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Role of public and private pension benefits in financing elderly household consumption

—Comparison of OECD countries

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1——Introduction： Aging and its implications for the pension system

Due to rising life expectancy and declining fertility, aging is now a global phenomenon. The trend is particularly pronounced in developed countries as a whole, where the population aged 60 and over has already surpassed the young population under 15. According to a report by the U.N. entitled "World Population Prospects 2008 Revision," the former is expected to become twice the size of the latter by 2050. Japan is the first advanced country to begin decreasing in total population, and its proportion of elderly persons aged 65 and over is the world's highest, reaching 22.6% as of 2010. As shown in Table-1, the speed of aging is surprisingly rapid. Until the mid 1980s, the proportion of elderly persons in Japan was low even among OECD countries. But the proportion subsequently shot up from 10% in 1985 at an accelerating pace, and took only 20 years to reach 20%.

Table-1: Percentage of population aged 65 and older

C.Y.	1950	1960	1970	1980	1985	1990	1995	2000	2005	2006	2007	2008	2009	2010	Change from 2000 to 2010
Austria	10.4	12.2	14.0	15.4	14.2	14.9	15.1	15.5	16.2	16.5	16.7	17.0	17.3	17.6	2.1
Canada	7.7	7.5	7.9	9.4	10.3	11.3	12.0	12.6	13.1	13.3	13.4	13.6	13.8	14.1	1.5
Denmark	9.1	10.6	12.3	14.4	15.1	15.6	15.3	14.8	15.1	15.3	15.6	15.9	16.3	16.7	1.9
Finland	6.7	7.2	9.2	12.0	12.5	13.4	14.2	14.9	16.0	16.1	16.3	16.5	16.8	17.2	2.3
France	11.4	11.7	12.9	14.0	13.1	14.2	15.4	16.1	16.5	16.5	16.5	16.6	16.7	17.0	0.8
Germany	9.7	11.5	13.7	15.6	14.6	15.0	15.4	16.4	18.9	19.3	19.7	20.0	20.2	20.5	4.1
Italy	8.1	9.6	11.2	13.5	13.3	15.2	17.0	18.4	19.6	19.8	20.0	20.1	20.2	20.4	2.0
Japan	4.9	5.7	7.0	9.1	10.2	12.0	14.4	17.2	19.9	20.4	20.9	21.4	22.0	22.6	5.3
Norway	9.7	11.1	12.9	14.8	15.7	16.3	15.9	15.0	14.5	14.5	14.6	14.6	14.8	15.0	0.0
Sweden	10.3	12.0	13.7	16.3	17.9	17.8	17.5	17.2	17.2	17.3	17.5	17.7	18.0	18.3	1.1
Switzerland	9.5	10.2	11.4	13.8	14.1	14.6	14.8	15.4	16.0	16.2	16.4	16.7	17.0	17.3	1.9
United Kingdom	10.7	11.7	13.0	14.9	15.2	15.7	15.9	15.9	16.1	16.2	16.2	16.3	16.4	16.6	0.7
USA	8.3	9.2	9.8	11.2	11.8	12.3	12.5	12.4	12.4	12.4	12.5	12.6	12.8	13.0	0.6
EU15	9.4	10.6	12.3	14.0	13.7	14.7	15.6	16.4	17.3	17.5	17.6	17.8	18.0	18.2	1.8
OECD30	7.7	8.5	9.6	10.8	10.9	11.6	12.4	13.1	13.8	14.0	14.1	14.3	14.5	14.7	1.6

Source: UN, W*orld Population Prospects 2008 Revision*

Demographic changes inevitably affect the social security system. Unless the public pension

system is fully funded, benefits for retired generations will be mainly financed by contributions of working generations. As described below, the internal rate of return of such a pay-as-you-go public pension system depends on the growth rates of the working population and per capita wage.

Simple model of a pay-as-you-go public pension system

＜ Assumptions： each generation lives for two periods ＞

$C_{t,1}$：Per capita consumption of “generation t” in period t as a worker

$C_{t,2}$：Per capita consumption of “generation t” in period t+1 as a retiree

$Y_{t,1}$：Wage of “generation t” in period t as a worker

$Y_{t+1,1}$：Wage of “generation t+1” in period t+1 as a worker

⇒ $Y_{t+1,1}=(1+w)\ Y_{t,1}$ （w: growth rate of wage）

$S_{t,1}$： Per capita private savings of “generation t” in period t

$P_{t,1}$： Per capita public pension contributions of “generation t” in period t

$P_{t+1,1}$： Per capita public pension contributions of “generation t+1” in period t+1

⇒ $P_{t,1}=p\ Y_{t,1}$, $P_{t+1,1}=p\ Y_{t+1,1}$ （p: contribution rate, as percentage of wage）

$B_{t,2}$： Per capita public pension benefit of “generation t” in period t+1

L_t： Population of “generation t”

L_{t+1}： Population of “generation t+1”

⇒ $L_{t+1}=(1+n)L_t$ （n: growth rate of population ）

r： Interest rate

＜ Internal rate of return ＞

・Relations among consumption, wage, contribution and benefit of “generation t”

$C_{t,1}=Y_{t,1}-P_{t,1}-S_{t,1}$ ・・・ ①

$C_{t,2}=(1+r)S_{t,1}+B_{t,2}$ ・・・ ②

・A Condition for balanced income and expenditure of public pension system：

$L_tB_{t,2}=L_{t+1}P_{t+1,1}$ ・・・ ③

⇒ $B_{t,2}=(1+n)P_{t+1,1}=(1+n)pY_{t+1,1}=(1+n)p\ (1+w)Y_{t,1}$ ・・・ ④

Then,

・Rate of return for “generation t”：

$B_{t,2}\div P_{t,1}-1=(1+n)(1+w)-1 \fallingdotseq \mathbf{n+w}$ ・・・⑤

・Whole life budget constraint：

$C_{t,1}+C_{t,2}/(1+r)=Y_{t,1}+\{(1+n)(1+w)/(1+r)-1\}\ p\ Y_{t,1}$ ・・・ ⑥

Rapid aging can cause intergenerational conflict especially when expected net benefits from the public pension system differ significantly between retired and working generations. Table-2 shows intergenerational inequality of net benefits in the Japanese public pension system. Generations born in 1955 or earlier will receive more than they have paid in, while younger generations must pay in more than they will receive. For the sustainability of the system, it

is imperative that benefit and contribution levels be acceptable to every generation and follow appropriate standards.

Table-2: Money's worth ratio by year-of-birth cohort (after 2004 public pension reform)

Cohort by year of birth	(A) Whole life contribution paid in by employee households (married-couple)	(B) Whole life benefit paid out to employee households (married-couple)	(C) = (B) / (A)	(D) = (B) / (2A)
1935	¥ 8.3 mil.	¥ 52.0 mil.	6.27	3.13
1945	¥ 15.0 mil.	¥ 49.0 mil.	3.27	1.63
1955	¥ 25.0 mil.	¥ 55.0 mil.	2.20	1.10
1965	¥ 37.0 mil.	¥ 68.0 mil.	1.84	0.92
1975	¥ 51.0 mil.	¥ 86.0 mil.	1.69	0.84
1985	¥ 66.0 mil.	¥ 107.0 mil.	1.62	0.81
1995	¥ 83.0 mil.	¥ 133.0 mil.	1.60	0.80
2005	¥ 103.0 mil.	¥ 164.0 mil.	1.59	0.80

Notes: A, B and C are published figures; A and B show present value discounted by assumed interest rate;
A does not include contributions paid in by employers.
Source: Ministry of Health, Labour and Welfare

Stated differently, the socially acceptable level of public pension benefits for financing living expenses of older people must be consistent with what other instruments are available besides the public pension, how much working households voluntarily save for retirement including private pension[1] premium payments, and the amount of assets that retired households have for decumulation. In other words, the public pension is not expected to finance the entire consumption of retired households, because they can also choose to dissave out of privately accumulated assets, such as by receiving a private pension benefit or withdrawing deposits.

It is also important to know whether the consumption expenditure of elderly households is adequate compared to that of younger households, as well as the extent to which such consumption is financed by the public pension benefit, private pension benefit, or other dissavings. However, detailed information on amounts actually financed by the public benefit and the private benefit or other forms of dissavings is not readily available in Japan or other advanced countries.

The purpose of this report is to provide such information. First, we compare levels of benefits and fund assets of public and private pensions in Japan with those of other countries, using each country's national accounts statistics and household survey on income and expenditure. Adjustments have been made to the international data to unify statistical concepts. Then turning to Japan, we focus on the private pension benefit of retired households and amount of contributions paid to private pensions by working households, and analyze how and why these trends have changed from the past.

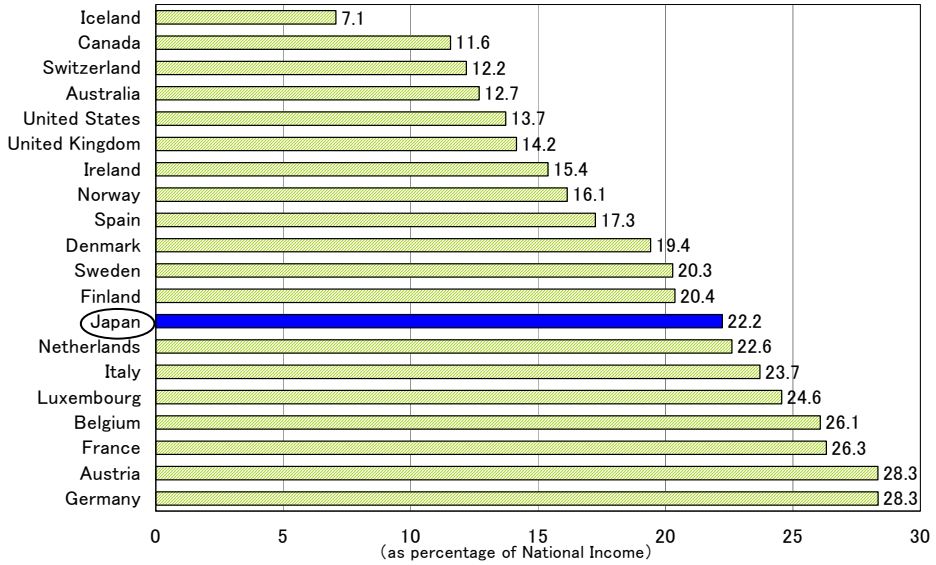
1 Private pensions include pensions for corporate employees and individuals.

2――International comparison of pension benefits and fund assets using macro level data

1｜Social security benefits and social security funds

Figure-1 shows “social security benefits by general government” in 2007 as a percentage of national income in high-income OECD countries.[2] The absolute amount of social security benefits paid by the Japanese government was 92.6 trillion yen, equivalent to 22.2% of national income. While Japan’s benefit-to-national income ratio is not low, it is below the levels of the top seven European countries such as Germany, Austria, France, Belgium, Luxembourg, Italy and Netherlands. On the other hand, the four Nordic countries (Denmark, Finland, Norway and Sweden) and Switzerland are lower than Japan.[3]

Figure-1: Social security benefits by general government in high-income OECD countries (2007)



Notes: Social security benefits by general government are defined here as “social benefits other than social transfers in kind” plus “social benefits in kind other than transfers of individual non-market goods and services” in the sector account for general government.
Sources: Cabinet Office, Government of Japan, *Annual Report on National Accounts*, OECD, *National Accounts*

The majority of assets held by "social security funds," a sub-sector of general government, are considered as the public pension fund. As shown in Figure-2, all social security fund assets at the end of 2007 were far below national income. Only Finland and Japan (73.7% and 52.7%) are over 50%, while countries with high levels of social security benefits as a percentage of national income such as Germany, Austria, Belgium and Italy are less than 10%.

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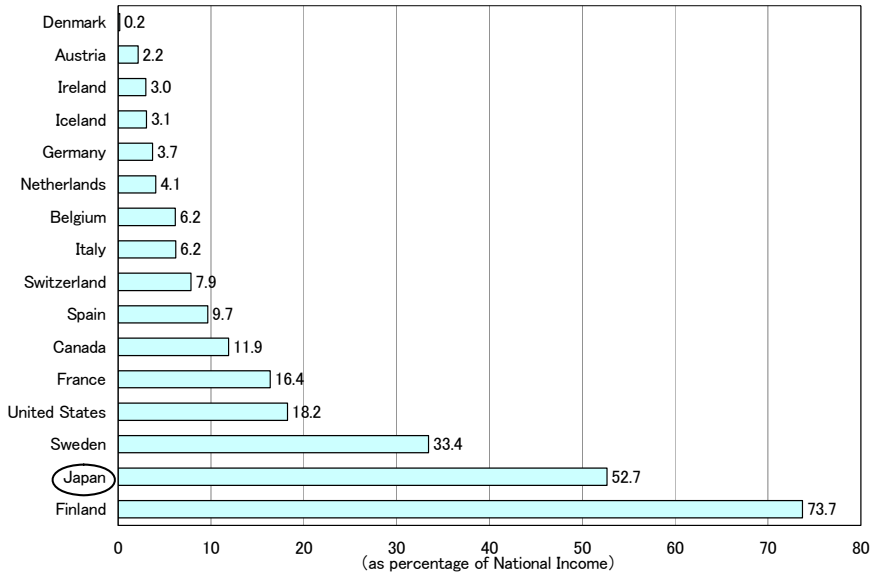
[2] “High-income countries” in this report denotes the top 20 OECD countries with similar or higher levels of GDP per capita than Japan in 2008. Japan’s GDP per capita in that year was 3.956 million yen, equivalent to 38,371 U.S. dollars, ranking 19th among the 30 OECD member countries.

[3] OECD’s well known *Social Expenditure* statistics include not only social benefits paid by governments but also non-market goods and services transferred by governments and private benefits such as corporate pension and unfunded lump-sum benefit for employees. In addition, the coverage and extent of private benefits as a portion of social expenditure varies significantly by country. *National Accounts* statistics are more appropriate for strict comparison purposes because sector coverage and statistical definitions are uniform internationally. Values of “social security benefits by general government” based on national accounts data are far below those of social expenditure data in some countries such as the Nordic countries.

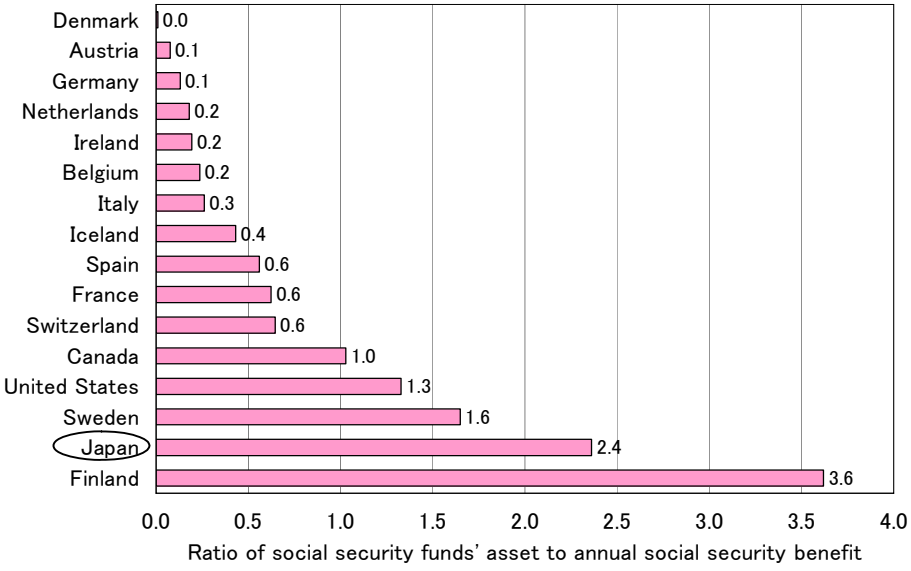
Figure-2: Financial assets of social security funds in high-income OECD countries (2007)



Note: Data is not available for Australia, Luxemburg, Norway and United Kingdom.
Sources: Cabinet Office, Government of Japan, *Annual Report on National Accounts*; OECD, *National Accounts*

Figure-3 shows the size of financial assets held by social security funds without new earnings as a ratio to annual social security benefits. Countries with a ratio greater than one are Finland (3.6), Japan (2.4), Sweden (1.6), the U.S. (1.3) and Canada (1.0). No country has fund assets exceeding four years worth of benefits. In other words, social security funds of high-income OECD countries are very small compared to the total amount of public pension benefits to be paid in the future. In Japan, since the public pension fund is legally required to reserve only one year's benefit at the end of the planning period of 100 years, future benefits need to be financed by future contributions.

Figure-3: Asset-to-benefit ratio of social security funds in high-income OECD countries (2007)



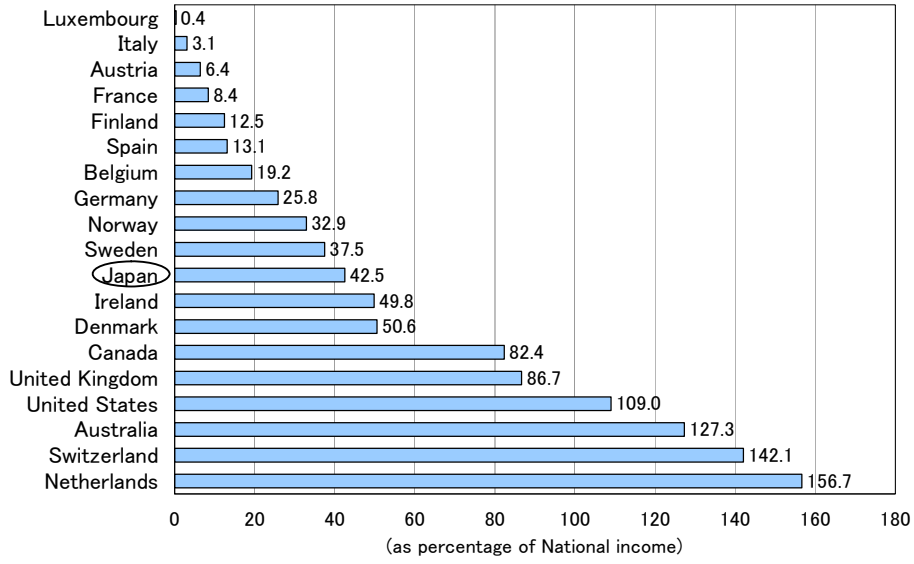
Note: Data is not available for Australia, Luxemburg, Norway and United Kingdom.
Sources: Cabinet Office, Government of Japan, *Annual Report on National Accounts*; OECD, *National Accounts*

Thus the public pension systems of high-income OECD countries can be regarded as being practically unfunded, and based on a "pay-as-you-go" method. In this sense, high levels of contributions and benefits inside the public pension system cause large intergenerational income transfers to continually arise from working generations to retired generations. Such income redistribution must inevitably requires the broad support of contributing generations. Otherwise, the public pension system will be extremely difficult to maintain.

2 | Relationship between social security benefits and private pension funds

One of the merits of private pension plans is that benefits are funded in advance. Figure-4 shows the financial assets held by both individual and corporate pension funds as a percentage of national income. The Netherlands (156.7%), Switzerland (142.1%), Australia (127.3%) and United States (109.0%) all exceed 100%, while Japan is ranked ninth out of 18 countries at 42.5%. Interestingly, the four Nordic countries and Japan are common in that they have medium levels of both social security benefits and private pension fund assets.

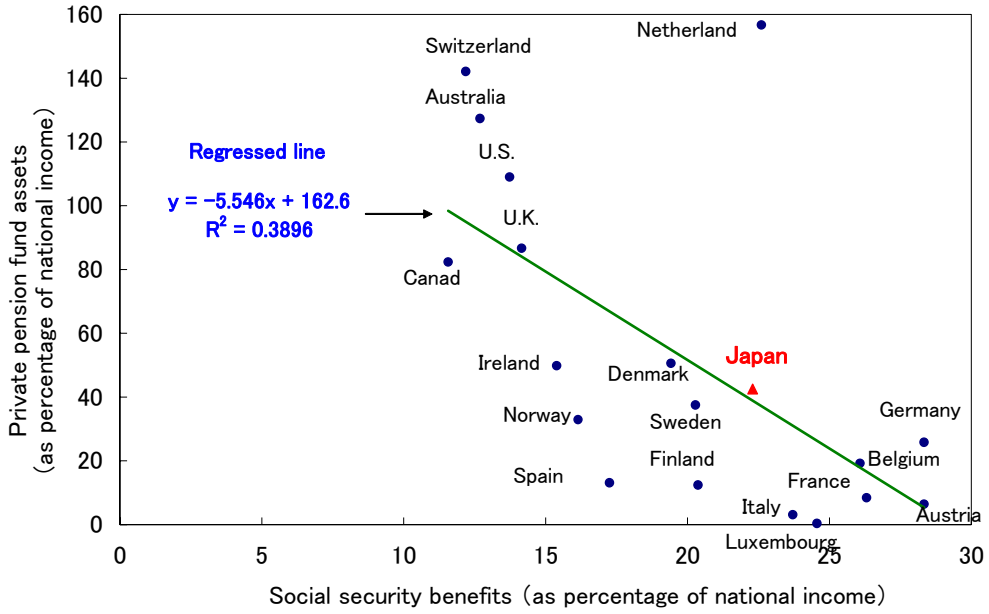
Figure-4: Financial assets of private pension funds in high-income OECD countries (2007)



Notes: 1. Private pension funds include pension funds for corporate employees and individuals.
Values comprise a portion of gross financial assets of households and non-profit institutions serving households.
2. Data is not available for Iceland.
Sources: Cabinet Office, Government of Japan, *Annual Report on National Accounts;* OECD, *National Accounts*

Figure-5 focuses on the relationship between "private pension funds assets" and "social security benefits" at the end of 2007. The negative correlation supports the view that public and private pension are substitutes, as the majority of social security benefits can be regarded as public pension benefits. Euro countries except for Denmark and Finland are located in the bottom-right corner of the chart. On the other hand, Switzerland and Anglo-Saxon countries are located in the upper left corner. The Netherlands and Switzerland show large deviations from the trend line, while Japan is located almost on the trend line.

Figure-5: Relationship between private pension fund assets and social security benefits (2007)



Notes: 1. Private pension funds include both corporate pension funds for employees and pension funds for individuals.
Figures comprise a portion of gross financial assets of households and NPISH (non-profit institutions serving households).
2. Data is not available for Iceland.
Sources: Cabinet Office, Government of Japan, *Annual Report on National Accounts*; OECD, *National Accounts*

Based on the degree of dependency on public and private pension systems suggested by these relationships, high-income OECD countries are classified into following three groups.

(Group A) Countries weighted toward private pension: Australia, Canada, Ireland, Switzerland, U.K. and U.S.

(Group B) Countries weighted toward public pension: Austria, Belgium, France, Germany and Italy, Luxemburg

(Group C) Countries with well-balanced weighting of public and private pension: Denmark, Finland, Japan, Norway, and Sweden

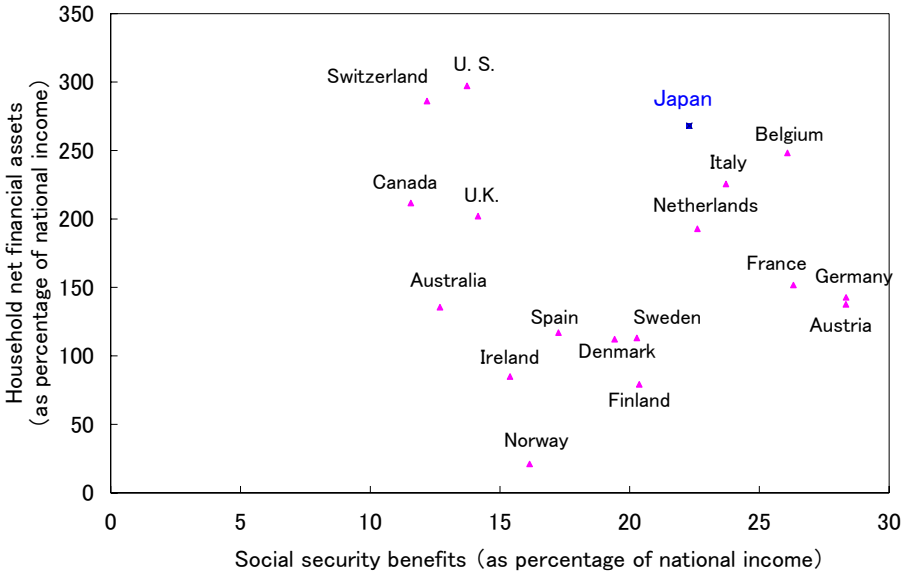
(Note) The Netherlands and Spain do not belong to any of the three groups.

In terms of personal savings to prepare for retirement, there are several instruments other than the private pension, such as deposits and life insurance.

Figure-6 shows the relationship between "net financial assets of households" and "social security benefits" at the end of 2007 in this context. The net financial assets of U.S. households is highest as a percentage of national income. However, the countries whose net financial assets of households are twice as much as national income include those with both high and low levels of social security benefits. Thus no correlation is observed between net financial assets of households and social security benefits. Among several reasons considered, perhaps the biggest factor is that the aggregated household data in the macro statistics cover not only retired generations but also working generations. Similarly, the range of effective analysis using macro

statistics is limited if we focus on income, expenditures and savings or dissavings of retired households. Thus we draw on each country's survey data on households, in other words micro level data, in the following section.

Figure-6: Relationship of net financial assets of households and social security benefits (2007)



Notes: 1. Net financial assets of households are gross financial assets minus liabilities of households and NPISH.
2. Data is not available for Iceland and Luxemburg.
Sources: Cabinet Office, Government of Japan, *Annual Report on National Accounts*; OECD, *National Accounts*.

3——International comparison of retired household income and consumption using micro level data

1 | Comparison of per capita consumption of elderly households

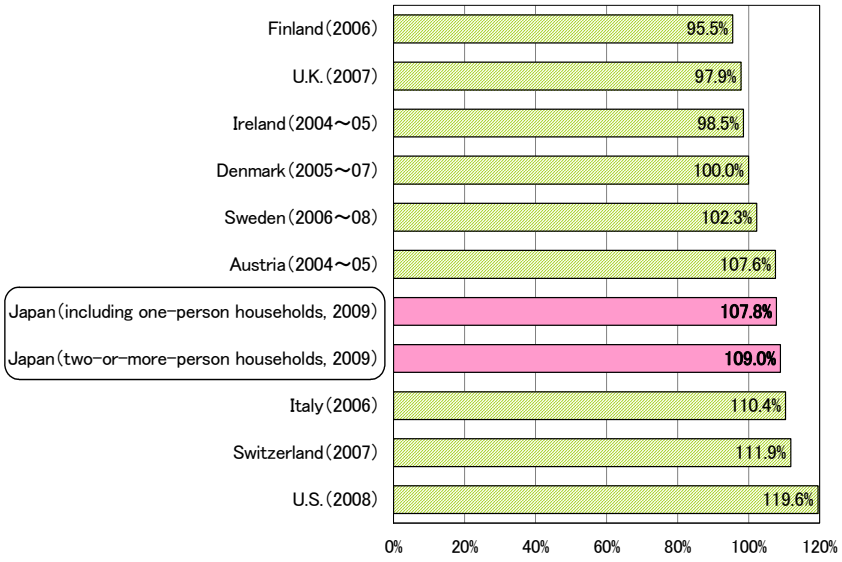
Micro level data on income and expenditures are available for 11 countries: Austria, Denmark, Finland, Germany, Ireland, Italy, Japan, Sweden, Switzerland, United Kingdom and United States. The respective data sources are shown in Table-3.

Table-3: Sources of household survey data

Austria	Statistics Austria	Household Budget Survey
Denmark	Statistics Denmark	Household Budget Survey
Finland	Statistics Finland	Household Budget Survey Income Distribution Statistics
Germany	Federal Statistical Office	Household Budget Survey
Ireland	Central Statistics Office	Household Budget Survey
Italy	Banca d'Italia	Survey on household income and wealth
Japan	Ministry of Internal Affairs and Communications	Family Income and Expenditure Survey
Sweden	Statistics Sweden	Household Budget Survey
Switzerland	Swiss Federal Statistical Office	Household Budget Survey
United Kingdom	National Statistics of UK	Family Spendings
United States	U.S. Bureau of Labor Statistics	Consumer Expenditure Survey

Before comparing internationally the income and expenditure composition of retired households, we first need to confirm whether the per capita consumption of retired households is actually equivalent to that of working households. Pension benefits cannot be said to fulfill the important role of financing consumption if the standard of living of retired households is inadequate.

Figure-7: Per capita consumption of retired households relative to total households



Notes: 1. If original consumption data include repayment on mortgage loans, property taxes or private pension contributions, these are excluded from consumption after adjustment.
2. All sample households include one-person households, except as noted for two-or-more person households in Japan.
Sources: See Table-3.

Figure-7 compares consumption expenditures per capita of retired households to those of all households in ten countries.[4] In seven countries, the relative consumption per capita of retired household exceeds 100% and values are not less than 95% in the remaining three countries. As for Japan, even if we exclude one-person households, whose consumption tends to be larger than the per capita consumption of two-or-more person households due to a scale effect on consumption, the level of per capita consumption of retired households is equivalent to 109% of all two-or-more person households. Thus the standard of living of retired households is not low compared to working households.

2 | Breakdown of income, expenditure and dissavings of elderly households

In making international comparisons of income, expenditures and savings or dissavings of retired households, we must be careful because statistical concepts in micro level data vary considerably by country. If we follow the standard concepts of economics, the following

[4] Per capita consumption of German households cannot be calculated because the original data does not contain number of household members per household unit.

definitional relationships between income and expenditures, and between consumption and savings or dissavings must hold.

- Disposable income ＝ Gross income － Non-consumption expenditure
- Non-consumption expenditure ＝ Income taxes ＋ Social security contributions ＋ Other taxes
- Savings ＝ Disposable income － Consumption expenditure
  (occurs if Consumption expenditure ≦ Disposable income)
- Savings ＝ Increase in financial assets ＋ Increase in real (non-financial) assets － Increase in liabilities
  (holds if no capital gains and losses accrue on assets and liabilities)
- Dissavings ＝ Consumption expenditure － Disposable income
  (occurs if Consumption expenditure ＞ Disposable income)
- Dissavings ＝ Decrease in financial asset ＋ Decrease in real (non-financial) asset － Decrease in liabilities
  (holds if no capital gains and losses accrue on assets and liabilities)

Here, payment[5] of private pension premiums (contributions) should be treated as a form of savings similar to a net increase in deposits, bonds and shares. On the other hand, receipt of private pension benefits, as well as withdrawals from a checking account, should be regarded as negative savings, namely dissavings. This is because withdrawals from a checking account represents a transformation of existing financial assets from deposits to cash, and is quite differ from earned income or the formation of new wealth. If retired households receive a private pension benefit, they must necessarily have paid in a corresponding premium as a part of savings out of disposable income in the past. Dissavings via receipt of private pension benefits in the present and future are consistent with savings via paying private pension premium in the past. This statistical treatment is adhered to in Japan's *Family Income and Expenditure Survey* and Denmark's *Household Budget Survey*, but not in the surveys of other countries.

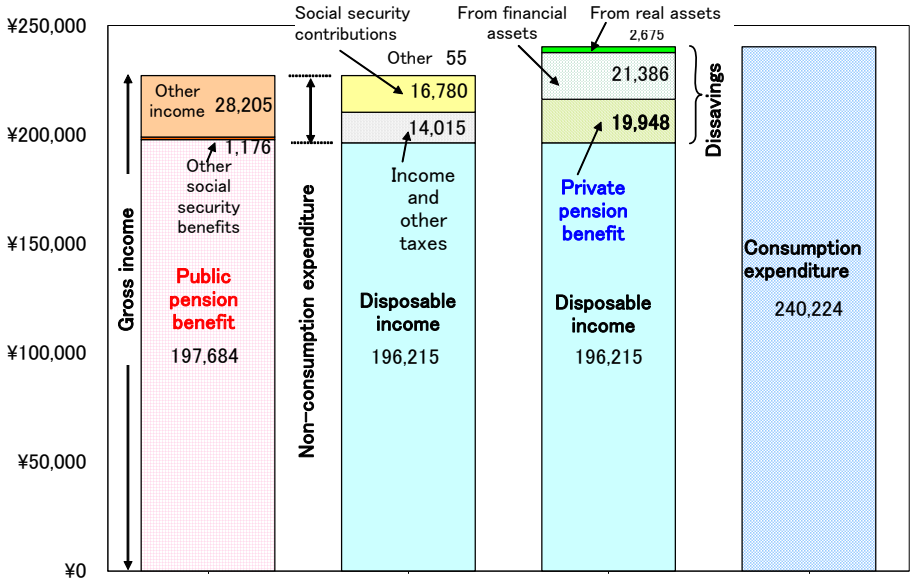
Social security contributions, as well as other non-consumption expenditures, are transfers paid by households to general government, while social security benefits and other transfers paid by general government to households are regarded as a source of gross income. Although all countries treat social security benefits as household income, some countries treat social security contributions as expenditures out of after-tax income, in other words as consumption expenditures. As disposable income implies that households have a choice of allocating between consumption and savings, in order to analyze household behavior under the life-cycle budget constraint, it is necessary to distinguish between consumption expenditures and non-consumption expenditures, and between income including public pension benefits from

[5] Contributions to corporate pension plans by employers can be regarded as imputed payment by employees, and thus treated as a part of imputed income.

dissavings including private pension benefits.

Fortunately, no adjustment is necessary to the statistical concepts of Japanese survey data. Figure-8 illustrates the relationships among income, expenditures and savings or dissavings of two-or-more-person retired households in Japan. [6]

Figure-8: Structure of income, consumption and savings of Japanese retired households (2009)



Note: Shows monthly averages in JPY of two-or-more person households with nonworking householder aged 65 and over.
Source: Ministry of Internal Affairs and Communications, *Family Income and Expenditure Survey*

Figure-8 shows monthly averages of sampled households in 2009. Most of the gross income of 227,065 yen comes from the public pension benefit of 197,684 yen. Disposable income after deducting non-consumption expenditures such as income taxes and social security contributions from gross income is 196,215 yen. Since disposable income is exceeded by consumption expenditures of 240,224 yen, the difference of 44,009 yen comprises negative savings which must be financed by the decumulation of existing assets. Dissavings consist of a private pension benefit (19,948 yen), withdrawal of other financial assets (21,386 yen), and disposal of real assets (2,675 yen).

Next we compare internationally the structure of income, consumption and savings after adjusting the statistical concepts of each country's original data as necessary[7].

As shown in Table-4, clear patterns are observed in the composition of income, expenditures and savings.

[6] Some detailed data is not available for total retired households including one-person households.
[7] See Appendix.

Table-4: Income, consumption and savings of retired households in selected OECD countries

	① Gross income	Earned income	Property income	Social security benefit	Public pension benefit	Other income	② Payment of interest	③ Non-consump expend.	④ Dispos-able income	⑤ Consump. expend.	⑥ Savings	⑦ Private pension benefit (negative value)	⑧ Change in other assets	⑨Social security benefit / Consump. expend.	⑩Private pension benefit / Consump. expend.
(B) Austria(2004～05)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	100.0	93.4	6.6	n.a.	n.a.	n.a.	n.a.
(C) Denmark(2005～07)	146.2	11.7	19.8	77.7	n.a.	37.0	4.6	41.6	100.0	100.9	-0.9	-2.6	1.6	77%	3%
(C) Finland(2006)	125.9	8.1	20.3	95.7	91.1	1.9	0.4	25.5	100.0	84.0	16.0	-3.0	19.0	114%	4%
(B) Germany(2007)	118.8	6.3	19.2	89.1	78.3	4.2	n.a.	18.8	100.0	93.1	6.9	-7.5	14.4	96%	8%
(A) Ireland(2004～05)	112.8	34.1	7.7	63.5	55.3	7.5	0.0	12.8	100.0	155.6	-55.6	-68.3	12.7	41%	44%
(B) Italy(2006)	n.a.	8.9	26.6	64.5	n.a.	n.a.	n.a.	n.a.	100.0	78.2	21.8	n.a.	n.a.	83%	n.a.
(C) Japan(two-or-more-person households, 2009)	114.5	6.8	1.2	101.8	n.a.	4.7	n.a.	14.5	100.0	122.6	-22.6	-10.2	-12.4	83%	8%
(C) Japan(including one-person households, 2009)	115.7	8.8	1.2	101.3	100.7	4.4	n.a.	15.7	100.0	122.4	-22.4	-10.2	-12.3	83%	8%
(C) Sweden(2006～08)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	100.0	81.4	18.6	n.a.	n.a.	n.a.	n.a.
(A) Switzerland(2007)	190.7	9.8	34.7	127.3	115.1	18.9	n.a.	90.7	100.0	200.3	-100.3	-103.4	3.1	64%	52%
(A) U.K.(2007)	127.4	6.0	22.0	99.4	n.a.	n.a.	1.0	26.3	100.0	144.2	-44.2	-70.4	26.2	69%	49%
(A) U.S.(2008)	115.2	35.0	16.1	63.4	60.5	0.7	5.9	9.3	100.0	159.5	-59.5	-56.0	-3.5	40%	35%

Notes: 1. All sample households include one-person household, except as noted for two-or-more person households in Japan.
2. All figures except ⑨ and ⑩ are indexed. Disposable income is standardized to 100.
⑥ denotes saving rate. ④=①−②−③, ⑥=④−⑤, ⑧=⑥−⑦
3. For Italy, composition of gross (before-tax) income is replaced by that of after-tax income.
4. For the U.S., public and private pension benefit are estimated using the amount of total benefits in surveyed data and amounts of public and private pension benefit in macro statistics.

Sources: See Table-3.

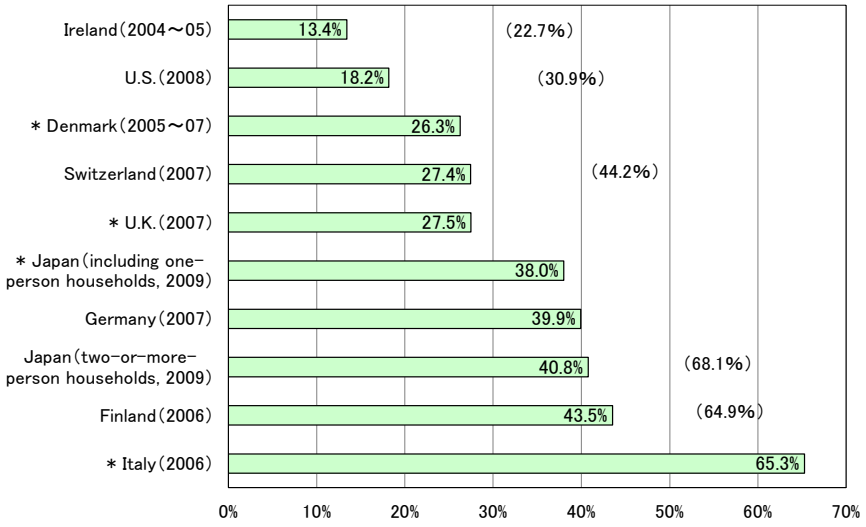
First, we find that in Ireland, Switzerland, United Kingdom and the United States, (Group A countries, who are weighted toward the private pension), retired households have high levels of private pension benefits relative to disposable income (⑦). The value is more than 100% in Switzerland, and ranges from 56% to 70% in the other countries. In Switzerland, the public pension covers the first-tier benefit, while mandatory corporate pension plans cover the second-tier benefit. Interestingly, the two benefit levels are almost the same. Households in all four countries have negative saving rates (⑥), indicating that consumption exceeds disposable income. Thus we can infer that private pension benefits contribute a great deal to the level of consumption. The negative savings rate of retired households is consistent with the life-cycle hypothesis of consumption.

Secondly, in Germany, Italy, and Austria, (Group B countries, who are weighted toward the public pension), retired households consume less than disposable income. The positive saving rate is not consistent with the simplified life-cycle hypothesis. One possible reason is that households in countries weighted toward the public pension may have a precautionary motive for savings owing to uncertainty about the unfunded public pension system. Another reason is that they may have a bequest motive for savings. If this is true, an intergenerational transfer through the public pension will be partially offset by a private intergenerational transfer through bequest.

A third possible explanation regards the reliability of the survey data; it may not have successfully captured dissavings.

As for Japanese retired households, the relative level of the private pension benefit is 10% of disposable income, which is highest among countries with a well-balanced weighting between public and private pension (Group C). The saving rate is the lowest within the group, with a negative value of less than -22%. Danish retired households have a slightly negative saving rate, while Finish and Swedish households have positive values for savings. At the same time, the level of public pension benefits received by Japanese households is more than 100%, second only to the level of Swiss households.

Figure-9: Gross replacement rate based on actual household data



Notes: 1. All sample households include one-person household, except as noted for two-or-more person households in Japan.
2. Gross replacement rate is calculated as the average public pension benefit of retired households, divided by average earned income of working households, most of whom are younger generations.
3. Asterisk (*) denotes that the social security benefit has been used in place of the public pension benefit.
4. Number in parentheses shows replacement rate calculated using average earned income per worker.
Sources: See Table-3

The gross replacement rate in Figure-9 measures the purchasing power of the public pension benefit per retired household as a percentage of earned income per working household, based on actual household data.
It should be noted that the rate is calculated not for an individual who is assumed to have just begun participating in the public pension system, but for a retired household who is actually receiving a public pension benefit at the time of the survey.[8]
Again, the values for households in Ireland, Switzerland, United Kingdom and United States are low. The gross replacement rate of Japanese retired households is about 40%, not low in the

[8] "Pension at a Glance" published by OECD in 2009 estimates assumed-individual-basis replacement rates for member countries. Gross replacement rate of average male earner in Japan is 33.9%, second lowest among values of assumed individuals in 30 countries.

international context. As mentioned earlier, per capita consumption of retirees is slightly higher than the level of working households, and is financed by the public pension as the main source of income and by dissavings including private pension benefits. Thus Japanese elderly households are to be said well off.

4——Trends in private pension benefits and contributions of Japanese households

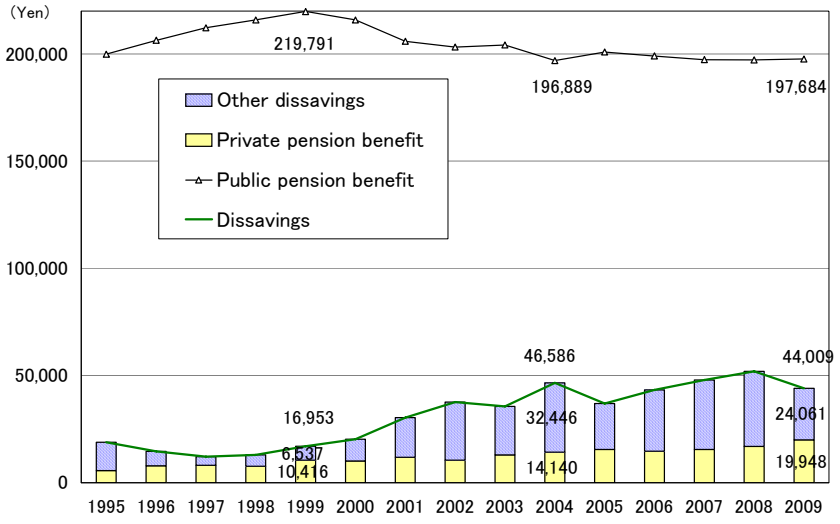
1 | Amount of private pension benefit and other dissavings of elderly households

This section focuses on changes in the trends of pension benefits and contributions in Japan. In the former section, we represented Japanese retirees using households with a nonworking householder aged 65 and over in 2009 for international comparison purposes.

However, the structure of income and consumption financing of retired households has been changing. Dramatic changes are observed especially in households with a nonworking householder aged 60-64.

As shown in Figure-10, retired households aged 65 and over received a monthly private pension benefit equivalent to 19,948 yen in 2009, which is 5,808 yen more than the amount received five years ago (14,140 yen), and 9,532 yen more than the amount received 10 years ago (10,416 yen). Thus the amount of private pension benefits has steadily increased. The total amount of dissavings has increased to 44,009 yen, which is 27,055 yen more than the amount of 16,953 yen a decade ago. The private pension benefit represents 45% of dissavings in 2009.

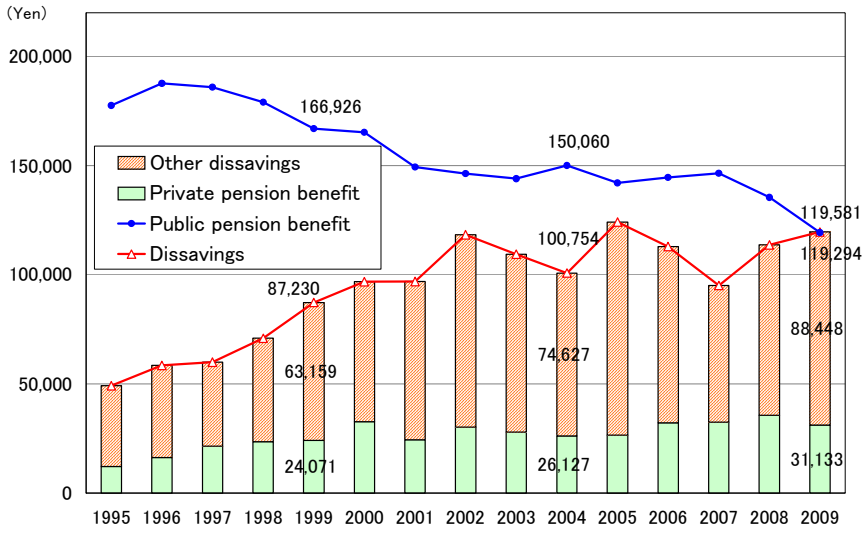
Figure-10: Trends in public pension benefit and dissavings of retired households aged 65 and over in Japan



Source: Ministry of Internal Affairs and Communications, *Family Income and Expenditure Survey*

In contrast to the increase in total dissavings including private pension benefits, the monthly public pension benefit has decreased slightly. The public pension benefit of 197,684 yen in 2009 represents a decline of 22,107 yen from the level of 219,791 yen in 1999. In other words, reduction of the public pension benefits has been compensated by increased dissavings, with a steady increase in private pension benefits.

Figure-11: Trends in public pension benefit and dissavings of retired households aged 60-64 in Japan



Source: Ministry of Internal Affairs and Communications, *Family Income and Expenditure Survey*

As shown in Figure-11, these trends are more pronounced in retired households aged 60-64. As the pensionable age for the first-tier benefit was stepped up starting in 2001, the public pension benefit declined from 150,060 yen in 2004 to 119,294 yen in 2009, which is far below the level of 1999 (166,296 yen). The decrease in public pension benefits has been financed by an increase in dissavings.

The amount of total dissavings including private pension benefits was 87,230 yen in 1999. It increased to 100,754 yen in 2004 and reached to 119,581 yen in 2009, exceeding the amount of the public pension benefit. The amount of private pension benefit in 1999 was 24,071 yen. It increased to 26,127 yen in 2004 and to 31,133 yen in 2009. As shown in Table-5, stepping up of the pensionable age is planned to continue until 2030.

Table-5: Stepping-up of pensionable age for public benefit

	The first pillar benefit (Basic old-age pension)				The second pillar benefit (Employees' old-age pension, earnings-related)			
	Men		Women		Men		Women	
Date of birth	Age	Year	Age	Year	Age	Year	Age	Year
～1941.4.1	60	2000	60	2000	60	2000	60	2000
41.4.2～42.4.1	61	2002		2001		2001		2001
42.4.2～43.4.1		2003		2002		2002		2002
43.4.2～44.4.1	62	2005		2003		2003		2003
44.4.2～45.4.1		2006		2004		2004		2004
45.4.2～46.4.1	63	2008		2005		2005		2005
46.4.2～47.4.1		2009	61	2007		2006		2006
47.4.2～48.4.1	64	2011		2008		2007		2007
48.4.2～49.4.1		2012	62	2010		2008		2008
49.4.2～50.4.1	65	2014		2011		2009		2009
50.4.2～51.4.1		2015	63	2013		2010		2010
51.4.2～52.4.1		2016		2014		2011		2011
52.4.2～53.4.1		2017	64	2016		2012		2012

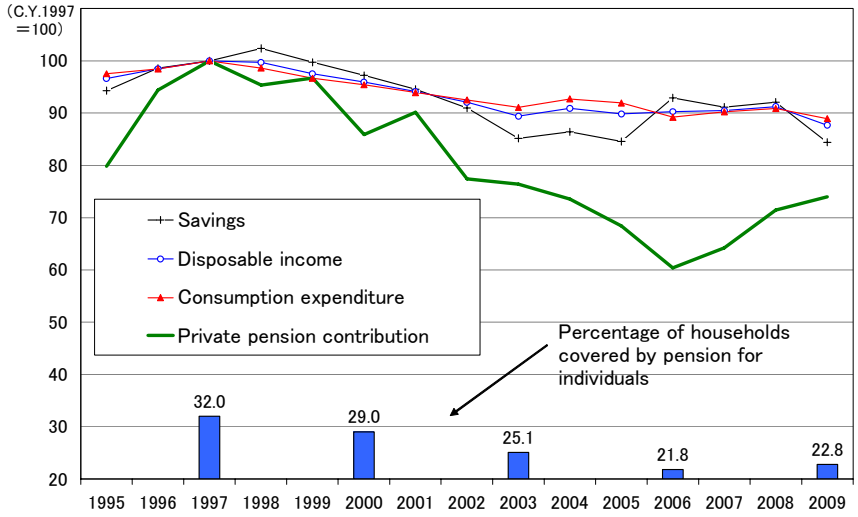
	The first pillar benefit (Basic old-age pension)				The second pillar benefit (Employees' old-age pension, earnings-related)			
	Men		Women		Men		Women	
Date of birth	Age	Year	Age	Year	Age	Year	Age	Year
53.4.2～54.4.1	65	2018	64	2017	61	2014	60	2013
54.4.2～55.4.1		2019	65	2019		2015		2014
55.4.2～56.4.1		2020		2020	62	2017		2015
56.4.2～57.4.1		2021		2021		2018		2016
57.4.2～58.4.1		2022		2022	63	2020		2017
58.4.2～59.4.1		2023		2023		2021	61	2019
59.4.2～60.4.1		2024		2024	64	2023		2020
60.4.2～61.4.1		2025		2025		2024	62	2022
61.4.2～62.4.1		2026		2026	65	2026		2023
62.4.2～63.4.1		2027		2027		2027	63	2025
63.4.2～64.4.1		2028		2028		2028		2026
64.4.2～65.4.1		2029		2029		2029	64	2028
65.4.2～66.4.1		2030		2030		2030		2029
1966.4.2～		2031		2031		2031	65	2031

2 | Amount of private pension contributions by younger households preparing for retirement

The amount of private pension benefits of retired households depends on the contributions they made in the past when they were working.

As shown in Figure-12, disposable income as well as savings of working households under 60 peaked in 1997 or 1998. Both have been stable since 2003, with disposable income amounting to 443,889 yen and savings amounting to 122,302 yen in 2009. Surprisingly, the trend decline in private pension contributions is larger than the trend decline in total savings. Personal contributions to private pension plans decreased significantly from the peak level of 5,289 yen in 1999. Though the amount of contributions in 2009 has slightly increased to 3,914 yen from the bottom in 2006, is still far below the peak level.

Figure-12: Trends in private pension contributions and savings of working households in Japan



Note: Surveyed private pension premium does not include corporate pension contributions paid by employers for employees.
Sources: Ministry of Internal Affairs and Communications, *Family Income and Expenditure Survey*; Cultural Center for Life Insurance, *National Survey on Life Insurance*.

The expected future benefit of private pension after retirement for presently working households will be less than the level of already retired households, reflecting a lower level of contributions. In addition, owing to changes in benefit indexation and stepping-up of the pensionable age for the second-tier benefit, the amount of public pension benefit for householders aged 60-64 will decline further. Thus retired households in the future will not be as well off as at present unless household behavior changes or reforms in tax and social security systems are carried out. If we are to rely on voluntary savings to prepare for retirement, reforms in tax and social security systems will be necessary so that working generations save more out of disposable income. We should also consider ways to reduce the intergenerational income redistribution while increasing the intragenerational income redistribution.

5——Concluding remarks

Public and private pensions appear to be good substitutes. The actual level of dependence on public pension systems varies by country. Japan is said to have a well balanced weighting between the two at present. For retired households in Japan, the public pension benefit is internationally high as a share of disposable income. However, the private pension benefit and other types of dissavings have grown in importance to maintain a consumption level comparable to younger households. Even though retired households are well off today, future retired households may not be. Two main reasons are the cutbacks in public pension benefits, and expected decrease of private pension benefits as contribution levels keep falling compared to earlier generations.

Appendix: Adjustment of statistical concepts to original data

Country	Item to be adjusted	Additions to original data	Deductions from original data
Austria	Detailed data is not available		
Denmark	Disposable income	None	Fines, Fees, Charity
	Consumption	None	None
Finland	Disposable income	None	Pensions and compensations based on private insurances, Realized capital gains
	Consumption	None	Interests payment, Tax-like charges, Fees, Fines and other items outside consumption expenditure
Germany	Disposable income	None	Occupational pensions, Revenue from the sale of goods, Ongoing transfers
	Consumption	None	–
Ireland	Disposable income	None	Retirement pensions
	Consumption	None	Private pension fund contributions, Additional voluntary contributions (pension), Principal & interest (Mortgage repayments)
Italy	Detailed data is not available		
Japan	Disposable income	None	None
	Consumption	None	None
Sweden	Disposable income	None	Tax on real estate
	Consumption	None	Tax on real estate
Switzerland	Disposable income	Sporadic Income	Second pillar pensions, Taxes, Gifts and other transfers
	Consumption	Supplementary health insurance premium	None
United Kingdom	Disposable income	None	(Private) Annuities and pensions, Council tax, domestic rates
	Consumption	None	Mortgage interest payments, Council tax, domestic rates, Household insurances
United States	Disposable income	None	Private retirement pension, Mortgage interest and charges,
	Consumption	None	Mortgage interest and charges, Property taxes, Pensions and Social security contributions

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