

Chapter 8

Population aging and health care spending in Japan:

Public- and private-sector responses

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In many industrialized countries life expectancy at birth is rapidly approaching 80 years. Since the early 1980s Japan's life expectancy at birth has been at the highest level in the world. Despite their high health status, however, the Japanese people pay relatively little for medical care by international standards (Campbell and Ikegami 1998; Jeong and Hurst 2001; Imai 2002). In 2002, for example, Japan's total medical spending as a share of GDP was 7.9 percent, below the OECD average of 8.6 percent.

Since establishing universal medical insurance coverage in 1961, the Japanese government has adopted numerous policy measures and programs to contain the costs of medical care. The majority of the policy and program changes have been made since the early 1980s, when the formidable problems of population aging facing Japan in the twenty-first century began to attract the attention of policymakers. Given that Japan's population aging is the most advanced of all the industrialized countries and is projected to increase

for the next few decades (Ogawa 2005), it is highly likely that the country's medical insurance plans will be further modified in the years ahead.

Although a considerable amount of empirical work has been undertaken to quantify the effects of population aging on the costs of medical care in Japan (Ogawa 2003; Ogawa et al. 2003; Cabinet Office 2005), none of the empirical studies has dealt separately with rising public and private medical costs. In this chapter we employ a new methodological approach to examine how, and to what extent, the public and private sectors have been affected by the government's policy and program changes in response to Japan's unprecedented population aging.

For this purpose we shall first discuss the key health care policies and programs that have effectively kept Japan's spending on medical care at a relatively low level in the postwar period. Then, using microlevel data derived from four rounds of the National Survey on Family Income and Expenditure, and drawing upon the newly developed framework of the National Transfer Accounts (NTA) system, we shall estimate the changing age profile of intergenerational transfers of both private and public health care resources over the period from 1989 to 2004. Finally, we shall relate our previous discussion of past policy developments to the computed results.

In the next section we briefly review the two crucial factors influencing Japan's medical expenditures over the past few decades: the country's demographic transformations and its economic growth performance. Then, in the following section, we briefly describe Japan's medical insurance plans and discuss some of the basic features of those plans. Next we present an analysis of Japan's deteriorating demographic capacity for family support and the abrupt value shifts related to the provision of in-home care by adult

children for their elderly relatives; and we follow this analysis with a discussion of our data sources and several methodological issues. The two subsequent sections examine our estimated results based on the age profiles of private and public health expenditures and present an analysis of the net flow of private and public health spending. In the final section we summarize our principal findings and discuss their policy implications.

Although the chapter focuses on Japan and its medical-policy responses to population aging, its situation is relevant to other developed societies, which also must cope with mushrooming medical costs. Japan's medical and health policy responses to its rapid population aging are also likely to serve as a useful model to an increasing number of developing countries, particularly in Asia, that are undergoing rapid demographic transformation and in the process of establishing their own medical-insurance schemes. Despite its rapid economic development, Japan has retained some of its traditional cultural values; and for that reason the Japanese medical care model may be of interest to policymakers in the developing region who wish to combine the best of traditional and modern approaches to providing health care services to the elderly.

Recent demographic developments and economic growth in Japan

Immediately after its short-lived baby-boom period (1947–49), Japan experienced a dramatic fertility decline (Retherford and Ogawa 2006). Between 1947 and 1957 the total fertility rate (TFR) declined by more than 50 percent, from 4.54 to 2.04 births per woman. Subsequently there were only minor fluctuations around replacement-level fertility until the first oil crisis in 1973. Thereafter the TFR started to fall again and in 2005 reached 1.26 births per woman, which was an all-time low in postwar Japan.

Although Japan's recent very low fertility has attracted a great deal of attention domestically and internationally (Retherford and Ogawa, 2006), much less attention has been paid to the unprecedented rapidity of its mortality transition. Between 1947 and 2005 life expectancy at birth in Japan rose from 50.1 to 78.5 years for men and from 54.0 to 85.5 years for women. Thus male life expectancy became the fourth highest in the world, after that of Hong Kong, Iceland and Switzerland; and female life expectancy became the world's highest. Moreover, between 1947 and 2005, Japanese life expectancy at age 65 grew from 10.2 to 18.1 years for men and from 12.2 to 23.2 years for women, indicating a marked increase in the retirement period and in the joint survival to older ages of both husbands and wives.

Figure 1 plots the data on the average age of the 50 oldest Japanese men and women to die in each year over the period from 1950 to 2004. For both sexes the average age at death among the 50 oldest persons rose substantially in Japan over the second half of the twentieth century. Moreover, the plotted average age trends indicate that the tempo of life prolongation has increased considerably for both sexes since 1973, when Japan's medical programs were substantially upgraded to include free medical services for persons aged 70 and over (Ogawa 2005).

[Figure 1 about here]

Because of these dramatic improvements in longevity, the age distribution of the Japanese population has also been changing significantly over the past several decades. The relative size of the young population has declined, while the relative size of the elderly population has increased. In 1984 the elderly (those aged 65 and over) accounted for only 10 percent of the population, less than in other industrialized countries. Despite this

delayed onset of population aging, in 2005 Japan became the first country in which the aged comprised more than 20 percent of the population. In contrast, in 2005 the proportion of those in the 0–14 age group was 13.7 percent, the lowest in the contemporary world. These demographic developments imply that fewer children will be available to provide familial support and pay taxes when they mature, and the deficit will strain the public support system in the years to come. Policy responses to these population changes will influence the Japanese economy, intergenerational equity and social welfare for decades.

Japan's changes in age composition since World War II have occurred in parallel with spectacular economic growth. At the close of the war the Japanese economy was severely damaged, but by the end of the 1950s its productive capacity had recovered to the prewar level. During the 1960s Japan's real GDP grew at a phenomenal rate of about 11 percent per annum. After the first oil crisis in 1973, however, its economic growth performance became much less impressive. The average annual growth rate of real GDP was 4.2 percent in the 1980s.

Following the Plaza Accord in 1985, the Japan entered into a bubble economy, but the investment boom ended abruptly in the early 1990s and a number of leading banks and other financial institutions declared bankruptcy. Government tax revenues dropped dramatically and government debts accumulated at an unprecedented rate, reaching US\$8.3 trillion in 2005, or approximately 1.5 times the country's GDP for that year (Ministry of Finance 2006). Japan's current government debt is by far the worst among the industrialized nations. Moreover, its international competitiveness has deteriorated. In the early 1990s the Japanese economy was ranked first in international competitiveness, but by 2006 it was ranked seventeenth (IMD 2006). In addition, the household savings rate has

been on a downward trend in recent years. In 2000 it was 9.8 percent, but by 2004 it had declined to 2.8 percent (Cabinet Office 2006).

Unfortunately the Japanese government implemented a series of inappropriate macroeconomic policies to rectify these unfavorable economic conditions. It took the government several years to realize that drastic economic-restructuring policies were needed to make the economy more competitive in international markets. Because of the government's delayed policy responses, some economists call the 1990s 'Japan's lost decade' (Yoshikawa 2001). Since 2002, however, the Japanese economy has been slowly improving, thus recording the longest postwar boom.

The government medical program

The government instituted both a universal pension scheme and a medical program in 1961. Since then Japan's Social Security system has grown remarkably. It encompasses not only those two components but also the Long-term Care Insurance Scheme (implemented in 2000) and other smaller programs such as the Employment Insurance Scheme.

As shown in Figure 2, the share in GDP of Social Security expenditures accounted for by the two main components has changed substantially over time. In 1970 pension benefits paid out corresponded to 0.65 percent of GDP, whereas the medical benefits paid out amounted to 2.79 percent of GDP. By 2003 the expenditures for pension benefits had increased to 8.20 percent of GDP and the medical benefits had increased to 6.52 percent. The major shift toward pension benefits has occurred mainly because of population aging and the maturation of the pension system. In addition, major policy and program changes

have been made in the medical plans to rein in snowballing health costs, as we shall discuss below.

[Figure 2 about here]

Unlike the United States, where market forces are favored in the development and allocation of health resources, Japan has a health care system that is highly regulated by the government, combining a mainly private provision of services with mandatory health insurance (Imai 2002). Because Japan's health insurance plans are occupation-specific, most enrolment is automatic, and there is little choice of coverage for either consumers or insurers. Five major health insurance plans are currently in operation. The association-managed Health Insurance Plan (AHIP), the government-managed Health Insurance Plan (GHIP), and the National Health Insurance Plan (NHIP) are the three largest; and together they cover 87 percent of the population. Employees of large-scale enterprises are enrolled in the AHIP, and employees of small or medium-sized businesses are enrolled in the GHIP. Persons not covered by other plans are enrolled in the NHIP. Members of the NHIP tend to be older than those in the other plans, primarily because a large proportion of NHIP members are self-employed small-business owners and farmers.

Under all of these plans, service providers (hospitals and clinics) are paid directly by insurers (the third-payer system). Nearly all prices are strictly controlled by a fee schedule, and fees for various medical services are set out in the schedule. Any extra charges (or 'balancing billing') are prohibited. The fee schedule, which is revised every two years, is determined through negotiations between insurers and the providers. As is generally the case in Europe and elsewhere, the process of setting fees is highly political. Nevertheless the priority placed on fairness and political 'balance' among constituents

helps to contain costs and to ensure access to health care in Japan (Campbell and Ikegami 1998).

As a result of the policy emphasis on egalitarianism, quality tends to be sacrificed as Japanese physicians increase their caseloads to maintain their income. This emphasis can be seen as a side-effect of the spending-control mechanism that operates through price fixing by the government. Thus the practice of giving ‘gifts’ to physicians in exchange for high-quality medical services is widespread. According to one estimate for the year 1990 (Campbell and Ikegami 1998, 5), the total amount of such monetary gifts roughly corresponds to 0.1 percent of GDP. Dissatisfactions with the system that are often voiced by patients include a long waiting time, short consultation time, insufficient explanation by doctors and lack of medical information for the patient (Imai 2002). Although evidence is rather limited, it is generally believed that the percentage of patients who are satisfied with their health care system is lower in Japan than in North America or Western Europe (McKinsey Global Institute 2000).

In 2005 the medical plan premium was 8.2 percent of a worker’s earnings for both the AHIP and the GHIP (Health and Welfare Statistics Association 2006). The cost of the premium is split between employee and employer, and the government provides small subsidies to cover administrative and management costs. In the case of the NHIP the amount collected from each household varies, depending on the household’s annual income and assets. In addition the government provides the GHIP and NHIP with subsidies from the regular General Account budget, and the amount of the subsidies is calculated as a fixed percentage of outlays as stipulated by law. In the case of the AHIP the government subsidizes part of its administrative costs.

Since the establishment of universal health coverage in 1961, many revisions have been made to the government medical plans (Table 1). The country's extraordinary economic growth performance during the 1960s led to the provision of free medical care services for persons aged 70 and over beginning in early 1973. As a result of slower economic growth triggered by the first oil crisis in late 1973, however, the provision of free medical care services for the elderly was abolished in 1983; and elderly patients were required to make nominal contributions. Initially, the amount of the contribution was 400 yen (approximately US\$2, based upon the 1983 exchange rate) per month for outpatients and 300 yen per day for inpatients. Since then the contributions have been raised periodically, as indicated in Table 1.

[Table 1 about here]

Younger patients too were required to share the increasing medical costs. In 1984 a 10 percent co-payment was introduced into the health insurance plans. The amount of the co-payment was raised to 20 percent in 1997 and to 30 percent in 2003. Starting in 2002 elderly patients were required to make a 10 percent co-payment, and in October 2006 the co-payment for the elderly was raised to either 20 percent or 30 percent, depending upon their annual income.

In 1983 another major change was introduced into the Japanese medical care system. The Health Service System for the Elderly, a new account specifically for persons aged 70 and over, was established. Because of the NHIP's lower premium rates and older age composition, its financial foundation was weaker than that of the other four plans and required heavy government subsidies from its inception. To ease NHIP's financial difficulties, the four other medical plans for employees have been required to make

contributions to the NHIP since 1984, compensating for differences in age composition between the plans. As shown in Figure 3, since 1984 the costs of the Health Service System for the Elderly have been growing rapidly. Hence the patterns of cost growth for the components of the medical care system have varied considerably ever since, although the total medical costs (in nominal terms) have been rising continuously throughout the period under review.

[Figure 3 about here]

As a consequence of the establishment of this special account for the elderly under the NHIP, the financial situation of the AHIP, which has the youngest age composition, has deteriorated rapidly. Various proposals to integrate the five plans into one unified plan are currently under discussion.

A few points of interest emerge from the data from four countries plotted in Figure 4. Japan's ratio of the total health expenditure to GDP has been at a relatively low level by international standards, particularly compared with other industrialized countries. As can be seen from Figure 4, the pattern of growth of Japan's health care spending relative to its GDP changed substantially beginning in the early 1980s. From 1960 to 1980 it increased from 3 to 7 percent. Over the subsequent period, 1980–2002, it grew only marginally, from 7 to 8 percent. A primary factor contributing to this slowing of the growth trend of health costs has been tighter control by the government over an increase in the price index for the fee schedule.

[Figure 4 about here]

The price index for the fee schedule of Japan's medical services rose rapidly in the late 1960s and during the 1970s, but its growth slowed thereafter (Figure 5). More

importantly, the fee schedule was adjusted downward by 1.3 percent in 2002 for the first time in the history of Japan's health insurance system. In 2006 it was further lowered by 1.36 percent.

[Figure 5 about here]

Despite the implementation of cost-containment measures through the adjustment of the fee schedule and co-payments, total expenditures on medical care have been rising (see Figure 3). Numerous factors are considered to be responsible. Among them are rapid population aging, remarkable medical technological progress and the changing pattern of Japan's morbidity and mortality (Campbell and Ikegami 1998). Apart from these factors, improved availability of medical services has led to a rise in cost. In 1970 the government adopted a new policy for increasing the number of physicians through an expansion of the education program. Its goal was to raise the service ratio of physicians from 127 to 150 per 100 000 population by 1985. This target was achieved in 1983, and by 2002 the ratio exceeded 206 per 100 000, resulting in an excess supply of physicians.

As mentioned earlier, Japanese physicians tend to provide excessive medical services with a view to increasing their income, and this in turn leads to a rise in government medical expenditures. Primarily to put a brake on the escalating cost of health care, and partly to avoid possible unemployment among physicians, in 1995 the government reduced the number of students admitted into medical schools by 10 percent.

Another cause of rising medical costs, which is related to the supply side of health care services, has been the rapid increase in the number of hospital beds and their utilization. The number of hospital beds per 100 000 people rose from 735 in 1960 to 1331 in 1988 (Health and Welfare Statistics Association 2006). In parallel with the fast growth in

the number of hospital beds, the average length of stay in inpatient-care institutions became by far the longest among all the industrialized countries (Figure 6). Because inpatient services are substantially more costly than outpatient services, the cost related to hospitalization was a main cause of the rising total medical expenditure in Japan until the late 1980s.

[Figure 6 about here]

Why did the Japanese people stay in hospitals for such long periods? One explanation lies in the phenomenon known as ‘social hospitalization’. The Japanese people believe that a social stigma is attached to the word ‘institution’. Psychologically the word ‘hospital’ is more acceptable to families caring for the elderly than the word ‘institution’. The proportion of the elderly institutionalized has been strikingly lower than that for other industrialized nations (Campbell and Ikegami 1998). The other explanation, which is more cogent, is that because there was a severe shortage of long-term care facilities for the elderly, the overwhelming majority of older inpatients received medical care at general hospitals, substantially raising the average duration of hospitalization. For example, in 1985 the average length of hospitalization for those aged 65 and over was 87 days, as compared with 11 days for those aged 0-14 (Health and Welfare Statistics Association 1988). To reduce the duration of hospitalization, the government made numerous policy and program changes. One of them, approved in 1983, was to establish institutions for the long-term care for the elderly. In 1987, among the country’s 9841 hospitals, only 8.5 percent of them specialized in providing long-term geriatric care; by 2004 that proportion had grown to 47.3 percent (Health and Welfare Statistics Association 2006). The elderly

who receive long-term geriatric care are required to pay considerably more than their counterparts who receive in-patient services at ordinary hospitals.

In addition, because institution-building is a slow process, and Japan's population aging was expected to accelerate during the next few decades, the government emphasized in its 1987 White Paper on Health and Welfare that responsibility for looking after elderly patients should be shifted from hospitals to family caregivers, who are usually middle-aged women. To facilitate this transfer process, the government increased its budgetary allocation for the social service programs for elderly patients through its ambitious ten-year project called 'the Gold Plan' for the period 1990–2000. Through this plan, central and local governments improved the number and quality of such social services as home-helpers, short-stay facilities, and day-care centers for the elderly.

In 2000 the government initiated the largest and most radical program of mandatory long-term care insurance in the world (Campbell and Ikegami 2000). The primary objective of the Long-term Care Insurance Scheme is to improve the quality of care for the elderly by eliminating inefficiencies that have resulted from the intermixing of medical treatment and long-term care functions. The scheme collects obligatory insurance contributions from a broad sector of the population (all persons aged 40 and over). The benefits provided include such services as home visits by home-helpers, visits to day-care centers, and long-term stays in nursing homes for older persons who are bedridden or suffer from senile dementia. However, because the demand for such services increased much more quickly than had been anticipated, the sustainability of the scheme was threatened; and so the government adjusted downward the benefits for mild cases. The revised program for elderly people with less severe handicaps went into effect in April

2006. It provides such preventive services as training to increase strength, nutrition, and oral care (how to chew, etc.).

As a consequence of these policy changes, the average hospital stay has been declining since the late 1980s (Figure 6). To reinforce this trend the government implemented a new cost-containment scheme, called the ‘Diagnosis Procedure Combination’, in 2003. Under this scheme the cost of hospitalization is calculated on the basis of the number of days of hospital stay, and the weights assigned to the cost per day decline as the number of days increases. Although its impact on inpatient costs is expected to be substantial in the long run, the scheme was applied in only 82 large hospitals when it started in 2003. Although the number of hospitals enrolled in the scheme has been gradually increasing over the past few years, it is still too early to assess its effect.

Using a long-term simulation model developed by the Nihon University Population Research Institute (the NUPRI model), we have projected the total medical expenditure measured in nominal terms over the period 2000–25. The simulated result shows that the total expenditure on medical care is expected to rise almost 1.9 times over the 25 years. As a percentage of GDP, it is projected to grow from 5.6 percent in 2000 to 6.6 percent in 2025.

Deteriorating family support and normative shifts

In general Japan’s current demographic and economic characteristics are similar in many ways to those of other industrialized countries, but there are some important differences. Family organization is one example (Ogawa and Retherford 1993, 1997). Unlike Western European countries, multigenerational households are still fairly common in Japan (Ogawa and Ermisch 1996; Ogawa, Retherford and Matsukura 2006). According to the 2001 round

of the International Survey of Lifestyles and Attitudes of the Elderly (Cabinet Office 2002), the proportion of persons aged 60 and over who were living alone in Japan was only 10 percent in that year (Figure 7). By contrast, corresponding figures were 36 percent for Germany, 40 percent for the United States and 42 percent for Sweden. Owing to rapid demographic shifts and changing lifestyles, however, the proportion of the elderly living alone in Japan has been steadily rising over the past two decades. Although the Japanese government often views the low level of one-person households among the elderly as a unique asset that can be tapped to offset the adverse effects of population aging on the sustainability of the Social Security system (Ministry of Health and Welfare 1978), the validity of this view has become increasingly questionable as the process of population aging advances.

[Figure 7 about here]

In addition, social values among the Japanese people have been changing rapidly over the past few decades. Some of the important value shifts are well captured in time-series data gathered in a series of nationwide surveys concerning fertility and family planning, which the Mainichi Newspapers have conducted every other year since 1950 (Population Problems Research Council 2000). Since 1963 successive rounds of these surveys have included a question on the attitude of married women under age 50 toward taking care of aged parents. The precoded response categories are (i) 'good custom', (ii) 'natural duty as children', (iii) 'unavoidable due to inadequacy of public support resources', and (iv) 'not a good custom'. The results, plotted in Figure 8, indicate that the proportion of respondents who believed that providing care for elderly parents was either a good custom or children's natural duty was, by and large, stable over the period from 1963

to 1986. Between 1986 and 1988, however, a dramatic decline occurred in this proportion, and the trend is still under way. The two years between 1986 and 1988 correspond to the period when the government shifted more of the burden of care for the elderly from the state to families. It is conceivable that the middle-aged women responded negatively to that change.

[Figure 8 about here]

Despite these normative shifts on the part of potential caregivers, as the aging process advances, the number of elderly patients who need intensive nursing is expected to increase at an alarming rate. Using the NUPRI model, we estimated the number of those aged 65 and over who will be bedridden or suffer from senile dementia during the next 25 years, assuming that the age-sex-specific pattern of the incidence of these cases remains unchanged throughout the projected period. The number of bedridden patients, either at home or at medical institutions, will grow 2.2 times, i.e. from 1.25 million in 2000 to 2.70 million in 2025. The total number of senile dementia cases will increase 2.4 times, from 1.64 million to 3.99 million during the corresponding period.

Substantial proportions of these elderly patients have been and will be looked after at home by their adult children, particularly by middle-aged women who are not in the labor force. Bearing this family-support pattern in mind, we have projected the ratio of elderly patients at home to women at various ages outside the labor force. The estimated results are shown in Figure 9. As indicated, the ratio of the aged at home who are bedridden or suffer from senile dementia to women outside the labor force has grown over time. For instance, approximately one out of every seven women aged 40–49 assumed responsibility for taking care of one infirm elderly person at home in 2000, but almost half

of the nonworking women of this age group are likely to provide in-home care to elderly patients in 2025.

[Figure 9 about here]

These results indicate a dramatic rise in the burden placed upon middle-aged Japanese women providing in-home nursing for the infirm elderly. They are subject to revision, depending upon the future direction of the Social Security system, family policies and employment practices.

Data sources and methodology used to compute health expenditures

Although many factors affect health expenditures, age is one of the most important. It is closely related to the incidence of illness, and often illnesses that affect the elderly are the most serious and costly to treat. Thus in Japan, as in most other countries, the elderly consume a disproportionate share of health care services, and population aging will likely lead to an increase in the share of GDP devoted to health.

Although the elderly consume health care services, they do not necessarily bear the costs associated with providing those services. As explained above, a substantial portion of health care spending in Japan occurs through public health schemes that are heavily subsidized by taxpayers, and health insurance has provided especially attractive terms for the elderly, thus sheltering them from those costs. Some portions of health care costs are also borne by non-elderly Japanese through private transfers. The remainder of this chapter focuses on analyzing health-expenditure data for the years 1989, 1994, 1999 and 2004 with the aim of exploring how health care consumption and costs have varied by age and how they are likely to change over the next few decades.

The analysis presented here is part of a larger effort to understand how public and private consumption vary by age, how this leads to intergenerational transfers to the elderly and to children, how the methods used to effect intergenerational transfers are changing, and how these changes will interact with population aging to influence economic growth and intergenerational equity in Japan (Ogawa et al. 2006). This work is being done as part of a larger international effort to construct a system of National Transfer Accounts that measures the reallocations of resources across age groups in a manner consistent with National Income and Product Accounts (Mason et al. forthcoming). The health sector is an important component of this work because health consumption by the elderly (and the very young) is quite significant and because so much of health care spending is financed through transfers from one age group to another.

The methodological details involved in estimating National Transfer Accounts are available at the website for the National Transfer Accounts (NTA) Database, www.ntaccounts.org, and will not be repeated here. In addition, important methodological details that apply only to the analysis for Japan are presented at that site (in particular the supplementary material to the working paper on Japan health spending).

An important component of the analysis presented here comprises estimates of private and public consumption of health care services for individuals classified by single years of age for 1989, 1994, 1999 and 2004. To estimate age profiles of private consumption we draw heavily upon household data gathered in the four rounds of the National Survey on Family Income and Expenditure (NSFIE). Unfortunately, the NSFIE data on private health expenditure are available only for households and not for each

household member. For that reason we are not able to calculate the medical expenditure for each individual in a straightforward fashion.

To overcome this data limitation, we have employed the estimation methodology previously used by Mason et al. (forthcoming) to link the household's private health expenditure to the individual level. Regression techniques are employed to allocate the observed expenditure in each household to its members, yielding an estimate of health spending for individuals. The estimated values are used to estimate per capita spending on health care by single year of age. We have experimented with alternative specifications, and most have produced similar results. The final per capita age profiles have been adjusted proportionately to match aggregate control totals based on National Income and Product Accounts for Japan. A detailed discussion pertaining to this adjustment process is available at the NTA Database website, www.ntaccounts.org.

The Statistics Bureau of the Japanese government has been conducting the NSFIE at five-year intervals since 1959. One of the primary objectives of the survey is to shed light on the structure of household economies and the regional differences in family incomes and expenditures, principal durable goods owned, and assets and liabilities.

A comparable sampling framework was applied to the four rounds of the NSFIE, which we have used in the present study. For expository purposes we discuss the 2004 round, which is similar in all important respects to earlier rounds analyzed here. The sample size of the 2004 wave of the NSFIE was approximately 55 000 private households with two or more members and about 50 000 one-person households. The sampling ratio for one-person households was considerably greater than that for multi-person households. For each household type, the selection procedure was a stratified random sampling based

on geographical locations. Because it is difficult to design the stratified random sampling procedure based upon geographical locations without creating some variability in sampling ratios over the regions, the NSFIE is subject to the regional variability of sampling ratios. For this reason, when microlevel data from the NSFIE are analyzed, each observation needs to be properly weighted. Private households with two or more members were surveyed for the period of three months from September through November 2004, and one-person households were surveyed for the period of two months from October through November 2004.

The age profile of public consumption of health services is estimated from administrative records on health care services provided directly by governmental units and from information about reimbursement of public health insurance programs detailed above. The value of services provided by private providers but reimbursed by public health insurance is counted as public health consumption in these accounts. The age-profile data are relatively complete and individual-specific rather than household-specific. Detailed sources are provided in the supplementary material on the NTA Database website.

National Transfer Accounts are constructed so as to be consistent with National Income and Product Accounts. Estimates based on the microlevel data derived from each round of the NSFIE need to be scaled up to the national level. To fulfill this task we have explored using two major data sources of private health expenditure, i.e. data from the *Annual Report on National Accounts* (2006) published by the Cabinet Office, and data from the Ministry of Health and Welfare (later renamed Ministry of Health, Labor and Welfare). These two data sources provide data on the aggregate household health expenditure on a time-series basis. Figure 10 compares the aggregate data from these two

sources over the period 1980–2003. Because the personal health-related expenditures reported in the national income accounts include all spending on health at the familial level, they cover the costs for medical treatments at medical institutions as well as costs for the purchase of nonprescription drugs. In contrast, the data on personal expenses gathered by the Ministry of Health, Labor and Welfare cover only the costs of medical treatments at medical institutions. This is due to the fact that the data compiled by the Ministry are generated from information on costs covered by patients. In view of these differences in the coverage of the two data sources, we have opted to use information from the National Accounts as macroeconomic control variables. Public consumption includes reimbursements from national health insurance programs.

[Figure 10 about here]

Estimated age profiles of private and public health expenditures

The age profiles of health spending in Japan are similar in broad respects to those found in other industrialized countries. Young children, particularly those 0–4 years old, are much more costly than older children. Between the ages of 10 and 40 health spending is relatively steady and low. The amount of spending increases with age after age 40, rising to ever higher levels. In 2004 individuals in their 70s, for example, consumed 4.3 times as much health care on average as individuals in their 30s.

Given that health care is consumed much more by the elderly than by the young, it is virtually certain that health care spending will increase as Japan's population ages. The age profiles of spending, however, are changing and will continue to change in the future, responding to important features of Japan's health care system and health care policy. First, unlike the United States, where the prices of medical services are determined to a

greater extent by the interplay of demand and supply, the Japanese government controls the prices of health care services. Second, Japan has national health insurance that covers virtually everyone whereas the US public system is primarily a system for the elderly. As is shown below, however, the role of the public sector varies considerably with age. Third, the Japanese government is heavily involved in controlling the supply of services from determining how many health personnel will be trained to determining what kinds of services will be provided and under what conditions.

Although the public health care system in Japan is nearly universal, the private sector is far from negligible. Private health care consumption as a percentage of total health care consumption has varied between 24 and 29 percent according to our calculations, but the relative importance of the private sector varies with age. For young children only, private consumption of health care represents more than half of total health care spending. For older children and non-elderly adults, private consumption varies between about 30 and 40 percent of total health care spending. As people age, the public sector becomes increasingly dominant, with public consumption accounting for 90 percent or more of total consumption for those 85 and older. Thus the age profiles of health expenditure are very different for private consumption and public consumption, and hence we estimate and discuss them separately. The profiles have been estimated for four years—1989, 1994, 1999 and 2004—and cover a period during which Japan has been trying to prepare for the rapid population aging that is coming. The estimated results are displayed in Figures 11 and 12.

[Figure 11 about here]

As shown in Figure 11, private consumption of health care by young children is very high as compared with consumption by older children and younger adults. Private consumption begins to rise from about age 40 and reaches a peak at about age 65. Thereafter private consumption declines steadily up to age 80 and beyond, depending on the year of the survey. In every year analyzed, private spending on the health care of the elderly is less than private spending on the health care of young children, although total spending on the health care of the elderly is substantially greater. Again, medical services for the elderly are much more heavily subsidized than are medical services for their younger counterparts.

The trends in health care spending between 1989 and 2004 were very different depending on age. For those under the age of 35, the period was one of remarkable stability. On average, real per capita spending increased by 0.2 percent per year during the 15-year period analyzed. There were some noticeable changes during the period, however. Per capita private spending declined considerably at younger ages between 1989 and 1994 and then recovered over the next ten years. These changes seem to be explained by the bursting of the bubble economy in the early 1990s and the slow economic recovery after the turn of the century.

The trend in private health care spending for the elderly is quite different, reflecting not only the price constraint imposed by public policy but also the many changes in the extent of subsidies outlined above. In real terms, per capita private health spending increased significantly between 1989 and 1994 and again between 1999 and 2004. During the 15-year period as a whole, the age profile for those 65 and older shifted upward at an annual real rate of 8.6 percent.

What explains these trends? As mentioned earlier, the government raised co-payments from 10 to 20 percent in 1997 and from 20 to 30 percent in 2003; and the impact of these changes can be observed from the response of those aged 40 and over. The changes were even more pronounced for the elderly. As shown in Table 1, the cost-sharing program for the elderly aged 70 and over had been repeatedly revised upward, and a 10 percent co-payment (and a 20 percent co-payment for those with higher income) was imposed upon elderly patients in 2002. Evidently these program and policy changes have had a very substantial impact on private health expenditure.

As compared with the private health expenditure, the age profile of public expenditure shows a very distinctive J-shape. Per capita public health spending is relatively low among children and younger adults, but then rises sharply with age, particularly among those who are 70 and older, as shown in Figure 12. Per capita public health expenditure increased significantly between 1989 and 1994, mainly because of the changes in the fee-schedule and also the introduction of the Gold Plan in the 1990s. Between 1994 and 1999 per capita public spending was relatively stable, especially at older ages. Although it is not obvious from the figure, per capita spending for many non-elderly adults and older children declined by as much as 15 to 20 percent during that period. The changes—and lack of change—during the period reflect the tight controls maintained on prices and increases in the share of costs borne by patients. The only group to experience a significant increase in per capita public health spending during the period was those aged 2 and under.

[Figure 12 about here]

Further retrenchment occurred between 1999 and 2004. The declines in per capita public health expenditure were concentrated among the elderly. The introduction of the Long-term Care Insurance Scheme is the principal reason for this decline, as indicated in Figure 3. Figure 12 shows the Long-term Care Insurance expenditure in addition to the public health expenditure. As discussed earlier, the Long-term Care Insurance expenditure has been increasing since the scheme's inception in 2000 owing to its unexpectedly high demand among the elderly. With the Long-term Care Insurance expenditure added, the total health care benefits received by the elderly are much higher than those in 1999.

If we consider the 15-year period—and ignore long-term care—Japan has successfully maintained a cap on health spending. For adults in the 21–59 age group, the age profile increased by 0.9 percent per year during the period. For those in the 60 and older age group the age profile shifted upward by 0.5 percent per year during the period. General prices over the same period increased at an average rate of 0.63 percent per year. For the most part, then, per capita public spending on health did not increase. The only exception to this generalization is that for children public per capita spending increased moderately, at 2.8 percent per year.

Who pays for health care now and in the future?

To this point the analysis has been limited to estimating consumption of health services by age. For the most part, however, those who are paying for health care services are not the same as those who are receiving the services. As we have already noted, more than 80 percent of total expenditures on health care is funded by taxpayers. Moreover, some portion of private spending is borne by family members other than those receiving the services, mainly the adult children of the elderly. The purpose here is to assess the extent

to which the costs of health care services are being shifted across age groups, primarily from children and the elderly to those in the working ages. Given the decline in the size of the workforce that Japan is experiencing, increases in health care costs will create fiscal problems to the extent that they are channeled through the public sector, and personal financial hardship to the extent that they are channeled through the private (familial) sector.

The estimates presented here are preliminary, and we anticipate that more refined estimates will become available as work on this topic continues. Again the analysis is based on methods developed as part of the broader effort to estimate National Transfer Accounts for Japan. The costs of public health care are borne by taxpayers. The age pattern of these costs depends on the system of taxation—that is, the resource being taxed, the variation in the resource by age and variation in tax rates by age. Japan's Social Security system, including public health insurance, is funded through taxes on labor income. We assume that the tax rate is independent of age. The age profile of labor income is estimated on the basis of the NSFIEs, as described above. The net flow of public spending is calculated as the value of public health care consumed by each age group less taxes paid by the corresponding age group to finance public health care consumption.

The same principles govern the calculation of private transfers, although the calculation methods are different. Private transfers reported here consist of only intrahousehold transfers. These we calculate at the household level using the NSFIE. Household members with personal income exceeding their consumption make transfers to members with consumption exceeding their personal income. We assume that health care transfers within the household are directly proportional to the share of health care in the

total consumption of the individual receiving the transfer. In other words, within-family transfers are not targeted at particular needs; but health care transfers will be larger if, as is likely to be the case, large medical expenses lead to an increase in intrahousehold transfers. The magnitude of private health care transfers is understated because interhousehold transfers in response to health care needs are not included in the calculation. A more detailed description of the methodology is available at www.ntaccounts.org.

Figure 13 shows aggregate annual private and public consumption of health care by age in Japan for each of the four years analyzed and net private and public health care transfers by age for each year. Aggregate private spending and public spending are calculated by multiplying per capita flows by the population in each age group. Net aggregate public and private transfers for health are also reported. A positive net flow indicates that the age group—including the young and the old in this case—has net transfer inflows. A negative value, experienced by those in the working ages, indicates that the age group is experiencing a net transfer outflow.

[Figure 13 about here]

The implications of population aging for aggregate health care consumption are starkly apparent if we compare 1989 (panel A) with 2004 (panel B). Health care consumption by the young and prime-age adults has changed little during this period as per capita health care costs have been kept in check and population size in many of these age groups has been relatively constant or declined. In contrast, health care consumption by the elderly has increased very substantially as a result primarily of an increase in their numbers. The relative importance of the public sector increases markedly with age. For the young and prime-age adults, public and private consumption are not greatly different, but

for the elderly the public sector dominates. Changes in public policy have shifted some consumption from the public to the private health sector, but the public sector remains dominant for the elderly.

Who pays for health care? The answer to this question is found by examining both net health care transfers and net health care consumption. Private expenditures on health care are equal to the difference between private consumption and private net transfers. This is most easily illustrated for children, who consume health care but do not pay for it. Rather it is primarily their parents (and grandparents) and taxpayers who bear the cost. As can be seen in the figure, net private transfers equal private consumption for children. Net private health transfers to the elderly are substantial, and their relative importance varies with age. Those in their 60s and early 70s are paying more than half of the cost of their health care, but the remainder is being shifted to younger adults—most often to adult children with whom the elderly are co-residing. The extent to which the elderly are self-sufficient declines fairly substantially at older ages.

The private costs of health care are borne by prime-age adults. Net private transfers reach their (negative) peak for individuals who are in their 30s and early 40s. Many are parents bearing the health costs of their children. At these ages private transfers for health more than exceed private consumption of health. The combined private cost is greater for these age groups than for any others in the population.

The series in Figure 13 are stacked to show total consumption of health care and total net health-cost transfers. Children do not pay for any of their health care costs, but the elderly pay for a portion of their own. The share of the total cost borne by the elderly declines substantially with age, to a greater degree than in the case of private spending. By

the time the elderly are in their 80s they are paying for only a small fraction of their health care costs. The remaining costs are shifted to prime-age adults.

Net public transfers and net total transfers reach their (negative) peak at a somewhat older age than net private transfers, because taxes to support health care are tied to labor income. As a consequence the largest share of health care costs is falling on older workers. This has been increasingly the case as population aging has occurred. Although our focus here is on health care spending, the same trend is characteristic of other social security-type spending. In 2004, for example, the Social Security benefits to the elderly were approximately 70 percent of total benefits, while the children received approximately 4 percent (National Institute of Population and Social Security Research 2006). Health care costs will prove to be increasingly burdensome as the number of elderly grows and the number of workers begins to decline. The extension of the retirement age may provide partial relief. This could eventually lengthen the negative net flow beyond 60 years of age. Nonetheless, much of the growth in population will be at older ages, when health care costs are high, and their costs will be borne entirely by older workers.

The effect of population aging on health spending was significant in 2004, as depicted in Figure 14. Using the profile for 2004, we have projected the net flow of health transfers to the elderly in 2025. The calculation shows that the net flow of health transfers to the elderly will almost double, while the net flow to prime-age adults will become an increasingly large deficit.

[Figure 14 here or above]

Summary and conclusion

It is well-known that Japan's medical care services are rather inexpensive by international standards, although the health status of the Japanese people is one of the best in the world (Campbell and Ikegami 1998). Over the past few decades Japan's population has been aging at an unprecedented rate, and its proportion aged 65 and over is currently the highest in the contemporary world. To shed light on how the Japanese health care system has been coping with the formidable pressure of rapid population aging over the past two decades or so, we have analyzed, by heavily relying upon the framework of the National Transfer Accounts system, the change in the age profiles of both private and public health expenditures over the period from 1989 to 2004. In addition we have discussed these intertemporal shifts in private and public health expenditures by linking them to the changes in health care policies and programs implemented during the same time period.

One of our major findings is that the stringent fee schedule has lent itself to effectively keeping the country's total health spending under tight control. The other finding is that a series of age-based policies and programs, such as the introduction of the co-payment system and the cost-sharing scheme for the elderly, have been effective in keeping the total medical expenditure within a manageable range. The Long-term Care Insurance Scheme has also played a significant role in mitigating the effects of population aging on the country's total medical expenditure over the past few years.

Many uncertainties characterize the future prospects of Japan's health care delivery system, particularly given the further acceleration of population aging in the years ahead. It is anticipated that the number of Japanese aged 65 and over will increase from 27 million in 2005 to 37 million by 2025. Not only is the number of the elderly projected to increase,

but also more advanced technological developments are anticipated in the medical field. Thus it is very likely that Japan's future medical care spending will continue to rise.

Although the Japanese health care system offers equitable access to the entire population at relatively low cost, it is conceivable that the government's huge deficits may lead to efforts to replace the public program with private health insurance. It is also possible that the balance-billing restriction may be removed with the passage of time.

To encourage higher fertility, a number of local governments have recently begun providing substantial subsidies to parents to cover the co-payment for medical care for children below age 15. In another policy change, in April 2006 the Japanese government drastically reduced the benefits available to the elderly through the Long-term Care Insurance Scheme, a move that is likely to mitigate the growth of the country's medical care expenditure. The impact of these changes on the total health care expenditure, both private and public, remains to be seen.

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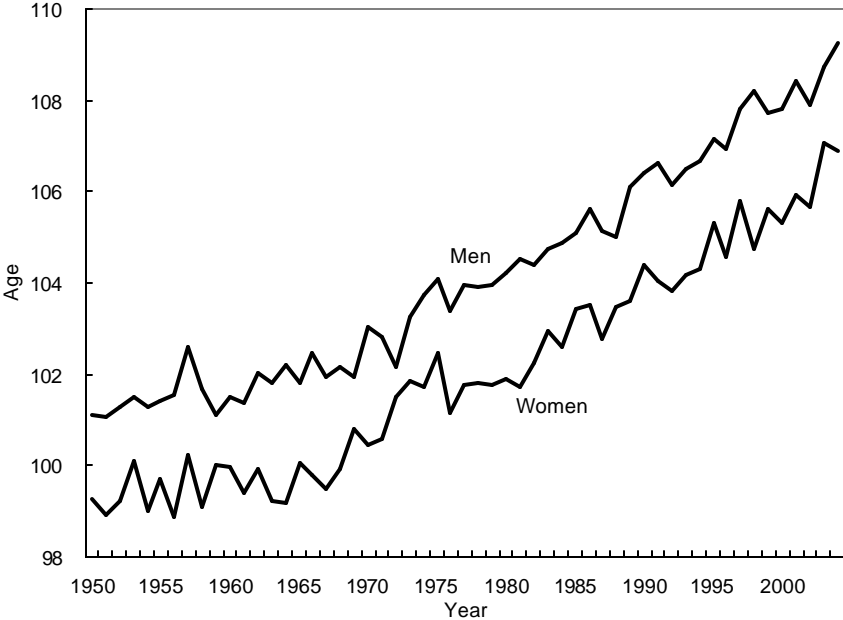
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Table 1. Evolution of Japan's medical care system, 1961–2006

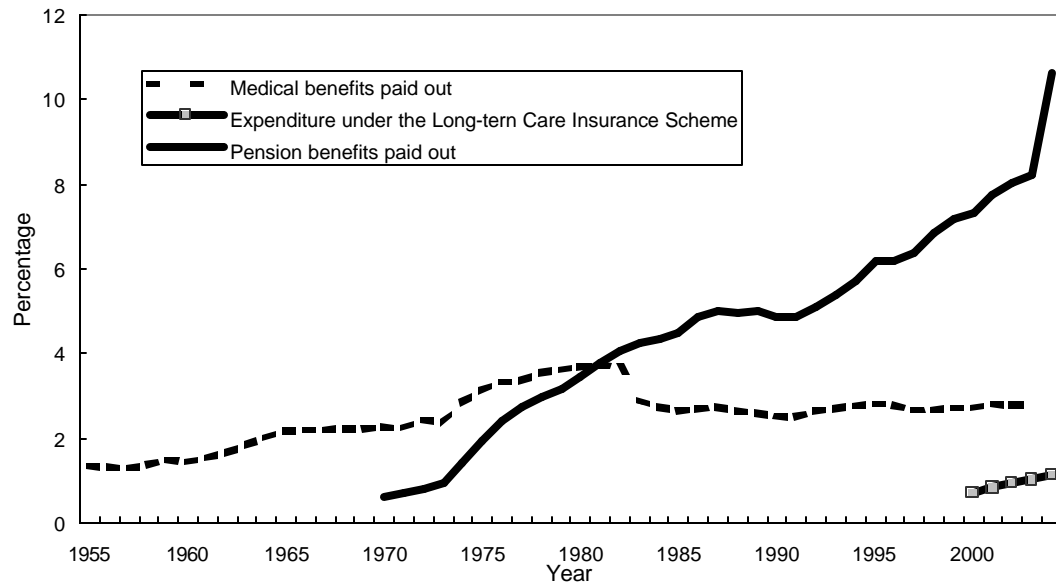
Year	Policy or program development
1961	Universal coverage of medical services established
1973	Free medical care services provided to those aged 70 and over
1981	Contribution to the cost sharing of medical expenses increased; Policy of fee exemption for high-cost medical services introduced
1983	Free medical services for those age 70 and over abolished, and elderly patients required to make monthly contributions of 400 yen (equivalent to US\$2 based on the 1983 exchange rate) per month for outpatient care and 300 yen per day for inpatient care; Law on Health Service System for the Elderly (those aged 70 and over) established
1984	10% co-payment for non-elderly introduced
1986	Elderly contributions increased: For outpatients, from 400 to 800 yen per month For inpatients, from 300 to 400 yen per day
1987	Law on the Health Services Facilities of the Elderly enforced
1990	10-year Gold Plan implemented
1993	Elderly contributions increased: For outpatients, from 900 to 1000 yen per month For inpatients, from 600 to 700 yen per day
1995	Elderly outpatients' contributions increased from 1000 yen to 1010 yen per month
1996	Elderly contributions increased: For outpatients, from 1010 to 1020 yen per month For inpatients, from 700 to 710 yen per day
1997	Co-payment for non elderly raised from 10% to 20% Elderly contributions increased: For outpatients, from 1020 yen per month to 500 yen per visit For inpatients, from 710 to 1000 yen per day
1998	Elderly inpatients' contributions increased to 1100 yen per day
1999	Elderly contributions increased: For outpatients, from 500 to 530 yen per visit For inpatients, from 1100 to 1200 yen per day
2000	Long-term Care Insurance made effective; Contributions for the elderly abolished and payment limits set (3000 yen per month for outpatients, 37 200 yen per month for inpatients)
2002	10% co-payment required of elderly patients; 20% co-payment required of those with higher income
2003	Co-payment for non-elderly increased from 20% to 30% Diagnosis Procedure Combination introduced at 82 specially designated hospitals
2006	Co-payment for elderly increased from 10% to 20%

Figure 1. Average age at death among the 50 oldest persons, by sex: Japan, 1950–2004



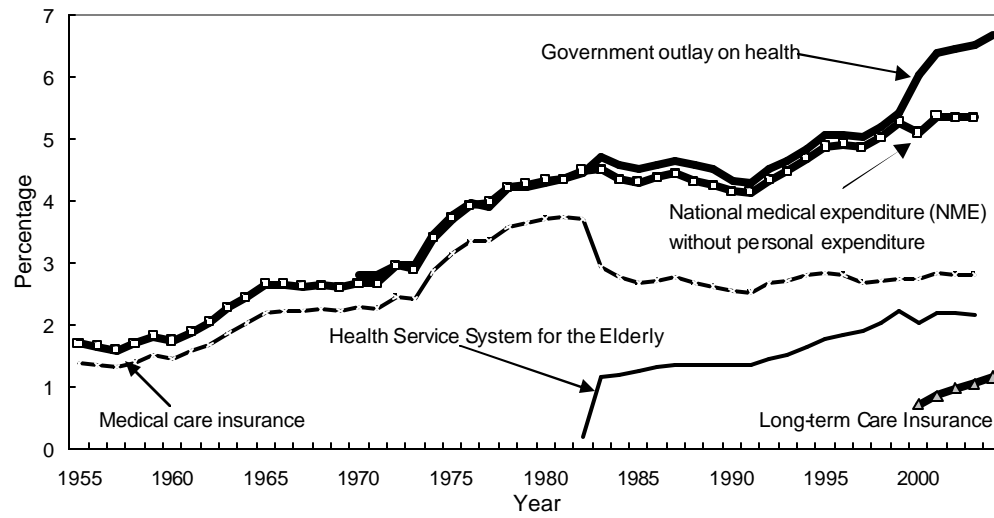
Source: Ministry of Health, Labor and Welfare, *Vital Statistics* (various years).

Figure 2. Patterns of growth of expenditures for selected Social Security components relative to GDP: Japan, 1960–2003



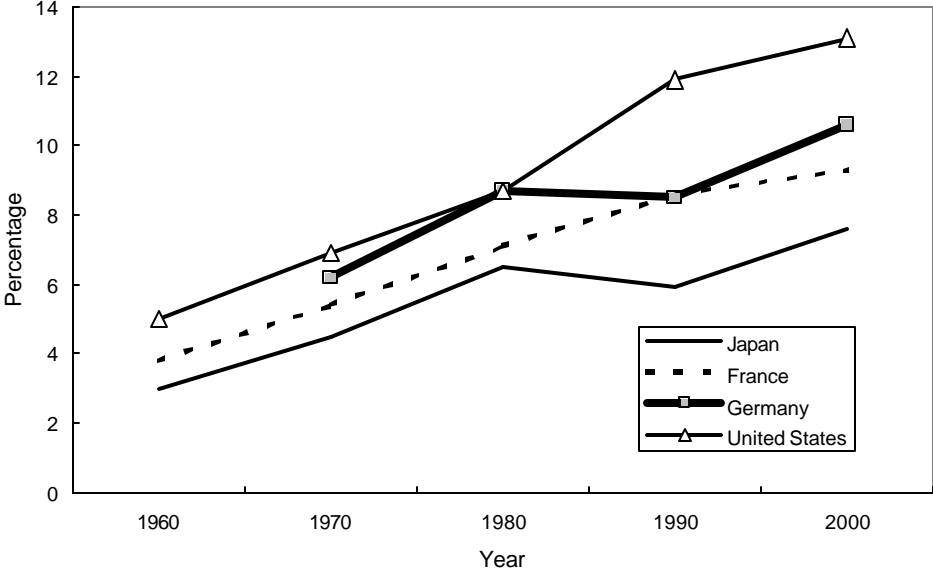
Source: Health and Welfare Statistics Association (2006).

Figure 3. Growth of medical costs for selected components of health system relative to GDP: Japan, 1960–2003



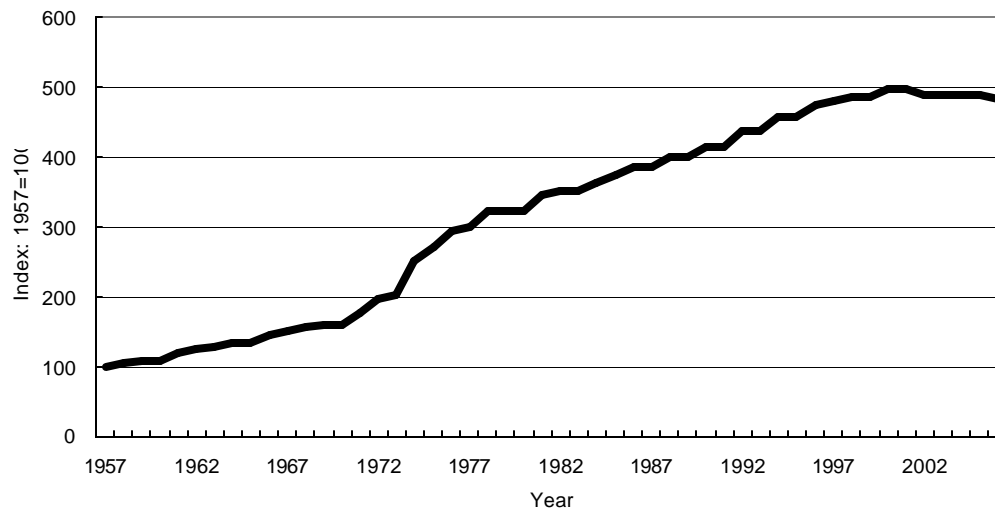
Source: Health and Welfare Statistics Association (2006).

Figure 4. Growth of total health expenditure in relation to GDP: selected countries, 1960–2000



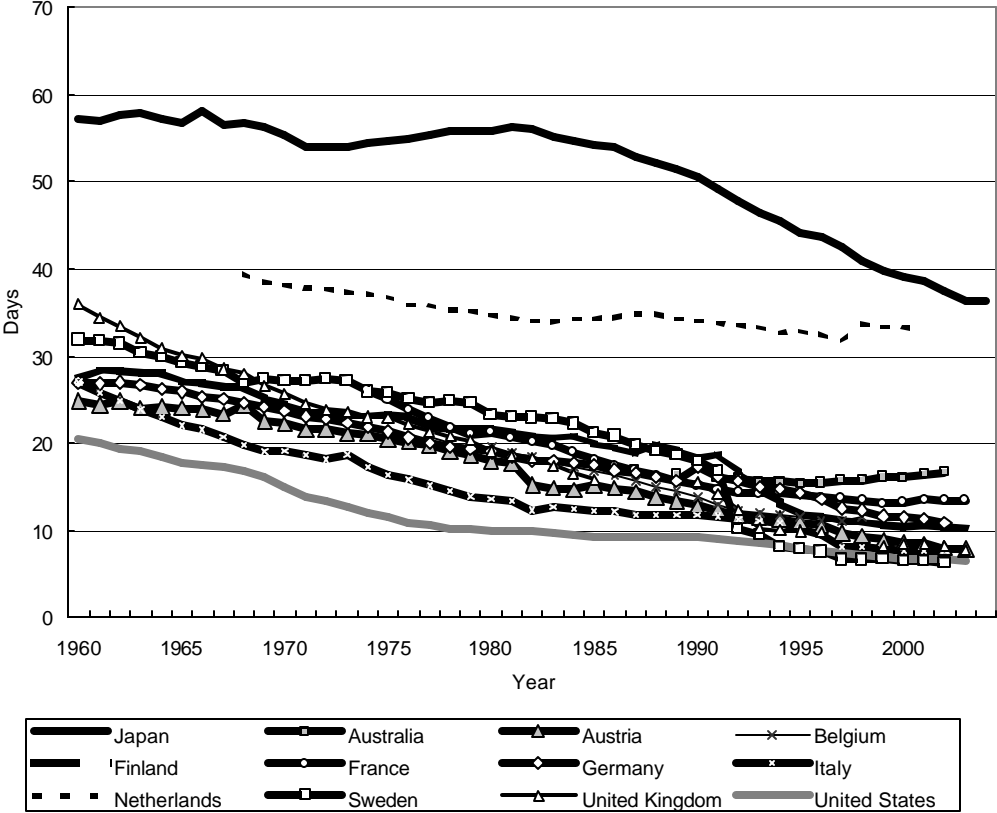
Source: OECD (2006).

Figure 5. Change in the unit price of medical services: Japan, 1957–2006



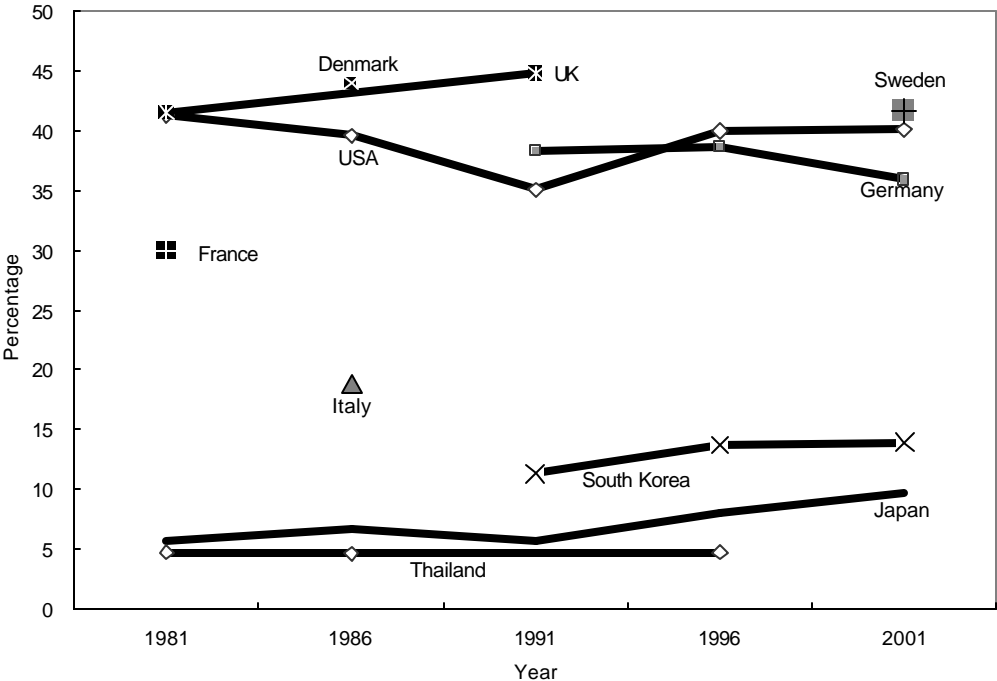
Source: Health and Welfare Statistics Association (2006).

Figure 6. Trends in average duration of hospital stays: Japan and selected industrialized countries, 1960–2004



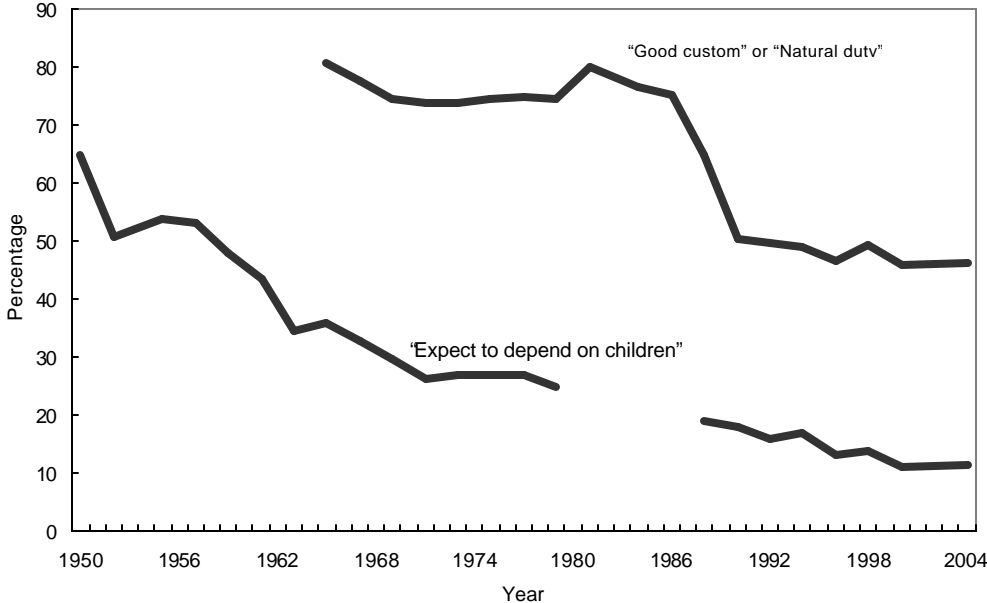
Source: OECD (2006).

Figure 7. Change in the proportion of those aged 60+ living alone: selected countries, 1981–2001



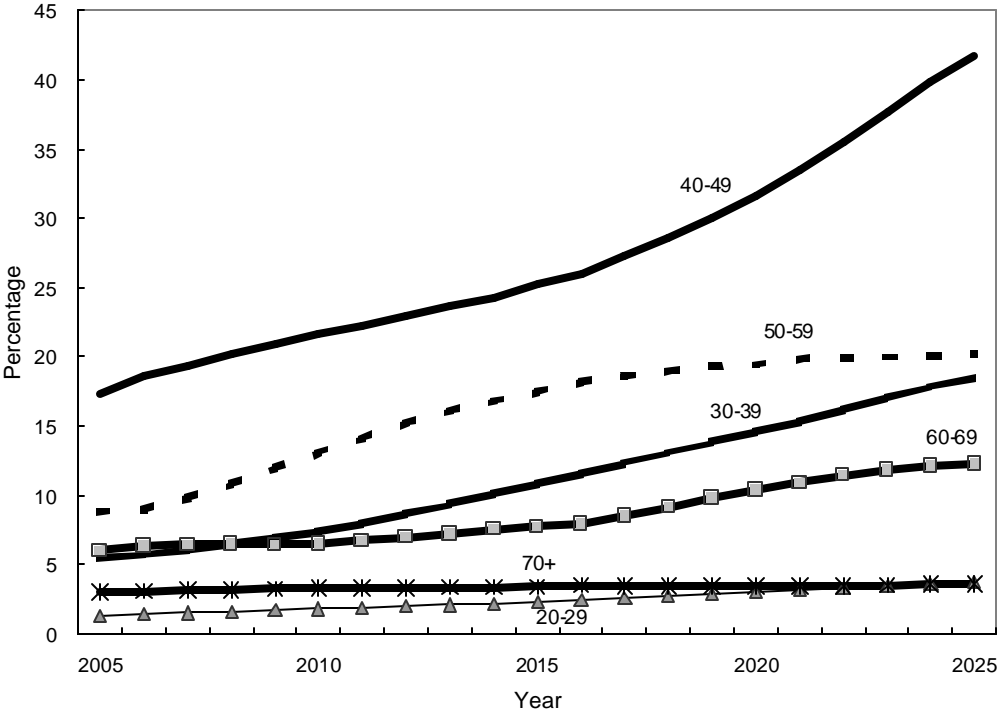
Source: Cabinet Office (2002).

Figure 8. Trends in norms and expectations about care for the elderly: Japan, 1950–2004



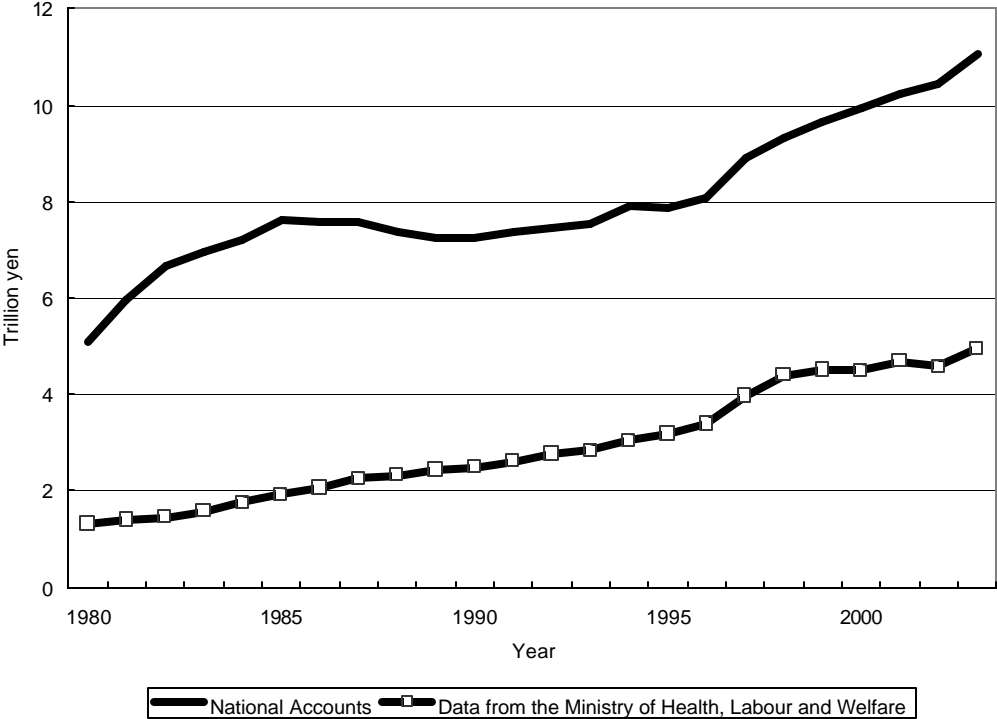
Sources: Mainichi Newspapers of Japan (2000, 2004).

Figure 9. Projected ratio of the elderly suffering from senile dementia or bedridden to the nonworking adult female population at various ages: Japan, 2005–2025



Source: Calculated by using the NUPRI long-term simulation model.

Figure 10. National private health expenditure in trillion yen: Japan, 1980–2003



Sources: Cabinet Office (2006); Ministry of Health, Labor and Welfare, *National Medical Expenditures* (various years).

Figure 11. Monthly per capita private health spending, by age, estimated by the regression method, real value: Japan, selected years, 1989–2004 (base year = 2000)

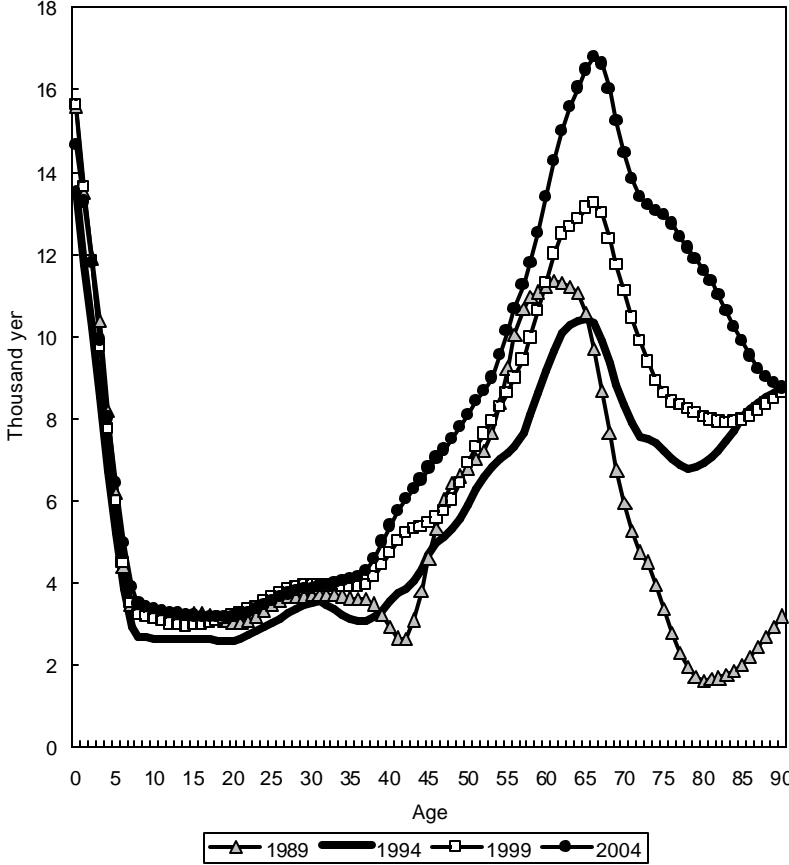


Figure 12. Change in monthly per capita health care expenditures, by age: Japan, selected years, 1989–2004

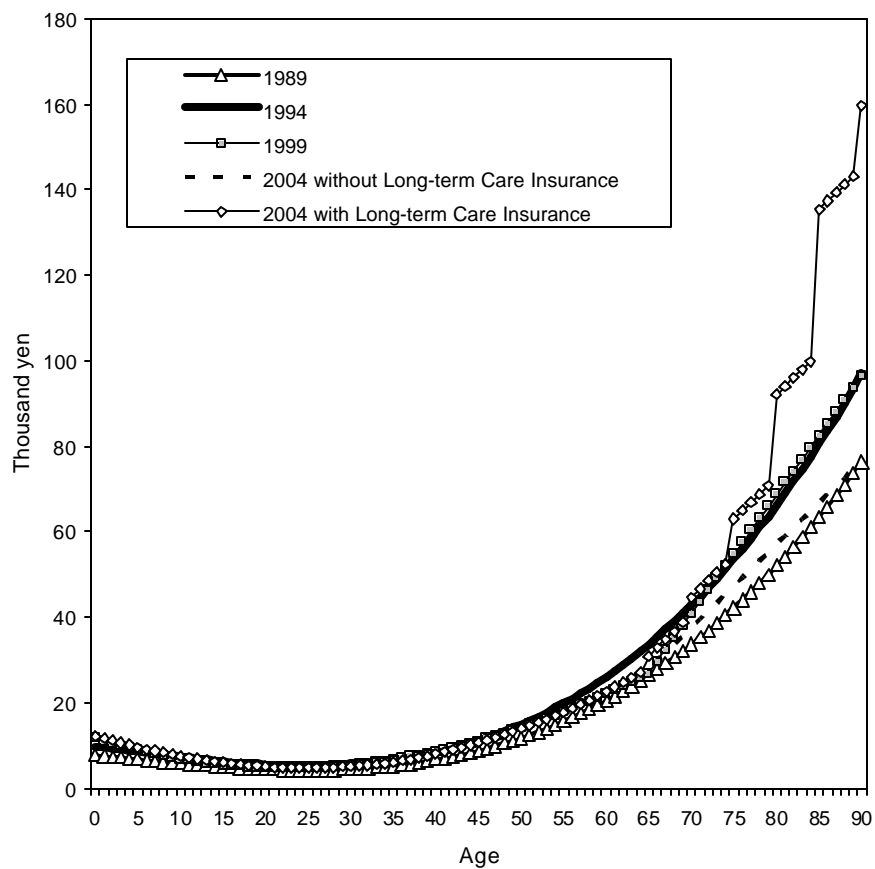
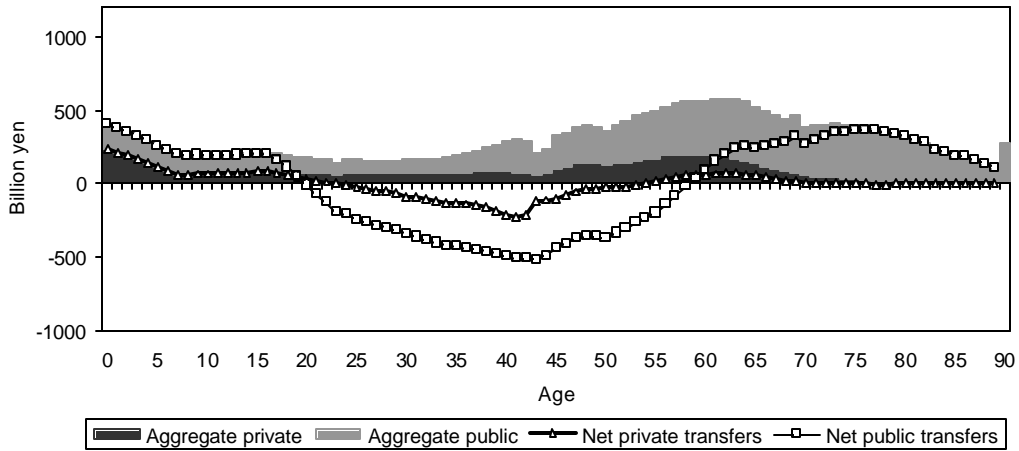
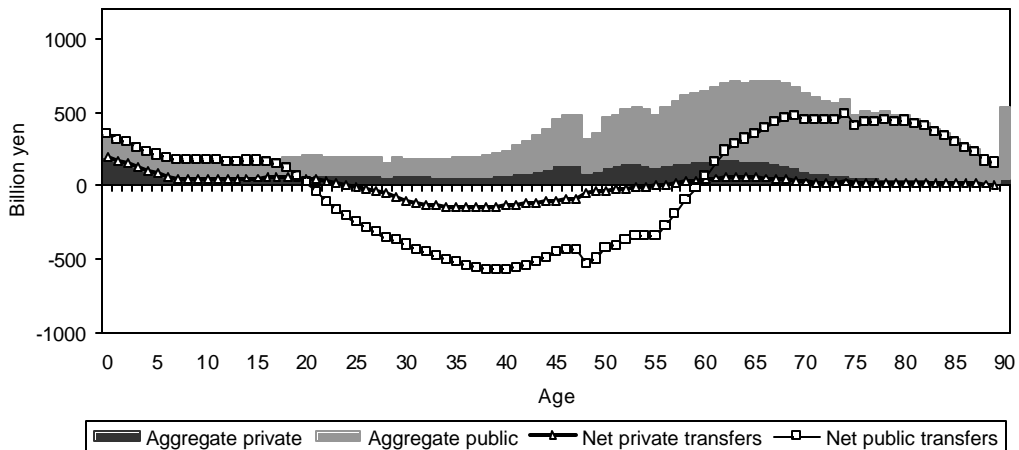


Figure 13. Annual health expenditures and net health transfers: Japan, selected years, 1989–2004

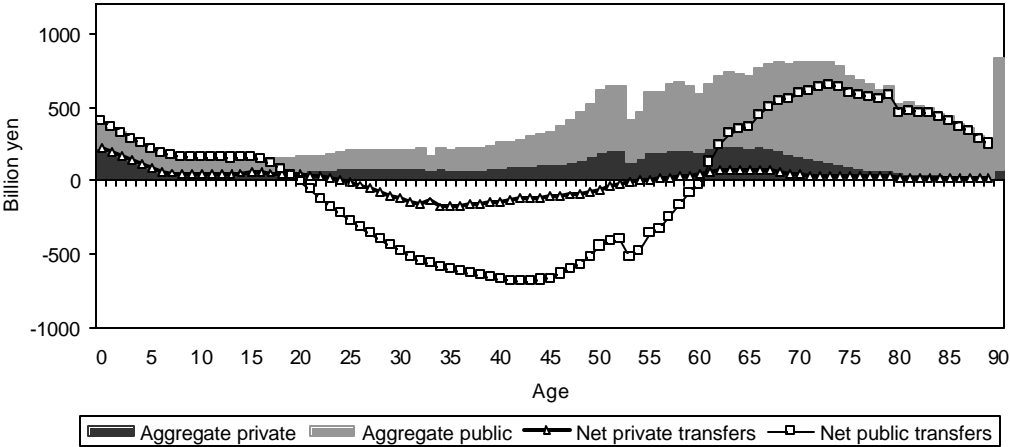
Panel A: 1989



Panel B: 1994



Panel C: 1999



Panel D: 2004

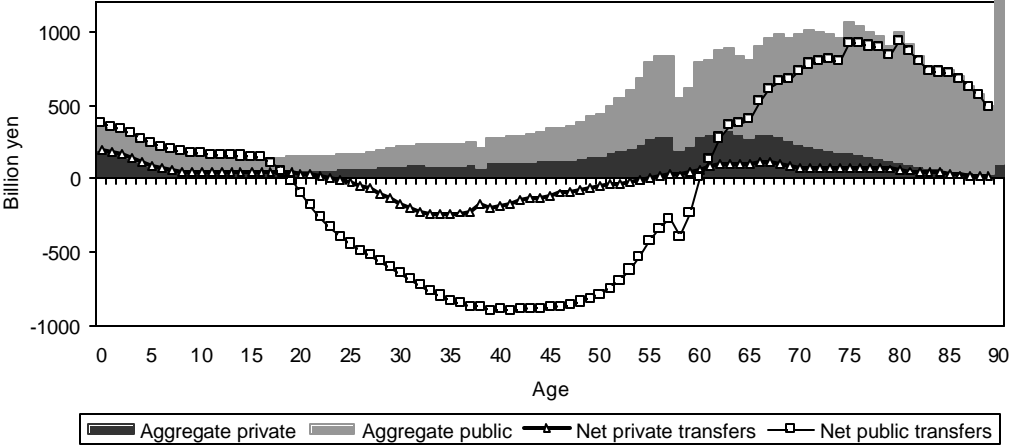


Figure 14. Monthly population-weighted net total health transfers: Japan, 2004 and 2005 (nominal value, in trillion yen)

