Premarital Pregnancy and Its Impact on Timing of The First Marriage for Chinese Women

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Abstract

Premarital pregnancy has enormous impacts on individual woman's life course trajectory. Many studies have reported significant increases in premarital sexuality in China. However, no systematic study has been done with regard to premarital pregnancy and its consequences on Chinese women. Using the 2001 China National Family Planning and Reproductive Health Survey data, this study focuses on self-reported premarital pregnancies of Chinese women. We found that the likelihood of premarital pregnancy is close related to women's residence, education, and the macro socioeconomic environment. We also examine women's transition to first marriage after their premarital pregnancies. We found that the average age at first marriage for women with premarital pregnancies is significant higher than that of all other women. The timing of first marriage to a large extent depends not only on women's ages at pregnancy but also on the outcomes of pregnancies.

Key words: Fertility, Reproductive Health, Marriage, China

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Introduction

The substantial increase in premarital sexual behavior in China during recent decades has drawn lots of attentions. Many researches had been conducted concerning these changes (Li 1990, Liu, 2000, Pan 2000, Zhang et al.1999). However, most of these studies focused upon changing attitude towards sexuality and increasing incidence of premarital sex among adolescents. No systematic study has been done on premarital pregnancy and its impact on individual life course in China.

Premarital pregnancy has exhibited an increasing trend over time in China since 1950s (Wang and Yang 1996), despite that premarital sex has been social taboo in China (Elvin 1984, Sun 1981). Based on the 1988 two-per-thousand survey data, Wang and Yang found that around 5% of the total births in China were in fact conceived before marriage in the 1980s, even without counting the considerable amount of premarital abortions (1996). Results from the 1997 China Demographic and Reproductive Health survey show that about 3% of total pregnancies reported were results of premarital sex (Walther 2001). According to the 2001 China Family Planning and Reproductive Health Survey, 10.61% of pregnancies after 1980 were conceived before marriage. Clearly, premarital pregnancy has become an increasingly important social issue in China.

Premarital pregnancy has enormous effects on individual's health and life course trajectory. Premarital sex, particularly among adolescent, exposes adolescents to the risk of sexually transmitted diseases (STD). Premarital pregnancies could lead to induced abortion, earlier marriage, and later marriage instability (Martin and Bumpass 1989, Teachman 2003, Trussell and Rao 1989). Given the importance of this issue, a lot of researches had been conducted in the Western societies. However, there are few systematic studies on premarital pregnancy in China despite of this emerging social problem. Researchers and policy makers are still puzzled by the basic questions, such as the prevalence, outcomes, and consequences, regarding premarital pregnancy. Apparently, a study focusing on premarital pregnancy could not only be necessary for public awareness but also implemental for government and NGOs.

This study is intended to examine the premarital pregnancy and its consequences among Chinese women. Rather than simply focusing on some basic problems, such as when premarital pregnancy happens and what is the outcome, we'll further examine what determines premarital pregnancy and how premarital pregnancy influences individual woman's late life course transitions, particularly first marriage.

In this study, we use 2001 China Family Planning and Reproductive Health Survey (FPRHS) data, which record complete reproductive histories for ever-married women and help us to identify premarital pregnancies. Lack of reliable data has been one of the most important reasons that cause scarcity of research in this area. Premarital pregnancy is much more sensitive than other premarital sexual behaviors. As the result, research data on this topic are rarely available. However, examining premarital pregnancy by tracing individual woman's reproduction retrospectively is a relatively reliable approach. Using the 2001 FPRHS data, we identified premarital pregnancies by women's retrospective records of pregnancy processes. We distinguish between two types of premarital pregnancy: **premarital pregnancy** that ends before the first marriage and **premarital conception** that ends after the first marriage. In our analysis, we focus only on premarital pregnancies, mainly because these pregnancies are completely out of protection of marriage and increase women's vulnerability.

Data analysis consists of two parts. Firstly, we use multivariate logistic regression to examine the major determinants of premarital pregnancy. Then in the second part, we build a discrete-time event history model on first marriage for these women with premarital pregnancies. The subsequent sections will be organized as follow: in the second section, we report the data management and statistical methods. In the third section, we analyze the major determinants of premarital pregnancy using logistic regression. The transition from premarital pregnancy to the first marriage is examined in the forth part through Cox proportional hazard model. Finally, we end with brief conclusion and discussion.

Data and Methods

Data used in this analysis are from the 2001 China Family Planning & Reproductive Health Survey (FPRHS), conducted by the State Family Planning Commission of China. The 2001 FPRHS covers over 1100 villages in 330 counties (or urban districts) across 31 mainland provinces. The nationally-representative sample was a repeated one from a previous survey in 1997 (SFPC 2001), which was selected based on a multi-stage probability-proportionate-to-size sampling scheme (PPS). In total, over 39,000 women aged 15-49 were interviewed in the 2001 survey.

In the 2001 FPRHS, individual woman was inquired about her whole pregnancy history, from the first one to the latest[1]. The full retrospective record of pregnancy allows us to identify when and to whom a premarital pregnancy occurs. In the FPRHS data, ending dates of premarital pregnancies and dates of first marriage are given in month and year. Therefore, the sequence of first pregnancy and first marriage can be determined with high-level precision. We define a pregnancy as premarital pregnancy if its ending date is earlier than the woman's date of first marriage[2]. So it is different from the definition of premarital conception, which refers to a pregnancy conceived before marriage but ended after marriage (Wang and Yang 1996). In other words, our definition of premarital pregnancy mainly refers to premarital birth and premarital abortion. In identifying premarital pregnancy, we only focus on women's first pregnancies. It is possible that a woman could have multiple premarital pregnancies before getting married, and we do find a few cases. However, we decided to disregard the multiple premarital pregnancies, mainly because we believe that the first pregnancy could exert the biggest impact on women's mental and physical well-being[3]. So we treat a woman as one with premarital pregnancy as long as her first pregnancy ends before her first marriage.

[1] In the survey, only ever-married women were requested to report their entire pregnancy history. Never-married women were systematically eliminated in this section mainly for the concern of sensitivity. This is definitely disappointing because premarital sex among unmarried women could be very intersting. Nonetheless, the records for eve-married already yield some valuable information about premarital pregnancy.

[2] The FPRHS survey did not distinguish whether the date of marriage refers to legal marriage or customary, which might affect our definition of premarital pregnancy. It is unknown whether women tend to report their dates of legal marriage (obtaining marriage certificate) or customary marriage (dates of wedding)? In some rural villages where early marriages are popular, legal marriage is replaced by customary marriage because couples cannot meet the minimum ages for legal marriage.

[3] We only focus on the first premarital pregnancy also because it is unclear whether the impact of multiple premarital pregnancies is cumulative or not.

In our analysis, we only choose women whose first pregnancies were after 1980. The first reason of doing this is the more recent a pregnancy ends, the less likely for it to be misreported. The second reason is that nationwide socioeconomic reform started in the early 1980s in China. By choosing this subgroup of women, we can examine the influences of socioeconomic changes on sexual behavior. Finally, we identified 477 women in total who reported premarital pregnancies[4], which count about 2% of the subgroup of women we choose.

It is very legitimate to challenge the data quality, particularly because of the sensitivity associated with premarital pregnancy. There are a few features of the 2001 FPRHS that could improve the data quality. First, the survey was conducted by experienced female interviewers in a face-to-face manner. This interview strategy might increase women's willingness to report their premarital sexual experiences[5]. Secondly, the data quality, particularly the accuracy of date reporting, could be facilitated by the Chinese animal-year system (Coale 1983, Banister 1987). However, there is no guarantee that there won't be any misreporting in the survey data[6]. To make the data clean and improve analytic precision, we adopted a few more measures to ensure our data quality, particularly data reliability of our subsample. We firstly eliminate those remarried women even if their first pregnancies were before their reported marriage dates; just in cases that they misreported their dates of first marriage with their dates of remarriage. The second measure we used is to choose only women whose first pregnancies were after 1980. Usually the older a woman is, the more likely a misreport would happen. So restricting sample to a younger cohort will reduce the possibility of misreporting. The third measure is to check every single record that we identified. If there is

[4] For data cleaning purpose, we delete those women who were remarried. If woman reported her date of remarriage as her date of first marriage, it makes our definition of premarital pregnancies problematic. Among women we identified with premarital pregnancies, 97% of them are in their first marriage. The rest 3% are divorced or widowed.

[5] Studies in African countries had indicated the advantage of face-to-face interview in collecting sensitive information from adolescents compared to some computer-assisted approaches (Mensch et al. 2003).

[6] Under the scrutiny of individual records of those premarital pregnancies we identified, we found that a couple of cases are apparently illogical. For instance, there is a woman whose year of first pregnancy equal to her year of birth. Apparently it is illogical and might be an input error. So we deleted it from the data set. However, we believe that the reporting errors or input errors are completely at random.

any logical error or input error, we'll eliminate the case. Therefore, we are quite confident with the accuracy of case identification.

Data analysis in this paper is divided into two parts. In the first part, we use some logistic regression to analyze the likelihood of premarital pregnancy in China. We compare the odds of premarital pregnancy across groups of women with different classification. Then, in the second part, we use discrete-time event history model to analyze the hazard rate of first marriage for these women.

Premarital Pregnancy and Its Major Determinants

Premarital sexuality has been a taboo in China for thousands of years, because of the Confucian ideology and customs. The cultural prejudice against premarital sexuality even makes it quite sensitive to discuss this topic publicly. As the Chinese society becomes more and more open toward the outside world by adopting its open-door policy in the early 1980s, Chinese people became widely and deeply exposed to the Western culture and ideology. Gradually premarital sexuality becomes permissive in many Chinese areas (Zhang et al. 1999). Vast of studies have reported the increasing trends of premarital sexuality among adolescents in China in the last two decades (for example, Wang and Yang 1996). Our data yield consistent result of premarital sex as previous studies. Figure 1 shows the increasing trend of both premarital conception and premarital pregnancy in China in the last two decades. The increase in odds of premarital pregnancy (including premarital birth and premarital abortion) was in fact very significant. On average, a woman's odds of premarital pregnancy in the early 1980s (1980-84) were 0.012. The odds were doubled to 0.027 in the late 1990s (1995-99). Women's odds of premarital conception also kept increasing in the last 20 years. During the 1990s, on average about 10% of total pregnancies each year were actually conceived before marriage. Apparently, women's odds of premarital conception are much higher that women's odds of premarital births or abortion.

(Figure 1 here)

Different social and cultural instrumental changes have been employed to understand the significant increase in premarital sexuality in China. The first one is the changes in marriage pattern. Many researchers argued that changes in premarital sexuality are closely related with the changing marriage pattern from arranged marriage to free-choice romantic love (Chang 1996, Farrer 2002, Yan 2002, Zhang 1999). In the traditional China, arranged marriage and customs of sexual separation made premarital sex and thus premarital pregnancy quite rare (Wolf and Huang 1980). When free-choice romantic love become more and more popular in China, frequent dating and modern dating fashion create opportunities for sexual activities. In his fieldwork, Yan found that free dating and private house space increase incidence of premarital but post-engagement sex among Chinese youths (2002).

Individual's changing attitudes towards sexuality is another important determinant of premarital sex (Fan et al. 1995). Premarital sex has become widely acceptable among young people. According to the 1997 China Demographic and Reproductive Health Survey by SFPC, 12.6% of Chinese women agreed that a man and a woman could have sexual intercourse if they are engaged or want to marry each other. The proportion of agreement on premarital sex between non-prospective spouses is much higher among university students. Some studies found that around 10% of college students in Beijing had premarital sex (Pan and Zeng 2000). Increase in premarital sexuality is closely related with the change in attitudes toward sexuality.

Education and nonfamilial employment has been assigned important roles in understanding premarital sex (Chang 1996, Wang and Yang 1996). Completion of education[7] implies readiness for adulthood, and nonfamilial employment implies independent living environment. Both expose young adults to high risk of intimate love which leads to premarital sexual behaviors. Pan's influential studies on sex workers in south China indicate premarital sex is quite common among young female migrant workers (1999, 2000).

[7] It is more appropriate to say 'ending of education' rather than 'completion of education', because in China a lots of young adolescents are unable to continue education mainly because they fail in high-school or college entrance exam or they couldn't afford tuition. So many of them are at very young ages when they finish junior high school or high school and cannot pursue further education. Early ending of education directly push young adolescents to find employment opportunities.

Besides these changes, Wang and Yang argued that family planning program is also an important instrumental factor that affects premarital sexual behavior (1996). Nationwide family planning program in China facilitates dissemination of sexual and contraceptive knowledge among young adults, and it makes contraception and induced abortion easily accessible. However, The effect of family planning program on premarital pregnancy in unclear so far. One the one hand, family planning program fights against 'illegal' birth. So it is very difficult to have premarital birth under this policy environment. On the other hand, the spread of family planning facilities makes premarital abortion easily accessible.

We agree that all these instrumental changes mentioned above are key variables in understanding premarital sexuality. However, we think that determinants of premarital sexuality and determinants of premarital pregnancies must be differentiated. The first reason is that premarital pregnancy, either ended with birth or abortion, could be the most undesirable result of premarital sex. Unlike premarital conception, premarital pregnancy will be completely out of protection of marriage. Therefore, the negative impact of pregnancy on woman might be considerable. The second reason is that premarital conception is much more popular than premarital pregnancy, as shown in Figure 1, and premarital conception involves prospective spouses. However, premarital pregnancy might be a result between non-prospective spouses. Therefore, we must analyze these two events differently.

Our explanatory model mainly uses social contextual and individual life-course variables to understand premarital pregnancy. We believe that social context and individual life course are important to understand why premarital pregnancy occurs to some women while not others. The social context where a woman is embedded and her life course context could determine how the societal factors affect the individual. Here the social-contextual variables include rural-urban residence, geographic locations and pregnancy periods. Individual life course variables refer to woman's age and education experience. Inclusion of independent variables are restricted by the data available. It does not necessarily imply that these variables are the only determinants of premarital pregnancy. It simply means that the effects of societal instrumental changes on premarital pregnancy are intermediate through

some of our independent variables. Table 1 presents the basic descriptive statistics of independent variables includes.

(Table 1 here)

Individual living environment is dichotomized into rural and urban residences. In our sample, over two-third of women live in rural areas. In China, urban areas are more economically developed and are more open toward the Western culture. As the results, more and more urban youths follow the Western behavior patterns. Romantic love, new dating fashion, and even premarital sex are very common in the urban areas. Premarital sexuality is also much more permissive in urban areas. Therefore, we expect to find significantly higher likelihood of premarital pregnancy associated with urban women.

We divide Chinese provinces into three groups according to their geographic locations: coastal provinces, middle provinces, and west provinces[8]. The division of provinces could generally reflect the levels of socioeconomic development among these provinces. Affected by the socioeconomic developmental levels, the geographic distribution of premarital pregnancies is not even across provinces in China. Since changes in sexual behavior show strong correlations with socioeconomic development, we hypothesize that women live in coastal provinces would have higher odds of premarital pregnancy.

We also include a period variable, which is measured by the year when premarital pregnancy ends. Because the term of a pregnancy must be 10 months or less, this variable could clearly show when a pregnancy took place. So it could also contextualize the social periods when a premarital pregnancy occurs. As shown in Figure 1, incidence of premarital pregnancy could greatly affected by the social periods. Among all the premarital pregnancies reported in the survey, about 39% of them were between 1980 and 1989. Over 60% of the premarital pregnancies occurred after 1990. Apparently, there was a significant increase in

[8] Coastal provinces include Beijing, Tianjin Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Guangxi, and Hainan. Middle provinces consist of Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan, Sichuang, Chongqing, Guizhou, and Yunnan. Inland provinces include Shanxi, Inner Mongolia, Xizang, Shannxi, Gansu, Qinghai, Ningxia, and Xinjiang.

premarital pregnancies in the last decade. The period effect could capture the influences of modernization, including both socioeconomic change and value change, on premarital sexuality. Whyte had found that economic development affects sexual behavior and attitudes in both Western and Oriental world (1984). Therefore, it is reasonable to expect a period effect on premarital pregnancy.

Education is a very important individual characteristic. The meaning of education variable could be multidimensional. Firstly, education is a life-course variable representing individual's age of school completion. School completion plays an important role in determining the readiness for sex and adulthood (Chang 1999). Secondly, education could represent the cognitive level of contraceptive knowledge, which could affect the likelihood of unintended pregnancy. Finally, the level of education also determines individual attitude toward sexuality. However, it is unclear whether the level of education and sexual openness are linearly associated. For example, women with college education could be more likely to engage in premarital sex because they are widely exposed to the western culture. However, women with higher education level could also be strongly influenced by the Confucianism in Chinese culture, which opposes premarital sexuality. Therefore, the effect of individual education on premarital pregnancy will be very import. We don't expect the effect will be linear. We think that if a woman has low level of education, she'll be deeply affected by the traditional ideology because of her limited exposure to new ideology. As a result, she will be very conservative and is less likely to have premarital sexual experience. On the other hand, if a woman has very high education, she'll be very affected by new culture and ideology, and she will be much inclined to new living style. Therefore, she is more likely to have premarital sexual behavior. However, she's less likely to get pregnant because of her contraceptive knowledge and awareness.

Age is another major life-course variable included in our model. Woman's age not only has biological meaning, but also social meaning. In our sample, age at premarital pregnancy varies enormously across women. The median age of premarital pregnancy is 21. Apparently, most of women have been physically mature when having premarital pregnancy. The average age at premarital pregnancy was relative stable in the last two or three decades. Usually, the

higher a woman's age, the more likely that she will be involved in premarital sexuality. However, as age increases, woman's awareness of social damage caused by premarital pregnancy also increases. So we expect that old women are less likely to have premarital pregnancies compared to younger women.

Table 2 reports the results of three different models of logistic regression on premarital pregnancy[9]. Model 1 tests the effects residence, education, ethnicity, and age on premarital pregnancy. We found that urban women have higher odds of premarital pregnancy than rural women[10], although over two thirds of the premarital pregnancies occurred in rural China. Meanwhile, Han women are more likely to have premarital pregnancies than ethnic minority women. Education exerts significant impact on the likelihood of premarital pregnancy. Both junior high and high school education show significantly higher odds of premarital pregnancy that primary school education. However the difference between the effects of junior high and high school education is relative small. The effect of age at pregnancy is also significant. As we expected, premarital pregnancy is more likely to occur among younger women. It is quite reasonable mainly because old women could have already been married.

(Table 2 here)

In Model 2, we introduced period variables. Two period indicators for 1990s are statistically significant, which indicates that odds of premarital pregnancy were significantly higher in the 1990s than those in the 1980s. In model 3, we add a variable representing different geographic regions[11]. Significant coefficients with both coastal provinces and middle provinces imply that women in these areas are more likely to have premarital pregnancies than women in the west provinces.

[9] We noticed the small percentage of women with premarital pregnancies among total women interview, and we didn't expect that this extreme dichotomy in dependent variable would bias the estimates of coefficients. The asymptotic property ensures that the power of estimation increases with sample size.

[10] Because we don't have longitudinal records of women's residence, we don't know where women resided when premarital pregnancy occurred.

[11] Unlike some previous studies (such as Wang and Yang 1996), we didn't include any spouse variables in our model. The main reason is that we make an assumption that women did not change their sex partners before marriage. We believe that it's risky and extremely shaky to make such an assumption, particularly for analysis of premarital pregnancy.

Outcomes of Premarital Pregnancy and Transition to First Marriage

Getting pregnant before marriage is undesirable and embarrassing for many Chinese women. So most likely premarital pregnancy will be ended up with induced abortion. Only a small portion of women will carry the pregnancy to full term, which ends with premarital births. Among all women with premarital pregnancies we identified from the data, 63.2% of them ended up pregnancies with induced abortions. Surprisingly, 29.3% of the premarital pregnancies turned out to be live births. However, for legal pregnancies within marriage, 92% of the first pregnancies ended with live births, and 4.7% of the first pregnancies ended with induced abortion. Apparently, premarital pregnancy is more likely to be ended with induced abortion. There is a significant increase in the probability of premarital abortions in 1990s, while the probability of premarital births keeps declining. In other words, women having premarital pregnancies are more likely to have induced abortions in the 1990s. Figure 2 clearly shows this change.

(Figure 2 here)

China has strong policy against out-of-policy births. If a premarital birth were the result, a woman would face many tough situations. Probably, the most difficult one is *Hukou*, or household registration. Premarital births, apparently out-of-policy, have to undergo severe procedures in order to get their legal registration[12]. Meanwhile, unlike some Western countries, there is no welfare program for premarital births or single motherhood in China. Women with premarital births might face economic disadvantage, opportunity cost, and social discrimination. It would be very instrumental to study what affects woman's decision to choose premarital birth or premarital abortion.

Usually, Results of premarital pregnancies will exert both visible and invisible impacts on women's later lives. Lots of life course studies illustrated the importance of premarital

[12] Usually, it's very hard to have a premarital birth registered. The normal procedure involves monetary penalty, proof from hospital of delivery, proof from local public security bureau.

pregnancy on individual's later life-course transitions and trajectory (for example, Dush et al. 2003). Premarital pregnancy is a very common reason for early marriage and induced abortions. Premarital pregnancy is also found to cause marital instability. Pregnancy and childbirth among unmarried adolescents often results in severe adverse health, social, and economic consequences. Many US studies reported that these consequences include a higher percentage childbirth complications; a higher incidence of low birth weight babies; a higher infant mortality and morbidity; a greater likelihood of divorce divorce; a decreased likelihood of completing schooling; and higher risks of unemployment and welfare dependency.

In China, consequences associated with premarital sexuality for women could be both physical and psychological, both individual and social. Psychologically, woman will encounter tremendous mental pressures, such as scary, self-abasement, regrets. Physically, a woman might have some syndrome including bleeding, confliction, menopause, etc, particularly after induced abortion. Premarital sexuality could put a woman in the disadvantaged position in her love relationship. Her partner could easily dump her with some easy excuses. Most seriously, premarital sex could overshadow the future marriage and lead to unhappy marital life. Furthermore, premarital pregnancies could bring social stigmatization against women in China. The negative impact might be less if the premarital pregnancy involves only prospective spouses, despite that the parents from both sides will be very upset and embarrassed (Yan 2002). Otherwise, a premarital pregnancy could cause serious trouble for a woman if the woman's partner has not been socially identified. Whatever the outcome of the pregnancy, the woman's reputation in that village is completely damaged. Usually, she would lose her opportunity to marry a man from the same village. The only choice for her might be to marry a man from another area where people know nothing about her past.

When to marry, even whom to marry, is closely related with the results of premarital pregnancies. In many Chinese areas, whether a woman has premarital pregnancy or abortion, she should get married as soon as possible, because both her family and herself don't want to be humiliated and lose face. However, things seem to be changed a lot. In Yan's fieldwork at northeast China village, he found that premarital sex did not affect women reenter the local

marriage market. There are two pathways the woman will face: marry with the man who makes her pregnant or marry someone else. To marry with her original 'troublemaker' is straightforward and quite understandable. However, to marry someone else has many other issues involved. She usually marries someone who does not know very well about her past, particularly her pregnancy experience. If the pregnancies were ended by induced abortion, there would be relatively less damage on women's social reputation, compared to premarital births. Therefore, we expect that women with premarital abortion are more likely to get married quickly. Premarital birth is worse than premarital abortion. One obvious trouble is that it takes longer time (10 months) to carry the baby to full term. Another trouble is how to handle the child. Because of the strict family planning policy in China, some women might send the child to some families just for adoption. In the rural areas, the scenario could be different, because people tend to be more permissive and tolerant on premarital abortions or premarital births. Because of the strict family planning policy and difficulty in household registration system, it is very difficult to have premaritally-born children adopted. Premarital births have to be raised by the women or their families.

Because of the problems associated with premarital pregnancy, Chinese women with premarital pregnancies are more likely to have late marriage. This is different from what has been found in the US, where premarital pregnancy leads to early marriage. According to the 2001 FPRH Survey, the average age at first marriage for women with premarital pregnancies is 22.846, while the average for all women who married after 1980 is 21.854[13]. Not surprisingly, the average age at marriage is significantly higher for women with premarital pregnancies. Since we cannot control all possible confounding factors, we cannot claim that premarital pregnancy delay first marriage. Nevertheless, premarital pregnancy does show its influences on first marriage. From our data, the median interval between ends of premarital pregnancies and first marriage is about 9 months for these women, while the mean interval is about 15 months (15.149, s.d.=19.202). Table 3 shows the pace of getting married for women with premarital pregnancies by different characteristics. In Table 3, we present the proportion of women remaining unmarried at different times after their premarital pregnancies, with the

[13] The significantly higher age at first marriage for women with premarital pregnancies is consistent with Wang and Yang's finding about the relationship between age at marriage and premarital conception (1996).

classification of different characteristics we used in previous analysis of social and institutional factors might affect timing of first marriage. From this table, we found that urban women would spend more time to enter marriage than rural women after premarital pregnancies. The differences among women with different educations are small. However, women with junior high education show slowest pace to get married. Women's transition to first marriage also displays different patterns across periods. It took women shorter time to enter marriage in the 1990s. The transition pattern varies greatly depending on different pregnancy outcomes. Having a premarital boy will keep women unmarried for a longer period of time compared with having a premarital girl or premarital abortion. Because the descriptive approach used in Table 3 cannot consider the effects of all independent variables simultaneously, we have to build a multivariate model.

(Table 3 here)

We use event history model to examine the impact of premarital pregnancy on women's transition to first marriage[14]. Since both dates of premarital pregnancy and first marriage are measured in month and year, it is more appropriate to adopt the discrete-time event history analysis (Allison 1982, 1995, Singer and Willet 1993). We choose month as the period unit because over half of women get married within a year after their premarital pregnancies. Meanwhile, Choosing year or half-a-year as period unit will fail to reveal the internal variation of hazard. The starting point of analysis is defined as the ending date of premarital pregnancy[15]. Since all women in the sample have at least one premarital

[14] As we said before, the effect of premarital pregnancy on first marriage can only be identified if we could control all possible covariates. However, in event history analysis, we can only define the risk of marriage starts from the termination of pregnancy or beginning of pregnancy for women with premarital pregnancies. But we don't know precisely the onset of marriage risk. Or in other words, we don't know clearly when women begin to consider marriage seriously. Therefore, we focused our analysis on interval between pregnancy and marriage.

[15] Some people might argue that there are some problems in the definition of starting point for event history analysis, that is, the ending date of premarital pregnancy. It is reasonable and understandable because it takes longer time to have a birth (after 9-10 months) than to have an abortion (usually in the first trimester). Using ending date of a pregnancy as the starting point of analysis does not necessarily mean that women start to risk marriage only after pregnancy. Women's risk of marriage can begin anytime after they become mature, either physically or mentally. Choosing ending date of pregnancy as the starting point implies that we are analyzing the interval between end of pregnancy and getting married. It would be quite interesting to think about when woman begin to consider getting married: immediately after she knew she's pregnant, or after end of pregnancy?

pregnancy and the data were retrospective, there is no right-censored case in the data. The inclusion of independent variables is determined by both variable availability in survey and theoretical consideration. We use almost the same set of independent variables as we used in analyzing premarital pregnancy in the last section.

Table 4 reports the results of a series of event history models. In Model 1, we only test the effects of different pregnancy outcomes and age at pregnancy on transition to marriage. We found that transition to the first marriage was greatly dependent on the outcomes of premarital pregnancies. If the outcome of pregnancy is a baby girl, there is no significantly in hazard of marriage compared to premarital abortion. However, having a baby boy significantly decrease the hazard of first marriage. In other words, if a pregnancy is carried full-term and ended in a live birth of baby boy, transition to marriage could be delayed. There is no significant difference between a premarital baby girl and a premarital abortion in terms of their impacts on timing of marriage. However, the effect of abnormal pregnancy is quite surprising. If a premarital pregnancy ends in a stillbirth or spontaneous abortion, the woman tend to get married soon. Women's ages at premarital pregnancies also play significant roles in determining the timing of first marriage. The relationship between women's ages and hazard of marriage is nonlinear. Before a woman reaches 25 or 26, the older she is when getting pregnant, the higher the hazard of getting married. But after 25 or 26, the higher the woman's age, the lower the hazard of getting married.

(Table 4 here)

In Model 2, we add education variable and period variable. There is no significant difference among women with different educations in terms of their transition from premarital pregnancy to the first marriage. There is also no difference between premarital pregnancies ended in different periods. Unlike the likelihood of premarital pregnancy that shows the increasing trends in periods, the timing of marital transition does not differ significantly between 1980s and 1990s.

In Model 3, we add residence variable, geographic region variable, and interaction between residence and education. From the model, we didn't find any regional difference in women's transition to first marriage after premarital pregnancies. Since rural women in China have significantly lower average education than their urban counterparts, we would expect the effect of education could be different between rural and urban areas. In this model, we found a significant interaction effect between residence and education. For women with low or high education, residence has no influences on their transition to first marriage. But for women with junior high school education, their transition to first marriage does depend on their residence. Interesting, it on average takes more time for urban women with junior high education to get married than rural women.

Based on the result of model, we estimate the baseline survival function using the SAS program[16]. Figure 2 illustrates the baseline survival function of getting married for all women with premarital pregnancies. In Figure 3, we differentiate different transition patterns among women with premarital pregnancies by their pregnancies results. We can see clearly how different pregnancy outcomes affect woman's transition to marriage. In Figure 4, we present the interaction effect between residence and education on woman's transition to marriage. In the panel showing junior high education in Figure 4, we can see the line for urban women is over the line for rural women throughout the specified period of time, indicating a significantly different transition pattern.

(Figure 2, 3, and 4 here)

Summary and Discussion

China has been undergoing tremendous social change in sexual culture in the past several decades. Premarital sex and premarital pregnancy, used to be prohibited, now become much more permissive. From the 2001 China Family Planning and Reproductive Health

[16] We use discrete-time event history model (logistic regression based on person-period data), suggested by Allison (1982), to test the hazard pattern. The result shows clearly a nonlinear relationship between hazard and time interval (Result are not shown in the tables). The figures shown here were based on baseline survival function from Cox model (PROC PHREG in SAS).

Survey, we found that about 2% of total pregnancies after 1980 were premarital abortions or premarital births. About 11% of Chinese women have premarital conception experiences. Basically, we found that premarital pregnancies kept increasing in China in the last two decades.

In this paper, we analyzed determinants of having premarital pregnancies. We found that urban women have higher odds of premarital pregnancies than rural women. More than half of the premarital pregnancies ended with induced abortions. There is also significant period and regional difference in the likelihood of premarital pregnancy, which is consistent with the argument of socioeconomic effect on premarital sexuality. We also found woman's age is negatively associated with premarital pregnancy. Premarital pregnancy is more likely to occur among younger women. Education is also a very important determinant of premarital pregnancy. Women with junior high education or higher have significantly higher odds of premarital pregnancy than women with lower education.

In our analysis, we also examined women's transition from premarital pregnancy to first marriage. With regard to the first marriage, woman's age play a very most significant role. However, age effect on first marriage for a woman with premarital pregnancy experience is nonlinear, depending on the woman's actual age. The result of premarital pregnancy also has significant effect on timing of first marriage. The timing of first marriage greatly depends on how a premarital pregnancy ends up with. If a premarital pregnancy leads to a live birth, it will delay marriage timing. Premarital births are quite different from premarital abortions in terms of their effects on first marriage. It is understandable that women having premarital abortions spend less time to get married than those with premarital births. One reason is that abortion usually is conducted in the first trimester of pregnancy, while birth needs pregnancy to be carried into full term. So there is a 6-to-7-month interval between premarital abortion and premarital birth in terms of the time to finish. Why premarital baby girl reduces the interval compared to a baby boy? We think there are two possible explanations. The first one is adoption. The second one is sex preference. Baby girl from premarital birth could be easily sent for adoption than baby boy. There is no significant difference in transition pattern between women with premarital girls and premarital abortion.

We found that there is also an interaction effect between education and residence, specifically between junior high education and rural residence, on women's transition to marriage. Urban women with junior high education have significantly lower hazard of entering marriage than rural women with junior high education.

The education effect is quite interesting and need more elaboration. As Chang pointed out, the level of being open or being Westernized does not indeed positively related to the amount of schooling, because high education might also lead to acceptance of Chinese culture (1996). Our analysis of premarital pregnancy indicates that both junior high education and high school education are associated with higher likelihood of premarital pregnancies. But the difference between the effects of junior high and high school is very small. So openness or exposure to Western ideology alone seems unable to explain premarital pregnancy completely. Previous studies already pointed out that ignorance, negative attitudes about contraception, lack of awareness of pregnancy risks, lower moral reasoning and a general lack of knowledge about sex and birth control are some reasons that adolescents do not use protection in sex (Garenne et al. 2000, Kimmel and Weiner, 1994). We believe that their limited contraceptive knowledge and lack of awareness of pregnancy risks also contribute to the high risk of premarital pregnancy for women with junior high or high school education. In our analysis of first marriage, women with junior education display different transition pattern to first marriage[17]. The reason for this lies in other characteristics associated this group of women. Usually, women with junior high were not dropout students, but they fail to qualify the entrance test for high school. When they enter society, women with junior high education are with very low chance of having a decent job. Particularly for women in urban areas, junior high education, bad job, and premarital pregnancy will put women in very disadvantaged position in the marriage market. This will accelerate transition to marriage because these women will have very limited bargaining power.

[17] In another analysis not reported here, we found that women with junior high education also display different pattern of premarital pregnancies. In a logistic regression based on only women with premarital conceptions and premarital pregnancies, junior high education significantly increases woman's risk of premarital pregnancy, compared to primary education or high school education.

Focusing on traditional socio-demographic factors alone could not help to understand what determines the occurrence of premarital pregnancy and the timing of first marriage after a premarital pregnancy (Teachman and Polonko 1984). Many scholars suggested it is convincing to put premarital pregnancy in the context of other life events in woman's life course, particularly nonfamilial working experience (Chang 1996, Wang and Yang 1996). Accordingly, women who have nonfamilial living and working experiences are more likely to engage in premarital sex. Studies have revealed that female migrant workers from rural areas are in fact sexually active (Pan, 1999). Our finding that women from some provinces have higher odds of premarital pregnancy is supportive for this argument, because these provinces are major sources of migrant workers. Longitudinal record of women's nonfamilial work experiences also helps to understand when and where premarital pregnancy occurs, in the work places or in their hometowns. It will help us to understand the geographic distribution of premarital pregnancy. In our analysis geographic division of provinces into three regions might not be a good approach. Probably we should divide geographic regions by the proportion of female migrant workers, either out-migrants or in-migrants, if we had known women's nonfamilial work experiences. Besides, longitudinal information on women's partner would be quite useful for future studies, because we don't know whether women changed their partners or not. But this information seems to be very difficult to solicit.

Based on this analysis, we think that there are three more important questions that deserve further examination. The first one is when women begin to think about marriage seriously, at the beginning of premarital pregnancy or at the end? Women's awareness about marriage helps us to understand their involvement in premarital sex and why they have premarital pregnancy. It is very possible that a woman might use premarital sex or premarital pregnancy to facilitate their transition to marriage if she wants to marry a man. The second question is why some women carry pregnancy to full term and end with live birth, while other women choose to have abortion. As we discussed above, this question also help us to understand their transition to first marriage. It would be implemental to make separate analysis for premarital birth and premarital abortion: why birth? And why Abortion? The third question is how premarital pregnancy change women's value at marriage market.

Whether women with premarital pregnancies find husband in local area or remote area? Marriage market is also very helpful for understanding the transition after premarital pregnancy.

In our analysis, we definitely didn't claim that the data represent the actual situation of premarital pregnancies in China, because it is really a very difficult issue to survey. Despite the survey is nationally representative and is claimed to have good quality, we didn't claim that this study yielded a complete picture of premarital pregnancy in China. We believe that there must be under-report of non-report in premarital pregnancy, which needs more advanced research techniques to explore. However, we do believe the reported premarital pregnancies are in fact true and deserve serious analysis. Because of the data limitation, we cannot overgeneralize our conclusion. We examined and understood this topic with great caution. We hope that this study could help to generate some provoking discussion on premarital pregnancies in China.

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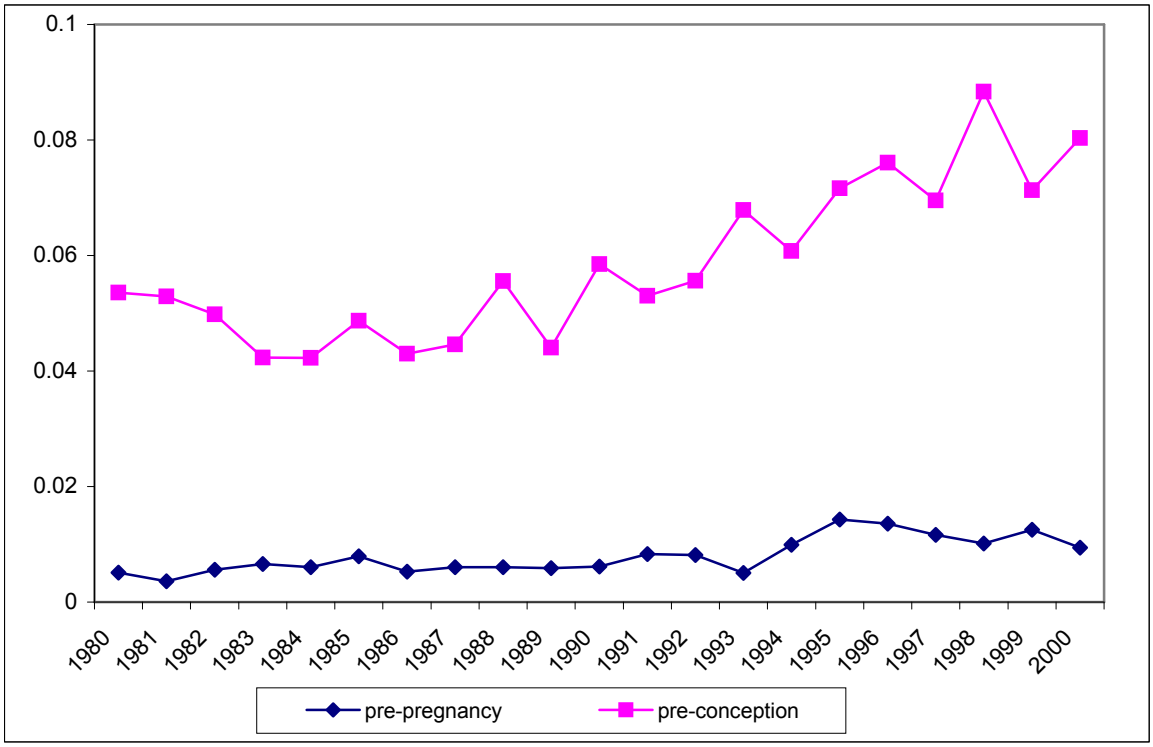
Tables and Figures

Table 1. Frequency distribution and odds of premarital pregnancies by different characteristics of Chinese women, 1980-2001

Variables		In Sample	Premarital
Place of Residence			
	Rural	0.745	0.650
	Urban	0.255	0.350
Age at first pregnancies		23.113	21.111
Ethnicity			
	Han	0.905	0.929
	Ethnic Minority	0.949	0.071
Education			
	Primary school or less	0.465	0.354
	Junior high school	0.368	0.478
	High school or above	0.167	0.168
Region			
	Coastal Provinces	0.431	0.470
	Central Provinces	0.431	0.500
	Western Provinces	0.138	0.030
Year of Premarital pregnancy			
	1980-1984	0.225	0.153
	1985-1989	0.271	0.241
	1990-1994	0.243	0.258
	1995-2001	0.262	0.348

N=27684, in which 477 women with premarital pregnancies.
Source of Data: 2001 China Family Planning and Reproductive Health Survey

Figure 1. Odds of Premarital Pregnancy and Premarital Conception for Chinese Women, 1980-2000



Source of Data: 2001 China Family Planning and Reproductive Health Survey

Table 2. Coefficients of logistic regression on premarital pregnancy among ever-married women whose first pregnancies were after 1980, China 1980-2001.

	Model 1		Model 2		Model 3	
Variables	b	odds	b	odds	B	odds
Intercept	4.283***		4.415***		3.554***	
	(0.443)		(0.459)		(0.491)	
Residence: Rural	-0.774***	0.461	-0.815***	0.443	-0.885***	0.413
	(0.113)		(0.114)		(0.115)	
Urban	--		--		--	
Age at Pregnancy	-0.367***	0.693	-0.386***	0.680	-0.401***	0.670
	(0.020)		(0.021)		(0.021)	
Ethnicity: Minority	-0.566**	0.568	-0.641***	0.527	-0.415*	0.660
	(0.184)		(0.185)		(0.185)	
Han	--		--		--	
Education						
Primary or less	--		--		--	
Junior High	0.640***	1.897	0.554***	1.741	0.567***	1.763
	(0.109)		(0.110)		(0.110)	
High School or above	0.620***	1.860	0.568***	1.765	0.605***	1.831
	(0.165)		(0.166)		(0.167)	
Period of Pregnancy						
1980-84			--		--	
1984-89			0.077	1.080	0.063	1.065
			(0.152)		(0.153)	
1990-94			0.353*	1.423	0.361*	1.434
			(0.151)		(0.151)	
1995+			0.809***	2.246	0.825***	2.281
			(0.145)		(0.146)	
Region						
Coastal Provinces					1.392***	4.022
					(0.209)	
Middle Provinces					1.302***	3.675
					(0.208)	
West Provinces					--	
Likelihood Ratio	405.143		451.134		515.618	
d.f.	5		8		10	

Note: *P<0.05, **P<0.01, ***P<0.001
N=27684, Premarital pregnancy=478
Source: 2001 China National Family Planning and Reproductive Health Survey.

Figure 2. Percentages of live births and abortion after premarital pregnancies and conceptions, respectively, among Chinese women 1980-2000.

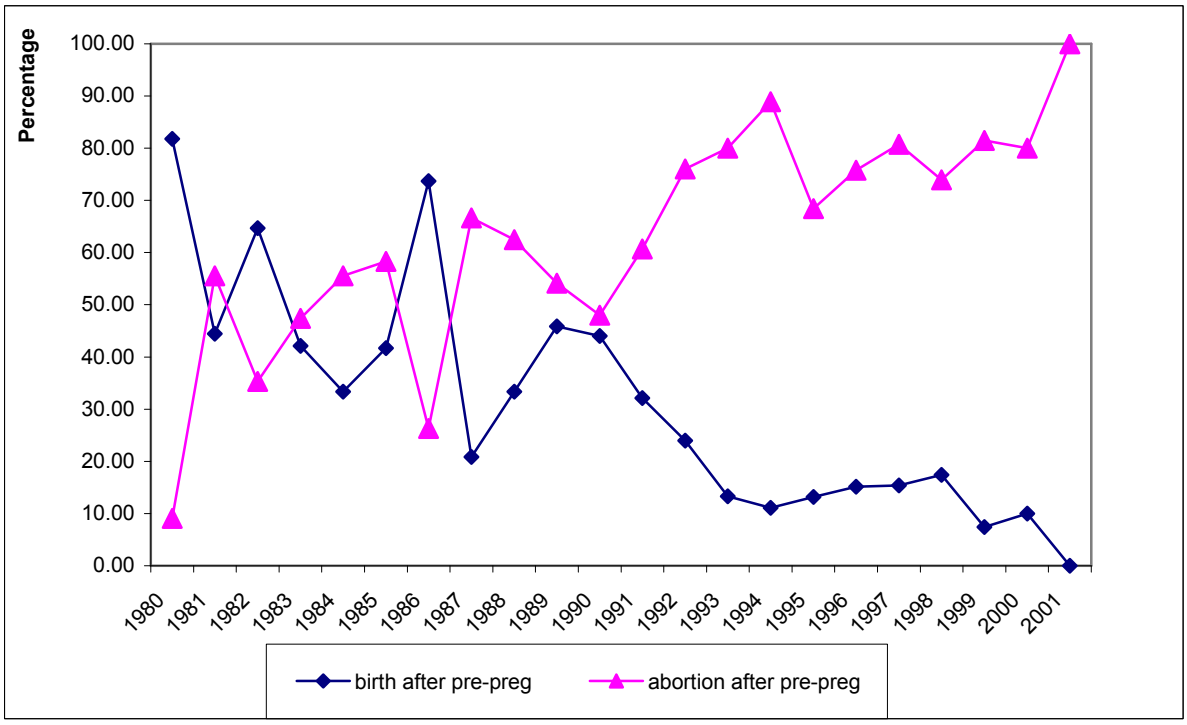
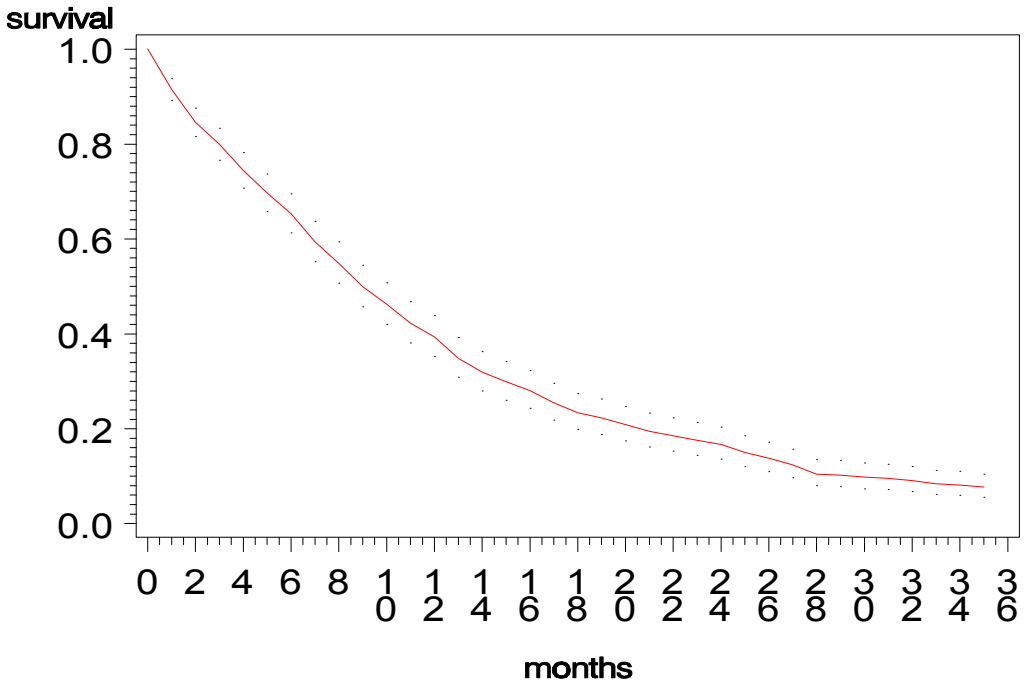


Table 3. Cumulative percentages of getting married after end of premarital pregnancy for Chinese women,

Months	3	6	9	12	15	18	21	24	Mean Interval	Standard deviation
Place of Residence										
Urban	0.144	0.293	0.419	0.569	0.677	0.743	0.796	0.814	15.455	18.684
Rural	0.180	0.334	0.492	0.598	0.688	0.743	0.778	0.814	14.984	19.504
Education										
Low	0.159	0.335	0.488	0.606	0.706	0.759	0.788	0.818	14.314	16.997
Middle	0.184	0.325	0.469	0.583	0.693	0.741	0.798	0.820	15.759	22.032
High	0.138	0.275	0.413	0.563	0.613	0.713	0.738	0.788	15.175	14.493
Year of pregnancy										
1980-1984	0.135	0.351	0.514	0.595	0.635	0.662	0.743	0.757	19.904	29.916
1985-1989	0.148	0.296	0.461	0.626	0.739	0.791	0.817	0.852	14.087	17.236
1990-1994	0.114	0.252	0.382	0.537	0.626	0.683	0.732	0.772	18.130	20.844
1995-2001	0.235	0.374	0.512	0.596	0.711	0.789	0.819	0.843	11.584	10.795
Outcome of Pregnancy										
Boy	0.213	0.307	0.413	0.507	0.547	0.560	0.613	0.653	26.560	34.609
Girl	0.212	0.439	0.530	0.682	0.742	0.788	0.803	0.818	14.662	20.406
Abortion	0.133	0.275	0.440	0.560	0.685	0.758	0.805	0.838	13.338	12.349
Other	0.227	0.455	0.682	0.864	0.864	0.955	0.955	0.955	7.229	6.330

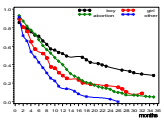
Source of data: China Family Planning and Reproductive Health Survey 2001

Figure 3. Proportion of women remaining unmarried month after premarital pregnancy, China 1980-2001



Source of data: 2001 China Family Planning and Reproductive Health Survey

Figure 4. Proportion of women remain unmarried months after first premarital pregnancies, China 1980-2001



Note: Baseline survival function under Model 3.
Source of data: 2001 China Family Planning and Reproductive Health Survey

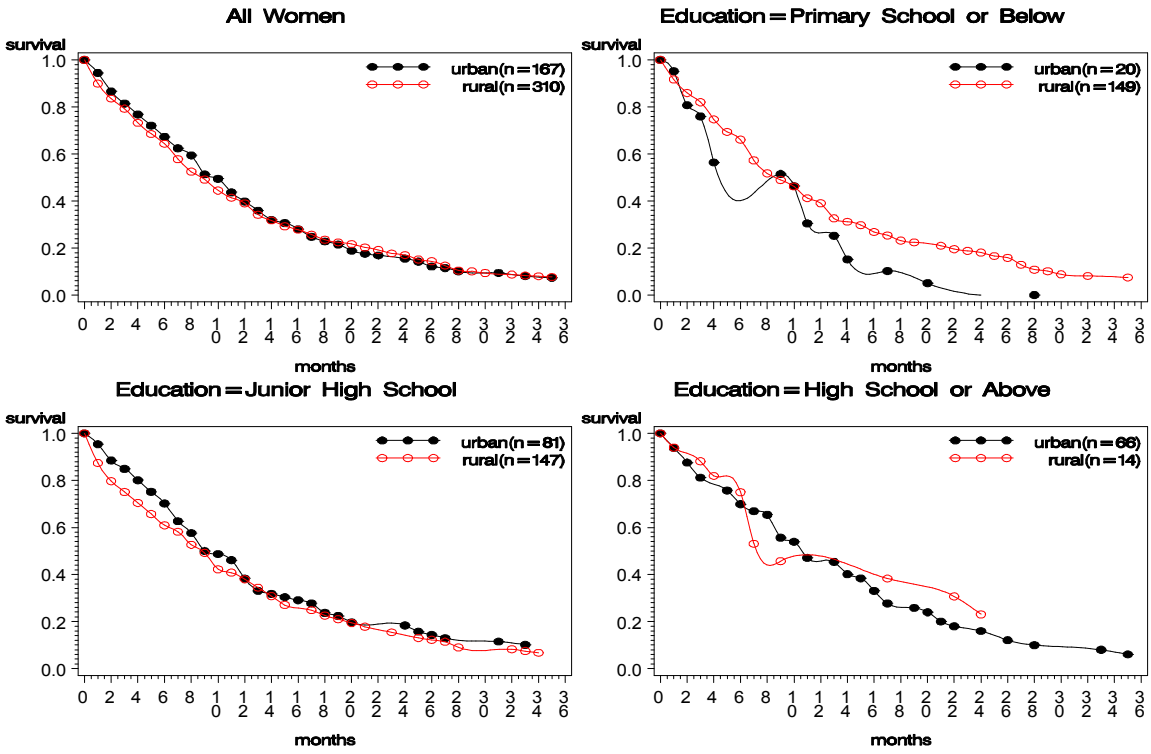
Table 4. Coefficient of Discrete-Time Cox Survival Model on First Marriage for Women with Premarital Pregnancies, China 1980-2001

Variables		Model 1		Model 2		Model 3	
		b	Odds	b	Odds	b	Odds
Pregnancy Outcomes	Boys	-0.558***	0.573	-0.693***	0.500	-0.745***	0.475
		(0.143)		(0.155)		(0.162)	
	Girls	0.009	1.009	-0.108	0.898	-0.127	0.881
		(0.145)		(0.152)		(0.156)	
	Other	0.599***	1.821	0.572***	1.772	0.569**	1.766
		(0.194)		(0.195)		(0.196)	
	Induced Abortion	*r.c.*		*r.c.*		*r.c.*	
Age at Pregnancy		0.571***	1.770	0.578***	1.783	0.595***	1.814
		(0.151)		(0.154)		(0.160)	
	Age squared	-0.012***	0.988	-0.012***	0.988	-0.012***	0.988
		(0.003)		(0.004)		(0.004)	
Edu	High School or Above			-0.252	0.777	-0.480	0.618
				(0.152)		(0.276)	
	Junior High School			-0.132	0.877	-0.576*	0.562
				(0.110)		(0.268)	
	Primary School or Below			*r.c.*		*r.c.*	
Period	1980-1989			*r.c.*		*r.c.*	
	1990 -2001			-0.172	0.842	-0.163	0.849
				(0.108)		(0.109)	
Residence	Rural					-0.305	0.737
						(0.259)	
	Urban					*r.c.*	
Region	Coastal					-0.139	0.870
						(0.293)	
	Middle					0.050	1.052
						(0.287)	
	Western					*r.c.*	
Interaction							
	Rural*High school					0.021	1.022
						(0.401)	
	Rural*Junior High					0.610*	1.841
						(0.298)	
Likelihood Ratio		65.258		71.062		80.377	
d.f.		5		8		13	

Note: The coefficients associated with discrete time intervals are not shown in this table.

*P<0.05; ** P<0.01; *** P<0.001. 'r.c.' stands for reference category. Standard errors are in parentheses.

Figure 5. Proportions of women remaining unmarried months after premarital pregnancy by education and residence, China 1980-2001



Source of data: 2001 China Family Planning and Reproductive Health Survey