

Education and Transition to First Marriage in China

Ming Zhao

E-mail: mz1683@nyu.edu

Educational Attainment and Transition to First Marriage in China

Abstract

Using the Chinese General Social Surveys from 2010, 2012, 2013, and 2015, this article examines the effects of education on marriage transition for both men and women in different economic reform periods and urban-rural areas. The Kaplan-Meier survival estimates suggest that marriage patterns by education are distinguishable for men in different contexts but generally consistent for women. Relying on the estimates predicted by the discrete-time logit models, I find that for men, college always delayed marriage at early ages while accelerating marriage at later ages. Further, if men with primary education failed to marry by their late 20s, they were more likely to remain unmarried than their higher-educated counterparts thereafter, regardless of periods and areas. For urban men, middle school and high school began to represent later marriage in the late-reform cohort. Finally, as long as women's educational level was higher than primary school, it delayed marriage until later ages, when the effects of education disappeared. These results indicate that decreased chances of marriage for men of lower economic prospects may support Becker's "marriage market" model, while delayed marriage for women of higher economic prospects may support Oppenheimer's "marriage search" theory when it incorporates economic-independence effects.

Introduction

Previous studies on marriage formation focusing on the context of developed countries have thoroughly documented transition to first marriage as an outcome of economic prospects (e.g., Goldscheider and Waite 1986; Mare and Winship 1991; Oppenheimer and Lew 1995; Sweeney 2002; Raymo 2003). However, findings regarding marriage formation in China remain incomplete and inconclusive. In a recent article, Jia Yu and Yu Xie (2015) examined the effects of socioeconomic determinants on marriage timing in China, but they exclusively focused on urban areas. To test and extend their findings, I situate my empirical work in both urban and rural areas by drawing on different data. Further, I apply a cohort analysis based on the economic-reform periods to observe how dynamic the relationship is for men and women. To investigate whether and to what extent the effects of economic prospects, measured by education in particular, on marriage transition vary with gender, periods, and areas, I first present the trajectories of marriage patterns with demographic analyses. I then review theories and studies on marriage formation and provide education dynamics in the Chinese context. I finally use the event history analysis to examine marriage transition and discuss some applicable theoretical explanations for marriage formation in China.

Marriage Patterns in China

Historically, marriage was done to fulfill obligations to ancestors by producing male offspring to continue the family line (Goode 1963; Thornton and Lin 1994). Traditional Chinese marriage is identified as patriarchal, patrimonial, patrilineal, and patrilocal, emphasizing the absolute authority of parents and men (Xie 2013; Thornton and Lin 1994). At the beginning of the twentieth century, marital timing was the early twenties for men and the late teens for women

(Thornton and Lin 1994).¹ Specifically, according to the data collected in 1929-1931 by Nanking University in China, men's mean age at marriage was 21.3, and women's was 17.5 (Barclay et al. 1976). Additionally, the data also provided evidence of the universality of marriage: "fewer than one in a thousand women and three in a thousand men never married . . . [and] nearly everyone who married was married by age 25" (Barclay et al. 1976:610). The marriage age of women was especially early and universal because, on one hand, marrying at a younger age enabled women to have more chances to produce male children contributing to the family line, and on the other hand, traditional belief regarded daughters as outsiders to the natal family (Thornton and Lin 1994; Goode 1963).

Traditional marriage patterns, to some extent, have transformed as Chinese society develops (Xie 2013). According to the National 1% Population Census of 1982, 1990, 2000, and 2010, marriage has been delayed significantly. Figure 1 shows the changes in the mean age at first marriage for men and women over the few last decades. For men, the mean marriage age was about 25 in 1982 and dropped to about 23.7 in 1990.² It has risen steadily since then, however, and reached 26.5 in 2010. With a similar pattern, women's marriage age was around 22.5 in 1982 and decreased slightly in 1990. From 1990, it has been rising, reaching approximately 24.5 in 2010. As shown, men tended to marry about two years later than women consistently from 1982 to 2010. Although the gender gap was reduced compared to previous Chinese tradition, women are still marrying earlier than men on average.

[Figure 1 about here]

¹ Although the evidence is based on the data from Taiwan, it still illustrates the traditional Chinese family system (Xie 2013).

² The mean age at marriage in 1982 was relatively higher than the age in 1990 because of the implementation of a national family planning campaign called "wan xi shao" (late marriages, long birth intervals, and few births) during the 1970s (Tien 1983).

To show how marriage has been delayed for men and women, Table 1 presents the never-married percent by age-specific group. From 1982 to 2010, less than half of men married between age 20-24, and the percentage has decreased since 1990. Although the large majority of men got married by age 35, the percent of men who were never married before age 30 increased by roughly 20 percentage points from 1990 to 2010, and the percent of those who were never married before age 35 in 2010 nearly doubled compared to that in 1990. For women, more than half were married by age 25 in 1982 and 1990, but the percent dropped to less than 20 percentage points in 2010. Instead, an increasing number of women married after age 25. Particularly, the percent of never-married women aged 25-29 increased to nearly 22 percentage points in 2010, as opposed to 5 percentage points in 1982, and the never-married percent of the 30-34 age group grew almost fourfold from 2000 to 2010.

[Table 1 about here]

Theories and Previous Studies on Marriage

A foundational theory on marriage formation is that of gender-role segregation by Talcott Parsons (1949). It identifies a division of labor in families, where men have an instrumental role as the breadwinner, while women have the express role of homemaker. Based on this idea, Gary Becker (1973, 1974) developed a “marriage market” model and argued that the gain from marriage depends on trading the specified roles, with assumptions that the market is in equilibrium and each individual expects to maximize “household-produced commodities” when looking for a mate. In this sense, better economic prospects place men into a better position in the marriage market and thus grant them more marriage opportunities. However, for women, better economic characteristics, which imply less household specification and thus reduced gain from marriage, result in fewer marriage opportunities or late marriage.

Valerie Oppenheimer (1988) offered an alternative “marriage search” model to explain marriage formation. When gender roles are highly differentiated, an uncertainty about future economic prospects may postpone men’s marriage because accepting a poor marital match now may prevent them from forming a better match later, which suggests that men’s present lower socioeconomic status may be related to delayed marriage. In contrast, women generally marry at younger ages in a setting where they engage primarily in household production, because the level of the early uncertainty about their future economic prospects is much lower than that of men, and the likelihood of marriage declines as women get older. As gender roles become less segregated, Oppenheimer proposed that economic prospects that are considered important in a marital match for men are increasingly symmetrical for women. When there are better economic prospects for young women, unions are less reliant on those of men, which are usually low at early ages. In other words, parity in women’s economic prospects makes marriage formation more likely before the potentially higher socioeconomic status of young men is achieved in the future. As such, both men and women’s economic prospects are positively associated with marriage formation when women’s economic roles come to resemble those of men.

Previous studies in the United States using individual-level analyses have consistently found positive effects of economic prospects on marriage transition of men and women (Cherlin 1980; Goldscheider and Waite 1986; Mare and Winship 1991; Lichter et al. 1992; Oppenheimer and Lew 1995; Oppenheimer et al. 1995). These findings support Oppenheimer’s theory that economic characteristics are valued in marriage formation for both men and women in a society with a lower degree of specification of gender roles. The importance of women’s economic characteristics for marriage has been further demonstrated as growing, given the rapid increase in the proportion of women in the labor force since the 1960s (Qian and Preston 1993; Lichter et al.

2002; Goldstein and Kenney 2001; Sweeney 2002). In Japan, according to James Raymo (2003), the relationship between educational attainment and marriage transition for women was negative for the birth cohorts between 1942 to 1974 because Japan was a society where women had great difficulties balancing work and family. However, a recent study observed positive effects of earnings among Japanese women for the birth cohorts of the 1970s, and the proposed reason for that was the stagnations in economic prospects of young men but improvements in those of women since the 1990s (Fukuda 2013).

More recently, Yu and Xie's study (2015) made contributions to the existing literature on the determinants of marriage formation in the context of urban China. They found that economic prospects became increasingly more positive determinants of marriage formation for men and argued that it might be because men are usually expected to provide a housing unit for marriage, while housing prices have increased dramatically in recent years. Particularly, although higher education delayed men's marriage at early ages, it was eventually associated with a higher likelihood of marriage. However, education had increasingly more negative effects on women's marriage transition for the birth cohort after 1974, in contrast to the negative relationship only at early ages for the older cohorts. Yu and Xie then proposed that the role of education for marriage among Chinese women today can be explained by the traditional hypergamy: as women's education in China has greatly improved, there is a relative shortage in the availability of men who have a better education to match while the "marry up" culture for women still persists. As a consequence, their findings suggested that with more gendered roles of economic prospects over time, Becker's "marriage market" model would be more applicable to China.

Education Dynamics in China

The “use of educational attainment as a proxy for economic resources has played an important role in” studying trends of marriage transition in developed countries (Raymo 2003). However, China provides a unique setting to examine the trends because education expansion has changed over time with rapid economic development promoted by economic reform. China initiated economic reform in rural areas by instituting a market economy in 1978 and officially implemented it in urban areas by developing private sectors in 1992. Hence, education expansion is expected to display a varied pattern across periods and between areas, which may further lead to dynamic associations between education and marriage formation among different groups.

Pre-reform Period: 1949-1977

During the beginning years of the People's Republic of China, the government focused on nationwide expansion in basic education in order to achieve socialist economic development. The number of primary and middle schools therefore was significantly increased in urban and rural China (Hannum and Xie 1994). In the late 1950s, as the demand for trained specialists increased, the priority was placed on developing urban secondary and tertiary education given the conditions of scarce resources, which therefore reduced available resources for the expansion of basic education, especially in rural areas (Hannum and Xie 1994; Hannum 1999). During the Cultural Revolution from 1966 to 1977, for promotion of educational equalities between peasants and other classes, labor and political loyalty became important for academic achievement. Key-point schools, vocational secondary schools, and entrance examinations were abolished. The number of years spent in primary and secondary education were also reduced. Although the number of primary and secondary schools was instead increased, the educational quality was significantly challenged during the revolution (Hannum and Xie 1994; Hannum 1999). Taken together, basic education was developed in both urban and rural China, but the

percentage of higher education in urban areas was much higher in contrast to a very small percentage in rural areas during the period.

Early-reform Period: 1978-1991

Education regained respect and was viewed as a foundation for national modernizations during the early reform (Hannum and Xie 1994). Such a shift was justified with the new ideology that social inequalities under socialism could be best reduced by improving living standards with economic development. Responding to the emphasis on economic development, the education system returned to its competitive model. Particularly, in order to produce expert knowledge, key-point schools and vocational secondary schools were expanded, and entrance examinations were reinstated (Hannum and Xie 1994; Hannum 1999). However, schools in rural areas, compared to those in urban areas, were underfunded due to the decentralization of finance to local governments since the early 1980s. This resulted in the number of quality primary and secondary education opportunities in rural areas remaining static or even decreasing. Moreover, school fees increased at a time when the agricultural economy became privatized, so educating children in rural areas was increasingly costly (Hannum and Xie 1994; Hannum 1999; Wu 2010). Acknowledging such disparities, China established a 9-year system of compulsory education in the mid-1980s in order to expand basic education in urban and rural China (Hannum 1999; Wu 2010). For the expansion of higher education, the small percentage in rural areas had difficult time increasing because of the shortage in educational resources even at primary and secondary levels, compared to a totally different picture in urban areas.

Late-reform Period: Post-1992

With the national transition to a market economy, education was regarded as a means of economic development more than that of socialist political ends (Hannum 2005; Wu 2010).

Under the 9-year system of compulsory education, primary education was largely universalized by 1998, and middle school enrollment was also improved remarkably by the mid-1990s. However, as economic growth afforded more resources for educational development, the uneven regional economic development since the early 1990s had further widened the gap in local governments' capacity to fund education. To adapt to the increasing number of students and educational cost, schools even at basic levels of education were allowed to charge tuition and other fees. Hence, charges by schools have been a primary cause of school dropouts in rural areas due to the low income of farming families. In contrast, local governments in developed areas have greater resources for education (Wu 2010). Further, such disparities in school funding make education quite different between urban and rural areas. Although higher education has dramatically expanded since 1998 at the national level, opportunities for entry to college were rather different for urban and rural China, given that children in rural areas were even less likely to attend high school (Wu 2010).

Data and Measure

Data

To explore the timing of marriage in China, I base my analysis on the Chinese General Social Surveys from 2010, 2012, 2013, and 2015 (CGSS2010, CGSS2012, CGSS2013, CGSS2015), which contain 45,954 observations comprising 22,586 males and 23,368 females in both urban and rural areas. The CGSS is a continuous, repeated, cross-sectional survey project with a national representative sample of the population aged 18 or older and has employed a new multistage sampling method since 2010. First, two levels of sampling are designed: a required level and a selective level. The required level includes five metropolises: Shanghai, Beijing, Guangzhou, Shenzhen, and Tianjin, while the selective level covers other urban and rural areas.

Each level contains three-stage sampling. At the required level, the three stages are sub-district, neighborhood, and household. At the selective level, the first stage is district, county, or county-level city; the second is neighborhood or village; and the third one is household. Finally, each sampled household will have one adult randomly selected as the survey respondent.

Methods

To examine transition to first marriage, I structure the analysis into the Kaplan-Meier estimator of survival probability and the discrete-time logit regression. The Kaplan-Meier survival estimator is given by:

$$S(t) = \prod_{i:t_i \leq t} \left(1 - \frac{d_i}{n_i}\right)$$

where S denotes the unmarried probability at age t , d_i denotes the number of married individuals at age t , and n_i denotes the number of individuals at the risk of marriage at age t . The discrete-time logit regression function is given by:

$$h_i(t_i = t \mid t_i \geq t, X_{it}) = \frac{1}{1 + \exp [-(\beta X_{it} + \alpha_t)]}$$

where h_i is the first marriage hazard rate at age t , X_{it} is a vector of covariates, β is a vector of regression coefficients, and α_t is a set of constants.

Analytical Sample

The initial exposure to the risk of first marriage is assumed at age 15, following Yu and Xie's study (2015), because teen marriage has been practiced in both traditional and contemporary China (Goode 1963; Liu and Zhao 2009; Yu et al. 1994). Therefore, I drop a small number of observations of people who married before age 15 (N=142). Besides, observations with missing values on any variables used in the logit regression are excluded (N=1,754), so the final analytical sample size is 44,058. Lastly, and importantly, to relax the assumption of

proportional hazards, I transform individual units to person-year records, in which the records from age 15 to the age at first marriage (for married samples) or age at survey (for unmarried samples) were generated for each observation.

Variables

Marital status is the dependent variable, coded 0 if survey respondents were never married at the time of the survey and 1 otherwise. That is, respondents who were never married are censored, or in other words, are exposed to the risk of marriage. Age is the time variable, measured by year, to denote either the age at first marriage or age at censoring. To have a linear baseline hazard of age, I model a spline function with knots at 22, 26, and 31 for men and at 20, 26, and 31 for women, following Yu and Xie's study (2015). The age segments defined by knot are slightly different between genders because the minimum legal marriage age has been 20 for women and 22 for men since 1980 (Tien 1983), and as Table 1 shows, there was a two-year gap in the mean age at first marriage from 1982 to 2010 continuously.

Education is the primary interest predictor of this analysis, defined as the highest educational level achieved before marriage, disregarding the degree. The variable is categorized into four levels: primary school, middle school, high school, and college. The category of primary school denotes illiteracy, primary school dropouts, and graduates. Middle school denotes middle school dropouts and graduates. High school represents high school dropouts, students, and graduates. With the various forms of secondary education in China, high school applies to senior high, vocational school, secondary vocational school, and technical school. The college category covers dropouts, graduates, and students of junior and senior college as well as graduate school.

To fully investigate the effects of education, I separate observations by gender, birth cohort, and urban-rural residence (see descriptive statistics in Table 2 in the appendix). Since the role of education may be gendered for marriage formation (Yu and Xie 2015), I use gender as a group dimension to observe the detailed pattern. According to Ryder (1965), birth cohort is significant for studying social changes as each cohort shares the socialization made by historical events in the same time interval, so it is able to capture the characters of different periods related to education dynamics. Following Yu and Xie's measure, I categorize birth cohort into pre-reform, early-reform, and late-reform cohorts. Specifically, the pre-reform cohort describes births before 1960, so most of the respondents in this cohort would be at risk of marriage before the economic reform in 1978. The early-reform cohort consists of those who were born between 1960 and 1974, and therefore the majority of this cohort was exposed to marriage risk from 1978 to 1992, when the market economy was introduced in rural China. The late-reform cohort denotes the respondents born after 1974, most of whom would marry after 1992, when the market economy was expanded to urban China. Because there were great disparities in economic development and educational opportunities between urban and rural China (Wu 2010), I divide residential areas into urban and rural, denoting where respondents were living when surveyed.

Since urban residents may have experienced a rural-to-urban hukou conversion in the duration of exposure as an upward social mobility, I add hukou status before marriage as a control variable (Yu and Xie 2015). I also control if observations were currently enrolled in school because previous studies suggest a conflict between school enrollment and family formation (e.g., Yu and Xie 2015; Raymo 2003; Thornton et al. 1995). The other control variable is ethnicity because ethnic minorities have been shown to be associated with economic and educational disadvantages compared to the majority Han (Hannum 2002; Wu and He 2018).

Previous studies also find that family background affects the timing of marriage (e.g., Axinn and Thornton 1992; Easterlin 1980; Raymo 2003; Yu and Xie 2015), so I use parental education, employment, and party membership to measure family background. Particularly, parent's year of schooling is defined by whichever parent had a better education.³ Parent's employment is categorized as unemployed or employed, describing if one parent or both were employed when observations were at age 14. Parent's party membership is coded as Communist if one of the parents was so.

Results

Kaplan-Meier Curves

To observe first marriage patterns by education, I plot the Kaplan-Meier survival estimates in Figure 2, showing the unmarried probability at a particular age separately by gender, birth cohort, and residence. Looking at urban men across birth cohorts, pre-reform and early-reform cohorts display that men with a primary school education married earlier than those with higher educational levels until their early 30s. As age approached 35, the unmarried probabilities by education became almost identical, with the exception that the primary school had slightly higher probabilities in the pre-form cohort. For the late-reform cohort, increased education from middle school consistently delays marriage before the early 30s, while primary school education was associated with earlier marriage before the middle 20s, yet later marriage after age 35, compared to all other levels.

[Figure 2 about here]

The estimates for rural men in pre-reform and early-reform cohorts failed to show a coherent marriage pattern by education, but two distinguishing features can be captured. First,

³ To avoid losing a large number of observations, I compute the mean for parent's year of schooling to replace missing values.

men with a college education tended to marry later than men with lower levels until their late 30s, and second, if men with a primary education did not marriage by their early 20s, they had higher unmarried probabilities than men with higher educational levels, especially after age 30. For the late-reform cohort, middle school and higher levels showed a positive relationship with the unmarried probabilities before men in their late 20s. However, primary school was not associated with earlier marriage, and it presented much higher unmarried probabilities after the early 30s than any other educational levels.

For urban women in pre-reform and early-reform cohorts, higher levels of education were related to higher unmarried probabilities. As age increased, the differences narrowed, while college constantly had higher unmarried probabilities than other educational levels in pre-reform and early-reform cohorts. For the late-reform cohort, higher educational levels, compared to middle school, displayed higher unmarried probabilities. The probabilities did not merge as age increased, and college was associated with much higher unmarried probabilities until the late 30s. Surprisingly, primary school, in comparison to middle school, began to have a tendency to delay marriage after the late 20s.

For rural women, middle school and high school showed no significant differences on unmarried probabilities after their early 20s in the pre-reform cohort, and primary school and middle school displayed even smaller differences after age 25 in the early-reform cohort. Increased education from primary school up to high school had identical unmarried probabilities since the late 20s across all cohorts. College in the early-reform cohort yielded much higher unmarried probabilities than other educational levels after age 25, while college in the late-reform cohort tended to significantly delay marriage all the time. In summary, the Kaplan-Meier curves suggest that college and primary school represented distinguishable unmarried

probabilities at later ages for urban men in the late-reform cohort and for rural men in all cohorts. In contrast, marriage patterns were generally consistent for women in that education increased unmarried probabilities until later ages.

Discrete-Time Logit Models

To further study the transition to first marriage, I present the coefficients for discrete-time hazards models separately by gender, birth cohort, and residence. Table 3 shows the results for men and Table 4 for women. The coefficients of education in Table 3 indicate that for urban men in the pre-reform cohort, middle school increased the odds of marriage by 12% ($e^{0.113}-1$), while college decreased the odds by 27% compared to primary school. In the early-reform cohort, only college, relative to primary school, was significantly associated with 35% lower odds of marriage. In the late-reform cohort, middle school increased the odds of marriage by 28%, while college reduced the odds by 41% compared to primary school. Looking at rural men, in the pre-reform cohort, middle school was the only significant level where the odds of marriage were 19% higher than for primary school. In the early-reform cohort, middle school and high school were associated with 34% and 36%, respectively, higher odds of marriage than primary school, while college was not significant. In the late-reform cohort, middle school increased the odds of marriage by 35% compared to primary school; in contrast, college decreased the odds by 66%.

[Table 3 about here]

In Table 4, for urban women, middle school, high school, and college in the pre-reform cohort were associated with 38%, 48%, and 67%, respectively, lower odds of marriage compared to primary school. With the same pattern, middle school, high school, and college in the early-reform cohort were associated with 23%, 44%, and 67%, respectively, lower odds of marriage. In the late-reform cohort, middle school, relative to primary school, was not significant, while high school and college reduced the odds of marriage by 46% and 75%. For rural women, middle

school and high school in the pre-reform cohort were associated with 35% and 50%, respectively, lower odds of marriage than primary school. In the early-reform cohort, middle school, high school, and college reduced the odds of marriage by 15%, 39%, and 62%, respectively, compared to primary school. With the same pattern, middle school, high school, and college in the late-reform cohort reduced the odds of marriage by 29%, 55%, and 86%, respectively.

[Table 4 about here]

The coefficients of age spline for both men and women across cohorts show an inverted-U shape. Specifically, the coefficients for men increased rapidly between ages 15 and 21 and increased slowly at the early 20s; later, the coefficients decreased in which the decrease after 30 was faster than in the late 20s. The women's pattern was similar to the men's in that the coefficients increased before 26 while decreasing thereafter; however, the decrease for women after 30 was slower than in the late 20s. Urban hukou status decreased the odds of marriage for men and women living in urban areas. In contrast to expectation, being enrolled in school had positive effects on odds of marriage for both men and women across all the cohorts.⁴ Ethnic minority status was significant for men in the early- and late-reform cohorts but not for any women. Parent's year of schooling was negatively significant only for some cohorts. Parent's employment status was not significant for rural residents but yielded negative effects for urban residents. Finally, parent's Communist party membership was not a significant variable.

Models with Interactions

As the Kaplan-Meier estimates show and the age-spline functions indicate, effects of education on first marriage vary by age, so I then add interactions between education and age to

⁴ This unexpected direction of coefficients was probably resulted from the undistinguished order between graduation and marriage in that the unit of the two variables is limited to year.

the presented models above. Table 5 and Table 6 display the coefficient results of the primary interest separately for men and women. As shown, all educational levels compared to primary school were significantly negative, while all interactions between education and age were significantly positive, regardless of gender, birth cohort, and residence. That is, the negative effects of education on odds of marriage declined as age increased.

[Table 5 about here]

[Table 6 about here]

To better interpret the interaction coefficients, I plot predicted survival curves, namely, cumulative unmarried probabilities, in parallel with the Kaplan-Meier curves. The predicted estimates are displayed in Figure 3. First, when holding other variables fixed,⁵ primary school for urban men was associated with much higher unmarried probabilities especially after the early 30s. In the late-reform cohort, middle school and high school started to show higher unmarried probabilities after the early 30s with the pattern that the lower educational levels were, the higher the unmarried probabilities. For rural men, primary school represented relatively higher unmarried probabilities than middle school since their early 20s. Surprisingly, for rural men in the early-reform cohort, middle school and high school were related to higher unmarried probabilities than college after age 30, together with primary school showing that men with higher educational levels were more likely to marry by age 30.

[Figure 3 about here]

For urban women, the predicted curves were not too different from the Kaplan-Meier curves. In pre-reform and early-reform cohorts, as long as educational levels were higher than primary school, the unmarried probabilities were higher until the late 20s, when the differences

⁵ Categorical variables are fixed at their modes and continuous variables are fixed at their means.

started to narrow. In the late-reform cohort, primary school became a little disruptive after the late 20s and resulted in slightly higher unmarried probabilities than middle school and high school after the middle 30s. For rural women in pre-reform and early-reform cohorts, middle school and high school were associated with higher unmarried probabilities than primary school until their late 20s, while later, middle school and high school tended to be identical with primary school, and interestingly, primary school showed very slightly higher unmarried probabilities after their early 30s. In the early-reform cohort, college was always associated with higher unmarried probabilities, but in the late-reform, the effect of college significantly declines as age approaches 35.

Taken together by the predicted curves, for men, college always delayed marriage at early ages while advancing marriage at later ages. Second, if men with a primary-school education failed to marry by their late 20s, they were more likely to remain unmarried than men with a higher-level education, regardless of periods and areas. Interestingly, middle school and high school began to represent later marriage in the late-reform period for urban men; however, the same pattern was observed in the early-reform period for rural men while dissolving later in the late-reform period. Finally, for women, as long as educational level was higher than primary school, it delayed marriage until later ages, when the effects of education disappear.

Discussion and Conclusion

One primary goal of this article is to test Yu and Xie's findings (2015). Focusing on urban China, they found, for men across cohorts, college delayed marriage at early ages, while it accelerated marriage at later ages; however, any educational level lower than college was increasingly related to a lower likelihood of marriage at later ages. For women in the late-reform cohort, education was negatively associated with marriage transition, but for those in the pre-

reform and early-reform cohorts, the negative association was true only at early ages.

Concerning testing their findings, my results are only partially consistent with theirs. College did postpone marriage at early ages, while it advanced marriage at later ages for urban men in all cohorts, and primary school was indeed increasingly related to a lower likelihood of marriage at later ages. However, I found that the condition of middle school and high school being associated with a lower likelihood of marriage at later ages was valid exclusively for the late-reform cohort rather than all cohorts. Instead, middle school and high school for the urban men in pre-reform and early-reform cohorts eventually led to higher married probabilities at later ages. Generally, Yu and Xie found a positive relationship between education and marriage transition for urban men across cohorts, but I found such a relationship valid only for urban men in the late-reform cohort. For urban women, my findings only supported parts of theirs in terms of the negative association at early ages for the pre-reform and early-reform cohorts. What is inconsistent is that I found that the negative association at early ages was preserved for the late-reform cohort rather than being applicable to all ages for the cohort.

As an extension of Yu and Xie's findings, I found that for rural men, primary school was always related to higher unmarried probabilities at later ages across cohorts. Although college consistently predicted higher unmarried probabilities in the pre-reform cohort, college speeded up marriage at later ages in the early-reform and late-reform cohorts. Beyond expectations, education was positively associated with marriage transition at later ages for rural men in the early-reform cohort, while such an association disappeared in the late-reform cohort.

Interestingly, the positive association at later ages was observed for urban men in the late-reform cohort. One possible explanation for this would be the increasing migration of workers from rural areas to urban areas and that those who decided to migrate were highly selective. As Table

2 shows, the number of rural men became increasingly decreased across cohorts. In addition, the relationships between college and marriage transition in the pre-reform and early-reform cohorts can be misleading because there were very few men who were born before 1974 and had a college education living in rural areas. For rural women, although their marriage patterns were similar to those for urban women, again there were even fewer women who had a college education and resided in rural areas in the pre-reform and early-reform cohorts. Because of the limited variation of data, the relationship between education and marriage transition in rural areas should be further examined. One alternative method to study marriage in rural China is to use rural hukou status rather than rural residence. In this way, migrant workers are placed back at their origin. Future studies may want to use this method to distinguish urban and rural observations.

Yu and Xie argued that as the roles of economic prospects became more gendered over time for marriage formation, in which men's better education is valued while women's is not, Becker's "marriage market" model become applicable to today's China. According to my findings, men with a college education in the most recent cohort were indeed more popular than their less-educated counterparts, which indeed supports Becker's model. However, for women, although women with a higher education were less likely to marry at young ages, they finally get married at later ages just like their less-educated counterparts. That is, higher education for women is not necessarily devalued. If higher education makes women less popular in the marriage market, older women with higher education should be much less likely to marry because of not only the relative shortage in availability of matchable men but also the competition from younger women (Goldman Westoff, and Hammerslough 1984; Oppenheimer 1988). Oppenheimer suggested that as women's economic roles resemble those of men,

economic prospects became important for both men's and women's marriage. However, neither Yu and Xie's findings nor mine showed validity in China. By incorporating some of the economic-independence effects into the "marriage search" theory as described, Oppenheimer provided a different perspective that better economic prospects allow women to have a more careful search in the marriage market and probably encourage some women to set "higher minimum levels of acceptability for a prospective spouse" (1988: 584) and therefore will finally lead to later marriages and nonmarriages. Nonmarriage is still marginal for women in China, but this integrative model very well explains the relationship between their higher education and delayed marriage.

APPENDIX

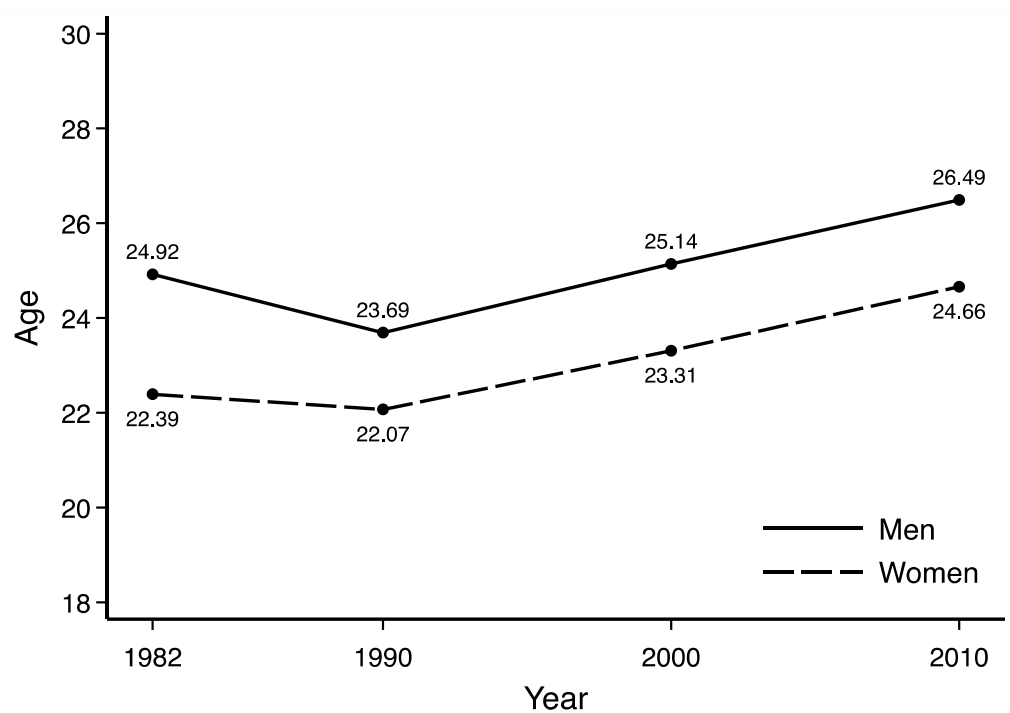
Figure 1. Mean Age at First Marriage of Men and Women: 1982-2010

Table 1. Percent of Never-Married Men and Women Aged 15-49: 1982 to 2010 (%)

Age	1982	1990	2000	2010
Men				
15-19	99.07	98.20	99.72	99.40
20-24	71.98	62.45	78.65	82.44
25-29	23.59	16.71	24.68	36.29
30-34	8.84	7.16	7.45	12.62
35-39	6.77	5.73	4.12	6.44
40-44	5.71	5.17	3.82	4.15
45-49	4.37	5.07	3.96	3.12
Women				
15-19	95.62	95.32	98.75	97.89
20-24	46.45	41.35	57.46	67.55
25-29	5.27	4.29	8.67	21.62
30-34	0.69	0.64	1.35	5.35
35-39	0.28	0.30	0.51	1.76
40-44	0.20	0.24	0.29	0.75
45-49	0.18	0.18	0.21	0.44

Table 2. Descriptive Statistics of Selective Variables

	Men						Women					
	Urban			Rural			Urban			Rural		
	Pre-reform cohort	Early-reform cohort	Late-reform cohort	Pre-reform cohort	Early-reform cohort	Late-reform cohort	Pre-reform cohort	Early-reform cohort	Late-reform cohort	Pre-reform cohort	Early-reform cohort	Late-reform cohort
Married (%)	98.27	96.08	49.90	95.17	94.98	64.34	99.08	98.35	63.26	99.82	99.75	82.33
Age (mean)	26.31 (6.78)	25.83 (5.51)	24.89 (3.97)	26.06 (10.40)	24.54 (6.01)	23.69 (3.86)	23.34 (5.76)	23.63 (4.19)	23.55 (3.45)	21.26 (3.84)	21.71 (3.01)	21.66 (2.86)
Education (%)												
Primary school	30.15	12.70	4.54	68.80	40.93	17.35	49.19	21.51	6.48	89.57	63.19	29.77
Middle school	33.36	33.54	19.89	22.92	44.31	50.81	26.90	33.53	23.69	8.56	31.15	47.02
High school	26.64	35.53	28.68	7.81	14.08	22.52	19.45	32.11	27.42	1.87	5.33	14.16
College	9.84	18.24	46.90	0.47	0.68	9.32	4.46	12.85	42.41	0.00	0.34	9.06
Enrolled in school (%)	2.80	3.14	11.46	0.41	0.44	6.18	1.19	2.85	12.18	0.47	0.56	6.82
Urban hukou Status (%)	65.40	60.79	63.64	3.94	2.81	7.48	56.34	52.67	54.14	0.95	1.80	5.88
Ethnic minority (%)	4.53	5.26	7.30	10.22	12.37	14.48	5.13	6.30	8.14	10.25	12.94	14.79
Parent's schooling year (mean)	3.54 (4.12)	6.13 (4.55)	9.32 (3.77)	1.68 (2.87)	3.63 (3.76)	6.93 (3.49)	3.34 (4.12)	6.07 (4.54)	9.12 (3.76)	1.45 (2.74)	3.37 (3.78)	6.54 (3.73)
Parent's employed status (%)	48.70	55.28	68.05	11.11	15.95	33.14	46.27	53.86	64.68	11.69	15.95	27.68
Parent's Communist membership (%)	30.73	38.88	40.49	26.74	31.05	33.58	31.08	39.88	37.88	27.75	32.08	27.89
N=44,058	4,886	4,073	4,105	4,085	2,910	1,709	4,921	4,258	4,476	3,511	3,083	2,041

Standard deviations in parentheses

Figure 2. Kaplan-Meier Survival Estimates of Transition to First Marriage by Education

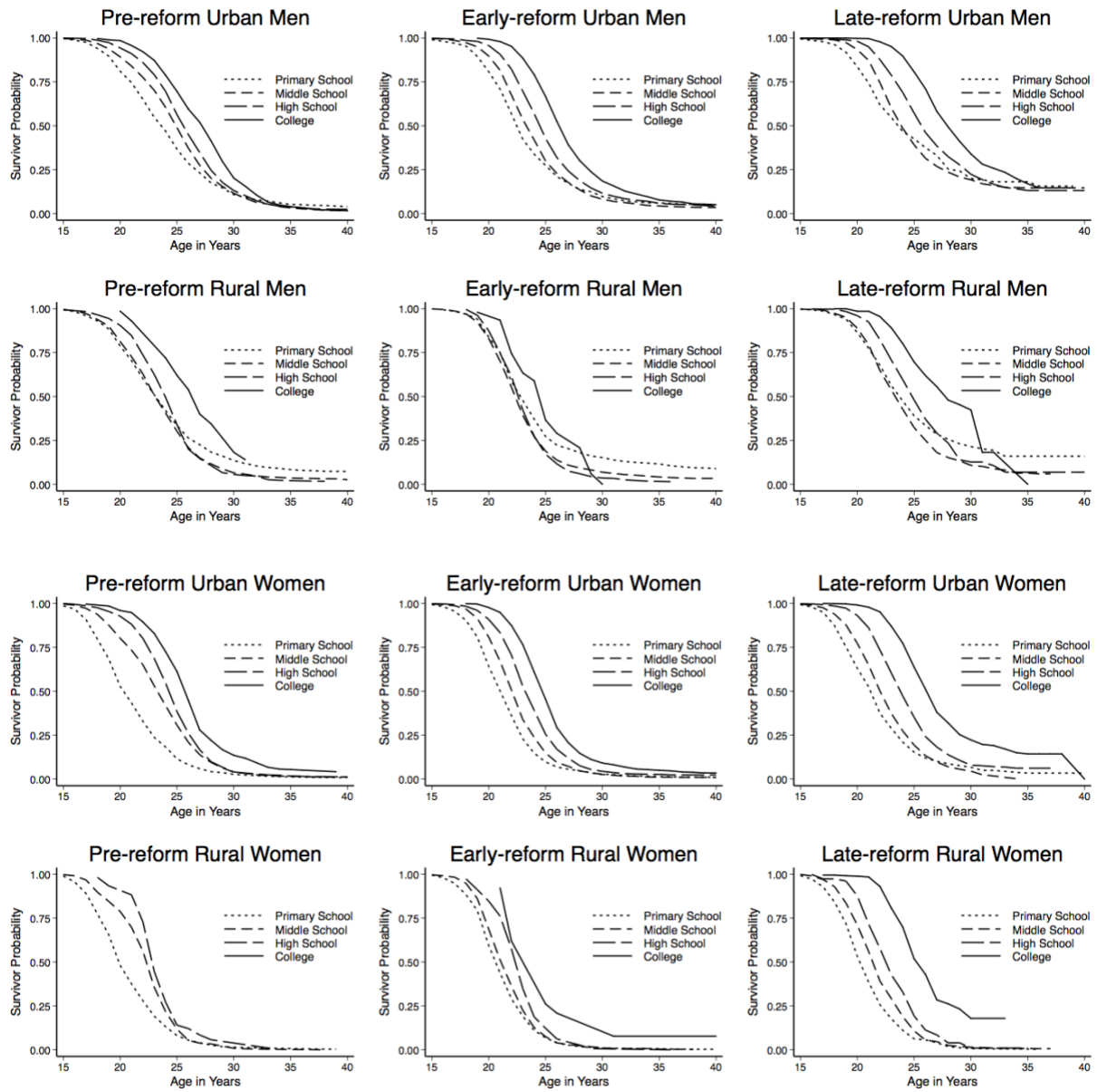


Table 3. Coefficients for Men's Transition to First Marriage

	Urban			Rural		
	Pre-reform cohort	Early-reform cohort	Late-reform cohort	Pre-reform cohort	Early-reform cohort	Late-reform cohort
Age (spline function)						
15–21	0.374*	0.550*	0.607*	0.337*	0.585*	0.541*
	(0.016)	(0.025)	(0.022)	(0.016)	(0.016)	(0.030)
22–25	0.269*	0.182*	0.271*	0.086*	-0.143*	0.039
	(0.016)	(0.018)	(0.018)	(0.019)	(0.022)	(0.035)
26–30	-0.008	-0.131*	-0.058*	-0.170*	-0.196*	-0.164*
	(0.017)	(0.020)	(0.025)	(0.023)	(0.031)	(0.058)
31+	-0.190*	-0.185*	-0.418*	-0.179*	-0.138*	-0.294*
	(0.014)	(0.020)	(0.094)	(0.016)	(0.023)	(0.122)
Education (ref. = primary school)						
Middle school	0.113*	0.083	0.245*	0.173*	0.295*	0.298*
	(0.051)	(0.072)	(0.104)	(0.048)	(0.053)	(0.099)
High school	-0.006	-0.025	-0.045	0.004	0.311*	-0.162
	(0.055)	(0.076)	(0.105)	(0.074)	(0.078)	(0.132)
College	-0.320*	-0.429*	-0.527*	-0.533+	-0.326	-1.081*
	(0.077)	(0.089)	(0.109)	(0.286)	(0.303)	(0.206)
Enrolled in school	0.674*	0.675*	0.800*	1.236*	1.200*	0.857*
	(0.102)	(0.102)	(0.098)	(0.196)	(0.298)	(0.244)
Urban hukou Status	-0.457*	-0.572*	-0.443*	-0.236*	-0.317*	0.174
	(0.046)	(0.053)	(0.056)	(0.095)	(0.148)	(0.160)
Ethnic minority	0.163+	-0.190*	0.203*	0.113+	-0.146*	-0.392*
	(0.087)	(0.085)	(0.090)	(0.067)	(0.073)	(0.111)
Parent's year of schooling	-0.020*	-0.004	-0.009	0.001	0.015*	-0.007
	(0.005)	(0.005)	(0.007)	(0.007)	(0.007)	(0.012)
Parent's employed status	-0.133*	-0.162*	-0.272*	0.073	-0.025	-0.144
	(0.045)	(0.052)	(0.054)	(0.066)	(0.070)	(0.089)
Parent's Communist membership	0.020	-0.003	-0.014	-0.069	-0.097+	-0.099
	(0.040)	(0.041)	(0.047)	(0.045)	(0.052)	(0.077)
Constant	-9.928*	-13.220*	-14.967*	-8.990*	-13.866*	-13.314*
	(0.319)	(0.522)	(0.468)	(0.316)	(0.331)	(0.627)
N=242,252	59,228	47,124	43,927	45,954	29,772	16,247

Robust standard errors in parentheses

* p<0.05, + p<0.10

Table 4. Coefficients for Women's Transition to First Marriage

	Urban			Rural		
	Pre-reform cohort	Early-reform cohort	Late-reform cohort	Pre-reform cohort	Early-reform cohort	Late-reform cohort
Age (spline function)						
15–19	0.263*	0.651*	0.580*	0.300*	0.603*	0.550*
	(0.021)	(0.032)	(0.033)	(0.022)	(0.029)	(0.034)
20–25	0.286*	0.253*	0.323*	0.147*	0.139*	0.173*
	(0.013)	(0.013)	(0.014)	(0.018)	(0.019)	(0.024)
26–30	-0.230*	-0.312*	-0.303*	-0.286*	-0.344*	-0.309*
	(0.030)	(0.031)	(0.040)	(0.047)	(0.053)	(0.096)
31+	-0.166*	-0.212*	-0.096	-0.085*	-0.109*	-0.148
	(0.035)	(0.041)	(0.122)	(0.029)	(0.041)	(0.292)
Education (ref. = primary school)						
Middle school	-0.486*	-0.255*	-0.089	-0.435*	-0.158*	-0.342*
	(0.052)	(0.060)	(0.098)	(0.074)	(0.052)	(0.074)
High school	-0.655*	-0.574*	-0.622*	-0.689*	-0.487*	-0.803*
	(0.057)	(0.067)	(0.099)	(0.155)	(0.104)	(0.117)
College	-1.112*	-1.118*	-1.394*		-0.955*	-1.934*
	(0.103)	(0.088)	(0.104)		(0.484)	(0.179)
Enrolled in school	0.747*	0.778*	0.792*	1.605*	1.275*	-0.049
	(0.131)	(0.105)	(0.083)	(0.343)	(0.370)	(0.266)
Urban hukou Status	-0.208*	-0.256*	-0.142*	-0.185	-0.359*	0.128
	(0.049)	(0.051)	(0.055)	(0.211)	(0.177)	(0.149)
Ethnic minority	0.099	-0.013	0.013	0.009	-0.016	0.106
	(0.089)	(0.089)	(0.090)	(0.073)	(0.072)	(0.090)
Parent's year of schooling	-0.024*	0.001	-0.037*	0.004	-0.011+	-0.024*
	(0.005)	(0.005)	(0.007)	(0.008)	(0.006)	(0.009)
Parent's employed status	-0.124*	-0.091+	-0.114*	-0.115	0.071	0.094
	(0.048)	(0.049)	(0.056)	(0.074)	(0.070)	(0.080)
Parent's Communist membership	0.045	0.026	-0.008	-0.079	-0.049	0.059
	(0.040)	(0.041)	(0.047)	(0.049)	(0.050)	(0.068)
Constant	-6.702*	-14.185*	-12.956*	-7.120*	-12.869*	-11.783*
	(0.387)	(0.621)	(0.636)	(0.398)	(0.539)	(0.628)
N=194,400	45,878	40,757	42,167	26,009	23,969	15,620

Standard errors in parentheses

* p<0.05, + p<0.10

Table 5. Coefficients for Men's Transition to First Marriage Interacting with Age

	Urban			Rural		
	Pre-reform cohort	Early-reform cohort	Late-reform cohort	Pre-reform cohort	Early-reform cohort	Late-reform cohort
Education (ref. = primary school)						
Middle school	-2.027*	-2.420*	-2.987*	-1.106*	-0.128	-1.521*
	(0.280)	(0.484)	(0.941)	(0.252)	(0.311)	(0.679)
High school	-3.172*	-4.160*	-6.867*	-2.746*	-1.641*	-5.149*
	(0.289)	(0.486)	(0.993)	(0.313)	(0.397)	(0.880)
College	-5.811*	-7.545*	-13.239*	-5.618*	-9.990*	-11.089*
	(0.412)	(0.531)	(1.022)	(1.251)	(2.766)	(1.663)
Middle school \times Age	0.086*	0.105*	0.131*	0.054*	0.018	0.076*
	(0.011)	(0.020)	(0.040)	(0.010)	(0.013)	(0.029)
High school \times Age	0.126*	0.171*	0.280*	0.115*	0.084*	0.208*
	(0.011)	(0.020)	(0.042)	(0.013)	(0.016)	(0.037)
College \times Age	0.210*	0.282*	0.504*	0.193*	0.401*	0.405*
	(0.015)	(0.022)	(0.043)	(0.044)	(0.112)	(0.066)
Other Variables Controlled						
Constant	-9.545*	-12.621*	-12.795*	-9.801*	-13.911*	-12.661*
	(0.320)	(0.524)	(0.980)	(0.274)	(0.395)	(0.737)
N=242,252	59,228	47,124	43,927	45,954	29,772	16,247

Robust standard errors in parentheses

* p<0.05, + p<0.10

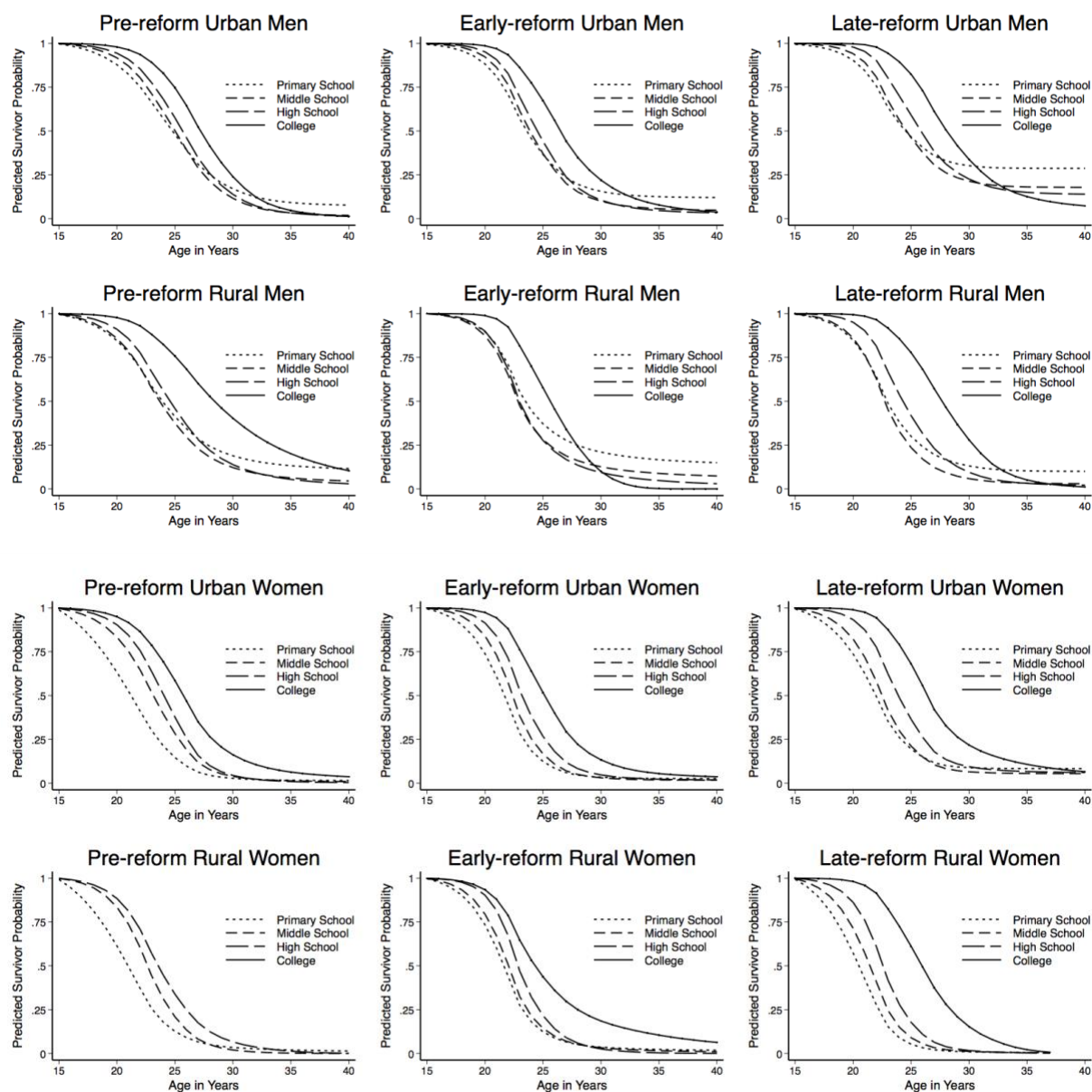
Table 6. Coefficients for Women's Transition to First Marriage Interacting with Age

	Urban			Rural		
	Pre-reform cohort	Early-reform cohort	Late-reform cohort	Pre-reform cohort	Early-reform cohort	Late-reform cohort
Education (ref. = primary school)						
Middle school	-3.287*	-2.481*	-2.437*	-4.571*	-1.417*	-2.025*
	(0.358)	(0.444)	(0.659)	(0.588)	(0.346)	(0.496)
High school	-5.289*	-4.693*	-6.174*	-4.865*	-4.960*	-5.068*
	(0.437)	(0.478)	(0.695)	(0.796)	(0.839)	(0.908)
College	-6.124*	-7.954*	-11.859*		-3.982*	-10.217*
	(0.633)	(0.588)	(0.774)		(1.646)	(1.256)
Middle school \times Age	0.126*	0.101*	0.106*	0.189*	0.059*	0.080*
	(0.016)	(0.020)	(0.031)	(0.026)	(0.016)	(0.024)
High school \times Age	0.201*	0.182*	0.247*	0.184*	0.201*	0.196*
	(0.019)	(0.021)	(0.032)	(0.035)	(0.037)	(0.041)
College \times Age	0.209*	0.289*	0.445*		0.129*	0.357*
	(0.026)	(0.025)	(0.034)		(0.065)	(0.053)
Other Variables Controlled						
Constant	-7.317*	-11.584*	-9.628*	-7.719*	-11.349*	-9.647*
	(0.225)	(0.374)	(0.579)	(0.215)	(0.276)	(0.421)
N=194,400	45,878	40,757	42,167	26,009	23,969	15,620

Robust standard errors in parentheses

* $p < 0.05$, + $p < 0.10$

Figure 3. Predicted Survival Estimates of Transition to First Marriage by Education



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