Research Article

The role of premarital cohabitation in the timing of first birth in China

Lijun Yang

Contents

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Abstract

BACKGROUND
Premarital cohabitation has become an increasingly popular pathway to marriage in China. However, we lack studies on its role in the timing of first birth.

OBJECTIVE
Motivated by the "second demographic transition" (SDT) theory, three questions are examined: (1) Does cohabitation accelerate the timing of first birth via premarital conceptions? (2) Are cohabitants who are not pregnant at the time of marriage more likely to delay parenthood than non-cohabitants? (3) Does the association between premarital cohabitation and the timing of first birth vary by birth cohort?

METHODS
Information regarding premarital cohabitational experience and age (in months) at first birth was collected from 7,310 women in the 2010–2018 China Family Panel Studies (CFPS). The role of cohabitation in the timing of first birth was evaluated using a discrete time competing-risk model.

RESULTS
Premarital cohabitation accelerates the timing of first birth by increasing the risk of premarital conceptions, but it delays first birth conceived within marriage. The fertility-accelerating effect of premarital cohabitation rebounds in the post-1980s generation after a temporary decline between the 1960s and 1970s birth cohorts, while the fertility-delaying effect of cohabitation has been consistently observed without any sign of decline or rebound over time.

CONCLUSIONS
The contradictory role of premarital cohabitation in the timing of first birth in China exemplifies a complex interplay between the tendency for path dependency and nonconformist value reorientations in the SDT. The rebound of the fertility-accelerating

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[1] School of Social Development and Public Policy, Beijing Normal University, China.
   Email: lijunyg@hotmail.com.

effect of cohabitation among the post-1980s generation suggests that the two contradictory roles of cohabitation will likely coexist for a long time.

1. Introduction

Living together before marriage has become an increasingly popular way to transition to marriage in China. Between 1980 and 2010, the percentage of Chinese marriages preceded by cohabitation increased from 4% to 40% (Yu and Xie 2021). Empirical studies that attempt to understand the role of cohabitation in family formation have disproportionately focused on the reasons for cohabitation (Zhang 2020) and the effects of cohabitation on age at marriage (Liang 2020), divorce proneness (Zhang 2017), and the division of housework (Song and Lai 2020). A few studies that relate cohabitation to childbearing are affected by the research emphasis in the West and have exclusively focused on the relationship context of childbearing (e.g., Pu 2008; Zhang 2021), while the role of cohabitation in the timing of first birth (including both births conceived within and outside of marriage), has received no attention, although the cohabitation/fertility relationship has long been posited by theorists of the second demographic transition (SDT) as a vital indicator of the contour of the evolution of family and subreplacement fertility (Lesthaeghe 2010).

In particular, although the diffusion of cohabitation corresponds to simultaneous increases in age at first birth, the decline in the total fertility rate (TFR) in China (Raymo et al. 2015), and increasing diversity in the timing of first birth (Zhao and Zhang 2018), no attempts have been made to link cohabitation to these changes in fertility. The implication of cohabitation for fertility is largely inferred from the association between cohabitation and age at marriage (Liang 2020). An implicit assumption is that Chinese people marry to have children, and cohabitation plays a part in a marriage's initial period. However, attitudinal data suggest that this assumption may not hold across the entire population because a shift from a child-centered to adult-centered family culture has been observed among Chinese people who cohabited before marriage (Yang 2019).

The present study has two goals. The first goal is to expand our understanding of the landscape of childbearing and to relate women's premarital cohabitational experience to the timing of first marital birth. The second goal is to offer a perspective on the temporal evolution of SDT patterns by tracking the role of premarital cohabitation in the timing of first birth across three successive birth cohorts of Chinese women, distinguishing births conceived within marriage from those conceived outside of marriage.

Motivated by two aspects of SDT theory, namely, the identification of four developmental stages in the SDT and the stress on the complex interplay between

nonconformist value reorientations and a tendency for historical path dependency in the process of family formation, three questions on the role of cohabitation in the timing of first birth and cohort differentials are examined: (1) Does cohabitation accelerate the timing of first birth via premarital conceptions? (2) Are cohabitants who are not pregnant at the time of marriage more likely to delay the timing of first birth than Chinese women who marry without premarital cohabitation? (3) Does the association between cohabitation and the timing of first birth vary among women from different birth cohorts?

2. The emergence of cohabitation as a prelude to marriage in China

A central proposition of SDT theory is that the SDT is a global phenomenon (Lesthaeghe 2020). A country's position on the developmental trajectory of the SDT sheds significant light on the role of cohabitation in the timing of first birth. Four developmental stages are identified and distinguished by different roles of cohabitation in the family formation process: (1) a residential arrangement practiced mainly by a small 'deviant' group of people, (2) a prelude to marriage, (3) an alternative to marriage, and (4) a substitute for marriage (Heuveline and Timberlake 2004). The transition from one stage to the next is characterized by a progressive differentiation of sexual activity from the exigencies of reproduction and increasing rates of nonmarital cohabitation and nonmarital births.

Cohabitation before marriage has emerged and become more popular as China has sped up its transition from a planned to a market economy and become more involved in the world economy (Raymo et al. 2015). Alongside rapid socioeconomic development, individual desires for privacy, autonomy, and free sexual expressions were unleashed. The age of first sexual intercourse was lowered (Parish, Laumann, and Mojola 2007). The link of sex to marriage was less emphasized compared to that of love, emotion, and mutual attractions (Yeung and Hu 2016). Cohabitation, which had been considered immoral and unethical, is now increasingly perceived as a personal matter (Pan 2006) and is accepted (Zheng et al. 2001) and practiced by more young adults of a new generation (Yu and Xie 2021).

However, due to the lingering Confucian tradition and the slow-changing institutional structures, the linkage of cohabitation with marriage in China manifests two distinctive characteristics. First, the vast majority of Chinese people (particularly women) perceive a close link between cohabitation and marriage (Parish, Laumann, and Mojola 2007), viewing cohabitation more as a prelude to marriage than a trial period for compatibility testing and acceptable only if the couple is engaged or anticipated to become married within a short period of time (Zheng et al. 2001; Zhang 2020). Second, although premarital cohabitation is associated with increased age at marriage and nonmarital birth in societies in the second stage of the SDT (Heuveline and Timberlake

2004), the marriage-delaying effect of cohabitation is weak in China (Parish, Laumann, and Mojola 2007; Liang 2020). There is also no evidence that premarital cohabitation has eroded the privileged status of marriage, which is the only pathway to childbearing for the vast majority of Chinese people (Yu and Xie 2021) and, according to Davis (2014), reflects the prohibitiveness of the marriage laws of China and the hukou system on nonmarital birth.

Accordingly, nonmarital pregnancies, although they precipitate cohabiting in societies where a significant proportion of first births are born in cohabiting unions (Lichter, Sassler, and Turner 2014), are not an impetus to cohabit in China. Available data suggest that most premarital pregnancies in China either end in induced abortions (Zheng and Chen 2010) or are legitimized by a shotgun marriage (Che and Cleland 2003). Indeed, a recent large-scale survey of Chinese women born in 1995 or later (Generation Z) revealed a strict aversion to nonmarital cohabitation as a solution to premarital pregnancy, showing that virtually all Chinese women consider marrying directly if they decide to carry a premarital pregnancy to term (Yangcheng Evening News 2017). Qualitative data suggest that this tendency reflects not only the dominant influence of conservative social norms but also the fact that Chinese women who are most likely to conceive a child outside of marriage usually have little reproductive knowledge and determine the pregnancy at a late date; by then, a shotgun marriage is probably the only feasible solution (Zheng et al. 2001).

3. The linkage of cohabitation to the timing of first birth in China

The second aspect of SDT theory that is particularly informative regarding the role of cohabitation in the timing of first birth in China relates to the theory's emphasis on the complex interplay of nonconformist value reorientations and a tendency for historical path dependency in family formation. In societies where the rise of cohabitation is accompanied by increasing diversity in the timing of first birth (such as China) (Zhao and Zhang 2018), this theoretical lens, when combined with the four-stage developmental framework, implies two quite different mechanisms linking cohabitation to the timing of first birth.

First, when the tendency for historical path dependency dominates the process of family formation and childbearing, a short-lived premarital cohabitation may help maintain the early-childbearing culture by increasing the risk of conception, which, in turn, facilitates marriage formation for couples who already have plans in that direction.

Although conception is not normatively expected in the transition from cohabitation to marriage in contemporary China (Wang et al. 2019), the rise of cohabitation since the 1980s nevertheless parallels an upsurge of premarital pregnancies carried to term in

marriage (Ma and Rizzi 2017). The demographic characteristics of Chinese women who conceived their first births outside of marriage indicate that this fertility-accelerating effect of cohabitation is associated with the tradition of early marriage and childbearing, mixed with low rates of contraceptive use (Qian, Tang, and Garner 2004), a high incidence of unintended pregnancies (UNESCO and UNFPA 2018), and a strong belief in fatalism (Herrmann-Pillath 2006). Postconception marriages are more often observed in regions where premarital engagement is popular and among Chinese women of rural origin with a middle school education or less who marry in their late teens or early twenties (Qian and Jin 2020).

Urbanization, particularly large-scale rural-urban migration, has accentuated this fertility-accelerating effect of cohabitation, as it expanded women's scope of geographical mobility, autonomy, and the likelihood of cohabiting before marriage (Gaetano 2008) but did not diminish their connections with their community and the early fertility culture (Goldstein, White, and Goldstein 1997). In the late 1980s, the high incidence of premarital pregnancies among adolescent and young migrant workers was identified as an important factor in increasing fertility rates in China (Yu, Wang, and Yang 1994). Although subsequent declines in the tradition of early marriage and childbearing (Gu et al. 2007) suggest that the fertility-accelerating effect of cohabitation may have decreased over time, the episodic rebound of teen fertility, particularly since 2010 (Luo et al. 2020), suggests that the decline is likely moderate and may have been reversed by the sharp increase in cohabitation among the recent generation of migrant workers (Qian and Jin 2020; Yu and Xie 2021).

The wide availability of health facilities for induced abortions (Qian, Tang, and Garner 2004), coupled with the most lenient abortion laws in the world (Cao 2015), undoubtedly helps curtail any further growth (if not a notable decline) of this fertility-accelerating effect of cohabitation, enabling premaritally pregnant Chinese women to avoid hurrying into an unplanned marriage (Wang et al. 2019). Evidence regarding the mediating role of contraceptive use is spare and less consistent, with some studies indicating no change in contraceptive practice in the transition to cohabitation (Gao, Tu, and Yuan 1997), while more recent studies revealed an active search for modern contraceptives among young women who are most likely to cohabit before marriage (Decat et al. 2011). Nevertheless, the increasing practice of conscious birth control in marriage suggests that it is reasonable to expect similar observations in the prelude to marriage (Wang et al. 2019).

Based on these observations, the first two hypotheses are proposed as follows:

H1: Premarital cohabitation accelerates the timing of first birth via nonmarital pregnancies among adolescents and young adults.

H2: The fertility-accelerating effect of cohabitation, which may have declined for some time, rebounds following a recent sharp rise in cohabitation.

In contrast to the inertia associated with path dependency, both the dynamic component of the four-stage developmental framework and the nonconformist value reorientations in the second aspect of the SDT imply a tendency for convergence in the SDT pattern characterized by premarital cohabitation, later childbearing, and sometimes few children.

To be sure, there is no consistent evidence (as is also the case for some European countries (Lesthaeghe 2010)) indicating that Chinese couples' preferred number of children (two children) has decreased over time (He et al. 2018). What has changed is the purpose for having children, from primarily for fulfilling the duty to the family to increasingly satisfying personal emotional needs (Zheng et al. 2009), with a subsequent decline in the intensity of the constraints of traditional fertility norms on the timing of first birth and increasing tendency for young adults of more recent cohorts to embed first birth timing in the attainment and progression of educational and career goals (Yeung and Hu 2013).

The reasons that young adults give for cohabitation (e.g., Cao et al. 2010; Zhang 2020) suggest that this shift from traditional family values is led by cohabitants in China, such as difficulties in maintaining a balance between work and family, concerns over individual sacrifices required to raise children, and potential harm to health and beauty due to childbearing. A more recent study that directly compared the fertility attitudes of Chinese women with and without premarital cohabitational experience indicated a positive association between premarital cohabitation and low fertility attitudes, finding that cohabitants valued career success more than children, preferred few children, and felt less pressure to have sons, compared to non-cohabitants (Yang 2019).

Although there are no studies on whether differences in fertility attitudes between women with and without premarital cohabitational experience translated into differences in the timing of first birth, trend data indicate this possibility. Between 1975 and 2010, the percentage of Chinese marriages preceded by cohabitation increased sharply (Yu and Xie 2021). China's total fertility rate (TFR) was more than halved, dropping from 3.8 to 1.6 children per woman (Raymo et al. 2015), and the drop was particularly pronounced in metropolitan areas where cohabitation was more prevalent (Guo et al. 2012). The peak of childbearing, although it was not delayed, was lowered over time (Zhao and Zhang 2018), reflecting a simultaneous increase in the diversity of marital and childbearing behaviors since China's total fertility rate dropped below the population-replacement level.

Diminishing governmental programs supporting the patterns of early family formation (such as housing and childcare) (Du and Dong 2010), combined with

increasing levels of educational aspirations and accomplishments (Yang 2018) and prolonged transition onto a firm career path (Yeung and Hu 2013), suggest that the tendency to cohabit before marriage and delay first birth will likely persist or even become stronger as China continues on its current track of demographic transition. Census data have revealed that couples with double incomes and no kids (DINKs) have become increasingly visible in metropolitan cities with a high incidence of cohabitation (Hu and Peng 2015).

Based on these observations, this study proposes the following:

H3: Premarital cohabitation is associated with a delayed timing of first birth for Chinese women who were not pregnant at the time of marriage.

H4: The fertility-delaying effect of cohabitation is greater for younger than for older cohorts of women.

4. Data

The data were drawn from 9,043 women born in the 1960s or later who were first interviewed in the 2010 China Family Panel Studies (CFPS), including 8,526 women who had already married by the 2010 CFPS and 517 single women who married between the 2010 CFPS and the 2018 CFPS. Because the study focuses on premarital cohabitations and the timing of first marital births, 232 women who, by the 2018 CFPS, remained unmarried were excluded. Also excluded were 1,066 single women who dropped between the 2010 CFPS and 2018 CFPS and 500 women who were married by 2010 but whose information on the date of marriage contains logical errors or is missing.

A comparative analysis of the single women who were lost to subsequent follow-up (N = 1,066) and who were successfully tracked (N = 749, including 517 women who married in the follow-up and 232 women who remained unmarried by the 2018 CFPS) revealed no systematic evidence that the two groups of women differed in hukou status and other sociodemographic characteristics, except that women who were lost to follow-up were younger and were more likely to be enrolled in school in 2010. The follow-up issue may therefore arise from geographical mobility associated with educational transition and labor market entry, diminishing our ability to generalize the result to the floating population. However, this follow-up issue is unlikely to cause serious bias in the estimate of the relationship between cohabitation and the timing of first birth. This is because virtually all of the women born in the 1960s and 1970s had already married (99%) and given birth to their first child (95%) by the 2010 CFPS, and two-thirds of the women born in the 1980s or later had married and given birth to their first child by the 2010 CFPS or in the follow-up. Nevertheless, because a large proportion of women who

were lost to follow-up were born in the 1980s or later, this high rate of attrition may limit our ability to identify the cohort trend in the relationship between premarital cohabitation and the timing of first birth.

The analytical sample was obtained by imposing two restrictions on the remaining 9,043 ever-married women. First, because the vast majority of Chinese marriage and childbearing occur between the ages of 18 and 35 and nearly all children were born within marriage (Yu and Xie 2021), women who experienced these two events outside of this age range or bear their first child outside of marriage were excluded. The exclusion of women with an out-of-wedlock birth is also justified by the fact that nonmarital birth is largely the result of the tradition of marriage without registration (or an hun), which differs from the norms underlying the SDT. Second, childbearing experiences in the second or higher order of marriages were also excluded because pre- and postmarital cohabitation and childbearing substantively differ from one another (Brown 2000). After imposing these two restrictions and excluding an additional 176 women with missing values on premarital cohabitational experience, hukou status, and number of siblings and 260 women whose information does not allow for determining whether and when they have their first child, the final sample consists of 7,310 women born in the 1960s and later.

The relationship between premarital cohabitation and the timing of first marital birth was estimated using event history techniques for discrete time data. Because childbearing is an important development task in the transition to adulthood (Lübke 2015), the time at first birth was measured from the month when a woman turned age 18 to the month of first birth or censoring. The observation period was from 216–420 months of age. Information regarding first birth event history in the observation period was compiled in terms of person-months of risk exposure starting at 216 months of age. Because women marry at different ages, late entry was adjusted to ensure that each woman's birth experience was compared to her identically aged (in months) peers (Singer and Willett 2003).

The study distinguishes between two competing risk events: birth resulting from pregnancies outside of marriage and birth resulting from pregnancies within marriage. Two event-specific risk sets are identified. The first risk set is for estimating the hazard probability of first birth resulting from pregnancies outside of marriage. It consists of women who are not yet censored and women who have not experienced the competing risk event. The second risk set is for estimating the risk of first birth resulting from pregnancies within marriage. It includes women who are not yet censored and women who have not experienced the competing risk event. A woman's contribution to the person-months of exposure is equal to the number of months that she is observed since entry into the risk set. In total, 7,310 women contributed 158,935 person-months of exposure.

5. Measurements

5.1 Dependent and independent variables

The dependent variable is a three-category variable distinguishing among (1) no births (reference category); (2) marital first births conceived outside of marriage; and (3) marital first births conceived within marriage. Following England, Shafer and Wu (2012), this study assumes that all pregnancies occurred nine months prior to birth. A marital birth is considered to be conceived outside of marriage if the time interval between marriage and birth is less than nine months, while a birth is considered to be conceived within marriage if the interval is equal to or greater than nine months. This classification clearly introduces some errors, typically misclassifying premature births conceived within marriage as premaritally conceived but postmarital births. However, it provides a relatively standard operating procedure that is largely consistent with the literature. Moreover, the adoption of a more restrictive definition of premaritally conceived but postmarital births does not change the conclusions about the role of premarital cohabitation in the timing of first birth.

Because of a large number of missing data on the beginning time of cohabitation, it is not practically possible to follow the strategy of Manning and Cohen (2015) and use the union status prior to pregnancies to distinguish between women who cohabited before marriage and women who directly married. Rather, premarital cohabitation experience is determined according to women's replies to the question of whether they cohabited with their husbands before marriage. It is coded as a dummy variable.

One problem with this procedure is that it may risk reversing the temporal order of pregnancies and cohabitation. However, as discussed above, the order issue should not be serious in China given the high risk associated with cohabiting to legitimize a pregnancy and strong social norms for shotgun marriage (Ma and Rizzi 2017). Nevertheless, the robustness of the results was assessed by limiting the analysis to births that were born (1) four or more months after marriage, (2) five or more months after marriage, and (3) six or more months after marriage. Because, by definition, cohabitants spend at least three months in nonmarital cohabiting unions, plus the time used to determine the pregnancy and resolve it, which normally ranges from one to three months (Zheng et al. 2001), this procedure ensures that the births remaining for analysis are minimally affected by the order issue.

The measurement issue also precludes identifying the effect of long-duration cohabitation and serial cohabitation. However, previous studies suggest that these two types of cohabitation are rare in China (Zheng et al. 2001; Parish, Laumann, and Mojola 2007) and tend to be concentrated among remarried, widowed, and divorced women and

women who bear their child outside of marriage (Lichter and Qian 2008). Excluding these women, as done in the sample selection, helps minimize their confounding effects.

5.2 Control variables

The environments in which a woman grows up play an important role in her marital and childbearing behavior. This study distinguishes between two dimensions of the environment. The normative environment of society is a three-category variable, distinguishing among women born in the 1960s, the 1970s, and the 1980s or later. The family environment is epitomized by the father's education. Because only 2% of the fathers had attended college, college-educated fathers were combined with fathers who had only a high school degree. The father's education is a four-category variable, distinguishing (1) less than primary school, (2) primary school, (3) middle school, and (4) high school or above. Following Ma and Rizzi (2017), fathers with missing values on education are flagged. The mother's education is not controlled because it does not differ from the father's education in its effect on children's likelihood of cohabiting or conceiving before marriage (Ma and Rizzi 2017) and because including it in the analysis causes collinearity problems. Previous findings indicated that fathers' education reduces the risk of pregnancies outside of marriage (Ma and Rizzi 2017).

Women's own education is a four-category variable, distinguishing among primary school or less, middle school, high school, and college and above. It measures women's educational attainment at the time of marriage. Previous studies indicate an inverse relationship between women's education and age at first birth (Goldstein, White, and Goldstein 1997). Regarding women's education and premarital pregnancies, the pattern is less obvious, depending on measurement precision and coding strategies. Although some studies indicate an inverse relationship between women's education and premarital pregnancies (Qian and Jin 2020), others suggest that the relationship is an inverted U-shape (Ma and Rizzi 2017). Husbands' education is highly correlated with women's education, and including it does not improve the model fit but causes serious collinearity problems. Following Qian and Jin (2020), husbands' education is not included in the analysis.

The number of siblings and hukou status were also controlled. Previous findings indicate that growing up in a large family and having a rural hukou are associated with an increased risk of conceiving outside of marriage (Qian and Jin 2020). Race is not controlled because non-Han ethnicities are highly heterogeneous, including ethnic groups that are virtually assimilated into Han cultures and those that maintain their distinctive traditions and cultures (Xiong and Yang 1989). Table 1 presents the basic information

for women who cohabited before marriage and those who did not cohabit before marriage.

Table 1: Basic information of covariates, women with and without premarital cohabitational experience

|	Whole sample (N = 7,310) %/mean	Cohabitants (N = 951) %/mean	Non-cohabitants (N = 6,359) %/mean
Premarital cohabitation	13.0	1	0
Birth cohorts			
the 1960s cohort	39.7	11.8	43.8
the 1970s cohort	35.6	36.1	35.5
the 1980s cohort	24.7	52.2	20.6
Educational achievement at the time of marriage			
Primary school or less	38.8	22.0	41.3
Middle school	37.3	41.4	36.6
High school	16.6	23.0	15.6
College or above	7.3	13.6	6.4
Father's education			
Less than primary school	31.9	21.5	33.5
Primary school	27.8	28.9	27.6
Middle school	18.2	25.4	17.2
High school or above	10.9	15.0	10.3
Missing	11.1	9.1	11.4
Rural hukou	72.0	64.4	73.2
Number of siblings	2.8	2.1	2.9

6. Results

6.1 Descriptive results

One out of eight Chinese women born in the 1960s and later cohabited with their husbands before marriage. Premarital cohabitation was more prevalent among the younger cohorts of women and women who had gone beyond middle school. Virtually all women included in the analysis (99%) gave birth to their first child during the time of observation, including 27% of women who conceived their first child outside of marriage, 72% of women who conceived their first child within marriage, and 1% of women who had been childless until the end of the observation. Premarital pregnancies were more prevalent among women who cohabited with their husbands before marriage: 46% for women who cohabited before marriage compared to 24% for women who directly married.

Figure 1 presents, by age in months, the proportions of the risk set that experienced either type of birth event as a function of their premarital cohabitation experience. The sample hazard probabilities are estimated using the life-table method. Time to birth is

grouped in such a way that each time interval includes enough birth events to produce reliable estimates. As indicated in Figure 1, the hazard function describing the months to bear a child conceived outside of marriage begins at a low level and increases steadily until reaching a peak at 280–290 months, after which the hazard probability declines steadily. Throughout the observation period, women who cohabited before marriage were at greater risk of giving birth to a child conceived outside of marriage than women who married without prior cohabitation. The gap increases at 220–280 months and stays at a relatively constant level thereafter.

Figure 1: **Sample hazard probability of first birth resulting from pregnancies conceived within and outside of marriage, cohabitants and non-cohabitants (*N* = 7,310)**
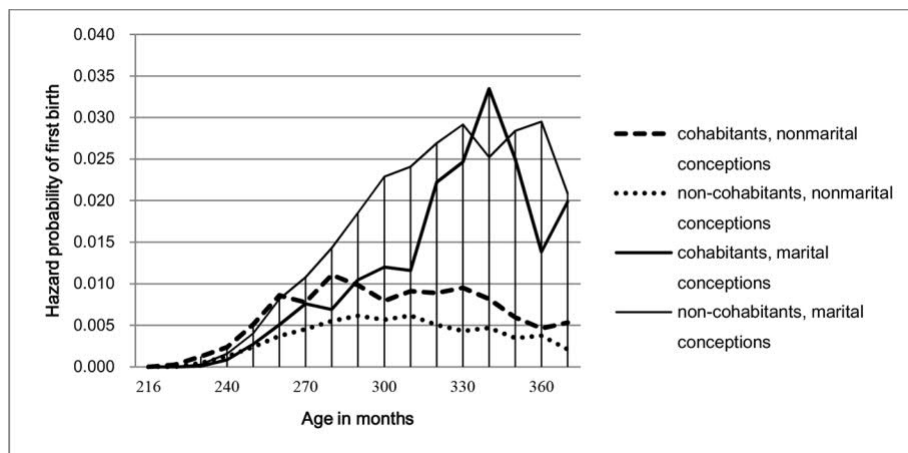
The hazard function describing the age in months to bear a child conceived within marriage also begins at a low level. However, it increases faster and for longer periods of time. The hazard function peaks at 330–340 months, 50 months later than the hazard function describing the months to bear a child conceived outside of marriage. Afterward, the hazard begins to drop steadily, from 0.034 to 0.020 for women who cohabited before marriage and from 0.029 to 0.021 for women who married without prior cohabitation. Except at 340–350 months, the hazard probability is greater for women who directly married than for women who cohabited before marriage in every time interval evaluated.

6.2 Multivariate regression results

The hypothesized relationships between premarital cohabitation and the timing of the two competing birth events are estimated based on a multinomial logit model (Allison 2003). Motivated by plots of the sample hazard functions, the logit of the hazard is specified as a quadratic function of age in months. Differences between cohabitants and non-cohabitants in the temporal position of peaks and troughs of the hazard functions are captured by an interaction term between cohabitation and age in months. Note that the effect of late entry time is not estimated in the model because when the time to first birth is measured in terms of age, the effect of late entry time is absorbed into the effect of time (Singer and Willett 2003). A comparison between models with and without control for the late entry time reveals no notable differences in the coefficients of the covariates.

The discrete-time hazard model is specified as follows:

$$\log\left(\frac{P_{ijt}}{P_{iot}}\right) = B_{0j} + B_{1j}t_{ij} + B_{2j}t_{ij}^2 + B_{3j}Cohabit_i + B_{4j}Cohabit_i \times t_{ij} + \boldsymbol{B_j x_i}$$

where P_{ijt} is the conditional probability that a birth event of type j occurs for person i at time t given that no event has occurred prior to time t. Two competing birth events are identified: birth resulting from pregnancies outside of marriage ($j = 1$) and birth resulting from pregnancies within marriage ($j = 2$). P_{i0t} is the probability that no event has occurred for person i at time t. Event time (age in months) is represented by t_{ij}, which varies from person to person and by event type. $Cohabit_i$ measures whether person i has cohabited before marriage; x_i is a vector of control variables.

Two sets of regression coefficients are obtained, predicting the timing of first birth resulting from pregnancies outside of marriage ($j = 1$) and the timing of first birth resulting from pregnancies within marriage ($j = 2$). The regression coefficients for predicting the timing of first birth resulting from pregnancies outside of marriage versus the timing of first birth resulting from pregnancies within marriage can be derived from subtracting the second set of regression coefficients from the first set of regression coefficients.

The results from the discrete-time survival analysis (Table 2) support the historical path dependency hypothesis and the demographic convergence hypothesis. Living together before marriage accelerates the timing of first birth resulting from pregnancies outside of marriage (B = 1.73, 95% CI = 0.74, 2.71) but delays the timing of first birth resulting from pregnancies within marriage (B = –0.91, 95% CI = –1.69, –0.12). The effect of cohabitation on the timing of first birth resulting from pregnancies outside of marriage is large in the late teens and early twenties and decreases with age, as indicated by the coefficients of the cohabitation by time interaction term (B = –0.004, 95% CI =

–0.01, 0.00). Specifically, the odds of giving birth to a child conceived outside of marriage among cohabitants (versus non-cohabitants) decreases 5% for every 12-month increase in age. The coefficient for the cohabitation by time interaction term (B = 0.002, 95% CI = –0.0002, 0.0049) does not indicate an age gradient (either a positive one or negative one) in the association between premarital cohabitation and the timing of first birth resulting from marital pregnancies.

Table 2: **Discrete-time competing risks model on the timing of first marital childbearing (*N* = 7,310)**

	Birth conceived outside of marriage vs. no births		Birth conceived in marriage vs. no births	
	B	95% CI	B	95% CI
Intercept	−8.74	[− 11.53, − 5.96]	−14.39	[− 15.90, − 12.88]
Age in months	0.04	[0.02, 0.06]	0.07	[0.06, 0.08]
Age in months × Age in months	−0.0001	[0.00, 0.00]	−0.0001	[0.00, 0.00]
Premarital cohabitation	1.73	[0.74, 2.71]	−0.91	[−1.69, −0.12]
Premarital cohabitation × Age in months	−0.004	[−0.01, 0.00]	0.002	[0.00, 0.00]
Birth cohorts (reference = the post-1980s cohorts)				
the 1960s cohort	−0.49	[−0.63, −0.35]	−0.21	[−0.30, −0.13]
the 1970s cohort	−0.33	[−0.45, −0.21]	−0.17	[−0.25, −0.09]
Educational attainment at the time of marriage (reference = primary school or less)				
Middle school	0.26	[0.15, 0.37]	0.004	[−0.06, 0.07]
High school	0.20	[0.05, 0.35]	−0.15	[−0.24, −0.06]
College or above	−0.11	[−0.35, 0.13]	−0.21	[−0.34, −0.07]
Father's education (reference = less than primary school)				
Primary school	−0.07	[−0.19, 0.05]	0.05	[−0.03, 0.12]
Middle school	−0.08	[−0.22, 0.06]	0.02	[−0.07, 0.11]
High school or above	−0.30	[−0.48, −0.12]	−0.06	[−0.16, 0.05]
Missing	−0.09	[− 0.25, 0.06]	0.002	[− 0.09, 0.10]
Rural hukou	0.03	[−0.09, 0.15]	0.01	[−0.06, 0.08]
Number of siblings	−0.01	[−0.04, 0.02]	0.005	[−0.01, 0.02]
Numbers of person-months	158,935		158,935	
Likelihood ratio	38,049		38,049	

Note: 95% confidence intervals in the bracket [lower bound, upper bound]

The positive effect of cohabitation on the timing of first birth resulting from pregnancies outside of marriage is also observed when comparing women who conceived their first child outside of marriage and women who conceived their first child within marriage. The coefficient for the main effect of premarital cohabitation, which can be derived from the corresponding coefficients in the first two columns of the table, is positive (B = (1.73 – (–0.91)) = 2.64, 95% CI = 1.39, 3.88). Specifically, the odds of giving birth to a child conceived outside of marriage (as opposed to within marriage) for women who cohabited before marriage is 14 times (exp (2.64), 95% CI = 4, 48) as high as that for women who directly married. The coefficient for the interaction of cohabitation

with time is negative (B = (–0.004 – 0.002) = –0.006, 95% CI = –0.010, –0.002), suggesting that the positive effect of cohabitation decreases with age in months.

Limiting the analysis to births born after the fourth, fifth, or sixth month of marriage, an analytical strategy used to ultimately ensure that births conceived outside of marriage are either conceived in cohabiting unions or legitimatized directly by a shotgun marriage does not diminish the association between cohabitation and the timing of first birth resulting from pregnancies outside of marriage in Table 2. In fact, evidence for the path dependency hypothesis becomes stronger. The coefficients for cohabitation in models estimating the timing of first birth resulting from pregnancies outside marriage become greater, increasing from 1.73 to 1.90–2.08 (Table 3), while the coefficients for the interaction of cohabitation with time remain largely unchanged. The coefficient for cohabitation in models estimating the timing of first birth resulting from pregnancies within marriage diminishes somewhat after imposing these limits on births, from –0.89 (95% CI = –1.67, –0.10) when the analysis is limited to births born after the fourth month of marriage to –0.74 (95% CI = –1.53, 0.05) when the analysis is limited to births born after the sixth month of marriage.

To test the two trend hypotheses on cohabitation and the timing of first birth, the interplay of birth cohorts with cohabitation as well as cohort differences in the effect of other covariates are explored. Interaction terms that do not improve the model fit are removed. The findings support the rebound hypothesis. The association between premarital cohabitation and the odds of giving birth to a child resulting from pregnancies outside of marriage is reduced by 20% (((1 – exp (–0.23)) * 100%, 95% CI = 37%, 0.00%) between women born in the 1960s and women born in the 1970s, but it does not differ between women born in the 1960s and women born in the 1980s or later (Table 4). Similar magnitude of rebound was also observed when the comparison is between women who conceive their first child outside of marriage and women who conceive their first child within marriage. There is no strong evidence for the proposition that the shift toward older age at birth is led by cohabitants of more recent cohorts, as indicated by the coefficient for the interaction of cohort with cohabitation in the model estimating the timing of first birth resulting from marital pregnancies (B = –0.0003, 95% CI = –0.20, 0.20) (Table 4).

Table 3: **Discrete-time competing risks model on the timing of first marital childbearing, births that were born (1) four or more months after marriage (*N* = 7,005), (2) five or more months after marriage (*N* = 6,873), and (3) six or more months after marriage (*N* = 6,685)**

	Birth conceived outside of marriage vs. no births		
	> = 4 months	> = 5 months	> = 6 months
	B	B	B
Intercept	−10.59	−12.20	−13.64
	[−13.67, −7.51]	[− 15.50, −8.90]	[−17.23, −10.05]
Age in months	0.05	0.06	0.07
	[0.03, 0.07]	[0.04, 0.08]	[0.04, 0.09]
Age in months × Age in months	−0.0001	−0.0001	−0.0001
	[0.00, 0.00]	[0.00, 0.00]	[0.00, 0.00]
Premarital cohabitation	2.08	1.94	1.90
	[0.99, 3.17]	[0.77, 3.11]	[0.59, 3.21]
Premarital cohabitation × Age in months	−0.005	−0.005	−0.005
	[− 0.01, 0.00]	[− 0.01, 0.00]	[− 0.01, 0.00]
Numbers of person-months	158,118	157,443	156,304
Likelihood ratio	36,673.85	35,952.53	34,910.81
	Birth conceived in marriage vs. no births		
	> = 4 months	> = 5 months	> = 6 months
	B	B	B
Intercept	−14.34	−14.27	−14.18
	[− 15.85, − 12.83]	[− 15.78, − 12.76]	[− 15.69, − 12.67]
Age in months	0.07	0.07	0.07
	[0.06, 0.08]	[0.06, 0.08]	[0.06, 0.08]
Age in months × Age in months	−0.0001	−0.0001	−0.0001
	[0.00, 0.00]	[0.00, 0.00]	[0.00, 0.00]
Premarital cohabitation	−0.89	−0.83	−0.74
	[− 1.67, − 0.10]	[− 1.61, − 0.04]	[− 1.53, 0.05]
Premarital cohabitation × Age in months	0.002	0.002	0.002
	[0.00, 0.00]	[0.00, 0.00]	[0.00, 0.00]
Numbers of person-months	158,118	157,443	156,304
Likelihood ratio	36,673.85	35,952.53	34,910.81

Note: 95% confidence intervals in the bracket [lower bound, upper bound]. Control variables are the same as in Table 2.

Table 4: **Discrete-time competing risks model on the timing of first marital childbearing, the interaction between premarital cohabitation and birth cohort (*N* = 7,310)**

	Birth conceived outside of marriage vs. no births		Birth conceived in marriage vs. no births	
	B	95% CI	B	95% CI
Intercept	−8.73	[− 11.51, − 5.94]	−14.37	[− 15.88, − 12.86]
Age in months	0.04	[0.02, 0.06]	0.07	[0.06, 0.08]
Age in months × Age in months	−0.0001	[0.00, 0.00]	−0.0001	[0.00, 0.00]
Premarital cohabitation	1.67	[0.68, 2.66]	−0.93	[− 1.72, − 0.15]
Premarital cohabitation × Age in months	−0.003	[− 0.01, 0.00]	0.002	[0.00, 0.01]
Premarital cohabitation × The 1970s cohort	−0.23	[− 0.47, 0.00]	−0.0003	[− 0.20, 0.20]
Birth cohorts (reference = the post-1980s cohorts)				
the 1960s cohort	−0.46	[− 0.61, − 0.32]	−0.26	[− 0.35, − 0.16]
the 1970s cohort	−0.27	[− 0.41, − 0.14]	−0.18	[− 0.27, − 0.09]
Educational attainment at the time of marriage (reference = primary school or less)				
Middle school	0.27	[0.16, 0.38]	−0.002	[− 0.07, 0.07]
High school	0.23	[0.05, 0.40]	−0.23	[− 0.35, − 0.11]
College or above	−0.16	[− 0.41, 0.09]	−0.26	[− 0.40, − 0.12]
High school × The 1960s cohort	−0.07	[− 0.33, 0.18]	0.17	[0.02, 0.32]
College or above × The 1960s cohort	0.56	[− 0.04, 1.15]	0.31	[0.00, 0.61]
Father's education (reference = less than primary school)				
Primary school	−0.08	[− 0.20, 0.04]	0.05	[− 0.03, 0.12]
Middle school	−0.08	[− 0.22, 0.06]	0.02	[− 0.07, 0.11]
High school or above	−0.30	[− 0.48, − 0.12]	−0.05	[− 0.15, 0.05]
Missing	−0.10	[− 0.26, 0.06]	0.003	[− 0.09, 0.10]
Rural hukou	0.03	[− 0.09, 0.15]	0.01	[− 0.06, 0.08]
Number of siblings	−0.01	[− 0.04, 0.02]	0.005	[− 0.01, 0.02]
Numbers of person-months	158,935		158,935	
Likelihood ratio	38,034		38,034	

Note: 95% confidence intervals in the bracket [lower bound, upper bound]

The fitted hazard functions by cohort and cohabitational experience provide a graphical illustration of the results of hypothesis testing (Figure 2a–c). The prototypical women are urban middle school graduates with two siblings. The fathers of the prototypical women are also middle school graduates. In support of the path dependency hypothesis, in each time period, particularly in the late teens and early twenties, the probability of giving birth to a child conceived outside of marriage is greater for women who cohabited before marriage than for women who directly married. The gap in the hazard probability widens considerably among women born in the 1980s or later, reflecting a rebound of the fertility-accelerating effect of premarital cohabitation. In support of the convergence hypothesis, the probability of giving birth to a child conceived within marriage is greater for women who directly married than for women who cohabited before marriage. The gap in the hazard probability remains constant until months 275–285, after which it begins to narrow. There is no evidence that the cohabitant–non-cohabitant difference in the hazard probability is greater for younger than for older cohorts of women.

Figure 2: **Estimated hazard probability of first birth by cohort based on results in Table 4. The prototypical women are urban middle school graduates with two siblings whose fathers are also middle school graduates.**

(a) Women born in the 1960s
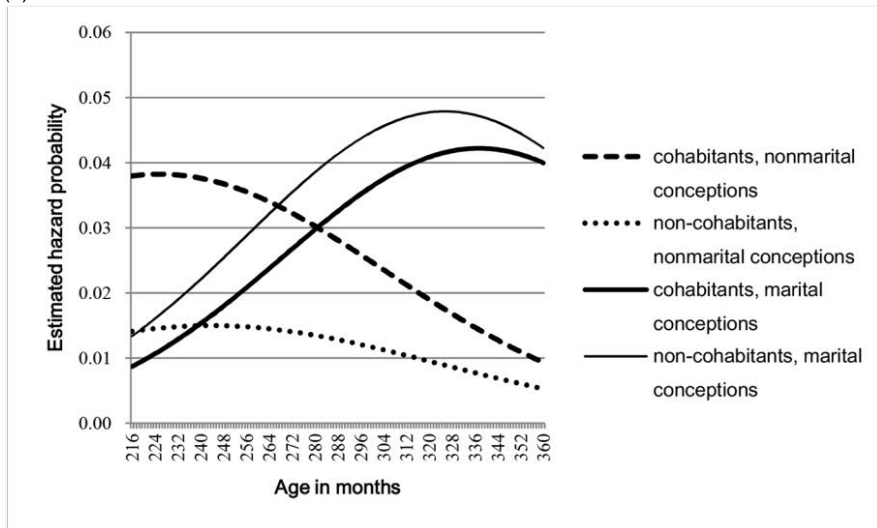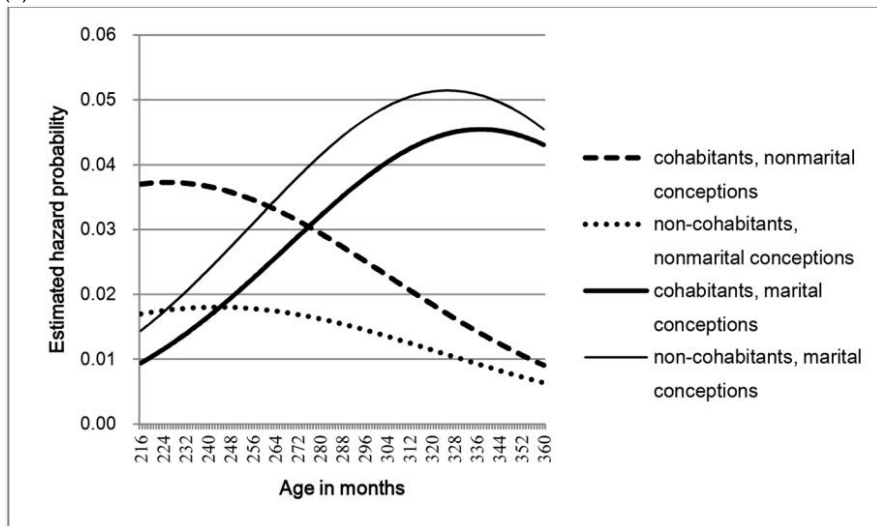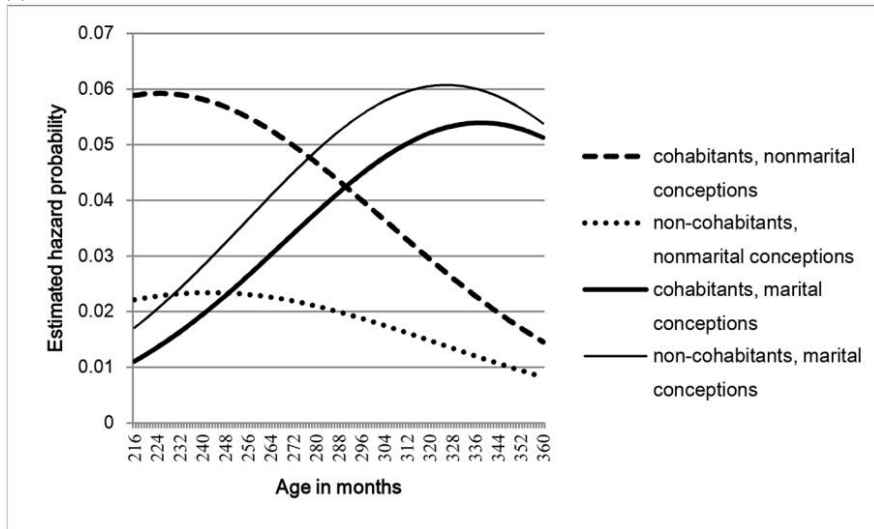

(b) Women born in the 1970s

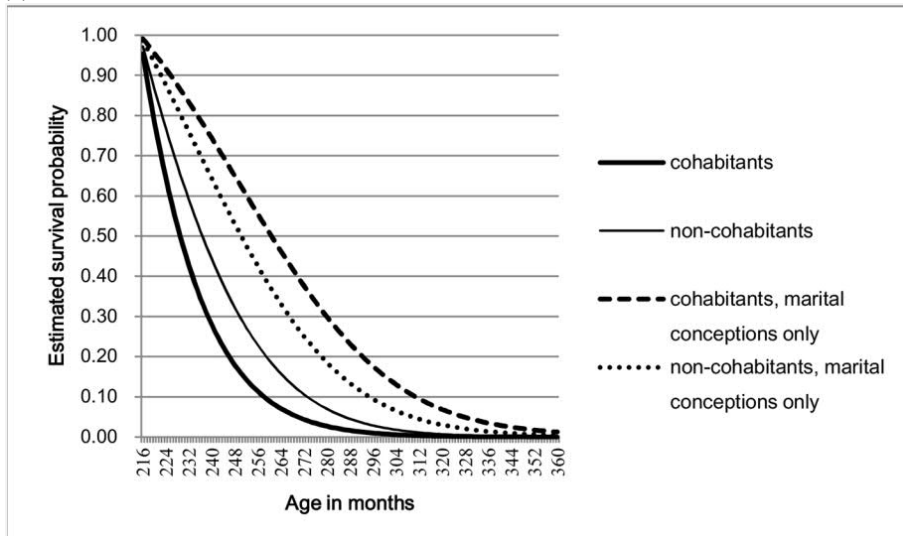**Figure 2:**   **(Continued)**

(c) Women born in the 1980s and later

The survivor curves, which summarize the month-by-month differences in hazard probabilities between women who cohabited before marriage and women who directly married (Figure 3a–c), shed additional light on the role of premarital cohabitation in the timing of first birth. Largely owing to the high risk of giving birth to a child conceived outside of marriage in the late teens and early twenties, women who cohabited before marriage entered motherhood faster than those who directly married. The fertility-accelerating role of cohabitation becomes more obvious when births resulting from pregnancies outside of marriage are excluded in the assessment of survivor function. As shown by the dotted lines in Figure 3a–c, the survivor function becomes less steep, and the change is greater for women who cohabited before marriage and women born in the 1980s or later. As a result, women who directly married enter parenthood faster than those who cohabited before marriage, though the difference decreases with age.

Figure 3: **Estimated survival probability by birth cohort based on results in Table 4. The prototypical women are urban middle school graduates with two siblings whose fathers are also middle school graduates.**

(a) Women born in the 1960s
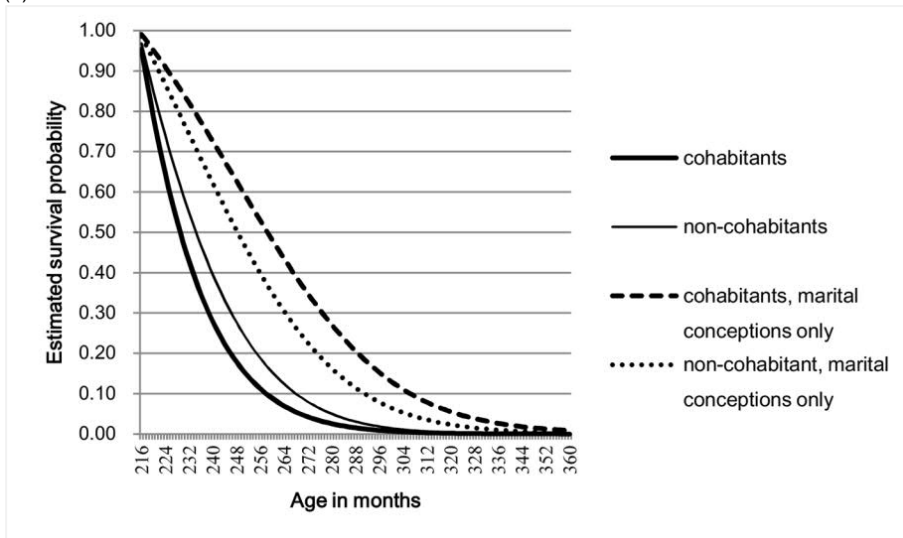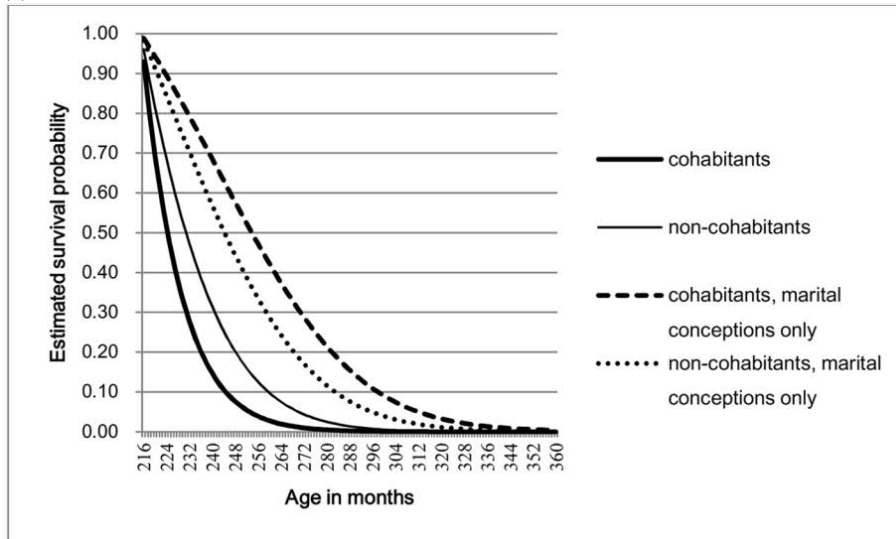

(b) Women born in the 1970s

Figure 3: **(Continued)**

(c) Women born in the 1980s and later

The cohabitant–non-cohabitant difference in age at first birth may arise from the cohabitant–non-cohabitant difference in age at marriage. It could also arise from differences between the two groups of people in the pace of transition from marriage to parenthood. Given that long-duration cohabitation and serial cohabitation are rare in China (Parish, Laumann, and Mojola 2007), the influence of cohabitation probably mainly operates through the second mechanism. To explore this possibility, in the last analysis step, time to first birth is redefined as months since marriage (or censoring). Time to first birth is specified as a linear function of marriage duration in months (which fits the model better than the other forms) and is re-estimated using a discrete time competing-risk model. Age at marriage is included as a covariate, together with other covariates in Table 2.

For all three cohorts of women, cohabitation is associated with a delayed timing of first birth resulting from marital pregnancies, as indicated by the negative coefficient for cohabitation (B = –0.35, 95% CI = –0.49, –0.21). A negative association between premarital cohabitation and the odds of bearing a child conceived within marriage is observed throughout the first 53 months of marriage, though the coefficient of cohabitation by marriage duration interaction term (B = 0.007, 95% CI = 0.002, 0.011) suggests that the association becomes less negative as marriage duration increases. The proposition that premarital cohabitation accelerates the timing of first birth by increasing

the risk of premarital pregnancies also receives some empirical support. However, the positive effect of cohabitation did not emerge until after the sixth month of marriage.

The findings on education are largely consistent with previous studies (Goldstein, White, and Goldstein 1997; Ma and Rizzi 2017). Women in the middle two categories of education (middle school and high school) are most likely to conceive outside of marriage, while the risk of bearing a child resulting from marital pregnancies is lowest for women in the two highest categories of education (high school and college), although this negative association between education and childbearing is more pronounced among women born in the 1970s and later than among women born in the 1960s (Table 4). Having a father with a high school degree or above is associated with a reduced risk of conceiving outside of marriage. It is worth noting that once time to first birth is defined as months since marriage, the educational differences in the timing of first birth observed in Table 4 largely disappeared (Table 5), reflecting a lack of diversity in the pace of transition to parenthood in marriage in China. Contrary to Qian and Jin (2020), premarital pregnancies are not related to family size or hukou status. Because premarital pregnancies sometimes result in premarital births in areas where the tradition of marriage without registration (or an hun) is popular, this observation may arise from the exclusion of premarital births from the analysis.

Table 5: **Discrete-time competing risks model on the transition from marriage to childbearing (*N* = 7,310)**

	Birth conceived outside of marriage vs. no births		Birth conceived in marriage vs. no births	
	B	95% CI	B	95% CI
Intercept	1.07	[0.55, 1.59]	−2.48	[− 2.77, − 2.19]
Age at marriage in months	0.0003	[0.00, 0.00]	−0.0006	[0.00, 0.00]
Marriage duration in months	−0.49	[− 0.50, − 0.47]	−0.02	[− 0.02, − 0.02]
Premarital cohabitation	−0.58	[− 0.88, − 0.29]	−0.35	[− 0.49, − 0.21]
Premarital cohabitation × Marriage duration	0.08	[0.04, 0.12]	0.007	[0.00, 0.01]
Birth cohorts (reference = the post-1980s cohorts)				
the 1960s cohort	−0.04	[− 0.19, 0.11]	0.04	[− 0.04, 0.13]
the 1970s cohort	−0.06	[− 0.19, 0.07]	0.04	[− 0.04, 0.12]
Educational attainment at the time of marriage (reference = primary school or less)				
Middle school	0.04	[− 0.09, 0.16]	−0.02	[− 0.08, 0.05]
High school	0.07	[− 0.10, 0.24]	−0.04	[− 0.13, 0.06]
College or above	0.07	[− 0.19, 0.33]	0.001	[− 0.13, 0.14]
Father's education (reference = less than primary school)				
Primary school	0.08	[− 0.05, 0.22]	0.01	[− 0.07, 0.08]
Middle school	0.04	[− 0.11, 0.20]	−0.001	[− 0.09, 0.09]
High school or above	0.02	[− 0.18, 0.21]	0.02	[− 0.08, 0.12]
Missing	0.01	[− 0.17, 0.18]	0.001	[− 0.09, 0.10]
Rural hukou	−0.01	[− 0.14, 0.13]	−0.01	[− 0.09, 0.06]
Number of siblings	0.01	[− 0.03, 0.04]	0.001	[− 0.02, 0.02]
Numbers of person-months	158,935		158,935	
Likelihood ratio	3,335.36		3,335.36	

Note: 95% confidence intervals in the bracket [lower bound, upper bound]

7. Conclusion and discussion

Living together before marriage has become an increasingly popular way to transition to marriage in China. Previous studies that attempt to understand the role of premarital cohabitation in family formation have exclusively focused on the reasons for cohabitation and the linkages of cohabitation with events that indicate a decline in the institutional status of marriage. The association between premarital cohabitation and the timing of first birth has not received the attention of sociologists or family demographers. Motivated by SDT theory, in combination with the increasing diversity in the timing and pathway into parenthood in China (Zhao and Zhang 2018), this study proposed two competing hypotheses – the path dependency hypothesis and the convergence hypothesis – and two trend hypotheses on the role of premarital cohabitation in the timing of first birth and tested these four hypotheses by drawing on a sample of 7,310 women from the 2010–2018 CFPS.

The results from a discrete time competing-risk model support the historical path dependency hypothesis, showing that premarital cohabitation accelerates the timing of first birth resulting from pregnancies outside of marriage. The negative age (in months) gradient in the association between premarital cohabitation and the timing of first birth suggests that the fertility-accelerating effect of cohabitation is anchored in the tradition of early marriage and childbearing. Because age is related to contraceptive practice (Lou et al. 2012), the role of tradition in the cohabitation-pregnancies association is inevitably reinforced by the low rate of contraceptive prevalence and contraceptive efficiency among adolescents and young adults (Che and Cleland 2003). The strong belief in fatalism in unintended pregnancies (Herrmann-Pillath 2006), coupled with the tendency toward greater relaxation of birth control, suggests that the cohabitant-non-cohabitant difference in the timing of first birth resulting from premarital pregnancies may arise partly from cohabitants' greater tendency to engage in premarital coitus than non-cohabitants. In the context of the ongoing rise of cohabitation before marriage in China, the fertility impact of this age-related contraceptive practice is unlikely counteracted by structural and institutional changes that make abortions more accessible to individuals who need them (Qian, Tang, and Garner 2004).

Conversely, research on the nexus of cohabitation, pregnancies, and childbearing suggests that age-related behavior changes other than contraceptive practice have the potential to reduce premarital pregnancies and the likelihood of carrying the pregnancies to term, such as rehabilitation from alcohol abuse, the expansion of social support, increases in efficacy, and reaching a turning point in work careers (Guzzo and Hayford 2020). For a thorough understanding of the mechanisms underlying the high incidence of premarital pregnancies among adolescent and young adult women who cohabited before

marriage, future studies should combine quantitative analyses with in-depth interviews concerning birth desires, fertility norms, contraceptive use, and abortion experiences.

Evidence for the path dependency hypothesis is fairly robust and is not affected by the measurement issue on the order of cohabitation and conceptions. In fact, the hypothesis gains greater support when the influence of shotgun cohabitation is minimized by limiting the analysis to women bearing their first child after the third, fifth, or fifth month of marriage. Because shotgun cohabitation tends to inflate the effect of cohabitation on the timing of birth resulting from pregnancies outside of marriage, the finding that the coefficients for cohabitation did not decrease but rather increased after imposing these limits on births suggests that shotgun cohabitation is rare in China. Redefining the time to first birth in months since marriage provides further support for this conclusion, showing that the positive effect of cohabitation on the timing of first birth resulting from pregnancies outside of marriage (which, by definition, is defined within the first nine months of marriage) did not emerge until at 7–9 months of marriage.

For women who conceive their first child within marriage, the results of the study support the proposition of a convergence of fertility behavior among countries on the track of the SDT: delayed first birth timing led by women who cohabited before marriage (Lesthaeghe 2020). Findings from the model in which times to birth are defined as the number of months between marriage and first birth shed additional light on the convergence hypothesis, showing that the fertility-delaying effect of cohabitation arises partly because women who cohabited before marriage take longer to transition from marriage to first birth than women who directly married. Because premarital cohabitation provides a couple more opportunities to build their relationship before marriage, these findings support the proposition that the rise of cohabitation before marriage signifies an ideational decline in the intrinsic value of children and the advent of a below-replacement fertility regime (Van de Kaa 2001; Sassler and Cunningham 2008; Yang 2019). However, the data do not contain information that allows researchers to separate the influence of ideational change from that of contraception, induced abortion, and fecundity. If cohabitants who are not pregnant at the time of marriage are more likely to experience unintended pregnancy and resolve it through unsafe abortion than non-cohabitants, their greater tendency to delay the timing of first birth within marriage may be partly attributable to abortion-related decline in fecundity.

The test of the trend hypotheses suggests that the two opposing effects of premarital cohabitation are likely to coexist for a long time. On the one hand, the results revealed a rebound of the fertility-accelerating effect of cohabitation in the post-1980s generation after a temporary decline between the 1960s and 1970s birth cohorts. On the other hand, although the data do not support the proposition of a strengthening of the fertility-delaying effect of cohabitation, neither do they indicate that this effect has decreased over time. In fact, because of the longitudinal structure of the data, the long-term fertility-

delaying effect of premarital cohabitation is very likely underestimated due to censoring and truncation of the marital and childbearing behaviors of postponers and women born in the late 1980s and the 1990s who are most likely to cohabit and delay the timing of first birth.

Specifically, although current observed data suggest that the fertility-delaying effect of cohabitation is largely compensated by its fertility-accelerating effect, any subsequent changes in the role of cohabitation in the family system will likely disrupt this balance, including the length of cohabitation before marriage, the prevalence of serial cohabitation, the linkage of cohabitation with marriage and age at marriage, and the spreading of nonmarital childbearing and legal and institutional changes in response to it. Nevertheless, the findings in Japan and other societies in the second or third stage of the SDT revealed that rises in premarital cohabitation did not cause a proliferation of DINK culture (Raymo, Iwasawa, and Bumpass 2009; Lesthaeghe 2010). Attitudinal data suggest that this is also likely the case in China (at least in the short run), as the majority of DINK couples attribute their childlessness to uncertainty about the labor market and would consider having a child once their labor market positions improve (Cao et al. 2010). For a more conclusive answer to the cohort trend in cohabitation and the timing of first birth, we must wait until the vast majority of the younger cohorts of women pass through their prime reproductive ages.

This study has several limitations that should be addressed by future research. First, although the findings are largely consistent with existing theories, the unique institutional context of China, particularly the prevailing practice of the one-child policy during the study period, poses a challenge to their generalizability. Second, because the study focuses on the childbearing behavior of married women, censoring of marital and childbearing events suggests the need for caution in generalizing the results to the whole population. The high attrition rate further limited our ability to identify cohort trends and assess whether the rebound of the fertility-accelerating effect of cohabitation is sufficiently large to compensate for fertility delay led by cohabitants. Additionally, the exclusion of women with premarital births means that the analysis cannot address a central issue in SDT theory – namely, cohabitation is seen by some couples as an alternative to marriage. Third, the lack of information regarding the number of children wanted and the preferred timing of birth precludes the possibility of measuring the extent of unintended pregnancies and induced abortions among cohabitants versus non-cohabitants and separating the influence of nontraditional family values from the influence of abortion-related decline in fecundity and social and structural factors that indicate an inability to reach fertility goals (Klerman 2000). Fourth, the exclusive focus on women limited our understanding of men's familial attitudes and fertility desires and the gender power dynamics in negotiating the course of family building. It also limited

our ability to test many of the gender-related assumptions underlying the simultaneous rise of premarital cohabitation and age at first birth.

Despite these limitations, this study greatly advances research on the SDT by providing an analytical framework that allows researchers to relate premarital cohabitation to the timing of first birth. The results of the study are an important basis for assessing the efficacy of existing Chinese family planning programs and formulating new policies and programs to keep up with the changing patterns of family formation in China.

8. Acknowledgements

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