The New Socioeconomic Marriage Differentials in Japan[1]

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1. Introduction

This study will be one of the first studies to provide insights into the emerging patterns of Japanese marriages. My analyses uncover the most-up-to-date educational differentials in Japanese marriage and the structural and behavioral changes in patterns of assortative mating, i.e., who marries with whom with respect to educational characteristics. The study updates Raymo and Iwasawa's (2005) paper on educational assortative mating in 1980-1995 Japan and further explores the newly emerging mating process in 2000s Japan. The study also builds upon studies of the U.S. experience and considers the social implications of the causes and consequences of the recent changes in marriage behavior in Japan.

2. Background

The expansion of the never-married population is one of the most dramatic demographic changes in the latter half of the 20th century in Japan. The trend toward later marriage and growth in the proportion of men and women who never marry is not only a major cause of the Japan's low fertility rate, but is also a driving force behind other major family and social changes (Iwai 2010, Iwai 2011).

Though correlates of the trend toward later and less marriage are complex, previous studies showed that women's economic well-being (measured by educational attainment or income) was negatively associated with marriage. Women with higher education and higher income tended to marry later and were more likely to never marry (Tsuya and Mason 1995, Higuchi 2001, Retherford, Ogawa, and Matsukura 2001, Ono 2003, Raymo 2003, Raymo and Iwasawa 2005, Tsuya 2009, Sakai 2009). However, more recent studies demonstrate that this relationship has reversed, with women's socioeconomic resources positively associated with the likelihood of marriage in the 2000s (Fukuda 2013, Iwasawa 2013, Statistics and Information Department in the Ministry of Health, Labour and Welfare 2013).

In fact, a similar change has been evident in the U.S. (Goldstein and Kenney 2001), Australia and New Zealand (Heard 2011), some of European countries (Kalmijn 2013) and most recently reported in Taiwan (Yen-hsin 2014). In the U.S., for example, since the 1980s, college-educated women, on average, had lower marriage rates than their less-educated counterparts during the most of the 20th century (Goldin 2004). Previous studies, however, have shown that the

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marriage rates of college-educated women started rapidly catching up with those of women with less education beginning in the 1980s (Goldstein and Kenney 2001). Similarly, the relationship between women's earnings and marriage has also changed from no correlation to a strongly positive association since the 1980s (Sweeney 2002). As a result, several studies have shown that college-educated women and women with higher income are more likely to marry since the 1980s (for reviews, see Oppenheimer 1997, Sweeney 2002).

How can one theoretically interpret the relationship between women's socioeconomic status and marriage formation? Both sociological and economic theories which deal with benefit from marriage have long emphasized the advantages of gender role division between spouses and argued that the benefits from marriage are maximized when the husband specializes in market production, and the wife in household tasks (Parsons 1949, Becker 1981). Oppenheimer (1988), however, challenged this view by arguing that economic contributions of the wife should bring even more direct benefit to marriage than gender specialization. Oppenheimer (1988) applied job-search theory and suggested that a woman's greater economic resources increase her incentives and capacity to prolong her spouse-search process in order to find a better match. Also as young men's economic prospects becomes increasingly uncertain, a woman's high socioeconomic status potentially relates positively rather than negatively to her attractiveness as a marriage partner and it can have a positive effect on marriage formation by offsetting the presumed negative effects of a woman's greater economic independence. Recent studies in the U.S. mostly support Oppenheimer's theory by showing women's economic resources such as education, employment and earnings become more positively associated with marriage (Blossfeld and Huinink 1991, Oppenheimer and Lew 1995, Thornton, Axinn,and Teachman 1995, Goldstein and Kenney 2001, Sweeney 2002). Therefore, these studies suggest that the benefits of marriage are more directly conceived by today's U.S. couples as deriving from the economic contributions of both spouses rather than the advantages of gender division of spousal roles.

In the U.S., the shift in the relationship between women's economic resources and marriage has been accompanied by a concurrent increase in educational and earnings homogamy (Blackwell 1998, Schwartz and Mare 2005, Sweeney and Cancian 2004). That is, an increasing tendency for highly-educated or high-earning women to marry men with similarly high levels of education and earnings. Several studies have shown that this trend toward increased socioeconomic homogamy is partly responsible for widening economic inequality in the U.S. (Burtless 2003, Sweeney and Cancian 2004).

On the other hand, much less is known about the new relationship between women's economic standing and the likelihood of marriage in Japan. I provided the first documentation of the newly emerging marriage pattern in Japan (Fukuda 2013) from panel data analysis by showing effects of women's earnings turn to be positive in marriage intensities in the 1970s birth cohort.

Similarly, a result from the discrete-time hazard model using the large panel data on young adults in Japan shows that the relationship between women's income at previous year and first marriage hazard in a given year is explained by a positive logarithm function in the period of 2002-2012 (Statistics and Information Department in the Ministry of Health, Labour and Welfare 2013). It is not clear, however, if the same conclusion will be confirmed from the analysis of another type of longitudinal data, i.e. retrospective survey data. In general, panel data (i.e., data from surveys that follow the same respondents over time), though rich in information at each survey point, focuses on a narrower range of cohorts and observation length is shorter than is the case with retrospective data. In addition, panel data suffer from non-random attrition (drop-out) from the survey, while retrospective data does not have this problem[3]. Therefore, retrospective data actually have advantages over panel data for providing accurate behavioral changes over time (across cohorts). In addition, there are some arguments that income is not necessarily the best measure for a young adult's earning capacity as income of young employee is typically low at career entry levels and it does not reflect one's long-term earning potentials (Burgess, Propper and Aassve 2003, Xie et al. 2003). Therefore, it is also desirable to conduct statistical testing using other measures of individual's earning potential such as education and occupation to confirm the new relationship between women's economic standing and the likelihood of marriage in Japan.

Furthermore, there have been few studies of recent trends in assortative mating (who marries whom) in Japan. Raymo and Iwasawa (2005) is one exception which analyzed educational assortative mating in 1980 and 1995 Japan. Their study found that negative educational gradients, in fact, increased during the period between 1980 and 1995. Furthermore, their analysis also indicated that women's faster progression than men to enrolling to either junior college or university created a relative shortage of university educated men in marriage market and possibly suppress marriage rates of those highly educated women (Raymo and Iwasawa 2005). Raymo and Iwasawa's (2005) argument is in line with other findings from previous studies on Japanese marriage (Tsuya and Mason 1995, Higuchi 2001, Retherford, Ogawa, and Matsukura 2001, Ono 2003, Raymo 2003, Raymo and Iwasawa 2005, Tsuya 2009) which shows lower marriage tendencies among highly educated women than their less-educated counterpart. Only recent study of Iwasawa (2013) shows signs of a small increase in educational homogamy between 2005 and 2010. However, more systematic analysis of assortative mating is called for. In sum, we have little knowledge about whether the same pattern persists in the marriages after 2000 where presumably new marriage pattern is emerging.

This study examines educational differentials in female marriage and patterns of

[3] The retrospective survey is subject for misreporting due to respondent's wrong memory and selection bias due to obtaining information from only survived respondents (Blossfeld and Rohwer 2002). However, the bias of retrospective surveys should be rather limited in the study of rather explicit demographic events, e.g. marriage, in a given low mortality context in Japan.

educational mating in Japan by using the most recent data. The study also investigates in which extent the social and economic forces behind the change are similar to the U.S. case. As Japan and the U.S. are substantially different, for example, in the degree of gender role division or in labor market environment, investigating the extent of similarity in the changes in the social and economic correlates of female marriage will also provide a good test case of accessing the universality and scope conditions of theories regarding shifts in men's and women's economic roles within union. The paper's findings are expected to contribute to a series of the social theory which explains the relationship between socioeconomic development and widely observed family changes, i.e. the transition from male-breadwinner unions to dual-earner unions (Blossfeld and Drobnic 2001, Goldin 2006, Esping-Andersen and Billari 2015).

In addition, examining the latest marriage behaviors in Japan is highly relevant not only to population scholars but also to the policy making community. First, one of the reasons behind the new marriage pattern is change in the economic foundations of marriage. The new marriage pattern suggests that dual-earner marriages are becoming more common among newlyweds, relative to traditional male-breadwinner marriages. In Japan, the tax policies, social security systems and family policies have been designed to be most effective for intact, male-breadwinner families and have arguably perpetuated the prevalence of male-breadwinner families. The evidence of a shift toward dual-earner marriages would call into question the future prospects of current policies and suggest to policy makers that further reforms may be necessary in the areas of family policies to meet with well-being of younger generations and to facilitate family-formation, a major goal of many recent policy efforts.

Second, the new marriage pattern may be a sign of widening economic inequality among younger generations. Marriage has functioned to promote social class mobility by matching men and women from different social and economic backgrounds. U.S. studies (Burtless 2003, Sweeney and Cancian 2004) show that changes in the relationship between women's economic resources and the probability of marriage has been accompanied by a trend toward increased educational and earnings homogamy. This trend has served as one of the driving forces behind growing economic inequality in the U.S. Related evidence on Japan provided by this paper will hopefully increase policy maker's attention to the ways in which marriage can contribute to social inequality and may suggest the need for public policies in this area.

In this study, education is chosen as one of the proxies of individual's long-term earning potentials followed by other studies of marriages in Japan and the U.S. The study aims 1) to compare female educational differentials in marriage formation in the past and present, and 2) to assess how educational pairings of newlyweds have changed over time in Japan. By investigating these research questions, I am going to test whether and how the shift in economic foundation of Japanese marriage are taking place and consider its social implications on social stratifications and gender relationships.

3. Data and Methods

1) Data

For the analysis of Japanese marriage, I will use individual-level data pooled across the 11th through 14th Japanese National Fertility Surveys (JNFS) - conducted in 1997, 2002, 2005 and 2010, respectively. JNFS is a series of surveys of married women as well as non-married men and women aged 18-49. The surveys were conducted by the National Institute of Population and Social Security Research in Tokyo, Japan. In each survey round, a total of 8,000 to 10,000 women and 4,000 to 5,000 single men provided information on the date of their marriage and educational attainment of oneself and her husband if present. Other information on family and demographic background prior to marriage is also collected. The surveys are authorized by Japanese government and achieve response rates at around 80% in each wave by the drop-off and pick-up method which is a commonly used method in Japan. Currently, pooled data from JNFS provides the largest sample set to analyze the trends in the educational combinations of spouses in Japan.

2) Methods

First, women's educational differentials in marriage intensities are examined by multi-variate hazard model. The model is applied to the person-age data of women born in 1948-1992. I analyzed the first marriage observed among female respondents of their age between 15 and 39 in the period of 1988-2010. The model includes age, education, period and examines all possible two- and three-way interactions of these covariates. Age is defined as dummy variables of 5 year-old age groups (15-19, 20-24, 25-29, 30-34, 35-39) and period is defined as quasi-5-year period dummies (1988-1992, 1993-1997, 1998-2002, 2003-2005, 2006-2010). Each period dummy is created in a way to have a census year in the mid-point of the category except for the last two categories. As the latest survey is conducted in 2010, it is not feasible to take year 2010 as a mid-point. Therefore, I collapsed the last 5 years into one category and the rest of the early 2000s into the other. In fact, Japan's TFR was the lowest in history in 2005. Therefore, the last period category of 2006-2010 eventually overlaps with the period of Japan's fertility upturn. My study, therefore, provides some insights into the marriage behaviors during the period of fertility recovery in Japan. Finally, educational attainment is defined as four categories, namely junior high school (JHS), high school (HS), a sum of the non-university post-secondary education such as vocational school, two-year junior college and technical college (JC), and finally, four-year university or graduate school (UNI). The purpose of the model is first to find the best model to describe the actual age-, education- and period-specific first marriage hazard and second to conduct statistical testing of educational differentials in each age group by different period. The model identifies how educational differentials by age look differ in the past and the latest period.

Second, the analysis of educational assortative mating is conducted. The analysis of "who

marries with whom" often utilizes two-sex marriage models, in contrast to the sex-specific analyses of marriage correlates just described above. Formal demography is rich in the development of two-sex marriage models. In this study, I will use the harmonic mean model proposed by Schoen (1988).

The harmonic mean model proposed by Schoen (1988) is expressed as following;

$$N_{ijkl}^{t} = \alpha_{ijkl}^{t} \frac{F_{ik}^{t} M_{jl}^{t}}{F_{ik}^{t} + M_{jl}^{t}} \quad (1)$$

Thus, $$MR_{ijkl}^{t} = \frac{N_{ijkl}^{t}}{F_{ik}^{t}} = \alpha_{ijkl}^{t} \frac{M_{jl}^{t}}{F_{ik}^{t} + M_{jl}^{t}} \quad (2)$$

i:women's age, *j*: men's age, *k*: women's education, *l*: men's education,
N: N of marriages, *MR*: marriage rate, *F*: N of women at risk, *M*: N of men at risk,
α: Force of attraction

The model eventually decomposes marriage rates of women with education *k* at age *i* and men with education *l* at age *j* by two components, namely, force of attraction, α_{ijkl}^{t} and availability ratio, $\frac{M_{jl}^{t}}{F_{ik}^{t} + M_{jl}^{t}}$. The force of attraction indicates marriage propensity of a particular educational matching of women at age *i* and men at age *k*. On the other hand, availability ratio measures a relative supply of, in this case, eligible men for the same particular marriage. For both measures, the higher value indicates the higher likelihood of the occurrence of the marriage. It is important to note that two measures are independent from each other. Therefore, force of attraction is considered measuring the behavioral aspect of assortative mating, while availability ratio is measuring the structural aspect of the marriage market.

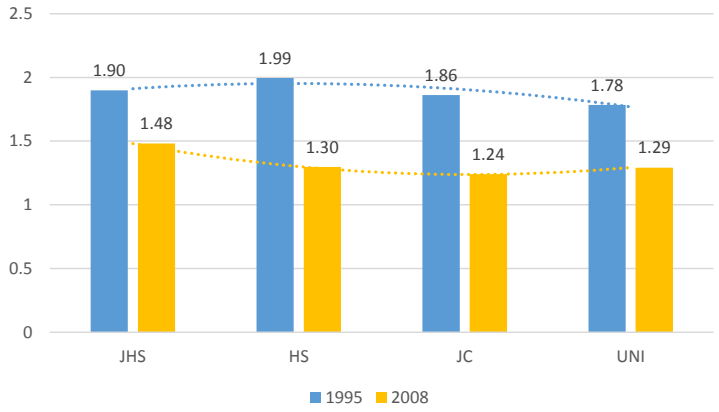
This method allows me to assess, for example, how much of the increase in a particular educational pairing, e.g. university educated couples, is due to the increase in the supply of college-educated females, and how much is due to behavioral changes across periods. As previously mentioned, Raymo and Iwasawa (2005) applied this model to Japanese marriages between 1980 and 1995 to examine the pattern of educational assortative mating using JNFS conducted in 1982, 1987, 1992 and 1997. I will conduct similar analyses by adding updated data from the 1997, 2002, 2005 and 2010 rounds of the JNFS and compare how patterns are different in their latest observation point in 1995 (average of 1993-1997 period) and mine in 2008 (average of 2006-2010 period). In the analysis, both marriage counts and exposures are grouped into the 5-year old age category. Education category is the same as the hazard model. With this method, my study investigates if positive assortative mating is observed in recent marriages with respect to couples' educational qualifications and explains how compositional and behavioral changes in the marriage market have contributed to the observed changes.

4. Results

1) Educational Differentials in Female First Marriage

First, I calculated Total First Marriage Hazard (TFMH, hereafter) by summing up age-specific hazards of female aged 15-39 in the period 1993-1998 (1995, hereafter) and 2006-2010 (2008, hereafter) from the person-age data of pooled JNFS data. Figure 1 shows TFMH by women's education in 1995 and 2008[4]. As shown in Figure 1, TFMHR is lower in 2008 than in 1995 in all education groups due to the prolonging trends of later- and non-marriage. However, educational differentials in TFMH clearly show a shift from negative educational gradients to no-gradient[5]. It is particularly noticeable that women with university education are now as marriageable as high school graduates in contrary to the previous period in 1995. This first descriptive result provides firm evidence of the emergence of the new marriage differentials in recent Japan.

Figure 1. Observed TFMH by Women's Education in 1995 and 2008



Second, I fit the discrete-time hazard model of female marriage to the same person-age data using complementary log-log link. The model includes age, period and education as covariates and their interactions are also examined. As a result, the following model is identified as the best to describe the marriage patterns observed in the data.

$$\ln[-\ln(1-P_{it})] = \beta_1 A_i(t) + \beta_2 E_i + \beta_3 P_i(t) + \beta_4 A_i * E_i + \beta_5 A_i * P_i(t) + \beta_6 E_i * P_i(t)$$

Here, the dependent variable is the complementary log-log transformation of first marriage hazard probability at a given time *t* of individual *i*. A, E, and P represent age, education and period of

[4] Percentages of women who have only junior high school education are about 3% in both periods. Therefore, this group is ignorable in the interpretation of educational differentials in marriage.

[5] As a result of the statistical testing, there are no significant differences between TFMHs of each educational group at 5% levels in 2008, while they are statistically different from each other at 5% levels in 1995.

individual *i* in time *t*, respectively. Age and period are time-varying while education is time-constant[6]. The model also includes all combinations of two-way interactions out of three covariates. Three-way interaction of age, education and period was, however, not included as it is not statistically significant at 10% levels.

Figure 2. Relative Hazard of First Marriage by Women's Age and Education in 1995 and 2008

*** p<.01, ** p<.05, + p<.10

Figure 2 shows relative hazard ratios of first marriage by women's age, education and period, derived from the model. The full estimation table is attached in Table A-1 in Appendix. Due to the small sample size, women with only junior high school education are omitted from the graph. The reference category is a woman with high school education at age 25-29 in the 1995 period. Hazard ratios of each category is above 1 if first marriage hazard of a given category is higher than that of the reference woman and less than 1 if vice versa. I conducted Wald tests to examine whether marriage hazards of junior college and university women are statistically different from that of high

[6] I have examined a model with "in school" dummy. However, the substantial result is almost identical.

school graduates within the same age group.

As expected from Figure 1, first marriage hazards are lower in 2008 than those in 1995 for almost all education and age groups. The only exception is women at age 35-39. Due to the late marriage trends, women in the late 30s show higher marriage hazards in 2008 than in 1995. The general patterns of educational differentials are similar in 1995 and 2008. In both periods, there are strong negative educational gradients in marriage hazard until age of the early 20s. In age 25-29, educational differentials disappear, then, educational gradients turn to be positive in age of the 30s. The only difference between the two periods is that positive educational gradients are steeper in age 30-34 and 35-39 in 2008 than in the same age groups in 1995. According to Wald tests, the positive educational gradients at age 30-34 and 35-39 in 2008 are statistically different from those in 1995 at 10% levels and .001 % levels, respectively. This is due to that university educated women have much higher marriage hazards than other less-educated groups in these age groups in 2008. In conclusion, it is likely that the recent shift in educational differentials is largely responsible to the high marriage intensities in the age 30s, particularly the late 30s, among university educated women. This pattern is more resemble to the U.S. marriages where highly educated women are marrying late but more marriageable than their less-educated counterpart.

2) Educational Mating Patterns in 1995 and 2008

In the second set of the analysis, Schoen's harmonic mean model of two-sex marriage (Schoen 1988) is used to examine the demographic and behavioral factors of educational pairings in Japan in 1995 (period 1993-1997) and 2008 (period 2006-2010). First, Table 1 shows the distributions of educational attainment among population at risk of first marriage by sex and period for men and women age 15-39, derived from the person-age data of the pooled JNFS.

There is an interesting contrast between men and women in the extent to the period changes in education distributions. During the 13-year period, women with university education rapidly increased and caught up with those of men, while men's educational distribution has almost no change. Noticeably, women with university education increased 11 percent-point from the 1995 period to the 2008 period. Due to this change, women with only high school education and non-university post-secondary education such as vocational school, technical school and two-year junior college[7] decreases at 6 percent-point and 5 percent-point, respectively. Percentage of women with any kind of post-secondary education has been higher than that of men since the 1995 period. However, there is a clear distinction between university education and other post-secondary education in terms of labor market position, wage, thus, perceived social status in Japan. It is also worth noting that at the period of 2008, percentage of university educated men is still 8 percent-point

[7] For women, a majority of the non-university post-secondary education is consisted with two-year junior college. 63.2% of women in this category is junior college graduates in 1995 period while 53.7% of them are so in the 2008 period.

higher than that of women.

Table 1. Distributions of Educational Attainment among Population at Risk of First Marriage by Sex and Period in 1995 and 2008

a. Men

educ	1995	2008	Total
JHS	7,527	1,757	9,284
	7.1	6.4	6.9
HS	42,037	10,138	52,175
	39.4	37.0	38.9
VS/JC /Tech	17,623	4,638	22,261
	16.5	16.9	16.6
UNI	39,511	10,860	50,371
	37.0	39.7	37.6
Total	106,698	27,393	134,091
	100	100	100

b. Women

educ	1995	2008	Total
JHS	2,884	743	3,627
	3.1	3.2	3.2
HS	31,880	6,692	38,572
	34.7	28.8	33.5
VS/JC /Tech	38,297	8,458	46,755
	41.7	36.4	40.6
UNI	18,893	7,374	26,267
	20.6	31.7	22.8
Total	91,954	23,267	115,221
	100	100	100

*: Upper column shows sample sizes and lower column shows percentages of each education category in a given period.

Given such changes in the education components in the marriage market in Japan, how do patterns of educational pairing change accordingly? First, I compare with the distributions of marriage counts by educational pairings of spouses in 1995 and 2008. Table 2 shows the ratio of the marriage counts distributions in 2008 over those in 1995. Values above 1 indicate increase in the incidence of a given educational pairing in 2008 from 1995, while values less than 1 indicate decrease in the incidence of the educational pairing.

Table 2. Ratios in Marriage Counts Distributions by Educational Pairings: 1995 vs 2008

% 2008 / % 1995

	Men				
Women	**JH**	**HS**	**VS/JC/Tech**	**UNI**	**Total**
JH	0.86	1.58	0.94	1.24	1.20
HS	0.72	0.59	0.89	0.83	0.69
VS/JC/Tech	0.69	0.86	1.53	0.89	0.98
UNI	0.36	2.91	2.99	1.79	1.95
Total	0.72	0.80	1.34	1.15	–

The table shows that marriages of university educated women are substantially more apparent among all marriages in 2008 than in 1995[8]. The incidence of marriages of university educated women is almost doubled from 1995 in 2008. Also there is almost 80% increase in the incidence of university educated couples in 2008 from 1995. These are not surprising under the rapid increase in university educated women in the marriage market of 2008 as shown in Table 1. It is, however,

[8] Again in this table, we can ignore the values of junior high school marriages due to their low incidence.

interesting to see that female educational hypogamy also gains its popularity in 2008 than in 1995. For example, the percentage of university educated women who marry with a man with less than university education is nearly tripled from 1995 in 2008. The incidences of these marriages consist of 17% of marriages among university educated women in 1995 while its share increased up to 25% in 2008. Raymo and Iwasawa (2005) noted the strong tendencies of female educational hypergamy as a cause of non-marriage among university educated women in 1995 Japan. Results of Table 2 here suggests some evidence of the change in the patterns of educational mating due most likely to the worsening marriage squeeze among female university graduates. On contrary to university educated women, university educated men who marry with high school woman or vocational or junior college woman are only slightly decreased in 2008, while their marriages with university educated woman substantially increased in 2008.

It is, however, not clear from Table 2 that how much of the increase or decrease in a particular educational pairing is due to the changes in education component in the marriage market and how much of them are due to the changes in behavior or preference. Table 3 shows the ratios of force of attractions (FA) in 2008 over 1995. FA is an intensity measure of each educational pairing, which is independent from the educational composition. Therefore, its comparison informs us how intensity of a particular educational pairing increased or decreased independent from compositional changes in education distributions in marriage market. FA is calculated by educational pairing and age group. Age-specific FAs are thus summed up by educational pairings of each period, then, ratios are taken by using these summed values from 1995 and 2008.

Table 3. Ratios of Force of Attraction (FA) by Educational Pairings: 1995 vs 2008

FA 2008 / FA 1995

	Men				
Women	JH	HS	VS/JC/Tech	UNI	Total
JH	0.74	0.93	0.56	0.82	0.79
HS	0.60	0.47	0.54	0.61	0.53
VS/JC/Tech	0.56	0.57	0.93	0.52	0.62
UNI	0.31	1.02	1.60	0.74	0.82
Total	0.63	0.62	0.78	0.64	0.65

Table 3 shows that the only one educational pairings which apparently increasing the tendency to match in 2008 over 1995 is, namely couples with a university educated wife and a husband with non-university post-secondary education. Therefore, increase in the incidence of this educational pairings observed in Table 2 is not only due to the compositional increase in university educated women but also due to their increasing tendency or preference to match themselves in the marriage market. Although why this pairing is increasingly more prevalent than in the past is not clear from my analysis, the result of Table 3 provides another evidence of weakening female educational

hypergamy among university educated women in Japan. Contrary to these couples, the ratio of FAs of university educated couple is less than 1, which means that increase in marriage incidence of this pairing observed in Table 2 is entirely explained by compositional increase in female university graduates and their propensity to match is, in fact, lower in 2008 than in 1995.

Note also that both men and women, education total FA ratios are all lower in 2008 than in 1995 in Table 3. These negative education total FA ratios for women help understanding the shift in educational differentials in TFMH presented in Figure 1. Because both high school and non-university post-secondary education groups show the most severe drop in FAs (marriage propensities), educational differentials in female marriage hazard summed by age shifted from negative to no-differential. Men's education total FA ratios also steeply drop from 1995 in 2008 except for non-university post-secondary education group. It is noticeable that marriage propensity of university educated men dropped just as much as high school graduates between 1995 and 2008.

As men and women exhibit different mating patterns, next, I present the changes in FAs and changes in availability ratios (AR) by educational pairings separately for men and women. Just as FA, when AR is high, relative supply of eligible partners for a particular educational pairing is high, thus marriages are more likely to occur. Therefore, if AR is higher in 2008 than in 1995, it means that marriage market condition which is measured by relative supply of available partners is better in 2008 than in 1995 for a particular match. Again AR is also calculated by educational pairings and age groups. Therefore, I summed up AR of each age group by educational pairings of each period and ratios are taken by using these summed of values from 1995 and 2008.

First, the upper part of Table 4 shows changes in AR in 2008 over 1995. The table of women presents that these ratios of university educated bride are all negative, while they are all positive in the table of men. These negative ratios in women's table show that relative supply of eligible men to university educated women got worse in 2008 for all educational pairings. Contrary, men with all education groups are now having more supply of university educated women in their marriage market than before. This clearly indicates that rapid increase of university educated women created an even more severe marriage squeeze of themselves in the marriage market of the 2008 period. The counterfactual analysis followed by the method used in Raymo and Iwasawa (2005) shows that a half of the decline in marriage rate of university educated women between 1995 and 2008 is explained by the changes in the educational compositions in the marriage market (see Appendix Table A-2).

Table 4. Ratios of Availability of Eligible Partners and Force of Attraction by Sex and Educational Pairings of Groom and Bride: 1995 vs 2008

a. Ratios in Eligible Partners: AR2008/AR1995

Women		Groom			
		JH	HS	VS/JC/Tec	UNI
Bride	JH	0.96	1.02	1.07	1.02
	HS	0.76	1.03	1.04	1.06
	VS/JC/Tec	0.63	0.97	0.93	1.00
	UNI	0.58	0.86	0.82	0.89
Men		Groom			
		JH	HS	VS/JC/Tec	UNI
Bride	JH	1.10	0.81	0.71	0.78
	HS	1.09	0.95	0.97	0.92
	VS/JC/Tec	1.13	1.04	1.04	1.00
	UNI	1.25	1.29	1.18	1.23

b. Ratios in Force of Attraction: FA2008/FA1995

Women		Groom			
		JH	HS	VS/JC/Tec	UNI
Bride	JH	0.69	0.92	0.56	0.83
	HS	0.72	0.53	0.81	0.72
	VS/JC/Tec	0.68	0.60	1.12	0.54
	UNI	0.26	0.83	1.52	0.65
Men		Groom			
		JH	HS	VS/JC/Tec	UNI
Bride	JH	0.84	1.04	0.55	0.76
	HS	0.57	0.40	0.43	0.50
	VS/JC/Tec	0.54	0.55	0.85	0.49
	UNI	0.33	1.55	1.68	0.94

In the lower part of Table 4, ratios of FAs in 1995 and 2008 are shown. Changes in FA are more complex as its patterns differ by sex. For instance, FA ratios for university educated couples are negative for women but almost no change for men. Among university graduates, men's preference to marry with a woman from the same education group does not change from 1995, while women are increasingly less selective to choose a similarly educated man in 2008 than in 1995. Instead of university educated couples, again couples with a university bride and a groom with non-university post-secondary education are more likely to match in 2008 than in 1995. This pattern is observed for both women and men at similar degrees. Among high school graduates, men are increasingly more likely to marry with university educated women in 2008 than in 1995, while university educated women became slightly more reluctant to marry with high school graduated man during the same period. In sum, university educated women are more favorably chosen as a marriage partner by men with high school or non-university post-secondary education.

In contrast, it is shown that FA ratios of women with high school and junior college education became negative among men with all education groups in 2008. It is even striking that men's matching intensities with these women are cut into a half between 1995 and 2008. Especially,

junior college women used to be a major supply of brides for university educated men when university education is largely skewed to men. It is, however, not the case any more in the latest marriages in Japan. As discussed in Fukuda (2013), due to the prolonging deflation economy, economic prospects of Japanese young adults are gaining uncertainty. A sense of economic uncertainty should be higher among those non-university graduates who are more likely to be ended up with unstable employment (Nagase, Nawata and Mizuochi 2011). Therefore, marriage with a woman with high or stable earning potential may be seen as an attractive option for those less-educated men. Decreasing tendencies of men to marry with high school or junior college graduate women can also be explained in the same line with this story as their earning potentials are, in general, lower than those of university graduated women.

5. Conclusions

This paper examined new socioeconomic marriage differentials in Japan by investigating both educational differentials and educational assortative mating in first marriages observed in the period of 1995 and 2008. The analyses employ period perspective to compare how educational differentials in female marriage as well as educational assortative mating patterns are different between the two periods.

My first set of analyses clearly revealed that women's educational gradients in first marriage hazard are shifted from negative to no-differential in recent Japan. The multi-variate hazard model analysis further revealed that this shift is mainly brought by high marriage intensities among university educated women that is pronounced at their age of the 30s in the 2008 period. Contrary to university educated women, marriage hazards of women with high school degree or non-university post-secondary degrees significantly dropped from 1995 in 2008. As a result, the educational gradients of women's first marriage have shifted in an aforementioned way.

The second set of my analyses further uncovered the changes in the marriage market structure and mating behaviors by examining educational assortative mating during the same period. Schoen's (1988) harmonic mean model is used to calculate marriage propensities (force of attraction) and availability ratios of each age-specific educational-pairing. The most significant finding is that university educated women are under the severe marriage squeeze due to their rapid increase in the marriage market between the two periods. Due to the marriage squeeze, some of these university graduates are increasingly more likely to marry with a man with non-university post-secondary education such as vocational school or technical college in 2008. It is further confirmed that university educated women are increasingly more favored as a marriage partner by men who are less educated than university graduates in 2008. These findings suggest that Japan's tradition of female educational hypergamy is slowly changing from both male and female perspectives in recent Japanese marriages. University educated couples are more prevalent among all

marriages in 2008 than in 1995. Contrary to my expectation from the U.S. studies (Blackwell 1998, Schwartz and Mare 2005, Sweeney and Cancian 2004), however, matching propensity of university educated men and women is, in fact, lower in 2008 than that of 1995, due mainly to women's reduced tendency to marry with a university educated man. As a result, the social consequence of marriage to create household income inequality is so far limited to a certain extent in Japan.

I argue that the social background behind these changes in educational differentials and educational mating patterns are deterioration of men's economic prospects and the increasing trend of female university education. Similar to young adults in other developed nations, Japanese young adults also have been facing rapid changes in socioeconomic contexts since the 1990s, which is typically characterized as higher job insecurity and lower wages than previous generations (Fukuda 2013). These changes have resulted in stagnations in young men's economic prospects, especially for those with less education. Decrease in marriage propensity of university educated couples further suggests that job security of university educated men might also be declining during the period of 1995-2008. In contrast, more women are gaining university education and gender gaps in wages and labor market positions are slowly but steadily improving during the same period (Fukuda 2013). These situational changes likely to stimulate young adults' preference shift toward gender egalitarian economic roles within marriage. My analysis additionally suggests that the continuing marriage squeeze among university educated women further facilitate such changes.

Finally, from a theoretical point of view, my paper provided social and demographic conditions which facilitate the change in economic foundation of marriage. Increasing economic uncertainty and expansion of female higher education are global trends in both developed and developing societies. It is an important contribution of this paper to show that the shift in the preference of spouse's economic role takes place not only in western countries but also in Japan where traditional gender role ideology is firmly rooted in social life and male-breadwinner family is seemingly perpetuated by the designs of social systems such as the tax policies, social security systems and family policies. Japan's Prime Minister Shinzo Abe and his cabinet announced that expanding opportunities for women to join Japan's labor force, "womenomics", is one of the key pillars in their economic revival strategy (Abe 2014). How well these initiatives and related policies fit to the emerging patterns of marriage and family life should affect people's well-being and propensity of family formation. Both for theory development and informing the policy making community, further research on Japan's new family demographics is called for.

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Appendix

Table A-1. Hazard Ratios of First Marriage, estimated by Discrete-time Hazard Model

	Exp(β)	
Age		
15-19	0.07	***
20-24	0.60	***
25-29	1	
30-34	0.67	***
35-39	0.20	***
Education		
JH	0.67	***
HS	1	
VS/JC/Tech	1.03	
UNI	0.93	
Period		
1988-92	1.22	***
1993-97	1	
1998-2002	0.82	***
2003-05	0.65	***
2006-10	0.52	***
Age#Education		
15-19#JHS	6.12	***
15-19#VS/JC/Tech	0.12	***
15-19#UNI	0.01	***
20-24#JH	2.32	***
20-24#VS/JC/Tech	0.54	***
20-24#UNI	0.23	***
30-34#JH	0.67	**
30-34#VS/JC/Tech	1.07	
30-34#UNI	1.24	***
35-39#JH	0.87	
35-39#VS/JC/Tech	1.24	*
35-39#UNI	1.37	**

(To be continued to the right panel)

	Exp(β)	
Age#Period		
15-19#1988-92	0.60	***
15-19#1998-2002	1.51	***
15-19#2003-05	1.86	***
15-19#2006-10	1.50	*
20-24#1988-92	0.94	
20-24#1998-2002	1.15	***
20-24#2003-05	1.20	**
20-24#2006-10	1.11	
30-34#1988-92	0.83	**
30-34#1998-2002	1.03	
30-34#2003-05	1.09	
30-34#2006-10	1.13	
35-39#1988-92	1.14	
35-39#1998-2002	1.52	***
35-39#2003-05	1.39	*
35-39#2006-10	2.25	***
Education#Period		
JH#1988-92	1.07	
JH#1998-2002	0.96	
JH#2003-05	0.87	
JH#2006-10	1.34	*
VS/JC/Tech#1988-92	1.00	
VS/JC/Tech#1998-20	1.03	
VS/JC/Tech#2003-05	0.93	
VS/JC/Tech#2006-10	1.04	
UNI#1988-92	1.05	
UNI#1998-2002	1.07	
UNI#2003-05	1.01	
UNI#2006-10	1.18	*
Constant	0.17	***

legend: * p<.1; ** p<.05; *** p<.01

Table A-2. Comparison of Observed and Counterfactual Marriage Rates, by Education Group

	Observed (MR08/MR95)	Counterfactual*
JHS	0.78	0.80
HS	0.63	0.58
JC	0.65	0.68
UNI	0.71	0.85

*: Availability Ratios held constant at 1995 values.

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