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6   The Effects of Aging on National Saving and Asset Accumulation in Japan

Naoto Yamauchi

6.1   Introduction

This paper investigates the effects of population aging on saving behavior and asset accumulation in Japan. There are a lot of empirical studies on the relationship between population aging and household saving behavior, and most economists and policymakers believe that aging has and will lower the household saving rate to some extent. The precise magnitude is still open to question, however.

I shed light on fluctuations in the national saving rate as a whole, as well as in the household and private saving rates. Reasons for emphasizing national saving are as follows. Japan has a huge trade surplus at the moment, and this external balance (or imbalance) is, by the definition of national account, a mirror image of the internal saving-investment balance. It is obvious that national saving has a closer link to the external balance than the savings of individual sectors. Moreover, if households view their saving plans through the corporate and government veils, so that household saving is not independent from corporate and government savings, it makes sense to focus on national saving rather than sectoral saving.

National saving is important not only because it is a source of investment and one of the major determinants of macroeconomic growth but also because it is closely related to the demand for financial and real assets, and it may well affect asset price formation. For instance, how does saving through employer-sponsored private pension funds affect the saving behavior of individual sec-

tors, the national saving rate, and the demand for various assets? Since private pension funds have become major institutional investors, it is extremely important to know the potential impacts of the future decumulation of pension funds as population aging proceeds.

The paper is organized as follows. Section 6.2 gives an overview of fluctuations of national saving in Japan, and the relationship between aggregate saving rates—either household or national—and demographic variables is examined. Sections 6.3 and 6.4 discuss the effects of population aging on household saving rates and corporate and government saving rates, respectively. I try to decompose the System of National Accounts (SNA) basis for national and sectoral savings consistently into saving by age group or cohort, in order to clarify who (which age cohort) saves and who dissaves. By examining saving rates in this way, I hope to clarify the relationship between population aging and fluctuations of national saving. Section 6.5 focuses on saving through employer-sponsored pension plans, with statistical comparisons between Japan and the United States. Section 6.6 offers a brief conclusion.

6.2 Population Aging and National Saving

### 6.2.1 Fluctuations of National Saving

National saving consists of household saving, corporate saving, and government saving. Figure 6.1 shows yearly fluctuations in the national saving rate and individual sector saving rates, all defined as ratios to national disposable income. The household saving rate, which is the most familiar to us, increased gradually in the 1960s and increased rapidly during the first half of the 1970s, but since the mid-1970s it has been declining gradually.

The national saving rate, on the other hand, increased until around 1970, but after rather sharp drops in the first half of the 1970s, it did not fluctuate much during the 1970s and the 1980s. The difference between the changing patterns of the household saving rate and the national saving rate is, by definition, explained by fluctuations in corporate and government saving rates. In particular, a sharp increase in the government saving rate more or less offset the decrease in the household saving rate in the 1980s.

6.2.2 Demographic Factors and Saving Rates

Many theoretical and empirical studies have tried to explain fluctuations in the household saving rate, and a number of possible explanations have been identified for the high saving rates up to the mid-1970s and for the recent declining trend.[1] Possible explanations of the high saving rates include the bonus payment system, unavailability of consumer credit, the low level of social secu-

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1. A comprehensive survey of various explanations for Japan's high household saving rate can be found in Horioka (1990).
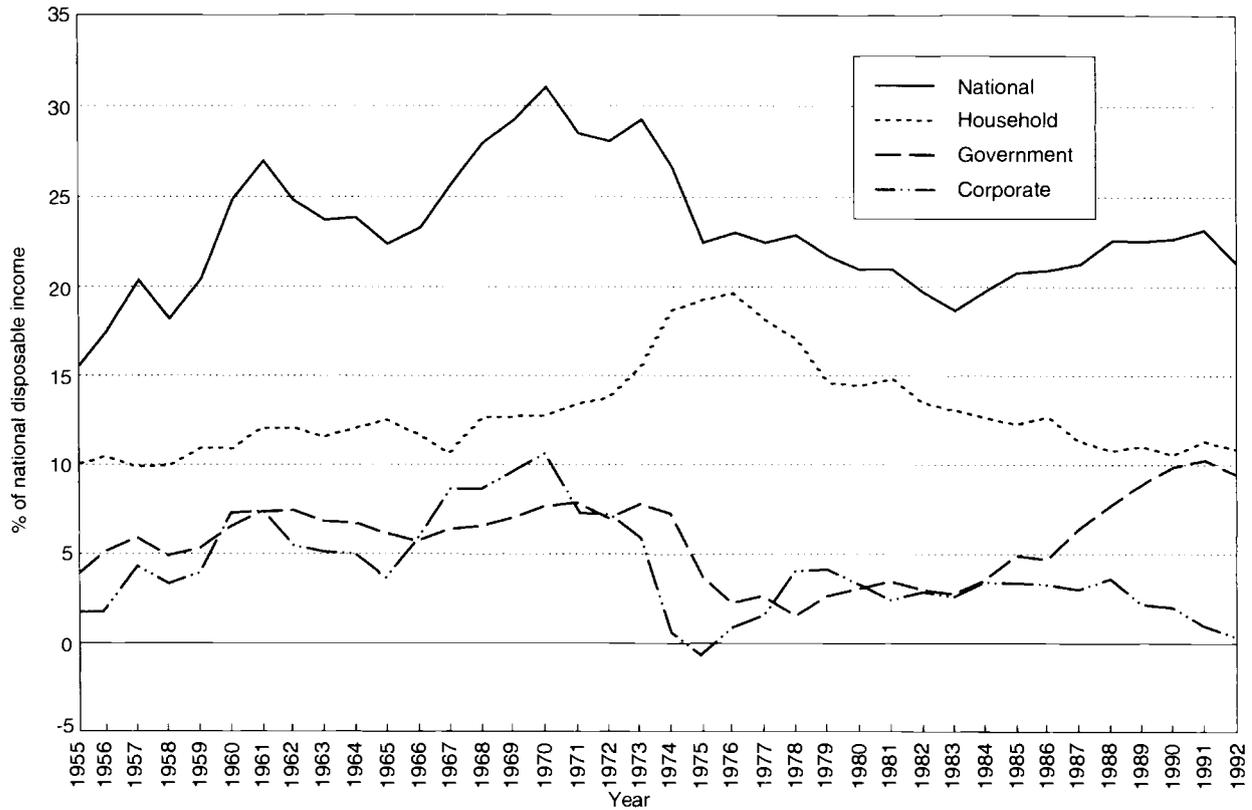
Fig. 6.1   Japan's national and sectoral saving rates
Source: Economic Planning Agency, *Annual Report on National Accounts* (Tokyo: Government Printing Office, various years).

rity benefits, the low level of asset accumulation, the high cost of housing, high economic growth, and the high ratio of working to total population. The recent decline in the saving rate can be explained by reversals of some of these factors.

Some economists emphasize population aging to explain the recent decline of the household saving rate. How do demographic factors affect saving rates? Using conventional time-series regression analysis, Horioka (1991) showed that the coefficient of the demographic variable was larger in the national saving equation than in the private and household saving equations. This result implies that corporate saving and government saving are more sensitive to population aging than household saving is. If this is the case, it may be quite misleading to look at only household saving when investigating the effects of aging on saving behavior.[2]

6.3 Household Saving and Asset Accumulation

According to the standard life-cycle model of saving, people save when young, dissave after retirement, and die without wealth. On the other hand, according to the dynasty model of saving, parents and children are linked by altruistic motives. As Auerbach, Cai, and Kotlikoff (1991) show, the national saving rate is higher for the dynasty (or altruistic family) model than for the life-cycle model. Which model is more applicable to Japan? Several eminent studies have been published. Some of them support the life-cycle model, but many found evidence that fails to support this model.

6.3.1 Data of Cohort Saving

I use the Family Savings Survey (FSS), or Chochiku Doko Chosa, to answer this question. There are several statistics in the survey, including saving data divided by different age groups. The FSS data set is better than other statistics, such as the Family Income and Expenditure Survey (FIES), or Kakei Chosa, in several ways. First, figures for the saving of self-employed households are available in the FSS, but not in the FIES. Second, the FSS saving figures are likely to be more accurate because they are calculated from reported assets and liabilities rather than from income and expenditure.[3] Moreover, FSS data are available for every year.

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2. When I regressed national and household saving rate equations on the demographic factor, the ratio of the elderly to the total population in this case, the estimated coefficients on the elderly population ratio were significantly negative when variables that represent asset holding were omitted. However, when the asset variables were included as explanatory variables, the ratio of the elderly population became insignificant. This behavior reflects serious multicollinearity between the demographic and asset variables. Therefore, it is fair to conclude that population aging may lower saving rates, but the results of time-series regression are not robust and the relationship between aging and saving rates may not be straightforward.

3. The FSS asks respondents about outstanding financial wealth at the end of the calendar year and at the end of the year before, and about transactions involving houses and land throughout the year.

It is worth noting that the definition of the FSS saving rate is different from that of the SNA saving rate. There are several technical differences, for instance, the treatment of imputed rent for owner-occupied housing and transfers in kind, such as medical services and public education. I would like to point out two more factors. First, the FSS saving rate is defined as the net increase in the value of assets held divided by annual income. Net increase includes not only the acquisition of financial and real assets, but also capital gains and losses from financial assets (but not real assets) that accrue in a year. The SNA saving rate, however, does not include capital gains and losses. We might interpret the FSS household saving rate as indirectly reflecting the corporate saving rate, if corporate saving in the form of retained profits raises the stock prices of a company and shareholders' asset value.

Second, the SNA saving rate is net of depreciation, whereas the FSS saving rate is a gross saving rate in the sense that it includes capital consumption or depreciation. Therefore, FSS saving is comparable to SNA gross saving, which is the sum of net saving plus depreciation of the household sector.

Figure 6.2 shows that the amount of aggregate household saving based on the FSS gives a good approximation of the amount of SNA gross saving. The differences in movement between the two saving rates reflect the difference in definitions. The FSS saving rate went up in the first half of the 1970s and in the second half of the 1980s. This probably was caused by asset price inflation during these periods.
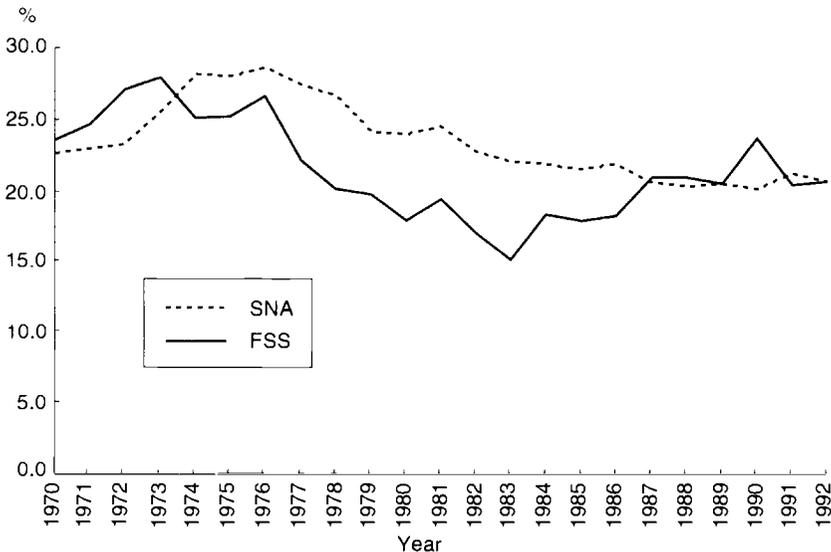
Fig. 6.2   SNA and FSS gross saving rates
Source: Author's calculation from Economic Planning Agency, *Annual Report on National Accounts* (Tokyo: Government Printing Office, various years) and the FSS.

6.3.2 Saving and Asset Accumulation of the Elderly

According to the FSS, the saving rate of all households ("all" includes self-employed) in 1980–92 period was on average 19.4 percent of annual income. This statistic can be broken down by age of household head. The age distribution of household saving is shown in table 6.1. The saving rate for households with heads aged 65 or older was 16.3 percent, lower than the average, but still positive. The saving rates of households with heads aged 60–64 or 55–59 were slightly higher than the average. In the 1970s the saving rate of households with heads aged 65 or older was even higher than the average.

These facts show that households headed by the elderly do not dissave or decumulate their wealth substantially. This apparently contradicts the life-cycle model of saving. Do elderly households really continue to accumulate wealth? A longitudinal survey is necessary to test this precisely, but such a survey is virtually unavailable in Japan. So instead we used published cross-sectional age-wealth profiles. The National Survey of Family Income and Expenditure (NSFIE), or Zenkoku Shohi Jittai Chosa, and the FSS supply tabulations of this kind. Table 6.2 shows cross-sectional age-wealth profiles in 1992 from the FSS. It shows that households with older heads tended to be wealthier in terms of the current value of financial assets.

However, table 6.2 does not show time-series or cohort age-wealth profiles. I compiled "pseudo"-cohort data on age-wealth profiles by tracking published cross-sectional age-wealth data from annual reports of the FSS. The cohort age-wealth profiles show that the Japanese household continues to accumulate wealth until at least age 65. For example, figure 6.3 shows how personal wealth is accumulated in households where the head was born in 1924. This upward-sloping profile may be exaggerated by the asset price inflation of the second half of the 1980s. However, the age-wealth profiles for households with heads born in years other than 1924 also show clear upward-sloping curves, and these profiles do not include the asset inflation period of the late 1980s. Therefore, the pattern of asset accumulation by Japanese households is quite different from that in the United States.

As Hayashi, Ando, and Ferris (1988) pointed out, there may be some sample

Table 6.1   **FSS Saving Rates by Age of Household Head (percent)**

Years	Average	–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65+
1970–74	25.7	27.4	19.1	22.8	26.2	27.0	24.8	19.9	30.1	33.3	28.9
1975–79	22.8	5.8	16.9	22.5	23.9	23.0	22.1	21.3	28.9	21.1	24.6
1980–84	17.6	9.7	15.0	16.9	18.4	18.1	16.4	16.9	20.6	18.5	16.2
1985–89	19.8	8.4	14.6	20.7	21.6	21.1	17.6	18.4	22.5	23.3	15.8
1990–92	21.8	1.9	15.0	19.1	19.5	22.5	24.1	22.0	22.0	28.7	17.0
1970–79	24.2	16.6	18.0	22.7	25.1	25.0	23.5	20.6	29.5	27.2	26.8
1980–92	19.4	7.4	14.9	18.9	19.9	20.3	18.6	18.6	21.7	22.7	16.3

Source: FSS data.

Table 6.2   **Composition of Household Financial Wealth by Age of Household Head, 1992**

Financial Asset	−24	24–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65+	Total
Total outstanding (1,000 yen)	1,596	4,182	6,739	7,114	10,635	13,841	14,126	19,146	20,825	23,414	14,654
				Composition (percent)							
Demand deposits	19.6	14.8	7.8	8.4	6.9	6.2	6.5	5.8	5.7	6.1	6.4
Time deposits	45.1	39.9	44.7	41.3	47.3	43.7	42.1	43.2	51.3	46.7	45.6
Life Insurance, etc.	26.3	30.7	29.6	34.5	30.3	28.5	30.4	22.9	21.5	16.6	24.4
Corporate equities	0.0	2.2	5.7	5.8	5.4	9.1	8.0	17.8	8.6	14.6	10.9
Bonds	0.0	0.8	1.5	1.5	1.4	1.8	2.1	1.1	2.9	4.0	2.4
Unit and open-end trust	0.0	0.0	1.9	0.6	1.0	1.8	1.7	1.4	1.9	1.8	1.6
Open-end bond trust	7.1	1.1	1.1	0.8	1.1	1.7	0.7	0.9	1.1	1.1	1.1
Loan trust and money in trust	0.0	1.2	1.6	2.7	2.8	3.6	4.8	4.2	5.2	7.3	4.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: FSS data.
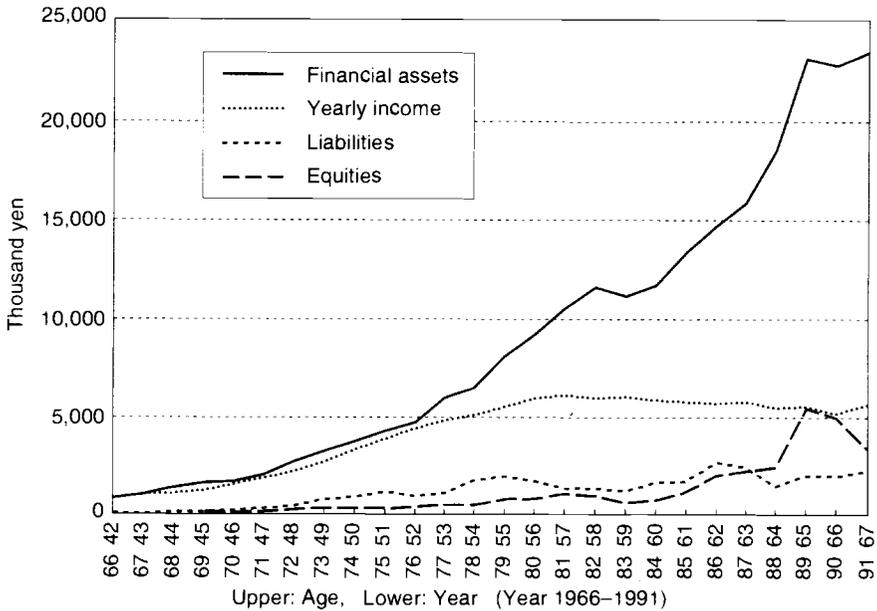
Fig. 6.3   Age-wealth profile for household head born in 1924
Source: Author's calculation from the FSS.

selection biases due to the fact that elderly household heads tend to be wealthier than the elderly living in extended families. They compared the saving rate of the nuclear family with that of the extended family and estimated that the elderly in extended families are likely to continue to save and accumulate wealth until around age 80–84. We expect that similar reasoning is applicable to the FSS, but this has not yet been confirmed. Hayashi et al. also found that U.S. households after retirement dissave on average approximately one-third of their peak wealth by the time of death.

6.3.3   Decomposition of Household Saving by Age Cohorts

The annual saving of the household sector as a whole is the sum of the savings of all age groups. It is not very difficult to decompose household saving by age group. The annual household saving of each age group multiplied by the number of households gives the total saving of each age group. Figure 6.4 shows the results of these calculations. For example, in the period 1990–92, households headed by the elderly, aged 65 or older, saved 8.9 percent of total household savings, whereas households with heads aged 60–64 accounted for 12.8 percent.

The share of saving contributed by older households (with household heads aged 50 or older) increased gradually in the 1970s and 1980s. On the other hand, households with younger household heads (say, up to age 40) have made
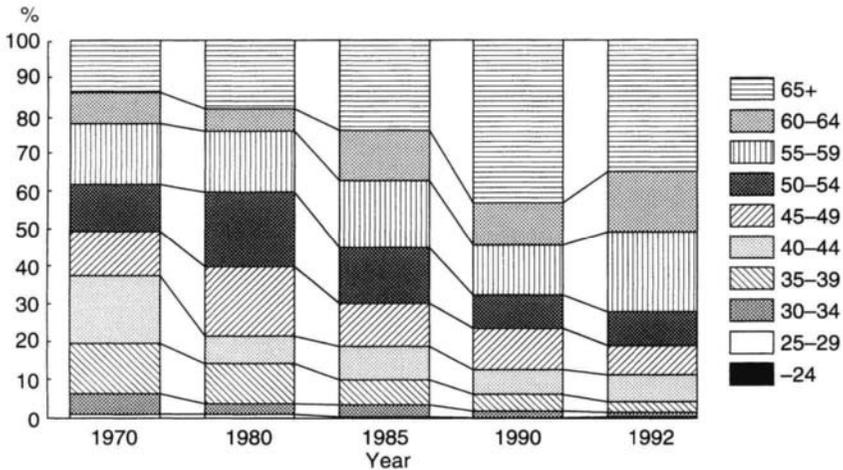
Fig. 6.4   Decomposition of FSS household saving by age of household head

smaller and smaller contributions as time goes on. This more or less reflects population aging in Japan, or in this case the aging of household heads. We can estimate the exact impact of population aging on the aggregate household saving rate from these data.

6.3.4   Role of Intergenerational Transfers

The typical elderly household in Japan continues to accumulate wealth, rather than decumulate it as the standard life-cycle theory implies. Thus a huge amount of wealth is transferred from parents to children by means of bequests. For example, Barthold and Ito (1992) estimated the volume of transferred wealth from published tax statistics and concluded that in Japan at least one-third of household wealth is transferred wealth rather than life-cycle wealth.

The motive for inter vivos transfers may be purely altruistic or a kind of implicit contract between parents and children. If the elderly rarely decumulate their wealth, the macroeconomic impact of aging on the household saving rate may not be large.

6.4   Corporate and Government Savings

6.4.1   Household Saving and National Saving

There have been a number of studies on the relationship between aging and saving rates. Although most previous studies cover only the household saving rate, it is also important to investigate how the aging of the population affects national saving. A reason behind this is that a household may decide its saving rate taking into account the saving rates of firms and the government (see Ha-

yashi 1992, e.g.), or in other words, households may see their saving plans through the corporate and government veils. A review of past studies shows that, while there is a fairly clear negative correlation between household and corporate saving rates, the correlation between household and government saving rates is not so clear.[4]

6.4.2 Who Claims Corporate Wealth?

Who has the final right to use corporate wealth, which is the sum of past corporate saving? This is, in some sense, the same as the question: Who owns the corporate firm? There are several possible answers.

First, employees may own their corporate savings. This is plausible particularly in Japan, where the seniority wage profile and severance payment system still prevail. If firms, rather than their employees, save, because of the sharply rising wage-age profile this corporate saving is just preparation for future wage expenditure. This kind of corporate saving represents an increase in the claim by employees on the firm. In this case, the stock price of the firm will not go up even if the firm accumulates wealth since investors know that the wealth ultimately belongs to the employees.

On the other hand, if corporate saving does not reflect seniority wage profiles, then we can assume that stockholders ultimately own the incorporated enterprises and that they have claims on corporate savings and assets.

It is not easy to determine which of these conjectures is closest to the real world. The real world may in fact be a mixture of these. In this section I assume as a first approximation that corporate savings are ultimately owned by shareholders. Corporate equities held by other firms can be ignored because these claims on corporate savings are canceled out by cross-holding of shares. Thus, it is reasonable to allocate corporate savings to individual shareholders according to the number of equities held.

I decomposed aggregate corporate saving for specific years into savings by various age groups proportional to the share of equities held by households. The age distribution of shareholders is available from the FSS. Figure 6.5 shows the age distribution of equities and unit and open-end trusts for various years. Since the elderly tend to be wealthier in terms of asset holdings and tend to have a larger proportion of corporate equities in their portfolios, the holding of corporate equities is highly concentrated among the elderly. For example, households with heads aged 65 or older have 33.4 percent of the total value of

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4. I estimated simple household saving rate equations using corporate and government savings and household disposable income as explanatory variables. If households decide their saving behavior taking government and corporate savings into account, the signs of the coefficients on corporate and government savings should be negative. While the coefficients on corporate saving are negative as predicted by the theory, the coefficients on government saving are positive, which contradicts the theory. This implies that households see through the corporate veil (at least partly), but not through the government veil.
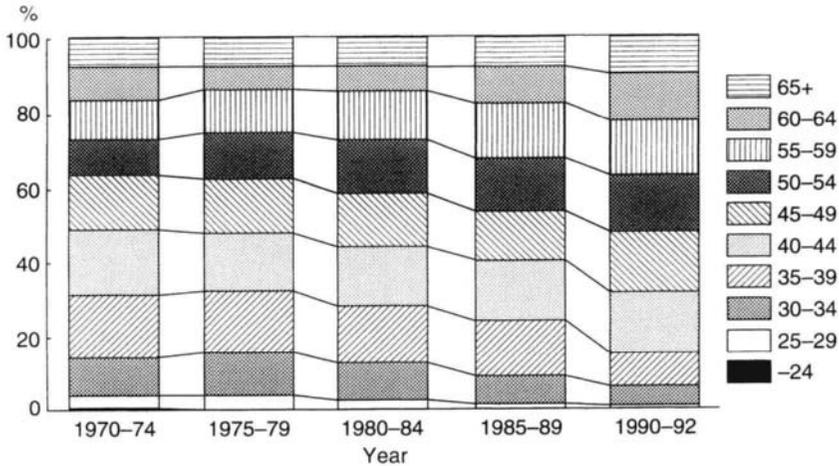
Fig. 6.5   Composition of shareholding by age of household head
Source: Author's calculation from the FSS.

stocks. Households aged 55 and older have about 70 percent of the total. Figure 6.5 also shows that the share of corporate equities held by households with heads aged 65 or older increased drastically from just over 10 percent in 1970 to approximately one-third in 1992.

6.4.3   Aging and Government Saving

Government saving is defined as revenue minus consumption expenditure. Thus, the government surplus is defined as government saving minus capital formation.

In the SNA, general government is divided into three subsectors: the central government, local government, and the social security funds. Thus, the saving of general government is the sum of the savings of the three subsectors.

Figure 6.6 shows the fluctuations in the saving rates of these subsectors, defined as ratios to national disposable income. The saving rate of the central government went negative after 1975, just after the first oil crisis, because of the contraction of tax revenue and the failure to cut government expenditure. But the deficit became smaller and the saving rate of this sector finally became positive in 1987. The saving rate of local government has expanded gradually since 1975 and has accounted for nearly 4 percent of national disposable income in recent years. The saving rate of the social security funds also has increased gradually; it reached more than 3 percent in 1991.

Who contributes to government saving in a specific year? Who dissaves government wealth? An answer is easiest to find for the social security funds.
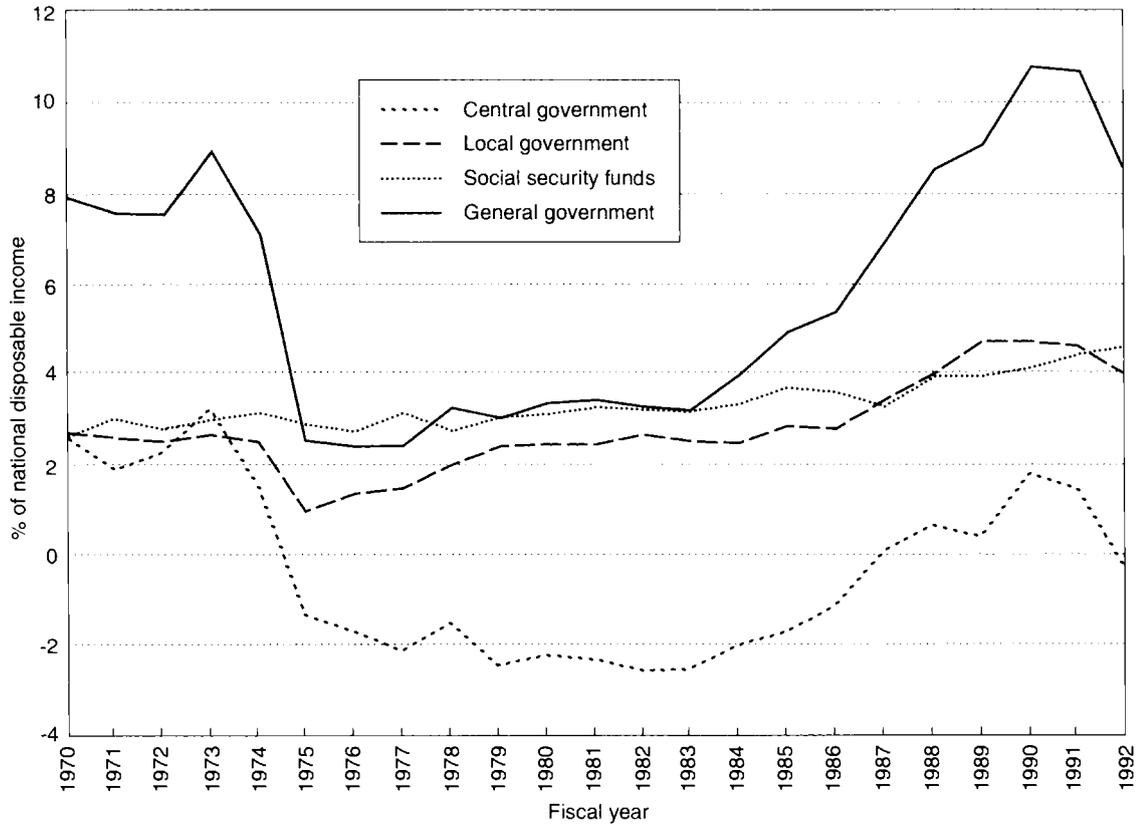
Fig. 6.6   Japan's government saving rates by institutional sector
Source: Economic Planning Agency, *Annual Report on National Accounts* (Tokyo: Government Printing Office, various years).

People of working age make positive contributions, whereas retired people, aged 65 or over, make negative contributions to these savings.

The tax burden for a specific age cohort can be estimated in a similar way. However, it may be difficult to estimate an age-cohort decomposition for government expenditure. Moreover, it is difficult to decompose future government saving by age cohort because we have to predict future government tax and expenditure policies almost perfectly to do so. But we could apply the generational accounting method developed by Kotlikoff and others (see, e.g., Kotlikoff 1992; Auerbach, Gokhale, and Kotlikoff 1991). It would be fruitful for examining the relationship between population aging and government saving, as well as for the evaluation of various policies.

6.4.4   Aging and the Social Security Funds

Two major components of the social security funds are the public pension system and the medical care program. Japan's public pension system consists of several different programs. The balance of the income-expenditure account of the social security funds reflects the balances of all individual programs. Currently, the social security funds have a fairly large surplus (positive savings) and accumulated wealth. However, we can reasonably predict that savings and wealth will decrease and eventually become negative as a result of the rapid aging of the population. Quite a few studies estimate in various ways intergenerational redistribution by means of the public pension system. The internal rates of return of public pensions have been calculated for various age cohorts. Takayama et al. (1990) calculated public pension wealth and the amount of intergenerational transfers using the microdata set from the NSFIE.

We can investigate how much population aging and some possible program reforms (changes of eligible age, rate of contribution, standard of benefit payments, etc.) affect the accounting balance of the social security funds. It is useful to calculate the positive and negative contributions by age group. It is almost certain that population aging will cause a sharp increase in medical care costs. In fact, medical care costs for the elderly are much higher than the average for all age groups. As for the public pension, we can estimate which age cohorts make positive or negative contributions to the medical care balance sheet.

Since the saving of the social security funds will eventually be distributed to the household sector at some time in the future, this saving may have a clearer correlation with household saving than does general government saving.[5]

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5. To test this, I estimated the household saving rate equations with the saving of the social security funds as one of the explanatory variables. The results show that the estimated coefficient is not significant, just like the coefficient for government saving as a whole. This implies that households do not necessarily take the accumulation of wealth in the social security funds into account in deciding their own saving rate.

6.5   Saving through Private Pension Plans

6.5.1   Development of Employer-Sponsored Pension Plans

In this section, I explore the impact of the development of employer-sponsored or occupational pension funds on national saving and capital markets. Saving through private pension funds has become more and more important in both the United States and Japan.

In the United States, private pension fund assets amounted to $2.3 trillion at the end of 1992. In Japan the one-time severance payment used to be more popular than payment in the form of a pension. Occupational pension plans, however, have recently become an important instrument of saving for retirement. Two major occupational pension schemes are tax-qualified pensions (TQP), or the Tekikaku Nenkin, and semipublic employee pension funds (EPF), or the Kosei Nenkin Kikin.

The TQP scheme was founded in 1962 to replace the traditional severance payment system, whereas the EPF scheme was founded in 1966 to increase the standard of pension payment by combining employer-sponsored private pensions with public employee pensions. In 1992, there were 1,474 EPFs and 86,766 TQPs, covering 31 million employees, or approximately 60 percent of all private sector employees. The amount of accumulated wealth in various private pension funds has increased rapidly. The total amount of wealth accumulated by private pension funds was nearly 50 trillion yen at the end of fiscal 1992. For both EPFs and TQPs, life insurance companies and trust banks are responsible for fund management. Table 6.3 shows this upward trend.

The relative importance of pension fund reserves in household balance sheets is much smaller in Japan than in the United States. Table 6.4 shows this. In the United States, pension fund reserves were 21.4 percent of total household net wealth and 28.3 percent of household financial assets at the end of 1992. In Japan, outstanding employer-sponsored pension wealth was only 2.2 percent of net worth and 4.8 percent of financial assets.

6.5.2   Composition of Pension Wealth

The asset allocation of U.S. private pension funds is quite different from that of Japanese funds. Approximately 50 percent of the financial assets of U.S. pension funds are invested in corporate equities and mutual fund shares (see table 6.5). In Japan, approximately 25 percent of accumulated pension trust wealth is in corporate equities. The share of corporate equities increased gradually beginning in 1971, when the share of equities was only 6 percent. During the same time the share of loans decreased drastically, from 79 percent in 1970 to 14 percent in 1992.

Asset allocation is restricted by various regulations. In the case of Japan's pension trusts, risk-free assets (in the sense that the principal should be maintained) should account for 50 percent or more of total wealth. Moreover, do-

Table 6.3   **Accumulated Private Pension Wealth in Japan (billion yen and percent)**

End of Fiscal Year	Tax-Qualified Plans	Employee Pension Funds	Total Pension Wealth	Percentage of Household Financial Wealth	Net Yearly Increase	Percentage of Household Saving
1965	19	0	19	0.1		
1966	43	2	45	0.1	26	0.7
1967	78	15	93	0.2	48	1.2
1968	130	46	176	0.4	83	1.4
1969	196	100	296	0.5	120	1.8
1970	276	187	463	0.6	167	2.1
1971	375	315	690	0.8	227	2.5
1972	481	486	967	0.8	277	2.5
1973	613	714	1,327	1.0	360	2.4
1974	808	1,032	1,841	1.2	514	2.4
1975	1,040	1,438	2,478	1.4	637	2.6
1976	1,315	1,936	3,251	1.6	773	2.7
1977	1,633	2,536	4,168	1,8	917	3.1
1978	2,008	3,209	5,217	1.9	1,049	3.4
1979	2,478	3,997	6,475	2.1	1,258	4.4
1980	3,052	5,020	8,073	2.4	1,598	5.3
1981	3,707	6,167	9,874	2.6	1,801	5.4
1982	4,456	7,485	11,941	2.9	2,067	6.5
1983	5,277	8,986	14,264	3.1	2,323	7.2
1984	6,199	10,688	16,887	3.3	2.623	7.9
1985	7,188	12,596	19,784	3.5	2,897	8.4
1986	8,257	14,765	23,023	3.6	3,239	8.7
1987	9,432	17,161	26,593	3.7	3,570	10.3
1988	10,459	19,649	30,109	3.7	3,516	9.9
1989	11,859	22,488	34,347	3.6	4,238	11.0
1990	13,027	25,580	38,607	4.1	4,260	10.8
1991	14,095	28,820	42,915	4.3	4,308	9.7
1992	15,027	32,184	47,213	4.8	4,298	9.8

Source: Author's calculation based on SNA and data compiled by the Trust Association.

mestic corporate equities, foreign assets, and real estate should not exceed 30, 30, and 20 percent of total wealth, respectively.

The difference between the positions of U.S. and Japanese pension funds as institutional investors in capital markets reflects the difference between pension fund portfolios or asset mixes between the two countries. In the United States, private pension funds hold 22 percent of their total market value in the form of equities, while in Japan, pension funds hold only 1 percent of their market value in that form (see table 6.6).

The asset composition of employee pension funds is quite different from that of households. In the United States, households invested 22.4 percent of their net worth in equities (including equity in noncorporate business) and 8.4 percent in "credit market instruments" in 1992, while private pension funds

Table 6.4   **Household Sector Balance Sheet in the United States and Japan**

Component	1980[a]	1985[a]	1990[a]	1992[a]
U.S. Households				
Net worth (billion $)	9,644.3	14,072.3	18,839.3	21,414.4
Composition (%)	100.0	100.0	100.0	100.0
Reproducible assets	34.6	31.2	32.3	31.0
Land	14.3	15.9	14.1	13.5
Financial assets	66.3	69.8	74.2	75.6
Checkable deposits and currency	2.7	2.7	2.7	3.1
Small time and saving deposits	11.8	13.0	12.1	10.3
Money market fund shares	0.7	1.5	2.3	2.2
Large time deposits	1.2	0.5	0.6	0.0
Credit market instruments	5.8	7.3	10.0	8.4
Mutual fund shares	0.5	1.5	2.7	4.2
Corporate equities	11.5	11.5	9.8	11.8
Life insurance reserves	2.2	1.8	2.0	2.0
Pension fund reserves	9.5	14.2	17.5	21.4
Equity in noncorporate business	19.3	14.6	13.0	10.6
Security credit	0.2	0.2	0.3	0.4
Miscellaneous assets	0.8	0.9	1.1	1.1
Total assets	115.2	116.9	120.7	120.0
Total liabilities	15.2	16.9	20.7	20.0
Japanese Households				
Net worth (trillion yen)	856	1,237	2,393	2,180
Composition (%)	100.0	100.0	100.0	100.0
Inventory	1.0	0.7	0.4	0.4
Net fixed assets	16.7	13.8	9.5	11.2
Nonreproducible assets	57.7	56.1	64.0	58.4
Land	54.2	53.7	62.5	56.6
Financial assets	39.9	45.2	39.7	45.6
Currencies	1.8	1.6	1.3	1.5
Demand deposits	3.1	2.7	2.2	2.7
Time deposits	21.8	24.0	18.3	23.1
Long-term bonds	3.2	4.1	2.9	2.9
Corporate equities	4.7	5.3	6.8	4.9
Life insurance reserves	4.7	6.5	7.3	9.4
Pension fund reserves[b]	0.9	1.6	1.6	2.2
Miscellaneous assets	0.7	0.9	0.8	0.9
Total assets	115.2	115.8	113.6	115.6
Total liabilities	15.2	15.8	13.6	15.6

Sources: For the United States, Board of Governors of the Federal Reserve System, *Balance Sheet for the U.S. Economy* (Washington, D.C., 1993); for Japan, Economic Planning Agency, *Annual Report on National Accounts* (Tokyo: Government Printing Office, 1994).

[a]End of calendar year.

[b]Pension fund reserves are not included in net worth for Japanese households.

Table 6.5   **Asset Allocation of Private Pension Funds for the United States and Japan (percentage of total)**

Component	1980[a]	1985[a]	1990[a]	1991[a]	1992[a]
United States					
Checkable deposit and currency	0.9	0.5	0.5	0.7	0.7
Time deposits	5.3	9.5	7.6	4.8	4.9
Money market fund shares	0.6	0.9	1.4	1.0	1.0
Mutual fund shares	1.5	1.8	3.0	3.0	3.2
Corporate equities	47.6	44.5	46.9	44.3	44.8
Credit market instruments	32.2	29.1	28.6	28.6	28.1
U.S. government securities	10.8	15.0	14.5	13.2	13.0
Treasury issues	6.9	8.9	9.8	8.9	9.0
Agency issues	3.9	6.1	4.6	4.2	4.0
Tax-exempt securities	0.0	0.3	0.2	0.2	0.2
Corporate and foreign bonds	16.5	11.1	10.3	9.8	9.7
Mortgages	0.8	0.7	1.7	1.3	1.3
Open-market paper	4.2	1.9	1.9	4.2	4.0
Miscellaneous assets	11.9	13.6	11.9	17.5	17.3
Total	100.0	100.0	100.0	100.0	100.0
Japan					
Liquidity assets	0.5	2.3	2.1	2.1	2.4
Loans	37.4	20.3	14.1	13.6	14.0
Bonds	51.7	51.2	41.3	42.3	42.2
Corporate equities	9.2	16.0	25.9	25.8	25.0
Foreign bonds	0.6	9.5	16.0	15.6	15.7
Real estate	0.2	0.6	0.6	0.6	0.6
Total	100.0	100.0	100.0	100.0	100.0

Sources: For the United States, Board of Governors of the Federal Reserve System, *Flow of Funds* (Washington, D.C., various years); for Japan, data provided by individual trust banks.
[a]End of calendar year.

invested 44.8 percent of their wealth in corporate equities and 28.1 percent in credit market instruments (cf. table 6.4 with table 6.5). In Japan, households allocated only 4.9 percent of their net worth to equities and 2.9 percent to long-term bonds, whereas pension trusts allocated 25.0 percent of their assets to corporate equities, 42.2 percent to bonds, and 15.7 percent to foreign bonds (again, cf. table 6.4 with table 6.5). In sum, in both the United States and Japan, pension funds tend to allocate a larger part of their wealth to relatively long-term and risky assets than do households.

The difference between the asset portfolios of household investors and institutional investors such as pension funds may be explained by several factors. For instance, since the portfolio of an institutional investor is much larger than that of an individual, the former can allocate more of its wealth to risky assets. Economies of scale in investment may be important as well. Institutional investors may not be just intermediaries or agents of households, that is, "repositories" of household savings invested in capital markets.

Table 6.6   **Holdings of Corporate Equities at Market Value in the United States and Japan**

Investor	1980[a]	1985[a]	1990[a]	1992[a]
	United States			
Households	70.7	62.4	52.5	47.1
Foreign	4.1	4.9	6.6	6.5
Commercial banking	0.0	0.0	0.1	0.1
Mutual savings banks	0.3	0.2	0.3	0.2
Insurance	22.0	27.6	33.7	36.4
Life insurance companies	2.9	2.9	2.8	2.7
Other insurance companies	2.1	2.2	2.3	2.6
Private pension funds	14.2	17.9	20.1	21.8
Government retirement funds	2.8	4.6	8.4	9.3
Mutual funds	2.7	4.4	6.7	9.3
Brokers and dealers	0.2	0.5	0.3	0.3
Total	100.0	100.0	100.0	100.0
	Japan			
Households	27.9	22.3	20.4	20.7
Foreign	5.8	7.0	4.7	6.3
Commercial and trust banks	19.9	20.9	25.5	25.5
Securities investment trust	1.9	1.7	3.7	3.2
Pension trust	0.4	0.8	1.0	1.2
Insurance	16.1	16.5	15.8	16.2
Life insurance companies	11.5	12.3	12.0	12.4
Other insurance companies	4.6	4.1	3.9	3.8
Other financial institutions	2.3	2.4	1.6	1.2
Nonfinancial business	26.2	28.8	30.1	28.5
Government	0.4	0.3	0.3	0.3
Brokers and dealers	1.5	1.9	1.7	1.2
Total	100.0	100.0	100.0	100.0

Sources: For the United States, Board of Governors of the Federal Reserve System, *Flow of Funds* (Washington, D.C., various years); for Japan, Japan Council on Stock Exchange, *Equity Distribution Survey* (Tokyo, various years).

[a] End of calendar year.

6.5.3   Comparison of Individual Saving and Saving through Firm Pension Funds

Does the development of retirement saving through private pension funds affect individual saving behavior?

Pension plans are classified into two types: defined-contribution plans and defined-benefit plans. In a defined-contribution plan, contributions are determined by a formula agreed to by employers and employees. In a defined-benefit plan, the employee's pension benefit is determined by a formula that takes into account years of service for the employer and wages or salary. While defined-contribution plans are by definition fully funded, in the sense that the value of benefits equals that of the assets, defined-benefit plans can be funded to any degree (for details, see Bodie and Papke 1992). In Japan, so far as EPFs

and TQPs are concerned, most corporate pension plans are designed to be defined-benefit plans, and they must be fully funded in the sense that the discounted value of benefits is equal to the discounted sum of contributions.[6]

A simple life-cycle saving model can be used to explain how and to what extent the development of pension plans affects household and national savings. As summarized by Munnell and Yohn (1992), it may seem obvious that aggregate saving will be unchanged by the introduction of pension plans if (1) employees and employers correctly perceive the increase in future income encompassed by pension promises and reduce wages by an equivalent amount, (2) employees reduce their direct personal saving by the increased value of future pension benefits, and (3) the firm transfers to the pension fund or some other firm investment an amount equal to the pension promise.

However, the real world is more complicated than that, and saving through corporate pension funds is not necessarily a perfect substitute for private retirement saving. Important factors in the real world are favorable tax treatment for pension plans and uncertainty about benefits.[7]

In the statistical rules of the SNA, saving through EPFs is included in the saving of social security funds, which is a subsector of general government, while saving through TQPs is included in household saving from the start. Tax-free reserves by corporations to prepare for severance payments are classified as corporate saving.

Hence, if severance payments are replaced by EPFs, corporate saving would be replaced by government saving, whereas if severance payments are replaced by TQPs, corporate saving would be replaced by household saving.

6.5.4 The Impact of Aging on Capital Markets

Aging may affect individual saving behavior and asset markets and prices in two ways: first, through the change in individual portfolio choice—say a shift from bonds to equities as one grows older—and, second, through the behavior of employer-sponsored pension funds. In this section let us examine the latter.

A large fraction of financial assets in the United States is held by employer-sponsored pension funds, as we have already seen. These assets will be sold to finance pension benefits sometime in the future. When the number of retired elderly becomes larger than the number of employees, sales of assets by these funds will be large relative to purchases (saving to fund the future benefits of

6. However, a substantial number of EPFs and TQPs have failed to accumulate enough funds to meet future payments in these years because of historically low interest and weak asset market indices. Therefore, it is suggested that some defined-benefit pension plans be reorganized into defined-contribution plans.

7. How strong is the link between pension fund accumulation and household direct saving? To clarify this, I estimated a household saving equation using saving through corporate pension funds (defined as net yearly increase of managed assets) as an explanatory variable. The estimation results show that the coefficients on saving through corporate pension funds are statistically significant, and the values of these coefficients are much higher than unity. This implies that typical households see corporate pension programs as good substitutes for individual retirement saving.

current workers). Thus, the tendency will be for the price of assets to fall. This change in the market for financial assets could have a substantial effect on the accumulated wealth of the elderly.

The effects may differ between Japan and the United States. The negative impact on the capital market may be much smaller in Japan than in the United States. The reasons are as follows: First, in Japan the elderly tend to continue to save, or at least not dissave much, as discussed earlier. Second, it is highly likely that a substantial part of individual retirement saving will be replaced by compulsory or semicompulsory saving through employer-sponsored pension plans, which have a larger demand for corporate equities and long-term bonds. In the transitional period, the selling pressure on equities may be offset by the potential demand for them. Third, in Japan, the regulation of the asset composition of pension funds has been quite restrictive, but the possible deregulation of asset composition would encourage demand for corporate equities. While it is difficult to estimate the possible effect of such deregulation on investment, the present asset mix of U.S. pension funds gives us a good hint. As we have already seen, U.S. pension funds allocate approximately half of their assets to corporate equities. There must be a fair amount of room for Japanese pension funds to increase the share of equities in their portfolios.

6.6   Conclusions

One of the purposes of this paper was to find some statistical evidence about the effects of population aging on national saving, corporate pension funds, and asset accumulation. I have examined these, using the System of National Accounts, Flow of Funds, and Family Savings Survey in Japan and the United States. The main findings of the empirical investigations are as follows.

First, microdata on household saving and wealth by age do not show that the elderly dissave or decumulate their assets drastically in Japan. If this is really the case, aggregate household and national saving rates are not likely to decline sharply in the near future.

Second, indirect saving through employer-sponsored pension plans is gradually replacing a portion of individual direct saving in Japan, just as in the United States. Increasing pension fund wealth tends to lower the household saving rate, but it is not clear whether the growing popularity of corporate pensions lowers the national saving rate.

Third, the demand for corporate equities will increase rather than decrease as long as corporate pension funds cover more and more employees and have a positive attitude toward investment in equities, supported by deregulation of investment. Therefore, in Japan, it is unlikely that the negative impact of aging on the capital market will be serious.

While I have emphasized the interrelationship of saving behavior among individual subsectors, I have not conducted exact statistical tests about this interdependence, apart from some preliminary time-series regression analysis.

Among the subsectors reviewed in this paper, the quantitative impact of aging on the saving behavior of the government sector is not yet clear. We have to develop some sort of simulation model to evaluate effects of aging on the government sector. Every topic listed here is of particular interest to us but is left for future work.

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