Changing Patterns of Marriage and Cohabitation in Post-Reform China

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Abstract

Premarital cohabitation has gained increasing popularity in China in the post-reform era (after the economic reform started in 1978). The central theme of this thesis is to examine this phenomenon, in particular, the socio-economic characteristics of cohabitors, and how cohabitation is associated with assortative mating outcomes and marital dissolutions. Drawing data from China Family Panel Studies (2010-2016), this thesis investigates three types of associations in heterosexual marriages: (i) between cohabitation and educational attainment; (ii) between cohabitation and educational assortative mating, and (iii) between cohabitation and subsequent divorce. Moreover, gender differences in each association and how these associations change across marriage cohorts (early-reform, mid-reform, and late-reform) were examined in detail.

Chapter 1 explores the association between educational attainment and premarital cohabitation among married individuals. The results show that the positive association between education and premarital cohabitation has not decreased but instead strengthened over time. This trend is more consistent for women than men. Chapter 2 examines the association between premarital cohabitation and educational assortative mating outcomes. The results show that the differences in homogamy patterns between married couples with and without cohabitation experience vary across educational levels. Moreover, marriages preceded by cohabitation are more likely to cross educational barriers. Chapter 3 examines the association between cohabitation and divorce. The significant positive effect of premarital cohabitation on the risk of divorce is only found among males, and this effect persists across marriage cohort. The results from this thesis indicate a significant difference between China and both Western countries and other East Asian countries. The findings suggest that China is developing different patterns and trends of demographic changes because of its unique institutional and cultural context.

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Introduction

Background

Cohabitation, a status of co-residence of couples without legal marriage, is a crucial component of demographic changes. In recent years, the increasing popularity of cohabitation has been observed in Western industrialised countries. In the United States, the proportion of marriages preceded by cohabitation increased from 10% in the 1960s to over 50% in the 1990s (Bumpass & Lu, 2000; Smock, 2000). In Nordic countries such as Sweden, Finland, and Denmark, nearly 80% of young couples cohabit, making cohabitation an alternative institution to marriage (Kiernan, 2004).

Cohabitation is identified as one of the major characteristics of the Second Demographic Transition. As one of the most influential demographic theories, the Second Demographic Transition is a concept first proposed by Lesthaeghe and Van de Kaa (1986) to describe the continuous demographic changes that happened after the First Demographic Transition was achieved. The main characteristics of the Second Demographic Transition include a sub-replacement fertility rate (therefore a declining population size if not mitigated by migration), unconventional family structures (e.g. delayed marriage age, rising cohabitation and divorce rate, out-of-wedlock birth), and egalitarian gender relations (Lesthaeghe, 1995; 2014). These features indicate that fundamental changes in intimate relationships and family formation might have occurred in recent years.

Previous research suggested that the Second Demographic Transition will gradually spread to other parts of the world (e.g. Lesthaeghe, 2014). Recently, in East Asian countries such as Japan, similar characteristics such as an increasing cohabitation rate were noticed. For example, 25% of females in the age group of 25 to 34 were

reported to have had cohabitation experience in a national survey in Japan in 2004 (Raymo et al., 2009). Do these changes suggest that East Asia is joining the Western trend?

Notable differences regarding demographic changes between East Asian countries and Western developed countries have been identified. Previous literature pointed out an "Asian marriage paradox". Although cohabitation is increasingly popular, marriage remains the normality, and fertility is largely constrained within marriage (Ochiai, 2014). Chang (2010) used the concept "compressed modernity" to explain the contradictory findings. According to Chang (2010), the modernisation process in South Korea happened in such a compressed and condensed manner that there are no distinct stages of modernity and post-modernity. Consequently, features and values reflecting both modernities coexist in South Korean society. The rising popularity of cohabitation does not necessarily lead to the decline of marriage; instead, it is the risk-aversive result of individuals holding on to strong traditional values and wanting to avoid family burden at the same time (Chang & Song, 2010). This concept has been useful for other East Asian societies where drastic social changes also happened over a short period of time. Ochiai (2014) adjusted the concept to be "semi-compressed modernity" to explain Japanese societal changes. Therefore, it seems that Asian countries do not share some of the key characteristics of the Second Demographic Transition, indicating fundamental differences between Western and East Asian societies.

In China, after the economic reform started in 1978, Chinese society has undergone dramatic changes. The next section will introduce the major societal changes in post-reform China, and then discuss the uniqueness of demographic changes in post-reform China compared to Western and other East Asian countries.

Societal Changes in Post-reform China

China has experienced significant changes in the post-reform era such as unprecedented economic growth and education expansion (Wu & Du, 2018). However, the rapid economic and social progress is also accompanied with increasing economic inequality (Xie & Zhou, 2014), class inequality (Li, 2020; Li et al., 2015; Treiman & Walder 2019; Zhou & Xie, 2019), and gender inequality (Mu & Xie, 2014).

Before the economic reform started, China's economy was characterised by state-owned economy and central planning, and in general low-efficient and isolated from the global market. The economic reform was started in 1978 to implement measures including gradually transitioning to market economy, de-collectivisation of agriculture sector, growing private sector, and opening up to foreign investment (Chen, 2002). As a result, Chinese economy experienced rapid growth with an average growth rate of 9.48% between 1979 and 2018 (World Bank National Accounts Data, 1979-2018).

A national education expansion campaign was started around the same time to facilitate economic development (Deng & Treiman, 1997; Han, 2000). Compared to Western and other East Asian countries, education expansion in China is different in terms of both its rapid speed and broad scale. Before the economic reform, most of the educational resources and employment opportunities were monopolised by the state through a centralised planning system (Wu & Zheng, 2008). Higher education was almost exclusively restricted to very few elites. In the post-reform era, new educational policies, including the implementation of compulsory basic education and expansion of higher education, caused a vast expansion of education on all levels.

The implementation of the nine-year compulsory education policy was started in 1985 to eliminate illiteracy and in turn reduce poverty. Rural people and women benefited the most from this system by gaining equal access to primary and junior-high

school education. Meanwhile, higher education was transformed from an elite system to a mass education system through privatisation and decentralisation (Wu & Zheng, 2008). From 1978 to 1998, the number of new college student enrolment almost tripled from 0.4 million to 1.08 million, and the total number of college students quadrupled from 0.86 million to 3.41 million (Li & Zhang, 2010). By 2019, the number of students enrolled in higher education institutions had risen to 40.02 million, with the gross enrolment rate reaching 51.6% (China Ministry of Education, 2019). Moreover, since the 1990s, the Chinese government has started Project 985 and Project 211, aiming to found first-class universities and strengthen key disciplinary areas in the 21st Century. Thus, higher education in China has grown both in its scale and quality through this series of measures (Wu & Du, 2018).

Consequently, education has increasingly replaced political capital to determine socio-economic status in the post-reform era (Zhao & Zhou, 2002; Zhang et al., 2005). The earning potential tends to increase with more education. For example, Zhao and Zhou (2002) found that in the late 1990s, college graduates earn 50% more than high school graduates, and high school graduates earn 20% more than those with less than six years of schooling. Meanwhile, meritocracy has replaced political background to become the main criteria for class advancement (Lu & Treiman, 2008). In particular, there has been observed a decreasing impact of CCP membership and an increasing influence of higher education on attaining elite occupations in the post-reform era (Treiman & Walder, 2019). Moreover, the gender gap in education narrowed considerably and even reversed in higher education (Yeung, 2013). By 2009, female college enrolment had already surpassed that of male. This has brought about more opportunities for women to join the labour market.

Despite the positive changes brought by rapid economic growth and education expansion, increasing economic, class, and gender inequalities have also been observed in post-reform China. Before the economic reform started, under the socialist regime, the state had a clear and rigid wage grade system which supressed income inequality (Zhou & Xie, 2019). Since 1978, as China gradually transitioned to market economy, the rigid wage system has been abolished and wage is decided by the market. Therefore, a larger income gap starts to emerge among different professions and among people with unequal skills within the same profession. Besides, unequal economic growth in different regions, especially between urban and rural areas, has also contributed to greater economic inequality.

Moreover, class inequality has also been observed in post-reform China. Treiman and Walder (2019) found that class origin continues to exert its influence in post-reform China. Through analysing national-level data, Li (2020) found that although education expansion has brought about more opportunities for all classes, the benefits have been disproportional for different classes. More privileged classes have benefited more, and as a result, further consolidated their position through education. This has led to enlarged class inequalities and decreased relative mobility in China. Zhou and Xie (2019)'s findings confirmed a significant decline in vertical social fluidity in terms of the link between origin and destination. This inequality is more extreme for women and rural residents (Li et al., 2015).

Furthermore, gender inequality has experienced a resurgence in recent years. From 1949 to 1978, under the socialist regime, a rapid increase in the status of women was observed both within the family and in the labour market in China. The Communist Party promoted gender equality in this period, with a dual purpose of liberating women from the oppression of the traditional family and making use of them as a vast reserve of

labour power to contribute to the economy (Wolf, 1984). However, after the economic reform started, gender inequality worsened. With the job allocation system abandoned, individuals face more competition in the job market as education expansion grows. Meanwhile, employers have higher autonomy to make decisions on recruitment and wage allocation. Consequently, the discrimination against women has grown (Hughes & Maurer-Fazio, 2002). Therefore, unlike Western countries where a consistently decreasing gender inequality has been observed (Inglehart & Norris, 2003), gender inequality in China has experienced a 'U-shaped' turn. Although it decreased under the socialist regime, there has been a resurgence of gender inequality in recent years, in both the labour market and the family life in China (Fincher, 2016; Mu & Xie, 2014).

Uniqueness of Demographic Changes in Post-reform China

In post-reform China, the percentage of premarital cohabitation has increased rapidly. While only less than 2% of couples cohabited in the pre-reform era, one-third of newly wedded couples choose to cohabit before marriage (Yu & Xie, 2015a). There are regional differences, for example, a higher likelihood of cohabitation is associated with urban residence and more developed areas (Fulda, 2017; Xu et al., 2014). Nevertheless, the rise in cohabitation has been a national phenomenon across the whole country.

When examining the rising phenomenon of cohabitation in China, one cannot avoid asking the question whether China is following the path of the Second Demographic Transition, or whether theories developed in other East Asian countries are more appropriate to understand demographic changes in China. This thesis proposes that demographic changes in China may display different patterns from both Western and other East Asian countries. A few reasons for this are listed below.

First, a fundamental difference which distinguishes Chinese society from other countries is the role of the state. Unlike Western democratic countries and other East Asian countries, the state in China has consolidated power in making and implementing family policies. The increasing popularity of cohabitation is a result of the changing power dynamics between the individual and the state in the post-reform era. On the one hand, the state gradually withdrew from individual's family decisions, and the Chinese family transitioned from being a unit of the extended community into a self-reliant private institution based on voluntary contracts (Davis, 2014). On the other hand, some critical areas of marriage and family life are still under the strict control of the state, such as fertility. Scholars have summarised this as the delinking of sexuality and fertility in China (Davis, 2014). While sexuality is increasingly privatised, fertility decisions (such as the occurrence and the number of children) are still strongly regulated by the government through the birth permit, household registration and family planning policies.

Second, the process of individualisation in China has displayed unique characteristics. Individualism is seen as the underlying driving force behind the Second Demographic Transition, meaning that people are holding individualistic values and pursuing self-actualisation after their survival needs are met (Lesthaeghe, 2014). While the popularity of cohabitation in both China and Western countries reflects growing individualisation, the process in China is more likely to be the result of the changing relationship between the individual and the state, instead of a fundamental ideational change as happened in Western countries. It also distinguishes China from familialistic individualisation in other East Asian countries where individuals hold on to traditional family values and take cohabitation as a risk-aversive choice to avoid family burdens (Ochiai, 2014). In China, the role of the state must be taken into consideration when trying to explain the coexistence of the rising popularity of cohabitation and universality

of marriage. This could be the result of individuals negotiating their choices within the range carved out by the government. In other words, people may enjoy their sexual freedom initially, but they will eventually submit to the state and get married. Therefore, although the rate of cohabitation is rising, the supreme power of the state means that marriage remains a stable and strong institution in China.

Third, another aspect that differentiates China from other countries is gender relations. In Western countries, there has been a linear progression of gender equality (Inglehart & Norris, 2003), while in East Asian countries such as Japan and South Korea, the "housewifisation movement" (emphasising males' bread-winner role and females' domestic role) and "de-housewifisation movement" (emphasising gender egalitarianism) happen at the same time due to compressed modernity (Ochiai, 2014). In contrast, in China, a distinct 'U-shaped' pattern of gender inequality has been observed, where gender inequality initially decreased under the socialist regime, and increased in recent years in both the labour market and family life (Fincher, 2016; Mu & Xie, 2014). This reversed trend of gender inequality, which is contrary to what has been observed in Western societies and other East Asian countries, suggests that Chinese demographic changes may follow different patterns.

In summary, the fundamental differences between the institutional contexts mean that the development of cohabitation practice in China might follow a different trajectory from that of both Western and other East Asian countries. In turn, the features of cohabitation serve as a window to help comprehend demographic changes in China. Moreover, this thesis will contribute significantly to the theorisation of cohabitation and demographic changes in China, in comparison to Western countries and other East Asian societies.

Research Objectives

There is currently very limited understanding of cohabitation in Chinese society. The existing few China-focused studies found that the characteristics of Chinese cohabitors are different from both Western and East Asian countries. For example, while the majority of the literature discovered that cohabitors tend to be less-educated (Bumpass et al., 1991; Bumpass & Lu, 2000; Raymo et al., 2009; Thornton et al., 1995), it has been found that better-educated individuals are more likely to cohabit in China (Yu & Xie, 2015a). A better understanding of cohabitation in China will not only provide insights on the nature of this rising phenomenon, but also contribute to the knowledge of demographic changes in the world by providing a case study on how demographic changes develop in a different institutional and cultural context.

This thesis investigates the phenomenon of cohabitation in China from the following three perspectives. The first perspective focuses on the characteristics of cohabitors, in particular, the association between educational attainment and premarital cohabitation. As educational attainment is an important indicator of economic prospect, social status, and cultural characteristics, the identification of the association between education and cohabitation is essential for deepening the understanding of the essence and features of cohabitation in a given society. The second perspective is the assortative mating patterns of cohabitors. Educational assortative mating has significant implications for social inequality and well-being of the family. However, little is understood about its relationship with premarital cohabitation in China. The third perspective is how premarital cohabitation is associated with marital outcomes. China has witnessed both a rapid increase in premarital cohabitation and a soaring rate of divorce in recent years. A better understanding of how they relate and the reasons why individuals enter and exit marriage has huge implications on both individual and societal levels, e.g. the

transmission of resources between couples, the environment in which the next generation grows up, and the welfare policies in a given society (Moffitt, 1998; Reinhold, 2010).

The China Family Panel Studies was started in 2010 and carried out biennially by the Institute of Social Science Survey of Peking University, China. As a nationally representative longitudinal survey, it collects extensive data on economic activities, education outcomes, family relationships, migration, and health (Xie & Hu, 2014). It, for the first time, identified and provided the retrospective information of premarital cohabitation history in married households, which makes the research purpose in this thesis achievable. Using four waves of data from the China Family Panel Studies conducted between 2010 and 2016, this thesis investigates the following questions:

1. Who cohabits in China before marriage? What is the association between education and premarital cohabitation? How does it differ between genders and change over time?
2. How do assortative mating patterns differ between married couples with premarital cohabitation experience and those without such experience? How do they change over time?
3. How is premarital cohabitation associated with subsequent marital dissolution? How does it differ between genders and change over time?

Research Outline and Contributions

Chapter 1 (*Changes in the Association Between Education and Premarital Cohabitation in Post-reform China*) explores the association between educational attainment and premarital cohabitation among married individuals in post-reform China. Moreover, this chapter for the first time investigates how this association changes over time across marriage cohorts to see whether the diffusion process observed in Western

countries has happened in China. Using data from the nationally representative China Family Panel Studies (2010-2016), logistic regressions are carried out to compare the association between education and premarital cohabitation across three marriage cohorts: 1981-1992, 1993-2001, 2002-2016.

Chapter 2 (*Educational Assortative Mating in Post-reform China: Does Premarital Cohabitation Make Any Difference?*) examines the association between premarital cohabitation and educational assortative mating among married couples in post-reform China. This chapter provides the first-ever evidence of comparison of educational assortative mating between married couples with and without premarital cohabitation experience and the changing trends in post-reform China. Drawing data from the China Family Panel Studies (2010-2016), log-linear models are used to compare the homogamy, hypergamy, and crossing patterns amongst married couples with and without cohabitation experience in three marriage cohorts: 1981-1992, 1993-2001, and 2002-2008.

Chapter 3 (*Premarital Cohabitation and Marital Dissolution in Post-reform China*) investigates the relationship between premarital cohabitation and subsequent divorce in post-reform China. Drawing data from the China Family Panel Studies (2010-2016), this chapter examines gender differences in the association between cohabitation and divorce, and how this association changes across three marriage cohorts: 1981-1992, 1993-2001, 2002-2008.

Literature Review

This section first introduces demographic changes, including cohabitation and relevant theories in Western industrialised countries and East Asian countries. After that, recent changes in cohabitation in China will be reviewed, and research gaps will be identified.

Table 1 summarises the similarities and differences in demographic changes among the West, East Asia, and China. When referring to Western countries, this thesis focuses on two main areas – North America and Northern Europe, as they represent two typical institutional environments among developed countries with different political and social welfare systems. While East Asia often includes a larger area, this thesis focuses on Japan and South Korea when referring to East Asian countries. This is because these two countries share similar Confucian cultural heritage as China, which features on patriarchal, patrilineal, and patrilocal values (Shin & Sin, 2012). Moreover, the majority of current literature on demographic changes and cohabitation focuses on these countries.

Table 1. Comparisons of Demographic Changes Among the West, East Asia, and China

	The West (Northern Europe, North America)	**East Asia (Japan, South Korea)**	**China**
Second Demographic Transition Characteristics	Full characteristics (sub-replacement fertility rate, delayed marriage age, rising cohabitation and divorce, out-of-wedlock births)	Have some characteristics (sub-replacement fertility rate, delayed marriage age, rising cohabitation and divorce) without others (out-of-wedlock births)	Have some characteristics (sub-replacement fertility rate, delayed marriage age, rising cohabitation and divorce) without others (out-of-wedlock births)
Compressed Modernity	Linear progression from the first to the second modernity and demographic transition	Compressed (no clear gap between the first and the second modernity and demographic transition)	Super compressed
The Role of the State	Moderate	Moderate	Strong
Ideational Values	Individualism	Individualisation without individualism; familialism	State-led individualisation; familialism
Gender Relations	Linear progression of gender equality	Coexistence of housewifisation and de-housewifisation	U-shaped pattern of gender inequality (decreased in the socialist regime and increased in the post-reform era)

Cohabitation and Demographic Changes in the West

Cohabitation is one of the major characteristics of the Second Demographic Transition. Three revolutions were pointed out to explain the background of the Second Demographic Transition, including the rise of cohabitation (Lesthaeghe, 2010). The

advancement of contraceptive methods gives much freedom to couples especially women to control or avoid fertility; the sexual revolution and wider acceptance of sex outside of marriage further delink fertility from marriage; the gender revolution raises women's status both in professional and family contexts, and in turn, marriage is less desirable due to rising opportunity costs.

The main driving force behind the Second Demographic Transition is ideational changes, in particular, secular, individualistic and anti-authoritarian values (Lesthaeghe & Neidert, 2006). Drawing ideas from Maslow (1954) and along the similar line of Inglehart (1970; 1990), Lesthaeghe and Van de Kaa (1986) think that the survival or security needs are replaced by "higher-order" needs or "post-materialistic" needs as the society modernises, such as the need for self-actualisation. The First Demographic Transition is called the "king-child era", meaning that the child's need is the priority of the family. In comparison, the Second Demographic Transition features in the model of the "king-couple era", where couples first and foremost seek self-realisation (Lesthaeghe, 2014). Childbearing becomes less desirable and secondary in marriages, and what matters most is the satisfaction and self-fulfilment of the couples. Therefore, marriage and childbearing are often delayed and even avoided altogether. Meanwhile, cohabitation has increased in popularity. Although couples may continue to enjoy sexual and emotional intimacy, they do not face the same responsibilities that marriages would entail.

Scholars have developed different theories to capture the changes in marriage and family. Giddens (1992) proposed concepts of "plastic sexuality" and "pure relationships" to explain new features of these demographic changes. Plastic sexuality means the delinking of sexuality and reproductivity due to the advancement in contraception methods and the erosion of traditional values. Sex becomes autonomous and a way of self-expression. Similarly, pure relationship means that there is no more sustaining

structure of the relationship. Accordingly, emotional intimacy and self-realisation become the most upheld priorities for both parties. Along similar lines, Beck and Beck-Gernsheim (2002) used the concept "post-familial family" to describe the essence of a modern family as "a site where dynamic social processes such as reflexivity, individualisation and risk operate". Over in the United States, Cherlin (2004) proposed that the function of marriage becomes more symbolic for American individuals. It is a type of social capital reserved for those who have enough material accumulations to settle down.

Cohabitation in Western industrialised countries share some common characteristics. First, cohabitation is a widely accepted social practice. More than half of the marriages formed in the 1990s were preceded by cohabitation in the United States (Bianchi, 2014; Bumpass & Lu, 1999; Kennedy & Bumpass, 2008; Smock, 2000). Regardless of national variations, an increasing trend has been observed among European nations, with Nordic countries taking the lead. The percentage of cohabiting couples among those in any partnership for people aged between 25 and 34 in 2001 reached 85% in Sweden and was above 70% in both Finland and Denmark (Kiernan, 2004). Second, childbearing in cohabiting relationships is common. For instance, about half of the out-of-wedlock births happen within cohabiting relationships in the United States (Kennedy & Bumpass, 2008).

The majority of existing Western literature on cohabitation is devoted to three areas: the characteristics of cohabitors, the assortative mating patterns of cohabiting couples, and the impact of cohabitation on marital outcomes. First, one of the most popular themes of research is the selectivity of cohabitors, meaning what characteristics determine that some people choose to cohabit. Socio-economically, researchers found that cohabitors generally have lower socio-economic status in terms of both educational

attainment and income (Bumpass & Lu, 1999; Cherlin, 2004; Lundberg et al., 2016; Smock, 2000; Williams et al., 2007). This is consistent across countries in North America and Northern Europe. Culturally, cohabitors tend to hold less traditional values. Specifically, they are less religious, more liberal and more gender egalitarian (Kiernan, 2001; Thornton et al., 1992; Williams et al., 2007). Moreover, scholars try to compare family background to explain why people cohabit. Some conclude that parents' relationship powerfully shapes children's marital choices. Individuals growing up in traditional families with two married biological parents tend to choose a similar path, and those from alternative family structures are more likely to choose alternative forms of union (Thornton et al., 1992; Williams et al., 2007; Xie et al., 2003).

Second, another popular theme in the research on cohabitation is the difference in assortative mating patterns between cohabiting and married couples. Empirical evidence has been inconclusive. The majority of researchers claim that cohabitation displays a different pattern of mate selection compared to marriage. Some researchers found that cohabitors are more likely to have homogamous and gender-egalitarian relationships (Schoen & Weinick, 1993). However, others argue that assortative mating of cohabitation is a "double-selection" process (Blackwell & Lichter, 2000). They see cohabitation as a winnowing process between singlehood and marriage, which means that there are two times of selection compared to direct marriages. Single people are firstly selected into cohabitation to test their relationships, and then better-matched couples among them are selected into marriage. Therefore, cohabiting couples should be less well-matched and less homogamous compared to directly married couples.

Third, there are also numerous papers devoted to the relationship between premarital cohabitation and marital outcomes. Most Western studies found that premarital cohabitation is negatively associated with marital stability, meaning that marriages

preceded by cohabitation are more likely to have lower marital satisfaction and a higher chance to dissolve (Hall & Zhao, 1995; Lillard et al., 1995; Reinhold, 2010). This holds true for most Western industrialised countries all over the world, including the United States (Axinn & Thornton, 1993; Booth & Johnson, 1988; DeMaris & Rao, 1992; Thomson & Colella, 1992), Canada (Balakrishnan et al., 1987; Hall & Zhao, 1995), and Northern Europe (Bennett et al., 1988). This association might be the result of the selectivity effect and the causation effect. First, certain characteristics that make individuals more likely to cohabit also make them more prone to divorce, for example, being less-educated (Bumpass & Sweet, 1989) and holding less traditional family values (Bennett et al., 1988; DeMaris & Rao, 1992; Reinhold, 2010). Moreover, many researchers found that even after controlling for the selectivity effect, cohabitation continues to exert a positive impact on marital dissolution. For instance, experiencing cohabitation itself may lower individuals' commitment to long-term relationships like marriage (Axinn & Thornton, 1993; Balakrishnan et al., 1987; Booth & Johnson, 1988; Bennett et al., 1988; Hall & Zhao, 1995; Thomson & Colella, 1992).

Cohabitation and Demographic Changes in East Asia

It has been debated whether the Second Demographic Transition has spread to the rest of the world, including East Asia. Some of the characteristics of the Second Demographic Transition have been observed in East Asian countries, such as a sub-replacement fertility rate, the rising age of marriage, an increasing divorce rate, and a growing proportion of singlehood (Ochiai, 2011). However, cohabitation becomes one of the dividing characteristics which distinguish East Asian countries from their Western counterparts.

Despite a rising percentage of cohabitation in recent years, the absolute number of cohabitating couples is relatively low in East Asia compared to Western countries. In

Japan, only 15% of individuals have ever had cohabitation experience in 2004 (Raymo et al., 2009). This is much less than nearly two thirds in the United States and 80% in Scandinavian countries around the same time (Ochiai, 2014). In South Korea, the percentage is even lower, where a 2009 survey found that only 11% of men and 2% of women had experienced cohabitation (Ochiai, 2014). The low percentages might reflect the under-reporting issue as a result of the social stigma associated with cohabitation in these countries. However, the figures are still considerably low compared to their Western counterparts. Moreover, childbearing within cohabitation is extremely rare. For example, less than 2% of births happened out of wedlock in South Korea in 2005, and the figure was 2.2% in Japan in 2009 (Ochiai, 2014). These figures are much lower than their Western counterparts, e.g. the United States where 41% of births happened outside marriages in 2012, half of which being born in cohabiting relationships (Sweeney & Raley, 2014).

These differences are summarised as the "Asian marriage paradox" (Ochiai, 2014). Although cohabitation is gaining more popularity, marriage remains a strong institution across East Asia. It is different from the trend observed in Western industrialised countries where marriage is declining in power. The differences cannot be explained away by cultural dissimilarities. Instead, scholars think that they are indicators of fundamental differences between Western and East Asian societies (Chang, 2010; Ochiai, 2014). In particular, there are three angles which distinguish East Asia from Western industrialised countries: compressed modernity, individualisation without individualism, housewifisation and de-housewifisation.

The first angle is compressed modernity. The concept was first proposed by Chang (2010) to explain societal changes observed in South Korea, which achieved modernisation and urbanisation in about 50 years, in comparison to a few centuries for

Western countries (Bianchi, 2014). According to Chang (2010), compressed modernity is a dynamic process where all different aspects of the society change in such a compressed and condensed manner that seemingly contradictory social and cultural elements coexist in the same society. Different from Western countries where a clear gap between the First and Second Demographic Transitions is identified, demographic changes in South Korea showed a continuous change without distinct stages. This compressed feature is not unique to South Korea. It is a regional phenomenon in East Asia. Ochiai (2014) adjusted the concept and used "semi-compressed modernity" to describe Japanese society. As the first industrialised country in East Asia, Japanese society had about 20 years gap between the First and Second Demographic Transitions, indicated by a stable fertility rate around replacement level. It makes Japanese society slightly less compressed compared to other East Asian countries.

The highly compressed and condensed nature of East Asian societies have brought about unique societal characteristics, such as the coexistence of seemingly contradictory cultural values. Thus, both traditional collective and modern individualistic values can be observed in the family sphere at the same time. In such a context, individuals' daily decisions are often stretched in different directions. It explains why traditional marriages are still held up high despite the rise of cohabitation.

The second angle is individualisation without individualism. Individualism is identified as the driving force behind the Second Demographic Transition. However, scholars argue that it is individualisation that has emerged in East Asia, rather than individualism as an ideology. It has been summarised as "risk-aversive individualisation" in South Korea by Chang (2010), and as "familialistic individualisation" in Japan by Ochiai (2014).

Risk-aversive individualisation describes the phenomenon that individuals try to delay marriage for as long as possible to avoid the risk associated with family (Chang, 2010). Different from Western countries where welfare systems are well established, the primary provider of elderly care in most East Asian countries is still families (Chang, 2010). Families serve as a safety net for individuals by sharing resources, but also become a burden especially for young people. Besides, women face notable discrimination in the labour market after getting married and having children. These reasons render early marriages unattractive among young people. Consequently, individuals at marriageable age often choose to cohabit first and delay marriage until they decide to have children (Chang, 2010).

Individualisation without individualism is a regional phenomenon across East Asia (Chang & Song, 2010; Ishida et al., 2010). Nearly 80% of respondents from the 2006 East Asia Social Survey (conducted in South Korea, Taiwan, and China) rate familial needs higher than the needs of their own. It indicates that East Asian families continue to be "a system of responsibilities and obligations" (Ochiai, 2014). It is far from the concepts of "pure relationship", "post-familial family", or "symbolic marriage" suggested by Western scholars (Beck & Beck-Gernsheim, 2002; Cherlin, 2004; Giddens, 1992).

Therefore, unlike the deterioration of marriage as an institution in the West, what happens in East Asia is the result of marriage remaining a strong institution for both individuals and the society. Individualisation is not an ideational revolution but a pragmatic choice. Instead of becoming an alternative to marriage, cohabitation in East Asia is often a risk-aversive choice for young people to avoid the burden of marriage temporarily. Its increasing popularity is the result of both institutionalised familism and practical individualisation (Chang & Song, 2010).

The third angle which distinguishes East Asia from Western countries is gender relations. In Western countries, there is a gradual transition from housewifisation (gender-based labour division in the labour market and family) to de-housewifisation (increasing individualistic choices of delaying or avoiding marriage and prioritising self-actualisation over family). In contrast, in East Asia, both housewifisation and de-housewifisation can be observed at the same time because of the nature of compressed modernity (Ochiai, 2014). The de-housewifisation in this context is often a risk-aversive choice made by responsibility-laden women rather than a result of ideational changes (Chang & Song, 2010).

While enjoying unprecedented educational and employment opportunities before marriage, women are still expected to take on family responsibilities and house duties after marriage. Moreover, discrimination persists in the labour market (Atoh et al., 2004). An 'M-shaped' pattern of women's job participation has been observed in Japan, where women often drop out from the labour market after giving birth and return to employment after children reach school age (Ochiai, 2014). Compared to women in Japan, South Korean women are even less likely to return to employment (Atoh et al., 2004). Therefore, cohabitation might become a popular choice among women in such a context to delay entry into marriages and family roles.

Although cohabitation in East Asia displays different characteristics from the West, research on this topic is minimal. This might be because cohabitation is still a marginal phenomenon considering its relatively low rate, and because survey data on cohabitation has been unavailable until recently. In South Korea, no systematic quantitative study has been conducted on cohabitation due to data unavailability (Raymo et al., 2015). At the moment, existing literature on cohabitation in East Asia mainly comes from Japan.

Attitudinal surveys show that traditional familialism is still dominant in Japan. Using data from the 1987 Japanese National Fertility Survey, Iwasawa (2004) found that the majority of cohabitors have the intention to marry their cohabiting partners in the future. It implies that cohabitation is more likely to be a precursor to marriage rather than an alternative lifestyle. Analysing nationally representative data collected in 2004, Raymo et al. (2007) found that cohabitation rate has risen fast to about 20% among the recent birth cohort, but this figure is still relatively low compared to Western countries. The duration of cohabitation tends to be short and is positively associated with early marriage. This is interesting because instead of becoming an alternative to marriage, cohabitation in Japan potentially promotes marriage and in turn early fertility (Raymo et al., 2007). In terms of the characteristics of cohabitors, educational attainment is negatively associated with the choice of cohabitation (Raymo et al., 2009). This is consistent with the findings in the West.

Cohabitation and Demographic Changes in China

The First Demographic Transition started in China in the early 1970s (Ji, 2003) and was completed around the end of the last century (Jiang, 2002). After that, demographic changes in China continued to happen fast and wide. The rate of cohabitation increased rapidly, from being less than 2% in the 1970s to nearly one third recently (Yu & Xie, 2015a).

Cohabitation in China shares some similarities with other East Asian countries. First of all, the cohabitation rate in China is low. Despite the dramatic increase in the last few decades, the percentage of married couples preceded by cohabitation is only one-third in the recent marriage cohort. This figure is much lower than that in Western countries. The duration of cohabitation is short, most of which is between 6 months and 2

years (Yu & Xie, 2015a). Moreover, the coexistence of traditional and modern family values is also prevalent in China. Similar to other East Asian countries, marriage remains a strong institution in China while cohabitation gains its popularity as a risk-aversive choice of individuals, especially amongst women.

Moreover, Chinese society also experiences compressed modernity. Chang (2010) thinks that Chinese society is even more compressed than other East Asian countries considering the speed of societal and demographic changes in China. In the post-reform era, China transitioned from a planned economy to a market economy. The reform generated a mixed-market economy which is called "socialist country with Chinese characteristics" by the government (Fowler et al., 2010). The mixture of both capitalist and socialist features makes compressed modernity in China even more extreme (Chang, 2010).

However, cohabitation in China has some unique characteristics that distinguish it from both Western and other East Asian countries. First, in terms of the selectivity of cohabitors, empirical research found cohabitation to be more common among individuals with higher education and from higher-status families (Xie, 2013; Yu & Xie, 2015a). This contrasts with the patterns found in both Western and other East Asian countries, where less-educated people tend to cohabit. Second, the current legal environment in China means that cohabitation cannot become the context where childbearing happens. Women are required to be married to get the "birth permit" to give birth to children, so that children can have the household registration status to benefit from the state school and social welfare system. This makes out-of-wedlock birth rate extremely low in China. The reason for cohabitors to get married may be closely related to fertility plans. This is a distinct feature of cohabitation in China and is in direct contrast to cohabitation in developed countries like America where nearly half of all out-of-wedlock births happen

in cohabiting relationships (Heuveline & Timberlake, 2004). Although the rate of nonmarital births in cohabitation is also low in other East Asian countries, the reasons behind are different from that in China. The legal restraints in China mean that cohabitation is unlikely to become an alternative institution to marriage in the near future.

The most crucial reason accounting for the above differences is the role of the state. The state has strict control over Chinese family life. Although it gradually withdrew from family life in the post-reform era, it continues to exert its influence on Chinese marriage and family through population planning policies and marriage laws. Because of this, individualisation and gender relations in China also display unique characteristics under the influence of the state.

Before 1949 (when the People's Republic of China was founded), the function of marriage was first and foremost reproduction to continue the family lineage. Marriages were arranged between parents according to the criterion of equivalent family background. Romance and intimacy were not necessary, and to a large extent, absent and even avoided in traditional families (Wolf, 1984). Between 1949 and 1978, under the socialist rule, the state undermined the power of the family over individuals' lives through passing the 1950 Marriage Law. The law abandoned feudalist practices such as polygamy and arranged marriages, and reinforced the state's power over families. The primary purpose of marriage was no longer continuing the family line. Instead, marriages served the state by maintaining social stability and providing workforce for economic development (Palmer, 1995).

During this period, the state intervened family affairs on a detailed level (Wolf, 1984). For example, the state controlled marriage through registration and compulsory mediation process before divorce. The work unit had much power in helping young people find partners and its approval was a prerequisite before marriage (Wolf, 1984).

Marriages were only recognised as legal after registration with the government. Before its dissolution, it was also required to go through the mediation process provided by the local community and court. The 1950 Marriage Law even explicitly stated that the collective purpose of reproduction is a social function that marriage should perform, and thus divorce is discouraged because it undermines this purpose (Davis, 2014). There was not much room for the pursuit of individual happiness in marriage and family. In this context, sexuality was restricted within the institution of marriage as the means of reproduction. Extramarital sex could be grounds of persecutions (Davis, 2014). Cohabitation was seen as illegal and immoral.

In the post-reform era, the state withdrew itself from many aspects of family life. As the country shifted from a planned economy to a market economy, central planning has gradually been replaced by voluntary contracts and privatisation of possessions (Davis, 2014). Accordingly, other areas in Chinese society have undergone dramatic changes. In this new era, reproduction is no longer seen as the essential function of marriage. Marriage is redefined by the state as a private contract between individuals in pursuit of their emotional happiness (Davis, 2014). Divorce becomes much easier than before. According to the 1980 Marriage Law, the breakdown of couple affections is a reasonable ground for divorce. Compulsory mediation is no longer required (Palmer, 1995). Moreover, there is a much higher tolerance towards premarital sex, which is regarded as a private matter.

In this context, legal regulations about cohabitation have been relaxed. The 1989 Opinions on the Trial of Cases of Cohabitation by the Supreme Court used language like "illegal cohabitation" to show its disapproval towards co-residing relationships without marriage and urged these relationships to complete marriage registration. In 2001, the Supreme Court's Interpretation on Several Issues Concerning the Application of

Marriage Law removed the prefix “illegal”, and cohabitation becomes a neutral term. It shows that the state started seeing cohabitation as an acceptable social practice. The updated judicial interpretation of the Marriage Law promulgated by the Supreme Court in 2003 more clearly states that the court does not accept cases regarding the termination of cohabitation relationships. The interpretation of the Marriage Law by the Supreme Court in 2013 further explains that cohabitation only comes into the court’s purview in the case of a contested divorce or assigning compensation (Davis, 2014).

The above changes indicate that the state increasingly sees cohabitation as a private matter with no need for intervention. However, it should not be seen as the state endorsing cohabitation. The legal changes might be the result of the state accommodating the common social practice of cohabitation while continuing to hold on to other critical aspects of family life such as fertility.

Fertility has always been under strict control. The state carried out several birth planning campaigns to directly influence family choices to control both the quantity and the quality of the population. For example, from the late 1970s, the one-child policy was implemented throughout China. It lasted for over three decades until recently when it was replaced by the two-child policy in 2015 and then the three-child policy in 2021. The number of children families are allowed to have is still within the direct control of the state. The current legislation requires women to be married to get the ‘birth permit’ before giving birth to children (Currier, 2008). Illegitimate children do not have the same rights as children born in registered marriages. They have many difficulties in accessing education, healthcare, and other social welfare advantages (Palmer, 1995). The 2001 Population and Family Planning Law reaffirmed family planning as a fundamental national policy. Therefore, fertility in China is not just individual decisions, but more like

a national strategy. In this context, childbearing is unlikely to happen in cohabiting relationships in the foreseeable future.

Apart from directly regulating family decisions, the state also indirectly influences cohabitation by having an impact on the process of individualisation and gender relations. The rise of individualisation in China has been observed by many researchers (Cao, 2009; Yan, 2010). Several factors have contributed to this. First, economic development and modernisation reduce the power of traditional institutions and empower individuals. Second, developmental idealism suggests that people in developing countries follow the cultural trends set off in developed countries (Thornton et al., 2015). The increasing cultural exchange between China and the Western world exposes Chinese to Western individualistic values. Younger generations even mimic the behaviours from Western media which are seen as fashionable. Third, urbanisation and large scale of migration help younger generations get away from family influences and intergenerational control.

The individualisation process in China shares some similarities with other East Asian countries. Familialism persists without much erosion. The family continues to be the primary safety net for individuals. Adult children are obliged to care for their elderly parents according to the 1980 Marriage Law, and the failure to fulfil this responsibility makes a criminal offence (Palmer, 1995). Surveys from 2006 show that in recent years filial piety has been enhanced by more extensive access to education (Hu & Scott, 2016). The individualistic decisions such as cohabitation are likely to be risk-aversive results of both holding on to traditional family values and trying to avoid family burden for as long as possible.

The key difference between China and other East Asian countries concerning individualisation is that it has been under the strong influence of the state. In the family sphere, the rise of individualisation in post-reform China is accompanied by the

withdrawal of the state's intervention. Indeed, individuals have more freedom than before in terms of partner choice and divorce. The higher tolerance towards premarital sex has contributed to the rise of cohabitation. However, the state still decides where individuals can or cannot enjoy their freedom. For example, fertility is seen as strategic for the nation and is controlled strictly by the government. Moreover, the state educates its citizens using Confucian family values such as filial piety to strengthen family ties. This process can be summarised as state-led institutionalised familialism and individualisation. Individuals are navigating their choices under the shaping power of the state.

The state also has a significant impact on gender relations. While there has been a consistent rise of gender equality in the West, it is not a straightforward process in China. Similar to other East Asian countries, both traditional and modern gender values coexist in Chinese society due to its compressed nature of modernity. However, what differs China from other East Asian countries is the trajectory of gender relations in China. The process has been heavily influenced by the state policy and determines that future progress will also be different.

Gender-based labour division was dominant in traditional Chinese society before 1949. Men were breadwinners, and the major tasks of females were childbearing, childrearing, and domestic chores (Hu & Scott, 2016). After 1949 when the People's Republic of China was founded, women's status was raised both inside the family and in the labour market so that they could be liberated to join the labour force and contribute to the national economy (Wolf, 1984). In the post-reform era, when state intervention is less in this aspect, gender inequality has reappeared in both the labour market and the family. Researchers suggest that it might have never been removed culturally, but was just repressed by the state policy (Mu & Xie, 2014). In the post-reform era, gender

discrimination is found in both the labour market and the family when such repression is relaxed.

With the abandonment of job allocation and the decentralisation of wage payment system, employers have higher autonomy to make recruitment and wage decisions. Consequently, there has been a decline in women's earnings (Gustafsson & Li, 2001). Hughes and Maurer-Fazio (2002) found that married women have even larger gender wage gaps compared to unmarried women, and these differences cannot be entirely explained by other factors. This might be the reason why women are reluctant to enter marriage early and thus delay it by cohabiting with their partners. Inside the family, although women hold more gender-egalitarian attitudes than before, the attitudes of men are lagging. While education tends to increase egalitarian gender values, it is observed that the effect is much stronger for women than men. Compared to women, men continue to hold more traditional family values (Hu & Scott, 2016; Yan, 2010).

Using data from national cross-country surveys, Ochiai (2014) noticed that although female labour participation in China is higher, people in China have more traditional values in terms of gender labour division even compared to other East Asian countries such as South Korea. It might be the result of a growing emphasis on women's traditional family roles that appeared in media since the 2000s (Attané, 2012). Since ideational values predict future changes, gender relations in China might become even more conservative in the future (Ochiai, 2014). The trend has been confirmed by recent research in China, shown by a resurgence of gender inequality (Mu & Xie, 2014).

Past literature has consistently found that gender role specialisation and gender relations are closely linked to marriage and family decisions (Becker, 1981; Thomson & Bernhardt, 2010). The differences in the trajectory and future direction of gender relations between China and other countries suggest that cohabitation might display

different characteristics. The cost of entering into family is huge for women considering the discrimination in the labour market and the burden inside the family. Cohabitation might become an increasingly popular choice among females, especially those who have received higher education.

Research Gaps

The above sections reviewed cohabitation and demographic changes in the West, East Asia, and China. It is evident that although China shares some similarities with other East Asian countries, the fundamental difference in the institutional environment means that cohabitation in China will display different characteristics compared to both Western and other East Asian countries.

However, the current understanding of cohabitation in China is limited. Some regional studies (Quah, 2015; Raymo et al., 2015) and research focusing on general changes in marriage and family in contemporary China (Ma & Rizzi, 2017; Xie, 2013) identified the rising trend of cohabitation in China. The rate of cohabitation grew from less than 2% in the 1970s to nearly one third among recently married couples, which means that cohabitation has become a more acceptable social practice. There are regional variations in terms of the prevalence of cohabitation. It is more common in urban areas and affluent provinces (Fulda, 2017; Xu et al., 2014).

In terms of attitudinal changes, there has been erosion of traditional family values, a higher tolerance towards premarital sex (Jiang, 2002), and growing importance attached to personal privacy in recent years (Wang, 2011). Using data from the national cross-sectional Chinese General Social Survey in 2005-2008, Yeung and Hu (2013) found a higher acceptance of cohabitation among younger generations. Nearly half of the individuals from the recent birth cohort consider cohabitation as a personal matter,

compared to only 14% of people think so among the older cohort. Similarly, using a cross-sectional survey of college students in Hangzhou, Song (2015) found that the younger generation has a higher tolerance towards premarital sex and cohabitation compared to the older generation.

There are currently very few studies focusing directly on cohabitation. Examining the characteristics of cohabitors, Yu and Xie (2015a) found that they tend to come from the better-educated group and families with higher socio-economic status. This is opposite to what has been found in the West, where less education is associated with a higher tendency of cohabitation. Yu and Xie (2015a) think that it might be because cohabitation was already widely practised in Western countries in the 1980s when it was studied, so the findings do not reflect the initial stage of cohabitation when it was still seen as deviant behaviour. However, in other East Asian countries such as Japan and South Korea where cohabitation rate is still low, similar patterns to Western countries have been found that cohabitors belong to the less-educated group (Raymo et al., 2009). Thus, there is a lack of understanding of why the characteristics of cohabitors in China differ from those in the West and other East Asian countries.

Investigating the relationship between cohabitation and marital dissolution, Zhang (2017) discovered that cohabitation is associated with a higher likelihood of divorce; however, this effect disappeared in the recent marriage cohort. He concluded that the results show that the diffusion process has happened in China as cohabitation grew its popularity.

This thesis makes contributions to the existing literature by filling the research gap in the following ways. First, a comprehensive understanding of cohabitation, in particular quantitative evidence, is missing in China. Very few studies focused on cohabitation, which limits the knowledge of the nature and meaning of cohabitation in

China. This thesis investigates the phenomenon of cohabitation extensively through three angles: the characteristics of cohabitors, the assortative mating patterns of cohabitors, and the association between cohabitation and marital outcomes. These angles also reflect the main focuses of Western literature on cohabitation.

Second, another aspect that is missing from the current literature is the gender perspective. Cohabitation might mean something entirely different for men and women, considering that the opportunity cost of marriage and fertility is different for both genders. Besides, there is a higher cultural tolerance towards males who have had cohabitation experience, multiple sexual partners, and divorce. In contrast, women are still frowned upon regarding similar experiences in China. Gender is an important perspective in this thesis. The difference between males and females will be examined with respect to characteristics of cohabitors, as well as how cohabitation is associated with marital outcomes.

Third, comparative studies on cohabitation between different institutional contexts are lacking, especially between Western and East Asian countries. Through examining the applicability of demographic theories developed in Western industrialised countries in the Chinese context, the results of this thesis will contribute to this body of knowledge. Moreover, the findings will shed light on how demographic changes develop in a unique institutional environment with strong state control.

Lastly, previous literature in Western countries suggests that the meaning of cohabitation might change as cohabitation grows in popularity. However, few studies have examined how cohabitation develops in one country. Since the rate of cohabitation has grown fast in post-reform China, investigating how this phenomenon changes across marriage cohorts will serve as a case study of how cohabitation changes over time.

Chapter 1. Changes in the Association Between Education and Premarital Cohabitation in Post-reform China

Introduction

Cohabitation has become an increasingly common stage before marriage in post-reform China. As educational attainment is an important indicator of economic prospect, social status, and cultural characteristics, the identification of the association between education and cohabitation is essential for deepening the understanding of the essence and features of cohabitation in a given society. The aim of this chapter is thus to explore the association between educational attainment and premarital cohabitation among married individuals in post-reform China (after 1978), with a particular focus on the historical development of this association over the last few decades. This chapter first introduces the theoretical framework and empirical evidence regarding education and cohabitation in Western countries, which is then followed by a discussion around the contextual difference of China, with respect to the institutional and cultural changes related to cohabitation and education.

Family patterns have experienced dramatic changes in the last century throughout the world. Many Western developed countries have witnessed demographic changes featuring sub-replacement fertility, alternative arrangements of marriage, a higher divorce rate, gender-egalitarian relationships, births out of wedlock, and a declining population size. This has been summarised by some scholars as the Second Demographic Transition (Lesthaeghe & Van de Kaa, 1986). Of particular importance is the phenomenon of cohabitation, meaning co-residing without being legally married, which increased

dramatically over the last 50 years. For example, the percentage of marriages preceded by cohabitation grew from 10% in the 1960s to over 50% in the 1990s in the United States (Bumpass & Lu, 2000; Smock, 2000). Regardless of national variations, an increasing trend has been observed among European nations in general, with Nordic countries taking the lead. The proportion of cohabiting couples among those in any partnership for people aged between 25 and 34 in 2001 reached 85% in Sweden and was above 70% in both Finland and Denmark (Kiernan, 2004). In East Asian countries such as Japan, similar trends have been found too. For the same age group (25-34), 25% of females were reported to have had cohabitation experience in a national survey in Japan in 2004 (Raymo et al., 2009). These findings indicate that a fundamental change in intimate relationships and family formation might have occurred all around the world (Rindfuss & VanderHeuvel, 1990). Much of the previous research on cohabitation has focused on the characteristics of cohabitors, and the results were inconclusive. While the majority of the literature has found that cohabitors tend to be less-educated (Bumpass et al., 1991; Bumpass & Lu, 2000; Thornton et al., 1995), others have found variations among different countries, or over time within the same country (Thomson & Bernhardt, 2010).

In China, although cohabitation is a relatively new phenomenon, it has experienced a significant increase over the past few decades after the economic reform started in the late 1970s. The proportion of couples cohabiting before marriage was only less than 2% in the 1970s, but in the recent marriage cohort, this figure reached nearly one third (Yu & Xie, 2015a). However, there are fundamental differences between cohabitation in China and Western developed countries. One major difference is that childbearing is very rare in cohabiting relationships in China, contrasting with that in Western countries where a delinking of procreation and marriage has been witnessed (Cherlin, 2004). For instance, half of all out-of-wedlock births occur in cohabiting

relationships in the United States (Bumpass et al., 1991; Heuveline & Timberlake, 2004), whereas fertility remains an activity that is tightly restricted within marriage in China. This seems to link with current legislation in China that requires women to be married to get the 'birth permit' before giving birth. The birth permit is crucial for ensuring that the child can be registered with the Household Registration System (Hukou) and be entitled to the benefit of the state schools and social welfare system (Currier, 2008). Hukou system was set up in 1951 as a monitoring mechanism of population movement, which restrains individual rights such as entitlement to education, employment, and social welfare to a specified locality (Chan & Zhang, 1999). As a result, the regulation of birth permit renders the out-of-wedlock birth rate extremely low. Thus, childbearing continues to be predominantly restricted within marriage. Unlike Western countries, where cohabitation has increasingly resembled a family status (Bumpass et al., 1991) and marriage has gradually been deinstitutionalised and reduced to "a prestigious form of symbolic capital" (Cherlin, 2004) or "one life-style among others" (Giddens, 1992), marriage persists as a strong institution in China. In this context, cohabitation is more likely to function as a transitional stage before marriage rather than a substitution for marriage.

Therefore, the low fertility rate in cohabitating relationships in China reflects a more profound institutional difference between Chinese and Western societies. Contrary to cohabitation being an individual choice in many Western developed countries, cohabitation in China is under the strong influence of the state through its laws and regulations regarding marriage and fertility. Thus, cohabitation is not an entirely personal choice in China, but an outcome of individuals navigating their family choices under the shaping force of a strong state.

Despite a large volume of literature on cohabitation in Western countries, there

has been little research on cohabitation in China, which leads to a limited understanding of the phenomenon. Given the aforementioned differences between cohabitation in Western countries and China, it is uncertain whether the existing theories and conclusions for cohabitation in Western countries apply to the context of China. Empirical evidence has shown that the characteristics of cohabitors in China are different from the findings in the previous literature. For example, the majority of Western and East Asian studies found that cohabitors are less educated than non-cohabitors. However, Yu and Xie (2015a) reached the opposite conclusion that Chinese cohabitors are from the better-educated group. A deeper understanding of how education and cohabitation relate to each other will not only provide valuable insights into the nature of this rising phenomenon in China, but also contributes a case study on how demographic changes develop in a different institutional and cultural context.

Using data from the China Family Panel Studies (2010-2016), a detailed study of the applicability of the existing theories from Western literature in China is carried out in this chapter. Specifically, this chapter investigates the nature of the relationship between education and premarital cohabitation by examining whether the likelihood of premarital cohabitation differs among educational levels and between genders. Moreover, this chapter will, for the first time, investigate how the association between education and premarital cohabitation changes across marriage cohorts and whether the diffusion process has happened as observed in Western countries.

Literature Review

This section introduces the theoretical framework and empirical evidence of education and cohabitation in Western countries, which is followed by a discussion on the unique institutional context in China and recent changes in Chinese family formation in the post-

reform era, as well as current literature on cohabitation and education in China. Finally, hypotheses are generated from the literature review.

Theoretical Framework

Thomson and Bernhardt (2010) suggested that the understanding of how education influences cohabitation structurally and ideologically is still limited. As a different form of intimate relationships, cohabitation resembles marriage in many aspects, including co-residence and sexual activity. The role of cohabitation has traditionally been categorised as an alternative to marriage or as a transitional stage prior to marriage (Heuveline & Timberlake, 2004). Thus, this section presents the main theories about the relationship between education and intimate union formation, which includes both marriage and cohabitation. This is in line with previous literature on this topic (Ikamari, 2005; Thomson & Bernhardt, 2010).

Broadly speaking, there are two approaches to examining the relationship between education and union formation. The first approach emphasises the mechanism, entailing the pathways through which education influences union formation. Two main theories belong to this approach, including economic theory and ideological theory. The second approach, represented by diffusion theory, focuses on the progress or development of the relationship at the societal level. The following section explains these theories in more detail and argues that the diffusion theory provides a more relevant framework for this empirical study, i.e. understanding the evolving relationship between education and cohabitation in China.

According to the economic theory, education can influence the possibility and timing of union formation either negatively or positively. Negative economic theory suggests that education raises the opportunity cost of entering into marriage or

cohabitation, thereby reducing the incentives for people to form unions. According to Becker's new home economics theory (1981), men and women trade with each other in the marriage market akin to firms to maximise their utilities. In the traditional society where the level of women's educational attainment and participation in the labour market was much lower than that of men, men and women specialised in the labour market and family, respectively. Therefore, marriage formation benefited both parties. However, rising educational and labour market opportunities for women have made them more independent of men's economic support and increased the opportunity cost of entering into marriage, which makes marriage less desirable for them. In contrast, the opportunity cost of entering into cohabitation is lower than that of marriage, as it is associated with lower commitments in comparison to marriage (Thornton et al., 1995). Therefore, cohabitation may become an alternative to marriage for dual-earner relationships.

Positive economic theory, on the other hand, suggests that education has a positive effect on union formation by providing the necessary resources required for family functions. Education enables individuals to become economically independent and provides employment and income to support a thorough search for partners (Thomson & Bernhardt, 2010). This is in line with Oppenheimer's (1988; 1997) job search theory - that a marriage search is similar to a job search, especially in terms of the match sought and the duration of the search. Although education may affect marriage timing by delaying the transition to a stable work role, in the long run, education and consequential improvements in the labour market and earnings could improve one's position in the marriage market, facilitate the capacity of finding a suitable residence, and secure resources for stable family life (Oppenheimer, 1988). In this case, cohabitation can be seen as a transitional stage for those who are less economically advantageous to accumulate resources before entering into marriage.

However, the application of these theories depends mainly on the societal contexts, in particular, gender relations and the institutional environment supporting or restraining the family-work compatibility (Bernhardt, 1993; Thomson & Bernhardt, 2010). For example, Thomson and Bernhardt (2010) pointed out that in places where social policies and cultural practices promote gender equality and the compatibility of work and family life, education tends to play a positive role in providing resources for people to enter into unions. However, in situations where gender role specialisation is high, the positive economic theory can still apply to men as education associates them with a higher earning potential that better fulfils the bread-winning role. In contrast, the negative economic theory can be applied to women, who face a significant opportunity cost of forming unions and bearing children (Thomson & Bernhardt, 2010). In such cases, cohabitation may be more prevalent among highly educated women.

The ideological theory suggests that education changes the desirability of marriage or cohabitation via shaping the attitudes and values held by people. The process of education makes people more individualistic by exposing them to alternative ideas and preferences to their family origin. This rise in individualisation is widely recognised as a driving force of the Second Demographic Transition (Lesthaeghe, 1983). Education also produces values that place self-fulfilment above forms of collective life, e.g. family or marriage (Thomson & Bernhardt, 2010), which undermines the values required for marriage formation. This effect is more obvious in traditional societies where women rely on marriage and childbearing to gain social status. In such a context, when education liberates women from the expectations of early marriage and childbearing, it gives them new career opportunities and personal goals (Caldwell & Caldwell, 1987; Ikamari, 2005), which makes marriage less desirable.

The application of the ideological theory also depends on the societal

environment. In societies where a higher degree of values is placed on individual autonomy and gender equality and when cohabitation is widely approved, education may have little influence on the desirability of cohabitation or marriage (Thomson & Bernhardt, 2010). However, in societies where these ideas are not so common, education may have a significant influence, especially for women (Yu & Xie, 2015a).

In contrast with the aforementioned theories, the diffusion theory shifts the perspective from mechanism to societal-historical development. It points out that even within the same society, the application of the theories is heavily influenced by institutional and cultural changes. Therefore, the relationship between education and cohabitation is expected to follow a dynamic developmental process. In 2001, Kiernan introduced a diffusion thesis for understanding how the pattern of cohabitation evolves in different historical stages. By examining the extent and depth of changes of cohabitation in Western Europe, Kiernan (2001) described a trajectory that cohabitation has taken, from being a deviant behaviour at the primitive stage, to functioning as either a prelude to marriage or a trial marriage in the second stage, to becoming more socially acceptable as an alternative to marriage in the third stage, and finally becoming indistinguishable from marriage in the last stage. Thus, the phenomenon of cohabitation can be seen as a gradual and incremental process from innovation to diffusion. During this process, the relationship between education and cohabitation changes accordingly. When cohabitation is still a deviant behaviour, ideational changes are important for distinguishing cohabitors from non-cohabitors. Thus, education is more likely to influence cohabitation choice by bringing about changes in values and attitudes. As cohabitation gains wider acceptance, education may impact cohabitation choice more from an economic perspective.

Chinese society has undergone dramatic changes in the last few decades after the economic reform was initiated. From its origins as a deviant behaviour, cohabitation has

gained increasing acceptance in the society (Yu & Xie, 2015a). In terms of gender relations, a 'U-shaped' turn has been observed in China. Although the norms of gender role specialisation have changed from a male-breadwinning/female-homemaking dichotomy to a dual-earners model under the socialist regime, a resurgence of gender inequality in both the family and the labour market has been observed in the post-reform era (Cao & Hu, 2007). As societal environment changes and cohabitation progresses from being an innovative behaviour to an increasingly common practice, it is reasonable to suggest that the relationship between education and cohabitation has also evolved. Thus, it is not adequate to understand this relationship from a static perspective. The diffusion theory may provide a better framework to understand how the economic and ideological theories worked in various stages of the post-reform era.

Empirical Evidence

The majority of Western literature has focused on the mechanism approach. An inverse relationship between cohabitation and education has been found consistently, meaning that better education is associated with a lower possibility of cohabitation and a higher likelihood of marrying directly. For example, using panel data of mothers and children drawn from the Detroit metropolitan area from 1961 to 1985, Thornton et al. (1995) found that people with little school accumulation cohabit at higher rates than those with more considerable accumulation. This suggests that people with lower school accumulation substitute cohabitation for marriage, at least for a period of time, while those with more accumulation tend to marry directly. Using a national sample survey of 13,017 respondents conducted in 1987-1988 in the United States, Bumpass et al. (1991) further confirmed that for all birth cohorts born from 1930 to 1960, cohabitation among young adults was the least amongst the college-educated people. The cohort comparison

showed that college-educated individuals did experience an increase in cohabitation in the 1970s. However, the growth rate was less than that for their less-educated counterparts (i.e. those who did not complete high school). Thus, college graduates are not innovators in the dissemination of cohabitation but are imitators. This trend was further affirmed by Bumpass and Lu (2000) using a more recent national dataset collected between 1987 and 1995 in the United States, where they found that the least relative increase in cohabitation occurred among college graduates.

Therefore, research based on both local and national samples from 1961 to 1995 have consistently pointed to the inverse relationship between education and cohabitation, and this negative association has been strengthened in recent years. The standard explanation provided by these findings is the lack of financial resources for less-educated people. This is concurrent with the positive economic theory mentioned in the previous section, that education has a positive effect on marriage formation by providing necessary resources for mate search and for establishing a household. When faced with economic constraints, people may take cohabitation as a substitute for marriage in the early years, as cohabitation is associated with lower commitments as opposed to marriage (Thornton et al., 1995).

However, it is important to point out that the empirical evidence discussed above is predominantly from the United States. Research findings from other countries are not necessarily similar. For example, using data from the Swedish Young Adult Panel Study between 1999 and 2003, Thomson and Bernhardt (2010) discovered that the risk of cohabitation is not associated with prior educational attainment or ongoing enrolment. This is interesting, especially since earlier research in Sweden found that cohabitation was pioneered by the working class rather than college graduates using a sample of Swedish women born in 1936-1960 (Hoem, 1986).

These contradictory findings suggest that the relationship between education and cohabitation not only varies across countries, but also changes over time within one country as its institutional and cultural context changes. This supports the diffusion theory. When cohabitation rate was still low in Sweden, education had a strong effect on cohabitation. For the more recent cohort, almost all new unions start from cohabitation. The differential effect of education on cohabitors no longer exists in this family-friendly, gender-egalitarian welfare state (Thomson & Bernhardt, 2010). Since the majority of datasets used in the empirical research in the United States were collected before 1995, further research using more recent data might show varied outcomes to past studies.

The diffusion effect over time within a country has also been confirmed by Ní Bhrolcháin and Beaujouan (2013) using data from the British General Household Survey from 1979-2007. However, the direction of change is opposite to what has been found in Sweden. Specifically, cohabitation began among the best-educated women rather than the least-educated women in the 1970s and 1980s. Nevertheless, over time, the less-educated group overtook the higher educated group. The explanation is that the well-educated individuals were the pioneers of value change who embraced nonconformist and anti-authoritarian attitudes and rejected traditional marriage. Thus, they were the 'innovators' of cohabitation in the early stage. This concurs with the ideological theory mentioned in the previous section and suggests that the trajectory of the relationship between education and cohabitation might be different, depending on the historical and cultural context where cohabitation emerges from.

Therefore, cohabitation is a dynamic process both in the individual life course and in the society (Ní Bhrolcháin & Beaujouan, 2013). Ultimately, it is an individual choice made in a specific institutional and cultural context. With the changes of social and cultural acceptability of cohabitation, and the changes of gender relations and

demographic structure in the broader context, the relationship between education and cohabitation is expected to change accordingly (Manting, 1996; Ní Bhrolcháin & Beaujouan, 2013; Smock, 2000).

The Case of China

In China, cohabitation was extremely rare both in the traditional Chinese society before 1949 and under the socialist regime between 1949 and 1978 (Zheng et al., 2011), but has gradually gained popularity in the recent decades. The proportion of couples cohabiting before marriage has grown from being less than 2% in the late 1970s to nearly one third in the recent marriage cohort (Yu & Xie, 2015a). The growing popularity of cohabitation is interlinked with other changes in the post-reform era. This section will first introduce two dimensions of changing relationships: between the individual and the state, and between men and women. Thereafter, empirical findings on education and cohabitation in China will be addressed.

First, the increasing popularity of cohabitation is a result of the changing relationship between the individual and the state. Specifically, it is a process of the gradual withdrawal of the state from individuals' family decisions and the Chinese family transitioning from being a unit of the extended community into a self-reliant private institution based on voluntary contracts (Davis, 2014). Before the economic reform started, Chinese family life was under strong state control from 1949 to 1978. The primary purpose of marriage was no longer procreation to continue the family line like in the traditional Chinese society, but to serve the state, which has unprecedented power to shape family life through regulating marriage formation and dissolution (Palmer, 1995; Wolf, 1984). Attitude towards sex was extremely prohibitive and conservative during this period. Sex outside marriage, both premarital and extramarital, was regarded as highly

immoral (Zheng et al., 2011). In such a context, cohabitation was socially unacceptable and was seen as immoral. Moreover, practically it was difficult for individuals to cohabit because accommodation was often provided by their work units according to marital status (Wu, 1996).

However, this changed dramatically after the economic reform started in 1978. The most distinctive feature of this period is that the state withdrew from most aspects of family life (except for a few areas such as fertility) and started recognising the family as a private institution. Davis (2014) has summarised this change as a "triple turn", including "a turn towards marriage as a voluntary contract, a turn away from close surveillance of sexual relationships, and a turn away from the protection of communal property." For instance, one of the most profound changes of the Revised Marriage Law of 2001 is to strengthen the protection of individual properties, especially prenuptial properties. In addition, notarised agreements between spouses are recognised as legally enforceable (Davis, 2014). These changes indicate that the idea of voluntary contracts has been extended to intimate relationships. In this context, cohabitation has gained increasing acceptability. The interpretation of the Marriage Law by the Supreme Court in 2013 explains that cohabitation only comes into the court's purview when there are financial disputes (Davis, 2014). This has further confirmed that the state views cohabitation as a personal choice.

Although sexuality is increasingly privatised, fertility decisions such as the occurrence and the number of children are still strongly regulated by the government through the birth permit, household registration, and family planning policies. In particular, women still need to be married to get the birth permit before giving birth. Since children are registered with mothers' hukou, those born out of wedlock will not be able to get registration, and therefore, cannot access public education, healthcare, and

social welfare which is closely tied with hukou status. Moreover, those who give birth outside marriage are penalised by the law directly. For example, Article 41 of the 2016 Population and Family Planning Law states that those who have out-of-wedlock children should pay social maintenance fee to the local family planning administrative department.

In recent years, to increase the fertility rate and solve the ageing problem, the population planning policy has been gradually relaxed. Since October 2015, the one child policy which lasted for over three decades has been formally abolished and replaced by the two-child policy, meaning that a couple can have up to two children. In May 2021, the government has increased the number of children a couple can have to three. Although the policy seems to relax over the years, the state continues to have strict control of fertility in terms of the number of children through population policies and when to have children by regulating children born out of wedlock.

The second changing relationship in the post-reform era is gender relations. Although gender equality improved substantially under the socialist regime, it has deteriorated markedly in the post-reform era. After the founding of People's Republic of China in 1949, the government promoted gender equality in both the family and the labour market. The Marriage Law of 1950 outlawed long-practised arranged marriages and polygamy (Davis, 2014), and abolished the supremacy of men over women (Wolf, 1984). The rate of women's labour force participation increased by five times in the 1950s (Hare-Mustin, 1982) and reached nearly 90% at the eve of the economic reform (Hughes & Maurer-Fazio, 2002). However, after the economic reform started in 1978, gender equality worsened once the market has replaced central planning to determine employment and wage in the labour market. For example, previous research (Khan, 1996) has found larger wage gaps between men and women in areas where market forces are more prevalent, such as eastern coastal provinces and urban regions. A slower wage

growth (Shu & Bian, 2003) and a higher possibility of being laid off (Cao & Hu, 2007) have also been found among women, with married women experiencing even greater discrimination than single women (Hughes & Maurer-Fazio, 2002).

As mentioned in the previous section, how education and cohabitation relate to each other depends mainly on the societal context, especially gender role specialisation and gender relations. Thus, it is reasonable to suggest that the relationship between education and cohabitation might be of a different nature in China from that in Western developed countries.

Research on the association between educational attainment and cohabitation on the individual level in China is limited due to the lack of survey data (Jones, 2007). Since 2010, the China Family Panel Studies data have become available to researchers, and this provides a useful resource for research on this topic. Researchers (Xie, 2013; Yu & Xie, 2015a; Yu & Xie, 2017) found that better education is positively associated with cohabitation (i.e. education increases the likelihood of cohabitation for individuals). Yu and Xie (2015a) used the ideological theory to explain the results, suggesting that this difference is because better-educated people in China are more likely to adopt Western liberal values, such as a more tolerant view towards sexuality and a more egalitarian outlook of gender relations. They also suggested that cohabitation in China is still a marginal phenomenon pioneered by the well-educated group, but this might change in the future to resemble the trend currently observed in Western developed countries. Thus, they proposed that when cohabitation is more widely accepted, lower-income and less-educated individuals will gradually overtake the better-educated group to cohabit.

While the findings of Yu and Xie (2015a) provided valuable insights into the determinants of cohabitation in China, how the association between education and cohabitation changes over time has not been investigated. Thus, whether the diffusion

process has happened remains unknown. As mentioned previously, China has experienced dramatic societal changes over the past few decades. The family choices of each marriage cohort were influenced by the distinct public policies and legal frameworks of marriage of the time. Therefore, an investigation of the variation across different marriage cohorts will help understand how the relationship between education and cohabitation evolves over time.

Furthermore, it may be too simplistic to suggest that cohabitation in China will resemble the trend of Western developed countries, as proposed by Yu and Xie (2015a). While the popularity of cohabitation in China and Western countries both reflects a fundamental ideational change in the society such as growing individualisation, the process in China is the changing relationship between the individual and the state, instead of a categorical shift in the individual-society relationship as happened in Western countries (Yan, 2010). Although the state is increasingly privatising intimate relationships, the whole process is still primarily state-led, and the strong influence of state-induced policies cannot be neglected.

Therefore, the fundamental differences between the institutional contexts mean that the development of cohabitation practice in China might follow a different trajectory from that of Western countries. A better understanding of the time dependency of the relationship between education and cohabitation will not only provide critical insights into the nature of this new type of relationship in China, but also serve as a case study of how demographic changes develop differently in an institutional context with strong state control. Thus, this study will explore the association between education and premarital cohabitation and how it changes over time by testing the following hypotheses.

As mentioned in the previous section, the application of the economic theory and the ideological theory depends on the societal context. Since Chinese society has

historically been characterised as collective rather than individualistic and a resurgence of gender inequality has been observed in the post-reform era, education is likely to impose its influence on individuals through introducing more individualistic and egalitarian ideas. Therefore, this chapter hypothesises that better education is associated with a higher likelihood of premarital cohabitation.

Hypothesis 1: There exists a positive association between education and premarital cohabitation among married individuals in China.

The diffusion theory suggests that the association between education and premarital cohabitation changes within a society over time. In particular, when cohabitation is a marginal phenomenon, education is more likely to influence the choice of individuals by introducing individualistic and non-traditional family values. Nevertheless, as cohabitation becomes more popular, the ideological effect decreases, and education exerts its impact more from an economic perspective. Since education provides better job opportunities and earning potentials, better-educated people might marry directly. At the same time, cohabitation becomes a transitional stage for less-educated individuals to accumulate more resources before marriage. As cohabitation has grown from being a rare phenomenon to a common choice in post-reform China, this chapter hypothesises that the positive association between education and premarital cohabitation decreases over time.

Hypothesis 2: The positive association between education and premarital cohabitation decreases across marriage cohorts, and even reverses in the most recent marriage cohort.

Previous research suggests that the empowerment effect of education is stronger for women than men, meaning that better-educated women hold more gender-egalitarian views than men with similar educational levels (Shu, 2004). Consequently, the

ideological effect of education might be stronger for women than men. Therefore, this chapter hypothesises that the positive association between education and cohabitation is more evident among women.

Hypothesis 3: The positive association between education and premarital cohabitation is more evident for women than men.

Method

Data

This chapter uses pooled data consisting of detailed education and cohabitation histories from four waves of the China Family Panel Studies (CFPS) between 2010 and 2016. Started in 2010 by the Institute of Social Science Survey of Peking University, the CFPS is a nationally representative longitudinal survey conducted to collect data from Chinese families and individuals on economic activities, education outcomes, family dynamics and relationships, migration, and health (Xie & Hu, 2014). Using stratified multistage sampling methods (county-village-household), 14,798 families (consisting of 24,610 adults and 8,990 children) were interviewed for the 2010 baseline survey with an approximately 79% response rate. These individuals comprise core members of the CFPS and have been subsequently followed up on a biennial basis. New family members co-residing with the original respondents were added to the sample as new core members. The sample of CFPS 2016 consists of 36,892 adults and 8,427 children.

The CFPS data contains retrospective information of premarital cohabitation history and is highly suited for addressing the research questions of this study. However, the lack of available data on currently cohabiting couples means that comparison cannot be made between currently cohabiting individuals and married individuals. Since not every cohabitation will lead to marriage, including only the successful cases provides an

incomplete picture of the relationship between education and cohabitation. Nevertheless, since the majority of cohabitating relationships lead to marriage and multiple cohabitation experiences are still rare in China (Xie, 2013), the examination of the relationship between education and premarital cohabitation among married individuals will still provide valuable insights into the bigger question of the relationship between education and cohabitation in general. Moreover, since premarital cohabitation experience was recalled by both spouses separately, it offers an opportunity to cross check their answers. This chapter treated both spouses as having had premarital cohabitation experience if at least one of them reported positively. Around 0.3% of all couples had non-matching information, where one spouse reported having premarital cohabitation history while the other reported having none. For such cases, both spouses from these couples were treated as having had premarital cohabitation experience.

Data collected from four waves (2010, 2012, 2014, and 2016) from the CFPS were pooled together to increase the sample size. Since some of the respondents were interviewed multiple times with the same questions in the follow-up surveys, and the analyses of this chapter only include time-invariant variables, therefore, duplicate information about the same individuals were dropped. This is also consistent with the approach in previous research (Yu & Xie, 2015a). Moreover, a few limitations were applied to the sample. First, this chapter only focuses on cohabitation experience before first marriages. Previous research shows that the cohabitation rate in China has two distinct peaks corresponding to young adults and older people, respectively, where the latter are typically widowers living together without marriage to avoid inheritance complications (Fu, 2010). To avoid confusion with the interpretation of results, the sample in this study is limited to cohabitation experience before first marriages. As a result, 5,916 individuals with higher-order marriages were dropped from the sample.

Moreover, the scope of this chapter is cohabitation and marriages in the post-reform era (after 1978); therefore, only marriages formed during the period after the economic reform started were kept in the sample. To better control for the legal environment, marriages formed before 1980 were dropped because the Marriage Law of 1980 brought about significant changes around legislations of marriage. Thus, 9,193 individuals with marriages formed before 1980 were dropped.

In addition, individuals married before 15 years old were excluded from this study. Previous research shows that although the marriage legal age is 20 years old for women and 22 years old for men, marriage before legal age is widely practised in China, especially in rural areas (Gaetano, 2008; Liu & Zhao, 2009). These marriages are often formalised by local ceremonies and recognised as marriages rather than cohabitation both publicly and privately. Collecting data of married women aged 20-44 from rural central China, Chu (2001) found that 12% of the women got married before the legal age of 20, and it was easy for them to obtain a marriage license from the local government office. Similarly, since more than 10% of the respondents (13.6% of men and 11.5% of women, respectively) got married under the legal age in the CFPS sample, this study considers all marriages formed after 15 years old to be valid following the approach of Yu and Xie (2015b).

Furthermore, this study only kept individuals married before 35 years old to best capture the cohabitation and marriage choices among young adults. This is a common approach in marriage and family studies, as the majority of people are expected to have left home, finished formal education and settled down by this age (Kiernan, 2004). Only 1.6% of marriages in the sample were formed after 35 years old. Therefore, 601 cases where individuals married before 15 years old or after 35 years old were dropped. Consequently, a total of 16,216 cases were included in the analysis, consisting of 7,825

females and 8,391 males. Moreover, cross-sectional weights were used for all analyses to increase the representativeness of the population.

Measures

The dependent variable for the logistic regression is the cohabitation experience before marriage. During the surveys, all married individuals were asked a series of questions regarding their marital history and whether they had ever cohabited with their current spouse before getting married. The response to this question constitutes the individual's cohabitation experience. A binary variable was created with 1 indicating having cohabited before marriage and 0 meaning no such experience.

The key independent variable for the regression is the highest level of educational attainment of the individual, as reported at the time of the survey. The level of education at the time of the survey is assumed to be the same as the level of education at the time of the first marriage, because the level of education of individuals in China does not tend to change after marriage (Qian & Qian, 2014). For this study, a categorical variable was used to capture five levels of educational attainment: illiterate, primary school, junior-high school, senior-high school, and college education and above. Rather than illiterate people, individuals with primary school education were used as the reference group in logistic regression models, so that the results could better reflect the nuanced differences among different educational levels.

Other demographic and socio-economic variables that may be associated with both education and cohabitation outcomes were included to control for confounding factors. Previous research has shown that family socio-economic position influences both union formation and educational attainment (Axinn & Thornton, 1992). Thus, several control variables relating to family origin were included, namely father's educational

attainment, father's Chinese Communist Party (CCP) membership, ethnicity, hukou status at 12 years old, and geographical regions.

Father's highest level of education is preferred over mother's, as it is a better predictor for the economic status of the family considering gender discrimination towards women in the labour market (Hughes & Maurer-Fazio, 2002). In this study, father's education was divided into three levels: illiterate, primary school, and secondary school and above, because not many people from the older generations have accomplished education beyond secondary school. Furthermore, political capital was a major predictor for the socio-economic status of a family under the socialist regime (Hauser & Xie, 2005). This is measured by a dichotomous variable indicating whether the father is a CCP member or not. Furthermore, there is an unequal distribution of economic and educational resources in China, which resulted in significant inequality among ethnic minority groups, rural people, and certain geographical areas in China (Bian, 2002; Xie, 2016). Thus, the control variables included dichotomous measures for ethnicity (Han versus ethnic minority), hukou status at 12 years old (rural hukou versus urban hukou), and a continuous variable measuring gross domestic product (GDP) per capita of each individual's birth province. Hukou status at 12 years old rather than current hukou status was used because it better reflects an individual's socio-economic origin and available educational resources when the individual grew up (Ma & Rizzi, 2017).

Besides the variables relating to the family origin, age was also controlled for because education, cohabitation, and marriage change dramatically over the young adult years (Thornton, 1988). Lastly, survey years were controlled for to minimise the bias of the findings due to sampling errors. As the focus of this research is centred on the relationship between education and cohabitation, the results of the control variables will not be discussed extensively.

Analytical Plan

Logistic regressions will be conducted to examine the association between education and the likelihood of premarital cohabitation. The equation of the logistic regression model can be found in Appendix A. Two different models are conducted. While the first model focuses on the raw relationship between educational attainment and premarital cohabitation experience, the second model examines this association in more detail controlling for potential confounding factors.

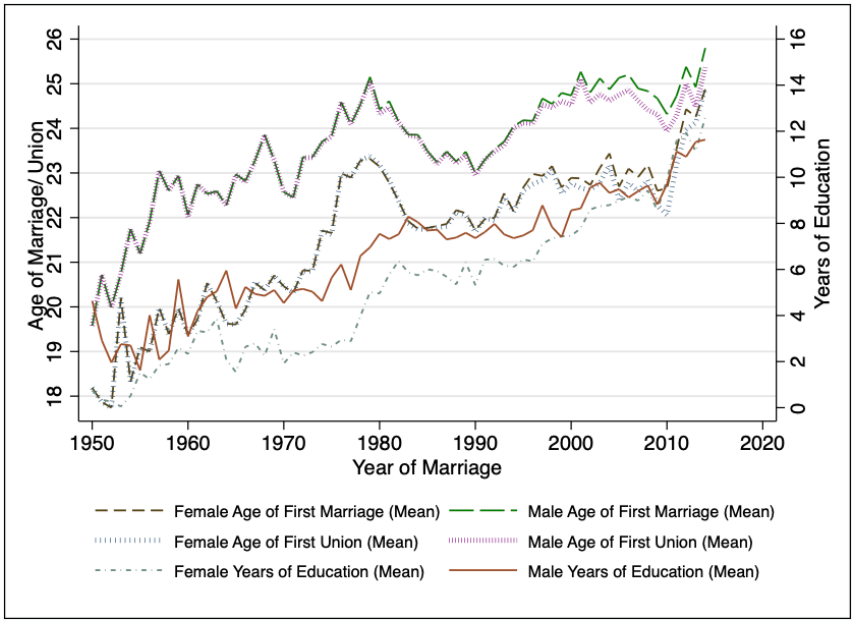
To examine how the association between education and cohabitation changes over time, three different marriage cohorts are isolated as follows: 1981-1992, 1993-2001, and 2002-2016. The reasons for dividing marriage cohorts in this way are because both 1992 and 2001 mark important milestones of both the economic reform and legislations around cohabitation. The year 1992 was seen as a pivotal point in the process of the economic reform, when the government adopted a pragmatic approach in constructing a "socialistic market economy system" (Hou, 2011). The reform and privatisation began to accelerate as a result (Naughton, 2008). In 2001, cohabitation was regulated in the Chinese Marriage Law for the first time (Yu & Xie, 2015a). Before then, cohabitation was not mentioned in the 1980 Chinese Marriage Law. However, the 2001 Chinese Marriage Law for the first time regulated financial disputes among cohabitors and deemed them private issues (Article 12). They only come under the court's purview when both parties fail to reach an agreement among themselves. This shows that the law started to recognise the rising social phenomenon of cohabitation. Thus, dividing cohorts in this way can to a large extent control for the institutional environment in which individuals make their family choices. Furthermore, logistic regressions will be carried out separately for men and women in each marriage cohort, as previous studies have observed gender differences in the prevalence and determinants of cohabitation (Yu & Xie, 2015a).

Results

Descriptive Results

This study aims to investigate the association between education and premarital cohabitation across different marriage cohorts in post-reform China. Before looking at the regression findings, descriptive results are first presented.

Figure 1. The Rise of the Age of First Marriage/Union and Years of Education for Married Individuals 1949-2016



Source: Pooled Data from CFPS 2010-2016.
Note: Results are weighted using cross-sectional weight.

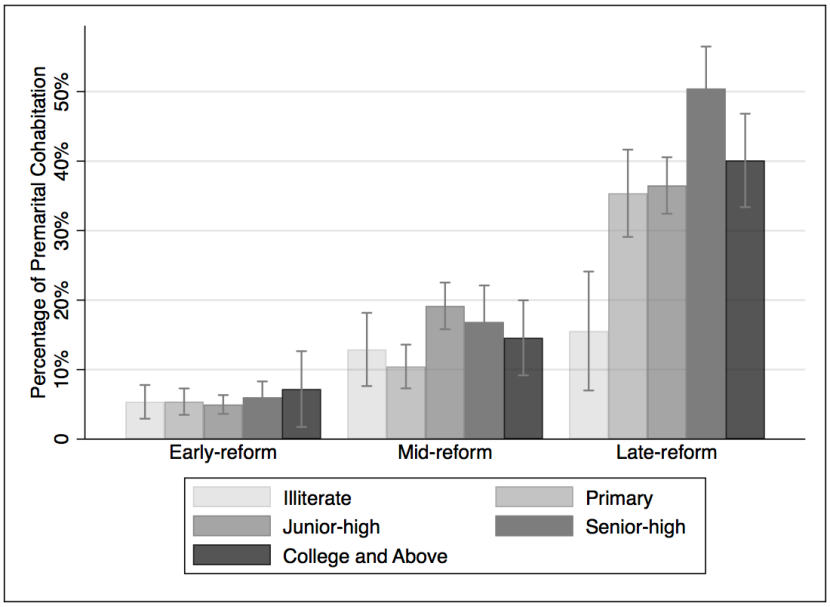
Figures 1 shows the increase in the years of education and the age of first marriage from 1949 to 2016 for married men and married women in the sample. The average years of education increased by 10 and 13 years for men and women, respectively, while the age of first marriage increased by about 6.3 years and 7 years for men and women, respectively. Thus, the age of first marriage seems to rise in tandem with the number of years of education.

Overall, there is a general increase in the age of marriage for both men and women over the past few decades. For example, the mean age of first marriage for women has increased from 17.8 years old in the 1950s to 24.8 years old in 2016. For

men, the increase was from 19.5 to 25.8 years old over the same period. The rise in the age of first marriage has been consistent, except for a sharp rise in the late 1970s followed by a drop in the early 1980s. This may be due to a government policy that promoted late marriages in the 1970s and encouraged people to get married in their late twenties. However, the 1980 Marriage Law lowered the legal marriage age to 20 years for women and 22 years old for men, which gave people the freedom to get married at a younger age again, thus setting up the drop in the age of first marriage in the early 1980s.

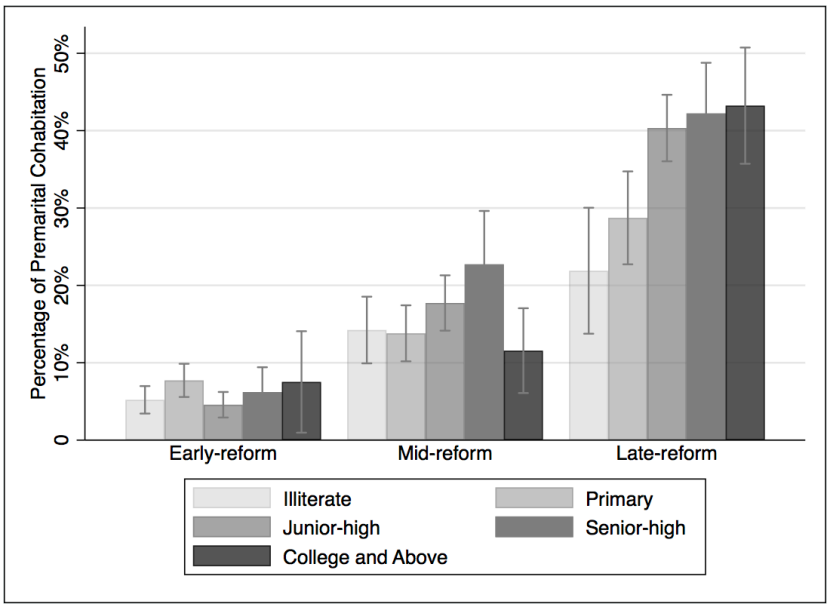
By comparing the age of first union (i.e. cohabitation) against the age of first marriage, some insights into the cohabitation trend can be identified. First, it is evident from Figure 1 that the prevalence of cohabitation among married couples increased substantially after the early 1990s for both women and men, as shown by the increasing gap between the two age-related curves. Second, the figure shows that the average duration of cohabitation tends to be short, delaying marriage by less than 1 year.

Figure 2. Percentage of Premarital Cohabitation Across Educational Attainment Levels and Marriage Cohorts for Married Males



Source: Pooled Data from CFPS 2010-2016.
Note: Results are weighted using cross-sectional weight and presented with 95% confidence intervals.

Figure 3. Percentage of Premarital Cohabitation Across Educational Attainment Levels and Marriage Cohorts for Married Females



Source: Pooled Data from CFPS 2010-2016.
Note: Results are weighted using cross-sectional weight and presented with 95% confidence intervals.

To investigate the relationship between education and cohabitation in China, the cohabitation rate was calculated for different education groups in each marriage cohort.

The results are shown in Figures 2 and 3 for men and women, respectively. In general, both figures show a substantial increase in cohabitation for both men and women. In the early-reform era, cohabitation was a relatively rare phenomenon, with less than 10% of the people choosing to cohabit before marriage. In the last two decades, this number tripled and nearly one-third of men and women cohabited before their first marriage.

The rate of cohabitation has increased significantly across all educational levels in the post-reform period. In the early-reform cohort (1981-1992), the rate of cohabitation was similar for all educational levels, and no particular level of education stood out, except for primary school educated females. However, the differentiating pattern of education and cohabitation becomes apparent in the mid-reform era (1993-2001). Among all educational levels, the most significant positive effect comes from secondary school for both genders. Both junior-high and senior-high school educated males have significantly higher cohabitation rate than primary school graduates, with the difference being 9% and 7%, respectively. As for females, senior-high school graduates have significantly 9% higher cohabitation rate than their primary school educated counterparts. One surprising finding is that college education is not associated with the highest cohabitation occurrence. Instead, it has a decreasing impact compared to senior-high school education, especially for females. This is different from Hypothesis 1, which posits that education is consistently positively associated with the cohabitation likelihood.

During the late-reform era between 2002 and 2016, the cohabitation rate continues to increase. For males, primary school education has replaced junior-high school to have the most significant positive association with 35% cohabitation rate, almost doubling the rate of illiterate males. Senior-high school education significantly increases the cohabitation rate by about 13% compared to the previous educational level, and it also has the highest cohabitation rate of 50% among all education groups. For

females, similar to the former cohort, the most significant positive effect comes from junior-high school, where the cohabitation rate is 11% more than the previous educational level. A key difference is that while college education increases the cohabitation rate for females, it has the opposite effect for males. It suggests that the positive association between education and premarital cohabitation is stronger for women than men, although the level of significance needs to be further tested.

The above results show that the relationship between education and cohabitation differs between men and women, and it changes over time across different marriage cohorts. However, the direction of change is opposite to what Hypothesis 2 suggests. Instead of education having the most positive association with cohabitation in the early cohorts and then decreasing over time (as observed in Western countries), female cohabitors seem to be more and more positively selected over time. This is less obvious for men, where the positive association of education and cohabitation is strongest amongst the senior-high school educated group in the most recent cohort. This seems to support Hypothesis 3, which assumes that the positive association between education and cohabitation is more evident for women than men. However, the rate of cohabitation among the college educated males has risen fast and has overtaken the junior-high educated group to become the second largest pool of cohabitors in the most recent cohort. Thus, college educated males may be the largest group of cohabitors in the future, which would imply that there is a delayed effect for best-educated men compared to women.

Table 1. Explanatory Variables by Cohabitation and Marriage Cohorts for Males in Post-reform China (N = 8,391)

Variable		Early-reform		Mid-reform		Late-reform	
		Cohabited	Non-cohabited	Cohabited	Non-cohabited	Cohabited	Non-cohabited
Education (%)	Illiterate	12.90	14.67	7.78	13.14	2.44	6.45
	Primary	22.58	22.20	17.96	26.17	15.89	19.14
	Junior-high	41.01	39.83	46.71	37.90	37.04	42.37
	Senior-high	19.35	18.76	17.07	12.98	26.53	16.44
	College and above	4.15	4.55	10.48	9.81	18.09	15.60
Age (Mean)		47.12	47.81	37.51	38.30	29.09	29.52
Ethnicity (%)	Han	96.77	93.82	91.92	91.07	92.18	90.22
	Minority	3.23	6.18	8.08	8.93	7.82	9.78
Hukou at 12 years old (%)	Urban	15.21	15.64	15.57	14.02	17.24	15.33
	Rural	84.79	84.36	84.43	85.98	82.76	84.67
Father's Education (%)	Illiterate	50.00	56.33	36.45	38.37	19.72	24.96
	Primary	31.67	28.21	36.45	35.64	29.45	28.07
	Secondary and above	18.33	15.46	27.09	25.99	50.83	46.97
Father's CCP membership (%)	CCP member	19.28	18.58	21.27	17.50	13.77	13.64
	Non-CCP member	80.72	81.42	78.73	82.50	86.23	86.36

Source: Pooled Data from CFPS 2010-2016.
Note: The table shows comparisons between cohabited and non-cohabited males in terms of educational attainment, age, ethnicity, hukou status at 12 years old, father's education, and father's CCP membership in three marriage cohorts in the post-reform era. Results are weighted using cross-sectional weight.

Table 2. Explanatory Variables by Cohabitation and Marriage Cohorts for Females in Post-reform China (N = 7,825)

Variable		Early-reform		Mid-reform		Late-reform	
		Cohabited	Non-cohabited	Cohabited	Non-cohabited	Cohabited	Non-cohabited
Education (%)	Illiterate	22.71	31.94	14.86	24.12	4.32	10.16
	Primary	36.23	23.43	21.67	26.36	13.69	19.07
	Junior-high	26.09	28.45	40.25	31.13	41.90	39.53
	Senior-high	11.59	13.47	15.48	10.21	22.33	17.14
	College and above	3.38	2.71	7.74	8.19	17.77	14.10
Age (Mean)		44.70	46.00	35.35	36.33	26.87	27.26
Ethnicity (%)	Han	97.10	93.67	90.40	89.96	91.12	89.15
	Minority	2.90	6.33	9.60	10.04	8.88	10.85
Hukou at 12 years old (%)	Urban	16.91	15.79	16.10	12.17	17.05	14.44
	Rural	83.09	84.21	83.90	87.83	82.95	85.56
Father's Education (%)	Illiterate	47.65	53.71	29.19	35.64	16.53	22.67
	Primary	32.94	28.87	35.91	35.21	31.07	30.87
	Secondary and above	19.41	17.42	34.90	29.15	52.40	46.46
Father's CCP membership (%)	CCP member	81.76	81.09	86.30	82.97	85.56	88.18
	Non-CCP member	18.24	18.91	13.70	17.03	14.44	11.82

Source: Pooled Data from CFPS 2010-2016.
Note: The table shows comparisons between cohabited and non-cohabited females in terms of educational attainment, age, ethnicity, hukou status at 12 years old, father's education, and father's CCP membership in three marriage cohorts in the post-reform era. Results are weighted using cross-sectional weight.

Tables 1 and 2 show the explanatory variables by premarital cohabitation experience and marriage cohorts for both males and females. For both genders, individuals with premarital cohabitation experience are becoming increasingly better educated over time. In the early-reform marriage cohort, the majority of cohabited males (76.49%) have education up to junior-high school, and this figure for cohabited females is even higher being 85.03%. However, this is completely opposite by the time of the late-reform cohort, with more than 80% of cohabited males and females having at least junior-

high school education. The percentage of college educated cohabitors increased dramatically. With only 4.15% of male cohabitors and 3.38% of female cohabitors having college education in the early-reform cohort, the figures increased to 18.09% for males and 17.77% for females in the late-reform cohort, nearly five times higher compared to those in the early-reform cohort.

In terms of other explanatory variables, cohabited individuals are younger, less likely to come from minority groups, more likely to have urban hukou and come from families with higher socio-economic status (having fathers with better education). The relationship between education and premarital cohabitation needs to be further examined when these confounding factors are controlled for.

Logistic Regression

To test the association while controlling for other confounding variables, logistic regressions were carried out to examine the association between educational attainment and premarital cohabitation, and whether it has changed across marriage cohorts.

Table 3. Odds Ratios for the Association of Educational Attainment and Premarital Cohabitation for Married Males Across Marriage Cohorts in Post-reform China

	Early-reform (1981-1992)		Mid-reform (1993-2001)		Late-reform (2002-2016)	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Educational Attainment (Ref. Primary School)						
Illiterate	0.88	1.03	0.98	1.02	0.45*	0.47*
	(0.28)	(0.32)	(0.30)	(0.31)	(0.16)	(0.17)
Junior-high	0.86	0.91	1.86**	1.80**	1.10	1.05
	(0.21)	(0.22)	(0.38)	(0.36)	(0.18)	(0.18)
Senior-high	1.07	1.18	1.59	1.73*	1.91***	1.87**
	(0.30)	(0.32)	(0.41)	(0.46)	(0.35)	(0.37)
College	1.24	1.37	1.34	1.60	1.27	1.26
	(0.57)	(0.65)	(0.38)	(0.50)	(0.25)	(0.28)
Age		0.95*		0.92***		0.96*
		(0.02)		(0.02)		(0.01)
Ethnicity (Ref. Minority)						
Han		1.23		0.93		1.13
		(0.56)		(0.25)		(0.24)
Hukou Status at 12 Years Old (Ref. Rural Hukou)						
Urban Hukou		0.96		0.68		0.95
		(0.28)		(0.18)		(0.16)
Father's Education (Ref. Illiterate)						
Primary		1.26		0.88		1.14
		(0.29)		(0.17)		(0.20)
Secondary and above		1.04		0.70		0.99
		(0.31)		(0.15)		(0.17)
Father's CCP Membership (Ref. Non-member)						
CCP Member		0.99		1.27		0.78
		(0.27)		(0.28)		(0.15)
Provincial GDP per capita		2.35*		3.52***		1.73*
($10,000)		(1.01)		(1.34)		(0.48)
Panel Wave (Ref. 2010)						
Wave 2012		0.73		1.41		1.17
		(0.29)		(0.38)		(0.21)
Wave 2014		2.21*		0.81		0.80
		(0.77)		(0.34)		(0.19)
Wave 2016		1.27		0.66		0.89
		(0.55)		(0.29)		(0.22)
Constant	0.06***	0.28	0.13***	1.61	0.52***	1.03
	(0.01)	(0.32)	(0.02)	(1.37)	(0.07)	(0.50)
Observations	3980	3980	2246	2246	2165	2165

Source: Pooled Data from CFPS 2010-2016. Note: Results are weighted using cross-sectional weight. Exponentiated coefficients; robust standard errors in parentheses; and ref. = reference

* $p<0.05$, ** $p<0.01$, and *** $p<0.001$.

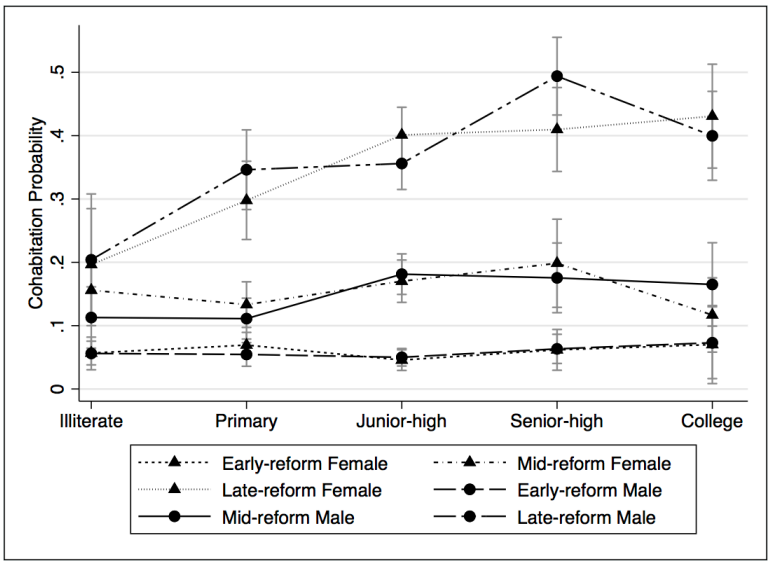
Table 4. Odds Ratios for the Association of Educational Attainment and Premarital Cohabitation for Married Females Across Marriage Cohorts in Post-reform China

	Early-reform (1981-1992)		Mid-reform (1993-2001)		Late-reform (2002-2016)	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Educational Attainment (Ref. Primary School)						
Illiterate	0.74	0.80	1.09	1.21	0.60	0.57
	(0.18)	(0.19)	(0.26)	(0.29)	(0.18)	(0.18)
Junior-high	0.63	0.64	1.40	1.34	1.58**	1.60**
	(0.15)	(0.16)	(0.28)	(0.28)	(0.28)	(0.29)
Senior-high	0.82	0.88	1.60	1.63	1.63*	1.66*
	(0.26)	(0.30)	(0.41)	(0.47)	(0.33)	(0.36)
College	1.18	1.01	0.85	0.86	1.71*	1.81*
	(0.57)	(0.53)	(0.27)	(0.30)	(0.37)	(0.45)
Age		0.91***		0.90***		0.94***
		(0.02)		(0.02)		(0.02)
Ethnicity (Ref. Minority)						
Han		1.64		1.04		0.91
		(0.83)		(0.26)		(0.20)
Hukou Status at 12 Years Old (Ref. Rural Hukou)						
Urban Hukou		1.43		1.07		1.01
		(0.42)		(0.26)		(0.19)
Father's Education (Ref. Illiterate)						
Primary		1.21		0.89		0.91
		(0.28)		(0.18)		(0.18)
Secondary and Above		1.29		1.12		0.87
		(0.39)		(0.25)		(0.16)
Father's CCP Membership (Ref. Non-member)						
CCP Member		0.92		0.86		1.18
		(0.26)		(0.22)		(0.26)
Provincial GDP per capita		1.62		2.04		2.75***
($10,000)		(0.69)		(0.80)		(0.78)
Panel Wave (Ref. 2010)						
Wave 2012		2.35*		1.08		0.99
		(0.87)		(0.36)		(0.20)
Wave 2014		1.82		1.41		0.69
		(0.80)		(0.56)		(0.18)
Wave 2016		3.45*		1.03		1.29
		(1.69)		(0.56)		(0.38)
Constant	0.08***	2.17	0.15***	4.18	0.43***	1.53
	(0.01)	(2.48)	(0.02)	(3.30)	(0.06)	(0.78)
Observations	3767	3767	2094	2094	1964	1964

Source: Pooled Data from CFPS 2010-2016. Note: Results are weighted using cross-sectional weight. Exponentiated coefficients; robust standard errors in parentheses; and ref. = reference

* $p<0.05$, ** $p<0.01$, and *** $p<0.001$.

Figure 4. Predicted Premarital Cohabitation Probability for Married Males and Females Across Educational Levels in Post-reform China



Source: Pooled Data from CFPS 2010-2016.
Note: Results are weighted using cross-sectional weight and presented with 95% confidence intervals.

Tables 3 and 4 present the logistic regression results for men and women, respectively. In both tables, the estimated odds ratios of the logistic model are presented separately for the early-reform, mid-reform, and late-reform marriage cohorts. The odds ratio shows the change of odds of cohabitation given a unit change of independent variables. Figure 4 presents the predicted probabilities of cohabitation for males and females. Although the results support the suggestion that the association of education and premarital cohabitation changes over time, the direction is opposite to what Hypothesis 2 suggests, which expects the association to decrease over time.

In the early-reform period, no significant relationship is found between education and cohabitation probability for both men and women. One possible reason is that during this period, educational level was generally low for both men and women, with the mean years of education being 8 years for men and 6 years for women, respectively (see Figure 1). Therefore, the differential effect of educational levels is not obvious.

In the mid-reform era, education has a significant association with men's choice to cohabit, with both junior-high and senior-high school educational levels having a significant association with cohabitation. Compared to primary school educated men, the odds of male junior-high and senior-high school graduates cohabiting before marriage are 80% and 73% higher, respectively. Contrary to men, education is not found to have any significant association with premarital cohabitation for women in this cohort, which suggests that education has a delayed effect on women in terms of their choice to cohabit. This might be due to the reason that when the cohabitation percentage was still relatively low in society (less than 10% according to figures 2 and 3), there was a stronger social stigma associated with women cohabiting than men. Thus, better-educated females would continue to choose a more traditional pathway to marriage just like their less-educated counterparts, despite any ideational change education might have brought about.

The decreasing effect of college education for men and women is surprising, considering that educational level has consistently raised the percentage of cohabitation till college level. This is different from Hypothesis 1, which proposes a consistent positive association between educational attainment and premarital cohabitation. There are three possible reasons for this. First, higher education may be related to higher family status and tighter family control because of more substantial financial investment in children. Thus, union formation is under stronger control of family compared to others. Second, better education is related to higher social and political capital in China, and college graduates are more likely to be CCP Members (Xie & Zhang, 2017). Since the Communist Party considered premarital sex and cohabitation as immoral under the socialist regime (Yu & Xie, 2015a) and it still carries out background check for its members, the CCP membership is likely to reduce the occurrence of premarital cohabitation. Third, university students in China usually live in student dormitory with

several people sharing a room, therefore, cohabitation might not be practically possible. Nevertheless, further research may be required to determine the reasons why college education is associated with a reduced likelihood of cohabitation for both men and women in this period.

For the most recent marriage cohort, education is a significant predictor of cohabitation for both men and women, even after confounding factors are controlled for. For men, better educational attainment has a positive association with cohabitation, but this positive association peaks at senior-high school. Illiterate men have 53% lower odds cohabiting than those who have primary school education. In contrast, senior-high school graduates have 87% higher odds cohabiting compared to the same group.

For women, educational attainment is a consistent positive predictor of cohabitation (i.e. the higher the educational level, the higher the odds of cohabiting before marriage). Senior-high school, for example, associates with 66% higher odds of cohabitation than primary school, while junior-high school education associates with 60% higher odds of cohabitation than primary school. College education has the highest positive association, with the odds of cohabitation being 81% higher than primary school educated females. This could be due to increasing gender discrimination in the labour market in recent years, which increases the opportunity cost for women to enter into marriage. Thus, highly educated women may delay marriage and substitute it with cohabitation for a period of time, which requires lower commitment than marriage. The results in the late-reform cohort suggest that the positive association between premarital cohabitation and education is more evident for women than men, which support Hypothesis 3.

In summary, the association between education and cohabitation exhibits different patterns for men and women, and this pattern changes over time. The direction of change

is opposite to what Hypothesis 2 suggests. In the early-reform era, education has no significant association with cohabitation for both men and women. When it reaches the mid-reform era, while education is a strong positive predictor for men, it has a delayed effect on women. In the late-reform era, better educational attainment (until college level) consistently increases the odds of women cohabiting, while the positive association for men peaks at senior-high school education. The stronger positive association of education in the late-reform era for women than men shows that male cohabitors are not as positively selected as women, which may indicate a possibility of educational hypogamous relationship in marriages preceded by cohabitation, meaning that wives have higher educational achievement than husbands.

Conclusion

The focus of this chapter is to examine the association between education and premarital cohabitation, how it changes over time, and differs between genders. While this chapter finds no significant association between education and cohabitation for both men and women in the early-reform cohort, this has changed in the more recent cohorts. In the mid-reform cohort, secondary education is found to have a significantly positive association with men's choice to cohabit. In contrast, there is a delayed effect of education on cohabitation for women. As for the most recent cohort, education is positively associated with cohabitation for both men and women, and this association is more consistent for women than men.

The above results generate the following conclusions. First, unlike the patterns that have been discovered in most Western countries, there exists a positive association between education and premarital cohabitation in China. This is consistent with previous literature on this topic in China. Second, the positive association between education and

premarital cohabitation is more evident in the most recent marriage cohort and more consistent for women than men. Contrary to what has been predicted by previous literature in China (Yu & Xie, 2015a), instead of having a positive association at first and then decreasing over time, educational attainment has become an increasingly positive predictor of cohabitation in China for both men and women across marriage cohorts. These results show a different story compared to what the diffusion theory suggests and contrasts with the empirical findings in Western countries. As cohabitors become increasingly negatively selected in Western countries, the results of this research show that the opposite trend is happening in China.

The increasingly positive association between education and premarital cohabitation in China may be because cohabitation is still not yet wholly accepted in China; thus, only better-educated people pioneer this behaviour as a result of being influenced by individualistic and non-traditional family values brought about by better education. The stronger positive association between education and cohabitation for women than men may indicate a disadvantaged position for women in post-reform China. With the resurgence of gender inequality in both domestic and professional space, better-educated women face higher opportunity costs in forming families and bearing children. Therefore, they may be more likely to choose cohabitation, which requires less commitment than marriage. The mixed results discovered in this study reflect a fundamental difference in the institutional context between China and Western countries, and indicate that China might be developing different demographic patterns and trends compared to Western countries.

Nevertheless, there are some notable limitations with the current study. First, the pathways through which education influences cohabitation have not been examined in detail. Further tests are required to determine how education influences cohabitation

through socio-economic prospect (e.g. the return of education) and ideational values (e.g. gender attitudes). Second, there is incomplete information about the timing of cohabitation before first marriage in the CFPS data, and future examination on how education is associated with the length of cohabitation might be helpful to uncover the meaning of cohabitation.

Another potential limitation is the self-reporting nature of the cohabitation experience. Previous studies (Murphy, 2000) have found a notable underreporting issue with cohabitation. Thus, the CFPS data might underestimate the prevalence of cohabitation in China. For example, the CFPS data show that about one-third of recently married couples have had premarital cohabitation experience. However, the number of reported cases of currently cohabiting couples is very low, and it does not reflect the rising trend of cohabitation. This could be because there is still a social stigma attached to cohabitation, which led to cohabitating individuals reporting as being single when asked about their current relationship status. Retrospective questions about cohabitation history may remove the cultural pressure and reduce the underreporting issue. Therefore, the scope of this research is limited to married individuals and how their educational attainment is related to premarital cohabitation experience, as this is the best quality of data that is available at the moment. While this research does not include cohabiting experiences that do not lead to marriage, future research may address this issue when such data becomes available.

Chapter 2. Educational Assortative Mating in Post-reform China: Does Premarital Cohabitation Make Any Difference?

Introduction

Assortative mating, or the patterns of who marries whom, has been one of the most popular topics among family sociologists and demographers, as it has significant implications for social inequality and the well-being of the family. At the micro level, spousal dissimilarities are negatively associated with marital quality and stability (Bumpass & Sweet, 1972; Blackwell & Lichter, 2004). Moreover, marriage compositions have a significant impact on the next generation by providing the family context in which children are raised and the available resources for them (Mare, 1991; Hamplova & Bourdais, 2008).

Furthermore, at the societal level, assortative mating is an essential indicator of the openness of the society and social inequality through the redistribution of resources and the exchange of socio-economic and cultural status between spouses (Blossfeld, 2009; Kalmijn, 1998; Ravazzini et al., 2017). A higher level of marital homogamy means that individuals tend to find spouses with similar background, indicating solidification of resources of the same social class. In contrast, higher heterogeneity means that people are likely to marry those who are different from their background, indicating more social fluidity and easier penetration of boundaries between different social classes. In China, it has been debated whether societal openness has increased or not in the post-reform era. Some scholars found greater societal fluidity brought by the market-oriented economy, increased educational opportunities, and large-scale internal migration (Bian, 2002; Nee,

1996). However, others claim that elite reproduction has been reinforced in post-reform China through higher education and intergenerational transmission of resources (Zhang & Zhang, 2012). Understanding the changing patterns of assortative mating patterns in the post-reform era will shed some light on the debate on the level of societal openness in China.

Couples are matched based on different factors – some are acquired characteristics such as race, while others are attained characteristics such as education. This chapter chooses to focus on education for several reasons. Besides its strong correlation with one's lifestyle, taste, and gender attitude (Halpin et al., 2003; Shu, 2004), education is one of the most critical determinants of individuals' socio-economic status in modern societies (Blossfeld, 2009; Halpin & Chan, 2003). In post-reform China, as the country gradually transitioned from a planned economy to a market economy, the returns to education have dramatically increased, and education has become the most critical factor determining an individual's socio-economic status (Nie & Xing, 2019; Zhao & Zhou, 2002). Moreover, there has been observed a decreasing impact of political factor (e.g. CCP membership) and an increasing influence of education on class advancement in post-reform China (Lu & Treiman, 2008; Treiman & Walder, 2019). Consequently, education has become one of the most important characteristics in assortative mating.

Moreover, accompanying the economic reform was a nationwide education reform, which resulted in a massive expansion of education on all levels (Han, 2010). This has brought about further changes in assortative mating. For example, previous research suggests that education expansion changes the marriage market through increasing the likelihood of people meeting partners with the same educational level as theirs (Blossfeld, 2009). Moreover, the gender gap in education has been narrowed and even reversed. Women have more educational opportunities than before, and the number

of female graduates even exceeds male in higher education (Yeung, 2013). This might change marital preferences as men are likely to prefer better-educated partners because of their economic contributions (Oppenheimer, 1988). Therefore, it is not surprising to expect changes in educational assortative mating patterns in the post-reform era.

An important factor contributing to the change in educational assortative mating is the rise of premarital cohabitation. However, this has been largely neglected in the existing literature. In recent years, it is increasingly common for couples to enter into marriage after a period of cohabitation (Ma & Rizzi, 2017). In China, the percentage of couples cohabiting before marriage has tripled from being less than 2% in the 1970s to almost one third in the recent marriage cohort (Yu & Xie, 2015a). Despite its rising popularity, marriage remains a strong institution. The duration of cohabitation before marriage is typically short, which ranges from 6 months to 2 years (Yu & Xie, 2015a). Furthermore, fertility is strictly restricted within the context of marriage and is very rare in cohabiting relationships (Currier, 2008). Therefore, unlike many Western developed countries, cohabitation is not an alternative form to marriage (Macklin, 1980), but more likely serves as part of the mate-selection process in China (Raymo et al., 2015). This leads to the following question: do marriages preceded by premarital cohabitation have any different assortative mating patterns compared to those without such experience?

Mixed results have been found in Western developed countries regarding the association between cohabitation and assortative mating. For instance, Schoen and Weinick (1993) discovered that cohabiting couples tend to be more homogamous than married couples, while Blackwell and Lichter (2000; 2004) reached the opposite conclusion. In China, much of the current literature on marital homogamy has not explored the role of premarital cohabitation. This chapter seeks to answer this question by comparing assortative mating patterns among two groups of married couples: those who

have had cohabitation experience before marriage, and those without such experience. This focus also distinguishes itself from the majority of existing Western research, which tends to treat cohabiting couples as a homogeneous group. This traditional approach fails to differentiate two distinct subcategories within the cohabiting couples: those who transit into marriage and those who separate after cohabitation. These two groups are likely to differ in their partner preferences, educational levels, and demographic characteristics (Gwartney-Gibbs, 1986). This chapter acknowledges the systematic differences between these two groups. Although both groups are theoretically relevant, this chapter focuses on the former category - the cohabiting couples who eventually get married, due to the lack of available data for the latter category. In particular, this chapter seeks to compare the difference in assortative mating patterns between those who transit into marriage through cohabitation and those who marry directly, and how this difference develops over time in post-reform China.

Literature Review

Theories of Cohabitation and Assortative Mating

Theories on this topic focus predominantly on the differences between currently cohabiting relationships and marriages. The following sections review these theories and their empirical evidence, followed by a discussion on how these theories can be extended to apply to the relationship between premarital cohabitation and mate selection among married couples in China. There are three main theories of assortative mating in relation to cohabitation – informal marriage, looser bond, and double selection (Blackwell & Lichter, 2000; 2004; Schoen & Weinick, 1993). Their differences are mainly due to the distinct understandings of the meaning and role of cohabitation in comparison to marriage (Hamplova & Bourdais, 2008).

The informal marriage theory considers no fundamental difference in mate selection patterns between cohabitation and marriage. In the marriage context, the tendency to marry someone similar to oneself is widely noted. This tendency is the result of similar socio-economic status and shared cultural taste and interest between spouses (Hu & Qian, 2015; Kalmijn, 1998; Schoen & Weinick, 1993). In the absence of homogamy, in the cases of intermarriage, men and women display different preferences for potential spouses. According to the exchange theory (Becker, 1981), individuals look for traits that are complementary to their own to maximise utility. Empirical studies found that women value economic characteristics that show an excellent acquisition of wealth and status in potential spouses, whereas men put more focus on physical attractiveness and youth of women (Bereczkei & Csanaky, 1996). Because education is a crucial indicator of economic potential in modern societies, women tend to marry up concerning educational level whereas men tend to marry down (Blackwell & Lichter, 2000; 2004; Xie, 2013). According to the informal marriage theory, similar patterns are expected to be observed among cohabiting relationships.

The looser bond theory, in contrast, assumes that cohabitation is a distinct institution compared to marriage, and thus cohabitors have different partner preferences compared to those who marry directly (Schoen & Weinick, 1993). A major feature that differentiates cohabitation from marriage is its temporality. The lack of permanence makes cohabitors less concerned with kinship issues such as childbearing, but more likely to focus on economic contributions from both partners (Blackwell & Lichter, 2004; Schoen & Weinick, 1993). The greater emphasis on economic egalitarianism, in turn, entails higher educational homogamy among cohabitors.

The third theory of mate selection and cohabitation is the double selection theory. According to this theory, couples are doubly selected into marriage through cohabitation

(i.e. first selected into cohabitation and then into marriage). Among all couples, better-matched ones (e.g. homogamous relationships) are more likely to marry directly, and less well-matched couples are first selected into cohabitation to examine their compatibility, and the successful ones will be further selected into marriage (Blackwell & Lichter, 2000). In this regard, cohabitation serves as a winnowing process for the evaluation of relationships and potential spouses. As heterogeneous relationships are more likely to dissolve during the winnowing process, increasing homogamy is implied in the process from cohabitation to marriage (Blackwell & Lichter, 2004).

The empirical evidence is, however, mixed. Research before the 1980s found little evidence for the difference between the characteristics of married and cohabiting couples, which is consistent with the informal marriage theory (Macklin, 1980). However, more recent literature almost unanimously found differences in homogamy patterns between these two groups, but the conclusions are sometimes pointing towards opposite directions. For example, studies examining data from the 1987-1988 National Survey of Families and Households in the United States found support for the looser bond theory (Schoen & Weinick, 1993; Sassler & McNally, 2003). In contrast, other researchers (Blackwell & Lichter, 2000; 2004; Jepsen & Jepsen, 2002) found evidence for the double selection theory from the Public Use Microdata Samples of the 1990 Decennial Census. Similarly, in Canada, Hamplova and Bourdais (2008) also found that married couples generally show higher levels of educational homogamy than cohabitors using census data from 2001.

Apart from the theories mentioned above, another important approach to understand the relationship between cohabitation and assortative mating is the diffusion theory, which emphasises the importance of understanding this relationship in particular societal contexts. It is noted that the majority of the empirical evidence cited above is

from North America, especially the United States. One possible reason to account for the contradictory findings is the change of the societal context. Most of the studies supporting the Informal Marriage theory used data collected before the 1980s, whereas more recent studies generally support the other two theories. This indicates that the selectivity of assortative mating in cohabitation has increased in recent decades. The evolving patterns have also been observed in Europe. By comparing cohabiting and married couples across three distinct institutional contexts using data of the European Social Survey from 2002 and 2004, Hamplova (2009) discovered that the differences depend mainly on the development of cohabitation in a given society. Specifically, as cohabitation becomes more prevalent, marriage and cohabitation will more likely resemble each other in terms of partner selection. This direction of change is, however, opposite to what has been observed in the United States.

Besides the inconclusive empirical evidence, previous literature fails to distinguish between two sub-groups within cohabiting couples; one group that eventually breaks up and the other group that eventually gets married. Therefore, the applicability of the aforementioned theories to the comparison between married couples with premarital cohabitation experience and those without such experience remains unclear. According to the informal marriage theory, if no difference exists between cohabitation and marriage, married couples who have had premarital cohabitation experience should have similar characteristics to those marrying directly. The application of the other two theories is less straightforward. The looser bond theory suggests higher educational homogamy among cohabitors, and thus as a subgroup, those who eventually get married are expected to be more homogamous than those who marry without cohabitation. On the contrary, the double selection theory predicts increasing selectivity from cohabitation to marriage. Accordingly, married couples with premarital cohabitation experience are likely to

resemble the characteristics of cohabitors, namely, have higher heterogeneity than those without cohabitation experience. The empirical evidence is very limited, as only a few studies have directly examined this topic. Using marriage license application data in Oregon from 1970 and 1980, Gwartney-Gibbs (1986) compared the joint characteristics of couples. Marriages preceded by cohabitation are found to be less homogamous than marriages preceded by singlehood in terms of both education and age, which seems to support the Double Selection theory.

The Case of China

The unique institutional context of China provides an excellent opportunity to examine whether the aforementioned theories developed in Western developed countries can be applied in a completely different political and cultural context. Furthermore, China offers an excellent case study to test how the application of the theories might change when the prevalence of cohabitation develops in society. Since 1978, the economic reform brought about significant changes in China, three aspects of which are of particular importance regarding assortative mating.

The most noticeable change is the increase in the freedom of individuals' partner choice and the decrease in the influence of both the family and the government. Before 1949, marriages were primarily arranged by parents in China to continue the family line. Between 1949 and 1978, a distinctive feature of Chinese family life was firm state control. The Marriage Law of 1950 granted the state unprecedented power to shape family life (Davis, 2014; Palmer, 1995). For instance, in the urban area, before marriage, couples must obtain permission from their work units which represent individuals to the state to intervene in family planning (Bian, 2002; Wolf, 1984). The collective purpose of marriages changed dramatically in the post-reform era, with the state withdrawing from

most aspects of family life and starting recognising family as a private institution (Davis, 2014). Particularly noteworthy were the legal changes regarding marriage during this period. The Marriage Law of 1980 allowed the breakdown of spousal affections to be a legitimate reason for divorce, signaling the recognition by the state of the importance of individuals' happiness in marriage. In 2001, the Revised Marriage Law recognised notarised agreements between spouses as legally enforceable. These changes indicate that the state further extended the idea of voluntary contracts to intimate relationships (Davis, 2014).

Furthermore, empirical evidence shows that individuals, especially the younger generation, have obtained higher autonomy in the process of mate selection than previous generations. Using cross-sectional data collected from Chengdu, Xu and Whyte (1990) found that arranged marriages almost disappeared after the late 1970s. Among the recently formed marriages, individuals play the dominant role in choosing partners for themselves. It was concluded that a major shift has happened from parent-dominated arranged marriages to individual-led free choice marriages.

Second, personal attributes, especially educational attainment, have replaced family background to become the most crucial criterion in mate selection. The long-standing "matching doors" principle in the traditional Chinese society emphasised the compatibility of family background of both spouses (Hu, 2016). Between 1949 and 1978 when under the socialist regime, personal attributes rather than family background became more important. One's political status (e.g. being a member of the Communist Party) was the most critical factor determining an individual's social status and privileges. In the post-reform era after 1978, political privileges deteriorated, and education has become the most desirable characteristic in the marriage market as it is closely linked with occupational opportunities, earning potential, and social status (Hu &

Qian, 2015; Zhang et al., 2005).

Finally, the resurgence of gender inequality in both domestic and professional fields has brought changes to the mate selection preference. Traditionally, with limited educational and employment opportunities, a woman's social status was determined by that of her husband (Mu & Xie, 2014). Status hypergamy (i.e. women marrying men with higher socio-economic status than themselves) was therefore prevalent. Under the socialist regime after 1949, a rapid increase in the status of women challenged the status hypergamy culture as women no longer relied on men to secure or improve their social status (Croll & Croll, 1981). However, this trend was reversed in the post-reform era. Researchers (Cao & Hu, 2007) found that with the state withdrawing from promoting women's rights and the increasing market forces, there is a widened gap in wage and the return to education between men and women. It has also been noticed that traditional gender roles (i.e. male as the breadwinner and female as the homemaker) have been re-emphasised and promoted in mainstream media in recent years (Attané, 2012). All this has revived and reinforced the tradition of status hypergamy (Mu & Xie, 2014), and women's better education may not be preferred in the marriage market as a result.

Research on assortative mating in China has been scarce due to the lack of empirical data until recently. Using nationally representative data, the majority of researchers discovered that educational homogamy increased significantly in recent decades since the 1980s (Han, 2010; Hu & Qian, 2015; Nie & Xing, 2019; Qi & Niu, 2012; Song, 2009; Wang & Wong, 2017; Xu et al., 2000). The findings indicate that as Chinese society modernises in the post-reform era, better-educated individuals solidify their achievement and status, which might lead to increasing societal inequality. In terms of intermarriage patterns (when people marry those having different characteristics from their own), status hypergamy has been long-standing in China, meaning that women tend

to marry men who are better educated than themselves. This has not changed much in the post-reform era (Qian, 2012; Qian & Qian, 2014; Mu & Xie, 2014).

However, the relationship between premarital cohabitation and educational assortative mating remains unknown. With its rising popularity in the post-reform era, premarital cohabitation is becoming a common stage before marriage in China. If there is a systematic difference in assortative mating patterns between marriages preceded by premarital cohabitation and those without such experience, then marital preferences and outcomes should be reshaped by this new mate selection process. This chapter will contribute significantly to the current literature by filling this gap and providing a better understanding of assortative mating patterns among married couples who cohabited before marriage and those without such experience in China.

As mentioned earlier, although cohabitation has increased dramatically in the post-reform era, marriage remains a strong institution. Hence, the informal marriage theory does not fit this institutional context as cohabitation is not an alternative form of relationship. The looser bond theory is also not suitable for the Chinese context, because although cohabitation in China is a temporary stage, the underlying motivation behind the union is very often long-term, and the majority of cohabiting relationships eventually lead to marriage. Therefore, the double selection theory seems to be the best-fitting theory to explain the role of cohabitation in China, where cohabitation serves as a staging ground before marriage for couples to trial their relationships. The following hypotheses are thus generated based on the double selection theory.

According to the double selection theory, premarital cohabitation serves as a staging ground for less well-matched couples to test their relationships. It is, therefore, reasonable to hypothesise that couples who cohabit before marriage are less homogamous than those without such experience.

Hypothesis 1: Married couples with premarital cohabitation experience are less homogamous than those without such experience.

The double selection theory also implies that among couples who do not marry homogamously, hypergamous relationships (i.e. between better-educated males and less-educated females) are more likely to marry directly. In contrast, less traditional relationships are more likely to test their compatibility through cohabitation.

Hypothesis 2: In terms of intermarriage patterns, among married couples who do not marry homogamously, those with premarital cohabitation experience are less hypergamous than those without such experience.

An extension of the double selection theory is that cohabitation is associated with a higher level of heterogeneity.

Hypothesis 3: Among married couples who do not marry homogamously, couples with premarital cohabitation experience are more likely to have a larger gap in educational attainment between spouses than couples without such experience.

The diffusion theory claims that as cohabitation becomes more prevalent in society, marriage and cohabitation will more likely resemble each other in terms of partner selection (Hamplova, 2009). Therefore, this chapter hypothesises that the difference between married couples who cohabit before marriage and those who do not has decreased in post-reform China.

Hypothesis 4: The difference between married couples with premarital cohabitation experience and couples without such experience decreases across marriage cohorts as cohabitation becomes more prevalent in China.

Method

Data

This chapter uses pooled data from four waves of the China Family Panel Studies (CFPS) data between 2010 and 2016, which contains national-level data including economic activities, education outcomes, family relationships, migration, and health (Xie & Hu, 2014). Detailed information about CFPS can be found in Chapter 1 Data section.

This chapter applied similar restrictions to Chapter 1 to the sample and only included marriages formed after 1980. Duplicate information about the same marriages due to multiple interviews were dropped. Moreover, an extra restriction was applied to the sample in this chapter. Previous studies (Xu et al., 2016) found that the risk of marital dissolution in China displays a reversed 'U-shaped' pattern with a peak of around 7 years. Similarly, census data from the United States show that the average number of years leading to divorce among first marriages is 8 years (Kreider & Ellis, 2011). Therefore, the most recent observations in the sample of this study included marriages formed before 2008, and they were observed until 2016. The extra 8 years of observation for the most recently formed marriages can minimise the upward bias towards heterogeneity, as some of the heterogamous couples who would have divorced at a later stage might not have separated by the time of observation. Therefore, 8,572 marriages formed before 1980 or after 2008 were dropped from the sample.

Similar to Chapter 1, the analyses in this chapter only focus on first marriages (therefore 1,848 higher-order marriages were dropped) and those married between 15 and 35 years old, which reduced the sample to 8,175 couples in total. Cross-sectional weights were used for all analyses to increase the representativeness of the population.

Analytical Approach

First, descriptive statistics of cross-classification of spouses' educational attainment by cohabitation experience will be presented. These are followed by log-linear models to examine the statistical differences of assortative mating patterns among married couples with and without premarital cohabitation experience. Five different models are conducted and compared to find the best-fitting model for the observed data, and the results from the best model are interpreted.

To examine how the association between education and cohabitation changes over time, three different marriage cohorts are isolated as follows: 1981-1992, 1993-2001, and 2002-2008. Both 1992 and 2001 mark crucial changes in the course of the economic reform and legislations around cohabitation. In 1992, the Chinese government further expanded the reform both in its scope and depth. As a result, privatisation in all sectors in society and decentralisation of state control began to accelerate (Naughton, 2008). As discussed in detail in Chapter 1, in 2001, the Revised Chinese Marriage Law regulated cohabitation and property in cohabiting relationships for the first time. It showed that cohabitation had become a well-recognised social phenomenon, and in turn, the legal changes encouraged a continuous change in Chinese family life. Thus, these cohorts are indicative of the cultural and political environment that significantly shaped the experiences of individuals. Descriptive statistics and log-linear models are conducted and presented for each marriage cohort separately.

Log-linear Models

The log-linear model is one of the most commonly used research methods for assortative mating, which suits the research purpose of this study. First, by allowing for discerning associations and patterns in the observed data net of the marginal distribution in the

population (Blackwell & Lichter, 2004; Hamplova & Bourdais, 2008; Kalmijn, 1998; Qian & Qian, 2014; Smits & Park, 2009), it helps rule out the influence of education expansion on the macro level in this study. Second, various log-linear models (e.g. quasi-independence, quasi-symmetry, and quasi-crossing models) can be fit into the cross-classifications (Goodman, 1984), to unpack the extent to which partner characteristics are associated with one another and the additive effect of premarital cohabitation. The equation for the three-way log-linear model can be found in Appendix A.

Following the methodology developed by Johnson (1980) and Mare (1991) and used extensively in previous research on topics regarding cohabitation and marital homogamy (e.g. Blackwell & Lichter, 2000; Hamplova & Bourdais, 2008), this study used quasi-independence (Q-I), quasi-symmetry (Q-S), and quasi-crossing (Q-CP) models to construct cross-classifications of partner characteristics of married couples with and without premarital cohabitation experience in each marriage cohort. The Q-I models examine the tendency of individuals to partner with those with the same educational levels; the Q-S models test the gender difference in the tendency to marry those who have higher or lower educational level than themselves, whereas the Q-CP models reveal the relative difficulties for prospective spouses to cross specific educational barriers to intermarry (Mare, 1991). The design of the models follows the tradition of Hamplova and Bourdais's (2008) research on comparing educational homogamy among married and unmarried couples in Quebec (the French province) and the rest of Canada (where predominantly Anglophone).

In particular, the Q-I models assume no statistical relationship between partner characteristics except the main diagonal of the table (Hamplova & Bourdais, 2008). Two sets of homogamy parameters (Homog0 and Homog) were used in the models in two steps to determine whether the diagonal effect is constant or differs across educational

levels. More specifically, Homog0 (see Table 1.1) is a dummy variable that equals 1 when the spousal educational levels are the same and equals 0 when their educational levels differ. In contrast, Homog (see Table 1.2) includes four distinct dummy variables (v1-v4) that differentiate the effect of each educational level along the diagonal. The educational level used to create the variables is the highest level of educational attainment of the individual. Five levels of educational attainment were identified in the CFPS: illiterate, primary school, junior-high school, senior-high school, and college education and above. As the number of marriages between college graduates and illiterate people is too few, educational levels were regrouped to include four categories in this chapter: illiterate, primary school, junior-high school, senior-high school and above.

Table 1.1. Design Matrices for Quasi-independence Model with Homog0 Parameter (Assuming No Differential Effect Among Educational Levels)

	Woman's Education			
Man's Education	Illiterate	Primary	Junior-high	Senior-high and above
Illiterate	1	0	0	0
Primary	0	1	0	0
Junior-high	0	0	1	0
Senior-high and above	0	0	0	1

Table 1.2. Design Matrices for Quasi-independence Model with Homog Parameter (Assuming Differential Effect Among Educational Levels)

	Woman's Education			
Man's Education	Illiterate	Primary	Junior-high	Senior-high and above
Illiterate	v1	0	0	0
Primary	0	v2	0	0
Junior-high	0	0	v3	0
Senior-high and above	0	0	0	v4

The Q-S model accounts for the asymmetry brought by the tendency for females to form hypergamous relationships, which has been observed consistently by previous literature (Blackwell & Lichter, 2000; 2004; Xie, 2013). Hyper (see Table 1.3) is a

dummy variable which equals 1 when the cells fall under the main diagonal, indicating that the educational level is higher for males than females.

Table 1.3. Design Matrices for Quasi-symmetry Model with Hyper Parameter (Assuming a Higher Tendency of Hypergamous Relationships)

	Woman's Education			
Man's Education	Illiterate	Primary	Junior-high	Senior-high and above
Illiterate	0	0	0	0
Primary	1	0	0	0
Junior-high	1	1	0	0
Senior-high and above	1	1	1	0

The Q-CP models assume that the difficulties for intermarriage increase as the differences between the prospective spouses enlarge. As each cell represents a particular combination of educational levels, it can also be seen as a nominal barrier for potential spouses to cross in order to marry each other (Blackwell & Lichter, 2000). The crossing parameters (v1-v3, see Table 1.4) indicate the degree of difficulty in crossing a particular barrier, i.e. between illiterate and primary school education (v1), between primary school and junior-high school education (v2), and between junior-high school and senior-high school education (v3). Like hypergamy parameters, crossing parameters also assume non-random distribution off the diagonal. The difference lies in that while hypergamy parameters measure the asymmetry of the distribution (higher man's education and lower woman's education), crossing parameters measure the distances between man's and woman's education rather than pointing to a specific direction.

Table 1.4. Design Matrices for Quasi-crossing Model with Cross Parameters (Indicating the Degree of Difficulty in Crossing a Particular Educational Barrier)

	Woman's Education			
Man's Education	Illiterate	Primary	Junior-high	Senior-high and above
Illiterate	-	v1	v1v2	v1v2v3
Primary	v1	-	v2	v2v3
Junior-high	v1v2	v2	-	v3
Senior-high and above	v1v2v3	v2v3	v3	-

0	1	1	1	0	0	1	1	0	0	0	1
1	0	0	0	0	0	1	1	0	0	0	1
1	0	0	0	1	1	0	0	0	0	0	1
1	0	0	0	1	1	0	0	1	1	1	0
v1				v2				v3			

These parameters were added into the model step by step to see whether the model would be improved. An interaction term between these parameters and premarital cohabitation experience was also added at each step, allowing the estimated cell frequencies to vary between couples who cohabited before marriage and those who did not cohabit before marriage. The parameters of the interaction terms are of the utmost interest of this study, as they indicate whether and how premarital cohabitation experience makes a difference in the assortative mating patterns. Premarital cohabitation experience is a dummy variable with binary outcomes (1 indicating having premarital cohabitation experience before marriage, and 0 indicating having no such experience). During the surveys, all married individuals were asked a series of questions regarding their marital history and whether they cohabited with their current spouse before getting married. The response to this question constitutes the individual's cohabitation experience.

Results

Descriptive Statistics

Table 2 provides the cross-classification of spouses' educational attainment by cohabitation experience in each marriage cohort.

Table 2. Descriptive Results of Educational Assortative Mating Patterns in Post-reform China

	Non-cohabited					Cohabited				
	Woman's Education (%)					Woman's Education (%)				
Man's Education (%)	Illiterate	Primary	Junior-high	Senior-high and Above	Total	Illiterate	Primary	Junior-high	Senior-high and Above	Total
	Early-reform Cohort (1981-1992, N=3,926)									
Illiterate	8.37	2.98	2.05	0.35	13.75	8.15	4.21	0.46	0.00	12.81
Primary	8.63	7.41	4.55	1.16	21.15	5.54	13.39	1.36	1.34	21.62
Junior-high	8.69	11.19	16.38	4.91	41.17	7.87	12.08	13.81	1.44	35.19
Senior-high and Above	3.18	3.17	7.23	9.74	23.32	1.73	4.87	11.09	12.70	30.37
Total	28.88	24.75	30.21	16.16	100.00	23.28	34.54	26.71	15.47	100.00
	Mid-reform Cohort (1993-2001, N=2,359)									
Illiterate	7.03	2.40	1.19	0.35	10.97	5.61	1.79	0.95	1.07	9.43
Primary	6.36	11.96	7.52	1.08	26.92	5.70	6.71	4.89	0.00	17.30
Junior-high	5.47	11.09	17.81	4.30	38.67	4.24	10.14	25.61	6.90	46.89
Senior-high and Above	0.64	2.21	7.24	13.36	23.45	0.34	3.75	10.14	12.16	26.38
Total	19.50	27.66	33.77	19.08	100.00	15.90	22.39	41.59	20.12	100.00
	Late-reform Cohort (2002-2008, N=1,890)									
Illiterate	4.41	0.84	1.06	0.04	6.34	0.73	0.51	0.02	0.02	1.28
Primary	2.91	5.90	7.27	0.42	16.50	1.65	4.17	8.11	1.07	15.00
Junior-high	2.44	9.68	22.97	7.98	43.08	1.95	6.78	29.86	5.62	44.21
Senior-high and Above	0.40	1.53	8.14	24.02	34.08	0.62	1.62	11.58	25.68	39.50
Total	10.15	17.96	39.44	32.45	100.00	4.95	13.08	49.58	32.40	100.00

Source: CFPS 2010-2016 pooled data. Note: Results are weighted using cross-sectional weights.

The following homogamy and heterogamy patterns are suggested in Table 2. In general, couples with premarital cohabitation experience are more homogamous than couples without such experience in both the early-reform and late-reform marriage cohorts. In particular, in the early-reform cohort, the total percentage along the diagonal is 48.05% for cohabited couples, compared to 41.9% for their non-cohabited counterparts. In the late-reform cohort, the difference is smaller with 60.44% of cohabited couples are homogamous, only 3.14% higher than non-cohabited couples (57.3% along the diagonal). In contrast, in the mid-reform cohort, the homogamy rate is very similar between cohabited and non-cohabited couples (50.09 versus 50.16% along the diagonal). However, none of these differences is statistically significant, which might be due to the variance in homogamy patterns among different educational levels. These patterns will be further unpacked using log-linear models.

In the absence of homogamy, in the early-reform cohort, marriages with premarital cohabitation experience have a slightly higher tendency to form hypergamous relationships (between better-educated husbands and less-educated wives) than their non-cohabited counterparts (43.11% versus 42.09% below the diagonal). Moreover, they are significantly less likely to be involved in hypogamous relationships (between better-educated wives and less-educated husbands). Only 8.81% of cohabited couples have hypogamous relationships (total percentage above the diagonal) compared to 16% of their non-cohabited counterparts. The hypergamy and hypogamy patterns continue in the mid-reform cohort, but the difference between cohabited and non-cohabited becomes much smaller. In the late-reform cohort, cohabited couples have a lower rate in both hypergamy and hypogamy relationships compared to non-cohabited couples. It is evident that none of these differences is statistically significant in the recent two cohorts.

One thing to note is that some cells have few observations. However, researchers have found that log-linear models can handle small expected cell frequencies or even empty cells quite well in assortative mating studies, with the condition that the sample size is large (Haberman, 1977), the number of such cells is not too big, and the cells are where expected, for example, between senior-high school educated wives and illiterate husbands (Smits & Park, 2009). Therefore, these cells are not expected to distort the statistical power of log-linear estimates.

Log-Linear Model Results

Table 3. Log-linear Models of the Association between Man's and Woman's Education Across Marriage Cohorts

		Early-reform Cohort (1981-1992) N of Couples (3,926)				Mid-reform Cohort (1993-2001) N of Couples (2,359)				Late-reform Cohort (2002-2008) N of Couples (1,890)			
Model		AIC	BIC	G^2	df	AIC	BIC	G^2	df	AIC	BIC	G^2	df
M1	Medu*Fedu + C	7.75	-11.62	40.37	15	7.73	-6.32	45.66	15	7.82	6.23	58.21	15
M2	M1+ Homog0*C	7.71	-11.25	37.27	14	7.79	-2.87	45.65	14	7.83	8.05	56.57	14
M3	M1+ Homog*C	7.13	-37.15	28.70	11	6.86	-39.76	26.09	11	6.56	-39.84	26.00	11
M4	M3+ Hyper*C	6.97	-40.85	21.53	10	6.91	-36.70	25.68	10	6.62	-36.56	25.82	10
M5	M3+ Cross*C	7.24	-29.18	26.27	8	6.70	-40.75	14.71	8	6.49	-37.73	17.72	8

Source: CFPS 2010-2016 pooled data. Note: Results are weighted using cross-sectional weights.
Medu – man's education; Fedu – woman's education; C – premarital cohabitation experience; Homog0 – homogamy parameter (cells on the main diagonal, 1 parameter); Homog – homogamy parameters (cells on the main diagonal, 4 parameters); Hyper – hypergamy parameter (cells below the main diagonal); Cross – crossing parameters (3 parameters).

While the descriptive results may be confounded by the marginal distribution of education between males and females in the society, log-linear models are able to examine the assortative mating patterns net of such influence. Table 3 compares the different log-linear models conducted to fit the observed data. For each model, the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), the likelihood ratio (G^2), and the number of degrees of freedom (df) are presented. The BIC statistic was firstly developed by Raftery (1986) to impose a penalty for additional

parameters added to the model while testing its fitness to the observed data in comparison to the saturated model. Thus, a smaller BIC indicates the improvement of a model. In this study, the BIC statistic will be relied on primarily for model comparisons.

Model 1 is a three-way interaction model controlling for the full association between man's and woman's education, together with the independent effect of premarital cohabitation. It assumes that educational assortative mating has no systematic association with premarital cohabitation experience and serves as the baseline model. This follows the methodology used by Schwartz and Mare (2005) and by Hamplova and Bourdais (2008). Both Models 2 and 3 are Q-I (Quasi-independence) models, allowing the association between educational assortative mating and premarital cohabitation experience to exist along the diagonal by including interaction terms between homogamy parameters and premarital cohabitation experience. Model 2 uses a single homogamy parameter (Homog0), whereas Model 3 uses four homogamy parameters (Homog v1-v4) to take the variation across educational levels into account.

According to Table 3, Model 2 does not improve the model, shown by a slight increase of BIC for all three cohorts. In comparison, Model 3 has a considerably better overall fit than Model 2 as BIC decreases remarkably and drops to negative values in all cohorts. This indicates that there exists a significant difference in forming homogamous relationships among couples with and without premarital cohabitation experience; however, this difference varies across educational levels.

Models 4 and 5 examine the association between premarital cohabitation experience and educational assortative mating among heterogamous relationships. An interaction parameter between hypergamy and premarital cohabitation experience was added to Model 4. Despite a continuous drop in BIC in the early-reform cohort (from -37.15 to -40.85) indicating a modest improvement of the model, this addition does not

improve the model in the recent two marriage cohorts, shown by a slight increase of BIC in both cohorts. It means that although the difference in forming hypergamous relationships among couples with and without premarital cohabitation experience exists in the early-reform marriage cohort, it has disappeared among the more recently formed marriages.

Model 5 includes interaction terms between crossing parameters and premarital cohabitation experience to test the association of premarital cohabitation and educational intermarriage in more detail. Compared to Model 3, the interaction terms do not improve the model in the early-reform cohort and the late-reform cohort indicated by a minor rise in the BIC statistic. However, the BIC statistic drops slightly from -39.76 to -40.75 in the mid-reform cohort, indicating that this model is a better fit of the observed data.

Among all models, the similar BIC statistics obtained for Models 3, 4, and 5 show that these three models have almost identical statistical power in fitting to the observed data. In particular, Model 4, which includes both homogamy and hypergamy parameters, can slightly better fit to the early-reform cohort observations. In contrast, Model 5, which includes both homogamy and crossing parameters, is the best-fitting model for the mid-reform cohort. As for the late-reform cohort, Model 3 containing only homogamy parameters is the best-fitting model. Further examinations of the results show that none of the interaction terms between hypergamy parameters and cohabitation experience is statistically significant; therefore, Hypothesis 2 is not supported which presumes that cohabited couples are less likely to form hypergamous relationships than non-cohabited couples. Thus, the results regarding hypergamy patterns will not be presented in this chapter. For consistency, the results of homogamy and crossing parameters will be drawn from Model 5 for interpretation and cohort comparisons in the following section.

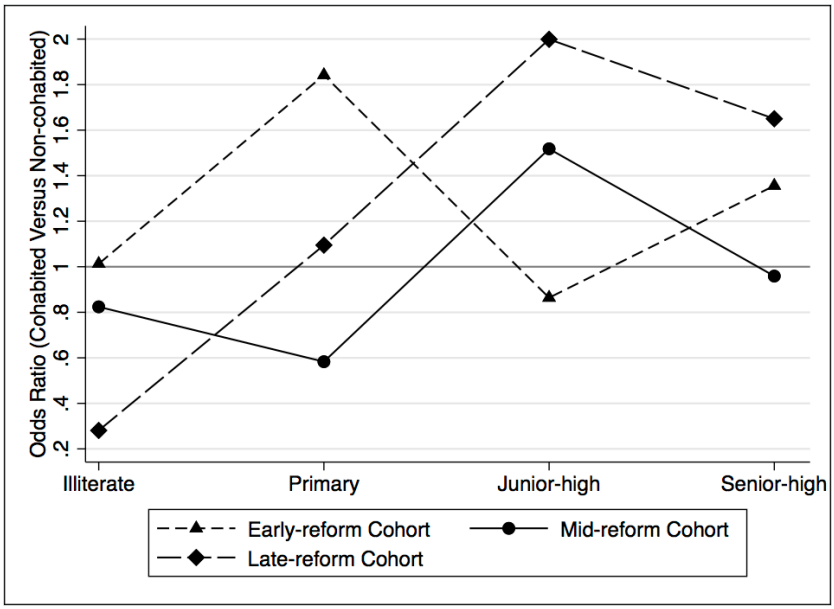
Homogamy Parameters

Table 4. Odds Ratio of Homogamy Across Cohorts (Couples with Premarital Cohabitation Experience Versus Couples Without Such Experience)

	Homog v1	Homog v2	Homog v3	Homog v4
	Illiterate	Primary	Junior-high	Senior-high and Above
Early-reform (1981-1992)	1.01 (0.30)	1.84* (0.54)	0.86 (0.25)	1.36 (0.40)
Mid-reform (1993-2001)	0.82 (0.15)	0.58** (0.11)	1.52* (0.28)	0.96 (0.18)
Late-reform (2002-2008)	0.28*** (0.05)	1.09 (0.21)	2.00*** (0.38)	1.65** (0.31)

Source: CFPS 2010-2016 pooled data. Note: Robust standard errors in parentheses. Results are weighted using cross-sectional weight. * $p < .05$, ** $p < .01$, *** $p < .001$.

Figure 1. Odds Ratio of Homogamy Across Cohorts (Couples with Premarital Cohabitation Experience Versus Couples Without Such Experience)



Source: CFPS 2010-2016 pooled data. Note: Results are weighted using cross-sectional weight.

Table 4 and Figure 1 report estimated odds ratios of homogamy for couples with premarital cohabitation experience and couples without such experience across marriage cohorts. Odds ratios have been commonly used to be indexes of effect size when interpreting the results of log-linear models (Alba, 1987; Zhu et al., 2006). The odds ratios in Table 4 and Figure 1 indicate the odds of individuals with premarital

cohabitation experience forming homogamous relationships in comparison to the odds of those without such experience having homogamous marriages. Overall, the results show significant differences among educational levels and across marriage cohorts. More specifically, better-educated individuals with premarital cohabitation experience are increasingly forming more homogamous relationships compared to those without such experience over time. In contrast, less-educated individuals with premarital cohabitation experience continue to form less homogamous marriages than those without such experience, and this becomes more extreme in the late-reform cohort.

In the early-reform cohort, there is no significant difference in homogamy patterns between individuals with premarital cohabitation experience and those without such experience for most educational levels. The only exception is the primary school educated individuals with premarital cohabitation experience who have significantly 84% higher odds of forming homogamous relationships than their non-cohabited counterparts. This pattern changed in the mid-reform cohort when the effect of primary school education reversed. At this time, primary school education reduces the odds of forming homogamous marriages by 42% for its graduates with cohabitation experience. In contrast, cohabitation begins to associate with higher odds of forming homogamous relationships among secondary school educated individuals. In particular, junior-high school educated individuals with premarital cohabitation experiences have 52% higher odds of having homogamous relationships than non-cohabited individuals.

In the most recent cohort, diverging patterns emerge between the better-educated and the less-educated individuals. Although premarital cohabitation significantly reduces the odds of having homogamous marriages among the least-educated individuals, it consistently raises the odds of forming such relationships for individuals with education beyond primary school. For instance, the positive association between junior-high school

education and premarital cohabitation has grown to be even stronger than the previous marriage cohort. At this time, the odds of having homogamous marriages for junior-high school graduates with cohabitation experience doubles that of their non-cohabited counterparts. Cohabited individuals with senior-high school education have 65% higher odds of forming homogamous relationships than their non-cohabited counterparts. At the other end of the educational spectrum, illiterate individuals with premarital cohabitation experience have significantly less homogamous marriages than those without such experience. Illiteracy significantly reduces the odds of forming homogamous marriages by 72%.

Notably, there exists significant variation in homogamy patterns among educational levels in each marriage cohort. The less-educated and the better-educated groups have gradually developed opposite patterns over time. These results do not support Hypothesis 1, which assumes an overly simplistic story that individuals with premarital cohabitation experience have less educational homogamy than those without such experience. The results above suggest that as cohabitation becomes more prevalent in post-reform China, two sub-groups have emerged within individuals who choose to cohabit before marriage. Although the better-educated individuals with cohabitation experience increasingly form more homogamous relationships than those without such experience, the less-educated individuals with cohabitation experience are having less homogamous relationships on a more extreme scale compared to their non-cohabited counterparts. Since the looser bond theory suggests that cohabitors place a higher emphasis on economic egalitarianism, and the double selection theory proposes that cohabitation serves as a staging ground for ill-matched couples to test their relationships, the results of this chapter show that individuals with premarital cohabitation experience constitute a heterogeneous group and no single theory can be applied to the whole group.

This chapter proposes 'dual selection' theory to account for the diversity observed within the cohabited group, meaning that the less-educated and the better-educated groups are displaying different selection patterns. The looser bond theory is more likely to apply to the better-educated group who are more educationally homogamous and place higher importance on egalitarianism, whereas the double selection theory is more suitable for explaining the less-educated individuals for whom cohabitation provides a staging ground to test their relationships and accumulate more economic resources before marriage. The dual selection process might reflect the polarisation that education expansion has brought about when socio-economic status is increasingly attached to educational attainment.

Hypothesis 4 expects the difference in assortative mating patterns between couples with premarital cohabitation experience and those without such experience to decrease over time. However, the above results found the opposite to be true. The difference between these two groups is instead getting more substantial, particularly among the least and the most educated groups. For example, in the late-reform cohort, illiterate cohabited individuals have significantly 72% lower odds of forming homogamous marriages than those without cohabitation experience. This difference is much bigger than the previous two cohorts. Similarly, junior-high and senior-high school educated individuals with premarital cohabitation experience have 100% and 65% higher odds of having homogamous relationships than their non-cohabited counterparts, respectively. These differences are also much higher than the previous cohort and completely reversing the patterns found in the early-reform marriage cohort. The results indicate that as cohabitation becomes more common in Chinese society, the selectivity of couples who choose to cohabit has not decreased but instead has increased. A full model was conducted including three-way interaction terms (between homogamy parameters,

premarital cohabitation, and marriage cohort) to test whether the differences between three marriage cohorts are statistically different. The results confirm significant differences across all three marriage cohorts and can be found in Appendix B.

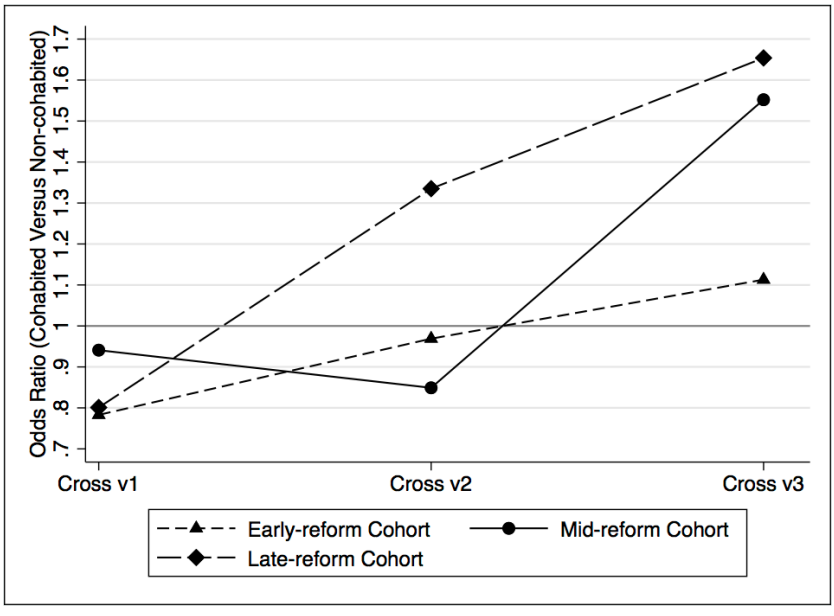
Crossing Parameters

Table 5. Odds Ratio of Crossing Educational Barrier Across Marriage Cohorts (Couples with Premarital Cohabitation Experience Versus Couples Without Such Experience)

	Cross v1	Cross v2	Cross v3
	Between Illiterate and Primary	Between Primary and Junior-high	Between Junior-high and Senior-high
Early-reform (1981-1992)	0.78 (0.19)	0.97 (0.25)	1.11 (0.29)
Mid-reform (1993-2001)	0.94 (0.14)	0.85 (0.14)	1.55* (0.32)
Late-reform (2002-2008)	0.80 (0.13)	1.33 (0.22)	1.65** (0.28)

Source: CFPS 2010-2016 pooled data.
Note: Robust standard errors in parentheses. Results are weighted using cross-sectional weight.
* $p < .05$, ** $p < .01$, and *** $p < .001$.

Figure 2. Odds Ratio of Crossing Educational Barrier Across Marriage Cohorts (Couples with Premarital Cohabitation Experience Versus Couples Without Such Experience)



Source: CFPS 2010-2016 pooled data.
Note: Robust standard errors in parentheses. Results are weighted using cross-sectional weight.
* $p < .05$, ** $p < .01$, and *** $p < .001$.

Table 5 and Figure 2 report the estimated odds ratios of crossing a particular educational barrier to intermarry for individuals with premarital cohabitation experience and those without such experience across marriage cohorts. The odds ratios in Table 5 and Figure 2 indicate the odds of individuals with premarital cohabitation experience crossing certain educational barriers to form heterogamous relationships in comparison to the odds of those without such experience crossing educational barriers. Cross v1 reflects the barrier between illiterate individuals and those having some formal education to form marriages, and Cross v2 indicates the barrier between those having primary school education and those having junior-high school education. As shown in Table 5 and Figure 2, the odds of crossing these two educational barriers are generally lower for individuals with premarital cohabitation experience compared to those without such experience. However, these differences are not significant.

As for Cross v3 which separates junior-high and senior-high school education, a similar pattern is found in the early-reform marriage cohort. There is no significant difference crossing this barrier between cohabited and non-cohabited individuals during this period. However, this pattern changed dramatically in the mid-reform cohort when cohabited individuals have significantly 55% higher odds of crossing the third educational barrier than their non-cohabited counterparts. In the most recent cohort, the odds of cohabited individuals crossing the third educational barrier is significantly 65% higher than their non-cohabited counterparts, even higher than the previous cohort.

These results indicate that there is no significant difference in crossing the first two educational barriers between individuals with premarital cohabitation experience and those without such experience. However, once cohabited individuals have crossed the first two educational barriers, it is more likely for them to cross the third barrier and form extremely heterogamous relationships, especially in the recent two marriage cohorts. The

results are consistent with the double selection theory, which implies that more heterogamous relationships cohabit to test their compatibility before marriage. These results, therefore, support Hypothesis 3, which suggests that couples with premarital cohabitation experience are more likely to have larger spousal educational differences than couples without such experience.

The results from crossing parameters do not support Hypothesis 4, but instead, show that the difference between couples with and without premarital cohabitation experience is more likely to have enlarged in the last few decades. Although the pattern of crossing the first and the second educational barriers remained similar across three cohorts, the pattern of crossing the third educational barrier completely changed in the recent two cohorts. It suggests that in the recent cohorts, the function of cohabitation might have changed to be a staging ground for less well-matched couples to test their relationships before marriage. This shift indicates a growing heterogeneity among couples with premarital cohabitation experience. A full model was conducted including three-way interaction terms (between crossing parameters, premarital cohabitation, and marriage cohort) to test whether the differences between three marriage cohorts are statistically different. The results (which can be found in Appendix B) show no significant differences across cohorts. Therefore, although it can be concluded that cohabited couples have significantly higher heterogeneity than non-cohabited couples in the recent cohorts, whether the level of heterogeneity is enlarged across cohorts needs to be confirmed when more data is available.

Conclusion

This chapter has provided the first-ever evidence of comparing educational assortative mating patterns between married couples with premarital cohabitation experience and

those without such experience in post-reform China. Log-linear models were conducted to evaluate the application of the informal theory, the looser bond theory, the double selection theory, and the diffusion theory in China.

In summary, the results show that huge heterogeneity exists among couples with premarital cohabitation experience, and no single theory can be applied to explain the whole group. The differences in homogamy patterns between couples with and without premarital cohabitation experience vary across educational levels and over time. The dual selection theory is proposed to account for the observed differences. While the less-educated individuals with premarital cohabitation experience form more extremely heterogamous relationships than those without such experience over time, the better-educated individuals with cohabited experience gradually form more homogamous relationships than their non-cohabited counterparts. Thus, the double selection theory can only be applied to the less-educated couples with premarital cohabitation experience (for whom cohabitation provides a staging ground to test the heterogamous relationships and accumulate economic resources before marriage), whereas the looser bond theory is more suitable for the better-educated group who place a higher emphasis on economic egalitarianism. The dual selection process might reflect the polarisation caused by education expansion when educational attainment increasingly becomes the most important determinant of socio-economic status.

Furthermore, among couples who do not marry homogamously, individuals with premarital cohabitation experience are more likely to have extremely heterogamous relationships. These findings are consistent with the double selection theory. Finally, as cohabitation becomes more prevalent in China, the difference between couples with premarital cohabitation experience and couples without such experience did not get

smaller but persists over time, particularly among the least and the best educated groups. This holds true for both homogamous and heterogamous marriages.

This chapter contributes to the existing literature in three aspects. First, this chapter for the first time provides empirical evidence on how premarital cohabitation is associated with assortative mating patterns in China and helps better understand the selection process from cohabitation to marriage. Second, this chapter serves as a case study of how the existing theories formed in Western developed countries can be applied to a country with a distinct institutional and cultural context. Third, the research on the development of the relationship between premarital cohabitation and assortative mating in one country remains scarce. Therefore, this chapter contributes to this body of knowledge by examining how the association between premarital cohabitation and assortative mating changes in China, where cohabitation has experienced rapid growth from being a marginal phenomenon to a common choice before marriage.

Some limitations of this chapter need to be acknowledged. One major limitation is the selection bias due to differential attrition from divorce among couples in different marriage cohorts. Estimates of the level of marital homogamy are likely to be upwardly biased among older couples (Blackwell & Lichter, 2000), as some heterogamous relationships which would end later may not have dissolved by the time of observation. With the crude divorce rate (number of divorces per 1,000 population) being less than 1.0 before the year 2000 in China (Wang & Zhou, 2010), this is unlikely to impose a systematic bias for this research, especially for the early-reform and the mid-reform marriage cohorts. However, with the rapidly increasing divorce rate in the last decade, it means that the late-reform marriage cohort may observe a higher homogamy pattern among both couples with premarital cohabitation experience and couples without such experience in the future after some heterogamous couples in both groups get divorced.

Although this chapter has taken a cautious approach by reducing the sample in the late-reform cohort to marriages formed by 2008 and observed until 2016, there might still be couples who would have divorced at a later stage included in the analyses. Since the majority of divorces happen within 15 years of marriage in China (Ma et al., 2019), future research on cross-cohort comparisons after all marriages in the sample have reached 15 years is necessary to confirm the findings of this chapter.

Furthermore, the results of this chapter suggest that married couples with premarital cohabitation experience tend to have extremely heterogamous relationships. The double selection theory suggests increasing homogamy through singleness to cohabitation and then to marriage, so it remains a puzzle why some extremely heterogamous couples still transit into marriages. One possible reason is the "sliding effect," often pointed out by researchers when examining the relationship between premarital cohabitation and marital instability. It is suggested that cohabitation increases the inertia to remain in a relationship, and some ill-matched couples who otherwise would not get married do end up married because of cohabitation (Stanley et al., 2006). Therefore, the double selection theory may not be sufficient to understand the selection process from cohabitation to marriage. The couples are not necessarily all successfully selected into marriage; they might also slide into marriage, especially heterogamous couples who build financial and emotional bonds during cohabitation, thus making breaking up increasingly costly. The mechanism through which couples transit into marriage through cohabitation needs to be further investigated, as it is essential for understanding the implication premarital cohabitation has for potential marital stability and dissolution.

Chapter 3. Premarital Cohabitation and Marital Dissolution in Post-reform China

Introduction

China has witnessed fundamental changes in family areas in the past few decades, of which two of the main features are a rapid increase in premarital cohabitation and a soaring rate of divorce. The central question of this chapter concerns the relationship between these two phenomena - premarital cohabitation experience and subsequent marital dissolution in China in the post-reform era after 1978.

The growing popularity of premarital cohabitation and divorce has been observed in many Western developed countries in recent years (Bennett et al., 1988). A better understanding of how they relate to each other and the reasons why individuals enter and exit marriages have huge implications on both individual and societal levels, e.g. the transmission of resources between couples, the environment in which the next generation grows up in, and the welfare policies in a given society (Moffitt, 1998; Reinhold, 2010). Despite the widespread belief that premarital cohabitation improves marital stability by providing couples with an opportunity to acquire more information about each other (Hall & Zhao, 1995; Lillard et al., 1995; Reinhold, 2010), the vast majority of existing literature in Western developed countries found the empirical evidence to show the opposite. Premarital cohabitation is linked with a higher marital dissolution rate in the United States (Axinn & Thornton, 1992; Booth & Johnson, 1988; DeMaris & Rao, 1992; Thomson & Colella, 1992), Canada (Balakrishnan et al., 1987; Hall & Zhao, 1995), and European countries (Bennett et al., 1988).

In China, after the economic reform was implemented in 1978, Chinese society has experienced dramatic transformations in all aspects, including family. A surge in cohabitation before marriage has been observed during this period. Prior to the post-reform era, premarital cohabitation was a rare phenomenon with less than 2% of couples cohabiting before marriage. However, this number has increased rapidly in the last few decades (Yu & Xie, 2015a). With respect to marital dissolution, the divorce rate remained extremely low in the early 1980s with the crude divorce rate (number of divorces per 1,000 population) being only 0.35 (Xu et al., 2011), although this figure has grown by ninefold to 3.02 in 2016 (National Bureau of Statistics of China, 2017).

Nevertheless, how premarital cohabitation and subsequent marital dissolution relate to each other is not clearly understood in the Chinese context. This topic is of particular importance for a few reasons. First, cohabitation is more likely to serve as a selection stage before marriage rather than a substitute for marriage because of the legal constraints in China. Since childbearing is restrained to registered marriage, out-of-wedlock births are extremely rare, which distinguishes the nature of cohabitation in China from Western developed countries. As previous literature in Western developed countries suggests that the nature of the relationship between premarital cohabitation and divorce largely depends on the role and meaning of premarital cohabitation in a particular institutional context, the difference between cohabitation in China and the West means that the association between cohabitation and divorce might display different patterns in China. In turn, a better understanding of this relationship will help elucidate the role premarital cohabitation plays in China in the marital formation process. Second, as cohabitation increasingly becomes a common stage before marriage in China, the relationship between cohabitation and divorce has important implications for the quality of the marital relationships and the well-being of the population. Third, China serves as

an excellent case study to examine whether theories developed in Western industrialised countries can be applied to China, which has a fundamentally different political and cultural context. A debate exists among researchers as to whether there is a converging trend in demographic patterns across societies; in particular, whether developing countries are following the trends which already took place in developed countries or taking different paths (Ochiai, 2014; Wilson, 2011). Examining the relationship between premarital cohabitation and marital dissolution helps contribute to the debate by providing empirical evidence on whether similar patterns can be found in China to what have been observed in the West.

Despite its importance, few studies have addressed this topic directly. Analysing the 2010 wave data of the China Family Panel Studies, Zhang (2017) found that the initial negative association between premarital cohabitation and marital stability disappeared among the recently married couples. Although Zhang (2017)'s study advanced the understanding of this topic, many questions remain unanswered. First, previous literature suggests substantial gender differences in the decision to cohabit (Huang et al., 2011) and to divorce (Hewitt, 2009; Rosenfeld, 2018), but the gender effect on the relationship between cohabitation and divorce has not been investigated in China. Second, the non-significant association between premarital cohabitation and divorce discovered in the recent marriage cohort by Zhang (2017) seems to contradict with the findings of Chapter 2 of this thesis, which discovered that married couples with cohabitation experience tend to have extremely heterogamous relationships compared to their non-cohabited counterparts. Since previous research consistently pointed out that marital heterogeneity is associated with higher marital instability (Bumpass & Sweet, 1972; Tzeng, 1992), it is surprising that Zhang (2017) found that the statistical association between premarital cohabitation and marital dissolution ceases to exist among

the recent marriages. A possible reason is that the majority of couples in the recent marriage cohort in Zhang (2017)'s study are newly formed, so they have not yet reached the time of possibly experiencing divorce. Consequently, there is a high censoring rate among marriages in the recent marriage cohort and a potential downward bias of assessing marital instability. Therefore, the results of the comparison between the early and the late marriage cohorts in Zhang (2017)'s study do not necessarily reflect the real trend and invites further investigation.

This chapter attempts to address these limitations and further unpack the association between premarital cohabitation and marital instability in post-reform China. The main contributions of this chapter include an investigation of gender differences, and an examination of whether the diffusion process has happened in China as observed in Western countries. These approaches also differentiate this chapter from Zhang (2017)'s study. In particular, this chapter uses more recent data from the China Family Panel Studies (four waves collected between 2010 and 2016) and applies much stricter sample restriction to the recently formed marriages. The following questions will be investigated. First, this chapter examines gender differences in the relationship between premarital cohabitation and subsequent divorce. Second, this chapter examines whether the association between premarital cohabitation and divorce has changed across three marriage cohorts: the early-reform cohort, the mid-reform cohort, and the late-reform cohort.

Literature Review

Theoretical Framework

Since very few studies in China have directly studied the relationship between premarital cohabitation and marital dissolution, this section will start by reviewing the theoretical

framework developed in Western industrialised countries. After that, the Chinese background and existing empirical evidence on this topic will be introduced, followed by a discussion on the application of existing theories in China.

Early theorists propose that premarital cohabitation increases marital quality and decreases the possibility of marital dissolution by providing an opportunity for potential spouses to acquire more information about each other and their compatibility (Becker et al., 1977; Reinhold, 2010). However, only a few empirical studies support this view. Using a nationally representative sample of individuals born between 1955 and 1965 in Denmark and followed up from 1980 to 1995, Svarer (2004) discovered that married couples with cohabitation experience have a lower likelihood to divorce. More recently, Kulu and Boyle (2010) analysed data from the Austrian Family and Fertility Survey in 1995-1996 and found that premarital cohabitation reduces the risk of marital dissolution after controlling for the characteristics of cohabitors.

Nevertheless, the majority of studies found the relationship to be the opposite. Specifically, couples with premarital cohabitation experience have an increased risk of marital dissolution than those without such experience. Empirical evidence from the United States (Axinn & Thornton, 1992; Booth & Johnson, 1988; DeMaris & Rao 1992; Lillard et al., 1995; Teachman & Polonko, 1990; Thomson & Colella, 1992), Canada (Balakrishnan et al., 1987; Hall & Zhao, 1995), and Northern Europe (Bennett et al., 1988) all support this view.

Two different approaches have been proposed to explain these results. The first one is the selectivity effect. As a selected group of people who differ from non-cohabitors (Hall & Zhao,1995), individuals who are more likely to cohabit have certain characteristics which mean that they are also more prone to divorce. For example, in terms of demographic features and socio-economic status, these individuals are often

found to be less educated and come from less stable families (Bumpass & Sweet, 1989). With respect to attitudinal values, cohabitors are more individualistic, less religious, have a lower commitment to traditional institutions, and hold more unconventional family values (Bennett et al., 1988; DeMaris & Rao, 1992; Reinhold, 2010). Regarding the preferences for future spouses, cohabitors are less concerned about educational or age homogamy and more likely to have spouses who are different from themselves (Schoen & Weinick, 1993; Hall & Zhao, 1995). These characteristics that make individuals more likely to cohabit before marriage also make them more vulnerable to the risk of divorce.

If the selectivity effect applies, then the relationship between cohabitation and subsequent marital dissolution is, to some extent, spurious as it results from the selected characteristics of cohabitors (Bennett et al., 1988). One would expect the effect of cohabitation on divorce to decrease or even disappear after the attributes of cohabitors are controlled for. Indeed, analysing a 1972 national longitudinal survey of 19,001 high school students in the United States, Lillard et al. (1995) found the positive association between premarital cohabitation and divorce to disappear after controlling for the selectivity effect.

The second aspect is the causation effect, meaning that experiencing premarital cohabitation itself increases the risk of marital instability for cohabitors through exerting influence on their attitudes and values towards marriage. More specifically, cohabitation may cause cohabitors to view marriage as a more casual relationship, and thus making divorce a more plausible choice for them (Axinn & Thornton, 1992; Thomson & Colella, 1991). Most empirical research confirms the causation effect by continuing to find a positive association between premarital cohabitation and subsequent marital dissolution after controlling for the selectivity effect. For instance, using multi-wave data of mothers and children between 1962 and 1985 in the United States, Axinn and Thornton (1992)

examined their attitudes and values towards divorce both before and after premarital cohabitation. They found that cohabitation significantly increases the acceptance of divorce even after controlling for the selective features of cohabitors. Similarly, drawing nationally representative data from the 1987-1988 National Survey of Families and Households, Thomson and Colella (1992) discovered that couples who cohabit before marriage have lower marital quality and a higher dissolution likelihood than those who marry directly. Other research using different datasets in the United States reached similar conclusions (Booth & Johnson, 1988; DeMaris & Rao, 1992).

Over in Canada, analysing a sample of 5,315 women from the 1984 Canadian Fertility Survey, Balakrishnan et al. (1987) found that couples with premarital cohabitation experience are 50% more likely to divorce than couples without such experience. More recently, using data from the 1990 General Social Survey including 8,177 ever-married respondents, Hall and Zhao (1995) found that the effect of premarital cohabitation does not decrease after the socio-demographic features of cohabitors are controlled for; instead, the impact has increased. Similar patterns have been found in Northern European countries. Examining data from a 1981 Swedish survey of 4,966 women between 20 and 44 years old, Bennett et al. (1988) found that the rate of marital dissolution among women who cohabited prior to marriage is 80% higher than those without such experience.

Among the research which directly examined gender differences in the relationship between premarital cohabitation and the risk of divorce, the majority of studies discovered no significant difference between males and females. For example, DeMaris and Rao (1992) found that the effect of cohabitation on the risk of divorce is similar for both genders in the United States. Manning and Cohen (2012) also confirmed

gender similarities using more recently collected data from the 2006-2008 National Survey of Family Growth in the United States.

Apart from investigating the nature of the relationship between premarital cohabitation and marital dissolution, another important focus in this area of research is on the change of this relationship over time and across countries. The diffusion theory suggests that the nature of the relationship between premarital cohabitation and marital dissolution depends on the role and meaning of cohabitation in a particular society. When cohabitation is still a marginal phenomenon in society, only a selected group of individuals cohabit before marriage. In this context, cohabitors might not intend to get married but are pressurised into marriage for institutional or family reasons and thus lead to unstable marriages (Teachman & Polonko, 1990). As cohabitation becomes more popular prior to marriage, it gradually loses its social stigma. At this time, cohabitation serves as a trial stage before marriage, where potential couples rehearse their marital roles and test their compatibility. Only well-matched couples will proceed to marriage while ill-matched ones break up after cohabitation (Teachman & Polonko, 1990). Therefore, it is expected that the higher risk of divorce associated with cohabitation will gradually disappear and even reverse over time.

Svarer (2004) suggested that this is precisely the reason why premarital cohabitation is found to reduce the risk of divorce in Denmark. At the time of research, cohabitation was already widespread in Denmark, with nearly 80% of married couples having had premarital cohabitation experience. Therefore, rather than increasing the risk of marital dissolution, cohabitation serves as a stage before marriage for couples to trial their relationship. Since only well-matched couples transit into marriages, cohabitation would lead to more stable marriages. Svarer (2004) predicted that similar results will be found in other countries when cohabitation becomes a large-scale phenomenon. This

might also be the reason why Kulu and Boyle (2010) found similar results when they used more recent data (1995-1996) from Austria.

Examining data from the 1988-1998 Fertility and Family Surveys collected in 23 countries across Europe, Liefbroer and Dourleijn (2006) confirmed the diffusion effect by finding a 'U-shaped' pattern concerning the relationship between premarital cohabitation and the risk of subsequent marital dissolution. When cohabitation is a marginal phenomenon, the selectivity of cohabitors from the rest of the population is obvious. Thus, cohabitation leads to unstable marriages. However, when cohabitation grows its prevalence in society, this negative effect reduces and even disappears, until that almost everyone in the society cohabits before marriage. Similarly, using recent data from the 1988-2002 National Survey of Family Growth in the United States, Reinhold (2010) found that the positive effect of premarital cohabitation on the risk of divorce has reduced for the later marriage cohorts. Manning and Cohen (2012) also found that the association between premarital cohabitation and the risk of divorce becomes non-significant among recently formed marriages using national data collected from 2006 to 2008 in the United States.

The Case of China

In China, premarital cohabitation has grown from being a marginal phenomenon to a common choice among married couples in the last few decades. Meanwhile, the rate of divorce has surged. However, the relationship between these two phenomena remains largely unknown. This section will first introduce the recent changes regarding both cohabitation and divorce in post-reform China, followed by a discussion on how the aforementioned theories developed in Western developed countries can be applied in the Chinese context. Hypotheses will be generated afterwards.

In the traditional Chinese society before 1949, marriage was not an individual choice, but more like a result of family arrangement to continue the family lineage (Xu & Whyte, 1990). Premarital cohabitation was almost non-existent in such a context as it was in violation of the Confucian ideology (Xu et al., 2014). Divorce was also extremely rare and only males had the privilege to initiate it (Feng, 2001). Chinese family life started undergoing dramatic changes since 1949 when the People's Republic of China was founded. A distinct feature of family life between 1949 and 1978 was the strict control of the government. Premarital cohabitation was socially unacceptable and regarded as highly immoral (Zheng et al., 2011). Although divorce was allowed under the law (the Marriage Law of 1950), mediation by the government was a necessary procedure, and divorce remained uncommon (Xu et al., 2014).

In the post-reform era, rapid economic growth was accompanied by an increasing cultural exchange between China and Western countries. Traditional family values were challenged, and younger generations are more familiar with and even eager to adopt the individualistic values observed in Western developed countries. Consequently, there is a much higher tolerance of premarital sex and a greater emphasis on spousal intimacy and affections in the marriage life. Meanwhile, except for a few areas such as fertility and birth planning, the government retreated from intervening in most aspects of family life. Both marriage formation and dissolution have increasingly become an individual choice. These are notably reflected in the recent amendments of Chinese Marriage Law. For example, the Marriage Law of 1980 recognises the freedom of divorce by stating the loss of mutual affections between spouses as a legal cause to terminate a marriage. Compared to its predecessor (the Marriage Law of 1950) in which mediation was mandatory and prolonged, the new legal provision gives couples much more freedom and flexibility to end their marriage (Palmer, 1995).

Consequently, both cohabitation and divorce rates have grown substantially in the post-reform era. While only less than 2% of couples cohabited before marriage before 1980, the percentage was nearly one third in the 2000s, as shown by nationally representative survey data (Xu et al., 2014; Yu & Xie, 2015a). The divorce rate has also surged with the crude divorce rate growing nearly 10 times in the last few decades from being 0.35 in 1980 to 3.02 in 2016 (Xu et al., 2011; National Bureau of Statistics of China, 2017).

A few assumptions can be made based on previous literature with regards to how the theories developed in Western developed countries can be applied to the relationship between premarital cohabitation and marital dissolution in post-reform China. In particular, past studies have found that cohabitors in China have some distinct features compared to those who marry directly. For example, they tend to have higher education and come from higher-status families (Yu & Xie, 2015a). Since better education is often associated with individualistic and liberal values in China (Sun & Wang, 2010), this means that cohabitors in China are more likely to hold non-traditional family values. Thus, the selectivity effect is likely to exist in China.

Moreover, cohabitation has developed its prevalence rapidly in the past few decades, from being a marginal phenomenon at the beginning of the post-reform era to becoming a common choice among married couples among the recently formed marriages (Yu & Xie, 2015a). Therefore, the role and meaning of cohabitation are also likely to have changed accordingly. Specifically, the selectivity effect of cohabitation might have decreased as cohabitation becomes more popular, as found in many Western developed countries. Therefore, a decreasing association between premarital cohabitation and divorce might be observed if comparing marriages formed in the later marriage cohort with those formed in the earlier stage of the post-reform era.

The nature of the relationship between premarital cohabitation and marital dissolution remained largely unknown until recently due to the lack of available survey data. Using the 2010 wave data from the China Family Panel Studies, Zhang (2017) found support for the diffusion process in the post-reform era. In particular, the positive association between premarital cohabitation and the risk of marital dissolution only exists in the earlier marriage cohort (1980-1994), and this effect seems to disappear in the recent marriage cohort (1995-2010). Some other studies confirmed the positive association between premarital cohabitation and divorce analysing the same dataset, but how the pattern has changed over time was not examined (Liu et al., 2019; Yang & Shi, 2019).

There are some limitations with existing studies which the current study will address. First, previous studies did not distinguish gender differences. It is consistently suggested that gender differences might exist regarding both the decisions to cohabit and to divorce. Huang et al. (2011) found considerable differences in the perceived role of cohabitation among males and females. Specifically, women tend to view cohabitation as a precursor to marriage, while men do not necessarily link cohabitation to marriage. This suggests that the role and meaning of premarital cohabitation might be different for men and women. Furthermore, women have had increased educational and labour market opportunities in post-reform China. Consequently, highly educated women might increasingly prefer cohabitation to marrying directly due to the higher opportunity costs. Meanwhile, they might also have more freedom in divorce decision as a result of financial independence. It is thus essential to distinguish gender differences when addressing the relationship between premarital cohabitation and divorce.

Second, the high censoring rates in Zhang (2017)'s study may introduce bias into the results, which means that the diffusion trend observed cannot be fully trusted and

need further investigation through including more updated data and a more robust way of controlling potential bias. Zhang (2017) also acknowledged that his results are at odds with the persistent positive association between premarital cohabitation and divorce in Western developed countries where cohabitation is even more prevalent than that in China. The recent marriage cohort in Zhang (2017)'s study includes marriages formed between 1995 and 2010, and the data were collected in 2010. Since the risk of divorce peaks at around 7 years among marriages in China (Xu et al., 2016), this means that nearly half of the sample in the recent marriage cohort have not had enough exposure time to possibly experience the risk of marital dissolution. Because the divorce rate has been increasing rapidly, this effect might be more substantial for the recently married couples. Previous studies pointed out that high censorship rates may decrease the effective sample size and introduce biased statistical inferences into research (Leung et al., 1997; Zhu et al., 2017). Therefore, the results of the recent marriage cohort in Zhang (2017)'s study need to be taken with caution, especially when using them to compare with the results from the previous cohort to test the diffusion process.

Moreover, the results seem to contradict with the findings of Chapter 2 of this thesis, which discovered that individuals who cohabit prior to marriage are more likely to cross educational barriers and form extremely heterogamous relationships (i.e. individuals marrying those who have very different characteristics compare to themselves). Since previous research associates couple heterogeneity with a higher risk of marital instability and dissolution (Bumpass & Sweet, 1972; Tzeng, 1992), it is reasonable to hypothesise that there is a higher risk of divorce among couples who cohabit before marriage among the recently formed marriages. This is opposite to what Zhang (2017) found in his research. It might be due to the reason that only individual

characteristics were controlled for in his study, but couple characteristics were not accounted for. It is, therefore, important to have these results re-investigated.

This chapter fills the research gap and addresses the aforementioned limitations through the following ways. First, this chapter investigates gender differences in the relationship between premarital cohabitation and marital dissolution for the first time, which has not been addressed by Zhang (2017). When this chapter examines how the association between premarital cohabitation and divorce changes, analyses will be conducted for men and women separately to distinguish the gender effects in the diffusion process. This is difference from Zhang (2017)'s approach which combined males and females into one group.

Moreover, by utilising more recent data (the China Family Panel Studies 2010-2016) and applying a stricter criterion to the recent marriage cohort, this chapter can to a large extent avoid the high censorship rate problem in Zhang (2017)'s study. Specifically, previous literature (Xu et al., 2016) found that the risk of divorce experiences a reversed U-shaped pattern in China, which means that the risk of divorce increases rapidly after being married, reaches its peak at around 7 years and declines after that. This is similar to the findings in the West. Census data from the United States show that the median of the number of years leading to divorce for first marriages is 8 years in 2009 (Kreider & Ellis, 2011). Therefore, this chapter only includes marriages formed before 2008 in the late-reform marriage cohort while the observation time for these marriages lasted until 2016, so that even the most recently formed marriages would have had exposure to the risk of divorce for at least 8 years. Although this cannot entirely eliminate the potential bias introduced by a too short observation time for all marriages, this can, to a great extent, minimise the magnitude of the bias. Third, the statistical models in this chapter include heterogamy indicators such as the spousal age gap, to account for the possibility that the

selectivity of cohabitors includes not only individual characteristics but also couple characteristics.

The following hypotheses are generated based on the review of the theories developed in the West as well as the Chinese context. The first two hypotheses pertain to the nature of the relationship between premarital cohabitation and the risk of marital dissolution. Considering the distinct individual and couple characteristics of cohabitors in China, this chapter proposes that there exists a positive association between cohabitation and marital dissolution.

Hypothesis 1: Individuals who cohabit before marriage are more likely to divorce than those who do not cohabit before marriage.

Consistent with Zhang (2017)'s results and the findings in the majority of Western literature, this chapter expects to find that the selectivity effect cannot fully account for the association between premarital cohabitation and marital dissolution.

Hypothesis 2: The positive association between premarital cohabitation and the risk of divorce continues to exist even after the selectivity effect is accounted for.

Chapter 1 of this thesis found that both male and female cohabitors are increasingly becoming better educated than their non-cohabited counterparts across marriage cohorts, but this pattern is more evident for women than men. Better education is associated with more individualistic values in China (Sun & Wang, 2010), which are often linked to a higher risk of marital instability. Hence, this chapter expects to find that the higher risk of divorce associated with cohabitation is stronger among women compared to men.

Hypothesis 3: The positive association between premarital cohabitation and divorce is stronger among women than men.

With regard to the diffusion process, because cohabitation has increased in popularity in post-reform China, this chapter expects to find that the positive association between premarital cohabitation and marital dissolution decreases over time. However, Chapter 2 of this thesis found increasing heterogeneity among recent marriages with cohabitation experience. Therefore, unlike Zhang (2017)'s findings, this chapter expects to find that the positive association between premarital cohabitation and marital dissolution continues to exist in the recent marriage cohort.

Hypothesis 4: The positive association between premarital cohabitation and divorce decreases over time but continues to exist in the recent marriage cohort.

Method

Data

Data utilised in this study come from the China Family Panel Studies (CFPS) conducted by Peking University, China, in 2010-2016. CFPS is a major national survey including detailed retrospective information of individual marital and divorce histories, as well as demographic and socio-economic characteristics, which are valuable for this research. Details about CFPS can be found in Chapter 1 Data section.

The CFPS data have several advantages in helping answer the research questions of this chapter. First, the CFPS data includes demographic and socio-economic characteristics of all adult members of a household and retrospective information of their first marriage, divorce, and premarital cohabitation history. The richness of the data allows for the investigation of the relationship between premarital cohabitation and marital dissolution in depth. Second, the CFPS data were collected on the individual level for both males and females, which allows gender comparisons when examining the relationship between premarital cohabitation and marital dissolution. Third, the CFPS

data includes marriages formed in different periods of the post-reform era, which provides an excellent opportunity for cohort comparisons to see how the association between premarital cohabitation and divorce changes as cohabitation grows in popularity.

The unit of analysis of this chapter is individuals' first marriage experiences. Similar to Chapter 1 and 2, data from 2010 to 2016 were pooled together to increase the sample size, and all duplicate observations about the same individuals (who were interviewed in multiple years) were dropped because the analyses only include time-invariant variables. Moreover, this chapter excluded marriages formed before 1980 (22,053 individuals were dropped) and marriages formed under 15 years old or after 35 years old (1,438 observations were dropped). In addition, this research is limited to premarital cohabitation experience before first marriages and subsequence divorces, because higher-order marriages have different marriage and divorce patterns (Reinhold, 2010). After these restrictions were applied, the final sample consists of 14,605 individuals, including 7,088 males and 7,517 females.

Analytical Strategy

Individual-level event history analysis is conducted to test the hypotheses regarding the nature of the association between premarital cohabitation and marital dissolution, and whether this association differs between genders and changes across marriage cohorts. The advantage of event history analysis is the ability to deal with censored information involved in the data, as there are couples who would have divorced at a later stage but had not divorced by the time of the interview, as well as marriages that ended involuntarily because of the death of one of the spouses.

The analyses begin by employing Kaplan-Meier survival curves to give clear visual images of the relationship between premarital cohabitation and marital dissolution

between different genders and over time. The following step utilises the Cox proportional hazards model to examine the association in more detail as it allows controlling for confounding covariates. All models are conducted separately between genders and among different marriage cohorts for comparison.

Methods

Event history analysis was used in this chapter to examine the association between premarital cohabitation and the risk of marital dissolution. The event of interest is whether or not the individual respondent had divorced for his or her first marriage by the interview date. Event history analysis is particularly suitable for this research because of the censored information involved in the data, which occurs either because divorce had not taken place by the survey date, or due to involuntary marital dissolutions as a result of the death of either spouse. Compared to other regression models, event history analysis takes into account censored information through the addition of information about timing into the models (Mills, 2010). It examines the hazard rate that the event of interest occurs at a given time interval (Mills, 2010). Thus, rather than dropping all the information of a censored respondent, it includes the knowledge of the censored individual up until censorship happens (Kleinbaum & Klein, 2012). Therefore, event history analysis can provide a more accurate estimate of the risk of marital dissolution by comparing individuals with premarital cohabitation experience to those without such experience.

In particular, two types of event history models were used in this chapter: Kaplan-Meier estimates and Cox proportional hazard models. As non-parametric models, Kaplan-Meier estimates calculate the probabilities of the event of interest occurring at a particular time without making assumptions of the hazard distribution shape (Mills, 2010). The survival curves produced by Kaplan-Meier estimates thus serve as excellent

visual tools to describe the hazard of divorce of individuals with premarital cohabitation experience and those without such experience.

However, Kaplan-Meier estimates are univariate analyses and cannot take into consideration the effect of other covariates which might confound the relationship (Mills, 2010). In comparison, the Cox proportional hazards model can solve this problem. First introduced by Cox (1972), the Cox proportional hazards model has been used as a common method in demographic studies. It assumes that the hazard rate of the event of interest can be captured by the effect of the independent variables in the model, and the relative hazard functions among groups are constant over time (Balakrishnan et al., 1987). The equation of the Cox proportional hazard model can be found in Appendix A. A crucial reason for using the Cox proportional hazards model in this chapter is that it allows the investigation of the relationship between premarital cohabitation and marital dissolution while controlling for a series of other factors such as demographic and socio-economic characteristics of individuals. In particular, two models were conducted for each gender and marriage cohort separately. While the first model examines the raw relationship between premarital cohabitation and marital dissolution, the second model investigates whether this association is spurious or real by testing the selectivity effect. Towards this end, the second model includes a set of confounding variables which might affect the likelihood of both cohabitation and divorce.

Measures

The event of interest in this chapter is whether divorce from first marriages had occurred by the survey time. All respondents were asked about their first marriage experiences, including whether they cohabited beforehand, and the dates of entry into and exit out first marriages if they were divorced or widowed. Based on answers to these questions, the

divorce variable was coded as a binary variable with 1 indicating that divorce had happened and 0 indicating not. The primary explanatory variable, premarital cohabitation experience, comes from answers to the question of whether respondents had cohabited with their first marriage spouses. It was also coded as a binary variable, with 1 indicating the respondent having had premarital cohabitation experience and 0 indicating no such experience.

The following variables were controlled for to test the selectivity theory: educational attainment, age, age of marriage, father's educational level, the number of children under 18, ethnicity, hukou status, and provincial gross domestic product (GDP) per capita. These variables have been found to be related to both premarital cohabitation and divorce by previous literature.

To begin with, previous studies discovered that cohabitors tend to come from the better-educated group in China (Yu & Xie, 2015a) and better education has also been linked with a higher divorce risk (Wang & Zhou, 2010). Five levels of educational attainment were identified and coded as a categorical variable: illiterate, primary school, junior-high school, senior-high school, and college education and above.

Moreover, previous literature suggests that the patterns of cohabitation and marital dissolution differ dramatically across birth cohorts as the macro-environment of cohabitation and divorce change in society (Bennett et al., 1988; DeMaris & Rao, 1992). Although this effect is minimised in this study since models were conducted separately for each marriage cohort, the birth year of each respondent was included in the models to further control the macro-level environment. Age of marriage was also controlled for as cohabitation behaviours change dramatically over the young adult years (Thornton, 1988). Younger age at marriage has also been found to be consistently related to increased marital instability (Menken et al., 1981; Teachman, 2002).

Besides, family background has been discovered to better represent a respondent's socio-economic status at the time of marriage (DeMaris & Rao, 1992). This impact was captured by father's educational attainment in the model. This is because father's education is a more accurate factor to indicate a family's socio-economic status, as a result of gender inequalities in the labour market (Zhao & Zhou, 2002). A categorical variable was created to signify father's educational level with three categories: illiterate, primary school, and secondary school and above.

The number of children has been found to be positively related to the stability of marriage in China (Xu et al., 2015); therefore, a continuous variable indicating the number of children under 18 in the household was created. Furthermore, economic inequality exists among ethnic minority groups, rural people, and certain geographical areas in China (Bian, 2002; Xie, 2016). Accordingly, control variables included dichotomous measures for ethnicity (Han versus ethnic minority), hukou status (urban hukou versus rural hukou), and a continuous variable of provincial GDP per capita.

In addition to these individual characteristics, a covariate indicating heterogeneity between spouses was used to control for couple characteristics, as previous literature suggests that the level of heterogeneity between spouses is positively related to the possibility of cohabitation and the risk of divorce (Blackwell & Lichter, 2004; Bumpass & Sweet, 1972; Hall & Zhao, 1995). Thus, spousal age gap was included in the models utilising a continuous variable indicating the difference of age between spouses. Apart from the variables listed above, the survey year was controlled for to minimise the sampling bias. Since the focus of this chapter is centred on the relationship between cohabitation and the risk of divorce, the results of the control variables will not be discussed extensively.

All models were conducted separately for different genders and marriage cohorts. This chapter chose the year 1992 and 2001 to divide the post-reform era into three marriage cohorts, as both 1992 and 2001 mark important changes in both the economic reform and legislations around cohabitation. In 1992, the Chinese government further expanded the reform, which was seen as a significant milestone in the course of the reform. Decentralisation of state control and privatisation in all sectors began to accelerate afterwards (Naughton, 2008). As discussed in more detail in Chapter 1, in 2001, the Revised Chinese Marriage Law regulated cohabitation and financial property in cohabiting relationships for the first time. It also further regulated divorce by including specific terms about the circumstances under which divorce is permitted. These changes indicate that cohabitation and divorce had become well-recognised social practices by then, and in turn, the legal changes encouraged a continuous change in these areas (Yu & Xie, 2015a). Hence, these cohorts are indicative of the institutional and cultural environment that greatly shaped the Chinese family life. Moreover, by including marriages formed before 2008 in the late-reform marriage cohort and observed until 2016, it can ensure necessary exposure to the risk of divorce even for the most recently formed marriages and thus reduce the magnitude of the sampling bias. Therefore, three marriage cohorts were created as follows: 1981-1992, 1993-2001, 2002-2008.

Results

Descriptive Results

Table 1 presents the means of all key variables in this chapter by premarital cohabitation experience and gender.

Table 1. Means of Variables by Premarital Cohabitation and Gender

	Males (N = 7,088)		Females (N = 7,517)	
Variables	Premarital Cohabitation	No Premarital Cohabitation	Premarital Cohabitation	No Premarital Cohabitation
First Marriage Dissolved	0.091	0.038	0.043	0.039
Age at Survey	40.81	47.28	38.32	45.24
Age at First Marriage	24.83	24.23	22.57	22.50
Illiterate	0.09	0.13	0.13	0.24
Primary School	0.19	0.22	0.25	0.23
Junior-high School	0.36	0.37	0.35	0.31
Senior-high School	0.20	0.19	0.16	0.15
College and Above	0.15	0.09	0.11	0.07
Father Illiterate	0.32	0.45	0.32	0.42
Father Primary School	0.36	0.32	0.33	0.32
Father Secondary and Above	0.32	0.23	0.35	0.26
Han Ethnicity (versus Minority)	0.90	0.91	0.89	0.90
Urban Hukou (versus Rural)	0.37	0.35	0.34	0.32
Age Gap	3.77	3.09	2.86	2.60
Number of Children Under 18	1.08	0.77	1.12	0.81

Source: Pooled Data from CFPS 2010-2016.
Notes: Results are weighted using cross-sectional weight.

There are a few important findings from the descriptive results shown in Table 1. In terms of the event of primary interest in this study – first marriage dissolution, there are significant differences between males who cohabited before marriage and those who did not; however, this effect is not significant for females. Specifically, 9.1% of males who cohabited before marriage experienced first marriage dissolution, while only less than half of this number (3.8%) of non-cohabited males had a divorce. Nevertheless, for females, the figures are similar between these two groups with cohabited females having a slightly higher divorce rate (4.3% for cohabited females compared to 3.9% for their non-cohabited counterparts). This suggests a significant gender difference in terms of the association between premarital cohabitation and marriage dissolution. The divorce rates in the sample are slightly higher than the average crude divorce rate in China (which is 3.02% in 2016 according to the data from China National Bureau of Statistics). It might

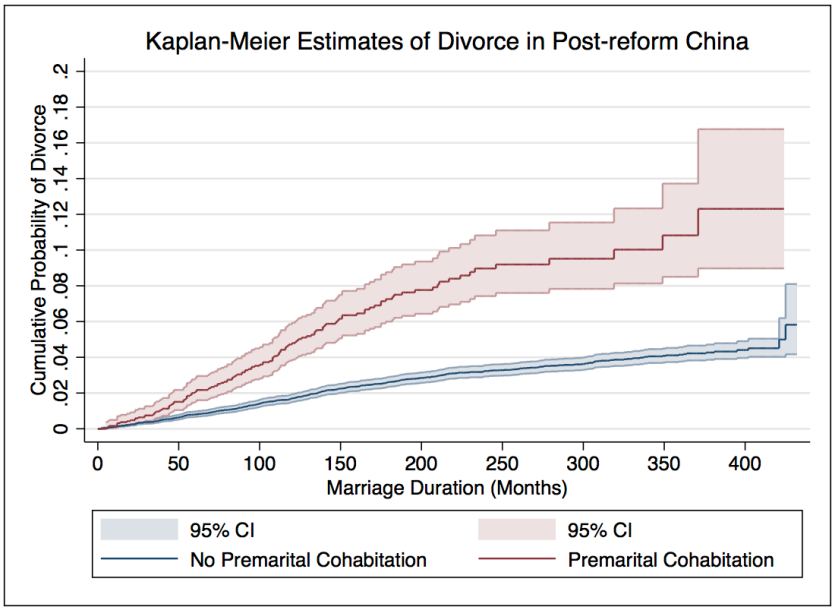
be because the selected sample only includes first marriages among young adults formed in the post-reform era, which have a higher divorce rate than the general population.

In terms of the explanatory variables, there is a consistent difference between individuals who cohabited before marriage and their non-cohabited counterparts. Compared to those without premarital cohabitation experience, individuals who cohabited prior to marriage are generally younger, better educated, and come from families with higher socio-economic status. Furthermore, they tend to have delayed age of marriage, a larger age gap with their spouses, and more children under 18 at the time of divorce or the end of observation.

Kaplan-Meier Survival Curves

Due to the censored information in the data, event history analysis is most suitable for this study. The first step used Kaplan-Meier survival curves to visually describe the patterns of the relationship between premarital cohabitation and divorce, and how it differs between genders and changes over time. Figure 1 shows the Kaplan-Meier estimates of cumulative probability of divorce between two groups: individuals who cohabited before marriage and those without such experience.

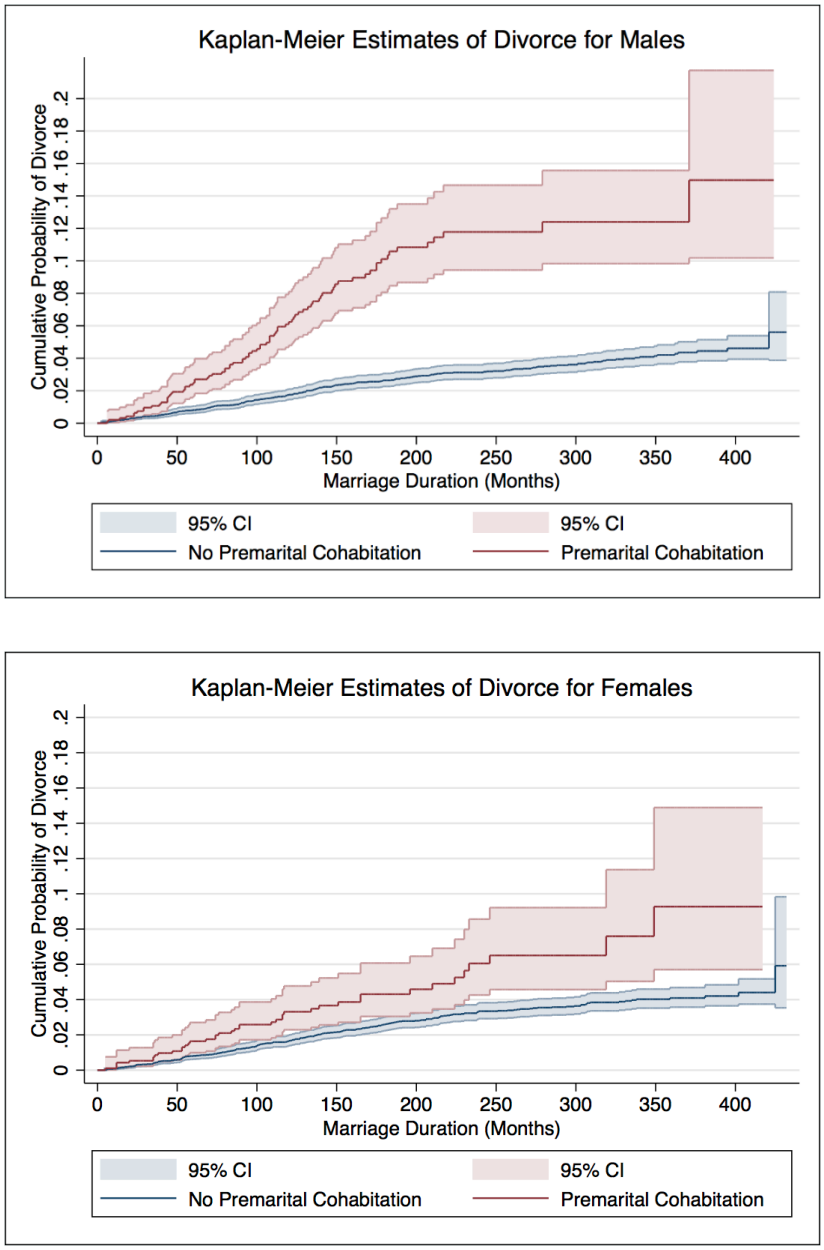
Figure 1. Kaplan-Meier Estimates of Divorce by Premarital Cohabitation in Post-reform China (1981- 2008)



Source: Pooled Data from CFPS 2010-2016. Note: Results are presented with 95% confidence intervals.

As shown in Figure 1, the probability of divorce is significantly higher among individuals with premarital cohabitation experience than those without such experience after being married for about 4 years (48 months). This difference increases as marriage continues. After 5 years of marriage (60 months), the probability of divorce for individuals with premarital cohabitation experience is about 0.02, which doubles the probability of 0.01 for their non-cohabited counterparts. At 12.5 years (150 months), the probability of divorce for individuals with premarital cohabitation experience reaches 0.06, tripling the probability of those without such experience (which is just below 0.02). The probability of divorce for cohabited individuals continue to triple that of non-cohabited individuals in the following years. It reaches 0.12 after 33 years (about 400 months) of marriage for cohabited individuals, while the figure for non-cohabited individuals is only 0.04 at this point.

Figure 2. Kaplan-Meier Estimates of Divorce by Premarital Cohabitation in Post-reform China for Males and Females (1981- 2008)



Source: Pooled Data from CFPS 2010-2016. Note: Results are presented with 95% confidence intervals.

According to Figure 2, there are notable differences in how premarital cohabitation relates to divorce between males and females. In general, the cumulative probability of divorce for males with premarital cohabitation experience is much higher than females with such experience. Moreover, while males with premarital cohabitation

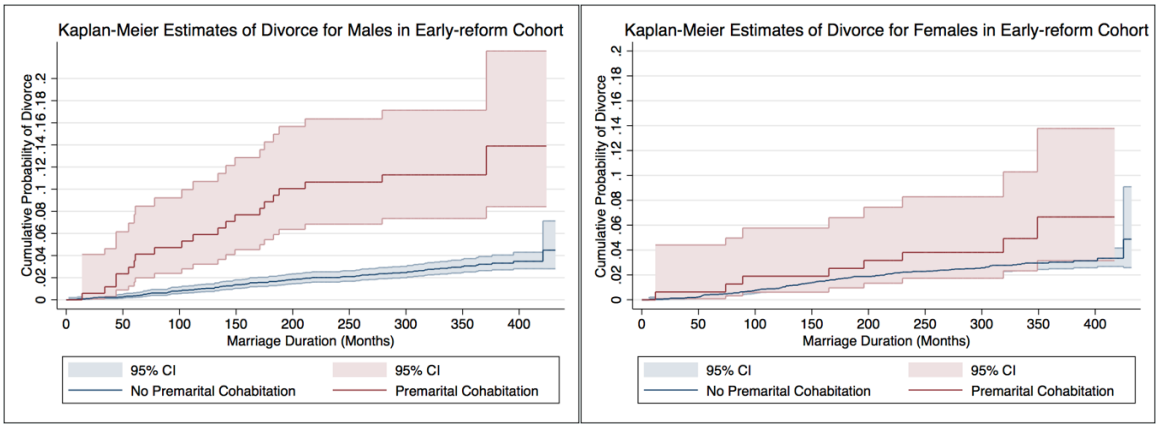
experience consistently have a higher cumulative divorce probability than those without such experience, this pattern is not as apparent among females.

More specifically, after 4 years of marriage (48 months), the cumulative risk of divorce for males with premarital cohabitation experience becomes significantly higher than those without such experience before marriage. However, the difference between females with cohabitation experience and those without such experience only appears after being married for almost 19 years (228 months).

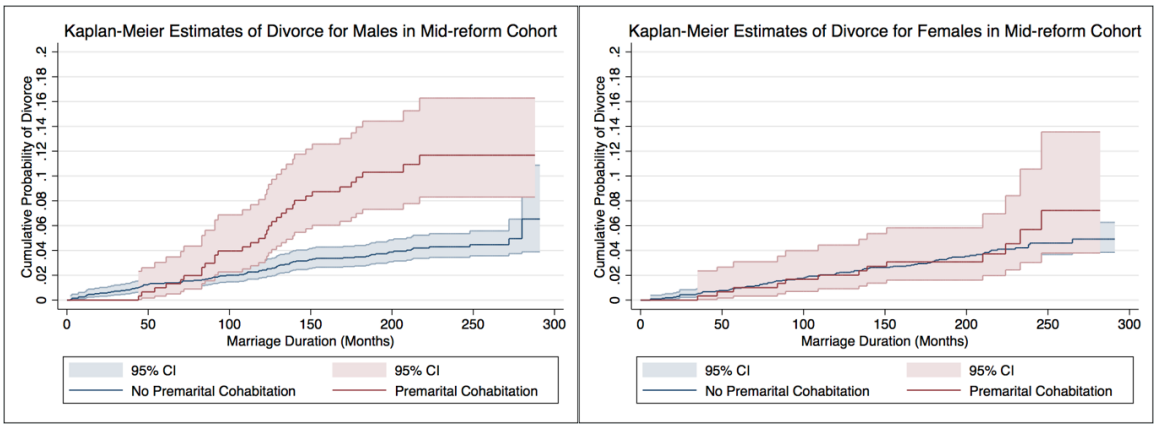
The cumulative risk of divorce for males with premarital cohabitation experience reaches 0.02 after 5 years of marriage (60 months), which doubles the risk for their non-cohabited counterparts. The difference continues to enlarge over time. When it reaches 10 years (120 months), the cumulative risk of divorce among cohabited males already triples the risk among non-cohabited males (0.06 versus 0.02). In contrast, the cumulative risk of divorce for females with premarital cohabitation experience is 0.03 at this point, which is half of the figure of males with premarital cohabitation experience, and only slightly higher than non-cohabited females for whom the figure is 0.02. The risk of divorce for males with premarital cohabitation reaches the highest point (nearly 0.14) after they are married for 31 years (372 months), while the risk for females with similar experience reaches the highest value of only 0.09 after being married for 29 years (348 months).

Figure 3. Kaplan-Meier Estimates of Divorce by Premarital Cohabitation in Post-reform China for Males and Females Across Marriage Cohorts (1981-2008)

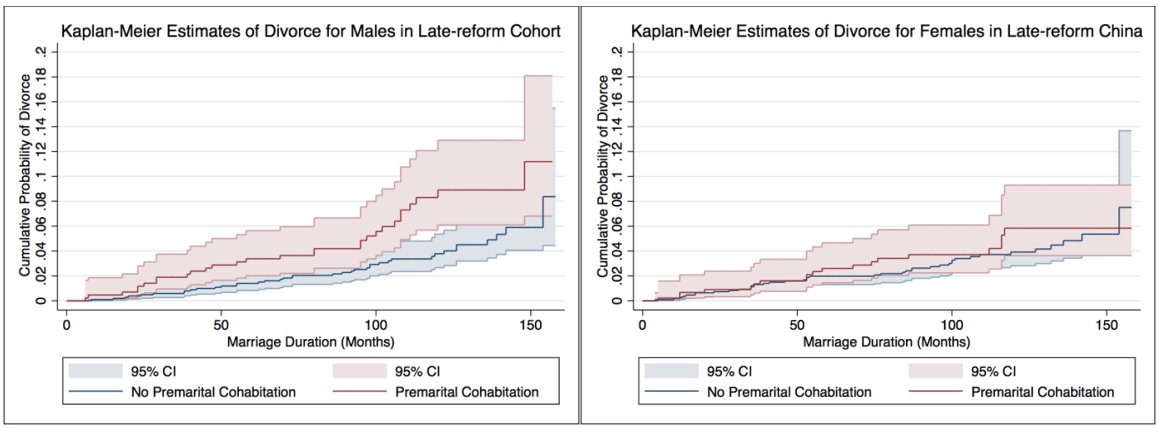
Early-reform Cohort (1981-1992)



Mid-reform Cohort (1993-2001)



Late-reform Cohort (2002-2008)



Source: Pooled Data from CFPS 2010-2016. Note: Results are presented with 95% confidence intervals.

Figure 3 shows the cumulative probability of divorce by premarital cohabitation experience and gender across marriage cohorts. In the early-reform cohort, males with premarital cohabitation experience are more likely to divorce than those without such experience. However, this effect decreases over time and becomes less evident in the most recent marriage cohort.

In the early-reform cohort, the difference in the risk of divorce between cohabited males and non-cohabited males starts to emerge after 4 years of marriage (48 months) and grows quickly. The risk of divorce among cohabited males triples that of non-cohabited males (0.06 versus 0.02) after about 12.5 years of marriage (150 months). After 17 years of marriage (204 months), the risk of divorce among cohabited males becomes 5 times more than that of their non-cohabited counterparts (0.10 versus 0.02).

In the mid-reform cohort, the risk of divorce for cohabited males becomes significantly higher than their non-cohabited counterparts after being married for 10 years (120 months). The difference grows at a much slower speed compared to the previous cohort. For the risk of divorce among cohabited males to triple that of non-cohabited males, it takes about 18 years (216 months, 0.12 versus 0.04), in comparison to 12.5 years in the mid-reform cohort. In the late-reform cohort, the difference in the risk of divorce between cohabited and non-cohabited males only becomes apparent after 9 years (110 months), and the difference remains little and becomes almost unnoticeable after 10.5 years (126 months).

In comparison, the impact of premarital cohabitation experience on women is not that obvious. Although females with premarital cohabitation experience have a slightly higher probability of divorce than their non-cohabited counterparts, this effect is not significant in all three marriage cohorts. The pattern of males seems to be in accordance with the diffusion process suggested by previous literature (Zhang, 2017), which expects

the association between cohabitation and divorce to decrease over time. However, the diffusion process does not apply to females. Whether these differences are statistically significant need to be further examined in the next step using Cox Proportional Hazards Models.

Cox Proportional Hazards Model Results

Cox proportional hazards models were then used to evaluate the relationship between premarital cohabitation and the risk of marital dissolution while controlling for other variables which may interfere with the possibility of both premarital cohabitation and divorce. Specifically, two models were conducted for each marriage cohort. The first model examines the raw association of premarital cohabitation and the risk of divorce, and the second model tests whether selectivity effect exists (Hypothesis 1) and can account for the association previously discovered (Hypothesis 2). All these models were conducted separately for males and females and different marriage cohorts, to test gender differences (Hypothesis 3) and the diffusion process (Hypothesis 4).

Table 2. Hazard Ratios of Divorce Among Males in Post-reform China

	Early-reform Cohort (1981-1992)		Mid-reform Cohort (1993-2001)		Late-reform Cohort (2002-2008)	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Premarital Cohabitation	4.38***	4.08**	2.83***	2.28**	3.39***	2.79**
	(1.57)	(1.52)	(0.86)	(0.71)	(1.25)	(1.07)
Birth Year		1.06		1.19*		1.23
		(0.04)		(0.08)		(0.13)
Age of Marriage		1.04		1.00		1.16
		(0.06)		(0.10)		(0.14)
Educational Attainment (Ref. Illiterate)						
Primary		1.04		0.45		0.64
		(0.48)		(0.25)		(0.51)
Junior-high		0.77		0.88		0.50
		(0.33)		(0.44)		(0.38)
Senior-high		1.08		1.03		0.26
		(0.50)		(0.59)		(0.22)
College and Above		0.65		0.47		0.04**
		(0.44)		(0.30)		(0.04)
Father's Education (Ref. Illiterate)						
Primary		1.22		0.92		1.39
		(0.44)		(0.31)		(0.77)
Secondary and Above		2.26*		1.34		2.17
		(0.79)		(0.49)		(1.03)
Ethnicity (Ref. Minority)		0.95		0.80		1.64
Han		(0.46)		(0.45)		(1.16)
Hukou (Ref. Rural)		1.70		1.60		1.88
Urban		(0.49)		(0.47)		(0.71)
Spousal Age Gap		1.03		1.17*		1.13
		(0.08)		(0.08)		(0.10)
Number of Children Under 18		1.39***		0.38***		0.21***
		(0.12)		(0.08)		(0.07)
Provincial GDP per capita		0.41		0.96		0.89
($10,000)		(0.19)		(0.53)		(0.45)
Panel Wave (Ref. 2010)						
Wave 2012	1.20	1.23	0.56	0.81	2.64	3.13
	(0.71)	(0.78)	(0.28)	(0.42)	(2.10)	(2.23)
Wave 2014	0.71	0.79	0.66	0.96	1.02	1.96
	(0.40)	(0.46)	(0.31)	(0.44)	(0.83)	(1.83)
Wave 2016	0.52	0.63	0.26***	0.31**	0.66	1.44
	(0.21)	(0.31)	(0.10)	(0.13)	(0.49)	(1.24)
Observations	3545	3545	2084	2084	1459	1459

Source: Pooled Data from CFPS 2010-2016. Note: Results are weighted using cross-sectional weight. Exponentiated coefficients; robust standard errors in parentheses; and ref. = reference

* $p<0.05$, ** $p<0.01$, and *** $p<0.001$.

Table 3. Hazard Ratios of Divorce Among Females in Post-reform China

	Early-reform Cohort (1981-1992)		Mid-reform Cohort (1993-2001)		Late-reform Cohort (2002-2008)	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Premarital Cohabitation	0.83	1.09	0.96	0.92	1.28	0.89
	(0.50)	(0.66)	(0.41)	(0.41)	(0.56)	(0.37)
Birth Year		0.96		1.15		1.16
		(0.04)		(0.10)		(0.17)
Age of Marriage		0.96		1.12		1.21
		(0.07)		(0.10)		(0.21)
Educational Attainment (Ref. Illiterate)						
Primary		1.89		2.03		0.86
		(0.94)		(1.06)		(0.65)
Junior-high		2.92*		1.28		1.01
		(1.32)		(0.66)		(0.77)
Senior-high		1.85		3.69*		0.76
		(0.99)		(2.12)		(0.69)
College and Above		7.51***		3.61		0.41
		(4.15)		(2.38)		(0.55)
Father's Education (Ref. Illiterate)						
Primary		0.69		0.67		0.37
		(0.25)		(0.34)		(0.24)
Secondary and Above		1.10		0.66		0.60
		(0.39)		(0.27)		(0.38)
Ethnicity (Ref. Minority)		0.61		0.74		0.53
Han		(0.26)		(0.35)		(0.29)
Hukou (Ref. Rural)		4.71***		1.08		0.95
Urban		(1.77)		(0.48)		(0.41)
Spousal Age Gap		1.07		1.04		1.01
		(0.07)		(0.08)		(0.08)
Number of Children Under 18		2.07***		0.44**		0.12***
		(0.19)		(0.13)		(0.05)
Provincial GDP per capita		0.70		0.83		0.92
($10,000)		(0.38)		(0.36)		(0.56)
Panel Wave (Ref. 2010)						
Wave 2012	0.70	0.78	0.82	0.91	0.69	0.70
	(0.36)	(0.41)	(0.46)	(0.51)	(0.50)	(0.59)
Wave 2014	0.27**	0.49	1.24	1.73	1.16	1.80
	(0.14)	(0.30)	(0.59)	(0.84)	(0.74)	(1.15)
Wave 2016	0.23***	0.40*	0.33**	0.46	0.39	0.85
	(0.08)	(0.16)	(0.14)	(0.22)	(0.22)	(0.54)
Observations	3725	3725	2220	2220	1572	1572

Source: Pooled Data from CFPS 2010-2016. Note: Results are weighted using cross-sectional weight. Exponentiated coefficients; robust standard errors in parentheses; and ref. = reference

* $p<0.05$, ** $p<0.01$, and *** $p<0.001$.

Tables 2 and 3 present the relationship between the risk of divorce and premarital cohabitation experience among males and females, respectively. The dependent variable is the hazard of divorce. All reported coefficients are hazard ratios. A coefficient larger than 1 indicates an increasing risk of divorce at any given time during the marriage for that particular covariate net of the effects of all other variables in the model, and a coefficient less than 1 signifies a decreasing risk of divorce.

A comparison between Tables 2 and 3 finds significant differences between males and females. While premarital cohabitation is a significant predictor of a higher risk of divorce among males consistently, it does not have significant effect for females in any marriage cohort. An additional model was conducted to test the gender difference in the association between premarital cohabitation and the risk of divorce by including an interaction term of premarital cohabitation and gender. The results confirm a significant higher risk of divorce among males with cohabitation experience compared to their female counterparts (results can be found in Appendix C-1).

The results do not support Hypothesis 3, which assumes a more positive association between premarital cohabitation and divorce for females than males. Instead, this study finds that the difference does not only lie in the magnitude of the relationship, but also in the nature of the relationship itself. Since previous literature suggests that the nature of the relationship between premarital cohabitation and divorce depends on the role and the meaning of cohabitation, these results indicate that premarital cohabitation may mean something entirely different for males and females in China. Any theories and understanding of the relationship between premarital cohabitation and the risk of divorce would need to treat these two groups separately.

There are a few possible reasons why differences are found between males and females regarding the relationship between premarital cohabitation and the risk of divorce

in China. First, previous literature (Booth & Johnson, 1988) suggests that the effect of premarital cohabitation on the risk of divorce is mediated through the commitment to marriage. Thus, the differences observed between males and females may reflect different levels of commitments to marriage between male and female cohabitors. For males, consistent with what has been discovered by Western literature, there is less commitment to marriage among those with premarital cohabitation experience compared to their non-cohabited counterparts. They might be forced into marriage as a result of societal pressure or slide into marriage because of increased inertia during cohabitation (Stanley et al., 2016). Thus, some incompatible couples who would not get married end up married not because they "decide" to do so, but because they "slide into" marriage due to the experience of cohabitation, such as the emotional and financial bond built up during cohabitation. However, the incompatibility will not disappear after marriage which eventually leads to instability. Consequently, the risk of divorce is higher among these males who have less commitment to marriage but enter into marriage only because of cohabitation inertia compared to those who marry directly.

However, females are in a more disadvantaged position compared to males in Chinese society which has been traditionally categorised as patriarchal, patrilineal, and patrilocal (Xie, 2013). There is a persistent social stigma attached to females if they break up from cohabitation or have multiple cohabitation experiences, thus the cost of ending a cohabitation relationship is much higher for females than males in Chinese society. Therefore, the decision to cohabit itself may already reflect a high commitment to marriage among female cohabitors. In consequence, there is no observed difference in their subsequent divorce patterns compared to their non-cohabited female counterparts.

Another possible reason for the observed difference between males and females might be the higher cost of divorce for females compared to males in China. Previous

studies suggest that women are more likely to stay in unhappy or abused marriages rather than seeking a divorce (Liu & Chan, 1999) in fear of potential financial difficulties or social stigma attached to divorced women (Sun & Zhao, 2016). Thus, it might be the case that even when some female cohabitors are pressurised or slide into unsuitable marriages, they do not necessarily initiate divorce and instead stay in ill-matched marriages.

Moreover, the imbalanced sex ratio in China might have increased the difficulty for urban women to find suitable spouses, and therefore, decreased their willingness to divorce. As a result of long-term son preference, wide use of ultrasound technology, and one-child policy, the sex ratio at birth has been highly skewed in China in the post-reform era (Poston et al., 2011; Tucker & Hook, 2013). According to the results of the Seventh National Population Census in China in 2021, the current sex ratio at birth is 111.3. Although this figure is already lower than the peak (around 122) in the early 2000s, it is still much higher than the normal range (which is between 103 and 107). Consequently, there are 34,900,000 more surplus men in China. Because of the persistent hypergamy preference, which means that women prefer to "marry up" while men tend to "marry down", two groups of people are having increasing difficulties finding suitable spouses: better-educated women in urban areas, and less-educated men in rural areas. They are often referred to as "left-over women" and "bare branches", respectively. In this context, although urban better-educated women might be more likely to have premarital cohabitation experience as suggested by Chapter 1 and 2, they might have a strong commitment to marriage and a high reluctance to end it because of the general difficult situation they face in the marriage market.

Therefore, the gender differences regarding the relationship between premarital cohabitation and the risk of divorce reflect a disadvantaged position among Chinese females in the process of both marriage formation and dissolution. Female cohabitors in

China may simultaneously experience the pull of modern individualistic values and the pressure of traditional familial ideology. Therefore, although female cohabitors can be seen as pioneers choosing the non-traditional family formation process compared to their peers, in terms of their commitment to marriage and the reluctance to divorce, they are more or less the same compared to those who marry directly.

Taking a closer look at the patterns for males, it is clear that there is a significant positive association between premarital cohabitation and the risk of divorce across all marriage cohorts. Including selectivity variables attenuates the effect slightly but does not eliminate the impact. Specifically, the raw hazard ratio of the risk of divorce for males with premarital cohabitation experience is 4.38 in the early-reform cohort, meaning that cohabiting before marriage significantly increases the risk of subsequent divorce by 4.38 times for males compared to those who marry directly. After adding the selectivity variables into the model, this effect decreases by 0.30 (to 4.08) and continues to be highly significant. Similarly, the risk of divorce for males who cohabit before marriage is 2.83 and 3.39 times higher than their non-cohabited counterparts in the mid-reform cohort and late-reform cohort, respectively. These figures are reduced to 2.28 and 2.79 after the selectivity variables are controlled for. The results show that the selectivity effect does exist, and part of the association between premarital cohabitation and the risk of divorce can be explained by the fact that individuals who are prone to cohabit also have characteristics that make them prone to divorce. For example, having fathers who are graduates from secondary school or above significantly increases the risk of divorce by 2.26 times than having illiterate fathers in the early-reform cohort. Meanwhile, one year's increase in the spousal age gap increases the likelihood of divorce significantly by 1.17 times in the mid-reform cohort. Previous studies show that cohabitors in China tend to have these characteristics – coming from families with higher socio-economic status and

more likely to form heterogamous relationships (Yu & Xie, 2015a; Chapter 2 of this thesis). Therefore, these results confirm the existence of the selectivity effect. However, the selectivity effect does not entirely eliminate the significant association between premarital cohabitation and the risk of divorce. The results from all marriage cohorts provide strong support for Hypothesis 1 and 2, that the positive association between premarital cohabitation and the risk of divorce does exist, and this association persists after controlling for the selectivity effect.

The coexistence of the selectivity effect and the causation effect suggests that no single perspective is sufficient to understand the relationship between cohabitation and divorce. A new 'causalisation perspective' might be more helpful to understand the whole process. Namely, certain key attributes increase individuals' tendency to cohabit, and then, the actual experience further serves as a catalyst for marital breakdown. In this sense, both characteristics of cohabitors and the cohabitation experience form a chain of necessary and sufficient conditions for the growing levels of marital instability in China. This causalisation perspective can also explain why the magnitude of the real causation effect of premarital cohabitation on divorce gets even larger after controlling for the selectivity effect in previous literature (Hall & Zhao, 1995).

In contrast to Zhang (2017)'s conclusions, the diffusion process has not been found according to the results in this chapter. Zhang (2017) suggests that as cohabitation becomes more prevalent in China, the association between premarital cohabitation and the risk of divorce disappears among the recently formed marriages. The results in Table 2 show that for males, the diffusion process did seem to happen for the first two marriage cohorts, indicated by a decreasing effect of premarital cohabitation on the risk of divorce (from 4.08 to 2.28). However, for the most recent cohort, the significant association between premarital cohabitation continues to exist, and the effect appears to be even

stronger than the previous marriage cohort. According to the results of Model 2 in the late-reform cohort (see Table 2), premarital cohabitation increases the risk of divorce significantly by 2.79 times when controlling for other variables, which is higher than that in the mid-reform cohort. This means that unlike what Zhang (2017) suggests, the results in this chapter show that the diffusion process has not happened in China. Instead, it appears that the relationship between premarital cohabitation and divorce has experienced a 'U-shaped' turn. After the initial decrease in the impact of premarital cohabitation on the risk of divorce, it increased again in the most recent marriage cohort.

In order to test whether the differences between cohorts are statistically significant, a full model including an interaction term between premarital cohabitation and marriage cohort was conducted for males and females separately (the results can be found in Appendix C-2). Interaction terms are used to test whether the effect of an independent variable varies depending on the value of another independent variable, and they are commonly used to compare group differences (Long & Freese, 2006). The results found no significant cross-cohort difference; thus, the changing trend described above needs to be taken with caution. Nonetheless, it can be safely concluded that the relationship between premarital cohabitation and marital dissolution is consistently significantly strong in all three marriage cohorts. This provides evidence that the diffusion process (which expects the association between cohabitation and divorce to decrease over time) has not happened, which is different compared to what Zhang (2017) suggested.

Since Hypothesis 4 suggests that the positive association between premarital cohabitation and divorce decreases over time but continues to exist in the recent marriage cohort, the results in this chapter find partial support for Hypothesis 4, that the association between premarital cohabitation and the risk of divorce continues to exist in

China. However, unlike what Hypothesis 4 suggests, this chapter finds that the significant association between these two phenomena has not decreased, which indicates that the diffusion process has not happened in China.

By performing analyses following the original methods of Zhang (2017), this chapter was able to replicate his findings. However, this chapter made a few substantial changes to the methods, which led to the different results between this chapter and Zhang (2017). First, Zhang (2017) only used data collected in 2010, while this chapter extended the observation of the same individuals until 2016. Second, this chapter only included individuals married before 2008 (while observed until 2016) in the most recent marriage cohort, to minimise the bias introduced by the high censoring rate among the recently married couples. Third, this chapter distinguishes gender effects, and the non-significant results in Zhang (2017)'s study might be because the significant impact of premarital cohabitation on divorce among males are counteracted by the non-significant effect among females.

Conclusion

This chapter explores the association between premarital cohabitation and divorce, two rising phenomena in family life in post-reform China. Through analysing data from the China Family Panel Studies collected between 2010 and 2016, this study yields the following main findings.

First, consistent with findings in the majority of Western literature, cohabiting before marriage increases the risk of subsequent marital dissolution for males in China. Contrary to previous studies in China (Zhang, 2017), this chapter finds support for the selectivity theory, meaning that those who are prone to cohabit also have characteristics

that make them more likely to divorce. However, this effect cannot completely account for the positive association between premarital cohabitation and the risk of divorce.

Second, this chapter examines gender differences regarding the relationship between premarital cohabitation and the risk of divorce and finds substantial differences between males and females. While the impact of premarital cohabitation on the risk of divorce is consistently strong for males in all marriage cohorts, no significant effect is found among females in any marriage cohort. This indicates a disadvantaged position of females in both marriage formation and dissolution in China. Stretched by both modern individualistic values and traditional family ideology, although Chinese females enjoy more educational and labour market opportunities than before, they continue to suffer from the strong social stigma attached to their choices to cohabit and divorce. Consequently, compared to males, females might have a higher commitment to marriage at the start of cohabitation, and find it more challenging to initiate divorce when they find themselves in unsuitable marriages.

Third, contrary to what has been suggested by Western literature and previous studies in China, this chapter finds that the diffusion process has not happened in China. Instead, the positive relationship between premarital cohabitation and the risk of divorce is consistently strong in all three marriage cohorts. This might be due to the high heterogeneity among couples who cohabit before marriage discovered by Chapter 2 of this thesis.

There are some limitations with the current study. The main limitation pertains to the bias related to the most recent marriage cohort, which is a result of the short observation period for the recently formed marriages. Although this study has largely minimised this bias by only including marriages formed before 2008 and observed until 2016, this cannot entirely eliminate the bias. Future studies are needed to provide

robustness check for the results of this chapter when these marriages have been observed for a longer time. Moreover, as mentioned in the Results section, two groups of individuals including better-educated women in urban areas and less-educated men in rural areas are having increasing difficulties in finding suitable spouses due to the imbalanced sex ratio. Although the analyses in this chapter included hukou status as a control variable, having separate models analysing urban and rural samples might be better at revealing the details of gender differences in urban and rural areas.

Another limitation is that although this chapter has included selectivity variables based on previous research on both characteristics of cohabitors and factors influencing divorce in China, there might be other factors not included in this study that determine a higher likelihood of both premarital cohabitation and divorce, such as attitudinal values (Hall, 1996). Therefore, the causal order of cohabitation and divorce cannot be fully determined in this study. Future analysis including these variables is recommended when such data become available in China.

Conclusion

As a major feature of the Second Demographic Transition, cohabitation is bringing changes to intimate relationships in many Western industrialised countries. In East Asia, although cohabitation is becoming increasingly common, there are many observed differences between cohabitors in East Asian countries compared to their Western counterparts. In China, premarital cohabitation has gained more popularity in the post-reform era (after 1978), when all aspects of Chinese society have experienced dramatic changes. However, the knowledge of this new phenomenon remains scarce. It is important to understand the nature and features of cohabitation in China, in order to comprehend its implications for marriage and family. Moreover, it remains unanswered whether demographic changes in China will follow the patterns and trends observed in Western developed countries and other East Asian countries, or whether China will be carving its own path due to its unique political and cultural context.

Analysing data from the China Family Panel Studies conducted between 2010 and 2016, this thesis investigates the phenomenon of cohabitation in post-reform China and focuses on how premarital cohabitation is associated with: (i) educational attainment; (ii) educational assortative mating outcomes, and (iii) the risk of subsequent marital dissolution. Moreover, this thesis also investigates whether these associations vary between different genders and change across marriage cohorts. These research questions were addressed in three empirical chapters.

Chapter 1 of this thesis examines the characteristics of cohabitors by looking into the association between premarital cohabitation experience and educational attainment among married individuals, as well as how this association differs between men and women and across three marriage cohorts: 1981-1992, 1993-2001, and 2002-2016. The

results from logistic regressions show significant gender and cohort differences. In particular, in the early-reform cohort, there is no significant association between education and cohabitation for both men and women. However, this changed in the mid-reform cohort, when secondary education is found to have a significant association with men's choice to cohabit. Meanwhile, there seems to be a delayed effect of education on cohabitation for women, since the non-significant association between education and cohabitation continues among women. In the most recent cohort, education is found to be positively associated with cohabitation for both men and women, and this association is more consistent for women than men. While the positive association between education and cohabitation peaks at senior-high school for men, the positive association continues up to college level for women.

These results are different from the patterns observed in Western developed countries and other East Asian countries, where a negative association between education and premarital cohabitation has been found. The fact that cohabitation is more popular among better-educated individuals in China indicates that cohabitation is practised by those who are influenced by individualistic and non-traditional values, which are often associated with better education. The more consistent positive association between cohabitation and educational attainment for women than men might be due to the rising opportunity costs for highly educated women to enter into marriage. As a result of the resurgence of gender inequality in both domestic and professional spheres in post-reform China, women often face discriminations in the labour market after they get married and bear children. Meanwhile, they continue to serve as primary carers of children and household chores under the influence of traditional family values in the society. Thus, better-educated women may be more likely to cohabit and delay marriage.

Moreover, the changing trend of the association between cohabitation and educational attainment across marriage cohorts is contrary to what has been suggested by Western literature and previous studies in China. Instead of having a positive association at first and then decreasing over time, cohabitation has an increasingly positive association with educational attainment in China for both men and women across marriage cohorts. While cohabitors are increasingly negatively selected in Western countries, the results of Chapter 1 show that the opposite trend is happening in China.

Chapter 2 of this thesis explores the association between cohabitation and educational assortative mating, where log-linear models were used to compare the homogamy, hypergamy, and crossing patterns among married couples with and without cohabitation experience in three marriage cohorts: 1981-1992, 1993-2001, and 2002-2008. The results show that the difference in homogamy patterns between married couples with and without cohabitation experience varies across educational levels. This thesis proposes the dual selection theory to account for the observed difference between the less-educated and the better-educated individuals. While the better-educated individuals gradually form more homogamous relationships than their non-cohabited counterparts, the less-educated individuals with premarital cohabitation experience form more heterogamous relationships than those without such experience over time.

This shows that huge heterogeneity exists among couples with premarital cohabitation experience, and the meaning of cohabitation might be different between the less-educated and the better-educated groups. Better-educated couples might prefer cohabitation because they have a higher emphasis on economic and gender egalitarianism in relationships. In contrast, for less-educated couples, cohabitation is more likely to serve as a staging ground to test their compatibility and accumulate more economic resources before marriage. The dual selection process might reflect the polarisation that

educational expansion has brought about in China when educational attainment becomes a major determinant of socio-economic status.

Moreover, among those who do not marry homogamously, individuals with premarital cohabitation experience are more likely to cross educational barriers to find their partners, suggesting that they have a higher tendency to have partners with very different educational levels compared to theirs. This means that individuals with premarital cohabitation experience are more likely to form extremely heterogamous relationships. Finally, as cohabitation becomes more prevalent in Chinese society, the difference between individuals with premarital cohabitation experience and those without such experience does not get smaller but persists over time, particularly among the least and the best educated groups. This holds true for both homogamous and heterogamous marriages.

Chapter 3 of this thesis inspects the association between cohabitation and divorce, and how the association changes across three marriage cohorts: 1981-1992, 1993-2001, and 2002-2008. The results found significant gender differences in terms of the association between cohabitation and marital dissolution. For males, cohabiting before marriage significantly increases the subsequent risk of marital dissolution in China. This continues to hold true after specific characteristics of cohabitors which might influence both cohabitation and divorce decisions are controlled for. The significant association is strong in all marriage cohorts, and no sign of diffusion has been observed. This might be due to the increasing heterogeneity among cohabited couples as discovered in Chapter 2 of this thesis. The results are contrary to what has been suggested by Western literature and previous studies in China.

However, for females, no significant effect of cohabitation on subsequent divorce has been found in any marriage cohort. This suggests that the meaning of cohabitation

might be different for males and females. For males, cohabitation might be a selection stage before marriage to test the compatibility of the relationship. Their commitment to marriage is lower than those who marry directly. Besides those who "decide" to marry after testing the relationship through cohabitation, there might be others who otherwise would not get married but "slide into" incompatible marriages because of the increased financial and emotional bond developed during cohabitation. Thus, the risk of subsequent divorce is higher among cohabited males. In contrast, for females, the decision to cohabit might already reflect a high commitment to marriage with their cohabiting partners, as there is a stronger social stigma attached to multiple cohabitation experiences for women in China. Therefore, the sliding effect does not apply to them. Another reason which might account for the difference is that it is more difficult for women to initiate divorce in China, in fear of financial difficulties and social discrimination that divorced women often face. Nevertheless, the difference between males and females in the association between cohabitation and divorce might reflect the disadvantaged position of females in both marriage formation and dissolution in China.

Contributions and Implications

This thesis advances the current literature in several aspects. First, it provides more quantitative empirical evidence to understand the phenomenon of premarital cohabitation in post-reform China. Regarding the characteristics of cohabitors, this thesis found that cohabitation is more prevalent among better-educated individuals in China who might be more likely to adopt individualistic values. In terms of assortative mating patterns, while the better-educated individuals with cohabitation experience are increasingly forming more homogamous relationships than those without such experience, the less-educated individuals with cohabitation experience are more likely to form heterogamous

relationships than their non-cohabited counterparts. This reflects the increasing social polarisation brought by education expansion in the post-reform era, as evidenced by findings in previous literature. For example, Li (2020) found that the benefits of education expansion have been disproportional for different classes. As a result, the more privileged group further consolidate their position through education, which has resulted in enlarged class inequalities and decreased relative mobility in China. The findings in this thesis confirm this pattern that among individuals with cohabitation experience, while the less-educated group are open to marry those who are unlike themselves, the better-educated group tend to form homogamous relationships and this trend is increasing over time. Among individuals who do not marry those with the same educational level, cohabited individuals are more likely to cross educational barriers and form extremely heterogamous relationships. It suggests that cohabitation might help increase societal openness by serving as a testing ground for those couples who are very different from each other before entering into marriage.

As for how cohabitation is associated with subsequent marital dissolution, this thesis found a significant positive association between premarital cohabitation and divorce among males, which indicates that males with premarital cohabitation experience have a significantly higher likelihood to divorce compared to their non-cohabited counterparts. These findings expand the knowledge of cohabitation in China and provide a comprehensive framework to understand this rising phenomenon from multiple angles.

Second, this thesis takes gender as an important perspective to unpack how cohabitation is associated with educational attainment and subsequent marital dissolution. The results not only advance the understanding of cohabitation, but also shed light on the nuanced gender relations in the family arena in China. Specifically, this thesis found that the positive association between cohabitation and educational attainment is more

consistent among women compared to men. Moreover, while the positive association between cohabitation and divorce is significant for males across all marriage cohorts, the association is not significant for women in any marriage cohort.

The observed gender differences in both relationships reflect the dilemma women face in post-reform China. Although women enjoy more educational and labour market opportunities in the post-reform era, they continue to live their family life under the influence of traditional family values. As women are still the primary carers of childrearing and domestic chores, there is an increasing opportunity cost for women to enter into marriage and bear children. Therefore, cohabitation becomes a popular choice for better educated women to delay marriage. Meanwhile, the persistent social stigma attached to multiple cohabitation experiences and divorce means that although these women appear to be pioneers in their decisions to cohabit, their commitment to the relationship is not necessarily different from their non-cohabited female counterparts who choose to marry directly. Thus, their decision to cohabit is more likely to be a temporary compromise to delay marriage, rather than avoiding marriage like cohabiting women in many Western countries. These findings in this thesis indicate the existence of gender inequality in post-reform China, and are consistent with previous studies which have found a resurgence of gender inequality in recent years (Fincher, 2016; Mu & Xie, 2014).

Third, this thesis contributes to the sparse prior research on premarital cohabitation development, e.g. how different aspects of cohabitation evolve in a country as it grows in popularity. This thesis makes its contribution to this body of knowledge by examining how the associations (between premarital cohabitation and educational attainment, assortative mating, and marital dissolution) change across marriage cohorts in China, where cohabitation has experienced rapid growth from being a marginal phenomenon to a common choice before marriage. The results show that the diffusion

process observed in many Western countries has not happened in China. For instance, individuals with premarital cohabitation experience are becoming increasingly better-educated across marriage cohorts. This positive association is the strongest in the most recent marriage cohort. Similar trends are also identified with the association between premarital cohabitation and assortative mating patterns. Better-educated individuals with cohabitation experience are forming more homogamous relationships over time, while less-educated individuals with cohabitation experience are having heterogamous relationships on a more extreme scale across marriage cohorts. The likelihood for cohabited individuals to cross educational barriers and marry those who are different from themselves is significantly strong across marriage cohorts. Similarly, the positive impact of cohabitation on marital dissolution is consistently strong for males in all marriage cohorts.

These results indicate that the selectivity of cohabitors is increasing rather than decreasing in China. This might reflect the changes in the institutional context in recent years. Since the state continues to exert tight control over critical family choices such as fertility, marriage remains a strong institution. Furthermore, there has been a resurgence of traditional family values in the society, e.g. emphasising on Confucian ideology such as filial piety and traditional gender labour divisions in mainstream media. In such a context, although cohabitation is gaining wider acceptability, there continues to be a strong social stigma attached to individuals who cohabit, especially for women who break up from cohabitation or have multiple cohabitation experiences. Since ideational values predict future behavioural changes (Ochiai, 2014), the selectivity of cohabitors in China might continue to be strong in the near future. The results in this thesis indicate the importance of considering contextual differences when understanding demographic changes.

Lastly, this thesis also serves as a case study on how the existing theories formed in Western developed countries can be applied to a country with a distinct institutional and cultural context. The results of this thesis show a consistent difference from those found in Western developed countries and other East Asian countries. For example, while less-educated individuals are more likely to cohabit in both Western and other East Asian countries, the opposite has been discovered in China, where it is the better-educated group that is more likely to cohabit before marriage. As for the assortative mating patterns, huge heterogeneity exists among cohabited individuals in China across educational levels. The variance between the less-educated and the better-educated individuals need to be accounted for, and no single existing theory developed in Western literature can be applied to the whole group. In terms of the association between cohabitation and marital dissolution, this thesis found substantial gender differences which are different from previous findings in the West.

The results in this thesis reflect a fundamental difference in the institutional context between China and Western countries, and indicate that China might be developing different demographic patterns and trends compared to Western countries. If the study of cohabitation is any indication, it shows that China has not experienced some key changes associated with the Second Demographic Transition, such as alternative arrangements of marriage, gender-egalitarian relationships, or births out of wedlock. It might be the case that China is still at the very early stage of the Second Demographic Transition. However, it is unlikely that the changes mentioned above will be observed in the near future considering the institutional constraints, e.g. the requirement of a birth permit (which cannot be obtained outside of marriage) for childbearing in China. As to whether China will eventually follow the same trends observed in Western countries or

develop its own path, further investigation is recommended when more empirical evidence is made available.

Future Research Directions

This thesis provides an in-depth investigation of the phenomenon of cohabitation in post-reform China. Looking forward, several research directions could be undertaken to provide a more comprehensive understanding of cohabitation in China, as highlighted below:

First, due to the limited availability of data, the comparisons in this research were made between marriages preceded by cohabitation and those without such experience. Premarital cohabitation experience which does not lead to marriage is not considered in this study. Although previous literature suggests that in the majority of cases cohabitation does lead to marriage in China (Yu & Xie, 2015a), this nonetheless provides an incomplete picture of what cohabitation means. Further research should be conducted in the future to include all premarital cohabitation experience when such data becomes available.

Second, there might exist a downward bias in terms of the marital homogamy level and divorce rate among the recently formed couples in Chapter 2 and 3, because some heterogamous couples might divorce after the survey date. Although cautious approaches have been undertaken to minimise such bias brought by the censored information, the bias cannot be completely eliminated. Thus, results from cross-cohort comparisons need to be taken with caution, and future research is needed to confirm the results in this study when more suitable data are available.

Lastly, due to the limitation of the methodology, the scope of this research is focused on discovering general patterns rather than uncovering reasons behind people's

behaviours. Qualitative research in the future, in particular, in-depth interviews with people who have had cohabitation experience and those without such experience might reveal more about the motivations behind their behaviours, e.g. the reasons why they decide to cohabit and to get married. Such information will be invaluable for a better understanding of the role and the meaning of cohabitation in post-reform China.

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Appendix

Appendix A. Equations of Models

Equation of Logistic Regression Model (Menard, 2002)

$$\log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n \quad \text{(A1)}$$

where p represents the probability of an event, p /1- p is the odds of the event, β_0 is a constant term, x_1-x_n represent explanatory variables, and β_0- β_n represent the regression coefficients associated with explanatory variables.

Equation of Three-way Log-linear Model (Agresti, 2013)

$$\log(\mu_{ijk}) = \lambda + \lambda_i^{\mathrm{A}} + \lambda_j^{\mathrm{B}} + \lambda_k^{C} + \lambda_{ij}^{AB} + \lambda_{ik}^{AC} + \lambda_{jk}^{BC} + \lambda_{ijk}^{ABC} \quad \text{(A2)}$$

where μ_{ijk} is the expected frequency of entity ijk; λ represents the mean of the logarithms of the expected frequency; λ_i^{A}, λ_j^{B}, λ_k^{C} represent main effects of categorical variables A, B, and C; λ_{ij}^{AB}, λ_{ik}^{AC}, λ_{jk}^{BC} represent interaction effects between two categorical variables (AB, AC, BC) while controlling for the third one; λ_{ijk}^{ABC} represents three-way-interactions between variables A, B, and C.

Equation of Cox Proportional Hazards Model (Mills, 2010)

$$h_i(t) = h_0(t)\exp(\beta_1 x_{i1} + \beta_2 x_{i2} + \cdots + \beta_k x_{ik}) \quad \text{(A3)}$$

where $h_i(t)$is the hazard function of the event of interest at time t for observation i, which can be explained by a set of covariates (x_{i1}- x_{ik}) and the baseline hazard $h_0(t)$ representing the hazard function when the values of all covariates equal to zero. β_1-β_k are the regression coefficients of the covariates.

Appendix B. Additional Log-linear Model Results

Appendix B-1. Log-linear Models of the Association Between Premarital Cohabitation and Education Across Marriage Cohorts in Post-reform China

		N of Couples (8,175)			
Model		AIC	BIC	G^2	df
M1	Medu*Fedu + C + MC	24.69	1443.44	1784.19	77
M2	M1+ Homog0*C*MC	14.27	482.08	791.02	70
M3	M1+ Homog*C*MC	10.35	90.73	440.56	55
M4	M3+ Hyper*C*MC	9.80	51.77	378.89	50
M5	M3+ Cross*C*MC	6.86	-164.14	53.94	24

Source: CFPS 2010-2016 pooled data. Note: Results are weighted using cross-sectional weights.
Medu – man's education; Fedu – woman's education; C – premarital cohabitation experience; Homog0 – homogamy parameter (cells on the main diagonal, 1 parameter); Homog – homogamy parameters (cells on the main diagonal, 4 parameters); Hyper – hypergamy parameter (cells below the main diagonal); Cross – crossing parameters (3 parameters); MC – marriage cohorts (3 parameters).

Appendix B-2. Odds Ratio of Homogamy Across Cohorts

	Homog v1	Homog v2	Homog v3	Homog v4
	Illiterate	Primary	Junior-high	Senior-high and Above
Cohabited in Early-reform Cohort (1981-1992) (Reference Group)				
Cohabited in Mid-reform Cohort (1993-2001)	1.30 (0.42)	0.36*** (0.11)	1.95* (0.63)	0.79 (0.25)
Cohabited in Late-reform Cohort (2002-2008)	0.33*** (0.11)	0.53 (0.18)	2.06* (0.69)	1.09 (0.37)

Source: CFPS 2010-2016 pooled data. Note: Robust standard errors in parentheses. Results are weighted using cross-sectional weight. * $p < .05$, ** $p < .01$, and *** $p < .001$.

Appendix B-3. Odds Ratio of Crossing Educational Barrier Across Marriage Cohorts

	Cross v1	Cross v2	Cross v3
	Between Illiterate and Primary	Between Primary and Junior-high	Between Junior-high and Senior-high
Cohabited in Early-reform Cohort (1981-1992) (Reference Group)			
Cohabited in Mid-reform Cohort (1993-2001)	1.20 (0.32)	0.98 (0.27)	1.54 (0.45)
Cohabited in Late-reform Cohort (2002-2008)	0.90 (0.27)	1.24 (0.36)	1.31 (0.38)

Source: CFPS 2010-2016 pooled data. Note: Robust standard errors in parentheses. Results are weighted using cross-sectional weight. * $p < .05$, ** $p < .01$, and *** $p < .001$.

Appendix C. Additional Cox Proportional Hazards Model Results

Appendix C-1. Hazard Ratios of Divorce in Post-reform China (With Interaction Terms Between Premarital Cohabitation and Gender)

	Hazard Ratio
Premarital Cohabitation	0.98
	(0.26)
Gender (Ref. Female)	0.95
	(0.14)
Cohabitation * Gender (Ref. Cohabitation * Female)	3.15***
	(1.02)
Birth Year	1.08**
	(0.03)
Age of Marriage	1.04
	(0.03)
Education (Ref. Illiterate)	
Primary	1.11
	(0.24)
Junior-high	1.23
	(0.25)
Senior-high	1.27
	(0.30)
College and Above	1.03
	(0.33)
Father's Education (Ref. Illiterate)	
Primary	0.91
	(0.16)
Secondary and Above	1.33
	(0.24)
Ethnicity (Ref. Minority)	0.70
Han	(0.14)
Hukou (Ref. Rural)	2.06***
Urban	(0.30)
Spousal Age Gap	1.05
	(0.03)
Number of Children Under 18	0.88
	(0.10)
Provincial GDP per capita	0.81
($10,000)	(0.17)
Panel Wave (Ref. 2010)	
Wave 2012	0.86
	(0.22)
Wave 2014	0.77
	(0.18)
Wave 2016	0.42***
	(0.08)
Marriage Cohort (Ref. Early-reform)	
Mid-reform Cohort	0.97

	(0.26)
Late-reform Cohort	0.83
	(0.35)
Observations	14605

Source: Pooled Data from CFPS 2010-2016. Note: Results are weighted using cross-sectional weight. Exponentiated coefficients; robust standard errors in parentheses; and ref. = reference
* p<0.05, **p<0.01, and *** p<0.001.

Appendix C-2. Hazard Ratios of Divorce in Post-reform China (With Interaction Terms Between Premarital Cohabitation and Marriage Cohort)

	Male	Female
Premarital Cohabitation	4.30***	0.75
	(1.52)	(0.46)
Early-reform Cohort (Reference)		
Mid-reform Cohort	2.80**	1.18
	(0.88)	(0.35)
Late-reform Cohort	4.18***	1.46
	(1.56)	(0.55)
Cohabitation * Marriage Cohort (Ref. Cohabitation * Early-reform Cohort)		
Cohabitation * Mid-reform Cohort	0.70	1.56
	(0.33)	(1.15)
Cohabitation * Late-reform Cohort	0.81	1.74
	(0.41)	(1.30)
Age of Marriage	0.95	1.00
	(0.03)	(0.03)
Educational Attainment (Ref. Illiterate)		
Primary	0.81	1.86*
	(0.26)	(0.57)
Junior-high	0.85	2.06*
	(0.25)	(0.60)
Senior-high	0.83	2.22*
	(0.27)	(0.75)
College and Above	0.36*	3.80**
	(0.15)	(1.57)
Father's Education (Ref. Illiterate)		
Primary	1.20	0.68
	(0.28)	(0.17)
Secondary and Above	1.99**	0.90
	(0.46)	(0.24)
Ethnicity (Ref. Minority)	0.86	0.63
Han	(0.28)	(0.17)
Hukou (Ref. Rural)	1.73**	2.35***
Urban	(0.32)	(0.55)
Spousal Age Gap	1.08	1.05
	(0.04)	(0.04)
Number of Children Under 18	0.75*	1.22
	(0.10)	(0.16)

Provincial GDP per capita ($10,000)	0.70 (0.20)	0.85 (0.25)
Panel Wave (Ref. 2010)		
Wave 2012	1.06 (0.38)	0.67 (0.24)
Wave 2014	0.76 (0.25)	0.79 (0.26)
Wave 2016	0.44** (0.13)	0.38*** (0.10)
Observations	7088	7517

Source: Pooled Data from CFPS 2010-2016. Note: Results are weighted using cross-sectional weight. Exponentiated coefficients; robust standard errors in parentheses; and ref. = reference
* p<0.05, **p<0.01, and *** p<0.001.