

# **Risk Aversion and the Timing of Marriage: Evidence from Japan**\*

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## **Abstract**

This paper conducts the empirical analysis on how the degree of risk aversion affects the timing of marriage, using the micro data on Japanese. One of previous studies, which used the U.S. data, finds that more risk averse individuals marry sooner regardless of sex and that the magnitude of the effect of risk aversion on the timing of marriage is larger for men than for women. However, I find that the risk aversion has a statistically significant effect on the timing of marriage for women, but not for men, with more risk averse women marrying sooner than their more risk-loving counterparts. This difference between Japan and the U.S. might reflect the difference in cultures and institutions.

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## 1. Introduction

What decide the timing of marriage? There are three papers which use the Japanese data and consider the factors of the timing of marriage. Mizuochi (2006) focuses on the effect of employment status on the timing of marriage and finds that if men are employed as regular employees in the first job after graduation, they tend to marry sooner, but women do not.<sup>1</sup> In addition, Mizuochi (2006) finds that individuals in the younger birth cohort get married later regardless of sex and finds that the level of education does not affect the timing of marriage for men, but women who have a higher level of education get married later. Nozaki (2007) uses data on women and focuses on how the macroeconomic factors such as the unemployment rate for men and women in the previous year of graduation<sup>2</sup> and the ratio of females to males in the same generation and education level (lower than high school and higher than junior college) affect the timing of marriage. Nozaki (2007) finds that if the ratio of females to males in the same generation and education level becomes higher, the timing of marriage becomes later,<sup>3</sup> and that when men (women)'s unemployment rate is high, women's marriage tends to be sooner (later). Sakata and McKenzie (2010) consider the effect of taxation on the timing of marriage. In Japan, if a couple gets married on December 31 and the wife's income in the next tax year is below 700,000 yen, the husband is eligible for the full deduction for spouse for the next tax year starting on the following day, January 1, whereas if the same couple gets married on January 1, the husband is not eligible for the spouse allowance for that year regardless of his spouse's income. Thus, everything else being equal couples have a tax incentive to marry by the end of calendar year rather than delaying their marriage in an early next year. However, the empirical analysis finds that the spouse allowance does not affect the timing of marriage.<sup>4</sup>

This paper focuses on the degree of risk aversion. As far as I know, there is no empirical paper in Japan which analyzes the relationship between risk aversion and the timing of marriage, and even in foreign countries there are only two papers.

The main results of this paper is as follows: Although Spivey (2010) which

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<sup>1</sup> The possible interpretations of these results are as follows: If men are employed as regular employees in the first job after graduation, they will be able to satisfy their economic condition required for marriage sooner and thus marry sooner. On the other hand, since women tend to leave their job to marry or have children, working as regular employees increases the opportunity cost of marriage. Therefore, working as regular employees has both positive and negative effect on the timing of marriage for women, and this might lead to no significant effect of regular employees on the timing of marriage.

<sup>2</sup> Nozaki (2007) mentioned that the reason to include the unemployment rate in the previous year of graduation is that Kurosawa and Genda (2001) finds that if labor market is tight at the time of job search, it becomes hard to find the job in the company people want to work for, and the rate of turnover becomes high, and the subsequent employment status tends to be unstable.

<sup>3</sup> The possible interpretation of this result is that since women prefer marriage partners with higher level of education than their own level of education, the facts that women's level of education is getting higher and that men's entry rates to university is stable delay marriage.

<sup>4</sup> Kitamura (2002) considers the determinants of marriage, not the timing of marriage and finds that high income, old age, and living with parents significantly decrease the probability of marriage.

used the U.S. data finds that more risk averse individuals marry sooner regardless of sex and that the magnitude of the effect of risk aversion on the timing of marriage is larger for men than for women, I find that the risk aversion has a statistically significant effect on the timing of marriage for women, but not for men, with more risk averse women marrying sooner than their more risk-loving counterparts. This difference between Japan and the U.S. might reflect the difference in cultures and institutions.

The remainder of this paper is structured as follows. Section 2 introduces theoretical and empirical results of previous studies. Section 3 describes the data used in this paper and how to construct the degree of risk aversion. Section 4 explains the estimation model and shows the empirical results. Section 5 provides concluding remarks.

## 2. Previous Studies

There are at least two reasons why risk aversion motivates individuals to get married sooner. The first reason entails a marital search model in which individuals search for a mate in the presence of uncertainty about the quality of potential future mates (see Spivey (2010) for details). In the model, searchers are identical in all respects except for their degree of risk aversion and receive a single offer per period from the distribution  $F(q)$  with support  $[0, \infty)$ .  $q$  denotes the quality of the offer received by searchers in the marriage market. Depending on the quality of the offer, searchers decide to accept the offer at hand and get married or decide to reject the offer and continue searching. Since marrying sooner mitigates the uncertainty about the quality of potential future mates, risk averse searchers have the lower reservation quality level and get married sooner than the average person.

The second reason relates to the benefit of risk sharing between two people. For example, if both spouses work and one faces an unemployment spell, one income remains to support the couple. If individuals marry sooner, they can insure themselves against exogenous income shocks. Thus, it is expected that the risk averse marry sooner.

However, if the quality (a function of income) of a potential spouse is higher, the insurance provided against exogenous income shocks will be greater. This could increase the reservation quality level of individuals and delay marriage. Thus, it is ambiguous that a more risk averse person will marry sooner or later.

There are two papers which conducted the empirical analysis on the effect of risk aversion on the timing of marriage. Schmidt (2008) considers marital timing of employed women using the Panel Survey of Income Dynamics (PSID) and finds that the more risk averse women marry sooner. In addition, Spivey (2010) considers marital timing of men and women using National Longitudinal Survey of Youth and finds that the more risk averse person marries sooner regardless of sex, and the magnitude of the effect of risk aversion is larger for men than for women.

However, there is a shortcoming of these two papers because since they use the degree of risk aversion measured when many respondents are already married, the causality is reverse. Sahm (2007) shows the result that the degree of risk tolerance increases after marriage, and thus we cannot deny there is an endogeneity problem. Spivey (2010) takes account of the problem of reverse causality and perform analysis only for marriages that occur after the year in which the question about the risk aversion is asked. As a result, it is found that the estimated coefficients of risk aversion are not

statistically significant, which imply that the result that the more risk averse person marries sooner is not robust.

This paper uses the degree of risk aversion measured before marriage and test whether the more risk averse person marry sooner or later and whether the empirical results differ by sex.

### 3. Data

This paper uses the micro data from the Survey of Living Preferences and Satisfaction<sup>5</sup> (SLPS). SLPS is a panel survey that has been conducted annually since 2003<sup>6</sup> and is a nationally representative sample of males and females aged 20-69 selected by a two-stage stratified random sampling from household registers. The questionnaire is in paper and pencil format and is distributed using the drop-off, pick-up method. Participants of this survey receive gift certificates for 500 yen in 2003, for 1,000 yen in 2004-08, and for 1,500 yen in 2009-11.

In the empirical analysis, I employed data from the 2005-2011 waves because the correct age of respondents is unknown until the 2004 wave. In addition, I dropped the observations in which respondents are married in 2005 in order to use the degree of risk aversion measured before marriage in the estimation, as explained in Section 2 (See Table 1 for the descriptive statistics in 2005). Moreover, I excluded observations that had missing values for the variables included in my analysis. As a result, the number of observations that remained in 2005-2011 was 216, 166, 134, 122, 105, 104, and 95, respectively.

The following question is used to measure the degree of risk aversion.

*As the proverb says, “Nothing ventured, nothing gained,” there is a way of thinking that in order to achieve results, you need to take risks. On the other hand, as another proverb says, “A wise man never courts danger,” meaning that you should avoid risks as much as possible. Which way of thinking is closest to the way you think? On a scale of 0-10, with “10” being completely in agreement with the thinking “Nothing ventured, nothing gained,” and “0” being completely in agreement with the thinking “A wise man never courts danger,” please rate your behavioral pattern. (X ONE Box)*



Using this question, I constructed the variable RISK\_AVERSION, which is the value subtracted the answer of the above question from 10.

Table 2 shows the mean of RISK\_AVERSION by age groups at marriage. “Age at marriage” in Table 2 means respondents’ age in the first year in which their answer

<sup>5</sup> In Japanese, *Kurashi no Konomi to Manzokudo Chosa*.

<sup>6</sup> SLPS has been conducted by Osaka University’s 21<sup>st</sup> Century Center of Excellence (COE) program Behavioral Macrodynamics Based on Surveys and Experiments since 2003 and by Osaka University’s Global COE program Human Behavior and Socioeconomic Dynamics since 2009. Osaka University’s COE program subcontracts the administration of the survey to Chuo Chosa-sha, probably the largest and most reputable private survey company in Japan.

about marital status became “married.” Since the lower age at marriage is, the higher the risk aversion is, it appears that more risk averse people marry sooner. However, two-sided t tests to evaluate the differences in the degree of risk aversion among age groups at marriage showed that there was no statistically significant difference among any age groups at marriage. Moreover, as shown in Table 2, although the mean of risk aversion for respondents who have never been married during the survey is lower than that for respondents aged 25-29, it is higher than that for respondents aged 30 or over. Therefore, the relationship between the degree of risk aversion and the timing of marriage is not clear from Table 2.

## **4. Empirical Analysis**

### **4.1 Estimation Model**

Section 4 analyzes the relationship between the degree of risk aversion and the timing of marriage, controlling for various household characteristics. Specifically, I used risk aversion, age, education level, income level, wealth, unemployment, self-employment, unemployment risk, bad health, major city, and year as explanatory variables (See Table 1 for the details of the definitions).

I estimate a hazard model to investigate the determinants of the timing of marriage. Survival analysis is appropriate because first, assuming normality of time to an event, which is required in OLS, is problematic, and second, right-censored spells (those individuals who never get married during the survey) should be included in order to use the full information. In addition, I use the semi-parametric Cox proportional hazards model because no assumption is made about the shape of the baseline hazard.

### **4.2 Estimation Results**

Table 3 presents the results of semi-parametric Cox proportional hazards estimations and shows hazard ratios and their standard errors.

First, focusing on the effect of risk aversion which is the main variable in this paper, the results are different by sex. While risk aversion does not have a significant effect on the timing of marriage for men, more risk averse women marry sooner. More specifically, for women, one increase in the degree of risk aversion increase the hazard by about 129%.

Spivey (2010, Table 5) also conducted the hazard estimation separately for the two sexes, but the results are quite different from those in this paper. Spivey (2010, Table 5) found that risk averse people marry sooner regardless of sex and that the magnitude of the effect of risk aversion on the timing of marriage is larger for men than those for women. This difference in the results between Japan and the U.S. might reflect the difference of countries’ cultures and institutions.

Next, looking at the other explanatory variables, any of them do not have significant effect on the timing of marriage for men. However, looking at the results for women, dummies for education level and for occupation have significant effects on the timing of marriage.

First, it is found that women with higher level of education marry later. Women who graduated from four-year college face a hazard rate that is only 7% of the hazard faced by women who graduated from high school or less than high school. This result is as expected because if women acquire high education, it increases the opportunity cost of marriage. The similar results are obtained in Mizuochi (2006) which also used

Japanese data. On the other hand, Spivey (2010, Table 5), which used the U. S. data, found that if the year of education increases, the timing of marriage is delayed for men, but that there is not significant relationship between the year of education and the timing of marriage for women.

Finally, if women are self-employed or family business employees (in self-employed business), they marry sooner than company employees and government employees. This might indicate that women with high income risks tend to marry sooner in order to insure themselves against income shocks.

## **5. Conclusion**

This paper investigates how the degree of risk aversion affects the timing of marriage. Using the micro data from the SLPS, I found that while risk aversion does not have a significant effect on the timing of marriage for men, more risk averse women marry sooner. One of previous studies, which used the data on the U. S., found that risk averse people marry sooner regardless of sex and that the magnitude of the effect of risk aversion on the timing of marriage is larger for men than those for women. This difference in the results between Japan and the U.S. might reflect the difference of countries' cultures and institutions.

Many challenges are left in this paper. For example, it should be confirmed whether the quality (for example, income and education) of the spouses of risk averse respondents are lower than that of the spouses of risk loving respondents, as indicated in search model. In addition, this paper used the question about "*Nothing ventured, nothing gained*" and "*A wise man never courts danger*" in order to construct the variable of risk aversion, but the estimation result might change if I used the other questions about risk aversion. Since SLPS includes some other questions about risk aversion, I will use them for robustness checks in the near future. Finally, since SLPS has been conducted in the U.S. as well as in Japan, it is possible to compare the results obtained by SLPS with those in previous studies.

**Table 1: The Definition of the Variables and Descriptive Statistics in the 2005 data**

Variables	Definition	Mean (Men)	Mean (Women)
RISK_AVERSION	The degree of risk aversion (0-10)	5.27	5.34
AGE	Respondents' age	36.47	32.35
COLLEGE_4YEAR	A dummy variable that equals one if respondents graduated collage (4year)	0.43	0.26
COLLEGE_2YEAR	A dummy variable that equals one if respondents graduated collage (2year)	0.08	0.29
MID_INOME	A dummy variable that equals one if the annual earned income of respondents before taxes, with bonuses included (and also business income) is 2 million yen to less than 4 million yen	0.36	0.34
HIGH_INCOME	A dummy variable that equals one if the annual earned income of respondents before taxes, with bonuses included (and also business income) is more than 4 million yen	0.24	0.14
WEALTH	Wealth of respondents' entire household (Unit: 10,000 yen)	3288.17	4189.71
UNEMPLOYED	A dummy variable that equals one if respondents are unemployed	0.00	0.01
SELF-EMPLOYED	A dummy variable that equals one if respondents are self-employed or family business employees (in self-employed business)	0.02	0.04
UNEMPLOYED_RISK	A dummy variable that equals one if respondents think that there is a possibility that they will be unemployed (in case of running their own business, the possibilities of discontinuing business) within 2 years.	0.34	0.36
BAD_HEALTH	A dummy variable that equals one if respondents have anxieties about their health	2.11	2.29
MAJOR_CITY	A dummy variable that equals one if respondents live in major cities.	0.32	0.32

**Table 2: The Relationship between Risk Aversion and Age at Marriage**

	The degree of risk aversion
Age at marriage is 25 to 29	5.82
Age at marriage is 30 to 34	5.25
Age at marriage is 35 to 39	5.22
Age at marriage is more than 40	5.20
Unmarried	5.44

**Table 3: The Estimation Results**

	Men	Women
RISK_AVERSION	1.0211 (0.1459)	2.2942 ** (0.9282)
AGE	0.7482 (0.3648)	2.4755 (3.0345)
COLLEGE_4YEAR	0.9690 (0.6457)	0.0742 * (0.1007)
COLLEGE_2YEAR	4.0205 (3.8889)	1.1031 (1.0286)
MID_INCOME	1.7871 (1.5755)	1.0401 (0.8770)
HIGH_INCOME	1.7205 (1.6302)	0.9637 (1.4135)
Log(WEALTH)	1.0096 (0.2711)	0.8892 (0.3132)
UNEMPLOYED	0.9135 (1.2145)	1.5140 (1.9758)
SELF-EMPLOYED	2.2513 (1.9804)	12.3498 ** (16.1128)
UNEMPLOYED_RISK	0.5861 (0.3811)	2.0239 (1.8612)
BAD_HEALTH	1.1836 (0.3413)	0.6498 (0.2801)
MAJOR_CITY	0.8283 (0.5969)	0.5928 (0.6042)
YEAR	1.3247 (0.2658)	0.8763 (0.2290)
No. of Observation	371	245
Log Likelihood	-41.0506	-17.7896
LR chi2(13)	7.00	15.80
Prob > Chi2	0.9022	0.2598

Note: The figures represent hazard ratios and their standard errors.



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