Changes in Sex Ratio and Female Marriage Timing: 
An Empirical Study

Fang HE*

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Second, increases in female wage rates relative to male wage rates bring forward female marriage timing.

Third, increases in earned income for women bring forward female marriage timing, but the effect is not strong. There is a popular notion that a decline in the benefits of marriage owing to the increase in women’s economic independence is the preeminent factor in the recent rise in delayed marriage, but according to the findings here, this is not true.

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Keywords: sex ratio; marriage timing; Cox Proportional Hazard model

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1. Introduction

In recent years, the average age at first marriage and the proportion of those who have never married have been rising for both men and women in Japan. According to the Vital Statistics conducted by Ministry of Health, Labour and Welfare, the average ages at first marriage in 1970 were 26.9 for men and 24.2 for women, but in 2010, those ages had risen to 30.5 and 28.8, respectively (Figure 1). For the younger generation, the tendency to get married later may develop into a higher rate of being single for life (Hukuda, 2012).

The National Institute of Population and Social Security Research calculated the contribution of changes in marital fertility rate and the contribution of changes in proportion married to low fertility rate in Population Statistics (2008). It showed that from the 1970s, the decline in the marriage rate had contributed more than the decline in marital fertility to the low fertility rate in Japan. Kato and Tsuda (1994) and Minetani (1995) confirmed this finding. Individuals’ decisions concerning whether to marry and when to get married not only have a strong influence on the fertility rate and growth of population but also influence the total labor supply and consumption and wage rates of a society. According to population estimates by the National Institute of Population and Social Security Research, the proportion of never married\(^2\) of the cohort born in 1995 will be 20.1%. Since the decline in population has been a major problem for Japan, figuring out the reasons behind the low marriage rate and the increases in age at first marriage has some urgency.

In this paper, we apply search theory to explain the process of mate search in marriage markets and try to figure out the reasons for delayed marriage. Search theory has been mainly used to explain the process of searching for work in labor markets. Mate searches and job searches are similar in several attributes. For example, both of them face problems of mismatch in supply and demand, information asymmetry, and search costs. Furthermore, the mate search model focuses on the timing of marriage, so it is helpful for us to figure out which aspects are causing delayed marriage. It also allows us to examine the geographic partition of the marriage markets in Japan by calculating the age and region-specific sex ratio in different ways. Although increases in age at first marriage are exhibited by both men and women simultaneously in Japan, and although men have a stronger tendency to not marry,\(^3\) (Figure 1, Figure 3) to improve the situation of low fertility rate it is more important to figure out the aspects causing women’s delayed marriage. This paper focuses primarily on women’s marriage timing.

The reasons for focusing on the sex ratio are that the changes of age-sex composition, the deviations in its geographic distribution of population, and the increases in the divorce rate in recent years may influence women’s decisions about investment of human capital, supply of labor, and timing of marriage. In this paper, besides the age and region-specific sex ratio, we also focus on the macro-economic environment, such as the region-specific unemployment rates, and on individual attributes, such as

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\(^2\) The proportion of those who have never married is the average between the 45–49 age group and the 50–54 age group. It also can be considered as the unmarried rate at age 50.

\(^3\) There are three main reasons for the male never married rate being higher than that of the female rate in Japan. First, the sex ratio at birth is around 1.04 in Japan, which means there are 104 male babies born for every 100 female babies. Since the death rate of males is higher than that of females, the age-specific sex ratio gets smaller in the older age group and becomes close to 1 at the age of 50. This means there are more men than women in the marriage market in Japan. Second, there are differences in age between husbands and wives. Men tend to marry women who are younger than themselves, which makes the marriageable pool of women even smaller as men age. Third, the remarriage rate for men is higher than for women, and in Japan, men who have been divorced tend to marry women who have never been married before. We can get related data to see these three characteristics of Japan’s marriage market from the Population Census of Japan conducted by the Statistics Bureau and the Vital Statistics conducted by Ministry of Health, Labour and Welfare.
education and income.

We use government macro–statistical data and the individual panel data of the Keio Household Panel Survey (KHPS) and the Japan Household Panel Survey (JHPS), which contain participants’ socioeconomic attributes.

The composition of this paper is as follows. The second section introduces mate search theory, the preceding studies, and the characteristics of this paper. The third section introduces the data used in this paper and outlines the characteristics of Japan’s marriage markets. The fourth section introduces the estimation method and the dependent variables and conducts the empirical studies. The fifth section summarizes the conclusions.

<Figure 1, Figure 2>

2. Literature Review and the Characteristics of This Paper

2.1 Literature review

Becker (1973, 1981) applied comparative advantage theory from trade theory to explain marriage behavior. According to his research, through specialization based on the comparative advantages in labor markets and household production, a man and a woman who get married and exchange their output will raise both of their utilities. The problem is that this kind of approach is static, showing only whether marriage is a beneficial choice or not; it cannot explain how the decisions about the timing of marriage have been made. For example, although getting married will have higher utility than staying single, it takes time to find a mate to marry, so an individual cannot get married quickly (Dejima, 2004, p. 34). This kind of situation is familiar from job search theory. Empirical studies such as Keeley (1977, 1979), Boulier and Rosenzweig (1984), Oppenheimer (1988), Matsushita (1989), Loughran (2002), Nozaki (2007), and Tachibanaki and Kimura (2008) used the mate search model to analyze marriage behavior. This mate search theory has mainly been applied to the analysis of women’s marriage timing because in most societies men make the offer of marriage and women make the decision whether to accept the offer or not.

The conception of mate search is as follows. Marriage markets are composed of competitive males and females. Every participant has a distribution of potential mates to marry. Because of the existence of an asymmetry of information, it costs every participant to find a mate to marry. The search costs are composed of direct costs, such as pecuniary costs and psychic costs, and indirect costs, such as opportunity costs caused by the time spent on the mate search. Furthermore, there is a possibility that, along with a prolonged mate search, the increase in age may cause a decrease in a participant’s market value as a mate to marry. Because of the existence of these search costs and the fluctuation of participants’ value in the marriage market, it is unreasonable to wait for the arrival of the most preferred or perfect match. The best strategy is to set a minimum acceptance level of what would be considered an acceptable match.

Expectations and reservations about marriage are influenced by participants’ earning capacity, education, family economic background, time discount rate, and risk aversion. Usually, women who have a high earning capacity, high education, low time discount rate, low risk aversion, and rich parents tend to have high expectations of marriage and tend to delay getting married. Besides the factors above, the obstacles to divorce posed by the legal and social environment also influence women’s reservation levels about marriage. When divorce is difficult, people tend to have a higher reservation level with regard to marriage.

Because it is usually men who offer marriage and because, in Japan, men are usually expected to be
the breadwinner, to be economically marriageable it is important for them to set up an independent household. In this paper, we focus on the timing of women’s first marriage and assume that only economically marriageable men are considered as possible mates to marry. Wilson (1987) assumes that all men who have a job are economically marriageable and concludes that the decrease in the number of men who are economically marriageable contributes most to the decline in marriage of low-income American black women from the end of 1960s to the beginning of 1980s. The hypothesis of Wilson that the decrease in the number of economically marriageable men has a strong influence on the marriage rates of women has been confirmed by much research (Wood, 1995; Loughran, 2002). In this paper, we do not use the sex ratios of the population to examine the state of the marriage market, and we follow Wilson in considering having a full-time job to be an indicator of economic marriageability for men. The calculated prefecture-level age-specified sex ratio and regional-level age-specified sex ratio are used to determine the real geographic range for women to carry out their mate search.

According to Becker’s comparative advantage theory, when women’s wage and employment rates increase, the utility of specialization decreases. At the same time, the opportunity costs of household production rise and the attractiveness of marriage goes down, with the result that marriage is delayed and the proportion of those who never marry rises. By contrast, according to the mate search model, women with a high earning capacity are considered to be better partners, so they find it easier to get marriage offers from men; thus, their search costs go down and their marriage timing will be brought forward. Sakai and Higuchi (2005) found that both men and women who experienced freeter (working part-time jobs) after graduation tended to delay their marriage. This finding supports the mate search model in which high-earning women are more attractive as potential marriage partners.

There are also some earlier studies about the relationship between marriage timing in women and the economic status of men, as well as women’s earning capacity and marriage behavior. Ota (2007) used the Population Census data at prefecture level and reported that the male part-time employment rate had a negative effect on the female marriage rate. Nozaki (2007) used the sex ratios of new graduates, and assumed that there is an educational background-specific marriage market, to analyze the relationship between an increase in highly educated women and women’s marriage timing. According to her research, there is a positive correlation between marriage timing and sex ratio. The unemployment rate of women has a negative influence on women’s marriage, and this tendency is stronger in the younger generation. However, in Japan, graduation is usually combined with geographic mobility, so it is doubtful that the sex ratio of new graduates is really representative of the sex ratio in region-specific marriage markets. In this paper, we use prefecture level and regional level age-specific sex ratios to represent the condition of marriage markets and try to identify which is closer to the real marriage market.

Hukuda (2012) used the Japanese Panel Survey of Consumers (JPSC, 1993–2008) conducted by the Institute for Research on Household Economics to examine the relationship between women’s earning capacity and marriage timing. According to her research, women’s earning capacity has a negative influence on marriage for the 1960 cohort, but for the 1970 cohort the correlation of earning capacity and marriage was positive. In this paper, we also focus on the relationship between birth cohort and women’s marriage timing.

2.2 The characteristics of this paper

In this paper, we combine Japanese individual panel data with the macro region- and age-specific

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4 Japan is divided into eight regions: Hokkaido, Tohoku, Kanto, Chubu, Kinki, Chugoku, Shikoku, and Kyushu.
population and economic data to observe the influences of changes in population composition on Japan’s female marriage behavior. We apply search theory, which is usually used to explain the process of searching for work in job markets. In the empirical section, we employ the Cox Proportional Hazard model to estimate the determinants of marriage timing dynamically. We also take consideration of the chronological changes in population composition in marriage markets and regional differences, using the prefecture/region- and age-specific sex ratio and try to identify which is closer to the real marriage market. We also assume that only economically marriageable men (full-time workers) are considered to be marriageable, so we use the ratio of number of full-time male workers to every hundred women in the same age rank and region.

3. Data and Statistical Observation

3.1 Data

This paper uses both macro statistical data and individual data. We have obtained the prefecture- and age-specific numbers for women from the Population Census (2005, 2010) and the population estimates conducted by the Statistics Bureau; the same numbers for full-time male workers were obtained from the Basic Survey on Wage Structure. We then calculated the sex ratios of full-time male workers per hundred women in the same age rank, and geographic region. The relative wages of women to men are calculated using the data of the Basic Survey on Wage Structure.

We assume that women are searching for men to marry in the same age rank (five years) and in the same geographic area, so we used age- and region-specific sex ratios.

The individual data we use are from the KHPS and the JHPS, both conducted by Keio University. The estimations of marriage timing are made using the samples of those who were single in the first year’s survey (KHPS 2004, 2007, 2012, and JHPS 2009).

3.2 Japan’s Marriage Markets

In this section, we use the macro data to examine the characteristics of Japan’s marriage markets. Figure 1 shows the trends of age-specific unmarried rates. According to these figures, apart from males in the 20–24 age group, unmarried rates rose quickly from the end of the 1970s. From the middle of the

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5 Our decision to choose the status of full-time worker as an indicator of an economically marriageable man does not necessarily mean that men who are not full-time workers are not economically marriageable. Moreover, there are many ways to define economically marriageable men; for example, being a regular employee or earning an annual income higher than a certain amount. Because of the limitations of the data available, we define being a full-time worker as being economically marriageable.

6 The Basic Survey on Wage Structure is sampled according to place of work, whereas the Population Census is conducted according to place of residence. This creates an inconsistency in geography when using these two surveys to calculate the region-specific marriageable men to women sex ratios. Since, according to our research, there is no available residence-based sex-, age- or region-specific employee data, we use the prefecture- and age-specific male full-time worker numbers from the Basic Survey on Wage Structure.

Another problem is that the Population Census is conducted on every individual living in Japan, but the Basic Survey on Wage Structure is only conducted on the samples extracted, so the calculated values of age- and region-specific full-time male workers to women are actually smaller than the real value. Nonetheless, we think this variable reveals the composition of the real condition of sex ratios in marriage markets.

7 According to the Vital Statistics conducted by The National Institute of Population and Social Security Research, the average age difference of total married couples in 1970 was 3.0, and for couples of first marriage it was 2.7, but in 2011 those figures had contracted to 2.2 and 1.7, respectively. There are couples whose age differences are larger than 5 years, but we think that choosing 5 years as the age length of rank is appropriate and is close to the target mate group.
1980s, the proportion of those never married and the average age at first marriage for men rose quickly and passed the figures for women. In addition, the difference in average age at first marriage between men and women is shrinking.

In the Vital Statistics, the National Institute of Population and Social Security Research asked subjects aged 18–34 about their willingness to marry. According to their results, around 90% of men and women are willing to get married (Table 1). However, the proportions of those wanting to “stay single forever” are increasing, and more so among men than women. The increase in the proportion of those never married may be affected by the number of those willing to marry. Since we cannot get further information about willingness to marry, in this paper we focus on actual marriage behavior. The Vital Statistics also asked subjects what aspects they value most in a partner. For men, personality, an understanding attitude toward work, and the capacity and willingness to do housework are important. Women think personality, economic independence, willingness to do housework, and an understanding attitude toward work are important. We can see by this that women value economic independence in their partners, which suggests we can assume that only those men who are economically independent should be regarded as potential husbands.

Figure 4 used the Longitudinal Survey of Adults in the 21st Century conducted by the Ministry of Health, Labour and Welfare to show sex- and income rank-specific marriage rates in the past six years (2010). According to Figure 4, for both men and women with an annual income under 5 million yen, there is a positive correlation between income and marriage rates. For the group with an annual income higher than 5 million yen, the marriage rates in the past six years are at the same level as that of the average.8

3.3 Observations Based on KHPS and JHPS

In this section, we use Kaplan-Meier survival estimates to show birth cohort- and education-specific unmarried probability visually. Since women in Japan are allowed to get married at the age of 16 by law and most people start to think about marriage after graduation, we have set two time spans, one at 20 years after age 16 and one at 20 years after graduation. The pooled data of KHPS 2004–2012 and JHPS 2009–2012 are used.

First, we can see that young birth cohorts have a higher unmarried probability. In addition, there are differences in the relationships between educational background and unmarried probability in the birth cohorts. For the birth cohort before the 1960, for the first several years after graduation, women with a higher education have higher unmarried probabilities, but 10 years from graduation, the differences in education have disappeared. For the 1960 birth cohort, with the passage of time, the differences of

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8 The subjects of the Longitudinal Survey of Adults in the 21st Century are aged from 23 to 42. With regard to the group annual income higher than 5 million yen, the biggest proportion is the group aged from 36 to 40, and the second is the group aged from 31 to 35. For single individuals who are older, the probability of getting married is declining, so it is possible that the lack of an increase of marriage in the group with an annual income higher than 5 million yen is influenced by age.
unmarried probabilities in education disappeared and then reappeared. By contrast, birth cohorts after 1970 have relatively small differences in unmarried probability after graduation, but the difference increased with the passage of time.

Concerning trends after legal marriageable age, at around age 20 the differences of unmarried rates in educational background appeared, and for the birth cohort before 1970, this kind of difference shrinks with the passage of time before finally disappearing. For the birth cohort after 1970, however, this kind of difference does not disappear.

From this observation, we can see that there are unmarried probability differences in educational background, and this tendency is stronger in the younger cohorts.

<Figure 5 and Figure 6>

4. Empirical Analysis

4.1 Estimation method

In empirical analysis, we focus on the length of search and employ the Cox Proportional Hazard Analysis. To see the differences in age and education, we observed the length from legal marriageable age (age 16) to first marriage and the length from graduation to first marriage. The female samples who were single the year before the first wave survey are used.

4.2 Dependence variables

The dependence variables are chosen based on the conception of the mate search model.\(^9\)

**The Age-Specific Sex Ratio in Marriage Markets**

According to the hypothesis of Wilson (1987), the decline in the number of marriageable men in the marriage markets pulls down the marriage rate of women. In this paper, we assume that only men who are economically marriageable enter the marriage market, and we treat men who have a full-time job as economically marriageable. In considering the existence of mobility costs, we also assume that mate search activities are conducted in the same prefecture or region. Since the age-specific sex ratios are different for each region, there are incentives to move to a higher sex-ratio region, but it is difficult to estimate the mobility costs and the benefits gained from such a move. Therefore, in this paper we assess the appropriate regional division for marriage markets. To do this, we calculate the age- and prefecture-specific sex ratios and age- and region-specific sex ratios.

**The Relative Wage between Men and Women**

We have used the relative wage level between men and women of the same age as an indicator of employment circumstances for women. The higher relative wage level for men will push up women’s reservation levels about marriage, which will postpone women’s marriage timing. At the same time, however, a higher wage means greater attractiveness in the marriage markets, a reduction in search costs, and consequently an earlier marriage. To see which of these two contradictory effects is greater, we calculated the age-specific relative wage level of women to men.

**Earned Income for the Last Year**

There is a popular notion that women’s economic independence has made marriage less attractive,\(^9\)

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\(^9\) KHPS and JHPS have questionnaires about time discount rates, but because they are not asked every year, we did not use them.
which is the preeminent reason for the recent rise in delayed marriage. Being economically independent allows women to have the composure to find a mate without the need to hurry. It also raises women’s expectations about marriage. The reservation levels concerning marriage also go up and marriage can be delayed. In the mate search model, however, women earning a higher income are more desirable to marry. It is difficult, then, to conclude that women with a high earning capacity are less likely to marry. In this paper, we use earned income for the last year \(^\text{10}\) as an indicator of earning capacity.

**Educational Background**

To assess the effects of educational background on marriage, we have included education dummies in the estimation. We use junior and high school graduates as the reference group and vocational school and college graduates as the comparisons. Earned income for the last year is an indicator of current earning capacity, whereas education is a kind of indicator of long-term earning capacity. Decisions about marriage are also influenced by the time discount rate, the value an individual puts on current utility. From the data used in this paper, it was impossible to get the information for time discount rates for the whole survey period, but education also works as an indicator of the time discount rate. Individuals with a high education usually have put a low value on current utility and tend to have low time discount rates. Therefore, we can think of education as an indicator both of earning capacity and time discount rate.

**Family Background**

It is not difficult to understand that parents’ economic circumstances will influence women’s decisions about marriage. Women with higher-income parents usually have a high standard of living, which makes their expectations of marriage high and makes it possible for them to delay marriage. The annual income of parents is a more appropriate indicator of their economic circumstances, but because this kind of information is not available in the surveys we used, in this paper we use the parental education-level dummies to assess family circumstances.

**Macro-economic Factors**

Macro-economic conditions will influence the number of men who are economically independent in marriage markets. We used the last year’s prefecture-specific total unemployment rates. Korenman and Neumark (1991) detected combined high marriage rates in marriage markets with high employment rates in labor markets.

**City Scale**

It is possible that there are differences in the distribution of potential marriage mates in big cities and small towns. For example, there are more potential marriage mates in a big city compared with a small town, which make the costs of mate search lower for big city residents. At the same time, consciousness of the existence of a high density of potential marriage mates may raise reservation levels and actually delay marriage. In addition, the nature of industry and the employment opportunities in big cities and small towns differ, affecting the sex ratio and the ratio of economically independent men to women. Since information regarding sex ratio and city size level is not available, in this paper we use the city size dummy to assess the influence of city residence.

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\(^{10}\) Earned income for the last year is calculated into real value by using CPI excluding imputed rent. The unit of earned income for the last year is 100,000 yen.
Divorce Rates

When societal norms are strict about divorce, individuals need more courage to get married, which may raise the reservation levels concerning marriage and pull down the marriage rates. In this paper, we use the prefecture-specific divorce rates of the last year as the proxy of feasibility of divorce.

4.3 Estimation Results: Estimation of Women’s Marriage Timing

Table 2 shows the descriptive statistics of samples used in the Cox Proportional Hazard model, and Table 3 shows the estimation results of the period from age 16 to first marriage and the period from graduation to first marriage. The estimation is also divided into prefecture-specific and region-specific figures. In the estimation, female samples who were single in the year before the first survey years are used. For the Cox Proportional Hazard Analysis, hazard ratios bigger than 1 mean that marriage timing will be accelerated.

</Table 2, Table 3>

For the estimation of age 16 to first marriage, graduation to first marriage, and age- and geography-specific estimates, the statistically significant variables are the same. These are “geography-specific number of (male full-time workers/female)×100,” “(Wage of female/wage of male)×100,” “earned income for the last year,” and “prefecture-specific divorce rates.” The geography- and age-specific sex ratios are statistically significant in each estimation model at a 1% level. This means that the more full-time male workers there are in the labor market, the earlier the marriage timing for women, showing that Wilson’s hypothesis applies to Japan’s marriage markets. Furthermore, after comparing the effects of age-specific sex ratio of the two geographical divisions, we can see that the values of hazard ratios for regions are larger than for prefectures, suggesting that women in Japan tend to carry out the mate search at a regional level and are not limited to prefecture of residence.

The hazard ratios of the relative wages of women to men are all statistically significant at the 1% level in each model, and the hazard ratios show that the higher the wages of women compared with men in the labor market, the earlier the marriage timing of women in the marriage market.

Concerning the effects of earned income from last year, the statistical significances are high, but the value of hazard ratios are close to 1, which means that although the higher a woman’s earning capacity the earlier her marriage timing, the influences are not that strong. Nonetheless, this undermines the idea that women’s economic independence is responsible for the recent rise in delayed marriage.

Concerning the effects of educational background, the statistical significances are different, but the results of all models show that compared with junior school and high school graduates, the search times of graduates from college and graduate school are shorter. We should be careful how we interpret this result. Because our estimations in this paper are only based on female samples who were single, there is a possibility of sample selection bias. From Figures 5 and 6 we know that probability of being unmarried is lower for women who are of a low education. This suggests that there is a possibility that the marriage rates of junior school and high school graduates are high, but the estimation, based only on the single samples, may have a sample selection bias. To solve this problem, we need to employ another analysis method that can include the samples of married women. However, this kind of analysis is not allowed for in the mate search model.

Concerning the effects of prefecture-specific total unemployment, the results are consistent in all models. The higher the unemployment rates are, the earlier women get married. However, this result is not consistent with preceding study (Korenman and Neumark, 1991). It is thus difficult to interpret. A possible
interpretation is that, when a recession comes, female workers tend to gain more influence compared with male workers, which will lower women’s opportunity costs and their reservation levels about marriage.

5. Conclusions

In this paper, we have attempted to identify the factors behind the tendency in Japan to marry late. We applied search theory to the process of women’s mate search in marriage markets and used having a full-time job as the indicator of being marriageable. We therefore used the number of male full-time workers for every hundred women in the same age and residence region as the variable showing the condition of the marriage markets. Using the estimations from the Cox Proportional Hazard model, we confirmed the following facts:

First, when the number of the full-time male workers in labor market increases, women’s marriage timing will be brought forward in the marriage market. Female marriage timing is influenced by the number of potential marriage mates.

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Third, increases in earned income for women bring forward female marriage timing, but the effect is not strong. There is a popular notion that a decline in the benefits of marriage owing to the increase in women’s economic independence is the preeminent factor in the recent rise in delayed marriage, but according to the findings here, this is not true.

The development of delayed marriage has been changing the population composition of Japan. The existence of people who are willing to marry but who are unable to do so indicates that there is room for improvement in Japan’s marriage market. Women’s marriage behavior and mate search costs are influenced by their knowledge of potential mates in the marriage market. The asymmetry of information accompanied by geographic distance elevates search costs and induces delayed marriage. To conquer this problem, employing mechanisms to expand information available about the marriage market and to reduce mate search costs to encourage matching is important. There is some hesitation on the part of government to involve itself in individuals’ marriage behavior, but to improve conditions in the marriage market, we recommend that it be made easier for people to use marriage agencies and that they be helped to reduce their mate search costs.
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Figures

Source: Population Census of Japan.

Figure 2. Decomposition of differences in total fertility rates: 1925–2005
Figure 3. Trends of never married rates and average age at first marriage
Notes: The proportion of the never married is the average between the 45–49 age group and the 50–54 age group. It also can be considered as the unmarried rate at age 50.
Figure 4. Sex- and income-rank-specific married rates in the past six years (2010)

Source: Longitudinal Survey of Adults in the 21st Century

Notes: 1) The subjects of this figure are the samples who answered the survey from the first survey to the ninth survey, plus those who were single in the third survey (2004).

2) Concerning the income amounts, for the married sample they are the amount for the year before marriage, whereas for the unmarried sample it is the amount in the eighth survey.

3) The married rates also include samples who divorced after getting married.

4) For those samples who married more than once, the most recent marriage is calculated.

5) The age of the samples is 23 to 42.
Figure 5. Birth-cohort- and education-specific unmarried probability (After graduation; Kaplan-Meier survival estimates)
Figure 6. Birth-cohort- and education-specific unmarried probability (After aged 16; Kaplan-Meier survival estimates)
Table 1. Trends of willingness to get married (1987–2010)

Source: Vital Statistics conducted by The National Institute of Population and Social Security Research

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<th>Variable name</th>
<th>Sample size</th>
<th>Average</th>
<th>Standard deviation</th>
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<td>14.342</td>
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<td>13.336</td>
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<td>12.360</td>
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From age 16 to first marriage | From graduation to first marriage

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<th>Variable name</th>
<th>Sample size</th>
<th>Average</th>
<th>Standard deviation</th>
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Table 2. Descriptive statistics

Table 3. The estimates of women’s marriage timing
Notes: Cox Proportional Hazard model is employed.

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<th>Expected hazard ratio</th>
<th>From age 16 to first marriage</th>
<th>From graduation to first marriage</th>
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<td>Region</td>
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