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LABOUR FORCE GROWTH IN SINGAPORE

Prospects and challenges

Koh Eng Chuan

Singapore's labour force participation rates are at high levels. Age specific rates, especially of men, have approached those of developed countries. The current very low total fertility rate of 1.25 would have major implications for Singapore's labour supply and economy in a closed population. Multi-pronged approaches such as measures to increase fertility, increase labour force participation, and to augment the local workforce with migrants are discussed. In the context of Singapore's physical land constraint, continued growth in the labour force in the long term would be challenging. Future gross domestic product growth is likely to be more sustainable via labour productivity growth. Identifying new niche areas of growth and having a nimble and quality workforce would become more important than labour force growth.

KEYWORDS: Singapore labour force growth; future labour supply; population projections

Introduction

Singapore's labour force participation rates (LFPRs) are at high levels comparable to those of developed countries (Table 1). Age-specific resident¹ LFPRs, especially those of men, have approached those of developed countries. Resident unemployment is low at about two per cent since the 1990s with exceptions in the immediate aftermath of the 1999 Asian financial crisis and the 2003 SARS crisis when it rose to about 4–5 per cent (MOM 2007a). In fact, the demand for labour is so strong that Singapore's labour force includes a large component of foreign guest workers.

In a closed population, the current below replacement fertility—total fertility rate (TFR) of 1.25 in 2005—would have two kinds of implications for Singapore's labour supply and economy. Firstly, the ageing of the population would lead to an ageing labour force, and secondly, the projected negative population growth by year 2020 (Wong 2007) would lead to declining workforce size. Using the fundamental identity that the aggregate output of an economy is the result of the size of the labour force and the average productivity of that labour (Landmann 2004; MAS 2000), this implies that future gross domestic product (GDP) growth in a closed population would have to depend primarily on labour productivity growth. There is therefore a need for policy measures to address the adverse implications of an ageing labour force and negative population growth.

The first part of this paper studies the trends in Singapore's age specific resident LFPRs and discusses whether further increases are possible by comparing Singapore's rates with those in other developed countries. The second part looks at the implications of an ageing and declining workforce on the economy, using projections of a closed population and the consequent labour supply as a baseline. The third part provides a range of policy

TABLE 1

Labour force participation rates, selected economies.

	Male	Female
Australia 2003	71.8	56.0
Germany 2003	65.4	49.3
Hong Kong 2003	72.0	51.0
Japan 2004	73.4	48.3
New Zealand 2003	74.0	59.5
Singapore 2006	76.2	54.3
UK 2003	70.6	55.3
US 2004	73.3	59.2

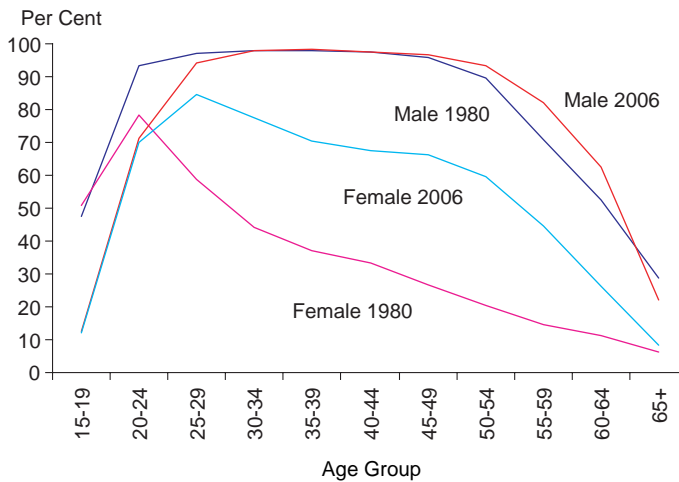
Source: ILO (2005). Labour Force Survey Report 2006, Ministry of Manpower.

options, most of which have already been discussed or adopted by the Singapore government, to counter the adverse implications of the current population trends.

Trends in LFPRs and Hours Worked

The LFPRs for males and females have increased over the last two and a half decades for all age groups, except for those aged below 25 years due to youths delaying entry to the labour market to pursue higher education (MOM 2007b). Gains are especially significant for female LFPRs (Figure 1). Changes in societal norms, narrowing gender education differences (MOE 2005), employment opportunities for women, and increased acceptance of working women have all contributed to higher female LFPRs.

While Singapore's LFPRs have been increasing, a comparison with the age specific LFPRs of selected developed countries show that there is still some potential for them to

**FIGURE 1**

Singapore's resident LFPRs, 1980, 2006.

Source: Census of Population 1980, Singapore Department of Statistics (Total [residents and non-residents] LFPR), Labour Force Survey 2006, Ministry of Manpower.

grow (Figure 2). For males, a further rectangularization similar to that experienced by Japan is possible; for females, participation after age 40 can be further encouraged. This is further discussed in the later section on possible measures to increase Singapore's labour supply.

The number of hours worked, which contribute to the supply of labour, are however already at high levels at an average of 47 hours, about four hours of which comes from overtime work (Table 2). Hours of work are high compared to Japan at 42.2 hours and US at 43.4 hours (ILO 2005). European countries—for example Norway 34.6 hours, UK 39.6 hours—have notably lesser working hours. This suggests that Singapore's supply of labour from those currently working has already reached a high saturation point.

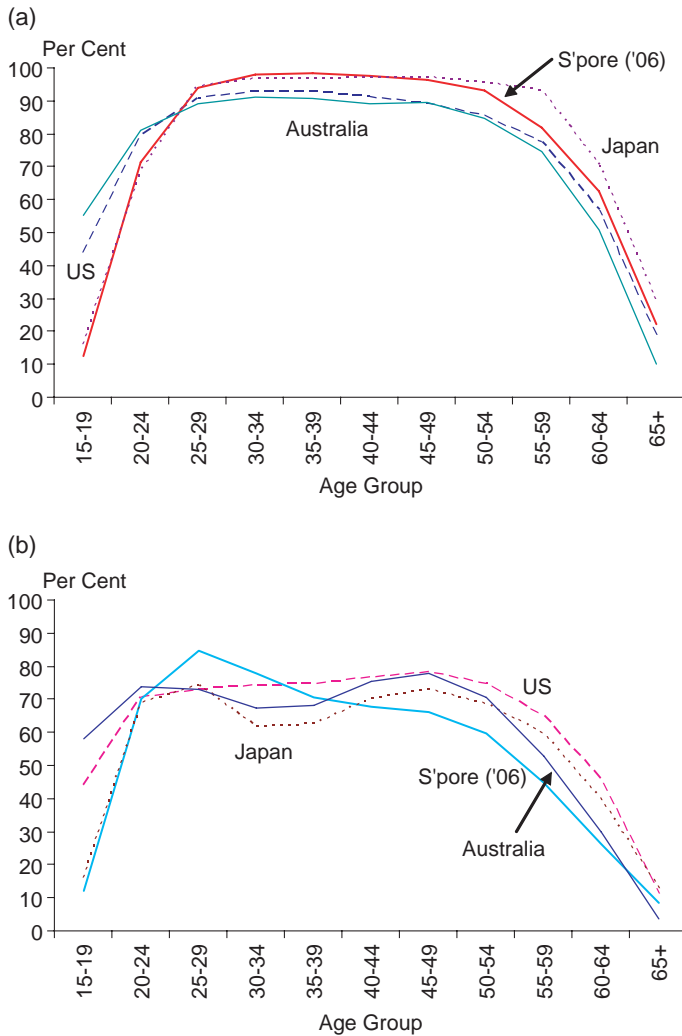


FIGURE 2
 (a) Male LFPRs of selected countries, 2004; (b) Female LFPRs of selected countries, 2004.
 Source: OECD (2005). Labour Force Survey 2006, Ministry of Manpower.

TABLE 2

Hours worked and overtime work in Singapore, 1994–2005.

	Average hours worked per week	Average hours of overtime per week
1994	47.0	4.5
1996	47.2	4.5
1998	46.8	4.1
2000	47.0	4.4
2002	46.0	3.6
2004	46.3	3.9
2005	46.5	4.1

Source: Labour Force Surveys, various years, Ministry of Manpower.

Implications in a Closed Population

In a closed population with no migration, below replacement fertility rates would lead to population decline about 15 years from now. Table 3 shows projection results conducted using the cohort component approach with year 2000 as the base, mortality declining (e_0 76.6 years for males and 81.4 years for females increasing to 78.9 and 83.6 respectively in 2050) and constant fertility (1.25) levels. This provides a baseline projection.

Labour supply obtained by applying the current 2006 resident LFPRs (MOM 2007a) into the future on the projected closed population model would see the workforce declining and ageing quickly (Table 4). Large contractions would be seen in all age groups except for the old ages above 60 years where there would be an increase in workers. Overall resident labour force would fall 33 per cent from 1.75 million in 2010 to 1.18 million in 2050. Out of the resident labour force, 23 per cent would be aged 55 and above in 2050 while it was only 11 per cent in 2010. The proportion of labour force to population would fall from 52 per cent in 2010 to 42 per cent in 2050.

In a closed population, these projections would have the following implications for Singapore's economy.

TABLE 3

Singapore's projected closed resident population, 2010–2050 (in thousands).

Year	Total	Male	Female
2000(actual)	3273.4	1634.7	1638.7
2010	3437.1	1710.9	1726.2
2015	3463.1	1719.0	1744.1
2020	3464.1	1714.5	1749.6
2025	3442.2	1697.8	1744.3
2030	3382.3	1662.4	1720.0
2035	3305.5	1615.4	1690.1
2040	3170.3	1543.6	1626.8
2045	3009.4	1461.4	1548.0
2050	2825.6	1372.2	1453.3

Source: Author's computations, closed population.

TABLE 4
Singapore's projected resident labour force, 2010 and 2050 (in thousands).

Age group	Male			Female		
	2010	2050	Change	2010	2050	Change
15–19	16.6	7.3	–9.3	15.0	6.7	–8.3
20–24	86.5	47.5	–39.0	79.4	44.4	–35.0
25–29	101.9	66.6	–35.2	86.2	57.2	–29.0
30–34	103.4	68.9	–34.5	82.1	52.3	–29.8
35–39	126.0	68.2	–57.8	96.7	46.8	–49.9
40–44	137.1	71.7	–65.3	99.9	47.7	–52.2
45–49	153.7	90.4	–63.3	105.2	59.8	–45.4
50–54	143.0	104.0	–39.0	90.5	63.0	–27.5
55–59	103.3	100.6	–2.6	56.4	53.3	–3.1
60–64	59.4	67.3	7.9	25.7	27.8	2.1
65+	11.7	19.6	7.9	4.8	7.6	2.8
Total 15+	1042.6	712.1	–330.2	741.9	466.6	–275.3

Source: Author's computations, closed population.

Demography of Workforce and Workplace Motivation

Organizational demography in the workplace would shift with an older workforce. In larger companies, a top-heavy hierarchy is likely to become more common. Business costs may increase with older workers rising through the ranks if companies operate under a seniority-based salary structure. Further, with younger working cohorts shrinking, talented young workers are likely to be in great demand. Easing the older workers out to make positions available to them would be a challenge (Geissler 2005). Those that fail to prioritize succession planning or retraining of older workers are likely to end up with people with outdated skills (Cohn *et al.* 2005). Foreign companies and investors may not find it attractive to come into a country with labour shortages, a lack of the right mix of skills or ageing workers (Wong 2007).

An elderly workforce is generally unlikely to be as vibrant, motivated, adaptable, entrepreneurial or risk-taking as a younger one. Workplace motivation theories suggests that in general as workers get older, they would gradually have met their life goals and settle for whatever they are receiving (Kanfer 1994). Even if they have not achieved their goals, they would be resetting their priorities, and these are not likely to be work-oriented. Along with weaker health, older workers are therefore likely to be less productive.

Such a scenario however cannot be overly generalized. Some scholars argue that ageing is not a problem, but a positive outcome of social, economic and health advances (Phillips 2000). The challenge is to transform the idea of 'active ageing' (WHO 2002) into reality. Since these issues have been identified early, steps have already been taken to address them. Singapore's National Wage Council advocates the reduction of wage components tied to seniority, and the development of special skills training for older workers to make them more employable (Vasoo *et al.* 2000). Some companies are able to motivate and draw the right competencies from workers of different ages through innovative human resource and incentives policies. They are also able to complement

experience and energy, creating synergies to steer their companies forward. With policies focusing on economic expansion and job creation, there have been ample opportunities for new entrants to the labour market (Ng 2007).

Dependence on Productivity Growth for Economic Growth

The fundamental identity stated earlier provides that the aggregate output of an economy is the result of the amount of labour of the economy and the average productivity of that labour. The neo-classical model of economic growth expresses output as a function of capital, labour, natural resources and technology (Abelson 2003). Since changes in natural resources are often negligible, a modified production function groups the use of technology and capital in improving output together under labour productivity (Figure 3), thus resembling the fundamental identity (MAS 2000).

The identity and Figure 3 show that if labour supply declines as projected, GDP growth would be pulled down by negative labour force growth, and would need to depend heavily on productivity growth. Productivity growth could be achieved through total factor productivity (TFP), educational attainment and increases in capital-labour ratios.

While capital-labour ratios are likely to increase only slightly in the long term from current high levels (MAS 2000), productivity gains from the improving education profile of the workforce will be significant in the short to medium term, as Singapore transits from a low-medium educated workforce to a highly educated workforce. Figure 4 shows the female education profile, with about 65 per cent having tertiary education at age 20–24 in year 2000. The male education profile shows similar improvement at the younger ages. If utilized effectively, this transitional period also presents an opportunity for Singapore to deal with the longer term levelling off to a highly educated labour force.

In the long term, Singapore’s main source of productivity growth is likely to be from TFP, which is broadly defined as the efficiency with which factors of production combine to produce output. Information technology (IT) innovations, improved business processes and business management are a large part of recent TFP growth (MAS 2000), and are likely to continue.

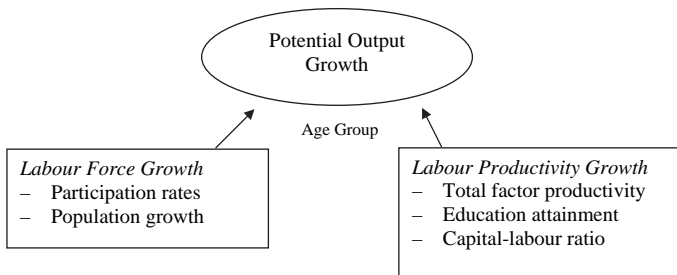


FIGURE 3
Determinants of potential output growth.
Source: MAS (2000).

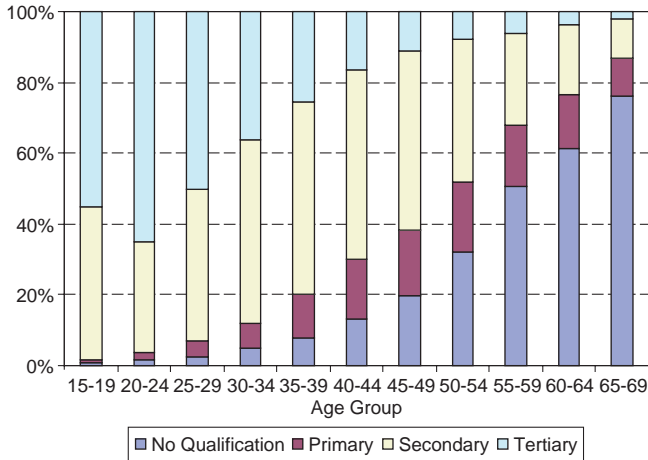


FIGURE 4
 Education profile of Singapore resident females, 2000.
 Source: Singapore Department of Statistics (2000).

Fiscal Impact: Reduced Tax Revenue and Increased Government Expenditure

Population ageing is a relative concept and the shrinking tax base in a closed population may not be sufficient to support rapid growth in the elderly population and the financing of other public infrastructure. While in the near future, taxes may increase with more mature workers, in the long run, when these mature workers reach retirement age and the younger population decreases, revenues from income taxes may not be sufficient. Additional public expenditure is expected in financing the needs of an ageing population in terms of transport and public amenities, health care services, retrofitting older housing estates to support 'ageing in place' policies, etc. (IMC 1999). Only 42 per cent of the total population would be in the labour force in 2050, compared to around 52 per cent now. There is therefore a need to maintain a diverse tax base from which the government can raise funds, including taxes on goods and services (GST), taxes on businesses and companies, excise tax, etc. Not unexpectedly, an increase of five to seven per cent in GST from 1 July 2007 was announced in Singapore's Budget 2007.

The future rise in the number of retirees would exert pressure on state finances. Singapore's approach has been to stress personal responsibility and savings for retirement, followed by family support and finally state support. In the 2004 working paper of the International Monetary Fund (IMF), Chan-Lau (2004) noted that the favoured approach to pension reform is to 'gradually replace the pay-as-you-go system with a fully funded system so that retirement income will be fully financed by investing the pension plan members' contributions in financial assets'. She indicated that defined benefit systems need to shift to defined contribution systems to achieve a sustainable system. With members in Singapore already contributing to their own individual accounts in the state-managed Central Provident Fund (CPF), the impact of ageing on state finances is minimized, although not completely negated.

Possible Policy Measures

Policy measures are necessary to address the adverse implications of labour supply decline in a closed population. McDonald and Kippen (2001) note that labour supply can be increased through raising fertility (measure one), immigration (measure two), or increasing LFPRs (measure three). Additionally, policy measures could attempt shifting the dependence of economic growth on labour supply growth to productivity growth (measure four).

Measure One: Increase Fertility

The Singapore government has adopted a pro-natalist stance since 1987, when it became obvious after 12 years of sub-replacement fertility that a return to replacement level fertility is going to be difficult, and unlikely to happen without some form of encouragement. However, despite a host of incentives at the workplace and for the family in terms of tax benefits for the parents, baby bonuses and education funds for the children (MCYS 2007), fertility continued falling. TFR reached a historical low of 1.25 in 2005 (Singapore Department of Statistics 2007).

Assuming that fertility eventually responds to the pro-natalist measures and the broader socio-economic environmental changes, and rises to 1.31 in 2010, and stabilizes at 1.45 in 2050, projections in a closed population show that resident population and labour supply decline would be delayed, but not averted (Figure 5). Further, Figure 5 shows that raising fertility is a long-term measure, because it takes about 20 years or more before a child born can enter the labour force and make a difference to labour supply. The results are very similar to PROJ I in Shantakumar's earlier study (Shantakumar 2002).

Measure Two: Immigration

Besides encouraging residents to have their children, attracting the right mix of people to settle in Singapore has now become an established approach. There are two

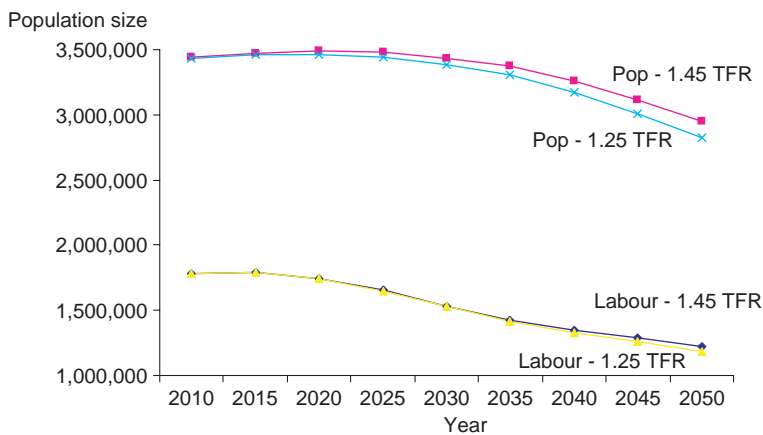


FIGURE 5

Projected resident population and labour force: fertility effect.

Source: Author's computations.

components of immigration: firstly the permanent migrants who later choose to naturalize, and secondly the foreign guest workers who remain a rotating pool of workers. Projections (Figure 6) incorporating the first component alone [30,000 net migrants from Hashmi and Hui (2002)] shows that declines in population and labour supply will be averted till beyond my projection horizon of year 2050, although the lines appear to be levelling off. The projection results are very close to PROJ V in Shantakumar's 2001 study (Shantakumar 2002).

The second component adds a layer of labour supply into the overall structure that is easily enlarged or trimmed with economic changes. This component is not included in my analysis since it could increase or decrease labour supply depending on economic situations and cannot be effectively modelled. It is useful to note that the contract nature of this supply means that the stock of foreign guest workers would remain youthful and adaptable to structural changes in the economy. This presents itself as an advantageous policy tool, notwithstanding possible socio-political frictions due to the adaptation needed for this population (Yeoh 2004).

Measure Three: Increase LFPRs

The increase of LFPRs can come from two sources: from married women and from the elderly.

- Figure 7 shows the LFPR of single versus married women. Single women are seen to be behaving much more like men in recent years, while the LFPR of married women shows it declining from the childbearing years. Some suggest that the easy availability of domestic workers would and has enabled married women to return to the workforce after birth (Yeoh *et al.* 1999), but these are not yet taking the M-shaped participation rates seen in developed countries (ABS 2004). Relevant policy incentives to enable women to return to the workforce could include a general child-friendly environment

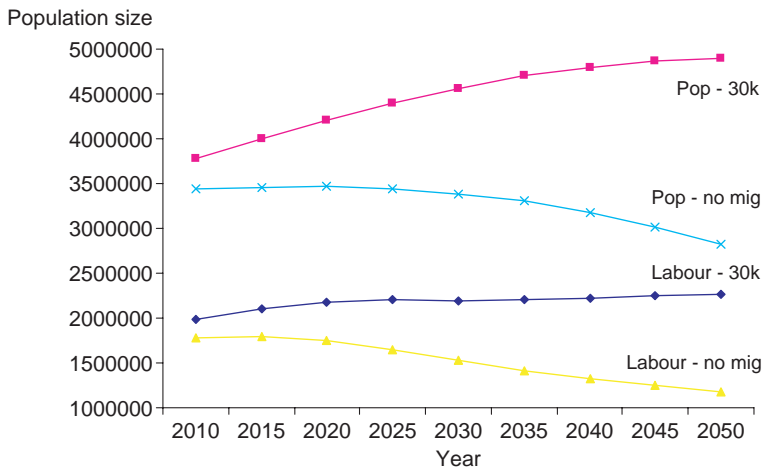


FIGURE 6
 Projected resident population and labour force: migration effect.
 Source: Author's computations.

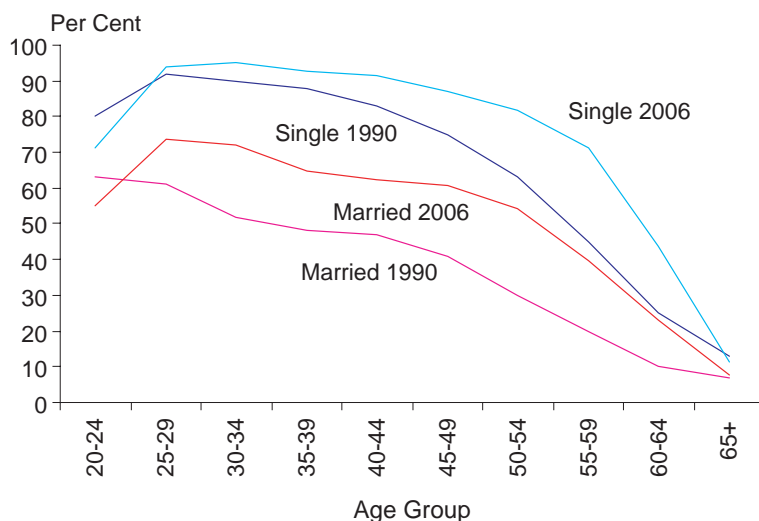


FIGURE 7

Resident female LFPRs, 1990, 2006.

Source: Census of Population 1990, Singapore Department of Statistics. Labour Force Survey 2006, Ministry of Manpower.

conducive to bringing up children, with specific measures including family-friendly workplaces, quality childcare centres to help look after their children, tax benefits for childcare, working mothers, etc.

- The LFPRs of age 55 and above show a gap between what is possible in Japan, US and the current levels in Singapore (Figure 2). The incentive to remain in the workforce has to be stronger, and this can be addressed by some form of negative income tax so that their disposable income is increased. The workfare scheme recently introduced would go some way in encouraging low wage elderly to work (MOM 2007c). The retirement age of 62 can be raised and there are plans to eventually raise this to 67 (MRSD 1999). The New Zealand experience shows that with an increase to age 65 for the withdrawal of pensions, the LFPRs for ages 60–64 have seen a significant increase (MSD 2001).

Increasing LFPRs is, however, a limited measure. This is because when saturation points in LFPRs have been reached, no further gains would be possible. Figure 8 shows that the labour supply based on a higher LFPR retains the same shape at a stable level above the baseline projections.

Measure Four: Identifying New Niche Areas of Growth

Productivity growth is more critical than crude labour growth. An example is the push for biotechnology as the next major development after the technology revolution (A*Star 2005). The key industries within the biomedical cluster are pharmaceuticals, health care services, medical technology and biotechnology. This initiative was launched in June 2000 to develop the biomedical sciences cluster as one of the key pillars of Singapore's economy, alongside electronics, engineering and chemicals. Another example is the move

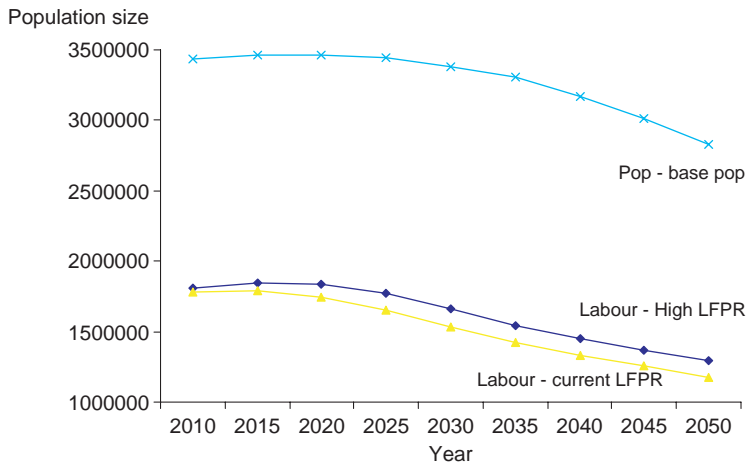


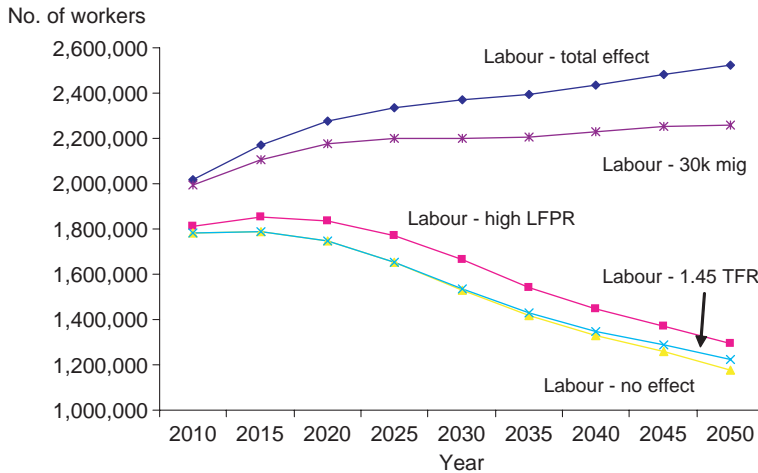
FIGURE 8
 Projected resident population and labour force: high LFPR effect.
 Source: Author's computations.

to develop 'clean energy' announced by the Prime Minister Lee Hsien Loong on 16 March 2007 (Lee 2007). This could result in an industry worth \$1.7 billion and employing 7000 people by 2015.

The quality of the workforce would need to be continually reviewed and training and education would have to be tuned to support the growth of such industries (Ng 2007). The Workforce Development Agency (WDA) set up in September 2003 shows the seriousness of the Government's intent. It has been charged with 'developing a comprehensive, market-driven and performance-based adult continuing education and training framework' (WDA 2007). It works with other agencies such as the National Trade Union Congress, the Singapore National Employers Federation, companies and training agencies to promote job re-creation, and to conduct courses, fund various schemes and explore new training and re-skilling to enhance 'human and intellectual capital'. Other complementary approaches include better use and adaptation of technology inputs, attraction of foreign capital investments, greater R&D, better managerial and business models, etc.

Concluding Remarks

Success with measures one to three would see resident labour supply increasing (Figure 9). The interplay of the measures would have multiplier effects on the overall resident labour supply—the net 30,000 annual migrants per year would experience the increases in TFR and LFPR as with the local population—and is more than the sum of each individual measure. The overall resident labour supply would reach 2.5 million in 2050, a significant increase from the 1.75 million in 2010 in a closed population model with no changes to TFR and LFPR. Nonetheless, resident labour force growth would decline from a high of 1.8 per cent per annum during 2005–2010, to a lower level of 0.3 per cent per annum during 2045–2050.

**FIGURE 9**

Projected resident labour force: total effect.

Source: Author's computations.

Multi-pronged approaches are likely to bring about more success in maintaining or raising labour supply, although analyses of each measure shows that they would pose challenges or would present conflicting issues. On fertility increase—despite generous incentives, the government's attempt to increase fertility appears to have hit a brick wall. Caldwell and Schindlmayr (2003) suggest that the broadest explanation is that put forth by Kingsley Davis in 1937, that the reproduction of the species is not easily compatible with advanced industrial society. On immigration—large-scale immigration has impact on the composition and cohesiveness of the population. The demand for foreign talent would also become increasingly competitive. On encouraging women to work—getting the right family-work balance has proven to be difficult, with the need to manage the expectations of companies on working mothers, and the need to minimize adverse impacts on young family life. On extending retirement age—this would intensify issues related to an ageing workforce. Individuals would have to accept the idea that working longer is good for them, while companies would have to be more receptive towards employing the older workers. Finally, on identifying new areas of economic growth—the search for new areas is usually difficult and accompanied with a degree of risk. Even when areas can be identified, global competition abounds, and Singapore will have to work hard to seek the competitive advantage to remain ahead.

Notwithstanding that foreign labour supply can continue to grow depending on policies and economic conditions, the above measures show that the resident labour force is likely to grow at a lower level of around 0.3 per cent per annum in the longer term. In the context of Singapore's physical land constraint, continued high growth in the labour force in the future would be challenging. Future GDP growth is therefore likely to be more sustainable via labour productivity growth. Maintaining a pool of foreign guest workers would thus be desirable to keep the labour supply nimble and responsive to economic changes and labour needs. Productivity growth in terms of better usage of workers and technology, investments into niche areas of growth, continual training of the workforce to

raise quality and face new developments, is possibly the principal way forward to fuel Singapore's economic growth.

NOTE

1. Residents refer to Singapore Citizens and Permanent Residents.

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