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Changes in the Determinants of Marriage Entry in Post-Reform Urban China

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Abstract Using population intercensus and national survey data, we examine marriage timing in urban China spanning the past six decades. Descriptive analysis from the intercensus shows that marriage patterns have changed in China. Marriage age is delayed for both men and women, and prevalence of nonmarriage became as high as one-quarter for men in recent birth cohorts with very low levels of education. Capitalizing on individual-level survey data, we further explore the effects of demographic and socioeconomic determinants of entry into marriage in urban China over time. Our study yields three significant findings. First, the influence of economic prospects on marriage entry has significantly increased during the economic reform era for men. Second, the positive effect of working in the state-owned sector has substantially weakened. Third, educational attainment now has a negative effect on marriage timing for women. Taken together, these results suggest that the traditional hypergamy norm has persisted in China as an additional factor in the influences of economic resources on marriage formation.

Keywords Marriage entry · China · Socioeconomic determinants · Economic reform

Introduction

Numerous studies have documented the importance of marriage timing to a variety of social outcomes such as fertility, education, and women's employment in both

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developed and developing countries (e.g., Casterline 1994; Coale and Treadway 1986; Rosero-Bixby 1996). Along with family structure, gender relations, and other aspects of the family, marriage timing has also served as a marker of social change (Nobles and Buttenheim 2008; Raymo 2003; Yabiku 2004). In most societies, the trend has been in the direction of later marriages—that is, delays in marriage timing (Lesthaeghe and Moors 2000; Lesthaeghe and Surkyn 1988). Several explanations have been proposed for the general trend of delays in marriage timing, the most prominent being the decline in fertility, ideational changes, and increased labor force participation of women (Blossfeld and Huinink 1991; Malhotra 1997; Oppenheimer 1988).

China has been undergoing rapid and significant societal changes in recent decades, in large part precipitated by the economic reform that began in 1978 (Xie 2011). In this study, we situate our empirical work in urban China and examine trends in how individual-level social determinants have influenced marriage timing, paying close attention to institutional changes associated with the economic reform. We examine empirically whether, and how, institutional changes at the societal level resulting from the economic reform may have altered the way in which individual-level social determinants affect entry into marriage.

Our study draws on recent data from China's 2005 1 % Population Intercensus ("mini-census") and two waves of Chinese General Social Surveys (CGSS2003, CGSS2008). We ask how the emergence of a market economy and the rise of a consumer culture may have changed the way social determinants affect marriage entry. Our study consists of two parts. First, using the recent mini-census, we provide an overall description of the changing patterns of first marriage in urban China. Second, capitalizing on the CGSSs with more detailed retrospective information, we compare cohort differences in how individual-level demographic and socioeconomic determinants affect marriage entry.

Theoretical Issues and Previous Studies

A longstanding hypothesis in the literature on marriage formation is gender role specialization (Parsons 1949). In recent decades, Gary Becker (1973, 1974, 1991) and other scholars formally represented this idea in a "specialization and trading" model. This model maintains that the major gain associated with marriage lies in the mutual dependence of the spouses, arising from their differentiated functions in the family, with the wife specializing in domestic labor and the husband in paid work. In addition, women and men are assumed to anticipate this role specialization following marriage when looking for marriage partners and thus trade attributes for their respective specialized roles in order to gain maximally from marriage. Under this model, success in the labor market has very different implications for young men than for young women anticipating marriage. For men, obtaining a good position in the labor market increases their desirability as a marriage partner and thus their opportunities to get married. For women, however, more involvement in the labor market means less specialization in domestic work and thus reduced gains from marriage, leading to a higher likelihood of nonmarriage or late marriage (Goldscheider and Waite 1986; Oppenheimer et al. 1997; Preston and Richards 1975).

Oppenheimer (1988) provided an alternative "marriage-search" theory. While acknowledging that high economic status in the labor market makes a woman an attractive marriage partner in modern society, the theory argues that her economic resources also enable her to sustain a more thorough search for a desirable marriage partner, thus prolonging her time before getting married. Over time, however, Oppenheimer's theory predicts that women's economic characteristics are favorably evaluated in the marriage market by their potential marriage partners.

Evidence bearing on the relationship between women's economic characteristics and their entry into marriage, however, remains ambiguous. On the one hand, studies based on macro-level data have generally found a negative relationship between women's economic characteristics—education and earnings, for instance—and their marriage rates (Coughlin and Drewianka 2011; Cready et al. 1997; Lichter et al. 1991; McLanahan and Casper 1995; Preston and Richards 1975; White 1981). Those findings are consistent with Becker's specialization model arguing that women might retreat from marriage as they become more economically independent.

On the other hand, scholars focusing on individual-level characteristics in the United States have shown not only that American women's economic prospects are positively related to marriage (Cherlin 1980; Goldscheider and Waite 1986; Lichter et al. 2002; Oppenheimer and Lew 1995; Thornton et al. 2007; Waite and Spitze 1981) but also that the importance of women's economic prospects for marriage has increased over time (Lichter et al. 2002; Goldstein and Kenney 2001; Qian and Preston 1993; Sweeney 2002). Rapid increases in women's labor force participation and improved woman-friendly work environments in Western countries since the 1950s could partly explain the changing role of women's economic prospects in marriage formation. According to Oppenheimer's theory, as women gradually come to resemble men in the labor market and become breadwinners for their families, their economic characteristics should converge in importance over time with men's economic characteristics in affecting marriage entry.

Previous research has shown that the role of women's economic prospects in marriage formation may vary over time and by society. Using a survey conducted in 1992, Raymo (2003) observed that education, a major determinant of economic potential, was negatively associated with marriage formation among women in Japan. However, more recent work by Fukuda (2013) found a reversal of the education gradient among Japanese women for the latest marriage cohort (1993–2008), likely a result from women's increased economic role during recent years. Another recent study reported that education exerts varying effects on marriage entry across European societies (Kalmijn 2013): it has a marriage-delaying effect in countries with more traditional gender role attitudes but facilitates marriage in countries with more gender-egalitarian attitudes.

In contrast, past research has consistently found evidence for the positive role of men's economic prospects in marriage entry. Studies using either cross-sectional or longitudinal data have invariably observed a positive relationship between measures of men's economic prospects and marriage formation in western societies (e.g., Cooney and Hogan 1991; Goldscheider and Waite 1986; Goldstein and Kenney 2001; Lloyd and South 1996; MacDonald and Rindfuss 1981; Mare and Winship 1991; Oppenheimer et al. 1997; Qian and Preston 1993; Sassler and Schoen 1999; Sweeney 2002; Teachman et al. 1987; Xie et al. 2003). In East Asian societies such

as Japan, Korea, and Taiwan, scholars have also observed that men with less education have lower likelihoods of getting married (Chen and Chen 2014; Park and Lee 2014; Rindfuss et al. 2013).

Past research on changes in social and economic determinants of marriage entry has been based largely on experiences in Western societies and Japan (Raymo et al. 2015). Little attention has been paid to potential changes in the importance of social and economic determinants for marriage in other societies undergoing rapid social changes. Post-reform China affords us a rare opportunity to consider how individual-level determinants of marriage may be moderated by macro-level institutional conditions given that many large-scale social changes, such as marketization and consumer revolution, have been co-evolving rapidly in recent decades (Xie 2011). This study exploits this opportunity, capitalizing on recent Chinese data covering different marriage cohorts. An explicit aim of the research is to discover, within the contemporary Chinese context, how broader institutional changes moderate how individual-level determinants affect marriage formation (Gould and Paserman 2003; Kuo 2003; Lichter et al. 2002).

Post-Reform China

Post-reform China provides a unique setting in which to advance our understanding about how personal economic characteristics affect marriage formation in different social contexts (Yu and Xie 2013). Since its founding in 1949, the People's Republic of China has undergone dramatic social changes, especially in terms of its economy. Governed by ideologically charged political elites, China's command economy stagnated from the 1950s to the 1970s. China began its economic reform in 1978 by introducing a market economy in rural areas. After 1992, the market reform was expanded to cover China's urban economy.

Marriage as a social institution has also undergone dramatic changes in China during the same period. Traditional Chinese culture placed great importance on the family, with a system of arranged marriages for all young persons at early ages (Thornton and Lin 1994). In this cultural tradition, individuals' characteristics had limited effects on marriage formation because the Chinese population practiced universal and early marriage (Raymo et al. 2015). Soon after the founding of the People's Republic of China in 1949, traditional Chinese family practices underwent dramatic changes. The Chinese government's policies and propaganda promoted freedom of mate choice to replace arranged marriage, giving individual preferences an important role in marriage formation (Whyte 1990; Xu and Whyte 1990; Zang 1993). The government's strong family planning program also encouraged and mandated late marriage (Chen and Kols 1982). Many past studies have shown that age at first marriage has been delayed for both men and women during the past six decades (Cai and Wang 2014; Wang and Mason 2008; Wang and Tuma 1993; Wang and Yang 1996). The proportion of male bachelors at age 40 reached the highest point in history during the 1990s among men with the least education (Lee and Wang 1999). In this respect, marriage in China now resembles marriage in Western societies given that it is closely related to social stratification in general (Wang and Mason 2008). For this reason, we believe that marketization and the influence of Western cultures accompanying the economic

reform since 1978 may have altered the way in which individual-level attributes have influenced the likelihood of entry into marriage.

In the pre-reform era, inequality was low, and economic expectations were limited. Before the economic reform, consumption in China was highly regulated by the state to be egalitarian (Parish 1981, 1984). Urban residents' consumption was largely dependent on distribution by bureaucrats (Walder 1986). Along with food and daily necessities, which were regulated with rationing coupons issued by local governments, home appliances, bicycles, and other "luxury" goods were all subject to limited allocations. Such "redistributive" practices were changed by the economic reform (Tang and Parish 2000). As the average income has increased, urban China has been undergoing "a consumer revolution" (Davis 1992, 2000, 2005), with rapid rises in consumerism fueled by high and ever-rising expectations regarding living standards.

One particular manifestation of a consumer revolution among urban Chinese is the high demand for housing (Davis 2005). In pre-reform China, urban Chinese families paid very low rent (1 % to 2 % of household income) for a housing unit provided by their work unit (*danwei*), albeit in relatively poor condition (Xie et al. 2009). In 1978, the average housing space in urban China was only 3.6 square meters per person (Song and Xie 2014). Between 1988 and 1998, the market-driven housing reform spurred the emergence of China's private housing market (so-called commercial housing). Now, urban Chinese families can and do purchase their own housing units on the housing market, sharply driving up housing prices in urban China during the past two decades (Wu et al. 2012). The husband is usually expected to provide the housing unit, which is widely considered a necessity for marriage. Consequently, increases in housing prices and other consumption costs may have contributed to an increase in the positive effect of men's economic potential on marriage in recent years (Mu and Xie 2014; Yu and Xie 2013). Taken together, we expect that men's economic prospects have increased in importance in marriage formation as a result of the post-reform consumer revolution in China. This change has caused post-reform urban China to resemble Western societies more closely and to comply more with Becker's specialization model than with pre-reform urban China. Drawing on the literature on marriage formation and applying it to the Chinese context, we derive the following hypotheses:

> *Hypothesis 1*: Men's economic prospects have become increasingly more positive determinants of the hazard rate of marriage entry in urban China.

The role of economic prospects in marriage formation might also be influenced by gender relations within a family. Traditional Chinese gender ideology prescribes that husbands shoulder the main responsibility for earning money, with wives attending to domestic work. Thus, women's own economic status was not considered an important factor in traditional mate selection. However, this traditional model of gender relations has undergone dramatic changes since the founding of the People's Republic of China in 1949 (Xie 2013). In the early years, the Communist ideology of liberating women encouraged them to act like men, including by contributing economic resources to their families (Yu and Xie 2011). During the economic reform era, Chinese women have narrowed or even reversed the education gap between themselves and men, with large proportions of women entering professional jobs traditionally occupied only by men. As several scholars have argued, men's and women's mate preferences become more

symmetric as women's roles in the labor market converge with men's roles (Oppenheimer 1994, 1997; Schwartz 2010; Sweeney 2002). When aspirations for consumption rise, high income potentials make women attractive marriage partners. Therefore, we expect that the role of women's economic prospects in marriage entry will move from Becker's specialization model to Oppenheimer's "marriage search" theory over time, as has been the case in the United States (Schwartz and Mare 2005).

> *Hypothesis 2*: Women's economic prospects have gradually changed from being negative determinants to being positive determinants of hazard rate of marriage entry.

Marketization has weakened the long-standing advantages held by workers in the state sector in the pre-reform period. As discussed in the past literature (Bian 2002; Wu 2002; Xie et al. 2009), the ownership of a work unit (*danwei*) was historically strongly associated with one's economic welfare, especially during the Mao era. Working in the state-owned sector was commonly called having an "iron rice bowl" (*tie fanwan*), symbolizing perpetual advantages in many aspects of life, such as housing. At a time when income inequality was low, whether (or not) one worked in the state sector served as a good indicator of one's economic status. However, as state-owned enterprises have been reformed during the reform era and many have been privatized, the advantages of state-sector employment have been declining, and a job in the state sector is no longer a lifetime guarantee of economic security. Around 2000, large-scale layoffs of workers from state-owned and collective enterprises in urban China signaled the declining status of workers within the redistributive system. As a result, the attractiveness of a state-sector job has declined. Such institutional changes in China provide us with the opportunity to examine how structural changes induced by state policies may have altered the importance of specific individual characteristics in marriage formation.

> *Hypothesis 3*: The facilitating advantage of working in the state sector for the hazard rate of marriage entry has declined over time for both men and women in urban China.

In studying changes in the social determinants of marriage in post-reform urban China, our research also contributes to the empirical literature on the relationship between economic factors and marriage formation in general. We know that China has undergone significant societal changes in its recent history—particularly, the Great Leap, the Cultural Revolution, and the market transition—and thus such a setting may enable us to observe clearer patterns in the changing effects of economic status for both women and men. Moreover, institutional changes such as marketization and the state-owned enterprises reform could also give us an opportunity to observe how macro-level factors might alter the process of micro-level marital behaviors. In this study, we situate our empirical work in urban China and examine the role of economic factors in entry into marriage within the context of urban China's rapid social changes.

Our study has two concrete aims. First, we will describe the general trend of marriage timing and its relationship with socioeconomic status (SES) in China over the past six decades. Second, we will explore how the importance of economic

prospects in marriage formation has changed during the reform period for both men and women.

Data and Measure

Data

For this study, we first use data from China's 2005 1 % Population Inter-census Survey (mini-census) to describe changes in the general patterns of marriage timing in recent decades. To study changing roles in individual-level marriage determinants, we analyze data from the 2003 and 2008 China General Social Surveys (CGSS2003 and CGSS2008). The China General Social Survey is a repeated cross-sectional national survey of the adult population aged 18 or older. The CGSS2003 covered only urban China, and the CGSS2008 covered both rural and urban China (except for Tibet). The CGSS employs a multistage stratified random sampling method. First, primary sampling units were selected from county or county-level districts, stratified by region, rural or urban location, and economic development levels. Second, four second-level sampling units (at the township or community level) were selected in each primary sampling unit. Third, two third-level sampling units (at the neighborhood or village committee level) were selected in each selected second-level unit. Finally, 10 households were selected in each third-level sampling unit. One eligible person aged 18 or older was randomly selected from each sampled household to serve as the survey respondent. Because the survey includes very detailed information on the education and work history of each respondent, we are able to construct annual measures from retrospective questions. In this study, we restrict our sample to the urban respondents.

Variables and Method

We use the discrete-time logit regression to model the effects of social determinants on the hazard rate of entry into first marriage. This approach permits us to incorporate both time-invariant and time-varying predictors and avoids the assumption of proportional hazards (Allison 1995). The dependent variable in the analysis is a dichotomous indicator of whether a marriage occurred in the interval of a year, with time-varying independent variables fixed at the beginning of the interval. Data are organized into person-year records, with one record for each person-year interval in which a respondent was at risk for first marriage, including the interval during which the first marriage occurred. For this analysis, the risk for marriage is assumed to begin at age 15.[1]

To study social change, we compare the marital behavior of successive birth cohorts. As Ryder (1965:844) articulated, "If [social] change does occur, it differentiates cohorts from one another, and the comparison of their careers becomes a way to study change." We compare three birth cohorts in this study: the pre-reform cohort (born before 1960),

[1] Although the legal marriage age in China is among the highest in the world, at ages 22 for men and 20 for women since 1981, many studies have shown that marriage before the legal marriage age has been widely practiced, even during the most recent post-reform era (Guo 1999; Liu and Zhao 2009; Yu et al. 1994). In our data, 12.2 % of men and 13.7 % of women married before they reached the legal marriage age. To be inclusive of all marriages, we define the beginning of marriage risk at age 15 instead of the legal marriage age.

most of whom were exposed to marriage risk before the reform of China in 1978; the early-reform cohort (born between 1960 and 1974), most of whom were exposed to marriage risk during the early reform years (1978–1992) in China; and the late-reform cohort (born after 1974), most of whom were exposed to marriage risk during the period of comprehensive urban reform after the South Tour Speech of Deng Xiaoping in 1992.

We show the mean values of the independent variables separately by sex and cohort in Table 6 in the appendix. We use two time-varying indicators to measure economic prospects: work status and education. Work status is divided into three categories: employed in the nonstate sector (reference group), unemployed, and employed in the state sector during each year. Education is measured by years of schooling. However, as shown in past studies (e.g., Raymo 2003; Sweeney 2002; Thornton et al. 1995; Xie et al. 2003), enrollment has a negative impact on marriage because of role conflicts between being a student and being married. To distinguish the effect of accumulated education from that of being enrolled in school, we construct an additional measure indicating the status of current school enrollment.

Following previous studies (e.g., Raymo 2003; Xie et al. 2003), we model the age pattern of entry into marriage with a spline function. Because the legal ages for entering marriage are different for men and women (see Footnote 1), we use different spline specifications for the two sexes. Although the sample was restricted to current urbanites, some respondents might have experienced a rural-to-urban *hukou* conversion.[2] Hence, the respondent's time-varying *hukou* status is also included as a dummy variable. Given that prior research has found that family background characteristics affect marriage formation (e.g., South 2001), we include father's educational level to measure family's SES. Because research in the United States suggests that marital behavior may vary by race (e.g., Bulcroft and Bulcroft 1993; Wilson 1987), we add ethnicity in our analysis (set to 1 if the respondent is from a minority group).

Results

Changing Patterns of Marriage Timing in China

Using data from the 2005 mini-census, we describe in Table 1 how patterns of marriage timing changed over different birth cohorts in China.[3] We present the 25th, 50th, and 75th percentiles of the marriage age (by which one-quarter, two-quarters, and three-quarters of a birth cohort would be married) by cohort and educational attainment. Overall, we find a general pattern of delaying marriage across cohorts for both men and women, by all three indicators. For example, the median marriage age increased from 24 for men and 21 for women in the pre-reform cohort to 25 for men and 23 for women

[2] By the household registration (*hukou*) system, society in Mainland China has been partitioned into two distinct parts: rural and urban (Wu and Treiman 2007). Almost all aspects of life differ between rural and urban areas.

[3] For the late-reform cohort, we restricted the sample to people who were over age 25 in 2005.

Table 1 Descriptive statistics for marriage timing

	Marriage Age							
	Men				Women			
	25 %	50 %	75 %	*N*	25 %	50 %	75 %	*N*
Pre-Reform Cohort	22	24	27	386,708	19	21	24	375,798
Primary school	21	24	27	205,722	19	20	23	276,127
Middle school	22	24	27	113,383	21	23	25	63,948
High school	23	25	27	46,304	23	24	26	26,649
College	24	26	29	21,299	24	25	27	9,037
Early-Reform Cohort	22	24	26	318,796	20	22	24	326,051
Primary school	21	23	27	72,581	20	21	23	119,384
Middle school	22	23	25	161,182	20	22	24	141,365
High school	23	25	27	54,486	22	23	25	43,518
College	24	26	28	30,547	23	24	26	21,784
Late-Reform Cohort	23	25	29	108,423	21	23	25	116,138
Primary school	22	24		19,254	20	21	23	28,822
Middle school	22	24	27	56,000	21	22	24	56,011
High school	24	26		19,072	22	24	26	17,294
College	25	27		14,097	24	25	28	14,011

in the late-reform cohort. This pattern of delaying marriage also holds true at all educational levels. Across all cohorts, educational attainment is shown to have a positive association with age of marriage for both men and women, likely because of the role conflicts between being a student and being married.

One surprising finding is that in the late-reform cohort, the marriage rate is lower for men with a primary school education than for men with a middle school education. Our calculation reveals that 60.2 % of men with a primary school education in the late-reform cohort were married by age 25, compared with 66.0 % of men with a middle school education in the same cohort. This disparity did not exist for the pre-reform cohort. In the pre-reform cohort, about one-half of the men had only a primary school education. They entered marriage earlier than all other education groups, and 67.3 % of them had ever been married by age 25, compared with 65.2 % of men with a middle school education. In the late-reform cohort, men with a primary school education became a minority group (18 %) and suffered disadvantages in the marriage market, to be discussed later.

To illustrate changing marriage patterns by SES, we plot the Kaplan-Meier survival estimates of transition to first marriage by education for the three cohorts in urban China. Figure 1 shows the results for men. For the pre-reform cohort, men with a primary school education were married much earlier than men with higher levels of education. Yet, the educational differences were narrowed for the early-reform cohort and reversed for the late-reform cohort. Figure 2 shows similar albeit less-pronounced patterns for three female cohorts. One anomaly is

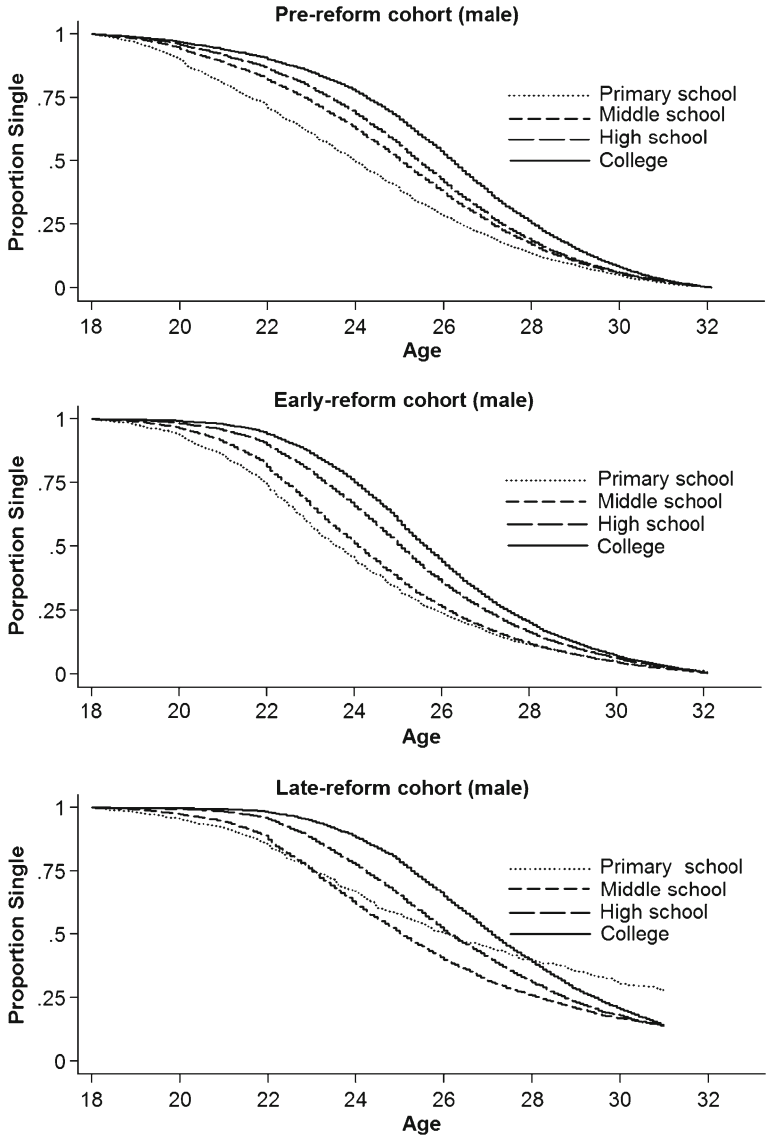

Fig. 1 Kaplan-Meier survival curves of transitions to first marriage for urban males by education

that a high percentage, about one-quarter, of men in the late-reform cohort with a primary school education remained unmarried at late ages, as shown in the last chart of Fig. 1. The extent to which this gender difference is attributable to imbalanced sex ratios with excess men among recent Chinese cohorts (Wei and Zhang 2011) is an interesting question that invites future research.

In sum, we take the general increase in median marriage age and decline in marriage rate among less-educated men to suggest a gradual shift in China from relatively early and universal marriage to later and more selective marriage. Marriage has increasingly become a sign of social status in China. In the past,

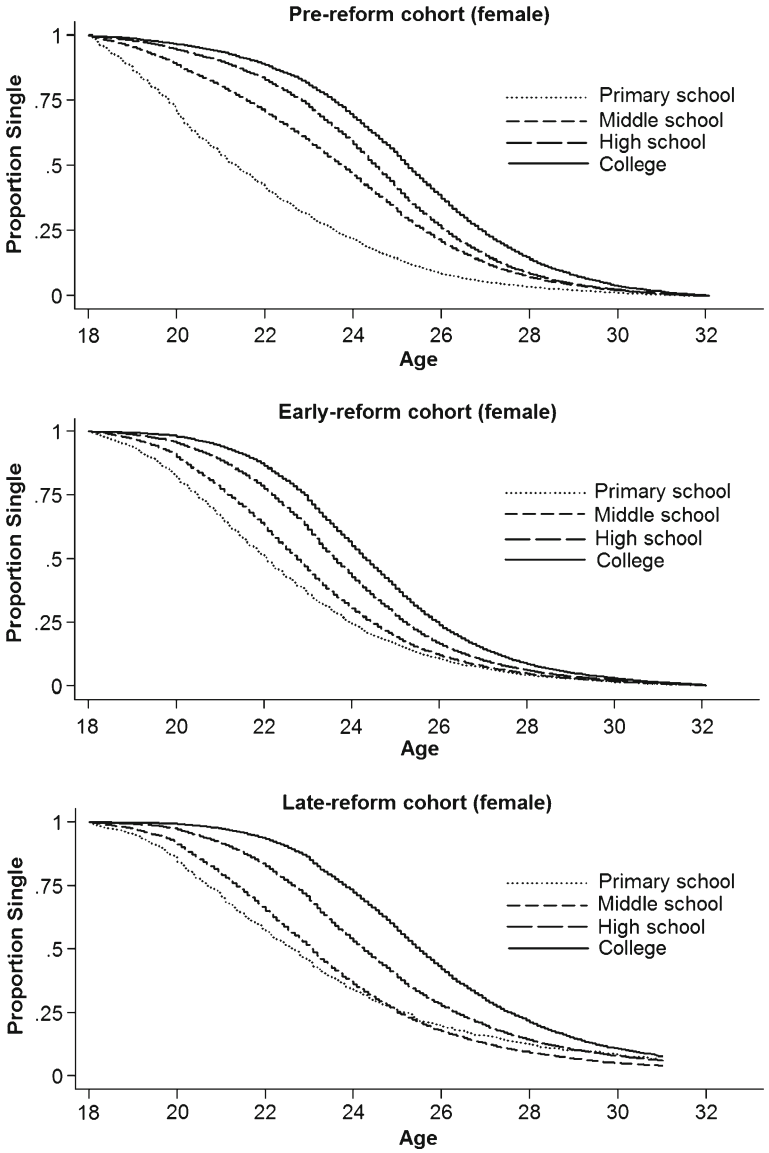

Fig. 2 Kaplan-Meier survival curves of transitions to first marriage for urban females by education

people with less education would enter marriage earlier because they finished school earlier and could more easily find partners. Nowadays, however, persons with less education face a disadvantage in the marriage market because they have fewer economic resources. If marriage has become more strongly associated with SES, as suggested in Figs. 1 and 2, there should be direct manifestations of this at the micro-level. Indeed, in the remainder of this article, we use individual-level data to further explore how the effects of economic potential and other determinants of entry into marriage have varied over time in urban China.

Cohort Comparisons

Using data from CGSS2003 and CGSS2008, we now study the changing importance of men's and women's individual-level determinants of marriage across cohorts. We show the results for men in Table 2 and the results for women in Table 3. In both tables, we present the estimated coefficients of the discrete-time hazards model in three separate columns for the pre-reform, early-reform, and late-reform cohorts. In addition, we provide statistical tests for whether the differences in the coefficients of major explanatory variables across the three cohorts are statistically significant.[4]

Comparing the coefficients of employment status across the three cohorts, we observe that the coefficient of having a job in the labor market became more positive over successive cohorts of men. For the pre-reform cohort, compared with employment in the nonstate sector, unemployment was not significantly associated with men's marriage entry; yet, for the early-reform and late-reform cohorts, unemployment was significantly associated with 32.9 % ($e^{-0.400} - 1$) and 73.1 % lower odds of marriage, respectively. This result supports Hypothesis 1, which predicts that economic prospects have become more positive determinants of marriage entry for men.

Hypothesis 2 predicts that good economic prospects changed from deterring women's marriage in the past to facilitating women's marriage currently. This hypothesis is partially supported by the result pertaining to employment status in Table 3. In the pre-reform cohort, compared with being employed in the nonstate sector, unemployment was associated with 22.5 % higher odds of getting married. The positive effect of unemployment disappeared for the later two cohorts. Although we do not observe a positive association between employment status and marriage for recent cohorts of women, as we hypothesized, the direction of change in the estimated coefficients of employment status is consistent with Hypothesis 2.

We also observe a steady decline in the advantage of working in the state-owned sector in marriage formation for both men and women, supporting Hypothesis 3. For urban Chinese men, shown in Table 2, employment in the state-owned sector was significantly associated with 39.0 % greater odds of getting married than employment in the nonstate sector in the pre-reform cohort, but the positive effect declined to 27.5 % greater odds in the early-reform cohort and disappeared in the late-reform cohort. For urban Chinese women, the results from Table 3 show a similar pattern. In the pre-reform and early-reform cohorts, compared with working in the nonstate sector, employment in the state-owned sector significantly increased women's odds of getting married by 21.0 % and 15.9 %, respectively, but this positive effect was no longer present for the late-reform cohort.

The estimated effects of education—another measure of economic prospects—are not consistent with the predictions of Hypothesis 1 and Hypothesis 2. For urban Chinese men, education was not significantly related to marriage in the pre-reform

[4] First, we pool the three cohorts and estimate the logit model with all the other variables in Tables 2 and 3 and their interactions with dummy variables representing cohorts. Then we reestimate a restricted version of the same model, deleting the interaction between the cohort dummy variables and one particular variable at a time. We obtain chi-square test statistics from such nested models for the null hypothesis that a particular variable has the same effect on marriage entry across the three cohorts. We report the statistical significance of the tests in the last columns of Tables 2 and 3.

Table 2 Coefficients for men from the logistic regression of transition to first marriage on selected independent variables

	Pre-Reform Cohort	Early-Reform Cohort	Late-Reform Cohort	Test Results Across Three Cohorts
Age (spline function)				Prob > $\chi^2(8)$ = .000
15–21	0.431**	0.645**	0.693**	
	(0.036)	(0.052)	(0.093)	
22–25	0.366**	0.327**	0.405**	
	(0.029)	(0.034)	(0.050)	
26–30	0.002	–0.043	–0.008	
	(0.032)	(0.045)	(0.068)	
31+	–0.085**	–0.179**	–0.168	
	(0.019)	(0.050)	(0.200)	
Work Status (ref. = employed in nonstate sector)				
Unemployed	–0.104	–0.400*	–1.315**	Prob > $\chi^2(2)$ = .011
	(0.114)	(0.180)	(0.477)	
Employed in state sector	0.330**	0.243**	0.186	Prob > $\chi^2(2)$ = .000
	(0.077)	(0.094)	(0.135)	
Currently Enrolled in School	–0.488**	–0.378**	–0.553**	Prob > $\chi^2(2)$ = .752
	(0.128)	(0.141)	(0.215)	
Years of Schooling	–0.013	–0.027†	–0.077**	Prob > $\chi^2(2)$ = .033
	(0.011)	(0.015)	(0.023)	
Father's Education (ref. = primary school)				Prob > $\chi^2(6)$ = .311
Middle school	–0.163	–0.236*	0.125	
	(0.120)	(0.109)	(0.146)	
High school	–0.272†	–0.117	–0.287†	
	(0.165)	(0.120)	(0.174)	
College	–0.367*	–0.302	–0.401	
	(0.185)	(0.184)	(0.249)	
Urban *Hukou* Status	–0.340**	–0.430**	0.078	Prob > $\chi^2(2)$ = .023
	(0.095)	(0.113)	(0.156)	
Minority	0.203	–0.358*	–0.818**	Prob > $\chi^2(2)$ = .003
	(0.164)	(0.178)	(0.290)	
Constant	–11.703**	–15.695**	–17.076**	
	(0.752)	(1.089)	(1.984)	
Number of Observations	15,248	11,519	8,364	

Note: Standard errors are shown in parentheses.

$^{\dagger}p < .10$ $*p < .05$; $**p < .01$

cohort, but significant negative effects are observed for the later two cohorts. For early-reform and late-reform male cohorts, one additional schooling year was associated with 2.7 % and 7.5 % lower odds, respectively, of getting married. Similarly, education had a negative association with marriage for urban Chinese women. For the three cohorts, one additional schooling year was associated, respectively, with 8.0 %, 6.2 %, and

Table 3 Coefficients for women from the logistic regression of transition to first marriage on selected independent variables

	Pre-Reform Cohort	Early-Reform Cohort	Late-Reform Cohort	Test Results Across Three Cohorts
Age (spline function)				Prob > $\chi^2(8) = .000$
15–19	0.457**	0.732**	0.720**	
	(0.035)	(0.064)	(0.094)	
20–25	0.265**	0.356**	0.378**	
	(0.020)	(0.023)	(0.032)	
26–30	–0.082†	–0.210**	–0.264**	
	(0.049)	(0.057)	(0.094)	
31+	–0.142**	–0.146*	–0.117	
	(0.031)	(0.065)	(0.299)	
Work Status (ref. = employed in nonstate sector)				
Unemployed	0.203*	0.020	0.185	Prob > $\chi^2(2) = .318$
	(0.086)	(0.133)	(0.274)	
Employed in state sector	0.191*	0.148†	0.105	Prob > $\chi^2(2) = .022$
	(0.086)	(0.091)	(0.132)	
Currently Enrolled in School	–0.987**	–0.519**	–1.486**	Prob > $\chi^2(2) = .000$
	(0.153)	(0.136)	(0.222)	
Years of Schooling	–0.084**	–0.065**	–0.133**	Prob > $\chi^2(2) = .016$
	(0.009)	(0.014)	(0.019)	
Father's Education (ref. = primary school)				Prob > $\chi^2(6) = .360$
Middle school	–0.211†	–0.035	0.009	
	(0.128)	(0.102)	(0.126)	
High school	–0.522**	–0.220†	–0.052	
	(0.160)	(0.132)	(0.150)	
College	–0.548**	–0.275†	–0.394	
	(0.203)	(0.163)	(0.278)	
Urban *Hukou* Status	0.084	0.097	0.210†	Prob > $\chi^2(2) = .691$
	(0.082)	(0.095)	(0.126)	
Minority	0.236	–0.081	0.244	Prob > $\chi^2(2) = .238$
	(0.145)	(0.151)	(0.188)	
Constant	–10.756**	–16.432**	–15.654**	
	(0.671)	(1.237)	(1.838)	
Number of Observations	12,230	10,877	8,531	

Note: Standard errors are shown in parentheses.

$^{\dagger}p < .10$ $*p < .05$; $**p < .01$

12.4 % lower odds of getting married. As in the previous studies, school enrollment is associated with lower odds of marriage for both men and women. For men, the marriage-delaying effect of school enrollment has not changed much over cohorts. For women, however, the negative effect of schooling enrollment was especially pronounced in the late-reform cohort.

Across the three male cohorts, the coefficients of age spline show an inverted-U shape as found in past research: increasing rapidly between ages 15 and 22 (or 20), slowing down in the middle 20s, plateauing in the late 20s, and declining thereafter.[5] The age pattern for women is similar, again displaying a nonlinear pattern. Moreover, for men, rural *hukou* status was associated with a higher likelihood of getting married only in the pre-reform and early-reform cohorts, but not in the late-reform cohort. Yet for urban Chinese women, the advantage of having an urban *hukou* for marriage formation existed only among the late-reform cohort: urban *hukou* was associated with a 23.3 % increase in the odds of marriage. Furthermore, ethnicity in urban China was not significantly related to entering marriage for either men or women. Finally, father's education did not have a significant impact on marriage formation among men. For women, father's educational level was negatively associated with marriage likelihood only for the pre-reform cohort.

In the preceding analyses, we assumed constant effects by age. However, past research has shown that the effects of such determinants as educational attainment on marriage entry may vary by the duration of exposure to marriage (Raymo 2003; Raymo and Iwasawa 2005). To allow for varying effects by age, we add interactions between our main explanatory variables and the respondent's age to additive models in Tables 2 and 3. We present the key results of this exercise in Tables 4 and 5, separately for men and women.

We observe that work status and enrollment do not vary by age for men in all three cohorts. For women, however, the interaction effect between being unemployed and age is significant and negative for the late-reform cohort, suggesting that being unemployed changed from a positive to a negative predictor of the hazard of marriage entry when women in the late-reform cohort reached age 20.7. The interaction effect between enrollment and age is significant and positive for women in the late-reform cohort, indicating a reduction in the marriage-delaying effect of being enrolled as women in this cohort aged. Most notably, we observe strong and significant interaction effects between age and education for both men and women. The main effect of schooling years (i.e., when age is set to 15) is negative. The positive signs of the interactions between schooling years and age reveal that the negative effect of education on hazard of marriage entry declines with age. In Figs. 3 and 4, we graphically depict the interaction patterns for men and women respectively in three cohorts with predicted survival curves—cumulative probabilities of remaining unmarried.[6]

[5] We thank an anonymous reviewer for making this suggestion. The legal marriage ages were 18 for men and 20 for women, per the first Marriage Law of China in 1950. They were revised upward to 20 for men and 22 for women in the Amendment to The Marriage Law in 1980. Consequently, we tried different spline specifications by gender and cohorts. For the pre-reform cohort, the spline cut is set to <20, 20–26, 26–30, and >30 years old for men and to <18, 18–26, 26–30, and >30 years old for women. For the early-reform and late-reform cohorts, the spline cut is set to <22, 22–26, 26–30, and >30 years old for men and to <20, 20–26, 26–30, and >30 years old for women. We obtained similar results under the different specifications.

[6] We first derived predicted marriage probabilities by duration and then calculated cumulative survival probabilities, using estimates reported in Tables 4 and 5. We fixed other covariates at the following values: being currently employed in the nonstate sector, not being enrolled in school, having an urban *hukou,* Han ethnicity, and father having only primary school education.

Table 4 Models for men's transition to first marriage including interactions with age

	Pre-Reform Cohort	Early-Reform Cohort	Late-Reform Cohort
Work Status (ref. = employed in nonstate sector)			
Unemployed	0.670	–2.123	0.335
	(0.597)	(1.392)	(3.685)
Employed in state sector	0.699	–1.296	–0.449
	(0.478)	(0.860)	(1.316)
Unemployed × Current age	–0.031	0.093	–0.075
	(0.024)	(0.058)	(0.164)
Employed in state sector × Current age	–0.015	0.061	0.024
	(0.018)	(0.036)	(0.051)
Currently Enrolled in School	0.260	–1.626	–2.627
	(0.731)	(1.077)	(1.811)
Currently Enrolled in School × Current Age	–0.026	0.058	0.098
	(0.029)	(0.044)	(0.073)
Years of Schooling	–0.382**	–0.611**	–1.008**
	(0.063)	(0.106)	(0.195)
Years of Schooling × Current Age	0.014**	0.023**	0.036**
	(0.002)	(0.004)	(0.007)
Other Variables Controlled			
Constant	–10.064**	–9.666**	–8.495**
	(0.887)	(1.307)	(2.368)
Number of Observations	15,248	11,519	8,364

Note: Standard errors are shown in parentheses.

**$p < .01$

As shown by the survival curves for men, although higher education delays the marriage entry at early ages, it eventually speeds up marriage at later ages, indicating a positive effect on the likelihood of ever marrying. From the survival curves for women, we observe that for the pre-reform and early-reform cohorts, higher education slightly delayed marriage entry, but there are no educational differences in the proportion who would ever marry. For women in the late-reform cohort, however, education exerted a persistently strong marriage-delaying effect with age (shown in Table 5), resulting in a large negative association between education and the likelihood of ever marrying. For example, 39.1 % of college-educated women in this cohort, versus 24.7 % of their peers with senior high school education, remained unmarried by age 30.

In summary, the analysis from cohort comparisons reveals certain changes in the effects of individual-level social determinants for transition to first marriage in urban China. First, economic prospects, including employment status and education, have become more and more positively associated with time of marriage and likelihood of ever marrying for men. However, we did not observe a positive association between economic prospects and the likelihood of ever marrying for women. In the late-reform

Table 5 Models for women's transition to first marriage including interactions with age

	Pre-Reform Cohort	Early-Reform Cohort	Late-Reform Cohort
Work Status (ref. = employed in nonstate sector)			
Unemployed	1.086	1.379	6.152*
	(0.720)	(0.986)	(2.586)
Employed in state sector	0.125	–0.0501	–0.461
	(0.559)	(0.689)	(1.188)
Unemployed × Current age	–0.0411	–0.0625	–0.296*
	(0.0269)	(0.0457)	(0.130)
Employed in state sector × Current Age	0.0013	0.0057	0.021
	(0.023)	(0.029)	(0.049)
Currently Enrolled in School	–2.921**	–4.311**	–7.105**
	(0.704)	(0.992)	(1.719)
Currently Enrolled in School × Current Age	0.094**	0.173**	0.260**
	(0.030)	(0.043)	(0.075)
Years of Schooling	–0.265**	–0.317**	–0.288*
	(0.057)	(0.091)	(0.145)
Years of Schooling × Current Age	0.008**	0.011**	0.007
	(0.002)	(0.003)	(0.006)
Other Variables Controlled			
Constant	–10.544**	–13.827**	–15.263**
	(0.792)	(1.433)	(2.347)
Number of Observations	12,230	10,877	8,531

Note: Standard errors are shown in parentheses.

*$p < .05$; **$p < .01$

cohort, college-educated women married much later and had lower rates of ever marrying than their less-educated counterparts. Finally, working in the state-owned sector lost relative significance across the three cohorts.

Discussion and Conclusion

Previous studies on marriage formation have failed to settle the debate regarding the changing effects of economic prospects. For example, Sweeney (2002) found an increasingly positive role of women's economic prospects in the United States, but Raymo (2003) reported that higher levels of education among women are associated with a lower likelihood of marriage in Japan. For men, although most researchers have acknowledged a significant positive effect of economic potential on marriage formation (Oppenheimer and Lew 1995; Xie et al. 2003), previous research has not found significant changes in such effects over time. We contribute to the literature on the determinants of

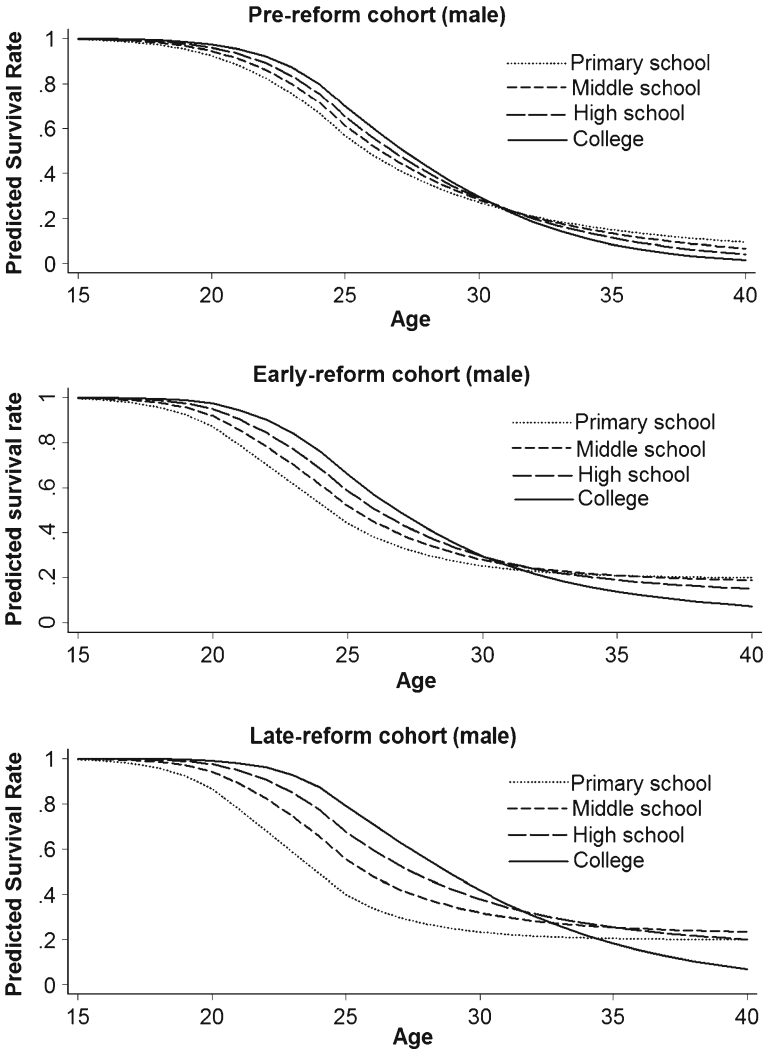

Fig. 3 Predicted survival curves of transitions to first marriage for urban males by education

marriage formation by situating marital behavior in a society that has undergone rapid social changes: urban China in recent decades.

Our descriptive results reveal that the early and universal marriage pattern characteristic of the Chinese family has eroded. For both men and women, marriage age increased over birth cohorts, and the marriage rate before age 25 also declined. Moreover, the Kaplan-Meier survival analysis suggests that marriage is increasingly associated with SES in China, and that the one-quarter of men with the least education in the most recent cohort were excluded from marriage altogether.

Using individual-level survey data, we further explored how individual-level social determinants of marriage timing have varied in importance over time in

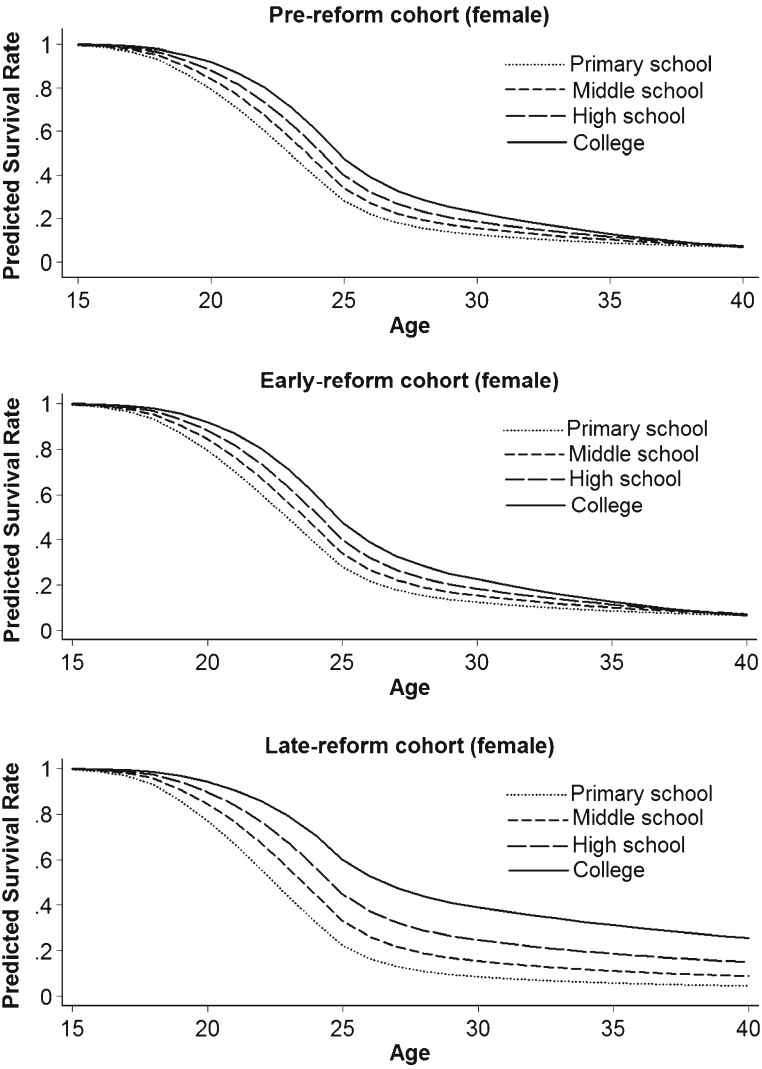

Fig. 4 Predicted survival curves of transitions to first marriage for urban females by education

urban China. In general, our results suggest that better economic prospects increase the chance of finding a spouse for men in the most recent cohort. Employment status has become increasingly more positively associated with marriage formation for men. The influence of education on the risk of marriage depends on age and gender. Higher education delays men's marriage entry at early ages but eventually leads to a higher likelihood of ever marrying. This pattern is particularly pronounced for the early-reform and late-reform cohorts, showing that education became an increasingly more positive determinant of marriage entry among Chinese men. Similarly, women in the most recent cohort show a positive association between being employed and hazard rate of marriage entry after age 21. However, educational attainment had an increasingly

negative association with the likelihood of marriage entry. Taken together, our results suggest that the role of economic prospects for men's marriage formation in China has gradually become similar to that observed in the United States (Sweeney 2002; Xie et al. 2003), but the pattern for women is consistent with earlier findings in Japan, another East Asian society (Raymo and Iwasawa 2005). As a result of privatization and marketization during the economic reform, the advantage of working in the state sector, for both men and women, has declined and finally disappeared over successive cohorts.

Our research shows that the marriage pattern in contemporary China can no longer be characterized as early and universal. A natural question that arises is whether the current trend will lead toward a relatively high proportion of unmarried individuals in China. In other East Asian societies such as Japan, Korea, and Taiwan, scholars have found that a substantial proportion of both men and women will never marry, especially men with low levels of education (Chen and Chen 2014; Park and Lee 2014; Raymo et al. 2015; Rindfuss et al. 2013). Our results reveal a similar pattern in a recent male cohort, with one-quarter of the men with only primary school education being excluded from the marriage market. Although our results indicate that marriage has remained largely universal for women in China, we acknowledge that the family values and marriage behavior of Chinese women have changed greatly during recent years. "Leftover women" (*sheng nu*)—unmarried, highly educated females over 27—has become one of the hottest social issues in China, and numerous news reports have documented the difficulties of women with higher education in mate selection (Fincher 2012; Magistad 2013). Our results provide empirical evidence that women with college education in the late-reform cohort had a much lower likelihood of marriage entry than their less-educated counterparts. One possible explanation for this pattern is the traditional pressure of hypergamy in China (Mu and Xie 2014). In recent years, Chinese women's education has greatly improved, to the point of equaling or even surpassing that of men. According to government statistics, 51.7 % of enrolled college students were female in 2013 (Ministry of Education of the People's Republic of China 2013). Yet, if the pressure for Chinese women to marry up persists, the relative shortage in the availability of higher-educated men makes suitable matches more difficult than in the past. Taken together, our findings suggest more gendered roles of economic resources over cohorts for marriage formation in China and provide evidence that Becker's specialization model has become more applicable over time.

As with most studies on this topic, our research is also limited in some ways. Future work will benefit from extending the traditional single-sex models to two-sex models, considering the exposure variability for meeting potential marriage partners (Zeng and Xie 2008) as well as the true preferences of both men and women (Logan et al. 2008). Such integrative models will enable us to better understand the effects of the interactions between men's and women's personal attributes on marriage within larger, ever-changing social contexts.

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Appendix

Table 6 Descriptive statistics of main predictors for men and women[a]

	Male			Female		
	Pre-Reform Cohort	Early-Reform Cohort	Late-Reform Cohort	Pre-Reform Cohort	Early-Reform Cohort	Late-Reform Cohort
Married (%)	99.63	97.67	52.74	99.74	99.22	64.51
Work Status (%)						
Employed in nonstate sector	32.83	33.66	26.29	37.63	40.97	33.87
Unemployed	16.16	16.73	37.40	28.60	20.59	44.13
Employed in state sector	51.01	49.61	26.29	33.77	38.44	22.00
Currently Enrolled in School (%)	8.86	11.37	19.87	5.18	10.73	19.70
Urban *Hukou* Status (%)	82.47	81.14	77.62	74.74	71.96	69.23
Minority (%)	4.52	5.56	5.63	5.70	7.26	7.96
Father's Education (%)						
Primary school	83.03	62.27	36.46	85.53	63.24	36.17
Middle school	9.13	18.09	31.92	7.28	19.89	33.33
High school	4.34	14.34	23.47	4.47	10.28	24.97
College	3.51	5.30	8.14	2.72	6.59	5.53
Age (mean)	25.71	25.24	24.34	22.86	23.56	22.91
Years of Schooling (mean)	8.59	10.98	12.48	6.67	9.92	11.77
Number of Observations	1,084	774	639	1,140	895	741

[a] Measured at the time of the transition to first marriage or last observation.

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