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The Unprecedented Shift in Japan's Population: Numbers, Age and Prospects

Vaclav Smil

Three recent statistical releases have led me to revisit the future of Japan's population. On December 20, 2006 the National Institute of Population and Social Security Research (NIPSSR) published its latest long-range forecast of the country's population that showed, once again, a faster decline than previously anticipated: the medium variant projects the total population of only about 90 million (89.93) people by 2055, the figure that both [Asahi Shimbun](#) and [Mainichi Shimbun](#) found "shocking" [1]. On March 13, 2007 the United Nations Population Division (UNPD) revealed the latest revision of its official long-range population estimates and projections with detailed forecasts for all of the world's countries up to the year 2050 [2]. And on March 22, 2007 the Ministry of Internal Affairs and Communications published its latest nationwide estimate of Japan's population [3].

As the country's census takes place every five years on October 1 (during the years ending with 0 and 5) these official intercensal numbers are tied to that date [4]. As of October 1, 2006 Japan had 127,769,500 people, just 1,500 more than a year earlier. But the number of Japanese had actually declined by 50,500 while that of foreign nationals (totaling 1,615,000) increased by 52,000. This means that 2006 was the second year in which Japan's population declined, the indisputable beginning

of a long-expected trend. Japan's population (including foreign residents) peaked in December 2004 at 127,838,000 people and only a stunning, not just surprising, turn of demographic fortune can prevent the combination of relatively rapid population decline and of unprecedented aging of the country's population.

This trend has been anticipated, as it turned out rather accurately, since 1992. Between 1947 and 1957 Japan's total fertility rate (TFR) was more than halved, from 4.54 to 2.04; between 1957 and 1973 it stagnated close to the replacement level, and in 1973 it resumed (at a slower rate) its secular decline [5]. Little was made of this during the 1980s as nearly all of Japan's socio-economic indicators were then pointing relentlessly toward greater prosperity and a greater role in global affairs. Japan's media noticed only when the TFR sank to an all-time low of 1.57 in 1989, and after another low (1.53) was reached in 1991 the Institute of Population Problems concluded that the continuation of this trend would see the beginning of population decline by about 2005 and halving of the total population size within a century [6].

Japan is not unique in facing a shrinking and aging population; most of the European countries have seen very similar rates of falling TFR, and as many of them, most notably Italy [7], anticipate population declines and hardly less worrisome rates of aging and increases of dependency ratios (children and retirees/economically active population). But, as in other instances of economic and social trends (persistence of Japan's very low interest rates and the extent and duration of stock market collapse are two obvious post-1989 examples), the expected continuation of Japan's population decline and aging will take the country into an unprecedented, and truly extreme demographic territory, making it an involuntary global pioneer of a new society.

The UNPD's latest medium forecast for 2050 envisages 102.51 million Japanese, the lowest expected total of the biannual

series, and 10 million below the medium variant of the 2004 revision that put the total at 112.19 million [8]. UNPD's latest low variant forecasts for Japan's population in 2050 is just 88. million and the high estimate 118.27 million, ranging from 13. below to 15.3% above the mean value. The medium variant of the forecast prepared by the National Institute of Population & Social Security Research (NIPSSR) in 2002 put the 2050 total at 100.59 million, and the low and the high estimates at, respectively, 92.03 and 108.25 million, a tighter range of just -8.5% and +7.6% [9]. If these forecasts prove accurate, then Japan's population will have charted only a slightly asymmetrical arc (peaking in 2004) during the 100 years between 1950 and 2050 (Fig. 1), and the total of about 100 million would mean that the country, now the world's tenth most populous nation, would not even rank among the top 15 in 2050 [10].

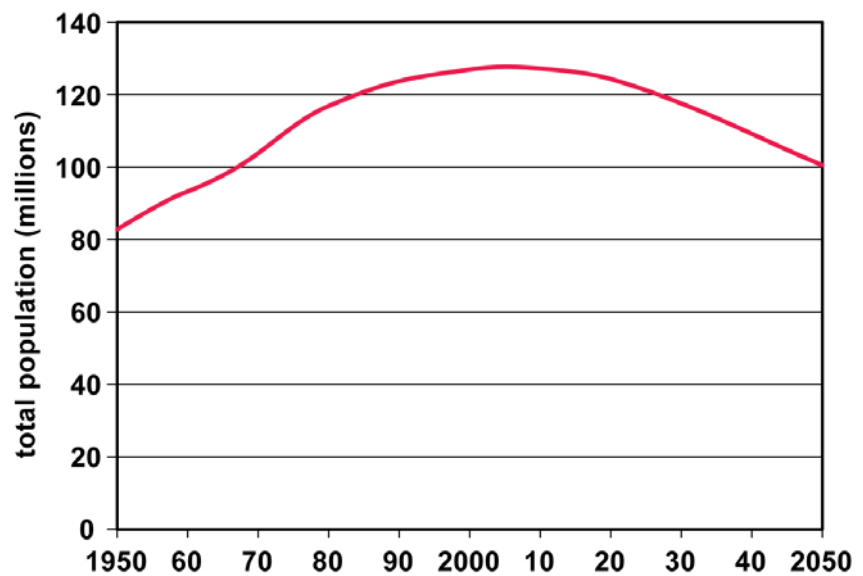


Fig. 1. Japan's past and future population: 1950-2050 arc.
Source: NIPSSR 2006 (ref. 12).

The loss of more than 25 million people by the year 2050 will have numerous internal repercussions. Most obviously, it will further accelerate the already substantial decline and demise of villages and small towns as the countryside depopulates and as the population concentrates even more in a few extensive

conurbations [11]. But a smaller population does not have to have a commensurate negative effect on a country's international standing and historical evidence confirms that there has been no obvious (and not even a statistically faintly discernible) link between the size of a nation's population and the imprint it has left on the course of human affairs. City states of classic Greece, renaissance Florence and early modern Venice are among the extreme examples of social, political, cultural and military influence that was quite incommensurable with small populations of these elite polities, while East Asia provides some excellent post-1950 examples of relatively small societies gaining worldwide renown for their economic prowess (Hong Kong, Singapore, Taiwan).

Consequently, there is no inherent reason why Japan of 100 million could not continue to exert influence that goes far beyond its share of global population which will be most likely just 1% by 2050 (it is nearly 2% today). After all, Japan of about 47 million defeated Russia in 1905, Japan of 67 million launched its attack on China in 1931, Japan of 72 million fatefully challenged the United States in 1941 while Japan of 100 million emerged as a new global manufacturing superpower during the 1960s [12]. Japan's fundamental population problem will not be the loss of 25 (or perhaps even 35) million people by 2050, but an unprecedented aging of its population that will accompany this decline. This aging will result from the combination of what appears to be a permanently low TFR and continuing gains in life expectancy.

Japan's TFR has been below 1.3 since 2003, and given the entrenched trends toward less marriage and later marriage age [13] and consequently higher age of the first birth (now at 30 years), it is highly unlikely that TFR could be revived enough to reach at least 1.8-1.9, or just 10-15% below the replacement level. In fact, the medium variant of the latest NIPSSR forecast assumes TFR of just 1.26 in 2055 (Fig. 2).

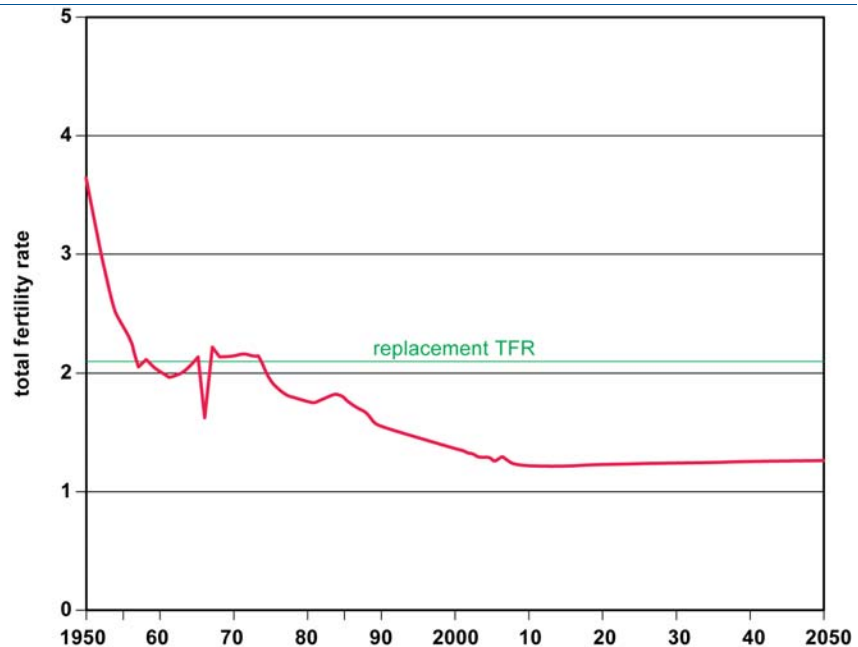


Fig. 2. Japan's total fertility rate, 1950-2050. Plotted from data in Ogawa and Retherford (ref. 5) and Kaneko et al. (ref. 1).

As for increasing longevity, Japan has led the global ranking for decades, and this will almost certainly continue. The country's median age is expected to increase by a decade, from just over 43 years in 2007 to more than 52 years in 2050 (it was just 22 years in 1950), and NIPSSR forecasts Japan's life expectancy to rise from 78.3 years for males and 85.5 years for females in 2000 to, respectively, 80.95 and 89.22 years by 2050; men would thus gain about 2.6 years, women 3.7 years. According to NIPSSR's medium variant, by 2050 about 36% of Japanese will be older than 65 years, the UNPD's medium variant puts that share at almost 38%, and NIPSSR's low variant has it as high as 39% (in 2000 their share was 17.4% in 2006 20.5%). Japan's unprecedented rate of aging is best illustrated by comparing the country's age-sex distribution as it has shifted from a pyramid shape characteristic of societies with high TFR (graphs for 1930 and 1950) to a barrel-shaped profile by 2000 and to a caged distribution by 2050 (Fig. 3).

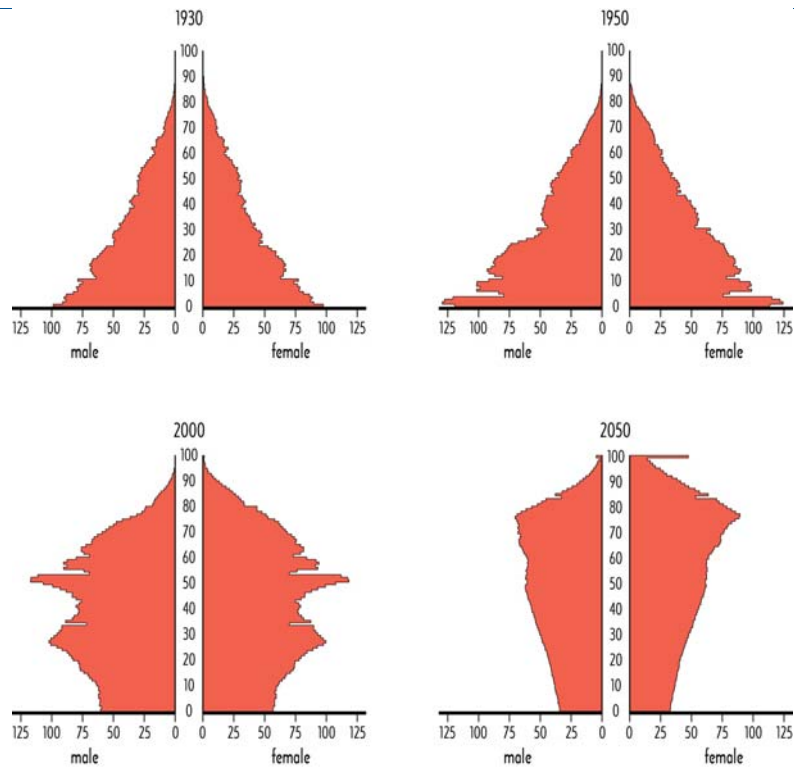


Fig. 3. Changes of [Japan's age-sex population distribution, 1930-2050](#).
[An animated version of these distributions is available here.](#)

This shift will mean that by 2050 the country would have about 3.3 times as many people 65 and older as children of less than years of age. That alone would be a remarkable transformation -- in 2006 that ratio was less than 1.5 -- but the reality would have some even more stunning elements. According to the latest UNPD forecast in 2050 Japan's population of people 80 years and older could be 37% larger than that of the country's children. There is, of course, no precedent in history for a population where the numbers of octo- and nonagenarians would surpass those of children. By 2050 Japan could have nearly 5 million people in their 90s and there could be more than half a million of centenarians, some 90% of them women.

And it is a very safe bet (contrary to sci-fi-like claims of the coming era of healthy aging and life spans reaching into 120s) that most of these very old people will need considerable help. A recent study of 304 Tokyo centenarians (using standard

assessment methods to classify physical and mental functions) provided a revealing glimpse of reality [14]. Just five individuals (less than 2%) were in the exceptional category, with all of the functions graded as excellent. About 15% were normal, that is maintaining good cognitive ability and mobility. But 55% were frail, impaired either cognitively or physically, and 25% were fragile, with much deteriorated physical and mental functions. There is no need to belabor the public health aspects of this situation. This enormous challenge will come on top of exorbitant pension obligations and economic challenges (including changes in savings and investment rates), as addressed in a number of recent publications [15].

Japan's old-age dependency ratio (assuming the productive age population between 15 and 54 years of age) will soar from 0.3 in 2007 (that is 3.08 economically active persons per retiree) to 0.66 in 2050, or just 1.5 productive workers per retired person. By far the most effective step to address this challenge would be to raise the retirement age to 69. Old-age dependency ratio for the productive age between 20 and 69 years of age would still more than double, from 0.23 in 2007 to 0.51 in 2050, but the latter figure would obviously translate into a much less onerous ratio of nearly two employed people per retiree.

Population decline and aging are projected to continue during the second half of the 21st century: by 2100 Japan's population of less than 65 million would be back to the total it reached in 1930, shortly before the invasion of China. Such very long-range forecasts can be wide of the mark -- but the forecasts looking just a generation ahead can be expected to be fairly accurate and in Japan's case the generation is now 30, rather than 20 or 25, years. Most of the Japanese females that will give birth during that period are already alive, and hence the only two factors that could shift the projection drastically are either a surge in fertility (a highly unlikely shift in today's Japan) or a catastrophic spell of mortality (caused by a pandemic or an

extraordinary natural disaster). Or, of course, a change that is not at all a part of Japan's official long-range population forecasts: an open door to large-scale immigration from neighboring countries.

Consequently, there is a very high probability that Japan of 2050 will continue along the down slope of its grand secular population arc (see Fig. 1) while its population becomes more geriatric than that of any other society in history. Readers young enough to be alive three decades from now will have a fascinating opportunity to judge if that trend will prove to be more challenging, indeed more crippling, for Japanese society than the one on which the US has been embarked on for a generation, that is the continuation of relatively vigorous population growth based on substantial legal, but above all on far more massive (and seemingly uncontrollable) illegal, immigration.

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He wrote this article for Japan Focus. Posted on April 19, 2007.

Notes

[1] This projection will be eventually posted on the NIPSSR website. It is now available only in a journal article in Japanese. Kaneko, R. et al. 2007. Population projection for Japan: 2006-2055, with Long - range Population Projections: 2056-2100. [Jinko mondai kenkyu \(Journal of Population Problems 63\(1\): 29-71. For the reaction see: \[Foreign Press Center Japan. Projection of a 30% population drop by 2055 alarms Japan. December 25, 2006.\]\(#\)](#)

[2] United Nations Population Division (UNPD). 2007. [World Population Prospects: The 2006 Revision](#). New York: UNPD.

[3] [Population in 2006 hovers around 128 million](#). Japan Today March 27, 2007.

[4] Preliminary results of the October 1, 2005 census showed a total of 127.76 million.

[5] Ogawa, N. and R.D. Retherford. 1993. The resumption of fertility decline in Japan: 1973-92. Population and Development Review 19:703-741.

[6] Institute of Population Problems. 1992. Population Projections for Japan: 1991-2090. Tokyo: Ministry of Health and Welfare.

[7] OECD. 2004. Ageing and Employment Policies - Italy. Paris: OECD.

[8] UNPD. 2005. World Population Prospects: The 2004 Revision. New York: UNPD.

[9] National Institute of Population and Social Security Research (NIPSSR). 2002. Population Projections for Japan: 2001-2050. Tokyo: NIPSSR.

[10] In 1950 Japan had the world's fifth largest population (China, India, USSR, USA, Japan). In 2007 its population was surpassed by those of China (1329 million), India (1169), USA (306), Indonesia (232), Brazil (192), Pakistan (164), Bangladesh (159), Nigeria (148) and Russia (142 million). By 2050 the countries ahead of Japan will also include Congo, Ethiopia, Philippines, Mexico, Egypt and Vietnam.

[11] Depopulation of rural Japan is already starkly evident not only in regions remote from major cities where entire villages are nearing abandonment and where shrinking population forces municipalities to merge in order to boost their tax base: a few years ago I was offered (if I agreed to move in) a large,

well-built house on a wooded slope overlooking a lovely valley a small village only a little more than one hour north of Kyoto that had already lost its post office, its elementary school and all but a score of its aging inhabitants. See also: Onishi, N.

“Aging and official abandonment carries a Japanese village to extinction.” Japan Focus japanfocus.org/products/details/200

[12] Past population totals are taken from: NIPSSR. 2006. [Population Statistics of Japan 2006](#). Tokyo: NIPSSR. (this is a massive 20.9 Mb file). In 1964, the year of Tokyo Olympics and the first shinkansen, Japan had 97 million people, and the country topped 100 million three years later.

[13] Retherford, R.D., N. Ogawa and R. Matsukara. 2001. Late marriage and less marriage in Japan. Population and Development Review 27: 65-102.

[14] Gondo, Y. et al. 2006. Functional status of centenarians in Tokyo, Japan: Developing better phenotypes of exceptional longevity. Journals of Gerontology Series A - Biological Sciences and Medical Sciences 61(3):305-310.

[15] Coulmas, F. 2007. Population Decline and Ageing in Japan The Social Consequences. New York: Routledge; MacKellar, L. et al. 2004. The Economic Impacts of Population Ageing in Japan. Northampton, MA: Edward Elgar; Okamoto, A. 2004. Tax Policy for Aging Societies: Lessons from Japan. New York: Springer-Verlag; Traphagan, J.W. and J. Knight, eds. 2003. Demographic Change and the Family in Japan's Aging Society. Albany, NY: State University of New York Press. See also: Masa H. 2006. [Japan stares into a demographic abyss](#). [Japan Focus](#)