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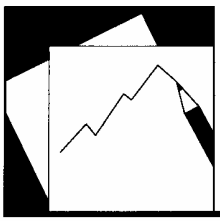

# IMF Working Paper

# Hong Kong Special Administrative Region: Macroeconomic Impact of an Aging Population in a Highly Open Economy

*Lamin Leigh*

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**IMF Working Paper**

Asia and Pacific Department

# Hong Kong Special Administrative Region: Macroeconomic Impact of an Aging Population in a Highly Open Economy

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Authorized for distribution by Jahangir Aziz

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## Abstract



Hong Kong SAR's population is aging rapidly. This paper concludes that, without a change in policies, aging could adversely affect growth and living standards. While higher labor productivity growth and increased migration of younger skilled workers from the Chinese mainland, would attenuate the economic impact of aging, they would not offset it fully. Aging will also put pressure on public finances, particularly as a result of rising health care costs. There is a relatively narrow window of opportunity to implement policies to lessen the impact of aging, given that the demographic effects could start setting in as early as 2015 when the working population's support ratio peaks. In recent years, the Hong Kong SAR authorities have been focusing on policies that could help limit the fiscal impact of aging, including continued expenditure restraint on non-age-sensitive areas, reform of health care financing (including introducing private health insurance system), and tax reforms.

JEL Classification Numbers: E21, E27, E62, H31

Keywords: Aging, Productivity Growth, Fiscal Impact, Health Care Costs

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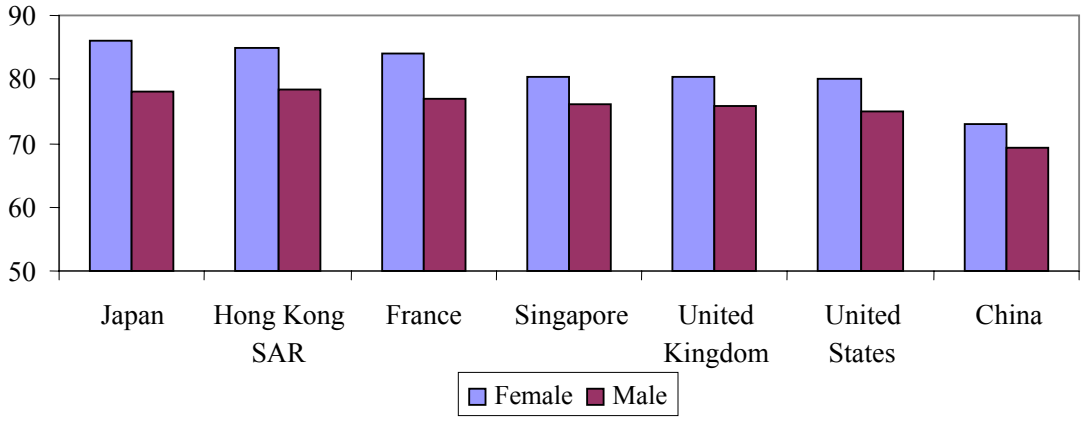
## I. INTRODUCTION

Hong Kong SAR's population is aging rapidly.[2] Low fertility rates and rising longevity (life expectancy) are causing a gradual decline in population growth and a shift in the age structure of the population toward a greater share of the elderly. While Hong Kong SAR's current old-age dependency ratio of about 16 percent is low compared to comparator economies in the region, it is projected to double by 2030 and exceed those of other Asian countries (including Japan) by 2060 (Figure 1b).

This paper discusses the macroeconomic effects of an aging population for Hong Kong SAR. The analysis is based on a small-open-economy model, sharing many of the features found in the IMF's global macroeconomic simulation model, MULTIMOD, but extended to incorporate demographic projections and life-cycle dynamics (Faruqee, 2002). The paper concludes that aging is likely to slow economic growth in Hong Kong SAR and to put pressure on public finances. The demographic effects will start setting in about 2015, when the labor force support ratio is projected to peak. Thus, an integrated and early response is needed to use the window of opportunity during the next decade to design policies that could mitigate the impact of aging on Hong Kong SAR.

Figure 1a. Life Expectancy at Birth (Years of Life), 2004

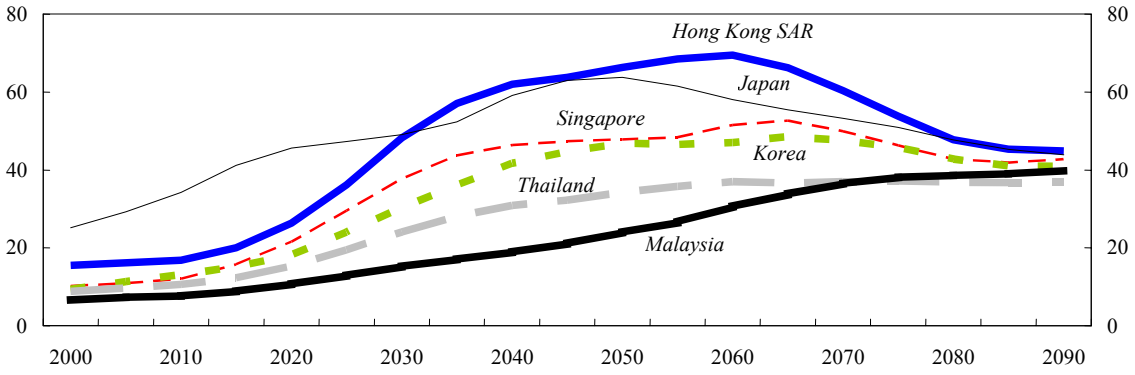



Source: World Development Indicators, World Bank.

[2] Since the 1970s Hong Kong SAR's population has exhibited trends toward aging. In particular, the fertility rate dropped to 0.9 in 2004 (from about 3.5 in the early 1970s) which is well below the replacement rate of 2.1. At the same time, life expectancy remains high (Figure 1b) and is projected to reach 82 for men and 88 for women by 2031.

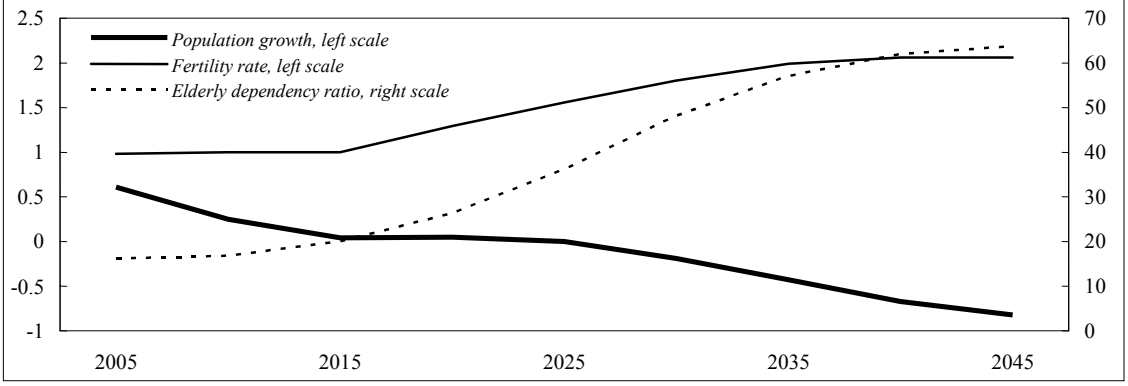
## Figure 1b. Population Aging in Hong Kong SAR
(relative to comparator and other advanced economies)

Old-Age Dependency Ratio 1/ (In percent)

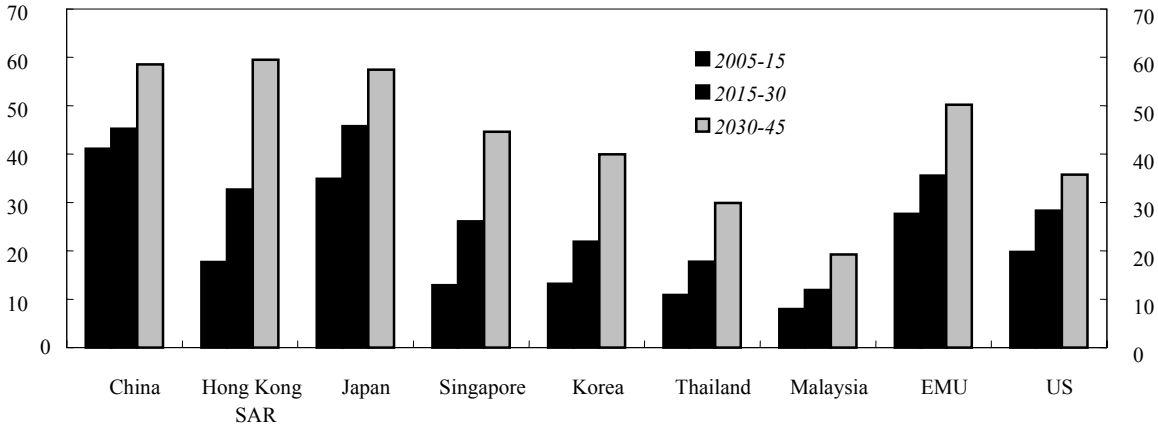



Source: *World Development Indicators Database*, World Bank.
1/ Defined as ratio of old-age dependents to working-age population.

### Hong Kong SAR's Demographic Projections, 2005-45
(In percent,in terms of the adult population)




### Hong Kong SAR's Old-Age Dependency Ratio




Source: World Development Indicators, World Bank. Dependency ratio levels (in percent) and defined as old-age dependents to working-age population.

## II. MACROECONOMIC EFFECTS OF AGING

The key channel through with which population aging affects the economy in the model used in this paper is through its effects on the life-cycle profiles of individuals' earnings. These profiles typically have a hump-shaped pattern: earnings rise as young individuals enter the labor force and start gaining work experience, peak in middle age, and decline as individuals move into retirement. On the supply side, age-earnings profiles reflect changes in relative productivity and labor supply over an individual's working life. Changes in the age structure of the population affect aggregate labor supply through differences in relative productivity and individual labor supply. On the demand side, individuals are assumed to adjust their savings and smooth consumption based on their anticipated path of life-cycle income. Young individuals are net borrowers, because their current income is below their permanent income. Mature agents, at the peak of their income potential, save in anticipation of retirement. The elderly also save in this model, given the uncertainty about their lifespan. Population aging could affect the economy and public finances in several ways:

- Potential growth could decline unless there are large and sustained productivity gains.

- Growth in revenue from income-based taxes could slow in line with both GDP and the number of labor force participants. Absent tax increases or hikes in social security contribution rates, this will result in lower revenues.

- There could be pressures for health expenditures to continue to rise owing to aging and the resulting rising demand for health services. As the average age of the population increases, spending on pensions, health care, and long-term care will rise. Also, the increased longevity will in itself increase the demand for health care as health diminishes with age, giving rise to a "double-aging" problem. Delivering health care services to the population is primarily a public task in Hong Kong SAR (with the public sector's share of in patient care currently about 95 percent).

- As a predominantly service-based economy, additional budgetary pressures could arise from the need to upgrade the education system and workforce quality to remain competitive. As a higher proportion of budgetary resources are spent on the elderly, fewer resources could be devoted to productive investment.

On the external accounts, per the life-cycle hypothesis, during the initial phase of aging the current account position tends to improve. It then dissipates as savings fall with the increasing number of retirees. The life-cycle model entails dissaving when young, low saving early in adult life, high saving at the middle of the working life, and then low or negative saving in retirement. Hence, as countries go through the early stages of a demographic transition, they are expected to experience current account surpluses. As the demographic transition toward older population continues, there are declining current account surpluses, although bequests may in fact make this ambiguous. Thus, these ongoing demographic changes in Hong Kong SAR could have a significant impact on saving, investment, and current account balances in the years ahead.

## III. SIMULATIONS AND ANALYSIS

The simulations are based on a dynamic general equilibrium system with forward-looking behavior and rational expectations. Consumption and saving behavior is based on Blanchard's (1985) model, where agents are assumed to have finite planning horizons.[3] There is a Cobb-Douglas form production function with capital and labor. Investment behavior is based on Tobin's q theory, whereby the desired rate of investment exceeds the steady-state rate as long as the expected marginal product of capital is greater than its replacement cost. On the external side, import volumes depend on the main components of aggregate demand and exports reflect the foreign import demand functions. Exchange rates and interest rates are linked to the interest parity condition. The real exchange rate equilibrates the goods markets and ensures consistency between flow relationships and consumers' desired rates of asset accumulation. Economic agents can borrow and lend freely in international capital markets at the prevailing world interest rate.

Demographic projections are based on World Bank data. The main factor underlying population aging trends is the decline in fertility rates over the last half a century: from 3.5 children per woman in the early 1970s to about 0.93 children in 2000-05. The demographic projections assume that the fertility rate will stabilize around 2015 and then rise gradually to the replacement rate, leading to a stationary population by 2100. Under these projections, the elderly dependency ratio will peak in about 2055, gradually decline after that, and stabilize by 2090. The assumption that the elderly dependency ratio will stabilize at some point in the future is essential for ensuring the stability of the model.[4] The demographic projection data in the baseline assume zero net migration on average through 2050. This assumption is relaxed later in the sensitivity analysis.

The macroeconomic baseline is calibrated to reflect the features of the Hong Kong SAR economy in a long-run steady state. Given the model's assumptions about population structure and underlying productivity growth, baseline long-run growth averages about 2½ percent per annum which broadly corresponds to long-run growth projected for the world economy. The population is assumed to remain stationary in the baseline, and hence the long-run per capita GDP growth averages roughly 2½ percent. Consumption is assumed to be inelastic with respect to the interest rate (namely, the intertemporal elasticity of substitution is small at ½), while the rate of time preference is taken to be 2½ percent. The long-run world interest rate is assumed to be about 4 percent. Noninterest fiscal revenues are projected to grow in line with GDP, whereas expenditures are projected to respond both to output growth and to the age structure of the population. In particular, recurrent outlays are assumed to rise in proportion to GDP (with a buoyancy of unity). In addition, outlays on the elderly are

[3] The framework for the simulations follows that of Faruqee (2002).

[4] From the policy point of view, however, the choice of the demographic projections is less relevant, since the analysis in this paper focuses on the period to 2050, and for this period the World Bank projections are broadly similar to those of the United Nations.

assumed to have a unitary buoyancy with respect to the dependency ratio. [5] The investment return on fiscal reserves is assumed to be 5 percent, broadly in line with historical performance which has reflected a conservative investment policy oriented toward low credit risk and high liquidity. The initial level of government debt is set to about 1½ percent of GDP.[6]

Scenario analysis: The first scenario incorporates the increase in the elderly dependency ratio but assumes that no policies are taken to mitigate the impact of aging on the economy. By 2050, the elderly dependency ratio increases by about fourfold. This increase reflects a gradual decline in the fertility rate and a rise in longevity (a decline in the mortality rate). In the second scenario, higher labor productivity leads to faster growth than in the baseline.[7] Under both scenarios, it is assumed that net immigration flows into Hong Kong SAR remain broadly unchanged through 2050. As part of a sensitivity analysis, the impact of positive net migration flows and the effects of increasing the retirement age from 65 to 70 years are also studied.[8]

Population aging is estimated to reduce GDP growth in the long run compared to the baseline scenario of stationary population (Table 1). The transmission dynamics of a population aging shock are characterized by a two-stage process. Initially, until 2015, the effect of rising longevity outweighs that of lower fertility, and the adult population and the effective labor supply increase. As the population aging shock continues to unfold, the effect of lower fertility rates starts to dominate. Thus, from 2015, the effective labor supply starts to decline. By 2050, the level of real GDP is projected to decline by about 20 percent (relative to the baseline without demographic change). With the composition of the labor force shifting toward a larger share of the elderly, the productivity-adjusted labor supply falls by more than the number of workers. As a result, real GDP per capita also declines in the long run relative to the baseline, albeit to a lesser extent (by 10 percent relative to the baseline by 2050). The current account surplus starts to rise until about 2030, as investment falls. Thereafter, the trend reverses as the decline in savings due the aging effect starts to outpace the decline in investment.

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[5] Note that the model does take into account a likely reduction in government expenditure on children and youth-related items in the long run.

[6] This debt consists of the global bond and notes that the government issued in July 2004, which will be fully repaid in 2019.

[7] Under this scenario, labor productivity growth is assumed to be on average about 20 percent higher than in the original baseline.

[8] The migration shock assumes that net migration rises such that it offsets about 50 percent of the decline in the working population's support ratio by 2050. The support ratio is defined as the size of the working population as a ratio of the total population.

Table 1. Macroeconomic Effects of Population Aging
**(Deviations from stationary-population baseline levels)**

| | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|---|
| **I. Unchanged policies 1/** | | | | | | | | |
| Real GDP (percent change) | 1.46 | 0.92 | 0.16 | -0.62 | -1.40 | -6.49 | -14.51 | -20.99 |
| Real GDP per capita (percent change) | 0.18 | 0.26 | -0.01 | -0.37 | -0.73 | -2.90 | -7.76 | -10.05 |
| Current Account Balance (percent of GDP) | 1.68 | 2.56 | 3.44 | 2.91 | 2.38 | 1.86 | 0.83 | -0.20 |
| Savings (percent of GDP) | 0.66 | 0.38 | 0.10 | -0.18 | -0.47 | -0.75 | -1.03 | -1.26 |
| **II. Increasing labor productivity** | | | | | | | | |
| Real GDP (percent change) | 1.72 | 1.34 | 0.52 | -0.49 | -0.78 | -3.60 | -8.06 | -11.66 |
| Real GDP per capita (percent change) | 0.30 | 0.41 | 0.12 | -0.26 | -0.58 | -1.84 | -3.65 | -4.82 |
| Current Account Balance (percent of GDP) | 1.96 | 2.75 | 3.55 | 3.83 | 4.17 | 3.41 | 2.84 | 2.05 |
| Savings (percent of GDP) | 0.87 | 0.63 | 0.74 | 0.94 | 1.26 | 0.99 | 0.85 | 0.62 |
| **Memorandum items** | | | | | | | | |
| Real GDP (percent change) 2/ | 1.94 | 1.64 | 1.03 | 0.71 | 0.82 | -1.40 | -4.49 | -6.02 |
| Real GDP (percent change) 3/ | 1.79 | 1.41 | 0.83 | 0.39 | 0.21 | -2.40 | -6.93 | -9.57 |

Sources: Staff calculations.
1/ Assumes no policies are taken to mitigate the impact of aging on the economy.
Also assumes zero change in net immigration flows into Hong Kong SAR.
2/ Increased labor productivity combined with immigration flows of younger skilled labor into Hong Kong SAR.
3/ Increased labor productivity combined with raising the retirement age from 65 years to 70 years.

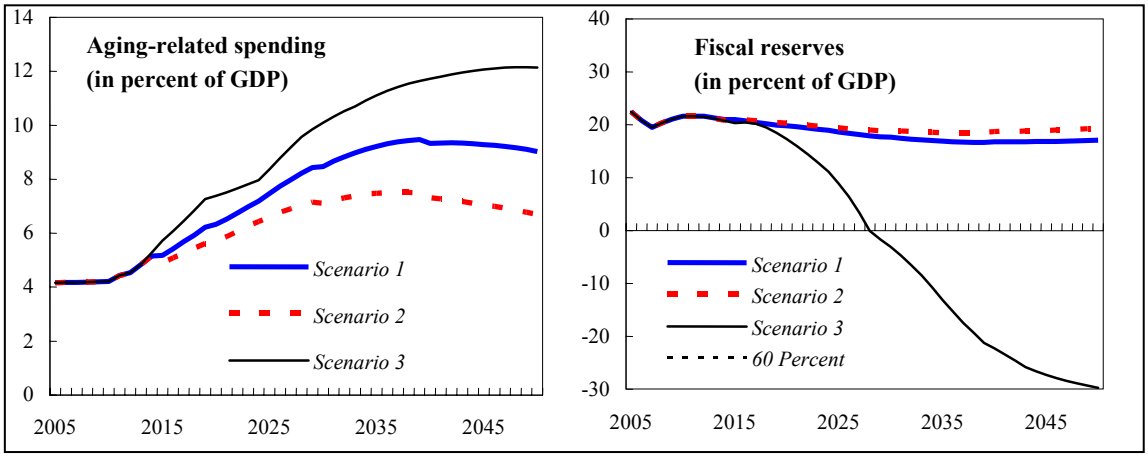
While alternative assumptions on labor productivity and immigration flows would partly neutralize the welfare impact of aging on Hong Kong, together these factors do not offset it fully. The results are sensitive to alternative demographic projections, with growth and fiscal effects being proportional to the increase in the elderly dependency ratio. Under alternative assumptions of increased labor productivity, the estimated impact of population aging on growth would be smaller (almost halved). Thus the increase in labor productivity would partly neutralize the welfare implications of the increase in the elderly dependency ratio. If increased labor productivity is combined with a greater immigration flow which allows Hong Kong SAR to import younger skilled workers, the welfare implications of aging reduces significantly but is not offset fully.[9] In contrast, the simulation results also show that the impact of increasing the retirement age by five years is limited and does not change significantly the dynamic impact of aging on Hong Kong SAR.

Aging would also put pressure on Hong Kong SAR's public finances. Although the impact on public pensions is likely to be limited, health care spending would rise as these services

[9] Holzmann (2005) shows that migration levels would have to reach enormously unrealistic levels to begin to make a dent on the dependency ratio.

are largely government supplied.[10] Due to the relative decline in the working population, income-based tax revenues could fall. Our simulations indicate that even if productivity growth were to remain unchanged from its present levels and if some policy measures are taken to mitigate its impact on public finances (for example, through greater private sector participation in the heath care financing), the overall impact on public finances could be significantly higher than under a scenario of stationary population. As an additional sensitivity test, our results also show that that under an extreme scenario of significantly lower productivity growth, combined with the government bearing a large part of aging-related spending, the impact on fiscal reserves would be significant.

Figure 2. The Effects of Aging on Public Finances




Source: Staff Projections

Scenario 1 assumes that current labor market productivity growth is maintained, the private sector shares part of the aging-related health cost and the Mandatory Provident Fund (MPF) becomes the growing source of financing retirement income by 2030.

Scenario 2 explores similar assumptions in scenario 1 but with higher labor productivity growth.

Scenario 3 is the extreme scenario. It assumes a significantly lower productivity growth than in scenarios 1 and 2, combined with the unchanged policies scenario where the government would have to bear a large part of the aging-related cost. Negative fiscal reserves after 2030 denote accumulation of government debt.

## IV. Initiatives Taken by the Hong Kong SAR Authorities to Address Population Aging

Over the last few years, Hong Kong SAR has devoted resources to assessing both current and future trends in its demographic structure and has considered some policy measures to mitigate its impact. In July 2002, following the Chief Executive's announcement, the Chief Secretary for Administration set up a task force on population policy. The immediate task of

[10] Publicly provided pension is very limited unlike in many other countries in a similar situation. The Mandatory Provident Fund (MPF), which was established in 2000, is the main pension vehicle; it is fully funded and privately managed and will also provide a growing source of retirement income by 2030.

the Task Force was to identify the major challenges to Hong Kong SAR arising from its demographic trends and characteristics, setting the objective of a population policy and recommending a set of coherent policy objectives which the government can explore in both the short and medium term.

The authorities are developing various policies to mitigate the impact of an aging population, some of which were outlined in the report by the Task Force on Population study.

- The Hong Kong SAR government operates various schemes to allow for importation of skilled workers, including those from the mainland. The Supplementary Labor Scheme (SLS), which commenced in February 1996, operates on the basis of the following twin cardinal principles: local workers must be given priority in filling any job vacancies available in the job market; and employers who are genuinely unable to recruit local workers to fill their job vacancies should be allowed to bring in imported workers for such vacancies. Since its inception, most of the workers imported through the SLS have come from the mainland. Most recently, in his FY2006/07 budget speech (February 22, 2006), the Financial Secretary announced the "Quality Migrant Scheme" which will aim at attracting highly skilled workers from abroad to Hong Kong SAR. [11]
- The government is taking steps to better control health care costs. The government is reviewing the fees and charges of public hospital services with a view to exploring the scope for adjusting the subsidy level to contain rising health care costs and to instill a sense of value among users. The authorities also plan to encourage the provision of health care by the private sector.
- In addition, the authorities have initiated other measures such as facilitating the emigration of elderly recipients of the Comprehensive Social Security Act (CSSA) to Guangdong and Fujian provinces. Such portable schemes are expected to enable retirees to emigrate to the Mainland while allowing them to maintain some access to their retiree benefits in Hong Kong SAR. However, so far the take-up rate of this portable CSSA scheme has been low.
- The Mandatory Provident Fund (MPF), which was established in December 2000, allows the citizens to select their investment plans from a large number of private investment funds. Civil Service Provident Fund Scheme is a defined-benefit pension scheme, which is also obliged to participate in the MPF even though the MPF is based on defined contributions. The MPF is expected to become a growing source of retirement income over time.

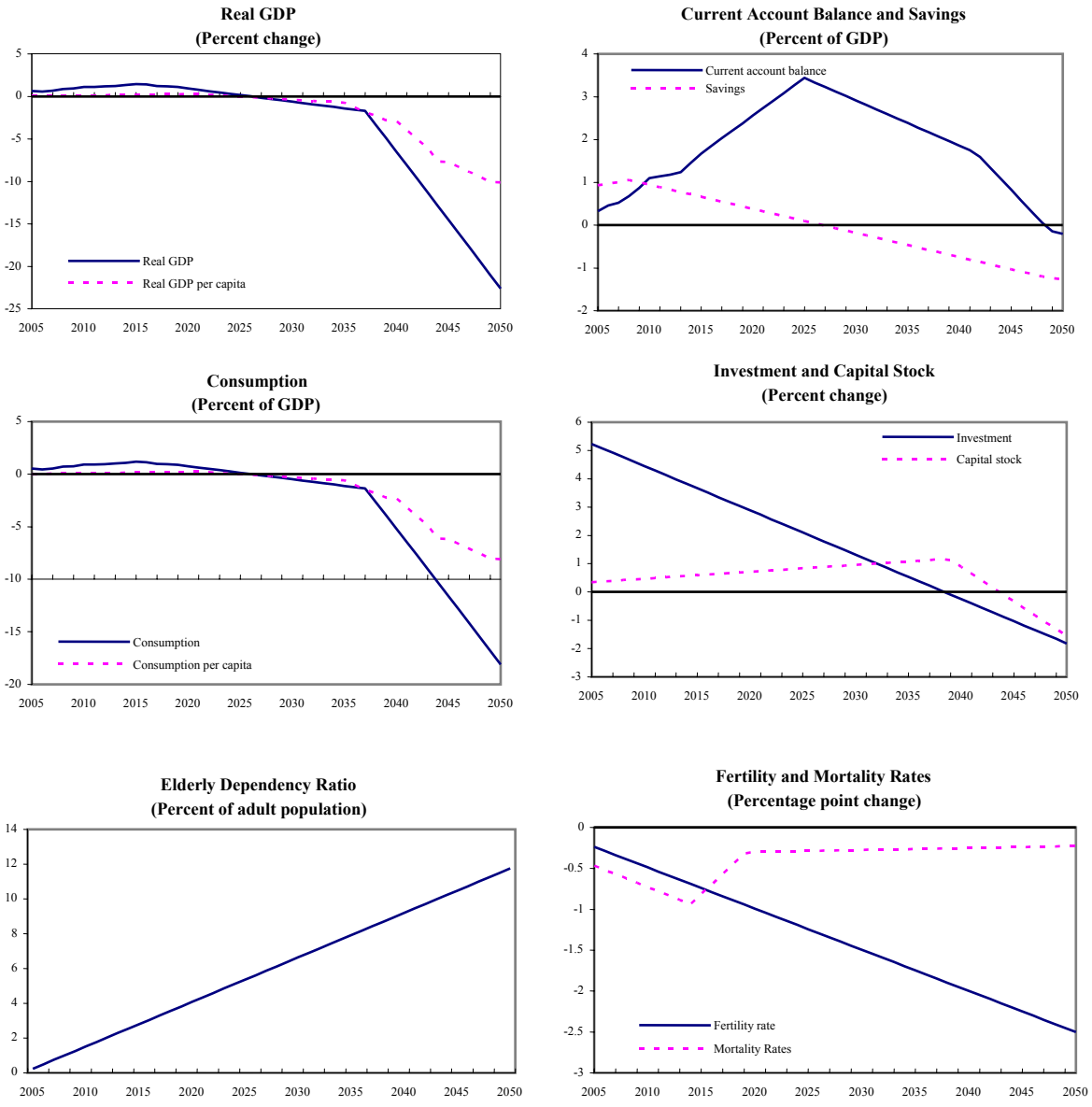
[11] In his recent FY2006/07 budget speech, the Financial Secretary also announced that budget balance was restored in FY2005/06, three years ahead of schedule. Both the operating and consolidated accounts were in surplus for the first time since FY1997/98. The overall surplus of 0.3 percent of GDP was significantly better than the 0.8 percent of GDP deficit envisaged in the budget.

## V. CONCLUSIONS

The analysis in this paper show that under unchanged policies, population aging could adversely affect growth and living standards in Hong Kong. While higher labor productivity growth and increased migration of younger skilled workers from the mainland and elsewhere would attenuate the economic impact of aging, they would not offset it fully. Aging will also put pressure on the public finances particularly on health care cost.

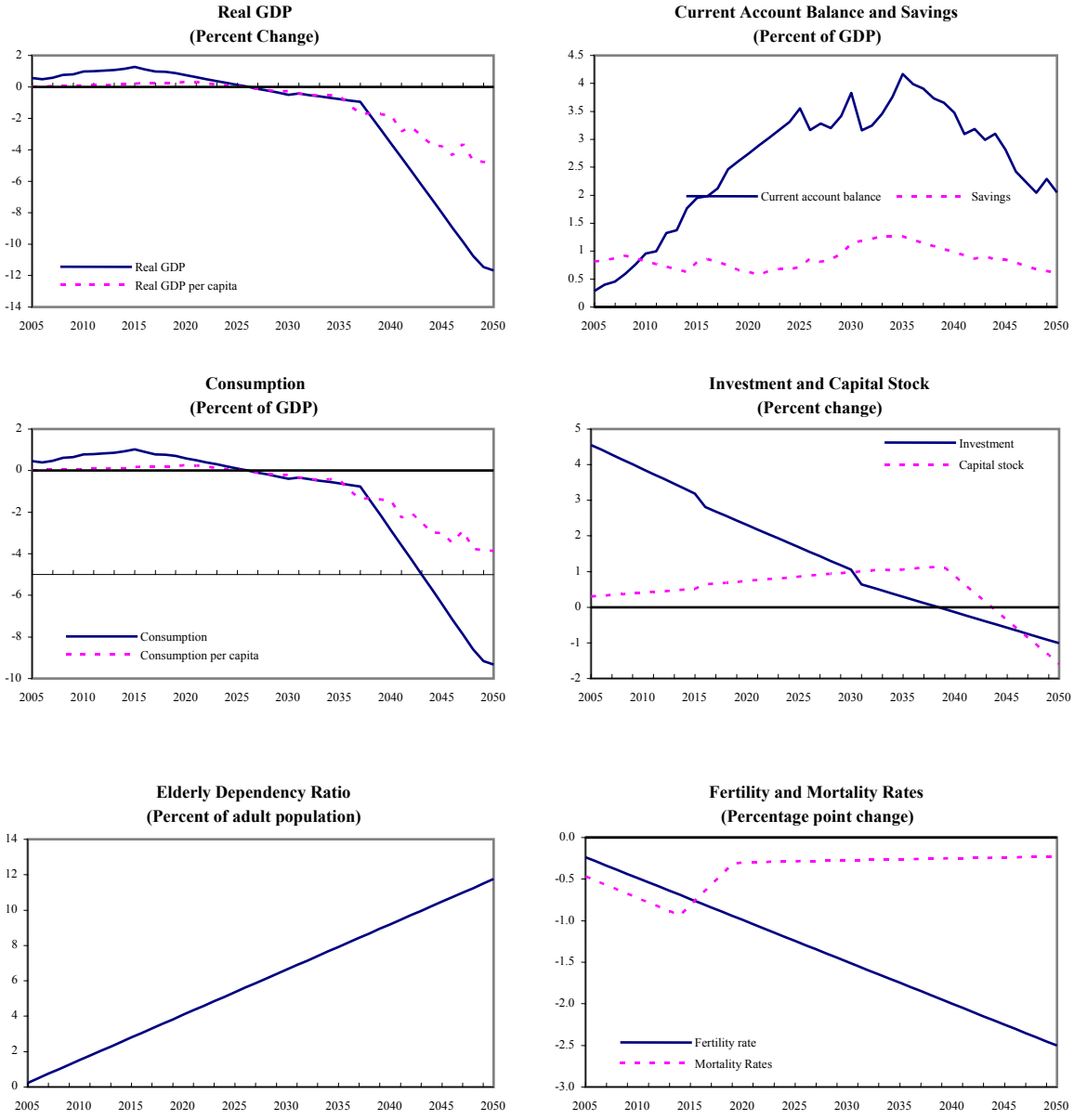
Thus, an integrated and early response is needed to address the impact of population aging. As the demographic effects will start setting in about 2015 when the labor force support ratio is projected to peak, this leaves a window of opportunity during the next 10 years to design specific countervailing policies which could mitigate the impact of aging. Given the likely stress on public finances, specific measures could be taken to mitigate the impact of the likely rise in health and long-term-care spending on public finances. Strengthening the fiscal position could be achieved through a mix of continued expenditure restraint, especially in non-age-sensitive areas, continuation of the ongoing reforms in health care provision (including introducing private health insurance system and raising user fees—with safeguards for the needy), and welfare reforms and revenue-enhancing measures. Other measures could also be taken to shift the associated health care costs of aging to the private sector which could include the introduction of a Medicare-type levy on employees to be administered by the Mandatory Provident Fund. As noted in Section IV, the Hong Kong SAR authorities are already considering some of these measures  These combined with continued success at fiscal consolidation would go a long way in mitigating the impact on the public finances of a rapidly aging population.

Figure 3. Demographic Shock Impact under Unchanged Policies
(Deviations from stationary-population baseline levels)




Sources: Staff Calculations.

Figure 4. Demographic Shock Impact with Increased Labor Productivity Growth
(Deviations from stationary-population baseline levels)




Sources: Staff Calculations.

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**Detailed Analysis of the Impact of Aging on Public Spending**

*The Basic Model:* In addition to demographics, developments in employment and the generosity of the pension benefit system for the elderly—both with respect to eligibility and to the benefit level—will have some impact on public finances. Thus, the increase in pension spending will depend on the development of four factors (see below):[12]

- the relative number of elderly (*aging effect*);
- the share of working-age people in employment (*employment effect*);
- the share of elderly receiving pensions (*eligibility effect*);
- the pension level of old-age recipients (*benefit effect)*.

The evolution of pension spending as a share of GDP depends on the age structure of the population, old-age generosity and eligibility, and the productivity of the employed. Thus, the pension share to GDP can be written as follows:

$$\frac{Pension\ \ Spending}{GDP} = \left(\frac{Number\ \ of\ \ Pension\ \ Re cipients}{Employment}\right) * \left(\frac{Average\ \ Pension\ \ Benefit}{Average\ \ Pr oductivity}\right) \quad (1)$$

The ratio of pensioners to the employed can be decomposed further into the product of three ratios: (i) the dependency ratio; (ii) the inverse of the employment ratio; and (iii) the eligibility ratio (Dang, Antolin, and Oxley, 2001). This gives:

$$\frac{Pension\ \ Spending}{GDP} = \underbrace{\left(\frac{Population\ \ \geq 65}{15 \leq Population\ \ \leq 64}\right)}_{1} * \underbrace{\left(\frac{15 \leq Population\ \ \leq 64}{Employment}\right)}_{2} * \underbrace{\left(\frac{Re cipients}{Population\ \ \geq 65}\right)}_{3} * \underbrace{\left(\frac{Average\ \ Pension\ \ Benefit}{Average\ \ Pr oductivity}\right)}_{4} \quad (2)$$

The first three ratios on the right-hand side are the dependency, inverse employment, and eligibility ratios, respectively. This shows that pension spending as a share of GDP increases

[12] Although pension reform in Asia is still at a relatively nascent stage, with many countries in the region still relying on national provident funds, Hong Kong SAR seems be the exception. It has a very good mandatory provident fund scheme. Publicly provided pension is very limited in Hong Kong SAR, unlike in many other countries in a similar situation. The Mandatory Provident Fund (MPF), which was established in 2000, is the main pension vehicle, and it is fully funded and privately managed. The MPF ordinance stipulates a retirement age of 65. However, members can claim their accrued benefits at age 60. Under the new civil servants pension scheme the normal retirement age was raised from 55 to 60, thus narrowing eligibility and strengthening disincentives to early retirement.

with the dependency and eligibility ratios and with the generosity of old-ages to average productivity; it decreases with the employment ratio.

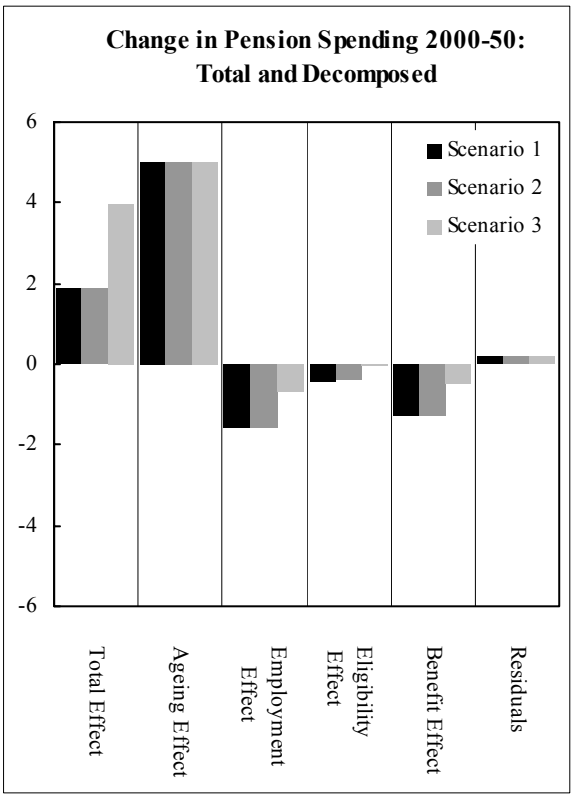
The contribution of each of these four ratios to the change in the overall share of pension spending to GDP can be approximated by the log linear decomposition:

$$\frac{\partial\left(\frac{Pension\quad Spending}{GDP}\right)}{\partial t} \cong \left(\frac{\partial\quad log(1)}{\partial t} * ps_{t=0} + \frac{\partial\quad log(2)}{\partial t} * ps_{t=0} + \frac{\partial\quad log(3)}{\partial t} * ps_{t=0} + \frac{\partial\quad log(4)}{\partial t} * ps_{t=0}\right) + \varepsilon \quad (3)$$

where pst=0 is current old-age spending as a share of GDP and ε is the residual from the log linearization. To minimize the significant residuals normally following from a linearization of a nonlinear function with large changes over long periods, one can calculate (3) for shorter subperiods and add them. We followed this procedure when calculating the results presented below.

Long-term projections of age-related spending and its effect on general government finances are very sensitive to the underlying assumptions. Thus, assumptions about demographic changes and about the impact of labor market policies have large effects on the path of age-related spending. The sensitivity of age-related spending and thus public finances to the economic outlook and to the effect of structural reforms is illustrated in a number of different scenarios. The scenarios are divided into three groups that explore the outlook for age-related spending and the public finances in a “high case” of solid growth and very successful outcomes of policies to mitigate the impact of aging and a “low case” of lower growth and less successful of policies to mitigate the impact of aging.

- *Scenario 1:* Assuming that labor market productivity growth is maintained at current levels, combined with some private sector participation in the financing aging-related health care cost, the growth of old-age related spending will be contained through a higher employment ratio (*employment effect)*, tighter eligibility (*eligibility effect*), and potentially an increase in productivity growth to above average old-age benefit growth (*benefit effect*). However, this will be insufficient to counter the impact of the rise in the dependency ratio (*aging effect*), and pension spending (as a share of GDP) is still projected to rise by about 2 percentage points from 2000 to 2050. Together with a projected rise of 2 percentage points in spending on health and long-term care, total age-related spending will put some increasing demands on budgetary resources. Absent compensating measures, this would lead to decline in the fiscal reserves-to-GDP ratio.




- *Scenario 2:* This scenario explores the impact of higher labor productivity than in scenario 1, which leads to a higher real GDP growth during 2008-2050. However, this increase in productivity would also lead to higher wage growth and thus to adjustments in the average pension level, leaving the *benefit effect* broadly unchanged from scenario 1. Overall age-related spending as a share of GDP falls, as pension spending is projected to reach around the same level as in scenario 1, while health and long-term-care spending are lower due to the higher GDP level. This has positive dynamic effects on public finances, and consequently, the fiscal reserves-to-GDP ratio is projected to decline slightly less than in scenario 1.

- *Scenario 3:* This scenario explores the outlook under significantly lower labor productivity growth than in both scenarios 1 and 2 combined with lack of success in the authorities' efforts to mitigate the impact of aging on the public finances through greater private sector participation in financing health care costs. This assumption makes a considerable difference. Pension-related spending increases as employment develops more negatively (*employment effect*), people retire earlier (*eligibility effect*), and average pensions develop more in line with the slower-growing GDP (*benefit effect*). Health and long-term-care spending increase by around 6 percentage points due to lower GDP growth, raising total age-related spending as a share of GDP by about 8 percentage points.