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Is Being Single Better? An Analysis of Employment Structure and Wages of Japanese Female Workers

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Abstract

Using the 1993-2010 Japanese Panel Survey of Consumer data, this paper examines Japanese women's labour force participation and determinants of earnings by marital status with a particular focus on the unmarried. Estimates confirm that experience and education increase women's labour force participation, but age reduces it among unmarried women and increases it among the married. Estimates further show weak evidence of a 1.4 per cent wage penalty for being single. Age, high education, and full-time employment status produce a wage premium for women, regardless of their marital status, but experience has no effect on unmarried women's earnings and reduces married women's wages by 2.3 per cent. Occupational differences have a large effect on earnings: professional and technical occupations offer high wage premiums for women, regardless of their marital status. Industry differences also matter: unmarried women in the finance/insurance/real estate industry and married women in public administration earn sizable wage premiums.

Keywords: Women's employment, Labour force, Participation, Wage, Marital status

JEL classification: J21, J24, J31

1. Introduction

Japan faces a sharp increase in the elderly population, a steady decline in fertility, and a predicted reduction in population. Moreover, increases in marriage postponement among young people (Clark *et al*. 2010; Lesthaeghe, 2010; and others), in the population of never-married women (Clark *et al*. 2010; Lesthaeghe, 2010; Matsukura *et al*. 2007; Ueda, 2007; and others), and in the number of both 'freeters'[1] and 'NEETs'[2] (Clark *et al*.

[1] A 'freeter' is an individual who lack full-time employment or are unemployed or are freelancers.
[2] A 'NEET' is a young individual who are not educated, employed and trained.

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2010; Ohta *et al*. 2008; Kondo, 2007; and others) further accelerate these developments and have raised additional concerns and debate about the workforce population.

The traditional gender division of labour in households (Ross, 1987), long career interruptions for childbirth indicated by an M-shaped labour supply curve (Kawata and Naganuma, 2010; Matsukura *et al*. 2007; and others), and the income tax system (Yamada, 2011; Akabayashi, 2006; and others) in Japan are likely to discourage or limit women, particularly married ones, from participating in the labour market, and lead many either to abandon their careers (Matsukura *et al*. 2007) or to seek contingent employment (Genda *et al*. 2010; Osawa, 2005; and Houseman and Osawa, 1995). The traditional seniority-based wage system also has given less advantage to women, who are less likely to commit to lifetime employment.[3]

In recent years, however, the traditional gender division of labour in households has started to change from male-breadwinner households to dual-earner households (Fukuda, 2013). The structure of employment has also started to change to a merit-based pay system, which emphasizes employees' skills and training (Shimizu and Higuchi, 2010; Ohta *et al*. 2008; and Atoda and Tachibanaki, 1991). Concurrently, educational attainment among Japanese women has increased substantially (Kishi, 2014; Kawaguchi and Ueno, 2013; Kambayashi *et al*. 2008; Osawa, 2005; and others) and the numbers of employed female workers and of those who want to be employed have increased significantly (Kawaguchi and Ueno, 2013; Hausmann *et al*. 2012; and Matsukura *et al*. 2007). Also, firms are under economic pressure to lower labour costs and increase profits (Osawa, 2005; and Houseman and Osawa, 1995).

Given dramatic changes in the marriage market, the workforce population, employment structure, and economic conditions in Japan, further study is warranted to analyze the employment status of Japanese female workers as the role of women in the labour market becomes more important. This paper builds upon the literature on labour supply and wages by investigating whether being single is better than being married for women in the Japanese labour market. It further provides new evidence regarding the determinants of labour force participation and earnings of female Japanese workers, and attempts to offer tactics to improve labour market welfare among women in Japan. To accomplish these goals, I estimate the wage equation utilizing Heckman's sample selection model with the 1993-2010 Japanese Panel Survey of Consumer data.

This study first finds weak evidence for a 1.4 per cent wage penalty among single women, who are more likely than married ones to participate in the labour market. Age increases the wages of all women as well as labour force participation among married women, yet it reduces labour force participation among unmarried women. Experience, on the other hand, has a positive impact on the decision to participate in the labour force among women, yet it reduces married women's wages by 2.3 per cent and has no effect on the earnings of unmarried women. Education increases the earnings of women, and the premiums increase as the level of education increases; in particular, unmarried and married women with 'at least a Bachelor's degree' earn 21.3 per cent and 22.8 per cent, respectively, more than their counterparts with less than a high school diploma.

[3] Lifetime employment is defined as a stable and long-term employment commitment between a worker and an employer rather than a permanent employment contract (Ono, 2010; and others).

This study further confirms that full-time employment[4] offers higher earnings premiums relative to part-time employment[5] for women, and differences in earnings premiums within employment status are smaller for unmarried women relative to married ones. The effect of occupations on earnings is prominent – professional and technical occupations offer high wage premiums of 27.6 per cent and 35.7 per cent, respectively, for the unmarried and 42.9 per cent and 57.5 per cent, respectively, for married women, relative to their counterparts. Similarly, industry differences have a varied effect on the wages of Japanese female workers – unmarried women in the finance/insurance/real estate industry earn an 11.3 per cent wage premium, while married ones in public administration earn a 11.1 per cent premium.

This study has a few important findings. First, women's labour force participation and wages are influenced by marital status. Second, there is weak evidence for a small wage penalty for being single. Third, being single, work experience, and high educational attainment increase women's labour force participation. Lastly, attainment of high education, full-time employment, and professional and technical occupations produce higher earnings for Japanese women, regardless of their marital status. The findings in this study highlight issues in the ongoing debate concerning the welfare of Japanese women in the labour market. These include work-family balance, marriage and fertility decisions, an increased number of contingent employees and limited human capital investment that negatively impacts women's labour force participation and earnings, and also an overrepresentation in lower-paid occupations that leads to occupational segregation among women in the workforce.

This paper makes two notable and new contributions. First, it offers deeper insights into understanding Japanese women's labour force participation decisions and the factors contributing to differences in the wages of Japanese female workers, with particular attention to the unmarried. It further provides useful implications for workers (especially women), firms, and policy makers in reevaluating existing work conditions and policies, and identifies new ways to promote women's employment, reduce wage differentials among women, improve worker status, and increase the Japanese workforce population.

2. Empirical Strategy

The objective of this paper is to investigate the recent trends of the employment structure and the earnings of Japanese female workers by marital status, with particular attention to unmarried ones, using the Japanese Panel Survey of Consumers (JPSC) for the years 1993-2010. It further investigates the factors contributing to differences in labour force participation and wages among married and unmarried women in an attempt to examine whether being single is advantageous over being married in the Japanese labour market.

[4] Full-time employment is defined as employment with predetermined working hours per week of about 40 hours (e.g., eight hours a day, five days a week), according to the Labour Force Survey conducted by the Statistics Bureau of the Ministry of Internal Affairs and Communications.
[5] Part-time employment is defined as employment with fewer than 40 work hours per week (e.g., six or up to eight hours a day, three or up to five days a week), according to the Labour Force Survey conducted by the Statistics Bureau of the Ministry of Internal Affairs and Communications.

The empirical analyses are centered on estimating the standard wage equation, and thus researchers must be aware of potential endogeneity bias, heterogeneity bias, and sample selection bias into employment (Semykina and Wooldridge, 2010; Newmark and Korenman, 1994; and others). Since the wages of an individual are estimated over the life cycle in this study, education can be treated as exogenous, consequently endogeneity bias is inevitably an issue. Furthermore, individuals in the data sample in this study are drawn from a homogeneous population, so the heterogeneity bias is not inherited. Hence, I focus on the treatment of sample selection bias when I estimate the wage equation. To do so, I employ the following Heckman's sample selection model, which considers a random sample of I observations and equations for respondent I, using a data sample that includes both working and non-working individuals.

$$\begin{aligned} y_{1i}^{*} &= x_{1i}\beta_1 + \varepsilon_{1i} \\ y_{2i}^{*} &= x_{2i}\beta_2 + \varepsilon_{2i} \end{aligned} \qquad (i = 1, ..., I) \tag{1-1}$$

The sample selection model consists of: (i) a participation equation; and (ii) a resultant outcome equation as follows.

$$y_{1i} = \begin{cases} 1 \;\; if \;\; = S_{1i}^{*} > 0 \\ 0 \;\; if \;\; = S_{1i}^{*} \le 0 \end{cases} \tag{1-2}$$

where y_{1i}* determines whether or not respondent *i* has participated in the labour force.

$$y_{2i} = \begin{cases} 1 \;\; if \;\; = S_{1i}^{*} > 0 \\ - \;\; if \;\; = S_{1i}^{*} \le 0 \end{cases} \tag{1-2'}$$

where y_{2i}* is observed when y_{1i}*=1, whereas y_{2i} need not take on any value when y_{1i}* ≤ 0, and it defines whether a respondent *i* at time *t* supplies labour in the labour market.

The likelihood of labour force participation being observed depends on socio-economic variables, (x_{1t}), which include the respondent's: (i) marital status; (ii) age; (iii) experience; (iv) education; (v) metropolitan living status; (vi) number of children; (vii) parents' cohabitation with financial sharing; (viii) housing tenure and (ix) spouse's age.

The actual log hourly wage of a respondent *i* at time *t*, ($\ln(w_{it})$), is a function of control variables, (x_{2t}), which include the respondent's: (i) age; (ii) age squared; (iii) experience; (iv) experience squared; (v) education; (vi) metropolitan living status; (vii) employment status; (viii) occupation; (ix) industry and (x) a mean zero individual error term at time *t*, (ε_i). I also control for a respondent's marital status. The sample selection model is estimated with Heckman's two-stage procedure.

3. Data

This paper uses microdata obtained from the 1993-2010 waves of the Japanese Panel Survey of Consumers (JPSC) conducted by the Institute for Research and Household Economics. The JPSC gathers information on the demographic status of 1500 Japanese females aged 24-34 (Cohort A born in 1959-1969) in 1993, adds 500 Japanese females

aged 24-34 (Cohort B born in 1970-1973) in 1997, adjoins 836 Japanese females aged 24-29 (Cohort C born in 1974-1979) in 2003, and further appends 636 Japanese females aged 24-28 (Cohort D born in 1980-1984) in 2008, initially containing 30,744 observations (see, appendix A1 for details on the initial data sample). The JPSC contains respondents' age, educational attainment, marital status, employment status, metropolitan living status, wage, weeks worked, and family members' characteristics.

In this study, I use several socio-economic variables. The respondents' education dummy variables are constructed for five education levels: less than a high school diploma, high school diploma or equivalent (GED), technical or trade school diploma, Associate degree, and at least a Bachelor's degree. The respondents' work experience is measured in total years of work after graduation.[6] Other variables of interest include age, employment status, marital status, number of children, parents' cohabitation with financial sharing, housing tenure, metropolitan living status, occupation, and industry.

In addition, in the 1993-2010 JPSC data, earnings are defined by three different measures: (1) monthly or weekly salary; (2) daily earnings and (3) hourly wage. The hourly wage for individuals who reported daily earnings is calculated as the daily earnings divided by the hours worked per day. The hourly wage for individuals who reported a monthly or weekly salary is calculated by: (i) obtaining the salary per day (which is calculated as the monthly or weekly salary divided by the working days per month or week) and (ii) salary per day divided by hours worked per day. The hourly wage for individuals who reported daily earnings is calculated as earnings per day divided by hours worked per day. The hourly wage for respondents who reported it is used as reported. The calculation of hourly earnings for each individual is performed prior to pooling the data.

In order to examine the employment structure and the wages of Japanese female workers, I construct a dataset that includes both working and non-working individuals for estimation. The likelihood of labour force participation being observed depends on various socio-economic variables, (x_{1t}), which are shown in equation (1). Respondents who reported invalid responses[7] on spouse's age and/or spouse's annual income are eliminated from the sample.

In addition, the actual log hourly wage of a respondent i at time t, ($\ln(w_{it})$), is a function of control variables, (x_{2t}), which is also shown in (1). The hourly earnings in the data sample are top coded at ¥15,180. The data sample is further restricted to respondents who have valid hourly earnings and those who reported hourly earnings of at least ¥150 per hour.[8] The log hourly wage, which is a dependent variable, is then calculated based on the hourly earnings. After these restrictions, the sample size for the wage equations for the 1993-2010 JPSC data, defined as the labour force participation data, is reduced to 30,712 (see, table 1 for details of this data sample).

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[6] The respondent's work experience is calculated as the sum of total months of work after graduation in the first survey year and total months of work in each year thereafter, and then this sum is divided by 12 months to obtain total years of work after graduation.

[7] Invalid responses refer to the value expressed as '99', '999', or '9999' submitted by respondents in a questionnaire in the survey.

[8] The data sample includes respondents who earn less than the minimum wage (that refers to the national weighted average amount per hour), which was set at 583 yen in 1993 and 730 yen in 2010. See details on minimum wages in Japan at the Ministry of Health, Labour and Welfare.

4. Descriptive Analysis

This section first summarizes relevant individual characteristics of the sample data and the recent trends of labour force participation and of employment status among Japanese women by marital status and by cohort, using the labour force participation data.

Table 1 shows selected characteristics of individual respondents. In the 1993-2010 JPSC sample, approximately 30 per cent of respondents are unmarried with a mean age of 31, while the remaining 70 per cent are married with a mean age of 35. Educational attainment of unmarried women is similar to that of married ones; however, about 23 per cent of unmarried women and 12 per cent of married women hold at least a Bachelor's degree, and 33 per cent of unmarried women and 43 per cent of married women hold a high school diploma or equivalent. More educated women seem to be more likely to remain unmarried. As expected, more than 84 per cent of unmarried women have no children, while 86 per cent of married women have at least one child.

Table 1 also shows that mean experience (that is, total years of work after graduation) is about 13 years for unmarried women and 10 years for married ones, while mean experience in the full sample is about 11 years. It is evident that unmarried women have more work experience than married ones. Approximately 88 per cent of unmarried women and 54 per cent of married ones are in the labour force, while about 64 per cent of the full sample was participating in the labour market during the period 1993-2010. These results confirm that unmarried women have more work experience than married ones and are more likely than married women to participate in the labour force.

Figure 1, which offers additional insights into the trends of labour force participation among Japanese women by marital status, offers some interesting findings. The percentage of labour force participation among unmarried women for the period 1993-2010 is fairly consistent (87-90 per cent), while that among married women increased over time (42 per cent in 1993 and 61 per cent in 2010). As a result, the labour force participation of women in Japan has been on an upward trend for the last two decades. The figure confirms that married women are slowly increasing their labour force participation in Japan although unmarried women are more likely to participate in the labour market.

In terms of women's employment selection by marital status, figure 2 shows that the percentage of unmarried women in full-time regular employment is slowly falling after it peaked at 75 per cent in 1995, while that among married women increases over time with the exception of 2010. The figure also illustrates that the percentage of women who hold dispatch/fixed-term/other contingent employment[9] is small; however, it is increasing over time for both unmarried and married women. In particular, the increase in the percentage among unmarried women in 2010 is remarkable, and it is possible that the significant reduction in full-time regular employment is explained by the increase in dispatch/fixed-term/other contingent employment among unmarried ones. Additionally, the percentage of both unmarried and married women who hold

[9] Dispatch/fixed-term/other contingent employment is classified as non-regular employment. More precisely, a 'dispatched' temporary (or 'Haken') worker is defined as a worker who is employed and dispatched by a temporary labour agency, a 'fixed-term' worker is defined as a worker who is hired to perform a specialized job under the terms of a contract and for a specified period of time, such as contract employees (or 'Keiyaku Shyain'). See, detail for Asano (2011).

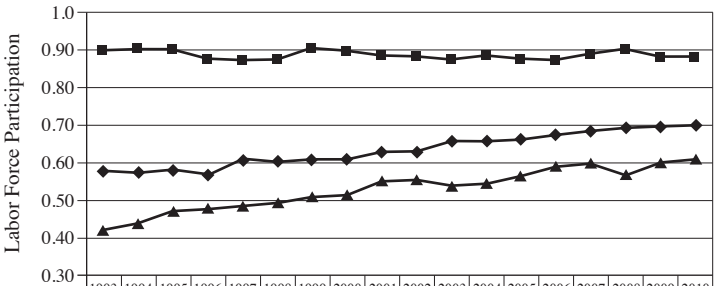
part-time contingent employment has been increasing over time except in 2010, and married women are more likely than unmarried women to select part-time contingent employment that allows more flexible work arrangements (Okumura and Islam, 2011).

Table1 - Labour Force Participation Data: 1993-2010

	All Sample n=30712			*Unmarried n=9333*			*Married n=21379*		
	Total	*Mean*	*S.D*	*Total*	*Mean*	*S.D*	*Total*	*Mean*	*S.D*
Age	30712	33.96	6.163	9333	31.42	5.936	21379	35.07	5.927
Experience (= Total Years of Work)	30712	10.94	7.897	9333	12.89	7.302	21379	10.09	7.996
Education									
Less than HS Diploma	1920	0.063	0.242	598	0.064	0.245	1322	0.062	0.241
High School Diploma or Equivalent	12397	0.404	0.491	3118	0.334	0.472	9279	0.434	0.496
Technical or Trade School Diploma	5255	0.171	0.377	1501	0.161	0.367	3754	0.176	0.380
Associate Degree	6421	0.209	0.407	1962	0.210	0.407	4459	0.209	0.406
At least Bachelor's degree	4719	0.154	0.361	2154	0.231	0.421	2565	0.120	0.325
Labour Force Participation									
In the Labour Force	19682	0.641	0.480	8252	0.884	0.320	11430	0.535	0.499
Not in the Labour Force	11030	0.359	0.480	1081	0.116	0.320	9949	0.465	0.499
Number of Children									
Zero	10683	0.348	0.476	7844	0.840	0.366	2839	0.133	0.339
One	5374	0.175	0.380	652	0.070	0.255	4722	0.221	0.415
Two	10036	0.327	0.469	526	0.056	0.231	9510	0.445	0.497
Three or more	4619	0.150	0.357	311	0.033	0.179	4308	0.202	0.401
Housing Tenure									
Housing Tenure (yes=1)	20152	0.656	0.475	6140	0.658	0.474	14012	0.655	0.475
Housing Tenure (no=1)	10530	0.343	0.475	3179	0.341	0.474	7351	0.344	0.475
Metropolitan Living Status									
Living in a Large City	7918	0.258	0.437	2871	0.308	0.462	5047	0.236	0.425
Living in a Medium City	18151	0.591	0.492	5381	0.577	0.494	12770	0.597	0.490
Living in a Small City	4585	0.149	0.356	1064	0.114	0.318	3521	0.165	0.371
Living & Financial Status									
Living & sharing finance w/ parents (yes=1)	10611	0.346	0.476	6121	0.656	0.475	4490	0.210	0.407
Living & sharing finance w/ parents (no=1)	19999	0.651	0.477	3177	0.340	0.474	16822	0.787	0.410
Partner/Spouse									
Age	21379	37.72	6.992	-	-	-	21379	37.72	6.992
Annual Income	19997	536.1	293.6	-	-	-	19997	536.1	293.6

*Housing Tenure: 30 out of 30712 (or 14 out of 9333 unmarried and 16 out of 21379 married) respondents had invalid responses.
*Metropolitan Living Status: 58 out of 30712 (or 17 out of 9333 unmarried and 41 out of 21379 married) respondents had invalid responses.
*Living & Financial Status: 102 out of 30712 (or 35 out of 9333 unmarried and 67 out of 21379 married) respondents had invalid responses.

Figure 1 - Recent Trends of Labour Force Participation by Marital Status: 1993-2010 (unit: per cent)



	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Full Sample	0.58	0.57	0.58	0.57	0.61	0.60	0.61	0.61	0.63	0.63	0.66	0.66	0.66	0.67	0.68	0.69	0.70	0.70
Unmarried	0.90	0.90	0.90	0.87	0.87	0.87	0.90	0.90	0.88	0.88	0.87	0.88	0.87	0.87	0.89	0.90	0.88	0.88
Married	0.42	0.44	0.47	0.48	0.48	0.49	0.51	0.52	0.55	0.55	0.54	0.55	0.57	0.59	0.60	0.57	0.60	0.61

5. Empirical Results

This section examines the estimation results of the Heckman's sample selection model. The analyses of the model for the estimated equation are conducted for three specifications: (1) all respondents; (2) unmarried women only; and (3) married women only, using table 2, in an attempt to analyze how selected socioeconomic factors and marital status impact the labour force participation and the wages of Japanese female workers.

Effects of Socio-economic Factors on Labour Force Participation and Wages

Estimates presented in column (1) in table 2 show that the coefficient of being single on earnings is negative, which indicates that unmarried women suffer a wage penalty of 1.4 per cent (exp(0.014)-1), but it is only statistically significant at the 10 per cent level. Hence, there is weak evidence for a small wage penalty for being single. Column (2) in the table further reveals that the effect of being single on labour force participation is positive and is highly statistically significant. It confirms that unmarried women are more likely than married ones to participate in the labour market, which is consistent with existing studies (Okumura and Islam, 2011; Kishi, 2009; and others).

Columns (1)-(2) in the table also suggest that, over all, age increases the labour force participation of women as well as the wages of Japanese female workers by 5.2 per cent. This trend persists for married women, if equations are estimated separately by martial status, as shown in columns (3)-(6). For unmarried women, however, age increases their wage by 7.7 per cent, while it reduces their labour force participation. These results indicate that labour force participation among unmarried women tends to contract as they age, even if a wage premium associated with age is present. Therefore, increasing the workforce population in Japan requires policies to encourage the participation of both female and older workers in the labour market.

Table 2 - Heckman's Sample Selection Estimates of Earnings for Women by Marital Status: 1993-2010 Dependent Variable: Log Hourly Wage

	All Sample		*Unmarried*		*Married*	
	Selection Two-Step		*Selection Two-Step*		*Selection Two-Step*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Independent Variables	*Outcome Equation*	*Participation Equation*	*Outcome Equation*	*Participation Equation*	*Outcome Equation*	*Participation Equation*
Unmarried (yes=1)	-0.014*	0.638***	-	-	-	-
	(0.008)	(0.037)	-	-	-	-
Age	0.051***	0.032***	0.074***	-0.039***	0.018***	0.059***
	(0.005)	(0.002)	(0.007)	(0.006)	(0.006)	(0.004)
Age Squared	-0.001***	-	-0.001***	-	0.000	-
	(0.000)	-	(0.000)	-	(0.000)	-
Experience (= Total Service	-0.012***	0.132***	-0.007	0.163***	-0.023***	0.128***
Length in Years)	(0.002)	(0.002)	(0.005)	(0.005)	(0.003)	(0.002)
Experience Squared	0.000	-	0.000	-	0.001***	-
	(0.000)	-	(0.000)	-	(0.000)	-
High School with Diploma	-0.026**	0.102***	-0.010	0.270***	-0.017	0.036
(yes=1) (E2)	(0.013)	(0.039)	(0.019)	(0.084)	(0.017)	(0.044)
Technical or Trade School	0.028**	0.176***	0.039*	0.536***	0.036**	0.052
(yes=1) (E3)	(0.014)	(0.043)	(0.021)	(0.100)	(0.018)	(0.048)
Associate Degree (yes=1) (E4)	0.036***	0.194***	0.062***	0.685***	0.037**	0.048
	(0.013)	(0.042)	(0.021)	(0.101)	(0.018)	(0.047)
At least Bachelor's Degree	0.195***	0.378***	0.202***	0.845***	0.221***	0.178***
(yes=1) (E5)	(0.015)	(0.045)	(0.023)	(0.095)	(0.020)	(0.052)
Full-Time: Regular	0.302***	-	0.261***	-	0.317***	-
	(0.006)	-	(0.011)	-	(0.008)	-
Contingent: Dispatch &	0.207***	-	0.193***	-	0.205***	-
Fixed-Term, Other	(0.011)	-	(0.017)	-	(0.015)	-
Metropolitan Living (Big City)	0.147***	0.063*	0.156***	0.046	0.128***	0.062*
	(0.009)	(0.032)	(0.014)	(0.083)	(0.012)	(0.036)
Semi-Metropolitan Living	0.049***	0.013	0.062***	-0.084	0.038***	0.023
(Medium City)	(0.008)	(0.028)	(0.013)	(0.076)	(0.010)	(0.031)
Professional/Specialist/Mgmt/	0.316***	-	0.244***	-	0.357***	-
Teacher (O1)	(0.015)	-	(0.024)	-	(0.020)	-
Programmer/Nurse/	0.391***	-	0.305***	-	0.454***	-
Nutritionist (O2)	(0.013)	-	(0.021)	-	(0.018)	-
Office Administration (O3)	0.192***	-	0.149***	-	0.209***	-
	(0.011)	-	(0.018)	-	(0.014)	-
Manufacturing & Operations (O4)	0.084***	-	0.027	-	0.125***	-
	(0.013)	-	(0.022)	-	(0.016)	-
Services and Sales (O5)	0.148***	-	0.080***	-	0.184***	-
	(0.012)	-	(0.020)	-	(0.015)	-
Manufacturing (I1)	-0.042***	-	0.019	-	-0.083***	-
	(0.012)	-	(0.016)	-	(0.016)	-
Retail Trade (I2)	-0.118***	-	-0.032**	-	-0.164***	-
	(0.011)	-	(0.016)	-	(0.015)	-
Finance/Insurance/Real Estate (I3)	0.054***	-	0.107***	-	0.020	-
	(0.014)	-	(0.018)	-	(0.020)	-
Service (I4)	-0.055***	-	-0.028**	-	-0.070***	-
	(0.010)	-	(0.014)	-	(0.014)	-
Public Administration (I5)	0.081***	-	0.028	-	0.105***	-
	(0.013)	-	(0.020)	-	(0.018)	-
Children (1)	-	-0.581***	-	-0.012	-	-0.620***
	-	(0.039)	-	(0.129)	-	(0.041)

Table 2 - Heckman's Sample Selection Estimates of Earnings for Women by Marital Status: 1993-2010 Dependent Variable: Log Hourly Wage (continued)

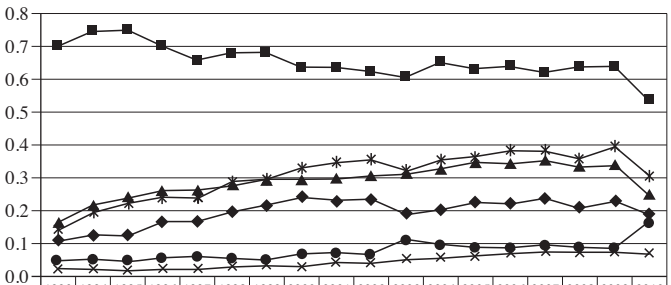
	All Sample		*Unmarried*		*Married*	
	Selection Two-Step		*Selection Two-Step*		*Selection Two-Step*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Independent Variables	*Outcome Equation*	*Participation Equation*	*Outcome Equation*	*Participation Equation*	*Outcome Equation*	*Participation Equation*
Children (2)	-	-0.846***	-	-0.092	-	-0.908***
	-	(0.037)	-	(0.132)	-	(0.040)
Children (3 or more)	-	-0.901***	-	-0.207	-	-0.971***
	-	(0.042)	-	(0.148)	-	(0.045)
Living & Sharing Finance	-	-0.215***	-	-0.340***	-	-0.203***
w/ Parents (yes=1)	-	(0.026)	-	(0.074)	-	(0.029)
Home Ownership (yes=1)	-	0.066***	-	0.095	-	0.028
	-	(0.023)	-	(0.064)	-	(0.025)
Respondent's Spouse's Age	-	-0.006***	-	-	-	-0.022***
	-	(0.001)	-	-	-	(0.003)
Constant	5.778***	-1.104***	5.284***	1.073***	6.520***	-1.236***
	(0.084)	(0.076)	(0.125)	(0.200)	(0.121)	(0.082)
Lambda	-0.080***	-	-0.042*	-	-0.164***	-
	(0.021)	-	(0.022)	-	(0.026)	-
Sigma	0.387	0.387	0.351	0.351	0.410	0.410

Notes: Standard errors are shown in parentheses. ***, **, * indicate significant at the 1%, 5% and 10% levels, respectively.

Table 2 further shows that the coefficients of experience on labour force participation among unmarried and married women are positive and are statistically significant. However, the coefficients of experience on earnings for both unmarried and married women are negative, and they are statistically significant only for married women. These results suggest that experience reduces married women's wages by 2.3 per cent and has no effect on unmarried women's earnings. This unexpected finding likely results from Japanese women's short job tenure (Nakata and Ryoji, 2002; and others), career interruptions due to marriage and childbearing (Kawata and Naganuma, 2010; Matsukura *et al*. 2007), and/or limited career choices, which prevents them from acquiring experience that offers a lifetime wage premium (Ono, 2010).

Estimates in columns (1)-(2) show that the coefficients of education are positive and are statistically significant, which confirm that education increases Japanese women's wages and labour force participation. Yet, the trends are somewhat different by marital status. The likelihood of labour force participation among unmarried women increases as educational attainment increases, while increases in participation among married women are limited to those with an educational attainment of 'at least a Bachelor's degree'. In the case of earnings, the premiums are only apparent for those with educational attainment of 'Associate degree' (6.4 per cent for unmarried and 3.8 per cent for married) and 'at least a Bachelor's degree' (22.4 per cent for unmarried and 24.7 per cent for married). These results suggest that higher levels of education produce a higher wage premium for women in Japan.

Figure 2 - Employment Status by Marital Status: 1993-2010 (unit: per cent)



	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Regular: Full-Time Unmarried	0.701	0.747	0.751	0.702	0.656	0.678	0.679	0.634	0.636	0.623	0.608	0.653	0.630	0.641	0.621	0.637	0.638	0.534
Regular: Full-Time Married	0.164	0.216	0.237	0.258	0.258	0.279	0.292	0.296	0.297	0.306	0.313	0.328	0.346	0.342	0.353	0.336	0.341	0.247
Contingent: Dispatch Unmarried	0.046	0.051	0.047	0.054	0.058	0.053	0.051	0.064	0.066	0.066	0.109	0.095	0.088	0.081	0.093	0.086	0.083	0.161
Contingent: Dispatch Married	0.023	0.023	0.020	0.021	0.023	0.030	0.034	0.031	0.041	0.040	0.053	0.055	0.064	0.070	0.075	0.071	0.076	0.068
Contingent: Part-Time Unmarried	0.110	0.125	0.126	0.166	0.168	0.196	0.214	0.241	0.229	0.233	0.188	0.203	0.226	0.221	0.239	0.207	0.230	0.187
Contingent: Part-Time Married	0.144	0.195	0.221	0.241	0.242	0.289	0.296	0.327	0.347	0.355	0.321	0.355	0.360	0.384	0.381	0.360	0.394	0.307

Effects of employment status, occupations and industries on wages

Turning to employment status, estimates presented in columns (1), (3) and (5) in table 2 show that the coefficients of full-time employment, which include full-time regular and dispatch/fixed-term/other contingent, on the wages of Japanese female workers are all positive and are highly statistically significant. More precisely, for unmarried women, the wage premiums associated with full-time regular employment and full-time dispatch/fixed-term/other contingent are 29.8 per cent and 21.3 per cent, respectively. For married women, those premiums are 37.3 per cent and 22.8 per cent, respectively. These results indicate a positive return to full-time employment on the earnings of female workers relative to part-time employment, and smaller wage premium differences within employment status for unmarried women relative to married ones.

Estimates in column (1) in table 2 further reveal that the coefficients of occupations on the wages of Japanese female workers are all positive and are highly statistically significant. For unmarried women, those who are in professional (O1) and in technical & healthcare support (O2) occupations earn 27.6 per cent and 35.7 per cent, respectively, more than unmarried ones who are in 'other' occupations (O6[10]). Similarly, married women who are in these occupations earn 42.9 per cent and 57.5 per cent, respectively, more than their counterparts. Although the wage premiums are apparent for women in all occupations, except for unmarried women who are in manufacturing and operation (O4), professional occupations and technical & healthcare support occupations produce even larger earning premiums for women, confirming the hypothesis that occupational choice has a large influence on Japanese women's earnings (Nakata and Ryoji, 2002).

Examining the effect of industries on the wages of women, estimates in column (1) in table 2 shows that the coefficients of finance/insurance/real estate (I3)

[10] 'Other' occupations (O6) include self employed, small business owner, or others.

and public administration (I5) are positive and statistically significant, while those of the manufacturing (I1), retail trade (I2) and service (I4) industries are negative and statistically significant. Different trends are observed, if the equations are estimated separately by martial status. Unmarried women who are in the finance/insurance/real estate industry (I3) earn 11.3 per cent more than unmarried women who are in 'other' occupations (I6),[11] while married women who are in public administration (I5) earn 11.1 per cent more relative to their counterparts. On the other hand, women who are in the retail trade (I2) and the service (I4) industries suffer a sizable wage penalty, regardless of their marital status. These results also confirm that industry selection matters in maximizing earnings for Japanese women.

Discussion on Japanese Women's Labour Market Outcomes

In light of the empirical findings in this study, there are a few potential reasons for explaining the small wage penalty for unmarried women in Japan. One is that the earnings of unmarried women are less sensitive to work experience. This is because the traditional seniority-based wage system has given less advantage to women, who are less likely to commit to lifetime employment, and has offered less firm-specific human capital investment, both of which prevent the unmarried from obtaining high earnings. There is also a decline in the percentage of unmarried women in full-time regular employment and an increase in contingent employment among new entrants to the labour market and female workers of all cohorts (Asano *et al*. 2013; Kishi, 2009; and others) due to changing labour market conditions during 'Japan's lost decades'. Non-regular employees not only experience job insecurity, serial job changing, and less firm-specific human capital investment, but also have lower wages and slower earning growth relative to regular workers (Kishi, 2013; Sano, 2012; Esteban-Pretel *et al*. 2011; and others); hence, unmarried women are likely to suffer a wage penalty in the labour market in Japan.

It is also worth noting the challenges that female workers in Japan have long faced. First, Japanese women, in general, receive low appraisal points from employers (Nakata and Ryoji, 2002), and Japanese female workers do not benefit from the lifetime employment system (Ono, 2010; and others). Thus, the effect of job tenure, age and experience (Nakata and Ryoji, 2002; and Genda and Kurosawa, 2001) on the wages of women is less than with men in Japan. In addition, the return to education on the earnings of Japanese female workers is declining (Kambayashi *et al*. 2008), even though educational attainment among Japanese women is increasing (Sano, 2012 and others) over time. Empirical findings in this study confirm that the effect of human capital investment on female workers' labour market outcomes is weak in Japan.

Second, Japanese women are overrepresented in lower-paid occupations, such as clerical and service occupations, and Japanese female workers are likely to experience occupational segregation in the workplace (Nakata and Ryoji, 2002). This is partially caused by one's occupational choice, which is explained by the choice of academic majors that Japanese women select – mainly humanities, arts-education,

[11] 'Other' industries (I6) include farming/fishing/forestry, mining/construction, and transportation/utilities, or others.

home economics, and social science – relative to those of Japanese men that are focused on engineering or social science (Nakata and Ryoji, 2002). This occupational selection leads Japanese women to land in lower-paid positions in the clerical and service sector, which is increasingly dominated by contingent employees in recent years (Asano *et al*. 2013). Given this, Japanese women, who are in the manufacturing or service industries and/or in contingent employment, are worse off compared to their counterparts, regardless of their marital status, as confirmed by estimates in this study.

Lastly, Japanese women are more likely (than Japanese men) to encounter career interruption, re-employment difficulties, and a deterioration of skills in periods of non-labour-participation due to marriage and childbearing (Nakamura and Ueda, 1999). Because Japanese firms have more incentives to hire new high school or college graduates over mid-career workers for internal promotions (Hashimoto and Kondo, 2012; and others) and engage less in mid-career hires (Kambayashi and Kato, 2011; and others), women who marry and bear children tend to have negative labour market outcomes in Japan (Kishi, 2009; and others). This potentially contributes to decreases in marriage among those who are educated and committed to the labour market in Japan.

6. Concluding Remarks

This paper examines the determinants of labour force participation and the recent wage trend among female Japanese workers, and further analyzes the factors contributing to differences in their wages by marital status. To measure these effects, I estimate the wage equation utilizing Heckman's sample selection model with the 1993-2010 Japanese Panel Survey of Consumer data.

This study finds weak evidence for a 1.4 per cent wage penalty among unmarried women, although they are more likely than married ones to participate in the labour market. Age increases both the wages of all women and labour force participation among married women, but it reduces unmarried women's labour force participation. Experience increases labour force participation among all women, yet it has no effect on the earnings of unmarried women, while it reduces married women's wages by 2.3 per cent. Education increases the earnings of all women, and the premium increases as the level of education increases; in particular, unmarried and married women with 'at least a Bachelor's degree' earn 21.3 per cent and 22.8 per cent, respectively, more than their counterparts with less than a high school diploma.

This study further confirms that full-time employment status offers higher earnings premiums relative to part-time employment status for all women, and that differences in wage premiums within employment status are smaller for unmarried women than for married ones. The effect of occupations on earnings is prominent – professional and technical occupations offer high wage premiums for both unmarried and married women. Industry differences have varied effects on the wages of Japanese female workers – unmarried women in the finance/insurance/real estate industry and married women in public administration earn the largest wage premiums.

This paper extends existing studies on labour force participation and wage differentials among female Japanese, with particular attention to unmarried women, by utilizing the 1993-2010 Japanese Panel Survey of Consumer data. The findings of

this study have a few important implications. First, women's labour force participation and wages are influenced by marital status. Second, there is weak evidence for a small wage penalty for being single. Third, being single, work experience, and high educational attainment promote women's labour force participation. Lastly, high education, full-time employment, and professional and technical occupations produce higher earnings for Japanese women, regardless of their marital status.

The findings in this study echo issues in the ongoing debate concerning the welfare of women in the Japanese labour market. Desires for work-family balance influence work, marriage and fertility decisions, leading to an increased number of contingent employees and limited human capital investment. These outcomes, in turn, negatively impact earnings, and accelerate an overrepresentation of women in lower-paid occupations that leads to occupational segregation. The results of this study are useful for developing policies to increase the female workforce population, reduce wage differentials among female workers, improve worker status, and reduce job segregation in the Japanese labour market.

Appendices

Appendix A1 - Initial Data Observations by Cohort: 1993-2010

Panel #	*Year*	*Age*	*Total*	*Cohort*	*Obs*	*Cohort*	*Obs*	*Cohort*	*Obs*	*Cohort*	*Obs*
1	1993	24-34	1500	A	1500						
2	1994	25-35	1415	A	1415						
3	1995	26-36	1341	A	1341						
4	1996	27-37	1289	A	1289						
5	1997	24-38	1749	A	1249	B	500				
6	1998	25-39	1628	A	1193	B	435				
7	1999	26-40	1537	A	1131	B	406				
8	2000	27-41	1481	A	1098	B	383				
9	2001	28-42	1421	A	1057	B	364				
10	2002	29-43	1373	A	1030	B	343				
11	2003	24-44	2139	A	980	B	323	C	836		
12	2004	25-45	1980	A	944	B	312	C	724		
13	2005	26-46	1870	A	904	B	292	C	674		
14	2006	27-47	1774	A	875	B	278	C	621		
15	2007	28-48	1706	A	847	B	271	C	588		
16	2008	24-49	2284	A	828	B	260	C	560	D	636
17	2009	25-50	2168	A	799	B	255	C	541	D	573
18	2010	24-51	2089	A	778	B	246	C	522	D	543
All	1993-2009	24-51	30744	Cohort A	19258	Cohort B	4668	Cohort C	5066	Cohort D	1752
Born Year	1959-1984	-	-	1959-1969	-	1970-1973	-	1974-1979	-	1980-1984	-

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