



PACIFIC
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PACIFIC ECONOMIC OUTLOOK



Structure Project

Aging and Economic Growth Potentials in the Pacific Region

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*Aging and Economic Growth Potentials
in the Pacific Region*

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Aging and Economic Growth Potentials in the Pacific Region

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They refer only to the economies associated with PECC Member Committees.

PREFACE

This report on “*Aging and Economic Growth Potentials in the Pacific Region*” is the 11th report in a series of studies conducted by the Pacific Economic Outlook (PEO) Structure Project. PEO/Structure is one of the projects under the Pacific Economic Cooperation Council (PECC) and deals with longer-term structural issues of macroeconomics in the Pacific region.

Aging population has recently attracted increasing attention in developed as well as emerging market economies because of its potential risks for slow-down in economic growth, stagnation of technical innovation, and the fiscal burden it can impose through public pension and health insurance plans. Focusing on the Pacific region, one of the most rapidly aging regions, we examine these issues. In particular, we focus on the first two questions in order to enhance mutual understanding of the situations member economies face and the policy implications.

So far we have heard a great deal about the potential negative impacts on economic growth of aging based on past data. In assessing future prospects, however, we should take into account possible adjustments, both endogenous and exogenous (including policy responses), to the new reality of aging population. In particular, we are interested in the impact of an aging population on potential economic growth through its effects on private saving behavior and productivity growth in the foreseeable future, and this may be very different from what has occurred in the past.

First, we attempt to grasp an accurate picture of the population dynamics in each member economy. While uncertainty surrounding prediction of the population is unavoidable, it is nevertheless true that predictions of aging, fertility declines and expanding life expectancies have always been underestimated. We also found this trend to be true for member economies.

With regard to the economic effects of an aging population, particular attention has been paid to the similarities and dissimilarities of its relationship to labor supply, physical and human capital formation, and productivity across member economies as well as across periods. We have had reasonable doubt as to the steadiness across periods and similarities across economies in terms of labor market participation, saving and investment behavior of the private sector, and productivity growth, on which a bulk of prior studies were crucially based on. We proceed in this study with caution with respect to simplistic extrapolation of past data and attempt to explicitly take into account various channels with which private as well as public sectors adjust to the new realities of population aging in future decades.

This report is a summary of studies conducted by the PEO/Structure Project under the coordination of Dr. Akira Kohsaka¹ The first section of the report provides an overview, prepared by Dr. Kohsaka, on aging and economic growth potentials in the Pacific region as a whole. The second section consists of executive summaries of individual countries/regions that were submitted by specialists from each PECC

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member economy.

The PEO/Structure Project held two International Specialists Meetings in March and September 2006 in Osaka, Japan. These meetings were hosted by the Japan Committee for Pacific Economic Outlook which has been housed in and staffed by the Kansai Institute for Social and Economic Research (KISER).² The Committee has been sponsored by the Ministry of Foreign Affairs of Japan and by regional business communities, the relevant organizations of which are the Pacific Resource Exchange Center (PREX) and the Kansai Economic Federation (KEF).

Ambassador Yoshihisa Ara, Chairman of Japan National Committee for PECC (JANCPPEC), serves as Chairman of the Japan Committee for Pacific Economic Outlook. Mr. Hiroshi Isono, Deputy Executive Director and Ms. Machiko Fujita, Director coordinated the management of the PEO/Structure Project. Dr. Janis Y. F.Kea provided editorial support to the PEO/Structure Project.

The PEO/Structure Project presents its reports to the meetings of PECC and the Asia Pacific Economic Cooperation (APEC), forums of government officials and individuals in business, government and academic sectors who are interested in economic issues of the Asia-Pacific region.

For more information on the PEO/Structure Project, contact the secretariat at the Japan Committee for Pacific Economic Outlook.

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² The Kansai Institute for Social and Economic Research (KISER) is a nonprofit organization in Kansai (the region centered in Osaka, Kobe and Kyoto) that has as its objectives contributing to the development of the national and regional economies through academic advances. KISER promotes research projects under the cooperation of academia and local business community with the aid of governmental support. For more detail, see the information provided.

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OVERVIEW

OVERVIEW:

AGING AND ECONOMIC GROWTH POTENTIALS IN THE PACIFIC REGION

BY AKIRA KOHSAKA

Introduction

The issue of an aging population has been attracting increasing concern in developed as well as emerging market economies because of its potential risks for slowdown in economic growth, stagnation of technical innovation and the fiscal burden it can impose through public pension and health insurance plans. Focusing on the Pacific region, one of the most rapidly aging regions, we would like to examine these issues. In particular, we focus on the first two issues in order to enhance mutual understanding of the situation confronting members and in their pursuit of appropriate policy.

Thus far we have heard a great deal about the potential negative impacts on economic growth of aging based on past data. In assessing future prospects of the impact, however, we should take into account possible adjustments—both endogenous and exogenous (including policy responses)—to the new reality of aging population more seriously. In particular, we are interested in the impact of an aging population on potential economic growth through its effects on private saving behavior and productivity growth in the foreseeable future, and these effects may be very different from that which has occurred in the past.

First, we attempt to grasp the precise picture of the population dynamics in each member economy. While uncertainty on population prediction is unavoidable, aging, fertility declines and expanding life expectancies have always been underestimated.

We ascertained that this trend has continued across member economies.

With regard to the economic effects of an aging population, particular attention has been paid to the similarities and dissimilarities of its relationship to labor supply, physical and human capital formation, and productivity across member economies as well as across periods. We have had reasonable doubt as to the steadiness across periods and similarities across economies in terms of labor market participation, saving and investment behavior of the private sectors and productivity growth, on which a bulk of prior studies were crucially based on. We proceed in this study with caution about the nature of more or less simplistic extrapolation of past data, and we attempt to explicitly take into account various channels through which private as well as public sectors adjust to the new realities of population aging in future decades.

Policy measures to enhance labor supply, domestic saving and productivity have been scrutinized. For each category, policy alternatives that are currently practiced and their implementation and/or planning are discussed across the member economies. The composition of this overview is as follows:

Section 1 depicts demographic trends in the world, across regions and in the PECC region. Trends in fertility and life expectancy form the basis of demographic trends, which show common and uncommon features across regions and individual economies. Resulting changes in population structures or *aging*

are represented by the share of elderly and working age populations, which show lagged as well as clustering patterns within the PECC region as well as across regions.

Sections 2 and 3 discuss the impact of aging on economic growth and other macroeconomic variables, i.e., saving, investment and current account balance, respectively. Some estimation of the impact of aging is demonstrated to grasp quantitative features in the context of the individual PECC members. Section 4 touches on policy options necessary to cope with the possible negative impacts of aging as estimated in previous sections.

Section 5 then casts some doubt on the rationale of conventional discussions and estimation results of the impact of aging on economic growth and other macroeconomic variables. In particular, it is pointed out that the implications from these doubts are particularly relevant to the PECC region, and this may soothe exaggerated worries about the potential negative impacts of aging.

1. DEMOGRAPHIC TRENDS

1.1 Global Demographic Trends

The demographic transition began around 1800 with declining mortality in Europe; it has now spread to all parts of the world and is projected to be completed by 2100. Before the start of the demographic transition, life was short, births were many, growth was slow and the population was young. During the transition, first mortality and then fertility declined, causing population growth rates

first to accelerate and then to slow again, moving toward low fertility, long life and an old population (Lee 2003).

The data in Table 1 show that this transition has generated enormous demographic changes in terms of the size, composition and life cycles of population. Since 1800, the size of the global population has grown sixfold and by 2100 it will be ten times larger. While the share of working population to the total population will remain stable, the share of children will be reduced by one-half and that of the elderly will become five times larger, the latter of which will surpass the former sometime during the latter half of the 21st century. Life expectancy at birth is now twice as long and by 2100, it will be three times longer. In the meantime, total fertility in terms of births per woman will fall from 6 to 2 by 2100. This implies that “in 1800, women spent about 70 percent of their adult years bearing and rearing young children, but that fraction has decreased in many parts of the world to only about 14 percent, due to lower fertility and longer life” (Lee 2003).

1.2 Regional Trends

These global developments mask considerable variation between countries and regions that are the result of very different fertility, mortality and migration trends (IMF 2004). As Figure 1 shows, for example, although fertility rates have fallen almost universally in recent decades, they remain much higher in developing than in advanced countries, where they are generally below the replacement

Table 1. Global Population Trends over the Transition: Estimates, Guesstimates and Forecasts, 1700-2100

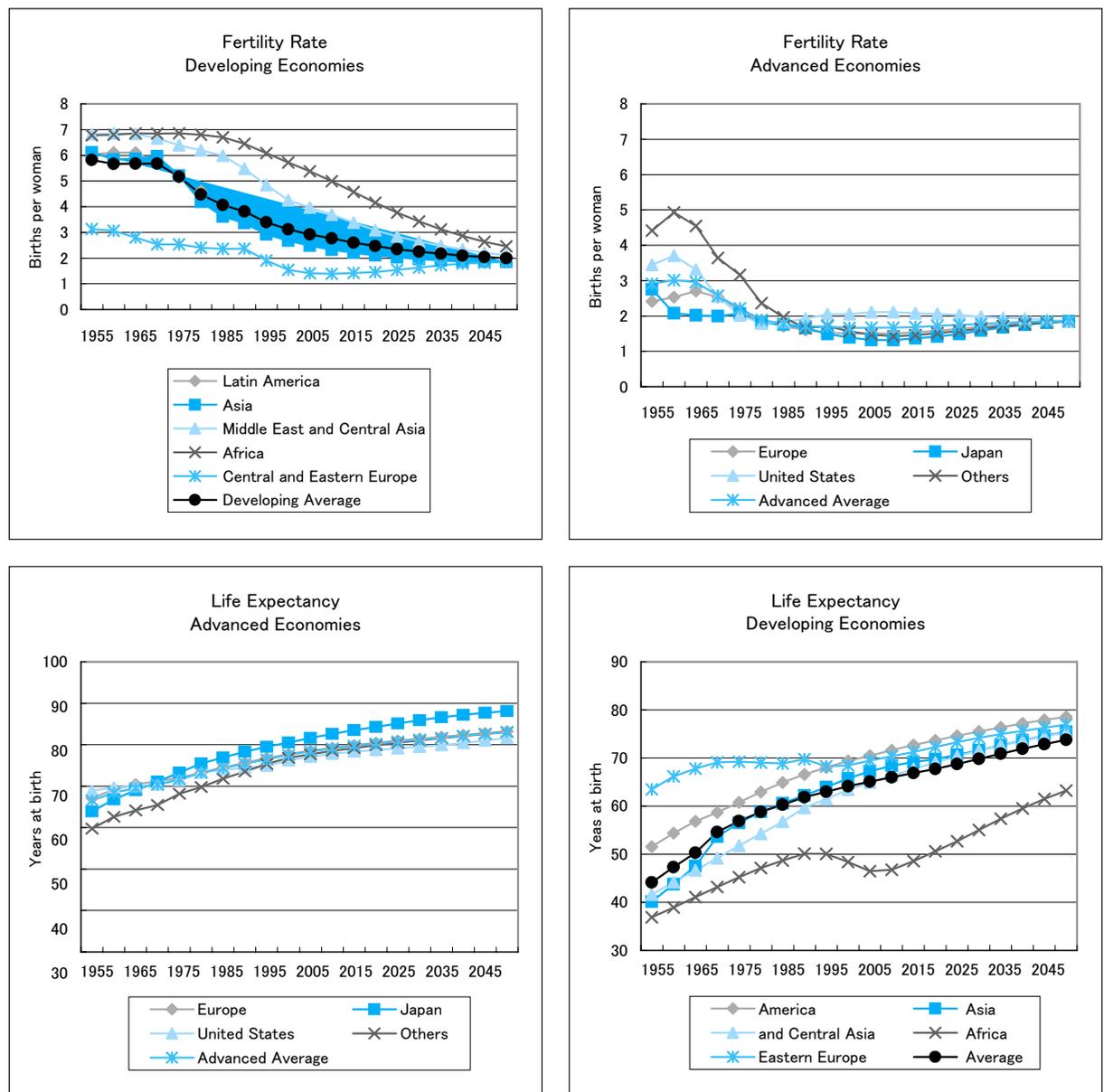
	Life Expectancy (Years at Birth)	Total Fertility Rate (Birth per Woman)	Pop Size (Billions)	Pop Growth Rate (%/Year)	Pop < 15 (% of Total Pop)	Pop > 65 (% of Total Pop)
1700	27	6.0	0.68	0.50	36	4
1800	27	6.0	0.98	0.51	36	4
1900	30	5.2	1.65	0.56	35	4
1950	47	5.0	2.52	1.80	34	5
2000	65	2.7	6.07	1.22	30	7
2050	74	2.0	8.92	0.33	20	16
2100	81	2.0	9.46	0.04	18	21

Source: IMF [2004].

rate. Even among developing countries, considerable differences exist—fertility rates are high in Africa and the Middle East, but are below replacement rates in East Asia and Central and Eastern Europe. Likewise, while life expectancy has risen across the globe over the past 50 years, life expectancy still remains much higher in advanced countries.

Among the PECC member economies, fertility rates had fallen to less than 2.1 by as early as 1990, except for Indonesia, Malaysia and the Philippines where the rates remain higher (Figure 2). China, Hong Kong, Korea, Singapore, Chinese Taipei and Thailand witnessed especially sharp declines in fertility rates since 1965. Turning to life expectancy, Hong Kong caught up with and exceeded the United States (Figure 2) by as early as 1970, Singapore did

Figure 1. Fertility and Life Expectancy by Region

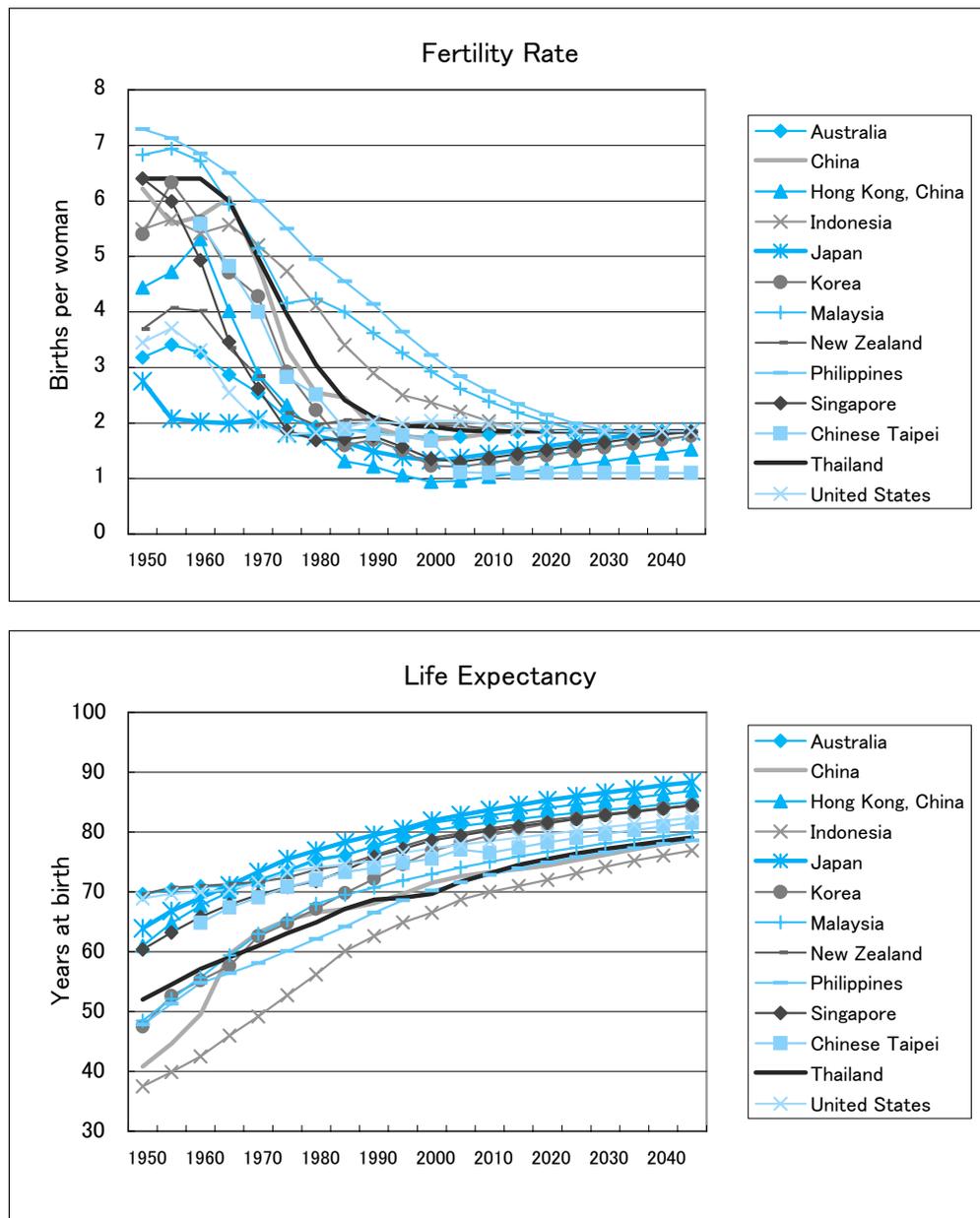


Source: IMF [2004].

so by 1990 and then Korea by 2005. In China, Indonesia, the Philippines, Chinese Taipei and Thailand was life expectancy shorter than that of the United States in 2005. In other words, the most notable feature of the PECC region is that it covers the most rapidly aging economies in the world—i.e., emerging markets in East Asia—in addition to already aged advanced economies like Japan.

According to the United Nations' current population projections (United Nations 2003), global population growth will continue to slow. The population in a number of countries is actually expected to decline over the next 50 years; for example, population is anticipated to fall by 22 percent in Italy and 14 percent in Japan. In other countries, population growth, although slowing, will remain robust, reflecting their higher fertility rates. These trends

Figure 2. Fertility and Life Expectancy



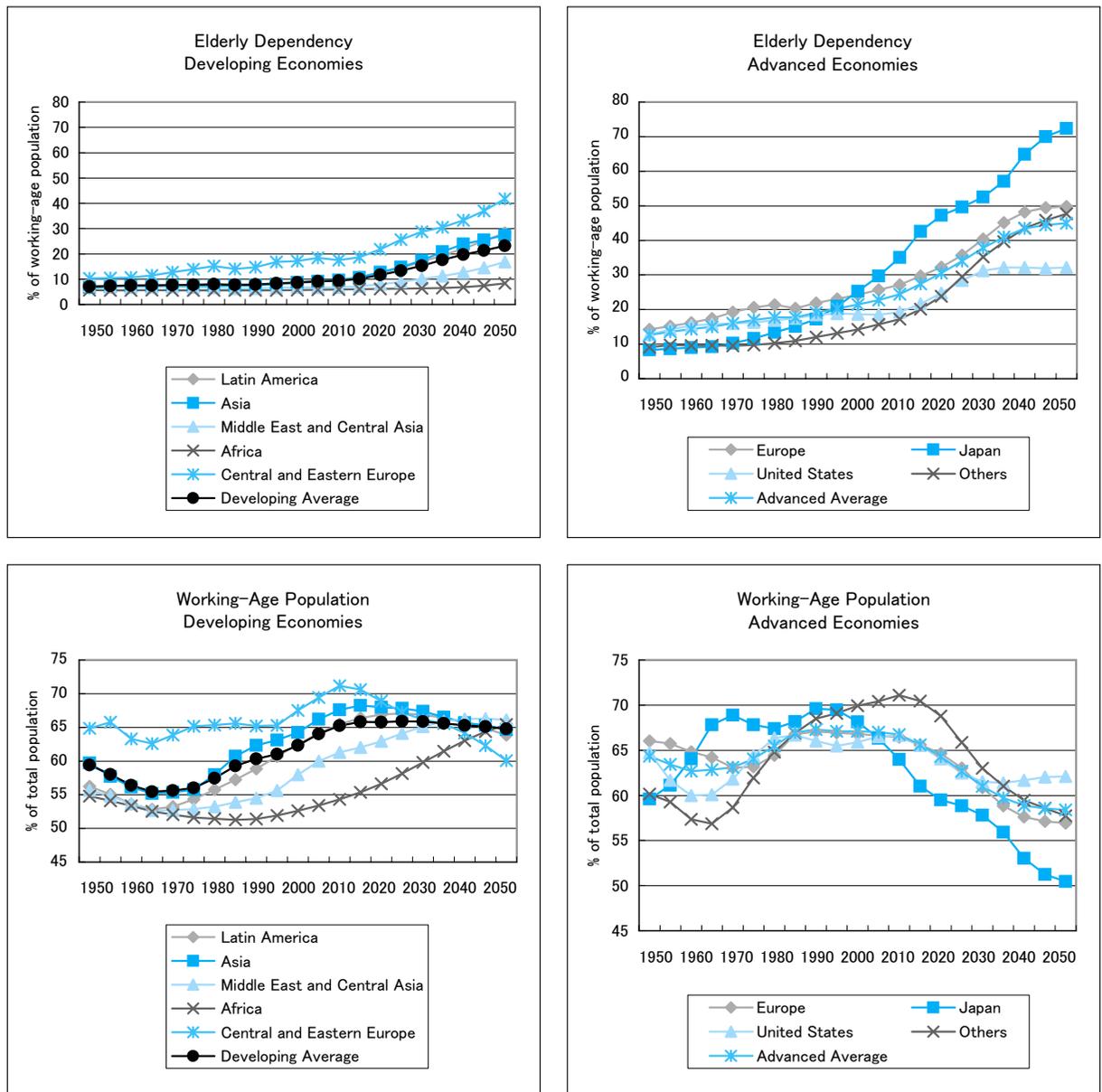
Source: United Nations, *World Population Prospects: The 2006 Revision Population Database*, <http://esa.un.org/unpp/index.asp?panel=3>

will lead to a continuing redistribution of the world's population away from the developed countries. Among the PECC economies, population will peak by 2050 in China, Korea, Singapore and Thailand.

The world's population will continue to age. The elderly will account for an increasing share of the population, although the pace and timing of aging varies widely between countries and regions. The elderly dependency ratio—i.e., the population aged

65 and older as a share of the working age (aged 15–64) population—is projected to rise dramatically in Japan and Europe, with lesser increases anticipated in the United States (Figure 3). Among the developing country regions, aging will also begin to accelerate in Asia and Latin America around this time—with China experiencing particularly rapid aging—but the share of elderly in Africa and the Middle East, while rising, will remain relatively small.

Figure 3. Elderly and Working-Age Population by Region



Source: IMF [2004].

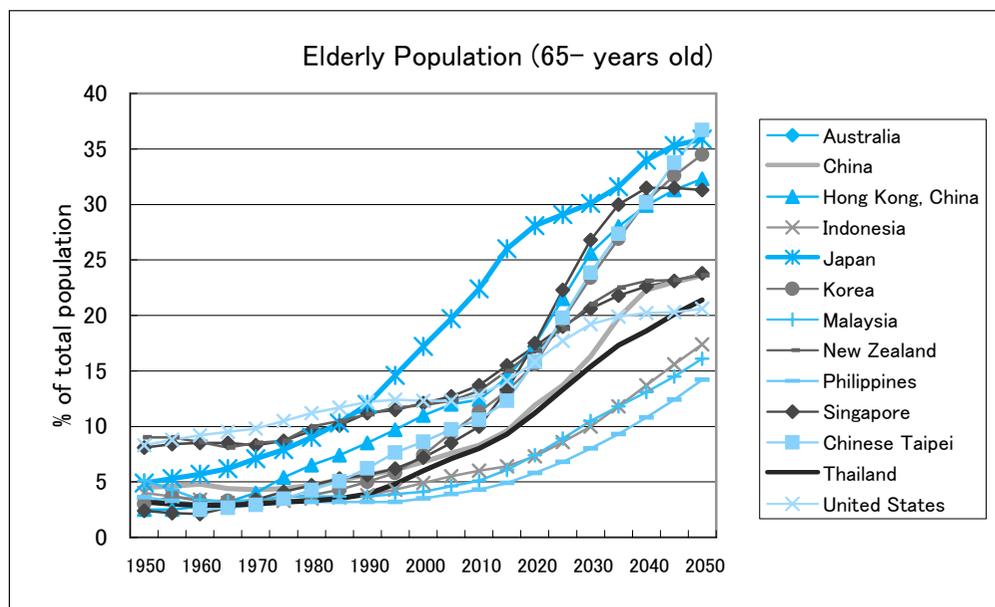
The share of the working age population will fall in advanced countries, but increase in many developing countries. In Japan and some European countries, this decline has already begun and is projected to accelerate. In the United States, a high rate of immigration and higher fertility rates result in a more modest projected decline until 2025, after which the share of the working age population stabilizes. In developing countries, the share of the working age population is projected to increase until 2015, and then remain at this higher level as a declining share of the young offsets a rising share of the elderly. The working age share will, however, begin to decline in some regions before 2050, first in central and eastern Europe, and then in Asia and Latin America. In the Middle East and Africa, increases in the working age populations are projected out to 2050.

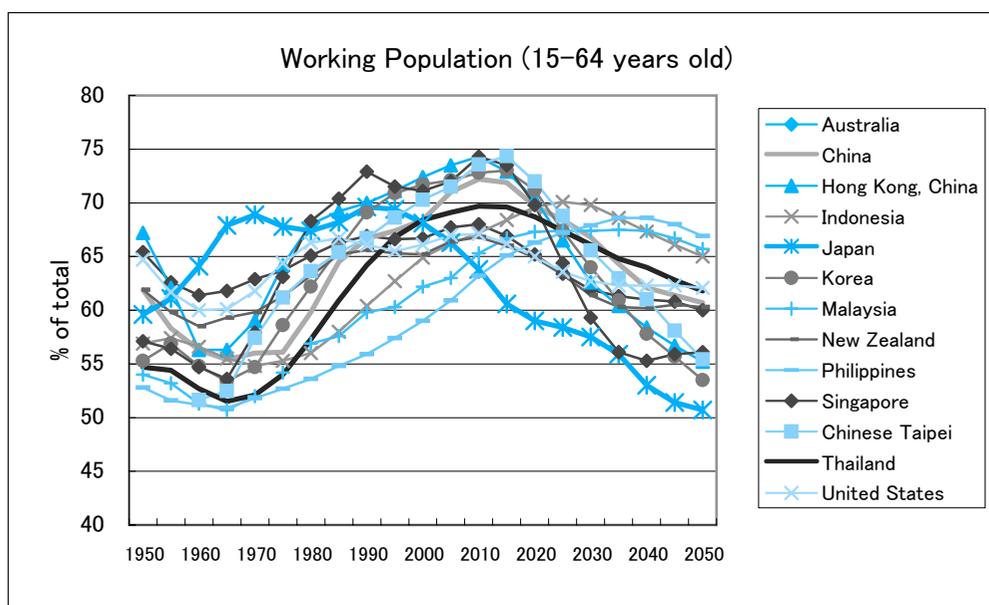
Figure 4 shows the shares of the working age and elderly populations in the PECC region. As Japan is the fastest in aging, its share of elderly will rise beyond 20 percent of the total population by 2010 and beyond 35 percent by 2050. Among the PECC economies, Hong Kong, Korea, Singapore and Chinese Taipei will be joining the fastest aging club by 2040; their elderly shares are projected to be more than 30 percent. Subsequently Australia, New Zealand and the United States will form the next aging group with elderly shares of more than 20

percent by 2030, and China and Thailand will catch up by 2050. Aging is slow in Indonesia, Malaysia and the Philippines, whose elderly shares are not projected to reach 20 percent by 2050.

Among the PECC economies, the working population share will reach its peak by 2015 except for Indonesia, Malaysia and the Philippines (Figure 4). While Japan used to have the largest share of working age population among the PECC region in the 1960s and 1970s, the country hit its peak as early as 1990 and the country's share of working age population will become the smallest among the region by 2015 and will continue to be so, falling to nearly 50 percent by 2050. Hong Kong, Korea and Singapore will face sharp increases in the share of working age population from around 55 percent to around 75 percent until 2015, but will face sharp declines in the shares from then on, almost catching up with Japan toward 2050. China and Thailand will also experience sharp increases in the working age population shares until 2015, but, in contrast with the emerging market economies, the declines in their shares will not be as rapid. Australia, New Zealand and the United States will also witness increases in their shares of working age population and then will face declines, both of which are relatively modest.

Figure 4. Elderly and Working-Age Population





Source: United Nations, *World Population Prospects: The 2006 Revision Population Database*, <http://esa.un.org/unpp/index.asp?panel=3>

2. IMPACT OF DEMOGRAPHIC CHANGES ON ECONOMIC GROWTH

As we have seen, the world is in the midst of major demographic transitions in which declining fertility rates and increasing life expectancy are significantly changing the age structure of national populations. The timing and speed of the demographic changes, however, are significantly different across countries. Advanced economies began their transition several decades earlier than developing countries. Hence the age composition of populations differs greatly between developed and developing countries. Ongoing demographic changes will have significant impacts on saving, investment and current account balances in the years ahead.

Economic growth is presumed to come from such sources as labor supply, capital formation and productivity growth. First, demographic changes

directly affect labor supply through changes in the working age population. Second, they indirectly affect capital formation through changes in household saving behavior across their life cycles, in size and composition of investment demand, and in capital-labor ratios and rates of return on capital. Third, they also indirectly affect productivity growth through changes in quality of human capital and innovation.

In order to assess the impact of demographic changes on economic growth, we start our discussion by examining some benchmark estimates of the impact. Using a 115-country panel data set covering the period 1960–2000, IMF (2004) investigated the relationship between demographic variables and per capita GDP growth, saving, investment, the current account and fiscal balances. The key results of the analysis are shown in Table 2.

Table 2. Macroeconomic Impact of Demographic Changes

	Growth in Real GDP per Capita	Saving/GDP	Investment/GDP	Current Account/GDP	Budget Balance/GDP
Impact of :					
Share of working-age population	0.080	0.72	0.31	0.05	0.06
Share of elderly population	-0.041	-0.35	-0.14	-0.25	-0.46

Source: IMF [2004].

The table shows the following, after controlling for other explanatory factors:

- Per capita GDP growth as well as saving and current account balances as a ratio to GDP are positively correlated with changes in the share of the working age population, and negatively correlated with changes in the share of the elderly.
- The share of the working age population is positively correlated with investment as a ratio to GDP.

2.1 Impact on growth

Per capita GDP growth is positively correlated with changes in the relative size of the working age population and negatively correlated with changes in the share of the elderly. This result suggests that we can think of various channels through which demographic changes affect economic growth. First, the positive correlation with increased working population partly reflects the direct productive impact of a larger labor force. Second, lower elderly dependency ratios may be expected to raise saving, which in turn helps finance more investment and increases output. Third, the control variables themselves may also partly reflect demographic impacts. The lower the initial level of per capita income, the larger the net positive impact of a decline in fertility,¹ hence increasing working population with some time lags. The impact of demography on growth or the demographic dividend may be supported, through a complementary relationship, by institutional and policy frameworks such as relatively open and competitive markets, substantial investments in basic education, fiscal discipline and a relatively deep financial sector. Per capita growth is also found to be positively associated with life expectancy, which may directly affect labor productivity through workers' health and hence human capital.

2.2 Estimated impacts of aging on growth

How large will the impact of projected demographic changes be on economic growth and other macroeconomic performance? Combining the estimated coefficients reported in Table 2 with the UN's population projections yields a sense of the potential magnitudes, and how they may vary across regions.

IMF (2004) summarizes as follows:

- In advanced countries, the impact of upcoming demographic changes on growth could be substantial. The estimates suggest that demographic change could reduce annual real GDP per capita growth in advanced countries by an average of 1/2 percentage point by 2050—i.e., growth would be 1/2 percentage point lower than if the demographic structure had remained the same as in 2000. Growth would be most severely affected in Japan, while the impact in the United States would be relatively small.
- The impact on growth in developing countries will vary by region. In Africa and the Middle East, per capita growth could be boosted by an increase in the share of the working age population. The results suggest that per capita growth in 2050 could be 0.3 and 0.1 percentage points higher, respectively, in these regions. In contrast, demographic changes are likely to weigh on growth in Central and Eastern Europe and, to a lesser extent, in emerging Asia and Latin America by 2050 (although in these latter two regions, individual country experience will vary).

The same framework can be applied to estimate decade-to-decade impacts of demographic change on economic growth in the past as well as projected periods. Table 3 and Figure 5 show the result for selected PECC economies. First, we find that all economies experienced positive impacts of demographic changes on growth for some duration during the latter half of the 20th century. Even Japan enjoyed this demographic dividend during the 1950s and 1960s, while developing PECC members in East Asia did so persistently from the 1960s toward the end of the 20th century.

Second, this positive impact will largely come to an end by 2010 and negative impacts will begin in the 2010s (or later in Indonesia, Malaysia and the Philippines) toward 2050. While the first negative impact since the 1960s sank in, first, in Japan in the 1970s, it hit the United States in the 1980s, and Australia and New Zealand in the 1990s. Korea will come next in the 2000s, and China, Hong Kong, Singapore and Thailand will follow in the 2010s.

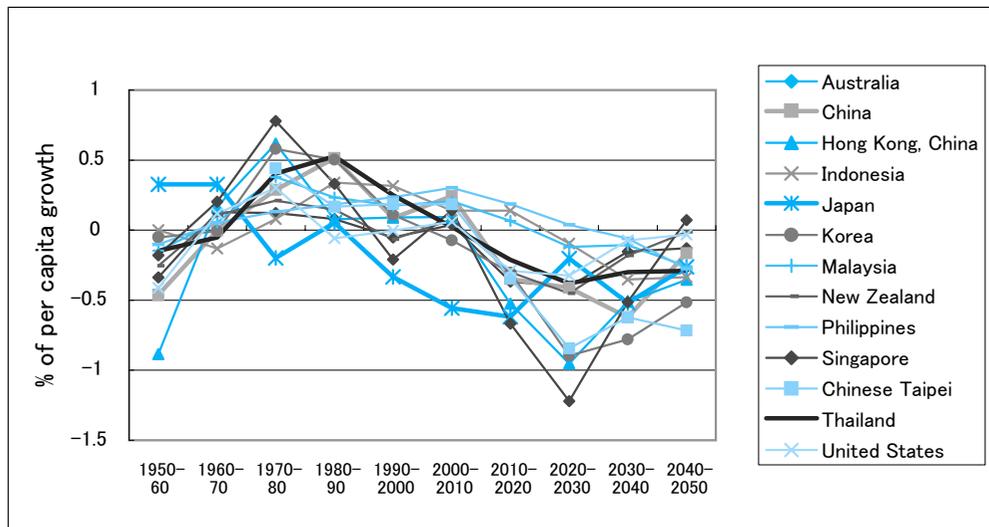
Third, with regard to the size of the impacts in terms of per capita growth, both the positive and negative impacts will be larger in Hong Kong, Korea and

Table 3. Estimated Total Demographic Impacts on Per Capita Growth

	1950-60	1960-70	1970-80	1980-90	1990-2000	2000-2010	2010-2020	2020-2030	2030-2040	2040-2050
Australia	-0.34	0.13	0.12	0.08	-0.05	0.04	-0.37	-0.40	-0.15	-0.13
China	-0.46	-0.00	0.29	0.52	0.09	0.24	-0.35	-0.41	-0.62	-0.17
Hong Kong, China	-0.88	0.17	0.62	0.08	0.09	0.09	-0.52	-0.95	-0.51	-0.35
Indonesia	0.00	-0.13	0.08	0.34	0.31	0.14	0.14	-0.09	-0.35	-0.34
Japan	0.33	0.33	-0.20	0.05	-0.33	-0.56	-0.62	-0.20	-0.52	-0.26
Korea	-0.05	-0.01	0.58	0.50	0.11	-0.07	-0.30	-0.90	-0.78	-0.52
Malaysia	-0.15	0.06	0.38	0.23	0.18	0.21	0.07	-0.12	-0.11	-0.26
New Zealand	-0.26	0.11	0.21	0.15	-0.06	0.07	-0.30	-0.45	-0.18	-0.01
Philippines	-0.10	0.05	0.13	0.18	0.24	0.30	0.19	0.04	-0.06	-0.28
Singapore	-0.18	0.20	0.78	0.33	-0.21	0.14	-0.67	-1.22	-0.51	0.07
Chinese Taipei			0.44	0.17	0.19	0.18	-0.34	-0.84	-0.62	-0.72
Thailand	-0.15	-0.05	0.40	0.53	0.25	0.02	-0.21	-0.38	-0.30	-0.29
United States	-0.41	0.12	0.30	-0.06	-0.00	0.06	-0.29	-0.32	-0.07	-0.03

Source: Author's calculation based on *Population Projections for Taiwan Area 2006-2051*, http://www.cepd.gov.tw/encontent/en_data/en_list.jsp?linkID=239&parentLinkID=112, and *National Income*, <http://eng.stat.gov.tw/lp.asp?ctNode=3567&CtUnit=1179&BaseDSD=7>

Figure 5. Estimated Demographic Impacts on Per Capita Economic Growth



Source: Author's calculation based on *Population Projections for Taiwan Area 2006-2051*, http://www.cepd.gov.tw/encontent/en_data/en_list.jsp?linkID=239&parentLinkID=112, and *National Income*, <http://eng.stat.gov.tw/lp.asp?ctNode=3567&CtUnit=1179&BaseDSD=7>

Singapore than in the other PECC economies, and the negative impacts in the near future will be sharper and more acute than the positive ones in previous periods in those economies. Somewhat surprisingly, their negative impacts will be even

larger than will occur in Japan. One of the reasons for this asymmetry comes from the negative impacts arising from the increasing share of the elderly population as opposed to either positive or negative impacts from the increasing and then decreasing

share of the working age population.

3. IMPACT OF DEMOGRAPHIC CHANGES ON SAVING, INVESTMENT AND CURRENT ACCOUNT

The conventional argument is that the demographic impacts on saving come from individuals' consumption smoothing behavior over lifetimes. This life-cycle behavior is assumed to show dissaving when individuals are young, little saving early in adult life, high saving at the middle and end of the working life, and then low or negative saving after retirement. Changes in the age composition of the population therefore affect aggregate personal saving. In particular, a demographic transition initially increases household saving as it reduces the number of young dependents and increases the number of working adults, but eventually it reduces saving as a larger portion of the population retires and reaches old age.

There are, however, ambiguities on saving behavior in the later stages of the life cycle. Studies based on macroeconomic data generally support the predictions of lifecycle approaches (for example, an increase in the elderly dependency ratio reduces saving). Studies based on microeconomic data, however, have cast some doubt on the extent to which the elderly dissave.² This may be because simplified lifecycle approaches do not adequately take into account the desire of the elderly to leave bequests, or their uncertainties about their lifespan after retirement and the financial support they will need. Some empirical studies based on household survey data do not adequately incorporate the public pension portion of elderly incomes, and this is why they may appear at odds with lifecycle behavior.³

Furthermore, when thinking about national saving, it is important to keep in mind that it consists of not only household saving but also corporate and public saving, all of which could behave in a very uncorrelated manner. For example, if we look at macroeconomic developments in the global economy since 1997, about two-thirds of the fall in saving rates in the industrial countries has been due to a reduction in private saving, with falling household saving only partly offset by higher corporate saving (IMF 2005). Noticeably, corporate saving has replaced household saving as the main source of private sector saving in industrial countries. In contrast, the saving rate in emerging markets has resumed its

secular increase, reaching a record high level in 2004. A substantial part of this increase reflects higher public saving.

These aggregate developments, however, mask considerable variation between the countries and regions. The recent deterioration in saving rates in industrial countries has been particularly marked in the United States and Japan. In Japan, this is a continuation of the decline in saving that began in the early 1990s, driven by a large drop in public saving. In the United States, saving has declined sharply since the late 1990s driven initially by a drop in private saving and since 2000, by the swing in the government budget from surplus to substantial deficit. Furthermore, in both Japan and the United States, corporate saving has risen substantially, offsetting lower household saving. Accordingly, there are good reasons why national saving does not necessarily appear to be consistent with the lifecycle hypothesis for household saving behavior.

With regard to investment, empirical studies generally find that investment is positively related to the share of young population.⁴ Countries with higher youth dependency rates face a relatively higher demand for investment in human capital and infrastructure. As a population ages, however, the labor force grows more slowly and the level and composition of investment (for example, in medical facilities) shift with the needs of a more elderly population.

The net effect on the saving-investment balance may or may not vary during the different stages of the demographic transition. Countries with a relatively young population may experience current account deficits, when investment demand outstrips domestic saving. As children age, fertility rates decline, life expectancy rises and the share of working population increases, which in turn may tend to cause saving to rise faster than investment. Hence, as economies go through the middle stages of a demographic transition, they are expected to experience current account surpluses. Eventually, as the aging of the population continues, the net impact on the saving-investment balance becomes ambiguous, reflecting uncertainty about the relative effects of rising elderly ratios on saving and investment. Although higher elderly dependency is often associated with an excess of investment over saving,

and hence a current account deficit, this partial correlation has lower statistical reliability.⁵

3.1 Estimated Impacts of Aging on the Current Account Balance

Just as in the case of estimated impacts of aging on per capita economic growth, the IMF (2004) summarizes the estimated impacts on current account balance as follows:

- Current account balances increase with the relative size of the working age population and decrease when the elderly dependency ratio rises. Although saving and investment are both affected by the age structure of the population, so that it is not immediately obvious what impact demographic change should have on the current account, most empirical studies agree with this. The same framework can be applied to estimate decade-to-decade impacts of demographic change on economic growth in the past as well as projected periods.
- Future demographic changes could lead to large changes in current account balances. In advanced economies, the negative impact of population aging on saving will generally result in deteriorating current account balances; indeed, for Japan, the results suggest that the deterioration could be on the order of 2 1/2 percentage points of GDP. The major exception is the United States, where demographic devel-

opments could lead to an improvement in the current account position of over 1 percentage point of GDP.

As before, let us turn to the estimated decade-to-decade impacts of demographic change on the current account in the past as well as projected periods. Table 4 and Figure 6 show the result for selected PECC economies. First, while we see negative impacts in developed economies and positive impacts in developing economies in the region until the 1980s, negative impacts have prevailed in both groups since the 1990s and then more or less large negative impacts will develop in the 2010s. This is simply because we assume a relatively large impact of the share of the elderly population (-0.25) as compared to the share of the working age population (0.05).

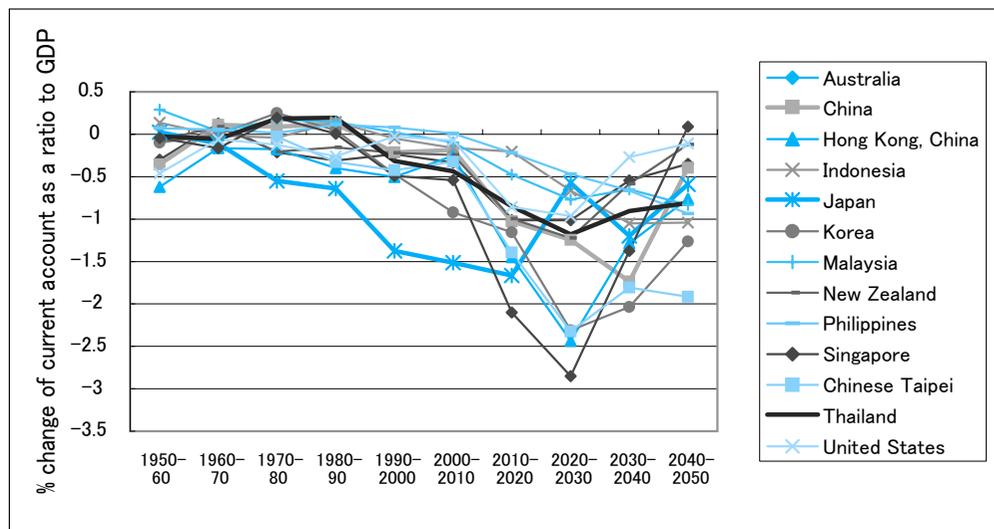
Second, as a result of the above, while Japan turned out to have had persistent negative impacts since 1970 and toward the 2000s in terms of the current account when it had persistent current account surplus, the country will have less negative impacts from the 2020s onwards. Third, somewhat surprisingly, advanced economies in the region will suffer from significant negative impacts in the 2020s, and Hong Kong, Korea and Singapore (and later China) will face serious negative impacts in their current accounts.

Table 4. Estimated Total Demographic Impacts on Current Account

	1950-60	1960-70	1970-80	1980-90	1990-2000	2000-2010	2010-2020	2020-2030	2030-2040	2040-2050
Australia	-0.30	0.13	-0.22	-0.31	-0.24	-0.34	-1.02	-1.02	-0.55	-0.35
China	-0.36	0.11	0.09	0.12	-0.22	-0.19	-1.03	-1.25	-1.74	-0.40
Hong Kong, China	-0.62	-0.17	-0.18	-0.40	-0.51	-0.26	-1.45	-2.44	-1.29	-0.76
Indonesia	0.14	-0.02	-0.04	0.15	-0.05	-0.16	-0.21	-0.67	-1.05	-1.04
Japan	0.03	-0.11	-0.55	-0.64	-1.38	-1.52	-1.67	-0.58	-1.20	-0.59
Korea	-0.10	-0.01	0.25	0.05	-0.47	-0.92	-1.16	-2.31	-2.04	-1.27
Malaysia	0.29	0.04	0.17	0.15	0.02	-0.10	-0.48	-0.77	-0.65	-0.84
New Zealand	-0.07	0.09	-0.21	-0.16	-0.22	-0.25	-1.00	-1.23	-0.59	-0.12
Philippines	0.07	0.06	0.02	0.12	0.08	0.01	-0.22	-0.47	-0.67	-0.94
Singapore	-0.05	-0.17	0.20	0.01	-0.49	-0.54	-2.10	-2.85	-1.38	0.09
Chinese Taipei			-0.03	-0.33	-0.43	-0.32	-1.39	-2.32	-1.81	-1.91
Thailand	-0.03	-0.06	0.19	0.20	-0.32	-0.44	-0.85	-1.18	-0.91	-0.81
United States	-0.46	-0.06	-0.13	-0.26	-0.03	-0.08	-0.86	-0.97	-0.27	-0.11

Source: Author's calculation based on *Population Projections for Taiwan Area 2006-2051*, http://www.cepd.gov.tw/encontent/en_data/en_list.jsp?linkID=239&parentLinkID=112, and *National Income*, <http://eng.stat.gov.tw/lp.asp?ctNode=3567&CtUnit=1179&BaseDSD=7>

Figure 6. Estimated Demographic Impacts on Current Account



Source: Author's calculation based on *Population Projections for Taiwan Area 2006-2051*, http://www.cepd.gov.tw/encontent/en_data/en_list.jsp?linkID=239&parentLinkID=112, and *National Income*, <http://eng.stat.gov.tw/lp.asp?ctNode=3567&CtUnit=1179&BaseDSD=7>

4. HOW TO COPE WITH POSSIBLE ECONOMIC SLOWDOWN?

Admitting that the impact of aging on economic growth and other macroeconomic developments is far from unambiguous, a policy that responds to aging in order to enhance labor supply, saving/investment and/or productivity is needed. We can summarize potential policy implications against possible negative impacts of aging along the lines put forth by the IMF (2004).

Labor supply. *Increasing labor market participation rates* is critical in order to cope with a decline in the labor supply. Measures to enhance labor force participation rates and labor supply, particularly among women and elderly have therefore attracted considerable attention. The increase in the participation rate among the working age population that would be necessary to keep the workforce-to-population ratio at current levels, however, is large. According to the IMF (2004), for advanced countries, participation rates would need to increase by an average of 11 percentage points, with the required increase being much higher for European countries and Korea than for the United States.

Permitting more immigration could also increase the labor force. In the PECC region, Hong Kong,

Singapore and Chinese Taipei are active host economies, while Indonesia and Philippines are source economies. Again, the migration flows that would be required to keep the labor force-to-population ratio constant at current levels are very large, particularly in light of the fact that the levels of migration have been low in recent years.

Raising the retirement age could also help offset the impact of population aging on the labor force. IMF (2004) estimates that an increase of about seven years would be needed, on average, in the advanced countries to keep the share of the working age population constant at its current level.⁶

Increasing fertility rates is naturally a fundamental solution to aging, though being a long-term one. These policies are relevant to emerging market economies including Hong Kong, Korea, Singapore, Chinese Taipei and Thailand as well as the advanced economies in the PECC region. It is far from unambiguous, however, whether public policies can raise fertility in low-fertility countries (Demeny 2003).⁷ In developing countries, in contrast, the larger working age populations need to be absorbed into the workforce. This holds true for Indonesia and the Philippines in the PECC region, which will require reforms to improve the flexibility of labor markets,

as well as better education and training to provide the skills necessary for employment.

Capital formation. A larger and more labor-efficient capital stock could help to at least partially offset the impact of a declining labor supply. As far as the Feldstein-Horioka paradox goes, saving may need to increase in order to finance domestic investment. One way to do this is for the government itself to save more, namely, generating primary fiscal surpluses and reducing public debt in emerging market economies as well as in advanced countries in the PECC region. In reality, however, population aging is likely to increase health care expenditures and make this fiscal task more difficult. As well as helping to contain public sector outlays, pension reforms may also contribute to higher private saving. In developing countries including those in the PECC region, as a general rule, a strong and stable macroeconomic framework together with institutional reforms are important elements of an environment conducive to domestic saving, capital inflows and capital accumulation.

Productivity. More efficient use of existing capital and labor could also offset the expected decline in labor and possibly capital availability in the advanced countries and the more rapidly aging developing countries. In this context, structural reforms aimed at boosting productivity by reducing the impediments to competition, improving labor market and price flexibility, upgrading human resources through investment in education, and spurring innovation will be important. Even in other developing countries, enhancing productivity would provide an important complement to the positive impact that demographic change may have on per capita growth in the coming years.

5. MISSING LINKS

5.1 Individual and Time Effects

To what extent can we rely on the above benchmark results of estimation? We need to keep in mind two reservations. First, we should note that the estimated responses of demographic changes, represented by parameter estimates in Table 3, are average estimates across regions as well as periods. Namely, if we have very diverse responses across regions and periods, the responses could be larger or smaller depending on the specifics of each region and time period. In fact, it would be rather surprising if we

have identical responses in practice. We should be modest, therefore, and view the estimated parameters only as benchmark averages instead of representative figures. Second, we should note that the estimated responses are historical estimates based on past data. Namely, they were carried out under past institutional environments which will likely be very different from future ones in various respects. For example, the degree of trade and capital openness, pension and other social safety net schemes, etc. could endogenously and significantly change these responses in the future. In other words, we may overlook many adjustment mechanisms across diverse economies/regions as well as unforeseen institutions.

In addition to the reservations pointed out in the previous section, which holds true for this section as well, we should specifically emphasize the possibility of striking cross-national differences in the time series pattern of saving and investment rates. For example, constructing a panel data set of 85 countries over the period 1960–2005, Bosworth and Chodorow-Reich (2006) examine the impact of demographic changes on saving and investment (Table 5). They assert that the demographically-induced fall in saving within the industrial economies will be far smaller than is often assumed because of a similar offsetting decline in investment requirements. Second, they note the importance of demographic effects which varies across regions. The impact in industrial countries appears rather weak, while Asia exhibits extremely large effects. Third, thus far the influence of demographic change on both saving and investment has been very modest, and its effects have been overwhelmed by other developments in the global economy.

Table 5 shows that the implied effects of past demographic changes on rates of saving and investment in (developing) Asia far exceed those for other regions. Whether or not the lack of a social safety net and/or a greater role for dynastic saving and other cultural factors, it suggests that Asia is the source of macroeconomic evidence for large demographic effects on saving. Nevertheless, there is no guarantee that the large sensitivity to demographic change will continue in future years as their incomes increase. In fact, many of the higher-income Asian countries, for example, have begun to introduce public retirement and unemployment insurance

Table 5. Demographic Impact on Saving and Investment by Major Region

Variable	All Countries	Industrial Countries	Latin America	Asia	Other	All Countries minus Asia
Saving						
Aged dependency	-0.64	-0.14	-0.72	-1.68	-0.32	-0.4
	(-6.7)	(-1.3)	(-2.7)	(-3.0)	(-0.8)	(-3.7)
Youth dependency	-0.19	-0.4	-0.25	-0.19	0.19	-0.11
	(-6.9)	(-6.4)	(-4.0)	(-3.1)	(-3.3)	(-3.1)
Investment						
Aged dependency	-0.28	-0.22	-0.78	-2.37	0.09	-0.18
	(-3.7)	(-2.5)	(-3.7)	(-4.3)	(-0.3)	(-2.2)
Youth dependency	-0.06	-0.17	-0.04	-0.29	0.11	0
	(-2.8)	(-3.4)	(-0.7)	(-4.8)	(-2.5)	0

Note: Regression of saving and investment ratios to GDP. In parenthesis are t-values.

Source: Bosworth et al. [2006], Table 4.

programs that will likely affect future saving and investment patterns.

5.2 General Equilibrium Considerations

Econometric analysis has been used to examine how demographic change could affect key economic variables. While it is a useful and convenient apparatus, it is known to suffer from some drawbacks. For example, each variable (i.e., saving, investment or the current account) is considered separately rather than as part of an integrated economic system, and the historical correlations identified between variables may not reflect causality. In particular, econometric analysis of demographic issues is subject to problems of endogeneity and omitted variables. For instance, income itself is an important determinant of fertility, mortality and hence the age structure of populations, and this in turn may introduce biases into the estimated coefficients.

Thus far, the global impacts of demographic change and the macroeconomic interactions among national economies through multiple channels of interdependence have been completely neglected. Namely, interest rates, exchange rates and external transactions need to be examined within a global general equilibrium framework. Explicit multicountry models, despite their weaknesses, are without doubt more desirable than partial equilibrium or implicit, unsystematic methods.

To address these issues, the IMF (2004) examines the potential impact of demographic change, using a multiregional macroeconomic model that explicitly captures the interactions between variables and across countries within an integrated and consistent framework. The results from the model and those from the econometric exercise reach broadly similar conclusions about the likely impact of the demographic changes projected over the next 50 years. It must be pointed out, however, that substantial uncertainties exist with these results, and different models project different outcomes. For example, simulations using some other multiregional general equilibrium model suggest a broadly similar impact on per capita GDP, but different future current account paths.⁸ While the behavior of saving is particularly critical to the results, it is not certain how households will respond to demographic change in reality, despite the lifecycle hypothesis. Will the elderly dissave in retirement or will they seek to maintain their wealth in the face of uncertainty about how long they will live? Further, if people expect that incomes in the future will be lower because of demographic change, will they raise saving in the near-term to smooth their future consumption?

5.3 Globalization

Globalization has linked macroeconomic variables across national borders more closely than in the past. External transactions and adjustments to

demographic shocks have become more important than purely domestic adjustments. Because demographic transitions are different in their pace and intensity across countries, their macroeconomic developments are strongly influenced by external transactions and exchange rate changes.

Countries with faster demographic transitions and greater population aging are likely to experience an appreciation of their currencies and current account surpluses (i.e., national saving exceeding domestic investment). Such changes partly cushion the rapidly aging economies from their larger demographic shocks; the openness of their economies works to mitigate the negative consequences for domestic output and consumption. On the other hand, industrial countries that are aging more slowly may experience opposite, adverse effects. It seems likely that population aging in the industrial economies will reduce the pool of available saving in those economies as a whole by less than it will reduce the domestic demand for investment funds. It is uncertain, however, whether industrial countries as a whole can feasibly run large, sustained current account surpluses with developing nations (that is, exporting some of their savings to finance productive investments in developing nations). In order for such a major change in the saving-investment balance of developing regions of the world to occur, low-income countries will have to make major progress in macroeconomic management, prudential supervision of financial markets and greater security for contracts.

Understanding how demographic change will affect saving, investment and net capital flows is far from complete. There are uncertainties not only about the demographic projections themselves, but also about the reactions of private saving and investment as the demographic transitions unfold. Households—in both advanced and developing countries—will probably respond according to the broad predictions of the lifecycle model; but aggregate saving, investment and net capital flows will also be significantly influenced by other factors including international differences in policies and business cycle conditions.⁹

6. CONCLUDING REMARKS

Like the world itself, the PECC region is in the midst of the demographic transition that is resulting

in an unprecedented aging of its population. Different economies, however, are at different stages of this transition. In most advanced economies (with Japan as a front runner), population aging is already well under way and the share of the working age population is projected to decline significantly. Some emerging members will be accelerating their pace of catch-up with advanced economies over the next 50 years. In contrast, the relative size of the working age population in developing economies in the region will rise in the coming years before aging begins.

The impact of these demographic shifts will be diverse in pace and degree across economies. According to conventional econometric analysis, in advanced countries, population aging will strain the finances of governments, especially pension and health care systems, while per capita growth rates are likely to be reduced. Notable is that the negative impacts of aging upon per capita economic growth in emerging markets in the region may exceed that of Japan, though with some time lags. In other PECC developing economies, their impacts will be negative (although modest) in contrast to developing countries in the rest of the world. International capital flows could be significantly affected. The conventional estimates suggest that significant changes in saving, investment and current account balances could take place in the next 50 years.

However, this conventional econometric analysis is too simplistic to project reliable future scenarios on macroeconomic development in the PECC region. It tends to understate country differences and time effects as well as possible future adjustments. In general, estimated parameters have tended to overstate the positive effects of demographic dividends in the past. Accordingly, straightforward application of those parameters to future projections in the period of aging tends to exaggerate negative demographic impacts, particularly without considering adjustment mechanisms including institutional and environmental changes. Even so, the estimated negative impacts on per capita economic growth in the PECC member economies appear modest to be in the range of at most -0.6 percent for one or two decades with the only exceptions being in Hong Kong, Korea and Singapore for the 2020s and 2030s.

In addition, there are considerable uncertainties and our understanding of how demographic change will affect economic performance is far from complete. For example, while it is clear that population aging will place strains on pension and health care systems in advanced countries, the magnitudes of the financial impact will depend on demographic outcomes, which are difficult to project. Even greater uncertainty surrounds the impact of demographic change on external balances and capital flows. Here, much will depend on the reaction of private saving, but it remains unclear to what extent households will adjust their behavior as the demographic transition unfolds.

Since the present dramatic population aging is unprecedented, it will inevitably bring serious economic and political challenges. Note, however, that life in aging, capital-intensive and culturally diverse countries in itself is part of our ultimate goals and there seems to be no strong reason for significantly negative impacts of aging on potential economic growth and other macroeconomic development in the PECC region. Pessimism on the impact of aging is unfounded, especially “provided our institutional structures are sufficiently flexible to allow us to adapt our life cycle plans to the changing circumstances and provided we are willing to pay for the health care and the extended retirement that we apparently want” (Lee 2003).

ENDNOTES

¹ Bloom, Canning and Sevilla (2001).

² Poterba (2004).

³ Miles (1999).

⁴ Higgins (1998).

⁵ Higgins (1998) and Bosworth and Keys (2004).

⁶ A remaining issue to consider is the possible role of labor mobility in the demographic adjustment process. Most macroeconomic models assume that labor does not move across countries. This omission could lead model predictions to overstate the role of

capital flows in the adjustment process because movements of labor from regions with rising working age populations to those with rising elderly dependency ratios are a possible alternative to capital flows. Government policies inhibit the flow of people across borders. In fact, immigration policies are a more significant determinant of migration than the willingness of individuals to migrate. Large movements of people across borders in the coming decades are thus unlikely—at least under current policies—to significantly mediate the macroeconomic effects of asymmetric demographic transitions.

⁷ Proponents of an activist public policy to raise fertility often point to the Scandinavian experiences, where measures to make motherhood and participation in the labor force by women more compatible have been implemented. While fertility rates have increased in recent years, it is not obvious whether these measures have caused the increase in fertility. For example, the IMF (2004) pointed out that fertility rates in the United States have also risen in recent years largely in the absence of such policies. In the United States, the private sector has responded to the increase in demand for child care and this has supported female labor force participation.

⁸ See Batini, Callen and McKibbin (2004).

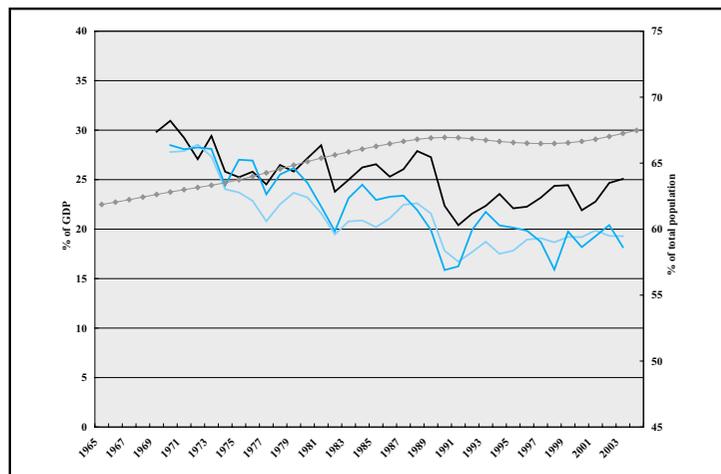
⁹ Empirical studies have found evidence that population age structure affects stock market prices and the real returns of different asset classes, but the consistency of this evidence is not overwhelming. It is not clear whether the evidence shows that demographic influences on asset prices and returns are large relative to other and less predictable determinants of prices and returns. The estimated effects of demographic factors are often sensitive to the start and end dates of the period analyzed and to the countries included in the sample. Researchers sometimes find that estimated demographic effects have the opposite sign in different countries, even countries such as Canada and the United States which share similar demographic histories and financial institutions. Economists can offer some plausible explanations for the divergent effects of demographic factors in different countries, but so far the evidence in support of these theories is weak.

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**EXECUTIVE SUMMARIES
ON INDIVIDUAL ECONOMIES**



— Gross capital formation
 — Gross savings
 — Private savings
 ◆ Population ages 15-64 (RHS)

According to Australia’s Productivity Commission, the proportion of Australians aged 65 years or over is expected to more than double by 2050. Similar to other developed countries, the population aging in Australia is attributable to increases in life expectancy and reduced fertility rates. Exactly how this will affect Australia’s long-term economic prospects has generated significant analysis and policy debate.

Aging is occurring more slowly in Australia as compared to other European and Asia-Pacific economies; nevertheless, in the coming decades, Australia’s population is expected to age rapidly. By mid-century almost one in four persons, or 7 million Australians, will be 65 years of age or over. Over the same period, the proportion of people over 85 years—i.e., the “oldest of the old”—is anticipated to rise from 1.5 percent to 5.0 percent.

Population aging not only relates to the number of elderly people, but also refers to the age structure of the population, that is, the ratio of the old to other ages. In Australia, the age structure of the population has shifted markedly. At present, there are 5.2 people in the potential workforce for every person aged 65 years or older, giving rise to an aged-dependency ratio of around 20 percent. By mid-century, the figure will have fallen to less than 2.4 people, increasing the aged-dependency ratio to over 40 percent. This is symptomatic of the long-run decline in fertility that has occurred in Australia since the 1960s and is not a product of the so-called “baby

boom” that followed the end of World War II (although it is often mistakenly associated with that phenomenon).

Much of the projected change reflects slow growth in the population of younger age groups in the forthcoming decades. Still there are a sufficient number of younger people to drive the economy and provide necessary services, and it should be possible to meet the needs of any given number of old people.

While population aging will accelerate in the coming decades, the impact on Australia’s national prosperity will be slight to modest, compared to other economies in the region that are experiencing more pronounced aging. For Australia, the estimated worst that can be expected is a slowing in the rate of growth of living standards in the order of 0.13 percent per annum and the best case is a slowdown of 0.015 percent. To put this in proper perspective, without any demographic change, living standards could be expected to grow at the rate of growth of labor productivity on average, which the Productivity Commission expects to be 1.75 percent per annum. The worst case would cut 0.13 percent from that, which implies a 1.62 percent growth in living standards.

Population aging does, however, pose challenges. It will have fiscal effects, alter international capital flows and change the relative prices of labor and capital. These consequences will mainly involve

income transfers within the economy rather than affect national living standards, although funding increased pensions and health care costs implies a disincentive to work effort arising from higher future tax rates.

Concerns about population aging may be alleviated by noting that aging is predominantly a reflection of beneficial trends, i.e., improved life expectancy and voluntary reductions in fertility. Moreover, population aging is a gradual phenomenon and its economic and fiscal impacts will build slowly over time.

Unfunded pension liabilities, while significant, will not exert as much pressure on Australia's government budget as it will in many other advanced economies. Australia will be a richer country when these impacts are felt and will have a greater capacity to absorb the additional costs of aging with average per capita incomes expected to be almost twice as large at mid-century than at present. Older Australians will also continue to play a significant role as volunteers and community members, with the value of volunteering expected to rise significantly by 2050.

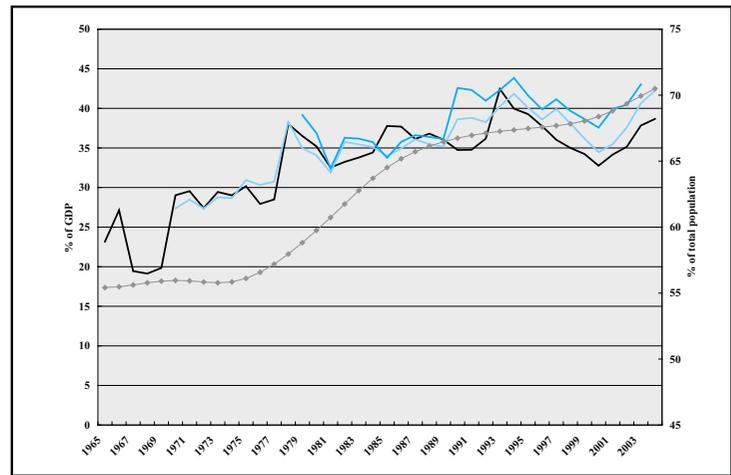
Policies can mitigate the effects of population aging on living standards and the fiscal balance by influencing fertility rates, migration, labor force participation and productivity growth. For instance, there has been a significant rise in the Australian birth rate since the Australian government introduced a maternity payment in 2004 that was raised again in 2006.

Without continued immigration, Australia's population will age more rapidly. However, substantially larger migrant intakes could result in unsustainably large population growth. Within the existing program, skilled migrants will lessen the fiscal impact of aging although competition with other aging economies for skills is strong.

Population policies are likely to be less effective than policies that encourage greater labor force participation in raising Australia's future labor supply. Recent retirement-related policy changes now dissuade early retirement.

The economy's capacity to meet the higher costs of

aging over the longer term depends critically on productivity growth because higher productivity-induced household incomes and increased average tax revenues would considerably lessen fiscal pressures. Considerable scope for improving productivity performance remains through policy reforms that heighten efficiency. For instance, at the sectoral level, a more efficient health system could play a role in reducing the direct costs of aging through better coordination across services and jurisdictions, a more flexible health care labor market, and better preventative health care. According to the Productivity Commission, productivity performance could also be further raised through policies focused on infrastructure, taxation, labor markets, natural resource management, innovation policy and the regulatory environment.



— Gross capital formation
 — Gross savings
 — Private savings
 ◆ Population ages 15-64 (RHS)

Since the 1970s, the family planning program has been in place throughout rural and urban China and, as a result, China's demographic transition process from the phase characterized by a high birth rate and low death rate to the phase characterized a low birth and low death rate has been shortened. At the start of the country's recent economic boom in 1982, China's population age structure was largely a bottom-heavy one which is characteristic of a young and growing population. In contrast, by 2000, China's population age structure was that of a mature population, where the largest shares are found in the working age populations. According to the result of the 1-percent population spot check issued by the National Statistic Bureau in August 28, 2006, by 2005, the population of age 0–14 years was 264.78 million or 20.27 percent of the total population, the population of age 15–59 years was 897.42 million or 68.70 percent of the total population, and the population aged 60 and over was 144.08 million or 11.03 percent (among this group, those 65 and over was 100.45 million, equivalent to 7.68 percent of the total population).

In February 23, 2006, the Office of China National Committee on Aging issued a report that studied the development trend of Chinese aging. The general conclusion of the report is that population aging is enduring and is irreversible in the 21st century. The proportion of older persons continues to rise and this trend is expected to continue throughout the next century. According to the report, both the proportion of older persons in the population and

the rate of population aging have been rising since 1999 when China transitioned from a mature society to an older society. The projected elderly population in 2100 is expected to be 318 million and will make up 31.09 percent of the total population.

The most significant period of population aging will be the period spanning 2030–50. During this period, the fastest-growing age group will be the oldest-old, i.e., those aged 80 years and over; this age group is expected to hit 437 million in 2051.

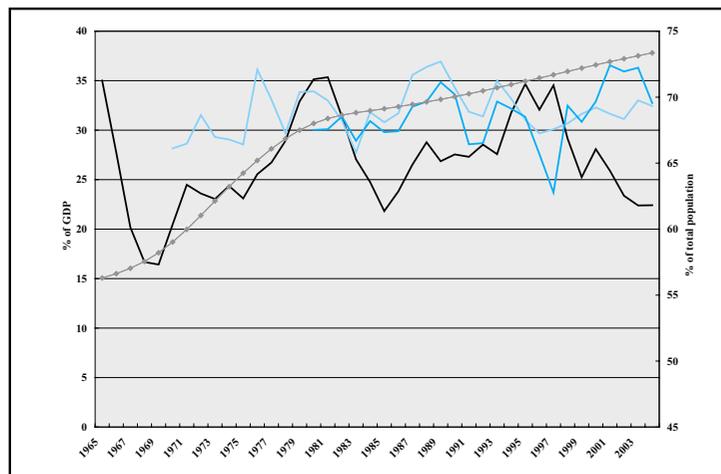
The golden period of population growth with a low support ratio that benefits economic growth will come to an end in 2033. After 2030, the total support ratio will increase by a large margin, exceeding 50 percent, with the older support ratio growing rapidly. Generally, the total support ratio and the older support ratio will rise to 60–70 and 40–50 percent, respectively. Up to the second half of the 21st century, the number of older population, the level of population aging and the older population aging will be stable and be at a high level after 50 years of rapid growth. The older population will be around 300 million, the level of population aging will be 31 percent, the number of persons aged 80 and over will be 80–90 million, and the level of aging of the older population will be 25–30 percent. Thus, the issues surrounding serious population aging and older population aging will soon become obvious.

From the end of 1978 until 2005, the demographic

situation was especially favorable for China's economic growth. The most significant gains from the first demographic dividend has already been reaped by the country, and China's average annual GDP growth rate is more than 9 percent. The gains from the second population dividend have also been reaped. China has maintained a high capital formation rate since the 1980s, and as a direct result, the country has experienced a higher capital-labor ratio and total factor productivity, both of which have contributed to labor productivity and economic growth.

With the population aging, the first population dividend will come to an end. However, with the appropriate economic and public policies, China can still gain from the second population dividend which can, in turn, contribute to China's economic development. In the next decade, the possible decline in savings that results from the aging of the population and the rise in the population share of the elderly is likely to be more than offset by the increase in the share of workers in the latter half of their working life when they tend to be particularly high savers. The demographic factors by themselves would imply higher household savings over the next decade. As the old-aged dependent ratio continues to rise and low-saving younger cohorts become more dominant in the working age group, the saving rate will begin to decline after two decades or more.

Although China officially became an aging society in 1999, the macroeconomic effects of the aging population have not been obvious until now. Nevertheless, we expect it will soon become more evident as the first population dividend will come to an end with the progress of aging and as the comparative advantage in labor-intensive industries erodes. The Chinese government has been paying attention to the issue of population aging and its effects on the Chinese economy. It is important for the Chinese government to take proper measures to resolve these issues related to population aging in order to realize China's economic growth potential.



— Gross capital formation
 — Gross savings
 — Private savings
 ◆ Population ages 15-64 (RHS)

Population aging is undoubtedly one of the major challenges facing the global economy today. While the precise effects of population aging on the economy are still not fully understood, the consensus is that the macroeconomic implications generated are significant and far reaching, and therefore should not be overlooked. In most studies, a reduction in the overall savings rate, lower productivity consequential to the dwindling labor force, slower GDP growth and greater strain on fiscal resources are the oft cited economic effects.

Hong Kong, China is also facing intensifying pressure of population aging. The fertility rate has now dropped to less than 1, which is significantly below the replacement level. Concurrently, thanks to the persistent decline in mortality and improving medical and health care services, life expectancies at birth for both sexes have increased appreciably. These developments taken together have resulted in a surge in the proportion of the elderly (age 65 and above), to around one-eighth today. While the current situation is still not too alarming, the latest official projections point to a marked acceleration in the aging trend in the next two decades, including: (i) a doubling in the proportion of the elderly population (aged 65 or above) by the late 2020s; (ii) sustained slow growth in the total population in the next two to three decades; (iii) a reduced share in the population of working age from 2012 onwards; and (iv) a contraction in the labor force in about ten years' time.

Under a do nothing scenario, the above developments can be expected to have considerable negative effects on the economy. A simple quantitative study based on a Cobb-Douglas production function estimates that the aging trend is likely to drag down the five-year trend growth rate of Hong Kong, China's potential output by 1.2 percentage points in 20 years. Moreover, as most of the old age-related public expenditure items—notably social security payments and subsidized health care service—are noncontributory and are funded by general revenue, the implications of an increasing share of elderly population on Hong Kong, China's public finances cannot be taken lightly.

The Government of the Hong Kong Special Administrative Region (HKSAR Government) is fully aware of the challenges arising from population aging and has been proactively taking the necessary steps to address them. Since population aging is a complex and wide ranging issue that straddles many different areas, a multi-pronged approach is considered to be a more pragmatic and viable option. Broadly speaking, the relevant policies and measures can be categorized into three main types: (i) reform of pension or retirement schemes; (ii) reform of the social security and health care systems, together with reform of the taxation system; and (iii) reform of manpower policy.

More specifically, the HKSAR Government has extensively revamped its population policy in recent years, including aligning the admission conditions

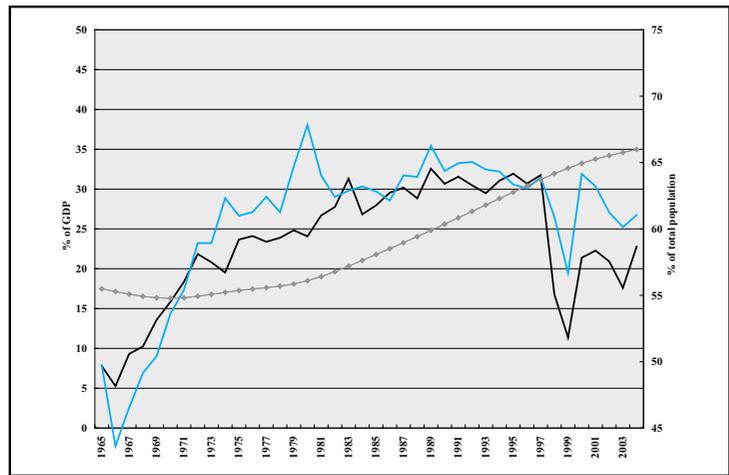
for professionals and talents from Mainland China with those from other sources as from July 2003; granting the same level of tax deduction for all children irrespective of number as of the 2003–04 assessment year; and launching the Quality Migrant Admission Scheme (QMAS) with a view to attracting more high-quality people to come and settle in Hong Kong. On pension reform, the HKSAR Government in 2000 launched the Mandatory Provident Fund (MPF) system to assist the local workforce in accruing financial resources for retirement protection and in replacing the original defined-benefit scheme with a defined-contribution scheme for newly recruited civil servants. For health care reform, the HKSAR Government started consultation on a future health care delivery model in July 2005, recommending repositioning of the public hospital system to target its services more towards low-income and underprivileged groups. With regards to manpower policy, the HKSARG has been devoting substantial resources to investment in education, resulting in a marked improvement in the quality of local workers over the years. There are also other schemes in place to encourage the local workforce to enhance their skills and pursue life-long education.

In order to mitigate the adverse impacts of population aging on public finances and economic growth in general, it is imperative for the HKSAR Government to come up with a coherent policy framework as soon as possible, with a view to coping with the challenges lying ahead. As it normally takes quite some time for public policy to be formulated, deliberated and implemented before producing any real effect on the community, now is probably not too early to kickstart the entire process. Despite the package of measures that have already been put in place, further reforms—particularly those on the social welfare and health care fronts—are still considered necessary.

Admittedly, experiences in other economies thus far are not conclusive as to whether population aging will hamper long-term economic growth. Aging has been observed for quite a long time in some advanced countries, but its effect may have been blurred by their sustained strong income growth. Furthermore, the nature of aging itself has also changed. Old aged people lead much healthier lives today as compared to the past, which allows them to

prolong their contribution to society. It seems likely that the definition of old age will change over time, as will the general perception of what aging is. Old age does not necessarily imply a net liability to the community at large. In quite a number of developed economies, a significant number of businesses are, in fact, related to the “silver hair market” and people are generally inclined to retire at a much older age than before.

Thus, population aging may present both challenges and opportunities for Hong Kong, China. Concerted efforts are needed from all parties concerned, including not only the HKSAR Government, but also nongovernment organizations, the business community and private individuals to improve further the three pillars of old aged financial security (in accordance with the framework suggested by the World Bank), as well as exploit new business opportunities that are generated by the aging trend where appropriate.



— Gross capital formation
 — Gross domestic savings
 — Population ages 15-64 (RHS)

It is widely believed that an aging population has important impacts on potential economic growth because of its expected impact on saving rates, labor supply and productivity. This paper is aimed at addressing issues of aging population and economic growth potential within the Indonesian macroeconomic policy context. In particular, this study answers two questions. First, can the impacts of an aging population on economic growth be explained well through the labor force effect and changes in national saving-investment behavior? Second, what is the impact of an aging population on the potential for economic growth in the medium to long run?

The focus on the Indonesian economy is particularly interesting due to the fact that, compared to other dynamic economies in Asia, Indonesia is still in the earlier stage of its demographic transition, with 7.5 percent of the population of age 60 years or older in 2005. Furthermore, for Indonesia, the demographic transition is considered to be an important issue, not only because of its implications for macroeconomic development in the medium to long run, but also because of its relationship with social values prevailing in society.

From a policy perspective, the Indonesian government's policies on population for the six decades after independence, indeed, have brought about significant changes in the demographic profile of Indonesia's population. Intensive programs on population welfare, especially in family Planning (Keluarga Berencana) and in health programs in

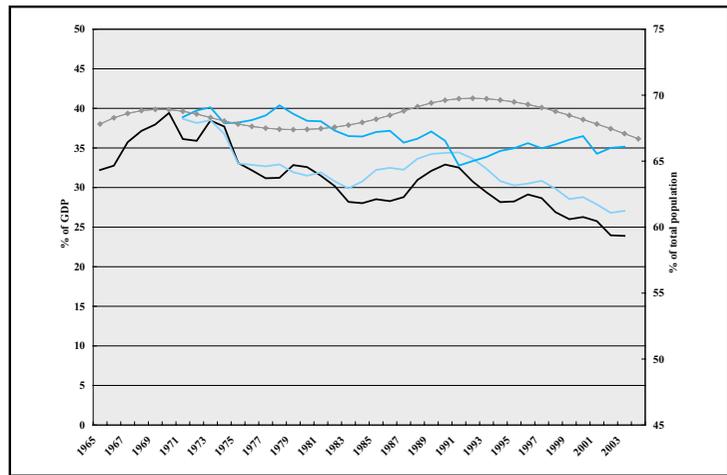
general, have succeeded in accelerating the demographic transition faster than, or at least at the same level as, economic development. This demographic transition is reflected in the rising trend in the number of aging population in the last three decades. The significant progress in Indonesia's economic and human development has resulted in better health conditions for Indonesians and a longer life expectancy. The country's life expectancy has increased dramatically from 45 in 1970 to 69 in 2005. Consequently, the number of Indonesians aged 60 and older have increased from 4.5 percent of the population in 1971 to 7.5 percent of the population in 2005.

It is worth noting that since the beginning of independence, Indonesia has faced and continues to face the problem of aging population vulnerability. In this regard, care for elderly citizens largely falls under the jurisdiction of their families, since it is assumed that productive citizens will take care of their aged and infirm parents. Very few government resources have been allocated to assist elderly Indonesians, especially those who are poor and/or have no immediate family members to assist them. However, since the late 1990s, the way the Indonesian government views the problem of the aging population has begun to change. This is due to changes in family structures and economic conditions that have led to greater difficulty for families to support the care of elderly Indonesians by themselves, thus leaving many elderly Indonesians to fall below the poverty line or become vulnerable

towards poverty.

With the country currently in the early stage of its demographic transition and with potential problems arising in the near future, it is quite difficult to comprehensively investigate the impacts of aging population on potential economic growth in Indonesia. This is so because economic growth is determined by many factors, not only demographic changes, but also other fundamental economic conditions, such as technological levels, human capital and policy environment. In this research, in addition to a qualitative investigation, we propose an alternative parsimonious setup in the context of regression analysis. Based on preliminary exercises, the study concludes that the impacts of aging population on economic growth potential can be explained well through the labor force effect and changes in national saving-investment behavior. In this regard, it is estimated that the increase in the proportion of aging population over the next two decades will hamper economic growth, with approximately 0.5 percent potential loss per year.

The key policy implications arising from the study are to maintain sound macroeconomic policies with low inflation and sustainable public debt, as well as to formulate the policy and institutional framework to promote domestic saving and capital formation. Beyond these findings, the challenges in Indonesian demography are also inseparable with the problem in fostering a higher quality of life and promoting a balance between population dynamics, natural resources and socioeconomic development. It seems also that future economic growth must come from growth in productivity. The fact that productivity growth has tended to slow down during the last ten years implies that the government needs to reexamine its policies with regard to education and training and technology development.



— Gross capital formation
 — Gross savings
 — Private savings
 ◆ Population ages 15-64 (RHS)

Japan's population has begun to decline; from 127.8 million in 2005, the country's population has fallen by 14,000 in 2006 for the first time since the end of World War II. With no significant pickup in fertility projected in the foreseeable future, it is anticipated that Japan's population will shrink to 118 million in 2030 and to 101 million by 2050. Moreover, the proportion of people aged 65 and older will rise to about 36 percent as compared to 20 percent in 2005. In 2100, the total population is projected to fall to around 60 million, only half of its current size. Since World War II, none of the leading world economies has faced a continually declining population as a result of lower fertility and an aging population, and Japan should be the first advanced country to have a society with a declining population.

These demographic pressures place serious challenges to economic policies in Japan. The declining population should depress the country's growth potential through slowing growth of the labor force and a reduction in the household savings rate. Population aging will place a heavier burden on future generations and dampen growth of per capita disposable income. In fact, the Japanese government has begun to seriously consider policy measures such as increasing childcare allowances and other public support to childcare so as to enhance fertility. However, it remains unclear how effective these policies will be and it is almost impossible to turn population growth into positive numbers. In terms of long-term economic prospects, therefore, key policy agenda are how to raise labor participation,

especially of women and the elderly, and how to improve productivity of the overall economy. Both of these could help to mitigate the negative impact of declining fertility and aging population on Japan's growth potential.

This study has three purposes that help to assess the demographic pressures and address policy issues in Japan. First, we review the country's long-term demographic trends, including population growth, fertility, age structure and life expectancy, over the period 1950–2050. Second, we review the relationship between demographic trends and macroeconomic performance, which has been observed over the past decades. Third, we roughly explore the impact of demographic pressures on the country's growth potential over the coming decades and present policy issues. In particular, we survey the current policy discussions about raising labor force participation and improving productivity, and investigate the extent to which these policy measures can affect growth potential.

The key points of the study are summarized below.

First, Japan has entered a phase of population decline with a rapid pace of aging. The total population will decline from 127.8 million in 2005 to 101 million in 2050, and the share of those aged 65 and older will rise substantially from 19.9 percent to 35.7 percent over this same period. This pace of aging is higher than in any other country in the world today. Moreover, there is no sign of increases

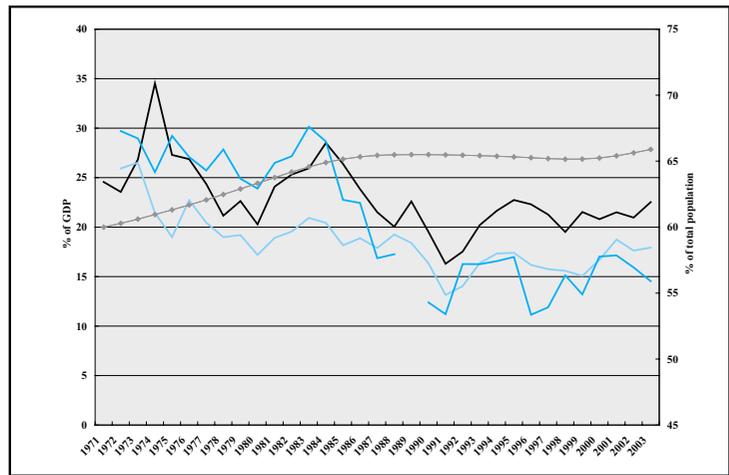
in the total fertility rate, which is officially projected to recover to 1.39 from the current level of 1.29.

Second, population shrinking and aging will reduce the country's growth potential mainly via two routes. On the one hand, the total labor force will decline by 0.8 percent per annum and subtract about 0.6 percentage points from real GDP growth over the next few decades. In addition, population aging will lead to a reduction in the household savings rate, which will decelerate capital accumulation (unless corporate savings do not fully offset its reduction). The overall impact of these two factors on potential growth is expected to be nearly 1 percentage point per annum. Assuming that total factor productivity will grow at 0.9 percent, the rate that has been observed over the past 25 years, the underlying real GDP growth rate over the next 25 years is projected to be around 0.6 percent, much lower than the 2.4 percent pace of growth that has occurred in the past 30 years.

Third, the government should implement policy measures to mitigate demographic pressures and ensure modest economic growth. First, it must enhance labor participation of the elderly and females. This could be accomplished, for example, by an increase in the mandatory retirement age, pension reforms to raise the elderly's incentives to work, and more childcare support and family-friendly policies to make it easier for females to keep working. Second, the government should accelerate productivity growth by promoting corporate R&D activity and enhancing human capital accumulation. The recent low pace of corporate R&D spending as well as the government's limited commitment to education raises concern about prospects of future productivity growth.

Fourth, a combination of enhancing labor force participation and promoting productivity advancement raises the possibility that GDP growth will remain at around 1.5 percent and that per capita GDP growth will sustain almost the same pace that has been observed over the past 25 years.

Lastly, it is difficult to forecast the impact of population aging on financial markets. However, the age pattern of asset holdings suggests that population aging will likely raise demand for riskier assets and have some positive impact on asset prices.



— Gross capital formation
 — Gross savings
 — Private savings
 ◆ Population ages 15-64 (RHS)

Many developed countries around the world, including New Zealand, are experiencing aging populations with older age groups comprising an increasing proportion of the total population. As in other countries, the main drivers of the aging of New Zealand’s population have been declining fertility and rising longevity. This aging of the population may have implications for the economy through its effects on labor supply and productivity, private and public expenditure, and savings and investment.

Population projections suggest that New Zealand’s population will continue to grow, albeit at a slower rate, as the population ages. By the late 2030s, one-quarter of the population will be of age 65 years or older as compared with 12 percent in 2005. The working age population will continue to increase over the next 20 years, before gradually declining, and the labor force will become older. New Zealand has higher fertility and a younger population than many other countries. These afford it some protection from more marked demographic changes that occur with population aging.

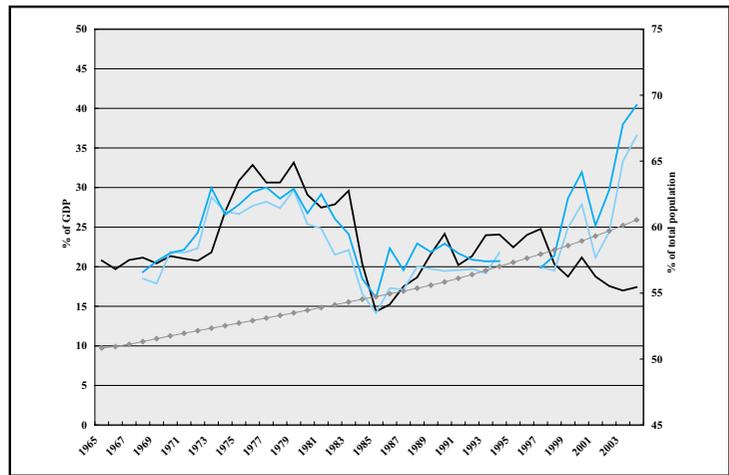
Increased labor force participation and employment of older workers are likely and will partially mitigate the slower and eventually negative growth in the size of the working age population. More elderly

workers in the labor force may reduce average hours per worker, but will not necessarily reduce labor productivity per hour worked. The latter may benefit from a possible improvement in New Zealand’s currently low capital-to-labor ratio.

Private expenditure is likely to decrease and change in composition, while public expenditure is likely to rise significantly, particularly on health care, although not only due to age and superannuation.

Population aging would not necessarily reduce total savings, given increased life expectancy, but is likely to change the types of assets held in favor of investments providing fixed income returns. It is also likely to increase the demand for financial products enabling withdrawal of the considerable equity held in housing in New Zealand. Consequently, a fall in the supply of investment funds available domestically—and, of particular importance for New Zealand, from overseas—which could exert upward pressure on interest rates, is possible but not inevitable. In addition, a fall in demand for investment capital is also not inevitable but depends on changes in labor supply, whether capital augments or substitutes for labor, the cost of and returns to capital, and changes in private expenditure.

Policy options focus on labor supply and productivity, with the greatest potential being in maintaining worker participation and productivity to an older age. These may be particularly important for New Zealand if it is to succeed in improving its low GDP per capita ranking as its population ages, given its already high participation, employment and hours worked and low labor productivity.



— Gross capital formation
 — Gross savings
 — Private savings
 ◆ Population ages 15-64 (RHS)

Many countries, including some in the developing world, are experiencing the increasing burdens of an aging population. The Philippines, however, seems far from having to address this issue. As of 2004, the aging population in the country comprises only 4 percent of the total population and is estimated to reach 10 percent only in 2040.

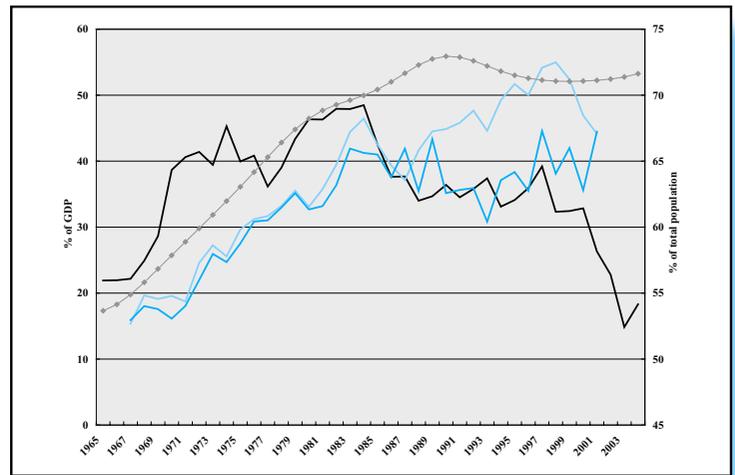
In contrast with other ASEAN countries, the demographic transition in the Philippines has been prolonged. This is because the reduction in fertility, attributed partly to increased income and partly to increased access to contraceptive devices, has been largely delayed for the country (Balisacan and Mapa 2004). As a consequence, the aging of the population has also been delayed, implying a different set of issues for the Philippines.

Although demographic transition “promises” a realization of the “demographic dividend” after about two decades of the “baby boom” period, it does not arrive automatically. The Philippines, with one of the lowest per capita spending on social services—particularly on education (2.8 percent of GDP in 2004) and health (0.3 percent of GDP in 2004)—has failed to establish an environment that enhances human capital in addition to insufficient population management.

The Philippines has done poorly in managing population growth. Despite the assistance and huge inflow of funds from various foreign agencies to help curb the population problem, the decline in

growth of the population is flatter than in most Asian countries. The loyalty of policymakers to natural methods of fertility reduction and the perceived restraint in effort are among the major reasons for the resulting population pattern.

The high population growth rate resulted in other challenges for the country. For one, fiscal and investment policy has been significantly affected by the demographic patterns. Other aspects of socioeconomic policy affected that may be mentioned are labor and education policy. The relatively faster population growth has prolonged the task of significantly reducing unemployment. In addition, alleviating poverty has also been made difficult with rapid population growth accompanied by high fertility rates.



— Gross capital formation
 — Gross savings
 — Private savings
 ◆ Population ages 15-64 (RHS)

The total population in Singapore, which comprises Singapore residents (residents include Singapore citizens and permanent residents) and nonresidents, more than doubled from 2.1 million in 1970 to 4.4 million in 2005.

Singapore is experiencing a steady increase in population and is one of the most rapidly aging populations in Asia. In terms of dependency ratio (defined as the percentage of citizens and permanent residents aged 0–14 and 65 and above per 100 of those aged between 15 and 64), it is expected to increase significantly after 2013, as life expectancy at birth for males and females rose from 74.1 and 78.4 in 1994 to 77.5 and 81.5 in 2005, respectively. As Singapore became more developed over the decades, its total fertility rate per female aged 14–44 years has declined drastically from 4.66, 2.07 and 1.61 in 1965, 1975 and 1985 respectively. Moreover, it has continued to decline significantly since the new millennium to an time low of 1.21 in 2005.

In terms of labor supply, Singapore continues to actively engage foreign white and blue workforce through flexible immigration measures and gradual enlargement of population policy in order to satisfy expanding demand, to improve labor cost competitiveness and to raise labor productivity. The latter objectives are in fact the mission of Standard, Productivity and Innovation or SPRING Singapore, a government agency set up to enhance the competitiveness of enterprises for a vibrant Singapore economy.

The unemployment rate which hit a historical high of 5.4 percent in 2003 due to the SARS outbreak, improved remarkably to 1.9 percent in 2005 (another historical low) due to robust full-scale economic recovery with record job creation in 2006. This achievement is largely complemented by the proactive efforts of the Workforce Development Agency (WDA) that was set up by the Ministry of Manpower (MOM) in 2003, which works in consultation with its Distributed CareerLink Network (DCN) partners in terms of job matching, job skill upgrading and job content redesign.

Notwithstanding significant improvement in the unemployment rate in recent years, the government is fully aware of the potential structural unemployment of the resident population of age 40–49 of age and older, coming from both the white (diploma and degree holders) and blue collar (with secondary or lower education attainments) workforce. The potential structural unemployment is also exacerbated by widening income disparity, as measured by the Gini coefficient which has worsened from 0.49 in 2000 to 0.52 in 2005. This deterioration in income distribution is due to increased globalization, rapid technology upgrading and economic restructuring currently going through the Singapore economy, which hit the middle age and older workers the hardest.

In terms of labor force participation rate, female participation has risen steadily over past the two decades from 46 percent in 1995 to 54 percent in

2005. This is particularly true for females in their early 30s, largely due to a successful policy on equal opportunity in education. However, female labor force participation dropped drastically for women in the early 50s as compared to males, probably due to age-sex discrimination and considerations for caring of extended family. Despite the longer average life span for Singaporeans, labor force participation for both sexes after 60 of age dropped dramatically, and this may be evidence of discrimination or general reluctance by employers to engage senior workers.

In terms of the mix of locals and foreign workers, which stood at 3:2 in 2005, MOM is facing the dual challenge of effectively meeting labor market demand during economic upturns without jeopardizing growth, and at the same time, ensuring swift retrenchment of the contract-base foreign workers to ensure low unemployment for the local workforce. MOM must ensure that policies on foreign labor will not unintentionally “price out” the competitiveness of the local workforce or hamper efforts toward higher productivity. That is, MOM has to balance meeting the economic growth-driven labor demand against foreign workers’ welfare, coupled with social friction and security impacts on the resident population in Singapore.

Singaporeans continued to be the biggest savers in the world, with gross national saving to GDP well over 50 percent in the 1970s and 1980s, and at 49 and 44 percent in 1994 and 2004, respectively. This trend of high saving ratios is mainly due to the mandatory central provident fund (CPF) contributions (or known as “force saving”) and lack of a comprehensive state social safety net in Singapore. The fundamental objectives of CPF are (i) to build a nonpension saving scheme for retirement needs (i.e., the minimum sum scheme), (ii) to promote public housing ownership through competitive loan scheme, (iii) to promote comprehensive health care (such as Medisave, Medishield, Medifund and Medishield plus), and (iv) to promote social equalizing through education (such as Edusave, Tertiary Education Loans Scheme). The secondary objectives of CPF are (i) to promote macroeconomic stability through CPF contribution variations especially during economic downturns, (ii) to promote company welfarism through employers’ contributions and (iii) to promote national unity through CPF cash top up schemes.

CPF is a self-financing social security system with mandatory saving for the resident workforce. The CPF fund is managed by the state or the CPF Board which guarantees a certain percentage return on the investment fund. The CPF system does ensure and allow for pre-retirement withdrawals from the age of 55 or for resident workers who have left the country for good. Mandatory CPF contributions are required from both the employee (z percent deducted from salary) and the employer (z percent in addition to the salary), with combined contributions going as high as 50 percent of the monthly salary in past years.

However, the CPF system, essentially a nonstate private sector-driven co-payment system between the employer and employee, has resulted in some unintended consequences. For example, due to an overcommitment of CPF saving into housing financing, the CPF housing scheme has been extremely successful with near 90 percent house ownership. However, it has also led to an “asset-rich cash-poor” syndrome as workers approach retirement age. The CPF system has also resulted in high and inflexible labor costs which erodes competitiveness of the Singapore workforce as regional competition intensifies. As the lifespan of Singaporeans increased to the 70s, an insufficient minimum sum set aside for old age retirement exerts a heavy social burden to younger related family members. As the size of the accumulated CPF fund expands after four decades of robust economic growth averaging 8 percent per annum, the burden of the state to efficiently manage the fund increases.

Under the CPF Public Housing Development Board (HDB) linkage and flow of fund, the CPF Board is under statutory requirements to purchase long-term Singapore government securities (SGS) from the central bank or the Monetary Authority of Singapore (MAS) with payment of interests and bond redemption. Financial institutions such as commercial banks and insurance companies are also required to hold SGS as part of their reserved requirements or liquid assets. Some of the CPF funds are also being channeled through MAS into the Singapore Government Investment Corporation (SGIC) for investments abroad.

The government, with MAS as the banker, provides the HDB with housing development loans, annual

grant and mortgage financing loans with repayment of interest. HDB then provides mortgage loans to public housing buyers (PHBs) at a concessionary rate and PHBs service the housing loans through employees' and employers' CPF contributions.

The pertinent issue for CPF members and the government is how to improve and optimize returns on investments through privatization of funds. Singapore's central bank finds it difficult to justify continued issuance of large sizes of bonds when there is no natural fiscal need (since the government is able to run a balanced budget on average over the business cycles). The next issue really is how to better satisfy the multi-pillar social security system (SSS) in order to achieve the tri-objectives as recommended by the World Bank, which include income smoothing saving, redistribution of incomes and insurance against risks. Thus the biggest challenge for the Singapore government is to further finetune the CPF system with swifter fund divestment drive, which should meet the tri-objectives of the SSS but can also serve to promote the fund management industry for the island state.

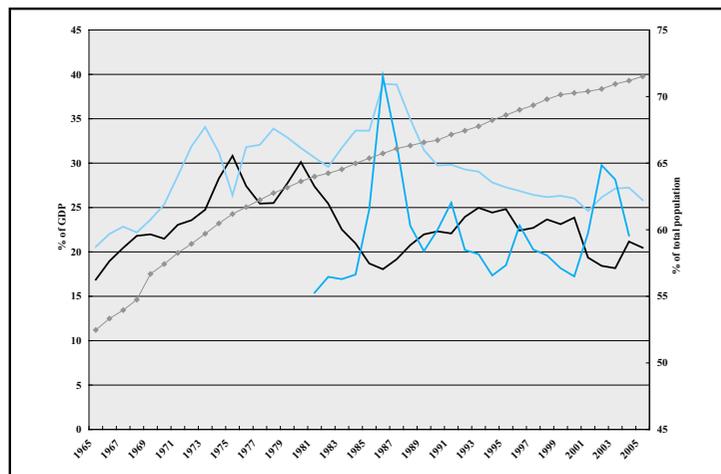
Total labor productivity in Singapore has fluctuated over time and hit a high of 6.6 and 7.3 percent in 1994 and 1999, respectively. However, labor productivity has declined -5.3 and 2.6 percent in 2001 and 2003, respectively, when the economy experienced negative growth GDP. In Singapore, it is more meaningful to look at multifactor productivity (MFP), which relates output to a combined set of two or more factor inputs. MFP therefore reflects the combined effect of factors such as technical progress, improvement in management practices, innovations, better organization of shop-floor and diffusion of technology across firms. A change in MFP measures the change in output that cannot be accounted for by the change in combined factor inputs. In 2004, the 8.1 percent growth in real GDP were due to contributions of capital, labor and multifactor productivity at 1.8, 0.8 and 5.5 percent, respectively.

As a small open economy in the face of greater globalization, increased regional competition and rapid escalation on the technological ladder, Singapore must begin to "think out of the box" and seriously examine the economic and sociopolitical implications of the doubling of the population to 8

million by 2025. This magnitude of growth translates into a population that is 60 percent or 4.8 million Singaporeans and permanent residents with 40 percent or 3.2 million foreigners, and maintaining the status quo in terms of the existing racial mix will be a challenge. The three categories of immigrants Singapore should be targeting include (i) wealthy individuals, (ii) internationally mobile professionals and (iii) risk-taking entrepreneurs.

The immediate economic implications of appropriate policies would mean higher productivity, innovation and further attraction of foreign direct and portfolio investment to Singapore. Property price hikes would take place across the board in the island state or at least rise rapidly for the top end of the market. Living housing space would be larger given the smaller family size and towering height in public and private housing. There would be greater contributions from new immigrants in terms of their contributions to income tax, corporate tax and transportation-related fees and charges to fund the ever-increasing government expenditures on education, social, old age and health care.

Increase in government revenue from an expanding economic pie of a more global and diversified Singapore economy with multisources of growth would emerge. These traditional and new sources of growth would include financial services, high-tech manufacturing, sea and air transportation hubs, chemical/pharmaceutical clusters, life science activities, tourism services, education services, medical and health care services, and regional headquarters and global telecommunication networks.



— Gross capital formation
 — National saving
 — Private saving
 ◆ Population ages 15-64 (RHS)

In the past fifty years, Chinese Taipei has transformed from an agricultural society to a service economy. The process of industrialization and urbanization has changed the dynamics of the family structure in Chinese Taipei, shifting its demographic makeup to younger and smaller families. At the same time, economic development has improved the standard of living in Chinese Taipei. Life expectancy has increased with advancements in the medical and welfare systems, but the improved quality of life has not been without its woes. As people live better and longer, Chinese Taipei has transformed to an aged society. An aging population has a profound impact on any economy, and this is especially true for Chinese Taipei which is experiencing aging at an accelerated pace. The increased life expectancy in Chinese Taipei has presented a new set of challenges to its economy.

According to the Department of Statistics, Ministry of Interior, the fertility rate in Chinese Taipei has been on the decline since 1961. At just 1.12 children per couple in 2005, Chinese Taipei now has one of the lowest fertility rates in the world. The reasons behind this declining birth rate are numerous. The change in both the family structure and size accounts for some of the changes. Increased women participation in the labor market can be another reason. As careers have become a realistic option for women, the traditional role of women has changed and the birth rate may have fallen as a result. All of these changes have transformed Chinese Taipei into an aged society with the percentage of elderly popula-

tion (age 65 and above) reaching over 7 percent since 1993.

The combination of aging and migration of the working population creates long-term labor supply disequilibrium for Chinese Taipei. In terms of labor supply, retirement as a reason for leaving the labor market has been stable since 2001, fluctuating between 4.3 and 4.6 percent. It is important to note here that formal retirement does not mean that the person is no longer participating in the labor market. Still, not enough labor is being created and as a result, guest workers are needed to make up the shortfall. With an annual growth rate of nearly 4 percent since 1997, the number of foreign workers in Chinese Taipei has reached over 320,000 persons in 2005. Immigrant workers are expected to make up more than one-fifth of the total workforce if the current trend continues.

In terms of capital supply, the private saving rate in Chinese Taipei is among the highest in the world; however, this trend is changing. From a high of over 38 percent in 1987, the household saving rate has been on a gradual decline and by 2005, the saving rate was just over 21 percent of the GDP, the lowest among Chinese Taipei's East Asian neighbors. In the public sector, the savings-to-GDP ratio for the Chinese Taipei government was 7.76 percent in 1989. Nevertheless, as welfare expenditure increases and fiscal income decreases, the Chinese Taipei government has been facing a budget deficit rather than surplus in recent years. However, there

is little evidence to support the presence of the Feldstein-Horioka effect in Chinese Taipei as the high saving rate has not been reflected in domestic investment.

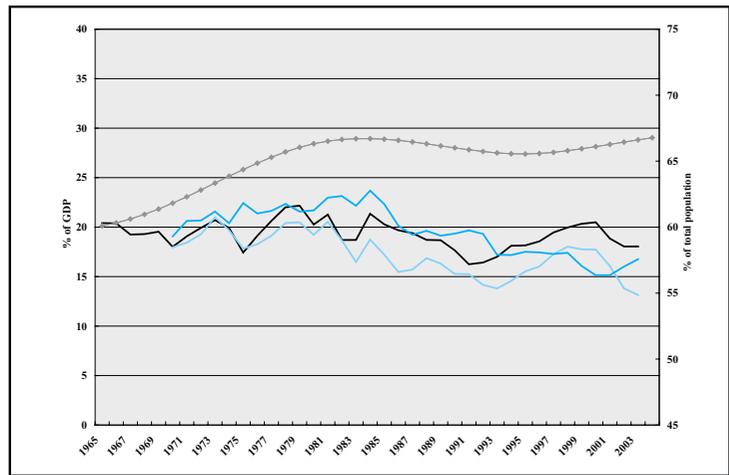
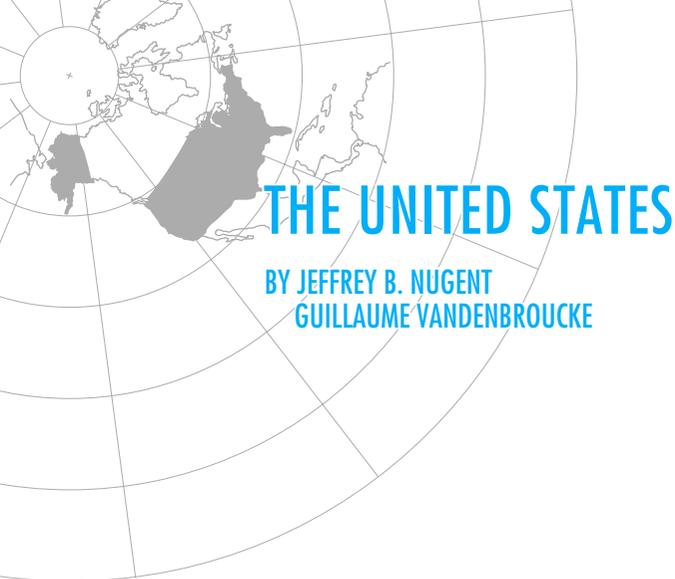
Dependency of the elderly has also been on the increase. The decline in saving can be a result of worsening economic development in Chinese Taipei as well as crowding out from the increase in public welfare where saving is perceived as less significant. This also increases the economic burden on average households. Families with at least one person age 65 and above have increased by over 50 percent since 1990, from just over 20 percent of total households in Chinese Taipei in 1990 to 30.7 percent in 2004. In the 1993 census, 58.4 percent of pensioners' income came from their children; by the 2000 census, this number had dropped to 47.1 percent. This situation is likely to deteriorate further as the birth rate declines; there are now fewer children to provide for the elderly. Government intervention is therefore critical.

With the decline in the labor force, diminishing productivity seems imminent. Although technology and efficiency gains can potentially offset the decline in the labor participation rate, increasing returns in efficiency gain will make future productivity gains difficult. A study on total factor productivity suggests that efficiency as a growth engine for Chinese Taipei has been on the decline, from the peak of 8.18 for 1961–73 to 3.23 for 1992–2002. Using labor force participation estimates from the Council of Economic Planning and Development (2004), the data suggest that GDP growth will be hampered by the aging population and the current 4.5 percent potential GDP estimate from the Chinese Taipei government appears ambitious.

Aging and the declining birth rate in Chinese Taipei present immense challenges to the government both economically and socially. Numerous policy measures have been introduced by the Chinese Taipei government to address these challenges including: (i) tax incentives for newborns as a measure to encourage the birth rate and (ii) improvements in financial security for the elderly, including the launch of a pension system for the elderly in 2002 in view of the aging needs. Nevertheless, more needs to be done.

A number of issues still need be addressed by the Chinese Taipei government in order to reduce the social costs that an aging society presents including: (i) how to adjust and reduce the social costs of an aging society; (ii) how to maintain vitality and drive in the society as well as to maintain welfare; (iii) how to ensure the financial independence of pensioners; (iv) how comprehensive can a social safety net be?; (v) do pensioners have to be financially dependent of the working population? Perhaps the concept of retirement will need to be reexamined. Do people really have to retire at the age of 65 when they are most experienced and knowledgeable?

The Chinese Taipei government will need to devise a comprehensive and sustainable care system that will not only improve the long-term care system, but one that is also financially viable. With the business potential of the silver industry, the private sectors need to be made aware of these new opportunities so that an aging society can also be a prosperous one.



— Gross capital formation
 — Gross savings
 — Private savings
 ◆ Population ages 15-64 (RHS)

Like other countries with relatively low fertility rates, declining mortality rates and increasing education and life expectancy, the United States has been experiencing considerable aging of its population. In addition, with rather continuous increases in wage rates, capital accumulation, capital gains and pension systems, and the declining importance of agriculture and other rural activities, people are retiring earlier and spending more years in retirement. Many of these trends are expected to continue and indeed to become stronger, thereby presenting American society with many challenges. Since these trends imply slower economic growth or even stagnation, these challenges extend to businesses and policymakers in addition to the citizenry.

In addition to slower growth and aging of the labor force, among other apparent effects of these trends are: (i) declining growth in human capital per worker (since older workers may have less education than younger ones); (ii) declining innovativeness (as older workers may be less flexible and mobile than younger ones); (iii) lower private saving rates (as a result of rising wealth and a declining precautionary motive for saving); and (iv) increased need for medical care for which it has proved very difficult to design low-cost means of supply, thereby increasing public expenditures and public sector deficits (i.e., lowering public saving rates as well).

This paper provides a couple of simple theoretical models demonstrating the logic behind some of

these effects. It also examines the U.S. experience in each of these respects, and uses this experience to demonstrate the relevance of these models to explaining some of these trends. In several cases, like declining innovativeness and education caused by labor force aging, there seem to be some offsetting benefits of the same changes. For example, older workers have lower absenteeism rates, that longer working lifetimes increase both the incentive for on-the-job-training and the benefits of job experience (learning by doing), and senior citizens frequently return for additional schooling. In other cases, like declining fertility of the native population and hence slower labor supply growth, these effects are offset by immigration, with the United States being a popular destination for emigrants, especially from developing countries. In addition, since the length of one's old age and the magnitude of medical and other needs during old age remain very uncertain, the decline in uncertainty is by no means necessarily as large as had been believed earlier. In addition, the industrial structure has been changing in ways (mainly away from heavy industry and manual labor into clerical, machine operation and computer-related activities) that make it easier and more attractive for older workers to carry on into older ages than was the case earlier. Senior citizens are also adopting healthier diets and lifestyles that increase their productivity and lower their absenteeism (when working). As a result, several of these trends are now being at least partially reversed. In particular, workers are retiring later and are working longer hours both before and after reaching

their sixties than they did before 1985. Second, household savings, the calculation of which is in any case severely distorted by the presence of capital gains, have started to pick up, at least slightly and may do so in the years ahead should housing and stock market prices increase less rapidly than in the past.

The most severe remaining problem is the high public sector fiscal deficit. Deficits remain high and could increase further as the baby boom generation begins to retire in the coming decade. Yet, even in this case, past experience in the 1980s and 1990s suggests that public policy changes to mitigate these problems are possible and eventually may even be likely.

The need for substantial new and continuing adjustments on the part of households, businesses and government can hardly be understated. For example, households need to realize how potentially serious their needs for accumulated savings may be in their ever longer periods of old age. Businesses need to find ways to make jobs more feasible and attractive to older workers and to outsource to older workers. In addition, there is a need for the kinds of incentive systems and coordination devices that will assure that these various adjustments will be undertaken simultaneously and in a coordinated and cost-efficient manner.

Yet, as the experience reviewed in the paper illustrates, many of these adjustment mechanisms seem operative, at least potentially. As a result, most of the challenges posed by population aging seem less insurmountable than many believe them to be. Even in the absence of such adjustments, moreover, it should be recognized that the aging problem in the United States in the foreseeable future should be less severe than in those countries where aging is proceeding more rapidly, where the productive structures are more heavily weighted toward heavy industry and manual labor, where fertility and net immigration rates are lower, and where education among older workers is at lower rates.

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The Pacific Economic Cooperation Council (PECC) was founded in 1980 at the initiative of the Prime Ministers of Japan and Australia, with the aims of serving as a regional forum for cooperation and policy coordination to promote economic development in the Asia-Pacific Region.

PECC is a unique tripartite partnership of senior individuals from business and industry, government, academic and other intellectual circles in 26 Asia-Pacific Economies¹. All participate in their private capacity and discuss freely on current, practical policy issues in search of broad-based answers to regional economic problems.

PECC advocated the need for a formal, intergovernmental organization in the Pacific from the time of its creation. The regional ministerial process of the Asia Pacific Economic Cooperation (APEC) has realized that goal and now provides PECC with a formal channel by which its practical recommendations can be implemented. PECC is the only non-governmental official observer of APEC since the formation of APEC. PECC has provided information and analytical support to APEC ministerial meetings and working groups.

PECC's substantive work is carried out through a range of forums and project groups. These cover trade and investment policy, financial and capital markets, community building activities for sustainable cities, human resource development, and digital divide resolution, as well as outlooks for the Pacific economy and food system.

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The groups of PECC activities meet periodically to organize seminars or workshops, conduct studies and publish their research outcomes and recommendations for the benefit of the Pacific community.

PECC member committees and PECC work groups send tripartite delegations to the PECC General Meetings. In the interim, policy matters are handled by a Standing Committee², and day-to-day administrative and coordinating functions are carried out by the International Secretariat based in Singapore.

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¹ The PECC Economies include Australia, Brunei Darussalam, Canada, Chile, China, Colombia, Ecuador, Hong Kong China, Indonesia, Japan, Korea, Malaysia, Mexico, New Zealand, Peru, The Philippines, Russia, Singapore, Pacific islands Forum, Chinese Taipei, Thailand, The United States and Viet Nam. France (Pacific Territories) and Mongolia are Associate Members. The Pacific Basin Economic Council (PBEC) is the regional business organization, and the Pacific Trade and Development Conference (PAFTAD) is the region-wide organization of academic economists, both of which are Institutional Members.

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KANSAI INSTITUTE FOR SOCIAL AND ECONOMIC RESEARCH (KISER)

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The Kansai Institute for Social and Economic Research (KISER) is a nonprofit organization in Kansai (the region centered in Osaka, Kobe and Kyoto) that has its objectives in contributing to the development of the national and regional economies through academic advances.

KISER was established April 2002 as a result of the consolidation of the three research institutions in the region: the Kansai Economic Research Center (KEREC), the Center for Industrial Renovation of Kansai (CIRK) and the Socio-Economic Research Institute in Kansai.

KISER promotes research projects under the cooperation of academia and local business community, with the aid of governmental support. The necessary funds for KISER are raised through membership fees from 175 leading firms in various industries from all over Japan.

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- * Sponsoring professional conferences and academic meetings (Modern Economic Policy Conference).
- * Promoting International Academic Exchange PECC-PEO (Pacific Economic Cooperation Council – Pacific Economic Outlook).
- * Encouraging interactions among academia, business communities, and governmental bodies.
- * Public affairs (publishing the newsletter “KISER”, maintaining our website).

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