

Benefits and contributions in the Japanese public pension system using Income Redistribution Survey (IRS) 1996 & 1999¹

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1. Introduction

The reform of the welfare state is among the priority issues in many developed countries, and the functions of income redistribution and risk pooling performed by the social insurance system have been reexamined in Japan under the circumstances of persistent low fertility, aging of the population, and global competition. In view of the financial difficulties in sustaining the social protection system, trimming of public programs together with expansion of private arrangements has been discussed in many countries. Political discontent has emerged in recent years in many industrialized countries due to a perceived notion that income inequality has been increasing while the middle class has been shrinking (Duncan, Smeeding and Rodgers, 1993). However, there are both upwards and downwards moves in the shrinking of middle classes (Burkhauser and Rovba, 2005).

Income distribution and redistribution through taxes and social security has been a topic of great concern for many years in Japan. Japan was considered an equal society in terms of income distribution. However, inequality of income has been increasing also in Japan since the 1980s. It is partly explained by the increase in the number of elderly households, especially single households, receiving retirement benefits. The belief of an equal society has been challenged recently, and the income equality level in Japan might be as low as that in the United Kingdom (Fukawa, 2002). The Gini coefficients of adjusted disposable income are low in Sweden, Denmark, and the Netherlands; and high in the United Kingdom and the United States (Foerster and Mira d'Ercole, 2005). Due to the public perception about this trend, the effect of income redistribution through the public pension system has been extensively discussed in Japan today. After viewing the general situation of income distribution in Japan, this paper studies the structural relationship between benefits and contributions in the Japanese public pension system using the Income Redistribution Surveys of 1996 and 1999.

2. Data and method

(1) Data

The Income Redistribution Survey (IRS) has been conducted in Japan every three years since 1972 by the Ministry of Health and Welfare

(now the Ministry of Health, Labor and Welfare). Fig. 1 shows a summary of the results of these surveys published by the Ministry without any adjustments for family size. This paper draws on micro-data from the 1999 survey as well as the 1996 survey. As for the household structure, the following category is used, as also in the survey: living-alone households, couple-only households, couple with children households, lone-parent households, three-generation households, and other households.

(2) Definition of income

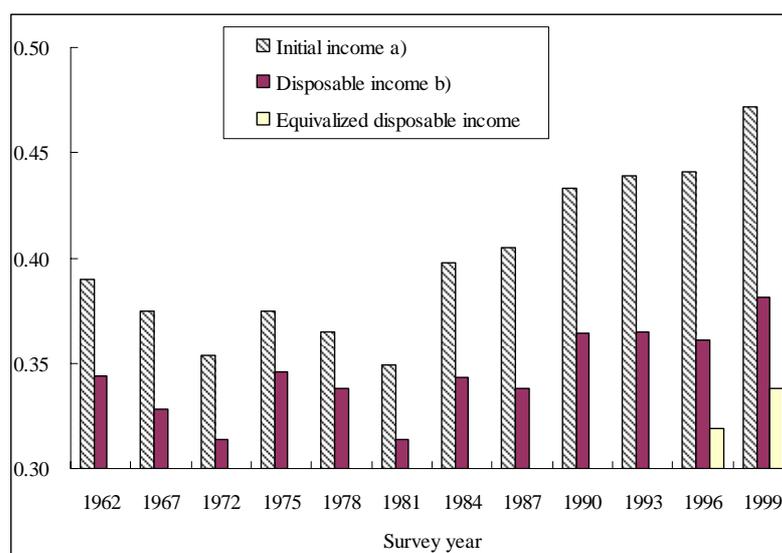
Initial income is the sum of a) wages and salaries, b) self-employed income, c) asset income, d) occupational pensions and retirement allowance from companies, and e) private remittance received, payment from life and non-life insurances². Initial income is therefore pre-tax pre-transfer income. Only direct taxes are considered in the survey, and the following taxes are included in the direct taxes: national as well as local income taxes, immobile property tax, and automobile tax. Concerning social security contributions, the employer's part is not included in the survey, and no adjustment is made on employer's contribution because we focus on contribution rate relative to wage. Social security (SS) benefits include both cash benefits and benefits in-kind, most of which are health services. However, health services are excluded from social security benefits in this paper³. Therefore, gross income and disposable income are defined as follows:

Gross income = Initial income + SS benefits excluding health services;

Disposable income = Gross income - (Direct taxes and SS contributions).

Gross income is considered as pre-tax post-transfer income, and disposable income as post-tax post-transfer income. The difference between gross income and disposable income is measured here as the proportion of the difference to gross income, which shows a relative scale of direct taxes and SS contributions (employee's part only).

Fig.1 Gini coefficient for initial income and disposable income of total households in Japan: 1962-1999



Source: The Ministry of Health, Labor and Welfare, Income Redistribution Survey, each year

Notes: a) Initial income equals pre-tax pre-transfer income

b) Disposable income equals post-tax post-transfer income

Table1. Average gross income and disposable income by age group: Equivalized
(In 10,000 yen per year)

Age group	1996		1999	
	Gross income a)	Disposable income b)	Gross income a)	Disposable income b)
Total	342.9	287.2	346.7	292.0
25-34	316.3	268.7	333.9	282.0
35-44	337.4	281.0	352.4	296.1
45-54	385.6	317.6	400.0	330.5
55-64	395.0	325.8	404.3	332.2
65-74	290.2	252.3	287.0	251.2
75+	246.4	215.1	256.5	227.2

Source: Author's calculations based on IRS 1996 & 1999.

Notes: a) Gross income equals pre-tax post-transfer income

b) Disposable income equals post-tax post-transfer income

c) Disposable income equals post-tax post-transfer income

(3) Adjustment for household size

The following equivalence scale is used in adjusting family size and age of children.

Equivalence scale: first adult (15+)=1.0;
additional adults = 0.5;
children (0-14) = 0.3

We use equivalized income, unless specified.

(4) Measures of inequality

The ratio of the top to bottom quintile/decile in terms of average income is referred to as the quintile/decile ratio. Comparisons of income distributions are more frequently based on the cumulative distribution of income compared to the cumulative distribution of households (i.e. the Lorenz curve). The Gini coefficient is used as

a summary measure of inequality in this paper⁴.

The Gini coefficient of disposable income for total households in the 1999 survey decreased from 0.381 to 0.338 by adjusting for family size. Adjustment for family size is especially necessary for households with older household heads and three-generation households.

3. Results

3.1 Income distribution of total households

Average gross income and average disposable income are shown by age group of household head in Table 1 and by gross income quintile in Table 2. The equivalized disposable income is the lowest for households with household heads aged 75+: 78 percent of the grand average in

1999. The difference between gross income and disposable income is 16 percent on average for both the 1996 and 1999 surveys. The changes of the quintile ratio from gross income to disposable income are 5.9 5.5 in 1996 and 6.7 6.1 in 1999 (Table 2).

Fig. 2 shows average initial income, gross income and disposable income according to gross income decile for total households in the 1999 survey. The difference between gross income and disposable income increases from 11 percent of gross income for the second decile to 20 percent for the tenth decile. Fig. 3 shows that disposable income minus initial income becomes

negative for the seventh and higher deciles. This is also an indicator to show the degree of income redistribution.

Table 3 shows average disposable income by household structure for each age group of the household head. Average disposable income for living-alone households changes remarkably according to age group, whereas three-generation households have relatively stable average disposable income by age group of household head. Gini coefficients of disposable income increase steadily with age, and they are high for living-alone households within the same age group.

Table2. Average gross income and disposable income by gross income quintile: Equivalized

Gross income quintile	(In 10,000 yen per year)			
	1996		1999	
	Gross income a)	Disposable income b)	Gross income a)	Disposable income b)
Total	342.9	287.2	346.7	292.0
1	116.7	101.3	107.8	95.5
2	214.9	187.5	209.3	184.5
3	295.3	254.2	292.5	253.6
4	367.8	337.7	400.9	340.4
5	690.0	555.4	723.3	586.2

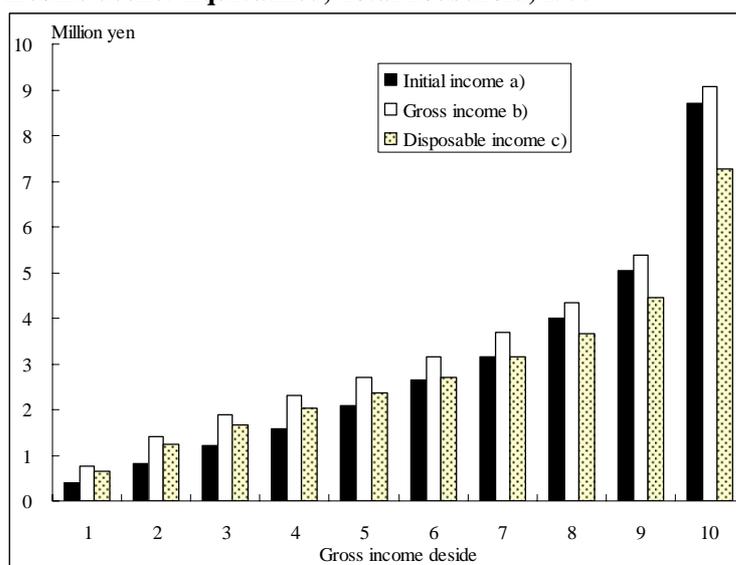
Source: Author's calculations based on IRS 1996 & 1999.

Notes: a) Gross income equals pre-tax post-transfer income

b) Disposable income equals post-tax post-transfer income

c) Disposable income equals post-tax post-transfer income

Fig.2 Average initial income, gross income and disposable income according to gross income decile: Equivalized, Total household, 1999

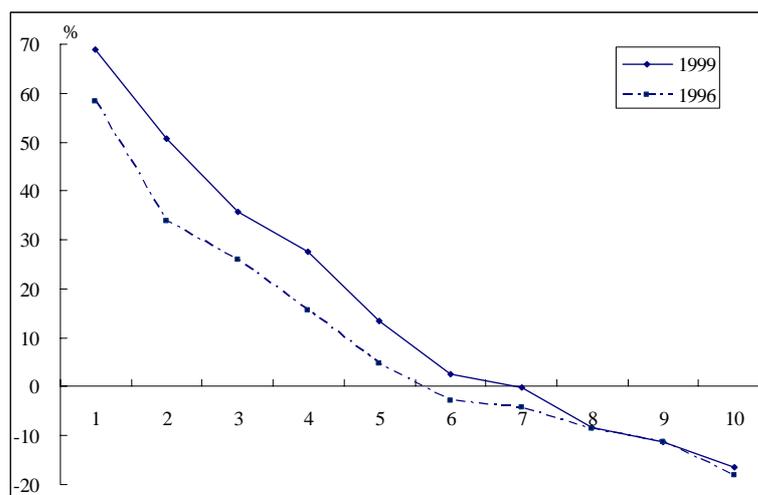


Source: Author's calculations based on IRS 1996 & 1999.

Notes: a) Initial income equals pre-tax pre-transfer income

b) Gross income equals pre-tax post-transfer income

Fig.3 Disposable income minus initial income as percent of initial income



Source: Author's calculations based on IRS 1996 & 1999.

Notes: a) Initial income equals pre-tax pre-transfer income

b) Disposable income equals post-tax post-transfer income

Table3. Equivalized disposable income by age group of household head and household structure : Total households

(1) Average disposable income

(In 10,000 yen per year)

Age group	Household Structure											
	Total		Living Alone		Couple Only		Couple with Children		Lone Parent		Three Generation	
	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999
Total	287.2	292.0	251.4	265.8	312.0	319.8	300.0	301.9	241.6	237.4	274.3	282.5
25-34	268.7	282.0	317.5	323.7	333.8	342.1	230.4	241.9
35-44	281.0	296.1	354.9	412.4	399.1	427.5	272.8	278.2	183.7	202.8	247.9	255.0
45-54	317.6	330.5	364.1	412.4	368.1	439.2	325.4	324.4	244.7	222.8	279.3	290.4
55-64	325.8	332.2	244.7	277.8	343.7	355.6	356.9	360.3	292.7	279.3	304.3	300.1
65-74	252.3	251.2	180.3	189.5	276.2	266.0	289.7	276.6	271.3	270.4	249.2	267.5
75+	215.1	227.2	146.3	179.9	219.1	242.5	279.5	255.1	260.3	191.6	290.6	298.1

(2) Gini coefficient

Age group	Household Structure											
	Total		Living Alone		Couple Only		Couple with Children		Lone Parent		Three Generation	
	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999	1996	1999
Total	0.319	0.338	0.383	0.410	0.336	0.348	0.279	0.292	0.352	0.355	0.288	0.309
25-34	0.243	0.272	0.234	0.246	0.210	0.210	0.203	0.243
35-44	0.274	0.287	0.280	0.301	0.214	0.242	0.249	0.248	0.327	0.320	0.256	0.254
45-54	0.295	0.319	0.392	0.383	0.296	0.334	0.267	0.277	0.302	0.315	0.258	0.296
55-64	0.341	0.352	0.405	0.444	0.344	0.344	0.303	0.314	0.357	0.340	0.320	0.329
65-74	0.346	0.347	0.350	0.389	0.349	0.335	0.319	0.326	0.373	0.293	0.282	0.303
75+	0.381	0.389	0.372	0.405	0.357	0.376	0.318	0.349	0.439	0.351	0.306	0.342

Source: Author's calculations based on IRS 1996 & 1999.

3.2 Pension benefits for elderly households (single or couple aged 65+)

(1) Income sources of elderly households

Table 4 shows the shares of different income sources of equivalized gross income for the elderly households (single or couple aged 65+)

by age group and by gross income quintile. The share of earnings decreases with age, and the share of public pension increases in return, except for the age group 85+ for which the sample size is small. It should be noted in this respect that private pension is not well

captured in the data. Viewed by income quintile of gross income, the share of public pension is more than 80 percent for the first to fourth quintiles, and it decreases to about 40 percent for the fifth quintile. However, the actual pension amount increases as income class increases. The share of earnings including

self-employed income is about 40 percent for the fifth quintile. The difference between gross income and disposable income is the lowest for the second quintile and increases with quintile. This index is important in comparison with that of the working population.

Table4. Shares of different income sources of equivalized gross income for the elderly households (single or couple aged 65+)

(1) By age group							(In 10,000 yen per year, percent)					
	1996						1999					
	65-69	70-74	75-79	80-84	85-	Total	65-69	70-74	75-79	80-84	85-	Total
Gross income	264.9	250.6	204.5	226.1	156.5	236.0	262.8	255.9	234.6	248.4	224.4	249.4
Share (%)												
Earnings	28.2	27.1	15.9	13.5	2.0	22.5	28.0	26.6	13.1	13.2	22.4	22.2
Public pension	62.2	62.0	73.5	63.7	75.4	64.9	58.0	64.9	70.2	70.1	64.9	64.8
Private pension a)	1.2	0.7	0.2	0.1	0.7	0.7	0.9	0.3	0.3	0.0	1.4	0.5
Asset income	5.9	6.2	6.7	18.9	13.5	8.2	7.0	5.2	12.1	12.8	8.0	8.2
Others	2.5	4.0	3.7	3.8	8.4	3.7	6.1	3.0	4.3	3.9	3.3	4.3
Disposable income	237.1	220.7	184.8	196.6	141.6	209.8	235.0	228.6	214.9	226.0	193.3	223.9
Difference b) (%)	10.5	11.9	9.6	13.0	9.5	11.1	10.6	10.7	8.4	9.0	13.9	10.2

(2) By gross income quintile							(In 10,000 yen per year, percent)					
	1996						1999					
	1	2	3	4	5	Total	1	2	3	4	5	Total
Gross income	66.4	131.5	191.6	251.4	539.8	236.0	73.4	139.3	200.4	257.9	576.4	249.4
Share (%)												
Earnings	10.9	6.9	6.7	9.1	39.8	22.5	5.2	6.7	8.5	6.6	40.0	22.2
Public pension	82.8	81.0	88.4	83.9	41.5	64.9	86.0	83.1	87.6	86.5	40.1	64.8
Private pension a)	0.0	0.0	0.2	0.6	1.1	0.7	0.0	0.1	0.5	0.3	0.8	0.5
Asset income	0.5	1.7	1.8	3.9	15.1	8.2	1.7	1.2	1.8	3.7	15.0	8.2
Others	5.8	10.4	2.9	2.5	2.5	3.7	7.1	8.9	1.6	2.9	4.1	4.3
Disposable income	59.0	124.2	179.1	233.9	453.0	209.8	68.2	132.0	186.5	237.1	495.9	223.9
Difference b) (%)	11.1	5.6	6.5	7.0	16.1	11.1	7.1	5.2	6.9	8.1	14.0	10.2

Source: Author's calculations based on IRS 1996 & 1999.

Notes: a) Private pension includes corporate pension and individual pension.

b) Difference = (Gross income - Disposable income) / Gross income

(2) Distribution of pension benefits

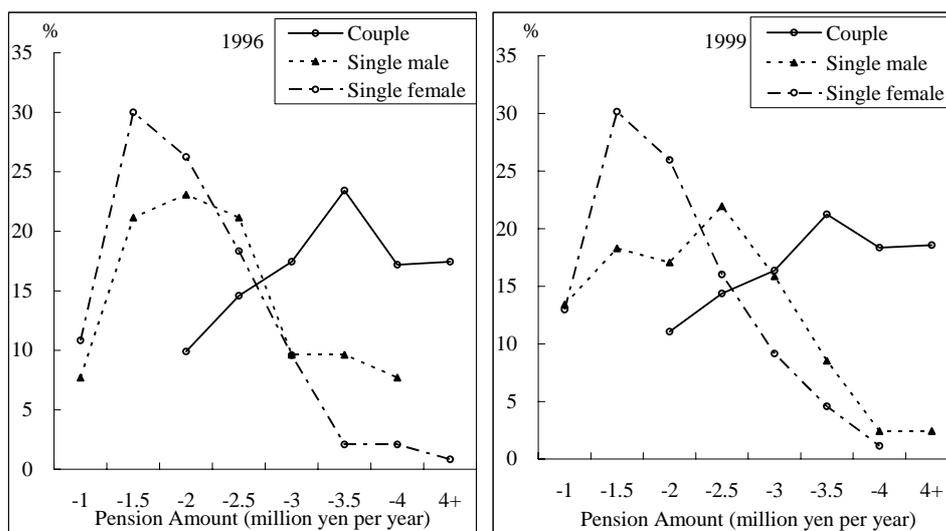
Fig. 4 shows the distribution of beneficiaries according to pension amount, focusing only on those beneficiaries who receive earnings related Employees' Pension. In order to focus on Employees' Pension, we eliminated those beneficiaries who received less than certain amounts (0.8 million yen for single and 1.6 million yen for couple) per year. From this Fig. 4, especially for 1999, we find somewhat similar distributions for couple and single male households with the difference being about 1 million yen. Actually, average benefits for a couple (3.21 million yen per year) equal 2.50 million yen for the husband plus 0.71 million yen for the wife. To take another example, the average benefit for a s-single female among the highest group is 3.3 million yen per year.

3.3 Pension contribution of employee households

This section focuses on those households where gross income as well as initial income equal to wages and salaries. Moreover, those households including individuals aged 65 or over are eliminated in this section. About 40 percent of households surveyed are under this category (referred to as "employee households").

(1) Income distribution of employee households
Average equivalized gross income is highest for the age group 55-64, except for the living-alone households. The Gini coefficients of equivalized disposable income for the whole employee households decrease to 0.335 from 0.347 of gross income, compared to 0.338 and 0.353 respectively for total households in the 1999 survey.

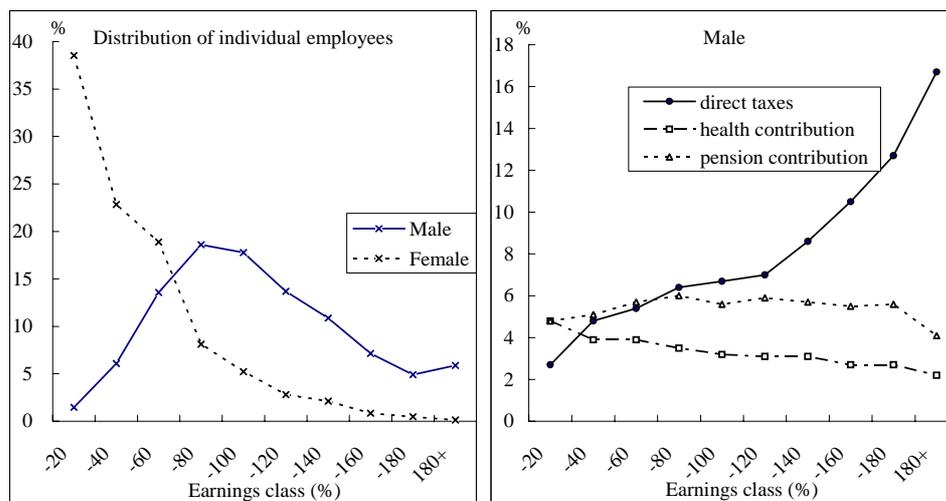
Fig.4 Distribution of beneficiaries according to pension amount: Employees Pension



Source: Author's calculations based on IRS 1996 & 1999.

Note: Those beneficiaries who received less than certain amounts (0.8 million yen for single and 1.6 million yen for couple per year) are eliminated in this figure.

Fig.5 Proportions of direct taxes, health insurance contribution, and pension insurance contribution to earnings by earnings class (average male earnings = 100 %): Individual Employee, 1999



Source: Author's calculations based on IRS 1996 & 1999.

(2) Proportion of direct taxes and SS contributions

Fig. 5 shows the proportions of direct taxes, health insurance contribution, and pension insurance contribution to earnings by earnings class. Earnings class is shown as percent of average male earnings. On the one hand, the progressive-ness of direct taxes can be confirmed; on the other hand, social security contributions (employee's part only) decrease slightly with earnings class. This could be partly explained by the fact that the contribution rate

applied to bonuses was much lower than that for monthly earnings⁵. Individual earnings of male employees are reduced by 17.9 percent on average through taxes and social security contributions (tax: 9.1 percent, health: 3.0 percent, pension: 5.5 percent, others: 0.3 percent).

(3) Accrual rate of public pension system for the employees

Assuming an earnings-related public pension system, individual benefit (B) is determined by

the following equation, where P is contribution point relative to the average wage (W) for each year, n is years of contribution, and A is the accrual rate of the system⁶:

$$B = A \cdot \sum_i^n P_i W_i$$

The average benefit for a couple receiving earnings-related pension was 3.21 million yen, and assuming that the wife is dependent, then the basic pension of 0.71 million yen means that $n = 35$ years. Further, assuming that $W = W_i = 6.17$ million yen, then the accrual rate which realizes a benefit of 2.5 million yen for 35 years of contribution is 1.16 percent.

Assuming that the average benefit for a single female among the highest group is the survivor's benefit and $n = 40$, then the corresponding old-age benefit B is calculated as $(3.3 - 0.8) / 0.75 + 0.8 = 4.1$ million yen. For this case, $A = 1.45$ percent⁷.

4. Discussion

Based on the analysis of the IRS 1999, the following observations can be made. First of all, the Gini coefficient of disposable income for total households decreases from 0.381 to 0.338 by adjusting for family size, and adjustment for family size is especially necessary for households with older household heads and three-generation households. Public pension benefits are the most important income source for the elderly, especially for the low income class. As for the shares of different income sources of the elderly households (single or couple only aged 65+) by income quintile of equivalized gross income, the share of public pension is more than 80 percent for the first to fourth quintiles, and it decreases to about 40 percent for the fifth quintile. The share of earnings is also about 40 percent for the fifth quintile. The Gini coefficient of equivalized disposable income for employee households is 0.335, which is slightly lower than that of total households. Individual earnings of employee households are reduced by 16 percent on average through taxes and social security contributions. The accrual rates of public pension system for the employees are calculated by way of illustration as 1.16 percent as well as 1.45 percent. Similar results are obtained also from the IRS 1996.

Social expenditure itself does not automatically reduce income inequality. However, Fig. 6 suggests that income equality

tends to be high in those countries where social expenditure as a percentage of GDP is high. Fig. 6 also suggests that countries with the same social expenditure level may have different Gini coefficients such as the Netherlands vs. the UK and Norway vs. Italy.

The proportion of disposable income to initial income for total households was quite similar between Japan and the United Kingdom (Fukawa, 2002): 97 percent in Japan, 94 percent in the United Kingdom. Viewed by income quintile, however, the degree of redistribution of income through taxes and transfers was much higher in the United Kingdom. The quintile ratio of disposable income was fairly similar between the two countries. Lower inequality of household earnings is the main force behind lower inequality of disposable income in Japan compared to the United Kingdom. Nevertheless, a higher degree of income redistribution through public transfers in the United Kingdom does not compensate for higher inequality of earnings between households in the United Kingdom (Jacobs, 2000).

Earnings are the second most important income source for the elderly in Japan and the United States. The key challenge posed by an aging society is achieving a proper balance between the amount of time spent in work and in retirement (OECD, 2001). Employment is increasingly considered an important alternative income source for the older population in many developed countries, and how to create job opportunities for the older population is the most critical issue in attaining the long-term sustainability of public pension systems.

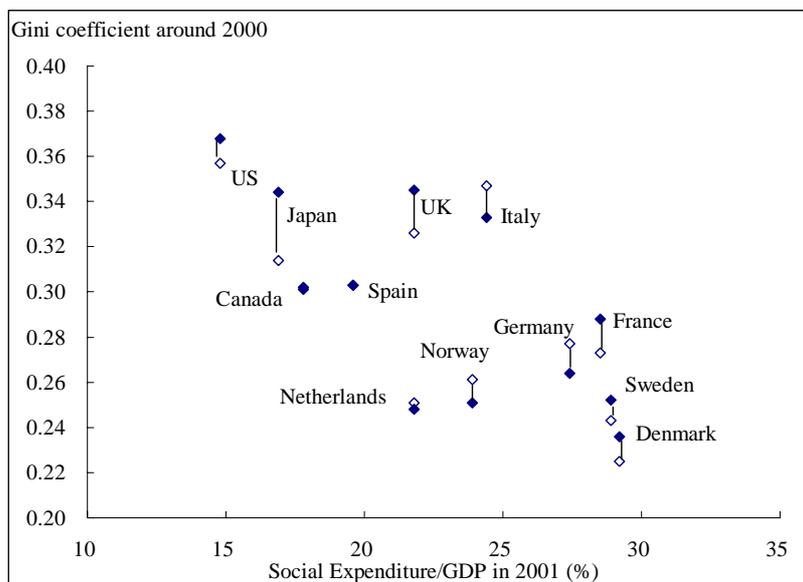
The IRS offers such advantages as detailed data on benefit and contributions items, rich information about household structure, and good coverage of low income households. Conversely, the survey has the following shortcomings (Fukawa, 2002): its accuracy is inferior to that of the Family Income and Expenditure Survey; coverage of benefits in-kind including health services is weak; coverage of indirect taxes is also weak; and wealth is completely left out of consideration.

Nevertheless, the survey results provide useful information. There is no strong relationship between income and asset. The proportion of asset income to total initial income in Japan is relatively low, 10 percent at most. Those who belong to the high income quintile have mostly high earnings. On the other hand, the inequality of assets is much larger than that of income, and wealth data as well as income data are necessary to analyze the economic

position of the population (Fukawa, 2002). Household living arrangements and pooling of income among household members play a role in risk adjustment, as families unmerge and remerge over the course of later life, and these mechanisms are particularly important in Japan

(OECD, 2001). Therefore, it is especially important to analyze the functions of social insurance in Japan according to the living arrangement of the elderly. In fact, about half of the elderly aged 65 or over in Japan still live with their adult children.

Fig. 6 International comparison of social expenditure as percent of GDP and Gini coefficient of total households



Notes: Oshio (2005) Foerster and Mira d'Ercole (2005)

Fig. 6 suggests that Japan is no longer an equal society. How equal the Japanese society is in terms of income distribution is a question yet to be answered, especially from the points of view of lifetime distribution and distributional effects through taxes and social insurance. As Burkhauser and Rovba (2005) claims, it is useful to show how the shape of the Japanese distribution changed over the 1980s and 1990s. In-depth studies are also necessary to compare Japanese income equality level to that of other countries. As accrual rate is a direct indicator of generosity for the earnings-related pension system, it is interesting to estimate the implied accrual rate of the public pension system for the employees after the 2004 reform in Japan.

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Notes

¹ The data used in this paper were made

available to the author by the Japanese Ministry of Health, Labour and Welfare, notice No.0826001 dated August 26, 2004.

² Lump-sum income is divided by 10 in order to eliminate arbitrary fluctuations of the results.

³ The reliability of the data for health services is much lower than that for cash benefits.

⁴ The Gini coefficient is equal to the area between the Lorenz curve and the diagonal expressed as a proportion of the whole triangle. It is alternatively equal to the expected average difference in incomes, relative to the mean, between any two persons drawn at random from the population. All summary measures imply some a priori value judgments about the distribution itself, and the Gini coefficient is most sensitive to inequality changes around the median.

⁵ The contribution rates of public pension insurance for private sector employees were 17.35 percent of monthly earnings and 1 percent of bonuses, both shared evenly by employers and employees, until FY2002.

⁶ The accrual rate means lifetime pension benefits in percent of assessed earnings per year of contribution.

⁷ $4.1 = A \times 40 \times 7.08$; then $A = 1.45 \%$

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