Income distribution in Japan based on IRS 1987-2002

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1. Introduction

The trend of low fertility continues in Japan, and Japanese people enjoy a long life expectancy. The total population peaked at 127.7 million in 2005, and has since begun to decline; it is projected to be between 92 and 108 million in 2050. The functions of income redistribution and risk pooling performed by the social security system in Japan have been reexamined in the light of persistently low fertility rates, the aging of the population, and global competition (Fukawa, 2005). Financial difficulty in sustaining the social security system has increased the need to improve the efficiency of the income redistribution system. Moreover, political discontent has emerged in recent years, due to the perception that income inequality has been increasing.

Income distribution and redistribution through taxes and social security have in fact been topics of great concern for many years in Japan. Japanese people themselves used to consider that income distribution in Japan was relatively equal, in comparison to the other developed countries. However, since the 1980s, Japan's income inequality has also been increasing. The Gini coefficient of equivalized disposable income is low for Sweden, Denmark, and the Netherlands, and high for Japan, the United Kingdom, and the United States (Förster and Mira d'Ercole, 2005). It would be ironic, but not a serious problem, if income inequality were increasing as the result of the expansion of social protections that enable the elderly to continue living independently. This paper examines Japan's income distribution over the past 15 years, and discusses the causes of the increase in inequality and some possible solutions.

2. Data and method

(1) Data

In this paper, we use micro-data from the Income Redistribution Survey (IRS) conducted by the Ministry of Health, Labor and Welfare (formerly the Ministry of Health and Welfare) in 1987, 1990, 1993, 1996, 1999, and 2002 (Note 1).

(2) Definition of income

Starting from market income (Note 2), gross income and disposable income are defined as follows:

Gross income = Market income + Social security benefits

Disposable income = Gross income - (Direct taxes and social security contributions)

In this paper, only cash benefits are included in social security benefits (Note 3), only direct taxes are considered in the survey (Note 4), and employers' part in social security contributions is not included. For post-tax post-transfer income, we primarily use disposable income. Annual income for the previous year is reported in each survey, but in this paper we refer to the survey year.

(3) Adjustment for household size

The following equivalence scales are used in adjusting for family size and the age of children.

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

Equivalence scale B: first adult (18+) = 1.0;
second adult = 0.7;
additional adults and children (0-17) = 0.5

Equivalized income is the income-per-adult equivalent. It is obtained by dividing a household's total income by the number of adult equivalents in the household. All members of a household have the same equivalized income. Here we use equivalized income based on scale B, unless otherwise 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 most 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 paper (Note 5). The equivalized income of each household is allocated to all its members, and Gini coefficients in this paper are calculated based on individual data (except in Table 1, where both the individual and household bases are shown).

(5) Population sub-group

In this paper, we define the working-age population as individuals between 25 and 59 years old and the aged population as individuals 65 years old or over. In Japan, about half of those aged 65+ live in single or couple-only households, while the remaining half live together with their children. Therefore, it is necessary to separate single elderly households or elderly couples (I) from those who co-reside with their children (II).

3. Income distribution of the total population, as well as the working-age and aged populations

3.1 Income distribution of the total population

The Gini coefficient of equivalized disposable income for the total population increased sharply from 0.288 in 1987 to 0.316 in 1990, remained below 0.32 from 1993-96, and then surpassed 0.32 in 1999 and 2002 (Table 1). We observe the same trend for Gini coefficients calculated using only one equivalized income per household (referred to as "By household" in Table 1). We use figures calculated on an individual basis in this paper in order to deal with elderly subjects who co-reside with their children on the same level as those who live alone or as couples.

Table 2 shows the income distributions in 6 countries. Results from both Scale A and Scale B are shown for Japan, indicating that the differences are not very significant. In income equality as measured by equivalized disposable income for the total population, Sweden ranks highest, followed by France and Germany. Japan and the UK lag behind, and the US is the worst among the 6 countries in Table 2.

Table 1. Gini coefficient of equivalized disposable income in Japan: 1987-2002

	1987	1990	1993	1996	1999	2002
By individual						
sample size	25512	28256	27244	24258	22771	21089
Total population	0.288	0.316	0.304	0.311	0.325	0.324
Working-age population	0.285	0.311	0.297	0.302	0.316	0.316
Aged population	0.323	0.358	0.345	0.341	0.344	0.338
By household						
sample size	7442	8572	8582	7914	7614	7401
Total households	0.301	0.331	0.321	0.323	0.335	0.338
Working-age households	0.287	0.308	0.299	0.301	0.313	0.323
Aged households	0.374	0.418	0.394	0.367	0.364	0.339

Note: Working-age population = individuals between 25 and 59 years old
Aged population = individuals 65 years old or over
Working-age households = households with household head between 20-64 years old & no household members aged 65 years old or over
Aged households = households with household head 65 years old or over & single or couple-only households

Table 2 Income distribution in 6 Countries: equivalized disposable income

	France	Germany	Japan		Sweden	UK	US
			A	B			
Gini coefficient							
Total population	0.273	0.277	0.318	0.324	0.243	0.326	0.357
Working-age population	0.272	0.276	0.308	0.316	0.242	0.319	0.346
market income	(0.403)	(0.408)	(0.354)	(0.361)	(0.375)	(0.432)	(0.420)
Aged population	0.269	0.269	0.338	0.338	0.216	0.278	0.369
P90/P10							
Total population	3.4	3.5	4.7	4.7	2.8	4.2	5.4
Working-age population	3.4	3.6	4.4	4.5	2.9	4.2	5.1
Aged population	3.3	3.1	5.1	5.1	2.5	3.2	5.5
Relative poverty rate (%)							
Age Total	7.0	8.9	13.8	14.0	5.3	11.4	17.1
0 - 17	7.3	10.9	13.7	16.6	3.6	16.2	21.7

Note: 1. Japanese figures are based on the Income Redistribution Survey 2002. A, B means Scale A, Scale B respectively.
2. Relative poverty rate is the proportion of individuals living in households with income below 50 % of the median equivalized disposable income of the total households

Source: Förster and Mira d'Ercole (2005).

Table 3 shows the proportion of individuals living in households with income below the poverty line (50 percent of the median equivalized disposable income of all households). This relative poverty rate for the total population shows exactly the same trend as the Gini coefficient, although the proportion of individuals receiving public assistance changed in a different way. Relative poverty rates for children (0-17) and the elderly (65+) are always higher than for the total population.

3.2 Income distribution in the working-age (25-59) population

The Gini coefficient for the working-age population shows exactly the same trend as that of the total population (Fig. 1b). Income inequality in the working-age population, then, is mainly caused by the deterioration of equality in their market income (Fig. 2a).

Inequality in market income during the period from 1996 to 2002 is considered to have been caused by several factors: a higher unemployment rate, stagnant and deteriorated average income (Fig.1a), and increased non-regular employment, among others. The rising importance of non-regular workers, such as young people on temporary contracts and married women working part-time, may have an influence on Japanese market income distribution in the future that cannot be overlooked. Non-regular workers are not only paid less, but also receive less fringe benefit coverage than regular workers. Among the six countries in Table 2, market income inequality is smallest in Japan, probably due to the lower unemployment rate, but Japanese disposable income inequality for the working-age population is as high as that of the UK. Therefore, Table 2 suggests that income redistribution policies are not functioning well for Japan's working-age population.

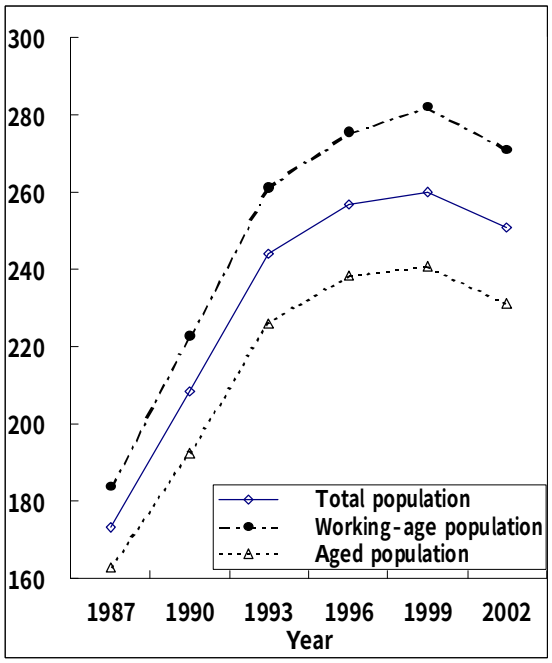
Table 3. Proportion of individuals living in households with income below the poverty line (50 percent of the median equivalized disposable income of the total households)

(in %)

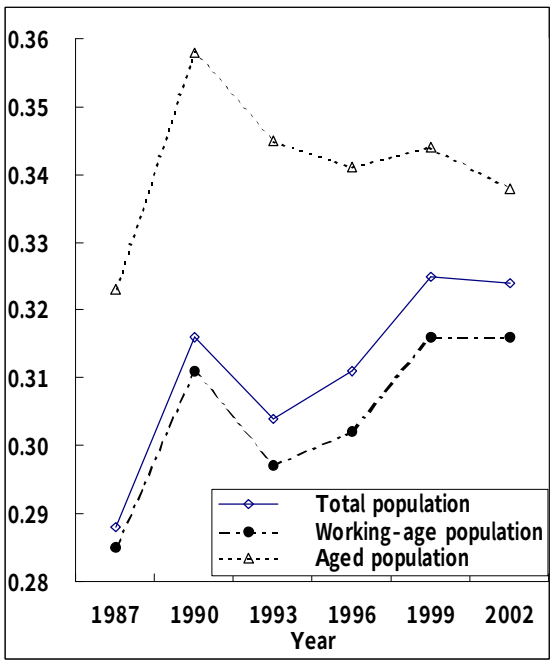
	1987	1990	1993	1996	1999	2002
Relative poverty rate						
age total	10.6	12.0	11.8	12.7	13.7	14.0
0-17	11.7	13.2	13.7	14.9	15.9	16.6
65+	16.6	18.6	18.6	17.7	17.3	17.7
Proportion of individuals receiving Public Assistance to the total population	0.8	0.5	0.5	0.4	0.3	0.7

Fig. 1 Equivalized disposable income and Gini coefficients of them: 1987-2002

(a) Equivalized disposable income



(b) Gini coefficient



3.3 Income distribution of the aged (65+) population

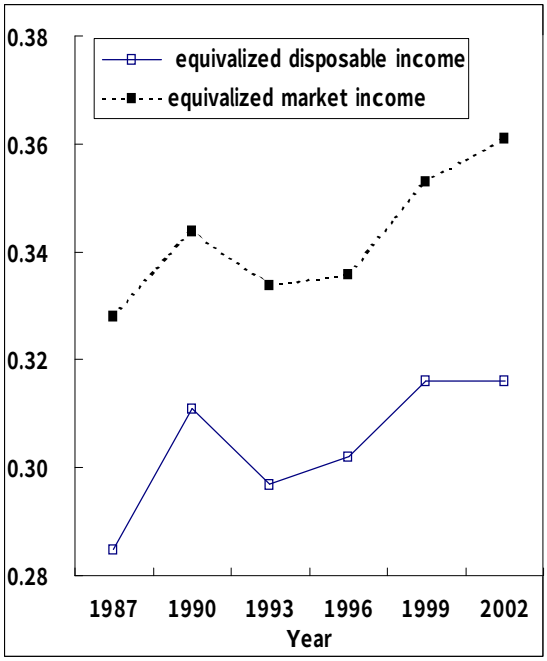
In Japan, the Gini coefficient of equivalized disposable income is higher among the aged population than in the total population. The main reason for this is the high labor force participation rate of the elderly.

(1) Income distribution of single elderly households or elderly couples (aged 65+)

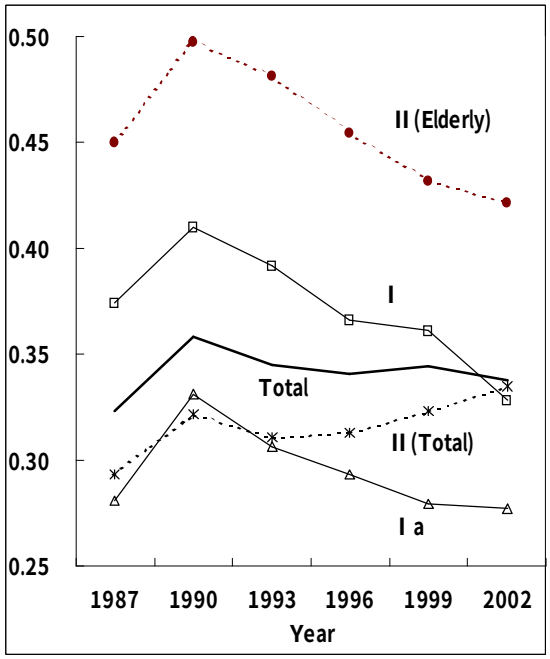
Single elderly households and elderly couples are divided into 2 groups: fully retired (Ia), and with earnings (Ib). Equivalized disposable income for group Ia is much lower, but much more evenly distributed, than for group Ib (Table 4, Fig. 2b). The Gini coefficient for group Ia is in fact smaller than that for the total population (except in 1990). Moreover, it is important to note that income distribution for single elderly households and elderly couples has improved since 1990 (Fig. 2b).

Fig. 2 Gini coefficients of equivalized disposable income

(a) Working-age population



(b) Aged population



(Note) Aged population
I= Single or couple
Ia= Single or couple & fully retired
II= Co-resident elderly
II(Total): Income of all household members are considered in calculating equivalized income.
II(Elderly): Assumed as if those who are less than 65 years old are not existing

(2) Income distribution of the co-resident elderly

Equivalized disposable income for group II is only slightly higher than that of group Ia if we focus only on the income of the elderly themselves. However, due to co-residence with their children and the sharing of economic resources among individuals of the same household, their equivalized disposable income is 30 to 40 percent higher than that (Table 4; 1987 is exception). For co-resident elderly, income distribution has improved dramatically through co-residence with their children (Fig. 2b). In 2002 the Gini coefficient, for example, decreased from 0.422 to 0.335 (that is, a 21 percent improvement) as a result of co-residence.

As mentioned above, the Gini coefficient for the aged population is larger than that for the total population, which is unique to Japan (Table 2). However, the Gini coefficient for retired elderly persons is smaller than that for the total population (except in 1990). Moreover, income distribution for the aged population has improved since 1990.

4. Some simulations on contribution levels and low-income samples

(1) Two simulations on contribution levels

In order to see the effect on the Gini coefficient for the total population, we conducted the two

Table 4. Equivalized disposable income and Gini coefficient of aged population

equivalized disposable income in 10,000 yen

	1987	1990	1993	1996	1999	2002
Single or couple (Ⅰ)	144.6	169.7	205.3	216.2	222.8	208.9
Fully retired (Ⅰa)	103.5	122.0	148.0	171.1	174.5	173.1
With earnings (Ⅰb)	207.2	254.4	315.7	312.5	332.7	295.5
Co-resident elderly (Ⅱ)						
Total household income	171.8	205.6	238.9	256.9	255.4	253.3
Elderly income only	105.6	149.6	167.3	178.6	193.2	196.6
Total (Ⅰ+Ⅱ)	163.0	192.6	225.8	238.5	240.7	231.4

Gini coefficient

	1987	1990	1993	1996	1999	2002
Single or couple (Ⅰ)	0.374	0.410	0.392	0.366	0.361	0.328
Fully retired (Ⅰa)	0.281	0.331	0.306	0.293	0.279	0.277
With earnings (Ⅰb)	0.380	0.412	0.392	0.394	0.400	0.351
Co-resident elderly (Ⅱ)						
Total household income	0.293	0.322	0.311	0.313	0.323	0.335
Elderly income only	0.450	0.498	0.482	0.455	0.432	0.422
Total (Ⅰ+Ⅱ)	0.323	0.358	0.345	0.341	0.342	0.338

simulations described below:

Case1: A progressive increase in the tax and social security contributions of each household

Based on the decile of equivalized disposable income, the direct taxes and social security contributions of each household were multiplied as follows, and equivalized disposable income was then recalculated accordingly.

decile	1	2	3	4	5	6	7	8	9	10
multiple	0.2	0.4	0.6	0.8	1.0	1.3	1.6	1.9	2.2	2.5

Case2: A progressive increase in the tax and social security contributions of each household, plus an increase in social security benefits for low-income households

Based on the decile of equivalized disposable income, the direct taxes and social security contributions of each household were multiplied by Multiple C and the social security benefits of each household were multiplied by Multiple B, as follows. Equivalized disposable income was then recalculated accordingly.

decile	1	2	3	4	5	6	7	8	9	10
Multiple C	0.2	0.4	0.6	0.8	1.0	1.3	1.6	1.9	2.2	2.5
Multiple B	1.6	1.4	1.2	1.1	1.0	1.0	1.0	1.0	1.0	1.0

The results are shown in Table 5 (Case 1 and Case 2). The Gini coefficient decreased dramatically in both cases, although to greater effect in Case 2. From these results, we can raise two points. First, tax and social security contributions put a strain on low-income households (regressive), contributing to high inequality in income distribution. Secondly, if we increase social security benefits by about 10 percent and allocate them to low-income families, we can improve income distribution significantly.

Table 5. Gini coefficients under different assumptions: Total population

	1987	1990	1993	1996	1999	2002
Base Case	0.288	0.316	0.304	0.311	0.325	0.324
Case 1	0.203	0.239	0.221	0.229	0.249	0.250
Case 2	0.191	0.227	0.210	0.216	0.235	0.233
Case 3	0.277	0.302	0.291	0.296	0.308	0.307

Note: Case 1 = To increase tax and social security contribution of each household progressively

Case 2 = To increase tax and social security contribution of each household progressively plus to increase social security benefits for low income households

Case 3 = To eliminate those households with income less than half of the poverty line

(2) A simulation on extremely low-income samples
Case 3 in Table 5 investigates the influence of very low-income samples. This simulation was conducted because it still often found that some individuals' income, especially that of co-resident elderly, were missing from the IRS. Those households with an equivalized disposable income of less than one quarter of the median income of total households were eliminated from the sample as "very low-income." The result is not as remarkable as expected. However, the Gini coefficient is lower by 4 to 5 percent compared to the base case in each year, which does carry certain importance.

5. Discussion

Based on the analysis of the IRS from 1987 to 2002, the following observations can be made. First of all, the Gini coefficient of equivalized disposable income for the total population increased in the 1990s compared to the 1980s, and increased further around 2000. This trend follows closely the Gini coefficient of equivalized disposable income for the working-age population, which then is mainly determined by the market income distribution for the working-age population. Secondly, the increase in the aged population during the period from 1987 to 2002 has not had much influence on the income distribution of the total population, as measured by the Gini coefficient. It is worth mentioning in this connection that the Gini coefficient for the aged population has improved since 1990, as stated below. Thirdly, the Gini coefficient for the aged population is larger than that for the total population. The reason for this is that earnings have more decisive power among the aged population. If we focus on retired single elderly households or elderly couples, the Gini coefficient is smaller than that for the total population (except in 1990). Fourthly, income distribution for the total population worsened between 1987 and 2002 (except from 1990 to 1993), as measured by the Gini coefficient of equivalized disposable income. However, income distribution for the aged population has improved since 1990.

In most OECD countries, the ageing of the population affects income inequality through the following two separate channels (Mira d'Ercole, 2006):

- First, the elderly have a lower disposable income than the working-age population; when the share of the elderly in the total population rises, inequality will tend to widen because of larger inter-group income differences.
- The second effect relates to how income inequality among the elderly compares to that of the total population. In most OECD countries, disposable income is more equally distributed among the elderly than in the working-age population, and this dampens the increase in aggregate inequality.

In Japan the situation is somewhat different because of high rates of co-residency and labor force participation among the elderly. The equivalized disposable income of the elderly population is lower than that of the working-age population, while the income inequality is higher. However, the increase in the aged population from 1987 to 2002 has not exerted much influence on the income distribution of Japan's total population in terms of equivalized disposable income. This is not necessarily contradictory to such view as market income inequality in Japan is mainly explained by aging of the population and changes in household structures, which is analyzed by Oshio (2005), Otake (2005), etc. Although the co-residency rate among the elderly is declining, household living arrangements and the pooling of incomes among household members still play an important role in risk adjustment in Japan.

Japan spends less on social protection than other OECD countries, and its spending is heavily tilted towards old-age pensions and health care, which disproportionately benefit the elderly population (Mira d'Ercole, 2006). Therefore, the Japanese welfare system has been more biased towards the elderly and less redistributive towards the poor. However, this does not necessarily mean that there is room to curtail benefits for the elderly, because old-age and survivor's pensions as a percent of the GDP, for example, are small in Japan as compared to other developed countries. Although countries with the same level of social expenditure may have different Gini coefficients, income equality tends to be high in those countries where social expenditure as a percentage of GDP is high (Fukawa, 2005).

Japan is no longer an equal society, as it was once perceived to be. The issue is how to increase income equality by eliminating avoidable causes for income inequality. More research is necessary from the point of view of lifetime income distribution. In-depth studies are also needed to compare the Japanese income equality level to those of other countries, as Jacobs (2000) did between the UK and Japan. The inequality of assets is much larger than that of income, and wealth data as well as income data (Note 6) are needed to analyze the economic position of the population. The key challenge posed by an aging society is to achieve a proper balance between the amount of time spent working and in retirement (OECD, 2001).

Employment is increasingly considered an important alternative income source for the aged population in many developed countries.

In sum, market income inequality and the weakened function of income redistribution through taxes and social security are considered to be major reasons for Japan's inequality in disposable income. Shrinking tax bases cause higher tax rates. The same argument applies to social security contributions. Moreover, the regressiveness of social security contributions is persistent and troublesome. With regard to benefits, cash benefits in Japanese social security are not generous enough to bring Japan's income distribution up to international standards.

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(Note 1) The data used in this paper were made available to the author by the Japanese Ministry of Health, Labour and Welfare, notice No.08220005.
(Note 2) Market 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, such as payment from life or other insurances. Lump-sum income is divided by 10 when and only when calculating Gini coefficients, in order to eliminate arbitrary fluctuations of the results.
(Note 3) Health services share a majority of in-kind benefits, and the reliability of the data for health services is much lower than that for cash benefits. Public pension benefits, child allowances and public assistance are included, among others, in cash benefits.
(Note 4) Direct taxes included in the survey are national as well as local income taxes, immobile property tax, and automobile tax.
(Note 5) 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 the most sensitive to inequality changes around the median.
(Note 6) 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 National Survey of Family Income and Expenditure (FIES); 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. The FIES did not include single households, which of course produce lower Gini coefficients. The FIES is conducted every 5 years; the most recently published survey is from 2004. The FIES 2004 separately surveyed 54,372 households with two or more members and 5,002 single households.

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