Population Ageing in Japan: Economic Issues and Implications for Southeast Asia

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Paper presented at the 2002 IUSSP Regional Population Conference, Bangkok, Thailand, 10-13 June 2002
Introduction

‘The aging of Japan’s population will not diminish its capacity to export capital in the next century, but little of that capital will go to Southeast Asia, at least if dependency rates are allowed to have their way. Rather, Southeast Asia will become a capital exporter, kicking the foreign dependency habit.’

Jeffrey Williamson and Matthew Higgins (2001)

When the Japanese children who are born this year are themselves elderly, they may find themselves living in a nation that is continuing to grow smaller - and older. Will such a nation be able to make the necessary savings and be able to increase the labour productivity to the degree that will be needed to support those children in their old age? And what will all this mean for other regions of the world, such as Southeast Asia?

Projections of population decline and population aging have caused the Japanese government to fear a loss of economic dynamism and difficulties in financing its pension and health schemes. Businessmen worry about the loss of customers and labor shortages and middle-aged adults worry about the availability of support in old age (Ogawa 2000). This widespread concern in Japan about population ageing is a prudent response to a demographic inevitability. In future decades; its population will age more rapidly than any country has ever done before. The proportion of the aged population will double from 10 to 20 per cent in less than 25 years. In contrast, most European countries took more than 50 years to travel the same distance (Ogawa and Retherford 1993a). It should be noted, however, that some countries in Southeast Asia, such as Singapore and Thailand, would traverse this distance even more rapidly than did Japan.

Population ageing is a normal part of the modernisation process whereby increased opportunities for women lead to lower fertility and improved medical care extends the life spans of older adults. In Japan’s case, however, the fertility of Japanese women fell faster than had ever occurred before even as Japan achieved one with the world’s highest life expectancies at birth in just a few decades. Furthermore, there are few signs of self-correcting tendencies that would slow the population ageing process or even prevent its acceleration.

The economic effects of the aging of Japan will not be confined to that country alone. Among the regions that will be most affected is Southeast Asia where demographic trends will closely track those of Japan; but with a 50 year lag. In 1990, 44 per cent of Thailand’s and 57 per cent of Indonesia’s direct foreign investment came from Japan (Mason 2001). Now the population structure of Southeast Asia is moving from one of declining youth dependency to increasing old-age dependency, prompting Williamson and Higgins (2001) to ask whether the young Southeast Asian tigers will become capital exporters by the year 2025 as countries like Japan ‘begin to fill up with retired adults’?
This paper will first review the past and future population trends in Japan with a view to showing that there has already been substantial aging of the Japanese population and that the next 50 years should bring not only additional aging; but population decline as well. Furthermore, there is little likelihood that these trends can be reversed. The second section of this paper describes the economic issues raised by the aging of the Japanese population in the context of population decline. Emphasis is placed on the role of population ageing in the accumulation of capital, labour and technological progress and in the fiscal problems facing the Japanese pension and health systems. The last section of this paper argues that the experiences of Japan are very relevant to the countries of Southeast Asia. The projected future demographic trajectory of the region closely tracks the actual path of the Japanese population during the last half-century. Assuming that the future economic and demographic situation of Southeast Asia will be comparable to that observed in the case of Japan, a number of lessons based on the Japanese experience are drawn.

I. Population Trends, Past and Future

At the time of Japan’s last census, October 1, 2000, the nation had a population of 127 million (Millet 2001). Its population had grown by only 1.1 per cent since the census of 1995, the smallest increase since 1950. In fact, the only segment of the population that had grown since the previous census was the elderly (aged 65 or older). That group had increased by 20 per cent. As a result, for the first time in the history of Japan, the population aged 65 and older outweighed the population under age 15 (17.3 per cent to 14.3 per cent).

At the dawn of the 20th century, about one third of the Japanese population was below the age of 15. Only one person out of twenty was age 65 or older. By 1940, however, the total fertility rate (TFR) had fallen to about 4 children per woman. Despite this decline, the population was growing younger, because the infant mortality rate had been cut even more significantly.

Between 1947 and 1949 there was a brief but intense ‘baby boom’. The rate of natural increase jumped from 1.3 per cent in 1940 to 2.0 per cent in 1947 and then rose above 2.1 per cent in the following two years. After this “baby boomlet”, however, the TFR that had been at 4.5 in 1947 fell to 3.7 by 1950 and continued to fall rapidly, reaching about 1.4 in 1995. It remained at about that level until the end of the century.

Despite the large changes in fertility and mortality that had taken place in the first half of the 20th Century, the age distribution had remained remarkably constant. This would change in the last half of the century. The working-age share would increase by about 10 percentage points and the old-age share would nearly triple while the young-age share in the population would be cut in half. By 1995, almost 70 per cent of the population was of working age with the remainder about equally divided among the young and the old.

Japan’s Ministry of Health and Welfare (MHW) prepares projections every five years (Endo and Katayama 1998). The medium variant of the 1997 projections (Takahashi et al. 1999) indicates that the Japanese population will
gradually decline, from more than 125 million in 1995 to about 121 million in 2025 and then fall more rapidly to just above 100 million by 2050. The United Nations’ projections are slightly more optimistic. They project that the Population of Japan will peak in 2010 at about 128 million and will fall to 109 million by 2050. (United Nations 2002).

The working age population of Japan peaked at 87 million in 1995 and declined to 86 million by the turn of the century. That figure is projected to be less than 72 million by 2025 (Hoshino and Nakazato 2002). Meanwhile, the population aged 65 and over had grown to more than 22 million in 2000 and is projected to be about 40 million by 2050 (United Nations 2002). Based on its analysis of the 2000 census figures, the National Institute of Population and Social Security Research projected that by 2050, the population aged 65 or older will comprise 36 per cent of the population, double its current percentage (Lai 2002). The Institute also projected that the working age population (aged 15 to 64) will decline from its current 86 million to 53 million in 2050.

Population decline has been and will continue to be will be accompanied by population ageing. The median age of the Japanese population has increased from 22 years in 1950 to 41 years in 2000 and it is projected to reach 50 years by 2025. By mid century, fully half the population of Japan will be over the age of 53 (United Nations 2002).

The young-age share of the population, which comprised 16 per cent of the total population in 1995, will fall to 13 per cent in 2025 and continue at that level through 2050. The working-age share will fall from almost 70 per cent of the population in 1995 to about 60 per cent in 2025 and then to about 55 per cent in 2050. The old-age (65+) share will increase from 17 per cent of the population in 2000 to 29 per cent in 2025 and to more than 36 per cent in 2050. The population share of the oldest-old (80+) that was less than one per cent in 1950, almost reached 4 per cent by 2000. By 2025, that figure is projected to exceed 10 per cent and by 2050, the oldest-old will make up 15 per cent of the Japanese population (United Nations, 2002). No nation has ever experienced such rapid ageing.

The slowdown of growth and the eventual decline of the Japanese population are due to the decline in Japanese fertility (Kojima 1995, 198). The total fertility rate (TFR) was nearly 5 births per woman in 1930. By 1960, however, the TFR had fallen to about 2 births per woman (at or below replacement), where it remained until 1973. It fell well below replacement levels by 1980 and since 1998 it has remained at about 1.38, far below the replacement level.

Though marital fertility in Japan has remained relatively constant since 1965, the proportion of Japanese women who are married has steadily declined because of increasingly higher ages at marriage and an increasing proportion of women who never marry at all. As a result of the delay in marriage and the rising probability of divorce, the proportion of women in the key childbearing ages (25-29) who are not married has increased from less than 10 per cent in 1930 to more than 50 per cent in 1995.
A major contributor to the aging of the Japanese population is the increase in life expectancy. In 1990, Japan had the highest life expectancy among the nations of the world (Goldman and Takahashi 1996). Furthermore the rate of decline in mortality is greater than in any other low-mortality country. Between 1950-1955 and 1995-2000, life expectancy for males increased from 61.6 years to 77.1 years. In the case of women, life expectancy went from 65.5 years to 83.8 years. And sometime in the first half of the 21st century, the life expectancy at birth of males will also be greater than 80 years. By mid-century, the life expectancy at birth of males will surpass 83 years and the life expectancy of females will exceed 92 years for a combined figure of 88 years (United Nations 2002).

A significant factor in the rapid growth of the elderly population of Japan is the steadily increasing life expectancy at age 65. For 65 year-old women that figure has increased from less than 15 years in 1950 to about 21 years in 1995. During the same period, male life expectancy at age 65 increased, from a little more than 10 years in 1950 to more than 16 years in 1995. By 1987, an 85 year old Japanese woman had a better than 50 per cent chance of surviving to see her 90th birthday (Manton and Vaupel 1995).

A. Age Structure of the Population

The young age share of the Japanese population was just below 15 per cent in the year 2000 and is likely to remain at about that level until mid-century. The proportion of the population in the working ages (15-64) is projected to be relatively constant at about 60 per cent of the total. The share of the old-age population (aged 65 and over) began to increase rapidly after 1950. By 2000, it had exceeded 17 per cent of the population. By 2010, it is projected to exceed 20 per cent of the population and by 2050 more than one person in three will be elderly (36 per cent).

The elderly population is ageing due to improving survival rates for the elderly. In 1950, about 27 per cent of the old age population was above the age of 75. In the year 2000, 39 per cent of the old age population was aged 75 and over. That share will almost reach 60 per cent by 2050.

The nature of the changes in age structure over time can be observed by looking at the growth (or decline) of individual age groups from period to period. For simplicity, we consider only two sub-periods, 1950 to 2000 and 2000 to 2050. In the latter half of the twentieth century, there was a change in Japan’s age profile. The young age groups declined and the older age groups increased. Since the latter was greater than the former, the total population increased.

Projections for the first half of the 21st Century indicate that this trend will continue. Not only will the young age groups (the groups that would give birth to the children) decline, so also will the working age groups. Only the dependent elderly age groups will increase, thus placing a heavy burden on the declining working age population.

There are a number of ratios by which we can measure different aspects of ‘dependency.’ In 1950 there were 60 young-age (0-14) dependents for every 100 persons of working age (15-64). After that, the young-age dependency rate
fell steadily. By 2010, there will be slightly more than 20 young dependents for every 100 persons of working age. That ratio is projected to remain constant until mid-century.

In 1970 there were about 10 old-age dependents (65+) for every 100 persons of working age (15-64). After that, the old-age dependency rate rose steadily and is projected to reach almost 60 dependents per 100 persons of working age by 2050. The United Nations defines the working age population as persons aged 15 to 59 and the elderly population as persons, aged 60 and above. Using their definitions, the old age dependency ratio rose from 8 to 25 in the last half of the 20th Century, will reach almost 50 by 2025 and by 2050 that figure is projected to exceed 70. (United Nations 2002)

The total burden on the working age population is the sum of the young-age and old age dependency. In the latter half of the 20th Century, the rapid decline in young age dependency caused the total dependency rate to fall. But by 2010, the growing old-age dependency rate will start to push up the total dependency rate and by 2050, Japan will have more than 80 dependents for every 100 of working age. Using the United Nations’ definitions, the total dependency rate of Japan began to rise after 1995. It reached 47 dependents per 100 of working age at the turn of the century. It will rise to 70 by 2025 and reach 96 by 2050. (United Nations 2002)

Ogawa and Retherford (1997) introduced the concept of the familial support ratio, the female population aged 40-59 divided by the population of both sexes aged 65 to 84. This ratio was about 1.75 in 1960. It has since fallen to 1.09 in 1995 and was projected to fall to 0.60 in 2025. At that time there will be only about one middle-aged woman for every two elderly persons. This would imply a significant decline in the availability of family-based eldercare.

The economic dependency ratio is the ratio of the economically inactive population to the economically active population (per 100). According to Kojima (1995) there were about 133 economically inactive persons for every 100 economically active persons in 1950. This ratio fell 110 in 1975 and remained at about that level until 1990. It is projected to fall to about 93 in 2000 after which it would begin to rise.

B. Causes of Demographic Trends

This section will first discuss the socio-economic causes behind the reductions in infant and adult mortality. It will then examine the reasons for Japan’s low and falling fertility. Finally, it will assess the likelihood that international migration could offset the projected trends in fertility and mortality and slow or stop population decline and aging in Japan.

1. Mortality Decline

Goldman and Takahashi (1996) ascribe the rapid increase in Japanese life expectancy after World War II to improvements in standards of living and
environmental sanitation. The more recent reductions in mortality are attributed to Japan’s rapid economic growth and free medical care for the elderly.

In the early years of the period between 1955 and 1989, mortality reduction among the young was the major contributor to the increase in life expectancy but at the end of the period mortality reduction among the aged had become the most important contributor.

In 1900, only about 71 per cent of children ever born survived to age 20. By 1995, almost 99 per cent of children did so. Previous declines in infant mortality had offset the declines in fertility, leaving the age structure largely unchanged. By mid-century, infant mortality had fallen to about 50 per thousand live births and at the end of the century, infant mortality had fallen to 3.5 infant deaths per thousand live births, leaving little scope for further improvement (United Nations 2002).

During the first half of the 20th century there had been almost no decline in mortality among Japanese aged 65 and over. However, lifestyle changes that reduced such causes of adult mortality as heart disease, cancer and stroke increased male life expectancy at age 65 to more than 16 years in 1995. Female life expectancy at age 65 rose to 21 years in 1995. Thus in 1995, almost 85 per cent of men and more than 90 per cent of women who had been born in 1930 had survived to age 65 and entered the elderly population. Today, almost every child born in Japan can expect to live to age 65 and a good deal longer.

2. Fertility Decline

While increases in rates of marital dissolution have been observed, the main causes of the fertility decline were delayed age at first marriage and the rise in the number of women never married. The average age at marriage for single women climbed from 24.5 years in 1975 to 27.7 years in 1995. The proportion of women projected to never marry increased from 5 to 15 per cent in the same period. (Retherford, Ogawa and Matsukura, 2000). According to the 1995 census, almost 50 per cent of Japanese women aged 25 to 29 were unmarried (Yashiro, 1998). Since the marital total fertility rate remained relatively constant at about 2.0 children per married woman, the result was a steady decline in the TFR.

In Japan, the proportion of married women using contraception has remained about 80 per cent. Ogawa and Retherford (1993a) estimate that about 20 per cent of births in Japan were the result of accidental conceptions. With an increase in available contraceptives (such as the contraceptive pill), this percentage might be cut significantly with a corresponding reduction in marital (hence total) fertility.

Among the major socioeconomic explanations for why women are delaying marriage are increased opportunities for higher education and improved employment opportunities under circumstances that make it difficult for women to combine childrearing with full-time employment. Other factors include the increase in the educational costs of children, changes in the tax code, the
increasing opportunity cost of children, the increased likelihood of divorce, and the declining value of children.

In Japan, there is a strong positive relationship between years of education and age at first marriage (Yashiro 1998). The average age at marriage for university graduates was about 28 years, as compared with about 26 years for high school graduates. Education plays a central role in a ‘lower fertility cycle.’ When families had many children, sons were sent to university and daughters received a junior college education at most. Now that there are fewer children in a household, all of them are likely to receive a university education. Thus lower fertility encourages female education, which in turn lowers fertility further.

The composition of female employment also shifted from farming and unpaid family labour to paid employment outside the home. It is just such employment that has the greatest effect on marriage and fertility (Ogawa and Retherford 1993a). A study done by Yashiro, Oshio and Li (1997) found that only in the households of women employed by others is there a tradeoff between continued employment and childcare. Hence, the structural shift in female employment away from family and self-employed work has increased the conflict between women’s work and childbearing.

Furthermore, increased education interacts with increased employment. As women have acquired more education, their salaries have increased, which in turn raised the opportunity cost of withdrawing from the labour force to rear children. This is especially true for women under 30, whose wages have risen from 70 per cent of men’s wages in 1970 to 84 per cent in 1990 (Ogawa and Ermisch 1994).

If increased education and improved earning prospects attract women into full-time, as opposed to part-time, employment, fertility will decline. While work experience lost by having children or taking care of aged relatives does not reduce wages in part-time employment (Ogawa and Ermisch 1996), it imposes significant opportunity costs on women in full-time employment. Ogawa and Clark (1996) calculated that the lost work experience associated with each additional pre-school child would lower a woman’s annual earnings by 13 per cent. Furthermore, each additional child aged 6 to 14 would lower her annual earnings by another 8 per cent.

In Japanese firms, promotions and wages that are closely linked to a worker’s years of service; thus increasing the opportunity cost of child rearing (Yashiro 1998). Other practices that make it difficult for women to combine motherhood with full-time employment include overtime work and frequent job relocations. Finally there are few full-time mid-career openings available to women who have raised their children and wish to return to full-time employment.

It is difficult for women to work while raising children because of the shortage of day care and other supporting facilities (Endo and Katayama 1998, 242). To address this problem, the Angel Plan that was implemented in 1994, which called for creating more day-care facilities (Ogawa 2000). Ogawa and Ermisch (1996) found that the probability that a woman with preschool children will engage in full-time employment is twice as large if she is co-residing with
parents or parents in law than if she is not. Hence, the decline in the three-generation family in Japan has also increased the opportunity cost of children for married women.

One way of encouraging fertility is to provide paid child-care leave. The Ministry of Labor’s *One-year Child Rearing Leave* policy, which is only applicable to full time workers, was first implemented in 1992. (Ogawa 2000). Ohkusa (2002) found that increasing childcare leave by one year would increase the average number of children desired by about 0.13. Income support also served to increase desired fertility, but to a lesser degree.

If trends in education, wages, and legislation are encouraging female full-time employment, changes in the proportion of the population that is elderly are working in the opposite direction. The pressure to care for the elderly contributes to lower fertility. Some women have abortions because they cannot care for both a new baby and a seriously ill parent. The Ministry of Health and Welfare estimates that by 2025, Japan will have 5.2 million elderly requiring full-time care, about 2.3 million of them bedridden (Efron, 2001). Hence, almost 2 per cent of the Japanese population would fall in the latter category. At the same time there is likely to be a decrease in the number of middle-aged women who are potential caregivers. So the probability that a woman may have to give up full time employment to care for an elderly parent is increasing. In 1995, nearly one out of every 10 Japanese women aged 40-49 was caring for an infirm elderly person in 1995 and by 2025 almost 50 per cent of non-working women of that age will be providing such care (Ogawa 2000).

Two major benefits of children are as potential old age support and as direct sources of utility. The development of pension schemes and financial institutions has reduced the need for children by providing alternative support mechanisms for the elderly (Ogawa 2000). Between 1970 and 1995, the percentage of elderly women living with their children fell from 70 to 49 per cent. Between 1981 and 1996, the percent of elderly Japanese who mention their children as a source of income was cut in half from 30 to 15 per cent. In a 1995 survey of Japanese women only 13 per cent of respondents said they were planning to depend on their children in old age (Retherford, Ogawa and Sakamoto 1999). The women who tend to have lower expectations of old age support are educated, urban, not living with parents and with higher incomes (Ogawa and Retherford 1993b, 594). All three groups are likely to become more numerous. Hence, the proportion of women expecting old age support should continue to decline.

While the value of children as a source of old age support has been declining, the direct and opportunity costs associated with childrearing have been increasing. Among the most significant direct cost is the cost of education. The government does provide monthly allowances for children for the first three years of life. But they are hardly sufficient to offset the costs of having a child.

Women who have contemplated divorce are much more likely to work as a full-time employees than to be housewives (Ogawa and Ermisch 1994). Thus the increase in the risk of divorce has contributed to women’s participation in full time paid employment, a factor closely associated with lower fertility. Among the
reasons for this increasing frequency of divorce are increases in the proportion of the population living in urban areas, the proportion of women working as paid employees, and the average educational levels of women. Since these ratios are likely to increase, the frequency of divorce is likely to increase as well, leading to further declines in Japanese fertility.

The picture described above would indicate that a return to replacement level fertility is quite unlikely. It is more likely that the decline in Japanese fertility will continue, if not accelerate.

C. Migration

In the year 2000, foreigners comprised only 1 per cent of Japan’s labour force and most of these were young men working temporarily in Japan without their families (Martin 2001). It would be possible to prevent the ageing or decline of the Japanese population by allowing increased international migration. However, such migration is not currently permitted nor is it likely to be permitted in the future. For this reason the United Nations (1998) population projections for Japan assume no net migration into that country. The United Nations (2001) has, however, calculated the amount of migration necessary to achieve certain population size and age structure objectives. In order to prevent population decline by keeping it at the level attained in 2005, Japan would have to admit slightly less than 400,000 immigrants per year over the next 50 years. This would mean that by 2050, almost 18 per cent of the Japanese population would be composed of immigrants or their descendants.

Such a policy would maintain population size but it would not prevent an ageing of the Japanese population. In order to keep the ratio of the working-age population to the retired-age population at its 1995 level (4.8), Japan would have to admit an average of 10 million immigrants per year over the next 50 years. Though such an immigration policy would maintain the age structure, it would result in the growth of the total population to 818 million in 2050. Furthermore, 87 per cent of that population would be comprised of immigrants or their descendants.

Australian demographers, Peter McDonald and Rebecca Kippen, estimated that for Japan to maintain the size of its current labour force, it would have to take in about 900,000 immigrants per year over the next 30 years after which the figure would gradually decline to 700,000 per year (Steketee 2001). Clearly, such a policy would be unacceptable to the Japanese. A somewhat more acceptable alternative would be a guest worker programme where workers would remain for only 10 years and have no children. However, when McDonald and Kippen calculated how many guest workers would be needed to stabilize the workforce, they found that it would require an annual inflow of 6.2 million by 2025 and an annual inflow of 21.6 million by the end of the 21st Century. At that time, migrants would comprise fully one third of the Japanese labour force. Obviously, this alternative is also not acceptable. Furthermore, as fertility declines in the countries of Southeast Asia, there may no longer be large pools of surplus labour available for immigration to Japan.
A more acceptable alternative is to encourage elderly Japanese to migrate to other countries, especially those of Southeast Asia. An example of this is the proposed development of a huge Japanese retirement village in Nonthaburi, Thailand (Bangkok Post 2001). Similar undertakings are envisioned for the cities of Sukothai, Songkla, Cha-am, Hua Hin, Kanchanaburi, Nong Kai and Chiang Mai.

II. The Economic Consequences of Population Aging

A. The Growth of GDP

In the three decades between 1965 and 1995, Japanese real GDP more than tripled to about 3.5 trillion dollars. By 2001, GDP had risen to more than 4 trillion dollars, however, the Japan Center for Economic Research (1998), projected that in the two decades between 2005 and 2025, Japanese GDP will decline by about 3 per cent.

Prior to World War I, the average rate of growth was about 3 per cent. After that war, the growth rate was slightly higher (Kosai, Saito and Yashiro 1998). Between the end of World War II and the mid-1970s was the period of most rapid growth (about 8 per cent per year). Since the mid-1970s there has been a significant fall in the rate of growth of GDP. Compared to earlier decades, the growth rate of Japanese GDP has been very low during most of the 1990s. It was negative in 1998 and it also fell by 0.5 per cent in 2001 (Brooke 2002).

In 1960, per capita GDP in Japan was equivalent to $4,700 in purchasing power parity terms. By the year 2000, that figure had risen to $24,900. (Public Purpose 2000). The average annual rate of growth of per capita GDP was 0.5 per cent between 1991 and 2000 (Hayashi and Prescott 2002). The Japan Center for Economic Research (1998) projected that, in spite of the fall in total GDP, per capita GDP will continue to grow, albeit slowly, between 2005 and 2025.

B. The Distribution of Income and Wealth

The ageing of a national population should cause increasing real wages as well as increasing inequality in the personal distribution of income. The first is a response to increasing scarcity of labour as a result of fewer persons in the prime working ages. The second is a compositional effect, as population shifts from age groups in which the distribution of income (derived mostly from wages) is relatively even to age groups in which the distribution of income (derived in large part from wealth) is relatively skewed.

The Gini coefficient for incomes in Japan fell from about 0.31 in the early 1960s to just above .25 in 1970 (Ohtake 1999). This was a period of high economic growth. Since that time, there has been increase in inequality with the Gini coefficient reaching about 0.28 in 1997. Approximately half of this increase
can be attributed to the ageing of the population. (There has been little increase in inequality within age groups).

Ohtake maintains that to properly measure income inequality, the preferred measure should be dispersions in lifetime income, for which the dispersion in current consumption is a good proxy. In a study of consumption inequality, Ohtake and Saito (1998) found that inequality rises sharply among people aged 40 and older.

In Japan, as in the United States, the largest asset in most households' portfolio is real property. Ohtake and Shintani (1996) found that the age profile of demand for housing in Japan is quite different from that of the United States where the demand peaks in the early thirties. In Japan, the age profile peaks at about age 60. The large demand for housing at age 60 in Japan may be due to the fact that most Japanese firms have mandatory retirement at age 60 and at that time, retirees receive large lump-sum payments with which they can purchase land and housing. Furthermore, the inheritance tax on housing is lower than that for other assets; so older people with a bequest motive may buy housing to pass on to their heirs with lesser taxation.

In their analysis, Ohtake and Shintani found that, in the short run, population age structure has a significant effect on housing prices. By increasing the number of persons in age groups with a high demand for housing, population ageing might be expected to raise housing prices, thus redistributing income from renters (the young) to proprietors (the elderly). Hence, it is reasonable to expect that the trend toward greater inequality will accompany the trend towards population aging.

C. Growth of Productive Capacity: Physical Capital

The changing age structure has had three major impacts on Japan’s productive capacity. Ageing has affected savings rates and the accumulation of capital. Ageing will affect the size and composition of the labour force and its level of human capital. Finally population ageing will affect the growth in total factor productivity.

Currently Japan saves a little less than one-third of GDP. The gross national saving rate peaked at about 1991 and has generally declined since then. Even so, Japan has the highest gross national savings rate among the developed countries. It is considerably higher than the rates of Germany and the United States.

The future course of Japanese savings rates will depend on the strength of the factors likely to reduce savings rates relative to factors likely to increase them. Among the factors that are likely to reduce savings rates in Japan are: (1) the ageing of the population, (2) the decline in economic growth rates, (2) the improvement in public pension replacement rates, (3) the increased availability of credit cards and consumer credit, (4) the ending of tax exemption on interest and the increase in taxes on capital gains and land holding, (5) the accumulation of assets due to past saving, and (6) an increase in the retirement age. Among the factors that are likely to increase savings rates in Japan are: (1) the decline in the labour force participation rates of the elderly, (2) the introduction of a
consumption tax, (3) financial deregulation, (4) increases in life-expectancy, (5) the collapse of stock prices, (6) the fear of reductions in social security benefits, and (7) the continuation of the bonus system. It is likely that the factors favoring lower savings rates will predominate.

Three major questions about Japanese savings rates have concerned researchers. They are: (1) How high are Japanese savings rates? (2) Why were Japanese savings rates so high? And (3) what will happen to Japanese savings rates in the future?

1. How High Are Japanese Savings Rates?

Hayashi (1986 and 1989) argued that Japanese savings rates are overstated relative to those of other industrialised nations, particularly the United States. Hayashi's argument is based on the treatment of depreciation and government expenditure. Hayashi (1986) warned that in comparing Japanese household savings rates with those of other countries, one should be aware that there are significant differences in the way that they calculate savings rates. The most important of these is that in Japan, depreciation is valued at historical cost while it is measured in replacement cost in most other countries. This increases both measured income and saving, and thus apparent Japanese savings rates.

The national savings rate includes the savings of households, firms and government. Much of the difference between Japanese and US national savings rates is a statistical illusion (Hayashi, 1989). The US national accounts treat all government spending as consumption, while the Japanese national accounts treat some government expenditures as investment. In the United States, government saving equals the budget surplus. In Japan, government saving equals the budget surplus plus government investment spending. This makes government saving, hence national savings rates, appear to be much larger than they would using the US system of national accounting.

2. Why Are Japanese Savings Rates So High?

Assuming that Japanese saving rates really were high, there must be an explanation. Much research has revolved around the life cycle hypothesis of Modigliani (1980) and others, which predicts that individuals will finance their consumption during retirement by dissaving. Hence, the primary motive for saving is to provide for one's retirement. In a stationary economy, the saving of the working age cohorts will exactly offset the dissaving of retirees with the result that aggregate household saving will be zero. But if the labour force or productivity is growing, then the saving of workers will exceed the dissaving of retirees and there will be positive net household saving. The more rapid the growth of the labour force, the higher the savings rate. If the life cycle hypothesis is true, population age structure is an important determinant of saving rates and the ageing of the Japanese population may be expected to put downward pressure on saving rates.
Many of the challenges to the application of the life cycle hypothesis to Japan center on the whether the elderly really do dissave. Hayashi, Ando and Ferris (1988) found that both the elderly in independent households and the elderly who live with their children continue to save in defiance of the life cycle hypothesis.

In addition to casting doubt on the life cycle hypothesis, their findings also cast doubt on the precautionary motive as an explanation for the high savings rate in Japan. Elderly single persons, in particular, should be saving to protect against excess longevity or catastrophic illness. But they are not savers, while those elderly who are married (and likely to have children) are savers. Hence, the bequest motive seems to be a better explanation than the precautionary motive.

They found that there was a significant flow of intergenerational transfers to the young because the assets of the young grow more rapidly than can be explained by their own savings rates. One source of these transfers is the independent elderly who save toward the end of their lives and then bequeath their wealth to their children.

Dekle (1990) found that wealth of individuals increased with their age. He estimated that the elderly were saving about 20 per cent of their disposable incomes. Meredith (1995a) found that the retired elderly have living expenditures that exceed their disposable incomes by 21 per cent. The working elderly, by contrast, save about 17 per cent of their income. Hence, when people retire, their incomes fall much faster than their consumption and they dissave. When the working and retired elderly are added together, elderly households, as a group, dissave about 3.5 per cent of their income. In contrast, working age households, on average, save 25 per cent of their income.

Ando et al. (1995) found that families headed by married couples aged 60 and 70 earned sizeable incomes and continued to save. Older individuals who have retired tend to become part of younger households. Horioka et al. (1996) also found that the employed elderly are indeed saving. They found that the average flow of savings in the case of an employed aged household head is ‘positive and large’. On the other hand, the average flow of savings in the case of a retired aged household is ‘negative and large,’ as predicted by the life cycle hypothesis.

Yashiro (1997) concluded that the elderly as a group do indeed dissave. Household studies tend to look at only the one-third of the elderly who maintain independent households, i.e. the households most likely to save. But about two-thirds of the elderly population are dependent on their children and are not included in household studies of elderly savings behavior. When this factor is taken into account, as it was in Yashiro and Maeda (1993), then the elderly do dissave as predicted by the life cycle theory.

If the life cycle hypothesis is true, then aggregate data should reveal an inverse relationship between saving rates and the share of the population that is elderly. Horioka (1989) did indeed find that the low dependency rates were major explanations of Japan’s historically high rate of household saving. Using cross-section data from 21 OECD countries, he found that all of the coefficients related
to the life cycle hypothesis were significant and had the correct signs. Applying these coefficients to Japanese data he concluded that the most important cause of Japan’s high savings rate was the relatively low old-age dependency rate. It explained fully half of the difference between the Japanese and US saving rates.

Horioka (1991) found that that the trends in Japanese savings rates over time could be explained by trends in the young-age and old-age dependency rates. A one percentage point increase in the old-age dependency ratio lowers the saving rate by at least one percentage point while a one percentage point decrease in young-age dependency ratio increases the saving rate by at least 0.3 percentage points. He concluded that the rapid rise in Japanese saving rates in the post-War years could be explained by the rapidly declining young-age dependency ratio and the decline in saving rates since the 1970s could be explained by the rapid increase in the old-age dependency ratio.

Using cointegration methods, Horioka (1997) again analyzed the effect of Japan’s age structure on the household saving rate for the 1955-1993 period. As in his earlier analyses, he found that both young age dependents and old age dependents have a significant negative effect on the household saving rate. Therefore, he concluded that Japan’s household saving rate would decline as the population ages.

An important modification of the basic life cycle theory of savings is the addition of a role for bequests. This is particularly relevant to Japan where at least one-third of family assets in Japan are acquired through inheritance (Barthold and Ito 1992).

Hayashi (1986) speculated that ‘bequests are probably the most important factor behind Japan’s high saving rate.’ However he also recognised that while the older generation is saving to make bequests, the younger generation might be increasing its spending in anticipation of a legacy.

Ohtake (1991) found the elderly without living children decumulate their assets faster than those with living children by 3 percentage points a year. He concluded that since the bequest motive explains some part of the Japanese saving rate, the ageing of the population will not cause as steep a decline in the savings rate as would be predicted by the simple life-cycle model.

Horioka et al (1996) also examined data on the attitudes towards bequests of aged household heads and their children. Two thirds of the responses were consistent with the life cycle model. They found that elderly household heads with a bequest motive were more likely to be residing with their children, and that the likelihood of receiving a bequest motivated children to take better care of their parents. This supports the view that most bequests are used to ‘finance one’s living expenses during old age’.

Tachibinaki (1996) points out that bequest motives may have strong but offsetting effects on future savings trends among the Japanese elderly and their adult children. Future generations that expect to inherit great wealth are likely to save less. Currently many elderly Japanese hold considerable wealth. Hence, the average bequest per household head will be relatively large and, because the younger generations will expect relatively large inheritances, they will save less.
Because of the ageing of the population, the proportion of households making bequests will increase while the proportion of households eligible to receive bequests will decline. That will increase the likelihood and average size of bequests. As the population ages, young people will be less likely to commit themselves to a regime of compulsory savings (e.g. by taking out large housing-related loans).

The high labour force participation among Japanese males aged 65 and over and the fact that household heads who are employed have a high propensity to save might help to explain the high rate of savings in Japan. However, younger households might save less in an economy where they know that they will continue to receive employment income when they are elderly. Hence, the high labour force participation of the aged may raise the saving of the elderly while at the same time it reduces the saving of younger households, with little net effect on the overall household saving rate. Modigliani and Sterling (1983), found that the higher labour force participation of the elderly in Japan lowered the private saving rate by more than 8 percentage points. In his study, however, Horioka (1989) found that the coefficient of labour force participation was not significant.

In an economy where population or productivity is growing, the adverse effect on the saving of younger households is likely to outweigh the positive effects on the savings of the elderly. In the 21st century, this effect, if significant, should be reversed. The young age population of Japan will be declining and so the saving of the elderly workers should exceed the dissaving in younger households. That would slow the decline in the Japanese saving rate. Furthermore, this favorable effect may be reinforced if the maturing of the pension system causes the labour force participation rate of the elderly to decline. Earlier retirement should put upward pressure on Japan’s saving rate.

Prior to 1973, the Japanese social security system was underdeveloped, which increased the need for precautionary saving and required a higher level of saving to meet retirement expenses. Nevertheless, Dekle (1990) found that the increase of household social security wealth did not displace private saving. Hayashi (1986) found that younger cohorts actually increased their savings in response to the 1973 increases in old-age pension benefits.

Horioka (1989) found that household saving is inversely related to retirement age, since a later retirement age implies a shortening of the retirement span. However, the coefficients of social security benefits were not significant. He concluded that: ‘the total effect of social security on saving is negligible, not because the wealth replacement [benefit] effect and the induced retirement effect roughly offset each other but because both effects are negligible’.

Two more recent studies tended to contradict Horioka’s findings. Takayama (1990) found that the Japanese public pension system reduced the overall savings rate of workers’ households by 12 per cent. His conclusion was that the public pension program in Japan increased the average propensity to consume of active generations and thus discouraged personal saving in Japan.

Using a life cycle model, Yamada, Yamada and Liu (1992) tested the ‘benefit effect’ and the ‘retirement effect’. They found that both effects of social
security wealth are statistically significant. However, the benefit effect is stronger than the retirement effect by a factor of six, therefore, the net effect of the expansion of social security is to reduce the household saving rate.

A number of hypotheses link Japan’s high saving rate to its rapid rate of economic growth. One of these, the permanent income hypothesis, asserts that the increases in Japanese income were not expected and were therefore considered to be transitory income and most such income is saved. A related explanation is the habit persistence hypothesis that suggests that the Japanese were slow to adjust their consumption to their growing incomes, whether transitory or permanent. Modigliani and Sterling (1983) found that income growth was the most important cause of the nation’s high personal saving rate.

Although cross-country studies have supported explanations of Japan’s high saving rates based on rapid income growth, time series studies have not. For example, the growth rate hypothesis does not explain why there was only a moderate decline in savings rates after 1974 even though there was a sharp decline in the growth rate of income.

To explain this, it has been suggested that there is a ‘ratchet savings effect’. Households have increased their target for the financial assets-to-income ratio because of the rapid increase in life expectancy, the long-term decline in the growth rate of labour productivity, the reduced employment opportunities for older workers and the decline in the financial condition of the social security system. If these factors have kept savings rates high in spite of much lower growth rates of income, a decline in growth rates of income associated with population ageing may not result in proportionate declines in Japanese savings rates.

The fact that saving rates were high in Japan even when the growth in incomes was quite low argues in favor of cultural factors. However the fact that saving rates have not declined even though the force of tradition has weakened in other areas tends to cast doubt on this explanation.

Surveys indicate that the most often cited motive for saving in Japan is precautionary. This would also explain the prevalence of (unintended) bequests as elderly households maintain precautionary reserves as protection against the risk of unusual longevity. Another source of risk is self-employment. The ratio of income earned by the self-employed to total income is higher in Japan than in most developed countries and the saving rate is higher among the self-employed than among employees. However, the importance of self-employment has declined while savings rates have risen, suggesting that self-employment may not have been an important determinant of Japanese savings rates.

The life cycle hypothesis predicts that the saving rate will vary positively with life expectancy at retirement. Since the life expectancy of the Japanese population at older ages is increasing, this should put upward pressure on the saving rate. This problem is compounded by the fact that Japan has a relatively low mandatory retirement age. The age of formal retirement is 60. However, many employees in Japan continue to work after formal retirement, though usually at lower pay rates, in order to maintain their living standards. Horioka (1989) did find cross-country evidence indicating that Japan’s low retirement age
contributed to the high saving rate. This would imply that efforts to increase the mandatory retirement age to 65 might reduce the household savings rate.

The life cycle hypothesis assumes that individuals are able to borrow against expected future wealth. Among the liquidity constraints faced by Japanese households are lack of consumer credit, the lack of housing credit and the receipt of lump-sum bonuses. At one time, Japanese consumers had to save in advance to make major purchases such as land, housing and consumer durables. Hence liquidity constraints might explain some part of Japan’s high saving rate. But Horioka (1990) points out that if consumer credit had been available, there would have been no decline in household saving because the repayment of consumer debt is equally a form of household saving.

An exception to this would be a growing economy where young consumers are income-constrained in their consumption. In a stationary economy, households would spend more in later years because of this early constraint and this would exactly offset the reduced consumption of younger households. But in an economy where population or productivity is increasing, the decline in the consumption of young households would exceed the increase in consumption by older households and the saving rate would increase. Now that Japan faces population decrease, borrowing-constraints on younger households should be accompanied by more-than-offsetting spending by older households, with the result that savings rates should be depressed.

Horioka (1988) found that housing-related saving was important from the point of view of individual households. But from the aggregate point of view, the presence or absence of housing credit would be irrelevant, since if loans were available, there would be a commensurate increase in saving by paying off the housing loans. When Horioka examined the role of housing in savings from a macroeconomic perspective, he found that saving for house purchases accounts for from 4 to 7 points of the gross saving rate. However the depreciation of housing assets has been greater than gross housing-related saving. Though housing-related saving is a very important component of total savings from the point of view of individual households, it does not contribute to savings at the aggregate level.

In Japan, full-time workers are likely to receive annual bonuses equal to more than two month’s salary. Ishikawa and Ueda (1984) found that the bonus system was an important contributor to high savings rates in the late 1960s and 1970s because the marginal propensity to save out of bonus income was almost twice that for ordinary wage income. Thus, the bonus-based compensation system may have contributed about 3 percentage points to Japan’s household savings rate.

The propensity to save out of bonuses might be higher because they are regarded as transitory income. However, households have come to expect bonuses and can calculate their likely value with great accuracy. Hence saving out of bonus income is not very well explained by the permanent income hypotheses; but rather by the phenomenon of ‘bounded rationality’. Households may adopt rules of thumb that say that in normal times one should save about half of bonus income.
The Second World War resulted in the destruction of much of Japan’s housing wealth, while postwar hyperinflation reduced the value of financial assets. Thus households may have saved in order to return to their desired wealth-income ratio. The target wealth hypothesis suggests that the Japanese were saving to maintain their wealth-income ratios in the face of rising incomes. If the Japanese were intent on maintaining this ratio at a constant rate, they would increase their savings rates in proportion to the increase in incomes. This would imply that if incomes were to fall due to population ageing, saving rates would also fall.

3. What Will Happen to Japanese Savings Rates?

Various researchers have made projections of future Japanese savings rates using a variety of techniques. Although there was no agreement on the amount of the decline, they all found that Japan’s savings rate would decline in the 21st century (MacKellar et al. 2002). Horioka (1989) projected that Japan’s saving rate would become negative early in the 21st century and fall to levels between -10 and -20 per cent of personal income throughout the first half of the century.

Ando et al., (1995) projected that the declining birth rate in Japan will first cause the saving rate to rise and then decline. They projected that the savings rate in 2020 would be higher than in 1985 even though the proportion of the 70 and over population had increased from 6 per cent to 20 per cent. They found that the higher saving of middle-aged couples would more than offset the decline in saving by the oldest group of individuals and families. Between 2020 and 2050, the share of children in the population will no longer decline very much while the share of persons 70 and above will rise significantly. Hence, the saving rate will drop from 15 to 10 per cent.

4. The Accumulation of Assets

A reduction in the saving rate should cause a reduction in the wealth-to-income ratio, a reduction in the rate of domestic investment and/or a decline in the rate of accumulation of net foreign assets, and a slowing in the formation of human capital.

Between 1955 and 1987, Japanese households greatly increased their wealth to disposable income ratio. This has been the result of their high savings rate and the rapid increase in land values and the value of securities. Since that time both rates of saving and asset values have fallen.

Yashiro (1993) points out that the ageing of population will have opposing effects on domestic investment. On the one hand a declining labour force may stimulate the demand for labour saving investment. On the other hand investment may be discouraged by the decline in profit rates due to the reduced labour supply and the higher interest rates that will result from lower savings rates.
Japan’s current account surplus is about 3 per cent of GDP. Because Japan has been running a surplus for several decades, it has experienced a significant growth in the ratio of its net foreign assets to GDP. The ultimate effect of population ageing on the current account balance will depend on the size of the decline in domestic investment relative to the decline in savings. If the decline in savings is greater, Japan’s external balance will fall, since the current account balance relative to GDP is equal to the domestic saving rate minus the investment rate.

Among those who have studied this question are Noguchi (1989), Auerbach et al. (1989) and Masson and Tryon (1990). They all find that, to some degree, a decline in Japan’s investment rate will offset the decline in Japan’s saving rate. But the decline in the latter will ultimately outweigh the decline in the former and Japan’s current account surplus will eventually become a current account deficit.

Noguchi (1989) found that the share of GDP accounted for by investment would decline until 2015 because of the decline in the labour force associated with the decline in the working-age population. For the period 1995-2015, the fall in the investment rate will exceed the decline in the savings rate and the current account surplus will grow. After 2015, the decline in the saving rate would again exceed the decline in the investment ratio, and the current account surplus will shrink and turn negative after 2025.

Auerbach et al. (1989) found that Japan’s current account surplus would reach a peak of 5.6 per cent of GNP in 1990 and then gradually decline until 2030, at which time the balance would be negative. After that time, Japan’s current account would gradually move back to the positive range, reaching a long run level of 2.3 per cent of GDP.

In a multi-county simulation analysis, Masson and Tryon (1990) found that over the period 1995-2025 the current account/GDP ratio would fall by 4.0 percentage points. In the process of declining by this much, the current account balance would be negative by 2000 and would continue to fall until at least 2015.

Higgins and Williamson (1996) observed that the effect of population ageing on investment was not identical to its effect on saving. Higher youth dependency has a greater negative effect on saving than on investment, thus inducing capital imports. On the other hand, increasing old age dependency has a greater impact on investment than saving. Hence, the current account balance of a country like Japan is likely to grow as the share of the elderly in the total population increases. Williamson and Higgins (2001) predict that between 1990-1992 and 2025 the Japanese saving rate would fall by 18 percentage points while the investment rate would fall by 20 per cent. Hence, the share of the current account balance (CAB) in Japan’s GDP will increase by 2 percentage points.

At this point, there seems to be no consensus on the effect that population ageing will have on Japan’s future stock of foreign or domestic capital.
D. Growth of Productive Capacity: Labour and Human Capital

Much of the economic growth of Japan occurred in the latter half of the 1950s and 1960s, when the labour force was growing rapidly and therefore was relatively young. At that time, the Japanese labour force was growing faster than the population due to the low level of fertility. Hence, employers could draw on a large stock of well-educated young workers who were willing to work for relatively low wages. The lower wages paid young workers, combined with their high levels of education, powered Japan's economic growth.

In the 21st Century, the labour force will grow slowly and will continue to age. Though the low fertility following the brief baby boom had increased savings rates, now Japanese firms must deal with an ageing labour force. In such a situation, Japan's seniority-based wage system will likely lead to higher labour costs and thus slow the rate of economic growth. Alternatively, the pressures of an ageing labour force will force firms to abandon the seniority wage system or to flatten age-earnings profiles.

1. Composition of the Labour Force

The proportion of the labour force accounted for unpaid family workers, as well as the self-employed, has fallen for both Japanese males and females, while the proportion of employees has risen. Furthermore, there was a major decline in the per cent of the labour force that was employed in the primary sector. Though there was moderate growth in the secondary sector, the most rapid growth was in the tertiary sector, which increased its share of the labour force from 38 per cent in 1960 to 57 per cent in 1986.

In 1960, only 60 per cent of Japanese students went on to high school. By 1983 this percentage had reached 93 per cent (Furuya and Clark, 1993). Between 1970 and 1988, the proportion of males in the labour force who had not completed junior college was more than cut in half, from about 47 per cent to about 23 per cent. At the same time the proportion of male workers who had completed college or university had almost doubled to 26 per cent. The number of females who had not completed junior high school was almost cut in half between 1975 and 1988 and the proportion that finished college or university more than doubled.

An important source of human capital formation is investment in training of employees at the level of the firm. The longer workers are retained in the firms, the longer the useful life of the stock of human capital and thus the greater the return on the initial investment. To reduce worker turnover, Japanese firms pay workers less than their productivity in the early years of their employment. In return, the firm guarantees the employees that if they are diligent and remain with the firm, they will receive wage raises based on seniority and late in their careers they will receive more than their productivity. During the period 1970-1988, average male job tenure increased from about 9 years to nearly 13 years and the average female job tenure increased from 4.5 to more than 7 years. In part,
increasing job tenure may be due to an ageing of the labour force, since older workers generally have greater job tenure.

2. Labour Force Participation Rates

Chiefly as a result of economic development, but also as a result of changes in household composition, education and social welfare systems, there have been significant declines in the labour force participation rates (LFPRs) of elderly men and women. But in the prime working ages (20-54), there has been a divergence between men and women. The LFPR of men fell, while that of women rose.

Yashiro, Oshio and Matsuya (1997) predicted that in the 21st century, the LFPRs of each age group of women will increase, in part because of cohort effects as young women with high labour force attachment move up the age ladder. Nonetheless the overall female LFPR will decline because a greater share of the female population will be in the older age groups, which have lower LFPRs. This compositional effect will outweigh the favorable cohort effects; unless the labour force participation of the elderly can be increased.

Because of an increase in schooling, there was a significant decline in the LFPRs of young men in both the 15-19 and 20-24 age groups. The decline is most rapid for the youngest age group. As in the case of males, there was a very steep decline in the participation of school age females (15-19). Unlike the case of males, however, there was no decline of participation rates among females aged 20-24; indeed, there was a slight increase over time.

Yashiro, Oshio and Matsuya (1997) note that between 1975 and 1995 the overall LFPR of adult women increased modestly, from about 46 per cent to about 50 per cent. However, there was a very substantial increase in the LFPR of women aged 25-29, from 42.5 per cent to 66.4 per cent. Among the reasons for the rise was the declining portion that was married. However, the LFPR of married women aged 25-29 increased as well, due to fewer children, better day care facilities, and shorter working hours.

MacKellar et al. (2002) report that a 1997 survey by the Japanese Ministry of Public Management sought to identify persons who would like to work but are unable to do so for reasons such as a lack of adequate childcare. They found that about 20 per cent of women aged 25 to 40 fell into this category. Based on this information, a scenario analysis showed that if these women were brought into the Japanese labour force by gradually reducing the discouraged worker effect, the decline in the Japanese labour force could be delayed until 2025.

The LFPRs of the elderly in Japan are quite high compared to other developed nations. However, there has been a significant decline in the participation rates of elderly men and women. Between 1987 and 1995, this trend was reversed. The proportion of males aged 60-64 who were working has increased from about 71 per cent to about 75 per cent (Yashiro, Oshio and Matsuya 1997). However this figure had fallen to 73 per cent in 2000 (Ohtake and Yamaga 2002). Yashiro, Oshio and Matsuya (1997) suggest that in the future, the labour force participation of older workers may rise as a result of the
increasing age of eligibility for public pensions to 65 as well as the general reduction in pension benefits.

3. Institutional Factors Affecting Labour Supply and Demand

The distinguishing features of the Japanese labour market include a seniority-based wage system and lifetime employment. Lifetime employment provided workers with job stability and employers with high levels of effort and low turnover. However, commitment to lifetime employment was linked to mandatory retirement at a relatively early age.

Another characteristic of the Japanese labour market is the bonus system, with bonuses sometimes amounting to one-quarter of total compensation. This system was closely linked to an implicit contract that firms would continue to provide employment (to long-term workers) even during economic downturns. During times of deficient demand, bonuses (and thus total compensation) could be cut rather than cutting employment of full time workers.

More than 70 per cent of Japanese firms will allow some workers to continue working past the mandatory retirement age or will re-employ workers in lower status jobs at lower pay. Because of these policies, Japan has the highest LFPR of older men among the OECD countries in spite of its mandatory retirement policies. On average, men work about five years after mandatory retirement, receiving wages 20 to 40 per cent less than their pre-retirement wages. It is this reduction in wages that has made it economical for employers to continue employing elderly workers.

In the 1990s, more than 90 per cent of Japanese firms had mandatory retirement policies (Furuya and Clark 1994). Even as mandatory retirement has been increasing, the mandatory retirement age has been rising. In 1974 the typical mandatory retirement age for men was 55 (or younger). By the year 2000, more than 99 per cent of firms had set their mandatory retirement age at 60, or older (Ohtake and Yamaga, 2002).

The Japanese government has urged firms to raise the age of retirement in order to stabilise pension and medical costs. Yet Ogawa and Clark (1996) report that firms had resisted doing so because of the higher costs that would be incurred by retaining older workers under the current seniority-based compensation system. While firms have raised the mandatory age of retirement, they have also (1) introduced early retirement programs, (2) increased the rates at which they transfer workers to subsidiaries and other firms, (3) made greater use of policies that allow firms to rehire workers after retirement at lower wages, and (4) changed their pattern of compensation to reduce the cost of older workers. The latter changes have included adding merit pay considerations to their wage setting and simultaneously reducing the size of longevity increases.

These new policies have to some degree adversely affected the morale of workers and thus the team-oriented methods used by many Japanese firms. A related problem with extending the age of retirement is that the final lump sum severance payment made to Japanese workers depends upon the years of
service and final earnings, both of which are likely to be increased by extending the age of retirement.

Currently, men can begin receiving public pensions at age 60; but this is gradually increasing to age 65. This will pose serious difficulties for those workers who were subject to mandatory retirement at age 60 and who are unable to find re-employment. Hence, the government of Japan is offering subsidies of various sorts to encourage the re-employment of such workers.

Continued employment of elderly workers should not only benefit the workers themselves, it should also alleviate the shortage of new workers as labour force declines. However, the Japanese pension system pays reduced pensions to low-wage workers aged 60 to 64. As wages rise, the pension is reduced. This has the same economic effect as imposing a high payroll tax in reducing the labour force participation of the elderly. When Ohtake and Yamaga (2002) analyzed the impact of this feature of the pension system on older employees, they found that it significantly inhibits the labour force participation of those aged 60 to 64. To stimulate the labour supply of older workers, they suggested that earnings tests for the payment of public pensions be abolished.

Although there is concern about the long run decline in the supply of labour, Japan is currently facing a problem of increasing unemployment. The unemployment rate has followed an upward trend over the last 30 years and reached a record high of 5.6 per cent in December 2001. Genda et al., (2002) decomposed the contribution to the unemployment rate by age group. They found that the contribution of male workers aged 60 to 64 has been increasing since 1974. Now their contribution to total unemployment rate is as large as that of the 20-29 age group because workers face high unemployment rates after mandatory retirement. Though the unemployment rates of these elderly Japanese workers are relatively high, the aging of the Japanese labour force has had little effect on the overall unemployment rate. While the increase in the older work force raises the overall unemployment rate, the decline in the younger work force lowers it. The two effects offset one another.

Though there is little concern about the decline of new entrants to the labour force during the current recession. In the future, however, this will be a major concern of firms in Japan. At that time they may find it necessary to invest in labour-saving technologies, better utilise female workers, and petition the government for increased immigration.

E. Growth of Productive Capacity: Productivity Growth

From 1983 to 1990, Japanese total factor productivity grew at about 2.4 per cent per year. However that rate fell precipitously to 0.2 per cent per year in the period 1991-2000 (Hayashi and Prescott 2002). Itoh (1996) had earlier shown that the rate of productivity growth has slowed, especially in the non-tradeable sector where Japan does not face international competition.

Kosai, Saito and Yashiro (1998) took issue with Krugman’s (1994) assertion that the growth of Japan (and other East Asian nations) was driven by capital accumulation rather than technical advance. They suggested that over the last century, the proportion of Japanese growth due to increases in Total
Factor Productivity (TFP) has risen from 20 to 47 per cent. They then used a macroeconomic model to assess how increasing the efficiency of the economic system might largely offset the effects of population ageing and allow declining population and sustained economic growth to coexist.

In the baseline case, the increase in the proportion of retired people reduced household savings rates and the declining labour force reduced rates of return on capital. Both developments, in turn, slowed capital formation and the growth rate of GDP.

In the first of their alternative scenarios, a tightening labour market was assumed to lead to efficiency gains similar to those observed in the late 1980s. Under these alternative assumptions, GDP stabilised after 2010. In a second alternative scenario, it was assumed that, in addition to increasing efficiency, the negative effect on fertility on female labour force participation is attenuated. This resulted in increased employment, and a less dramatic fall in the saving rate. Together, these caused GDP to continue growing after 2010 at the rate of about 1 per cent per annum. The authors concluded that, between increasing efficiency of markets and increased employment of women, Japan could continue to grow in spite of a shrinking labour force.

There is concern that an aging labour force might impede the rate of technological progress. However, the results a detailed study of the information technology sector did not support the ‘inflexible old worker hypothesis’ (Nishimura et al., 2002). There was no correlation between the rate of technological progress and the ratio of old workers with low education in the total labour inputs. Conversely, the study concludes that investment in information technology would be an effective way to counter the perspective shortage of young workers because of population ageing.

F. The Fiscal Impact of Pension and Health Systems

Increases in the relative size of the old-age population of Japan will increase public expenditures pensions and health care. The result will be increased dissaving in the public sector. Attempts to offset these increased expenditures with increased taxes may result in economic distortions including reduced labour force participation.

The Japanese social security system has three major components: medical care, pensions and welfare. Contributions to Social Security are projected to rise from 13 per cent of national income in 1993 to 21 per cent in 2025. If the other tax payments are added to that, the total should rise from 40 per cent of national income in 1993 to 56 per cent in 2025. Three quarters of this increase would be due to increases in social security contributions (Ogawa and Retherford 1997)

1. Public Pensions

Meredith (1995) maintained that the seeming fiscal health of the Japanese government was due to large surpluses in the social security accounts. He
argued that, absent the 1994 reforms, population ageing would cause these to deteriorate rapidly. Without those reforms, the ratio of pension benefits to GDP would go from 5 per cent of GDP in 1995 to 13 per cent of GDP in 2020 and medical spending would rise by 2 percentage points of GDP. The social security surplus would be eliminated about the year 2000, the social security deficit would equal 9 per cent of GDP by 2020, and the total government deficit would be equal to 16 per cent of GDP.

Japan’s public pension system, despite the existence of substantial trust funds to cover temporary deficits, is essentially a pay as you go system in which current benefits are financed by current contributions (Yashiro, Oshio and Matsuya 1997). It is a two-tier system. The first tier, or National Pension Scheme (NPS), is a public program that covers all residents older than 60 and provides them with a flat pension. It covers about 80 per cent of the working age population and has almost 70 million participants. The second tier, or Employee Pension Insurance (EPI), is for salaried workers and covers about 32 million private sector employees.

One third of NPS basic pension benefits are financed by subsidies from the general accounts of central government. The government does not directly subsidise the EPI system, however, employer and employee contributions to those plans are tax deductible. There is a large deduction for pension benefits, so they also remain largely untaxed.

There was a major expansion of pension benefits in 1973. The replacement rate was increased to about 60 per cent. The newly expanded pension system quickly ran into trouble, and in 1986, measures were taken that included: an increase in contribution rates, and the imposition of a forty-year participation minimum in order to qualify for the full NPS pension.

By 1994, there had been further deterioration of system finances and a new round of reform measures was introduced. Beginning in 2001, the starting age at which salaried workers are eligible to receive the NPS basic pension is to be gradually raised to age 65. Pension benefits were to be indexed to after-tax wages and public health insurance premiums are to be deducted from benefits. A special levy on bonuses was instituted and pensioners were prevented from drawing pension and unemployment benefits at the same time. The benefit formula was adjusted to discourage early retirement. However, even after instituting these cost-containment measures, the 1994 reforms called for public pension premiums to rise from 14.5 per cent of regular wages in 1994 to 29 per cent of wages in 2025.

Though the goal of the 1994 reform was to ensure that there would be adequate reserves even at the peak period of population ageing, Yashiro, Oshio and Matsuya (1997) argue that the large current net assets of the pension system will be exhausted well before that time. Various options for reducing outflow and increasing revenues of the pension system were proposed. One option is to link benefits to average life expectancy. The actuarial value of benefits would be maintained; but the monthly benefits would be reduced to take into account increasing life expectancy. Another option is to end the practice of indexing pensions to real wages. This practice allows increases in the real
incomes of contributors to be reflected in the real incomes of beneficiaries. Instead, public pensions would only be indexed to price levels in order to take into account the cost of living. Thus, the real purchasing power of pensions would remain constant; even while the real incomes of contributors was rising. Another option would be to raise the age at which individuals become eligible for payments under the basic plan (the NPS) from the current level of 65 years to 67 years.

Since the 1994 pension reforms were not sufficient to put the Japanese Social Security programme on an actuarially sound basis, in March of 2000, the Japanese Diet enacted an additional set of reforms that cut lifetime pensions by about 20 per cent (Mulheisen and Faruquee 2001). Benefit levels were cut by 5 per cent and there was a gradual increase in the age of eligibility for the earnings-related pensions from 60 to 65. Most importantly, pensions were to be indexed to consumer prices rather than disposable incomes (wages). However, Mulheisen and Faruquee argue that further benefit cuts or contribution rate increases will be needed to prevent the depletion of pension fund assets. A report by the Finance Ministry found that the total value of Japan's pension liabilities now equals about $4.4 billion or about one year’s GDP. (Takinawa 2000)

The main drawback of these benefit-reduction strategies is the heavy impact on the standard of living of the elderly. Pension payments accounts for roughly 70 per cent of the income of elderly households and about half of such households rely solely on public pensions for support in (Dai-Ichi Kagno Bank, 1998). An additional problem cited by Okunishi (2001) is that an extension of the eligibility age for receiving a full pension may raise the already high unemployment rate of the elderly.

A number of proposals have also been made to increase contributions. These include taxing bonuses and lump-sum retirement payments and requiring the dependent spouses of employees to make contributions. Tachibinaki (2002) suggested that the income of the basic pension scheme could be increased by replacing social security contributions with revenues from a consumption tax.

The Program Dependency Ratio (PDR) for a public pension program is defined as the ratio of beneficiaries to covered workers. As the various plans mature, the PDRs will increase. In 1993 there were 23 beneficiaries of the NPS for every 100 contributors. By 2025, that figure should more than double to 53 beneficiaries per 100 contributors. Unlike the NPS, where the age for receiving a pension is already 65, the age of eligibility of the EPI is rising toward age 65. Thus the PDR of the EPI, which was 17 per cent in 1995, will ‘only’ rise to 42 per cent in 2025.

According to Hatta and Oguchi (1997), cohorts born before 1950 will receive benefits that are much greater than their lifetime contributions. The excess of benefits over contributions is greater among older cohorts. Conversely, cohorts born after 1950 will receive less in benefits than their lifetime contributions. Thus, Japan’s public pension system redistributes income from younger to older generations. This intergenerational redistribution has two sources. First, in the expansion of benefits that occurred in 1973, those who
were too old to contribute the required number of years were made eligible for generous benefits regardless. Second, given the pay as you go nature of the system and rapid population ageing, there are relatively few workers per retiree and therefore benefits must be cut or contribution rates for younger workers must be raised.

When they reach age 60, employees often have the option of continuing work for the same company or a subsidiary; but at a considerably lower wage. If they do so, they may lose a part of their pension, because public pensions are subject to an earnings test until the worker reaches age 65 (Yashiro 1997). These earnings tests are likely to reduce the labour force participation of older workers, because an older worker can often earn more by retiring and collecting pension benefits and unemployment benefits than he could by continuing to work at a reduced wage.

2. The Health and Welfare Systems

Total medical care expenditures (both public and private) grew from about 6 per cent of national income in 1982 to about 7 per cent in 1995 (Yashiro 1997). By the year 2000, health care expenditures had reached $300 billion or about 8 per cent of GDP (Pearson 2002). Per capita medical expenditures grew at 5.5 per cent per annum between 1980 and 1997 (Iwamoto 2002).

Health care for the elderly has been heavily subsidised in Japan since 1972. The share of the elderly in total health care costs has risen from about 14 per cent in 1975 to 31 per cent in 1995; by 2025, the elderly are projected to account for half of total costs.

The ‘old old’ (70 and over) are estimated to account for 40 per cent of current medical spending (Pearson 2000). The lifetime medical expenditure of the average Japanese is about $17,000. About half of this is spent after age 70 (Yomiuri 2001). Patients who are over age 65 use more than 3 times as much medical care as other individuals (Yashiro, Oshio and Ii 1997). This group accounts for half of total medical spending (Australian Financial Review 2001).

While most of this reflects the greater need for medical care among the aged, some of it also reflects the fact that this group can receive virtually unlimited care for a very low fee.

In 1990 the ‘Golden Plan’ was instituted to reduce the demand for medical services by improving social services for the elderly and their families and by providing long-term care services. The major part of the Golden Plan is directed at improving home-based services for the elderly. In addition, elder day care centers were to be increased 17 fold by the year 2000.

Japan suffers from a scarcity of nursing-home facilities, and in 1992 the Golden Plan called for expanding the capacity of nursing homes by nearly 80 per cent by the year 2000. In part, as a result of the shortage of nursing home facilities, the average length of hospitalisation for persons 65 and older was 71 days in 1993. This was quite long compared to 20 days for Sweden in 1997 (Ogawa and Retherford 1997).
In 2000, Japan instituted a public long-term care insurance program. That program will significantly increase welfare spending, from about 2 per cent on national income in 1995 to about 5 per cent in 2025. On the other hand, the program to provide long-term care should slow the growth of medical spending. Nonetheless, Iwamoto (2002) projects that Japan’s national medical bill will grow by 40 per cent over the next three decades.

An analysis of the relative contribution of population growth and population ageing to rising medical expenditure indicates that the role of demographic factors is small relative to other factors such as cost increases (Endo and Katayama 1998). Iwamoto (2002) assessed the contribution of population aging by varying the age structure while keeping the per capita the medical costs of each age group constant. He found that only about one fourth of the annual growth rate was due to population aging. The major source of higher costs is not the elderly as a group, but rather the bed-ridden elderly, which consists disproportionately of the ‘old old’. There were 2 million bedridden elderly in 1993. That number is projected to be 5 million in 2025.

Though most of the health and welfare costs of an ageing society are met by the national government, elderly-related expenditures, such as medical, long-term care and welfare costs are met in part by municipalities. Hoshino and Nakazato (2002) project that as a result of urban population growth, the proportion of the elderly is likely to remain low in Japan’s major cities. However in most rural areas population decline will result in a high proportion of the elderly. Hence, in rural areas it will be difficult to fund programmes for the elderly out of local revenues.

G. Economic-Demographic Models of Ageing in Japan

A number of macroeconomic-demographic models have been developed to assess the effect of population ageing on the Japanese economy. Among them are models that were applied to several countries, including Japan. In addition, a number of models were built specifically to examine the demographic situation facing Japan.

1. Multi-Country Models

Several models have been constructed to examine the economic effects of the ageing of the populations of several countries, including Japan. Among them are models developed by Auerbach, Kotlikoff, Hagemann and Nicoletti (1989), Heller (1989), Masson and Tryon (1990), Roseveare et al. (1996), Higgins (1997), Turner et al. (1998), Hviding and Merette (1998) and Fougere and Merette (1999).

In order to study the effects of population ageing in Japan and three other OECD countries, Auerbach, Kotlikoff, Hagemann and Nicoletti (1989) modified an economic-demographic simulation model developed by Auerbach and Kotlikoff in 1987. They added to their model bequests, technical change,
international trade and government consumption expenditures that are linked to the age structure of the population.

The baseline simulation assumed no changes in the average replacement rate, the official age when pensions begin and the pattern of public spending. Per capita expenditures for each age group were assumed to grow at 1.5 per cent, the rate of technical change. In the base scenario, consumption taxes fall, social security contribution rates rise and saving rates decline. In the case of Japan, the net national savings rate fell by 18 percentage points between 1990 and 2030, due to rapid population ageing. Despite lower savings, the capital-output ratio rises, leaving Japanese workers with a higher after-tax wage in 2050 than 1985.

In a simulation of the ‘pure effect’ of ageing, it was assumed that the old age pension replacement rate (average benefits to lifetime earnings) would remain constant while fiscal expenditure would grow with the economy. They found that population ageing would have a significant effect for national saving, the real wage rate and the current account. They also found that the burden on those who must support the growing dependent elderly population is moderated by the fact that real wages for the working population are likely to rise and other types of taxes are likely to fall.

Finally, Auerbach et al. simulated the opening of the economy to foreign trade and investment. They note that as population ages in a closed economy, the rate of return to capital falls, thus discouraging saving. In the open economy case, capital can go abroad, preventing a fall in interest rates and maintaining the incentive to save. In the case of Japan, in particular, opening the economy increases savings significantly. The result is large outflows of capital from Japan and large surpluses in Japan’s current account.

Hviding and Merette (1998) constructed an OLG model to analyze the macroeconomic effects of four different types of pension reform in the context of ageing populations. They wished to determine whether pension reforms might significantly reduce the need to raise taxes in OECD countries. The four reforms were: (1) gradually abolish the public pension system over 50 years, (2) cut the replacement rate by 20 per cent, (3) cut the government debt to GDP ratio by 20 percentage points through increases in the wage tax, and (4) increase the effective retirement age by four years.

Unlike Auerbach et al., Hviding and Merette had an exogenous labour supply and the economy was closed; so investment equaled domestic saving. The working age population determined labour supply and the retired age groups determined the size of pension expenditures. Savings, consumption, capital accumulation and interest rates were all endogenous.

In the baseline scenario, the public sector debt to GDP ratio was assumed to be constant. Balance was achieved by varying the wage tax. The TFR was set to reproduce the projected rise in the old-age dependency ratio for the period 1950 to 2050. The effect of ageing in Japan was an increase of 25 percentage points in the wage tax. There was also a significant drop in the national saving rate. Despite lower savings, the capital-output ratio rose and the rate of return to capital declined. The effects of the proposed reforms were not large enough to
outweigh the economic impacts of Japan’s rapidly ageing population. Hence, they concluded that the only way to prevent dramatic increases in future taxes would be to make drastic cuts in benefits.

Fougere and Merette (1999) extended the Hviding-Merette model by incorporating human as well as physical capital. Individuals can increase their stock of human capital, and thereby their lifetime wage profile, by remaining outside the labour force and going to school. The opportunity cost of investing in human capital is current wage income and the returns to investment in human capital are the discounted sum of wage revenues. Thus, it pays to invest in human capital when young. At older ages, by contrast, individuals wish to acquire physical assets that can be sold during retirement. Hence, the young go to school and do not work, the middle aged work and save, while the elderly neither work nor save. Those who acquire human capital can pass on a part of that capital to future generations. Hence, it is possible to accumulate human capital (knowledge) indefinitely.

In their model, the ‘pure effect’ of population ageing is to reduce the real return on physical capital. At the same time, the present value of future wages is increased, with the result that young individuals invest more in human capital while the middle-aged generations supply more labour. Though the labour supply falls at first due to human capital formation, the effective labour supply ultimately increases as this human capital becomes available. Economic growth is stimulated and per capita output goes up. Of the countries studied, Japan and Italy, which had received the largest demographic shocks and experienced the largest declines in per capita income and consumption as a result of population ageing, ultimately experienced the highest rates of growth.

Because young people respond to fertility decline by investing in their own human capital, the wage-tax base increased and there is a smaller reduction in the savings rate. Despite a decline in the physical capital stock, economic growth increases in the long run because of an increase in human capital. Fougere and Merette conclude that population ageing will stimulate investment in human capital and this could result in increased rates of economic growth.

Their conclusions were contradicted by Sakuragawa and Makino (2002) who also developed an OLG model in which human capital is the engine of growth. However, in their model the aging of the Japanese labour force will lead to a reduction in the accumulation of human capital and thus will deter economic growth. A rise in the ratio of older workers to younger workers as a result of declining fertility will lead to a rise in the relative wage of younger workers. The increased opportunity cost associated with acquiring human capital will discourage younger workers from delaying their entry into the labour force.

Sakuragawa and Makino also found that an increase in the flow of young migrants to Japan would encourage economic growth. Migration would increase the supply of unskilled workers relative to skilled workers thus raising the relative wage of the latter. This should serve as an incentive for young workers to invest in more human capital and this should promote economic growth.

Goto (2002) used a simple computable general equilibrium (CGE) to empirically analyze the effects of migration, foreign direct investment and trade
liberalization as means of improving the economic welfare of Japan and several developing countries of East Asia including China, Indonesia, Korea, Malaysia, the Philippines and Thailand. The results derived from the model indicated that migration from other East Asian countries would increase welfare in those countries but lower it in Japan. In the case of trade liberalization, the welfare increases in other East Asian countries is much larger than in the case of increased emigration to Japan. Furthermore, trade liberalization substantially increases the welfare in Japan. Finally, Goto examined the effect of increased foreign direct investment by Japan in the other countries of East Asia. His results indicated that the welfare of Japan would increase because its capital would earn a higher rate of return but the welfare of the receiving countries would decrease.

2. Models of the Japanese Economy


Meredith (1995b) constructed a model to examine the long run implications of population ageing for the Japanese economy. In his model, the desired capital-output ratio will increase as the relative price of capital goods falls. As labour becomes scarce relative to capital, firms substitute towards capital.

Assuming that total factor productivity will continue to grow at the rate expected for the 1990s and the labour force participation rate of the working age population will remain roughly constant, he projected that the potential growth rate would decline from about 2.5 per cent in the 1990s to about 1.5 per cent in 2025. The projection called for a substantial decline in the household saving rate, from over 20 per cent in 1990 to only 10.4 per cent in 2030.

The 1994 social security pension reforms are calculated to raise contributions from their present level to 14.5 per cent of GDP by 2020 while reducing pension payments. Despite having significant impacts on the pension system, Meredith finds that the 1994 reform would have little effect on the path of private saving during the period from 2000 to 2020. Impacts on the public sector balance and current account are, however, quite significant. Because of the 1994 reform, public saving was projected to remain positive. Since investment demand is driven mostly by the desired capital-output ratio, pension reform has little impact on investment. As a result, the current account deficit, projected to be about 20 per cent of GDP, absent reform, fell to only 5 per cent of GDP in the pension reform case.

One of the more important insights from Meredith's work concerns the limited sensitivity of his model to productivity growth. When pensions are linked
to real wages, population ageing raises contribution rates regardless of productivity growth, because higher productivity simply translates via higher wages into higher pensions. A corollary is that, if pension are linked to wages, the future burden of transfer payments to the elderly is much more closely linked to the age structure of the population than to the rate of economic growth. \[ (viii) \]

In order to analyze the macroeconomic effect of population ageing and to simulate various policies that would deal with those effects, Yashiro Oshio, and Matsuya (1997) used a three sector neoclassical macroeconomic-demographic model that was designed to examine long-term supply-side aspects of ageing. The macroeconomic sector of the model determined production, savings, gross investment, and interest rates. An important assumption is that large social security contribution rates are assumed to reduce profits and thus investment and the rate of labour productivity growth. (Firms are unable to pass along social security contributions either to workers in the form of lower wages or to consumers in the form of higher product prices.)

Following the life cycle hypothesis, the saving rate was inversely related to the old-age dependency ratio and per capita social security benefits. Increasing contribution rates would reduce saving by workers while increasing benefit rates would reduce dissaving by retirees.

The real interest rate is determined by the marginal productivity of capital. Any excess of saving over investment demand is invested abroad. In the opposite case, net foreign assets are drawn down.

Yashiro, Oshio and Matsuya estimated that total labour force would fall from 68 million in 2020 to 40 million in 2050. The participation rate of individuals over 60 is projected to decline steadily because of improvement in pension benefits. The average adult female labour force participation rates falls from 50 per cent to 37 per cent in 2050. Real GDP grew throughout the entire period but at a declining rate. The saving rate first rises slightly, then falls precipitously. The investment rate falls much more slowly, resulting eventually in a current account deficit that amounts to more than 17 per cent of GDP by 2025. The public pension system trust funds will be gone by 2030. Net government debt is projected to increase as the general government gives ever-larger grants to the pension fund.

In a sensitivity analysis, Yashiro et al. assumed that rate of TFP growth was increased to 2.0. The more rapid growth of GDP had negative effects on the basic pension-related trust fund since contributions are fixed while benefits are wage-indexed. This confirms Merdith's finding that wage indexation practically guarantees that, given population ageing, pension benefits will rise as a share of GDP regardless of trends in productivity and economic growth. With the wage bill fixed as a share of GDP, as in a neoclassical model, this ensures that contribution rates must rise.

Yashiro, Oshio and Matsuya undertook a variety of policy simulations to gauge the effect of various possible additional reforms to the pension system. Among those was putting an end to wage indexation. They found that, if fully implemented, this reform would improve the pension balance greatly. It would more than offset the projected deficit in the two pension funds.
They combined the three main reforms (abolishing wage indexation, raising the eligibility age to 65, and requiring contributions from dependent spouses) into a scenario they called ‘Pension Reform Case’. The baseline scenario was called the ‘Standard Case’. Social security contributions are reduced from 21 per cent to 17 per cent of national income, approximately the same percentage as it is today.

The Pension Reform Case would reduce the replacement rate in 2050 from 41 per cent to 12 per cent. Although pensioners have a lower replacement rate, they will have paid less tax when they were young and could thus save more. GDP growth rates were higher under the Pension Reform Case, primarily because of the reduction in benefits resulted in increased labour force participation of the elderly. Given the strong negative impact of population ageing on the aggregate saving rate in the model, the implementation of pension reform had a large positive effect on the national saving rate, increasing it from 3 per cent of GDP to 15 per cent of GDP.

The impact of pension reform on investment rates is much smaller. By significantly raising national savings while having little impact on investment demand, pension reform is estimated to cause a substantial improvement in the current account balance. In the Pension Reform Case the current account deficit in 2050 would be 5.3 per cent of GDP, only a third its size in the Standard Case.

Like Yashiro, Oshio and Matsuya, Miles and Cerny (2002) used an OLG model to investigate the implications of pension reform in Japan during a period of population aging. They developed three reform scenarios: (1) keep the replacement rate at 50 per cent; (2) keep the contribution rate at 17.5 per cent and (3) gradually lower the replacement rate to 10 per cent by 2040. They found that if the replacement rate were kept at 50 per cent, the contribution rate would have to double to 35 per cent by 2040. Conversely, if the contribution rate were held at 17.5 per cent, the replacement rate would have to be cut in half by 2040.

By 2040, the highest level of average consumption is attained by reducing the replacement rate to 10 per cent (assuming that workers will fund their own retirement). However different age groups will be affected differently by the transition from a pay as you go system to one of funded pensions. Those who retired in 1999 and those who will be born after 2030 will gain. However those who would retire in 2030 would lose because they would have to bear the double payment burden of the transition to funded pensions.

Miles and Cerny also found that most of the extra savings that would be generated by a transition to funded pensions would be invested in Japan. Hence the capital-labour ratio would rise and the rates of return on investments would fall. However the increased capital-labour ratio would increase labour productivity and real wages of Japanese workers. The gains to future generations resulting from higher wages would more than offset the losses from lower investment returns. If the extra Japanese savings were sent abroad there would be smaller gains from the transition to funded pensions.

Mulheisen and Faruquee (2001) used the IMF world economic model (MULTIMOD) to assess the implications of population aging and decline in Japan. They found that real GDP would fall by a cumulative 20 per cent over the
next century compared with the baseline scenario where population is stationary. Projected demographic trends will result in an annual reduction in Japan’s GDP growth rate of one half of a percentage point between 2025 and 2075. Because of the ageing of the workforce and the differences in productivity across age groups, per capita GDP would be about 5 per cent less than if the population had been stationary.

Both savings and investment would fall in proportion to the fall in GDP but private savings and investment rates would remain about the same. Hence, the current account balance would remain positive so long as there was no increase in government deficits.

Their simulations of the public sector indicated that the contribution rate for the main wage-based employee pension system would increase from 17.5 per cent to almost 30 per cent by 2050. Medical contribution rates would have to rise by a similar proportion due to the rise in old-age medical expenditures.

MacKellar et al. (2002) constructed a partial equilibrium economic-demographic growth model to study the linkages between Japanese population dynamics, its macroeconomic, pension and health systems and the intergenerational distribution of income. The outcome of their baseline scenario was “demographic-based economic stagnation”. The aggregate savings rate and the growth rate of per capita GDP declined. The capital-output ratio increased. The rate of return on capital declined and the current account balance shifted from positive to negative. Real wages rose while the rate of return on capital fell. These gains for the working age population are offset, however, by increased pension and health insurance contribution rates. In particular, the public pension contribution rate rose from 17.7 per cent in 1995 to 41.1 per cent in 2050. The contribution rate for the health and long-term care systems rose from 7.8 per cent to 13 per cent in 2050.

Alternative scenarios examined the effects of (1) a 10 per cent increase in the population, (2) an older population of constant size, (3) a 10 per cent increase in the labor force with a constant age structure (4) a 10 per cent increase in age-specific propensities to consume and (5) a 10 per cent increase in the constant of the production function. Among their findings was that increased immigration would have little effect on the financing of social insurance because it would have a limited effect on the age structure. They also found that the pension and health system were more sensitive to changes in mortality than fertility in the short run and more sensitive to changes in fertility than mortality in the long run.

III. Implications of the Japanese Experience for Southeast Asia

MacKellar et al. observed that a half century ago ‘Japan was a poor country with a dismally overcrowded agricultural sector and an under-capitalized industrial sector producing simple consumer goods...’. Fifty years later, Japan is among the richest countries in the world due in part to its rapid fertility decline. But reduced young age dependency that promoted a high savings rate is rapidly leading to increased old age dependency, with the opposite effect. In the next
century we shall see the ‘unwinding’ of the demographic component of the
Japanese economic miracle.

There is good reason to expect that in the first half of the 21st Century, the
nations of Southeast Asia will follow a demographic trajectory that closely tracks
that of Japan in the last half of the 20th Century. For Southeast Asia the next 50
years will be a period of decelerating population growth combined with rapid
population aging. By 2150, the demographic profile of Southeast Asia should
closely resemble that of Japan in 2000 and many of the same economic issues
currently facing Japan will be challenging the nations of Southeast Asia. The
scale of these problems will be much larger in Southeast Asia since its
population in 2000 was more than 522 million as compared with a Japanese
population of about 84 million in 1950 (United Nations 2002). The projected
demographic trends in Southeast Asia correspond closely to those in Japan
during the last half of the 20th Century and the 5.41 per cent growth rate of GDP
in Southeast Asia (ASEAN 2001a) is not dissimilar to that of Japan in 1950.
Nevertheless, Southeast Asia must begin its economic climb from a much lower
base. In the year 2000, per capita income in Southeast Asia was $1,121 (ASEAN
2001b), about one fourth the per capita income in Japan in 1960 ($4,672).
Nevertheless, it should be possible to draw some lessons from the Japanese
experience that have policy significance for Southeast Asia.

A. Demographic Trajectories

Between 2000-2005 and 2045-2050, the growth rate of Southeast Asia’s
population is projected to fall from 1.38 per cent per annum to 0.38 per cent.
Between 1950-1955 and 1995-2000, the growth rate of the Japanese population
fell from 1.43 per cent per annum to 0.26 per cent.

In Southeast Asia, the median age will rise from 24 years in 2000 to 38
years in 2050. The median age in Japan rose from 22 years in 1950 to 41 years
in 2000.

The growth in the dependent population of Southeast Asia during the next
50 years will closely parallel the growth of the dependent population in Japan
during the last half of the 20th Century. In Southeast Asia, the population, aged
60-and-older, will rise from 7.1 per cent in 2000 to 22 per cent in 2050. In Japan,
the population aged 60 and older rose from 7.7 per cent in 1950 to 23 per cent in
2000. In Southeast Asia, the population, aged 65-and-older, will rise from 4.7 per
cent in 2000 to 16 per cent in 2050. In Japan, the population aged 65-and-older
rose from 4.9 per cent in 1950 to 17 per cent in 2000. In Southeast Asia, the
population, aged 80-and-older, will rise from 0.6 per cent in 2000 to 3.5 per cent
in 2050. In Japan, the population aged 80-and-older rose from 0.5 per cent in
1950 to 3.8 per cent in 2000. (This last group accounts for most of the
demographically driven increases in health costs.)

Trends in the working age populations of Southeast Asia will also
emulate those of Japan in the period 1950-2000. In Southeast Asia, the
population, aged 15 to 64, will gradually rise from 63 per cent of total population
in 2000 to 68 per cent in 2025 and then fall back to 64 per cent in 2050. In Japan,
the population the working age population rose from 60 per cent of total population in 1950, reached about 70 per cent in 1990 and fell back to 68 per cent by 2000.

In the case of the old-age dependency ratio, the trends are almost identical. In Southeast Asia, the old-age dependency ratio will rise from 7 per cent in 2000 to 25 per cent in 2050. In Japan, the old-age dependency ratio rose from 8 per cent in 1950 to 25 per cent in 2000.

Fertility decline is not projected to be as rapid in Southeast Asia as it was in Japan between 1950 and 2000. Hence, Southeast Asia will not experience as rapid a decline in young-age dependency. The rate will fall from 51 per cent in 2000 to 31 per cent in 2050. In Japan, the young-age dependency rate fell from 59 per cent in 1950 to 22 per cent in 2000. It is likely, therefore, that households in Southeast Asia may have greater difficulty accumulating savings than did their Japanese counterparts 50 years earlier.

Because of the slower decline in young-age dependency in Southeast Asia, the fall in its total dependency rate will be somewhat less rapid than in the case of Japan. In Southeast Asia, the rate will fall from 59 per cent in 2000 to 47 per cent in 2025 and then rebound to 56 per cent in 2050 as the rise in old-age dependency more than offsets the decline in young age dependency. In Japan, the total dependency rate fell from 68 per cent in 1950 to 47 per cent in 1975 and remained at about that level until 2000. In the case of Japan in the latter part of the 20th Century, the decline in young age dependency was so large that it fully offset the rise in old-age dependency.

The underlying demographic explanations for the expected population aging in Southeast Asia are quite similar to those in Japan a half century earlier. In Southeast Asia, the crude birth rate is projected to fall from 21.4 in 2000-2005 to 13.6 in 2045-2050. In Japan, the crude birth rate fell from 23.7 in 1950-1955 to 9.8 in 1995-2000.

A notable exception to the similarities in demographic trends concerns the crude death rate. In response to its aging population, the crude death rate in Southeast Asia is expected to rise slightly from 7.0 in 2000-2005 to 9.3 in 2045-2050. In Japan, rapid improvements in health kept the crude death rate on a downward path even as the population was ageing. Thus, the crude death rate fell from 9.4 in 1950-1955 to 7.6 in 1995-2000.

Though the TFR is projected to fall rapidly in South East Asia from 2.52 in 2000-2005 to 2.08 in 2045-2050, that is not nearly as rapid as the fall that occurred in Japan where the TFR collapsed from 2.75 in 1950-1955 to 1.41 in 1995-2000. Similarly, the increase in life expectancy at birth in Southeast Asia will not be quite as dramatic as Japan’s gains in the last half of the 20th Century. Life expectancy at birth for both sexes combined in Southeast Asia was 67 years in 2000-2005 and is projected to rise to 77.3 years in 2045-2050, a gain of about 10 years. In Japan, combined life expectancy at birth grew from 64 years in 1950-1955 to 80.5 years in 1995-2000, a gain of 16.5 years.

The slower projected increase in life expectancy at birth in Southeast Asia reflects the fact that the countries of the region are not likely to duplicate the spectacular decline in infant mortality achieved in Japan. In Southeast Asia the
infant mortality rate is projected to decline from about 41 per thousand live births in 2000-2005 to about 12 in 2045-2050 while the infant mortality in Japan rate fell from 50.6 in 1950-1955 to an amazing 3.5 in 1995-2000.

Clearly, in the next half century, the demography of Southeast Asia will tread the same paths as Japan traveled during the last half of the 20th Century. Though the region as a whole may travel that path a bit more slowly than did Japan, some nations may experience even more rapid aging than Japan. One such nation is Thailand, where the old-age dependency ratio is projected to double from 8 to 16 per cent between 2000 and 2025, a period of 25 years. By contrast, it took 35 years for Japan to double its old age dependency ratio from 8 to 16 per cent.

B. Policy Implications for Southeast Asia

Japan is on the frontier of our knowledge of how to adapt to a rapidly aging population. She had to break the path that the nations of Southeast Asia must follow. From this review of the Japanese experience it should be possible to distill some lessons that might be applied by the nations of Southeast Asia as they age rapidly over the next fifty years.

It is the labour force that is most directly affected by population ageing. The Japanese labour market was characterised by lifetime employment, seniority-based compensation, and mandatory retirement at an early age. The economies of Southeast Asia should try to avoid introducing such institutions since the Japanese experience proves that it is extremely difficult to maintain such a system in the face of a rapidly ageing labour force.

To some degree Japan could offset the decline in its work force by utilizing labour more efficiently. A significant portion of the Japanese labour force is working at relatively low levels of productivity, especially in such protected sectors of the economy as agriculture and petty retailing. By refusing to protect specific industries and allowing markets to reallocate workers to their most productive occupations, the countries of Southeast Asia can alleviate some of the adverse effects of a shrinking labour force. Conversely, the countries of Southeast Asia can economize on what will become their scarce labour resources by opening their markets to imported goods and permitting their firms to build factories abroad.

In Japan, the labour force participation of elderly men is higher than in any other developed country. There is some scope for increasing the labour input of elderly males through eliminating the disincentives in current pension regulations and reducing elderly unemployment. Nevertheless, the gains to be had from such efforts would be modest. The increased utilization of women is Japan’s best hope for preventing a precipitous fall in the size of its labour force. However, in Japan, many factors, especially the lack of day care facilities for children and the lack of help with home-care of the aged, inhibit the labour force participation of women. As they adopt public pension plans, the nations of Southeast Asia should avoid including means tests that weaken the incentives of the elderly to keep working. More important however is that as the societies of Southeast Asia start to cope
with the labour force decline, they take measures to address disincentives to female labour force participation. By doing so they could neutralise a very large part of the expected negative impact of demographic trends on their economies.

Population ageing, by reducing the supply of labour, caused Japanese firms to substitute capital for labour, leading to increases in capital-output ratios and declines in rates of return to capital. As populations age in Southeast Asia investment will increase while labour forces decline. This will result in declining rates of return. Ideally this will cause saving rates to fall so that a lower level of investment would match the region’s reduced need for capital. The result is likely to be a deceleration in GDP growth or even negative GDP growth in Southeast Asia in coming decades. Nevertheless, all the models reviewed here project that population aging, in the context of declining population growth, would be accompanied by positive growth in per capita incomes. As a result of slower rates of population growth that accompany population ageing, future generations in the countries of Southeast Asia can look forward to improving living standards.

In Japan, population ageing raised the rate of return to labour, redistributing income from *rentiers* to workers and from old to young. It also redistributed population from age groups where the distribution of income and wealth is relatively even to age groups in which it is relatively skewed. In view of the already substantial degree of income and wealth inequality in some Southeastern Asian nations, it may be necessary to undertake efforts in other spheres to offset the effect of population aging on increasing inequality.

Some models of the Japanese economy indicated that population ageing, by increasing the real wage rate, might induce younger cohorts to invest in more human capital, resulting in a better-qualified labour force and enhanced productivity. Other models indicated that, young cohorts might give up the opportunity to undertake higher education in order to take advantage of higher wages that are the result of population ageing. Hence, the countries of Southeast Asia will have to actively promote the education of young people. They cannot assume that a slowing in the accumulation of physical capital will be offset by an increased rate of accumulation of human capital.

Japan reduced the costs of ageing somewhat by investing abroad in relatively capital-poor countries, such as the nations of South-Asia. In future decades, it is likely that the countries of Southeast Asia will also be investing abroad. Slowing the rate of domestic capital formation would lower their GDP but their GNP would be raised by net factor payments in excess of the returns that would have been available at home. However, the nations of Southeast Asia should be forewarned that empirical studies of Japan (MacKellar et al.) indicate that the net returns to investment abroad are likely to be modest and other studies (Goto, 2001) indicate that returns may in fact be negative when effects on labour productivity are taken into account.

All studies reviewed here project that the Japanese household saving rate will decline, although there is no agreement on the size of the decline. In all these models, the ageing of the Japanese population is a significant factor underlying the decline in household savings. Hence, it is likely that population aging will put downward pressure on household savings rates in Southeast Asia.
in future decades. Heller’s (1998) projection model found that up through 2025, saving rates would tend to increase for the rapidly growing nations of Southeast Asia (‘the Southeast Asian Tigers’). Between 2025 and 2050, however, the aggregate savings rate may dip by 13 per cent. Therefore, the governments of the region may have to provide significant incentives to encourage saving.

Population ageing is likely to have a greater negative impact on saving than on investment demand. Therefore, a common feature of the macroeconomic projections reviewed here is a decline in Japan’s current account surplus, often to the extent of turning into a deficit. This implies that the ageing of Southeast Asia’s population will have not just domestic, but international economic consequences. The nations of Southeast Asia must be prepared for a significant diminution in the flow of foreign direct investment from Japan.

There is broad agreement that population ageing will put pressure on government fiscal balances. In the case of Japan, this occurred mostly through increased pressure on pension and health systems. Thus, as the countries of Southeast Asia introduce such systems they must be aware that they will cause their aggregate saving rates to decline. Heller (1998) argues that in much of Southeast Asia, stable and viable medical insurance systems must be put in place soon to address the aging of their populations. He argues that population ageing will have only modest fiscal effects in Southeast Asia until 2010 and modest growth up to 2035. After that the countries of Southeast Asia must be prepared for significant increases in the burden of pension programmes.

The simulation models of Meredith (1995b) and Yashiro et al. (1997) demonstrated that the most important pension reform in Japan would be to eliminate the wage indexation of pensions. As noted in MacKellar and Horlacher (2000), population ageing reduces the supply of labour relative to capital and thus raises the real wage. This, in turn, should reduce the contribution rate needed to pay for the increasing expenditures associated with population ageing. However, in the case of Japan, the increase in real wages caused an upward adjustment of pension benefits, as a result the payroll contribution rate moved upwards in lockstep with increases in productivity. Increases in labour productivity failed to lighten the burden of the pension system because pensions rose proportionately through the indexation process. In establishing their pension systems, the nations of Southeast Asia should link benefit levels to prices, thus maintaining the real value of pensions (as Japan did in its reforms of 2000). Under such a system, wage-based contribution rates need not increase so long as productivity grows at a sufficient rate.
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Notes

i An extended discussion of these issues can be found in Horlacher (2001a) and Horlacher (2001b).

ii A brief exception to the decline in the number of births was the period from 1971 though 1974 when the children of the baby boom gave birth to a small echo of the original baby boom.

iii Every one of the MHW population projections has over-predicted fertility and population growth.

iv Even if fertility returns to replacement level by mid-century, the population will be only 67 million at the end of this century.

v In 1996, the rate of natural increase was .02 per cent per year. By 2025, the rate is projected to be minus .06 per cent per year. At mid century, it is projected to be minus .085 per cent per year.

vi Feeney (1990) noted that ‘While overall ageing is not much affected by rapid mortality decline, the numbers of persons at very old ages is greatly affected.’

vii Mayhew (2000) has calculated that if mortality trends from the late nineteenth century to the present are extrapolated, by 2020 female life expectancy at 50 will be 40 years.

viii Manton and Vaupel (1995) found that in 1987 the life expectancy at age 80 of Japanese women was 88.5 years and the life expectancy at 80 of Japanese men was 86.9 years.

ix Kojima (1995) suggests that persons 75 years and over will constitute 14.5 per cent of the population in 2025 and 16.4 per cent in the mid 2050s. Ogawa and Retherford (1997) project that they will constitute 48 per cent of the elderly population in 2018.

x The segment of the Japanese population aged 100 years and over is growing at 13 per cent per annum (Ogawa and Retherford 1997).

xi In 1970, it fell from about 70 dependents per 100 of working age to about 50 dependents and remained at that low level through the beginning of the 21st Century.

xii Mortality under age 5 in 1995-2000 was 5 per thousand live births (United Nations 2002). It was projected to fall to 3 by 2040-2045.

xiii Ogawa and Retherford (1993a) found that the main effect of education is to delay entry into the first marriage. After a woman is married, education has little effect on her marital fertility.

xiv In 1955, the enrollment rates in either a junior college or university was 15 per cent for men and only 5 per cent for women. By 1990, the enrollment rate for women was 37 per cent versus 35 per cent for men.

xv The proportion of married women aged 20-54 working for wages outside the home increased from 13 per cent in 1963 to 42 per cent in 1990.

xvi A 1997 study cited by Yashiro (1998, 136) estimated the income that would be forgone by a graduate of a 2-year college. If she left full-time paid employment to have her first child at age 27 and then returned to work on a part-time basis at age 32, she would suffer both immediate and long-term losses of income. The lost wages during the five years she spent caring for her child would be about 19 million yen. However, her shift to part-time status would then pose an additional loss of 44 million yen over her working life. Thus the opportunity cost of leaving full-time employment to bear a child would be more than a 50 million yen for a graduate of a junior college. The cost would be proportionately higher for a university graduate.

xvii When either partner of a working couple is relocated, it is usually the wife who must quit her full-time paid job to remain with her husband.

xviii Nakamura and Ueda (1997) found that the availability of child day-care centers was a decisive factor in a woman’s decision of whether or not to give up her job. Women are more likely to take full-time employment if they are co-residing with their parents or parents-in-law because the latter can assist with childcare.

xix The Angel Plan also included measures that provide support for both child rearing and work, (b) providing support for child rearing at home and improving housing conditions (Ogawa 2000).

xx Ogawa (2000) projects that the number of senile dementia cases will increase from 1.25 to 3.22 million between 1995 and 2025.

xxi This may not have a significant impact on fertility since most care givers are in their forties or older.
Another explanation for the rapid decline in the fertility of Japanese women is the fact that they claim to get little psychic satisfaction out of the process of child rearing. The proportion of women with children aged 0 to 14 who report that they feel that child rearing is enjoyable has fallen to only 9 per cent in 1990. The corresponding percentages in other industrialized nations range between 40 and 70 per cent (Ogawa and Ermisch 1994, 211).

As of June 2000, the monthly allowance is about $40 for each of the first two children and twice that for each subsequent child (Ogawa 2000).

In June 1990, Japan tightened its immigration laws to further restrict the inflow of foreign workers (Ogawa 2000).

During the same period, the growth rate of per capita GDP in the United States was 2.6 per cent per annum.

In a closed economy, the effect of an increase in the ratio of the non-working elderly population to the working adult population is reduced per capita GDP. However, in the case of Japan, population ageing is associated with slowdown in total population growth, which should increase GDP per capita. Which effect dominates is an empirical question, however, most studies have estimated that the overall impact of projected population trends in rapidly ageing countries will be to reduce GDP per capita.

Among the other possible causes of inequality is the ‘bubble economy’ of the 1980s that raised asset prices and therefore magnified inequalities in asset ownership. But this would not explain why inequality continued to increase after the bubble had burst.

There is also a small hump in the Japanese age profile at about age 20. The price of land relative to the price of housing is much higher in Japan than in most other countries. In the United States, the price of land is usually less than 3/4ths the price of the structure. In Japan, the price of the land is likely to be about 5 times the price of the structure paced on that land. (Ohtake and Shintani 1996)

This effect of age structure change must be considered in the broader context the slowdown in aggregate population growth, which would tend to reduce the price of housing.

This elicited a counter-argument from Dekle and Summers (1991).

That factor alone accounts for two or three percentage points of the difference between Japanese and US household savings rates.

The US National Income and Product Accounts have recognised government investment and consequently government saving since January 1996. However, Hayashi (1997) maintains that those figures are not comparable to those included in the Japanese accounts.

Conversely, a declining labour force would result in a declining savings rate.

Moreover they found that there are substantial intra-family transfers from older to younger generations.

Dekle (1990) warned that his results might be the result of children paying the expenses of their parents or simply an artifact of small sample size.

Seventy per cent of their income was social security benefits.

The coefficients were larger than those estimated by Modigliani and Sterling (1983).

Omitted variables such as culture, tax incentives, the availability of consumer credit, the importance of bonus income and the distribution of income and wealth together explained only about a tenth of the difference between US and Japanese saving rates.

Bosworth, Burtless and Sabelhaus (1991) attempted to measure the effect of demographic changes on Japan's aggregate saving rate by examining differences in age-specific savings rates. They held the saving rate of each age group constant and changed the population shares of each group to get the aggregate savings rate. They concluded that the differences in age-specific savings rates were so small that changes in the population structure would not significantly affect the aggregate saving rate.

In the case of housing, the elderly without living children decumulate housing assets faster than those elderly who have living children by 5 percentage points.

For fixed retirement age, expected social security income would substitute for private savings, on the other hand, if the availability of social security led households to retire earlier, the lengthened retirement span would encourage private saving. The first is the ‘benefit effect,’ the second is the ‘retirement effect.’

In recent years such increases should have been considered permanent and therefore a smaller portion of those increases would be saved.
The fact that Korea, which shared many of Japan’s cultural traditions, had (up until recently) low savings rates also tends to argue against cultural explanations.

A related explanation is that young people would keep larger precautionary balances if they knew that they could not borrow to meet unforeseen emergencies.

In a later projection, Horioka (1991) was even more pessimistic.

These projections were made, the authors warn, under the assumption of constant productivity growth, and may therefore overstate savings. They suggested that it would be more reasonable to assume a decline in the rate of growth of productivity and hence the rate of growth of household incomes. If incomes grow more slowly, savings rates would likely fall because of habit persistence in consumption.

These results are broadly consistent with two earlier studies by Noguchi (1987) that also predicted that the current account would go into deficit about 2015.

Between 1965 and 1988 the proportion of male workers that was paid employees went up from about 67 per cent to about 80 per cent. During the same period the proportion of female workers that was paid employees went up from about 45 per cent to about 70 per cent. (Furiya and Clark, 1993).

The rapid shift of the labour force from the primary to the tertiary sector resulted in rapid rural-urban migration as well.

Since older workers are being paid more than their productivity, employers have a need for mandatory retirement. Clark and Ogawa (1992) found that the age of mandatory retirement is younger in firms where the earnings profiles of workers by age is steeper. This would tend to confirm the implicit contracts hypothesis. The policy of Japanese firms to rehire workers at lower wages after mandatory retirement is also consistent with this model.

But this was due to other factors as well, because the average tenure increased for all age groups of men over 30. (Furuya and Clark 1993).

LFPRs for men aged 15+ declined slightly from about 85 per cent in 1960 to about 77 per cent in 1988. The LFPR of adult women fell from about 55 per cent in 1960 to about 50 per cent in 1970 and remained relatively constant after that.

In general, labour force participation among the elderly is positively correlated with wages and education. Among men 60 and over more than 60 per cent of those with university degrees remained at work as compared to 39 per cent of those who had only completed junior high school. This would suggest that the labour force participation of elderly males would increase over time as their average educational level increases.

Among the methods they suggested for reducing the negative effect of women’s employment on fertility were more participation of men in home production and lowering the barriers that discourage women with small children from re-entering the labour market.

This is the only plan for farmers, the self employed, the unemployed, students and non-working wives.

In addition to the public pension system, retirement income is provided by Employee Pension Funds (EPS), which are private corporate pension funds. These funds cover about 12 million employees. There are 5 Mutual Aid Association Schemes (MAAS) which cover about 6 million public employees, such as teachers.

Employed workers would still be able to start drawing the earnings-related component of their pension at age 60.

Since taxes are expected to rise over time, the impact is expected to be to reduce the rate of growth of benefits.

Many of the corporate pension plans (EPS) are also seriously under-funded and their contribution rates will have to be raised or their benefit levels will have to be cut (Dawson 2000).

As of April 1, 1995 salaried workers are required to contribute 1 per cent of bonus income.

In addition to redistributing between generations, the public pension system redistributes incomes within generations, in three ways: (1) benefit calculation formulae favor the wealthy, (2) spouses of salaried workers are exempt from contributions, yet receive significant benefits, and (3) contributions are based only on salary, even though a large part of an employed person’s income may come from bonuses.

In response to the moral hazard problem, since 1984 the program offering free medical service to persons over age 70 was been abolished and the fixed fee that the elderly are required to pay for medical care was increased in 1986.
Families are expected to pay little or nothing for Golden Plan services. They are to be paid for by national and local governments.

The monthly co-payments for hospital stays are only two thirds of the co-payments for intermediate-care nursing homes, thus favoring long hospital stays.

The authors point out that their model may have overestimated the negative effects of ageing for four reasons: (1) their assumption of a fixed labour supply omits any positive effects on output that could be achieved by reducing distortions in the labour market, (2) the neoclassical production function does not allow any spillover effects from investment in human capital; as predicted in new growth theory, (3) savings may be underestimated as a result of failure to take account of liquidity constraints, and (4) in an open economy, the rate of return on capital would not fall and there would be more saving which could be absorbed by the current account as well as domestic investment.

Comparisons of the projections of many of these models for the period 1995 through 2050 can be found in MacKellar et al. (2002 Annex 3.3).

Let A represent the aged (retired population) and Y the young population, P the output per member of the working age population, B the per capita consumption of retirees, c the share of output consumed by the young population. Assuming that output equals the sum of consumption by the young and old, \( PY = cPY + BA \), it follows that the share of the young in consumption is given by \( c = 1 - (B/P)(A/Y) \). An increase in the dependency ratio \( (A/Y) \) can be offset by a rise in productivity \( (P) \) provided per-retiree benefits \( (B) \) remain constant. However if \( B \) is indexed to \( P \), the \( B/P \) ratio is fixed and an increase in productivity cannot offset an increase in the dependency ratio (Jackson, 1998, pp. 27-33).

Labour force was determined in the labour supply sector and the growth rate of the price level was endogenous. The model used a Cobb-Douglas production function in which output depends on the labour force, the capital stock and total factor productivity. Total factor productivity was assumed to grow at an annual rate of 1.6 per cent. Investment included business, government and residential investment. Business investment depends on profits and real interest rates.

The rapid growth of the Japanese economy since 1950 was also aided by its ability to borrow technologies from Western developed countries.

The United Nations (2002) defines the old-age dependency ratio as the population aged 60 and older divided by the population aged 15 to 59.

The doubling time for Singapore will also be much less than it had been for Japan (Ogawa 2000).

Blake and Orszag (1998) found that none of the pay as you go (PAYG) public pension systems in the major OECD countries is viable if pensions are indexed to wages but all are viable if they are linked to prices.