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# **Aging in Japan: Causes and Consequences. Part I: Demographic Issues [Revised and updated August 2002]**

**Horlacher, D.**

**IIASA Interim Report  
February 2001**



Horlacher, D. (2001) Aging in Japan: Causes and Consequences. Part I: Demographic Issues [Revised and updated August 2002]. IIASA Interim Report. IR-01-008 Copyright © 2001 by the author(s). <http://pure.iiasa.ac.at/6512/>

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## **Interim Report            IR-01-008/February**

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### **Aging in Japan: Causes and Consequences Part I: Demographic Issues**

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**Revised and updated  
August 2002**

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February 2001

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## Abstract

This paper reviews demographic issues related to the aging of the population of Japan. Among its findings are

- The aging of the Japanese population has little to do with "aging of the baby boom generation" as in countries such as the United States, because the baby boom was only three years long. It is rather, almost entirely due to low fertility.
- Recent fertility declines in Japan have reflected not so much declining marital fertility as decline in the proportion of women of childbearing age who are married. This is due mostly to rising age at first marriage and increased lifetime celibacy although the rising divorce rate also plays a role.
- The reluctance of young women to marry and raise children can be explained in terms of rising opportunity costs, particularly opportunity costs associated with the labor market. At the same time that costs of childbearing are rising, the benefits appear to be declining. A falling share of women report that they expect to rely on their children for age support and a surprisingly low proportion -- only 9 percent of mothers of 0-14 year olds, as opposed to 40-70 percent in other industrial countries - report that they derive pleasure from child rearing. As attitudes toward non-marital sex become more permissive, the benefits to be derived from entering into marriage are also falling.
- While mortality improvements play a secondary role in population aging (compared to low fertility), they have potentially significant impacts on health care costs and the demand for long-term care.
- Though it would be technically possible to prevent the ageing or decline of the Japanese population by allowing increased international migration, the levels required to halt population decline and population aging would be immense. Such large inflows are not currently permitted nor are they likely to be permitted in the future.

## **About the Author**

David E. Horlacher is an Associate Research Scholar at IIASA. He spent the summers of 2000-2002 with the SSR Project.

# **Aging in Japan: Causes and Consequences**

## **Part I: Demographic Issues**

David E. Horlacher

### **Introduction**

“It took more than a century for the population over age 64 to increase from 7 percent to 14 percent in France; it will take the United States about 75 years to traverse this span; it will require only some 26 years in Japan.” (Preston and Kono, 1988, p. 278).

The term “population aging” has become a common household expression in Japan (Kono, 1992, p. 303). The media give the issue extensive coverage. Demographic institutes conduct research on the causes of population aging and have made detailed projections of its future course. Economic institutes study the effects of aging on the quantity and quality of the labor force, the rates of savings and capital formation, and the feasibility of supporting future elderly populations and in the context of Japan’s generous social security system.

This widespread concern about population aging is a prudent response to a demographic inevitability. Not only will the population of Japan age significantly in future decades; it will age more rapidly than any country has ever done before. Figure 1 provides an international comparison of the old-age shares of the populations of Japan and five other OECD countries. It shows that in 1975, Japan had the lowest share (8 percent). But 25 years later, in 2000, Japan had the second highest old age share (17 percent), just behind that of Italy.

The time required for the proportion of the aged population of Japan to double from 10 to 20 percent is projected to be less than 25 years. Most European countries took more than 50 years to travel the same distance in the aging of their populations (Ogawa and Retherford, 1993a, p. 62). Japan is, therefore, on the frontier of our knowledge of how to adapt to a rapidly aging population. She must break the path that other nations will follow.

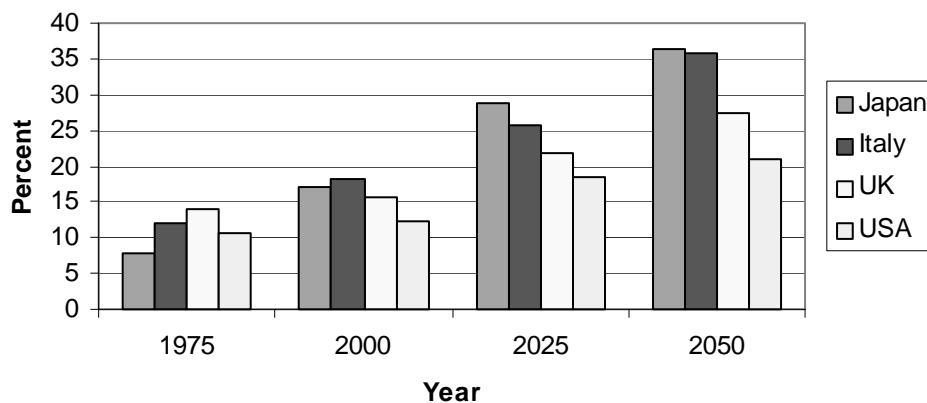
Population aging is a normal part of the modernization process whereby reduced infant mortality and increased opportunities for women lead to lower fertility. At the same time, improved nutrition, life styles, and medical care extend the life spans of older adults. In Japan’s case, however, the fertility of Japanese women fell faster than had ever occurred in the history of any industrial country. Added to that, Japan went from a nation of relatively high mortality to the one with the world’s greatest life expectancy at birth in the span of just a few decades. All the while its doors were closed



to immigration. Finally in the Japanese case, there do not appear to be any strong self-correcting tendencies that would slow the population aging process or even prevent its acceleration.

**Figure 1**

**Share of the Population Aged 65 and Older,  
Selected OECD Countries, 1975-2050**



Source: United Nations, 2002, *World Population Prospects: The 2000 Revision* (<http://esa.un.org/unpp/p2k0dat.asp>).

When the Japanese children who are born this year are themselves elderly, they may well 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 labor productivity to the degree that will be needed to support those children in their old age?

This study will review the state of our knowledge on those questions.<sup>1</sup> It will be divided into three papers, each published as a IIASA *Interim Report*. This *Report* will examine the trends in Japan's demographic structure and the reasons why those trends may continue. A second report will examine the economic implications of population aging and proposed policies for addressing some of the key problems posed by population aging. The third report will examine the implications of increases in the absolute and proportionate size of the old age population for the welfare of the elderly themselves.

This *Interim Report* is divided into six parts. The first part will provide a brief overview of past demographic trends and projections for the 21<sup>st</sup> century. The second part presents trends and projections of Japanese fertility and mortality. The third section

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<sup>1</sup> The present study is a component of a larger research effort by IIASA on the Socio-economic Impacts of Aging that is supported in part by the Economic Planning Agency, Government of Japan.

will describe trends in the Japanese age structure. The fourth part will examine the demographic consequences of the aging of the population in terms of the burden of dependency. The fifth part will examine the causes of increased life expectancy and the reasons why further increases are likely. The sixth section describes the socio-economic forces that have produced such low levels of fertility in Japan. The final section considers the likelihood of still further population declines and an acceleration in the pace of population aging.

## **I. Population Trends, Past and Future**

### **A. An Overview of The Demographic Transition in Japan**

In 1872, four years after the Meiji Restoration, the government conducted a nationwide census of the population that counted 35 million residents (Inoue, 1999). By the beginning of the 20<sup>th</sup> century, 1900, it was estimated that the population had grown to approximately 44 million<sup>2</sup>. It was a very young population. About one third of the population was below the age of 15. The working age population (15-64) comprised 62 percent of the population and only one person out of twenty was elderly (65 or older).

This young age structure was the result of high levels of fertility and mortality. Many of the 1.4 million children who were born in 1900 did not survive their first year. The infant mortality rate was 155 per thousand live births. It is not surprising, therefore, that the life expectancy at birth was only 44 years for males and 45 years for females. The nation's young age structure, combined with high levels of fertility and mortality, produced a crude birth rate of 32.4 per thousand of population and a crude death rate of 20.8 per thousand. These, in combination, resulted in a rate of natural increase of 1.2 percent per year.

The first modern census of Japan was conducted in 1920. It showed that, the crude birth rate had risen by more than 10 percent to 36.2 per thousand and the crude death rate had risen by 25 percent to 25.4 per thousand. As a result, the rate of natural increase fell slightly, to just under 1.1 percent per year. Over this 20-year period, the age structure experienced little change. The proportionate shares of the young age group and the working age populations had increased by .2 percentage points each with a corresponding decline in the share of elderly persons.

The total fertility rate (TFR) fell from about 5 children per woman in 1925 to about 4 children per woman in 1940. There can be a number of possible explanations for the pre-war fertility decline. Inoue (1999, p. 4) has called attention to the fact that during these two decades the share of the population engaged in agriculture and other primary industries was cut in half while the share of the population living in cities more than doubled. Despite the fertility decline, the population grew younger, because the control of infectious diseases, such as malaria, brought the infant mortality rate down from about 166 deaths per thousand live births in 1920 to only 90 in 1940. The

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<sup>2</sup> Figures for 1900-2000 taken from National Institute of Population and Social Security (200a) "Selected Demographic Indicators for Japan".

combined effect of falling fertility and infant mortality in the context of an almost unchanged age structure was to decrease the crude birth rate by about 20 percent to 29.4 per thousand in 1940 and to decrease the crude death rate by almost one third, to 16.5 per thousand and raise the rate of natural increase to about 1.3 percent per annum.

In the first half of the decade of the 1940s, Japan was at war. In the latter half of 1945 and over the next year, many young men returned to civilian life. Because much potential childbearing had been postponed in the early years of the decade, there was a brief but intense "baby boom" between 1947 and 1949. The annual number of births jumped to 2.7 million in 1947 and rose even higher in 1948 and 1949. The crude birth rate shot up to 34.3 per thousand in 1947 and remained at nearly that level through 1949. These were the years of Japan's most rapid population growth. The rate of natural increase jumped from 1.3 percent in 1940 to 2.0 percent in 1947 and then rose above 2.1 percent in the following two years.

After the baby boom, fertility patterns returned to their long-run trend values. By 1950, the TFR, which had been at 4.5 in 1947, had fallen to 3.7 births per woman and it continued to fall rapidly, reaching 2.4 in 1955. The crude birth rate fell to 28 in 1950 and 19 by 1955. The crude death rate also declined, but not enough to prevent the rate of natural increase from falling to 1.7 percent in 1950 and to 1.2 percent in 1955.

Commentators often speak of population aging in terms of the "aging of the baby boom generation." It is important to point out that, while this interpretation has some merit in the case of Western Europe and the United States, where the baby boom phenomenon lasted over 15 years, it is highly misleading in Japan, where it lasted only three years. To put it differently, Japan never had a "baby boom" -- it had a "baby blip." Population aging in Japan, as we shall see, is related to fundamental structural shifts in mortality and fertility conditions, not to the unwinding consequences of high fertility in the 1950s and 1960s.

Despite the large changes in fertility and mortality that had taken place between 1900 and the mid-1950s, the age distribution of the Japanese population had remained remarkably constant. The young-age share of the population had grown only 1.8 percentage points. The working-age share had fallen by only 1.3 percentage points and the elderly share had fallen by only 4 tenths of a percentage point. But 1955 was the turning point.<sup>3</sup> Never again would the age distribution remain fixed. Instead, the working-age share would shift upward by about 10 percentage points and the old-age share would more than triple by 2000. Meanwhile the young-age share in the population would be cut in half. By 2000, almost 70 percent of the population was of working age with the remainder about equally divided., with slightly fewer young than old.

The population of child-bearing age was still growing due to the brief baby boom two decades earlier. Hence, the number of births did not decline immediately. But as time went on, the annual number of births declined from 1.9 million in 1970 to 1.2 million in 2000. Gradually the young-age population, which had reached a high of

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<sup>3</sup> The dating of the turning point depends on which index of age structure is used. The index used here is the relative shares of the population. Other indexes include the aged dependency ratio, the young dependency ratio and the aging index. For a comparison of the time paths of these indices for the period 1950-1990, see United Nations, 1995 (Table 2, page 5).

almost 30 million in 1955, fell to 18 million in 2000. Accordingly, the young-age share was cut more than in half in forty-five years, from about 33 percent of the population in 1955 to about 15 percent in 2000.

A brief exception to the decline in births was the period from 1971 through 1974 when the children of the baby boom gave birth to a small echo of the original "boom". Births in those years rose slightly above 2 million; but by 1975, they had again fallen below that number and steadily declined thereafter until 2000 when births were only 1.2 million, the smallest number of births in Japan during any year up to that time.

## **B. Japan's Demographic Future- An Older, Smaller Nation**

The National Institute of Population and Social Security Research, a part of Japan's Ministry of Health and Welfare (MHW), keeps a close watch on demographic developments, preparing projections every five years (Endo and Katayama, 1998, p. 240). Compared to the 1997 projections, the most recent projections (prepared in 2002) assume a more rapid decline in fertility and thus imply a more rapid rate of aging.<sup>4</sup> The medium variant of the 2002 projections indicates that births will fall by nearly half, from 1.2 million in 2000 to 667 thousand in 2050. Deaths will also increase, from 962 thousand in 2000 to 1.6 million in 2025 and remain at that level until 2050. These trends imply that the Japanese population will gradually decline, from 127 million in 2000 to about 121 million in 2025 and then fall more rapidly to 101 million by 2050.

In 2000, the crude birth rate was 9.5 per thousand and the crude death rate was 7.7 per thousand, yielding a rate of natural increase of less than .02 percent per year. By 2025, the crude birth rate is projected to fall to 7.2 per thousand while the crude death rate rises to 13.2 per thousand, yielding a rate of natural increase of minus .06 percent per year. At mid century, the crude birth rate will have fallen to 6.7 per thousand while the crude death rate will have risen to 16.7 per thousand, again yielding a negative rate of natural increase (-.095 percent per year).

Population decline will be matched by a continuing change in the age structure. The young-age share of the population, which comprised 15 percent of the total population in 2000, will fall to 13 percent in 2025 and continue at that level through 2050. The working-age share will experience the greatest decline falling from 68 percent of the population in 2000 to about 59 percent in 2025 and then to about 54 percent in 2050. Simple mental arithmetic will confirm that the main cause of the decline in the working age will be a dramatic increase in the old-age share, from 17 percent of the population in 2000 to 28 percent in 2025 and to 33 percent in 2050. The old age share will have almost doubled over the next 50 years. No nation in history has experienced so rapid a rate of aging.<sup>5</sup>

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<sup>4</sup> The basic projection period is 2000-2050; but there is also a reference projection, which goes on to the year 2100.

<sup>5</sup> The long-run population forecast is also sobering. By the end of this century, according to the most recent Medium Variant, the population of Japan will have shrunk to only 64 million

These are, of course, no more than projections, and long-run demographic projections can go horribly wrong. For example, U.S. demographers in the 1930s extrapolated low Depression-era fertility rates forward, resulting in spectacular underestimates of the present U.S. population (the baby boom, of course, increased forecast error even more). In the process of going wrong, long-term population forecasts can cause a great deal of political mischief by fueling fears of national extinction. Three things, however, are striking about the Japanese population projection. First, the Medium Variant projections for the last half of the 21<sup>st</sup> Century are already based on a gradual return to an improbably high TFR (2.07) during the second half of the century. Even if the TFR returns to replacement level by the end of the century, the current age structure of the Japanese population means that there will be very few women to have babies. Second, the Japanese Ministry of Health and Welfare has published population projections every five years since 1975, and every one of those projections has over-predicted fertility and, as a result, population growth. Third, as we discuss in Section VI of this Report, there are no strong reasons to believe that currently depressed fertility levels will rise; in fact, there are much stronger reasons to believe that they will continue their long-term decline.

In summary, Japan's population has grown from about 35 million in 1872 to a present level of 127 million (see Figure 2). Its growth rate is now effectively zero and will shortly turn negative (see Figure 3). By 2050 the population is projected to fall to about 100 million. While long-term projections are little more than speculation, even if fertility returns to replacement level by mid-century, the population will be only 64 million at the end of this century.<sup>6</sup>

## II. Fertility and Mortality Trends

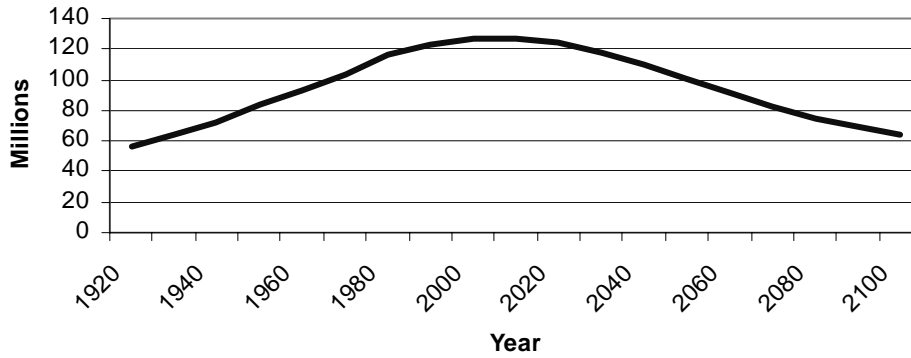
The slowdown and reversal of population growth in Japan is the result of steadily declining crude birth rates combined with crude death rates that fell at first but ultimately will rise, all in the context of an age structure that is continually becoming older.

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<sup>6</sup> Just five years earlier, the National Institute of Population and Social Security Research (1997) had projected that the population would be 67 million in 2100.

Figure 2

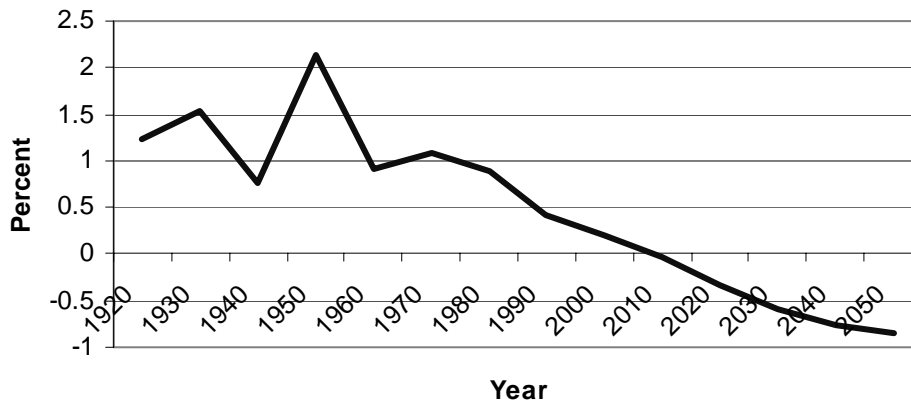
**Actual and Projected Total Population, Japan,  
1920-2100**



Source: National Institute of Population and Social Security Research (2002a) Table 1, and (2002b) Table 1 and Reference Table 1.

Figure 3

**Annual Rates of Population Growth, Japan, 1920-  
2050**



Source: National Institute of Population and Social Security Research (2002a), Table 1.

**A. Crude Birth and Death Rates**

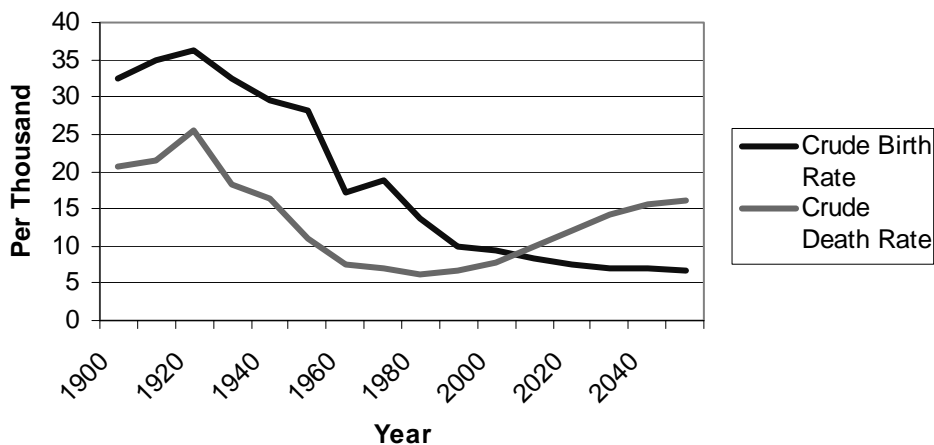
Figure 4 shows the trends in crude birth and death rates in Japan from 1900 to 2050. In 1900, the crude birth rate was about 10 per thousand higher than the crude death rate. Both rates tended to rise over the next two decades. After that, they began to fall, but the crude death rate fell slowly after 1960 and began to turn up about 1980.

Meanwhile the crude birth rate continued to fall rapidly. About the middle of this decade (2005) a rising death rate will intersect the gradually falling birth rate from below. Because of the increasing share of very old people in the Japanese population, the death rate will continue to rise until mid century, going to about 16 per thousand. At the same time, the crude birth rate is projected to stagnate at less than 8 per thousand.

Both the low crude birth rates and the rising crude death rates reflect in part the changing age structure. Crude birth rates are stagnant at a very low level because a declining portion of the population is entering the childbearing ages. Ogawa and Retherford (1993a, p. 703) observed that in the years after 1973, annual births fell even more steeply than TFR because changes in population age structure. Crude death rates are rising, not because mortality is rising (it isn't); but because an ever larger proportion of the population is at older ages where the survival rates are lower.

**Figure 4**

**Crude Birth and Death Rates, Japan, 1900-2050**



Source: National Institute of Population and Social Security Research (2002a) Table 5, and (2002b) Table 5.

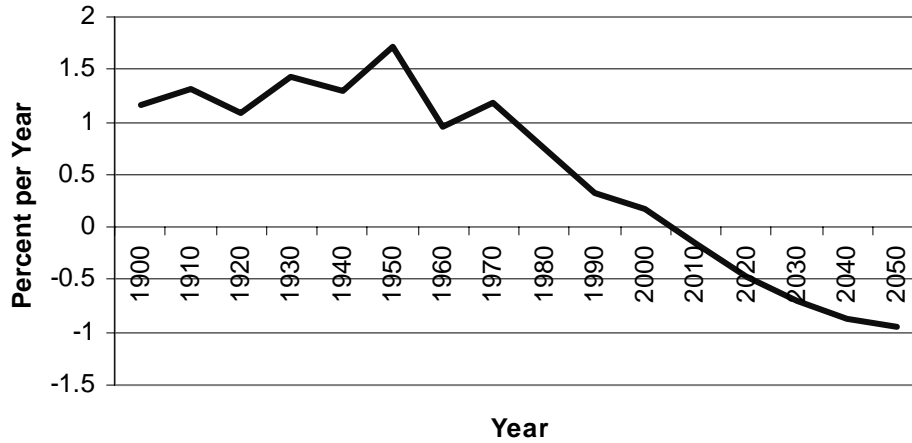
The difference between the crude birth rate and the crude death rate, when expressed as a percentage, yields the annual rate of natural increase, a figure that is very close to the annual rate of growth of the population<sup>7</sup>. Between 1900 and 1970, the rate of natural increase fluctuated between 1 and 2 percent (Figure 5). There was a small “baby boom” before 1950 and a weak echo of that boom about 1970. After that, rates of natural increase fell steadily and are projected to become increasingly negative shortly after the beginning of the 21<sup>st</sup> Century.

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<sup>7</sup> The difference between the rate of natural increase and the rate of growth of the population is the rate of net migration, a very small number in the case of Japan.

Figure 5

**Rate of Natural Increase, Japan, 1900-2050**



Source: National Institute of Population and Social Security Research (2002a) Table 5, and (2002b) Table 5.

**B. Fertility Rates**

This section will describe the decline in the total fertility rate as well as trends in the age-specific fertility of key age groups. Since, in Japan, almost all childbearing takes place within the context of marriage, this section will also discuss the increases in age of marriage, lifetime celibacy and divorce.

**a. Total Fertility Rate**

The slowdown of growth and the eventual decline of the Japanese population are generally attributed to the decline in Japanese fertility (Kojima, 1995, p. 198). The total fertility rate (TFR)<sup>8</sup> was nearly 5 births per woman in 1930 and remained above 4 a decade later (Figure 6). By 1960, however, the TFR had fallen to about 2 births per woman (at or below replacement), where it remained until the early 1970s. After that, it resumed its decline, dropping well below replacement levels (2.07) in 1980 and reaching 1.36 in 2000. The medium variant projection of the Ministry of Health and Welfare assumed that the TFR will decline to 1.31 by 2007 and thereafter will rise slowly reaching 1.39 by 2049 (National Institute of Population and Social Security Research 2002b, p. 6). Thus, over the 70-year period since 1980, the TFR of Japan has been or is projected to be significantly below the replacement level.

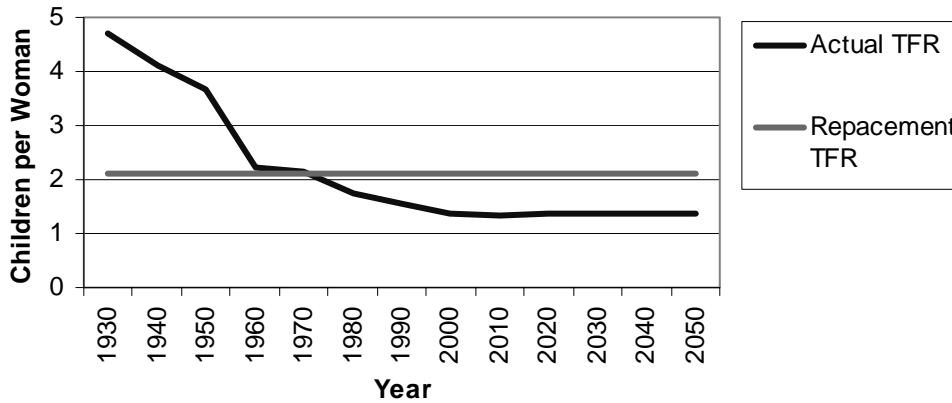
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<sup>8</sup> The total fertility rate (TFR) is a synthetic measure of fertility that is independent of age structure. It is the average number of children a cohort of women would have over their lifetimes if they were to experience the same age-specific fertility rates that pertain to the current period as they pass through their childbearing years.



Figure 6

**Actual and Replacement Total Fertility Rates,  
Japan, 1930-2050**



Source: National Institute of Population and Social Security Research (2002a), Table 9.

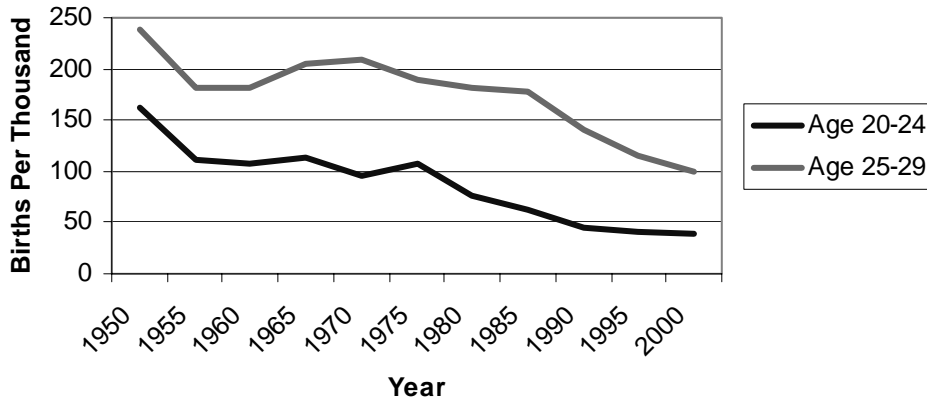
**b. Age-Specific Fertility Rates**

A decline in the TFR can reflect a decline in age-specific fertility rates (ASFRs) anywhere in the 15-49 age span. Figure 7 shows that the most pronounced trend in ASFRs was the steady decline since the 1930s in fertility at ages 20-24 and 25-29. In 2000, the ASFR of Japanese women aged 20-24 stood at just one third of its 1950 level. In all years between 1950 and 2000, the highest age specific fertility is found in the 25-29 age group. The ASFR for that group declined through 1960. It remained on a plateau until 1980, and then resumed its decline, falling to a level that is just 40 percent of what it was in 1950. It is now just barely above the age-specific fertility rate of the 30-34 year old age group.

Figure 8 shows that the fertility of older women (age group 30-34 and age group 35-39) declined rapidly through 1960 as contraception and abortion became available. This stands to reason, since traditionally, older women were likely to have completed desired childbearing. Since 1960, however, the fertility of these older women has risen slightly; this may reflect the fact that (as we describe below), the mean age at marriage has risen sharply, as a result of which there are more women in their thirties who still wish to have children.

**Figure 7**

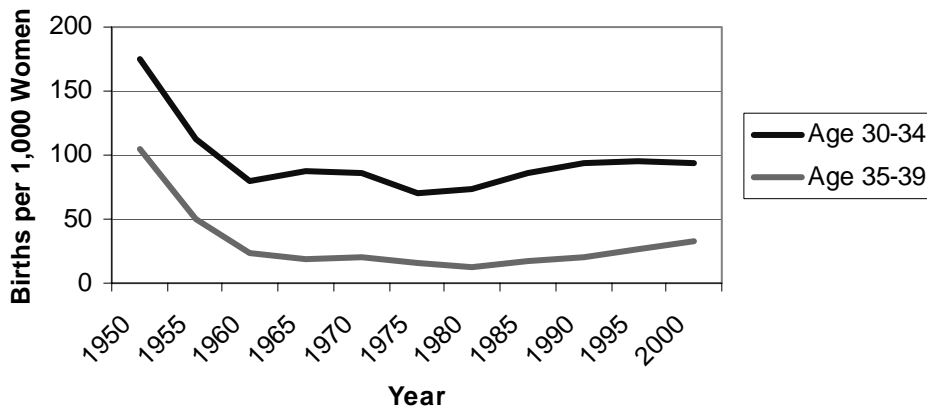
**Age Specific Fertility Rates, Japan, 1950-2000  
(Younger Women)**



Source: National Institute of Population and Social Security Research (2002a), Table 7.

**Figure 8**

**Age-Specific Fertility Rates, Japan, 1950-2000,  
(Older Women)**



Source: National Institute of Population and Social Security Research (2002a), Table 7.

### c. **Marriage and Divorce**

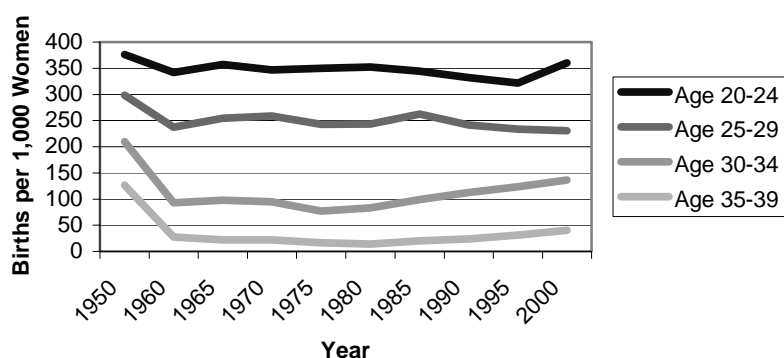
The TFR is the product of the total fertility rate of married women (the Total Marital Fertility Rate or TMFR) and the proportion of women who are married. Figure 9 shows that the fertility of married women in Japan has remained relatively constant since 1965. It has even risen slightly for all age-groups except for women aged 25-29 whose age-specific fertility rate is almost the same as it was in 1965.

A survey by the Institute of Population Problems and Social Security Research found that for all couples under age 50, the average ideal number of children has been constant at 2.6 since 1977. A little less than half of these couples desired three children and 40 percent desired 2 children. Only 10 percent desired one or no children (Atoh, 2001, p. 16).

The rapid decline in Japan's TFR is due to the steady decline in the proportion of Japanese women who are married. This has occurred for two reasons (1) increasingly higher ages at marriage and (2) an increased proportion of women who never marry at all. Hence, the trajectory of Japan's TFR will closely follow the socioeconomic trends affecting the propensity to marry (and stay married).

**Figure 9**

**Age-Specific Fertility Rate for Married Women,  
Japan, 1950-2000**



Source: National Institute of Population and Social Security Research (2002a), Table 7.

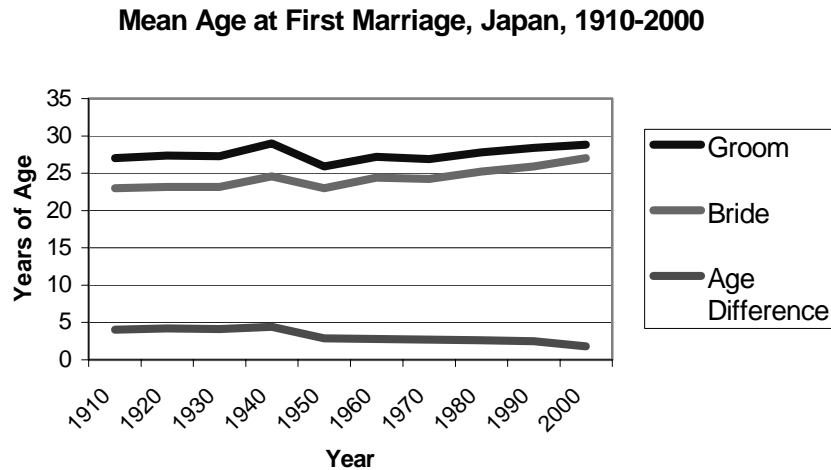
For males, the average age of first marriage rose from about 27 in 1910 to almost 29 in 2000.<sup>9</sup> The age of first marriage, for brides which was about 22 in 1910 has been rising almost continually and reached 27 years by 2000 (Figure 10). Because the Female Singulate Mean Age of Marriage has been rising faster than that of men, the age difference between bride and groom that was four years in 1940 is now less than two years.

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<sup>9</sup> According to Ogawa (2000) Japan is now one of the latest marrying nations in the world.

As a result of the delay in marriage and, of lesser significance, the rising probability of divorce, the proportion of women in the key childbearing ages who are not married is steadily increasing. The proportion of unmarried women in the prime childbearing age for Japan (25-29) has increased from less than 10 percent in 1930 to 54 percent in 2000<sup>10</sup> (Figure 11).

**Figure 10**



Source: National Institute of Population and Social Security Research (2002a), Table 6.

**Figure 11**



Source: National Institute of Population and Social Security Research (2002a), Table 16.

<sup>10</sup> Conversely, Kojima (1995, page 201) notes that the percent married among women aged 20-34 in 1990 was only three fourths of what it had been in 1975.

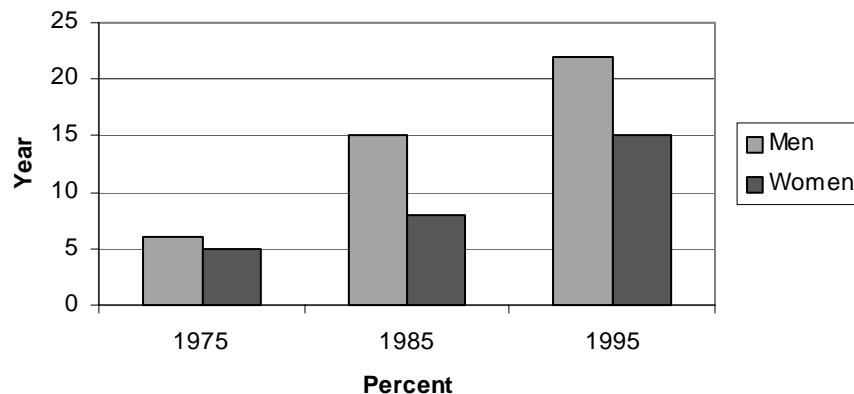
An important question is whether current trends in the proportion of Japanese women who have never married represents merely the postponement of marriage or an increase in the proportion of Japanese women who will never marry. One indicator that current trends represent delay of marriage rather than rejection of marriage is survey evidence that among 18 to 29 year olds surveyed in 1992, over 90 percent said they planned to marry someday (Raymo, 1998, p. 1024).

Retherford, Ogawa and Matsukura (2001, p. 68) report that the lifetime celibacy rate for Japanese men quadrupled from only 2 percent in 1975 to 9 percent in 1995. They also project that the proportion of women who will never marry had increased from 5 to 15 percent over the same time span (Figure 12). Thus they project that in 2010 about 20 percent of men and 8 percent of women at ages 45-49 will be unmarried.

Also contributing to the rising proportion of women in the childbearing ages who are not married is the rising divorce rate. The crude divorce rate in Japan has been rising rapidly since 1960. Figure 13 shows that the level for the year 2000 was 2.10 per thousand of population. That figure is higher than the French divorce rate in 1996 (1.90) and is close to that of Germany (2.14), (Retherford, Ogawa and Matsukura, 2001, p. 95). The Total Divorce Rate<sup>11</sup> in Japan has increased from about 80 per thousand persons in the 1960s to about twice that number in 1990.<sup>12</sup> (Figure 14).

**Figure 12**

**Estimated Proportion of Men and Women Who Will Never Marry, Japan, 1975-1995**



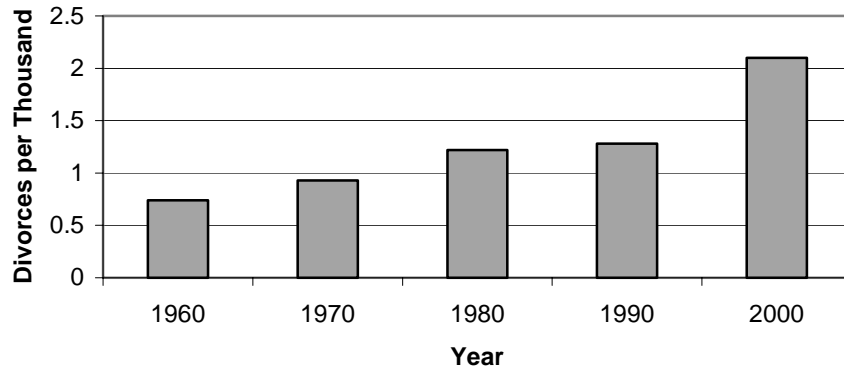
Source: Retherford, Ogawa and Matsukura (2001), Table 1.

<sup>11</sup> The total divorce rate is the sum of the current age specific divorce rates of women aged 16-49.

<sup>12</sup> Japan Ministry of Health and Welfare cited in Ogawa and Ermisch, (1994)

**Figure 13**

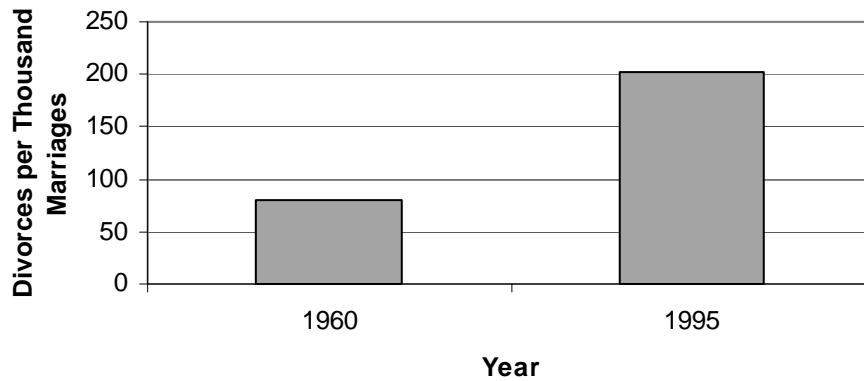
**Crude Divorce Rate, Japan, 1960-2000,  
(Divorces per 1,000 of Population)**



Source: National Institute of Population and Social Security Research (2002a), Table 5.

**Figure 14**

**Total Divorce Rate for Women below 50, Japan,  
1960-1995**



Source: Retherford, Ogawa and Matsukura (2001), p. 93.

#### **d. Total Marital Fertility Rates**

When Retherford, Ogawa and Sakamoto (1996) calculated Total Marital Fertility Rate (TMFR) values,<sup>13</sup> they found that they fell rapidly from almost four births per woman in 1951 to just over 2 births per woman in 1965 and, with the exception of 1966,<sup>14</sup> remained at that level until about 1973. Over the next two years the TMFR fell to a new plateau at slightly below 2 births per woman and tended to fluctuate slightly around that level after 1985. One reason for the decline in marital fertility was that the interval between marriage and first birth increased from 14.5 months in 1955 to 21.3 months in 1994 (Retherford, Ogawa, Sakamoto, 1996, p.136).<sup>15</sup>

### **C. Mortality Trends**

Two major measures of mortality improvement are reductions in the infant mortality rates and increases in life expectancy. In both respects, Japan has an impressive record of success. By 1990, Japan had achieved the highest life expectancy in the world (Goldman and Takahashi, 1996). Furthermore the rate of decline in mortality was greater than in any other low-mortality country. Between 1950 and 2000 life expectancy at birth for males increased from about 60 years to about 77 years. In the case of women, it went from 63 years to about 85 years.

#### **a. Infant Mortality Rates Cannot Fall Further**

One explanation for the growth in population in the early part of the 20<sup>th</sup> century was the success achieved by Japan in lowering infant mortality rates since a decline in infant mortality has the same effect on the infant population as an increase in fertility. Between 1900 and 1920, the Infant Mortality Rate (IMR) of Japan exceeded 150 per thousand live births (Figure 15). By 1940 it had fallen well below 100 and by 1960, it had fallen to about 30. At the turn of the century, 2000, the IMR was negligible, only 3.2 per thousand live births. Because the infant mortality rate is already so low, reducing it further can contribute very little to offsetting future declines in fertility.

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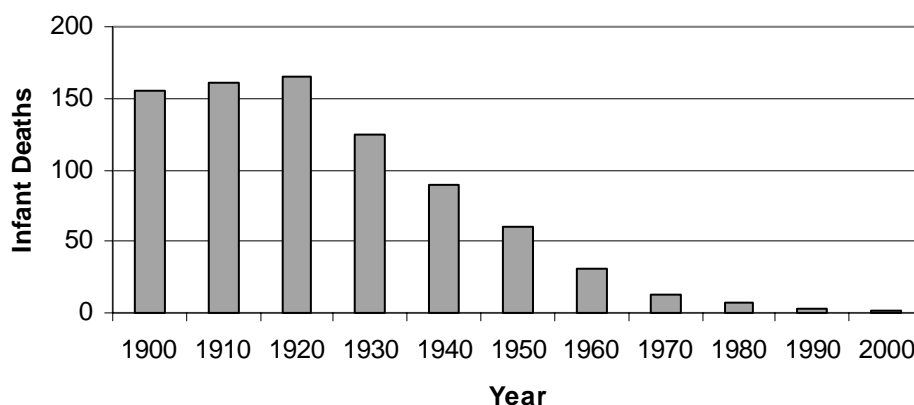
<sup>13</sup> See their Figure 6.1, page 125.

<sup>14</sup> There was a large dip in fertility in 1966. That was the year of the Fire Horse (hinoeuma), which was considered to be an unlucky year to give birth to a girl.

<sup>15</sup> If births before the eighth month of marriage are excluded, the increase is even more rapid, from 16.2 months in 1955 to 25.4 months in 1994.

Figure 15

**Infant Mortality Rate, Japan, 1900-2050,  
(Per Thousand Live Births)**



Source: National Institute of Population and Social Security Research (2002a), Table 5.

**b. Life Expectancy at Birth is Increasing**

Life expectancy at birth has increased significantly in Japan and is expected to continue to increase in the foreseeable future. Figure 16 shows the evolution of life expectancy at birth for both males and females from 1950 to 2000 and projected life expectancies up to 2050. By 2000, the life expectancy at birth of females was nearly 85 years. For males it was almost 78 years. By the half way point in the 21<sup>st</sup> century, the life expectancy at birth of females should exceed 89 years, while that of males is projected to exceed 80 years. In the year 2000, life expectancy at birth for both males and females was slightly higher in Japan than in any other OECD Country (Figure 17).

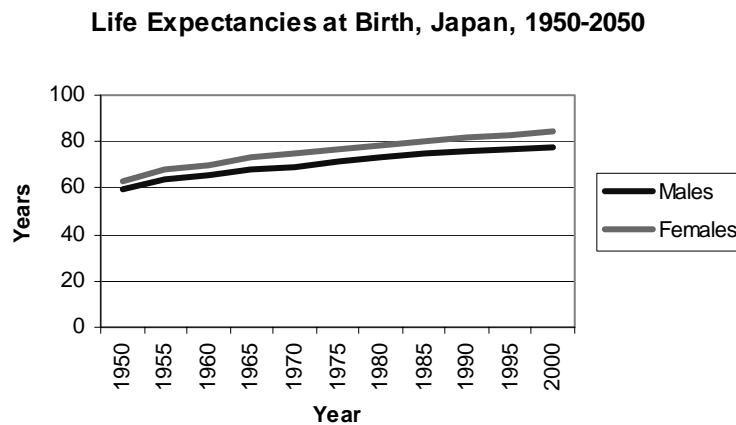
The implications of increasing life expectancy at birth for population aging in Japan are ambiguous. The early increases in life expectancy at birth were due to reductions in infant and child mortality. Other things being equal, such a decline in mortality will partially offset the effects of fertility decline (Lee 1994). Kono (2002, p. 6) observed that initial declines in Japanese fertility were not immediately reflected in more rapid population aging because they were accompanied by rapid mortality declines among children, which largely mitigated the effect of falling fertility. According to Kono, nearly half of the increase in Japanese life expectancy at birth between 1947 and 1970 was due to a reduction in the mortality of children under age 15 and contributed little to population aging. In the period 1970 through 2000, however, 64 percent of the increase in life expectancy can be attributed to those 65 years and over. In this period, the reduction in mortality was an important contributor to population aging in Japan.



**c. Life Expectancy at Age 65 and Age 80 Are Increasing**

A significant part of the explanation for the rapid growth of the elderly population in Japan is the steadily increasing life expectancy at age 65. In the first half of the 20<sup>th</sup> Century, there had been almost no decline in mortality among Japanese aged 65 and over. Life expectancy of men at age 65 was about 10 years in 1900 and it was the same in 1947. The life expectancy of women at age 65 did rise from 11 years in 1900 to 12 years in 1947, but this was an increase of only about 10 per cent in more than half a century. Figure 18 shows that the life expectancy of 65 year-old women has increased from less than 15 years in 1950 to more than 22 years in 2000. Male life expectancy at age 65 has also increased, from a little more than 11 years in 1950 to almost 18 years in 2000. A recent study (Manton and Vaupel, 1995) found that in 1987, the life expectancy of Japanese women at age 80 was 8.5 years and the life expectancy of Japanese men at 80 was 6.9 years.<sup>16</sup>

**Figure 16**



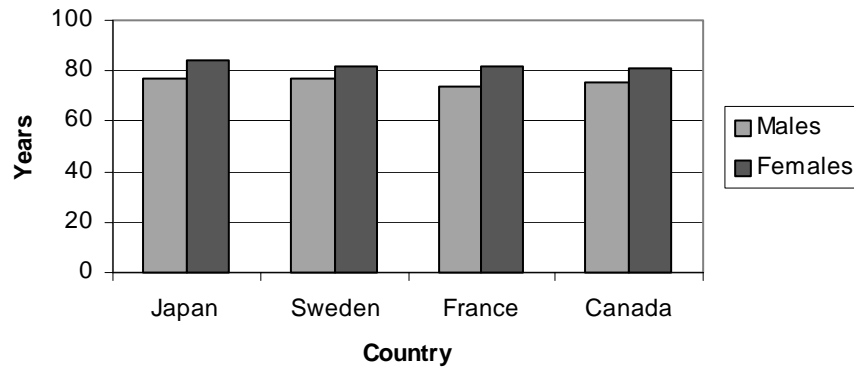
Source: National Institute of Population and Social Security Research (2002a), Table 12.

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<sup>16</sup> At age 80, the life expectancies of American elders are slightly greater than those of Japan, (89.1 years for women and 87 years for men).

**Figure 17**

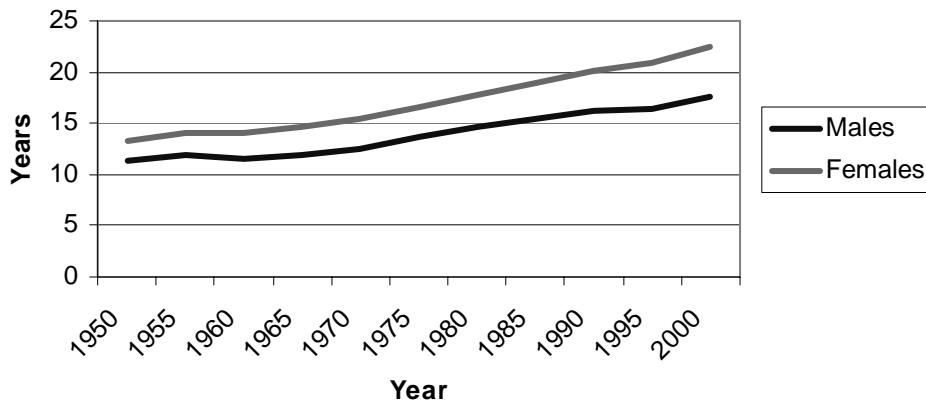
**Life Expectancy At Birth, Various OECD Countries, 1995-2000**



Source: United Nations Population Division, World Population Prospects Database (2002), (<http://esa.un.org/unpp/>).

**Figure 18**

**Life Expectancy at Age 65, Males and Females, Japan, 1950-2000**



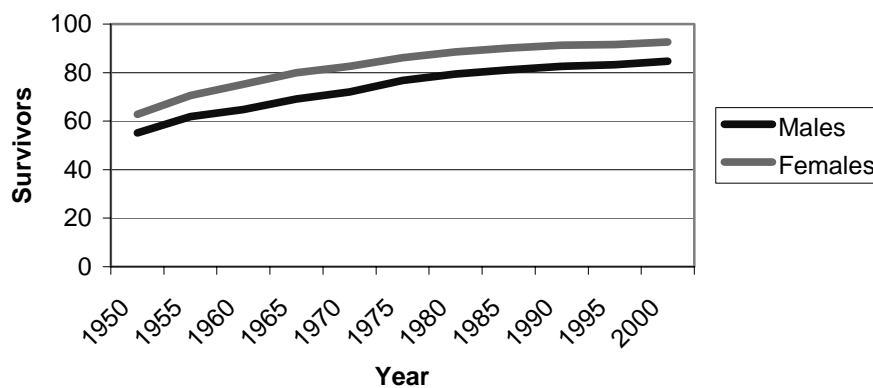
Source: National Institute of Population and Social Security Research (2002a) Table 12.

**d. Survival Rates are Increasing**

Since 1950, the number of Japanese newborns who are likely to survive to age 65 has been steadily increasing (Figure 19). In the case of females, the number of probable survivors per 100 births has risen from about 63 in 1950 to about 93 in 2000 (a 50 percent increase). The number of likely male survivors to age 65 has also risen, from 55 in 1950 to about 85 in 2000.<sup>17</sup>

**Figure 19**

**Number of Survivors to Age 65 per 100 Births,  
Japan, 1950-2000**



Source: National Institute of Population and Social Security Research (2002a), Table 12.

Survival rates for very old Japanese are already quite high. In 1987, an 85 year old Japanese woman had a better than 50 percent chance of surviving to see her 90<sup>th</sup> birthday (Manton, and Vaupel, 1995).

**D. Migration Trends**

Fertility decline combined with increased longevity at older ages must lead to an aging of the Japanese population unless those trends are offset by international migration. Though it would be possible to prevent the ageing or decline of the Japanese population by allowing increased international migration, such migration is not currently permitted nor is it likely to be permitted in the future.<sup>18</sup>

<sup>17</sup> Ogawa (1986) shows how male survivorship patterns have changed from 1921-25 to 1980. See his Figure XVI.I. The figure shows that the probability of a male surviving to age 65 increased from less than 40 percent in 1921-25 to more than 80 percent by 1980.

<sup>18</sup> In June 1990, Japan tightened its immigration laws to further restrict the inflow of foreign workers (Ogawa 2000).

In the year 2000, foreigners comprised only 1 per cent of Japan's labor force and most of these were young men working temporarily in Japan without their families (Martin 2001).<sup>19</sup> The Japanese government prohibits business firms from importing labor except for second generation Japanese and other persons with highly specialized skills (Mason and Ogawa, 2001, p. 56). For this reason the United Nations (1998) population projections for Japan assume no net migration into that country. The United Nations (2001b) 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 labor 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 program 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 labor force. Obviously, this alternative is also not acceptable.

### **III. The Age Structure of the Population Is Getting Older**

#### **A. Young-Age, Working-Age, and Old-Age Population Shares**

From 1920 through 1950, the Japanese population was quite young. Almost one in three was below the age of 15 (Figure 20). After that, the young age share fell quickly. It is projected to be about 15 percent of the population in the year 2000 and to be only 10 percent by mid-century.

The proportion of the population in the working ages (15-64) was relatively constant at about 60 percent until about 1960 after which the decrease in the share of the

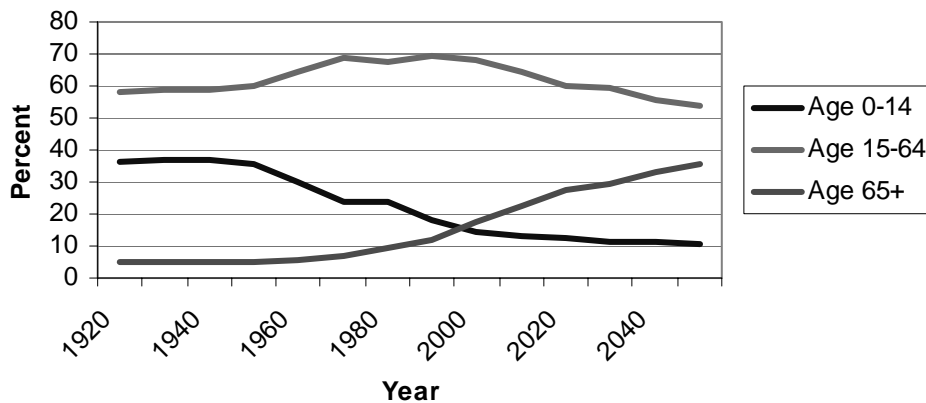
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<sup>19</sup> In 1996, an estimated 45 percent of all foreign workers in the Japanese labor market were undocumented (Mason and Ogawa, 2001, p. 57).

young-age population caused the working-age share to grow to nearly 70 percent by the turn of the century (2000). Over the next 50 years, the growth of the old-age share will cause the share of the working age population to fall sharply, to 54 percent of the population.

**Figure 20**

**Proportions of the Population by Age Group,  
Japan, 1920-2050**



Source: National Institute of Population and Social Security Research (2002a) Table 1, and (2002b) Table 1.

The share of the old-age population (aged 65 and over) began to increase rapidly after 1950. By 2000, it had exceeded 17 percent of the population. By 2025, it is projected to be about 29 percent of the population and by 2050 more than one person in three (36%) will be elderly.

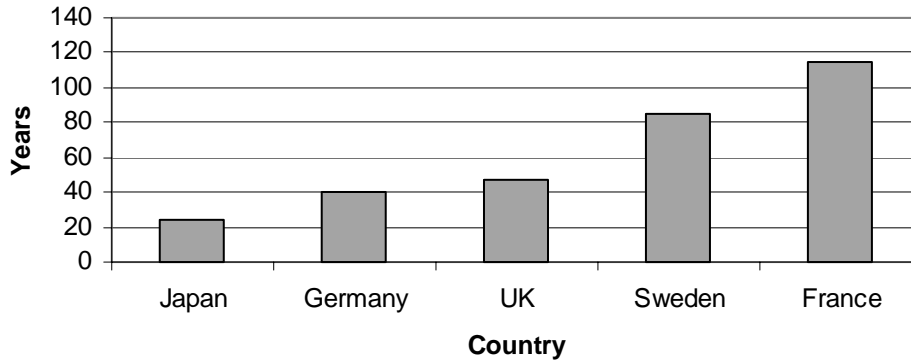
**B. The “Speed of Aging”**

The speed at which the old-age share of the population is increasing is particularly worrisome to Japanese policy makers. If population aging were to proceed slowly, they will have time to adjust to the new demographic realities. But if aging proceeds rapidly, they may not have sufficient time to formulate and implement the necessary new policies. As his measure of the “speed of aging”, Kono (2002) adopted the time period needed for the population over age 65 to move from 7 percent to 14 percent of the total”.<sup>20</sup> Figure 21 shows that the speed of aging was far greater in Japan than in other major OECD nations.

<sup>20</sup> The time required for the proportion 65 and over to double from 10 percent to 20 percent was projected to be 22 years, shorter than any other country. (Ogawa, 2000)

Figure 21

**Number of Years for the Percent of the Population  
65+ to Go From 7% to 14%,  
Various OECD Countries**



Source: Kono (2002), Table 1.

Kono (2002) used a decomposition technique to determine the relative importance of changes in fertility, mortality and age structure in the growth of the “elderly ratio”, the proportion of the population aged 65+. He found that over the period 1950-1985, the effect of fertility decline explains 2.38 percentage points of the increase in the share of the elderly in the total population while mortality decline explains only 1.93 percentage points (Table 3). Looking to the future, Kono noted that the medium variant of the 2002 projections of the Institute of Population Problems and Social Security Research (IPPSS) calls for an increase in the Japanese “elderly ratio” of 18.3 percentage points between 2000 and 2050. If the IPPSS had assumed no change in Japanese fertility or mortality during this half century, the elderly ratio would still have risen by 15 percentage points because future aging is now built into the Japanese age structure (Kono 2002, Table 4). Over the next half century, the small number of women that will enter the child bearing ages and the large number of middle aged persons who will join the ranks of the elderly almost guarantee a rapid aging of the Japanese population.

### C. The Aging of the Elderly Population

The elderly population (65+) itself is aging due to improving survival rates. In 1950, about 27 percent of the old age population was above the age of 75. In the year 2000, that figure had risen to almost 40 percent.<sup>21</sup> In fact, the older-old, the segment of

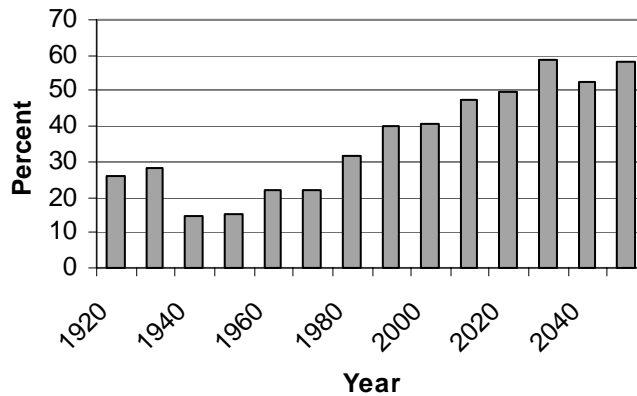
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<sup>21</sup> Kojima (1995) suggests that persons 75 years and over will constitute 14.5 percent of the population in 2025 and 16.4 percent in the mid 2050s. Ogawa and Retherford (1997) project that they will constitute 48 percent of the elderly population in 2018.

the population grew at the rate of 3.5 percent between 1995 and the year 2000.<sup>22</sup> The share of the old elderly (75 and older), that was less than 20 percent of the elderly in 1950, will be almost 60 percent of the elderly in 2050 (Figure 22).

**Figure 22**

**Proportion of the Elderly Population, Aged 75 or Older, Japan, 1920-2050**



Source: Kojima (1995), Table 2.

#### **D. Changes in Population by Age Group**

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 twist in Japan's age profile (Figure 23). The young age groups declined and the older age groups increased. Since the latter was greater than the former, the total population increased.

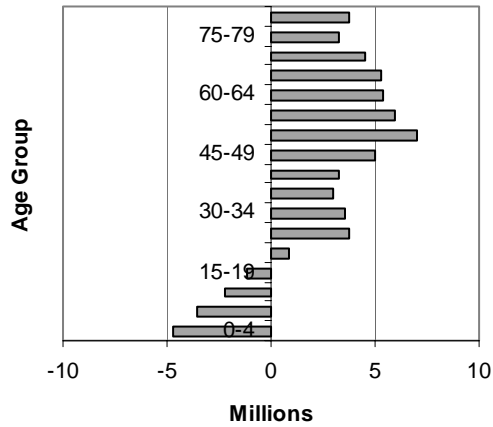
Projections for the first half of the 21<sup>st</sup> Century indicate that the twist in Japan's age profile will continue with a vengeance (Figure 24). Not only will the young age groups (the groups that would give birth to the children) decline, so also will the working age groups. Only the dependent elderly age groups will increase. It is the latter group that will place a heavy burden on the declining working age population.

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<sup>22</sup> The segment of the Japanese population aged 100 years and over is growing at 13 percent per annum (Ogawa and Retherford, 1997).

**Figure 23**

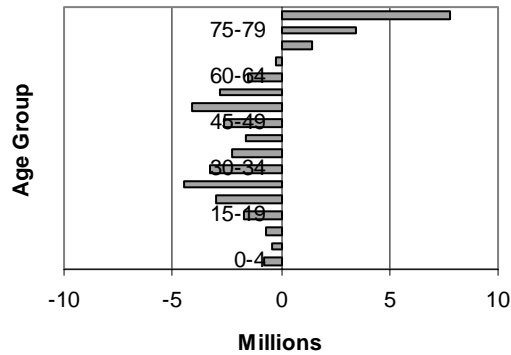
**Change in Total Population, By Age Groups, Japan, 1950-2000**



Source: United Nations (1997), page 490.

**Figure 24**

**Difference in Population By Age Groups, 2000-2050**



Source: United Nations (1997), page 4.

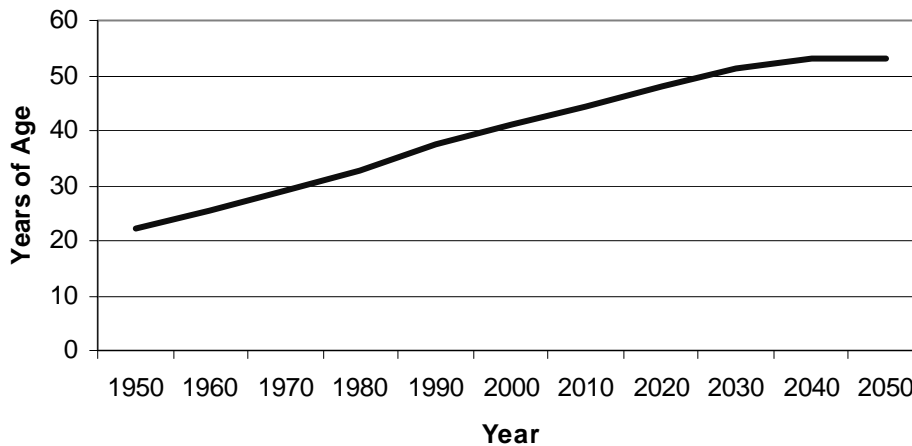
### **E. Increases in the Median Age**

A useful summary measure of demographic aging is the increase in the median age. 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 (Figure 25). By mid century, fully half the population of Japan will be over the age of 53 (United Nations 2002).



**Figure 25**

**Median Age, Japan, 1950-2050**



Source: United Nations (2002), World Population Prospects Database ), (<http://esa.un.org/unpp/>).

#### **IV. The Increasing Burden of Dependency**

Population aging in Japan has affected various demographic measures of the burden of dependency. "Dependency," a word loaded with negative implications, should be used with caution. To the extent that elderly persons work, or to the extent that they purchase goods and services by selling assets that they have accumulated by saving out of past labor income, they can hardly be considered "dependent." Nonetheless, it has become conventional in describing age distribution trends to examining a number of standard ratios designed to measure various aspects of "dependency."

##### **A. Dependency Ratios**

A demographic dependency ratio divides the dependent population by the working age population. The young age dependency ratio (YADR) places the young dependent population in the numerator. The old age dependency ratio (OADR) places the elderly dependent population in the numerator. The total dependency rate places both the young and the elderly populations in the numerator and thus is the sum of the YADR and OADR.<sup>23</sup>

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<sup>23</sup> The inverse of a "dependency ratio" is a "support ratio". While dependency ratios measure the average number of dependents that a working age person must support, support ratios measure how many working age persons are available, on average, to support a dependent. The burden of dependency can be equally well measured by dependency ratios or support ratios.

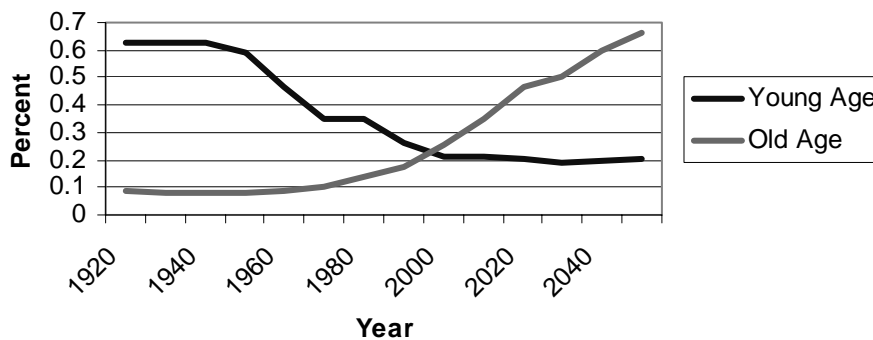
From 1920 through 1950 there were about 60 young-age (0-14) dependents for every 100 persons of working age (Figure 26). After that, the young-age dependency rate fell steadily. By 2000 it had reached a level of slightly more than 20 dependents for every 100 persons of working age. The young age dependency ratio is projected to remain at that level until mid-century.

From 1920 through 1970, there were no more than 10 old-age (65+) dependents for every 100 persons of working age). After that, the old-age dependency rate began to rise steadily reaching 25 elder dependents per 100 of working age by 2000. That figure is expected to rise rapidly to 66 dependents by 2050. Long run projections indicate that the old age dependency rate would peak in 2055 at about 67 percent of the working age population. After that the old age dependency ratio would gradually decline to about 60 percent in 2100. The total burden on the working age population, the sum of the young-age and old age dependency, is shown in Figure 27.

Between 1950 and 1970, Japan had enjoyed a demographic “Golden Age” in which the decline in young age dependency caused the total dependency rate to fall from about 65 dependents per 100 of working age to about 45 total dependents. It remained at that low level through the beginning of the 21<sup>st</sup> Century. But by 2010, when Japan’s Baby Boomers begin to retire, the growing old-age dependency rate will start to push up the total dependency rate and by 2050, Japan would have almost 85 dependents for every 100 of working age.

**Figure 26**

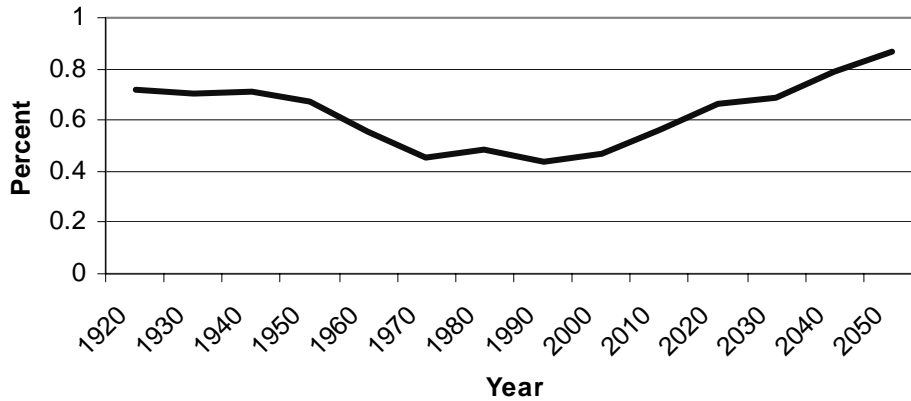
**Young-age and Old-Age Dependency Rates, Japan,  
1920-2050  
(percent of working age population)**



Source: National Institute of Population and Social Security Research (2002a) Table 1, and (2002b) Table 1.

Figure 27

**Total Dependency Rate, Japan, 1920-2050,  
(Percent of Working-Age Population)**



Source: National Institute of Population and Social Security Research (2002a) Table 1, and (2002b) Table 1.

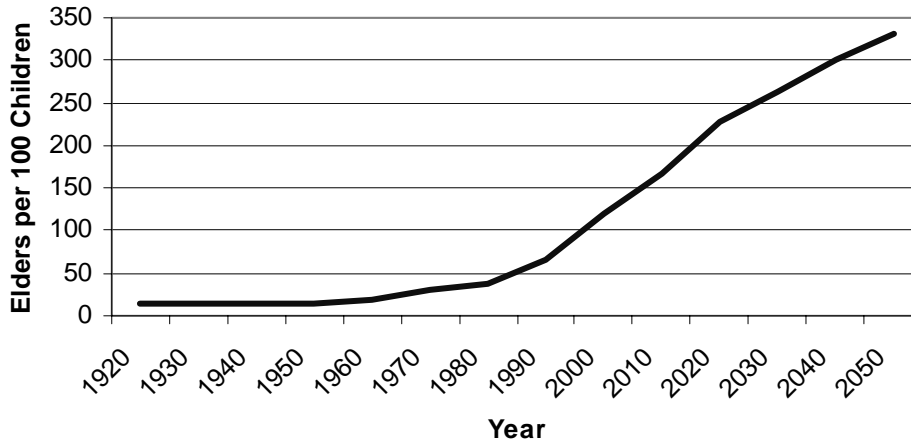
**B. Other Measures of Dependency**

A particularly sensitive measure of population aging is the ratio of the old-age population to the young age population, sometimes referred to as the "Elder-Child Ratio" and sometimes referred to as the "Index of Aging". Figure 28 shows that there were 50 or fewer elders for every 100 children through 1980. Afterwards the index moved up rapidly, reaching 120 by the year 2000. It is projected to reach almost 330 elderly per 100 children by 2050.

In order to assess the availability of non-working middle aged women to care for their elderly parents, Ogawa and Retherford (1997) introduced the concept of the familial support ratio, which they defined as the female population aged 40-59 divided by the population of both sexes aged 65 to 84. This ratio was about 175 percent in 1920 and remained above that level until about 1960 (Figure 29). It has since fallen to 109 percent in 1995 and was projected to fall to 60 percent in 2025. At that time there will only be one non-working middle-aged woman for every two elderly persons. Since such women are traditionally the family caregivers for the elderly, this would imply a significant decline in the availability of family-based care by the year 2025.

**Figure 28**

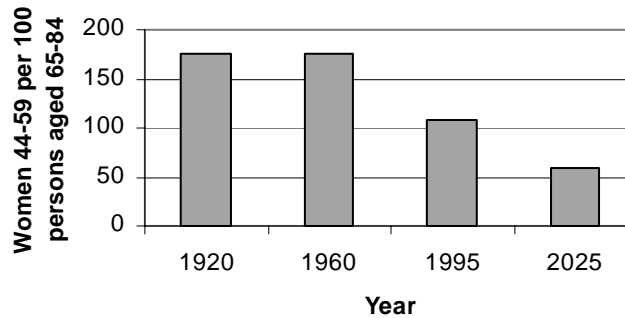
**Aged-Child Ratio (Aging Index), Japan, 1920-2050**



Source: National Institute of Population and Social Security Research (2002a) Table 1, and (2002b) Table 1.

**Figure 29**

**Familial Support Ratio, Japan, 1920-2025**



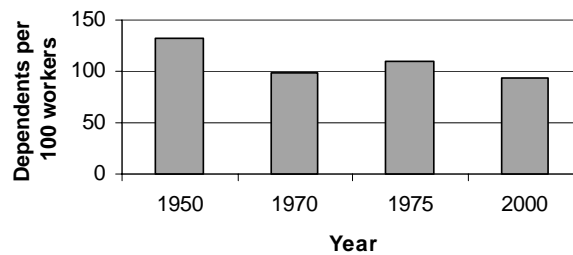
Source: Ogawa and Retherford (1997), pp. 62.

The economic dependency ratio is the ratio of the economically inactive population to the economically active population (per 100). According to Kojima (1995, page 202), there were about 133 economically inactive persons for every 100 economically active persons in 1950. This ratio fell to 99 in 1970, increased to 110 in

1975 and has remained at about that level until 1990. It is projected to fall to about 93 in 2000 after which it would begin to rise<sup>24</sup> (Figure 30).

**Figure 30**

**Economic Dependency Ratio, Japan, 1950-2000**



Source: Kojima (1995), page 202.

## V. Why Has Japanese Mortality Declined?

Population ageing is caused by declines in fertility (that are not matched by equivalent declines in infant mortality) as well as increases in life expectancy at older ages. This section will discuss the causes of the reductions in infant and adult mortality. The next section will examine the reasons for Japan’s low and falling fertility and assesses the likelihood that fertility may continue to decline.

As noted earlier, Japan has the highest life expectancy among the nations of the world. This has been one factor in the rapid aging of her population. Figure 31 shows the contributions of mortality reduction among the young (0-14) and among the elderly (65+) to the increase in life expectancy at birth of Japanese females between 1955 and 1989. In the early years of that period 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.

Goldman and Takahashi (1996) ascribe the rapid increase in Japanese life expectancy after World War II to improvements in living standards and environmental sanitation. Other contributing factors were better medical technology, new drugs for the treatment of infectious diseases, immunization programs, free screening for tuberculosis.

They ascribe the more recent reductions in mortality to Japan’s economic prosperity “which led to high average incomes, high educational attainment, low levels of unemployment” and a relatively equal distribution of income. In particular they credit the increased prosperity with causing the Japanese diet to shift from mainly rice and fish

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<sup>24</sup> The Employment Policy Research Committee of the Ministry of Labor makes projections of the Economic Dependency Rate.

to more animal products such as meat, milk and eggs, as well as more fruits and vegetables. They also credit the expansion of health care facilities and the increase in health care professionals, the national health insurance scheme and free medical care for the elderly.

### A. The Decline of Infant and Young-Age Mortality

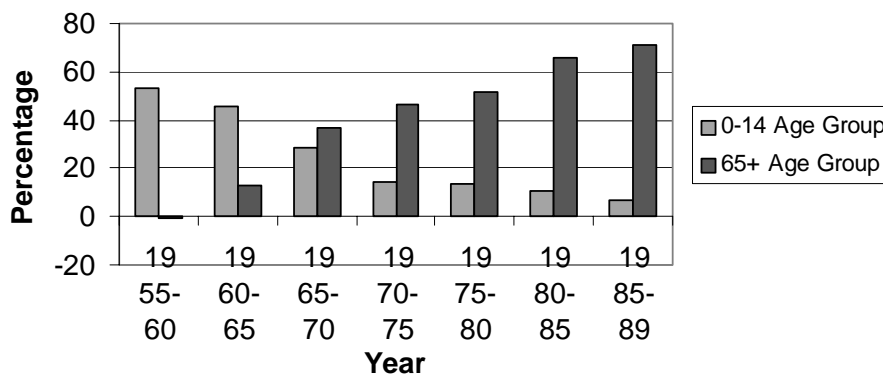
Japan's first revolution in mortality had dramatically reduced mortality among infants and children, reducing the Infant Mortality Rate (IMR) from 155 per thousand live births in 1900 to 3.2 per thousand live births in 2000.

Kono (1992, p. 314) also notes that the increases in life expectancy that occurred in the years after the Second World War were largely the result of a rapid decline in infant and child mortality, which had largely been caused by infections and parasitic diseases that were easily controlled by antibiotics and the techniques of modern medical science. Though the reduction of infant mortality contributed significantly to the increase in Japanese life expectancy, it temporarily slowed the pace of population aging.<sup>25</sup>

Yashiro (1997, p. 248) ascribes the sharp fall in mortality among children to improvements in nutrition and sanitary conditions.

**Figure 31**

**Percentage Contribution of Mortality Decline by Age Group to the Increase in Female Life Expectancy, Japan, 1955-1989**



Source: Kono (1992), Table 13.6.

<sup>25</sup> By increasing the number of surviving children, the decline in infant mortality made the population younger. Up until 1970, the reduced mortality among infants, children and youth made a major contribution to the lengthening of the average lifespan (Kojima, 1995, p. 201). After that time, mortality decline among the middle aged and elderly has made the greater major contribution to lengthening lifespans (Feeney, 1990, page 9).

Previous declines in infant mortality had offset the declines in fertility, leaving the age structure largely unchanged. But after 1955, infant mortality had fallen so low that there was little scope for further improvement. That alone would have resulted in an aging of the population. But there was more, a second mortality revolution.

## **B. The Decline of Old-Age Mortality**

As noted earlier, there had been almost no decline in mortality among Japanese aged 65 and over in the first half of the 20<sup>th</sup> Century. The second mortality revolution was directed at making lifestyle changes that reduced the causes of adult mortality. These efforts resulted in an increase in male life expectancy at age 65 from 10 years in 1947 to more than 17 years in 2000, an increase of more than 70 per cent. Female life expectancy at age 65 rose from 12 years in 1947 to more than 22 years in 2000, an increase of almost 80 per cent.<sup>26</sup> Furthermore, in 2000, almost 85 percent of the men and more than 90 percent of the women who had been born in 1935 had survived to age 65 and entered the elderly population. Henceforth, almost every child born in Japan could expect to live to age 65 and a good deal longer.

In 2000, Japan had largely conquered infectious diseases. The major cause of death were diseases of the elderly, such as malignant neoplasm (cancer), followed closely by heart disease and cerebrovascular disease. The percent of deaths among men and women due to each of these causes is shown in Figure 32. Figure 33 shows how the distribution of deaths due among these causes has changed in the last fifty years. Between 1950 and 2000 deaths due to malignant neoplasms have increased remorselessly (probably due to the interactive effects of smoking and aging). For dietary reasons, Japan has an unusually high incidence of deaths due to cerebrovascular disease.<sup>27</sup> But this has been falling since 1970, probably as a result of improved diet. The previous low fat diet of the Japanese “lowered the risks of heart disease but increased the risk of stroke”. The new Japanese diet may have been an important factor in causing the dramatic decline in the incidence of fatal strokes shown in Figure 33.<sup>28</sup> Other researchers, however, claim that reducing salt in the Japanese diet was the major contributor to the reduction of strokes.<sup>29</sup> Since 1990 there has also been a decline in the percent of deaths due to heart disease. But the proportion of deaths due to pneumonia is rising as the population ages.

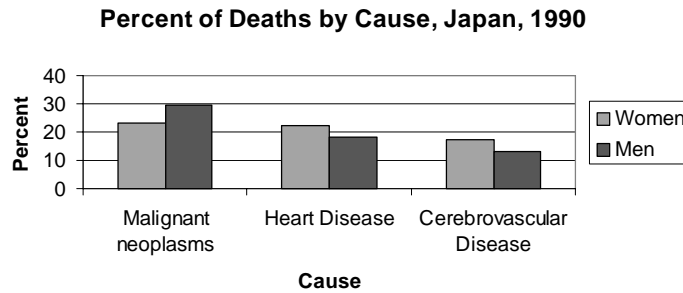
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<sup>27</sup> Japan still has one of the highest death rates from cerebrovascular disease among industrialized nations. (Mason and Ogawa, 2001, p. 56.)

<sup>28</sup> Atoh (1996) observed that in future mortality gains are likely to be slower because “Japan has already improved its cerebrovascular mortality almost to the West European level.”

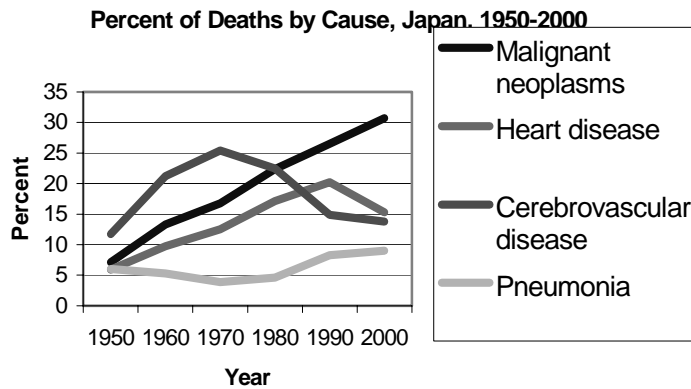
<sup>29</sup> As yet the consumption of fats has not been great enough to significantly increase the risk of heart disease.

**Figure 32**



Source: Wilmoth (1996, Table 13.2.).

**Figure 33**



Source: National Institute of Population and Social Security Research (2002a), Table 15.

Yashiro (1997, p. 248) attributed the increase in longevity of the aged to the rise in per capita income and the increased availability of medical services and especially the more equal distribution of income and medical services.

### **C. Long Range Mortality Projections**

There is considerable uncertainty as to the future course of mortality decline in Japan. Wilmoth (1996) presented four projections of life expectancy at birth and at age 65 by sex for Japan in the years 1995 through 2050. He used two different projection models. The model that extrapolates historical declines in age-specific death rates from all causes combined projects the greatest gains in life expectancy. The model that extrapolates age *and* cause-specific mortality rates projects the smallest gains in life expectancy. That is because while age-specific mortality is declining at all ages, mortality by certain causes of death (e.g. cancer and pneumonia) is increasing. Using the method based on extrapolating age-specific mortality by all causes combined,



Wilmoth projects that the life expectancy at birth of women will have increased by about 11 years between 1990 and 2050 (from 82.1 years to 93.7 years).<sup>30</sup> Using the method based on cause-specific mortality rate he projects an increase of only two years (from 82.1 years to 84.2 years). Extrapolating trends in mortality by cause of death he projects that life expectancy at birth would be about the same in 2050 as it was in 1990. Figure 34 shows a comparison of the two sets of projections for females. His best guess was that the life expectancy at birth would fall between these extremes gradually rising to about 79 years for men and 86 years for women.<sup>31</sup>

## VI. Why Has Japanese Fertility Declined?

If future increases in life expectancy are fairly modest, as Wilmoth (1996) expects (see discussion below), then the future share of the population over 65 will be more closely linked to fertility trends than improvements in mortality. Hence the key demographic issues surrounding population aging concern the reasons for fertility decline.

### A. Demographic Explanations for Fertility Decline

With the exception of but two years, the total fertility rate (TFR) in Japan has been falling since 1973.<sup>32</sup> That year marked a turning point in patterns of marriage and fertility. The average age at marriage, which had remained constant for many years, began a gradual rise from 24.2 years in 1970 to 26.3 years in 1995. Since the marital total fertility rate (MTFR) remained relatively constant at about 2.0 children per married woman, the result was a steady decline in the TFR.<sup>33</sup>

Ogawa and Retherford (1993a) suggest that Japanese fertility trends may be divided into three periods.<sup>34</sup> In the 1950s the TFR fell rapidly. It leveled off from 1957 to 1973 and then it fell rapidly again after 1973. These trends arose from a variety of demographic causes, such as an increase in celibacy, delayed marriage, an increase in childlessness within marriage, and a higher incidence of one-child families (p. 709).

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<sup>30</sup> In the case of males, he projects almost a 12-year increase in life expectancy based on declining total age-specific mortality (from 76.1 years to 87.9 years).

<sup>31</sup> A stationary population with such mortality would have 23 per cent of its population over age 65 and 4 percent over age 85 (page 284).

<sup>32</sup> A decomposition of changes in TFRs shows that these two anomalous years were largely caused by differences in the proportion females who were married, rather than by changes in the fertility rate of married women (Takahashi *et al.*, 1999, p. 87).

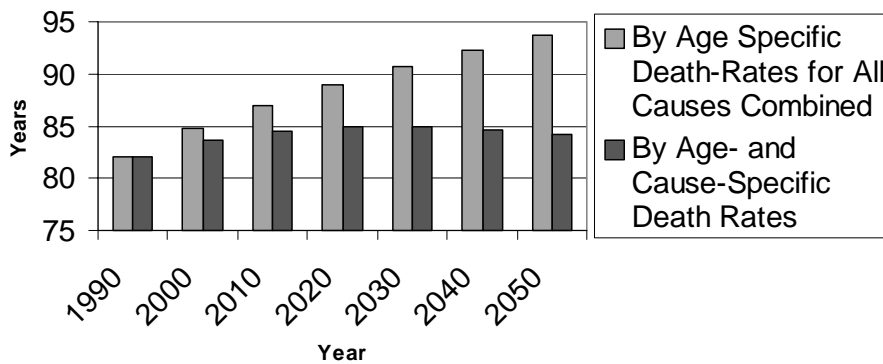
<sup>33</sup> Kazuo Tanaka (1992) shows that the TMFR has always been above 2.0 and began to rise in the late 1970s.

<sup>34</sup> Atoh (2001, p. 2) divides Japanese fertility trends after the mid-1970s into two periods. In the first period, 1973-1984, the TFR remained constant at about 1.8. In the second period (1985 to 1995) when “fertility continued dropping to record-breaking lows every year...”

They decomposed the changes in the TFR to assess the separate contributions made by the decline in the proportions married and the decline in marital fertility rates. In the 1950-1973 period, the main contributor to fertility decline was the decline in marital fertility (Figure 35). In the period 1973-1980, declines in the proportion married and declines in marital fertility made approximately equal contributions. In the period 1980-1990, the changes in the fertility of married women, would have actually caused an *increase* in the TFR. The sole cause of the declines in the TFR during this period was the decline in the proportions married, especially at younger ages.

**Figure 34**

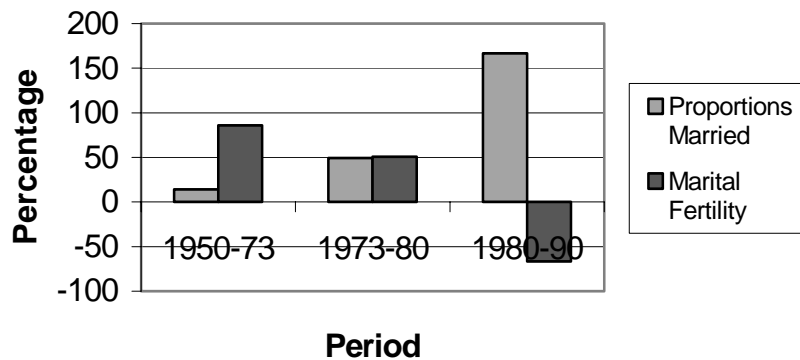
**Projected Female Life Expectancy at Birth, Japan 1990-2050**



Source: Wilmoth, John R (1996), “Mortality Projections for Japan”, in G. Caselli and A. Lopez (eds.), *Health and Mortality Among Elderly Populations*. Clarendon Press, Oxford, UK, Table 13.3.

**Figure 35**

**Percentage Contribution to the Change in the TFR, Japan, 1950-1990**



Source: Ogawa and Retherford (1993a), Table 5.

Like Ogawa and Retherford, Atoh (1992) decomposed the declines in the Japanese TFR after 1973 into two factors, changes in the proportion of the population currently married and changes in marital fertility. He also found that the fertility decline in Japan was almost entirely due to the decline in the proportion currently married.

Yashiro (1998, p. 132) also explains the post war fertility decline in Japan in terms of three periods. He suggests that the sharp drop in the birth rate toward the end of the 1950s was due to a drastic decrease in families with more than four children. The total fertility rate remained stable at about the replacement level (2.1) in the 1960s. He also concludes that the continuous decline in the birthrate since then is a result of the tendency of young people not to marry.

These analyses suggest that socioeconomic changes affecting the propensity of women to marry and divorce will have a major effect on the future course of Japanese fertility. Put differently, Japanese married couples still want children, but in recent years a diminishing proportion of women in their child-bearing years wish to be married. While increases in rates of marital dissolution have been observed, the main causes of this phenomenon are delayed age at first marriage and the rise in the number of women never married.

This section will discuss four demographic factors that may have contributed to the reduction of marriage and/or fertility in Japan. They are (1) the use of contraception, (2) the increasing proportion of males who are eldest sons, (3) the increasing prevalence of divorce and (4) the increasing proportion of the population residing in urban areas.

#### **a. *The Use of Contraception***

In Japan, as elsewhere, a major proximate determinant of marital fertility has been the use of contraception (see Figure 36). Following a rapid increase between 1950 and 1970, the proportion of married women currently using contraception has remained below 60 percent. This is a low figure in relation to other developed countries, and it may explain why there has been no significant decline in marital fertility in Japan in recent decades.<sup>35</sup> Though the decline in Japanese fertility cannot be attributed to increases in the use of contraception, an improvement in available contraceptives, such as the recent approval of the contraceptive pill, might increase contraceptive usage significantly. The result could be a large fall in marital fertility and an acceleration of population aging.

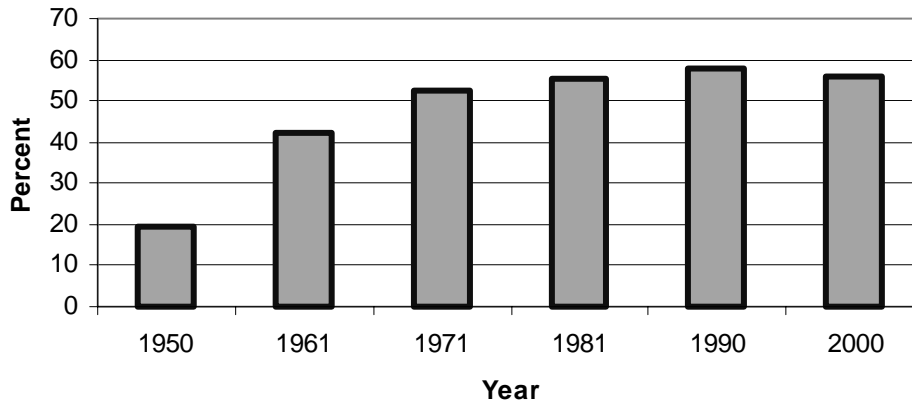
Atoh (2001, p. 3) also argues that contraception played a negligible role in the decline of Japanese fertility since the mid-1970s. He pointed out that there were no significant changes in the laws relating to fertility control or in the prevalence of contraceptive methods.

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<sup>35</sup> Another explanation for the relatively low contraceptive utilization in conjunction with low birth rate is Japan's relatively high abortion rate. Ogawa and Retherford (1993a, p. 719) estimate that about 20 percent of births in Japan between 1981 and 1982 were the result of accidental conceptions but Atoh claims that the number of "unwanted" births was very low.

Figure 36

**Percent of Women, Aged 15-49, Currently Using Contraceptives, Japan, 1950-2000**



Source: National Institute of Population and Social Security Research (2002a), Table 11.

**b. The Increasing Proportion of Eldest Sons**

One factor discouraging women from marrying is a direct consequence of previous fertility declines. Because Japanese families are smaller the proportion of sons that were eldest sons went from 40 percent in 1957 to 72 percent in 1998 (Retherford, Ogawa and Matsukura, 2001, p. 87).<sup>36</sup> If a woman marries one of those sons marry, she will be expected to bear the burden of caring for his aged parents. This is not always an attractive proposition, particularly for educated women interested in lifetime careers.

**c. The Increased Likelihood of Divorce**

One reason why Japanese women are delaying or avoiding marriage is the steady upward trend in the divorce rate in Japan (Figure 13). (The total divorce rate more than doubled between 1960 and 1995.) Among the possible reasons for the increasing frequency of divorce is the growing proportion of the population living in urban areas. Other possible reasons include the increase in the proportion of women working as paid employees, the increase in the average educational levels of women and the decline in the sex differential in average wages. In addition, the pension reform of

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<sup>36</sup> However, during this period the proportion of eldest sons who resided with their parents fell from 65 to 25 percent. As a result, in 1998, the co-residence rate for eldest sons (25%) was only marginally greater than that of other sons (15%). More than half of those responding to a 1988 Family Survey of married women who were co-residing said they were doing so because their husbands were eldest sons. Only 5 percent said they did so with the expectation that the parents would assist in taking care of the children

1985, which provided that the divorced spouse of an employee is entitled to receive the basic old-age benefits may have eliminated a significant barrier to divorce.

The increasing prevalence of divorce may also be due to its increased acceptability among young people. The National Opinion Survey of the Prime Minister's Office asked "Do you think it is allowable to get divorced if you are not satisfied with your spouse?". In 1972, only 20 percent of respondents thought it was allowable. By 1992 that figure had increased to 40 percent (Atoh, 2001, p. 15).

Surveys indicate that Japanese women who have contemplated divorce are much more likely to work as 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 employment, a factor closely associated with delayed marriage and thus lower fertility.

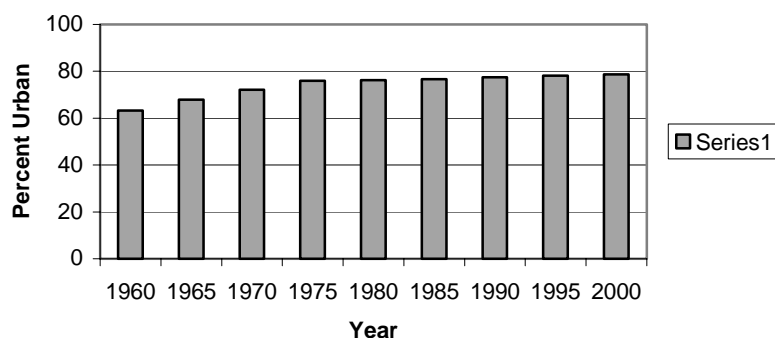
#### **d. Increasing Urbanization**

It has been hypothesized that the urbanization of the Japanese population played an important role in the decline in marriage and hence fertility in Japan. Between 1960 and 2000, the proportion of the population living in urban places gradually increased from 63 to 79 percent (Figure 37). Figure 38 shows that though TFRs are higher for rural than urban women, the differences in TFR are now quite small. Hence, the further urbanization of population may have only a small negative direct effect on fertility.

Perhaps the most important reason that rural-urban differences in fertility are so small is because rural-urban differences in singulate mean age marriage have become very small (Figure 39). Thus the continuing urbanization of Japan is not likely to play a significant role in the rising age at marriage and hence, declining fertility.

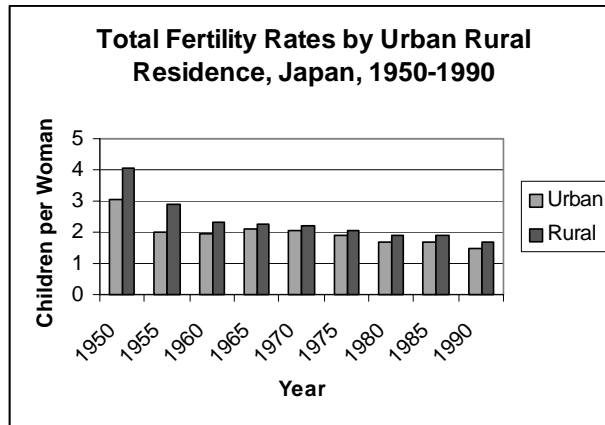
**Figure 37**

**Proportion of the Population Residing in Urban Areas, Japan, 1960-2000**



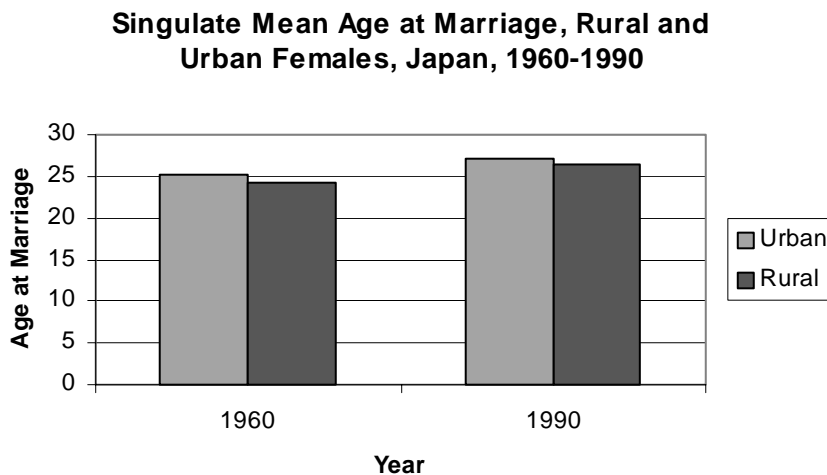
Source: National Institute of Population and Social Security Research (2002a), Table 25

**Figure 38**



Source: Ogawa, and Retherford (1993a), Table 3.

**Figure 39**



Source: Retherford, Ogawa and Matsukura (2001), Table 2.

## **B. Socioeconomic Explanations for Fertility Decline**

In Japan almost all births take place within the context of marriage. In such a society, fertility may decline either because of a decline in marital fertility or a decline in the proportion of women who are married, or some combination of the two. In the case of Japan, there has been no significant decline in age-specific marital fertility in the last thirty years. Fertility decline can be almost totally explained by declines in the proportion of women of childbearing age who are married. Therefore, this section will begin with a discussion of the factors that have contributed to the increase in the age of marriage and the increase in the proportion never married. It will then examine some factors that may be preventing a rise in marital age-specific fertility rates.

Among the major socioeconomic explanations for why women are delaying marriage, and hence having fewer children, are increased opportunities for higher education and improved employment opportunities within a social system that makes it difficult for women to combine childrearing (and hence, marriage) with full-time work.

Even though the proportion married is declining, marital fertility might well be rising in Japan were it not for a number of factors that mitigate against having many children. Among those factors are: the increase in the educational costs, changes in the tax code and social security regulations, the increasing opportunity cost of children, and changing attitudes about the value of children.<sup>37</sup> Among the other factors to be considered are the declining benefits associated with marriage and institutional changes (both those that have occurred and those that have not yet occurred).

### **a. Education of Women**

Increased education of women is perhaps the most important single cause of the rapidly increasing age of marriage and the rapidly increasing incidence of lifetime female celibacy in Japan. Not only do women delay marriage in order to acquire education, they are also more likely to delay marriage in order to enjoy the employment opportunities that increased education provides.

In a cross section analysis, Raymo (1998, p. 1032) found that the proportion of university-educated women in a prefecture had a significant negative effect on the proportion of women at ages 25-29 and 30-34 who had ever married.<sup>38</sup> Thus, education seems to be responsible for reducing marriage rates in the prime childbearing years.<sup>39</sup>

In 1975, the enrollment rates in either a junior college or university were 43 percent for men and only 32 percent for women. By 1995, this picture had been reversed. The enrollment rate for women was 48 percent versus 43 percent for men (Figure 40).<sup>40</sup>

If we consider only university-level education, in 1995, 23 percent of females entered the universities compared with 41 percent of males (Yashiro 1998, p. 133). However, Atoh (2001, p. 3) reports that the gap between boys and girls entering four-year universities is also narrowing. Furthermore, more females than males are majoring in fields that offer better paying jobs, such as law, economics, science and engineering.”

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<sup>37</sup> Certain government policies discourage full time labor force participation and thus help promote high marital fertility. Approximately 70 percent of women in part-time jobs earn less than the 1.03 million yen maximum above which they would have to pay taxes at a higher rate and they would be dependents on their husband's tax form. Elimination of this tax rule might further decrease fertility by promoting full time employment among women (Mason and Ogawa, 2001, p. 58).

<sup>38</sup> His analysis used pooled prefecture data for five census years between 1970 and 1990.

<sup>39</sup> Since marriage is closely linked with motherhood in Japan, many women who have postponed marriage beyond the prime years for childbearing may not marry at all. (Raymo, 1998, p. 1032).

<sup>40</sup> Raymo (1998, p. 1028) suggests that the proportion of female university graduates is the best measure of female advances in education. He argues that junior colleges serve primarily as preparation for the marriage market, rather than the labor market.

According to Yashiro education plays a central role in a “lower fertility cycle.” In the past, when families had many children, the sons were sent to university and the daughters received a junior college education at most. Now that there are generally only two children in a household, both of them are likely to receive a university education, whether they are boys or girls. Thus lower fertility encourages female education, which in turn lowers fertility further.

There is some evidence that increased education of women may not be as significant a cause of fertility decline as it once was. Prior to 1984, the completed cohort fertility of women aged 40-49 was negatively associated with the level of education (Figure 41). Though there has been a convergence of fertility behavior by level of education,<sup>41</sup> it is not inconsistent with the analysis of Ogawa and Retherford (1993a, p. 725) who 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.

A 1990 Ministry of Health study found 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. Retherford, Ogawa and Matsukura (2001) find that the level of education is the most important determinant of the singulate mean age of marriage. Figure 42 shows that for university-educated women, the singulate mean age of marriage was 3.5 years higher than for women with only a junior high school education. No such differential exists in the case of men. In Japan men prefer women who are less educated than they are; while women prefer men who are better educated than they are. That puts poorly educated men and well-educated women at a distinct disadvantage in the marriage market (Retherford, Ogawa and Matsukura, 2001, p. 72).

University-educated women are at a distinct disadvantage in attracting suitable marriage partners because they must compete with junior college graduates who also seek husbands among college educated men. (Few men attend junior colleges.) However, as noted above, Japanese college educated men prefer to marry down educationally and thus prefer junior college graduates (Raymo, 1998, p. 1028). Retherford, Ogawa and Matsukura (2001, p. 72) refer to this phenomenon as an education-induced “marriage squeeze” and predict that it will grow even more acute as women catch up to men in their educational attainments.

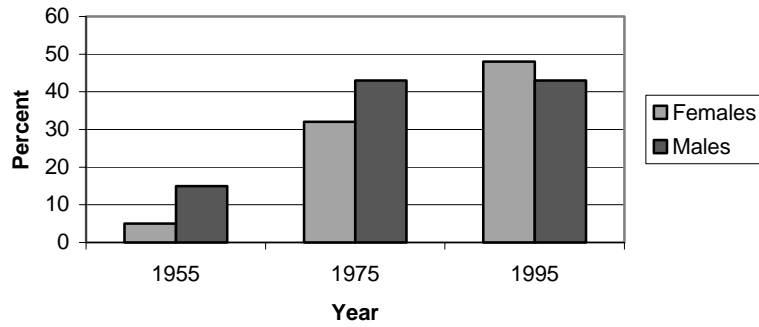
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<sup>41</sup> This data refers to women aged 40 and over in 1992 and therefore may not be reflective of the marital and fertility behavior of younger cohorts of Japanese women who have received tertiary education.



**Figure 40**

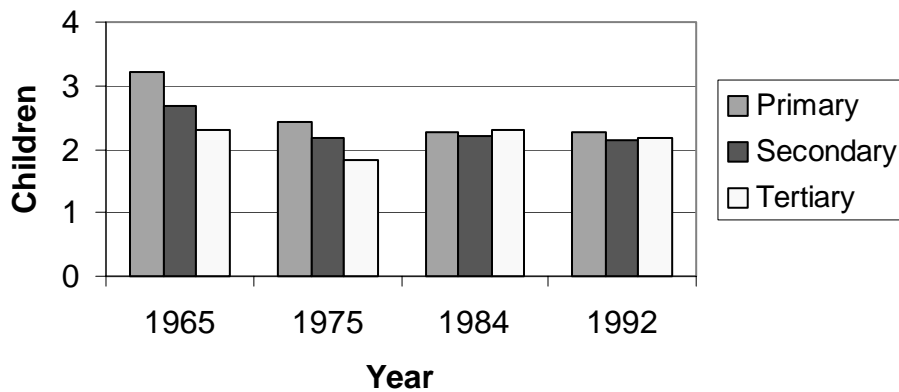
**Enrollment Rates in Higher Education, Japan, 1955-1995**



Source: Ogawa and Clark (1995), p. 312; and Mason and Ogawa 2001, p. 54.

**Figure 41**

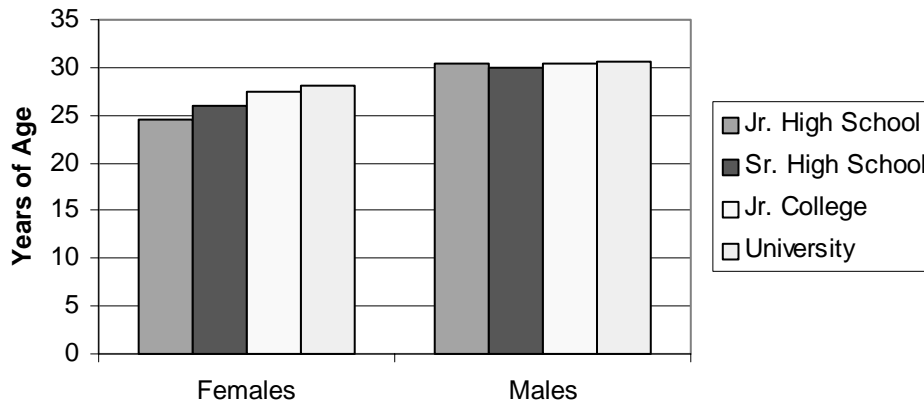
**Children Ever- Born to Women Aged 40-49, Japan, 1965-1992**



Source: Ogawa, and. Retherford (1993a), Table 3.

Figure 42

**Singulate Mean Age of Marriage, By Education Level, Japan, 1990**



Source: Retherford, Ogawa and Matsukura (2001), Table 1.

**b. Increased Labor Force Participation of Women**

Numerous time series and cross section studies of Japan show an inverse relationship between fertility and labor force participation. This reflects the effect of labor force participation on a woman's decision to delay or forgo marriage.<sup>42</sup> The overall labor force participation rate of women has been relatively constant at about 50 percent since 1960 (Figure 43). There has been a steady reduction in the labor force participation of women aged 15-19, because they were staying in school longer. However, the sharp drop in labor force participation of school-age girls (age 15-19) was more than offset by a dramatic increase in the labor force participation by women in the prime child-bearing age (25-29) and an increase in the participation of women aged 30-34 as well (Figure 44).

There was a shift in the nature of women's employment as well. Figure 45 illustrates that female employment has shifted from farming and unpaid family labor to paid employment outside the home. The proportion of women aged 15 and over working as paid employees increased from 22 to 35 percent of total female employment over the three decades. The proportion of married women aged 20-54 working for wages outside the home increased from 13 percent in 1963 to 42 percent in 1990.

Perhaps of greater importance to the future of Japanese fertility is the nature of the labor force participation of single women in the prime child bearing ages (25-29). In

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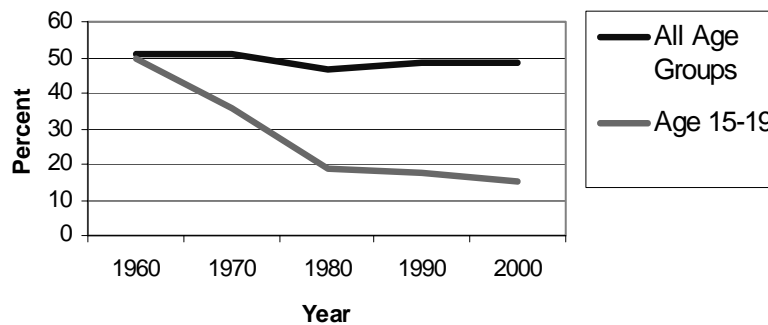
<sup>42</sup> Ogawa, Retherford and Matsukura (2001, p. 77) observe that the similarity between the shape of trends in labor force participation rates and the trends in age at marriage suggest that labor force trends were the main force driving up the age at marriage among Japanese women.

1972 about 80 percent of them were participating in paid employment. By 1999, that figure had reached 92 percent (Figure 46). It is just such employment that has the greatest effect on marriage and, hence, on fertility (Ogawa and Retherford 1993a).

A study done by Yashiro, Oshio and Ii (1997) analyzed the effect the availability of childcare services on the likelihood that a woman would participate in the labor force, either as a family worker, self-employed worker or paid employee. They found that only in the households of women employed by others is there “a tradeoff between continued employment and childcare”. Put differently, the structural shift in female employment away from family and self-employed work has increased the conflict between women’s work and childbearing.

**Figure 43**

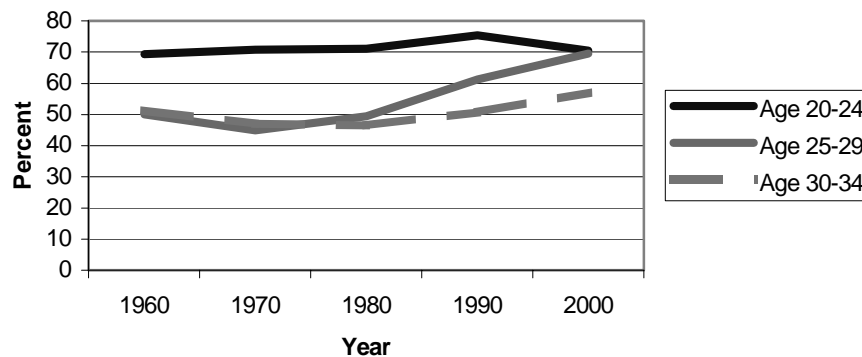
**Female Labor Force Participation Rates, Japan, 1960-2000**



Source: National Institute of Population and Social Security Research (2002a), Table 18.

**Figure 44**

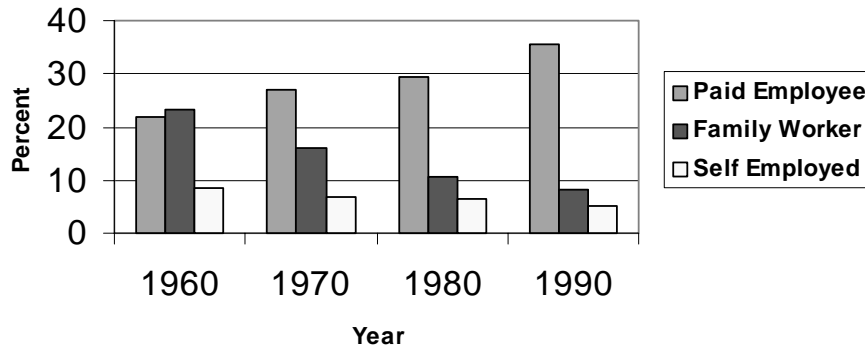
**Labor Force Participation Rates, Females, By Age-Group, Japan, 1960-2000**



Source: National Institute of Population and Social Security Research (2002a) Table 18.

**Figure 45**

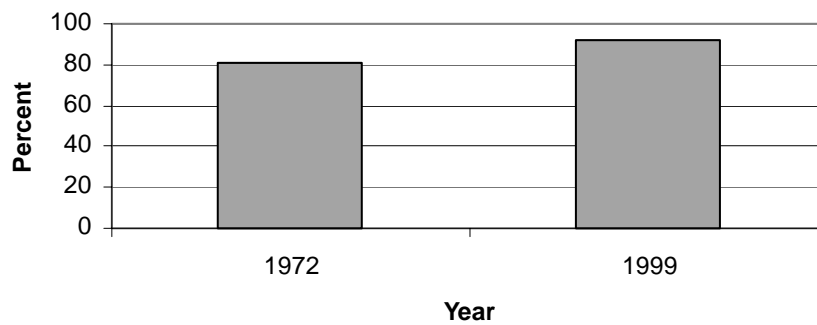
**Female Labor force Participation Rates By Type of Employment, Japan, 1960-1990**



Source: Ogawa,, and Clark (1995),Table 2.

**Figure 46**

**Proportion of Single Women, Aged 25-29, Participating in Paid Employment, Japan, 1972 and 1999**



Source: Retherford, Ogawa and Matsukura (2001), p. 81.

Since there has been no decline in marital fertility in Japan, a decision to marry is effectively a decision to have children, therefore anything that reduces the demand for children, also reduces the desire of young Japanese men and women to enter into matrimony. The experience of countries such as Sweden shows that high fertility and high female labor force participation can go hand in hand if alternative arrangements for childcare are available.

A study done by Yashiro, Oshio and Ii (1997) assessed the determinants of the number of children a woman would have. The authors found that fertility was negatively related to the woman's own-income, because it represented an opportunity

cost; positively related to household income, which could be used to pay child care expenses, and positively related to the presence of a healthy elderly woman in the household. They also found that, as the number of children increased the presence of an elderly woman living in the house became more important in maintaining a woman in employment.

There is an interaction between increased education and increased employment outside the home. As women have acquired more education, their salaries have increased, which in turn raises the opportunity cost of withdrawing from the labor force to rear children. This is especially true for women under 30, for whom the ratio of their wages to men's wages has risen from 70 percent in 1970 to 86 percent in 1995 (Mason and Ogawa, 2001, p. 54).

An important distinction among paid employees in Japan is between full-time and part-time status. In 1990 the average hourly wage for part-time paid employees was only about half that of full-time paid employees. They do not have a guarantee of lifetime employment, and few receive annual bonuses. Part-time employees get virtually no returns in pay from completing high school or college and their gains from years of work experience are much less than full-time employees.

Nevertheless, the option of taking part-time employment is especially important for married women. To a great extent, the decision by a Japanese woman to marry is equivalent to a decision to move from full time employment to part time employment, either immediately or after the birth of her first child.<sup>43</sup> About 90 percent of single women are full-time employees whereas only about 62 percent of employed married women are working full time.<sup>44</sup> (According to Mason and Ogawa (2001, p. 58) slightly less than half of married women worked full time in 1998.) Between 1979 and 1990 the percentage of married women aged 16-49 engaged in part-time work doubled from 11 to 22 percent. During that period the proportion in full-time jobs increased from 16 to 20 percent (Figure 47).

The two factors that are most important in determining whether a woman will seek full-time employment when she enters the labor market are the expected wage rate and the woman's educational background. An ILO report indicated that in 1986, the male-female wage gap was much larger in Japan than in most OECD countries (Figure 48). However, the wage gap between men and women has narrowed considerably, especially for women aged 20-24 and 25-29, the prime child bearing ages (Yashiro 1998). Figure 49 shows that in each age category, the wage-gap has narrowed

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<sup>43</sup> In 1965, 80 percent of women quit their jobs when they married by 1998 this figure had fallen to 38 percent. However, the proportion of women who quit when they have their first child has risen from 29 to 54 percent (Retherford, Ogawa and Matsukura, 2001, p. 82).

<sup>44</sup> One factor holding back married women from full-time employment is the tax and social security system, which is strongly biased towards full-time housewives (Yashiro 1998). Approximately 70 percent of married women in part-time jobs earn less than the amount that is the income tax threshold.<sup>44</sup> If they were to earn more, they would be required to pay income tax on their earnings and they would lose their dependent status in their husband's payroll and social security plans. Removal of these disincentives would encourage a larger proportion of married women (especially women with more formal education) to enter full-time employment.

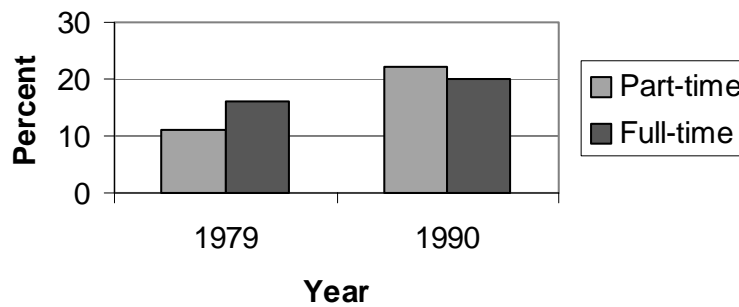
significantly since 1970.<sup>45</sup> It is likely that the male-female wage gap will continue to narrow. Thus, it is likely that an increasing number of women will delay or forgo marriage in order to engage in full time employment.

Ogawa and Clark (1995, p. 307) found that education had a very significant effect on the expected wage of women in full time employment, The ratio of women with some college education to men with some college education has increased substantially since 1975 and this ratio will continue to move in favor of women. This should serve to narrow the wage gap between men and women.

Lengthening job tenure, partly the result of delayed entry into marriage, will also help to close the gap in full-time employment. In 1971, on average females had held their current job for 5.6 years. This had increased to 7.3 years in 1990. In part this may be due to the 1986, Equal Opportunity Law, which significantly increased opportunities for women in large companies.

In 1992, Japan implemented a program that gave employed mothers a 1-year child-rearing leave. Although this was initially unpaid leave, it would allow women to return to the same job and status that they left on account of childbirth. Thus she would retain her job tenure. In 1995, the scheme was improved so that mothers on parental leave would receive 25 percent of their salary. However few women availed themselves of this opportunity because of the pressures from peers and supervisors (Ogawa, 2000).

**Figure 47**  
**Percentage of Married Women by Type of Employment, Japan, 1979-1990**



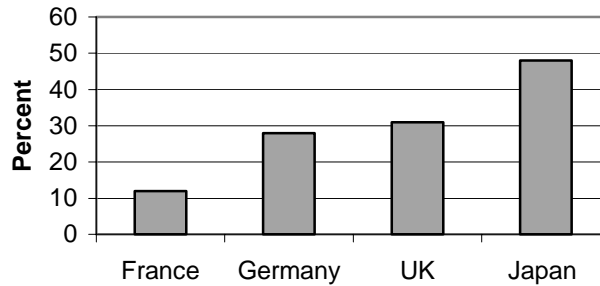
Source: Ogawa and Ermisch, 1996 pp. 678.

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<sup>45</sup> Atoh (2001, p. 4) reports that by 1994 the wages of women aged 20-29 had reached almost 90 percent of men's wages.

**Figure 48**

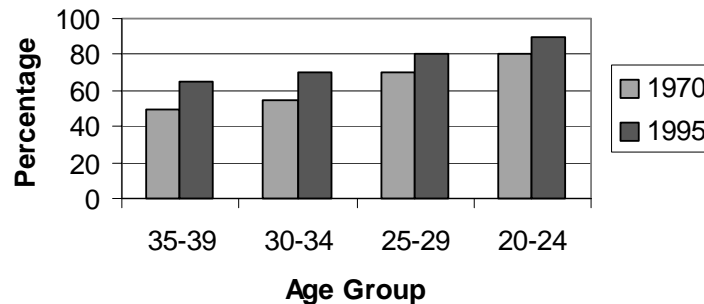
**Male-Female Wage Differential,  
Selected Countries, 1986**



Source: Ogawa,, and. Clark (1995), p. 296 and 311.

**Figure 49**

**Female Wages as a Percent of Male  
Wages by Age Group, Japan, 1970-1995**



Source: Yashiro (1998).

As increased education and improved earning prospects attract more women into full- as opposed to part-time employment, downward pressure on marriage rates and hence, fertility is likely. 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, p. 684), it imposes significant opportunity costs on women in full-time employment. Ogawa and Clark (1995) calculated that the lost work experience associated with each additional pre- school child would lower a woman's annual earnings by 13 percent. Furthermore, each additional child age 6 to 14 would lower her annual earnings by another 8 per cent.

A 1997 White Paper on People's Life by the Economic Planning Agency<sup>46</sup> 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 or about 190,000 Euros. However, her shift to part-time status would then pose an additional loss of 44 million yen, or 400,000 Euros, over her working life. If the opportunity cost of leaving full-time employment to bear a child is almost a half million Euros for a graduate of a junior college, it would be much more for a university graduate.

Promotion systems and wage scales that are closely linked to a worker's years of service also increase the opportunity cost of child rearing (Yashiro 1998). Other practices that make it difficult for women to combine motherhood with full-time employment include "chronic overtime work" (Yashiro 1998) and frequent personnel relocations. Those workers who resist relocation are considered to be "secondary players" in the firm. Hence, 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. 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 because wages and positions are granted on the basis of the length of tenure with the firm.

It is very difficult for women to work and raise their children because of the shortage of day care and other supporting facilities (Endo and Katayama, 1998, p. 242). A study by Nakamura and Ueda (1997)<sup>47</sup> 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. Yashiro (1998) suggests that in order to increase marital fertility, the opportunity cost of child rearing must be reduced. One way of doing this is to improve child-care facilities for working women.<sup>48</sup>

In order to increase marital fertility of working women, the Japanese government implemented a childcare leave program for working mothers and the "Angel Plan" in 1994, which was to greatly increase child care facilities (Mason and Ogawa 2001, p. 55). The provisions of the Angel Plan include (a) providing support for both child-rearing and work, (b) providing support for child-rearing at home, (c) improving housing conditions and living environments (d) making education less competitive and (e) reducing child rearing costs. One of the major programs under the Angel Plan was to create more day care centers. The shortage of such centers is particularly acute in urban areas. As a result of these shortages more than 32,000 preschoolers are wait listed for admission (Ogawa, 2000).

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<sup>46</sup> Cited by Yashiro (1998), page 136.

<sup>47</sup> Cited by Yashiro (1998), page 138.

<sup>48</sup> Yashiro cautions that this does not mean simply upgrading the existing public day care centers, which are aimed at low-income families. He proposes public support for child-care facilities that would operate in the private sector.



Married 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. Ogawa and Ermisch (1996, p. 694) 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 co-residing. Yashiro, Oshio and Ii (1997) also found that, as the number of children increased the presence of an elderly woman living in the house became more important in maintaining a woman in employment. Thus, the continuing decline in the three-generation family is likely to further reduce the attractiveness of marriage because the co-resident parents often provided the childcare that the wife needed in order to accept full time employment.

When Japanese women consider whether or not to marry, they realize that if they do, in middle age they may be forced to give up full time employment to care for an elderly parent. Over the next 35 years, the number of elderly in Japan who are frail, demented or bedridden will increase by a factor of three (Gibson, 1993). At the same time, there will be fewer middle-aged women to be caregivers. So the probability that a married woman may have to give up full time employment to care for an elderly parent-in-law is increasing. Surely this must give pause to single women who are contemplating marriage.

### **c. *The Decline in the Value of Children and Increase in Costs***

Marital fertility has not declined in Japan. In fact, it might have risen in recent years were it not for a decline in the value of children as potential old age support and as direct sources of utility. There have been regular surveys of Japanese women to measure their expectations about old-age support from their own children. They were asked, "Are you planning to depend on your children in old age?" In 1955, 65 percent of respondents answered affirmatively. In 1996 only 13 percent of respondents did so (Figure 50).<sup>49</sup>

The women that have lower expectations of old age support are those who are educated, urban, not living with parents and with higher incomes (Ogawa and Retherford 1993b, p. 594). As we move into the 21<sup>st</sup> Century, all three groups will account for an increasing share of the population. There is every reason to believe that as Japanese women become more educated, more urban, less likely to co-reside with parents and wealthier, the proportion who may wish to marry and have children to assure their old age support should continue to decline. In the future these women will look to the development of public pension systems, insurance plans and other financial institutions for financial security in old age (Ogawa, 2000).

Perhaps an even more telling explanation for the failure of fertility to rise among married women is the fact that many claim to get little psychic satisfaction out of the process of child rearing. The proportion of women with children aged 0 to 14 who

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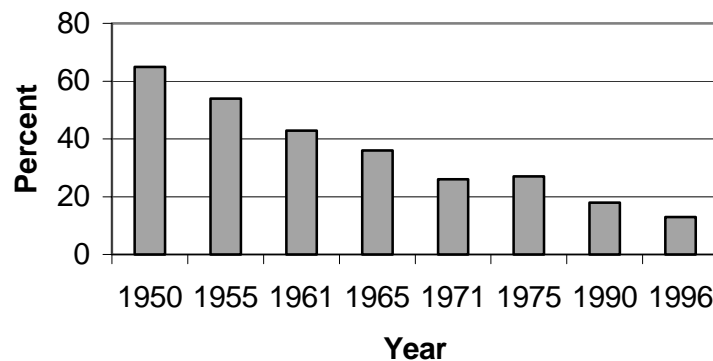
<sup>49</sup> The pessimistic expectations of parents about being able to depend on old-age support from their children are well justified. A survey by the Youth Section of the Japanese Prime Minister's Office found that the percentage of respondents who replied "I will support my parents by all means" fell from 35 percent in 1982 to 23 percent in 1992. (Atoh, 2001, p. 11).

report that they feel that child rearing is enjoyable has fallen to only 9 percent in 1990.<sup>50</sup> As the value of children as a source of old-age support has declined, the direct and opportunity costs associated with childrearing have increased. When asked what was the most difficult aspect of raising children, the most frequent item mentioned is costs. Among the most significant of the former is the cost of education, especially the costs of activities such as private tutoring, special after-classes schools (juku) and music lessons.<sup>51</sup>

Though it does not help with the costs of school-age children, the government does provide monthly allowances for children for the first three years of life. After, June of 2000, the allowance, which is 5,000 yen for the first two children and 10,000 yen for each subsequent child will be paid until the children enter preschool (Ogawa, 2000). But those allowances are hardly sufficient to offset the financial and opportunity costs of having a child.

**Figure 50**

**Percent of Women Expecting Old Age Support From Their Children, Japan, 1950-1996**



Source: Ogawa, and. Retherford (1993b) Table 2, and Mason and Ogawa (2001, p. 52).

**d. Declines in the Benefits of Marriage to Women**

Until the 1980s there was strong disapproval of premarital sex in Japan. Hence, a major benefit of marriage was that it provided a socially approved context in which young Japanese women could enjoy sexual relations. Since the mid 1970s, however, Japanese youth has become more accepting sex outside of marriage. According to the

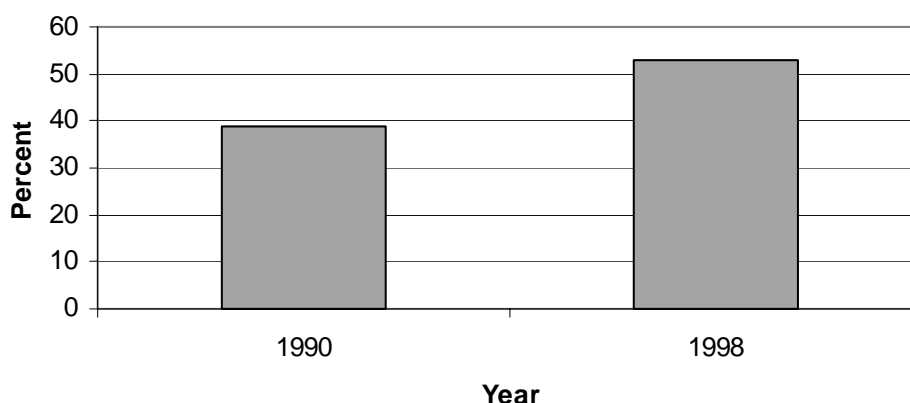
<sup>50</sup> The corresponding percentages in most other industrialized nations range between 40 and 70 per cent (Ogawa and Ermisch. 1994, p. 211).

<sup>51</sup> According to Ogawa (2000) the proportion of women who mentioned the cost of education as one of the difficulties in rearing children increased from 42 percent in 1981 to 66 percent in 1996.

World Youth attitudinal survey taken by the Prime Minister’s Office, the number of respondents who said premarital sexual relations should be avoided in any situation fell from 27 percent in 1977 to only 5 percent in 1992 (Atoh, 2001, p. 15). Continue with next paragraph. The rapidity with which unmarried women are taking advantage of these emerging opportunities may be inferred from the fact that the proportion of single women aged 16 or over who reported that they were currently using contraception increased from 39 percent in 1990 to 53 percent in 1998<sup>52</sup> (Retherford, Ogawa and Matsukura, 2001, p. 88)<sup>53</sup> (Figure 51).

**Figure 51**

**Proportion of Single Women Currently Using Contraceptives, Japan, 1990 and 1998**



Source: Retherford, Ogawa and Matsukura, 2001, p. 88.

A potential benefit of marriage is that it allows young people to reduce per capita housing and food costs by taking advantage of household economies of scale. For many young Japanese women, this benefit is no longer relevant. In 1998, 94 percent of single women aged 22 and over were able to live with their parents while contributing little to household expenses (Mason and Ogawa, 2001, p. 54).<sup>54</sup>

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<sup>52</sup> This data was based on responses to the 1990 and 1998 rounds of the National Survey on Family Planning.

<sup>53</sup> At present there is little cohabitation by unmarried couples in Japan because it is still considered socially unacceptable. However, as pre-marital sex becomes more widespread, cohabitation may become a more popular alternative to marriage, as in the case of Sweden (Retherford, Ogawa and Matsukura, 2001, p. 91).

<sup>54</sup> Though adults who live with their parents and contribute little financially are sometimes referred to as “parasite singles”, many Japanese parents, particularly mothers, want their adult children to live with them for the company that the children provide. (Retherford, Ogawa and Matsukura, 2001, p. 91).

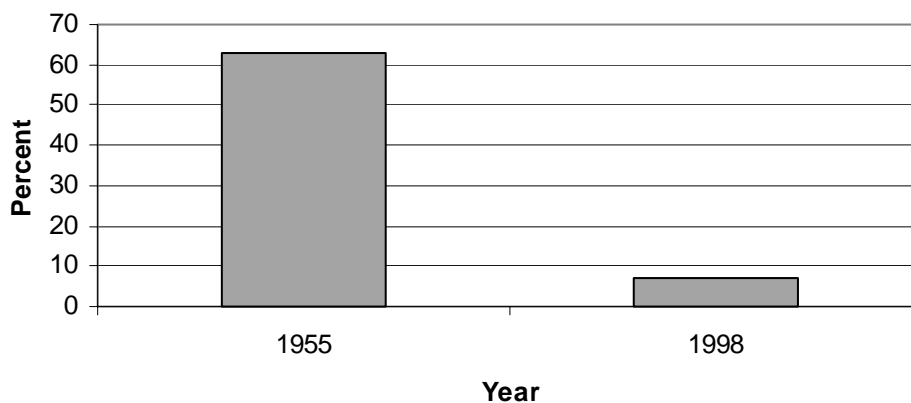
**e. Institutional Changes**

The marriage market in Japan is in a state of rapid transition. There has been a significant movement away from arranged marriages. In 1955, 63 percent of marriages were arranged. By 1998 this figure had fallen to only 7 percent (Figure 52). Retherford, Ogawa and Matsukura (2001, p. 87) argue that the rapid decline in arranged marriages is a very important contributor to the increasing age of marriage and the increasing celibacy rate in Japan because there are now no institutions in place to insure universal marriage. Yashiro (1998) seems to agree. He claims that women no longer decide to marry and then find a suitable spouse; rather, they simply keep working in hopes of finding an “ideal future spouse.” In his view, this new mate-seeking behavior lacks focus and intensity and thus increases the chances of remaining unmarried.

Perhaps an equally important are the institutional changes that must be made in the future if more Japanese women are going to be willing to marry and bear children. Rostow (2000, p. 298) suggested a *de facto* treaty between Japanese men and women. Women should “accept their inescapable part in raising the fertility rate” provided that “men share more fully than at present in the household and family tasks.” Rostow added, with a nod to reality: “This may well be the most difficult change to bring about...” McDonald and Kippen (2001, p. 18) observe that “The combination of increased fertility and increased labor force participation of women would imply a major shift in the organization of the Japanese family...”

**Figure 52**

**Proportion of Marriages that Were Arranged,  
Japan, 1965 and 1998**



Source: Retherford, Ogawa and Matsukura (2001), p. 86.

## VII. Summary and Conclusions

The growth rate of the Japanese population has been declining for the last thirty years and now is effectively at zero. According to official projections, the coming decades will witness the gradual shrinking of that population and at the end of this century, the population will be half its current size. As the population shrinks, it will also grow older, much older. By mid-century, one person in three will be over the age of 65 and more than half the population will be above the age of 50.

In fact, the Japanese population will probably decline and grow older more rapidly than the official projections indicate. Since infant and child mortality is negligible in Japan, almost all mortality reduction will occur at ages above 65. Life style changes and new government programs, such as Long Term Health Insurance for the elderly, will probably lead to more rapid reductions in mortality at very old ages than could be predicted by extrapolating current trends.

More importantly, it is likely that the TFR will continue to fall from 1.36 in the year 2000 to much lower levels, even below 1.0. Thus far, the decline in overall fertility has been slowed by the constancy of age specific marital fertility of women in all the major child-bearing age groups. If married women chose to have fewer children, then we shall see a very rapid collapse in Japanese fertility.

There are several reasons to expect a fall in marital fertility. The contraceptive pill is becoming more widely available and it will become simpler and more convenient for women to limit childbearing. At a more fundamental level, a growing portion of Japanese women are receiving a university education and entering careers that are both financially and emotionally rewarding. The opportunity cost of remaining at home to rear children is already very large and it is constantly increasing. Because of the competitive nature of the Japanese educational system, the time, money and emotional costs of bringing up a child are also very large and constantly increasing. At the same time, the expected benefits to be derived from having children are declining rapidly. The Japanese have chosen to provide for their old age through extremely high savings rates and by supporting a generous public pension system. A miniscule portion of young men and women expect to rely on their children for old age support and that portion is fast vanishing.

It is unlikely that marital age specific fertility rates will remain at their current relatively high levels. But even if they do, it is likely that the TFR will continue to fall rapidly due to a continuing trend toward higher ages at marriage and increased lifetime celibacy. One benefit of marriage is that it provides a socially acceptable context for sexual activity. That benefit is becoming less important. Data of the use of contraception by unmarried women indicate that many are finding sexual and emotional satisfaction outside of marriage. However, this same data indicate that a significant minority of unmarried women have yet to accept this lifestyle. If they do, marriage rates could plummet.

More fundamentally, there are growing problems in the Japanese marriage market. Because wives are expected to take care of co-resident in-laws in their old age, many women would prefer not to marry oldest-sons. But as fertility declines, the

proportion of eligible young bachelors who are eldest sons is steadily increasing. Fertility decline also means that couples can afford to provide a university education to daughters as well as sons. The result has been a steady increasing proportion of young women entering the marriage market with advanced degrees. These women want to marry men who are at least as well educated as they are. But university educated men would prefer to marry women with somewhat less education (e.g. junior college graduates). This educational mismatch can only grow more severe.

Given the expected declines in old-age mortality and in both marital fertility and marriage, the only way that Japan could avoid rapid aging, would be to open its doors to large-scale immigration. However, it is not likely that Japan will permit even small-scale immigration. Thus, the rapid aging and shrinkage of the Japanese population are not only inevitable, they are likely to proceed at a considerably more rapid pace than has been projected by the Japanese government. As Kono (2002) emphasized, it is the speed of aging that is critical. Given adequate time for adjustment, it is possible for a society to successfully adapt to most demographic trends. Unfortunately, the time available to Japanese policy members will be very short indeed.

## **Discussion (by Landis MacKellar)**

The population of Japan will age faster than any population in history, and in doing so must break the trail that other rapidly aging OECD countries will follow. Just as important as age-structure change will be the deceleration and, starting in the next few years, absolute decline in the Japanese population. According to the medium-variant 2000 projections prepared by the Japanese Ministry of Health and Welfare (MHW), population will decline from more than 127 million in 2000 to 121 million in 2025 and just more than 100 million in 2050. While long-run forecasts are essentially speculative, extrapolation of this projection to 2100 yields a population of just 64 million. The share of the population aged over 65, according to this projection, will almost double from 17 percent in 2000 to 35 percent in 2025 and exceed one-third of the population, 36 percent, in 2050. Because of the inertia of population and the associated "memory" of age structures, aging trends through the first few decades of this century are essentially fixed.

Over the very long term, of course, demographic projections can be in error, and when they do go wrong, they tend to go spectacularly wrong because of the geometric nature of population dynamics. Fear of population decline has been responsible for a great deal of political mischief in this century. However, two things should be kept in mind. First, the MHW forecasts *already* assumes that the Japanese total fertility rate (TFR) will continue to fall from its current level of 1.36 (2000) to 1.31 in the early years of this century, then gradually rise to 1.39 in 2050, after which MHW assumes that the TFR will gradually rise to replacement-level fertility (a TFR of 2.07). Our review of the socioeconomic causes of low fertility in Japan reveals little reason to adhere to this view. Second, MHW has done population projections every five years since 1975, and every one of these projections has overestimated fertility!

While commentators in other countries (such as the United States) often conceive of aging in terms of the "aging of the baby boom generation," this is misleading in Japan, where the baby boom lasted only three years. To a greater extent

than in other countries, aging of the Japanese population is due to the extremely rapid decline in fertility -- essentially from levels typical of a developing country (despite the fact that there had been a significant pre-War fertility decline) to sub-replacement levels. The fertility of marital women has remained relatively constant, at about 2 births per woman, since 1965. What decline has occurred in marital fertility since then can be attributed to the lengthening interval between marriage and first birth (earlier declines in marital fertility were the result of adoption of contraception and, as elsewhere, affected higher-parity births). The variable driving fertility decline since the mid-1970s has been, rather, the decline in the proportion of women of childbearing age who are married. Between 1970 and 1995, the proportion of women never married in what has been historically the peak childbearing age group (25-59) more than doubled, to about 50 percent. Between 1970 and 1995, the mean age at first marriage for women increased from 24.2 to 26.3. While statistically less important, the rising divorce rate has also reduced the share of women in their childbearing ages who are married. Unlike in Europe, which has also experienced declining marriage rates and rising divorce rates, fertility outside marriage is extremely low in Japan.

While the main cause of population aging is fertility decline, this trend has also reflected Japan's impressive record in increasing life expectancy, including extending the longevity of the aged. The life expectancy of a 65 year old woman has increased from less than 15 years in 1950 to about 22 years in 2000, while the life expectancy of a woman aged 80 is now about 8.5 years. While extending longevity of the aged has only a secondary impact (compared to low fertility) on population age structure, it may have a major impact on health care costs and the demand for long-term care (these aspects are the subject of another paper in this series, Mayhew 2000). The population aged over 100 is now growing at an annual rate of 13 percent.

Our review of the socioeconomic causes of low fertility suggests that most of these come down, one way or another, to women's rising opportunity costs of marriage and child rearing. Female education and labor market opportunities have expanded, while many of the necessary institutional changes to make these opportunity costs manageable --, increase husbands' participation in home production, flexibility in firms' employment and compensation policies -- have not been forthcoming. At the same time that costs are rising, the benefits of childbearing seem to be falling. A declining share of women report that they expect to rely on their children for old-age support. Perhaps most tellingly, the share of all women with children aged 0-14 who report that they derive pleasure from child rearing has dropped to only 9 percent, as opposed to 40 to 70 percent in other industrial countries.

We know from the experience of other countries, such as Sweden, that high female labor force participation need not go hand in hand with low fertility.<sup>55</sup> However, absent institutional changes to address the issues raised above, there is little reason to think that fertility will rise any time soon in Japan. The "homeostatic" argument, by which fertility tends ineluctably toward replacement level (whether from above or below) in the long term is not supported by empirical evidence. In fact, a number of

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<sup>55</sup> Sweden was able to combine high fertility with high labor force participation by breaking the link between marriage and fertility. In 1994, about half of Swedish children were born outside of marriage (Atoh, 2001, p. 5). It is not likely that Japan will break that link anytime soon.

admittedly casual arguments suggest that fertility in Japan could fall even lower. Contraceptive prevalence in Japan is still low relative to other countries and the methods used are relatively unreliable (as a result of which some 20 percent of births are accidental). Recent approval (after a delay of nearly forty years) in oral contraceptives may change this situation.

Whatever demography is, it is assuredly not destiny, despite what the French philosopher Auguste Comte reportedly remarked. The trends described here are not immutable, existing socioeconomic institutions will adapt to them so far as they can, and new socioeconomic institutions will evolve. However, concern over population aging in Japan is by no means an overreaction to a speculative possibility. It is a prudent response to a real problem



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