

MTI OCCASIONAL PAPER
ON POPULATION AND ECONOMY

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EXECUTIVE SUMMARY

- Singapore is located in a fast growing region – this brings us more economic opportunities but also increased competition. We need to calibrate our policies carefully in order to maintain our competitiveness, and yet grow at a sustainable rate so that all Singaporeans can enjoy an improving quality of life.
- In the next two decades, the Singaporean workforce will grow old and start to shrink, even as it becomes more educated. The jobs that Singaporeans aspire to will naturally shift. Even as we work towards maintaining an attractive and vibrant economy to meet the aspirations of Singaporeans, it will be increasingly difficult to find sufficient manpower to support lower-skilled jobs that are nonetheless still necessary to sustain a healthy economic mix.
- To address our demographic shifts, we will need a multi-pronged approach. First, we need to continue with our drive to raise productivity through business restructuring and workforce retraining. Second, we must encourage more residents to enter and stay in the workforce. Finally, we must complement our resident workforce with a calibrated rate of immigration and foreign worker inflow.

INTRODUCTION

Since Independence, we have created good jobs for Singaporeans, kept unemployment low, and raised wages. We have improved our standard of living by investing in education and healthcare, as well as physical infrastructure, such as public housing, transportation and tele-communications networks, through sustained economic development. Strong economic growth averaging 8% per annum since Independence, coupled with prudent fiscal policy, has enabled us to build up our nation's reserves over the years. This has provided Singapore with the resources to respond robustly to crises.¹

Some of the key factors underpinning our economic success are our business-friendly environment, our openness to foreign investments and access by businesses to a competent workforce. By having a vibrant mix of foreign and local enterprises in Singapore, we have created a diversity of good jobs for Singaporeans. Wages have increased substantially, while each successive generation of Singaporeans has been able to aspire to better job opportunities.

In the coming decades, our economy will be influenced by both internal and external factors. Externally, we will benefit from a more economically vibrant Asia, even as competition among cities for talent and investment becomes more intense. Domestically, the Singaporean workforce will age and start to shrink, even as it becomes more highly educated. Other natural constraints that we have, such as land and energy, will also limit the extent that our economy can grow sustainably.

¹ Singapore first tapped on its reserves to fund part of the \$20.5bn counter-cyclical Resilience Package in 2009. The \$4.0bn that was drawn has since been returned to the reserves in 2011.

As a society, we will have to develop strategies to address these significant shifts and continue to create economic opportunities for both current and future generations of Singaporeans.

HOW ECONOMIC GROWTH AFFECTS US

Economic growth has sustained our employment and wage growth

We have pursued economic growth not for its own sake, but for the opportunities and benefits that a vibrant economy brings. For most of the time since our Independence, we have been fortunate to enjoy these benefits. A favourable economic environment and significant social investments – particularly in the area of education – have allowed Singaporeans to enjoy high rates of employment and wage growth for most of our post-Independence period.

Over the decade from 2001 and 2011, Singapore’s citizen unemployment rate compared well with the best amongst developed economies, averaging only 4.1% compared to an average of 7.1% among the Organisation for Economic Co-operation and Development (OECD) countries. It is important that Singaporeans do not take our low unemployment rate for granted. The experience of countries still suffering from the aftermath of the financial crisis shows that unemployment can remain high in a sluggish growth environment ([Exhibit 1](#)).

Exhibit 1: Singapore’s unemployment rate is lower than most developed countries

Unemployment Rate % (2011)			
Spain	21.6	Canada	7.5
EU	9.6	Germany	5.9
France	9.3	Australia	5.1
US	9.0	Japan	4.6
Italy	8.4	Korea	3.4
UK	8.0		3.0
Finland	7.8		(Citizens)
Denmark	7.6	Singapore	2.0
Sweden	7.5		(Overall)

Sources: OECD Database and Ministry of Manpower (MOM)

Previous recessions illustrate how quickly slower growth can affect the employment prospects of Singaporeans. During the recession in 2003, for instance, our unemployment rate jumped to a seasonally-adjusted peak of 6.4% in September. The experience of OECD countries tells us that higher GDP trend growth tends to lead to lower unemployment in the future and vice versa.²

Beyond keeping the unemployment rate low, it is also important that Singaporeans experience real wage growth to improve their standard of living. [Exhibit 2a](#) shows a positive correlation between annual real GDP growth and real wage (including employer CPF contributions) growth in Singapore across the last two decades.³ Over this period, real wages grew by 2.5% per annum, with real wage growth being

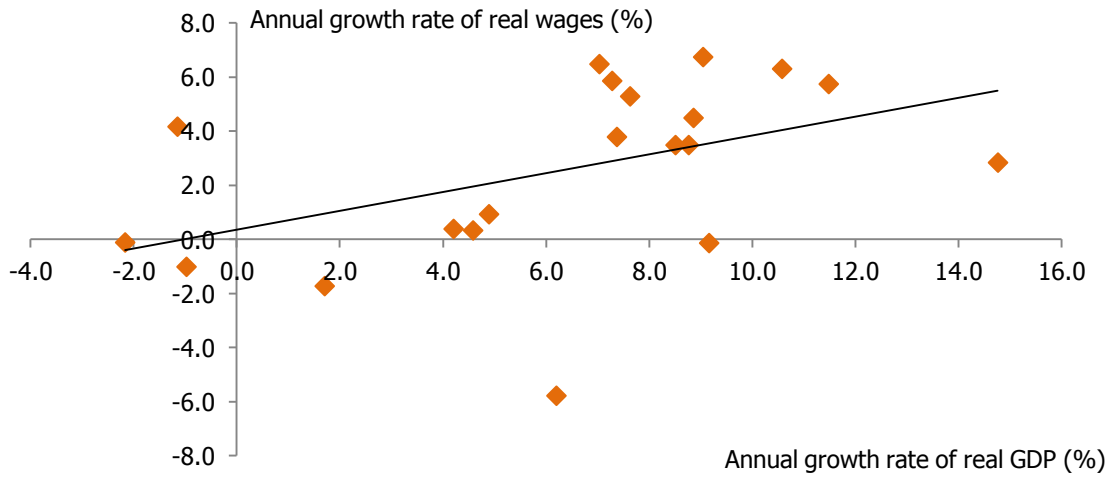
² "Why Does Trend Growth Affect Equilibrium Employment? An Explanation of an Old Puzzle", Elsby and Shapiro, 2011; and "Unemployment, Growth and Taxation in Industrial Countries", Daveri and Tabellini, 2000.

³ Real wages here refer to real total wages (including employer CPF contributions) which is the sum of basic wages, bonuses and estimates of employer CPF contributions.

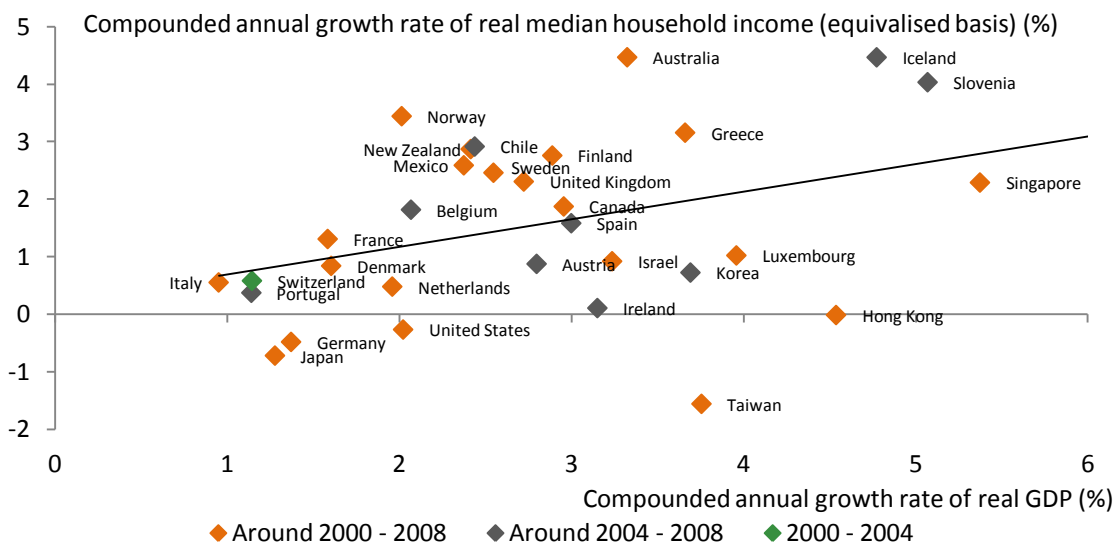
stronger during years of good economic growth. A cross-country comparison of OECD countries also shows that countries with higher GDP growth tend to have higher real wage growth (Exhibit 2b).

Exhibit 2: Relationship between real GDP growth and real wage growth

2a. Growth in real GDP and real wages in Singapore, 1991-2011



2b. Growth in real GDP and real wages in advanced economies and Singapore⁴



Sources: MTI Estimates, MOM, CEIC Database and OECD Database

⁴ Income data for Singapore is the growth rate of real median monthly household income from work per household member among resident employed households, and is not strictly comparable to the OECD equivalised income data. Income data for Hong Kong and Taiwan are the growth rates of real median household income and real disposable income of income recipients respectively. Growth rates are calculated from 2000 to 2008 for Singapore, Hong Kong and Taiwan. Due to the lack of data, the growth rates for OECD countries are calculated for the periods stated in the legend of the chart. Former Soviet satellite states, as well as Turkey, are outliers and have been excluded from the chart.

A stagnant economy will affect all Singaporeans

Achieving a sustainable rate of growth is important: growth which is too rapid puts a strain on our domestic infrastructure, while a stagnant economy can create a negative feedback cycle from which it can be difficult to extricate ourselves.

Thus far, Singapore has remained attractive to investors despite having a small domestic market. Due to its strong economic fundamentals including a stable business environment, a highly educated and productive workforce, and good connectivity to other markets around the region and the world, businesses find it attractive to locate in Singapore while serving global markets. This has created a natural growth momentum fuelled by the development of a dense business ecosystem with a wide range of industries.

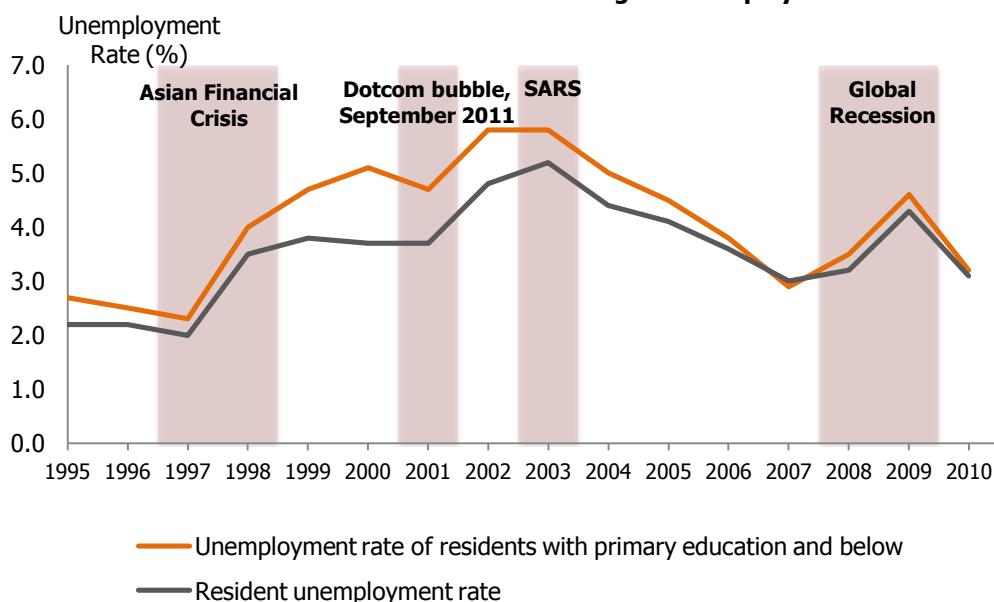
If tightening resource constraints, such as a shrinking workforce, limit their expansion prospects, investors may reconsider investing in Singapore. Local businesses may also have to relocate as many of our SMEs are dependent on the corporate ecosystem created by MNCs, and because they too will face expansion constraints in Singapore. With the relocation of MNCs and local businesses, it may become harder to sustain the corporate ecosystem and attract new investors to Singapore.

All these will have a significant impact on all Singaporeans. Not only will the number of jobs available in Singapore fall, the diversity of jobs available will also be affected as we will find it difficult to open up new sectors in Singapore. Singaporeans may then face difficulties finding jobs which they aspire towards, or, in extreme cases, any job at all.

Of particular concern are lower-skilled Singaporeans, who are less internationally mobile and will be more affected when growth slows. Evidence elsewhere in the world suggests that lower-skilled workers, who are typically more poorly educated and draw lower wages, tend to have the highest rate of unemployment during periods of slow growth.⁵ This has also been Singapore's experience ([Exhibit 3](#)). International studies further note that such workers are likely to face financial difficulties when they are retrenched, as they have a smaller savings buffer to fall back on during spells of unemployment.⁶

⁵ "Low-Skilled Workers Hit Hardest by Recession", Financial Times, 20 July 2011; "Recession Britain", Vaitilingam, 2009.

⁶ "Living Standards During Previous Recessions", Alastair and Sibietta, 2009; "Asia in the Global Economic Crisis: Impacts and Responses from a Gender Perspective", Dejardin and Owens, 2009.

Exhibit 3: Lower-skilled workers have a higher unemployment rate⁷

Source: MOM

Moreover, in the absence of local opportunities, some internationally mobile Singaporeans may seek opportunities elsewhere. In other countries, low salaries and poor job prospects have been found to be major reasons, if not the most important reasons, for brain drain. A vicious cycle of even fewer citizens in the working ages and a smaller tax base to support the ageing population, leading to slower growth and less economic opportunities may then ensue.⁸

Finally, a stagnating economy will also place greater demand for social spending to cater to short-term needs, while reducing fiscal resources to assist lower income households as well as to meet future needs.

In summary, Singapore will experience slower growth compared to the past. While part of this is inevitable as our economy matures, growth which is too sluggish will likely have a detrimental impact on Singaporeans across the board. With the economic opportunities and competition that we face as a result of being located in a growing region, we will need to calibrate our policies carefully to ensure that we maintain our competitiveness and yet grow at a sustainable rate.

⁷ During the global recession of 2008 and 2009, the Singapore government introduced the Jobs Credit Scheme (JCS), which was targeted at lower- and middle- income resident workers, to help companies preserve jobs. The JCS helped to mitigate the impact of the recession on resident unemployment.

⁸ "Show Me the Money (and Opportunity): Why Skilled People Leave Home – and Why They Sometimes Return", Migration Information Source, 2010. In "A Japanese Export: Talent", New York Times, 2007, it was also highlighted that a slowdown in growth in Japan had led to engineers and other professionals leaving to work in neighbouring economies such as Taiwan, South Korea and China. In addition to better pay packages, the Japanese professionals had migrated in order to seek more promising or stimulating opportunities. Many researchers have highlighted the potential for such reinforcing causation. Slow growth may lead to emigration, which in turn feeds back to even slower growth. Krugman (1991) highlights such a model, where the effects of migration can lead to the so-called "core-periphery" outcomes. An economy can reach a tipping point and become hollowed out.

OPPORTUNITIES AND CHALLENGES FOR SINGAPORE AS A GLOBAL CITY

Opportunities are present in the heart of booming Asia

Asia is expected to boom in the coming years and growth in the region is likely to continue to exceed that in advanced economies (Exhibit 4). The Asian Development Bank has projected that Asia will account for half of the world's output by 2050.⁹ Singapore is one of few English-speaking cities in the heart of Asia with a highly educated workforce, high levels of connectivity, reliable public services, and a stable government. We are close to emerging markets in Asia which have growing middle-class populations and an increasing demand for sophisticated manufacturing goods and services.

Exhibit 4: Growth in Asia will likely exceed growth in advanced economies
Annual growth rate in GDP for various periods

Country/Region	2000 - 2012	2012 – 2025 (Forecast)
China	8.6%	4.0%
India	6.8%	4.4%
Other Developing Asian Economies	4.2%	3.5%
Advanced Economies	1.7%	1.6%
World	3.3%	2.6%

Sources: International Monetary Fund (IMF) and the Conference Board

Singapore is well-placed to act as a node for key decision makers of global companies to manage their businesses in the growing Asia market, and as a spring-board for Asian companies seeking to expand into the global market. Many global companies, such as Levi Strauss & Co., already recognise Singapore's value proposition and have established their Asia-Pacific headquarters in Singapore. Our local businesses can similarly leverage on our strengths and expand beyond the domestic market to tap into the growth of emerging Asian economies. We can also continue to deepen our current areas of expertise in high-value and complex manufacturing, as well as high-end services in order to ride on Asia's growth.

Competition among cities will intensify

Making the most of the opportunities in Asia will also mean overcoming more intense competition among cities. Policymakers around the world increasingly recognise the value of cities as drivers of economic growth for their own countries.¹⁰ Competition in the future will thus come not just from top-tier global cities in the future, but also emerging cities in developing countries.

These cities will compete not just for investments, but also for human capital. Many studies have found that the availability of the necessary skills and manpower resource is key to the economic vibrancy of cities. For instance, the rise of New York City as an economic centre was fuelled by its status as an open economy.¹¹ The Mayor of New York City, Michael Bloomberg, has argued that the US's success is "built on immigrants who have powered [its] industries and started new ventures that today rank among the

⁹ "Asia 2050 – Realising the Asian Century", Asian Development Bank, 2011

¹⁰ Prime Minister Lee Hsien Loong highlighted in his speech to the Economics Society of Singapore in June 2012 that "Cities like New York, Munich, and London can prosper even if the countries they are in run into problems, because their fortunes are tied to the global economy".

¹¹ "Urban Colossus: Why is New York America's Largest City", Glaeser, 2005.

world’s leading companies”.¹² Singapore will need to continue attracting manpower with the necessary skills to prevent our economy from stagnating.

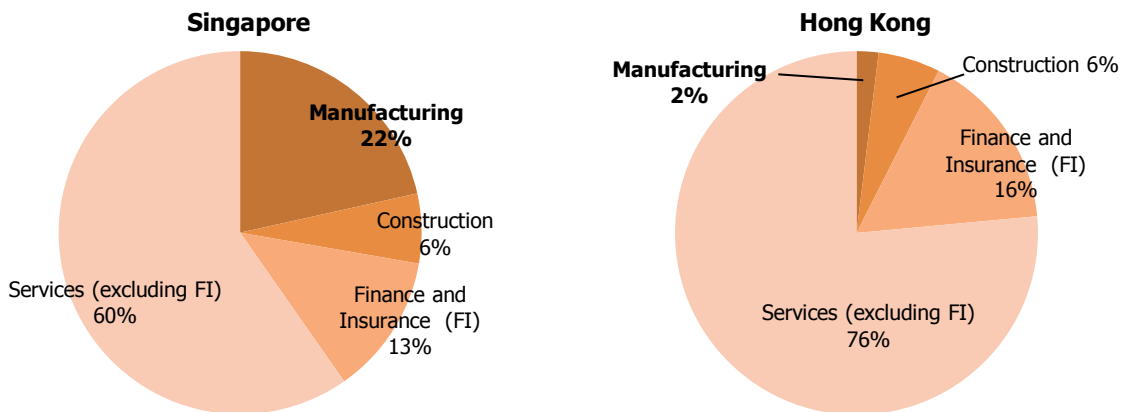
Maintaining diversity for economic resilience

As global competition intensifies and business cycles shorten, Singapore will also have to increasingly deal with more volatile growth. As a small economy, we cannot afford to close off our global finance and trade linkages, and thus will always be vulnerable to economic upheavals elsewhere.

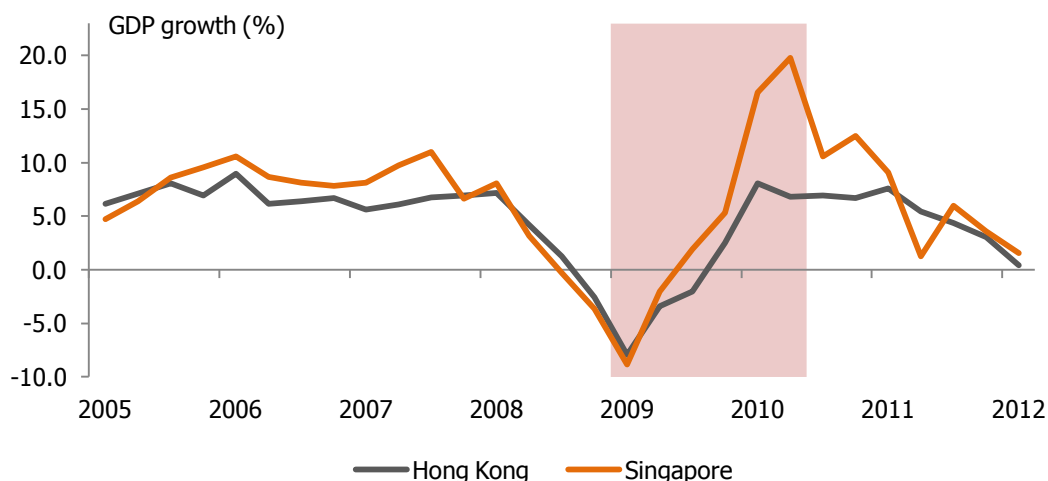
However, we can help ensure that our economy is resilient enough to cushion the impact of economic downturns on our people by maintaining a well-diversified portfolio of industries. This is particularly important given that Singapore is a city-state. Unlike Hong Kong, which has direct access to the mainland Chinese market and has strong links to manufacturing activity there, Singapore does not have this larger hinterland and thus cannot afford to lose manufacturing as a key industry. Hence, allowing manufacturing to shrink to a small share of the economy like Hong Kong is not an option for us. Moreover, anchoring manufacturing activities within Singapore generates good employment opportunities for Singaporeans, as well as creates other supporting industries which further help diversify our economic structure. This has increased the resilience of our economy and shortened the time to recovery, helping to support a rebound that was quicker and larger than Hong Kong’s following the downturn in 2009 (Exhibit 5).

Exhibit 5: Comparison of Economic Diversity and Resilience

Exhibit 5a: Economic Structure of Hong Kong and Singapore pre-crisis in 2008



¹² 36% of New York City’s population is foreign-born, far higher than the national figure of 11%. Source: "The Newest New Yorkers 2000: Immigrant New York in the New Millennium", New York City Department of City Planning, 2004.

Exhibit 5b: Year-on-year quarterly real GDP growth in Hong Kong and Singapore

Sources: Department of Statistics (DOS) and CEIC database

Other countries have suffered due to over-exposure to particular sectors. Ireland – a small and open economy with a population size similar to that of Singapore – was heavily exposed to a few volatile and sentiment-sensitive sectors, such as property-related activities and financial services, when the financial crisis of 2009 hit. This was one of the factors that contributed to the Irish Fiscal Crisis, leading it to seek a bailout from the European Union (EU) and IMF in November 2010.¹³ The lack of diversification in its export markets further exacerbated the recession. With 63% of its exports going to the EU and 19% to the US in 2006, the sharp fall in demand in these markets affected the Irish export landscape. By contrast, Singapore was able to ride on the rise in end-demand in Asia, particularly Greater China, to mitigate the impact of the crisis on our exports, and to drive our recovery.¹⁴

The open nature of Singapore's economy means that we will continue to be subjected to global business cycles. If we wish to create a stable and resilient economic environment for Singaporeans, we will have to consider how best to maintain a diversified economic structure. This will become even more important as we tackle the demographic challenges of an ageing population in the coming decades.

¹³ In 2006, construction, financial services and business services made up 10.6%, 10.4% and 17.9% of the Irish economy. By contrast, these sectors made up 3.0%, 11.1% and 10.8% of Singapore's economy.

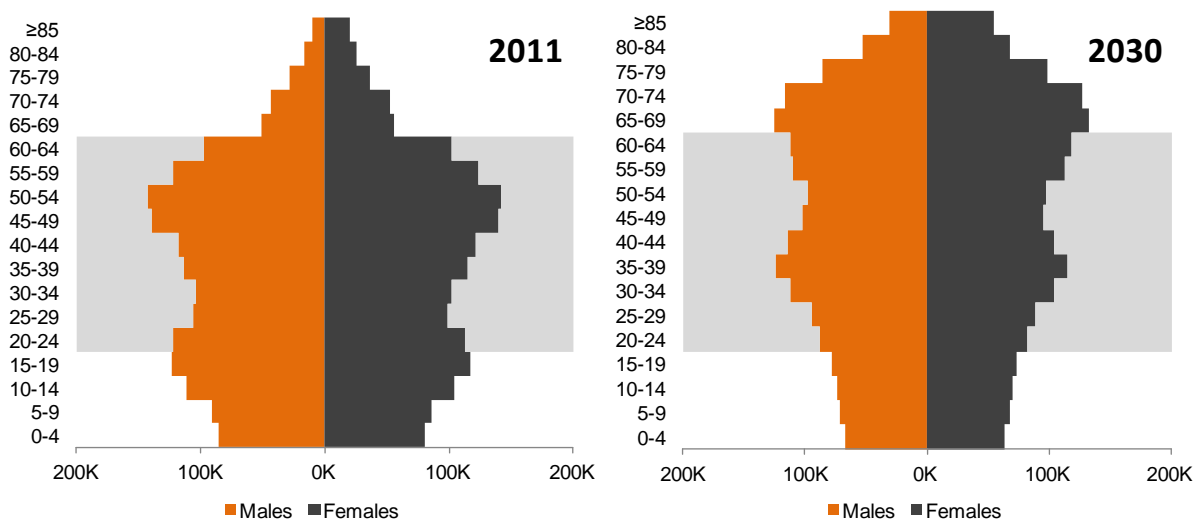
¹⁴ Singapore's exports to Greater China rose from 21% of total exports in 2004 to 26% in 2010. Exports to Latin America also tripled during the same period.

IMPACT OF DEMOGRAPHIC CHANGES

Our citizen workforce will age and shrink

At current birth rates and without immigration, Singapore’s citizen population will start to age and shrink. Between 2011 and 2030, the median age of the citizen population will rise from 39 years to 47 years.¹⁵ Singapore will also find itself in the unprecedented position of having a declining number of citizens in working ages (i.e. those aged 20-64) from 2020 onwards (Exhibit 6). As more Singaporeans retire and fewer young Singaporeans enter the workforce, our citizen workforce will start to shrink. This will have implications on our economic growth. Box 1 below describes how workforce growth affects economic growth.

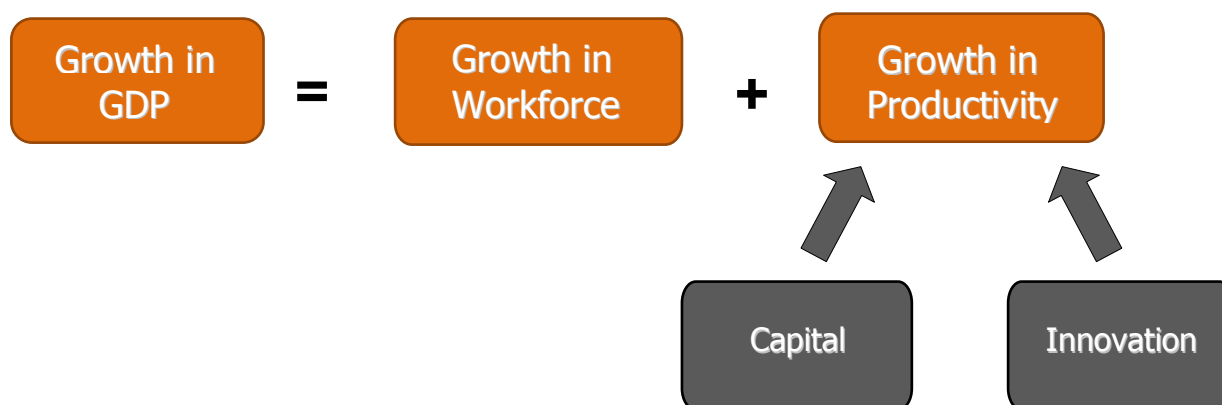
Exhibit 6: Number of citizens of working age (20-64 years)



Note: Shaded area indicates the working ages of 20-64 years.

Source: DOS and National Population and Talent Division, Singapore (NPTD)

¹⁵ "Citizen Population Scenarios", National Population and Talent Division (NPTD), 2012.

Box 1: The relationship between GDP, workforce and productivity growth

Gross Domestic Product (GDP) is a statistical measure of economic activity within a geographical boundary, usually a country. Growth in GDP can be decomposed into **workforce growth** and **productivity growth**.

Workforce growth refers to the growth in the number of people employed, which is in turn influenced by the number of people in the labour force and the unemployment rate. In a dynamic economy, businesses expand and new companies are set up, creating fresh job vacancies. In order to promote business activity, these vacancies have to be filled. Both the demand and supply of workers can limit workforce growth; for instance, vigorous job creation combined with a limited supply of workers will result in numerous unstaffed vacancies and stifle business expansion. Given Singapore's shrinking citizen workforce in the future, to achieve workforce growth will require us to augment our workforce through controlled inflows of immigrants and foreign manpower.

Productivity growth measures the growth in output produced by each worker. Productivity growth is driven by two main factors: **capital** and **innovation**. Increasing the amount of capital per worker (such as through investment in machinery and equipment) allows workers to become better at producing more and higher quality output. At the same time, the generation of new ideas through innovation, such as exploiting new technologies, new ways of using existing technologies and new business opportunities will also help to boost output. Simply put, innovation allows a country to generate more economic activity using the limited number of workers and capital that it has. Total factor productivity (TFP) is often used as the measure of productivity growth arising from innovation. The Economic Strategies Committee (ESC) in 2010 recommended that we raised productivity growth to an average of 2-3% per annum over the next decade. This is an ambitious target given the experience of developed countries; for example, OECD countries managed to achieve an average productivity growth of only 1.2% per annum in the last decade (from 2000 to 2010).

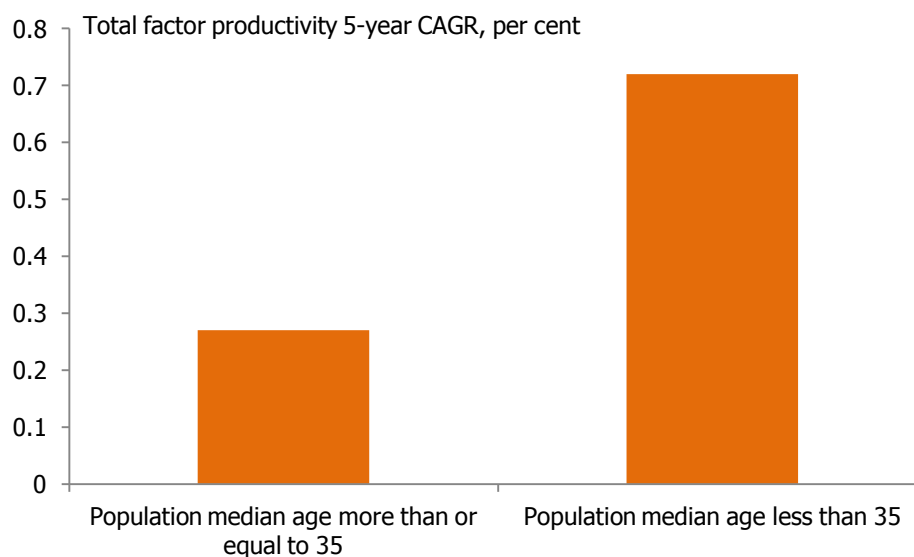
Ageing may dampen innovation

A rapidly ageing workforce, if not managed well, may lead to a lower level of innovation. Evidence from high-income OECD countries suggests that the median age of the population is negatively correlated with total factor productivity ([Exhibit 7](#)), a measure of productivity growth associated with higher innovation

and improving technology.¹⁶ If the ageing population in Singapore not only leads to a shrinking workforce but also results in lower innovation, it will become even more difficult for us to support productivity and economic growth.

It is thus important that policies are put in place to allow us to leverage on our older workers by first, investing in more elder-friendly technology; second, encouraging continuing education and training; and finally, encouraging our younger workforce to tap on the wealth of experience of our older workers.¹⁷

Exhibit 7: Population median age and average total factor productivity growth in high-income OECD countries (by 5-year periods) from 1990 - 2010¹⁸



Sources: The Conference Board, United Nations Population Prospects, 2010 Revision and DOS

Rising quality of the Singaporean workforce over time

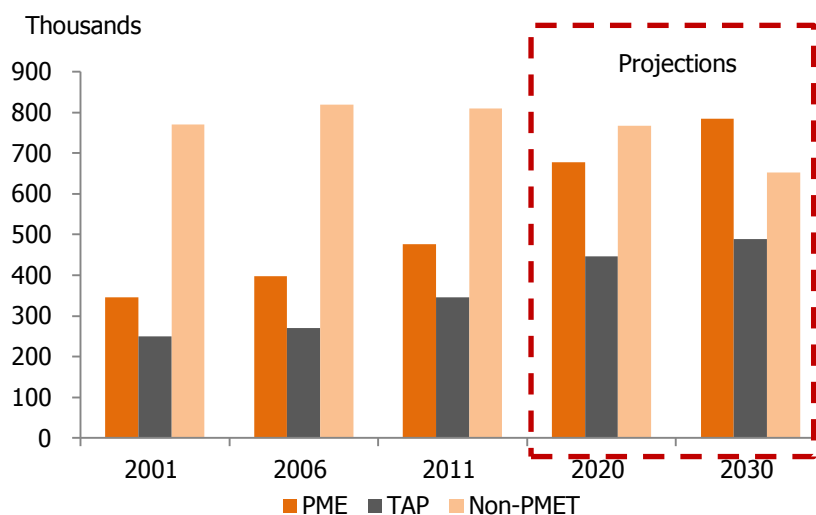
Younger generations of Singaporeans have access to a wider variety of education pathways and are increasingly well educated. With the improving educational profile, more Singaporeans will aspire to become professionals, managers, and executives (PMEs) and also take on skilled jobs as technicians and associate professionals (TAP). Based on current projections of the educational profile of Singaporean workers, MTI estimates that the number of Singaporeans in both types of jobs will rise from now till 2030, while the number of Singaporeans in low-skilled jobs will decline ([Exhibit 8](#)).

¹⁶ In other ageing countries, it has been found that ageing results in slower technological adoption. More frequent bouts of age-related health complications, sick day leave, etc., could also result in reduced productivity of the workforce. Furthermore, compared to younger workers, older workers have a shorter time horizon to reap the benefits of newly acquired skills which reduces their incentive to undergo training.

¹⁷ In other countries, companies such as BMW and TNT have introduced assistive tools and flexible work arrangements to ease the physical demands of a job on older employees as well as to allow younger employees to tap on the expertise of their older peers.

¹⁸ Total factor productivity gives an indication of the level of innovation and technological change in a country. The average of the population median ages in high-income OECD countries is 35.2 years. Median age is taken at the start of each 5-year period from 1990-2010. This negative correlation between population median age and total factor productivity holds in a regression analysis with control variables such as level of economic development, trade openness, manufacturing share etc.

Exhibit 8: Projections of employed Singaporeans by occupation based on changing educational profile



Sources: MTI Estimates and MOM

There are two implications to this trend. First, we need to create an increasing number of PME jobs to meet the aspirations of Singaporeans, while ensuring that our economic structure remains sufficiently diversified and resilient. As Singaporeans take up better jobs, their pay is also more likely to increase. Second, the need for less-skilled foreign manpower will increase as more Singaporeans take on skilled jobs. This shortage will be compounded by the fact that demand for less-skilled workers in sectors like healthcare and social services is expected to grow, given Singapore's ageing population.

Box 2: Ageing population woes – not a uniquely Singapore experience

The challenge of an ageing population is not unique to Singapore. A recent report by the OECD found that the size and share of the population aged 65 years and over have dramatically increased in all OECD countries over the last 30 years. Around 20% of Germany's population was aged 65 years and above in 2011, while Japan's share was around 23%. Many OECD countries have embarked on measures to address the challenges posed by an ageing population.

Germany, which has one of the fastest ageing populations, has adopted a five-pronged strategy aimed at sustaining its supply of skilled workers in the medium to long term. One key prong of the strategy is to attract skilled workers from abroad through managed migration. Ways to do so include establishing a "positive list" of professions facing a shortage of workers, and exempting immigrants in these professions from the usual labour market test. There has also been a trend of migration within the EU, from the east and south of Europe towards Western Europe, which has provided countries like Germany with a sustained supply of skilled workers.

Even in Japan where public opinion towards immigration has remained negative despite awareness of the problems posed by an ageing population, there have been increasing calls for its immigration policy to be loosened.¹⁹ The Policy Council of the Japan Forum on International Relations (JFIR), which consists of Japanese politicians and intellectuals, released a set of policy recommendations in November 2010 encouraging the population to be more accepting of foreign workers. The Council noted that the key question was not whether Japan should accept migrants, but how it should accept them. A few years earlier, in June 2008, a group of lawmakers in the ruling LDP had also proposed a plan to accept 10 million immigrants over the next 50 years.

To attract their share of talent, many countries have programmes designed to attract the brightest talent to live and work in their cities. For instance, several countries in Europe have overhauled their high-skilled visa programmes in recent years, while China recently introduced a new "talent visa" to make it more convenient for foreigners to work in the country.²⁰ Closer to home, Malaysia is also looking to reform its visa structure to be more attractive to high-skilled workers.

ADDRESSING THE DEMOGRAPHIC SHIFTS THROUGH A MULTI-PRONGED STRATEGY

Singapore's economy will increasingly be driven by higher value-added activities as our educational profile improves. We can also benefit from growing Asian prosperity by supplying not just goods but also critical services to the region. To build on our strong fundamentals and remain an attractive hub for business, as well as a place where Singaporeans can enjoy a good quality of life, it is vital for us to overcome our demographic challenges. Our strategies will have to be multi-pronged, covering the three main areas below.

¹⁹ "Substitutes for Immigrants? Social Policy Responses to Population Decreases in Japan", Shinkawa, 2012

²⁰ "China Creates New Visa Category to Attract Overseas Talents", People's Daily Online, 9 July 2012

Business restructuring and retraining of the workforce

First, we should continue to raise our productivity through business restructuring and the retraining of the workforce. One of the main recommendations from the Economic Strategies Committee in 2010 was to raise productivity growth to an average of 2-3% per annum over the next decade, an ambitious target given the experience of developed countries. To drive national productivity improvements, the National Productivity and Continuing Education Council (NPCEC), a committee comprising representatives from the government, business community and labour movement, was set up to champion and prioritise national productivity initiatives at the sectoral, enterprise and worker levels. To-date, the NPCEC has endorsed 11 of 16 productivity roadmaps and 3 horizontal enablers that address issues common to most sectors of the economy.²¹

To support the efforts of the NPCEC, the government set up a \$2 billion National Productivity Fund and rolled out initiatives such as the Productivity and Innovation Credit and boosted the Capability Development Scheme to help SMEs build up capabilities and restructure their businesses. In addition, the Workforce Development Agency supports various schemes to drive productivity improvements at the worker level through the Skills Development Fund. For example, change agents in organisations are trained to use productivity and business innovation tools under the Workforce Skills Qualification Certified Productivity and Innovation Manager scheme.

Raising productivity will require not just government initiatives. Ultimately, it will be the direct efforts and ideas of both employers and workers that will improve productivity. We will need to work together to continuously seek new business models and develop new skills in order to raise productivity at all levels.

Encouraging more residents to enter and stay in the workforce

Second, we should work towards raising our resident Labour Force Participation Rate (LFPR). In the last decade, we have seen an increase in the overall LFPR of individuals aged 25-64, from 76.2% in 2001 to 80.7% in 2011. In particular, the LFPR of female residents within this age group improved over the decade from 60.6% in 2001 to 69.9% in 2011, largely due to the improved educational profile of female residents. Schemes like the Work-Life Works! Fund and Flexi-works! are available to support companies in implementing strategies such as flexible working arrangements to help workers better balance work and family responsibilities.

We have also introduced various schemes to encourage individuals to remain in the workforce even after the conventional working age. The Retirement and Re-employment Act was enacted in January 2012 to provide both workers and employers with the flexibility to work out an arrangement where older workers can continue to contribute to the workplace up to the age of 65 (i.e. beyond the current minimum statutory retirement age of 62), as long as the workers have satisfactory performance and are medically fit. Other schemes implemented include the Special Employment Credit and ADVANTAGE! that help companies defray the cost of employing and training older workers, as well as the cost of redesigning jobs such that they are more suitable for older workers.

However, there is a limit to how much further our overall LFPR can increase. While a percentage point increase in LFPR will add about 30,000 resident workers to our labour force of 3.2 million, it is not

²¹ The 16 productivity roadmaps are administrative & support services, construction, electronics, precision engineering, transport engineering, general manufacturing, retail, food services, hotels, healthcare, infocomm & media, logistics, financial services, accountancy, social services and process construction & maintenance. The roadmaps that are pending endorsement are administrative & support services, financial services, accountancy, social services and process construction & maintenance. The 3 horizontal enablers that have been endorsed are the SME-Productivity Roadmap, Inclusive Growth Programme and the Increase SME Productivity with Infocomm Adoption & Transformation (ISPRINT) Programme.

possible to continually increase LFPR by one percentage point every year; our male LFPR is already one of the highest in the world, at 92.1% for the working ages of 25 to 64. We also need to recognise that some Singaporeans will not enter the workforce due to family and other care-giving priorities. Nonetheless, we should continue to strive to ensure that those who wish to work can do so, and to introduce suitable policies that can help residents to remain economically productive, no matter what their personal circumstances may be.

Complementing our resident workforce with foreign workers

Third, we need to have calibrated levels of immigration and foreign manpower. The improving educational profile of Singaporeans will result in fewer workers who will take on lower-skilled jobs, which are nonetheless still necessary to support higher-skilled and better paying jobs. These include lower-skilled jobs in the construction sector which are necessary to meet our infrastructural needs, as well as those in the eldercare and healthcare sector which will likely see an increase given our ageing population. There will thus be a continued need for foreign workers to support and complement our resident workforce, as well as to meet the social and healthcare needs of Singaporeans. We will elaborate more on the role played by foreign workers in our economy in the subsequent section.

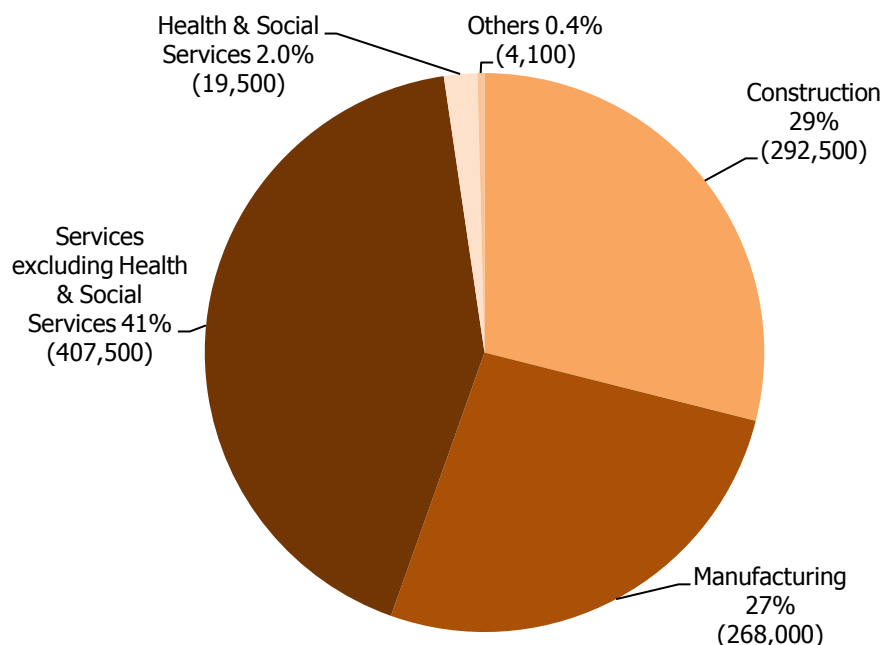
We recognise that no single strategy will be sufficient to address our demographic challenges. All three strategies – supporting productivity improvements, encouraging greater resident labour force participation and a calibrated foreign manpower policy – must be used in combination to help offset the natural decline in our citizen workforce.

IMPORTANCE OF THE FOREIGN WORKFORCE

In this section, we first elaborate on the economic contributions of foreign workers to Singapore, before discussing the trade-offs and considerations to bear in mind when calibrating the inflow of foreign manpower.

A breakdown of foreign workers in the economy (excluding foreign domestic workers, or FDWs) is provided in [Exhibit 9](#).

Exhibit 9: Distribution of foreign workers in the economy (excluding FDW) as of Dec 2011



Note: Figures in brackets refer to the absolute number of all foreign workers (including P, Q, S pass and Work Permit Holders) in the various sectors, excluding FDWs

Sources: MOM

Facilitating economic upgrading and restructuring; creating new and better job opportunities

Over the years, Singapore has been able to prosper because we have continually restructured our economy to stay resilient and relevant. If we wish to maintain our edge, we will have to decide how best to manage the exit of lower value-added industries, while developing new industries that provide better jobs for Singaporeans. This is important in order to ensure a diverse industry mix, bolster the resilience of our economy, and raise overall productivity.

One challenge that we face in our attempts at industrial renewal is that the skills and capabilities that new industries need may not always be immediately available in the Singaporean workforce. As there is often a minimum of 3-4 years from course commencement to graduation, it will take that long before we have graduates with the necessary skills for these industries. An even longer time is required to train experienced supervisors and managers in these fields. Having readily-available foreign manpower with the necessary skill sets allows us to anchor these emerging industries in Singapore first, while we develop the pipeline of Singaporean workers for these industries through working with the local institutes

of higher learning and continuing education providers. One example of an industry which has started to localise is the biomedical sector (see [Box 3](#)).

Box 3: Localisation of the biomedical science industry

Singapore's biomedical science industry expanded rapidly in the late 1990s. By the early 2000s, Singapore had established itself as a key biomedical manufacturing location. Today, Singapore is home to more than 50 commercial-scale manufacturing facilities operated by leading pharmaceutical, biotechnology and medical technology companies. In 2010, the BMS manufacturing industry employed close to 14,000 people.²²

For the pharmaceuticals and biological products industry in particular, the local PME share of total employment has grown significantly by about 14 percentage points in the last 10 years, reaching around 33% of total employment in this industry in 2010. There has been a decline in the Employment Pass (EP) holders' share of total employment in the industry over the same period. This shows that while EP holders were needed in the early years to help start the industry, some of the jobs they held have been subsequently localised.

With the increasing pace of technological change and intensifying competition for economic opportunities, we will need to restructure our economy more frequently to stay relevant. Productivity measures and training incentives will complement limited access to foreign manpower to bridge our skills gap in the immediate term, and contribute to the creation of more skilled and higher paying jobs for Singaporeans over the longer term.²³

Flexibility to respond to economic fluctuations and pursue growth opportunities

Singapore needs to make the most of quality business opportunities which are often hard to come by. Once missed, the potential growth and job opportunities may be lost permanently. Having some flexibility in manpower allows companies to capture such growth opportunities as they arise (see [Box 4](#)). As the companies grow in strength and expand abroad, more jobs will be created for Singaporeans, not just in Singapore but also overseas.²⁴

²² Based on data from the Singapore Economic Development Board's (EDB) Census of Manufacturing Activities.

²³ The government has been significantly tightening access to foreign manpower since 2010 for all segments. Levies have been increased and dependency ratio ceilings tightened for Work Permit and S Pass workers. Qualifying salaries of S Pass and Employment Pass have also been raised to keep pace with the rising salaries of the local workforce.

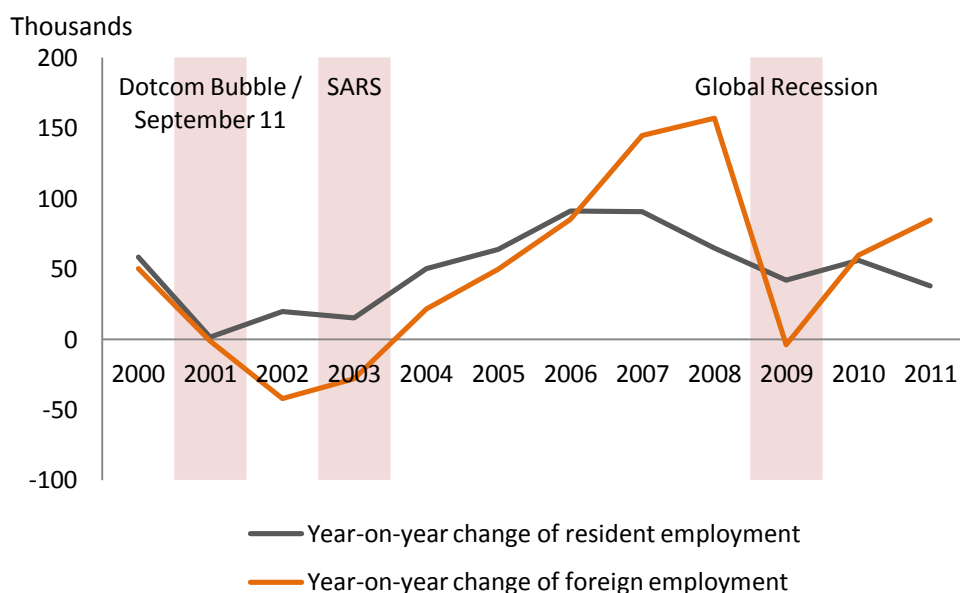
²⁴ According to IE Singapore's Internationalisation Survey, Singaporeans make up 72% of the overseas workforce for the average SME. This suggests that companies prefer Singaporeans to run their overseas operations.

Box 4: Capturing opportunities in the Marine and Offshore sector

Capitalising on the boom in the Marine and Offshore (M&O) sector between 2007 and 2011, our local M&O players, such as Keppel and Sembcorp, managed to capture about 70% of global orders for jack-up rigs, floating production storage and offloading conversions during this period.

They were able to do so only because they had the flexibility to hire more workers to meet delivery schedules. Over this period, the M&O sector added 22,000 workers in total.²⁵ This worked out to an increase in workers of 7.8% per annum, above the manufacturing average of 0.9% per annum. With Singapore-based M&O players as global industry leaders, Singaporeans have benefited as the share of residents occupying skilled positions in the M&O sector has increased. As of 2010, there were nearly 20,000 skilled locals working in this sector.²⁶

Apart from allowing companies to capture opportunities on the up-swing of a business cycle, foreign manpower also help to cushion Singaporeans from unemployment during downturns. Exhibit 10 illustrates this point well. During the economic downturn in 2008-2009, foreign worker employment dropped while resident employment continued to grow but more gradually. This trend can also be seen in the previous downturns, such as in 2001-2003 (Post September 11 and SARS).

Exhibit 10: Change in resident and foreign employment²⁷

Source: MOM

Complementing our resident workforce

As we create more high-skilled professional and technical positions for Singaporeans that are commensurate with their educational qualifications, there will continue to be a supporting base of jobs that may be more routine or manual in nature, or with more difficult working conditions.

²⁵ Based on data from EDB's Census of Manufacturing Activities.

²⁶ Skilled positions include professionals, managers, executives and technicians (PMETs) as well as craftsmen.

²⁷ The dip in foreign worker employment levels was broadly observed for all pass types.

Given the improving educational profile and rising aspirations of Singaporeans, the number of Singaporeans willing to take up such less-skilled jobs will continue to shrink. By helping to fill these jobs, foreign workers thus play a complementary role to Singaporean workers. The complementary roles of local and foreign manpower facilitate the development of a healthy ecosystem of diverse industries, which lends resilience to our economy. Some examples are given below.

- a. In the **logistics sector**, lower-skilled foreign manpower has helped support the creation of higher-skilled jobs for Singaporeans. In Pan Asia Logistics, a fast-growing local company specialising in freight forwarding and third party logistics services, foreign manpower have been engaged to facilitate its rapid overseas expansion, as well as to fulfil ground handling functions. Singaporeans are employed largely in skilled jobs, many of which have regional responsibilities, such as the role of a distribution manager, business development manager and solutions analyst. The synergy between local and foreign manpower is important for the development of the logistics sector, and contributes to Singapore's position as the world's top logistics hub.²⁸
- b. In **domestically-oriented sectors**, such as retail, food services and healthcare, low- and mid-skilled foreign workers typically take on jobs that are shunned by Singaporeans or where there are insufficient locals to meet the labour demand. Should we excessively restrict access to foreign manpower in these jobs, providers may not be able to meet the demands, for example, of looking after our elderly in community hospitals or homes for the elderly. Consumer inflation is also likely to increase.²⁹ This is because companies in these sectors typically have thin profit margins (e.g., those in food services and retail have profit margins of around 7% and 6% respectively), and are likely to pass on the higher wage costs arising from a shortage of labour to consumers.

Diversity in workforce

As cities race towards the next phase of innovation, a diversity of talent helps companies to compete for business on a global platform and understand the needs of global clients. Global teams with a diverse set of experiences, perspectives and backgrounds are key drivers of innovation and new ideas. Some sectors that could benefit from having a diverse workforce include higher value-added sectors like finance and business services and research and development. It may be desirable for these sectors to have access to some foreign manpower, even as we develop capabilities among Singaporeans to take on good jobs in these sectors. For example, in the area of research and development, studies in the US and Canada have found that high-skilled immigrants and international talent have a positive impact on innovation in the local economy, and help native inventors to be more innovative.³⁰ In Singapore, the diversity of talent has also helped to bolster our research capabilities and facilitate overseas collaborations (see [Box 5](#)).

²⁸ Singapore is the world's number one logistics hub according to the 2012 World Bank Logistics Performance Index.

²⁹ International studies done on the effects of immigration have shown that low-skilled immigrants and foreign workers can help to lower the price levels faced by locals. A study using US data estimates that low-skilled immigrants lowered the price of goods purchased by locals by 0.3%-0.4% as companies incurred lower wage bills in hiring them. As prices fall, even though the wages of low-skilled workers had declined, their purchasing power increased. International studies tend to focus on immigrants rather than foreign workers, and usually include foreign workers as part of the low-skilled immigrants count. Source: "*The Effect of Low-Skilled Immigration on U.S. Prices: Evidence from CPI Data*", Cortes, 2008.

³⁰ A study in the US finds that a 1% increase in immigrant college graduates as a share of the population is associated with a 13% increase in patents per capita. In addition, according to the World Bank, non-residents accounted for 248,200 or 51% of new patents filed in 2010 in the US. Source: "*How Much Does Immigration Boost Innovation?*", Hunt and Gauthier-Loiselle, 2009

Box 5: Diversity of talent helps bolster innovation and research capabilities

P&G, US

P&G, the world's largest personal and household care company by revenue, invested S\$250 million in a 500-man Singapore Innovation Centre (SgIC) for end-to-end innovation in beauty and male grooming. SgIC will be one of P&G's two mega R&D centres in Asia – a key growth market for the company. The 32,000 square metres facility, expected to open in 2013, will make P&G the largest private sector representative at Biopolis and provide easy access to the research cluster at one-north.

P&G's diverse teams of local and international researchers will look at the entire innovation value chain to deliver products in the areas of beauty and grooming, home care and personal healthcare. P&G has also signed a Master Research Collaboration Agreement with all 14 research institutes of public research agency, A*STAR, to strengthen the partnership between the SgIC and Singapore's research community, thus allowing the company to leverage upon the strong research capabilities available here.

IME-AMAT Centre of Excellence in Advanced Packaging (Joint Lab)

A Singaporean-led team from A*STAR's Institute of Microelectronics (IME) has set up a Centre of Excellence in Advanced Packaging with Applied Materials (AMAT), a global leader in the provision of manufacturing solutions for the semiconductor, flat panel display and solar photovoltaic industries.

The Centre is the most advanced lab of its kind dedicated to 3D chip packaging technology – a key growth area for the semiconductor industry.

The Centre is currently staffed by more than 50 scientists and engineers who hail from all over the world, including Singapore. By bringing together diverse talent, the Centre has been able to develop new capabilities in advanced 3D chip packaging, created high-quality jobs and positioned Singapore as a global leader in semiconductor R&D.

Contributing to our tax base

The foreign workforce also forms a key part of our tax base. While foreigners currently account for about 20% of all income taxpayers, they contribute more than 25% of our total personal income taxes. Foreigners living and working in Singapore also add to our GST tax base. Their tax contributions increase the fiscal resources for Government to meet various public expenditure needs, including social programmes and transfers to maintain a progressive fiscal system.

Supporting our social and development needs

Even as we grow economically, we will also need to ensure that our social and development needs are met. Otherwise, Singaporeans may be deprived of essential services in sectors such as construction, healthcare and other social services, many of which employ a significant proportion of foreign workers currently:

- a. Construction. The shortage of Singaporeans who are willing to work in the construction sector has led to the sector accounting for about one-third of the foreign workforce in

Singapore today.³¹ Even as the sector works hard to improve its level of productivity, foreign workers will continue to be needed as we develop our social and economic infrastructure. This is especially crucial in the next few years as the government has embarked on housing and transport projects to alleviate current infrastructural bottlenecks.

- b. Health and social services. The proportion of foreign workers in the health and social services sector is currently small, at around 2% of the foreign workforce. However, they perform essential roles in eldercare and healthcare, working as frontline integrated care workers in our nursing and community homes, or as allied health professionals. With Singapore's rapidly ageing population, the demand for workers in the health and social services sector will grow. Singaporeans are also less willing to take up the lower-skilled jobs in this sector. Any shortfall of Singaporean workers in this sector will have to be met by foreign workers in order to ensure that our elderly will continue to enjoy an adequate standard of care in their later years.

In addition, there were over 200,000 FDWs in Singapore as at December 2011. FDWs help to take care of our children and elderly, thereby enabling more Singaporeans to enter the workforce. With an ageing population, more FDWs will be required as caregivers for our elderly in the future.

How should we calibrate the inflow of foreign manpower?

Calibrating our inflow of foreign manpower will be a delicate balance. An overly liberal access to low-skilled foreign manpower could depress overall wages for low-skilled jobs or encourage businesses to rely on cheap labour instead of making productivity improvements. Too much high-skilled foreign manpower may lead to Singaporeans feeling a sense of displacement. Our physical infrastructure, which is being ramped up, may also be placed under stress in the immediate term.

Yet, an overly restrictive foreign manpower policy will have a detrimental impact on both our economy and society. We may have a less vibrant economy, with fewer job opportunities and lower wage growth. As productivity improvements and process restructuring cannot happen overnight despite our best efforts, moderating the inflow of low-skilled foreign manpower too quickly will adversely affect many companies, including our SMEs who employ more than half of our workforce. Some of them may fold or relocate, and Singaporeans in those companies will lose their jobs. While this is part-and-parcel of the economic restructuring process, whereby workers could be re-employed by more productive businesses, the challenge is calibrating at the right pace to avoid excessive unemployment. Further, a shortage of manpower may also mean that Singaporeans will face rising consumer prices as labour costs rise.

These are trade-offs that Singaporeans have to bear in mind when considering the appropriate level and pace of foreign manpower inflow. How we strike a balance, while ensuring that all Singaporeans have ample opportunities to train, upgrade and expand their career options, is a critical challenge that will have significant repercussions on the future development of our country.

³¹ Excludes foreign domestic workers.

CONCLUSION

Our demographic challenges require that we, as a nation, make some difficult choices now on how our economy should grow in the years ahead. As a maturing economy, our economic growth will naturally slow from the 8% per annum that we achieved since Independence.

As a small open economy, our growth will be affected by the volatility of the global economic environment. Nonetheless, there will continue to be economic opportunities given Asia's growth. Singapore is well positioned to ride on Asia's growth given its geographic proximity and cultural links.

Looking ahead, Singapore must consider how it will meet its demographic challenges and continue to provide opportunities to Singaporeans in a sustainable manner over the long run. While there are no easy solutions, any response is likely to rely on three broad approaches: restructuring our economy to push for productivity-driven growth; encouraging more residents (including women and older workers) to join and stay in the workforce; and carefully calibrating our intake of immigrants and foreign manpower. In addition, infrastructure development (e.g. housing and transport) must also keep pace with economic and population growth, so that Singaporeans can continue to enjoy a good quality of life.

If we as a society make the right choices, we will be able to put the economy on a sustainable growth path over the longer term. This will ensure that all Singaporeans, regardless of their skills and background, can continue to have access to good job opportunities, rising real wages and a higher quality of life in the future.