

## Chapter 8

### INVESTMENT IN SINGAPORE IN THE POST-CRISIS ERA: ISSUES AND CHALLENGES

by

Christian De Guzman, Liew Yin Sze and Luk Man Chi <sup>1</sup>

#### 1. Introduction

Since its independence in 1965, Singapore has transformed itself from an underdeveloped backwater to a world-class trade and financial hub that also features a strong manufacturing sector. The linchpin of Singapore's industrial development has been the country's strategic emphasis on investments, particularly those sourced from multinational corporations (MNCs), as an engine of growth. With hardly any natural resources, the government recognised early on the importance of attracting foreign direct investment which would not only raise the economy's long term growth potential but also provide jobs and income to the large number of unemployed. Foreign investors also bring with them new technology, ideas, and extensive marketing and distributional networks. At the same time, the government focused on creating a stable, conducive, pro-business domestic environment by providing suitable tax incentives, weeding out corruption, and setting up an efficient infrastructure network, among others. Fractious wage-bargaining and industrial actions were discouraged in favour of tripartite negotiations involving the unions, employers and the government. By and large, the emphasis on creating and maintaining a pro-business climate in Singapore has helped to attract and retain an adequate level of investment over time, even amidst challenging economic conditions.

#### 2. Trend of Investment in Singapore Since 1980

##### 2.1 Key Macroeconomic Indicators

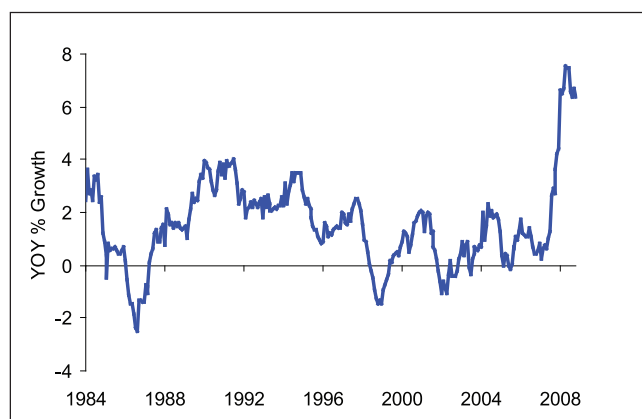
From 1980 to 1996, Singapore's nominal GDP grew from SGD25.1bn to SGD130.5bn; in real terms, GDP growth during this period averaged 8% per annum. The strong growth was punctuated by the devaluation of the Thai baht

1. The views in this paper are solely those of the authors and should not be attributed to the Monetary Authority of Singapore. The main authors of this chapter are Christian de Guzman, Liew Yin Sze, and Luk Man Chi. The authors wish to acknowledge the contributions of Cyrene Chew, Joey Chew, Ng Heng Tiong, Edward Robinson, Celine Sia, Saktiandi Supaat, and Tan Siang Meng.

in July 1997, which precipitated the Asian financial crisis. The Singapore economy slowed sharply from a growth of 8.3% in 1997 to a contraction of 1.4% in 1998. After the crisis, GDP growth picked up fairly quickly as exports rebounded strongly. From 1999 to 2007, annual real GDP growth averaged 6.1% despite downturns in the wake of the bursting of the tech bubble in 2001 as well as the outbreak of SARS in 2003.

A key feature of Singapore's economy has been a generally low level of inflation, which averaged 1.4% between 1984 and 2007 (Chart 1)<sup>2</sup>. This reflects the importance attached to price stability as the primary objective of Singapore's monetary policy. Since 1981, the conduct of monetary policy has been centred on the management of the exchange rate, given the highly open nature of the Singapore economy. At 430%, the ratio of trade to GDP in Singapore far exceeds that for most other countries. As such, the exchange rate has significant effects on both inflation and growth outcomes. The Singapore dollar exchange rate continues to be a nominal anchor for the economy and is the main instrument for the conduct of monetary policy (Chart 2). Insofar as the exchange rate influences relative prices, it serves as a useful tool to affect both the demand for imported consumer goods and the demand for Singapore's exports. Indeed, Singapore's track record of macroeconomic stability over the past three decades suggests that the exchange rate-centred monetary policy approach has worked fairly well.

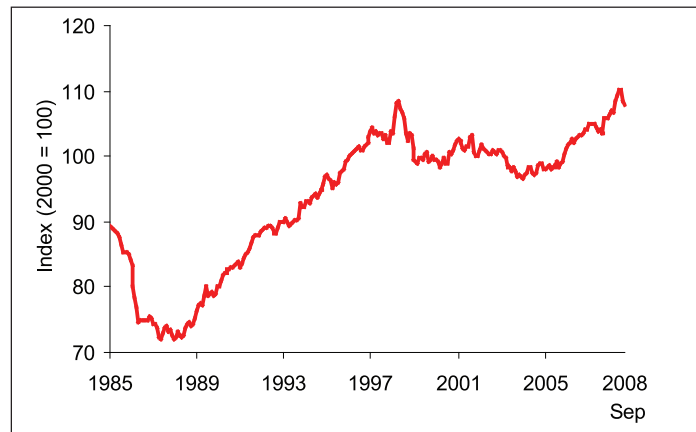
**Chart 1: Consumer Price Inflation**



Source: Singapore Department of Statistics

2. While CPI inflation shot up in 2008, it reflected a confluence of factors, including a spike in global oil and food prices, which have since receded. Singapore's inflation is widely expected to come off significantly in 2009.

**Chart 2: SGD Nominal Effective Exchange Rate**



Source: IMF

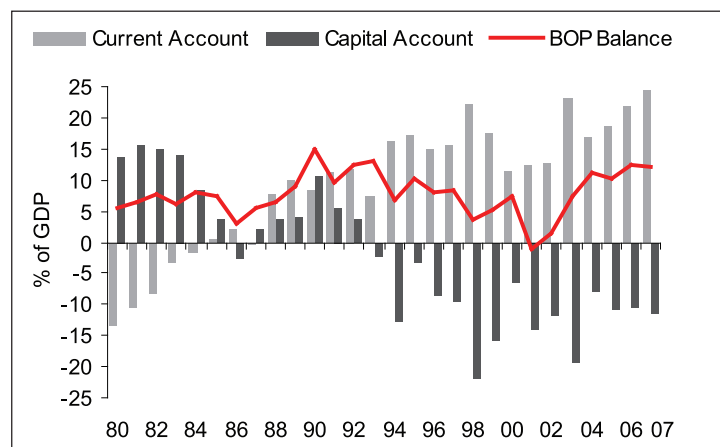
The reliance on trade renders the use of more conventional monetary policy targets, such as interest rates or money supply, less effective in influencing aggregate demand conditions (to fulfil the objective of price stability).<sup>3</sup> The choice of the exchange rate as the primary lever for monetary policy implies that the monetary authorities would have to give up control over domestic interest rates as well as the money supply within an environment of free capital flows (as postulated by the “open economy trilemma” or “impossible trinity”). As Singapore maintains an open capital account, domestic interest rates are largely determined by foreign interest rates and investor expectations of the future movements of the Singapore dollar.<sup>4</sup>

Besides low inflation, persistent balance of payments surpluses are another salient feature of Singapore’s open economy (Chart 3). Prior to 1985, the surpluses arose from substantial inflows of foreign direct investment, which more than offset deficits in the current account. The current account had registered deficits up to the mid-1980s due in part to significant imports of machinery and building materials as the economy industrialised and expanded at a rapid pace. For instance, between 1981 and 1985, construction and works accounted for more than half of fixed capital formation during the peak of the investment cycle.

3. Monetary Authority of Singapore, Staff Paper No. 37, *Managed Floating and Intermediate Exchange Rate Systems: The Singapore Experience*, December 2004.

4. Monetary Authority of Singapore, *Singapore’s Exchange Rate Policy*, February 2001, p.2.

**Chart 3: Balance of Payments**



Source: Singapore Department of Statistics

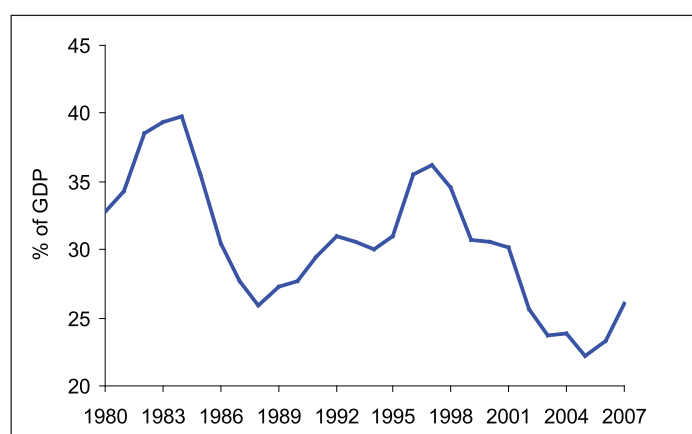
After the mid-1980s, the current account position turned into one of surpluses largely because of growing merchandise net exports. In the mid-1980s and early 1990s, the capital account also remained in surplus largely due to continued inflows of foreign direct investment. This contributed to strong balance of payments surpluses with attendant pressure on the Singapore dollar to appreciate. However, since 1993, the capital and financial account balance has been negative as a result of increased Singaporean investments abroad, although FDI continued to flow inwards. Recognising the inherent limitations to the growth of the (small) domestic economy, the government has actively sought to build an “external wing” by increasing investments in other economies. A number of significant corporate acquisitions, such as Singapore Telecommunications’ takeover of Australia’s Optus in 2001, contributed to the significant capital outflows during this period.

An important outcome of Singapore’s persistent BOP surpluses was the accumulation of official foreign exchange reserves, which rose to USD168.8bn as of September 2008. These reserves are managed by both the Monetary Authority of Singapore (MAS) and the Government of Singapore Investment Corporation (GIC). GIC was set up in 1981 as a dedicated institution, separate from MAS, to invest in longer term assets in order to preserve and enhance Singapore’s reserves. In the context of Singapore’s exchange rate-centred monetary policy, the accumulation of official foreign reserves has been an important factor underpinning public confidence in the Singapore dollar.

## 2.2 Real Investment Expenditure

Investment expenditure, as defined by gross fixed capital formation (GFCF) in the national accounts, has historically played a key role in promoting economic growth in Singapore. As Singapore focused on building infrastructure in the wake of its independence, the proportion of GDP attributed to GFCF climbed from 18.9% in 1965 to 32.7% in 1980. In the pre-Asian crisis period from 1980 to 1997, this proportion averaged 32.4% of GDP; in the post-crisis period from 1998 to 2007, GFCF moderated somewhat to 27.1% of GDP. (Chart 4)

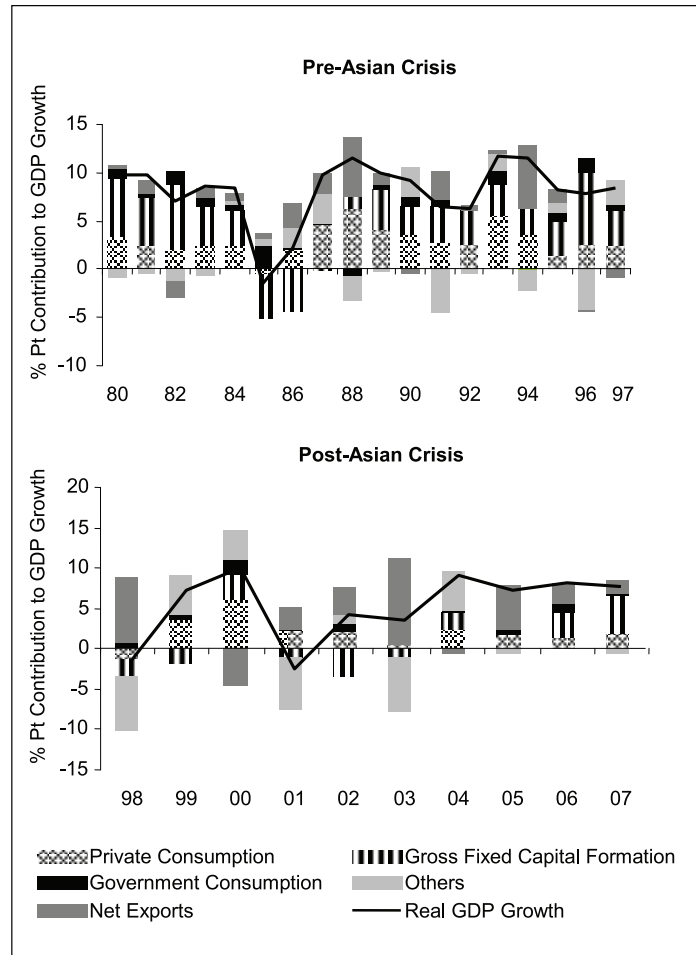
**Chart 4: Gross Fixed Capital Formation**



Source: Singapore Department of Statistics

GFCF posted strong positive contributions to GDP growth during the pre-crisis period with the exception of the post-recession period between 1985 and 1987. During the latter period, Singapore experienced a property glut resulting from the construction boom of the early 1980s and a sudden deceleration in demand. In contrast, the decade following the Asian financial crisis was characterized by smaller contributions from GFCF as a source of growth, although overall GDP still grew strongly, by an average of 6.1% (Chart 5). On the whole, both investment and GDP growth moderated after the Asian crisis compared to the earlier years of rapid economic development.

**Chart 5: Contribution to GDP Growth**



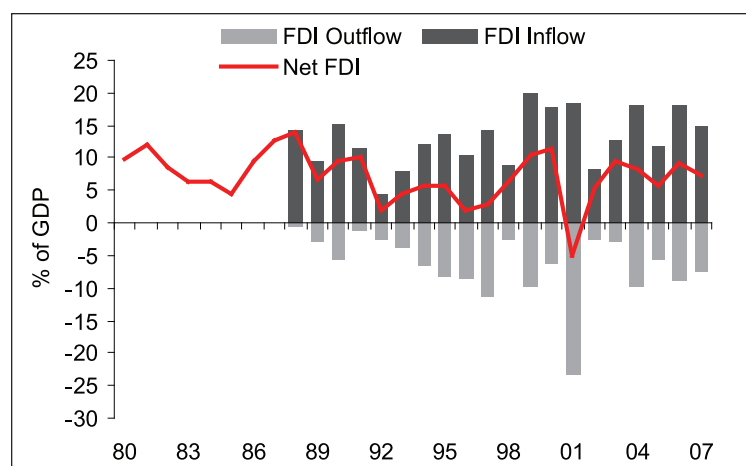
Source: Singapore Department of Statistics

Investment expenditure can be broadly divided into five categories: residential building construction, non-residential building construction, other construction & works, transport equipment, and machinery, equipment, & software. In comparing the pre- and post-crisis periods, construction & works accounted for a larger portion of GFCF before the crisis, averaging 54.4% of investment spending; after the crisis, this proportion fell to an average of 46.6%. This mirrored relatively increased spending on capital goods, as represented by machinery, equipment, & software, from an average of 31.6% of GFCF before

the crisis to 39.9% after the crisis. The pronounced increase in this category of spending reflected the emphasis on higher-value added activities, such as financial services, pharmaceutical manufacturing, and research & development.

Net foreign direct investment as measured in the balance of payments has consistently been positive from 1980 to 2007, except in 2001 (Chart 6). There has been no discernible difference between the pre- and post-crisis periods as net FDI has averaged 7.2% of GDP over the period observed. Reflecting the cumulative effect of these FDI inflows, the stock of foreign direct equity investment in Singapore has risen to SGD330bn in 2006, the latest year available. The increase in the stock of foreign direct equity investment from only SGD125bn in 1997 reflects in part the success of Singapore's investment promotion activities.

**Chart 6: Foreign Direct Investment Flows**

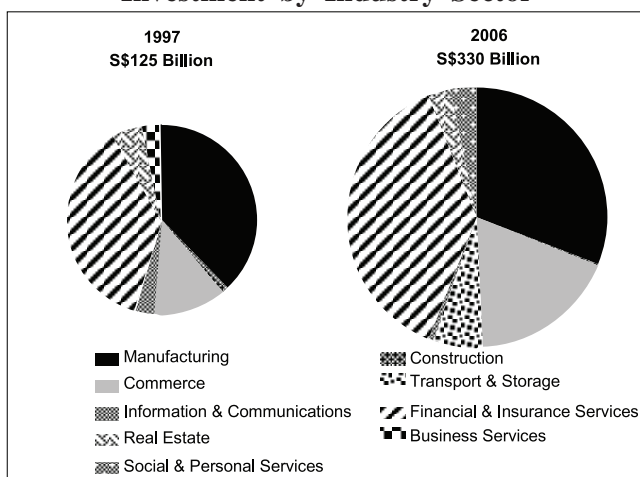


Source: Singapore Department of Statistics

### 2.3 Behind the FDI Numbers

A closer look at the figures underlying the stock of FDI provides some insight into the uses and sources of FDI. Manufacturing and financial services accounted for 70% of the total stock of FDI in 2006, roughly the same proportion as in 1997 (Chart 7). Within manufacturing, the stock of electronics FDI has fallen somewhat, both in terms of proportion and absolute size, declining from SGD34.1bn in 2000 to SGD32.3bn in 2006. However, the increase in the stock of pharmaceutical FDI from SGD13.8bn to SGD38.3bn over the same period has more than offset the losses from electronics manufacturing.

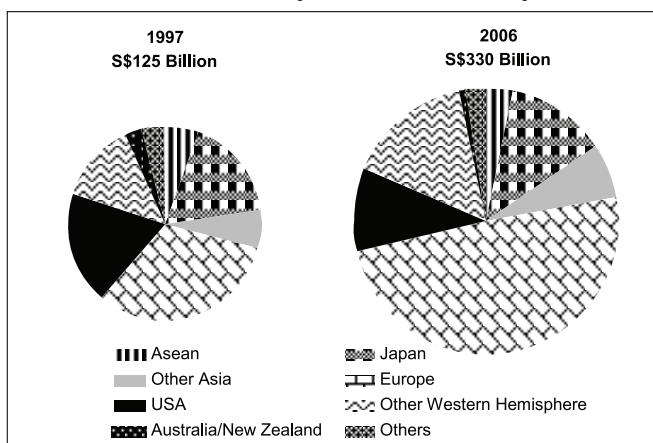
**Chart 7: Stock of Foreign Direct Equity Investment by Industry Sector**



Source: Singapore Department of Statistics

On the sources of FDI, the G3 economies continue to be the largest investors in Singapore (Chart 8). As of 2006, Europe accounted for the lion's share of 47% of the total stock of FDI in Singapore, up from 32% in 1997. Japan's share of total investments shrank from 17% to 12% over the same period, while the US' share fell from 19% to 10%. Some 10% of the total stock of FDI originates from other Asian countries ex-Japan.

**Chart 8: Stock of Foreign Direct Equity Investment by Source Country**

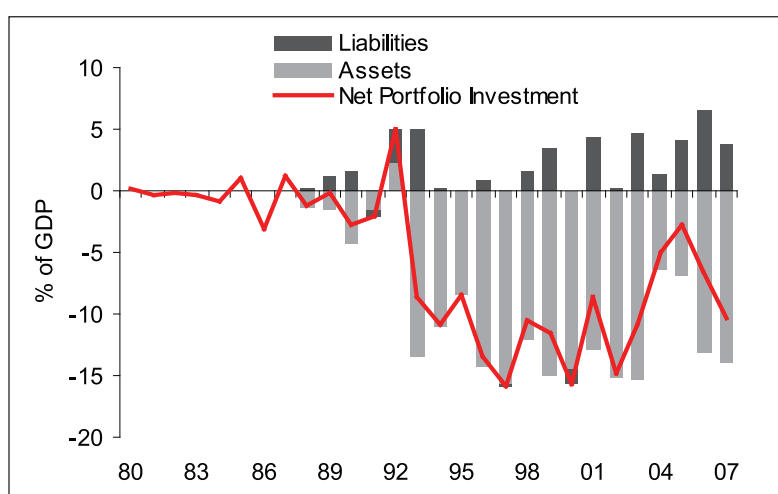


Source: Singapore Department of Statistics

## 2.4 Portfolio Investments

Reflecting efforts to develop a “second wing,” net portfolio investment registered a net outflow of 3.4% of GDP prior to the Asian financial crisis, intensifying to an average of 9.7% of GDP after the Asian crisis (Chart 9). Although portfolio inflows continued to come into the country, net flows were negative due to a sharp increase in portfolio outflows over the past decade.

**Chart 9: Portfolio Investment Flows**



Source: Singapore Department of Statistics

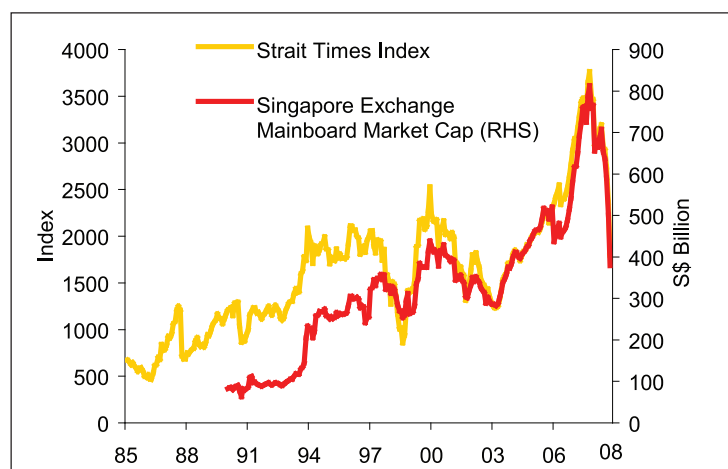
## 2.5 Growth of the Singapore Stock Market

From January 1985 to the onset of the Asian financial crisis in July 1997, Singapore’s benchmark equity index, the Straits Times Index (STI), rose by nearly 190%, reflecting an average growth rate of about 15% per annum. (Chart 10) The market capitalisation of the Singapore Exchange (SGX) Mainboard increased seven-fold from SGD54.9bn at the end of 1987 to SGD357bn in July 1997.<sup>5</sup> As

5. The Singapore Exchange (SGX) divides its company listings into the SGX Mainboard and the SGX Catalist. Prior to December 2007, the Catalist was known as the SESDAQ. The Mainboard lists companies that meet certain requirements including market capitalisation, pre-tax profits, and operating track record. In contrast, the Catalist is for newer companies and there are no quantitative requirements for listing. As of August 2008, the Catalist’s market capitalisation totaled SGD6.5 billion, or roughly 1% of the Mainboard.

Singapore strived to become an international financial hub, it promoted its equity markets as an excellent place to raise capital for both domestic firms and companies based abroad. The market capitalisation of foreign firms listed on the SGX Mainboard rose from SGD11.5bn in January 1990 (representing 14% of the Mainboard's total market capitalisation) to SGD149.3bn in July 1997 (42% of market capitalisation).

**Chart 10: Equity Market Indicators**



Source: Bloomberg and CEIC

Singapore's equity markets experienced a sharp correction during the Asian financial crisis. The STI fell by 56% from 1950 points in July 1997 to 856 points in August 1998. Over the same period, the market capitalisation of the SGX Mainboard fell by 29% from SGD357bn to SGD254bn.

Following the Asian financial crisis, the STI has recovered strongly despite economic downturns associated with the bursting of the tech-led bubble and the SARS episode of 2003. In the ten years since its August 1998 low, the STI has increased by 220% to 2740 in August 2008. (This represented a pull-back from an all-time high of 3876 reached in October 2007.) Similarly, the market capitalisation of the SGX Mainboard grew by 133% to SGD590bn over the same ten-year period. The growth in the size of Singapore's equity market post-Asian financial crisis can be attributed to strong overall economic growth, as well as the successful promotion of Singapore as a key international financial centre; this is evidenced by the increase in the number of foreign firms listed on the SGX Mainboard from 51 in August 1998 to 139 ten years later.

More recently, the stresses in global financial markets and sharp deterioration in the global economy have led to a significant sell-down of the Singapore stock market, as growth prospects waned. The STI fell to a low of 1600 on 24 October 2008 before recovering a little to 1733 as at end-Nov 2008. Reflecting the depressed sentiment, trading volumes have also declined sharply.

### **3. Major Policies Pertaining to Investment**

#### **3.1 Industrial Policy**

The Singapore government played an important role in determining the structural features of the economy, as economic conditions evolve. In the wake of the separation from Malaysia in 1965, the government supplanted import-substitution policies in favour of export-led industrialization. MNC investment was sought for labour-intensive manufacturing in order to generate mass employment. Simultaneously, a significant share of development expenditure was allocated for investments in physical infrastructure, housing, and education. By the second half of the 1970s, the economy was growing strongly and the imperative of mass job creation gave way to the need to ease labour shortages and improve productivity. Wage and education policies were implemented to shift employment away from low-end manufacturing to higher value-added, technology-based sectors.

Amidst the recession of 1985, the government convened an Economic Committee to examine the latent erosion of Singapore's competitiveness and to identify new directions for its future growth. The focus of investment promotion shifted from a singular emphasis on manufacturing to encompass services as well. As such, financial and business services became significant contributors to growth since the late 1980s. The Economic Committee also plotted Singapore's move up the value chain in manufacturing away from labour-intensive industries, such as concrete products and cement and rubber processing. Within electronics, for example, Singapore began to focus on more capital-intensive niches such as disk drives in the late 1980s and early 1990s and semiconductors from the mid-1990s. To further bolster Singapore's competitive position, corporate taxes were cut sharply from 40% to 33% and wages were made more flexible via the introduction of variable components into remuneration packages and cutting back on seniority-based pay.

In the aftermath of the Asian crisis, various government committees and task forces were convened to examine ways for Singapore to develop new competitive advantages. These included the Economic Review Committee (ERC)

chaired by then-Deputy Prime Minister Lee Hsien Loong which recommended further initiatives to encourage technology entrepreneurship and develop the venture capital industry. More importantly, in 1999, the biomedical sciences cluster, including pharmaceutical manufacturing, was identified as a key pillar of growth. The government subsequently announced that it would set aside at least SGD2.3bn in investments, grants, and other incentives to develop Singapore into a hub for research in the biomedical sciences. During this period, the government also liberalized “software” policies, for example, those related to social, cultural, and human capital, to help make the city-state an attractive destination for foreign talents and investments.

### **3.2 Free Capital Mobility**

As mentioned above, the exchange rate serves as the instrument of Singapore’s monetary policy, with the primary objective of ensuring price stability over the medium-term. Given the inherent cross-border nature of all consumption and production transactions in the economy, it is important that the exchange rate be fully convertible so as not to obstruct the free flow of goods and services between Singapore and its trading partners. In fact, nearly all exchange controls were abolished by 1978. Foreign investors are free to repatriate their capital and profits without restrictions. Likewise, local investors can also freely invest in overseas assets or keep their savings in foreign currencies, if they so desire.

### **3.3 Expansion of External Links**

Given Singapore’s small economy and its lack of natural resources, policymakers have made the strengthening of external ties a key priority in diversifying the economy. In the wake of the Asian crisis, Singapore’s economic planners sought to further enhance globalisation through the multilateral trading framework of the WTO, regional cooperation, as well as bilateral free trade agreements (FTAs) and investment agreements. The latter kind of agreement is aimed at promoting increased bilateral flows of investment by providing legal guarantees for the rights to repatriation and dispute settlement, as well as protection against expropriation or nationalization of investments. Comprehensive FTAs also incorporate elements of investment agreements in a wholesale manner. As of September 2008, Singapore has signed or completed negotiations on 15 bilateral or plurilateral FTAs.

## 4. Determinants of Real Investment Expenditure in Singapore

### 4.1 Data Sampling and Variables

In this section, we attempt to examine empirically some of the key determinants of private investment in Singapore over the past few decades. We use the following base equation for estimating private investment expenditure.

$$\textit{Real Private Investment} = f(\textit{real gross domestic product, real domestic credit to private sector, real interest rate, real effective exchange rate})$$

In addition, we explored the use of possible country-specific variables that may influence private investment expenditure from both local and foreign sources. However, these additional variables must be considered in the context of comparing investment pre- and post-Asian crisis, defined as 1980 to 1997 for the former and 1998 to 2008 for the latter. Singapore-specific variables to be included in the refined model should thus illustrate differences between the two periods. As such, the use of variables representing some of Singapore's conventional strong points was removed from consideration due to their "unchanging" nature before and after the Asian crisis. These included variables related to institutional quality, educational attainment, and infrastructural development

Given the requirements listed above, the following Singapore-specific variables were examined and are described below.

- *Corporate Tax Rate*: In our estimation exercise, we used the top corporate tax rate given the Singapore government's emphasis on attracting multinational corporations. These businesses, by virtue of the size of their revenues, would be taxed at the highest corporate tax rate. In addition to reductions in the corporate tax rate, the government has also provided other incentives to attract investment, including subsidized facilities and infrastructure, 5 to 10-year tax holidays, and tax exemptions for other expenses such as expatriate compensation and capital equipment. However, these benefits were granted in a targeted fashion and were not widely available to all investors. In contrast, corporate tax rates are applied across the board and thus more applicable to our estimation of aggregate investment expenditure. Moreover, cuts in the corporate tax rate generally correspond to key thrusts in investment promotion efforts.

- *CPF Contribution Rate:* The Central Provident Fund (CPF) is a compulsory social security savings plan for working Singaporean residents. Locally-based Singaporean employees set aside 20% of their monthly paycheck for their individual accounts at the CPF, while employers presently contribute 14.5% of their pay to the fund. Over the years, the employers' contribution rate had been progressively lowered, particularly during periods of economic downturn.
- *Public Investment:* Insofar as industrial policy has targeted specific sectors, public investment has often been tailored for particular industries through infrastructure development. Previously, industrial parks were built to cater to light manufacturers and logistics firms. More recently, research and development complexes have been constructed to cater to "innovative" industries; for example, Biopolis, a "hub" of nine buildings especially designed and pre-wired for research activity in the biomedical sciences, was completed in 2006. The overall level of infrastructure development has also been a key competitive advantage: in the World Economic Forum's latest *Global Competitiveness Report*, Singapore ranks second only to Switzerland in the quality of overall infrastructure. Singapore scores top marks for the quality of its port and air transport infrastructure in particular.
- *Tobin's q<sup>6</sup>:* This variable was included as a measure of domestic sector profitability and was calculated from a simple average of a sample of the domestic construction, financial and business, and other services industries. Higher values for Tobin's q should encourage greater private investment expenditure. This relationship is most clearly demonstrated in the construction sector: slower construction activity has accounted for much of the weakness in private investment after the Asian financial crisis and is reflected in lower values for Tobin's q for that particular sector. As market values declined sharply, developers held back on new construction projects amid poor expected results.
- *ASEAN-4 real GDP:* In pursuing an export-oriented industrialization policy shortly after independence, Singapore's policymakers realised the limitations imposed by the country's small domestic market. A key pillar to this policy has been the emphasis on attracting foreign direct investment, favoring multinational corporations looking to establish a base to serve the regional

---

6. This is actually a proxy of Tobin's q which was constructed internally and differs from the standard definition. In this case, Tobin's q is the ratio of the market value to the replacement cost or market price of a unit of current existing stock of business fixed capital divided by the price of the domestically produced good.

market. We thus include a variable for ASEAN-4 (Indonesia, Malaysia, Philippines and Thailand) real GDP to measure the vibrancy of the region as a market for goods and services produced in Singapore.

- Finally, given the importance of FDI relative to Singapore's overall investment spending, we assume that external financing is more important than local sources of capital. Moreover, due to the focus of monetary policy on the management of the exchange rate, interest rate movements are largely determined by international money markets.<sup>7</sup> As such, we have included a series for the quarterly average of the 3-month US dollar LIBOR as a measure of the cost of capital. In our preliminary estimates, we have found the local real interest rate to be insignificant as expected and have thus eliminated the local real interest rate from our base equation.

## 4.2 Empirical Results

Real private investment expenditure has been found to respond positively to domestic real output growth, real effective exchange rate depreciation, and increases to Tobin's  $q$ .<sup>8</sup> The results are thus consistent with mainstream theories of investment behaviour, namely, the accelerator model and Tobin's  $q$  theory.

The accelerator principle postulates that the rate of investment is primarily determined by the rate of change of output.<sup>9</sup> Our estimation confirms the role of the traditional neoclassical variable of output in explaining investment behaviour. Prior to the Asian financial crisis, Singapore experienced stronger GDP growth and relatively higher levels of spending vis-à-vis the subsequent period. The lower level of investment spending from 1998 onwards corresponded with lower average GDP growth as Singapore was buffeted by the bursting of the tech bubble, September 11 and the SARS outbreak.

Private investment expenditure is also positively correlated with increases in Tobin's  $q$ . Private investment will increase when the value of an additional unit of capital exceeds the cost of acquiring that unit. In the aftermath of the

---

7. In other words, the local interest rate is endogenous to the exchange rate given Singapore's open capital account.

8. Four variables were found to be significant at the 5% level, with varying lags (see Table 3 in the Appendix): the real effective exchange rate, ASEAN-4 GDP, Tobin's  $q$ , and the crisis dummy. Domestic GDP was also found to be significant at the 10% level, while the remainder of the variables examined were found to be relatively insignificant.

9. Increases in output beget further increases in output as a result of increased investment; inversely, there may be low levels of investment, or even negative net investment, when output is falling.

Asian financial crisis, the market value of firms fell heavily relative to the replacement cost of capital. As Tobin's  $q$  fell, the cost of capital rose and firms reined in their investment spending. As valuations recovered post-crisis, investment expenditures also increased in line with a rebound of Tobin's  $q$ , most markedly after 2003.

The exchange rate is found to have a negative effect on investment in the long run. An appreciation of the real exchange rate would cause Singapore's exports to cost more in foreign currency terms. The ensuing loss of export competitiveness would lead to lower profits and a scaling back of investment spending over the longer term. However, there is some empirical evidence that exchange rate appreciation may actually encourage investment expenditure in the short run, driven in particular by investments in the non-tradable sector, as assets priced in Singapore dollars gain in value in foreign currency terms. Asset prices have in fact been procyclical relative to exchange rate movements, corresponding to the construction boom following the SARS crisis of 2003. As Singapore has an open capital account, expectations of exchange rate appreciation may intensify capital inflows into Singapore dollar-denominated assets.

In the short-run, there is also some evidence that investment in Singapore responded more to the vibrancy of the regional market (ASEAN-4 GDP) than to domestic output growth. This lends support to Singapore's increasing importance as a regional hub over the course of the sample period. Also, as mentioned earlier, the small size of the domestic market may not adequately absorb the productive output resulting from the typically large investments sourced from multinational corporations.

It is interesting to note that the logged variables for the quantity (domestic credit to private sector) and price (LIBOR) of credit have proven to be insignificant. Given Singapore's growing importance as a global hub for financial intermediation, it may be unlikely that private investment expenditure has generally not required financing. This highlights the difficulties with finding suitable variables to model private investment expenditure in Singapore. Despite the high cost of labour and cost of living, Singapore continues to benefit from sustained private investment expenditure, even after the Asian financial crisis. As such, we argue that the qualities that make Singapore an attractive and profitable destination for both foreign and local investment have not significantly changed over our sample period and may not be easily quantified. These include the quality of infrastructure and institutions relative to other countries as measured by rankings such as the WEF's *Global Competitiveness Report*, for example.

## **5. Selected Issues and Challenges Pertaining to Investment in Singapore**

### **5.1 Liberalisation of Services Sectors**

Increasingly, efforts have been made to further liberalise the services industries. A sound and competitive service economy is a key contributing factor to Singapore's economic growth. The telecommunications services sector, for instance, plays a vital role in today's knowledge-based economy. All cross-border trade in services in fact depends on sound telecommunications infrastructure. This sector was liberalized in April 2000, which has since stimulated greater market efficiencies and increased consumer welfare. Consumers now have a greater range of service providers, a wider array of services to choose from, and significantly cheaper services. In fact, the cost of international calls in Singapore has fallen by up to 80% since liberalisation in 2000.

A sound services sector that is free from restrictions is also critical for attracting FDI. Foreign businesses would be encouraged to invest and re-invest in an environment where they are able to establish themselves as if they are a local firm in a free market. According to the final report of the ERC, regulations governing the services industry will be continually assessed in view of growing demand both domestically and regionally.<sup>10</sup> Liberalisation of these sectors may provide a key impetus to promote investment inflows, particularly from established players in other markets.

Of particular importance is the liberalisation of the financial sector as this was identified as a key pillar of the economy. In conjunction with the regulatory reforms in the US in the late 1990s that led to full-service financial conglomerates, financial institutions have been in search of greater scale and efficiency as they become more globalised. This has resulted in increased competition for "location-independent" financial activities. In response to this changing global landscape, the government has cultivated an environment for domestic banks to develop and strengthen their capabilities to better serve external markets. This was mapped out in a five-year liberalisation programme started in 1999 that has seen the domestic banking sector gradually opened up to foreign players. The liberalisation has complemented the development of three key niche segments of the financial sector - wealth management, business processing, and risk management - identified by the ERC's Sub-Committee on Financial Services

---

10. Economic Review Committee, *New Challenges, Fresh Goals – Towards a Dynamic Global City*, February 2003, p. 155.

to be aligned with Singapore's distinctive and self-sustaining competitive advantages; these pull factors include economic and political stability, a highly skilled and largely bilingual workforce, a well-regulated financial sector and an advanced IT platform.

## **5.2 China, India, and Regional Integration**

The emergence of new economic juggernauts like China and India present both challenges and opportunities for Singapore. The continued efforts to upgrade and restructure the Singapore economy become more important against the backdrop of fundamental changes brought about by the rapid expansion of these two Asian giants. China's continued catch-up in manufacturing expertise, combined with relatively low labour costs, underscores the need for Singapore to move up the technological ladder and promote higher value-added activities. Similarly, India could impel a similar move up the value chain for Singaporean services given India's competitive advantage in the provision of IT programming and administration, back-office processing, and other services currently provided under Singapore's "business hub" model.

In recent years, much rhetoric has been given to the "China effect," referring to the diversion of investments away from developing countries, such as those in ASEAN, towards China. Given Singapore's level of infrastructural and human development, as well as other structural features such as the relatively higher cost of labour, there may be opportunities to utilise Singapore's strengths to leverage on the growth of China and India; rather than seeing these large economies as a threat.

In the same vein, Singapore would be able to tap into existing intraregional linkages to promote inward investment flows. These linkages include its network of FTAs, as well as initiatives aimed at realising an integrated ASEAN Economic Community (AEC) by 2015. As part of the latter, the ten ASEAN countries have agreed on the ASEAN Comprehensive Investment Agreement (ACIA), which encompasses the liberalisation, facilitation, protection, and promotion of investments. Singapore's economic planners hope to position Singapore as an integrated manufacturing centre and services hub for the region.

## **5.3 Diversification and Increased R&D Investments**

Important measures have been introduced in recent years to continue to diversify the economy and enhance its resilience to external shocks. For example, as a consequence of Singapore's drive to develop a biomedical sciences industry,

particularly the manufacturing of pharmaceutical drugs and medical equipment, pharmaceutical's share of manufacturing value-added in Singapore has increased from 7.7% in 2000 to 22% in 2007.

The challenge remains to seek out further new sources of investments which would contribute to both economic diversification as well as long term GDP growth. In recent years, there has been greater emphasis on services-based and R&D investments, as opposed to "hardware" manufacturing investments.

In the services sector, a number of recent initiatives include the promotion of leisure, medical and IT-related services. The government hopes to capitalize on Singapore's status as a transportation, business and financial hub to attract further high-margin tourist receipts. In 2005, the government announced its decision to build two integrated resorts (IRs) by 2010 to augment Singapore's leisure and entertainment options, including the country's first two casinos, and to provide thousands of additional job opportunities. In 2007, Singapore won the right to host a Formula One race from 2008 onwards; in addition, it also won the right to host the first Youth Olympic Games in 2010. These premier sporting events garner worldwide attention and may spur new investments, particularly in the construction and hospitality sectors. The government also sees medical tourism as a promising sector of growth; it hopes to attract over 1 million international foreign patients a year by 2012, about three times the current number. Measures have also been taken to promote the development of the creative digital media industry such as interactive games and digital animation.

Research and development (R&D) has been identified as being at the crux of Singapore's long-term economic competitiveness. The government has placed greater emphasis on this sector in recent years in line with the framework provided for by its Strategic Direction for Science and Technology Policy (2006-10), or S&T Plan 2010. Under this plan, R&D funds are directed towards the support of existing industries, such as pharmaceutical manufacturing, and more importantly, scientific breakthroughs with significant economic potential. New areas identified include environmental and water technologies, as well as medical technology. As a consequence of this focus on R&D, gross expenditure on R&D has risen from barely 0.5% of GDP in the early 1980s to 0.85% in 1990 to 2.61% in 2007; under the S&T Plan, such expenditure is expected to top 3% of GDP by 2010.

## 6. Conclusion and Some Policy Recommendations

As a consequence of a sustained period of careful economic planning and prudent management, Singapore features several characteristics desirable to both foreign and local investors. High levels of institutional quality, human capital, and infrastructure, as well as deep and robust capital markets and fully convertible current and capital accounts, have reinforced Singapore's competitiveness in the global market for investments. This is reflected in Singapore's place atop the World Bank's Ease of Doing Business rankings for 2008 and 2009. Singapore has thus been successful in attracting FDI, as well as promoting locally-sourced investments before and after the Asian financial crisis; insofar as these funds have been used to finance activities related to fixed capital formation, this success has resulted in consistently positive contributions to GDP over our sample period.

However, as described in the previous section, there are key challenges facing the prevailing economic model and we have come up with the following recommendations to help sustain the level of fixed capital formation in the Singapore economy. These recommendations stem from our analysis of the empirical estimation of the determinants of investment that was detailed in Section 4.

- *Pursue pro-growth policies:* Given the correlation between GDP growth and real private investment, it is important for the government to continue to pursue pro-growth policies. The continued emphasis of monetary policy on balancing growth and inflationary pressures should help ensure a stable macroeconomic environment, which would tend to be supportive of long term growth and investments.
- *Preserve the value of the Singapore dollar:* Maintaining, as well as increasing, the purchasing power of the local currency may provide an incentive for foreign investment because of valuation effects vis-à-vis the source country. Moreover, a strong or neutral dollar policy has historically corresponded to lower interest rates given the open capital account, thus providing a stimulus to locally-financed investments.
- *Enhance local capital markets:* As Singapore developed into a high-income country, its workforce has built up a large reservoir of savings and wealth that could be used for more productive purposes. In addition, the cultivation of Singapore as a hub for financial services means that an increasingly large volume of global funds are intermediated in the city-state. Locally

domiciled firms, as well as foreign firms, should continue to leverage the local capital markets to tap these funds and provide an impetus for related institutions, such as SGX, to strive for greater scale and efficiency.

## REFERENCES

- Economic Committee. 1986. *The Singapore Economy: New Directions*, Singapore: Ministry of Trade and Industry.
- Economic Review Committee, 2003, *New Challenges, Fresh Goals – Towards a Dynamic Global City*. Singapore: Ministry of Trade and Industry.
- Economic Review Committee Sub-Committee on Services Industries Financial Services Working Group, 2002, *Positioning Singapore as a Pre-eminent Financial Centre in Asia*, Singapore: Ministry of Trade and Industry.
- Koh, Winston T.H. and Mariano, Roberto S., eds, 2006, *The Economic Prospects of Singapore*, Singapore: Addison-Wesley.
- Lim, Hng Kiang, 2007, “Raising the Competitiveness of ASEAN Services Industry,” Opening Address at the Second ASEAN Services Forum, 9 May 2007.
- Monetary Authority of Singapore, *Macroeconomic Review*, various years.
- Monetary Authority of Singapore, 2004, “Managed Floating and Intermediate Exchange Rate Systems: The Singapore Experience,” *MAS Staff Paper* No. 37.
- Monetary Authority of Singapore, 2001, *Singapore’s Exchange Rate Policy*, Singapore: Monetary Authority of Singapore.
- Toh, Mun Heng and Ng, Wai Choong, 2000, “Efficiency of Investments in Asian Economies: Has Singapore Over-Invested?”, Presented at the 7<sup>th</sup> Convention of the East Asian Economic Association.
- Von Alten, Florian, 1995, *The Role of Government in the Singapore Economy*, Frankfurt am Main: Peter Lang.
- World Economic Forum, *The Global Competitiveness Report*, Various Years.

## Appendix

### Sources and Methodology

Data has been primarily obtained from the following sources: CEIC, Datastream, the IMF's World Economic Outlook database, and the Monetary Authority of Singapore's internal database. Quarterly data has been deseasonalized where applicable and covers the period from Q4 1983 to Q1 2008.

Appropriate deflators were applied to most real variables to change each of their respective base years to 1980. All variables were converted to log form except for Tobin's  $q$ . A dummy crisis variable was also included to take into account of the intercept difference during the financial crisis; the crisis variable was defined as 1 for 1998Q1 to 1999Q1 (5 quarters) and 0 for the rest of the sample.

Each of the variables was first checked for multicollinearity using simple correlation coefficients. Table 1 in the Appendix shows that the correlation coefficients between a number of these variables are high, possibly indicating multicollinearity which may then lead to larger variances and standard errors. However, we have retained some of these variables in order to conform to the study's base model; we kept the present set of country-specific variables in order to minimize omitted variable bias for the variances of the estimated coefficients in the equation.

Table 1. Correlation Matrix between Variables

	ASEAN-4 GDP	DCTPS	GDP	Private GFCF	Public GFCF	LIBOR	REER	Tobin's $q$
ASEAN-4 GDP	1.00	0.98	0.99	0.94	0.52	0.32	0.09	0.51
DCTPS	0.98	1.00	0.99	0.95	0.64	0.39	0.16	0.54
GDP	0.99	0.99	1.00	0.94	0.55	0.32	0.07	0.48
Private GFCF	0.94	0.95	0.94	1.00	0.56	0.38	0.35	0.67

They were then tested for unit roots using the augmented Dickey-Fuller test. For all variables, the null hypothesis that the specific variable contained a unit root could not be rejected at the 5% significance level.

Subsequently, the Johansen procedure was applied to determine the number of cointegrating vectors present with the crisis dummy as an exogenous variable. The sample was found to be cointegrated at the 5% level with one cointegrating vector.

Once cointegration had been established, a vector error correction model was applied to the data in order to encapsulate the inherent inertia in private investment expenditure. A lag of four terms was included and resulted in the following long run equation:

$$\log(\text{private GFCF}) = -2.9 - 0.66*\log(\text{REER}) + 1.18* \log(\text{GDP}) + 0.3* \text{Tobin's } q$$

**Table 2**  
**Estimates of the Long-run Coefficients,**  
**Q1 1985 – Q1 2008**

<b>Dependent Variable : <math>\log(\text{Private GFCF})_t</math></b>			
<b>Variable</b>	<b>Coeff</b>	<b>Std Err</b>	<b>t-stat</b>
$\log(\text{REER})_t$	-0.66	0.24	-2.80
$\log(\text{GDP})_t$	1.18	0.03	11.88
Tobin $Q_t$	0.30	0.24	4.88

To capture the short run dynamics of investment expenditure, the long run equation was subsequently embedded within an error correction model using the Ordinary Least Squares (OLS) estimation method.. Explanatory variables were lagged by at least a quarter to avoid the endogeneity problem. Singapore's GDP and ASEAN-4 GDP were also assigned different lags to minimize the consequences from potential multicollinearity issues.

**Table 3**  
**Results of the Error Correction Model,**  
**Q1 1985 – Q1 2008**

<b>Dependent Variable : <math>\Delta\text{Private GFCF}_t</math></b>				
<b>Variable</b>	<b>Coeff</b>	<b>Std Err</b>	<b>t-stat</b>	<b>p-value</b>
Error correction term	-0.20	0.06	-3.37	0.00
$\Delta\log(\text{REER})_{t-4}$	0.61	0.24	2.51	0.01
$\Delta\log(\text{GDP})_{t-2}$	0.61	0.24	2.56	0.01
$\Delta\log(\text{ASEAN-4 GDP})_{t-4}$	1.25	0.31	3.98	0.00
<b>Diagnostics/Fit of Model</b>				
R-squared	0.37			
Adjusted R-squared	0.33			
Std Err	0.036			
Durbin-Watson stat	1.99			