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Japan's Unprecedented Aging and Changing Intergenerational Transfers

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Abstract

This paper analyzes some of the important impacts of Japan's unprecedented population aging on its postwar economy, by drawing heavily upon the computed results of the NTA-Japan project, ranging from the first and second demographic dividends to the lifecycle reallocations. We also shed light on the rapidly changing roles of public and familial support systems for the elderly in Japan, that have evolved together with the family organizational transformation and the rapid development of the social security system over the past several decades.

One of the principal findings of this paper is that an effective use of the demographic dividends, particularly the accumulated second demographic dividend which is likely to remain substantial for the next few decades, appears to be an attractive policy option for Japan to place its future economic growth on a steady path. Another important finding derived from this study is that, since the bursting of the bubble economy in the early 1990s, Japanese elderly persons have been informally playing the role of the society's safety net in providing financial assistance to their adult children and/or grandchildren through the traditional familial transfer mechanism.

Introduction

In 2005 the total world population exceeded 6.5 billion people, which is almost double the size observed in 1965 (United Nations, 2007). The annual growth rate of the world population, however, has been declining continuously during the past four decades: as opposed to its peak value of 2.02 percent during 1965-1970, the current annual growth rate is estimated at 1.17 percent. With the emergence of slower population growth in the latter half of the 20th century, the world demographic outlook of today is substantially different from the one only a few decades ago.

Such slowing global population growth has been induced primarily by a significant decline in fertility over the past few decades. In 1965-1970, there were only 8 countries with below-replacement fertility (a total fertility rate of less than 2.1 children per woman), a number that increased to 68 by 2000-2005. Moreover, in terms of the population share, as shown in Figure 1, only 8.4 percent of the world's population lived in countries with below-replacement fertility in 1965-1970, as compared to 42.7 percent in 2005-2010. It is projected that more than half of the world population will live in countries with a fertility rate below the replacement level in the second half of the 2010s (United Nations, 2007).

At present, the majority of these low-fertility countries are in the developed regions. It should be emphasized, however, that the number of countries in developing regions with below-replacement fertility has also been increasing at a phenomenal rate in recent years. It grew from nil to 24 developing countries/areas over the past four decades under consideration. Fourteen of these 24 countries/areas belong to Asia. Three Asian countries/areas with below-replacement fertility (Hong Kong, Macao, and the Republic of Korea) are currently classified in the category of lowest-low fertility (i.e. those with a TFR below 1.3). In fact, East Asia's fertility is now lowest in the entire world (McDonald, 2008).

Parallel to the worldwide decline in fertility, marked mortality improvements have been achieved in most of the world. Approximately a half of the world's population succeeded in meeting the ICPD Program of Action goal of reaching a higher-than-seventy-years life expectancy at birth for both sexes in 2000-2005. In many industrialized nations, life expectancy at birth has been rapidly approaching 80 years. In case of East Asia, three countries/areas (Hong Kong, Macao, and Japan) have already surpassed the 80-year level.

As a result of these rapid fertility and mortality transformations in the second half of the

20th century, we have witnessed phenomenal changes in the world's demographic landscape in terms of population age distributions, with a relative increase in the numbers of the elderly and a relative decrease in the numbers of the young. Thus, the 21st century is likely to become the century of population aging (Lutz, Sanderson, and Scherbov, 2004).

In many countries, both developed and developing, the age structural shifts have been generating a wide range of disruptions at both societal and familial levels. At the societal level, many governments, mainly in developed regions, have been increasingly concerned about adverse effects of population aging on various socio-economic dimensions, ranging from their national productivity, labor supply and its quality, savings and capital formation, to the financial sustainability of their pension schemes and/or medical care programs. At the familial level, because marriage and reproduction have been occurring much later in people's lives, they are having fewer children. Furthermore, there have been more marital disruptions and more one-person households. These family-level demographic developments have been affecting the ways in which family members interact with each other, especially in providing support to their elderly parents or children (Ermisch, 2003).

By and large, these observations are applicable to contemporary Japan. Its postwar fertility decline was the earliest to occur in the non-Western world, and was also the greatest in magnitude among all the industrialized nations. At present, its longevity is at the highest level in the contemporary world. As a consequence, Japan's population aging process has been extremely fast over the past several decades, and its proportion of the aged 65 and over is currently the highest in the world. In addition, the Japanese societal structure and family organization are substantially different from those in developed nations in the West (Hodge and Ogawa, 1991; Ogawa and Retherford, 1993, 1997; MacKellar, 2003; Ogawa, Retherford, and Matsukura, 2008). For these reasons, Japan has already faced, and is expected to be continuously encountering a variety of problems, both serious and unique, in the process of adjusting to its age structural shifts and in allocating support resources for a rapidly growing elderly population.

This paper discusses the impact of population aging upon both public and familial intergenerational transfers in Japan over the last few decades. Prior to discussing the changing patterns of these intergenerational transfers over time, in the next section we briefly highlight some of the key features of Japan's demographic dynamics observed in the postwar period. In the ensuing section, we succinctly describe some vital dimensions of Japan's socioeconomic system that have already been substantially affected by such rapid population aging and are

likely to affect the welfare of the elderly in the foreseeable future. In the following section we analyze the changing pattern of intergenerational transfers, both public and familial, over the period 1984-2004 by heavily drawing upon computational results generated from the Japanese component of the international project called "National Transfer Accounts (NTA)". In the final section, we consider some policy options available to 21st-century Japan for coping with its unprecedented population aging.

We confine the scope of this paper specifically to the Japanese context. However, Japan's experiences in population aging and its policy development seem to provide a useful base for analyzing important policy issues related to population aging in a number of developing countries, particularly those in Asia, which are currently undergoing rapid age structural transformations. Moreover, in the face of its fast postwar economic development, Japan still retains some of its traditional cultural values, which is why the Japanese model may be of relevance to policy makers in the developing regions who are interested in establishing a comprehensive approach by combining the best of traditional and modern values in providing care and support to frail elderly persons.

Rapid Demographic Transition in Postwar Japan

(a) Falling fertility and mortality

Japan's fertility transition began in the early part of the 20th century with gradual fertility reduction (Hodge and Ogawa, 1991). After World War II, however, the tempo of the reduction became extremely rapid. Following a short baby boom period (1947-1949), Japan's TFR declined by more than 50 percent from 4.54 to 2.04 children per woman during 1947-1957. This 50-percent reduction of fertility over the 10-year period is the first such experience in the history of mankind.

Subsequent to this fast fertility reduction in the 1950s, there were only minor fluctuations around the replacement level until the first oil crisis occurred in 1973, triggering a series of restructuring in the Japanese economy, which, in turn, slowed down the pace of Japan's economic growth. Parallel to this, Japan's fertility level started to fall again, as presented in Figure 2. By the mid-1990s, Japan's TFR declined below 1.5 children per women, with the value of TFR for 2005 plummeting to 1.26, lowest in postwar time, before the rebound to 1.32 in 2006 and 1.34 in 2007. This post-1973 decline is often referred to by some demographers as Japan's second demographic transition (Ogawa and Retherford, 1993; Retherford and Ogawa, 2006; Ogawa, Retherford, and Matsukura, 2008).

In line with these changes in TFR, the birth cohort size varied considerably over time, as depicted in Figure 2. During the baby boom period, there were, on average, approximately 2.7 million births per year, but by 1957, the number of births decreased to 1.6 million. In the early 1970s, however, despite the declined fertility rate, this number increased to more than 2 million, as an "echo" effect of the baby boom cohorts, or the often called “second-generation baby boomers”. Since then, births have again trended downward, marking slightly less than 1.1 million in 2007, which is 60 percent less than the total annual number of births recorded during the baby boom period in the late 1940s.

Japan’s recent low and declining fertility has been attracting a great deal of attention from both inside and outside the country. In contrast, however, relatively limited attention has been paid to the speed of Japan’s post-war mortality transition. In 1950-1952, Japan’s life expectancy at birth was 59.6 years for men and 63.0 years for women. In 2007, male life expectancy at birth reached 79.2 years to become the third highest in the world, following Iceland (79.4 years) and Hong Kong (79.3 years), and female life expectancy rose to 86.0 years, the highest in the world, followed by Hong Kong (85.4 years) and France (84.1 years). Moreover, between 1950-52 and 2007, life expectancy at age 65 grew to a substantial extent, from 11.4 to 18.6 years for men and from 13.4 to 23.6 years for women, which implies a marked increase in the retirement period and in the joint survival to older ages for both husbands and wives.

It is interesting to note that, as a result of remarkably extended life expectancy, insurance companies in Japan have recently made their first major downward revisions in premium payments in 11 years (The Asahi Shimbun, 2007). In addition, due to the improved life span, coupled with fewer children and increased marital instability, the composition of sales items in Japanese life insurance companies has been shifting significantly in the recent past. In 2008, for the first time ever, outstanding annuity and medical insurance policies, rather than life insurance contracts, occupied more than half of the products sold by Japanese life insurance companies (The Nikkei, 2008a).

It is also worthwhile to observe that the number of centenarians was increasing at the average annual growth rate of 13 percent over the period 1963-2007, which indicates that the age group 100 and over has been the fastest growing segment of the entire population in the past four decades or so.

In Figure 3, the data on the average age of the 30 oldest deaths in each year over the period 1950~2006 are plotted separately for men and women. The average age of the 30 oldest deaths

increased substantially over the second half of the 20th century for both sexes; in 2006 the average age of the 30 oldest deaths was 107.6 years for men and 109.9 years for women. More importantly, the plotted trends of the 30 oldest deaths indicate that the tempo of life prolongation accelerated for both sexes since the mid-1960s, a few years after the implementation of universal health coverage.

(b) Declining and aging population

As a consequence of the long-term transformations in both fertility and mortality, the age structure of the Japanese population has been shifting to a marked extent, as indicated in Table 1. The proportion of those aged 65 and over increased from 4.9 percent in 1950 to 20.2 percent in 2005, making Japan's population the oldest national population in the world during 2005. In contrast, the number of those aged below 15 has been declining for 27 consecutive years, and Japan now has fewer children than at any time since 1908 (Washington Post, 2008). Furthermore, the overall size of Japan's population began declining from the end of 2005.

What does Japan's population prospect look like for the next few decades? According to a population projection based on the most recent version of the population-economic-social security model constructed by the Nihon University Population Research Institute (Ogawa et al., 2003), the total population size is expected to continuously decrease to 121.1 million persons in 2025, a 5.2 percent reduction from 2005. Moreover, the proportion of those 65 and over is projected to increase from 20.1 percent in 2005 to 31.0 percent in 2025, which suggests that Japan's population is very likely to continue to be the world's oldest national population for the next twenty years. More importantly, the Japanese population will reach the world's highest level of aging at an unprecedented rate, as discussed elsewhere (Ogawa and Retherford, 1997; Ogawa et al., 2003). Compared with such European countries as Sweden and Norway, Japan is aging at a tempo approximately three times as fast. Furthermore, the proportion of those aged 75 and over in the population aged 65 and over is expected to grow rapidly from 40.9 percent in 2005 to 59.6 percent in 2025. A close examination of this projected result and country-specific data produced from the recent population projection prepared by the United Nations (2007) reveals that Japan's level for 2025 is likely to be by far the highest in the world, followed by Sweden (52.1 percent) and Italy (51.8 percent).

Changing Economic Growth Performance and Public Transfer Programs

(a) Macroeconomic growth

During World War II, Japan's productive capacity was utterly shattered. In 1959, Japan's per capita GNP was only US$153, lower than that of Mexico (US$181) or the Philippines

(US$172). By the end of the 1950s, however, Japan's real per capita income had recovered to prewar levels. During the 1960s, Japan's real GDP grew at a phenomenal rate of about 11 percent per annum. After the oil crisis of 1973, as mentioned earlier, Japan's economic growth performance became significantly less impressive than in the 1960s. In the mid-1980s, the Japanese economy entered the bubble economy phase, and this investment boom abruptly ended in the second half of 1990, causing a number of leading banks and other financial institutions to go into bankruptcy. In addition, government debts have been accumulating at an alarming rate, amounting to US$8.49 trillion in 2008. They have more than doubled over the last ten years, and are, relative to GDP, by far the worst among all industrialized nations. Moreover, Japan's international competitiveness has deteriorated very quickly. In the early 1990s the Japanese economy ranked first in terms of international competitiveness, but it fell to the 22nd place in 2008 (IMD, 2008). In view of these prolonged economic anomalies that began in the early 1990s, some economists call the 1990s "Japan's lost decade" (Yoshikawa, 2001).

Despite these major structural changes in the Japanese economy, its mandatory retirement policies still remain an extreme case in the practices of industrialized nations (Clark, Ogawa, Lee, and Matsukura, 2008). The proportion of firms having mandatory retirement rules has been increasing, not decreasing. The Japanese government is currently attempting to encourage firms to increase the mandatory retirement age to 65. The *Law Concerning Stabilization of Employment of Older Persons*, passed in 2004, requires firms to increase the age of mandatory retirement to 65. However, no penalties are imposed for noncompliance (Japan Institute of Labour Policy and Training, 2004).

Another feature of Japan's labor market is that despite the mandatory retirement policies, the elderly have high labor participation rates by international standards (Ogawa, Lee, and Matsukura, 2005; Matsukura, Ogawa, and Clark, 2007). In 2000, the labor force participation rate for elderly Japanese men aged 65 and over was greater than 30 percent. In sharp contrast, the corresponding figure for developed countries in Europe was below 10 percent and was 18 percent for the United States. Similarly, Japanese women are more likely to continue working than older women in Europe and the United States.

(b) Old-age pension and medical care plans

As a result of the miraculous economic recovery from the shambles of World War II, Japan managed to establish its universal pension and medical care schemes in 1961. Since then, Japan's social security system has grown remarkably. Between 1961 and 2005, the share of social security benefits increased from 4.9 to 23.9 percent of the national income (National

Institute of Population and Social Security Research, 2007). Moreover, the proportion of the social security expenditure allotted to the pension schemes increased from 22.7 percent in 1964 to 52.7 percent in 2005, while the corresponding value for the medical schemes declined from 54.4 to 32.0 percent over the period in question. Owing to population aging, as well as the maturity of the old-age pension schemes, the relative share of pension benefits paid out in national income has been on an upward trend in recent years.

Japan undertook major reforms of its public pension schemes in 2004. One of the primary objectives of the 2004 pension reform was to fix the level of future contributions in order to make the program more transparent for younger workers, but this reduced the benefits considerably. The government introduced a mechanism to automatically balance benefit levels according to future changes in the population age structure. The goal was to avoid repeated reforms and to restore the younger generations' trust in government pension schemes. This may be regarded as a paradigm shift in Japan's social security provisions (Sakamoto, 2005). As a consequence of the 2004 reform, the replacement rate for the Japanese public pension declined considerably, and is projected to continuously fall to 50.2 percent by 2023, after which, it is assumed, will remain unchanged up to 2050.

Such downward adjustments of benefits have been clearly reflected in the results of recent national surveys. According to a national survey on the economic life of the elderly undertaken by the Cabinet Office in January-February 2007 (The Nikkei, 2008b), 56.9 percent of respondents aged 55 and over (including baby boomers nearing the mandatory retirement age) stated that their pension benefits would fall short of their living expenses from age 60. In the 2002 round of this survey, the proportion of those who held this pessimistic view was 46.6 percent.

The second major component of social security benefits is medical. Subject to Japan's economic growth performance, the coverage in medical insurance plans has been revised on a periodic basis. Despite these changes that have taken place in the past few decades, the absolute amount of financial resources allotted to medical care services has been continuously rising. One of the factors that have been causing the rapid growth of medical costs and set Japan apart from other industrialized nations is an extremely long period of hospitalization in Japan (Ogawa et al., 2007). In 2005 it was 35.7 days, which is the longest among the 19 OECD countries, followed by 13.4 days in France (OECD, 2007).

In response to the upward spiral in medical care costs, the government of Japan

implemented the Long-term Care Insurance Scheme (LCIS) in 2000 with a view to reducing the average duration of hospitalization for inpatient care by facilitating in-home care. The LCIS is expected to alleviate the care-giving burden to be placed upon family members, many of whom are middle-aged women (Ogawa and Retherford, 1997). Because the expenditure for the LCIS had grown at an alarming rate since its inception, the scope of its services was critically reviewed and downgraded in 2006 with a view to curbing future costs.

In April 2008, the government of Japan implemented a new medical insurance scheme specifically for senior citizens aged 75 and older as another step toward curbing the nation's mushrooming medical costs. Under this new medical scheme, premiums are automatically deducted from pension payouts. However, because premiums have actually become higher under the new scheme for a certain segment of the targeted elderly age group, a possible revision of the new scheme has already become one of the most urgent political issues at the national level.

Weakening Familial Support and Abrupt Normative Shifts

As distinct from developed countries in the West, multigenerational living arrangements are still fairly common in Japan (Ogawa and Ermisch, 1996; Ogawa, Retherford, and Matsukura, 2008). Although three-generational households persist in Japan, the proportion of elderly living with adult children is declining and with it the potential for family support for the elderly. As displayed in Figure 4, the proportion of those aged 65 and over coresiding with their adult children declined from 70 percent in 1980 to 43 percent in 2005. In addition, the index called the familial support ratio (expressed as the ratio of women aged 40-59 to elderly persons aged 65-79) is expected to decline substantially over the next 20 years. The value of this index was 1.30 in 1990, and is projected to be 0.65 in 2010, which suggests a 50 percent decline over 20 years' time. The present value of this index is the lowest in the entire world and is expected to continue to be so for another 20 years.

Apart from these demographic transformations, value shifts among the Japanese people have been dramatic. These value changes are well captured in the time-series data gathered in the *National Survey on Family Planning* series, conducted every other year from 1950 to 2004 by the Mainichi Newspaper (Population Problems Research Council, 2004). Since the first round of the survey, except for a few rounds, the question regarding dependence on children for old-age security had been directed to currently married women of reproductive age who have at least one child. In addition to these time-series data obtained by the Mainichi Newspaper, we

have extended the time span, as depicted in Figure 5, by utilizing data collected in the *National Survey on Work and Family*, undertaken by the Nihon University Population Research Institute in 2007.

The precoded responses were as follows: (1) “expect to depend on children,” (2) “do not expect to depend on children,” and (3) “never thought about it.” The proportion of respondents who expect to depend on their children declined almost continuously over the period 1950-2004. Almost two-thirds of Japanese married women in 1950 expected to depend on their children for old-age security, but only 9 percent in 2007 expected to do so. These long-term downward trends in parents’ expectations for relying on their children in their old age closely parallel continuous improvements of old-age public pension schemes since the early 1960s.

In the *National Survey* conducted by the Mainichi Newspaper since 1963, the question on the attitude of married women towards taking care of their aged parents was asked in successive rounds. The precoded response categories are as follows: (1) “good custom,” (2) “natural duty as children,” (3) “unavoidable due to inadequacy of public support resources,” and (4) “not a good custom.” We have also supplemented these time-series data compiled by the Mainichi with the data gathered by Nihon University. As indicated in Figure 5, the proportion of those who chose one of the first two response categories (“good custom” and “natural duty as children”) was stable over the period 1963-1986. From 1986 to 1988, however, a sudden decline occurred in this proportion. In the years leading up to 2007, the proportion of married women of reproductive age who chose one of these two response categories was, by and large, declining.

Obviously, these demographic and socioeconomic transformations in postwar Japan have been affecting the pattern and mode of intergenerational transfers over time. To analyze these changes in intergenerational transfers over time, we will draw heavily upon some of the principal findings recently generated from the NTA project for Japan. A detailed explanation of NTA’s basic concept, the crucial computational assumptions utilized, and the definitions of other key variables are available on the NTA home page (*http://www.ntaaccounts.org*).

Population Aging, Intergenerational Transfers, and Two Demographic Dividends

The economic lifecycle is fundamental to understanding the macroeconomic effects of population aging. As has been recently discussed elsewhere (Bloom and Williamson, 1998; Mason, 2001, 2005; Mason and Lee, 2006, 2007), the divergence between production and consumption interacts with population age structural transformations, generating the

demographic dividend. More recently, the concept of the demographic dividend has been expanded to encompass two demographic dividends (Mason, 2007; Mason and Lee, 2007). One of the key components of the NTA system is detailed information pertaining to the lifecycle of production (labor income) and consumption. This information can be used to calculate the economic support ratio and quantify the extent to which per capita income has been influenced by changes in the working share of the population, i.e., the first demographic dividend. The economic lifecycle also provides key information for modeling the second demographic dividend, as explained below.

As a country passes through stages of a demographic transition, it undergoes considerable age structural shifts. When the country's fertility begins to fall, the first demographic dividend arises because changes in population age structure have led to an increase in the working ages relative to non-working ages. In other words, the first demographic dividend arises because of an increase in the share of the population at ages during which production exceeds consumption. Measuring the dividend in growth terms, the first demographic dividend is positive when the rate of growth of the number of effective producers exceeds the rate of growth in the number of effective consumers (Mason, 2007).

Figure 6 shows estimates of age-profiles of per capita consumption, both private and public sectors combined, and per capita production (labor income) in five selected years, namely, 1984, 1989, 1994, 1999, and 2004. These profiles have been estimated by drawing upon private-sector information derived from the five rounds of the *National Survey of Family Income and Expenditure* (NSFIE) from 1984~2004, carried out by the Statistics Bureau of Japan, and public-sector information for the corresponding five years, gleaned from various government publications. These estimated results are expressed in terms of 2000 constant prices.

A few points of interest emerge from this graphical exposition. First, as expected, throughout the time periods under review, there are sizeable income-consumption deficits at both young and older lifecycle stages. These lifecycle deficits must be financed with reallocations coming largely from the surplus of income generated at the lifecycle surplus stage.

Second, the age at which an average individual shifts from a net consumer to a net producer gradually increased from 24 years old during 1984-1989 to 25 years old in 1994 and to 26 years old during 1999-2004. Behind these upward trends in the crossing age, we may selectively enumerate the following as contributing factors: (1) earnings profiles, (2) hours worked, (3) women's labor force participation and the availability of child-care and old-age

leave schemes, (4) sectoral reallocation of the labor force, (4) higher enrolment rates in tertiary education, (5) a marked increase in freeters (those aged 15-34 who lack full-time employment or are unemployed) and NEETs (those not currently engaged in employment, education or training). At the other end of the lifecycle, the age transition from a net producer to a net consumer was postponed only marginally from 58 years old over the period 1984-1989 to 59 years old over the period 1994-2004. The persistency of the crossing age at the later stage of life cycle is attributable to the existence of the mandatory retirement age at 60 in contemporary Japan. These results indicate that the length of time when an average individual is financially self-sufficient ranges from 33 to 34 years, which is relatively short, corresponding only to two-fifths of the average length of life.

Third, the estimated age-specific profiles of per capita production over the period of 1994-2004 are fairly similar. This seems to reflect the influence of “Japan’s lost decade”. In addition, the upward shift in the profiles from 1984 to 1994 captures the effect of substantial economic growth on labor income during the “bubble economy” phase.

Fourth and more importantly, unlike the case of per capita production, the age-profiles of per capita consumption rose almost continuously over time, particularly at both young and older ages. It is worth noting that the amount of per capita consumption rose distinctively among those aged 65 and over in 2004. This seems to be accounted for by the implementation of Long-term Care Insurance (LTCI) starting from the year 2000. In-home care for the frail elderly, which had until then been informally provided by their family members, became formalized as a part of the market economy. As a result, Japan’s per capita consumption profiles have been increasingly similar to those in the United States, Sweden, and Costa Rica among the NTA member countries.

To facilitate computing and discussing the first and second demographic dividends, we have averaged the five sets of per capita consumption and production age-specific profiles observed over the 20-year period (Figure 7). By applying the computed age-specific results displayed in Figure 7 as statistical weights to adjust the entire population over the period 1925-2025, we have calculated the effective number of producers, the effective number of consumers, and the economic support ratio, i.e., the effective number of producers divided by the effective number of consumers. It should be noted that the first demographic dividend is defined as the annual growth rate of the economic support ratio, which corresponds to the change in output per effective consumer due solely to changes in age structure over the period 1925-2025 (Figure 8). For 34 consecutive years from 1945 to 1979, the effective number of

producers grew more rapidly than the effective number of consumers in Japan. As can be seen from this graphical exposition, the magnitude of the positive first demographic dividend was extremely large during the rapid economic growth of the 1960s and the early 1970s, as discussed in the earlier section.

As has been the case with other developed countries, Japan's first demographic dividend lasted for a few decades, but proved inherently transitory in nature. Since the mid-1990s the effective number of producers has been growing more slowly than the effective number of consumers, the economic support ratio has been declining, and the first dividend has turned decidedly negative. This change is a direct consequence of population aging.

The same demographic forces that produce an end to the first dividend may lead to a second demographic dividend. Implicit in the large gap between consumption and production at old ages is the lifecycle demand for wealth. To support consumption in old-age that greatly exceeds production, lifecycle pension wealth in one of two forms must be accumulated. One form is transfer wealth or the net present value of public or private transfers. The second form is assets, which consists of capital, land, foreign assets, etc. As a population ages, the demand for lifecycle pension wealth increases substantially. In part, this occurs because the duration of retirement is longer due to increase life expectancy and, in part, this occurs because of changes in the age composition of the population. If the demand for wealth is met by expanding transfer wealth, then population aging leads to large implicit debts imposed on future generations. If countries rely on capital accumulation to meet the retirement needs of the elderly, population aging provides a powerful incentive to accumulate capital and other assets. A key point is that in countries that rely on transfers, both public and familial, in meeting the retirement needs of the elderly, the second demographic dividend will not emerge. While the first dividend is purely accounting-oriented, the second dividend consists of both compositional and behavioral effects (Mason, 2007; Ogawa and Matsukura, 2007; Mason and Lee 2007). The second dividend is affected not only by the numbers of the elderly persons relative to younger persons, but also by the extent to which consumers and policy makers are forward-looking and respond effectively to the demographic changes that are anticipated in the years ahead. When life expectancy is increasing, for example, the impetus for accumulating wealth is stimulated, which, in turn, leads to a permanent increase in income. To summarize, if capital accumulation rather than familial or public transfer programs dominate the age reallocation systems for supporting the elderly, population aging may yield a second demographic dividend due to higher rates of saving and capital intensification of the economy.

Compared with the first dividend, measuring the amount of the second dividend is considerably more difficult, in part because the accumulation of wealth is intrinsically forward looking. In the present study, we have followed a relatively simple partial equilibrium method. As fully discussed elsewhere (Mason, 2007), the second dividend is defined as the growth rate of productivity or output per labor income.

The estimates of the second demographic dividend over the period 1960-2035 are shown in Figure 9. Japan's second demographic dividend increases remarkably in the 1980s. Furthermore, beginning from the 1990s, the amount of the second demographic dividend fluctuates to a considerable extent, with a trough in the 2010s, followed by a considerable upsurge in the 2020s and 2030s. These oscillations are substantially attributable to the rapid age compositional shifts in the early part of the twenty-first century, primarily because the second-generation of baby boomers enters the age group 50 years old and over, in which they are expected to commence accumulating wealth for their long retirement life.

Undoubtedly, depending on how the Japanese elderly utilize or allocate their current and future accumulated wealth, the Japanese economy's future scenarios will be substantially different. It is interesting to note that numerous banks and life insurance companies have recently been paying great attention to the baby boomers from 1947 to 1949, who are now approaching their mandatory age of retirement. They have greatly contributed to creating both first and second demographic dividends over the course of Japan's demographic transition after World War II, and are expected to enjoy the fruits of the second demographic dividend during their retirement life, as hinted in Figure 9.

Figure 10 plots the age profile of asset holding in Japan in 1999 among the elderly aged 60 and over. Using the 1999 round of NSFIE, we have estimated their age-specific pattern of the stock of real and financial assets. In addition, we have computed the present value of the expected future stream of public pension benefits. The detailed computational procedure and assumptions employed are available elsewhere (Ogawa and Matsukura, 2007). A quick glance at this graph reveals that the Japanese elderly are wealthy. At age 60, the total amount of assets an average person owns is more than 50 million yen, or US$0.5 million. In fact, they are wealthier than what this graph shows, because private pensions are not included in the computation. In addition, familial transfers are also not included in Figure 10, but they are discussed below.

It is interesting to observe that the amount of public pension benefits to be paid to the elderly is greater than that of real assets at a relatively early stage of retirement life, but the

latter exceeds the former by a great margin at a later stage of retirement life. This seems to suggest that the liquidation of real assets such as land and housing is crucial for very old persons, particularly those who are living alone. There seems to be a substantial potential for developing various financial schemes such as the reverse mortgage plan.

Attention should also been drawn to the fact that the Japanese people's preference for land has been changing to a considerable degree over the last 15 years or so, during "Japan's lost decade". According to various rounds of the *National Opinion Survey on Land Issues* conducted by the Ministry of the National Land and Transportation, the proportion of those aged 60 and over who thought that land was a better asset than financial assets such as savings and securities declined from 63 percent in 1994 to 37 percent in 2007, as displayed in Figure 11. This result may suggest that an increasing proportion of the Japanese elderly need more information regarding investment opportunities. Caution should be exercised, however, with regard to the lack of appropriate knowledge pertaining to various financial markets. According to a recent report released by the OECD (2005), 71 percent of the population aged 20 and over have no knowledge about investment in equities and bonds, 57 percent have no knowledge of financial products in general, and 29 percent have no knowledge about insurance, pensions, and tax.

To cope with these problematic realities, the Financial Services Agency of the Japanese Government implemented the Financial Instruments and Exchange Law, effective from September 30, 2007. This new financial business law aims at enhancing investor protection by tightening the rules for financial institutions' sales of stocks, investment trusts and other products that could cause holders to suffer a loss of principal. As a result, in order to avoid possible regulatory trouble, one of the major banks decided not to sell risk instruments to customers 80 and over unless they can demonstrate sufficient knowledge of investing or are accompanied by other family members at the time of purchase (The Nikkei 2007). The large bank requires that customers aged 70 and over receive explanation concerning the risks involved at least twice before they purchase an investment trust or variable annuities. Another leading bank has recently begun the practice of visiting customers aged 90 and over once every three months, even if their products do not suffer any losses.

Changing Pattern of Lifecycle Deficits and Lifecycle Reallocations

The effect of population aging on the accumulation of assets will depend on the system for reallocating resources across age. The NTA system provides a comprehensive framework for estimating consumption, production, and resource reallocations by age. NTA measures

intergenerational flows for a certain period of time (usually a calendar or fiscal year), and its flow account is governed by the following expression:

$$\underbrace{Y^l(x)+Y^A(x)+\tau^+(x)}_{Inflows}=\underbrace{C(x)+S(x)+\tau^-(x)}_{Outflows}$$

where Y^l = labor income, Y^A = asset income, τ^+ = transfer received, C = consumption, S = saving, and τ^- = transfer given. It should be noted that this flow identity holds for each age *x* as well as the whole economy.

Rearranging the terms, the lifecycle deficit, namely, the difference between consumption and labor income, $C(x)-Y^l(x)$, must be equal to the inter-age flows or reallocations that come in the following two forms: net transfers, $\tau(x)=\tau^+(x)-\tau^-(x)$, and asset-based reallocations, $Y^A(x)-S(x)$.

$$\underbrace{C(x)-Y^l(x)}_{Lifecycle\ deficit}=\underbrace{\underbrace{\tau^+(x)-\tau^-(x)}_{Net\ transfers}+\underbrace{Y^A(x)-S(x)}_{Asset-based\ realloocations}}_{Age\ reallocations}$$

The age reallocations can be further disaggregated into public-sector and private-sector age reallocations. That is,

$$C(x)-Y^l(x)=\left[\tau_g^+(x)-\tau_g^-(x)\right]+\left[\tau_f^+(x)-\tau_f^-(x)\right]+\left[Y^{Ag}(x)-S_g(x)\right]+\left[Y^{Af}(x)-S_f(x)\right]$$

where subscripts, *g* and *f*, refer to "public" and "private" age reallocations, respectively.

Before we proceed to the discussion of computational results, we would like to caution the reader about the following two points. First, both 'familial transfers' and 'private transfers' are used interchangeably in this paper; both of the terms refer to transfers coming from other family members of the same or different households. Second, although net private transfers are comprised of bequests and *inter vivos* transfers, the computation of the bequest component has not been completed at the time of writing this paper. For this reason, the bequests are excluded from the computational results reported in this paper.

It is also important to note that the estimated values for the totals are adjusted on the basis of the National Income and Product Accounts (NIPA) values, thus insuring consistency with NIPA. Labor income, however, does not exactly correspond to the NIPA counterpart, because the income of those self-employed includes returns to labor and capital. Based upon the result derived from one of the recent studies (Gollin, 2002), we have opted to allocate two-thirds of this income to labor and one-third to capital.

Figure 12 presents the changing pattern of three components of the reallocation of the lifecycle deficits for the entire country from 1984 to 2004. The three components include reallocations through assets, net public transfers, and net private transfers, measured in terms of 2000 constant prices and on an annual basis. Panel A illustrates the reallocation of the lifecycle deficits observed in 1984, Panel B stands for 1994, and Panel C for 2004.

There are several more important points to be noted with respect to Figure 12. First, the three panels clearly show a marked increase in the impact of the rapid growth of the elderly population upon transfers over time. The amount of net total transfers given to the elderly aged 65 and over increased by three times from 1984 to 2004. Particularly, the amount of net public transfers to the elderly grew 4.4 times in real terms over this time period. In contrast, the amount of net familial transfers to the elderly dwindled to one-fourth over this time period. It is also worth noting that the role of asset reallocations in financing the lifecycle deficits has become extremely important among the elderly population - the amount of asset-based reallocations increased by 10 times in real terms during 1984-2004. In the face of such phenomenal growth of the importance of asset-based allocations, however, the total amount of net public transfers dominated that of asset allocations in the elderly population in 2004.

Second, despite the shrinking of the young population, the total amount of the resources transferred to the population group aged 0-19 grew by 9 percent during the two decades. It should also be added that the composition of the net transfers changed appreciably over time. That is, during 1984-2004, the amount of net public transfers given to this age group rose by 35 percent in real terms, while the corresponding figure for net familial transfers declined by 7 percent.

Third, though relevant tables are omitted, on a per capita basis, the relative growth of net public transfers to both elderly and young persons increased to an equal extent, i.e., doubled, over the period in question. More importantly, while the amount of net familial transfers to the young population during the two decades rose by 34 percent, there was a 70-percent decline for the elderly population.

Fourth, in general, the productive age groups 20-59 experience negative net public transfers, and the peak age of tax burden for the productive age population as a whole tends to shift right-ward (to higher ages) over time, which reflects the influence of population aging as displayed in Figure 12. In 2004, the peak of the tax burden occurred approximately at age 57,

while in the earlier years the peak occurred between ages 40 to 50. It should be emphasized, however, that on a per capita basis, the peak of the tax burden remained relatively stable in the vicinity of age 55 during the time period under consideration.

Fifth, the role of asset-based reallocations became increasingly important over time particularly for the elderly, as can be clearly seen from the three panels of Figure 12. Although asset-based reallocations occur in both private and public sectors, the amount of asset-based reallocations in the private sector has consistently dominated those in the public sector. Furthermore, a positive asset-based reallocation implies that people receive asset income in excess of their saving. In 2004, for instance, positive asset-based reallocations reach their peak when people are in their 60s, and are comprised largely of the return to private assets (e.g., property income). In contrast, the small negative asset-based reallocation at young ages in 1984 occurred mainly owing to public saving exceeding public asset income.

Sixth and more importantly, a careful examination of the three panels reveals that the net familial transfers are negative among relatively young elderly persons. As displayed in Panel C of Figure 12, this phenomenon is particularly pronounced in 2004 among the elderly in their 60s and 70s. This implies that the amount of financial assistance that the relatively young elderly persons provided to their adult children and/or grandchildren exceeded the monetary assistance from the latter to the former. It is also worth noting that the amount of such, negative net familial transfers from the relatively young elderly to other age groups rose during the period of "Japan's lost decade" in which the unemployment rate remained at a very high level and labor income hardly grew at all in both nominal and real terms. The data displayed in Figure 13 further substantiates the validity of this interpretation: all the age groups received positive net intra-household transfers from the age group 60-74.

Moreover, according to a nation-wide survey undertaken by the Nihon University Population Research Institute in April 2007, the proportion of the survey respondents in their 40s who had received financial assistance from their parents over the previous 12 months was approximately 50 percent higher than that of those who had provided financial assistance to their parents. These results suggest that despite the fact that multigenerational coresidence has been eroding over the past few decades, the Japanese elderly are still playing a vital role in providing financial support for their offspring when the latter encounter economic difficulties. Although older persons in Japan are often considered liabilities for the country, they are actually playing a key role as a safety net. For this reason, they should be considered latent assets in contemporary Japanese society. Ironically, filial norms among the middle-aged have been

deteriorating since the late 1980s as displayed in Figure 5, and this could be interpreted as partial evidence proving that elderly parents, despite such deterioration, still, to a considerable extent, remain altruistic toward their children and/or grandchildren.

Further to our discussion with regard to Figure 13, we have also plotted changes in the net familial transfers to the elderly by age and year in Figure 14. The data plotted in this graph show an upward shift of age at which the net familial transfers to the elderly become positive. Over the period of two decades, that age rose from 63 years old in 1984, to 64 years old in 1989, 71 years old in 1994, 74 years old in 1999, and 77 years old in 2004. These upward shifts over time seem to be closely related to the improved pension benefits due to the maturity of the pension schemes, but causality is difficult to infer here. It is also interesting to observe in Figure 14 that for any given cohort, the importance of familial transfers does not increase much as the cohort members age. The ratio of net familial transfers to life cycle deficits for the elderly who turned 65 in 1984 remained virtually unchanged, around 0.15, over the subsequent 15 years, until they reached age 80 in 1999. Similar observations are applicable to those who were 70 and 75 in 1984. These plotted results indicate that from a cohort perspective, there is virtually no age gradient. This seems to be accounted for by the inter-cohort differentials in old-age pension maturity levels, which are heavily affected by the age of each cohort at which the universal coverage of public pension schemes was implemented.

In Figure 15, we have plotted the change in the pattern of financing consumption among the two elderly groups (65+ and 85+) from 1984 to 2004. Among those 65 and over, the role of public pensions was becoming increasingly important. In contrast, as has been already mentioned, familial transfers were becoming less important over time. Surprisingly, in 2004, the share of net familial transfers in financing consumption among the elderly aged 65 and over virtually disappeared, although a substantial proportion of the elderly in this age group were still coresiding with their adult children. It should be emphasized, however, that the inflow of familial transfers from the younger population is still significant among those aged 85 and over. This may be largely due to the fact that the elderly of this old age group receive a relatively limited amount of pension benefits as a result of (1) their shorter contribution period and (2) the dominance of women receiving a survivor's pension in this very old age group.

Moreover, the data plotted in Figure 15 indicate the share of asset-based reallocations has been growing substantially over time, particularly among the relatively young elderly, which is consistent with our earlier discussion in connection with Figure 10. In the case of those aged 65 and over, the proportion of consumption financed by asset-based reallocations grew from 14

percent in 1984 to 36 percent in 2004.

It is also worth remarking that the share of public transfers in the form of medical care services rose to a considerable extent, especially between 1999 and 2004, which is in agreement with our earlier discussion concerning the rise of per capita consumption among the elderly depicted in Figure 6. It is also interesting to observe in Figure 15 that, although declining over time, the share of labor income is considerable, which is consistent with the high labor force participation rate among the elderly population in contemporary Japan.

Concluding Remarks

In this paper, we have analyzed some of the important impacts of Japan's unprecedented population aging on its postwar economy, by heavily drawing upon the computed results of the NTA-Japan project, ranging from the first and second demographic dividends to the lifecycle reallocations. We have also shed light on the rapidly changing roles of public and familial support systems for the elderly in Japan, that have evolved together with the family organizational transformation and the rapid development of the social security system over the past several decades.

As extensively discussed in the literature, Japan's demographic landscape in the 21st century is extremely gloomy. In hope of raising marital fertility to alleviate the burden of rapid population aging on the economy, the Japanese government has formulated and implemented a series of pronatalist programs and policies since the early 1990s (Ogawa and Retherford, 1993; Retherford and Ogawa, 2006). And yet, despite such strenuous efforts, the country's fertility remains very low. Judging from numerous past experiences of many industrialized countries in the West, there is no panacea for restoring fertility to the replacement level. Moreover, the use of immigration measures is inconceivable in contemporary Japanese society. In view of the results of various recent opinion surveys on the importation of unskilled foreign workers to Japan, it seems safe to say that the introduction of a large-scale immigration policy in Japan is a rather remote possibility. In contrast to this, although the awareness of the two demographic dividends is still fairly limited in Japan, their effective use, particularly that of the accumulated second demographic dividend which is likely to remain substantial for the next few decades, appears to be an attractive policy option for Japan for placing its future economic growth on a steady path.

One crucial question arises: how can Japanese elderly persons make use of their accumulated assets and wealth? Depending upon where they invest their financial resources,

Japan's future economic growth performance is prone to differ considerably. If Japanese elderly persons are provided with sufficient knowledge about the dynamics of the financial market, they may have a good potential for investing their accumulated assets possibly outside Japan. Moreover, the timing of the first demographic dividend for selected Asian countries varies considerably, as presented in Figure 16. As examined earlier, Japan's first dividend ended in 1979. In contrast, in the case of China, for instance, the first dividend lasts for 41 years from 1973 to 2014. In an era of globalization, the healthier and wealthier among the Japanese elderly will have the opportunity to invest their assets in a dynamically growing Chinese economy, and bring financial gains back to Japan. Obviously, to facilitate such international transactions, proper institutional and legal arrangements need to be developed to protect the elderly investors.

In contemporary Japan, the elderly are generally considered as "debts". However, various analyses developed in this paper indicate that Japanese elderly persons will become powerful "assets" to keep the country on a sound and steady growth path in the years to come. Furthermore, over the past decade or so, they have been informally playing the role of the society's safety net in providing financial assistance to their adult children and/or grandchildren suffering from financial difficulties.

In addition, as discussed elsewhere (Ogawa and Matsukura, 2007), the number of healthy elderly persons in Japan is expected to increase significantly in the years ahead, and their educational attainment will be higher than that of the elderly in the past. In other words, Japan's future elderly will possess a substantial proportion of both the country's human and financial resources.

Before closing this paper, it seems appropriate to give few words of caution concerning the interpretation of some of the numerical results computed from the NTA-Japan project. First, as pointed out earlier, although net private transfers are comprised of bequests, the bequest component has not been included in the present paper due to the fact that its computational methodology, which can be used as a base for all NTA member countries, has not been finalized at the time of writing this paper.

Second, although private-sector information derived from the five rounds of the *National Survey of Family Income and Expenditure* (NSFIE) from 1984~2004 is one of the most vital inputs in the NTA-Japan project, the data derived from the NSFIE have limitations. For instance, although there are significant seasonal variations in the consumption pattern, each round of the NSFIE covers only three months of the year (i.e., from September to November). Therefore,

familial transfers in the form of wedding gifts, monetary contributions in case of death, financial assistance for university tuitions and housing, etc are likely to be rather poorly captured in the survey, which makes the estimates on familial transfers less reliable. Despite these data limitations in the NSFIE, the decreasing trend of familial transfers from adult children to their elderly parents over the past two decades still remains as a valid finding.

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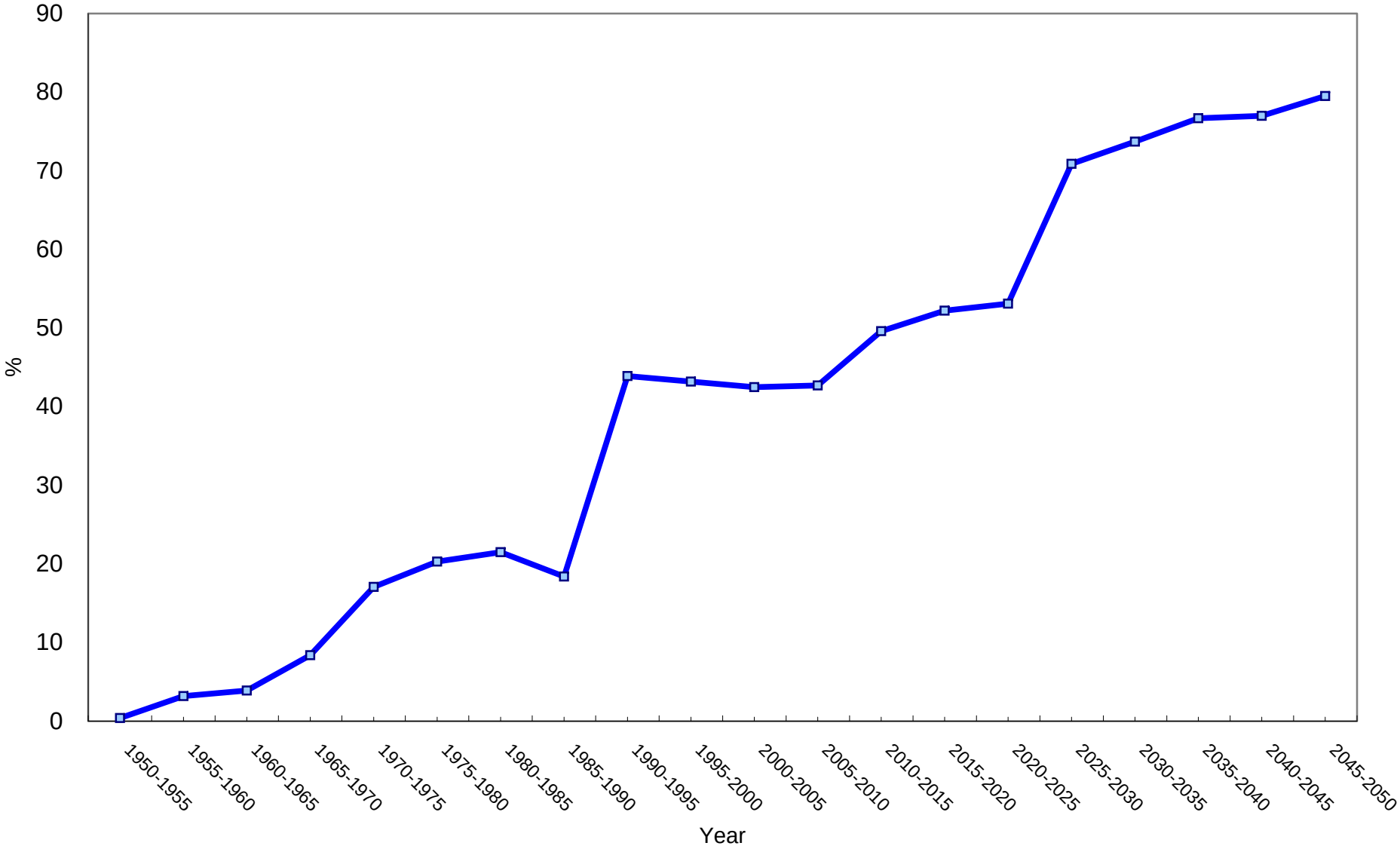
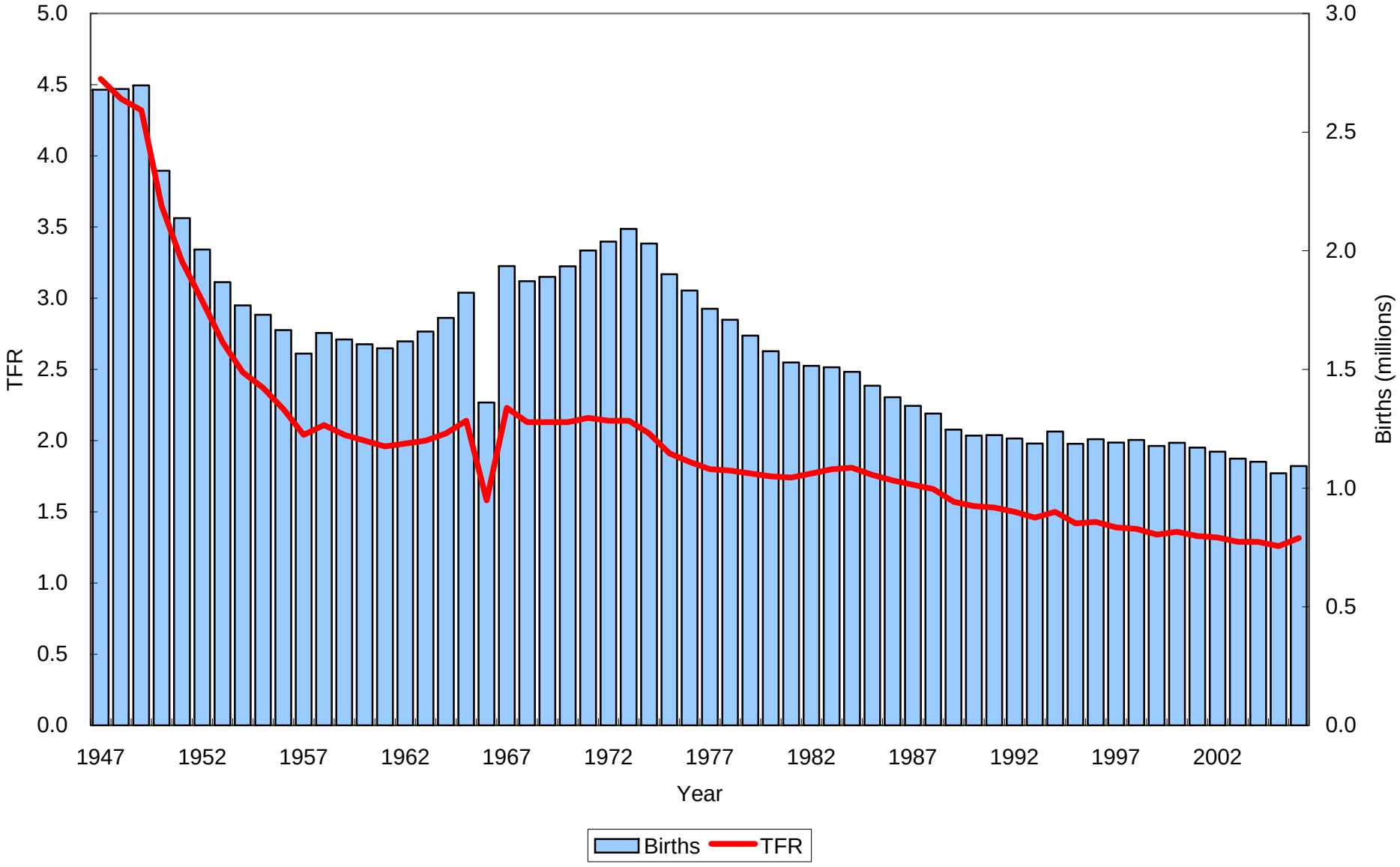
Figure 1. Proportion of population with below-replacement fertility in the world population: 1950-2050



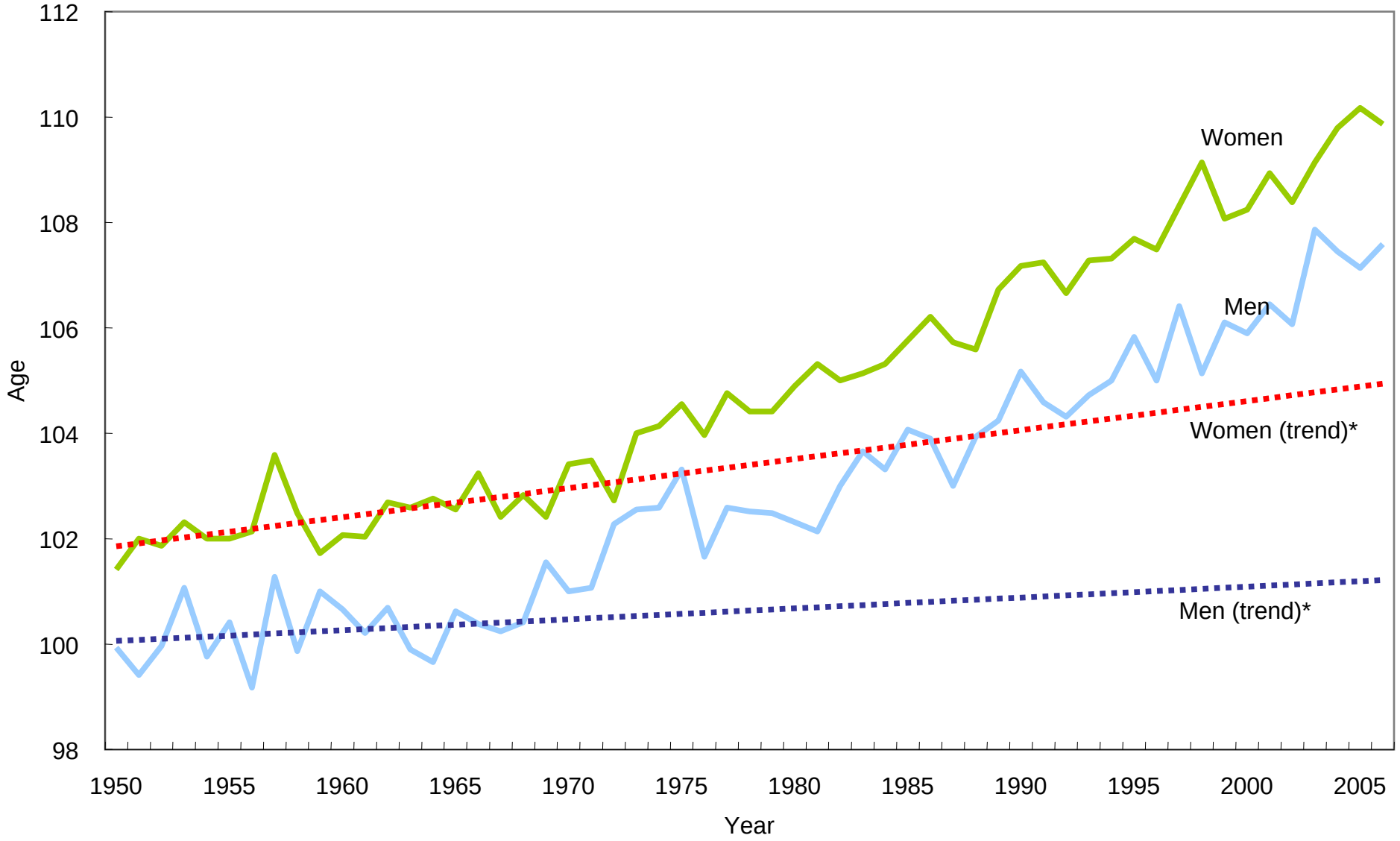
Source: United Nations, *Population Prospects 2006*, 2007.

Figure 2. Trends in number of births and TFR: Japan, 1947-2006



Source: Ministry of Health, Labour and Welfare, *Vital Statistics*, various years.

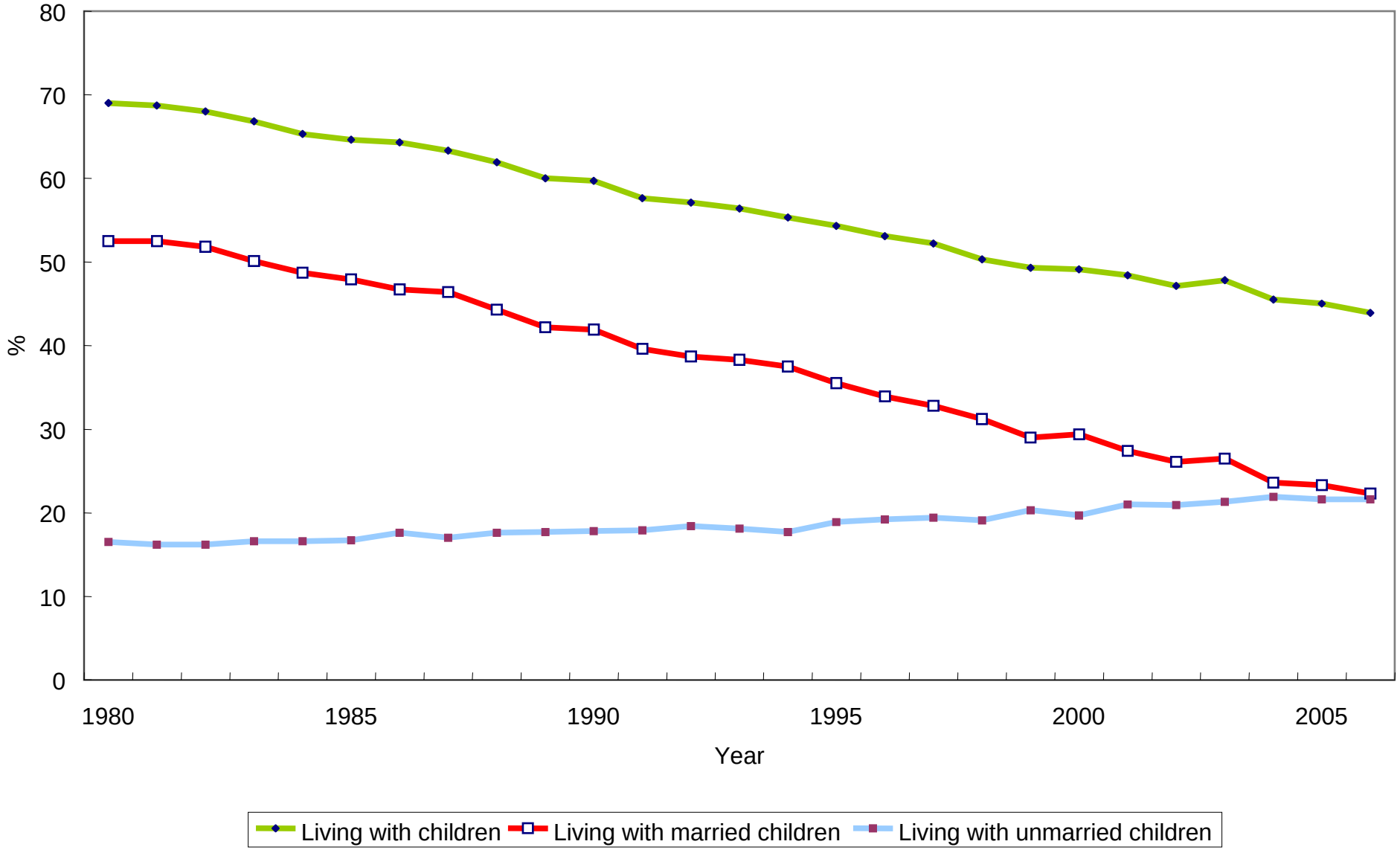
Figure 3. Change in average age of death among 30 oldest persons by sex: Japan, 1950-2006



* The trend lines for men and women have been estimated on the data from 1950 to1968.

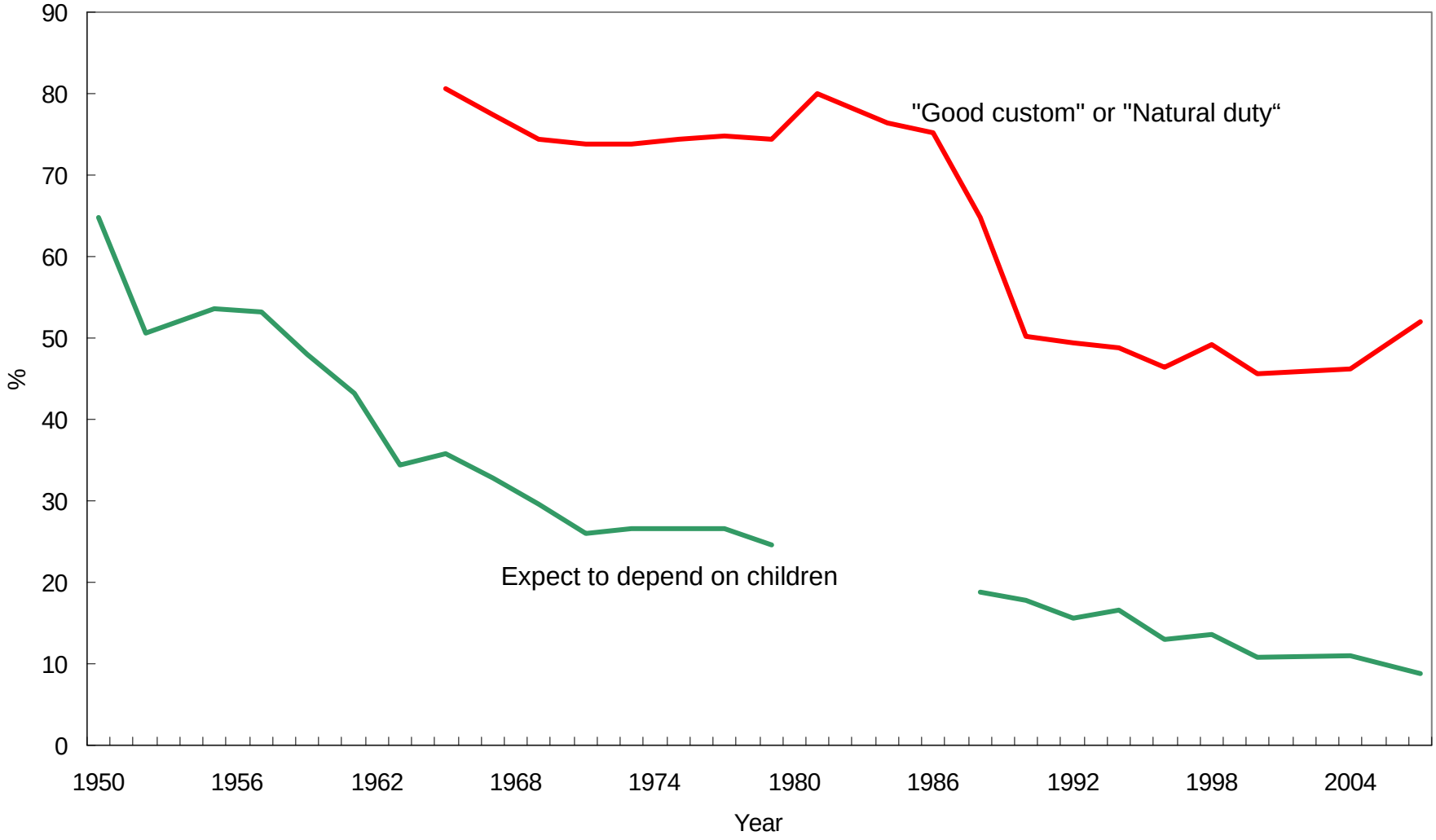
Source: Ministry of Health, Labour and Welfare, *Vital Statistics*, various years.

Figure 4. Change in proportion of those age 65 and over coresiding with their adult children: Japan, 1980-2006



Source: Ministry of Health, Labour and Welfare, *Comprehensive Survey of Living Conditions of the People: Health and Welfare*, various years.

Figure 5. Trends in values and expectations about care for the elderly: Japan, 1950-2007



Sources: Mainichi Newspapers of Japan, *Summary of Twenty-fifth National Survey on Family Planning, 20005*.

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Figure 6. Age-specific profiles of per capita consumption and production: Japan, 1984-2004

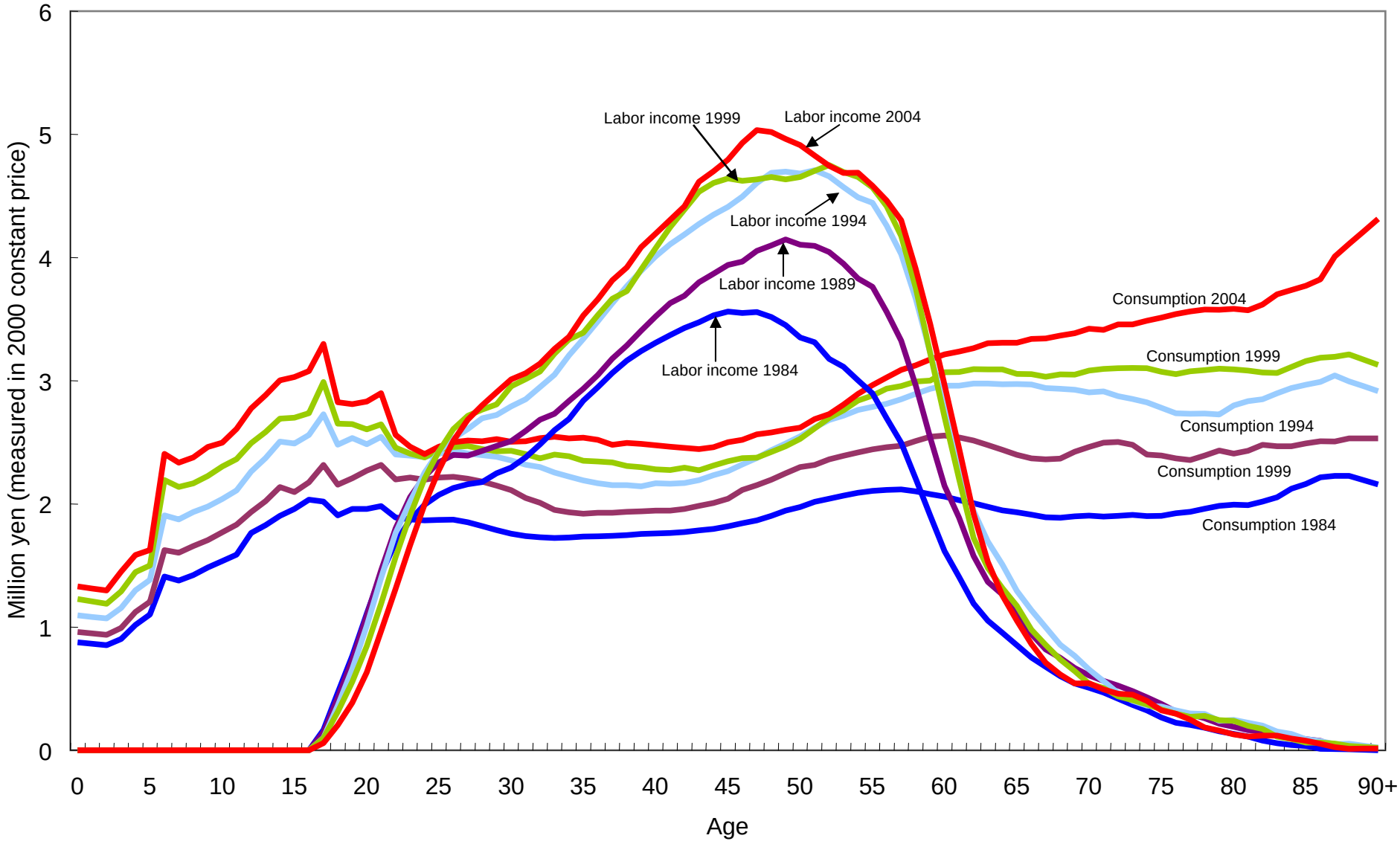


Figure 7. Average age-specific profiles of per capita consumption and production: 1984-2004

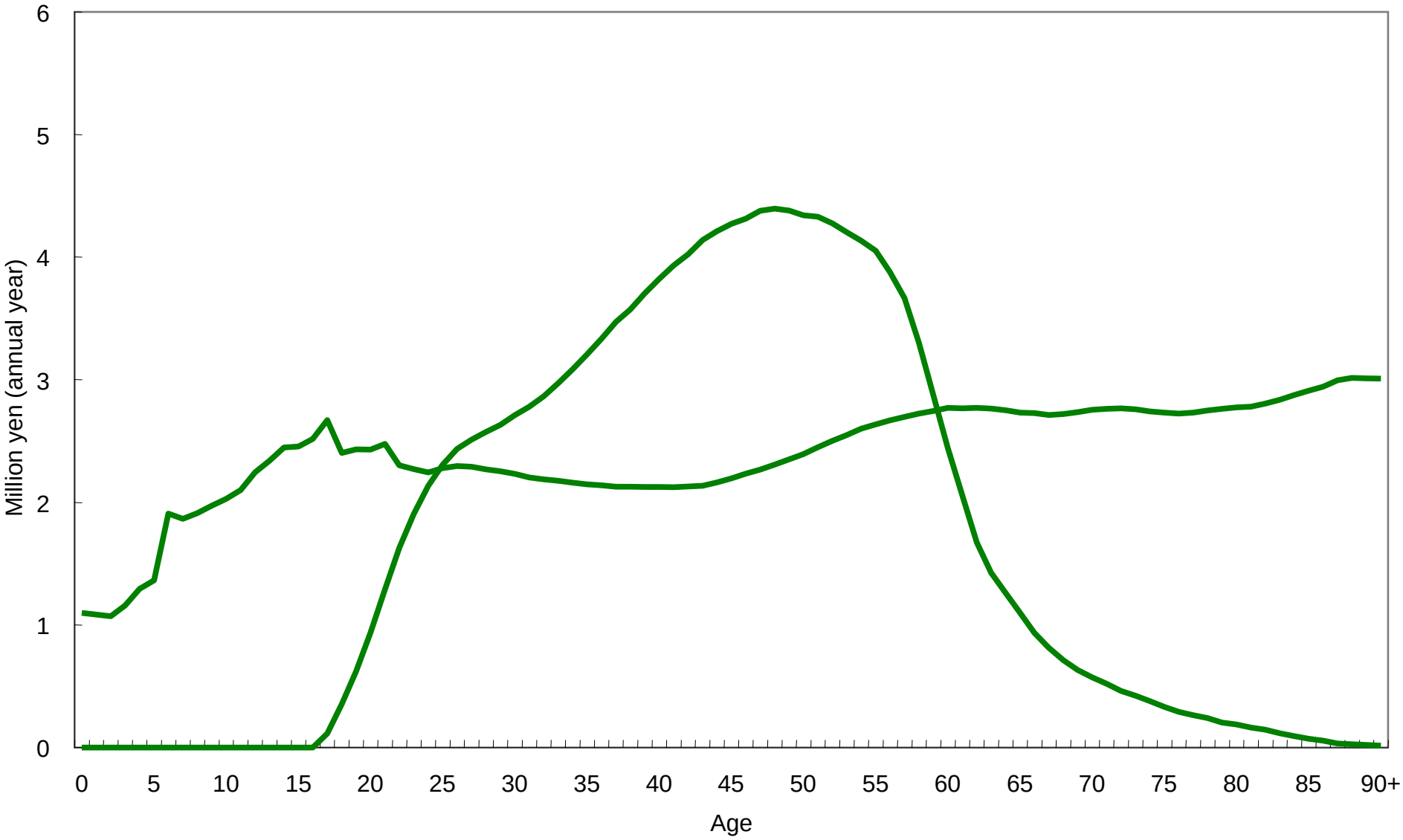


Figure 8. Trend in first dividend: Japan, 1925-2025

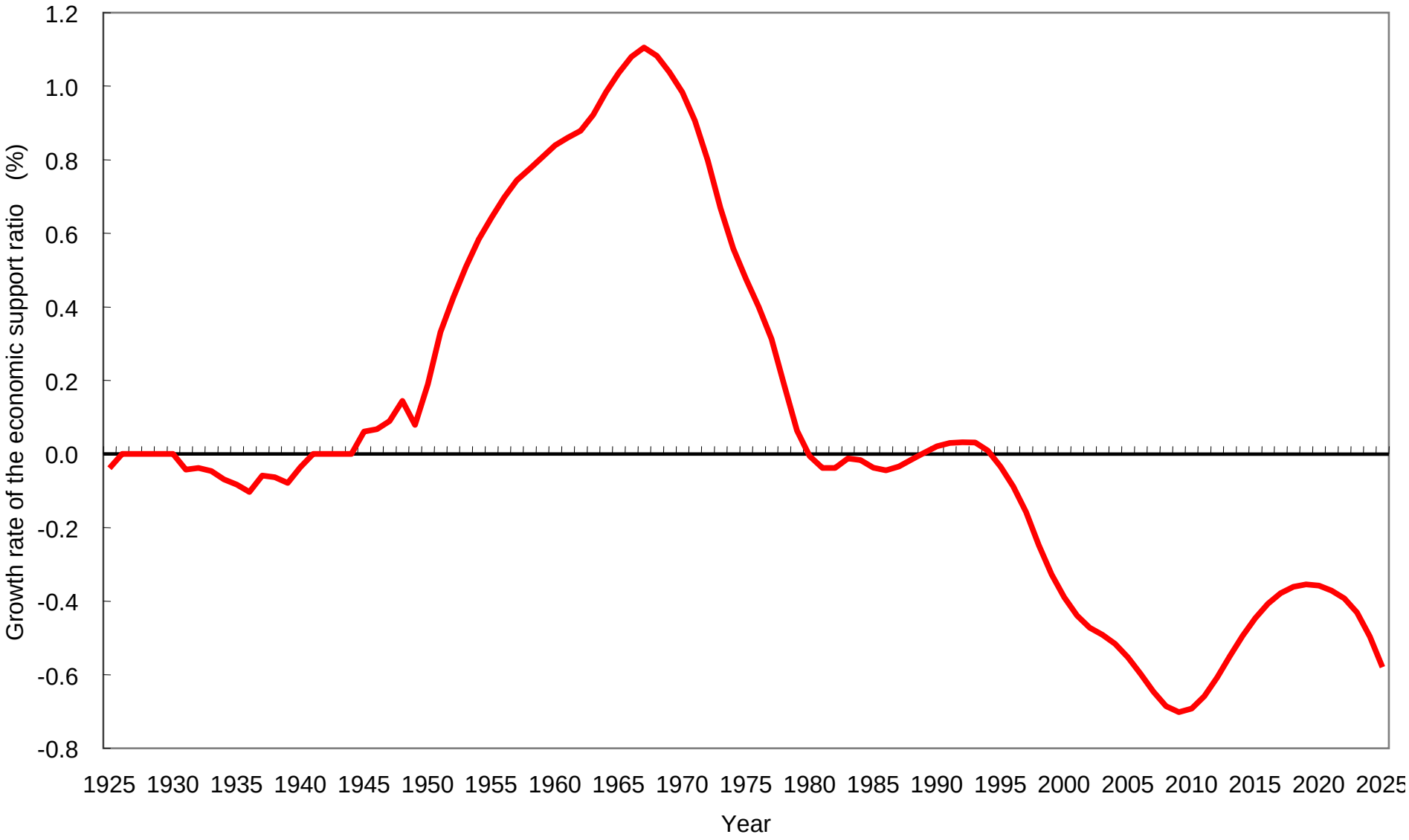


Figure 9. Trend in second dividend: Japan, 1960-2035

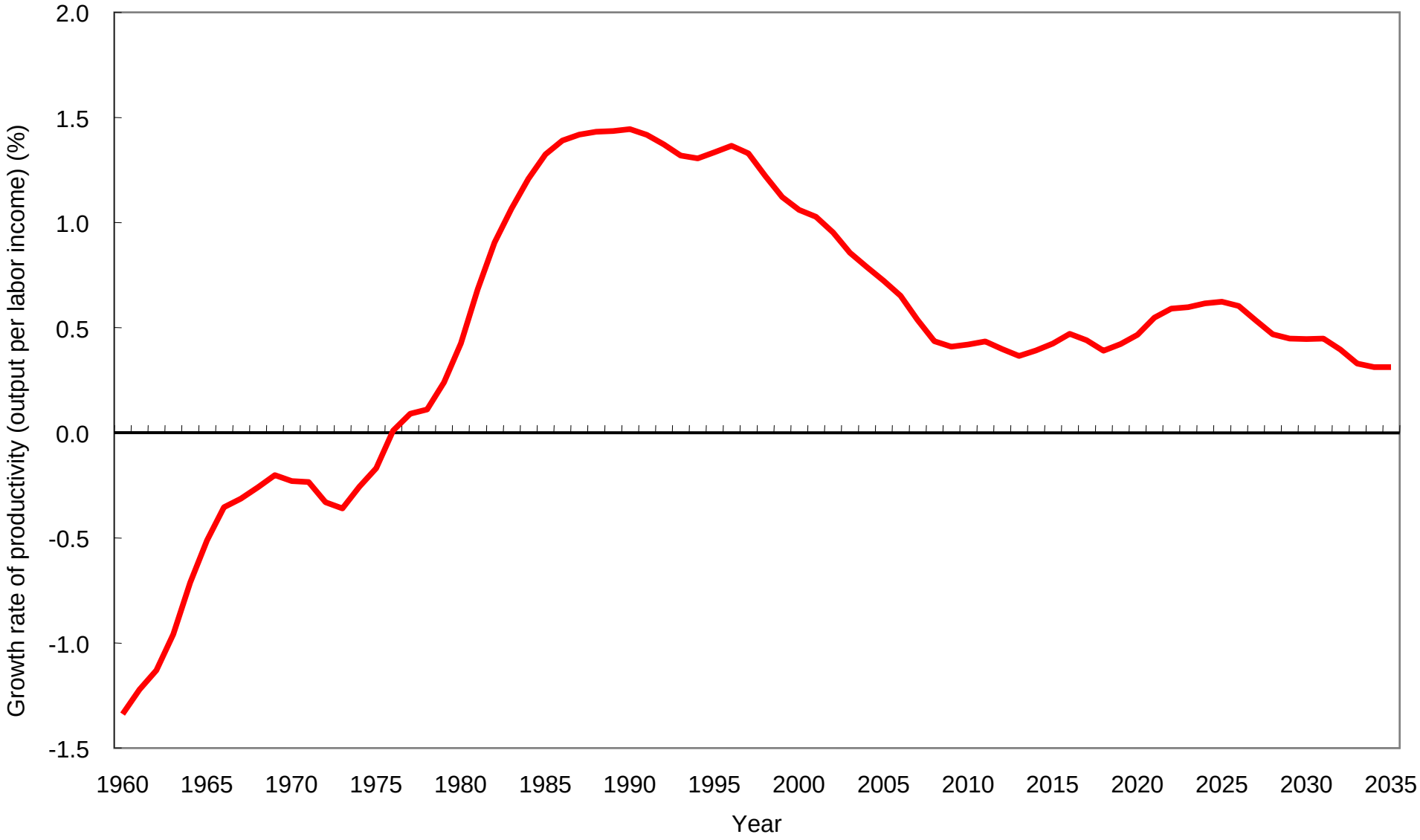


Figure 10. Age profile of asset and pension wealth transfers in Japan, 1999

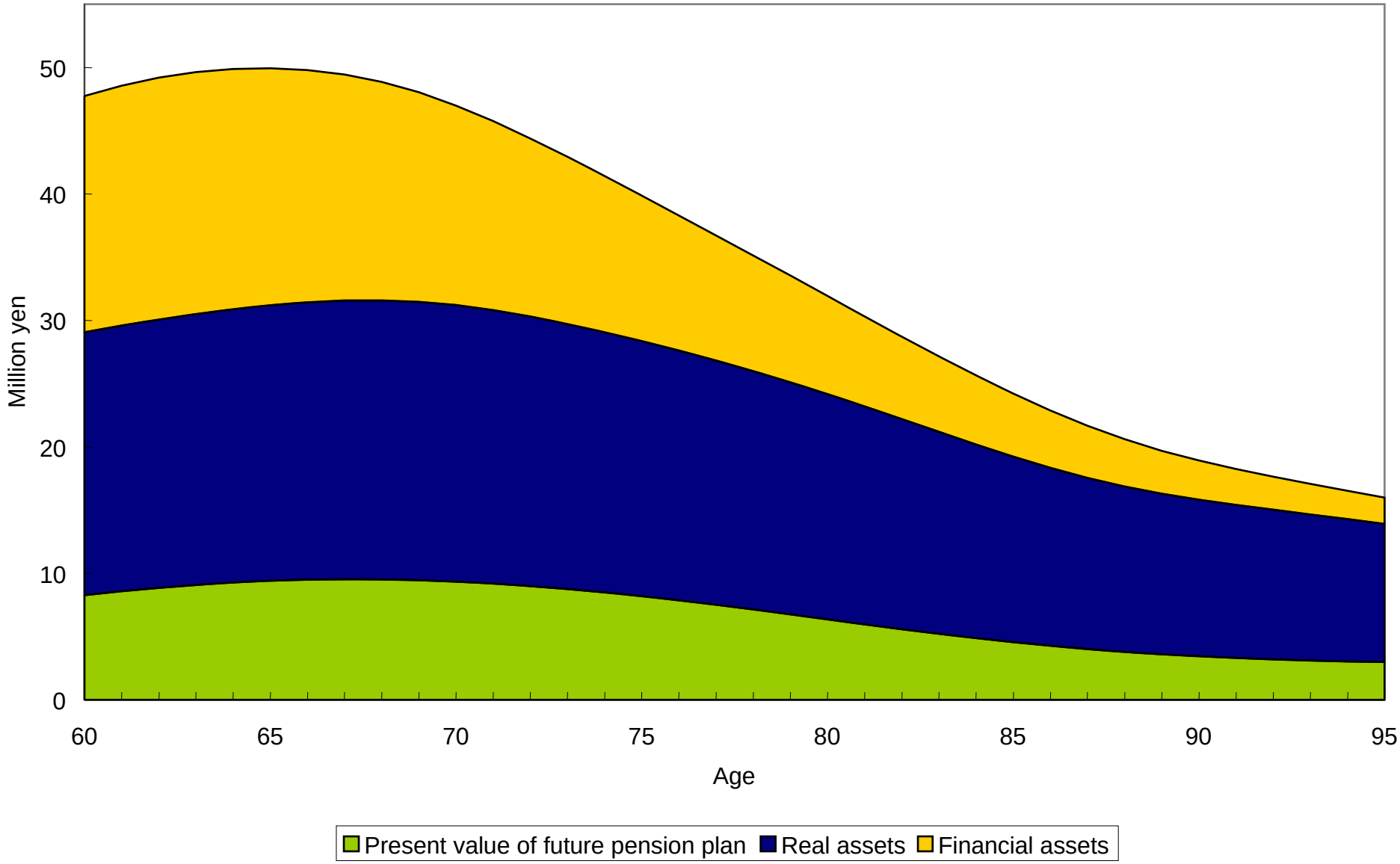
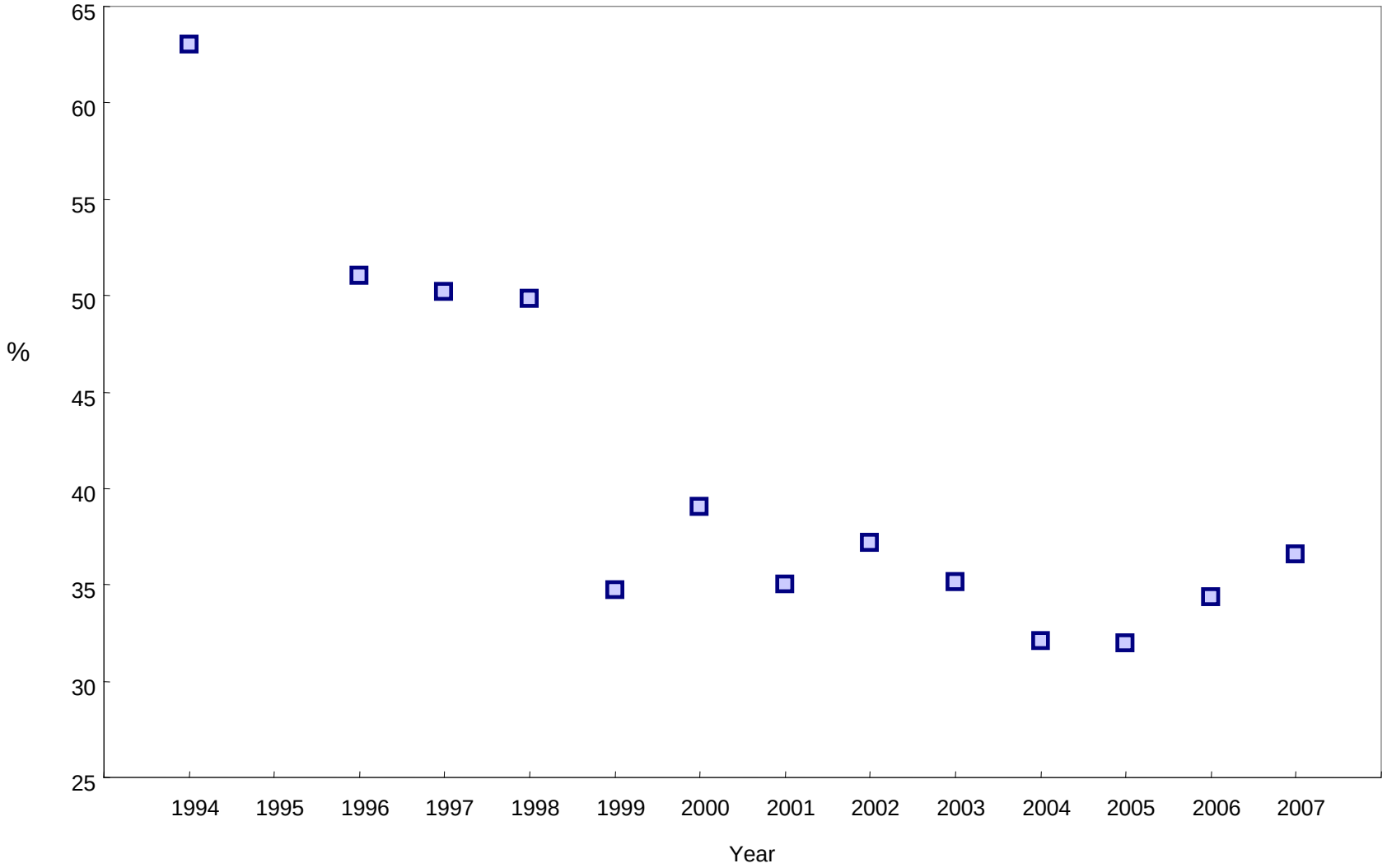
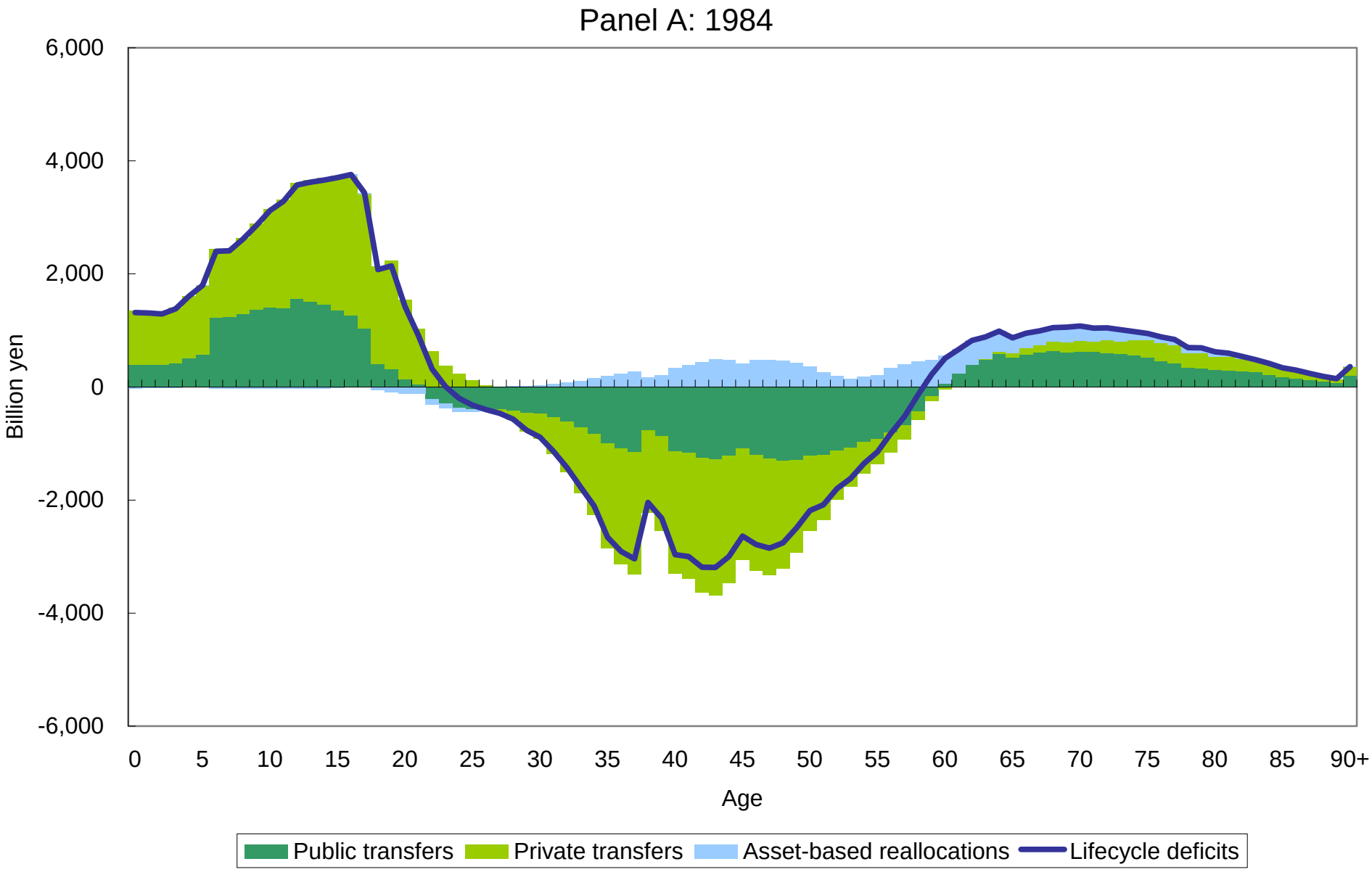


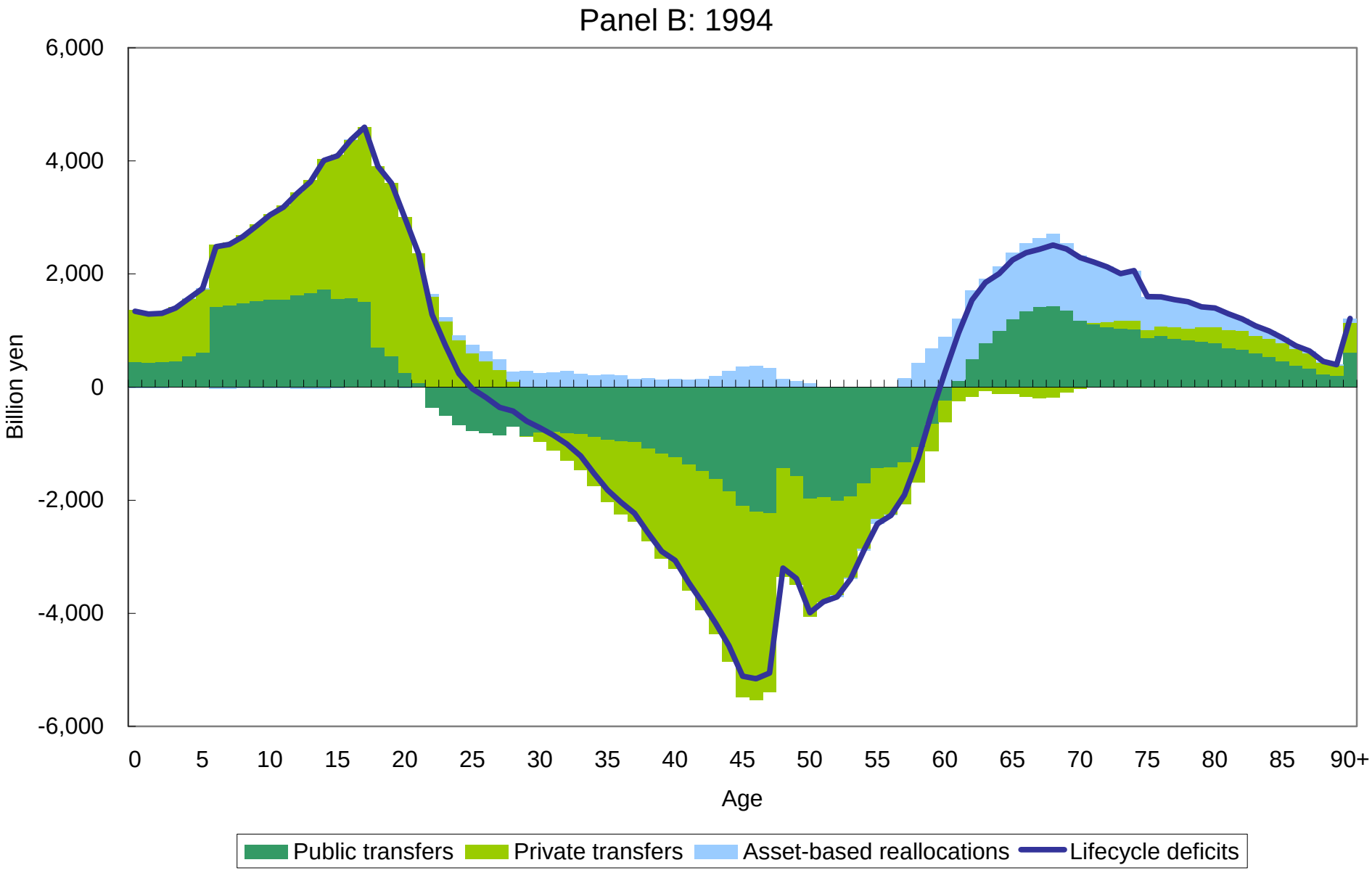
Figure 11. Changing preference for land as an assets among the elderly aged 60 and over: Japan, 1994-2007



Source: Ministry of Land, Infrastructure, Transport and Tourism, National Opinion Survey on Land Issues, 2007.

Figure 12. Changing pattern of three components of reallocations: Japan, 1984-2004




Panel B: 1994
6,000
4,000
2,000
0
-2,000
-4,000
-6,000
Billion yen
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90+
Age
Public transfers
Private transfers
Asset-based reallocations
Lifecycle deficits

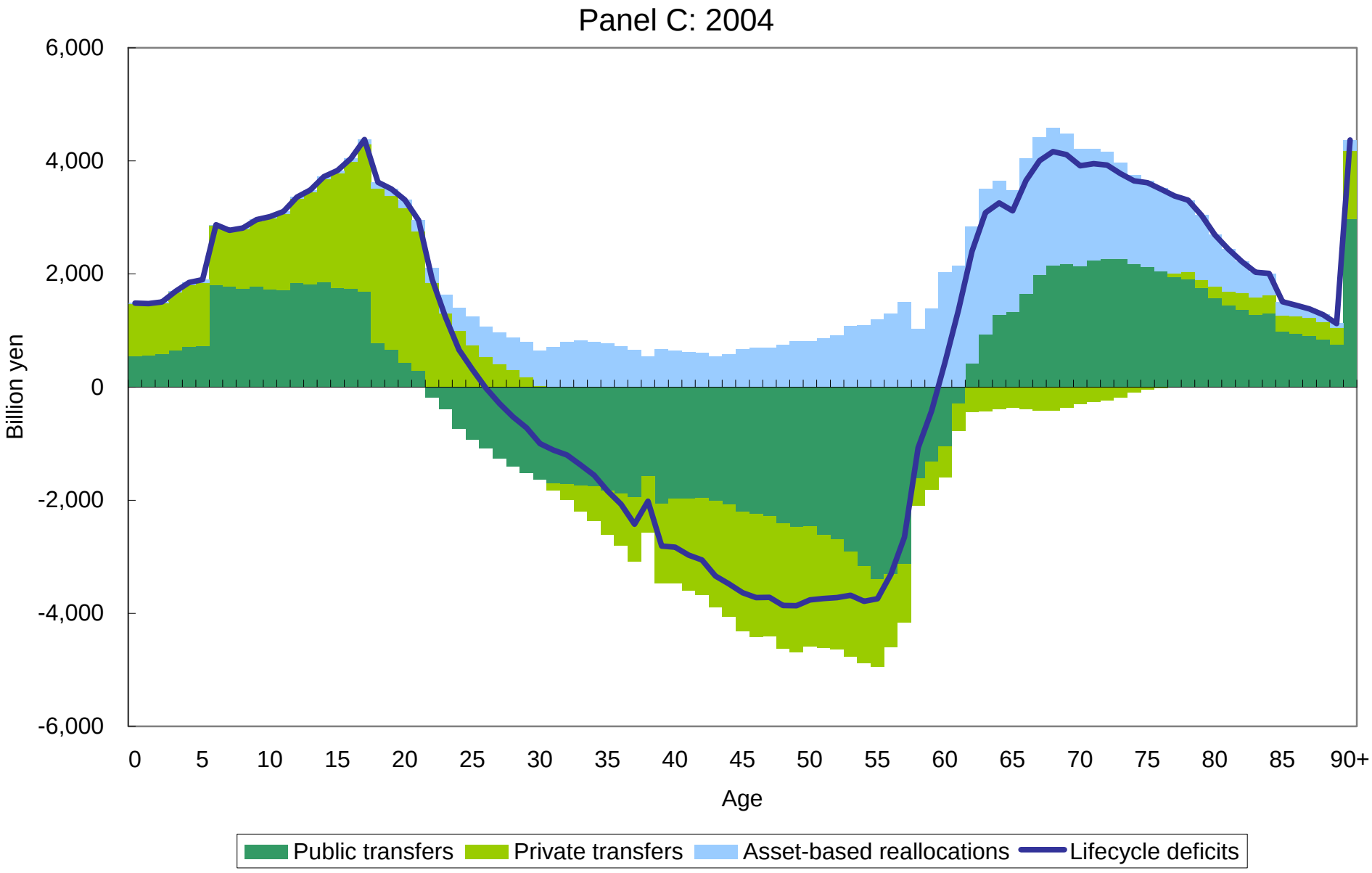

Panel C: 2004
6,000
4,000
2,000
0
-2,000
-4,000
-6,000
Billion yen
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90+
Age
Public transfers
Private transfers
Asset-based reallocations
Lifecycle deficits

Figure 13. Net per capita intra-household transfers between broad age groups, 2004

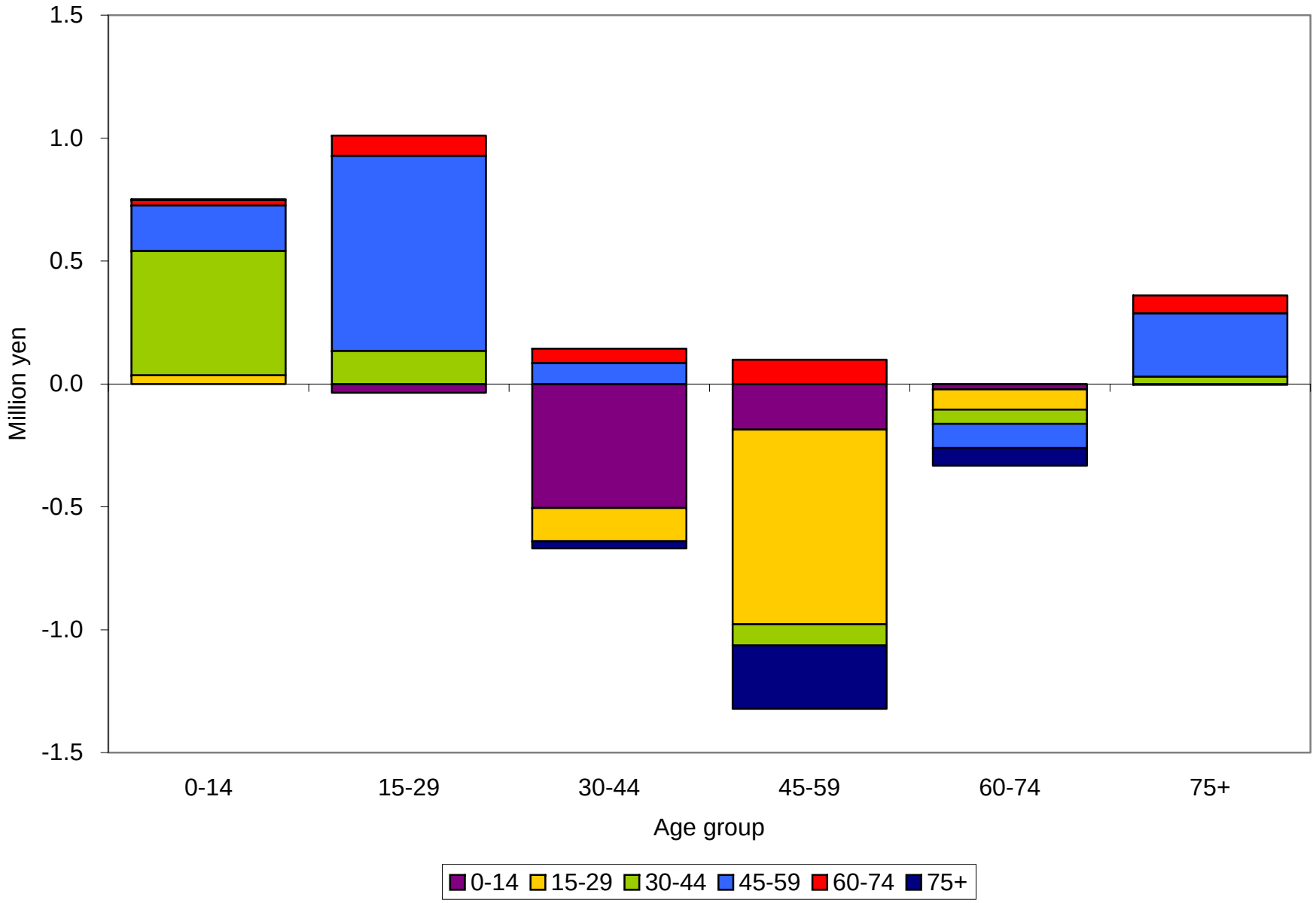


Figure 14. Net familial transfers, 65 and older: Japan, 1984-2004

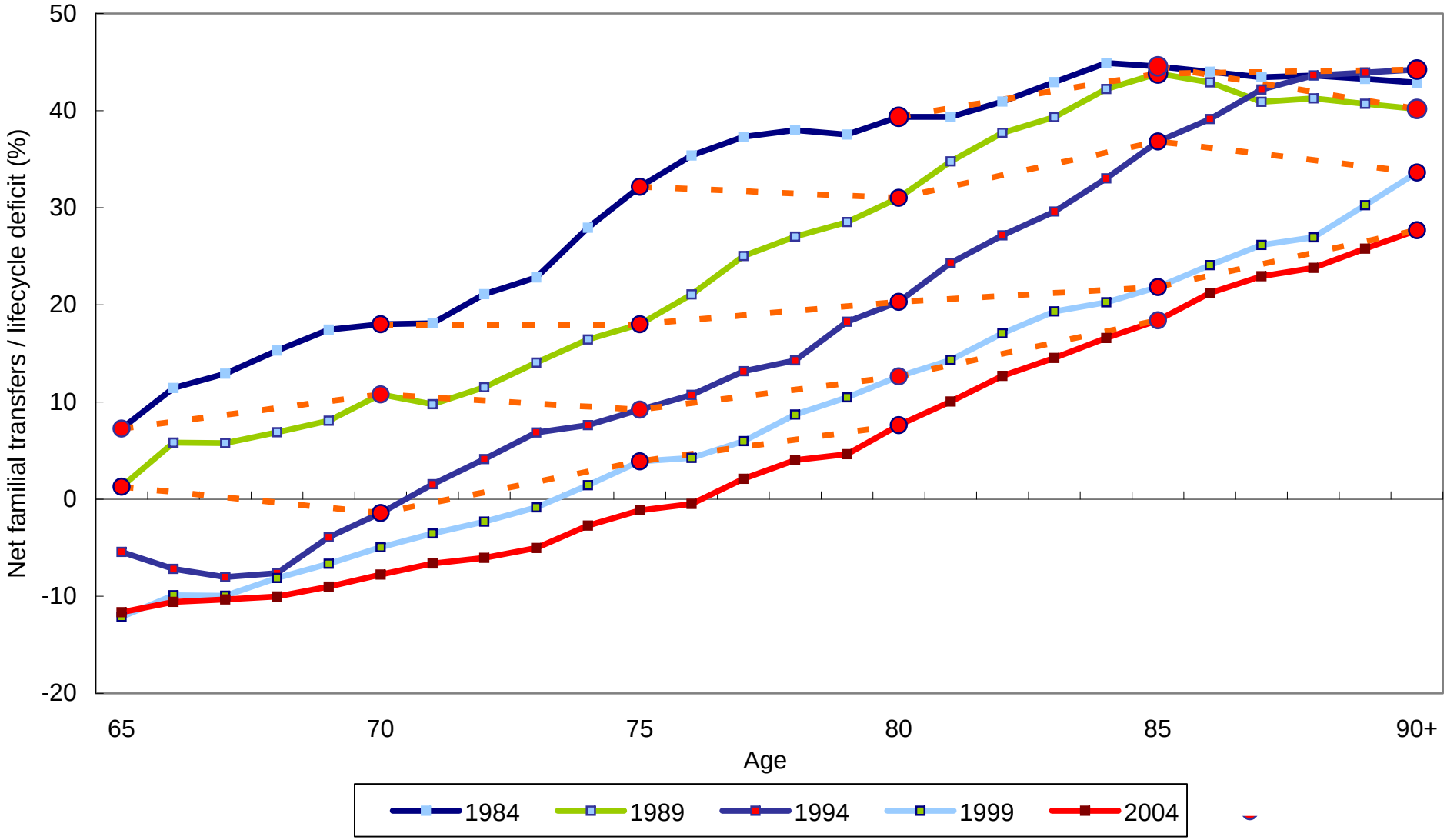


Figure 15. Change in the pattern of financing consumption among the two elderly groups: Japan, 1984-2004

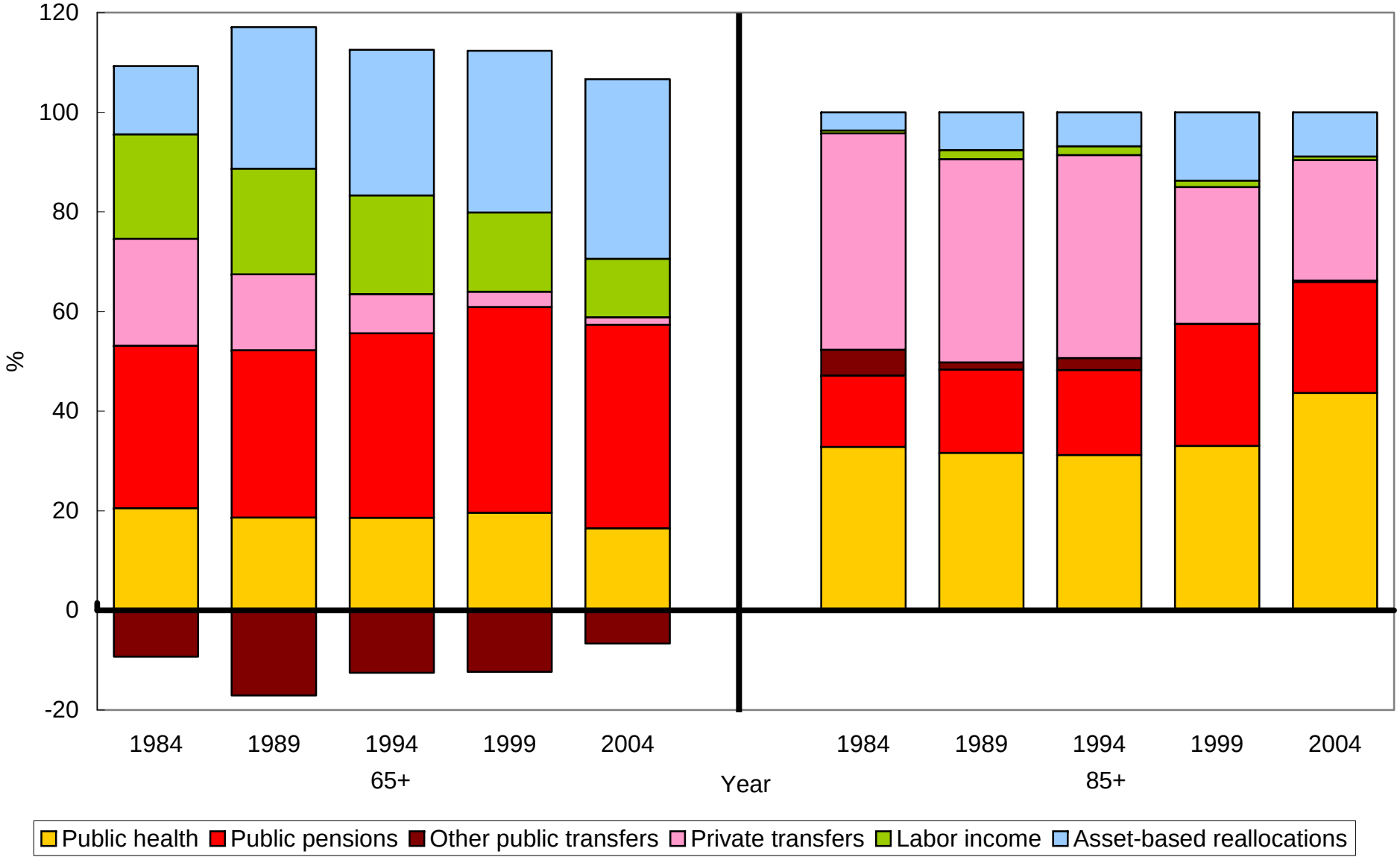


Figure 16. First demographic dividend in selected Asian countries, 1950-2050

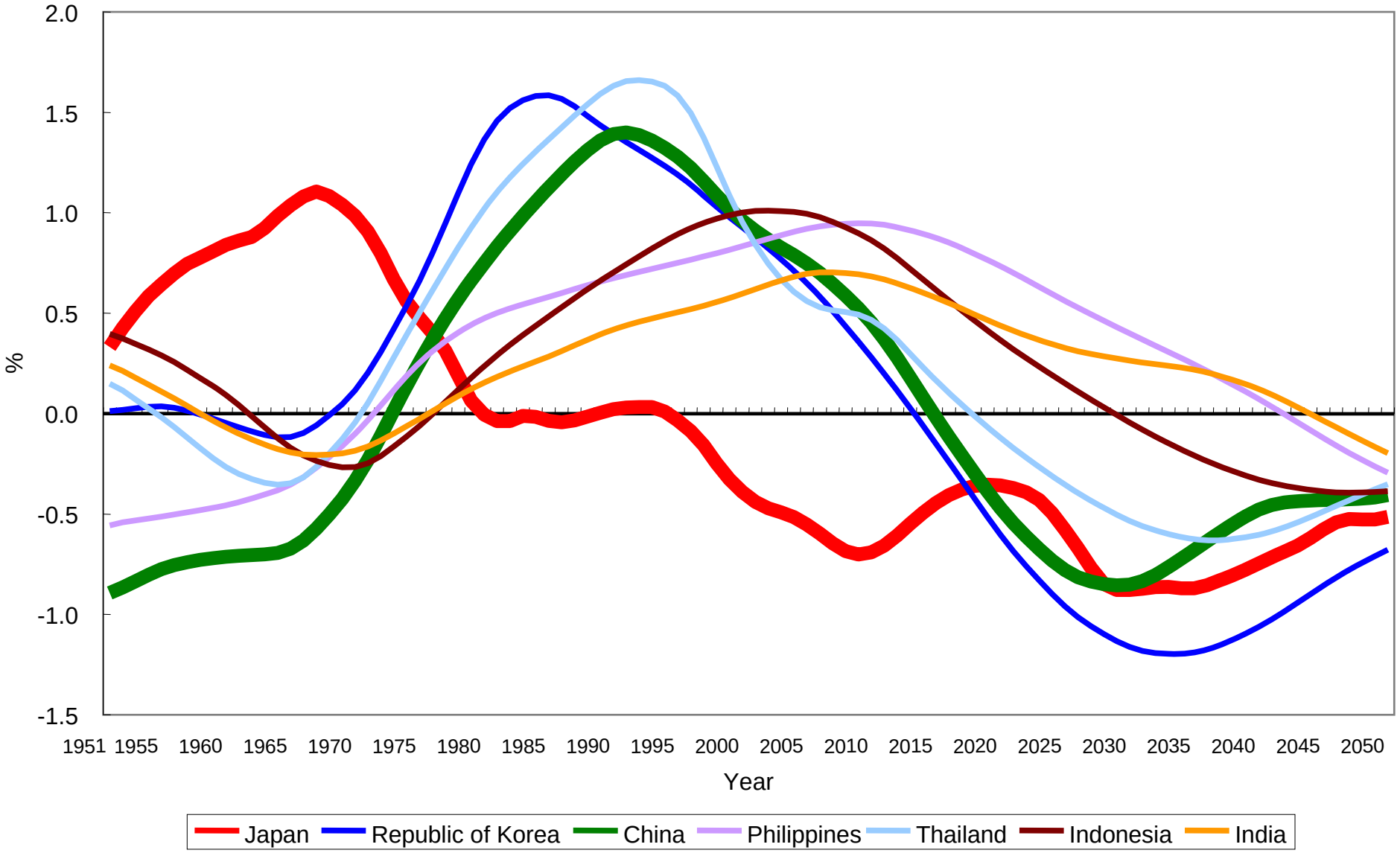


Table 1. Population change in Japan: 1950-2025

Year	Total population (1000 persons)	0-14(%)	65+(%)	Total Fertility Rate	Total Dependency Ratio	75+/65+(%)	Women 40-59/65-84
1950	83200	35.4	4.9	3.65	67.5	25.7	1.82
1955	89276	33.4	5.3	2.37	63.1	29.2	1.81
1960	93419	33.0	5.7	2.00	60.4	30.4	1.80
1965	98275	25.6	6.3	2.14	46.8	30.3	1.77
1970	103720	23.9	7.1	2.13	44.9	30.2	1.69
1975	111940	24.3	7.9	1.91	47.6	32.0	1.60
1980	117060	23.5	9.1	1.75	48.4	34.4	1.48
1985	121049	21.5	10.3	1.76	46.7	37.8	1.40
1990	123611	18.2	12.1	1.54	43.5	40.1	1.30
1995	125570	16.0	14.6	1.42	50.4	39.3	1.10
2000	126926	14.6	17.4	1.36	46.9	40.9	0.91
2005	127449	13.8	20.2	1.25	50.6	45.1	0.77
2010	127013	13.0	23.0	1.24	55.6	48.0	0.65
2015	125603	12.1	26.9	1.24	63.2	48.4	0.59
2020	123235	11.0	29.5	1.24	67.6	52.1	0.57
2025	120094	10.2	31.0	1.28	70.0	60.0	0.56

Sources: Statistics Bureau, Population Census, various year.
Nihon University Population Research Institute Population Projection, 2003