Income Distribution in Japan

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Abstract

This paper investigates the distribution of income among workers' households in Japan. Results from the family income and expenditure survey show that income inequality is increasing recently, although social redistribution of income is becoming more effective in leveling out the disparity. A detailed look at the data reveals that younger households and single mother households suffer from a substantially low income, and that social redistribution of income at the current level may not be enough to support such households.

1. Introduction

This paper investigates the distribution of income among workers' households in Japan. A number of sociologists argue that the seeming increase of income inequality in recent years is a by-product of the arrival of a rapidly aging society, and that, in fact, the dispersion of income within the same age group is decreasing. The main purpose of this study is to re-examine this assertion using longitudinal data, and to explore factors that may have an effect on income inequality. In addition, relationship between income distribution and household type is studied, and the effect of social redistribution of income assessed.

The article is organized as follows. Section 2 gives a description of the data. In Section 3, longitudinal changes in the income level and income inequality are studied. Section 4 provides analyses of income distribution within the same age group, and on the relationship between income and household type. The effect of social redistribution of income is explored in Section 5, and concluding remarks are given in Section 6.

2. Data

Primary source of data is the family income and expenditure survey, conducted by the Statistics Bureau. The survey has been taking its present form since 1962, with a sample size of about 9000 households for the year 2004. Given that it is a sample survey, the collected data inevitably contain sampling errors. Furthermore, sampled households are required to keep records of their income and expenditure on their own, without any form of external checks. As a result, the data may include errors in recording as well.

The key concept of the analysis is disposable income, that is, income after non-living expenditures, such as direct taxes and social insurance premiums, are paid for. Since data on disposable income are available only for workers' households, that is, households with heads employed by companies, governments, schools, factories, shops, etc., such households are the focus of this study. Households with non-working heads, self-employed heads, agricultural, forestry and fisheries households are not included in the study. It should also be noted that only those households with two or more persons are included in the study. Single person households are excluded from the analysis.

Secondary source of data include comprehensive survey of living conditions of the people on health and welfare, and the national survey on single mother households, both done by the Ministry of Health, Labor and Welfare. Results from a survey on wages conducted by the Nihon Keizai Shimbun and data from the annual report on national accounts by the Cabinet Office are also employed.

3. Long Term Changes in the Distribution of Income

3.1 Level of Income

Figure 1 displays values of monthly average disposable income per household (Y), and of monthly average equivalent disposable income per household member (YE), both for workers' households in Japan, during the period of 1970 to 2004. The corresponding growth rates are depicted in Figure 2. Income of each year is deflated by consumer price index of the corresponding year, relative to the year 2000. This is done to adjust for changes in commodity price levels over time, so that data after deflation indicate income measured in 2000 currency.

Figure 1 Income Levels

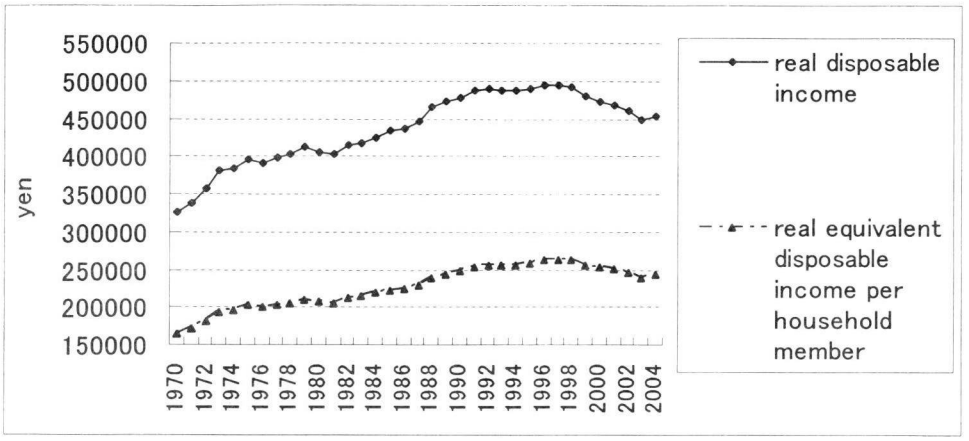
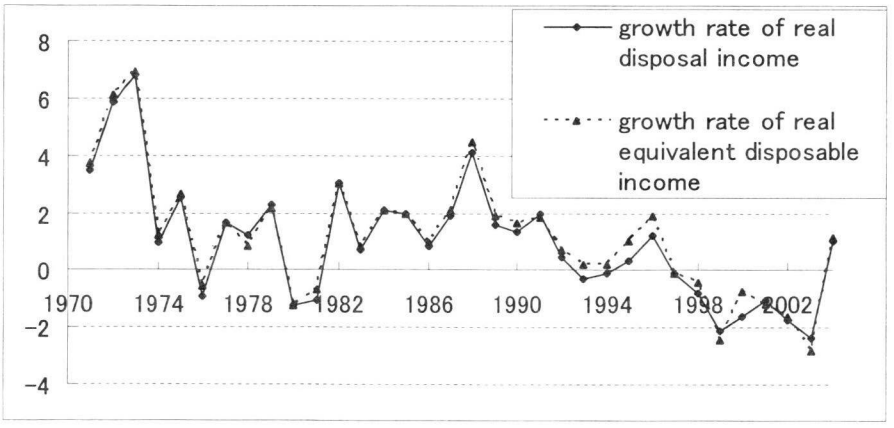


Figure 2 Growth Rates



The difference between Y and YE is in the unit of observation. The unit of Y is a household, whereas the unit of YE is an individual. The concept of YE is introduced to take account of change in household size over time. In general, equivalent disposable income per household member (YE) is defined as:

$$YE=\frac{Y}{m^{\varepsilon}},$$

where Y denotes the disposable income of a household, m is the number of persons in a household, and ε is a parameter called the equivalence elasticity.

The value of ε reflects assumptions on "economies of scale" in a household, and ranges from 0 to 1. A value of 1 indicates there are no "economies of scale", that is, if there are n

persons in a household, the consumption will be n times as much as a single person household. In this case, YE simply denotes "per capita" disposable income. A value of 0, on the other hand, indicates that the consumption of a household is independent of the household size, that no matter how many persons belong to a household, the level of consumption remains the same. Household members share fundamental services such as electricity, gas, etc., so it is natural to think that some kind of "economies of scale" exists. To what degree, however, is open to question. It is customary to use the value 0.5 for equivalence elasticity, and this will be followed throughout the paper. Note, however, that the choice is somewhat arbitrary, and depending on the value chosen, results could differ considerably.

It is seen from Figures 1 and 2, that both Y and YE increase steadily until the 90's when they reach a plateau, and start to decrease in the late 90's. The growth rates show strong resemblance between the movements of Y and YE, indicating that change in household size has little effect on the dynamics of the structure of income distribution. Note that Japan's economic bubble reached its peak in 1991, and shortly after, major economic indices such as land prices, GDP growth rates etc. began to fall sharply as the economy headed for a recession. The level of income, however, did not start its decline until 1998, as indicated by the figures above. It was not the bursting of the bubble itself that caused the income to fall, but rather, the prolonged stagnation of the Japanese economy following the burst that caused the damage. At present, for the first time since the period of rapid economic growth, Japanese people are getting poorer every year in terms of purchasing power, although there has been a slight improvement in the year 2004. Coupled with the high unemployment rate in recent years, financial conditions of Japanese workers' households are, without question, quite serious.

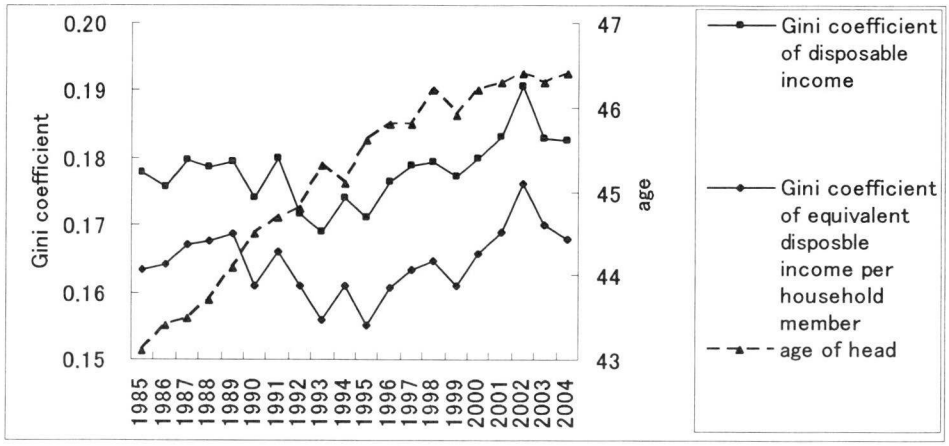
3.2 Inequality of Income

Among the many indices that measure dispersion, the Gini coefficient is employed here to investigate the income inequality between households. The Gini coefficient takes values between 0 and 1. Larger value of the Gini coefficient indicates larger disparity of income. In particular, when the Gini coefficient takes the value 1, it denotes complete inequality, that is, only one household has positive income while the rest of the households have no income. In contrast, when the Gini coefficient takes the value 0, it indicates complete equality between households, where every household has equal income.

Gini coefficient values were derived from the data on yearly income quintile groups, between

the years 1985 and 2004. Here, quintile groups refer to five equally divided groups in terms of the number of households, according to the amount of their yearly income. The results are plotted, along with the average age of household head, in Figure 3.

Figure 3 Gini Coefficient and Age of Household Head



Examining Figure 3, it is seen that the Gini coefficients of disposable income (Y) and of equivalent disposable income per household member (YE) exhibit similar fluctuations. Between the years 1985 and 1995, values of the Gini coefficients oscillate with a slightly decreasing trend, whereas, after 1995, the values increase steadily until the year 2002, indicating a rise in income inequality. It is not clear whether income inequality will continue to escalate in the future, or whether the slight decrease in the last couple of years is an indication of a change in trend. Comparing Figure 3 and Figure 1, it is seen that the Gini coefficient and income are moving in the opposite direction, and that the recent increase in the value of the Gini coefficients is accompanied by the decrease in the level of income. In other words, income inequality is becoming more severe as we are getting poorer.

Average age of household head is also included in Figure 3 to examine the hypothesis that aging of the households is the main cause of increasing income disparity. In recent years, the direction of change in the average age of household head and the value of the Gini coefficient seems to correspond with the aforementioned argument. This conjecture, however, cannot explain the decreasing tendency of the Gini coefficient between the years 1985 and 1995, when the average age of household head was constantly rising. In fact, the value of the correlation coefficient between the Gini coefficient of YE and age of head during the period of 1985 to 2004

is only 0.12, and the value of the correlation coefficient between the Gini coefficient of Y and of age of head during the same period is 0.33, both indicating very weak correlation. Even though Japanese society is aging steadily, income distribution follows no set pattern. All in all, the argument that the rise in income inequality is mainly due to the aging of households, seems to have limited grounds, at least with the data at hand.

What, then, are the factors affecting income inequality? One strong possibility is the overall condition of the economy. Since the burst of the economic bubble, Japan has been suffering from one of the longest economic recessions in recent history. It is well known that when the economy is in bad condition, inequality of income is more likely to intensify. As seen by the movements of disposable income, economic stagnation may, in effect, have played a major role in increasing income inequality in recent years. Now that the Japanese economy is slowly starting to pick up, it will be interesting to observe changes in income inequality for the next several years, to see which direction it will take.

The effect of changes in the wage system is another possible factor. Most companies in Japan have long employed the seniority order wage system, where the younger employees are paid disproportionately low wages while senior employees are paid very well, including a considerable amount on retirement. However, firms are now reevaluating their wage systems as competition becomes more severe and job-hopping more common place, and many are moving or have moved toward a wage system based on merit. Results of the 2005 survey on wages indicate that 86.7% of the enterprises employ wage systems based, at least to some extent, on merit, up 5% from the previous year. This change in the wage system may have had an influence on the income distribution of workers' households, a point that will be discussed in more detail in Section 4.1.

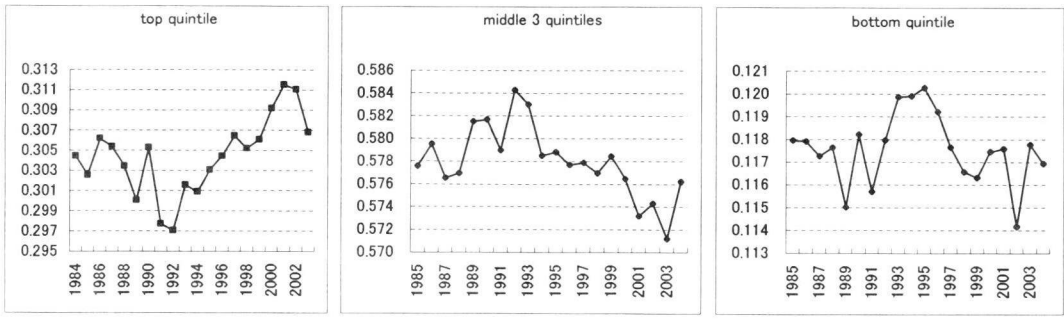
3.3 Income Shares by Quintile Groups

To study the structure of income inequality in more detail, shares of disposable income by yearly income quintile groups are analyzed in this section. In particular, income share of the highest income group (4a), the lowest income group (4c), and the middle three income groups representing 60% of the workers' households in the middle (4b), are calculated and depicted in Figures 4a-4c. Shares by quintile groups based on equivalent disposable income per household member show a similar pattern, and are omitted for simplicity.

It is clear from the figures that, for the last ten years, income share of the top quintile group is growing rapidly while the share of the middle three quintile groups is declining steadily. The

value of the correlation coefficient between the top quintile and the middle three quintile groups is, in fact, -0.92, indicating a very strong negative correlation. Put another way, the recent increase in income inequality is accompanied by a "hollowing out" of the middle class. Average workers are suffering losses while few well-to-do workers are doing better than ever. Whether this is caused by an economic recession, the changes in the wages system, aging of the households, or some other factor can not be concluded from this data alone. The ratio of the lowest income group shows irregular fluctuation without a clear trend.

Figure 4 Income Shares by Quintile Groups



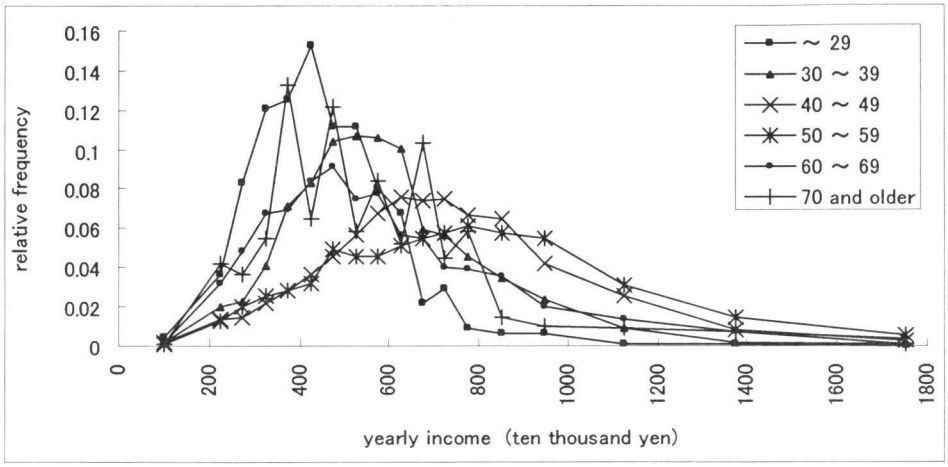
(4a) (4b) (4c)

4. Income Inequality and Household Type

4.1 Income Distribution by Age Group

Figure 5 shows distributions of yearly income of workers' households, according to the age group of household head, for the year 2004. It is seen that income distribution of younger households has smaller dispersion compared to households with older heads. Income distribution of households with heads ages 70 and older has a rather irregular shape, most likely, owing to various patterns in post-retirement re-employment processes. Note that households with completely retired heads are not included in the data, so that heads in this study are working in one form or another, even for older households. Income is at its peak for heads in their 50's. Most likely, the decrease in income following that is due to the post-retirement re-employment process, where many household heads take on a new, less paid, possibly part-time jobs. Although Japanese firms are now said to be in the course of making changes in the wage system, Figure 5 suggests that the seniority wage system is, in fact, still prevalent, and that people are paid their highest wages right before retirement.

Figure 5 Income Distribution by Age Group



To explore in more detail, the properties of income dispersion within each age group, values of two inequality indices are employed, namely, the Gini coefficient and the coefficient of variation. The coefficient of variation measures the spread of data around the mean value, relative to the mean value. It places more weight on values that are at both extremes of the distribution, while the Gini coefficient places more weights on values around the middle. The values of both coefficients, along with the monthly average disposable income of each age group are presented in Table 1.

Table1 Income Inequality by Age Group

	～ 29	30～ 39	40 ～ 49	50 ～ 59	60 ～ 69	70 and older	
Gini coefficient	0.192	0.206	0.221	0.239	0.279	0.250	
coefficient of variation	0.364	0.386	0.405	0.431	0.530	0.487	
average disposable income	337,980	413,489	491,152	484,797	340,002	333,840	(yen)

Both the Gini coefficient and the coefficient of variation indicate that income distribution becomes more dispersed with age, i.e., inequality intensifies with age. Although the average disposable income of households with heads in their 20's is nearly the same amount as that of households with heads in their 60's and 70's, the dispersion of income is much smaller.

Table 2 lists values of the Gini coefficients of each age group between the years 2000 and 2004, for a comparative study. Similar patterns are seen each year with regard to the relationship between income inequality and age, showing higher dispersion of income with age. There is no indication that inequality of income within each age group is decreasing over time, as some

researchers argue. In fact, for households with heads in their 40's, the dispersion is increasing. Same conclusions are drawn based on values of the coefficient of variation over the last five years, as shown in Table 3.

What, then, is the reason for the increase in income inequality among households with heads in their 40's ? A possible explanation is the change in the wage system. It has been seen from Figure 5 that the Japanese wage system still reflects a strong tendency to reward seniority. At the same time, as has been noted before, more than 3/4 of the enterprises now employ a wage system based, to some degree, on merit. It may be that more wage variation is working its way into same age, especially for those age groups at the center of the workforce. In other words, instead of making a drastic change in the wage system, firms may be incorporating wage systems that are partially based on merit, while at the same time, conserving some kind of seniority. A detailed data on the Japanese wage system is essential for further discussion.

Table 2 Gini Coefficient by Age Group

	~ 29	30 ~ 39	40 ~ 49	50 ~ 59	60 ~ 69	70 and older
2000	0.206	0.210	0.214	0.239	0.278	0.308
2001	0.212	0.202	0.217	0.240	0.260	0.306
2002	0.215	0.219	0.219	0.243	0.272	0.254
2003	0.190	0.206	0.220	0.234	0.276	0.287
2004	0.192	0.206	0.221	0.239	0.279	0.250

Table 3 Coefficient of Variation by Age Group

	~ 29	30 ~ 39	40 ~ 49	50 ~ 59	60 ~ 69	70 and older
2000	0.390	0.394	0.394	0.428	0.519	0.583
2001	0.415	0.377	0.396	0.430	0.494	0.579
2002	0.420	0.417	0.402	0.436	0.509	0.483
2003	0.355	0.389	0.403	0.422	0.526	0.546
2004	0.364	0.386	0.405	0.431	0.530	0.487

4.2 Income and Household types

In this section, relationship between income and household type is examined. For each type of household, average age of household head, average monthly disposable income, and equivalent disposable income relative to the average equivalent disposable income of all workers' households are listed in Table 4, for the year 2004. It is seen from this Table that, income of a household with 2 persons working is about 1.2 to 1.3 times the amount of income of a corresponding household with only 1 person working. The table also shows that single parent households,

especially the single mother households, have income significantly lower than the rest. Note that the data presented here do not include single person households, so all households including single parent households contain at least two people in a household.

According to the 2004 comprehensive survey of living conditions of the people on health and welfare, approximately 87% of the single parent households are single mother households. And results from the 2002 national survey on single mother households indicate that the average income of a single mother household was 2,120,000 yen, compared to the average income of a single father household of 3,900,000 yen. Given these facts and the figures in Table 4, it can be concluded that single father households have monthly disposable income that is at a comparable level as single income households with both parents present, while single mother households earn considerably less.

The difference in the financial situation between a single father household and a single mother household can be attributed to several factors. First, there is considerable difference between wage earners' time of employment. For example, 95.9% of single fathers have been holding jobs prior to becoming single parents, whereas, the percentage of mothers that have been working at the time they became single parents is only 63.5%. Second, 78% of the single father households with working heads are full-time employees, while only 40.4% of single mother households with working heads are full-time time employees. Third, average wage of female full-time employees in their early 40's is only about 60% of that of male full-time employees of the same age group, in Japan. These factors represent only a part of the difficulties that single mother households are facing. It is to be noted that over 2/3 of the single divorced mother households do not receive alimony from their ex-husbands.

Table 4 Income and Household Types

household type	members of household	age of head	disposable income	relative equivalent disposable income
average over all workers' households		46.4	444,966	1
3 or more persons working		53.7	490,952	1.006
2 persons working		46.8	494,984	1.112
	husband and wife	47.1	493,840	1.464
	husband, wife and an unmarried child	43.3	501,202	1.213
	husband, wife and two unmarried children	42.5	528,949	1.109
1 person working		44.6	396,079	0.910
	husband and wife	54.6	365,431	1.083
	husband, wife and an unmarried child	39.7	403,434	0.977
	husband, wife and two unmarried children	40.2	438,572	0.919
	single parent with unmarried children	47.4	260,240	0.690
	single mother with children under age 20	39.9	234,406	0.590
		(years)	(yen)	

In order to study a possible change in the social status of each household type, relative equivalent disposable income for the year 2000-2004 are presented in Table 5. It is seen that the relative financial position of each household type for the last five years remains largely the same, the only exception being the constant decline in the relative income of a household with 3 or more persons working.

Table 5 Relative Equivalent Disposable Income and Type of Household

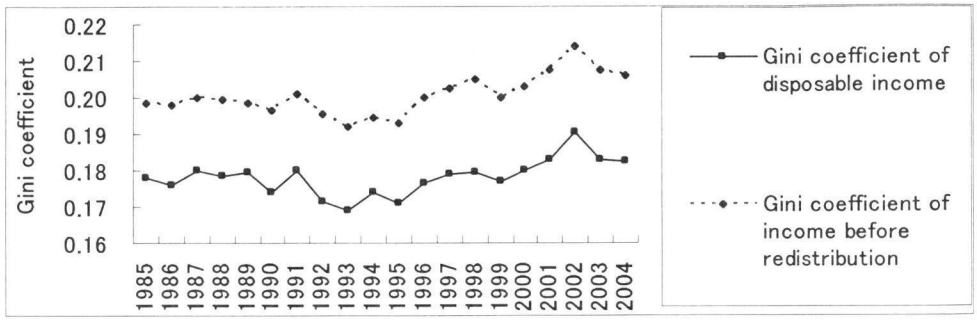
type	members of household	2004	2003	2002	2001	2000
average over all workers' households		1	1	1	1	1
3 or more persons working		1.006	1.014	1.046	1.059	1.081
2 persons working		1.112	1.105	1.111	1.081	1.082
	husband and wife	1.464	1.490	1.436	1.422	1.375
	husband, wife and an unmarried child	1.213	1.219	1.263	1.206	1.229
	husband, wife and two unmarried children	1.109	1.119	1.083	1.056	1.074
1 person working		0.910	0.912	0.899	0.915	0.909
	husband and wife	1.083	1.116	1.102	1.121	1.107
	husband, wife and an unmarried child	0.977	0.960	0.923	0.952	0.939
	husband, wife and two unmarried children	0.919	0.908	0.888	0.913	0.904
	single parent with unmarried children	0.690	0.678	0.765	0.676	0.732
	single mother with children under age 20	0.590	0.564	0.548	0.562	0.581

5. Social Redistribution of Income

As noted in Section 2, disposable income represents income including social benefits and excluding direct taxes as well as social insurance premiums. In short, it corresponds to income after social transfers have been made, i.e. income after social redistribution. An interesting question to ask, then, is just how much this transfer is contributing towards leveling out the dispersion of income? For this purpose, the Gini coefficient of income before redistribution is obtained and compared to that of income after social transfer.

The results are plotted in Figure 6. It indicates clearly that social redistribution has a significant effect on diminishing income inequality. As a matter of fact, each year, the value of the Gini coefficient is reduced by a little over 10% due to social redistribution.

Figure 6 Effects of Social Redistribution



To analyze the effect of social redistribution further, the ratio of the Gini coefficient after social redistribution of income to the corresponding value of the Gini coefficient before redistribution is depicted in Figure 7. Although there are some fluctuations, it is seen that the ratio has a decreasing trend, with an average decrease of approximately 0.0007 per year. This indicates that income redistribution is becoming more effective over time, at least, among workers' households. On the other hand, as discussed in Section 3.1, values of the Gini coefficient have been increasing for the last ten years. It can, therefore, be concluded that inequality of income among workers' households is on the rise, despite the growing effect of social redistribution on leveling out income inequality.

Figure 7 Ratio of the Gini Coefficients

To assess the effect of redistribution of income corresponding to each household type, the ratio of income after redistribution (disposable income) to that of income before redistribution (disposable income + taxes – social benefits) is calculated and presented in Table 6.

Table 6 Effect of Social Redistribution

type of household		income ratio
average		0.87
age of head	~ 29	0.88
	30 ~ 39	0.86
	40 ~ 49	0.84
	50 ~ 59	0.82
	60 and older	1.08
married, no children		0.89
married with unmarried children		0.86
single parent with unmarried children		0.97
single mother with children under 20		1.01

It is seen at once that households that are literally benefiting from income redistribution are households with older heads and single mother households. In fact, for households with heads ages 65 and over, income after redistribution is 137.92% compared to income before redistribution. Although single mother households have the lowest average income before redistribution, the income ratio is lower than that of households with older heads, owing, mainly, to the lack of pension payment.

It has already been shown in Table 1 that disposable income of households with heads in their 20's is at a comparable level to the disposable income of households with heads in their 60's or older, i.e., the retirement-age. Table 6 suggests that this is partly due to the heavy social burden on the younger households. The income ratio of households with heads in their 20's is not much different from that of households with heads in their 30's, although the level of income for households with heads in their 20's is considerably lower. Note, further, that retirement-age households have higher rate of house ownership and fewer persons in a household. This means that with almost the same amount of disposable income per household, the older households actually have more money that can be spent freely.

The findings here suggest that younger households are under very tight financial restrictions. Nowadays, social welfare after retirement seems to be the focus of many people. Nonetheless, it might be worthwhile to consider the issue of easing the financial burden on younger households, especially those with children. Otherwise, the current decreasing trend of the birthrate may not be reversed.

6. Concluding remarks

Income inequality between workers' households in Japan is increasing since the late 90's. Some argue that this is due to the arrival of a rapidly aging society. According to the data from the family income and expenditure survey, however, this conjecture is, at best, in question. During the last 10 years, Japan has been going through one of the longest recessions in modern history. Data suggest this overall economic condition may have contributed to the intensification of income inequality. At the same time, changes in the structure of the wage system may have contributed to the increase in income dispersion within the same age group. Recent increase in income inequality is accompanied by a decrease in the level of income, and also by a "hollowing out" at the middle of the distribution. Now that the economy is slowly picking up, it is of interest to observe how income inequality evolves.

Cross sectional analysis reveals that income inequality rises with age. It also shows that the average disposable income of households with heads in their 20's is almost as low as that of households with heads in their 70's or older, owing to the heavy burden of social redistribution. Studying the relationship between income and household types, it is seen that single mother households are suffering from strikingly low income, and although social redistribution of income for this group is beneficial, the amount does not seem to be enough. It may be worthwhile to contemplate a social program to relieve the financial hardships of younger households and single mother households.

Owing to the inaccessibility of individual data for the family income and expenditure survey, the empirical findings presented in this paper are of limited precision. A detailed research is necessary to make conclusive arguments.

e-references

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