Marriage Squeeze for Highly Educated Women?
Gender Differences in Assortative Marriage in Urban China

THESIS

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Yue Qian
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Thesis Committee:
Zhenchao Qian, Advisor
Chris Knoester
Liana Sayer
Abstract

Today in urban China, it is common to refer to highly-educated women who are still single in their late twenties as “leftover ladies”; however, empirical research has yet to examine the impact of education and age on marriage. This study pools four years of the Chinese General Social Survey (2003, 2005, 2006, and 2008) data to investigate the gendered patterns of marriage by education and age in the early years of the twenty-first century in urban China. Results show that the gender gap in marriage rates has reversed from favoring women to favoring men as education increases. Particularly, the female disadvantage in marriage markets is only experienced by highly educated women at older ages (i.e., 30 – 49). Log-linear models indicate a gender asymmetry in assortative marriage patterns: men display a tendency to marry younger, less-educated women than themselves, and women display a tendency to marry older, better-educated men than themselves, net of the disparate marginal distributions of age and educational attainment of both sexes. The educational hypergamy pattern does not change as women marry later, but is more likely to occur as men marry at older ages. These results indicate gender-asymmetric patterns of marriage formation and assortative mating by education and age in urban China.
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Vita

September 2006 ....................................... Wuhan No.6 Middle School, China
2010 ......................................................... B.M., Public Affairs, Renmin University of China

2010-2011 ................................................. University Fellowship, Sociology, The Ohio State University
Fall 2011 ..................................................... Graduate Research Associate, Department of Sociology, The Ohio State University
Winter 2012 ............................................... Graduate Research Associate, Department of Sociology, The Ohio State University
Spring 2012 to present ................................. Graduate Research Associate, Department of Sociology, The Ohio State University

Fields of Study

Major Field: Sociology
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Chapter 1: Introduction

In urban China today, highly-educated women who are still single in their late twenties are called “leftover ladies”, or shengnǚ in Chinese. This derogatory term suggests dim marriage prospects for older, highly-educated, single women. This stigma seems to exist only for these women, as no similar terms are applied to their male counterparts or similarly aged women with less education. This phenomenon also occurred in the U.S. in the early 1980s. Popular press portrayed the diminishing chances of marriage among older, better educated women (Cherlin 1990). However, empirical research found no support for this widespread perception: first marriage rates increased for college-educated women ages 25 and above between 1979 and 1987, despite a decline in availability of eligible partners (Qian & Preston 1993). This raises the question of whether the term “leftover ladies” publicized by the media is misleading, or indeed reveals the deteriorating marriage prospects of older, well-educated women in marriage markets in urban China. This study uses the Chinese General Social Survey (CGSS) to investigate this research question, focusing on a comparison of gender differences in marriage patterns in the early years of the twenty-first century in urban China.

Previous studies mostly focus on the effects of education on marriage formation and trends in the educational assortative mating, predominantly in the contexts of industrialized societies (e.g., Blossfeld 1995; Blossfeld & Timm 2003; Esteve & Cortina
These studies suggest that the role of education in the transition to marriage and assortative mating varies by countries, time periods, and marriage timing (Blossfeld 2009; Mare 1991; Qian 1998; Raymo & Xie 2000; Smits & Park 2009; Shafer & Qian 2010; Smits, Ultee, & Lammers 1998). The context-dependent results point to the importance of studying the relatively understudied association between education and marriage in developing countries. As a developing country that has experienced dramatic socioeconomic changes in recent decades, China provides a unique social context to investigate gender differentials in the role of education on marriage patterns.

First, among these unique contexts are demographers’ concerns about millions of excess males in China from 2000 onwards who will not be able to find Chinese brides because of imbalanced sex ratios, an unintended consequence of China’s one child policy (Goodkind 2006; Guilmoto 2012; Jiang et al. 2007; Poston & Glover 2005; Tuljapurkar et al. 1995). Given the male surplus and female deficit in China, women should be scarce and therefore highly sought after in marriage markets. However, the popular notion of a particular group of women are described as “being left” in China’s marriage markets runs counter to this logic. Therefore, studying distinctive marriage patterns in China facilitates a better understanding of implications of the paradoxical situation in which the shortage of potential brides and delayed marriage or non-marriage for women coexist in marriage markets in China.
Second, Oppenheimer’s career-entry theory of marriage (Oppenheimer 1988) predicts that, as women’s economic roles resemble those of men, a woman’s earning power, usually indicated by educational attainment, will have positive effects on her marriage outcomes including the likelihood of entry into marriage and marrying a husband with high socioeconomic status. This has been supported by empirical evidence from the U.S. marriage markets (Goldstein & Kenney 2001; Sweeney 2002; Sweeney & Cancian 2004). Interestingly, as suggested by the conventional wisdom regarding the marriage prospects of highly-educated women in China, women with good economic prospects are not regarded as sought-after wives in China, even though more than 90 percent of married women are in the labor force and nearly equally share economic resources with their husbands (Bian, Logan, & Shu 2000). Evaluating the application of theories in the unique Chinese context sheds light on the importance of developing and advancing context-sensitive theories of marriage.

In light of these perplexities, drawing on the integrated framework proposed by England and Farkas (1986) which emphasizes both individuals’ choices and structural constraints, this paper mainly addresses two questions: How does the role education plays in patterns of marriage formation and assortative mating differ by gender? How are the gender differentials in the relationships between education and marriage further modified by age? Therefore, the uniqueness of this study lies in the emphasis on a gender comparison and the analysis of joint influences of age and education in the Chinese context.
The remainder of the paper is organized as follows. I first introduce the theoretical framework used in this study and review previous studies on the effects of education and age on family formation and marital sorting. Next, I describe the gender system in China as well as the Chinese contexts of education and marriage, and then propose my hypotheses accordingly. An account of data, methods, and analytical strategies is followed by the result section. Results of descriptive analysis and log-linear models are presented, respectively. This paper concludes with a discussion section.
Chapter 2: Literature Review

Theoretical Framework

Drawing from the work of economics and sociology, England and Farkas (1986) develop an integrated framework for explaining the relationships of household, employment, and gender in the postwar era in the United States. This integrated framework emphasizing both individuals’ choices and structural constraints is also useful for understanding the gendered patterns of marriage in contemporary urban China.

The conceptual framework developed by England and Farkas (1986) integrates both individual and structural views. The understanding of individuals’ choices is based on micro-economics and social exchange theory. Both economists and exchange theorists assume that individuals are rational and thus make choices of partners and decision to marry that will maximize their well-being. Becker’s specialization and trading theory (1973; 1974; 1981) is a classical economic analysis of marriage. The basic assumption of Becker’s theory of marriage is that individuals marry only if their utility from marriage exceeds their utility from remaining single. Becker justifies a positive sorting of wives’ nonmarket traits with husbands’ earning power from an economic perspective. Becker argues that men have a comparative advantage in market work, while women have a comparative advantage in household work. Within households, couples maximize the
gains from marriage by allocating as much time as possible to tasks they have a comparative advantage in. Thus, sex role specialization in marriage, with husbands bearing the breadwinner role and wives specializing in domestic work and childcare, maximizes the utility of marriage. In sum, Becker maintains that positive assortative mating increases the efficiency of the marriage market by maximizing aggregate commodity output when traits are complements, such as women’s nonmarket traits (e.g., beauty and young age) and men’s market skills (e.g., education and income).

In addition, according to Becker’s theory (1981), with increases in the economic independence of women, sex-role specialization within marriage becomes less advantageous. Relative to poorly-educated women, highly-educated women invest more in market-oriented human capital, and thus have higher earning potential and greater economic independence. In addition to the very fact that women do most of the housework and childcare even if they also work outside the home (Bianchi 2000), highly-educated women may choose to forgo marriage due to the reduced gains from marriage. If Becker’s specialization and trading theory of marriage is applicable to China, we would expect a lower probability of marriage for highly-educated women, compared to similarly educated men or less-educated women.

Social exchange theory also illustrates the importance of individuals’ choices in marriage markets. On the one hand, people will evaluate the rewards and costs so as to decide whether to enter or stay in a relationship; on the other hand, the ability to obtain profits in a relationship is contingent on the ability to provide others with rewards
(Sabatelli & Shehan 1993). Therefore, in marriage markets, individuals try to maximize their rewards by trading in their resources. Exchange theory also suggests that men with characteristics the average woman prefers tend to marry women with characteristics most men prefer, and vice versa. In the current study, we treat age and education as resources that individuals in marriage markets can trade in. Gender differentials in marriage patterns by education and age reflect how individual sociodemographic characteristics are valued differently for men and women in China’s marriage markets.

Also, individuals can choose the timing of transition into marriage, depending on the resources they possess. For instance, based on the job-search theory in economics, the marital search model suggests that individuals will remain single until they find one partner who meets or exceeds the standards they set for the minimally acceptable match (England & Farkas 1986; Oppenheimer 1988). After estimating the costs and benefits of two alternative choices, individuals choose whether to keep searching or to get married. Sometimes individuals have to adjust their standard to the changing conditions in marriage markets. Yet, better-educated men and women with greater economic independence are able to set and stick to a higher standard for the minimally acceptable match and spend longer time in marital search in marriage markets. Thus, the marital search model implies that both education and age have impact on individuals’ entry into marriage and the partners they finally marry.

In addition to the individuals’ rational choices, the integrated framework (England & Farkas 1986) recognizes the importance of the constraining structures within which
personal choices are made. Structure refers to conditions at the aggregate level. Macro level conditions that are particularly relevant to explaining patterns of family formation and assortative mating include female labor force participation rates, sex roles at home, the culture that affects individuals’ preferences for spouses, and the number of eligible mates in marriage markets.

First, the prevalence of female’s labor force participation may lead to the growing importance of women’s earning power in determining their marriage prospects (Oppenheimer 1994; 1997; England & Farkas 1986). Second, as suggested by Oppenheimer’s career-entry theory of marriage (Oppenheimer 1988), gender roles within households influence marriage timing. When gender roles are highly segregated, women are likely to marry at young ages because the attributes indicative of their desirability as a marital partner remain relatively stable and may even peak. With increases in the female labor force participation, gender roles within households change as well: women are rarely expected to solely bear the homemaker role. Changes in the gender roles raise the level of early uncertainty about women’s attributes and in turn lead to marriage delays. Third, individuals’ preferences for spouses are usually influenced by cultures. Because of a premium on beauty in women and the youth-valorizing standard of beauty in the U.S. culture, women are devalued as they age more than is the case for men in US marriage markets (England & Farkas 1986; England & McClintock 2009). The “gendered double standard of aging” contributes to the deteriorating position of older women in the marriage markets. Finally, given the tendency for women to marry men older than
themselves, the supply of potential mates decreases with age for women but increases for men (Goldman et al. 1984). In sum, the structural factors discussed above influence values of individuals’ characteristics in marriage markets, constrain individuals’ choices, and play a central role in determining marriage patterns.

Drawing on the integrated framework emphasizing both individuals’ choices and structural constraints, I argue in this paper that education and age are importance resources individual can trade in when they search for spouses in China’s marriage markets. However, largely influenced by the traditional gender roles that still prevail in contemporary urban China, the role education and age play in marriage formation and assortative mating distinctively differs between men and women.

Previous Research

Both age and education are key individual attributes in the marriage markets. People do not marry randomly. Extensive empirical research has found educational homogamy and age hypergamy, the tendency for people to marry people of similar education and the tendency for men to marry women younger than themselves (Blossfeld 2009; Casterline 1986; Kalmijn 1998; Mare 1991; Presser 1975).

In addition, age and education have interactive effects on marriage. First, enrollment in the educational system delays entry into marriage (Blossfeld 1995). Since attaining an education makes it difficult to adopt family roles in most countries (Marini 1985) and involves a low degree of economic independence, most young men and women at school are therefore normally “not ready” to start a family. In most cases,
completion of education is considered as a socially significant precondition for entering into marriage. Therefore, schooling will postpone marriage.

Meanwhile, patterns of educational assortative mating are affected by marriage timing, that is, age at first marriage. The lower odds of homogamy among those who marry at older ages can be explained by the changing nature of the marriage market as people age. First, as young people leave educational institutions and move into the labor market they may be more likely to encounter potential spouses who do not share their educational attainment. This implies that the time interval between departure from school and marriage increases the chances of educational intermarriage (Mare 1991). Second, because of the shrinking availability of potential partners, still-single men and women may be forced to redefine the standard for an acceptable match (Lichter 1990; Schwartz & Mare 2012). For instance, men and women in their early 20s tend to have partners better educated than themselves, but persons in their 30s tend to cross the less-than-high-school/more-than-high-school educational barrier when partners differ in educational attainment (Qian 1998).

In sum, prior research examining the U.S. marriage market suggests that educational homogamy and age hypergamy are the dominant assortative marriage pattern. Nevertheless, people marrying late tend to be engaged in educationally heterogamous marriages.
**Chinese Gender System**

Under the integrated framework employed in the current study, individuals’ choices are constrained by structural factors. Among the structural factors, the importance of the gender system in a society in determining marriage patterns has been well recognized (England & Farkas 1986; Oppenheimer 1988). Empirically, prior studies suggest that effects of education on marriage for females depend on the degree of role differentiation by gender in the society: within societies with greater gender-asymmetric division of labor within families, such as Italy and East and Southeast Asia, educational level is found to be negatively associated with entry into marriage (Jones & Gubhaju 2009; Pinnelli & De Rose 1995; Raymo & Iwasawa 2005), while in societies with more gender-egalitarian division of labor within households, such as the United States, Sweden, and West Germany, education is insignificantly or positively related to marriage (Blossfeld & Rohwer 1995; Hoem 1995; Oppenheimer et al. 1995; Sweeney 2002; Sweeney & Cancian 2004). Therefore, gender roles in a society influence how sociodemographic characteristics of men and women are valued in market markets. As I will discuss in detail below, under the Chinese gender system, marriage patterns by education and age may be different for men and women.

A variety of competing social forces influences gender norms in China. Traditionally, Chinese Confucian culture advocates patriarchy and supports a strong gender hierarchy, and in this system, women are regarded as subordinate to men (Bauer et al. 1992). However, like most socialist states that explicitly make gender equality a
policy goal (Zhou et al. 1998), the Communist government has instituted a series of measures since the founding of the People’s Republic of China in 1949, aimed at raising the status of women. Particularly, the Party strongly promoted women’s labor force participation and equal marriage right, by implementing a host of legislation efforts to that effect. These efforts included prohibiting arranged marriage, raising the legal age at marriage, giving women and men equal rights to dissolve marriages and to possess property after divorce, providing access to a wider variety of work opportunities, and mandating equal pay to men and women doing the same job (Bauer et al. 1992). As a result, women’s employment, income, and education have achieved significant improvement since 1949 (Whyte 1984; Hannum & Xie 1994). Moreover, Chinese women have been participating in the paid labor force to an extent that has exceeded that in most other modern societies (Bauer et al. 1992; Parish & Busse 2000).

However, the high levels of female labor force participation do not necessarily imply gender-equalitarian divisions of labor within marriage (England & Farkas 1986). Although nearly all adult women in urban China work full time in jobs that paid only slightly less than their husbands’ jobs (Parish & Farrer 2000), the breadwinner role of the husband and the housekeeping role of the wife remain their primary place in the Chinese family (Zuo & Bian 2001). Women bear the double burden of full-time paid work and major responsibilities for child care and housework (Bian 1987; Parish & Farrer 2000; Wang & Li 1982; Whyte 1984), but few couples perceive the wife’s disproportionately heavy household responsibility as unfair (Feng et al 1995; Zheng 1997). Instead, a failure
of a husband to fulfill the provider role may increase a sense of unfairness in marital exchange (Zuo & Bian 2001). While men are expected to fulfill the financial duty, career-oriented women are commonly criticized as “selfish”, “nonfeminine”, and “irresponsible to household needs” (Zuo & Bian 2001), which suggests that women with high earning power and career aspirations are not viewed as attractive in Chinese marriage markets. Because of the emphasis on women’s homemaker role and men’s breadwinner role in China, educational attainment is likely to be positively associated with men’s marriage prospects, while negatively associated with women’s marriage prospects.

Moreover, China’s dramatic fertility decline and market transition may have contributed to the increasing importance of women’s homemaker role in the family. First, since the implementation of China’s one-child policy in 1979, China has experienced dramatic fertility declines, and the total fertility rate (TFR) has remained below the replacement level of 2.1 for decades in urban areas (Guo & Chen 2007; Zhao 2001). The drastic decline in fertility and the steady growth in family income have contributed to higher parental investment in each child (Fong 2004). Pimentel (2006) argues that smaller family size may have at least reinforced the importance of women’s domestic responsibilities, by placing extreme value on the production of the perfect only child. Second, in the Chinese context, female labor force participation originates often not from an internal drive to achieve or find fulfillment, but from external forces, either economic (e.g., help maintain family budgets) or ideological (e.g., female emancipation) (Parish & Busse 2000). During China’s economic reforms in the 1990s when the Chinese urban
population experienced a rapid shift from a planned to a market economy (Tang & Parish 2000), the market developed and eroded the power of the state (Bian 2002). Consequently, the official ideology that calls for gender equality may not be as prevailing as before. Some interview data indicate that traditional gender roles might be rising in the reform era; some women fantasize about fleeing work and seeing women's place as being primarily in the family (Parish & Busse 2000: 212; Lee 1998: 34-35). Given the persistent system of traditional gender roles in China, women may pay great attention to a man’s earning power when selecting marital partners. Because education is associated with higher career aspirations and earning potential, highly-educated women may not be perceived as desirable wives by men who desire to find a good homemaker and caretaker.

Also, the level of gender egalitarianism and its changes may differ substantially by gender itself. For instance, Chang (1999) finds that Chinese women are significantly more egalitarian than men in work and family values. Using data from the Survey of Marriage and Family in Beijing in 1991, Pimentel (2006) examines gender attitudes and gender behaviors including division of labor and decision making across three marriage cohorts: the early Maoist period (married 1949 to 1965); the Cultural Revolution and its aftermath (married 1966 to 1979); and the economic reform period (married 1980 to 1991). The results show that while women remain egalitarian in gender ideology across cohorts, the percentage of men who hold egalitarian gender attitudes declines significantly across cohorts. Indeed, educated individuals hold more egalitarian gender attitudes (Shu 2004). Yet, this positive effect of individual education is larger for women
than for men (Shu 2004). The gender differentials in gender ideology indicate that education may not enhance women’s marriage-market position in China because men with less egalitarian gender orientation tend to prefer less-educated women over better-educated women as spouses.

In sum, despite the high levels of female labor force participation in China, there is persistently great endorsement of traditional gender roles within households. The emphasis on women’s homemaker role and men’s breadwinner role in the family may lead to the deteriorating position of highly-educated women in marriage markets in urban China.

**Contexts of Education and Marriage in China**

China has experienced massive educational expansion since 1978 (Deng & Treiman 1997), and China’s higher education has expanded at an unprecedented pace since 1999 (Bai 2006). With these greater opportunities for education, women’s education starts to resemble that of men: from 1980 to 1997, women’s share of total enrollment in regular academic high schools increased from 40 percent to 46 percent, and women’s share of college enrollment increased from one-fourth to over one-third. While these are nationwide statistics, including both rural and urban areas, the more rapid convergence of male and female college enrollment has happened in cities (Tang & Parish 2000: 62).

In addition to educational expansion and greater gender equality in education, there is substantial increase in returns to education in urban China (Bian & Logan 1996;
Zhang & Zhao 2007; Zhao & Zhou 2007; Zhou, Tuma, & Moen 1996; 1997), and the most pronounced increase occurs for college-educated workers (Zhang & Zhao 2007). Educational credentials have positive effects on attaining occupational prestige in the reform era (Bian 1994; Lee 1991; Walder et al. 2000; Zhou 1995; 2001). Since education plays an increasingly important role in determining individual’s socioeconomic position in Chinese labor markets, education should count more in marriage markets as well. Yet, better education is expected to be an attractive attribute for males more than for females, because it is husbands that are considered as the primary breadwinner in Chinese families.

Indeed, accompanying the dramatic educational expansion, narrowing gender gaps in educational attainment, and rising returns to education, the odds of educational homogamy have increased between 1980 and 2000 (Han 2010). Descriptive statistics based on the 2000 Chinese census suggest gender differentials in the effects of education on marriage formation. In 2000, among women in the 30 - 34 age group, the proportion single is 0.6 percent for women with primary education, 1.2 percent for women with junior high school education, 2.8 percent for women with senior high school education, and increases to 4 percent and 11 percent, respectively, for women with tertiary education and those with post-graduate degrees (Jones & Gubhaju 2009). In contrast to women, for men above age 30, proportions single are the highest among those with no schooling and those with primary school education, and these proportions decline at higher levels of education (Jones & Gubhaju 2009).
In sum, previous studies suggest growing income inequalities and social distance between educational groups in the reform era of urban China. There is evidence that educational differentials in marriage formation differ by gender. Based on the preceding literature review, I develop the hypotheses for this study.
Chapter 3: Hypotheses

In order to investigate the gender differences in the effects of education and age on marriage patterns in urban China, both likelihoods of first marriage and patterns of assortative marriage are examined in this study. The hypotheses are as follows:

1) Gender differences in marriage rates differ by educational attainment: less-educated women have higher marriage rates than their male counterparts, while highly-educated women have lower marriage rates than their male counterparts.

2) When delaying first marriage into their thirties, highly educated men have higher marriage rates than highly educated women.

3) The patterns of educational and age assortative marriage are asymmetrical across gender: women display a tendency to marry older, better-educated men than themselves, whereas men display a tendency to marry younger, less-educated women than themselves, net of the education and age distributions of both sexes.

4) Age moderates the educational assortative marriage patterns, but the moderating effects of age differ by gender. As men marry at older ages, the odds of educational hypergamy increase, while as women marry later, the odds of educational hypergamy decrease.
Chapter 4: Method

Data

To examine gender differences in the effects of age and education on marriage outcomes in China, I use pooled nationally representative data from the Chinese General Social Surveys (CGSS) conducted in 2003, 2005, 2006, and 2008. Questions asked in the four years of CGSS are different, but they all provide information on gender, date of birth, marital status, marriage date, current level of education, and relationship to the householder for each member within the household. The proposed data from the CGSS provide the most up-to-date large-scale nationally representative individual-level data, and allow me to get information on single people as well as married respondents and their spouses. All of these features make the CGSS data the most appropriate for this study. Although 2005, 2006, and 2008 surveys cover the rural areas, owing to the sharp socioeconomic and institutional divide and differential marriage patterns between rural and urban China (Han 2010; Knight & Song 1999; Whyte 2010), only urban residents are included in this study. The sample sizes of urban samples for these four surveys are 5,984 in 2003, 6,098 in 2005, 6,013 in 2006, and 3,982 in 2008.
Sample

The analysis of this study is conducted in two steps. First, I study both single and first-married individuals through first marriage rates by education and age among males and females, respectively. In the first step, the unit of analysis is person-year of exposure to risk of first marriage. The goal of this step is to investigate the gender differences in the impact of education and age on likelihoods of entry into marriage. In the second step, I examine the assortative marriage patterns among currently first-married couples in urban China, in which the unit of analysis is first-married couples. The goal of this step is to investigate how men and women sort on education and age in marriage.

One approach to examining educational assortative marriage is to study prevailing marriages—all existing marriages at a given time. However, several issues arise. First, couples in prevailing marriages got married in different years, and odds of homogamy differ by marriage cohorts (Han 2010; Mare 1991; Raymo & Xie 2000). Second, due to education upgrading after marriage, education at the time of survey may be different from that at the time of marriage (Schwartz & Mare 2012). Third, selective marital dissolution may increase educational homogamy in prevailing marriages because marital disruption is more likely to occur among couples who have heterogamous education (Tzeng 1992). Finally, marriage order has impact on assortative marriage patterns: husband and wife in second or higher-order marriage have larger age and education differences than husband and wife in first marriage (England & McClintock 2009; Schwartz & Mare 2012). The biases can be reduced by studying newly contracted first marriages, because using data
from first marriages contracted not long before each survey can identify a definite marriage cohort, diminish the chances of educational upgrading after marriage and marital dissolution, and exclude higher-older marriages. Therefore, I limit my analysis to first marriages contracted between 2000 and 2008, that is, first marriages contracted three to eight years before each survey.

Yet, one potential problem exists. I can only know exactly from the CGSS data whether the focal respondent is in the first marriage or not, but have no way to identify the marriage order of the current marriage for spouses. Fortunately, despite recent increases, incidence of divorce and remarriage is still very low in China (Dommaraju & Jones 2011; Jones 2010; Zeng & Wu 2000; Zhang & Gu 2007). The 2006 CGSS data contain detailed information on marriage and family life, and thus allow me to examine the extent to which the results might be affected. In the 2006 CGSS, when I restrict the sample to the 700 respondents currently in their first marriages contracted between 2000 and 2006, only eleven of them, or 1.57 percent, have spouses who are not in their first marriages. Because the percentage of first marriage with a remarried spouse is small, lack of information on marriage order of the spouse is unlikely to bias the results.

In addition, only never married people between the ages of 20 and 49 and first-married individuals and their spouses who got married between the ages of 20 and 49 during the period 2000 – 2008 are included in this study. Several reasons account for this restriction. First, the minimum legal age of marriage is 20 for women and 22 for men. As a result, almost no women or men marry before their legal ages in urban China. For ease
of comparison, age 20 is used as the lower bound of the age group covered in this study for both men and women. Also, it is better to use the closed age group (e.g., 20 - 49) instead of the open-ended age group (e.g., 20+) so that the population at risk of marriage can be properly defined. It is typically assumed in demography that people are never going to marry if they remain single until 49 (Lindgren 2009), so I choose 49 as the upper bound of the age group.

In the first stage of my analysis, I replicate Raymo & Iwasawa’s (2005) approach to reconstructing the population at risk of first marriage from pooled survey data, which is a vital part of the calculation of marriage rates. First, I generate observations for spouses based on the responses about their spouses’ educational attainment, birth date, and date of marriage provided by the focal respondents who are currently in their first marriages contracted between 2000 and the survey year. Second, I merge the data for the married and unmarried samples of each sex. Third, I expand these merged data into person-year record form, creating one observation for each year that respondents were between the ages of 20 and 49 during the period from 2000 to 2008. Observations for each person end when that person remains single at the age upper limit, or is censored at the time of survey, or gets married. The number of person-year observations is 11,311 for females and 14,156 for males.

In the second stage of analysis, I restrict the analytical sample to first-married couples and aim to answer the question about who marries whom. Four years of survey data are pooled, and six observations are dropped because of missing data on educational
attainment for either respondents or their spouses. Finally, the analytical sample comprises 2151 couples who got married between the ages of 20 and 49 between years 2000 and 2008.

**Variables**

The CGSS asked the respondents about their current educational level and their spouses’ educational attainment at the time of the survey. Therefore, current educational attainment used in my study is not exactly the educational attainment at the time of entering first marriage. However, these two measures should be equivalent because schooling after marriage is rare in China. Limiting the sample to recently contracted marriages also helps avoid the selection bias arising from education upgrading after marriage. I classify educational attainment into four groups: less than senior high school, senior high school, vocational college (*Da Zhuan*), and four-year university or higher. Due to the compulsory nine-year education in urban China, all people with junior high school or less are collapsed into one educational group. Considering the substantial differences (e.g., social prestige, admission criteria, the average length of time to graduation, and job market placement after graduation etc.) between vocational colleges and four-year universities in China (Lin 2007), people with higher education are classified into two groups: those with vocational college education and those with university or postgraduate education.

For the pooled dataset, individuals are grouped into three age intervals: 20 – 24, 25 - 29, and 30 - 49. A small proportion of people marry for the first time after the age 30
in China (Jones & Gubhaju 2009), so single people aged 30 or over and people entering their first marriage between the ages of 30 and 49 are classified into one group. Note that in this study, age of a single person refers to current age, while age of a married person refers to age at first marriage.

Marriage Rate

Demography rates are defined as “occurrence/exposure rates.” First marriage rates thus contain in the numerator a count of first marriages occurring within a defined time period, and in the denominator an estimate of “person-years” at the risk of first marriage during that time period (Preston, Heuveline, & Guillot 2001: 3 - 4). Both single and first-married individuals are included to calculate marriage rates. In sum, the first marriage rate takes the form of:

Marriage Rate $[0, T] = \frac{\text{First marriages}}{\text{Person-years at risk}}$

Calculation of marriage rates is in essence an application of event history analysis. For each person-year observation in my sample, if the event (i.e., first marriage) does not occur, that is, that person remains single at that year, then that person-year observation contributes one year to the denominator. If we assume marriages happen evenly throughout one year, which usually holds true in a large population, then a person contributes half a year to the denominator at the year of entering first marriage. Likewise, the age-education-specific marriage rates are calculated in the same way.
Log-linear Models

When studying age and education assortative mating, I use log-linear models, a method widely used in assortative marriage research. Log-linear models can control for the differential marginal distributions of men and women in each age and education group so as to study the assortative marriage patterns net of the effects of population structure (Hout 1983).

Given the tendency for people to marry within their educational and age groups, I add an education homogamy parameter and an age homogamy parameter to the cells along the main diagonals for education and age, respectively. In order to examine the sex differences in marriage patterns, I add education and age hypergamy parameters to represent the gender asymmetry models. For education, I constrain the table cells where husbands are better educated than wives into one parameter; for age, I create a parameter in which husbands are in older age groups than wives.

I also employ crossings models in my analysis of assortative mating patterns (Han 2010; Mare 1991; Qian 1998; Schwartz & Mare 2005; Torche 2010). Crossings models can reveal which gap in spouses’ education are serious barriers to intermarriage. Table 1 presents the effects of crossings parameters on log odds of educationally heterogamous marriages. Crossings parameters are the log odds of intermarriage across adjacent educational categories relative to the log odds of homogamy, controlling for the marginal distributions of husbands’ and wives’ educational attainment. Prospective spouses with a greater distance in education must cross more barriers to get married. The log odds of
marriage for couples across several educational groups are the sum of the crossings parameters separating husbands’ and wives’ educational categories (Schwartz & Mare 2005). Note that crossings models are a gender-symmetrical model. That is, as long as the barriers crossed are identical, the crossings models assume that the difficulty of crossing the educational barriers is the same, no matter whether husbands or wives have more education.

Table 1. Parameters for Crossings Effects on Educational Assortative Marriage

<table>
<thead>
<tr>
<th>Husbands’ Educational Attainment</th>
<th>Wives’ Educational Attainment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than high school</td>
<td>Less than high school</td>
</tr>
<tr>
<td>High school</td>
<td>High school</td>
</tr>
<tr>
<td>Vocational college</td>
<td>Vocational college</td>
</tr>
<tr>
<td>University or higher</td>
<td>University or higher</td>
</tr>
<tr>
<td>Less than high school</td>
<td>1</td>
</tr>
<tr>
<td>High school</td>
<td>$v_1$</td>
</tr>
<tr>
<td>Vocational college</td>
<td>$v_1 + v_2$</td>
</tr>
<tr>
<td>University or higher</td>
<td>$v_1 + v_2 + v_3$</td>
</tr>
<tr>
<td></td>
<td>$v_2$</td>
</tr>
<tr>
<td></td>
<td>$v_2 + v_3$</td>
</tr>
<tr>
<td></td>
<td>$v_3$</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

Note: Table is adapted from Schwartz & Mare (2005).

When gender asymmetry and crossings models are included, the model can be presented as follows:

\[
\text{Log} = + \sum + \sum + \sum + \sum + \sum + \sum + \sum + \sum
\]
Where \( \mu_{ijkl} \) denotes the expected number of marriages between men aged \( i \) with education \( k \) and women aged \( j \) with education \( l \). \( \alpha \) is an intercept and other \( s \) denote parameters to be estimated. \( a_i \) and \( a_j \) denote age categories for men and women, respectively \((i, j = 20 – 24; 30 – 49; 25 – 29 \text{ is the reference group})\). \( b_k \) and \( b_l \) denote educational categories for men and women, respectively \((k, l = \text{less than high school}; \text{vocational college}; \text{university or higher}; \text{high school education is the reference group})\).

People do not make marriage decisions on age independent of education, or on education independent of age. Rather, they look at each other’s age, given their educational attainment, and they look at each other’s educational attainment, given their age: they make decisions based on the combination of both characteristics. Therefore, I control for the interactions between age and education for both husbands and wives in my model (see Qian 1997 for a similar approach).

In the model, \( p \) measures education homogamy \((p = \text{husbands with the same education as wives})\), and \( q \) denotes education hypergamy \((q = \text{husbands better educated than wives})\). Likewise, \( r \) measures age homogamy \((r = \text{husbands in the same age group as wives})\), and \( s \) denotes age hypergamy \((s = \text{husbands in older age groups than wives})\). \( \tau \) is a set of educational-crossings parameters. The education crossings barriers include marriages between persons who have less than high school education and who have high school education or above; between persons with less than vocational college education and those with vocational college or above; and between persons with less than university education and those with university or graduate education.
Chapter 5: Results

Marriage Rate

Figure 1 presents first marriage rates for males and females by educational attainment. The figure reveals substantial gender differences. Overall, women have a higher first marriage rate than men. After disaggregating males and females by educational attainment, we see that gender differences in first marriage rates vary by education. Among individuals with less than university education, women have higher marriage rates than men at each educational attainment level, and the gender gap in marriage rates narrows as educational attainment increases. Among the most highly educated, females have a lower marriage rate than their male counterparts. In particular, gender asymmetry in marriage rates is most striking at the extremes of the education distribution: the marriage rate for females with less than high school education (319‰) is almost 1.5 times as high as that for their male counterparts (213‰), while university education is the only education category in which females have a lower marriage rate than males. Thus, in consistent with Hypothesis 1, the female advantage in China’s marriage markets narrows and finally disappears as educational attainment increases.
Figure 1. First Marriage Rates, by Gender and Education

*Note:* <HS = less than senior high school, HS = senior high school

Figure 2 and Figure 3 present education-age-specific first marriage rates for males and females, respectively. Overall, men marry later than women. For instance, in younger age groups (i.e., 20 – 24 and 25 – 29), women have higher marriage rates than their male counterparts, while at ages 30 – 49, men have a higher marriage rate than women.

In addition, age-education-specific marriage rates suggest that educational differentials in marriage formation vary by age. Moreover, a gender difference in the effect of education on first marriage becomes apparent at ages 30 – 49. For both men and women at ages 20 – 24, marriage rates decrease with increasing levels of education, indicating the delaying effect of education on the timing of marriage. At ages 25 – 29, both male and females have relatively high marriage rates, regardless of education level,
which suggests that in urban China, the peak age group for men and women entering first marriage is at 25 – 29. Despite their lower marriage rates at younger ages, highly educated men “catch up” with less educated men at ages 30 and above: 30 – 49 year-old men with vocational college or university education have much higher marriage rates than less-educated men in the same age group. However, highly educated women do not catch up at older ages. Instead, among women aged 30 – 49 years old, the marriage rates are substantially lower for highly educated women than those with less education.

Finally, the gender gaps in marriage rates differ by age and education. In younger age groups (i.e., 20 – 24 and 25 – 29), the female marriage rates are consistently higher than the male marriage rates regardless of education level. However, among people aged 30 – 49 years old, the gender gap in marriage rates has reversed from favoring women to favoring men as education increases. In the 30 – 49 age group, the least educated women have a higher marriage rate than similarly educated men; the marriage rates are very close between men and women with high school education; and the marriage rates for males are 2.6 times and 3.7 times as high as those figures for females, in the vocational college and university categories, respectively. Therefore, in consistent with Hypothesis 2, the comparison of men’s and women’s education-age-specific marriage rates suggests that highly-educated men have much better marriage prospects than similarly educated women if they delay their marriages until their thirties.
Figure 2. First Marriage Rates, by Education and Age, Males

Note: <HS = less than senior high school, HS = senior high school
Descriptive Results of Educational Assortative Marriage

To investigate patterns of who marries whom with respect to education, I present the percentage distributions of spouse’s education by men’s and women’s educational attainment, separately in Figure 4 and Figure 5. Single people are excluded when percentages in these two figures are calculated. Some educational assortative marriage patterns emerge from these two figures. First, the tendency to marry with the same education category is apparent for both men and women, in particular for least educated men and for women at both ends of the education distribution. In the lowest category
(less than high school), 77 percent of men and 62 percent of women marry a spouse with the same level of education, and the figure is 68 percent for university-educated women.

Second, a higher percentage of men than women marry a spouse with less education than themselves across all educational groups, with the exception of least-educated people who are impossible to marry a spouse in a even lower educational category. In particular, the gender difference in probabilities of marrying a less-educated spouse is most pronounced among the most highly educated: the proportion of university educated women marrying down is 23 percentage points lower than that of university educated men. In sum, the majority of men and women in urban China marry within the same educational category, a pattern which is particularly pronounced for least-educated men and most highly-educated women.
Figure 4. Percentage Distributions of Wives’ Education by Husbands’ Education

*Note:* <HS = less than senior high school, HS = senior high school
Figure 5. Percentage Distributions of Husbands’ Education by Wives’ Education

Note: <HS = less than senior high school, HS = senior high school

However, the gender differences in assortative marriage patterns may be highly influenced by different educational distributions of men and women. For example, in 2005, among the 24 – 49 year-old urban population, the male-female ratio is notably asymmetrical only at the two extremes of the educational spectrum—0.9 in the lowest category and 1.3 in the highest category, but very close to 1 in the middle portion of the educational distribution1. As a result, for least educated men and for most highly educated women, they have a larger marriage pool of similarly educated eligibles to

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1 The male-female ratio is 1.05 both in the highly school category and in the vocational college category. The results are calculated by the author based on the 2005 China 1% population survey (National Bureau of Statistics of China, Table 4-1a, retrieved from http://www.stats.gov.cn/tjsj/ndsj/renkou/2005/renkou.htm 2012, April 19). The result is available upon request.
choose from. I ask whether these assortative marriage patterns still exist after controlling for the population structure. To address this question, I use log-linear models to investigate the association between husbands’ and wives’ education, net of marginal distributions of spouses’ education.

**Log-linear Models**

Table 2 reports the goodness-of-fit statistics—the deviance and the BIC statistics for each log-linear model examined in this study. The fit statistics are used to check goodness of fit and pick preferred models. Model selection is crucial in log-linear modeling. A saturated model uses up all the degrees of freedom in a table and explains all variation in the data. A saturated model is not very informative because it shows no advantages over examination of the observed frequencies, but it can serve as a baseline for comparison with other model fits. The goal of log-linear modeling is to reveal the association between variables in the table by finding a parsimonious model with acceptable goodness of fit (Hout 1983: 41 – 42). The Likelihood Ratio Test (LRT) and the Bayesian information criterion (BIC) are often applied to model comparison and selection. The LRT is usually used to compare two nested models. For example, suppose, Model M₀ is nested within M₁. That is, one or more parameters of M₀ are constrained to be zero, in a sense that M₀ is more parsimonious, or simpler, than M₁. The LRT statistic (L²) is the difference between the deviances of M₀ and M₁, and has approximately a chi-squared distribution with degrees of freedom equal to the difference between the degrees of freedom of these two models (Agresti 2002: 141 – 142). The simpler model usually
has more degrees of freedom yet a larger deviance. If $L^2$, indicative of reduction in
deviance, is statistically significant, then we conclude that $M_1$ provides significant
improvement in fit over $M_0$. Meanwhile, BIC statistics can be used to compare two
models that are not necessarily nested. The BIC statistic for a log-linear model is $BIC = L^2 - (df) \log(N)$, where $L^2$ is the LRT statistic, $df$ is the degrees of freedom, and $N$ is the
sample size. A smaller value of BIC indicates a better fitting model (Raftery 1986). The
BIC for a saturated model is zero, so negative BIC indicates that the current model is
preferred to the saturated model. In this study, both BIC and $L^2$ are used for model
selection.
Table 2. Fit Statistics for Log-Linear Models of Age and Educational Assortative Marriage

<table>
<thead>
<tr>
<th>Model</th>
<th>df</th>
<th>Deviance</th>
<th>BIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Marginals</td>
<td>133</td>
<td>2301.11</td>
</tr>
<tr>
<td>2</td>
<td>model 1 + WAGE * WEDU + HAGE * HEDU</td>
<td>121</td>
<td>2087.18</td>
</tr>
<tr>
<td>3</td>
<td>model 2 + Educational homogamy</td>
<td>120</td>
<td>1226.93</td>
</tr>
<tr>
<td>4</td>
<td>model 3 + Educational hypergamy</td>
<td>119</td>
<td>1147.63</td>
</tr>
<tr>
<td>5</td>
<td>model 4 + Educational crossings</td>
<td>116</td>
<td>780.02</td>
</tr>
<tr>
<td>6</td>
<td>model 5 + Age homogamy</td>
<td>115</td>
<td>436.30</td>
</tr>
<tr>
<td>7</td>
<td>model 6 + Age hypergamy</td>
<td>114</td>
<td>192.35</td>
</tr>
<tr>
<td>8</td>
<td>model 7 + WAGE * Educational crossings</td>
<td>108</td>
<td>187.09</td>
</tr>
<tr>
<td>9</td>
<td>model 7 + HAGE * Educational crossings</td>
<td>108</td>
<td>179.94</td>
</tr>
<tr>
<td>10</td>
<td>model 7 + WAGE * Educational homogamy</td>
<td>112</td>
<td>186.98</td>
</tr>
<tr>
<td>11</td>
<td>model 7 + WAGE * Educational hypergamy</td>
<td>112</td>
<td>188.99</td>
</tr>
<tr>
<td>12</td>
<td>model 7 + HAGE * Educational homogamy</td>
<td>112</td>
<td>181.65</td>
</tr>
<tr>
<td>13</td>
<td>model 7 + HAGE * Educational hypergamy</td>
<td>112</td>
<td>186.26</td>
</tr>
</tbody>
</table>

Note: df = degree of freedom; WAGE = wives’ age; HAGE = husbands’ age; WEDU = wives’ education; HEDU = husbands’ education.

Model 1 is an independence model. This model includes only marginal distributions of men’s and women’s age and education, and thus assumes no association among these variables. In other words, the independence model assumes that men and women marry randomly with respect to education and age. Not surprisingly, the BIC for Model 1 is much larger than zero, indicating a poor model fit. In Model 2, I allow wife’s education to interact with wife’s age and husband’s education to interact with husband’s age. Model 2 produces a significant drop in deviance compared to Model 1 ($L^2 = 2301.11 - 2087.18 = 213.93$, $df = 12, P < 0.05$), suggesting that people make marriage decisions based on the combination of both characteristics of age and education.
To capture the well-documented tendency for couples to marry within the same educational category, Model 3 adds an educational homogamy parameter. Adding the main-diagonal parameter substantially decreases the deviance ($L^2 = 2087.18 - 1226.93 = 860.25$, $df = 1$, $p < 0.05$), indicating a very strong tendency for educational homogamy. To test the gender differences in educational assortative marriage patterns, Model 4 adds a uniform educational hypergamy parameter. The significant reduction in deviance ($L^2 = 1226.93 - 1147.63 = 79.31$, $df = 1$, $p < 0.05$) indicates that wives display a tendency to marry up with respect to education, net of the disparate distribution of educational attainment across gender. The educational homogamy parameter explains much more of the variance in the data than the educational hypergamy parameter because addition of the educational homogamy parameter causes a much bigger drop in deviance than addition of the hypergamy parameter, suggesting stronger educational homogamy than educational hypergamy. Educational crossings parameters are added in Model 5, and the model fit significantly improves ($L^2 = 1147.63 - 780.02 = 367.60$, $df = 3$, $p < 0.05$). The BIC statistic for Model 5 becomes negative. Thus, Model 5 is preferred over the saturated model. The significant reduction in the deviance and BIC statistics indicate that educational homogamy, hypergamy, and crossings parameters all have improved the model fit. Thus, patterns of educational assortative marriage not only exhibit tendency toward homogamy and hypergamy, but also are affected by educational-crossings barriers.
Age assortative marriage patterns are explored in Model 6 and Model 7. To test the propensity of individuals to marry someone of similar age, an age homogamy parameter is added in Model 6, and this causes a significant reduction in deviance compared to Model 5 ($L^2 = 780.02 - 436.30 = 343.73, df = 1, p < 0.05$), suggesting the tendency for couples to marry within the same age group. To test the gender asymmetry in age assortative marriage patterns, Model 7 adds a uniform age hypergamy parameter. The significant reduction in deviance ($L^2 = 436.30 - 192.35 = 243.95, df = 1, p < 0.05$) indicates that wives display a tendency to marry men older than themselves, net of the marginal distributions of men’s and women’s age. Thus, decreases in the deviance and BIC statistics indicate that both age homogamy and hypergamy parameters have improved the model fit. Also, results of the LRT from Model 3 to Model 7 provide clear evidence of Hypothesis 3 regarding the gender asymmetry in the Chinese marriage patterns.

Based on Model 7 which appears to be the best fitting model so far, Model 8 to Model 13 add different interaction terms. The goal of Model 8 through Model 13 is to investigate whether age moderates the educational assortative marriage patterns and how this moderating effect of age may differ by gender. Model 8 add interactions between educational crossings parameters and two dummies for wives’ age group to examine whether odds of educational intermarriage vary by wives’ age. Similar analysis is done for husbands’ age in Model 9. Model 10 and Model 11 test whether educational homogamy and hypergamy patterns vary by wives’ age. Likewise, Model 12 and Model
investigate whether educational homogamy and hypergamy patterns vary by husbands’ age. Neither Model 8 ($\chi^2 = 5.26$, $df = 6, p > 0.05$) nor Model 9 ($\chi^2 = 12.41$, $df = 6, p > 0.05$) shows a better fit to the data than Model 7, suggesting that the educational crossings parameters do not differ by wives’ or husbands’ age at first marriage. Neither Model 10 ($\chi^2 = 5.37$, $df = 2, p > 0.05$) nor Model 11 ($\chi^2 = 3.36$, $df = 2, p > 0.05$) significantly improves the model fit relative to Model 7, but Model 12 ($\chi^2 = 10.70$, $df = 2, p < 0.05$) and Model 13 ($\chi^2 = 6.09$, $df = 2, p < 0.05$) fit more closely to the data than Model 7, suggesting that the educational homogamy and hypergamy patterns vary by men’s age but not by women’s age. Indeed, the BIC statistic favors Model 7 as the BIC statistic for Model 7 is the lowest among the thirteen models. The BIC statistics penalize Model 12 and 13 for using more degrees of freedom (i.e., having more parameters). Nevertheless, the BIC statistics for Model 7, 12, and 13 are all negative and very close to each other, indicating the good fit of these three models. In addition, according to the LRT, Model 12 and Model 13 significantly improve the model fit compared to Model 7. Therefore, I now examine in detail Model 7, Model 12 as well as Model 13.
Table 3. Parameter Estimates for Age and Educational Assortative Marriage from Model 7, 12, and 13

<table>
<thead>
<tr>
<th>Parameters</th>
<th>( \beta )</th>
<th>( \exp(\beta) )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 7</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational homogamy</td>
<td>-0.24</td>
<td>0.79</td>
</tr>
<tr>
<td>Educational hypergamy</td>
<td>0.41( ^\dagger )</td>
<td>1.51</td>
</tr>
<tr>
<td>Educational crossings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than high school/high school</td>
<td>-1.44( ^{***} )</td>
<td>0.24</td>
</tr>
<tr>
<td>High school/vocational college</td>
<td>-1.28( ^{***} )</td>
<td>0.28</td>
</tr>
<tr>
<td>Vocational college/university and up</td>
<td>-1.20( ^{***} )</td>
<td>0.30</td>
</tr>
<tr>
<td>Age homogamy</td>
<td>3.28( ^{***} )</td>
<td>26.53</td>
</tr>
<tr>
<td>Age hypergamy</td>
<td>3.90( ^{***} )</td>
<td>49.26</td>
</tr>
<tr>
<td><strong>Model 12( ^a )</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational homogamy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men aged 20-24</td>
<td>0.11</td>
<td>1.11</td>
</tr>
<tr>
<td>Men aged 30-49</td>
<td>-0.32( ^{**} )</td>
<td>0.72</td>
</tr>
<tr>
<td><strong>Model 13( ^a )</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational hypergamy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men aged 20-24</td>
<td>-0.10</td>
<td>0.91</td>
</tr>
<tr>
<td>Men aged 30-49</td>
<td>0.30( ^{*} )</td>
<td>1.35</td>
</tr>
</tbody>
</table>

Note: \( ^a \) Men aged 25-29 are the reference category. \( ^\dagger \ p < 0.10; ^{*} p < 0.05; ^{**} p < 0.01; ^{***} p < 0.001 \)
Table 3 reports the parameters of interest (column (β)) obtained from Model 7, 12, and 13, and the corresponding results of the exponential function of each parameter estimate (column Exp(β)). Model 7 includes educational homogamy, hypergamy, and crossings parameters. Note that a negative educational homogamy parameter does not indicate lower odds of educational homogamy as it would in a diagonals model without crossing parameters (Hout 1983: 34). A combined examination of educational homogamy, hypergamy and crossings parameters provides evidence that marriage is more likely for men and women who have the same educational category than those who do not. The positive educational hypergamy parameter suggests that it is more likely for women than for men to marry down with respect to education if people marry across educational boundaries. In sum, the odds of educational homogamy are the highest, followed by the odds of hypergamy, and marriages in which husbands are less educated than wives are least likely to occur.

The educational crossings parameters in Model 7 indicate which educational difference between partners is the most difficult barrier to cross. The crossings parameters are the log-odds of marrying across adjacent educational categories, and thus results of the exponential function of crossings parameter estimates are the odds of intermarriage across specific education barriers. As expected, all the crossing parameters are negative, indicating that it is less likely to intermarry than to marry homogamously, in terms of education. Nonetheless, the odds of intermarriage across different education barriers do not differ substantially. Specifically, the odds of intermarriage between those
with less than high school education and high school graduates are 0.24 times the odds of homogamy. The odds of marriage across the high school/vocational college barrier are 0.28 times the odds of homogamy, and the odds of intermarriage between vocational-college-educated people and university-educated people are 0.30 times the odds of homogamy. Therefore, the rigidity of education barriers decrease as education increases, with the greatest difficulty of crossing the barrier at the bottom of the education distribution, modest in the middle portion of the distribution, and the weakest barrier at the upper end of the distribution.

In Model 7, age assortative marriage patterns are investigated through age homogamy and hypergamy parameters. The odds of marrying in the same age group are more than 25 times higher than the odds of men marrying older women, and the odds of age hypergamy, marriages in which wives are younger than husbands, are nearly 50 times as high as the odds of age hypogamy, marriages in which wives are older than husbands. Therefore, there is clear evidence on gender asymmetry in age assortative marriage patterns, a tendency for women to marry older men than themselves and the very small likelihood of men marrying older women than themselves. In sum, Hypothesis 3 is supported by the results from Model 7. Couples in urban China display a tendency toward age and education hypergamy.

Model 12 and Model 13 examine whether educational homogamy and hypergamy patterns differ by husbands’ age at first marriage. Building on Model 7, Model 12 adds the interaction terms between educational homogamy parameters and two dummies for
husbands’ age group, and Model 13 adds the interaction terms between educational hypergamy parameters and dummy variables for husbands’ age group. Compared to men aged 25 – 29, men aged 30 – 49 are 28% less likely to marry wives within the same educational category, and 35% more likely to marry women with less education than themselves. In addition, despite no statistical significance of the coefficients for the youngest age group (i.e., 20 – 24), the signs of these coefficients suggest a consistent effect of husbands’ age on educational assortative marriage: relative to those aged 25 – 29, men aged 20 – 24 have higher odds of homogamy and lower odds of hypergamy. The results of Model 12 and 13 suggest that men who marry at older ages, in particular those who delay marriage until their thirties, are less likely to marry similarly educated wives and more likely to marry less educated wives, compared to men who marry at younger ages. Therefore, Hypothesis 4 is partly supported. Wives’ age does not appear to be associated with marital sorting, but husbands’ older age at first marriage is associated with higher odds of hypergamy and lower odds of homogamy.
Chapter 6: Conclusion and Discussion

Utilizing nationally representative sample survey data, this paper examines gender differences in marriage patterns by education and age in the early years of the twenty-first century in urban China. Both marriage formation patterns and assortative marriage patterns are examined in this study. In the first step, comparison of men’s and women’s marriage rates by education and age reveals great gender differences in marriage formation patterns. Overall, women have a higher first marriage rate than men. However, gender differences in marriage rates vary substantially across education and age groups. With increasing levels of schooling, the gender gap in marriage rates reverses from favoring women to favoring men. The highest educational category (i.e., university education) is the only education category in which females have a lower marriage rate than males. Thus, the female disadvantage in marriage markets in urban China appears to exist only among university-educated people. After men and women are disaggregated by education and age, there is a “catch up” effect for highly educated men but not for highly educated women who delay first marriage into their thirties. 30 – 49 year-old highly educated men have higher marriage rates than less educated men in the same age group, whereas 30 – 49 year-old highly educated women have much lower marriage rates than less educated women aged 30 – 49. More strikingly, the marriage rate for university-educated males almost four times as high as that for university-educated females. These
findings suggest that highly educated men have much better marriage prospects than highly educated women if they delay their marriages until their thirties.

In sum, this study has found empirical evidence on the deteriorating position of older, highly-educated women in marriage markets in urban China, as suggested by the term “leftover ladies” popularized by the mass media. They are “left” in China’s marriage markets in a sense that when delaying first marriage past age 30, highly educated women have much lower marriage rates than highly educated men and less educated women ages 30 – 49. Thus, it is the intersection of gender, good education, and older age that disadvantages those “leftover ladies” in China’s marriage markets.

In the second step, log-linear models are employed to investigate the assortative marriage patterns in urban China. In particular, I investigate whether patterns of marital sorting in China are asymmetrical across gender, by adding gender asymmetry parameters into log-linear models of age and educational assortative marriage. Results from log-linear models provide clear evidence on gender asymmetry in assortative marriage patterns, that is, a tendency toward education and age hypergamy. In other words, net of the disparate marginal distributions of age and educational attainment of both sexes, men display a tendency to marry younger, less-educated women than themselves, and women display a tendency to marry older, better-educated men than themselves. In addition, assortative marriage patterns vary by husbands’ age at first marriage, but not by wives’ age at first marriage. Compared to men marrying at younger ages, men marrying at older ages have decreased odds of marrying a spouse within the
same educational category and increased odds of marrying down with respect to education. Given the tendency toward education and age hypergamy and the increased odds of educational hypergamy for men marrying at older ages in urban China, highly-educated, older women are more difficult to find a good match in marriage markets than less educated women or younger women. Thus, the gender asymmetry in patterns of marital sorting may help explain why highly-educated, older women have particularly low marriage rates, indicative of the fact that they are being “left” in China’s marriage markets.

Drawing on the integrated framework proposed by England and Farkas (1986), I speculate that both individual choices and structural factors contribute to the gendered patterns of marriage formation and marital sorting in urban China. Age and education are important resources that individuals in marriage markets can trade in when they search for marital partners. Individuals choose when to marry, whether to marry, and whom to marry based on their preferences for spouses and their resources. However, preferences for spouses and the values of resources are largely influenced by structural factors such as systems of gender roles in a society and cultures defining what makes a good wife or husband.

In China, the stereotype that women should marry up in particular with respect to characteristics such as age and education still dominates many Chinese’s minds in modern times (Sun 2002). When choosing spouses, women put more emphasis on financial traits, such as education, occupation, and income, while men care more about nonmarket traits, such as appearance and age (Xu 2000; Yu 2011). Mate selection
depends on the preferences of both sexes. On the one hand, women, even highly-educated women who have great earning power themselves, do not prefer to marry men with worse economic prospects than themselves. On the other hand, women’s education does not count for much when men choose wives. Moreover, highly educated women may be even perceived as unattractive in China’s marriage markets because high levels of schooling tend to be associated with high career aspirations and achievements and thus failure at fulfilling the role of a good wife and mother. As a result of the gender differentials in mate selection criteria, education hypergamy characterizes assortative marriage patterns in urban China.

Given the tendency toward educational hypergamy, highly educated women have a smaller marriage pool, compared to less educated women and highly educated men. In addition to the propensity of men to marry a younger wife, the marriage pool shrinks even faster for highly educated women who delay their marriage. Moreover, the tendency toward educational hypergamy seems to intensify as men marry at older ages, but does not change as women marry later. If we assume that men prefer to marry a wife less educated than themselves and women prefer to marry a husband better educated than themselves, the findings of this study suggest that when delaying marriage until their thirties, men eventually marry a wife they most desire to marry, and women are not willing to marry by compromising their mate selection criteria.

There are a number of limitations to this study that should be recognized. First, due to the relative small sample size, 39 out of 144 cells, or 27 percent, are zero cells in the 4*4*3*3 count tables. These zero cells are likely to be sampling zeros, that is, if the
sample size is large enough, it is expected that these cells would not be zero cells. A large number of zero cells tend to yield unstable or biased results. However, following Kalmijn (1994), I use the pseudo-Bayes estimates (Bishop et al. 1975: 401 – 402) as a sensitivity analysis (results are available upon request), and generate nearly identical results. Therefore, I believe that results presented are quite robust. Second, the log-linear analysis is eminently descriptive. Although I use theories to speculate, further research, particularly qualitative research, is needed to explore the underlying forces driving the marriage patterns in China. Third, this study is a population-level analysis of cross-sectional data. It is useful to capture one snapshot of the marriage patterns in urban China. However, individual-level longitudinal research is needed to understand the changing mate selection processes as individuals’ education and age change. Finally, due to the limited sample size, I can only group men and women into four general educational categories. Some studies have found that higher education in China has transformed from an elitist to a mass system due to the unprecedented expansion since 1999 (Bai 2006). More striking gender differences are expected among men and women with postgraduate degrees. When data are available, it is interesting to create more refined educational categories.

This study makes contributions to existing marriage studies by examining the gender differentials in patterns of marriage formation and marital sorting in the unique Chinese context. “Leftover ladies” phenomena seem intriguing in the Chinese context of high female labor force participation because it fails to support the prediction that women’s earning power will become increasingly important in determining their
marriage prospects with increases in female labor force participation (Oppenheimer 1994; 1997; England & Farkas 1986). In line with the argument that some aspects of the gender system in a society (e.g., share of childrearing and housework between spouses) tend to be more resistant to change than other aspects (e.g., female participation in paid employment) (England & Farkas 1986), I argue that prevalence of married women's employment outside the home will not necessarily imply good marriage prospects of highly-educated women. Chinese gender role systems should still be considered as traditional because the breadwinner role of the husband and the housekeeping role of the wife remain their primary place in the Chinese family (Zuo & Bian 2001), despite almost universal labor force participation of married women and equal share of family income between spouses (Parish & Farrer 2000). A husband’s failure to fulfill the breadwinner role and a wife’s high career aspirations tend to cause family conflict (Zuo & Bian 2001). In such a gender role system, when selecting marital partners, women continue to pay great attention to a man’s earning power, whereas men may be reluctant to marry a wife with more education than themselves. In spite of high levels of female labor force participation, expectations for spouses remain gender asymmetrical, and sex role specialization within households is highly segregated. Thus, we may expect an increased importance of education in determining women’s marriage prospects when sex roles within households (e.g., recognition of wives’ income contribution to the family, equal share of housework and childcare, etc.) become egalitarian along with the high levels of female labor force participation.
Last but not least, studying the marriage patterns in the early years of the 21st century can shed light on the future of China’s marriage patterns, given the prediction by demographers that the shortage of potential brides will severely impact male marriage patterns from 2010 onwards at the national level (Goodkind 2006; Zeng 2007). Two extreme situations are likely to go hand in hand in marriage markets in China. On the one hand, lower-educated men in poorer provinces are disproportionately unable to get married because of both the bride shortage and the hypergamy patterns (Das Gupta, Ebenstein, & Sharygin 2010). On the other hand, scattered evidence suggests that a rising proportion of women, especially highly-educated women, are likely to be still single at age 30 in China’s major cities (Jones & Gubhaju 2009). This study reveals the notably low marriage rates for highly-educated women above age 30 and the clear educational and age hypergamy patterns net of the disparate education and age distributions of both sexes. Therefore, this study is the first step in revealing the great gender divide in China’s marriage markets, and an ironic coexistence of the “leftover ladies” and a bride shortage may be on the horizon.
References


