.2
Muslim	14.7	14.7	9.9
Other	3.2	4.6	10.9
Caste			
Scheduled caste	23.1	18.5	13.3
Scheduled tribe	10.5	8.3	5.7
Other backward	43.5	41.3	36.2
None	22.9	31.9	44.8
N	25 965	23 048	15 930

cohabitation begins is used in the analysis. This means that about 0.6 per cent of married respondents who have not yet started cohabitation with their husbands at the time of the survey are excluded from the analysis.

Marriage age could be considered as a continuous variable or as a series of categories. In this analysis, it is treated as a three level categorical variable: women who married between ages 12 and 16; those who married when they were aged 17-19; and those who married between ages 20 and 30. Based on NFHS-3, the percentage distribution of women in each of the above categories is as follows: 39 per cent married between ages 13 and 16; 36 per cent married between 17 and 19; and 25 per cent married between 20 and 30. Of course, any categorization of a continuous variable is bound to be somewhat arbitrary.

Other variables, used in the analysis, are self-explanatory and include education, wealth index (incorporated in the dataset), current residence, region, religion, caste and a number of living sons (for second and higher order birth intervals). Sample data is presented in table 1.

Methods

Three methods have been used in the analysis. First, a decomposition method is used to categorize the changes in fertility according to two factors: marriage age; and marital fertility. Second, Poisson model is used to test the influence of marriage age on total fertility, net of controls. Third, Cox proportional hazard model, a survival analysis technique, is used to examine the influence of marriage age on birth intervals.

To categorize the change in fertility rate between 1992/1993 and 2005/2006, a method described in Retherford and Rele (1989) and in Retherford and Ogawa (1978) papers is used. In this method the change in total fertility rate is “decomposed into two components: changes in nuptiality (age-specific proportions of currently married) and changes in marital fertility (age-specific marital fertility rates)” (Retherford and Thapa, 2004: 725), using age-specific fertility rates, proportion of currently married by 5-year age group and age-specific marital birth rate. The equation could be expressed as:

$$\Delta TFR = 5 \sum \bar{F}_{mx} \Delta P_x + 5 \sum \bar{P}_x \Delta F_{mx}$$

Where Δ represents the change between 1992/1993 and 2005/2006; F_{mx} is the age-specific marital fertility rate; P_x is the proportion currently married in each age group; $\bar{F}_{mx}$ and $\bar{P}_x$ are the averages obtained by summing up the values for 1992-3 and 2005-6 and dividing the sum by 2. Retherford and Thapa (2004) noted that doing so “avoids the presence of residual terms in the decomposition”.

Between 1992/1993 and 2005/2006 when the two surveys were conducted three states in India were divided. The 2005/2006 data for the divided states were combined to match the 1992/1993 boundaries.

Next, Poisson model was used to analyze the influence of marriage age on fertility. Here, fertility was measured as children ever born (CEB). A logarithmic offset was used to control for the variation in exposure time. Exposure time is the time elapsed in years from age at marriage to age at the time of the survey. The model could be expressed as follows:

$$\mu_{iti} = \exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p + \ln t_i)$$

Where μ_{iti} is the mean number of children over a period of length t_i ; t_i is the amount of time a woman is at risk; t_i is the logarithmic offset; X_1 to X_p are explanatory variables in the model.

Next, birth interval dynamics are summarized using survival curves. Progression from marriage to first birth and from first birth to $i+1$ birth, with a maximum i of 4 are examined. Survival curves offer an elegant way of visualizing the parity-specific birth interval dynamics. Such curves provide information about both the quantum and time trends of the transition to the next birth.

A detailed multivariate analysis of the influence of marriage age on birth intervals was carried out using discrete-time survival technique. Discrete-time techniques are described in Allison (1982, 1995). The key feature of the discrete-time approach is that each person contributes multiple observations based on the amount of time at risk. For analysis of first birth, time is measured in months and for analysis of higher-order births time is measured in years. The general statistical model can be expressed as follows:

$$\text{logit}(\text{pit} / 1 - \text{pit}) = \alpha_t + \beta_1 X_{it} + \dots + \beta_k X_{ik}$$

In the case of first birth: pit is the probability that first birth occurs to an individual i at time t , given that she has not had first birth yet; α_t is the function of time t that is to be estimated; $X_{it} \dots X_{ik}$ are a set of covariates; and $\beta_1 \dots \beta_k$ are vectors of the coefficients to be estimated.

Results

Marriage and fertility

During the time period under consideration in this paper (between 1992/1993 and 2005/2006) fertility in India declined by 0.71 (or by about 21 per cent) at the national level (see Table 2). However, the pace of

Table 2. Decomposition of the change in total fertility rate between 1992/1993 and 2005/2006, India and major States

(Estimates and percentage)

	TFR			Attributable to change in		
	1992/1993	2005/2006	Change	Marriage		Marital fertility
India	3.39	2.68	- 0.71	- 0.21	(29.9)	- 0.50 (70.8)
Urban	2.70	2.06	- 0.64	- 0.21	(33.2)	- 0.43 (66.8)
Rural	3.67	2.98	- 0.69	- 0.18	(26.2)	- 0.52 (75.2)
Andhra Pradesh	2.59	1.79	- 0.80	- 0.40	(50.3)	- 0.40 (50.4)
Assam	3.53	2.42	- 1.11	- 0.06	(5.4)	- 1.04 (93.7)
Bihar	4.00	3.83	- 0.17	- 0.05	(28.3)	- 0.13 (74.3)
Gujarat	2.99	2.42	- 0.57	- 0.01	(2.5)	- 0.56 (97.5)
Haryana	3.99	2.69	- 1.30	- 0.50	(38.1)	- 0.80 (61.5)
Karnataka	2.85	2.07	- 0.78	- 0.25	(32.1)	- 0.52 (66.6)
Kerala	2.00	1.93	- 0.07	0.08	- (115)	- 0.15 (215.0)
Madhya Pradesh	3.90	3.00	- 0.90	- 0.59	(65.6)	- 0.31 (35.0)
Maharashtra	2.86	2.11	- 0.75	- 0.40	(53.3)	- 0.35 (46.0)
Orissa	2.92	2.37	- 0.55	- 0.16	(29.2)	- 0.38 (69.9)
Punjab	2.92	1.99	- 0.93	- 0.23	(24.7)	- 0.69 (74.2)
Rajasthan	3.63	3.21	- 0.42	0.00	(0.8)	- 0.42 (100.4)
Tamil Nadu	2.48	1.80	- 0.68	- 0.42	(61.9)	- 0.26 (38.8)
Uttar Pradesh	4.82	3.77	- 1.05	- 0.28	(26.2)	- 0.78 (74.7)
West Bengal	2.92	2.27	- 0.65	0.01	- (1.0)	- 0.65 (99.5)

decline varied between states. In states such as Kerala where fertility was low in 1992/1993, the fertility decline was small, as expected. For states that had high fertility in 1992/1993, fertility declined by about 20-30 per cent. However, the major exceptions to this trend were Bihar and Rajasthan, two states that had high fertility in 1992/1993 and a modest (4 and 11 per cent, respectively) decline.

The changes in fertility rates were due to the following two factors: changes in marriage patterns and changes in marital fertility. These are presented in the last two columns of table 2. At the national level, about 30 per cent of the decline is explained by changes in marriage patterns (proportion married) and the rest 70 per cent is explained by changes in marital fertility. In Andhra Pradesh, declines in both the number of marriages and marital fertility contributed equally to the decline in total fertility. In other states, changes in marital fertility played an important role in fertility decline. As can be seen from table 2, in many states decline in marital fertility played a dominant role, accounting for more than 90 per cent decline in fertility. It appears that in West Bengal and Kerala changes in marriage patterns contributed to an increase in fertility, though the increase was small.

Estimates from the analysis of the individual level data, using the Poisson model, are presented in table 3. The Poisson model is estimating the mean number of children. Unadjusted estimates show that the later a woman marries the fewer children she will have. Compared to women who married between the ages 13 and 16, women who married between the ages 20 and 30 will have 19 per cent fewer children. When controls are introduced in the model, marriage age declines in importance. The adjusted estimates show that the fertility is slightly higher (by 2 per cent) for women married between the ages 17 and 19 and slightly lower (by 3 per cent) for women married between the ages 20 and 30.

**Table 3. Incidence Rate Ratios (exponentiated Poisson estimates)
of children ever born by marriage age cohort**

	Unadjusted	Adjusted
Marriage age		
17-19	0.96 **	1.02 **
20-30	0.81 **	0.97 **
(13-16)	1	1
N	59 151	59 151

Note: Estimates in the adjusted model are net of the following variables: education; wealth index; residence; region; religion; and caste.

Nuptiality and birth intervals

Life table estimates of birth intervals for the three marriage cohorts are presented in the form of survival curves in figure 2. The curves clearly show that women marrying early delay their first birth but have shorter intervals for subsequent births, and this difference widens for higher parities. In the case of first birth, only 30 per cent of women who married between the ages 20 and 30 had no first birth at the end of two years of

Figure 2. Transition to births by marriage age cohort, survival estimates, India 2005-2006

marriage, while 46 per cent of those married between the ages of 13 and 16 had no first birth at the end of the second year of marriage. Five years after second birth, 56 per cent of those married between the ages of 20 and 30 had no third birth compared to about 27 per cent of those who married between the ages of 13 and 16. Overall, survival estimates show that although those marrying early delay entry into childbearing, after the first birth they transition more rapidly to higher order births.

Table 4 presents adjusted odds of transition to next birth for nulliparous women and women at parity one, two, and three (i.e. first, second, third, and fourth birth interval, respectively). The first column presents

Table 4. Transition to next birth for nulliparous women and women at parity one, two and three

	First birth	Second birth	Third birth	Fourth birth
Marriage age				
17-19	1.21**	1.004	0.88**	0.95 *
20-30	1.24**	0.79**	0.69**	0.88**
(13-16)	1	1	1	1
Education				
Primary	1.01	0.99	0.76**	0.68**
Secondary	1.02	0.84**	0.57**	0.57**
Higher	0.91**	0.53**	0.29**	0.3**
(No education)	1	1	1	1
Wealth Index				
Poorer	1.04 *	0.98	0.99	0.9**
Middle	1.04 *	0.95 *	0.93**	0.81**
Richer	1.06**	0.99	0.83**	0.68**
Richest	1.08**	0.77**	0.56**	0.44**
(Poorest)	1	1	1	1
Current residence				
Urban	1.04**	0.92**	1.03	1.05+
(Rural)	1	1	1	1
Region				
North	0.92**	1.28**	2.44**	2.58**
East	1.01	0.85**	1.74**	2**
West	0.96**	1.18**	2.01**	1.66**
(South)	1	1	1	1
Religion				
Hindu	0.86**	0.8**	0.63**	0.56**
Other	1.03	0.91**	0.65**	0.57**
(Muslim)	1	1	1	1
Caste				
Scheduled tribe	0.98	0.98	1.06 *	1.05
Other backward	0.95**	1.001	0.96 +	1.01
None: forward	0.97 *	0.89**	0.75**	0.8**
(Scheduled caste)	1	1	1	1
Number of sons				
1		0.91**	0.65**	0.63**
2			0.53**	0.39**
3				0.47**
(0)		1	1	1
Time (in years)	1.04**	5.23**	5.32**	6**
Time square	1**	0.84**	0.81**	0.79**
N	1 392 255	180 657	176 661	104 271

Note: N- person months for first birth and person years for second, third and fourth births.

estimates for first birth interval. The estimates show that older marriage cohorts have higher odds of having first birth (i.e. shorter birth intervals) than younger marriage cohorts. For instance, women married between the age of 17 and 19 are 21 per cent more likely to have a first child than those married between the age of 13 and 16 years. A similar difference, 24 per cent, can be seen between women married between the ages of 20 and 30 and those married between the ages of 13 and 16, net of other factors in the model. This pattern is consistent with survival graphs presented earlier. It is clear that those marrying at a younger age have a longer first birth interval.

The next three columns present the estimates for second, third and fourth birth interval. In contrast with the first birth interval, the estimates for higher-order birth interval show that older marriage cohorts have lower odds for a transition to the next birth (i.e. a longer second, third or fourth birth interval) than younger marriage cohorts. For instance, those married at ages 20-30 years are 21 per cent less likely to transition to the second birth than those who married at ages 13-16 years. Third and fourth birth models reveal a pattern similar to second birth interval, i.e. longer birth intervals (or lower odds of having a next birth) among older marriage cohorts. The odds for a transition to third and fourth birth for women married between the ages of 20 and 30 are 31 and 12 per cent lower, respectively, than the odds for those married between the ages of 13 and 16.

Though the focus of the paper is on the age of marriage, some interesting findings that are not directly related to marriage age are worth noting. All three models indicate that a higher number of living sons at each parity reduces the odds of a next birth (i.e. lengthens the birth interval). For instance, having two sons at parity two decreases the odds of having a third birth by nearly half, and having two sons at parity three decreases the odds of a fourth birth by nearly three-fifths. Also, there is the expected effect of education whereby with increasing education levels the odds for a transition to a next birth decreases at all parities. However the influence of wealth is not consistent across all parities. Although the difference between the richest and poorest households is evident for all parities, differences among other groups are only present at higher parities. There are also regional differences in birth interval. Southern women have longer birth intervals than women in other regions, except for the second birth interval, for which women in the eastern region have the longest birth interval.

Discussion

Nuptiality and fertility are closely interlinked, especially in societies where out-of-marriage childbearing is not socially acceptable. Even in societies where non-marital childbirth does not carry any stigma, getting

married is still considered a step towards motherhood. The decision to get married may, of course, depend on a variety of factors besides those directly related to childbearing. However, as seen in some low-fertility countries in East Asia and the Pacific where fertility has fallen dramatically, marriage is increasingly delayed and non-marriage has gained prominence, suggesting that marriage, if not causally related, nevertheless has a strong influence on fertility.

Evidence from India, presented in this paper, demonstrates a mixed picture. Changes in marriage patterns have contributed to declines in fertility at the national level. However, changes in marital fertility have had a far more significant effect on the fertility decline, ranging from 70 per cent at the national level to more than 90 per cent in some States. Furthermore, analysis using individual data shows that the influence of marriage age is indeed very small when other factors are adjusted for. Thus, at least in the Indian context, it appears that marriage age has had a less influential role in reducing fertility.

Compared to substantial influence of marital fertility, marriage age seems to have had limited influence. One reason for this may be the Indian population policies' emphasis on stopping behaviour (mainly female sterilization) rather than spacing. Marriage delay as a mechanism to reduce fertility has not been promoted vigorously in India. This is in contrast with the Chinese population policy, which explicitly includes marriage delay in the later-longer-fewer policy (later stands for marrying late, longer stands for longer birth intervals, fewer stands for fewer children). It appears that the potential for delay in marriage age, as an effective tool for fertility control, has not been realized in India.

In addition to fertility, the paper also examined the marriage and birth interval dynamics. When it comes to the first birth interval, women who marry early wait longer than those marrying late. As Dommaraju (2010) has noted, this could be due to social and cultural factors that regulate sexual behaviour and the consummation of marriage. For the second and higher-order birth intervals the pattern is reversed with women marrying later having longer birth intervals than those marrying early. The current analysis makes it difficult to understand whether this pattern reflects spacing or stopping behaviour and, given the popularity of sterilization, it is likely that it occurs because of stopping behaviour.

There are two policy implications that stem from the findings. One is the need for population policy in India to acknowledge and promote late marriage age as a tool for fertility reduction. Such a policy would be effective in curbing population growth. The current population policy, which focuses on sterilization, pushes up the period of fertility, among other pitfalls (Matthews et al., 2009). A policy that promotes later marriage and spacing of births would contribute to a reduction in popula-

tion growth. The second implication relates to reproductive and maternal health. A recent study by Raj et al. (2009) mentions the many health issues faced by those marrying young. Although women who marry at a younger age delay their first birth, they have shorter subsequent birth intervals, putting them at a higher risk of maternal and reproductive morbidity. Thus a policy, promoting later marriage, could achieve the goal of population stabilization along with the benefit of better reproductive, maternal and child health.

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