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Shoichi Sasaki

December 2014
Discussion Paper No.1430

**GRADUATE SCHOOL OF ECONOMICS
KOBE UNIVERSITY**

ROKKO, KOBE, JAPAN

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Shoichi Sasaki⁺
Graduate School of Economics, Kobe University

This version: December 2014

ABSTRACT

This paper examines the effect of the aggravated male employment environment on female marriage behavior in Japan. Using extensive individual data from Japan's Employment Status Survey, I conduct an empirical analysis on the effect of increase in the male irregular employee rate, in terms of designation, on the single-female rate. The results show that decreasing male regular employment rate and increasing male irregular employment rate have significant positive effects on the rising single-female rate. The effect persists even when the mean of the distribution of male wage is controlled for. Furthermore, the increasing in the male irregular employment rate, regardless of the employment contract period, also has a significant positive effect on the rising single-female rate. These results suggest that the characteristics of Japan's dual labor market affect female marriage behavior. Thus, policies that can improve the income security of low-income males and promote a shift from irregular to regular employment are likely to raise the female marriage rate.

Key words: declining male labor market, dual labor market, irregular employment, female marriage behavior

JEL classification: J1; J3

* I would like to thank Kazufumi Yugami, Naoki Mitani, Yasuhide Tanaka, and seminar participants at Kobe University for their helpful suggestions and comments. I also thank the Kobe University Micro-data Archive (KUMA) for the Employment Status Survey data provided.

⁺ Corresponding author; Shoichi Sasaki; Research Fellow, Graduate School of Economics, Kobe University; 1-8-13, Maikodai, Tarumiku Kobe City, Hyogo Prefecture, Postcode 655-0046; Email: ichi2sun@fancy.ocn.ne.jp

1. Introduction

This paper examines the effect of the aggravated male employment environment on female marriage behavior in Japan. I focus, in particular, on the effects of a decrease in the male regular employee rate and an increase in the male irregular employee rate on the single-female rate.

In recent years, the relationship between the tendency among Japanese females to remain single or delay marriage and the worsening male employment environment in Japan has attracted social interest. Various studies note that the number of marriageable men has been decreasing with a growing number of men earning lower incomes due to the declining male labor market in the United States (Blau, Kahn, and Waldforgel 2000, Brien 1997, Lichter *et al.* 1992, and Wood 1995).

Additionally, Oppenheimer, Kalmijin, and Lim (1997) argue that career-entry uncertainties lead to delayed marriage. In other words, those employed in stopgap jobs are less likely to marry than those with permanent jobs, because the stopgap arrangement implies career immaturity, uncertainty about the young person's long-term prospects, and a declining labor market.

On the other hand, Japan's dual labor market is built solidly. If a person of the younger generation gets an irregular job after graduation, a subsequent transition to regular employment is very difficult because of the low fluidity in the employment market. Thus, irregular employees are forced to accept not just a lower lifetime wage but also unstable employment compared to regular employees (Genda 1997, Ohta and Genda 2007, and Ohta, Genda, and Kondo 2007).

The terms "regular employment" and "irregular employment" are listed as "Designation" in Japan's Employment Status Survey. This classification method is peculiar to Japan. The United States and most European countries do not classify employment status in this manner. In addition, the Survey also classifies employees' positions according to their employment agreements.

Following the classifications adopted in the Employment Status Survey, I classify male employment positions into four categories: male regular employment without a definite term, male regular employment with a definite term, male irregular employment without a definite term, and male irregular employment with a definite term. Therefore, male irregular employment is classified into two categories: male irregular employment without a definite term and male irregular employment with a definite term.

In Japan, the number of irregular employees without a definite term have increased in recent years (Kambayashi 2010a). It is recognized that irregular employment without a definite term is often renewed many times, so that the actual duration of service is relatively long (Koyō no Arikata ni Kansuru Kenkyukai [Meeting to Study Systems of Employment] 2009).

As Japanese companies determine employees' plans for capability development and their wage profiles using designations, some studies claim that designations rather than the term of employment have a larger impact on the labor condition or lifetime wage (Kambayashi 2013, Kambayashi and Kato 2012, and Kawaguchi, Kambayashi, and Hara 2011). Additionally, several researchers argue that the tendency among young females to remain single or delay marriage is related to the increasing male irregular employment rate (Nagase 2002, Ohta 2007, and Sakai and Higuchi 2005).

In fact, since the 1990s, the singlehood rate among Japanese women aged 25–44 years and the irregular employment rate among Japanese men of the same age group have risen simultaneously (Figure 1), thus lending support to the notion that some kind of positive relationship exists between these phenomena.



Fig.1. Trends of single-female rate and male irregular employment rate.

Therefore, it would be useful to examine the relationship between Japan's rising single-female rate and the aggravated male employment environment, and clarify whether young women tend to remain single or delay marriage depending on the irregular employment rate among Japanese men.

The outline of this paper is as follows. Section 2 presents the hypotheses and the estimation model. Section 3 describes the data. Section 4 reports the estimation results and discusses them, and Section 5 concludes the paper.

2. Hypotheses and estimation model

Conventionally, the mainstream economic approach to the predominant female behavior of remaining single or delaying marriage is a cost-benefit analysis founded on Becker (1973).¹

On the other hand, recent studies in the United States examine the relationship between macroeconomic factors such as the decreasing number of marriageable men and the

¹ Oppenheimer (1997) suggests that the specialization model based on marriage gain is essentially an argument for *nonmarriage*, not *delayed* marriage.

situation in the male labor market. Although most previous studies define marriageable men as “full-time employees,” in this paper, I employ the terms “regular employees” and “irregular employees,” as they characterize the dual labor market in Japan. Specifically, I analyze the effects of the employment indices, such as the regular employment rate, irregular employment rate, and unemployment rate, on the single-female rate, using anonymous Japanese individual data from the Employment Status Survey. The hypotheses are that the decreasing standard employment rate and the increasing irregular employment and unemployment rates raise the single-female rate.

Furthermore, I add the mean of the male wage in the marriage market to control the change of the male whole wage distribution.

I examine the abovementioned hypotheses using marginal effects of a probit model in which the dependent variable y_i is the marriage status of the female (single or married). The estimation model is shown in (1):

$$y_i^* = x_i\alpha + I\beta + M\gamma + \varepsilon_i \quad y_i = 1 \quad \text{if } y_i^* > 0, \text{ and } 0 \text{ otherwise} \quad (1)$$

where i represents the i th female.

The explanatory variables are female individual attributes x_i , such as age group and education background, and male wage inequality indices or labor market condition indices I , such as the male regular employment rate, male irregular employment rate, and male unemployed rate in the marriage market for females. I also use the control variable M , such as the mean of the male wage, sex ratio, and female habitation dummy variable in large urban areas, as the proxy variable for the marriage market,^{2,3} and ε_i is the error term. The sex ratio is the male-to-female ratio in the marriage market by age group and year.

3. Data

In this paper, I use official Japanese statistics (anonymous individual data) from the Employment Status Survey for 1992, 1997, and 2002,⁴ obtained from the Kobe University Micro-data Archive, Japan.

Considering that the data are anonymous, information on prefectures and households

² However, some previous studies include other employment conditions such as female regular employment, irregular employment, and unemployment as explanatory variables. I do not consider these variables in this paper, because many females retire or change their status to irregular employment on marriage or childbirth, causing endogeneity between the employment condition and marriage behavior. For the same reason, I exclude female wage as an explanatory variable.

³ I do not include the year dummy variable because the regular and irregular employment rates and the year dummy show a certain amount of correlation (correlation coefficient = 0.5-0.7).

⁴ Currently, data are available for these three years only.

with more than nine members is kept secret, and age and wage information are indicated not as actual numbers but as class values, to avoid identification of an individual or household. However, I use resampled data, which comprise 80% of the entire sample. Thus, the sample size is approximately 2,370,000 over three years.

In this paper, I restrict the sample to females aged 25–44 years, because women younger than 25 years include students. Further, as described in Figure 2, the single-female rate in the female age group of 20–24 years has not changed much during the period under study (about 87%), while approximately 90% of women are married by age 44.⁵ The final sample for the analysis includes 367,690 women.

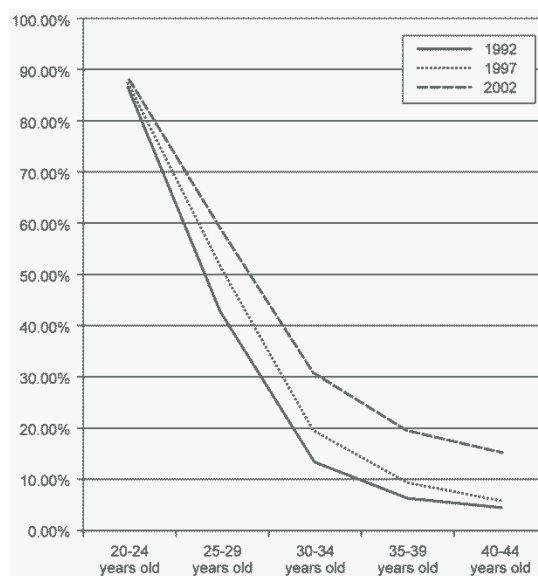


Fig.2. Trends of single-female rate in each 5-year age group.

I assume that potential marriage partners are males of the same age group and year. I do not assume marriage market segmentation by educational background.⁶

In this paper, I use an hourly rather than a yearly wage because of the cyclical changes in labor supply influences. I calculate the male employment indices, logarithm mean wage,

⁵ Because the 2002 questionnaire does not distinguish between divorcees or widows and single women, it must be noted that the single-female rate for 2002 (unlike those for the other years) includes divorcees and widows.

⁶ I assume that the women's potential marriage partners belong to the same 5-year age group because the mean age difference between men and women at first marriage was 2.6 years in 1992, 2.4 years in 1997, and 1.7 years in 2002. This gap has been gradually reducing, according to the Japanese National Fertility Survey. This is the largest statistical survey on the consciousness and marriage behavior of single Japanese persons and is conducted by the National Institute of Population and Social Security Research. In addition, I also assume, following Gould and Paserman (2003), that potential marriage partners may be from any educational background, because changes in male wage distribution may affect female education choice.

and sex ratio in the marriage market for each age group and year.⁷

Table 1 shows the descriptive statistics of the variables used in this analysis.

Table 1: The descriptive statistics of the variable

Variable		Women of ages 25–44 years				
		Obs.	Mean	Std. Dev.	Min.	Max.
Female age- group dummy	25–29 years old	367690	0.238	0.426	0	1
	30–34 years old	367690	0.235	0.424	0	1
	35–39 years old	367690	0.243	0.429	0	1
	40–44 years old	367690	0.283	0.451	0	1
Female education background dummy	Below junior high graduate	367690	0.075	0.264	0	1
	High school graduate	367690	0.539	0.498	0	1
	Graduate from vocational school	367690	0.272	0.445	0	1
	Above college graduate	367690	0.110	0.313	0	1
Female single probability		367690	0.219	0.414	0	1
Male logarithmic mean wage in marriage market		367690	7.452	0.177	7.128	7.735
Male employment condition in marriage market	Regular employment rate (%)	367690	96.238	2.626	88.650	98.270
	Irregular employment rate (%)	367690	3.762	2.626	1.730	11.350
	Permanent employment rate (%)	367690	90.489	3.415	81.626	94.202
	Temporary employment rate (%)	367690	5.069	1.352	3.588	8.503
	Unemployment rate (%)	367690	4.369	2.146	2.185	9.678
Sex ratio in marriage market		367690	90.827	2.414	88.602	94.486
Female habitation dummy in large urban areas		367690	0.322	0.467	0	1
Year dummy	1992	367690	0.372	0.483	0	1
	1997	367690	0.331	0.471	0	1
	2002	367690	0.297	0.457	0	1

Note: The regular/non-regular employment rate is the ratio of regular/non-regular employees to all employees.

⁷ I use the median of each wage grade as the personal wage and multiply it by 1.4 for the high-end yearly wage group (income exceeding 10 million yen). Furthermore, the real wage is based on the 2002 consumer price index. From 2002, however, each wage group in the Employment Status Survey questionnaire is further divided into yet more subgroups. Therefore, I standardize the wage groups according to those of 1992 and 1997, following Shinozaki (2001) and Kambayashi (2010b), to remove the influence of class interval change on the setup of the mean wage. In addition, following Ohta (2007), I define the irregular employment rate in terms of all employees, and the unemployment rate, as a proportion of the population.

4. Estimation results and discussion

Table 2 shows the estimation results of the marginal effects of the selected male employment condition indices. As stated previously, I use the male regular employment rate, male irregular employment rate, and male unemployment rate.

Table 2: Marginal effects of various male employment indices

	Male employment condition indices		
	Regular Employment rate	Irregular Employment rate	Unemployment Rate
Male employment Condition indices	-0.011 (0.003)***	0.024 (0.007)***	-0.030 (0.007)***
Number of obs.	367690	367690	367690
Pseudo R2	0.154	0.157	0.160

Notes:

1. Men in the marriage market are considered with controls for age group, year dummy.
2. Dependent variable: single female = 1, others = 0.
3. Other explanatory variables are female education background dummy, female age-group dummy, sex ratio in marriage market, and female habitation dummy in large urban areas.
4. Within the second-step parentheses are standard errors modified by clustering based on age group, education background, and year dummy.
5. ***, **, and * indicate 1%, 5%, and 10% levels of significance, respectively.

The coefficient of the regular employment rate has a significant negative effect at the 1% level for single-female probability.⁸ Moreover, the coefficients of the male irregular employment rate and male unemployment rate have significant positive effects at the 1% level for single-female probability. Thus, the results are consistent with the hypotheses.⁹

Among the control variables, the dummies for being educated beyond college and for female habitation in large urban areas have significant positive effects at the 1% level.

I repeat the estimations by controlling for the mean wage. If the dispersion of the male wage distribution does not spread, the increase of the male mean wage indicates the increase in the number of marriageable men, and thus, the increase of the male mean wage is expected to decrease the single-female rate. Columns 1, 2, and 3 of Table 3 show the estimation results for the selected male employment condition indices when the male mean wage is controlled

⁸ The coefficient of single-female probability refers to the marginal increase in percentage points of single females when each variable increases by 1%.

⁹ According to Gould and Paserman (2003), when a large number of single men tend to be low-income irregular employees, an increase in the number of single men decreases the male mean wage. To control for this reverse causality, I estimate the model using only data on married males and obtain results similar to those of Table 2.

for. The coefficients of the male mean wage do not have significant effects in all cases, but the signs of the coefficients are negative in more than half the cases. Therefore, the results are consistent with the hypotheses. Conversely, the coefficients of the regular employment rate, irregular employment rate, and unemployment rate have similar significant positive effects at the 1% level for single-female probability even after the male mean wage is controlled.

Table 3: Marginal effects of various male employment indices by controlling for mean wage

	Male employment condition indices				
	Regular Employment rate	Irregular Employment rate	Unemployment Rate	Regular Employment Without a Definite term	Irregular Employment With a Definite term
Male employment Condition indices	-0.001 (0.004)***	0.025 (0.008)***	0.029 (0.007)***	0.048 (0.015)***	0.051 (0.017)***
Male mean wage	-0.058 (0.234)	0.037 (0.156)	-0.033 (0.119)	0.073 (0.154)	-0.007 (0.158)
Number of obs.	367690	367690	367690	367690	367690
Pseudo R2	0.152	0.157	0.160	0.158	0.156

Notes:

1. Men in the marriage market are considered with controls for age group, year dummy.
2. Dependent variable: single female = 1, others = 0.
3. Other explanatory variables are female education background dummy, female age-group dummy, sex ratio in marriage market, and female habitation dummy in large urban areas.
4. Within the second-step parentheses are standard errors modified by clustering based on age group, education background, and year dummy.
5. ***, **, and * indicate 1%, 5%, and 10% levels of significance, respectively.

How can this result be interpreted? The reduction in the male regular employment rate and the rise in the male irregular employment rate decrease the male mean wage, which might, in turn, be related to a certain point in time. As Oppenheimer (1997) notes, an employment condition index, such as the male irregular employment rate, may capture the male lifetime wage due to career immaturity and uncertainty.

Then, do increased male irregular employment rates without or with definite terms exert different effects on the single-female rate? Columns 4 and 5 in Table 3 present the estimation results using the indices. Both indices have a significant positive effect at the 1% level on the single-female rate. Therefore, even if the employment agreement mentions no definite term, the rise in the male irregular employment rate has a significant positive effect. In other words, it is possible that females easily perceive the decrease in the rate of

marriageable men due to the increase in the rate of irregular male employees, because their employment statuses, conveyed by their designations after graduation, determine their lifetime wages and job stability.¹⁰ Additionally, the marginal effect of increasing male irregular employment without a definite term, which has risen in recent years, is as large as that of male irregular employment with a definite term. Thus, it is probable that this increasing male irregular employment without a definite term will increase the single-female rate.

5. Conclusion

It is crucial to identify why young Japanese women tend to remain single or delay marriage. Some studies empirically examine the relationship between the aggravated male employment environment and female marriage behavior in the United States. However, there is no such in-depth study in the Japanese context. Therefore, using extensive individual-level data from the Japan's Employment Status Survey, this paper empirically examined the effect of changes in male employment statuses, in terms of their designations, on the single-female rate.

The results show that when female education background, age group, sex ratio, and male mean wage are controlled for, the decreasing male regular employment rate and the increasing male irregular employment and male unemployment rates have a significant positive effect on the single-female rate. Thus, the results are consistent with the hypotheses. Furthermore, the increase in the irregular employment rate, regardless of the employment contract period, has a significant effect on the rising single-female rate.

These results can be interpreted in that Japanese women easily perceive the change in the rate of marriageable men in the marriage market by the composition of male employment statuses in terms of their designations. Furthermore, it is possible that the characteristics of Japan's dual labor market affect female marriage behavior seriously.

The results of this empirical analysis suggest the following policy implications. It is necessary to raise the male whole wage level and support a shift from irregular employment to regular employment by improving the labor market environment. These steps would help increase the female marriage rate in Japan.

To this end, the Japanese government should not only encourage companies to establish systems those help employers evaluate employees' capability accurately, but it should also promote employees' capability development programs and employee training. Improving income security is an additional requirement. However, the conditions and

¹⁰ According to the Japanese National Fertility Survey, the percentage of women who stated "I plan to marry in the future" increased slightly from 91.06% in 1992 to 92.53% in 2002. Thus, it is reasonable to say that the rise in female-single rate is not caused by a declining preference to marriage among Japanese women.

requirements are likely to differ for permanent versus temporary irregular employees. Thus, the implemented remedial measures should be appropriate to each category.

A future challenge is to accumulate substantial data to examine how these influences have affected and continue to affect the so-called lost-decade generation born in the 1980s, which faces job scarcity.

Acknowledgements

I would like to thank Kazufumi Yugami, Naoki Mitani, Yasuhide Tanaka, and seminar participants at the Kobe University for their helpful suggestions and comments. I also thank the Kobe University Micro-data Archive (KUMA) for the Employment Status Survey data provided by them.

Conflicts of interest

There are no conflicts of interest to declare.

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