

Asher, Mukul; Nandy, Amarendu

Working Paper

Managing prolonged low fertility: The case of Singapore

ADB Discussion Paper, No. 114

Provided in Cooperation with:

Asian Development Bank Institute (ADBI), Tokyo

Suggested Citation: Asher, Mukul; Nandy, Amarendu (2008) : Managing prolonged low fertility: The case of Singapore, ADB Discussion Paper, No. 114, Asian Development Bank Institute (ADBI), Tokyo

This Version is available at:

<https://hdl.handle.net/10419/53493>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



Managing Prolonged Low Fertility: The Case of Singapore

**Mukul G. Asher and
Amarendu Nandy**

August 2008

ADB Institute Discussion Paper No. 114

Mukul G. Asher is a professor of public policy at the National University of Singapore. Amarendu Nandy is a PhD candidate in Lee Kuan Yew School of Public Policy at the National University of Singapore.

This discussion paper is a revised version of the paper presented at the International Conference on “Public Finance/Social Security System in Depopulation society”, organized by the Policy Research Institute of Japan’s Ministry of Finance, Asian Development Bank Institute (ADBI), and Centre for Intergenerational Studies of Hitotsubashi University, 3 June 2008. The excellent research assistance of Geeta Karkhanis is greatly appreciated.

The views expressed in this paper are the views of the authors and do not necessarily reflect the views or policies of ADBI, the Asian Development Bank (ADB), its Board of Directors, or the governments they represent. ADBI does not guarantee the accuracy of the data included in this paper and accepts no responsibility for any consequences of their use. Terminology used may not necessarily be consistent with ADB official terms.

ADBI’s discussion papers reflect initial ideas on a topic, and are posted online for discussion. ADBI encourages readers to post their comments on the main page for each discussion paper (given in the citation below). Some discussion papers may develop into research papers or other forms of publication.

Suggested citation:

Mukul, Asher and Amarendu Nandy. 2008. Managing Prolonged Low Fertility: The Case of Singapore. ADBI Discussion Paper 114. Tokyo: Asian Development Bank Institute.
Available: <http://www.adbi.org/discussion-paper/2008/08/22/2673.managing.prolonged.low.fertility/>

Asian Development Bank Institute
Kasumigaseki Building 8F
3-2-5 Kasumigaseki, Chiyoda-ku
Tokyo 100-6008, Japan

Tel: +81-3-3593-5500
Fax: +81-3-3593-5571
URL: www.adbi.org
E-mail: info@adbi.org

© 2008 Asian Development Bank Institute

Abstract

This paper analyzes Singapore's multi-pronged approach to managing prolonged low fertility which has led to population aging, labor force shortages, increasing elderly dependency ratios, and feminization of the elderly population. This approach has emphasized high growth, and has given priority to becoming an attractive business location over providing adequate and equitable retirement and health financing; and has pursued policies designed to generate high levels of net immigration. The chosen policy priorities have created a dilemma centering on ensuring Singapore's business competitiveness on the one hand, and meeting its residents' needs and expectations on the other. In spite of many measures to boost fertility levels (official Total Fertility Rate was 1.29 in 2007, a rate at which population is reduced by 50% in 45 years), as well as high net immigration, population aging is expected to accelerate after 2010. This, along with high income inequalities (Gini coefficient was 0.52 in 2005), will make continuation of current policy priorities even more challenging for the policymakers. While future policy developments are difficult to predict, greater political contestability is likely to hasten the path toward policy priorities which give greater weight to the needs and expectations of the current Singapore residents, even if that leads to lower (but more sustainable and socially cohesive) growth.

JEL Classification: F22, H55, J11, J13, J18

Contents

I. Introduction..... 1

II. Demographic Trends..... 1

III. Policy Responses..... 4

IV. Concluding Remarks 9

References..... 11

I. INTRODUCTION¹

During the 19th and 20th centuries, the issue of population explosion, particularly in developing countries, was at the forefront of policy debates.² As a result, population control became an integral part of the economic development agenda of multilateral institutions and many countries around the world (Connelly 2008).

The fear of unmanageable population explosion has abated in the 21st century. This fear has been replaced in some countries by the concern that they may experience severe challenges arising from prolonged low fertility rates, which could eventually result in declining population, and subsequent loss of economic dynamism and military strength. Four out of nine people already live in countries in which the fertility rate has dipped below the replacement rate. According to the United Nations, the world's average fertility could fall below the replacement rate by 2025 (*The Economist* 2007). Central and Eastern Europe (from Germany to Russia); the Northern Mediterranean; and parts of East Asia are already facing serious challenges arising from depopulation.

The East Asian city-state of Singapore has experienced below-replacement fertility rates since 1975. It is ranked as having the third lowest Total Fertility Rate (TFR) of 1.08³ in the world in 2008 (CIA 2008). Therefore, Singapore may represent an instructive case-study of policy responses and implications of prolonged low fertility rate.

Singapore is among the most globalized economies in the world, with external demand, technology, investments, and manpower playing a dominant role in its evolution from a low-middle income country in the 1960s to a high income country today (Rajan 2003).

Singapore's globalization strategy is creating significant inequalities, and relative poverty. Thus, Singapore's Gini Coefficient (a measure of income inequality) increased from 0.44 in 1990 to 0.48 in 2000, to 0.52 in 2005, with the rising value implying greater inequality. The ratio of disposable income of the highest 20% to that of the lowest 20% has also increased from 11.4 in 1990 to 20.9 in 2000 (Taipei, China's corresponding figures are 5.2 and 5.6) (Chua 2007).

The rest of this paper is organized as follows. An overview of Singapore's demographic trends is provided in Section 2. This is followed by a discussion of the policy responses of the Singapore government to manage prolonged fertility decline in Section 3. The final section provides concluding observations.

II. DEMOGRAPHIC TRENDS

Singapore has experienced a prolonged period of declining fertility and high life expectancy for more than three decades. Singapore's fertility rate in 1957 peaked to six children per woman, but dramatically declined to the replacement level of 2.15 by 1975. Singapore has experienced below-replacement fertility since 1975. Factors attributed to such a rapid decline in fertility include higher ages of marriage and childbearing; and greater family planning measures among the resident population. The life expectancy at birth has also increased from around 68 years in 1970 to 80.4 years in 2007 (ROS, DOS 2008). This is expected to rise to around 85 years by 2050 (UN 2006).

Declining fertility rates and increasing life expectancy (both at birth and during old age) has lead to profound changes in the age-structural composition of the population. This has resulted in population aging, labor force shortages, increasing elderly dependency ratios,

¹ Unless otherwise specified all Dollars refer to Singapore Dollars (SGD). Exchange Rate as of Aug 13 2008: 1 USD = 1.40 SGD.

² Between 1900 and 2000, there was a near quadrupling of the world's population.

³ TFR is defined as the average number of children that would be born to a woman over her lifetime, under certain specific assumptions. The officially reported TFR for Singapore at 1.29 in 2007 is however much higher. The TFR of 1.3 has a special mathematical significance for demographers. At that rate, a country's population is reduced by 50% in 45 years.

and feminization of the elderly population. This has important implications for the resources needed for retirement and health care.

Selected indicators of Singapore's demographic profile for its resident population are provided in Table 1. Singapore's rapid aging becomes particularly evident after 2010 (Table 1). Thus, population aged above 65 years, as projected by The United Nations, will increase from about 0.46 million in 2010 to 1.41 million in 2030, an increase of 207% in just two decades (Table 1).

Table 1: Selected Ageing Indicators in Singapore

Year	Population aged 65+ <i>Medium Variant</i>		Population aged 80+ <i>Medium Variant</i>		Dependency Ratio <i>Medium variant</i>			Working-age/Elderly
	(thousands)	(Percent)	(thousands)	(Percent)	(Total)	(Child)	(Old age)	
2000	287	7.2	48	1.2	41	31	10	10.0
2010	461	10.0	88	1.9	35	21	13	7.7
2020	871	17.5	153	3.1	43	18	25	4.0
2030	1411	26.8	291	5.5	69	24	45	2.2
2050	1632	31.3	730	14.0	78	23	56	1.8

Source: Calculated from Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: The 2004 Revision and World Urbanization Prospects: The 2003 Revision*, <http://esa.un.org/unpp>, 29 August 2007; 6:23:22 PM.

Life expectancy at age 65, currently at 17.2 years for men, and 20.6 years for women (ROS, DOS 2008) is also expected to rise, thereby posing even greater challenges in managing an aging society. The working-age persons to elderly ratio will decline from 7.7 in 2010, to 2.2 in 2030, and further to 1.8 in 2050. The median age of the resident population in 2007 was 36.4 years, and this is expected to increase to 53.7 by 2050 (ROS, DOS 2008; UN 2006).

The above dynamics of rapid aging is evident from the population pyramids for Singapore over the period 2000–2050 (Figure 1). The changes in age-structures revealed by the pyramid in 2010 and in 2050 are particularly striking. In 2010, the largest number of men and women were in the 40–44 age-group; but by 2050, it is projected that the largest number of females will be in the 75–79 age group; and males in the 55–59 age group. This also suggests increasing feminization of the elderly population.

Figure 1: Singapore Population Pyramids, Selected Years

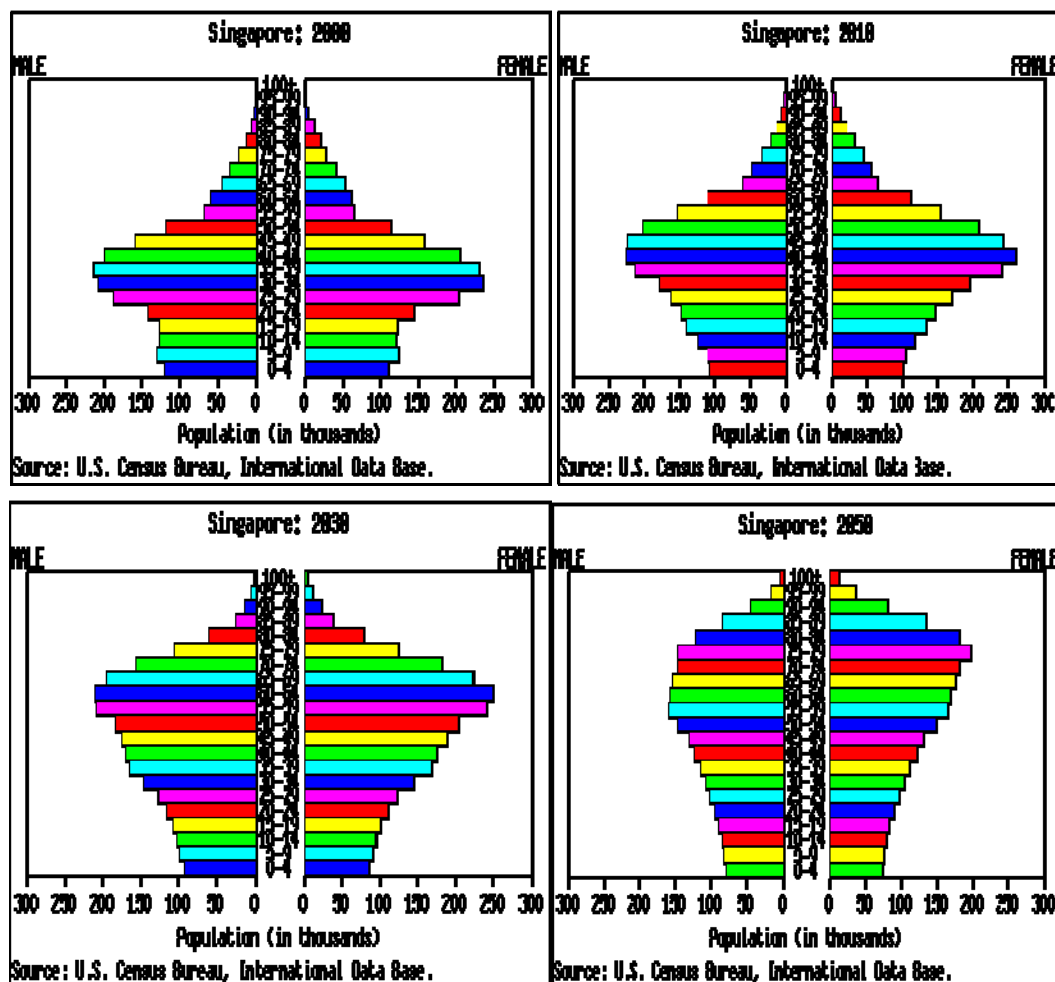


Table 2 provides the age-specific Labor Force Participation Rate (LFPR) for males and females in Singapore for 2006. Singapore's total LFPR, at 65%, is higher than the corresponding figure for Japan (54%) and Republic of Korea (62%), but lower than that of Denmark (78%) and Canada (67%).⁴ However, the LFPR for age groups between 40 to 64 years is much lower in Singapore. Thus, for the age group 60–64 years, Singapore's LFPR at 44% compares unfavorably with Japan (55%), Republic of Korea (56%), Canada (45%), and United States (52%). Such a pattern is also observed in the LFPR for the 65–69 age group.

Singapore policymakers have argued that a longer period in the labor force may be an important instrument for coping with the financial needs of old age. However, even for the 60–64 age group, only 44% are in the labor force and this figure declines sharply at higher ages (Table 2). For women, this is particularly the case, where only one in six women in the 65–69 age group was in the labor force in 2006. Since the mean life expectancy at age 65 for women was 20.6 years in 2006, such a low level of labor force participation does not suggest that this will be a major instrument for ensuring financial adequacy in old age.

⁴ Data for other countries were obtained online from ILO LABORSTA database, <http://laborsta.ilo.org/>, accessed on 12 June 2008.

Table 2: Singapore: Age-Specific Labor Force Participation Rate for Residents
(June 2006)

Age Group (Years)	Male	Female	Total
15–19	12.6	12.1	12.2
20–24	71.4	70.0	70.7
25–29	94.0	84.5	89.0
30–34	98.0	77.7	87.2
35–39	98.2	70.4	83.8
40–44	97.7	67.7	82.5
45–49	96.5	66.2	81.4
50–54	93.3	59.5	76.8
55–59	81.9	44.7	63.5
60–64	62.5	26.2	43.9
65–69	36.0	15.6	25.3
70–74	20.0	7.7	13.2
75 & above	6.8	2.0	3.9
TOTAL	76.2	54.3	65.0

Note: The Singapore's resident labor force was 1.88 million in June 2006, while the total labor force was 2.59 million.

Source: ROS, DOS (2008)

The above analysis suggests that Singapore's demographic transition has been consistent with trends observed in industrial countries, except that in Singapore, the transition has occurred much more rapidly. Singapore has moved from being a high-fertility, low middle income country during the 1950s to a high income, demographically mature city-state in the span of a few decades.

III. POLICY RESPONSES

The policy responses to managing prolonged low fertility levels in Singapore have been wide-ranging. They are discussed below.

Strong Emphasis on Growth and Fiscal Management

Singapore has continued to emphasize high growth, which its policymakers regard as essential for the city-state to sustain its competitiveness and dynamism in a globalizing world; and to address various political economy and demographic challenges.

Singapore has recorded persistent budget surpluses, measured using IMF methodology, and has accumulated substantial fiscal reserves over the years (Asher 2003).⁵ The fiscal surpluses have primarily been due to extensive use of non-conventional revenue sources. Thus, during the 1991 to 2001 period, the fiscal revenue from leasing of land⁶ averaged 6.2% of GDP annually, while its reported investment income included in the budget⁷ averaged 4.5% of GDP annually (Asher 2003, Table 8.1).

⁵ As at 31 March 2000, the total assets of the Singapore government were US\$319 billion (Asher 2003). Estimates of such assets are not available for recent years.

⁶ The state currently holds more than 85% of land, which it leases to users. At the time of Singapore's Independence in 1965, the government owned only 40% of the land. There is neither a constitutional nor a common law right to own land.

⁷ Singapore's two Sovereign Wealth Funds (SWFs), Government Investment Corporation (GIC) and Temasek Holdings, as a result of specific statutes, are not required to provide any information on their investment policies and performance. Recently, there has been a provision that 50% of net investment income (whose definition is not provided by the authorities) will be included in the budget. So, the figures cited in the text on the contribution of investment income to fiscal revenues significantly understate their contribution. Truman (2007) estimates Singapore's foreign exchange reserves at US\$152 billion (as of September 2007) and its SWF assets at US\$323 billion.

Singapore has also made extensive use of regulatory levies, such as Electronic Road Pricing (ERP), and Certificate of Entitlement (COE) (requirement of the right to own a car for a 10-year period) to generate budgetary revenue.

While Singapore does not publish net national savings, or a breakdown of gross domestic savings, Asher (2003) has estimated that between 1991 and 2001, budgetary savings contributed, on average, about two-fifths of gross domestic savings.⁸

High Net Immigration

Singapore's TFR has been below the replacement rate for over three decades. Policymakers realize that measures designed to increase TFR such as the Children Development Co-savings (Baby Bonus) Scheme,⁹ increased maternity leave, and subsidies for infant and child care are likely to have a limited impact on fertility levels. Therefore, the primary instrument has been relatively large scale and sustained but selective net immigration. Singapore has sent out strong signals that such net immigration will be pursued without changing the dominant Chinese character of the city-state, or altering the ethnic composition.

Table 3 provides a breakdown of Singapore's population between citizens, permanent residents, and foreign workers and their dependents. The data indicates a sharp decline in the share of citizens in the total population between 1990 and 2005. The share of citizens declined by 15% from 86.1% in 1990 to 71.5% in 2005. Correspondingly, the share of permanent residents nearly increased by 300%, while the share of the non-resident population nearly increased by 200% during this same period. In 2005, close to 30% of the total population were non-citizens. This share is expected to rise (Burton 2007). Such level of absorption of foreign-born persons is likely to create both profound and subtle changes in the Singapore society, the contours of which will unfold over time.

Table 3: Singapore: Population Composition, 2007

	1990	2000	2005	2007
Total population	3,047	4,018	4,351	4,589
	(100.0)	(100.0)	(100.0)	(100.0)
Citizens	2,624	2,973	3,113	3,583*
	(86.1)	(74.0)	(71.5)	(78.1)
Permanent Residents	112	290	441	NA
	(3.7)	(7.2)	(10.1)	
Non-resident population	311	754	798	1,006
	(10.2)	(18.8)	(18.3)	(21.9)

Note: Includes Permanent Residents.

Source: Chua (2007); Republic of Singapore (ROS), Department of Statistics (DOS) (2008); ROS, DOS (2002).

In February 2007, Singapore officially announced a population target of 6.5 million. While an exact date has not been set, media reports suggest a time frame of 20 years.

A public opinion survey published in a local paper in early 2007 reports that nearly 43% of Singaporeans believed the government is more concerned about foreign talent than its citizens; and doubted that high immigration helps create jobs and fresh opportunities. Nearly 9 respondents out of 10 feared that foreign talent will take away their jobs (Bala 2007). It is

⁸ For a more detailed analysis of the composition of saving in Singapore, see Peebles and Wilson (2002).

⁹ The Baby Bonus Scheme was introduced in 2001. It provides children of citizens (first to fourth child) a cash gift of S\$6000 and co-savings (i.e. a dollar for dollar matching) of up to S\$12,000 per child by the government. The scheme applies until the child is six years old (<http://www.babybonus.gov.sg/bbss/html/index.html>). These appear to be a relatively small proportion of the total cost of bringing up a middle-class child.

significant that these perceptions are held when Singapore is currently experiencing a favorable macroeconomic cycle. This suggests that political management would become even more difficult if employment growth slows substantially. This is relevant as the 6.5 million population target implies much higher levels of net immigration. If the negative perceptions about foreign talent take deep root, it could have a negative impact on the attraction of Singapore as a business location (Bala 2007), and therefore in managing the impacts of low fertility.

Unpublished research by Singapore's foremost demographic expert, Dr. G. Shantakumar suggests that while relatively high net immigration sustained over time can help in averting a decline in population, it will not address the rapid aging of Singapore's population.¹⁰

Singapore's official attitude towards its citizens emigrating abroad has been shifting from ridiculing them as "quitters" to cautiously encouraging them to retain at least some links with Singapore. A survey by Singapore Press Holdings in July 2006 found that 67% of young Singaporeans wanted to work abroad, and more than 50% of them would consider emigration (*The Straits Times* 14 June 2008).

There are no regularly published figures on emigration from Singapore, but a recent official figure suggested that at least 150,000 (4.8% of citizens in 2005) Singaporeans, mostly in their prime working age, are living abroad. About 1000 citizens are annually giving up their Singapore citizenship (*The Straits Times* 14 June 2008).

Thus, even as the Singapore government attempts to compete for talent from abroad, it has been facing a difficult challenge of retaining its own citizens. This challenge will become more acute as the proportion of those from abroad markedly grows.

Besides addressing the root causes of such large emigration, Singapore policymakers also need to consider more flexible categories, such as the varying degrees of rights already enjoyed by the citizens. This may include a people of Singapore origin category under which individuals can obtain maximum economic benefits enjoyed by the citizens; less discrimination against permanent resident status in housing and other economic benefits; automatic right of citizenship to those born in Singapore, as well as for children with at least one Singapore parent. More liberal rules of employment for expatriate spouses could also help augment the labor supply.

Minimum Social Risk Pooling in Financing Retirement and Health Care

Unlike other high income, demographically mature economies, Singapore has relied almost exclusively on a single-tier mandatory savings arrangement,¹¹ administered by the Central Provident Fund (CPF). The CPF has become the key social, political, and economic institution in the country. The CPF system is quite complex, due to its multiple roles. It is, for example, the primary mortgage financing institution in the country. The CPF system does not contain any social risk pooling elements.

CPF contributions are channeled to three accounts. Two-thirds is channeled to the Ordinary Account (OA) which can be used for housing and investment schemes. 19% is channeled to the Medisave Account (MA) which can be used for hospitalization expenses, and for catastrophic health insurance. The remaining 14% is channeled into a Special Account (SA), which can be used for retirement and other purposes.

Effective from 1 July 2007, the CPF contribution rate of employers was raised by 1.5% to 14.5%, while the rate for employees remained unchanged at 20%, for a total of 34.5%. There was, however, no increase in the wage ceiling of \$4,500 per month.¹² If such a ceiling

¹⁰ Personal communication with Dr. G. Shantakumar.

¹¹ Foreign workers who are not citizens or Permanent Residents (PRs) are not permitted to be a part of the CPF system. They also do not receive public assistance or other benefits.

¹² The total CPF contribution rate was 36% in 2001, with a wage ceiling of \$6000, with the employer and employee contributions at 16 and 20% respectively. The employer contribution was reduced to 13%, for a total of 33% in 2003. The rate and wage ceiling changes have been undertaken in response to macroeconomic conditions and the perceived need to sustain Singapore's business competitiveness. However, these changes

remains fixed in nominal terms over a long period, it implies a decrease in the wage ceiling in real terms. This in turn will further adversely impact the replacement rate.

In 2006, the average balance per member of \$40,598 was less than the per capita GDP of \$46,832. This is extremely inadequate, as an average person will require financing for at least two decades during retirement. The age at which a member can withdraw the minimum sum in monthly installments, increased from 62 to 65 years, which will not make additional resources available during retirement.¹³

It is now reluctantly acknowledged, even by the policymakers in Singapore, that the CPF system will not be adequate to meet the aging issues. There are several reasons for this inadequacy.

First, given the multiple focus of the CPF, the proportion of contributions withdrawn during the pre-retirement period is very high, averaging 82.7% during the period from 2001 to 2006 (CPF 2006). The share of contributions devoted to retirement is therefore low. In some years, discretionary policy measures have reduced the CPF contributions towards retirement to zero.

Second, design and governance issues also act against the adequacy objective; and so does the tendency to use the CPF system as a short-term stabilization instrument. The CPF contribution rates and wage ceiling have been dramatically reduced when macroeconomic cycles suggested slower growth; and increased when the opposite was indicated.

The administered interest rate structure, and lack of transparency and accountability in the ultimate investments of CPF balances (\$125.8 billion as of December 2006) have meant low real returns on these balances.¹⁴ Thus, from the 1987 to 2006 period the annual real rate of return credited to CPF members was 1.26%. As the returns are lower than their corresponding growth in GDP by about 8% and in real wages by around 4.5%, the replacement rate is likely to be low.

The interest rate paid on CPF balances has been a weighted average of savings accounts and one year fixed deposit interest rates of domestic banks, with a minimum nominal interest rate of 2.5%.¹⁵ The investment of the CPF Board is, in essence, only in non-marketable government securities. The interest on these securities is determined retroactively based on the interest declared on CPF balances.

In August 2007, the government announced changes in the administered interest rate arrangements, effective from 2008. For the first \$60,000 of CPF balances, a member will receive an additional 1% over the normal rate. However, instead of paying 1.5% more than the normal rate on balances in MA and SA accounts, the rate will be pegged to a rate of 10-year Singapore government securities plus 1%.

The Singapore budget has shown a trend towards persistent and large structural surpluses.¹⁶ The CPF balances have therefore not been used for government expenditures. Instead, through complex procedures, they are turned over to one of Singapore's holding companies, Government Investment Corporation (GIC).

are potentially reducing resources from the CPF for retirement at a time when the need for more resources is urgent due to demographic trends.

¹³ The minimum sum is the amount people must keep in their retirement accounts after withdrawing their CPF at age 55. Currently, a member may withdraw the minimum sum (as of 1 July 2007 this was \$99,600) at age 62 in monthly installments over roughly a 20 year period. According to official figures, of the 22,600 CPF members who turned 62 years in 2006, only 34% were able to meet the minimum sum requirements. The median shortfall for the remaining members was \$49,300, nearly 50% of the minimum sum.

¹⁴ Chua (2007) has argued that the inflation rate in Singapore, as measured by the Consumer Price Index (CPI) is significantly understated, primarily because of the way the housing component is incorporated. This could result in even lower real rates of return.

¹⁵ On balances in SA and MA of the CPF funds, the administered interest is 1.5% higher than the declared rate.

¹⁶ As at March 2004, total accumulated budget surpluses were \$399.1 billion or 228% of GDP (IMF 2006: 16). The IMF (2006) study reports that "there is...no comprehensive information on the market value of the government's assets, including those of the Government of Singapore Investment Corporation (GIC)" (p. 16).

GIC has a global portfolio. By statutory protection, it does not need to reveal its investment policies and performance to the public or the Parliament. To the extent GIC obtains a higher return than those credited to the CPF members, the difference is an implicit tax or a tax on CPF wealth. This is large, growing, and highly regressive, as low income households are likely to have a disproportionate share of their wealth in CPF balances (Asher and Nandy 2006).

There are also two other factors which reduce the real value of CPF balances. First, Singapore increased the rate of its Goods and Services Tax (GST) from 5% to 7% in 2007. There is strong econometric evidence from international experiences that such an increase will raise the cost of living by the same percentage points as the increase in GST, i.e., 2%. This will act as a tax on CPF wealth. Second, in 2008, Singapore's inflation rate is expected to be about 6%. To the extent interest credited to CPF members is less than the inflation rate, an erosion of the real value of CPF balances will arise. This will further accentuate the inadequacy of the CPF for financing retirement and health care. Singapore also has the highest negative real interest rate (3-month market rate minus official CPI inflation) of about 5.5% in Asia (Minder 2008). This distorts household financial decisions. The centralized control of national savings by the government agencies and banks, however, is of considerable advantage to those controlling them.

Blake et al. (2008) suggest that a DC system should be designed from back to front (that is, from desired outputs to required inputs) with the goal of delivering an adequate targeted pension with a high degree of probability. In Singapore, there has been no public discussion of the actual replacement rate that will be obtained by different cohorts of the elderly. There also does not appear to be any target rate of replacement and the contribution of the CPF's savings and other instruments to the rate. Singapore's DC system thus does not meet the requirement of good design recommended by Blake et al. (2008).

It should be emphasized even without the above design and governance features, a single-tier retirement financing system involving only mandatory savings, can never provide an adequate replacement rate; or address inflation and longevity risks;¹⁷ or provide survivor and disability benefits (Asher and Nandy 2006). A multi-tier system involving a mixture of defined benefit (DB) and defined contribution (DC) systems, with varying degrees of risk-pooling or risk-sharing arrangements are needed for a robust, adequate, and equitable social security system (Holzmann and Hinz 2005).

Singapore's health care financing system follows a pattern similar to the retirement financing system. The share of private provision of health care in Singapore is around three-fourths, with one-fourth coming from the government budget (Asher and Nandy 2006). The respective shares are reversed in the Organisation for Economic Co-operation and Development (OECD) countries. The private-public composition of healthcare expenditure in 1980 resembled the current OECD composition, so the public policies have contributed to a lopsided share of private provisions in health care. The share of third party payment through insurance and other risk-pooling instruments in Singapore's national health expenditure is extremely low. The adverse impact of these factors has been partially mitigated by the state's utilizing its overwhelming dominance over hospital beds to promote autonomy and efficiency in the hospitals (Ramesh 2008).

The Medishield system, which is Singapore's health insurance system for relatively long hospital stays, has no social risk-pooling arrangements as premiums vary positively with age.¹⁸ Moreover, the coverage stops at age 85. Table 1 suggests that the number of old-old

¹⁷ In August 2007, the government announced that the members will have to compulsorily purchase an annuity from their own balances at age 55, while the benefits will be paid after a member reaches 85 years. The government has ruled out any budgetary support for the system. But the other details have still not been announced. The compulsory annuity will reduce already low CPF balances, thus adversely affecting the adequacy. If the generally observed correlation between income and life expectancy holds for Singapore, then the compulsory annuity will be inequitable as poorer groups will receive proportionately less benefits. There are no plans for inflation indexation of the annuity.

¹⁸ The Singapore government has adopted an opt-out method for enrolling newborn babies into the Medishield System. Such a method is to be extended to school-age children as well.

(over 80 years) will rise rapidly reaching 88,000 by 2010, and 297,000 by 2030. Assuming the cutoff age for Medishield remains constant, there will be an estimated 111,000 persons above 85 years (US Census Bureau 2006) who will not have basic catastrophic insurance coverage during their most vulnerable stage in life.

For an affluent and rapidly aging society, assessment of the health financing system needs to go beyond the conventional indicators. If international experience is any guide, social risk-pooling in the financing of healthcare, near universal coverage, and greater individual choice should be additional criteria in evaluating a health system. The application of technology in healthcare provision becomes more pervasive in an affluent and aging society. This drives up costs, making cost control a high priority objective. In addition, the expectations concerning quality of healthcare are much higher. At the same time, low fertility rates make reliance on family and immediate community more difficult to sustain.

The above discussion suggests that minimizing the importance of the social insurance and social risk pooling elements in the retirement and health financing systems has been a key method of coping with low fertility rates over a prolonged period. The policymakers have repeatedly emphasized that this approach will continue even as Singapore's demographic structure begins to resemble that of a typical OECD country. Singapore's strong fiscal position and increasingly aggressive investment strategies of its SWFs have provided resources and flexibility to enhance the adequacy of their retirement and health care financing systems.

A research finding from Europe should be especially illuminating for the Singapore policymakers. In Europe, the Scandinavian countries have both the most extensive social welfare systems in Europe and at 1.8, among the highest fertility rates (Shorto 2008).

Additional Measures

Singapore has also begun to undertake certain measures that encourage the continued employment of the aged. These measures include increasing the retirement age, opening job placement offices for the elderly, and providing subsidies to companies that hire elderly workers, both male and female. Increasing the labor force participation rate of women of all ages is helpful in coping with labor supply constraints arising from prolonged low fertility rates.

Subsidies are also provided to certain voluntary organizations that undertake various community-based social services for the elderly.

Though the government's explicit philosophy has been to discourage institutional long-term care for the elderly, it has encouraged certain community-based aged services. The government's Housing and Development Board (HDB) offers housing plans for multi-generational families and "granny" flats for the elderly.

However, unlike other high-income, de-populating economies, it has not taken sufficient advantage of the demographic complementarities with other Asian countries (such as India, Philippines, or Viet Nam), by engaging in outsourcing and off-shoring activities, despite its geographical and cultural proximity to these economies; and technological sufficiency. It has therefore failed to sufficiently extend its economic space as an instrument for countering the labor force and productivity impacts of prolonged fertility decline.

Singapore is attempting to increase the identification between companies and domestic workers. The policymakers hope that this will make companies more willing to provide health and retirement benefits, as well as training. The key objective is employability of workers at all ages.

IV. CONCLUDING REMARKS

Singapore has experienced prolonged period of below-replacement fertility rates for more than three decades. Declining fertility and increasing life expectancy, along with high levels of per capita income and education, have resulted in profound changes in the age-structural composition of its population over the years. Such demographic changes have lead to

population aging, labor force shortages, increasing elderly dependency ratios, and feminization of the elderly population, thereby posing significant challenges to the policymakers. The primary challenge has been to sustain its growth and economic dynamism, while simultaneously managing the implications of a prolonged period of low fertility on the economy and the society.

Singapore's approach to managing the challenges of prolonged low fertility rates has been wide-ranging. Singapore has emphasized high growth and prudent fiscal management to lessen the fiscal impact of its aging population. It is consciously attempting to focus on gross national product (GNP) which includes investment income earned overseas from accumulated financial assets. Its two SWFs have been quite aggressive in their investment strategies in pursuit of higher returns.

Singapore has consciously encouraged high net immigration on a sustained basis, but without altering the predominance of the Chinese population. Singapore has invested heavily in physical infrastructure, in social and cultural amenities, and has pursued flexible labor markets and government procedures to facilitate the inflow of requisite manpower. At the same time, it is cautiously encouraging past emigrants to retain some links with Singapore.

Singapore has primarily relied on a single-tier mandatory savings mechanism to provide for retirement income security, and health care. It has been reluctant to broaden social risk pooling through a multi-tier approach (even though it has run persistent government surpluses and accumulated comfortable foreign reserves), and has discouraged long-term institutional care for the aged. Such reliance, however, is contingent on the continued one-party dominance of Singapore's political, social, economic, and cultural landscape. A more contested political arena and weakening of one-party dominance are likely to make the current mechanism politically unsustainable.

Unlike other high income, de-populating economies, it has not taken sufficient advantage of the demographic complementarities with other Asian countries (such as India, Philippines, or Viet Nam), by engaging in outsourcing and off-shoring activities, despite its geographical and cultural proximity to these economies; and technological sufficiency. It has therefore failed to extend its economic space.

As Singapore responds to low rates of fertility for a prolonged period of time, and forces of globalization, it faces a fundamental dilemma. It must ensure its competitiveness as a business location on the one hand, and meet its residents' needs and expectations on the other. The danger is that if the balance is shifted too far in the direction of Singapore as a business location, both aspects of Singapore (business location and a nation) may be undermined. If the balance is shifted towards meeting the national needs, then the trade-off will be acceptance of a somewhat slower growth.

Singapore will have to make participating in the labor force and procreating more compatible if it is to manage prolonged periods of low fertility. It will also have to meet the needs and expectations of an increasingly demanding and internationally mobile population for better balance between work and life; and for increased economic security and better risk management in old age. This will be a major challenge for the policymakers, and will test their abilities and ingenuity.

REFERENCES

- Asher, Mukul G. 2003. Fiscal Policy Challenges Facing a Mature Asian Economy: The Case of Singapore. In *Sustaining Competitiveness in the New Global Economy: A Case Study of Singapore*, edited by Ramkishen S. Rajan. UK: Edward Elgar.
- Asher, Mukul G. and Nandy, A. 2006. Mandatory Savings for Asset Enhancement: The Case of Singapore. *Social Development Issues* 28 (2): 57–70.
- . 2008. Singapore's Policy Responses to Ageing, Inequality, and Poverty: An Assessment. *International Social Security Review* 61 (1): 41–60.
- Bala, S. 2007. Red Carpet for Foreigners Puts Locals in Black Mood. *Financial Times*. 8 February.
- Blake, D., Cairns, A. and Dowd, K. 2008. Turning Pension Plans into Pension Planes: What Investment Strategy Designers of Defined Contribution Pension Plans Can Learn from Commercial Aircraft Designers. Pension Institute Discussion Paper PI-0806, April.
- Chua, H.B. 2007. *Singapore Economy: The New and the Dual*. Singapore: Citigroup.
- . 2007. The Bottleneck Economy. *Singapore Market Weekly*. Singapore: Citigroup.
- Connelly, M. 2008. *Fatal Misconception: The Struggle to Control World Population*. Cambridge: Harvard University Press.
- Economist, The*. 2007. How to Deal With a Falling Population? July 26.
- International Monetary Fund (IMF) 2006. *Singapore: Selected Issues, IMF Country Report* 06/151. Washington DC: IMF.
- Minder, R. 2008. Asian Banks Face Inflation Dilemma. *Financial Times*. June 6.
- Peebles, G. and Wilson, P. 2002. *Economic Growth and Development in Singapore: Past and Future*. Cheltenham: Edward Elgar.
- Rajan, R. S. 2003. *Sustaining Competitiveness in the New Global Economy: A Case Study of Singapore*. UK: Edward Elgar.
- Ramesh, M. 2008. Autonomy and Control in Public Hospital Reforms in Singapore. *American Review of Public Administration* 38 (1): 62–79.
- Republic of Singapore ROS Department of Statistics (DOS). 2002. *Twenty Five Years of Below Replacement Fertility: Implications for Singapore*. Available: <http://www.singstat.gov.sg/papers/seminar/fertility.pdf>, Accessed: 4 July 2007, 2:10 PM.
- . 2008. *Key Annual Indicators*. Available: <http://www.singstat.gov.sg/stats/themes/people/hist/popn.html>, Accessed: 15 May 2008, 6:23 PM.
- Shorto, R. 2008. Are Europe's Baby Blues a Crisis or an Opportunity? *International Herald Tribune*. 28–29 June: 1–2.
- Truman, E.M. 2007. Sovereign Wealth Fund Acquisitions and Other Foreign Government Investments in the United States: Assessing the Economic and National Security Implications. Testimony before the Committee on Banking, Housing, and Urban Affairs, United States Senate, 14 November 2007.
- United Nations. 2006. *World Population Prospects: The 2006 Revision*. Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. Available: <http://esa.un.org/unpp>. Accessed: 23 November 2007; 3:48:26 PM. UN Statistics Division.
- United States Census Bureau. 2006. International Data Base. Available: <http://www.census.gov/cgi-bin/ipc/idbsum.pl?cty=SN>. Accessed: 20 February 2007, 9:36 AM.