

Doshisha University Life Risk Research Center

Discussion Paper Series No. 2015-01

Women's Work and Differentials
among Couples

Sayaka SAKODA and Toshiaki TACHIBANAKI

Faculty of Economics

Doshisha University

*Life Risk
Research Center*

Discussion Paper Series

Women's Work and Differentials among Couples

Sayaka SAKODA¹ and Toshiaki TACHIBANAKI²

Abstract

There are several causes to explain the reasons why the degree of income inequality has increased significantly in Japan. Several recent studies have suggested that the degree of income inequality among people in the same age range has increased.

A standard measure for evaluating income inequality is typically based on household income, which includes one-earner household income and two-earners household income. Family structure has changed over recent decades, however, and the amount of a wife's income has increased and has a strong influence on the household income. There is growing concern about whether this increase in household income inequality is due to the husband's or the wife's income.

The purpose of this paper is to investigate income inequality with respect to the change of the income balance between the husband's income and that of the wife. We arrived at the following three conclusions: firstly, a positive correlation can be seen between the husband's income and the wife's income among couples whose ages are in their 30s and 40s; secondly, we decomposed the Gini coefficient to the wife's income increases, not only the income inequality among women but also household income inequality. Lastly, we show that educational level is crucial in determining women's professional/working income, regardless of their husband's income

JEL codes: D31, J12, J16

Keywords: Income distribution; Earnings inequality; Family structure

¹ Ph.D. student, Graduate School of Economics, Doshisha University, Kyoto, Japan.
Reserch Fellow, Life Risk Research Center, Doshisha University, Kyoto, Japan.
Ph.D. Research Fellow, Fondation France-Japon de l'EHESS, Paris, France

² Professor Emeritus, Kyoto University.

1. Introduction

There are several causes to explain the reasons why the degree of income inequality has increased significantly. Many specialists claim that a change in the structure of families, i.e. the increasing number of aged people and single people, is responsible for greater inequality (Ohtake(2005), Oshio(2004, 2006)). Several recent studies have suggested that the degree of income inequality among people in the same age group and of the same sex has increased. It is well known that there are wider income differentials among the elderly, however Ohta (2005) showed that there is also a wider income inequality among the youth. The choice of spouse should be influenced by income inequality among young people, and the change of women's education level and working behaviour also affects marriage choice.

The purpose of this paper is to explore the income distribution in Japan today. Household income has long been used as the main indicator for assessing income inequality. It is believed that a household income with two earners and a household income with only one earner should lead to the same result when evaluating income inequality among families. Thus, we treated household income with one earner in the same way as household income with two earners.

However, these days, as the participation rate of married women in the labour force increases, the income of the wife has come to have a large effect on the household income. There is growing interest in the impact of the two-earners family on the level of family income.

This paper is aimed at evaluating the differential of household income, and, in particular, the effect of the change in the income source of the total family income and the transition of the husband's income and the wife's labour participation after 2000. Thus, more attention is paid to the effect of the incomes of wives. At the same time, we investigate the following

question: whose wife is working, and what is their working status, and what are their socio-economic characteristics?

A standard measure for evaluating income inequality is typically based on household income. There has been a negative correlation between the labour force participation rate for wives and the income of husbands. Therefore, to evaluate income inequality, it is enough to focus only on household income.

The structure of Japanese households has changed dramatically; an increasing number of aged people and single people may account for a growing inequality. There is a need to consider the income composition within families.

Over the past generation, the employment rates of Japanese women have increased. There is a relationship between the employment rate of wives and the income level of husbands, and Douglas–Arisawa’s second law, namely the negative correlation between the wife’s labour force participation rate and the husband’s income level, has played a strong role.

There are several previous researches that focus on measuring the effect of the wife’s income on household income. Burtless (1999) explained that changes in women’s earning patterns partly reinforced the effect of expanding household income inequality. Karoly and Burtless (1995) claimed that rising family inequality is led by the positive correlation between women’s earnings and family income.

As for the research regarding Japan, Higuchi(1995) and Abe and Oishi (2006) claimed that there remains a negative correlation between the employment probability of the wife and the size of the husband’s income level in the comparison between households. They denied the existence of ‘power couples’. We regard ‘power couples’ as those in which both husbands and wives earn higher incomes with possible their higher educations and better jobs. Urakawa (2006) affirms that there remains a negative correlation between the

husband's income level and the wife's labour participation. On the other hand, the author acknowledges the existence of power couples. Ohtake (2001) and Kohara (2001) show a decrease in the degree of correlation between the husband's income and that of the wife.

The Douglas–Arisawa second law only focused on the husbands' income, and did not refer to the wife's income or her socio-economic background. It is impossible to explain the couples whose wives have superior education or something professional skills. Theoretically, it makes sense that, when a wife's wage rate is high enough, she goes to work rather than staying at home; on the other hand, staying at home as a full-time housewife makes more sense for a wife whose wage rate wouldn't be so high.

In this paper, we try to clarify the following two points: (1) the recent relationship between the income of the husband and the wife's labour participation and the level of income; (2) what socio-economic factors motivate the wife to work?

2. The combination of couples by income

This analysis uses the '*Survey on the Stratified Japanese Society*' in 2006 and "*Life and Happiness in Regional Areas*" in 2011 which were conducted at Doshisha University, whose financial support was provided by the Ministry of Education and Science of the Japanese government.

The survey asked for both individual persons' socio-economic status and for that of their spouses. These surveys are conducted through an Internet interview. The number of interviewers in the data in 2006 was 5,502 and the response rate was 76.0%. The number of interviewers in 2011 was 8,058 and the response rate was 76.0%.

In previous researches, Abe and Oishi (2006) showed the rate of wives' labour participation in relation to husbands' income, while Urakawa (2007) explored the relationship between the income of the husband and that of the wife and, Urakawa (2007)

made a point that Douglas-Arisawa's second law was still existed.

We produced Table 1, in which the vertical axis shows the income of the husband and the horizontal axis shows the income of the wife, to explore whether the wife works or not when her husband's income is high enough. It is shown by a quartile figure in husband and wife income respectively. The numbers in the upper row show the results in 2006 and the numbers in the lower row show the results in 2011. Figures in this table are the percentage figures to the total.

Table 1-1 shows the results in all age groups. This table indicates that there is more distortion among the wife's income than among husband's. The high ratio in the first quartile means that income earned by the wife plays only a supplemental role in household income.

In addition, the actual income of the first quartile is 'under one million yen', and that of the second quartile is 'one million yen to one and a half million yen'. These are relatively low across all age groups. One of the reasons is that wives tend to consider tax deductions when they work, which is known as the "1.03 million yen barrier" to save income tax payment.

Previous studies also show the influence of the "1.03 million yen barrier" on wives' labour supply (Higuchi, 1995; Nagase, 2001; Kohara, 2001). Anecdotally, there still remains a gender gap in earnings.

Focusing on the cell in which both husband and wife belong to the first quartile, the number rose by about 4% point from 2006. This cell implies the image of couples in which both the husbands and wives earn a low income. We named such couples "weak couples" in contrast to "power couples" in Tachibanaki and Sakoda (2013).

So, do high-earning husbands tend to prefer full-time housewives? The answer is "no".

The ratio of couples in which both spouses earned high incomes decreased from 7.06% in 2006 to 5.76% in 2011. This result may deny the existence of couples in which spouses earn high incomes; however, the opposite conclusion may be drawn from Figures 1-2, 1-3, 1-4 and 1-5, which are grouped according to age.

Although the ratio of 'power couples' decreases in the 20s from 2006 to 2011, there is a relatively high ratio of 'power couples' in their 30s and 40s. And focusing on the fourth quartile, husbands' actual income in this quartile decreased from "8.5 million yen" in 2006 to "7 million yen" in 2011. On the other hand, wives' actual income in the fourth quartile increased from "2.5 million yen" in 2006 to "7 million yen" in 2011, which shows that wives' income increased considerably over five years.

This result implies, not only relatively but also substantively, that the high-earning wife and the wife's income have come to play a large role in household income.

In this section, our result, the combination of couples by income quartile, shows that the rise of the wife's income is important in the couples in which both spouses earn high incomes. These tables also imply that the matching of couples widens the gap among households.

3. The decomposition of the Gini coefficient by income source

Our goal in this section is to examine the contribution of different income components, with respect to the wife's income, to the changes in inequality. The Douglas-Arisawa's second law focused on the labour supply of wives under the condition of husbands' income, but did not pay attention to the amount of wives' income when they work.

The Gini coefficient is one of the most effective measures dealing with income inequality. Decomposition of the Gini coefficient through the contribution of income components is suggested by Lerman and Yitzhaki (1985). This method was applied by Karoly and

Burtless (1995).

When there are K different sources of incomes, the following equation decomposes the Gini coefficient.

$$G = \sum_{k=1}^K [\text{cov.}(y_k, F) / (\text{cov.}(y_k, F_k))] \cdot [2 \text{cov.}(y_k, F_k) / m_k] \cdot (m_k / m) \quad (1).$$

$$= \sum_{k=1}^K R_k G_k S_k$$

F : the distribution function of total household income

F_k : the distribution function of the k-th income source

m : average household total income

m_k : average income of the k-th income source

S_k : the share of the average income of the k-th income source over the average of the total incomes

R_k : the correlation between the rank of the k-th income source

G_k : the Gini Coefficient for the k-th income source

The contribution of each income source to total income inequality is given by

$$I_k = \frac{(R_k S_k G_k)}{G} \quad (2).$$

where the sum of I_k is equal to unity.

Table 3 shows the Gini coefficients for the husband's and the wife's income. Following Burtless (1999), we also decomposed the change in the Gini coefficient between two time periods. The change in the Gini coefficient between years 0 and 1 can be written as the following equation.

$$\Delta G = G_1 - G_0 \quad (3).$$

$$\sum_1^K (S_{k1} - S_{k0}) G_{k1} R_{k1} + \sum_1^K S_{k1} (G_{k1} - G_{k0}) R_{k1} + \sum_1^K S_{k1} G_{k1} (R_{k1} - R_{k0}) \quad (4).$$

where ε is a residual not explained in the decomposition.

It is possible to measure the impact of a change in that element of the level of inequality.

Income is measured by an equivalent scale family income adjusted by the number of family

members. We adopted the value of e , which was equal to 0.5 in this adjustment.

As a result, S_k shows that the share of total income from k -th component. For couples in their 20s between 2006 and 2011, the share of adjusted income derived from the earnings of the male head declined from about 74% to 69%; on the other hand, those of the female head rose from about 26% to 31%, which is sharper than for 30s couples.

Gini correlation (R_k) shows that the source that correlates most highly with the rank of total income is the earning from the male head. Though the Gini correlation for female heads' earnings of all age groups declined, the Gini correlation for female heads' earnings among couples in their 30s and 40s rose from 0.6521 in 2006 to 0.7161 in 2011. The wife's income made a positive impact on the rank of household income among couples in their 30s and 40s. The difference of the Gini correlation for male's earnings among 30s and 40s is relative small, comparing to other generations.

G_k shows the Gini coefficient of the k -th income component. The Gini coefficient of the husband's income in all age groups rose from 0.1963 to 0.2301. On the other hand, the Gini coefficient of the wife's income rose from 0.1771 to 0.1870 between 2006 and 2011 among couples in their 30s and 40s. Thus this result suggests that the Gini coefficient expands among couples in their 30s and 40s.

Share of inequality (I_k) shows the combined effect of the income share. Earnings from the female head of 30s' accounts 0.3666 in 2006 and it rose to 0.3913 in 2011, which means the contribution from wife rose slightly.

4. The empirical analysis of wife labour supply

There are several studies like Osawa (1999) and Takayama and Arita (1991) that explore the factors that determine women's labour participation. Such recent studies shed light on wives who have high earnings. On the other hand, Shu (2012) clarified the existence of the

wife who is forced to be a full-time housewife despite the fact that the husband's income is low. Our study also confirmed the existence of such wives. The education level of wives whose husband earns a relatively low income is also relatively low, so it is difficult to find the opportunity to earn high wage.

We presented two models in Table 4-1 and Table 4-2; the first consists of three groups (full-time workers, part-time workers and full-time housewives) and the other one consists of four groups (full-time workers, part-time workers, full-time housewives and professionals). Employment status is classified by (1) full-time workers who work as full-time employees, executive members or civil servants, (2) part-time workers who work with a limited duration of the contract, or with other special contracts. We exclude the people whose husband or wife works as self-employed, including familial workers and homeworkers because the labour supply of self-employed should be totally different from that of employed workers. The reference group is full-time housewives.

The dependent variable is the wife's employment status, and the independent variables are (1) the number of children and the age of the youngest child, (2) the educational level of the husband, (3) the educational level of the wife, (4) the husband's annual income, and (5) the size of the residential area. We use multinomial logit analysis.

Educational variables for both husband and wife are classified by the schooling levels, namely (1) compulsory education, (2) secondary education, (3) junior colleges and vocational schools, (4) universities, and (5) graduate schools.

Husband's income variable is classified by 10 levels ('none', '1 to 2 million yen', '2 to 3 million yen', '3 to 4 million yen', '4 to 5 million yen', '5 to 6 million yen', '6 to 7 million yen', '7 to 8 million yen', '8 to 10 million yen' and 'over 10 million yen').

The reference group is 'age 0-3' for children, '3 to 4 million yen' for husband's annual income and 'secondary education' for couple's education.

Table 4-1 shows the estimated result for three groups of employment status. The highest attention is paid to the effect of husband's income on the wife's choice to work as a part-time worker. Husband's annual income is positive coefficient with statistical significance for 'none' to '5 to 6 million yen', but it is not significant for over '6 to 7 million yen'.

Table 4-2 shows the estimated result for four groups of employment status, including professional work for all age groups. Table 4-3 shows the results for those in their 30s, and Table 4-4 shows the results for those in their 40s.

The right-end column is the estimated result, including professional occupation. For the wife who works as a professional worker, the husband's income is rarely significant. The most interesting observation is given by the fact that the most important variable to work as a professional worker is own educational level. This tendency is most remarkable in Table 5-2 for the 30s group, but cannot be seen in Table 5-3 for the 40s. For the 30s group, the highly educated women tend to choose a profession rather than being a full-time housewife.

This result is consistent with the proposition made by Kohara (2001) who suggested that (1) high husband income has only a weak effect on constraining wives' employment, known as the Douglas-Arisawa law, and (2) the number of households in which both spouses earn high incomes is increasing. However, her work didn't clarify whether the age group of households in which both spouses earn a high income is increasing.

There is a positive coefficient with statistical significance for professional works, and a higher educational level, with the higher coefficient shown among full-time workers in their 30s and 40s.

In all generations, the husband's income provides a negative coefficient. In particular, however, the educational level that represents their own socio-economic resource shows a positive coefficient with statistical significance. This result represents that the women who

would like to work with making full use of their talent.

5. Concluding remarks

The main purpose of this study was to investigate whether the Douglas–Arisawa second law has been eroded under the condition in which the labour force participation rate of wives has been increasing even among those households where husband income levels are high.

Using data from the “*Survey on the Stratified Japanese Society*” in 2006 and “*Life and Happiness in Regional Areas*” in 2011 which were conducted at Doshisha University, whose financial support was provided by the Ministry of Education and Science of the Japanese government.

This paper attempted three analyses: the combination of couples by quartile of income, the decomposition of the Gini coefficient by income source and the empirical analysis of wife labour supply, using multinomial logit analysis, in order to clarify the cause of household income inequality and the mechanism of wife’s labour supply.

This study showed that: First, in all households where the husband is high-earning, the wife’s income belongs to the first quartile of all wife’s income, so that the wife’s income plays only a supplemental role in household income. However, a positive correlation can be seen between husband’s income and wife’s income among couples in their 30s and 40s. We observe a change the time effect those couples in which both husbands and wives belong to the first quartile and fourth quartile can be called ‘weak couples’ and ‘power couples’. Second, the decomposition of the Gini coefficient shows that the wife’s income of those couples in their 30s and 40s tends to contribute to household income inequality. We found that the contribution of wife’s income towards household income rose by decomposing the Gini coefficient change between 2006 and 2011. From this result, it is not

exaggerate to say that the factor that defines household income currently inequality is the wife's income. Finally, using multinomial logit analysis, our study found that those wives with high education or the possibility of working for high-earnings tend to choose to work professionally.

These factors predict that income inequality will widen in future. Since marriage is based on individual choice, it is impossible to prevent from an increase in the income inequality caused by family composition.

There is a need to reconsider the tax system and social security system taking into considering the influence of the wife's income on household income.

Table 1-1 The combination of couples by quartile of income (all age groups)
(N=1204 in 2006 , 2030 in 2011) (%)

		wife's income			
		1	2	3	4
husband's income	1	8.80	3.07	3.49	6.64
		12.32	7.59	4.48	5.52
	2	14.87	6.06	3.41	7.31
		10.79	7.00	3.35	6.70
	3	10.88	3.32	2.82	7.48
		8.33	4.68	2.22	5.96
	4	9.30	3.65	1.83	7.06
		9.36	3.94	2.02	5.76

Table 1-2 The combination of couples by quartile of income (20s')
(N=351 in 2006, 118 in 2001) (%)

		wife's income			
		1	2	3	4
husband's income	1	11.40	2.56	5.70	3.42
		10.17	7.63	6.78	0.00
	2	21.65	5.98	9.40	5.41
		11.02	5.93	4.24	11.02
	3	7.98	1.42	1.42	3.70
		4.24	3.39	0.85	9.32
	4	7.41	0.85	3.99	7.69
		8.47	4.24	5.08	7.63

Table 1-3 (30s) (N=501 in 2006, 489 in 2011)

		wife's income			
		1	2	3	4
husband's income	1	10.98	4.99	3.79	7.39
		14.11	4.09	9.61	2.86
	2	13.97	6.99	3.19	7.98
		13.70	6.95	8.38	7.36
	3	12.77	2.59	2.00	7.19
		3.48	2.04	4.29	3.07
	4	7.39	2.40	1.20	5.19
		8.18	3.27	3.27	5.32

Table 1-4 The combination of couples by quartile of income (40s) (N=249 in 2006, 546 in 2011)

		wife's income			
		1	2	3	4
husband's income	1	10.04	8.03	6.43	8.84
		15.34	8.13	4.81	6.65
	2	9.64	3.21	3.61	8.03
		12.01	6.84	2.40	4.25
	3	8.03	3.21	3.21	4.82
		5.18	2.59	0.92	3.14
	4	8.43	7.23	2.01	5.22
		13.86	4.81	2.22	6.84

Table 1-5 The combination of couples by quartile of income (50s) (N=51 in 2006, 660 in 2011)

		wife's income			
		1	2	3	4
husband's income	1	17.65	5.88	3.92	5.88
		8.97	8.07	4.63	2.84
	2	9.80	5.88	3.92	3.92
		13.30	10.31	4.33	6.73
	3	7.84	5.88	5.88	7.84
		9.42	6.28	1.94	7.03
	4	1.96	5.88	3.92	3.92
		8.37	2.24	1.94	3.59
合計		37.25	23.53	17.65	21.57
		40.06	26.91	12.86	20.18

Table 2 The decomposition of the Gini coefficient by income source									
	all age group			20s'			30s' and 40s'		
	2006	2011	change	2006	2011	change	2006	2011	change
Share of Income (Sk)									
husban's income	0.7347	0.7344	-0.0000600	0.7387	0.6875	-0.00811	0.7391	0.7315	-0.00129
wife's income	0.2653	0.2656	0.0000671	0.2617	0.3125	0.0105	0.2609	0.2685	0.002262
sum			0.0000071			0.0024			0.00097
Gini Correlation (Rk)									
husban's income	0.8269	0.8687	0.00706	0.8165	0.8468	0.00390	0.8221	0.8384	0.00242
wife's income	0.6899	0.5930	-0.00971	0.7605	0.6669	-0.00910	0.6521	0.7161	0.00714
sum			-0.00264			-0.00521			0.00956
Gini Coefficient (Gk)									
husban's income	0.1963	0.2301	0.02156	0.1771	0.1870	0.00576	0.1969	0.2027	0.00356
wife's income	0.4121	0.3772	-0.00550	0.4351	0.3112	-0.02582	0.4070	0.4156	0.00165
sum			0.01607			-0.02006			0.00521
Share of Inequality (Ik)									
husban's income	0.6125	0.7119		0.5521	0.6266		0.6334	0.6087	
wife's income	0.3875	0.2881		0.4479	0.3734		0.3666	0.3913	
% Change									
husban's income	-0.1222	-0.0225	0.0997	-0.1862	-0.0609	0.1253	-0.1057	-0.1228	-0.0171
wife's income	0.1222	0.0225	-0.0997	0.1862	0.0609	-0.1253	0.1057	0.1228	0.0171
Overall Gini Coefficient	0.1947	0.2062		0.1933	0.1737		0.1889	0.2042	
Number of Family Units	2609	3158		776	35		1416	1019	

Source : "Survey on the Stratified Japanese Society" on 2006, "Life and Happiness in Regional Areas" on 2011

Adjusted income among person: $e=0.5$

		full-time worker			part-time worker		
		B	S. E.	Exp(B)	B	S. E.	Exp(B)
constance		-1.516	0.192		-0.814	0.142	
The number of children and the age of the youngest child	No child	0.224 *	0.107	1.251	0.038	0.084	1.039
	Age:0-3(ref)						
	Age:4-6	-0.293	0.184	0.746	-0.183	0.154	0.833
	Elementary student	-0.136	0.147	0.873	0.781 **	0.110	2.184
	Over highschool student	-0.314 *	0.115	0.731	0.467 **	0.090	1.595
Marriged	-1.535 **	0.172	0.216	-0.585 **	0.114	0.557	
Wife's Educational level	Junior high school highschool(ref)	0.104	0.176	1.110	0.296 **	0.118	1.345
	vocational school	0.116	0.132	1.123	0.136	0.093	1.145
	Technical school or college	0.413 **	0.135	1.511	0.061	0.098	1.063
	Undergraduate school	0.978 **	0.141	2.659	0.026	0.116	1.027
	Graduate school	1.076 **	0.371	2.933	-0.368	0.415	0.692
Husband's income	None	-0.172	0.287	0.842	-0.382 †	0.207	0.683
	Under 1 million yen	1.007 **	0.384	2.738	1.465 **	0.287	4.329
	1 to 2 million yen	0.483 †	0.285	1.621	0.980 **	0.198	2.663
	2 to 3 million yen	0.377 *	0.182	1.458	0.681 **	0.130	1.976
	3 to 4 million yen						
	4 to 5 million yen	0.500 **	0.151	1.648	0.500 **	0.116	1.648
	5 to 6 million yen	0.320 *	0.162	1.377	0.614 **	0.118	1.847
	6 to 7million yen	0.354 *	0.160	1.425	0.336	0.125	1.400
	7 to 8 millon yen	0.475 **	0.171	1.608	0.334	0.134	1.396
8 to 10 million yen	0.023	0.171	1.023	0.228	0.123	1.256	
Over 10 million yen	-0.085	0.174	0.918	0.181	0.124	1.198	
The size of the city	Large-sized city (population of one million or larger)	-0.048	0.138	0.953	-0.338 **	0.101	0.713
	Medium-sized city (population of less than one million)(ref)						
	Small-sized city	-0.098	0.135	0.906	-0.223 *	0.097	0.800
	Town or village	0.239	0.191	1.270	-0.033	0.141	0.967
Husband's educational level	Junior high school highschool(ref)	-0.081	0.150	0.922	-0.132	0.108	0.876
	vocational school	-0.065	0.126	0.937	-0.079	0.091	0.924
	Technical school or college	-0.180	0.193	0.836	-0.131	0.149	0.877
	Undergraduate school	-0.073	0.147	0.930	-0.311	0.106	0.733
	Graduate school	-0.194	0.274	0.824	-0.171	0.200	0.843
Nagelkerke					0.116		
Coc-Snell R ²					0.099		

p ≤ 0.001:***, p ≤ 0.01:**, p ≤ 0.05:*, p ≤ 0.10: †

Table3-2 Multinomial logit annalysis on Wife's labour supply(incuding profession) (N=5237) (ref. group : full-time house wife)										
	Full-time worker			Part-time worker			Profession			
	B	S. E.	Exp (B)	B	S. E.	Exp (B)	B	S. E.	Exp (B)	
Constance	-1. 807	0. 221		-1. 031	0. 152		-3. 039	0. 277		
The number of children and the age of the youngest child	No child	0. 433 **	0. 132	1. 542	0. 112	0. 093	1. 118	0. 355	0. 144	1. 426
	Age:0-3(ref)									
	Age:4-6	-0. 027	0. 205	0. 974	-0. 212	0. 168	0. 809	-0. 231	0. 247	0. 794
	Elementary student	-0. 110	0. 173	0. 896	0. 840 **	0. 116	2. 317	0. 283	0. 183	1. 327
	Over highschool student	-0. 345 *	0. 134	0. 708	0. 498 **	0. 096	1. 646	0. 018	0. 147	1. 018
Wife's educational level	Marriged	-1. 622 **	0. 196	0. 198	-0. 554 **	0. 119	0. 575	-1. 384 **	0. 241	0. 251
	Junior high school	0. 070	0. 192	1. 072	0. 218	0. 122	1. 244	1. 027 **	0. 249	2. 793
	highschool (ref)									
	vocational school	-0. 020	0. 147	0. 981	0. 021	0. 097	1. 022	1. 215 **	0. 199	3. 371
Husband's income	Technical school or college	0. 164	0. 153	1. 178	-0. 039	0. 102	0. 962	1. 357 **	0. 203	3. 883
	Undergraduate school	0. 602 **	0. 162	1. 826	-0. 132	0. 123	0. 876	1. 954 **	0. 208	7. 054
	Graduate school	-0. 043	0. 565	0. 958	-1. 107	0. 561	0. 331	2. 498 **	0. 394	12. 164
The size of the city	None	-0. 322	0. 338	0. 725	-0. 367	0. 217	0. 693	-0. 218	0. 375	0. 804
	Under 1 million yen	0. 969 *	0. 420	2. 635	1. 481 **	0. 292	4. 398	0. 959	0. 502	2. 610
	1 to 2 million yen	0. 230	0. 351	1. 259	1. 015 **	0. 205	2. 760	0. 741 *	0. 333	2. 098
	2 to 3 million yen	0. 389	0. 202	1. 475	0. 730 **	0. 134	2. 075	0. 308	0. 250	1. 361
	3 to 4 million yen									
	4 to 5 million yen	0. 560 **	0. 167	1. 751	0. 541 **	0. 121	1. 717	0. 364	0. 206	1. 439
	5 to 6 million yen	0. 305	0. 183	1. 356	0. 638 **	0. 123	1. 893	0. 426	0. 204	1. 532
	6 to 7million yen	0. 341 +	0. 181	1. 407	0. 384 **	0. 130	1. 468	0. 203	0. 215	1. 225
	7 to 8 millon yen	0. 274	0. 203	1. 316	0. 338 *	0. 141	1. 402	0. 612 **	0. 210	1. 844
	8 to 10 million yen	0. 036	0. 197	1. 037	0. 222	0. 130	1. 248	0. 178	0. 207	1. 195
Husband's educational level	Over 10 million yen	-0. 167	0. 206	0. 847	0. 187	0. 131	1. 205	0. 127	0. 207	1. 135
	Large-sized city (population of one million or more)	-0. 008	0. 155	0. 992	-0. 292 **	0. 106	0. 747	-0. 365 *	0. 172	0. 694
	Medium-sized city (population of less than one million)(ref)									
	Small-sized city	-0. 222	0. 153	0. 801	-0. 205	0. 101	0. 815	-0. 167	0. 165	0. 846
Nagelkerke	Town or village	0. 004	0. 220	1. 004	-0. 058	0. 147	0. 944	0. 191	0. 238	1. 210
	Junior high school	0. 075	0. 163	1. 078	-0. 113	0. 112	0. 893	-0. 394 +	0. 215	0. 674
	highschool (ref)									
	vocational school	-0. 094	0. 142	0. 911	-0. 055	0. 094	0. 947	-0. 087	0. 167	0. 917
	Technical school or college	-0. 305	0. 235	0. 737	-0. 194	0. 159	0. 824	0. 141	0. 225	1. 152
Coc-Snell R ²	Undergraduate school	-0. 066	0. 165	0. 937	-0. 280 *	0. 111	0. 756	-0. 236	0. 190	0. 790
	Graduate school	-0. 307	0. 325	0. 736	-0. 281	0. 219	0. 755	0. 222	0. 293	1. 248
				0. 146						
				0. 131						
p ≤ 0. 001:***, p ≤ 0. 01:**, p ≤ 0. 05:*, p ≤ 0. 10: †										

Table3-3 Multinomial logit analysis on Wife's labour supply(including profession) (N=1079) (ref. group : full-time house wife) (age:30s')										
	Full-time worker			Part-time worker			Profession			
	B	S. E.	Exp(B)	B	S. E.	Exp(B)	B	S. E.	Exp(B)	
Constance	-1.352	0.409		-1.079	0.334		-3.518 **	0.641		
The number of children and the age of the youngest child	No child	0.872 **	0.248	2.392	1.260 **	0.224	3.526	1.106 **	0.285	3.024
	Age:0-3(ref)									
	Age:4-6	-0.031	0.270	0.970	0.149	0.239	1.161	-0.295	0.353	0.744
	Elementary student	0.201	0.299	1.223	1.403 **	0.226	4.067	0.658 *	0.336	1.932
	Over highschool student	-18.056	0.000	0.000	1.924 *	0.916	6.848	-17.560	0.000	0.000
	Marriged	-	-	-	-	-	-	-	-	-
Wife's educational level	Junior high school highschool (ref)	0.686 †	0.386	1.986	0.470	0.310	1.599	1.744 **	0.622	5.719
	vocational school	-0.044	0.289	0.957	0.003	0.216	1.003	1.463 **	0.515	4.321
	Technical school or college	0.272	0.320	1.312	-0.050	0.254	0.951	1.903 **	0.530	6.704
	Undergraduate school	0.982 **	0.320	2.669	-0.189	0.297	0.828	2.696 **	0.528	14.815
	Graduate school	-0.531	1.114	0.588	-1.388	1.113	0.250	3.200 **	0.746	24.540
Husband's income	None	0.953	1.058	2.593	1.595 †	0.886	4.931	-17.250	8720.693	0.000
	Under 1 million yen	1.143	0.981	3.136	0.944	0.958	2.571	0.833	1.308	2.301
	1 to 2 million yen	0.872	1.037	2.392	1.718 *	0.835	5.573	2.249 *	0.964	9.478
	2 to 3 million yen	-0.480	0.434	0.619	0.381	0.317	1.464	-0.035	0.541	0.966
	3 to 4 million yen									
	4 to 5 million yen	-0.575 †	0.308	0.563	-0.079	0.253	0.924	-0.179	0.375	0.836
	5 to 6 million yen	-0.589 †	0.318	0.555	-0.149	0.266	0.861	-0.150	0.375	0.861
	6 to 7million yen	-0.533 †	0.313	0.587	-0.626 *	0.293	0.535	-0.757 †	0.416	0.469
	7 to 8 millon yen	-0.403	0.401	0.668	0.174	0.320	1.190	-0.102	0.461	0.903
	8 to 10 million yen	-1.023 *	0.432	0.360	-0.722 *	0.350	0.486	-1.531 *	0.611	0.216
Over 10 million yen	-1.419 *	0.583	0.242	-1.034 *	0.452	0.356	0.345	0.466	1.412	
The size of the city	Large-sized city (population of one million or larger)	0.255	0.295	1.290	-0.123	0.238	0.884	-0.351	0.354	0.704
	Medium-sized city (population of less than one million) (ref)									
	Small-sized city	-0.141	0.291	0.869	-0.218	0.225	0.804	0.038	0.331	1.039
	Town or village	0.115	0.424	1.122	-0.405	0.347	0.667	-0.434	0.580	0.648
Husband's educational level	Junior high school highschool (ref)	-0.386	0.380	0.680	-0.100	0.288	0.905	-0.249	0.470	0.780
	vocational school	0.217	0.269	1.242	0.129	0.220	1.137	0.384	0.355	1.468
	Technical school or college	0.077	0.398	1.080	0.216	0.334	1.241	0.870 *	0.430	2.388
	Undergraduate school	-0.127	0.323	0.881	-0.081	0.251	0.922	-0.068	0.427	0.934
	Graduate school	-0.572	0.548	0.564	-0.164	0.398	0.849	0.313	0.565	1.368
Nagelkerke	0.250									
Coc-Snell R ²	0.228									
p≤0.001:***, p≤0.01:**, p≤0.05:*, p≤0.10:†										

Table3-4 Multinomial logit analysis on Wife's labour supply(incuding profession) (N=1079) (ref. group : full-time house wife) (age:40s')													
		Full-time worker			Part-time worker			Profession					
		B	S. E.	Exp(B)	B	S. E.	Exp(B)	B	S. E.	Exp(B)			
	Constance	-0.869	+	0.478	0.420	-0.715	+	0.410		-2.197	0.670		
The number of children and the age of the youngest child	No child	-0.424		0.324	0.654	0.392		0.316	1.480	0.363	0.478	1.438	
	Age:0-3(ref)												
	Age:4-6	0.066		0.346	1.068	-0.328		0.421	0.721	1.174	**	0.415	3.234
	Elementary student	0.449		0.397	1.566	0.867	**	0.291	2.380	1.563	**	0.445	4.774
	Over highschool student	0.507		0.930	1.661	1.128	**	0.299	3.088	3.083	**	0.795	21.816
	Marriged	-0.869		1.142	0.419	18.909		6577.197	162896005.103		-0.185	1.182	0.831
Wife's educational level	Junior high school highschool (ref)	0.562		0.987	1.755	0.220		0.267	1.246	-0.654	1.322	0.520	
	vocational school	-0.448		1.138	0.639	0.140		0.202	1.150	-0.667	1.151	0.513	
	Technical school or college	0.027		0.476	1.027	-0.025		0.226	0.975	-0.831	0.645	0.436	
	Undergraduate school	0.020		0.414	1.020	0.062		0.269	1.064	-0.166	0.451	0.847	
	Graduate school	-0.526		0.443	0.591	-0.485		0.904	0.616	-1.027	+	0.527	0.358
Husband's income	None	-0.345		0.412	0.708	-0.575		0.881	0.563	-0.729	0.453	0.483	
	Under 1 million yen	-0.947	*	0.452	0.388	1.233	+	0.735	3.430	-0.531	0.419	0.588	
	1 to 2 million yen	-0.665	+	0.401	0.514	0.923		0.592	2.516	-0.533	0.390	0.587	
	2 to 3 million yen	-1.311		0.470	0.270	0.054		0.373	1.055	-1.036	*	0.431	0.355
	3 to 4 million yen												
	4 to 5 million yen	0.139		0.366	1.149	0.154		0.300	1.167	0.138	0.368	1.148	
	5 to 6 million yen	0.063		0.360	1.065	0.270		0.285	1.310	-0.006	0.373	0.994	
	6 to 7million yen	0.291		0.509	1.338	-0.037		0.286	0.964	0.883	+	0.493	2.418
	7 to 8 millon yen	-0.420		0.406	0.657	-0.406		0.288	0.666	-2.382	**	0.780	0.092
8 to 10 million yen	-0.281		0.328	0.755	-0.208		0.273	0.812	-0.156	0.331	0.855		
Over 10 million yen	-0.716		0.579	0.489	-0.583	*	0.288	0.558	-0.280	0.483	0.756		
The size of the city	Large-sized city (population of one million or larger)	0.273		0.348	1.314	-0.220		0.228	0.802	-0.923	**	0.372	0.397
	Medium-sized city (population of less than one million) (ref)												
	Small-sized city	-0.660		1.096	0.517	0.068		0.220	1.070	0.028	0.669	1.028	
	Town or village	0.115		0.424	1.122	0.039		0.327	1.040	-1.669	0.505		
Husband's educational level	Junior high school highschool (ref)	-0.386		0.380	0.680	-0.530	*	0.268	0.589	0.646	0.277	1.908	
	vocational school	0.217		0.269	1.242	0.110		0.208	1.116	1.219	0.390	3.382	
	Technical school or college	0.077		0.398	1.080	-0.279		0.338	0.757	0.954	0.280	2.596	
	Undergraduate school	-0.127		0.323	0.881	-0.565	*	0.231	0.568	0.291	1.187	1.337	
	Graduate school	-0.572		0.548	0.564	-0.487		0.549	0.614	-18.629	0.000	0.000	
Nagelkerke		0.250											
Coc-Snell R ²		0.228											
p≤0.001:***, p≤0.01:**, p≤0.05:*, p≤0.10:†													

Reference

- Abe, Yukiko and Oishi, Akiko(2006), "Tsuma no Shotoku ga Setai-Shotoku ni Oyobosu Eikyo", Oshio, Takashi, Tajika, Eiji and Fukawa, Tetsuo, eds. *Nihon no Shotoku-Bunpai-Kakusa Kakudai to Seisaku no Yakuwari* , pp.185-209, University of Tokyo Press. (in Japanese)
- Burtless.G. (1999) "Effects of growing wage disparities and changing family composition on the U.S. income distribution" *European Economic Review*. Vol.43. pp.853-865.
- Enpi, Shu (2012) "Sengyo syufu setai no syunyu nikyokuka to hinkon mondai" *JILPT Discussion Paper 12-08*, (in Japanese)
- Fumio, Ohtake (2001) "Koyou mondai wo kangaeru kakusa kakudai to nihon teki koyou " *Osaka university Press* , (in Japanese)
- Fumio, Ohtake and Makoto, Saito (1998), "Population aging and consumption inequality in Japan," *Review of Income and Wealth*, 44, pp.361-381.
- Fumiaki, Ojima (2011) "Tsuma no syugyou to syotoku kakusa" Yoshimichi Sato, Fumiaki Ojima eds, *Gendai no Kaisou Syakai 1-kakusa to Tayousei*, University of Tokyo, pp.113-127, (in Japanese)
- Karoly, L. A. and Burtless, G.(1995) "Demographic change, rising, earnings in equality, and he distribution of personal well-being, 1959-1989." *Demography*, Vol. 32, No.3, pp.379-405.
- Kunio, Urakawa(2007) "Kazoku no Henyou to Kyouiku Iyoku no Setai kan Kakusa ni kansuru kousatu" *Kobe Daigaku Keizaigaku Kenkyu*. No. 54, pp. 107-126, (in Japanese)
- Lerman. R. and Yitzhaki. S.(1984) "A Note on the Calculation and Interpretation of the Gini Index." *Economic Letters* Vol.15. No,3-4 pp.363-368.
- Machiko, Osawa(1993) "Keizai Henka to Jyosi Roudou" *Nihon Keizai Hyoron sya*, (in Japanese)

- Miki, Kohara (2001), "Sengyo-shufu ha Yufuku na Katei no Shocho ka?" *The Japanese of Labour Studies*, No.493, pp.15-29, (in Japanese)
- Naosumi, Atoda and Toshiaki, Tachibanaki (1985) "Shotoku gensen betsu ni mita syotoku bunpai no fubyoudou" *kikan syakai hosyo kenkyu*. Vol.20 No.4 pp.330-339, (in Japanese)
- Nobuko, Nagase (2001) "Pa-to no Chingin ni 103 manen no Kabe ha Jyuuyou ka?" *Nihon Roudou Kenkyu Zassi*, No.489, pp.60-61.
- Tadashi, Yagi and Toshiaki, Tachibanaki (1996) "Touka Syotoku Hiritsu no Sokutei to Syotoku Bunpai Fubyoudo-do no kaisyaku" *Kikan Syakai Hosyo Kenkyu*, Vol.32 No.2 pp.178-189
- Takashi, Oshio(2004) "1990s ni okeru Syotoku Kakusa no Doukou" *kikan syakai hosyoku kenkyu* Vol.40 No.3 pp.277-285, (in Japanese)
- Takashi, Oshio(2006) "Syotoku Kakusa no Suii to Saibunpai Seisaku no Kouka" Oshio, Takashi, Tajika, Eiji and Fukawa, Tetsuo, eds. *Nihon no Shotoku-bunpai-kakusa kakudai to seisaku no yakuwari* . University of Tokyo Press. pp. 11-38 (in Japanese)
- Tomiko, Arita (1992) "Tmokasegi Setai no Kakei Jittai to Tsuma no Syokugyo Sentaku" *Nihon Keizai Kenkyu*, Vol.22, (in Japanese)
- Toshiaki, Tachibanaki and Sayaka, Sakoda (2013) "Fufu Kakusa Syakai –Nikyokuka suru Kekkon no Katachi" *Cyuko Shinsyo*.
- Yoshio, Higuchi (1995) ""Sengyo Syufu" Hogo Seisaku no Keizaiteki Kiketsu", Tatsuo, Hatta, Naohiro Yashiro eds., ""Jyakusya' Hogo Seisaku no Keizai Bunseki" *Nihon Keizai Shinsya*.