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Social and Economic Change and Family Formation: Results of a Micro-Demographic Study from Nepal

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Abstract

Using micro-demographic data gathered from a single ethnic group, this paper investigates the effects of community, family and life course transition variables on the timing of family formation in a community experiencing rapid social transformation in Nepal. Results from event history analysis demonstrated that women born in most recent cohort, their educational attainment and their experience of unsupervised living are associated with decreased risk of first marriage. While pre-marital work experience is associated with an increased risk of marriage. Likewise, women who were married after 1980, who had lived outside their natal home before marriage, who are literate, and who chose their own marriage partners experienced a significantly increased risk of giving first birth. The findings thus signify the importance of socio-economic transformation on the timing of family formation in Nepal.

Context

The timing of marriage and first birth are the two important aspects of family formation. Most of the Asian countries are experiencing in recent years a general rise and virtually universal delay of first marriage. This phenomenon of increasing delay in the timing of first marriage is true in Nepal. What is equally true is the shortening of the first birth interval. Study has revealed a drop in the mean age at marriage by 1.6 years in the case of more recent cohort of women (20-24) compared to the age group of 40-44 years of women (Aryal, 1998). Study has also documented a drop in the median age at first birth by one year in the case of more recent cohort of women (25-29 years of age) compared to the old cohort (40-44 years).

Previous studies have demonstrated the influence of female education, employment opportunities for women, urbanization, industrialization, income, religion, marriage customs, and timing and rule of inheritance on the timing of first marriage and first birth (Basu, 1992; Elm and Hirschman, 1979; Macfarlane, 1976; Thornton and Fricke, 1989; Thornton and Lin, 1994; Tsuya, 1994). Empirical studies have also shown the importance of ethnicity

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(Hirschman , 1985; Rindfuss et al., 1983, Thapa, 1989 and 1997; Fricke and Teachman, 1993) and community and family and life course transition variables (Dahal et al. 1993; Dyson and Moore, 1983; Fricke et al., 1995) on the timing of family formation i.e., timing of marriage and first birth interval.

In this paper family formation has been defined to include two important events viz., timing of first marriage and timing of first birth. This paper attempts to broaden the understanding of the dynamics of family formation. Using micro-demographic data gathered from a single ethnic group known as "Newar" within highly urbanized Kathmandu Valley of Nepal this paper investigates the impact of family and individual experience variables on the timing of family formation in the context of social transformation. The present paper thus intends to seek answer to the following specific research questions: (i) Are there any overall patterns of family formation that can be discerned? (ii) Are there any temporal changes in the timing of marriage and timing of first birth? (iii) Can the temporal changes in the family building process, if any, be explained by familial and individual's early life experience variables which are linked to non-familial mode of organization?

Factors Affecting Family Formation

Previous researches have identified several factors that influence family building process. This paper attempts to present major factors affecting family building processes and explain their casual mechanism and develop the expectations to be tested later. It confines to those factors, which are included in the model.

Birth Cohort and Marriage Cohort

Cohort refers to a group of people experiencing a particular event during the same period of time. Since the effects of any events vary with women's age the meaning and significance of such events might differ among birth and marriage cohort. Ryder (1965) argues that generational change is likely to be dependent upon successive cohorts being exposed to new influences and opportunities. Furthermore, the social environment where the women are socialized might differ across *birth and marriage cohorts*. This changing social environment will lead to the differences in the occurrence of any events. Thus, we argue that the effect of birth cohort on marriage timing will be positive. In other words the later born women marry later than the earlier born. One may expect changes in behavior across birth cohort of women due to changes in socioeconomic environment in the society over time. New social transformation is expected to influence the younger cohort. Thus the younger marriage cohort is expected to have shorter intervals to first birth.

Education

Another important individual life course experience is education. Studies indicated that educational attainment is probably the single most important socioeconomic condition

associated with nuptiality change (Goode, 1970) and variation in first birth interval (Rindfuss et al., 1980; Hirschman, 1985, Kasarda et al., 1986; Kravdal, 1994). The effect of education on age at first marriage could be negative as well as positive. More the schooling a women has the older she is likely to be at her first marriage (Casterline, 1980; Hirschman, 1985; Smith, 1980; Sweet, 1977; Thornton et al. 1984; Tsuya, 1994; Voss, 1977; Waite and Moore, 1978). Thornton and Fricke (1987:766) argues that extended schooling which provides young people a new set of activities and roles takes time and can lead to postponement of marriage. However, the potential for delay, as they argue will be much greater in societies where age at marriage was relatively younger.

It has also been documented that higher educational attainment of women may place them in a better position in a marriage market. Hence, compared to women of lesser educational attainment, better-educated women tend to have better prospects to get married (Cherlin, 1978). Higher education often means higher aspirations, greater autonomy to women in the choice of marriage partners, lesser parental control over the marriage process, more employment opportunities and more independent life style and attitudes (Goode, 1970; Fricke et al., 1986; Hirschman, 1985; Tsuya, 1994). These effects tend to delay the age at marriage of women.

Contrary to what is argued above, higher female education may sometimes promote early marriage. It has been argued that educational institutions bring together boys and girls together who are similar in ages and backgrounds and facilitates greater interactions (Thornton and Fricke, 1987) among themselves thus intensifying the marriage market function. This eventually promotes early marriage (Marini, 1978).

Regarding the effects of education on timing of first birth it affects fecundity through better health and nutrition and lower prevalence of disease. Fetal losses are also likely to be lower for more educated women. It has also been argued that coital frequency varies with education (Kallan and Udry, 1986). More educated women tend to have own choice marriage due to exposure and interactions during their educational attainment resulting to quick intimacy and more frequent coitus and lower waiting time to first birth.

In the specific setting of Nepal where marriage is still early and universal we posit that higher education will delay the female age at marriage. But we might expect short interval to first birth among educated women compared to uneducated one.

Work before Marriage

Another important life course experience variable is the work before marriage. Studies on marital timing have documented work before marriage as an important factor explaining the variation in marital timing. Two opposite arguments, however, prevail. One line of argument is that premarital non-familial work facilitates marriage. A women's job and the earnings from it acts as her dowry (Goode, 1970; Tsuya, 1994) and promotes early marriage by making her a more durable marriage candidate (Tsuya, 1994). Females work participation out of her parental home increase the opportunity to contact potential mates which could lead to early involvement in courtship and premarital pregnancy (Bayer, 1968; Lin, 1987)

leading to the culmination of early marriage. Employment facilitates marriage by providing the resources needed for forming and maintaining an independent household (Goldscheider and Waite, 1986).

The other argument suggests that pre marital non-familial work could delay marriage for three reasons. Firstly, they acquire greater domestic autonomy. Secondly, daughters in the family farm could be an important source of labor. Her outside work could become a productive asset to the natal household and parents may not be willing to lose them. Thirdly, young women may opt to maintain their independence for some time before they settle down in life and work provides them necessary resources to remain single(Fricke et al., 1986; Hirschman, 1985; Lin, 1989; Preston and Richards, 1975).

Thornton and Fricke (1987) argued that the impact of women's employment outside home much depends on the existing mate selection process and existing pattern of age at marriage and the control of parents over the earnings of their children. They, however, cautioned that if the autonomy will continue parents will no longer be able to control the earnings and influence the marriage process of their daughters. In this study we will use our survey data to test these two alternative hypotheses.

Lived Outside before Marriage

Living unsupervised by seniors before marriage is another important life course experiences that might affect the marital timing. Previous research, however, demonstrates that the effect of unsupervised living might vary depending upon the contextual factor. Daughters' unsupervised living would accelerate the timing of marriage by providing them the opportunity for interaction with the opposite sex. Contact with potential mates will also be widened. The unrestricted movement might thus lead to early involvement resulting to elopement. Living unsupervised might also delay marriage. It is argued that living unsupervised by seniors leads to more autonomous behavior in mate selection process which in turn delays marriage (Fricke et al. 1995; Tsuya, 1994). This autonomy may also lead to quick intimacy among couples and hence shorter intervals to first birth. We will try to test these hypotheses.

Age at Marriage

Various studies have indicated that age at marriage has a very strong direct effect on length of first birth interval (Fricke and Teachman 1993; Hirchman, 1985). Women who marry late tend to have their first child sooner after marriage then young brides. This may be partly due to the increased fecundity of brides and grooms and also partly due to catch-up effect of later marriage (Chen and Morgan, 1991; Yang and Feng, 1994).

"As age at marriage increases to a women's early 20s her early married years coincide with her most fecund period" (Rindfuss and Morgan 1983:263).

We, therefore, hypothesize that increase in age at marriage is associated with shorter intervals between marriage and first birth.

Parental Characteristics

Parental characteristics also affect marital timing. Studies indicated that mothers' access to wider social net work, father's education and experience of wage labor are linked with timing of marriage of their daughters (Becker, 1973; Dahal et al., 1993; Fricke et al., 1995; Goldscheider and Waite, 1986). Researchers argued that higher levels of parental education reduce the probability of young marriages especially for women because educated parents encourage their daughters for alternatives to conventional family roles (Goldscheider and Waite, 1986).

Thornton and Lin (1994) in their study of Taiwan found that daughters of well educated men on average are better educated themselves, are more likely to work outside the home. They have a voice in choosing their husbands and marry later. Contrary to this Fricke et al. (1995) found that father's literacy and mother's ability to speak Nepali language increases the risk of marriage of their daughter in one setting lacking the effects of father's education in another setting.

Father's experience of wage labor can also accelerate the risk of marriage of daughters through wider contact of fellow workers in the work place. Furthermore, father's participation in wage labor before his daughter's marriage is often associated with autonomous choice of spouse (Fricke and Teachman, 1993). If the father is involved in wage labor he is more likely to recognize the importance of his daughter's opinion in the selection of her marriage partner. We, therefore, hypothesize a positive association between parental experiences such as education, wage labor and risk of marriage of daughters and first birth.

THE SETTING

This is the study of a Newar community of Kirtipur, an ancient historical place in Kathmandu valley, Nepal.[1] The study area, Chithu Bihar Village Development Committee (VDC) is one of the four VDCs of Kirtipur, a semi-urban area. Since the study area is widely known as Kirtipur and the major area of Kirtipur town[2] is comprised of this VDC we hereafter refer our study area as Kirtipur. It is situated at a hilltop at a distance of only 7 km south west of Kathmandu, the capital of Nepal.

According to the 1991 Census, this settlement of 805 households has population of 4538. The inhabitants are Newars. It is a homogenous population with respect to norms and values regarding marriage and other social practices. It may be noted that Newars comprises

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[1] The three administrative districts, namely Kathmandu, Lalitpur and Bhaktapur, are known as Kathmandu valley.

[2] Until 1962 when a Town Panchayat Act was passed redefining "town", Kirtipur was considered as a town.

about 6 percent in the total population in the country (CBS, 1993).

Until recently, agriculture was the major occupation in Kirtipur. About 90 percent of residents were employed in agriculture. There has been a decline in this proportion in recent years with a shift in occupation from agriculture to non-agriculture such as carpentry, bricklaying, poultry farming, brick making, craft- work, shop-keeping. Others are engaged in small business and government jobs as well. One estimate of 15 years ago showed that one in five household in Kirtipur have one of their members working in an office (Davis et al., 1979/80). Present figure should be still higher. Proximity with capital Kathmandu and another town Patan has provided opportunities for alternative jobs.

Historically, weaving was an important part of the village economy and in many ways contributed to enhance the household income (William, 1965). Acquisition of handloom was most common among the households. There has been a gradual transformation resulting to a change in the nature of the family economy. Nowadays an increasing number of women are found engaged in other activities such as teaching, tailoring, garment, and carpet weaving within and outside Kirtipur.

One remarkable change is in the field of education. Access to education has increased sharply due to the rise in the number of schools. Furthermore, the traditional practice of not sending the girl child to school has been abandoned almost entirely leading to an increase in female literacy. However, gender bias in educating the children is still prevalent. During our field visit we encountered parents who had withdrawn their daughters from school in order to send to carpet weaving in the nearby places for supporting the family.

Ownership of consumer durables was almost non-existent few years ago. In recent years the pace of acquisition has increased rapidly. Most of the households now owned radio/ recorder and T.V. Thus people are exposed to modern communication system and entertainment media. As a result of this the life style of the people in Kirtipur has undergone changes. Furthermore, non-governmental organizations (NGO's) are active in launching and supporting development projects in the area. One such noteworthy program is the establishment of childcare centers, a move that facilitates women's involvement in the income generating activities.

Family system is also undergoing changes. Traditional joint family system is gradually giving way to the nuclear family. While marriage arranged by parents and/or seniors continue to be the most common practice, marriage by one's own choice is in practice. In essence, marriage has shifted from parental arrangement to joint decision making between parents and children; children have gained autonomy in the choice of marriage partners. The opinion of both sons and daughters are sought and thus, this can be treated as a step toward women's autonomy. Once the marriage alliance is finalized the boys and girls are allowed to meet freely with each other. Elopement is also practiced; during the survey 18 cases of elopement were recorded.

These various socioeconomic transformations combined with the social context of marriage are expected to influence the family building process in the study community.

Trends in Age at Marriage and Age at First Birth in Kirtipur

Data reveal that women in Kirtipur get marry at 18.44 years in average. Cohort comparisons reveal a significant rise in the average age at marriage from 16.16 among the eldest cohort to 19.46 among the youngest cohort.

The first birth interval – the interval between marriage and the first child – is 16 months. Thus, the average age at first birth is approximately 19.8 years. Data indicated a trend toward shorter intervals; the average first birth interval ranged from 1.46 years for the youngest cohort to 3.41 years for the eldest cohort.

Table 1 shows the life table for the probability of entering into first marriage in single years. The result indicates the continued situation of low age at marriage and universal marriages in Kirtipur. Sx column in the table displays the proportion of women remaining unmarried at the beginning of the age interval. It thus describes the rapidity with which the samples of women enter into marriages as they advance to their higher ages. Even though the minimum age at marriage was reported as 7 less than 2 percent women were married before they attain age 10. The tempo increases much faster after they attain the age of 16. Before the women complete their 21st birthday more than 50 percent are already married. By the time they are 25 years old only 20 percent remain unmarried.

Table 1. Probability of First Marriage in Single Age for All Women

Age	Sx	qx	Effective sample size
7	.998	.002	483
8	.996	.002	482
9	.994	.006	481
10	.988	.010	478
11	.977	.002	473
12	.975	.024	466
13	.952	.011	444
14	.941	.028	428
15	.915	.030	401
16	.888	.073	370
17	.823	.086	326
18	.752	.220	285
19	.588	.161	210
20	.493	.270	163
21	.360	.120	108
22	.317	.165	85
23	.264	.147	61
24	.225	.084	48
25	.206	.222	41
26	.161	.107	28

Sx = Survivor curve for not experiencing a first marriage.
qx= Discrete time hazard rate for experiencing a first marriage in interval.

The qx column in the table displays the probability that a woman will experience her first marriage within that age interval. The qx column in the table clearly demonstrate the pattern of low risk of marriage in early age followed by higher risk at a later age which gets leveled off by age 20. Thus, where at age fourteen women have about a 3 in 100 chance of getting married, their risk at age twenty is 27 in 100. The risk of getting married is thus nine times more at the age of twenty compared to fourteen years. However, one can notice little irregularities in the pattern of risk after the age 20. This could be attributed to the fewer number of women in each successive age interval.

Table 2 shows the life table estimate of first marriage by birth cohorts. It establishes the pattern of increasing age at marriage across time. Female who were born in the earlier cohorts are more likely to experience their first marriage sooner than the women who were born more recently. Among the women born in 1959 or before about 18 percent were already married at the age of 15. For the women born between 1960-70 and 1971-81 the proportion is 4 and less than 1 percent respectively. The Sx column of the table across various birth cohorts thus clearly indicates a rising trend in the age at marriage of most recent birth cohort women compared to earlier born.

Table 3 presents the monthly probability of an ever-married women giving birth to first child by duration of marriage. Due to fewer cases the probability up to 10 years since

Table 2. Life Table Estimates of First Marriage by Age and Birth Cohort

Age at Marriage	Birth Cohort					
	< 1959		1960-1970		1971-1981	
	Sx	N	Sx	N	Sx	N
7	.995	201	1.000	100	1.000	182
8	.990	200	1.000	100	1.000	182
9	.985	199	1.000	100	1.000	182
10	.975	197	.990	99	1.000	182
11	.955	193	.990	99	.994	181
12	.950	192	.990	99	.994	175
13	.901	182	.980	98	.994	164
14	.876	177	.980	98	.994	153
15	.827	167	.960	96	.994	138
16	.777	157	.950	95	.987	118
17	.708	143	.860	85	.954	97
18	.599	121	.830	83	.924	81
19	.411	83	.690	69	.810	59
20	.332	67	.570	57	.726	39
21	.208	42	.400	40	.690	26
22	.178	36	.360	36	.610	13
23	.134	27	.320	32	.563	2
24	.109	22	.280	26	—	-
25	.104	21	.247	20	—	-
26	.074	15	.209	13	—	-

marriage are only presented. The qx and Sx figures in the table indicate a very rapid movement into family formation after marriage. As the data reveal, the conditional probabilities increase during the first year of marriage and tend to peak at 24 months since marriage. The likelihood that a first birth would be highest before the end of second year of marriage is due to the nine months gestation.

Table 4 presents the life table estimates of first birth by marriage cohort. Data in the table establishes the pattern of decreasing length of birth interval across time. It has been demonstrated that women marrying more recently experience the first birth at a faster pace than the women marrying in earlier cohorts.

DATA AND METHODS

The data for the present study come from a retrospective survey undertaken during the month of October/November, 1993. In-depth interview of selected cases were also conducted

Table 3. Life Table Estimates for First Birth after Marriage for a Sample of Ever-Married Women (First 10 Years Since Marriage)

Years Since First Marriage	Sx	qx	Effective Sample Size
1	.644	.356	301
2	.321	.503	191
3	. 190	.407	91
4	. 150	.211	52
5	. 116	.225	40
6	.086	.258	31
7	.079	.087	23
8	.064	.191	21
9	.060	.059	17
10	.056	.062	16

Sx= Survivor curve for not experiencing a first birth

qx= Discrete time hazard rate for experiencing a birth in interval

Table 4. Life Table Estimates of First Birth after Marriage by Duration and Marriage Cohort

Years Since First Marriage	Marriage Cohort							
	<1960		1960-1969		1970-1979		>1980	
	Sx	N	Sx	N	Sx	N	Sx	N
1	.735	83	.724	58	.656	61	.515	99
2	.374	61	.431	42	.377	40	.172	48
3	.289	31	.207	25	.213	23	—	—
4	.229	24	.172	12	.145	13	—	—
5	.205	19	.138	10	—	—	—	—

and supplemental information was gathered through informal conversations with the village head. The 1990 voter's list prepared by the National Election Commission for Nepal's General Election was used to randomly select 200 households (out of 805) from all 9 wards. In the survey, information on education, work, residence, outside exposure, parents' background and the timing of these experiences were collected, using a structured questionnaire. All female residents of 12 years and above in the sampled households were interviewed. This yielded 487 women, both married and never married. Additional information was also gathered through informal conversation with the village head to supplement and complement the survey data. In this paper the analysis of marriage timing is confined to 483 women while the analyses of the timing of first birth are confined to 301 ever-married women.

In Kirtipur, over 90 percent of the residents speak only Newari language, their mother tongue, which is different from the national language, Nepali. Experienced and qualified Newari students therefore, conducted the interviews. This combined, with the careful supervision by the investigator ensured quality data from the survey.

As the data comes from retrospective accounts of marriage and first births, which are generally believed to be afflicted by, recall lapse, there could be some concern regarding the quality of data. Measurement error in data could be due to forward displacement of first birth date, backward displacement of marriage date and omission of early births that died (Kallan and Udry, 1986). It is assumed that measurement errors are distributed randomly across the analytical groups of interest within this fairly homogeneous population and this does not systematically affect the analyses (Fricke and Teachman, 1993; Rindfuss and Morgan, 1983).

Measures

Our survey data enables us to generate required variables to test the hypotheses. The analytical approach pursued here, unlike others, is free from the casual ordering defect as all the variables are relevant to the timing of events both marriage and first birth. Table 5 and 6 describe variables used in the analysis of marriage timing and first birth timing respectively.

Background variables considered in these analyses are: birth cohort, marriage cohort, parent's work experience respondent's life course experiences, respondent's literacy. Age at marriage, choice of spouse and customary exchange of gifts are the marriage characteristics.

By classifying the women into three different birth and marriage categories it was intended to capture the varying context of socialization among these cohorts of women. It is also believed that this categorization will allow explaining the temporal variation, if any in the timing of family formation in Kirtipur. It's argued that the general approach to the analysis of change is to classify women according to their birth cohort (Thornton et al. 1984).

The other set of variables relates to the familial background of the women which is represented by father's education, his work experience at wage and salary work before

daughter's marriage and mother's work experience. Previous research has established the importance of familial background in explaining the variations in the timing of the first marriage of daughters (Fricke et al., 1995).

Women's education, their outside exposure before marriage and their involvement in family farm are yet another set of variables that relates to the life course experience of the women. Women's education is measured by years of completed schooling having no schooling at the lower end and college education at the upper end with three other categories in between. This refers to the time of survey. It is however, true for girls that education is acquired prior to marriage and very few women became literate after marriage if they were not so before marriage. The examination of ever-attended school and literacy variables confirms this observation.

Respondent's outside exposure is the dichotomous variables indicating whether or not the women has ever lived apart from her parents or other supervising seniors for a month or longer. This variable may be treated to represent the female autonomy. More their out side

Table 5. Variables Used in the Models of Timing of First Marriage

Variable\Definition	Proportion in category	(N)
Birth Cohort		
0 = Born £ 1959	.41	202
1 = Born 1960-70	.21	100
2 = Born 1971-81	.38	182
Family Background		
Father's schooling		
0 = Not attended school	.50	242
1 = Attended school	.50	242
Father's work experience		
0 = No wage labor	.49	236
1 = Wage labor	.51	248
Mother's work experience		
0 = No wage labor	.89	433
1 = Wage labor	.11	51
Respondent's Life Course Experiences		
Living Arrangement		
0 = Always lived with senior relatives	.92	444
1 = Lived apart from seniors	.8	40
Respondent's education		
None	.59	286
Primary	.14	66
Lower Sec.	.13	61
Secondary	.10	51
University	.04	20
Family farm		
0 = Not engaged in family farm	.24	114
1 = Engaged in family farm	.76	370

exposure before the marriage, more autonomous they will be in the choice of spouse which finally affects the timing of marriage. Like-wise women's premarital work experience is also a dichotomous variable indicating whether or not a woman has ever worked in the family farm before marriage.

Methods

Since the paper focuses on the socioeconomic factors associated with family formation, the approach, therefore, is to examine the covariates of the timing of first marriage and first

Table 6. Variables Used in the Models of Timing of First Birth

Variable\Definition	Proportion in Category	(N)
Marriage cohort		
Omitted category <1969	.47	141
Dummy variable 1970-79	.20	61
Dummy variable >1980	.33	99
Father's work experience before respondent's marriage		
0=No wage labor	.21	63
1=Wage labor	.79	238
Respondent's outside exposure before marriage		
0=Never lived outside village	.83	251
1=Lived outside	.17	50
Respondent's literacy		
0=Cannot read and write	.76	229
1=Can read and write	.24	72
Age at marriage		
0=_19	.54	164
1=>19	.46	137
Choice of spouse		
0=Parents/Seniors chose	.71	215
1=Respondent's chose	.29	86
Exchange of gifts in marriage process		
0=No gifts exchanged	.52	158
1=Gifts exchanged	.48	143

birth interval. The dependent variable of the multivariate models of the marriage timing is the risk (hazard rate) of entering into a marriage for all women age 12 years and above, both single and ever married. This takes care of the bias involved in the analysis that restricts to only ever-married women (Elm and Hirschman, 1979; Thornton and Lin, 1994; Tsuya, 1994). The dependent variable of the multivariate models of the first birth interval is the risk (hazard rate) having first birth after marriage, not the risk of first conception.

The dependent variable involves a single destination state - entering into marriage. Event history analysis is an appropriate method for the type of analysis being attempted here. Within that group of methods discrete time analysis has been employed as the method is relatively easy and quite flexible and makes no assumption about the shape of the hazard function (Allison, 1984; Fricke and Teachman, 1993; Guikey and Rindfuss, 1987).

The analysis presented in the paper focuses on the timing of family formation by modeling a dichotomous dependent variable, coded 0 if no event (marriage/first birth) occurred and 1 if the events occurred in a given year. Therefore, the multivariate models were estimated using logistic regression, a technique appropriate for analysis of dichotomous dependent variable (Goodman, 1976; Morgan and Teachman, 1988; Hosmer and Lemeshow, 1989).

In the models of marriage timing controls for time and time square were also entered because the risk of marriage is likely to change as a simple function of continuing exposure (Fricke and Teachman, 1993). As it is very much likely that the effects of the covariates might differ across the life course of the women interaction effects of some covariates were also explored. However, no significant effects were discovered, nor do they yield any additional explanatory power.

Results

Results of our multivariate analysis of the determinants of age at marriage and age at first birth are displayed in Table 7and 8 respectively. The estimated regression coefficients are presented in the form of exponentiated coefficient for the log-odds. For ease of interpretation the coefficients are transformed into an odds ratio relating the presented effect to the omitted category by calculating exp(b) for each coefficient in the original equation. These transformed coefficients can be interpreted as the amount by which odds are multiplied for each unit change in the explanatory variables (Morgan and Teachman, 1988). Coefficient greater than 1 implies that an increase in a variable is more likely to increase the event to occur i.e., *positive effects*. Coefficients less than 1 indicate the decrease in probability as that variable is increased i.e., *negative effects* and coefficient 1 implies no effect at all.

The relationship between a variable and the *risk of first marriage* controlling for Time and Time^2 are displayed in column 1 of Table 7. The coefficients in the first column come from seven logistic equations, one each for the seven explanatory variables listed. The effects of familial background and life course experience variables separately together with birth cohort variable are estimated in Model 1 and 2. Model 3 contains estimates of coefficients

with all variables being considered simultaneously.

Figure in the zero-order column of Table 7 reveal negative effects of birth cohort, father's education, his work experience, mother's work experience, respondent's years of schooling and her experience of unsupervised living. Respondent's pre-marital work experience is the only variable showing the positive impact.

It is very interesting to note the very strong effect of birth cohort, independently of other variables. Zero-order column as well as Model 1 through 3 indicates a consistent decline in the risk of first marriage for later birth cohort. Women born in the most recent cohort experienced a significantly decreased risk of first marriage compared to women born before 1960. Women born during 1960-70 and 1971-81 are 43% and 72% less likely respectively to marry across ages than all women born before 1960. The coefficients remain highly significant in all three models. This finding supports our earlier hypothesis that most recent birth-cohort of women marry later than earlier born women.

All the three variables that tap familial background in zero-order column are strongly associated with the decreased risk of marriage. The probability of marriage is lower by 50% if her father ever attended school, 31% less if the father worked as a wage labor compared to those women whose father never attended school and never worked as a wage labor. Similarly, mother's work experience as a wage labor has a negative impact on the timing of marriage of daughters. The risk is less by 30% as against the omitted category. Subsequent models including the effects of life course transitions variables, however, show a decline in both the magnitude and the significance of the effect of these variables. This shift is noteworthy and perhaps signifies that the impact observed from these variables in zero-order column was primarily mediated through the birth cohort variables.

Among the variables representing life course experience while respondent's pre-marital work experience is associated with an increased risk of marriage, both respondent's education and her experience of unsupervised living are associated with decreased risk of marriage. Although the impact of unsupervised living is in the expected direction it is not statistically significant. The decline in the magnitude and strength of pre-marital work experience variable in the full model signifies that the experience is mediated mainly through education.

Perhaps the most noticeable result of Table 7 is the significant influence of education on the risk of marriage. A consistent reduction in the risk of marriage occurs with higher level of education. It may be observed that women's who have primary education experienced only 61% of the risk of marriage that women with no schooling experience. Alternatively, one can say that the hazard of marriage for women with primary education is 39% lower than the hazard for women with no schooling. Similarly, women having lower secondary and secondary education have 71% and 85% less likelihood respectively of getting married as compared to women with no schooling. The results, however, indicate that women with university education are 76% less likely to get marry. This indicates that after the completion of secondary education the tempo of marriage gradually increases.

The negative impact of education on the risk of marriage is more apparent in the secondary

education category. Results indicate that the risk of marriage for secondary education is almost less by one fourth of those of primary education and one half of lower secondary education. The observed effects of respondent's education, with the exception of primary education category, remained largely unaffected when other control variables are introduced in the multivariate models. This clearly signifies that women's educational attainment beyond primary education has a considerable effect on the timing of first marriage. This confirms the earlier expectation.

The relationship between variables and the *risk of first birth* controlling for Time and Time^2 are displayed in column 1 of Table 8. Observed relationship confirm a significant

Table 7. Discrete Time Analysis of Risk of First Marriage for Kirtipur Women[1]

Variable	Zero Order[2] eβ	p	Model 1 eβ	p	Model 2 eβ	p	Model 3 eβ	p
Birth cohort								
1960-1970	0.57	(.000)	0.58	(.000)	0.71	(.020)	0.72	(.026)
1971-1981	0.28	(.000)	0.32	(.000)	0.47	(.000)	0.48	(.000)
Father's schooling								
Ever attended school	0.50	(.003)	0.74	(.237)			0.91	(.741)
Father's work experience								
Wage labor	0.69	(.015)	0.86	(.339)			0.89	(.475)
Mother's work experience								
Wage labor	0.70	(.027)	0.82	(.245)			0.96	(.815)
Respondent's education								
Primary	0.61	(.024)			0.81	(.372)	0.81	(.376)
Lower Sec.	0.29	(.000)			0.40	(.004)	0.41	(.005)
Secondary	0.15	(.000)			0.21	(.000)	0.21	(.000)
University	0.24	(.000)			0.36	(.012)	0.38	(.020)
Respondent's work experience								
Family farm	1.59	(.006)			1.29	(.144)	1.28	(.163)
Living arrangements								
Lived apart from seniors	0.81	(.211)			0.96	(.839)	0.98	(.901)
Time	—		1.62	(.000)	1.62	(.000)	1.61	(.000)
Time^2	—		0.98	(.000)	0.98	(.000)	0.97	(.000)
Model X^2-			217.20		250.84		251.65	
Total observations	3480							
No. of Ist Marriages	307							

[1]Presented as odds ratio relating presented likelihood to omitted categories (see Table 5) in dummy variable logistic regression. [2]Controlling for Time and Time^2.

effect of marriage cohort, respondent's outside exposure before marriage, respondent's literacy and age at marriage. Women who are married after 1979 experienced a significantly increased risk of giving a first birth compared to women who were married before 1970: they are 116% more likely to experience first birth in any given interval according to zero-order effects. The cohort who married in the 1970s does not differ significantly from earlier cohorts as far as the likelihood of having first birth is concerned though the effects are positive. These effects of marrying in a later cohort remain significant but decrease in strength as additional variables are added to the models. This suggests these variables may exert influence on the marriage process itself, in addition to influencing the risk of having a first birth.

The coefficient for father's work in zero-order column indicates that the odds of first

Table 8. Discrete Time Analysis of Risk of Giving Birth in Years since Marriage for All Ever Married Women[1]

Variable	Zero Order[2] eβ	p	Model 1 eβ	p	Model 2 eβ	p	Model 3 eβ	p
Marriage cohort								
1970-1979	1.36	(.123)	1.23	(.315)	1.31	(.185)	1.22	(.359)
>1980	2.16	(.000)	1.79	(.008)	1.93	(.001)	1.66	(.026)
Respondent's outside exposure before marriage								
Lived outside	2.09	(.001)	1.73	(.023)			1.70	(.031)
Respondent'sliteracy								
Can read & Write	1.78	(.003)	1.18	(.471)			1.15	(.558)
Father's work experience before R's marriage Wage labor	1.45	(.043)	1.33	(.128)			1.30	(.169)
Respondent's first age at marriage								
>19	1.57	(.004)			1.39	(.050)	1.34	(.081)
Choice of spouse								
Respondent chose	1.38	(.066)			1.23	(.283)	1.14	(.505)
Exchange of gifts								
Gifts exchanged	1.26	(.213)			1.19	(.386)	1.18	(.416)
Time´gifts	1.14	(.085)			1.18	(.042)	1.19	(.035)
Time	——		1.10	(.356)	1.01	(.917)	1.03	(.807)
Time²	——		1.03	(.011)	1.04	(.010)	1.04	(.008)
Model X²			70.70		70.74		78.30	
Total observations 804								

[1]Presented as odds ratio relating presented likelihood to omitted categories (see Table 6) in dummy variable logistic regression. [2]Controlling for Time and Time².

birth for daughters whose fathers worked as a wage laborer are 45% greater than the daughters in the same interval whose father's did not work. This variable retains its positive effect but losses its significance as other variables are added in the model. Women who lived outside their natal home before marriage are 109% more likely to have their first birth in any given interval as against the omitted category. This effect remains significant across the models. This result is also in general agreement of previous research (Fricke and Teachman, 1993).

Women who marry at age 19 or older have 57% more risk of bearing children in each interval than those marrying before the age of 19. It should be noted that when included with other variables in Models 2 and 3 its effects and significance is diminished. However, the coefficients are relatively stable. The respondent's own choice of spouse is positive but not significant in any of the models, suggesting that women who choose their own spouse may be more likely to experience a first birth. This relationship is in expected direction and supports our hypothesis.

Finally, whether or not gifts were exchanged during marriage has been entered into equation with an interaction term (Gift*Time) to access the possible changing effects of this variable over time. Gift exchanged is associated with higher risk of bearing a first child and thus supports our hypothesis. Gifts exchanged marriages are 26% more likely to have their first child in each interval compared to those marriages where gifts were not exchanged. However, the coefficients are not significant. The effect listed by the interaction term (Gifts*Time) indicates the extent to which the effect of gifts increases over time. It was found that the gifts marginally increases the risk of bearing the first child from 1.14 in zero order column to 1.18 in Model 2 and almost stabilize in Model 3. It is interesting to observe that when included with other variables in Models 2 and 3 the significance of this interaction term increases as well signifying the importance of gifts over time.

Conclusions

Results from the analysis showed birth-cohort, marriage-cohort, women's education, and her pre-marital experience as the significant predicators in the study area. It was suspected that women belonging to different birth-cohorts and marriage-cohorts are exposed to varying context of socialization, which might have a significant bearing on the timing of marriage and first birth interval. The consistent declines in the risk of first marriage for later birth-cohorts have confirmed the expectation and thus signify the importance of social transformation on the timing of marriage and first birth.

Among the variables that capture life course experience of women, education is by far the single most important variable negatively associated with the risk of marriage. It was posited that higher education delays the female age at marriage. The consistent reduction in the risk of marriage with higher levels of education has supported this hypothesis. This finding is in conformity with prior research relating education to marriage timing in some Asian countries (Casterline, 1980; Hirschman, 1985; Tsuya, 1994; Fricke et al., 1986; Thornton and Lin, 1994). Our result indicated towards the need of promoting female education

with more emphasis on secondary education as this level seems to have much stronger impact in delaying first marriage in Kirtipur. We may thus expect that if female education is promoted it will definitely help to push the female age at marriage further up in Nepal.

Substantial changes observed in first birth timing across marriage cohort can be explained by changes in measures associated with marriage. Marriages in which gifts are exchanged also increase the probability of having a first birth quickly. These situations provide a sense of security to the bride, which facilitates in building-up the intimacy much quicker. Likewise respondents who lived outside before marriage enjoy greater autonomy in mate selection process and timing of marriage. This autonomy could have lead to early involvement and quicker intimacy resulting to early family formation. Further study is needed to determine how the timing and spacing of births impacts upon Nepal's fertility transition.

The present study, however, has not been able to measure the impact of some of the factors that are theoretically important in the study of family formation. This is basically due to the lack of information from the survey. In order to have a complete understanding a larger study that gathers information on all theoretically important variables is recommended.

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