

Analysis of the Effects of Macroeconomic Conditions on the First Marriage *

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Abstract

The purpose of this paper is to find out if the macroeconomic indicators such as the economic growth rate or unemployment rate affect the timing of the first marriages. We have analyzed the timing of the first marriages by Discrete Time Method using the first marriage data in “The Japanese Longitudinal Survey on Employment and Fertility (LOSEF): the 2011 Internet Version” (conducted by professors Takayama, Inagaki and Oshio), a retrospective panel data for education, job history, as well as the adolescent family environments for more than 4 thousand individuals whose birth years span three decades, starting from 1950. We have found that, for both men and women, good economic conditions shortens the time to first marriages, while higher unemployment in graduating years tend to delay them. We have confirmed that for men, regular employment is important to marriage, but it is not the case for women, which is what the standard search theory for marriage suggests. On the other hand, we have found men and women from high income families tend to marry early, contrary to what has been found in previous works.

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1. Introduction

There is a consensus in Japan that the low fertility rates of the last two decades are the results of increase in the number of single women and the age at first marriage (Iwasawa 2002). Many economic demographers now believe that, *ceteris paribus*, marriage rate increases with the increase in the male earnings, but decreases with the increase in the female earnings (Blau et al 2000). A number of Japanese empirical studies have shown the increase in the proportion of women getting higher education, getting good jobs and the reduced gap in earnings between women and men can explain a large part of the decline in marriage and fertility (Ogura and Dekle 1992, Takayama et al 2000, Ogura and Kadoda 2010).

Although a large number of studies have investigated the effects of business cycles and fertility and marriage for the U.S. and the other developed countries, most of these studies have been based on observations of aggregated data of these countries (Butz and Ward 1979, Winegarden 1984, Macunovich 1994, Sobotka et al 2010, Goldstein et al 2013), including the ones for Japan (Ogawa and Mason 1986, Lee and Gan 1989, Ogawa and Retherford 1993, Ueno 1998, Retherford, Ogawa and Matsuoka 2001, Ogawa 2003). There have been a limited number of micro-econometric studies, most of which are based on cohorts born between relatively narrow intervals.

Based on the assumption of differential opportunity costs of unit time between working and non-working wives, a well-known study using the aggregated data of the U.S. presented an evidence of the counter-cyclical relationship of fertility (Butz and Ward 1979). However, a subsequent analysis cast serious doubts on the robustness of their findings (Macunovich 1993). Recent experience in Europe and Japan suggest that in a severe recession, as many young men out of schools cannot find stable employment, young women are not tempted to marry them, and fertility rate falls (Ogura and Kadoda 2010). Thus the relationship between economic conditions and marriage may not be a simple one.

The purpose of this paper is to examine the effects of macroeconomic conditions on marriage, by estimating a discrete survival function on the time to first marriage starting at age 18. Our estimation is based on a panel data called “The Japanese Longitudinal Survey on Employment and Fertility (LOSEF): the 2011 Internet Version” (conducted by professors Takayama, Inagaki and Oshio), which is a retrospective panel data for education, job history, as well as the adolescent family environments for more than 4 thousand individuals. This data offers the marriage experience of individuals whose birth years span more than three decades, starting from 1950 to 1981. The macroeconomic conditions when they were most marriageable ranged from the last phase of high growth era to the glacier period of the last two decades, with bubble economy in the middle. Such a wide swing in economic environments happening in relatively short period of time provides a very good opportunity to examine their effects on marriage behavior. Our unit of time for observation is one year and our analysis covers more than four decades, starting in 1968 and ending in 2011.

Following the previous studies, we control for such individual characteristics as the types of current employment, number of years of education, and types of first employment after graduation. Various socioeconomic characteristics of the household in which the person grew up are controlled too. Macroeconomic conditions are represented by the current rates of economic growth and the rate of unemployment in the graduating

year. The latter variable captures the long-lasting effects of the macroeconomic conditions at the time of graduation on subsequent personal income levels and employment.

To preview our results, pooling all samples, we find that good macroeconomic conditions promote marriage for both men and women, but their effects are not large. A high unemployment rate at the time of graduation works as a persistent inhibitor of marriage for both men and women. The strongest promoter of marriage is regular employment for men, but it is irregular employment for women. The strongest inhibitor of marriage is being a student for both men and women. Being unemployed immediately after graduation seems to have a persistent negative effect on marriage, for both men and women.

Estimating by birth cohorts revealed somewhat different stories; for cohorts who reached age 20 prior to 1990 in the bubble economy, good economy still promotes marriage, and bad economic condition at the time of graduation still delays marriage. On the other hand, for women who reached age 20 after the burst of the bubble economy, a higher rate of unemployment at the time of graduation promoted marriage. The last point may indicate that marriage may be now a new risk-sharing arrangement on the part of women in today's unprecedented economic hardships, although more research on this point is needed.

2. Background for our research

2.1 Changes in marriage market in the last fifty years

Increases in the age at first marriage and in the number of unmarried women have contributed to the rapid decline in fertility in Japan since 1970. As the number of babies born outside of marriage accounts for only 2 % of all babies born in Japan, the decline in marriage rates has been directly translated to the declines in fertility rates (Ogura 1994, Iwasawa 2002).

In terms of marriage rate, we can divide the post WWII history of Japan into two distinct periods; namely, the period of universal marriage that lasted until the mid-1980's, and the second period of individual search.

During the period of universal marriage, almost everyone got married, many with the help of "arranged marriage"¹. The marriageable age changed a few years over the years, having been pushed by college education; most women got married before they reached 25 years old, and most men got married before the age 30. The universal marriage during this period was supported by what economists termed as "Japanese system of corporate management", or lifetime employment with seniority based wages. In the formal labor market, regular jobs were reserved for men, and only a small number of jobs like teachers or nurses were open to women. Every year, large firms hired exclusively graduating men and women, with an understanding that men were expected to work for life, but women, given mostly manual or subsidiary jobs, were expected to leave when they find someone to marry. If women had stayed on the job, without regular promotions given to men, their earnings would have been one-third or one-quarter of male counterparts. Most women did not have an alternative life-plan to marriage.

The period of universal marriage had began with the era of high economic growth

¹ In spite of the word "arranged", only the initial introduction in the search process was arranged, and the marriage itself had not been arranged. Both families, choosing the acceptable ones from the lists of candidates who had circulated their bios and photographs for formal introduction, meet a few times before they decide to get married or not.

around 1950, and it managed to last almost three decades until the middle of 1980's. Why did this period come to an end? Simply put, it ended because Japanese firms, no longer could sustain the sexual discrimination in the labor market, began hiring women for jobs once reserved for men, and gave women an alternative to marriage (Ogura 2001). Several factors including the currency shock of 1971, and oil-shock of 1973, contributed to this change. On the supply side, by 1970's, middle-income families, which used to send only their sons to college, could now afford to send their daughters too, and hence the supply of women with higher education was abundant.

As a result, in the economic "bubble" of the second half of 1980's, the second baby-boomers reached their marriageable age, and many of them discovered that the economic gains from marriage were no longer overwhelming. Instead of going through the motion of "arranged marriage" as their preceding generations had done, they would rather keep on working until she would meet a marriageable man. For the first time in modern history of Japan, women were given a right to remain single for life, without condemning herself to a lifetime of poverty.

There are two points we would like to make on the relationship between women and the labor market at this moment. First, after some initial confusion, marriage still remains a lifetime goal of most women. The proportions of women who give higher priority to work over marriage are still small. According to the National Survey on Marriage and Childbirth, in 2010, 89.4% of surveyed single women replied that they are going to get married eventually, and only 6.8% of them replied they intend to remain single for life. These proportions have remained stable in the last two decades².

Secondly, women's pursuit of work opportunities and higher income still seems to be conditioned by their marital status. In particular, in the last three decades, we have not observed an increased tendency among "married" women to return to work. If we look at the changes in the labor force participation rates during this period, among single women, it has increased by more than 10% points³. Among married women, however, it has changed little⁴. Comparing the labor force participation rates between 2001 and 2011, the rates have increased in 25-29 year old class and in 30-34 year old class, but changed little in the other age classes (Fig 1-3-1). These changes seem to indicate that many women keep on working a few more years after marriage, but once they leave their jobs to have children, they do not return to labor market.

2-2. Previous studies on the determinants of marriages

In explaining why people get married, Becker (1973) likened marriage to trades between men and women. The economic gains from marriage, according to Becker (1973), are based on the different comparative advantages of men and women. Men have comparative advantage in market labor and women have comparative advantage in household labor.

A sufficiently large difference in market wage rates between men and women enables almost all women to get better off by getting married, and trading her market labor for household labor. As the difference narrows, however, a woman can benefit from marriage only if her partner's earnings exceed a certain minimum level, and hence she starts searching for a marriage partner. Many previous studies presume that such a

² The only exceptions are the second half of 1980's and the first half of 1990's. Among women between ages 30-34, the proportion of "single for life" jumped to 16.9% in 1987, but dropped to 12.6% in 1992. In subsequent surveys, the proportion fell back to below 10%.

³ From 52.6% in 1980 to 63.2% in 2011.

⁴ From 52.6% in 1980 to 49.0% in 2011.

search is similar to a job search in labor economics. Just as a job searcher sets the minimum acceptable wage offer and accepts any offer above it (MacCall 1970), a woman in search of a marriageable partner sets a minimum acceptable earning level, which we will call her reservation wage, and accepts the first offer above it.

Most of the empirical works on the timing of marriage can be regarded as applications of this search model with reservation wages. For many women, the reservation wage is an increasing function of their own earning; for example, it can be simply their current earnings multiplied by some factor similar to an equivalent scale. As such, an individual attribute that enhances her earning capacity (e.g. higher education, regular employment etc.) increases her reservation wage, reduces the number of qualified men, and delays the timing of marriage. In contrast, an attribute associated with a lower earning capacity (e.g. compulsory education only, irregular employment or unemployment) decreases the reservation wage, and shortens the time to marriage.

There are other factors that need to be considered. In Japan, the role of education may be one of them. In the seniority-based system of Japanese firms, there is very small difference in wages among the workers of the same age in their twenties, but the difference widens as time goes on, with education serving as the most important signal for the growth in earnings in the middle age. The increase in the number of women with college education, however, tends to decrease the number of qualified men.

For most Japanese women, moreover, the reservation wage is not just a function of their own earnings, but also a function of the standard of living they would like to have. Women from higher income households may ask for a higher reservation wage than their own earnings can justify. For example, Higuchi and Abe (1999) and Ogawa (2002) argued that single women tend to set the reservation wage on the basis of their own father's income. The observed delay in marriage, according to Higuchi and Abe (1999), reflects the smaller number of young men who can meet reach the same income as achieved by their father's generation, in the stalled macro economy.

3. Macroeconomic conditions and marriage

3-1. Previous studies and the macroeconomic conditions

Previous studies on marriage focused on the relationship between the delay in marriage and the increase in reservation wage as well as in the opportunity costs of childbirth, and analyzed the effects of the individual properties on their marital behaviors. Few included macroeconomic indicators in their analyses⁵. In this paper, we are going to analyze the effects of macroeconomic variables on marriage behaviors.

3-2. Macroeconomic conditions at the time of graduation

When are the marriage decisions of young men and women most susceptible to macroeconomic conditions? The answer should be at the beginning of their work life, with no savings to buffer the variation in income. There are a number of interesting studies on the impacts of macroeconomic conditions at graduation on subsequent employments and incomes in Japan. For example, Sato (2008) has shown that the labor market conditions at graduation influence not only the qualities of the first jobs but also the subsequent jobs, and, in particular, those who have been employed as irregular workers at

⁵ We have found one study (XXXX) that has included the unemployment rate as an explanatory variable of the timing of first marriage, and found it does not have a statistical significance.

graduation tend to be employed as irregular workers in subsequent jobs as well, facing a long-term insecurity. Also Sakai and Higuchi (2005) have shown that those who had become part-time workers following graduation tend to marry late and have children late, due to their low income. Similarly, Ohta, Genda and Kondo (2005) have shown that individuals in cohorts who had their first jobs in difficult economic times continue to face low real wage rates and unstable employment, compared with those in cohorts who had gotten their first jobs in good economic times. While in most developed countries, the effects of the initial conditions are shown to last for at most 10 years before they disappear, in Japan, the end of these effects are not yet established (文献).

3-3. Effects of individual characteristics

Among the individual characteristics that influence the probability of marriage, the most important property is the type of employment. According to Nagase (2002), irregular employees tend to marry later than regular employees. Subsequently, Mizuochi (2006) has shown that male regular employees marry earlier than male irregularly employees, but found no such difference among women with different employment types.

Another important aspect of individual characteristics is the education level. Comparing the individuals with different education levels, Ohtani (1989) has found, while among women less than 22 years old, women with more education had lower rates of first marriage than women with 9 years of education, that among men under the age 25, those with less education had lower rates of first marriage. Subsequently, Mizuochi (2006) has found that, for both men and women, from the time they leave their last schools, more educated individuals take less time to get married than do less educated. Nozaki (2007) also confirmed the finding of Mizuochi (2006), by observing that, while individuals with less education enter the labor market at younger ages and get married younger, it actually takes them more time, from the time they get the first job, for them to get married, and showed that those with college education or more take the least amount of time to get married from the time of graduation.

4. Methodology

4-1. Data

Our analysis is based on the first marriage data in “The Japanese Longitudinal Survey on Employment and Fertility (LOSEF): the 2011 Internet Version” (conducted by professors Takayama, Inagaki and Oshio), which is a retrospective panel data for education, job history, as well as the adolescent family environments for more than 5 thousand individuals whose birth years span three decades, starting from mid-1950’s. The survey is designed to take advantage of the periodical provision of individual pension and employment records from the public pension authority, and ask the respondents to add retrospectively the information on education, the changes in jobs, types of employment, marriage, births, living arrangements with parents, location, types of jobs as well as the information on current living conditions, family and lifestyles.

The dataset contained information of 5,953 individuals under the age 61. We have excluded some samples following our exclusion criteria. The first are the individuals who had married under the age 18. Legally speaking, to get married under the age 20, one needs a parent’s consent. In addition, men have to be over the age 18, and women have to be over the age 16. Only a small fraction of population has married under the age 18, so this exclusion should not matter too much. In addition, as the individuals thus excluded are distributed uniformly across generations, this exclusion should not influence our estimation results too much.

The second exclusion concerns the observations above some age. Since our interest is on the first marriage than can produce children, we wanted to put some reasonable upper limit on the age. We have selected age 41 as such a limit, and individuals who married after the age had been treated as right censored data.

After these exclusions, for our analysis of survival time, we had data for 4,044 individuals, born between 1956 and 1981, during the period of 1968 to 2011. Although there were slightly more males (2,082 individuals, or 51.5%) than females (1,962 individuals, or 48.5%) in the sample, females experienced more “failures”, with males accounting for 1,478 “failures”, and females accounting for 1,644 failures.

4-2. Methodology

For our analysis, we use the analysis of survival time in this paper. This method enables us to analyze the causal effects of the factors that may contribute to the onset or the end of a phenomenon under observation. The advantage of this analysis is that it takes account of censoring or censored data, which is important in realistic survival time data. We define the failure of our analysis as the first marriage of an individual. For each individual, we start counting the number of years from the moment an individual reaches age 18, end our counting when the individual gets married, but we end the counting when the individual reaches age 41, or end by year 2011, treating all the samples as right-censored for which no marriages have been reported.

Among the available models in the survival analysis, we have chosen a discrete time method. We have started our estimation using a standard, semi-parametric, Cox proportional hazard model that had been used in the previous works on marriage. Unlike non-parametric models, a proportional hazard model allows us to introduce covariates and to examine their effects on survival time, without worrying about the risks of misspecification, by selecting a wrong distribution function. For a proportional hazard model to be valid, however, each covariate in the data has to satisfy the proportionality assumption, which, in practice, is very difficult. As a global statistical test for such proportionality, after estimating our proportional hazard models, we have computed Schoenfeld residuals, and carried out chi-square tests. Unfortunately, we have found the result significantly different from zero, indicating that our data did not support the proportionality assumption (Table 4.2.1).

As our next step, we have tried to choose the best model among the popular parametric survival models (Table 3-4-2). We have compared the goodness of fit measures in the estimation results of exponential distribution, Weibull distribution, Gompertz distribution, log normal distribution, log-logistic distribution, and gamma distribution, but found relatively small differences. The AIC did not give us a clear-cut choice either, and we could not resolve our concern about the misspecification (Table 4.2.2).

As a result, we have chosen a discrete time method that can handle both proportional hazard and other types of hazards (Allison 1982). Moreover, since our data is a retrospective data in which events are reconstructed by the year, this analytical model is a particularly suitable one.

4-3. Selection of variables

Following the specifications of previous studies, as our main explanatory variable, we have selected the type of current employment. The type of our current employment consists of four categories (regular employment, self-employment, non-regular employment, and student), out of which we have chosen regular employment as the base category. In addition to the type of current employment, we have added an indicator variable for the non-regular employment of the initial job. This will make it possible to analyze the lasting effects of the initial condition at subsequent ages.

As to the education level variable, we have used the total number of years at school. High school graduates are given 18 years, graduates of junior colleges or special vocational schools 20 years, college graduates 22 years, and those with post graduate degrees 24 years. The variable is treated as a continuous variable.

As to the macroeconomic indicators, we have selected the rate of economic growth of the previous year at each age, as well as the rate of unemployment of the last year in school. The former is a time-varying variable, while the latter is a time-invariant variable.

We also used a number of indicator variables to capture the effects of pre-adolescent family backgrounds, including “My family subscribed to a newspaper”, “My family had own bathroom”, and “My parents constantly quarreled”, respectively, at the time when the respondent was 15 years old. Also the Rikert-type scale rating (1: significantly lower,..., 5: significantly higher) of the household income at age 15 relative to the neighbors’ was used in its original form.

5. Results and discussions

5-1. Results of Pooled Cohort Data (both sexes, separate male and female)

We present our estimation results using all cohorts in our sample, first using pooled male and female data, then separate results using male data and female data. (Table 5.1.1) (Table 5.1.2) (Table 5.1.3)

First of all, the estimation results of pooled cohort data indicated that women tend to marry earlier than men, and hence we decided to estimate our survival functions separately for men and for women.

The non-regular employment dummy of the first job shows a significantly delaying effect on marriage, for both men and women. The dummy is an indicator variable for the employment categories of the self-employed, part-time workers, and temporary workers.

Regarding the effects of current employment, however, there is a subtle difference between men and women. For men, all the types of employment other than regular employment (i.e., self-employment, irregular employment, and student) significantly delay marriage. Being a student naturally has the largest negative effect, followed by irregularly employed. Even self-employed has a negative effect. On the other hand, for women, being a student has the largest negative effect, but, contrary to men, irregularly employment now has a significant positive effect. In other words, women’s own irregular employment promotes marriage, rather than delaying it. It is consistent with the reservation wage hypothesis⁶; irregular employment reduces it and increases the number of qualified single men.

The number of years of education does not have a significant effect for men, one way or the other, but it delays marriage significantly for women.

Macroeconomic factors have significant effects on marriage. A higher rate of economic growth shortens time to marriage for both men and women, but the effect is larger for women. On the other hand, a higher rate of unemployment in the graduating year

⁶ Another possibility is the self-selection; namely those who want to marry earlier opt for irregular employment, rather than for regular employment. In our data, however, we did not worry about this possibility because the null hypothesis of the exogeneity assumption of all employment types could not be rejected ($p > 0.53$).

delays marriage. In terms of the absolute value, the coefficient of annual growth rate is less than one-half of the macro unemployment rate. The effect of the macro unemployment, in turn, is less than one-half of the non-regular employment.

Family background variables at age 15 do not seem to have significant effects on the time to marriage, except the household income. Moreover, the income variable has positive effects for both men and women. The result is natural for men. It probably indicates that those men raised in higher income households enjoy unobserved advantages in the search such as graduating more prestigious schools, better education, or more wealth.

Not only the coefficient of income for women is positive, but also it is almost twice that of men. This result contradicts a naïve prediction that, *ceteris paribus*, daughters from rich families, having set reservation wages higher by observing their fathers' earnings, will spend more time looking for marriage partners. There are several ways to explain this result. Firstly, daughters may not simply set reservation wages by observing their fathers' earnings, but by observing wage distribution of men in their own cohort. Alternatively, our result may indicate that more affluent families have several ways to improve the odds of their daughters search. Secondly, richer families can afford more intensive search for qualified partners for their daughters in each time period. Thirdly, more affluent parents can give various financial incentives for their daughters to marry desirable candidates by side-payments. Fourthly, even without direct payments, marrying daughters from affluent families can have long-term benefits for men.

5-2. Estimation results by cohorts: results and observations

We have shown three estimation results for each birth cohorts (1950's, 1960's and 1970's) pooling data of both sexes, male data and female data, separately. As we have discussed earlier, those born in 1950's spent their marriageable age in the period of universal marriage, those born in 1970's or later came after its collapse, and those born in 1960's are somewhere in between. In terms of macroeconomic conditions, those born in 1960's had been exposed to the extremely good macroeconomic conditions in their marriageable age, those born in 1970's have been affected by the deep recession during the lost decades.

For women, employment categories do not seem to have significant effects, except for student. For men, however, interesting results have been obtained. Among men who were born in the 1950's, and reached adulthood in the 1970's, no significant effects of employment categories were observed either, except for students. This is consistent with the practice of the universal marriage. But among men who were born in the 1960's, and reached adulthood in the 1980's during the bubble economy, in addition to students, irregular employment showed a clear negative effect. Among men who were born in the 1970's, and reached adulthood in the 1990's after the burst of bubble economy, self-employed were added to the significant negative list. One possible interpretation of these results is that, with the increase in economic uncertainty since 1980, the regularly employed men have become more attractive as partners of marriage, due to their economic stability.

Number of years of education showed modest, but consistent negative effects for women in each of these three cohorts. For men, it did not have a consistent sign, except for the small but significant negative sign for those born in the 1970's. The future stability in employment and earnings of male workers may be completely captured by employment status.

As to family background, we should point out that a higher household income increas-

es the hazard of marriage both for women who reached adulthood in the 1980's, or in the bubble economy, and for women who reached adulthood in the 1990's, or the first of the lost decades. In other words, it is a universal phenomenon that surfaced in the 1980's, as universal marriage collapsed, but it is independent of macroeconomic conditions.

As to macroeconomic variables, significant effects, obtained in cohort-pooled samples, now have been lost. This is not very surprising. Due to data splitting by cohort, their variations within each cohort were significantly reduced, resulting in significant increase in standard errors of the estimated coefficients.

One interesting result is the positive sign of the macro unemployment rate in the graduating year obtained from women in 1970's cohort. Given the negative sign obtained from the cohort-pooled sample, this positive effect stands out as one of the characteristics of this 1970's cohort. In addition, the women in this cohort are characterized by a large, statistically significant, negative effect of the initial non-regular employment effect. Unlike previous cohorts, even the women belonging to the least-demanding class in terms of reservation wage have experienced delays in marriage. On the other hand, those succeeded in getting regular employment have married earlier. Marriage in this cohort seems to be a form of insurance for the increased income instability coming from the deep economic recessions of the 1990's and early 2000's.

Concluding Remarks

In this paper, by estimating a discrete survival model to the time to marriage, we have shown that time to marriage is affected not only by individual properties, but also by the macroeconomic conditions of their graduating years. We have shown that job characteristics associated with higher or stable income for male workers shortens the time to marriage, but it's the other way around for female workers. We have also found that throughout the normal business cycles, a low economic growth delays marriage, while a higher growth rate shortens the time to marriage. The unemployment rate in graduating year works in similar ways; a high unemployment rate tends to delay marriage.

Most of these findings are consistent with the predictions of a search model for a marriage partner, except the effect of high family income on women. Unlike the previous presumption, we have found high family income shortens the time to marriage, rather than delay it. A high family income of women may result in higher reservation wage, but it may also enable her to engage in more intensive search or receive side payments from family.

Another interesting finding is on the effect of unemployment rate during the long, deep recession of the 1990's. In this period, contrary to the normal business cycle, we have found that a higher unemployment rate shortens the time to marriage among the regularly employed men and women. While further research is needed to confirm this result, we can interpret it as an insurance policy against the extreme employment uncertainty during this period.

【注：関連データ】

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