

Household Savings and Wealth Distribution in Japan

Yukinobu Kitamura, Noriyuki Takayama and Fumiko Arita*

1. Introduction

It has been seven years since our publication on household savings in Japan. Our previous publication made use of the large micro data, the National Survey of Family Income and Expenditure (NSFIE), over the period of 1979-1989 (see Takayama and Kitamura (1994)). Now that the micro data from the 1994 NSFIE has become available among academic users, we would like to add new information to our previous work and uncover new facts that have emerged after the burst of the bubble economy.

The main objectives of this paper are to update the data provided in Takayama

* This paper was prepared for International Comparisons of Household Saving (Academic Press). We are grateful to the editors of the conference volume ,especially to Dr Axel Börsh-Supan. We are very grateful to Richard Blundell, Fumio Hayashi, Charles Yuji Horioka for their constructive comments on the early draft. We are also grateful to Michiko Baba for her efficient and skillful data processing. This research is partially financed by the grants from the Ministry of Education, Science and Culture, given to the Project on Intergenerational Equity (Director General, Professor Noriyuki Takayama) as one of the Scientific Researches Priority Areas. Corresponding address: Noriyuki Takayama and Yukinobu Kitamura, Hitotsubashi University, Institute of Economic Research, Naka 2-1, Kunitachi, Tokyo 186-8603, Japan. Fumiko Arita, Toyo Eiwa Women's University, Department of International Social Science, Miho-machi 32, Midori-ku, Yokohama, 226-0015, Japan. E-mail address: Noriyuki Takayama: takayama@ier.hit-u.ac.jp, Yukinobu Kitamura: kitamura@ier.hit-u.ac.jp, Fumiko Arita:

and Kitamura (1994) and to present descriptive information rather than testing particular models of household saving behavior, so that future researchers can examine the household saving behavior in Japan as they like.

Before presenting our results, it is worthwhile reviewing the recent literature on the household saving behavior in Japan. First of all, Hayashi (1997) is a landmark of this literature. Chapter 10 of Hayashi (1997) provides an excellent account of recent literature and evidences on Japanese saving. He identifies key stylized facts; (1) Japan's saving rate is not as high as commonly thought, and (2) the accumulation of wealth by Japanese households starts very early and lasts until very late in life, with unconsumed wealth transferred to the next generation in the form of bequests. As to the second point, Hayashi, Ando, and Ferris (1988) argue that the bulk of intergenerational transfers take place in the form of bequests and that bequests come not only from the independent (nuclear) old, but also from the pool of extended families that seem to accumulate wealth regardless of the parents' age. Barthold and Ito (1992), using bequest tax filing information, show that about one-third to one-half of household assets are obtained by bequests in Japan. It implies that the old households do not dissave enough and leave sizeable bequests, intended or not. Takayama and Kitamura

(1994) also find some evidence of substantial intergenerational transfers from the NSFIEs. Ohtake (1991) argues that bequests are motivated by selfishness rather than by altruism. From these studies, we conclude that intergenerational transfers do occur at a substantial magnitude, no matter what motivation lies behind it.

Horioka (1990, 1993) provides another good survey of the literature from the viewpoint of different motives for saving. The author has identified more than 30 factors. Horioka and Watanabe (1997) also conducted empirical investigation of saving motives using a micro data from a Japanese government survey. Horioka finds that net saving for retirement and precautionary motives are of dominant importance. Using a different data set, Ohtake and Horioka (forthcoming) discover that retirement and housing motivations are of importance. Motivation for the acquisition of owner-occupied housing remains strong and it promotes high saving, especially because of limited mortagage markets and high down-payment requirements (i.e. the presence of liquidity constraints). Hayashi, Ito and Slemrod (1988) investigate the effects of tax incentives and down-payment requirements on a household's tenure choice and on saving behavior in the U.S.A. and Japan by simulation methods. The result is that these factors do not offer a complete explanation of the large gap between the saving rates of the two countries largely because of institutional differences in the typical

down-payment ratio and tax incentives.

2. The Data

Several large-sample micro-surveys concerning Japanese household behavior are conducted regularly by the government¹. Detailed comparisons of the NSFIE with other data sources in Takayama *et al.* (1989, chapter 3) indicate that the NSFIE captures a fairly accurate and unbiased picture of the household behavior in Japan and thus the NSFIE is one of the most reliable sources of information (though we admit that it contains possible reporting errors). For this reason, throughout this paper, the NSFIE is used to identify household behavior in Japan. In addition, fortunately we are able to use four different NSFIE data points in time, i.e., the 1979, 1984, 1989 and 1994 surveys. Although these are not panel data, intertemporal comparisons among four data points in time can be made to approximate actual life cycle behavior².

¹ For details, see Takayama and Kitamura (1994, section 3.2). The major surveys include the Family Income and Expenditure Survey (Designated Statistics No.56), the Family Saving Survey (Approved Statistical Report), the National Survey of Family Income and Expenditure (Designated Statistics No.97), the Basic Survey of Japanese Living Conditions (Designated Statistics, No.116) and the Survey on Time Use and Leisure Activities (Designated Statistics, No.114).

² The statistical surveys by the government are published regularly in highly summarized forms. Although these summaries contain valuable information and are accessible by everyone, detailed data

Since 1959, the NSFIE has been conducted every five years to reveal levels of income, consumption and household assets, their structure and distribution, as well as the differences among regions. All these analyses are performed through the investigation of two key areas: family income and expenditure, and assets and liabilities in Japanese households. This survey is designed to sample over 50,000 households (53,000 in 1979, 54,000 in 1984, 59,100 in 1989, and 56,000 in 1994). Survey items include (1) family income and expenditure, (2) annual income, financial assets and liabilities, (3) major durable goods, and (4) attributes of households and their members, including housing conditions.

With a large sample size and wide coverage in items, the NSFIE is a treasure trove of information. It enables researchers to make detailed analyses according to various household characteristics³.

We need to explain briefly how we construct our final data set.
First, we eliminate two large categories from the original sample over 50,000; agricultural households and a single member household (about 4,900).

analysis can not be made without using the original micro data tapes. According to laws governing the use of these statistics, researchers must apply to use these original tapes and give sound reasons. Only after obtaining permission from the government can researchers use the data tapes in which individual identities are carefully disguised.

³ For details of the NSFIE, see Hayashi, Ando and Feris (1988).

Second, if some relevant data such as yearly income, savings, financial assets, housing assets, home ownership, durable assets are missing, these households are eliminated from the sample.

Third, we also drop the households whose yearly incomes exceed 4 times of standard deviation of the income distribution of the whole sample from its mean.

Fourth, if information on debt outstanding and golf club membership certificates are missing, we put zero-value on such items.

Fifth, employee's households include (1) regular laborers, (2) private office workers, (3) public office workers, and (4) corporate administrators. The rests are considered as self-employed households.

Sixth, the definitions of disposable income and consumption in the system of national accounts differ from those of the NSFIE in the treatment of imputed rents from housing and depreciation of housing structures. It will be useful to list characteristic features and shortfalls of the disposable income concept used in this paper. These are as follows:

(1) Remittances to other family members or relatives are treated as part of "other consumption expenditures". On the other hand, remittances from relatives are counted as a source of yearly income of receiving households. Intergenerational transfers within

extended families are not reported separately and counted in consumption expenditures.

(2) Medical benefits in kind are excluded.

(3) Imputed rent from housing is excluded from income.

(4) The flow of services from consumer durable is not reported. Expenditure on consumer durables is counted as consumption.

(5) Capital gains or losses on stocks, equity in one's own home and equity in consumer durable are not included.

(6) The annual tax burden is not reported. Income and resident taxes are to be estimated. Annual social security contributions are also not reported in the NSFIE, while annual social security benefits are reported.

(7) Interest on loans is included in income and is also treated as part of non-consumption expenditures.

(8) Interest and dividends are underreported⁴.

The most discussed data problem with the NSFIE is the sample selection bias with old households. The problem goes as follows. Because of the prevalence of the

⁴ Around 70 percent of households in the NSFIE don't report any amount of interest or dividends. With such a low awareness of capital income, the value of real interest income seems to be hardly recognized by households.

extended family for example, in 1994, 17.5% of all households were extended family (i.e. the heads of households are the younger members of the families) and 30.6% of all households have household members aged above 65⁵. The existence of extended families implies that there are two categories of older people: those still maintaining an independent household (i.e. the independent old) and those living with children (i.e. the dependent old). Wealth and flow of savings for the dependent old cannot be observed directly because of no breakdown among family members in the NSFIE. When the true age profile of saving behavior is to be identified, we have to extract savings and wealth of dependent old from the extended families and add them to those of the independent old. As the economic status of the independent old is substantially better than that of the dependent old, the old age saving behavior would have a self-selection bias if we do not make such adjustments. Hayashi, Ando and Ferris (1988) suggests a method of removing this bias by comparing nuclear families and extended families whose younger generation is similarly aged. We find however that this method needs to be refined due to insufficient control of household characteristics to carry out

⁵ This implies that 13.1% of the elderly live their own and this trend has been increasing over time. Sooner or later, of all people age above 65, more than half of them live independently from their children, given a rapid urbanization and generous social security benefits.

statistical matching between nuclear and extended families⁶. Takayama and Kitamura (1994) provide a complementary estimation method of intergenerational transfers to Hayashi, Ando and Ferris (1988).

It is quite important to adjust this sample selection bias, if the main research issues are concerned with the saving and wealth accumulation behavior of the old households or intergenerational transfers from the old to the young households.

We decide not to adjust our data based on two reasons. First, we find ample evidences of rapidly decreasing number of extended families, thus, it may be quite misleading to excessively stress the importance of extended family in Japan. Second, this paper is not directly concerned with the old households as it were, but with the entire household saving behavior in Japan.

In the following, we would like to explain our definitions of variables in the NSFIE data⁷.

⁶ For example, the extended families are prevalent in self-employed households living in the rural areas, while the nuclear families are prevalent in employees' households living in the big cities. A simple comparison between the two only adjusting age cohorts is quite misleading, because this comparison may reflect differences in region, occupation, and social values.

⁷ For those who want to convert yen into Euro values, the following two steps can be used. (1) To convert nominal values into the 1998 real values in yen, use Consumer Price Index (CPI) by setting 1998 =100, 1979=69.96, 1984=83.72, 1989=88.57, 1994=97.38 and 2000=98.35. (2) To exchange yen with

2.1. Disposable Income

In the NSFIE, gross yearly income (all household members) includes wages and salaries, income through business and work at home, returns from assets, social security benefits, donations, and consumption in kind. The amount left over after deducting non-consumption expenditures such as taxes and social security contributions is disposable income. After subtracting consumption expenditures from disposable income, we obtain savings on the flow base.

Taxes and social security contribution on annual base are not available in the NSFIE. We need to estimate these items for individual households by adjusting with household characteristics such as yearly income, family composition, age, employment-status. We consider only two types of taxes, income tax and inhabitant tax and two types of social security contributions, public pension contribution and social health insurance contribution (c.f. employment insurance tax is negligible, as it is lower than 0.4%).

Definition of disposable income is given as follows (see Table 1).

$$\text{Disposable Income} = \text{Yearly Income} - \text{Tax and Social Security Contribution} \quad (1)$$

Euro, use the market exchange rate in 1998, 1Euro=159.57yen.

2.2. Consumption Expenditure

The NSFIE definition of consumption expenditure includes medical expenditures in cash and purchases of consumer durables. Remittances to other family members and intergenerational transfers in the form of gifts are also included.

In the NSFIE, monthly average household income and expenditure are obtained only for three months, i.e. September through November. It is necessary to convert monthly data to yearly data. In so doing, seasonal adjustment ratios for 10 major expenditure items are calculated to obtain an annual conversion factor (see Tables 2-3).

For example, yearly consumption for 1994 is calculated as follows.

$$\text{Yearly Consumption} = 12.288947 \times (\text{Foods}) + 11.994339 \times (\text{Housing}) + 12.97166261 \times (\text{Fuel, Light & Water Charges}) + 12.34859801 \times (\text{Housing Furniture & Household Appliance}) + 13.46894251 \times (\text{Clothes and Footwear}) + 12.311852 \times (\text{Medical Care}) + 11.847619 \times (\text{Transportation & Communication}) + 12.192596 \times (\text{Education}) + 13.340823 \times (\text{Recreation}) + 12.973387 \times (\text{Others}) \quad (2)$$

2.3. Saving Flows

After subtracting consumption expenditures from disposable income, we obtain savings on the flow base (see Tables 4-5).

$$\text{Saving Flows} = \text{Disposable Income} - \text{Yearly Consumption} \quad (3)$$

Saving rate is defined as the ratio between saving flows and disposable income (see Table 6).

$$\text{Saving Rate} = \text{Saving Flows} / \text{Disposable Income} \quad (4)$$

When we calculate the saving rates for different age group, income class, home ownership (see Table 7), and employment status, we use the following definition for the mean saving rate (see Table 8-13).

$$\text{Mean Saving Rate for Group } i = \sum_i (\text{Saving Flow}) / \sum_i (\text{Disposable Income}) \quad (5)$$

If the distributions of disposable income and saving flow are skewed, the mean and median saving rates would differ. We use the following definition for the median saving rate.

$$\text{Median Saving Rate for Group } i = (\text{median saving in } i) / (\text{median disposable income in } i) \quad (6)$$

2.4. Net Worth

Net worth is calculated as a sum of net financial assets, net housing assets, and consumer durables (i.e., total durables minus golf club membership certificates) (see Table 14-16).

$$\text{Net Financial Assets} = \text{Financial Assets} - (\text{Total Debt} - \text{Debt for Housing Assets}) \quad (7)$$

$$\text{Net Housing Assets} = \text{Housing Assets} - \text{Debt for Housing Assets} \quad (8)$$

Where housing assets include only the primary house, excluding the other houses such as summerhouses.

$$\text{Net Worth} = \text{Financial Assets} - \text{Total Debt} + \text{Housing Assets} + (\text{Durables} - \text{Golf Club Membership Certificates}) \quad (9)$$

It is worth noting that the NSFIE reports much lower per-household financial assets than do the Flow of Funds Accounts (FFA) and the Annual Report on National

Accounts (SNA). In 1984, the FFA estimated 10.35 million yen on average, and the SNA 8.8 million yen, while the NSFIE reported 6.2 million yen. In 1989, the FFA reported 16.45 million yen, the SNA 16.90 million yen, and the NSFIE 10.30 million yen. The gap between the FFA and the SNA is relatively small (i.e., SNA/FFA was 0.850 in 1984 and 1.027 in 1989), compared with that between the NSFIE and the FFA (or between the NSFIE and the SNA) (i.e., NSFIE/FFA was 0.600 in 1984 and 0.626 in 1989; NSFIE/SNA was 0.705 in 1984 and 0.609 in 1989). These facts imply that, although the gap between the SNA and the FFA (less than 15 percent) can be explained in terms of differences in statistical coverage (e.g., private non-profit institutions and health insurance funds are included in the FFA but not in the SNA), the approximately 40 percent difference between the NSFIE and the FFA (or between the NSFIE and the SNA) must go beyond the usual explanations of differences in statistical coverage and reporting months. Three explanations can be made: First, as was discussed above, there exists a sample selection bias due to refusals among wealthier households to participate in the survey. Consequently, the mean asset holdings in the NSFIE are lower than in the SNA or the FFA. Second, the difference may be affected by underreporting by self-employed households. Although both the NSFIE and the FFA (and the SNA) include self-employed households, those in the NSFIE seem to report

financial assets only for personal use and exclude those for business purposes. Third, it should be noted that the SNA data are constructed from value added in the production sector and that, with the commodity flow method, the household sector is treated as a residual. Thus, in general, household sector accounts (e.g., savings) are subject to statistical (measurement) errors⁸.

3. Age Profile of Savings

The age-income, the age-consumption and the age-saving profiles are shown in Figures 1, 2 and 3 respectively. Disposable income, consumption expenditure, and saving increase its nominal values in all age-profiles over time. As before, the age-income, the age-consumption, and the age-saving profiles are hump-shaped, reaching its peaks at ages 50-54.

To put these data together, the age-saving rate profile is shown in Figure 4. The saving rates over life-cycle follow, more or less, the same pattern over time, i.e. the saving rate as a whole keeps rising over the age-profile. Figure 5 shows an alternative age-saving rate profile for the median household. Compared with Figure 4, the pattern

⁸ A statistical error could occur when inventories of consumer goods pile up or when these are

is almost identical until age 55-59. After age 60, the saving rates of the median household go down steadily.

As far as flow data in Figures 1-4 are concerned, no strong signs of behavioral change after the burst of the bubble economy in the early 1990s is found. In retrospect, economic recession did not penetrate enough into the daily life of the households in 1994. The worse came later in 1997-98 when a series of large bankruptcies occurred in various industries. We have to wait the 1999 NSFIE to examine the impacts of economic recession in 1997-98.

4. Saving Rates by Income Class

The average saving rates in all households by quartile income class are shown in Table 6 and Figures 6-9. Throughout the sample period, the poorest quarter of the households (I) experiences negative saving rates usually in their 60s of age and after, while the other quarters of the households (II-IV) keep positive saving rates steadily over life-cycle.

To be more precise, for the second and third quarters of households (II-III), the

increasingly consumed by other sectors of the economy (e.g., the corporate sector).

age profiles of saving rates are, more or less, hump-shape over the age-profile. For the richest quarter (IV), the age profile of saving rates is somewhat different from those of the other quarters. It keeps rising and ends with a very high rate (easily above 40%) over age 80.

The acquisition of a house is probably the most significant consumption decision each household makes over the life cycle. Therefore, saving behavior is quite likely to be affected by the housing purchase decision (see Hayashi, Ito and Slemrod (1988)). Table 7 presents the age-profile of the home-ownership rate. Regardless of the survey years, the rate starts rising at around ages 30-34 and reaches a steady-state level (i.e. about 90%) at ages 55-59, just before retirement. This steady-state level seems quite high by international standards.

Table 8 presents the saving rates of households that own their homes. This table shows that it is income class that mainly differentiates saving rates. Home-owning households with little, if any, saving motivation for housing purchase keep high savings, except for the very poor elderly households.

Table 9 shows the saving rates of tenant households are, in general, lower than those of home-owning households. It is the poorest quarter (I) that dissaves throughout the age-profile.

The general pictures in Table 10 of households with a working head overlap with those in Table 6. Table 11 shows that the saving rate goes down substantially when the household head is not working. Only the richest quarter (IV) has positive saving rates throughout the age-profile.

Tables 12-13 compare the saving rates between employee and self-employed households. In general, the saving rates of poorer quarters (I-III) are higher in the employee households, while those of the richest quarter (IV) are higher in the self-employed households. Income flows of the employee households remain stable over the age-profile and thus income distribution among them is more equal than that among the self-employed households.

5. Cohort Analysis

The mean saving rates by cohort are shown in Figure 10, constructed from Table 6. A general pattern of the saving rates remains the same as in Figure 4, that is, even the elderly households keep saving at a substantial margin.

Figure 11 shows the median saving rates by cohort. A general pattern of the saving rates remains the same as in Figure 5, that is, the households after age 60 reduce

their saving rates steadily.

Among many cohorts, the baby boomer cohort (birth year 1945-49)⁹ deserves a special attention because it comprises the largest demographic cohort. As Figure 10 shows, the baby boomer cohort in their 40s reduces their saving rates from 1989 to 1994, while most neighboring cohorts raised their saving rates in 1994. Kitamura, Takayama and Arita (2001) conducted analysis of variance (ANOVA) for this cohort data and found a statistical evidence that the baby-boomer generation indeed started behaving differently as early as in their 40s in 1989.

Why this happened? As the hump shapes are observed in Figures 1-2, both the disposable income and consumption reach its peaks around the mid 50s of age, with accelerating increases in consumption expenditure in the 40s of age. The baby boomer cohort happened to be their 40s in 1994. As discussed before, consumption expenditure increases steadily from 1989 to 1994, and especially so for the baby boomer cohort. That results in a drop in saving rates. It is noteworthy that in the U.S.A., the unprecedented economic boom in the 1990s has enabled the boomer generation to accumulate their wealth (see Sterling and Waite (1998)) in the forms of

⁹ We have to be careful about the conceptual differences of the baby-boomer generations in the U.S.A. and in Japan. In the U.S.A., the baby-boomer includes those who were born from 1946 to 1968, while in Japan, it usually includes only those who were born from 1947 to 1949.

real estate, pension funds, and stocks. Conversely, the protracted Japanese economic recession in the 1990s has made very little room for the baby-boomers to accumulate their wealth for after-retirement by themselves and through firms' retirement severance pay funds.

Generational accounting results from Japan (see Takayama, Kitamura and Yoshida (1999) and Takayama and Kitamura (1999)) also indicate that we cannot afford to provide generous public pension benefits to the boomer cohort and that further public pension reforms would be inevitable, if the public pension scheme is to be kept running.

6. Age-Wealth Profile

Net worth (financial and housing assets) increases over all the age-profile without a substantial decrease after retirement (see Figures 12-14). With a closer scrutiny, however, net housing assets in 1994 became slightly lower for the younger households than those in 1989. It means that the younger households could not purchase the housing assets in 1994 as much as those in 1989. Net financial assets, on the other hand, are higher than those in the previous period. As housing assets accounted for 66% of total net worth in 1994 (see Tables 14-16), over all net worth in 1994 remains

the same as in 1989. It should be noted, therefore, that as far as the household worth is concerned, net worth does not drop even after the burst of the bubble in the early 1990s¹⁰.

Wealth distribution became unequal in the 1990s. In particular, net worth holdings became increasingly distorted between home owners and tenants (see Table 14).

Figures 15-16 indicate net worth and net financial assets held by cohorts over the period of 1979-1994. Net worth increases substantially in the bubble period (i.e. 1984-1989). It is surprising to find that net financial assets increase even after the collapse of the stock market in Japan. Net financial assets reach its peak at ages 60-64 because of lump-sum retirement severance payments at around age 60. As Takayama and Kitamura (1994) show, intergenerational transfers might be made from the elderly cohorts to the younger cohorts. However, from the net worth and financial assets holding by cohorts in Figures 15-16, no strong evidence of transfers can be observed, in particular, for the baby boomer cohorts to receive.

¹⁰ This is partly because the officially evaluated land prices (koji-chi-ka) in 1994 do not reflect fully a

7. Wealth Distribution

So far, we observe household savings and wealth holdings over the age profile. In this section, we add another dimension of income and wealth distribution over the age profile.

Table 17 shows the percentage of negative savers by income class over the age profile in 1994. This table confirms our earlier finding that within variation of percentage of negative savers in the same income class is smaller than between variation of different income classes and that variation of negative savers in the same age profile is much larger than that in the same income class. In short, it is income distribution that determines mostly the saving behavior. Tables 18-19 examines the same aspect from a slightly different perspective (namely counting the number of households holding financial assets less than 3 million yen in 1994).

Tables 20-22 indicates wealth distribution over its own decile or over income decile. Table 20 reveals that distributions of net worth and financial assets are equally skewed. Comparing Tables 21 and 22, wealth distribution over own dicile is much skewed than that over income decile. It reveals implicitly that wealth is much unevenly distributed than income. To confirm this conjecture, the Gini coefficient of

sharp drop in market land prices after the burst of the bubble economy.

income distribution in Japan has been the range of 0.3-0.4 in 1979-1994 while the Gini coefficient of *net worth* was 0.519 in 1984 and 0.562 in 1994.

Table 23 and its graphical expressions of Figures 17-18 reveal a three dimensional picture of wealth distribution. These pictures show variance of wealth distribution within the same income decile is larger than that within the same wealth decile. This implies those who belong to a lower income decile might have a substantially large amount of wealth while those who belong to a lower wealth decile is less likely to earn a substantially high income. In other words, it may be misleading to observe wealth distribution over income decile because income is not a good indicator of wealth holding.

Takayama (1992a) reports the decomposition of net worth distribution by means of decomposable measure of inequality for the 1984 NSFIE. He uses so called the Toyoda Measure of Inequality (see Toyoda (1980)) that is essentially based on the analysis of variance (ANOVA)¹¹. By construction, the Toyoda measure T is decomposable such that,

¹¹ More precisely, Toyoda measure T is defined as $T = (\sigma / \mu)^2 / 2 = \sigma^2 / (2\mu^2)$, where σ = standard deviation of the sample, μ = mean of the sample, σ / μ is the coefficient of variation, and σ^2 = variance of the sample.

$$T = T_b + \sum w_j T_w(j) \quad (10)$$

where T_b = the Toyoda measure between group, $T_w(j)$ = the Toyoda measure within group, $w(j)$ = a weight = the net worth share of each group in total net worth.

Table 24 reports the results. Takayama decomposes net worth distribution over home ownership, age profile, region, employment status, and income class for the 1984 NSFIE. Home ownership explains 12.2% of overall wealth inequality. Age profile, region, employment status explain as little as 2-8%. Income class, here again, plays the major role in explaining the wealth inequality by 15.9%. Nevertheless, the Toyoda measure shows that within group variance easily exceeds between group variance.

Table 25 replicates the same approach to the 1994 NSFIE. The general pattern remains the same as that in 1984, namely homeownership, age profile, region, employment status, and income class explain as little as 1.5-8.4% of overall inequality. In other words, the Toyoda measure shows that within group variance exceeds between group variance. However, note that, in 1994, within group variances became larger than those in 1984.

Take age profile, within group variances for the younger cohorts became two to

three times larger than before. It also implies that intra-generational inequality gets more relevant than intergenerational inequality. It is noteworthy that within group variance for the baby boomer cohort was much smaller than that for the neighbor cohorts in 1994.

8. Construction of Social Security Wealth

Another important issue in household saving is to identify whether or not the social security system affects household saving. This question was originally raised by Feldstein (1974) and extended by many authors. In case of Japan, Takayama (1992a,b) conducted an econometric estimation of consumption expenditure, using the present value of public pension benefits (GSSW) as one of the explanatory variables in the 1979 and 1984 NSFIE. Estimated values of the parameter for GSSW are significantly positive. For workers' households, the figures are about 1.2% in 1979 and 2.4% in 1984, implying that the presence of social security wealth caused annual consumption expenditure to increase 1.2% and 2.4% of GSSW in 1979 and 1984 respectively.

The model can be refined by allowing the effect of human capital variables to vary by age. The presence of social security wealth is estimated to increase 1984

consumption expenditures of workers' households by about 1.5% of GSSW. This increase in consumption expenditure would be equivalent to 13.9% and 12.0% of disposable income in 1979 and 1984 respectively.

The Japanese public pension program increases working households' propensity to consume, viz., the evidence confirms the hypothesis that social security wealth discourages personal savings in Japan.

Note, however, that the public pension system has been changed many times and will be reformed again and again in the future. Benefits and contributions will be more closely balanced; the social security wealth of each individual will also be reduced in the near future by raising the normal retirement age to 65 or more and by decreasing real levels of monthly benefits. The future prospects of these reforms might have encouraged household savings¹².

According to our framework, the following identity is defined.

$$\begin{aligned} \text{Income} - (\text{tax and social security contributions}) &= \text{disposable income} \\ &= \text{consumption and savings} \end{aligned} \quad (11)$$

¹² Although we have not conducted a similar econometric analysis using the 1989 and 1994 NSFIE, high saving rates among those aged above 55, might be evidence of precautionary savings due to uncertainty in the public pension system. See Takayama (2001) for the latest public pension reform.

Social security contributions are further divided into public pension contributions and health insurance. Let us define discretionary savings as savings in the RHS of eq. (11) and mandatory savings as (public pension contributions – public pension benefits + contributions to the severance pay fund + interests from social security wealth + interests from accumulated severance pay). For statistical simplicity, here we take mandatory savings simply as public pension contributions minus public pension benefits (i.e. net public pension contributions), and ignore contributions to the severance pay fund, interests from social security wealth, and interests from accumulated severance pay. Then, it is obvious from construction of eq.(11) that discretionary savings are negatively correlated with mandatory savings. In addition, we calculate the crude ratio between mandatory savings and discretionary savings for different age groups. The results are given in Table 26.

It is apparent that the ratio becomes significantly negative for those aged above 60, i.e. cohorts 1-3. Cohort 1 in 1994 shows a substantially high positive value, which is because saving itself is negative, so that the ratio becomes positive. There is no surprise in the fact that cohort 1 in 1994 receives rather large net benefits. That is, mandatory savings do matter with the old households. The ratio becomes negative in

overall average in 1989 and 1994. This implies that the balance of public pension system as a whole becomes negative.

In the near future, generous public pension benefits in Japan are to be reduced, while the contribution rate may be permanently frozen at the current level or be reduced through a partial shift of funding to a consumption-based tax. At the same time, we should encourage private initiatives including a private, personal saving account for retirement, through the use of powerful tax-incentives¹³.

To construct social security wealth (SSW) as a measure for mandatory savings, we need to use the baseline equation as follows,

$$SSW_{t+1} = (1 + \rho)SSW_t + \tau_t - b_t \quad (12)$$

where SSW = social security wealth, ρ = internal rate of return, τ_t = public pension contribution, b_t = public pension benefits.

First, the stream of public pension contributions can be calculated from age-income profile multiplied by historical public pension contribution rates over the period of 1960-1999. Second, the stream of public pension benefits is to be adjusted

¹³ A Japanese version of 401k plan started in October 2001. See Takayama (2001).

annually with inflation and is added up to the average life expectancy (from 2000 to 2022). Third, we have to set $SSW_{t+R} = 0$ such that the internal rate of return equates two streams; public pension contributions and benefits under the Pay-As-You-Go system. At the age of retirement, 60 in year 2000, SSW in Japan is estimated to equal 34.21million yen (218 thousand Euro (1998 constant) as 1 Euro = 159.57 yen in 1998) and the nominal internal rate of return is 8.7% per year.

Given the average net financial assets (excluding SSW) for age 60-64 in 1994 was 20.42 million yen (131 thousand Euro (1998 constant)), the estimated SSW 34.21 million (218 thousand Euro (1998 constant)) is very large indeed, although the actual SSW is expected to be even larger than the estimated SSW.

As is obvious, the SSW includes a component of intergenerational transfers. If we assume that the market rate of return from investment was 5.5% in nominal terms per annum, and that the discount rate for the future SSW will be 4.0%, then, the estimated SSW will go up to 50.92 million yen (324 thousand Euro (1998 constant)). This figure is rather common to the Japanese. Consequently, the component of intergenerational transfers in the SSW will turn out to be as much as 29.13 million yen (185.6 thousand Euro (1998 constant)), in this case (see Figure. 19).

9. Conclusion

This paper confirms that most findings in Takayama and Kitamura (1994) are still valid.

These include (1) variations in saving behavior across different income classes are much wider than those over the age profile within the same income class, (2) as income grows and wealth accumulation increases, richer households save at increasingly high rates over the age profile, (3) diversity of saving behavior among elderly households is much greater than among younger households, as their employment status, home ownership, and financial asset holdings differ substantially. The richer elderly households keep saving at significantly positive rates.

In this sense, the bottom line of the household saving behavior remains the same after the burst of the bubble economy in the early 1990s.

Our new findings are as follows. (1) The cohort analysis indicates that the saving behavior follows, more or less, the same pattern of that of cross section observations in respective years. The saving rates of younger cohorts are stable, but this dose not imply homogeneity of younger cohorts, but the degree of heterogeneity is more or less the same amongst the younger cohorts. (2) However, according to the 1989 and 1994 NSFIE, The baby-boomer cohort (age 40-44 in 1989 and 45-49 in 1994)

has deviated from other younger cohorts. This phenomenon did not exist in the 1984 NSFIE when the baby-boomer cohort was age 35-39. (3) Estimated social security wealth (*SSW*) under the Japanese environment, is as much as 50.92 million yen (324 thousand Euro) at the age of retirement. The share of intergenerational transfers in the *SSW* is also very large.

The first point may be explained by the fact that increase in heterogeneity after age 55 (especially after 60) is mostly due to differences in lump-sum retirement severance payments or social security wealth. Variability of these benefits is much wider than that of regular monthly salaries as the firms' economic performances, welfare plans for retirement severance pay funds, and unions' bargaining powers differ substantially among firms and organizations.

The second point is important because the baby-boomer cohort consists of the largest demographic group. Hence, their behavior significantly affects macroeconomic variables such as aggregate consumption, investment and income distribution.

This leads to the third point. When the baby-boomer generation reaches their late 50s and early 60s, variability of retirement severance payments, of social security wealth and of intergenerational transfers will be much wider than now. Intergenerational equity issue will inevitably be focused on the baby-boomer generation.

It is quite crucial to set up institutional arrangements concerning intergenerational equity (e.g. public and private pension schemes) before the baby-boomer generation reaches their retirement age. This task is left to our future research project.

References

- Barthold, T. and Ito, T.(1991) “Bequest taxes and accumulation of household wealth: U.S.-Japan comparison”, in Ito, T. and Kruger, A.(eds) *The Political Economy of Tax Reform*, Chicago: The University of Chicago Press, pp. 235-90.
- Feldstein, M.(1974) “Social Security, Induced Retirement and Aggregate Capital Accumulation”, *Journal of Political Economy*, 82(5), pp.905-26.
- Hayashi, F.(1997) *Understanding Saving*, Cambridge: The MIT Press.
- Hayashi, F., Ando, A. and Ferris, R.(1988) “Life cycle and bequest savings: A study of Japanese and U.S. households based on data from the 1984 NSFIE and the 1983 Survey of Consumer Finance”, *Journal of the Japanese and International Economies*, 2, pp.450-91.
- Hayashi, F., Ito, T., and Slemrod, J. (1988) “Housing finance imperfections, taxation, and private saving: A comparative simulation analysis of the United States and Japan”, *Journal of the Japanese and International Economies*, 2, pp.215-38.
- Horioka, C.Y.(1990) “Why is Japan’s saving so high? A literature survey”, *Journal of the Japanese and International Economies*, 4, pp.49-92.
- Horioka, C.Y.(1993) “Savings in Japan”, in Heertje, A.(ed) *World Savings: An International survey*, Oxford: Blackwell.
- Horioka, C.Y. and Watanabe, W.(1997) “Why do people save? A micro-analysis of motives for household saving in Japan”, *Economic Journal*, 107, pp.537-552.
- Kitamura, Y., Takayama, N. and Arita, F. (2001) “Household savings in Japan revisited”, *Research in Economics*, 55(2), pp.135-153.
- Ohtake, F.(1991) “Bequest motives of aged households in Japan”, *Ricerche Economiche*, 45(2/3), pp.283-306.
- Ohtake, F. and Horioka, C.Y.(forthcoming) “Saving motives in Japan”, in Ishikawa, T.(ed) *The Distribution of Income and Wealth in Japan*, Oxford: Oxford University Press.
- Sterling, W. and Waite, S.(1998) *Boomerconomics*, New York: Balantine Books.
- Takayama, N. (ed)(1992a) *The Stock Economy* (in Japanese), Tokyo: Toyo-Keizai.
- Takayama, N. (1992b) *The Greying of Japan: An Economic Perspective on Public Pensions*, Tokyo: Kinokuniya and Oxford: Oxford University Press.
- Takayama, N. (1998) *The Morning After in Japan: Its Declining Population, Too Generous Pensions and a Weakened Economy*, Tokyo: Maruzen.
- Takayama, N. (2000) “An Outline of the Defined-contribution Pension Plan: Japan’s Version of the 401(k) Plan”, *JETRO Investment News*, no.21., available on the

website (<http://www.ier.hit-u.ac.jp/~takayama.index.html>).

Takayama, N. (2001) “Pension Reform in Japan at turn of the century”, *Geneva Papers on Risk and Insurance*, October 2001.

Takayama, N., Funaoka, F., Otake, F., Sekiguchi, M. and Shibuya, T.(1989) “Household Assets and The Saving Rate in Japan”, *Keizai Bunseki*, no.116 (in Japanese).

Takayama, N. and Kitamura,Y. (1994) ‘Household Saving Behavior in Japan”, in Poterba, J.M.(ed) *International Comparisons of Household Saving*, Chicago: The University of Chicago Press. pp. 125-167.

Takayama, N., Kitamura, Y. and Yoshida, H. (1999) “Generational Accounting in Japan”, in Auerbach, Alan J., Kotlikoff, Laurence J. and Leibfritz, Willi. (eds) *Generational Accounting Around The World*, Chicago: The University of Chicago Press. pp. 447-469.

Takayama, N. and Kitamura, Y. (1999) “Lessons from Generational Accounting in Japan”, *American Economic Review*, 89 (2), pp.171-175.

Toyoda, K.(1980) “Decomposability of Inequality Measures”, *Economic Studies Quarterly*, 31(3), pp. 207-216.