

The Impact of Tax Reform in 2004 on the Female Labour Supply in Japan

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EXTENDED ABSTRACT

In 2003, the Japanese Diet passed legislation to abolish part of the special deduction for spouses (*Haigusha Tokubetsu Kojo*) which would take effect in the 2004 tax year. This paper investigates the impact of this tax reform on female labour supply in Japan. A number of earlier studies have shown that married women are likely to adjust their labour supply in order for their husbands to become eligible to take advantage of this deduction. By using the first and second waves of the Keio Household Panel Survey (KHPS) collected in 2004 and 2005, this paper uses the difference-in-differences approach to examine whether there has been any change in the behaviour of female labour supply as a result of this tax reform. The empirical evidence indicates that the tax reform in 2004 had a negative and statistically significant impact on both the decision of female spouses to enter the labour market and on the number of hours they worked conditional on their participation in the labour market. In addition, the empirical evidence obtained does not support the Douglas-Arisawa Law.

1. INTRODUCTION

The purpose of this paper is to examine whether the abolition of a significant portion of the special deductions for spouses (*Haigusha Tokubetsu Kojo*) has had an impact on the female labour supply in Japan. In the recent wave of structural reforms, tax reform has been one of the top items on the agenda for the Japanese government. Given the extremely large budget deficits, the Japanese tax system has been the subject of heated debate, and has been targeted for the reform. The tax reform in 2003 cut into income tax system, and, in particular, abolished a significant portion of the special deductions for spouse. The amendment has come to an effect from 1 April 2004.

Spouse deductions were initially designed to support the nuclear family where full-time housewives specialized in domestic work and child bearing, on the basis of the argument that the contributions of housewives to the households should not be underestimated. In addition, Japanese firms often provide employees an allowance for spouses whose incomes are less than 1 million yen. This threshold is set to closely match the threshold associated with the spouse deductions in the tax system (Nagase (2001) and Higuchi (1995)). However, as the labour force participation rate of women has increased over time, the policy of protecting fulltime housewives in this way has come under heavy criticism, and it has been suggested it causes significant distortions in the labour market.

The change in tax system in 2004 enables us to investigate what incentives or disincentives the tax system provides for suppliers of labour. The tax system may be seen as having a possible impact on both the decision to participate in the labour market and the hours of work given a decision to participate in the labour market. Depending on how tax system operates, it can provide an incentive or disincentive for labour supply. In the context of the social security earnings test in the USA, Friedberg (2000) and Gruber and Orszag (2003) examine the impact of changes in the earning tests on labour supply decisions. They suggest there are some effects of the earning test on the labour supply of older workers. Ohtake and Yamaga (2003) confirm similar effects in Japan.

Moreover, the relationship between tax system and labour supply is often discussed in the context of female labour supply. Eissa and Liebman (1996) examine the impact of the American Tax Reform Act of 1986 (TRA86), which included an expansion of the earned income tax credit (EITC), on the labour supply decision. As only single women with

children were eligible for the credit, in order to capture the effects of change in the system, Eissa and Liebman (1996) compare the change in labour supply of single women with children to that of single women without children. They conclude that the expansion of the earned income tax increased the labour force participation of single women with children.

There are numerous studies that examine the relationship between female labour supply and the tax system in Japan. Abe and Ohtake (1995) examine the income distribution of married part-time workers, and found that married part-time workers were "bunching" at the earnings limit. This implies that married women did adjust their labour supply, so that they can avoid becoming liable for taxation, and their husbands can be eligible for the spouse deductions. Higuchi (1995) poses the question of whether policies protecting fulltime housewives in fact protect wealthy household rather than low income households. He examines whether married part-time workers adjust their annual income taking into account features of the tax system. According to Higuchi (1995), 35.6% of married part-time workers adjust their annual income, and their annual working hours are as much as 24.8% shorter than those who do not adjust their income. Furthermore, the higher the income of the husband, the more likely he is to be eligible for both the basic and special spouse deductions. Kohara (2001) also finds a similar trend that the wives of relatively high income husbands are more likely to adjust their labour supply to avoid exceeding the threshold for their husbands to be eligible for the spouse allowance. In contrast, Akabayashi's (2003) simulation results indicate that the abolition of spouse deductions would have little impact on female labour supply in Japan. Nagase and Nawata (2005) present simulation based estimates of the impact of totally eliminating the spouse and special spouse deductions. Their simulations suggest that the elimination of both deductions would lead to a significant increase in the labour supply of women who currently work more than 1100 hours per year.

This paper aims to answer the question of whether the partial abolition of the special spouse deduction has influenced the labour supply decisions of women? If married women adjust their income to ensure that their husbands are eligible to receive the special spouse deduction, the abolition of the spouse allowance should increase the labour supply of married women. However, there could be no effect after the policy change if the labour supply of married women is independent of the special spouse deduction, if they are not aware of the

amendment, or if they could not immediately adjust their work hours due to some constraints.

The rest of this paper consists of five sections. Section 2 provides some details of the spouse allowance. Section 3 discusses the identification strategy and the models to be estimated, while section 4 describes the data. Section 5 reports the results of estimation, and section 6 contains a brief conclusion.

2. SPOUSE DEDUCTIONS

It may be useful to provide some explanation of the spouse deductions in Japan. In order to simplify the discussion, it is assumed that the head of the household is a husband and the spouse is a wife. In addition, the explanation is based on the case where the annual income for tax purposes of the head of the household is below 10 million yen. If a spouses annual income exceeds 1 million yen, the spouse's income becomes subject to income tax, and if her annual income exceeds 1.03 million yen, she is liable for the residential tax. Not only does she become to liable for taxation when her income exceeds these thresholds, but her husband also loses his spouse deductions. There are two types of spouse deductions: the basic spouse deduction (*haigusha kojo*); and the special spouse deduction (*haigusha tokubetu kojo*). The basic spouse deduction is a deduction of 380,000 yen that be claimed by a husband provided his wife's net income is 1.03 million yen or less. On the other hand, the special spouse deduction is a three part system. Husbands whose spouse had a net income of less than 760,000 yen were entitled to a special spouse allowance of 380,000 yen. Husbands whose spouse had a net income between 760,000 yen and 1.03 million yen were entitled to a special spouse allowance between 380,000 yen and zero, where the amount was reduced in step wise fashion as the spouse's income rose. It is important to note that it is these two parts which have been abolished in 2004. The final part is where a husband has net income of the husband is 10 million yen or less and a wife who earns more than 1.03 million yen and less than 1.41 million yen. In this case, the husband would be eligible for a special spouse allowance between 380,000 yen and zero, where the amount was reduced in step wise fashion as the spouse's income rose, even though he is not eligible to claim a basic spouse deduction. That is, a significant portion of the special spouse allowance available in the 2003 tax year was not available in the 2004 tax year. A tabular summary of the current system of basic and special spouse allowances is provided in Table 1.

3. MODEL

In order to examine the effects of the partial abolition of the special spouse deduction on the labour supply decisions of women, this paper will apply the methodology of Eissa and Liebman (1996). As mentioned earlier, Eissa and Liebman have investigated the effects of the TRA86 on labour force participation rates and hours worked of single women. The TRA86 changed the system of EITC by giving greater financial encouragement to single women to take low wage jobs, but this only applied to those women with children in their care. Eissa and Liebman (1996) estimates the impact of the TRA86 using the difference-in-differences approach by comparing the treatment group of single women with children to the control group of single women without children. Eissa and Liebman (1996) computed a simple difference-in-difference estimator, and then further estimated a probit model for labour participation and an hours worked equation by pooled ordinary least squares to check the robustness of the results.

In this paper, those who are expected to be affected by the change in the policy, the partial abolition of the spouse deductions, are married women. Thus, the treatment group is married women. On the other hand, the control group consists of single women. The analysis is twofold since we examine both labour force participation and hours worked.

We will estimate the following discrete variable model for the labour force participation of individual women:

$$P(lfp_{it} = 1) = \Phi(\alpha + \beta X_{it} + \gamma_0 married_i + \gamma_1 year05_t + \gamma_2 (married \times year05)_{it}), \quad (1)$$

where *lfp* is a 0-1 dummy variable taking unity if the *i*'th woman reported working at least one hour in period *t*. In addition, *married* and *year05* are 0-1 dummies which are equal to one for any married woman and for observations for 2005, respectively. X_{it} is a vector of demographic characteristics that includes education dummies, age, age squared, dummies for male and female parents living at home, husband's income, other unearned income of the women, number of family members living at home (excluding the women in question), number of preschool children, regional unemployment, city size dummies, and regional dummies. The interest of parameter is γ_2 . If married women adjusted their labour supply to avoid earning beyond the threshold before the abolition of the special spouse deduction, it is expected that the treatment effect, γ_2 , will be positive. The regional unemployment dummies are designed to take account of differing

macroeconomic conditions across regions in Japan, and differences in macroeconomic conditions in 2004 and 2005.

For the hours worked of individual women, the following equation can be specified:

$$HW_{it} = \alpha + \beta X_{it} + \gamma_0 married_i + \gamma_1 year05_t + \gamma_2 (married \times year05)_{it} + \varepsilon_{it}, (2)$$

where HW is weekly hours worked, and the sample is limited to $HW > 0$. The definitions of the explanatory variables in the model are the same as for equation (1).

4. DATA

The data used in this paper are the first two waves of the Keio Household Panel Survey (KHPS) collected in early 2004 and early 2005. This survey aims to investigate various aspects of household behaviour including consumption and labour supply behaviour. The first wave of KHPS was conducted in the period of January-March 2004 with a sample size of 4005 households. Of these 4005 households, data on 82 households was deemed to be unusable. The second wave of KHPS was conducted in January to March 2005. Between the first and second waves, there was an attrition rate of 17.3%.

KHPS contains information on households, families, and individuals. Since for married couples the survey asks the identical questions to both the respondent and his or her spouse, the first wave contains detailed data on approximately 7000 individuals. In KHPS, the questionnaire asks average weekly hours worked. Although the amendment to the tax law came in April of 2004, the first wave of the KHPS is assumed to capture the labour supply before the policy change as the survey was conducted January-March period, before the amendment came into effect.

Table 2 summarises the descriptive statistics. The total sample size is 4809 (among those, 2460 are for 2004 and 2349 for 2005). There are 2310 women in the sample who provide at least 1 hour of work. It is worth noting that there are some obvious outliers in the average weekly hours worked reported. The maximum of hours of work is 150, but this is not the only outlier. There are a small numbers of people who also report their average weekly hours worked as more than 100 hours. Although it is difficult to draw the line to distinguish outliers, we also estimate with the sub-sample of women reporting hours worked of 80 hours or less.

5. RESULTS

In both waves, KHPS asks individuals whether they adjusted their working hours or annual income. Table 3 shows the number of women who report that they adjust their annual income in order to receive various allowances and deductions for spouses. Although there are a large number of missing observations and the questionnaire changed slightly in 2005, about 13 per cent of the respondents adjust their annual income in each year. Table 4 reports the results of a simple difference-in-differences estimator of the impact of the tax change on the labour force participation of women. The estimated value is -0.021 and is insignificant. Contrary to our expectation, married women become less likely to participate in the labour market after the amendment, but the effect is not significant.

The treatment and control groups may differ in their demographic characteristics, so there is a possibility that the results in Table 3 may simply reflect differences of demographic characteristics between the treatment group and the control group rather than a treatment effect. In order to control for these demographic characteristics, equation (1) is estimated for labour force participation, and equation (2) and for hours worked, (2) is estimated.

Table 5 reports the results of various specifications of (1). First, it is (unrealistically) assumed that the data sets for 2004 and 2005 are independent. A probit model is estimated using an unbalanced panel without any individual effects. Second, a balanced panel is used and individual effects are controlled for using fixed effects logit model. For comparison, the results for a logit model without fixed effects are also reported. The treatment effect, the coefficient of ($year05 * married$), is negative and significant in probit and fixed effect logit models. In terms of the sign of the treatment effect, these results confirm that of Table 4.

Interestingly, the empirical evidence does not support the Douglas-Arisawa Law of a negative correlation between husband's income and wife's labour supply. According to the Douglas-Arisawa Law, the higher the income of the head of the household, the lower the chance that his spouse will work outside the household. In the past, many previous studies in Japan support the Douglas-Arisawa Law, for example, Higuchi (1995). However, Kohara (2001) contends that in recent years, the empirical evidence does not support the Douglas-Arisawa Law. The coefficients of husband's income in the three specifications in Table 5 are all insignificant. Thus, these results are consistent with Kohara (2001).

The results of estimating an hours worked equation without a sample selection correction are summarised in Table 6. The first two columns are the results for the unbalanced panel. As discussed earlier, some respondents report excessively large values for their average weekly hours worked. In order to control for the effects of these outliers, a sub-sample limited to individuals who report their weekly hours worked are less than 80 hours. Independent of the outliers are treated, both estimated results suggest a significant negative treatment effect. Furthermore, the last column in Table 6 reports the result of estimating equation (2) for a balanced panel with individual effects. The fixed effects model is preferred to other panel specifications. The fixed effects model also indicates that the coefficient of (*year05*married*) is a negative and significant. Through the examination from various perspectives, it can be concluded that there is a negative treatment effect for the abolition of a significant proportion of the special spouse deductions, and the results are robust.

Moreover, for those who are already in the labour market, their husband income is likely to reduce their hours of work. The coefficient on husband's income is negative and significant in the results of pooled OLS in Table 6. However, the magnitude of the coefficient is very small, -0.004 for all observations and -0.003 when the sample is limited to those reporting they worked less than 80 hours. Once the individual effect is controlled for in the fixed effect model, the correlation disappears. Table 6 also suggests that the presence of female parent living at home also helps women increase their hours worked. The variable has a positive and significant variable in the pooled OLS case.

6. CONCLUSION

This paper has examined the impact of tax reform 2004 on the female labour supply in Japan, and found that married women in fact reduced their labour supply after the amendment rather than increased it. The result needs to be interpreted with some caution. The puzzling unexpected negative impact may be caused by specification errors. One possible and popular candidate is missing variable bias. In the early 2000s, a number of policy changes have been made, and they have surely influenced the households too. It is then possible that we are picking up the impact of other policy changes which might have worked to reduce the labour supply of married women rather than the effect of the altered spouse deduction system. It is essential that some further effort is taken to reduce the possibility of this bias. This paper also found that the Douglas-Arisawa Law of negative correlation

between a husband's income and his wife's labour supply does not seem to apply in Japan recently.

7. ACKNOWLEDGEMENT

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Table 1 Spouse Deductions (units: 1000 yen)

	The amount of special spouse deduction		The amount of basic spouse deduction
	2003	2004	
The total amount of spouse's income			
0 to 699.999	380	0	380
700 to 749.999	330	0	380
750 to 799.999	280	0	380
800 to 849.999	230	0	380
850 to 899.999	180	0	380
900 to 949.999	130	0	380
950 to 999.999	80	0	380
1000 to 1030	30	0	380
1030.001 to 1049.999	380	380	0
1050 to 1099.999	360	360	0
1100 to 1149.999	310	310	0
1150 to 1199.999	260	260	0
1200 to 1249.999	210	210	0
1250 to 1299.999	160	160	0
1300 to 1349.999	110	110	0
1350 to 1399.999	60	60	0
1400 to 1409.999	30	30	0
1410 or more	0	0	0

Note: The figures in this table assume that the annual income of the head of the household is below 10 million yen.

Table 2 Descriptive Statistics

Variable	Mean	Std.Dev	Min	Max	Cases
Hours of work	30.536	19.234	1	150	2310
Year05	0.488	0.500	0	1	4809
Married	0.839	0.368	0	1	4809
High school	0.556	0.497	0	1	4809
Junior college	0.212	0.409	0	1	4809
University	0.117	0.322	0	1	4809
Age	46.496	12.761	20	73.83	4809
Living with female parent	0.096	0.295	0	1	4809
Living with male parent	0.052	0.222	0	1	4809
Husband's income	313.864	280.799	0	6500	4809
Female's other income	21.971	75.393	0	2000	4809
No. of family members	2.574	1.428	0	8	4809
No. of preschool children	0.253	0.598	0	5	4809
Regional unemployment rate	5.016	0.844	3.531	6.5	4809
Large size city	0.232	0.422	0	1	4809
Medium size city	0.584	0.493	0	1	4809
Hokkaido	0.045	0.208	0	1	4809
Tohoku	0.059	0.235	0	1	4809
Chubu	0.189	0.392	0	1	4809
Kinki	0.172	0.378	0	1	4809
Chugoku	0.058	0.234	0	1	4809
Shikoku	0.034	0.180	0	1	4809
Kyushu	0.113	0.317	0	1	4809

Table 3 Spouse Deductions and the Labour Supply Adjustment

	Adjusted	Not applicable	Not necessary	Do not know	Obs
2004	207	496	700	173	1576
	Adjusted	Did not adjust			
2005	185	1202			1387

Table 4 Labour Force Participation Rates of Women

	2004	2005	Difference	DID
Married Women Proportion	0.548	0.567	0.019	-0.021
Standard Error	0.009	0.010	0.014	0.033
Sample Size	2911	2454		
Single Women Proportion	0.748	0.787	0.040	
Standard Error	0.022	0.020	0.030	
Sample Size	391	428		

Table 5 Labour Force Participation Rates: Single versus Married Women

Variable	Unbalanced Panel			Balanced Panel					
	Probit			Logit			Fixed Effects Logit		
	Coefficient	Std. Error		Coefficient	Std. Error		Coefficient	Std. Error	
Year05	0.164	0.145							
Married	-0.464	0.088	***	-1.159	0.136	***	-22.138	63.290	
Year05*Married	-0.207	0.116	*	-0.064	0.079		-1.094	0.393	***
High School	0.135	0.065	**						
Junior college	0.122	0.078							
University	0.133	0.088							
Age	0.117	0.013	***						
Age squared	-0.002	0.000	***						
Living with female parent	0.030	0.080		0.133	0.151		-2.402	1.707	
Living with male parent	-0.124	0.106		-0.192	0.197		-2.053	1.677	
Husband's income	-0.001	0.001		0.000	0.000		0.000	0.002	
Other income	-0.002	0.000	***	-0.008	0.001	***	-0.020	0.005	***
No. of family members	0.048	0.017	***	0.178	0.029	***	-0.190	0.368	
No. of preschool children	-0.635	0.041	***	-0.791	0.063	***	-2.226	0.647	***
Regional unemployment rate	-0.113	0.172		-0.199	0.044	***	-2.656	0.606	***
City & Regional dummies	YES			YES			YES		
Observations	4809			3786			3786		
Log likelihood function	-2795.982			-2317.095			-322.225		

Notes: *, **, and *** indicate the coefficient is significant at the 10%, 5%, and 1% significance level, respectively. For the education dummies, the base education group is junior high school. For the city dummies, the base group is villages. A constant was included.

Table 6 Hours of Work: Single versus Married Women

Variable	Unbalanced Panel Pooled OLS				Balanced Panel Fixed Effects			
	All		Hours of work<80		All			
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error		
Year05	-0.559	2.451			-1.437	2.195		
Married	-4.817	1.487	***		-5.284	1.352	***	1.348 5.472
Year05*Married	-5.723	1.785	***		-3.835	1.598	**	-7.654 1.445 ***
High school	-1.844	1.692			-1.809	1.511		
Junior college	-0.254	1.870			-0.991	1.663		
University	1.781	2.024			0.896	1.797		
Age	-0.142	0.265			-0.088	0.244		
Age squared	0.002	0.003			0.001	0.003		
Living with female parent	3.029	1.656	*		2.593	1.389	*	1.030 6.935
Living with male parent	-2.095	2.227			-1.708	1.811		-18.830 8.890 **
Husband's income	-0.004	0.002	**		-0.003	0.001	**	0.000 0.002
Female's other income	-0.017	0.011			-0.013	0.010		-0.012 0.013
No. of family members	-0.788	0.331	**		-0.866	0.292	***	0.573 1.227
No. of preschool children	-3.087	0.860	***		-3.045	0.830	***	-1.523 3.552
Regional unemployment rate	-3.487	3.497			-3.294	3.122		-5.893 2.101 ***
City and Regional dummies	YES				YES			
Observations	2310				2286			1288
Adjusted R-squared	0.089				0.093			0.423

Notes: *, **, and *** indicate the coefficient is significant at the 10%, 5%, and 1% significance level, respectively. For the pooled OLS results, White's heteroscedasticity robust covariance matrix is used to compute the standard errors. In the balanced panel analysis, the fixed effects model is chosen on the basis of the results of a Hausman test. A constant was also included.

