MAS Monetary Authority of Singapore

macroeconomic review

economic policy department

Volume VI, Issue 1
April 2007

Volume VI, Issue 1
April 2007

Economic Policy Department
Monetary Authority of Singapore

ISSN 0219-8908

Published in April 2007

Economic Policy Department
Monetary Authority of Singapore

http://www.mas.gov.sg

Printed by Stamford Press Pte Ltd

Contents

LIST OF ABBREVIATIONS

BEER	behavioural equilibrium exchange rate
bpd	barrels per day
COE	Certificate of Entitlement
CPF	Central Provident Fund
CPI	consumer price index
CSCE	Coffee, Sugar and Cocoa Exchange
DLI	Domestic Liquidity Indicator
DOS	Department of Statistics
EDB	Economic Development Board
EPD	Economic Policy Department
ERS	Economic Restructuring Shares
FI	fiscal impulse
FY	financial year
GDP	Gross Domestic Product
GST	goods and services tax
HDB	Housing and Development Board
IEA	International Energy Agency
IMF	International Monetary Fund
IPI	import price index
LPG	liquid petroleum gas
MMS	Monetary Model of Singapore
MOF	Ministry of Finance
MOM	Ministry of Manpower
m-o-m	month-on-month
MRT	Mass Rapid Transit
MSD	Macroeconomic Surveillance Department
NEER	nominal effective exchange rate
NII	net investment income
NODX	non-oil domestic exports
NORX	non-oil re-exports
OECD	Organisation of Economic Cooperation and Development
OPEC	Organisation of the Petroleum Exporting Countries
PMETs	Professionals, Managers, Executives and Technicians
q-o-q	quarter-on-quarter
REER	real effective exchange rate
ROA	return on assets
ROE	return on equity
SAAR	seasonally adjusted annualised rate
SERS	Selective En bloc Redevelopment Scheme
SGX	Singapore Exchange
SIBOR	Singapore Interbank Offer Rate
SMA	Singapore Medical Association
SME	Small and Medium Enterprises
STB	Singapore Tourism Board
TFP	total factor productivity
ULC	unit labour cost
USCI	unit services cost index
WDA	Workforce Development Agency
WPH	Workfare Permit Holders
WTI	West Texas Intermediate
y-o-y	year-on-year

Preface

The Macroeconomic Review is published twice a year in conjunction with the release of the MAS Monetary Policy Statement. The Review documents the Economic Policy Department's (EPD) analysis and assessment of macroeconomic developments in the Singapore economy, and shares with market participants, analysts, and the wider public, the basis for the policy decisions conveyed in the Monetary Policy Statement.

The production of the Review is coordinated by EPD under the general direction of Dr Khor Hoe Ee, Assistant Managing Director (Economics), and Edward Robinson, Executive Director (Economic Policy & Macroeconomic Surveillance). EPD is supported by the Macroeconomic Surveillance Department (MSD) in this project. The primary contributors to the Review were Celine Sia, Ng Bok Eng, Liew Yin Sze, Ng Heng Tiong, Soo Cheng Ghee, Priscilla Ng, Tu Suh Ping, Tok Yoke Wang, Supaat Saktiandi, Jason Lee, Ng Yi Ping, Koh Ngiap Weu, Cyrene Chew, Adrian Ng, Ang Eng Siong, Dennis Tan, Guo Shanyi, Koh Tsin Zhen, Tan Yin Ying, Ong Jia Wern, Edwin Heng, Ji Gang and James Cheo. Peter Wilson, Associate Professor, Department of Economics, National University of Singapore edited the publication and provided comments and guidance. The publication also benefited from useful comments by Professors Andrew Rose and Sam Ouliaris. The data used in the Review were drawn from the following government agencies: CAAS, CPF Board, DOS, EDB, IE Singapore, LTA, MOF, MOM, MTI, STB and URA.

The Review may be accessed in PDF format on the MAS website: http://www.mas.gov.sg/masmcm/bin/pt1Macroeconomic_Review.htm.

The Review may also be purchased at major bookstores, online (http://asp.marketasia.com.sg/Spore/sporeindex.asp), or on an annual subscription basis (details on the last page).

Highlights

Despite the headwinds from the slowing US economy and the inventory build-up in the global semiconductor industry in the second half of last year, the Singapore economy recorded an impressive 7.9% rate of growth in 2006, marking the third consecutive year of robust expansion. While the IT-related industries were lacklustre, the rest of the economy, particularly non-electronics manufacturing and financial services, recorded strong gains. CPI inflation was relatively contained at 1.0% despite higher energy-related costs.

Going forward, some re-balancing of global growth towards Asia and the Eurozone is likely as the US economy slows. In particular, stronger domestic demand in the region should help to cushion the impact of declining external demand from the US. On the domestic front, the strength of the non-IT industries should provide a counterweight to the weakness in the electronics sector in the first half of this year. Barring any adverse shocks, Singapore's GDP growth is projected at 4.5-6.5% this year. Nonetheless, there are continuing risks in the external environment which will warrant careful monitoring over the course of the year.

Chapter 1 of the *Review* traces the growth dynamics in the domestic economy since Q4 last year. Particular attention is given to the role of the non-IT sectors in supporting growth in view of the slowdown in the electronics industry towards the end of 2006.

Chapter 2 discusses wage-price dynamics. The increase in domestic CPI inflation last year can largely be attributed to higher oil prices. The direct pass-through effects, however, have tapered off since H2 2006 following an easing in oil prices. Other sources of inflation remain benign, reflecting, in part, modest wage pressures and muted non-oil import costs. On the labour market front, robust job creation led to lower unemployment and increased job vacancies last year, and the strong labour demand was accommodated by a rise in the resident labour force participation rate, together with higher inflows of foreign workers. Also included in this chapter is a Box Item that characterises the nature of labour market adjustment to output changes over the business cycle.

Chapter 3 contains our assessment of the near-term growth and wage-price outlook for the domestic economy, taking into account developments in the global economy and IT industry. We emphasise, in particular, the medium-term drivers in IT and highlight the broadening support for growth in the rest of the economy, including the emerging clusters in the financial sector. A decisive recovery in the IT industry in H2 would provide an additional fillip to overall economic growth. This chapter also contains a Box Item on the growth potential of the US economy. Despite a projected decline in labour force growth, we conclude that US potential growth over the medium term is unlikely to decline sharply, since the factors underpinning productivity growth are likely to remain intact.

This issue of the *Review* includes two Special Features which present some of the Department's ongoing research work. The first evaluates the predictions from the quarterly MAS Survey of Professional Forecasters. We look in particular at the short-run forecasts for four key macroeconomic variables: GDP growth, CPI inflation, NODX growth, and the unemployment rate, based on the twin criteria of unbiasedness and efficiency. Our results suggest that forecasters have, in general, been relatively efficient in incorporating the latest information into their predictions for GDP growth (one quarter ahead). The second Feature seeks to estimate the effect of the impending GST hike on domestic CPI inflation. Using an impact analysis based on previous GST changes, and taking into account the relatively robust economic environment, we estimate the pass-through effect of the tax increase to be in the range of 60-80% this time around. This means that CPI inflation could rise by an additional 0.4-0.6% points in both 2007 and 2008.

The next issue of the *Review* will be released in October 2007.

Economic Policy Department
Monetary Authority of Singapore
24 April 2007

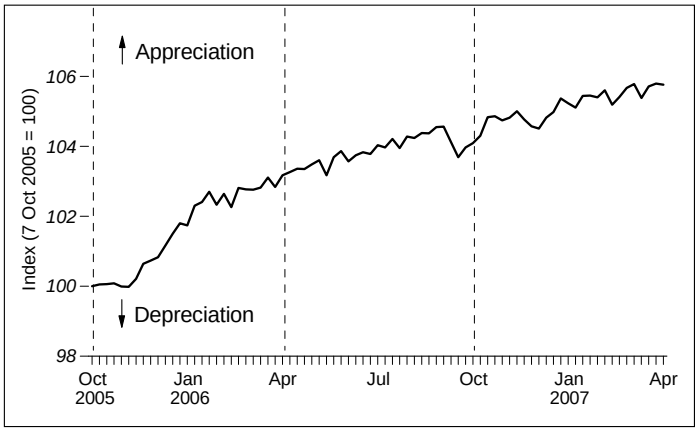
10 April 2007

Monetary Policy Statement

INTRODUCTION

1. In October 2006, MAS reaffirmed the policy of a modest and gradual appreciation of the S$NEER policy band. This policy stance, which has been in place since April 2004, has contributed to the low and stable inflation environment amidst the robust economic growth of the past few years.

Chart 1
Nominal Effective Exchange Rate (S$NEER)



- - - - indicates release of statement on monetary policy

2. The S$NEER has fluctuated near the upper end of the policy band during the past six months. (Chart 1) This reflected a number of factors, including the broad-based weakness of the US$, a resurgence of capital inflows into the region, as well as a relatively buoyant Singapore economy. Against expectations over the appreciation of the S$ and the liquidity conditions in the market, the three-month domestic interbank rate has come down to 2.9% as at end-March 2007, from 3.4% in September 2006.

OUTLOOK FOR 2007

3. The Singapore economy performed well in 2006, with expansions across a broad range of industries. Net job creation was strong and the unemployment rate has fallen to 2.7%, the lowest in five years. The *Advance Estimates* released by the Ministry of Trade and Industry suggest that GDP growth continued at a steady pace in Q1 2007, supported by ongoing expansions in the transport-hub, finance, and construction sectors.

4. Looking ahead, the external environment is expected to remain broadly supportive of sustained growth. Financial conditions are mostly favourable with inflation well-contained. Growth in Asia is expected to be anchored by the major economies of China, India and Japan. However, a number of risk factors have recently emerged. US economic growth has lost some momentum, led by the correction in its housing sector, and the problems in the subprime mortgage market may yet lead to some retraction in consumer spending. Further, the global IT industry remains weak on a build-up of inventories and strong competitive price pressures.

5. Reflecting some of these weaknesses, Singapore's export growth has moderated, and the manufacturing sector is expected to expand at a slower rate this year than in 2006. Conditions in the IT industry are likely to remain sluggish till later in the year, although the non-electronics clusters are expected to maintain healthy growth. Economic activity will be buttressed by the continued growth in the services industries, including financial and business services as well as the tourism-related cluster. Overall, GDP growth is projected to come in at 4.5-6.5% in 2007, down from the nearly 8% recorded in 2006.

6. While the 2% point GST hike (effective in July 2007) is estimated to raise CPI inflation by about 0.5% point each in 2007 and 2008, the full extent of the impact will be tempered by other offsetting fiscal measures. Import costs have been well-contained by the appreciation of the S$NEER over the past few years. However, other business costs including rentals have risen in the past year. In the labour market, overall wage increases have been moderate, although pockets of tightness have recently emerged in some industries. This year, CPI inflation is projected to come in at 0.5-1.5% under the present policy stance, similar to the 1% registered in 2006. MAS underlying inflation is also expected to hold steady at 1-2% in 2007.

MONETARY POLICY

7. Growth in the Singapore economy is expected to be slower this year after the rapid pace in 2006, reflecting the moderation in the global economy and IT industry. There are potential downside risks to growth and MAS will closely monitor external economic and financial developments. While domestic cost pressures have emerged in some segments of the economy, they remain relatively contained and overall inflationary pressures are expected to stay low.

8. MAS will maintain the policy of a modest and gradual appreciation of the S$NEER policy band in the period ahead. There will be no re-centring of the policy band, or any change to its slope or width.

CHAPTER 1

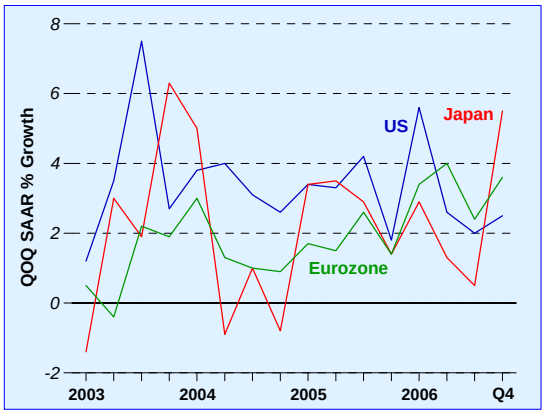
MACROECONOMIC DEVELOPMENTS

1.1 External Developments

Growth Picked Up in the Final Quarter

Following a relatively weak performance in the third quarter of 2006, the G3 economies rebounded in Q4. (Chart 1.1) Growth in the initial months of 2007 remained firm, although there were signs pointing to some moderation going forward. Meanwhile, the Asian economies generally held up well, due to stronger domestic demand, even though IT exports were sluggish.

Chart 1.1
G3 GDP Growth



Source: Datastream

US growth was propped up by consumption, despite the continuing house price correction.

The US economy expanded by 2.5% q-o-q SAAR in Q4 2006, slightly higher than in the third quarter. Weak investment spending dragged real GDP growth down by almost 1.5% points, but there was a strong showing in private consumption which expanded by 4.2% q-o-q SAAR. Consumption was buttressed by strong employment and wage growth amidst a fairly tight labour market, as the unemployment rate reached a six-year low of 4.6% in 2006. Moreover, lower oil prices boosted household disposable income, lending further support to consumption.

At the same time, the US economy benefited from a number of one-off factors in Q4. An unusually warm winter kept fuel prices low and was conducive to weather-sensitive activities such as construction. Meanwhile, moderating inflationary pressures in the second half of 2006 allowed for a pause in monetary tightening by the Federal Reserve, providing a supportive backdrop to economic activity.

Growth rebounded in the Eurozone and Japan, driven largely by domestic demand.

The Eurozone economy expanded at a robust pace of 3.6% q-o-q SAAR in Q4 2006. Indeed, in recent quarters, growth has outpaced that of the US, as investment accelerated due to strong corporate profits and improved business sentiment. Real GDP in Japan grew strongly as well, by 5.5% q-o-q SAAR in Q4, the fastest expansion in three years. Growth was driven by business investment, on the back of solid corporate profits, and private consumption. For the whole of

2006, private capital expenditure expanded at its fastest pace in nine years.

The East Asian economies slowed, primarily due to weaker export growth.

Most of the East Asian economies witnessed a moderation in growth in the final quarter of 2006. (Table 1.1) Export growth, in particular, slowed sharply in most countries, with the exception of Thailand, Hong Kong and China.

The drag from export growth was, in part, offset by the sustained expansion in domestic demand. In fact, regional domestic demand[1] accelerated to 4.0% y-o-y in Q4 2006, led by investment which grew at 6.3%, the strongest in nine quarters. Domestic demand appears to have become more resilient to volatility in the external environment. Indeed, in recent quarters, domestic demand and export performance seemed to have become less correlated. (Chart 1.2)

Monetary policy in Asia has paused or reversed due to easing of inflationary pressures.

Global inflation has been generally well-contained. In line with this, the US Federal Reserve has kept its policy rates on hold since mid-2006, following four successive increases in the Fed funds rate to 5.25% over the first half of the year. Notwithstanding the 0.25% point hike in the policy rate in February 2007, the Bank of Japan has also kept monetary conditions broadly accommodative against the backdrop of weak consumer prices. Among the major developed economies, only the Eurozone saw tighter monetary conditions amidst robust economic expansion.

Among the ASEAN-4 economies, inflation has remained largely muted. (Chart 1.3) The uptick in inflation in Northeast Asia in recent months was largely driven by higher food prices, reflecting adverse weather conditions. In response to easing inflationary pressures, most central banks in the region have either stopped raising policy rates, or have begun to ease their monetary stance.

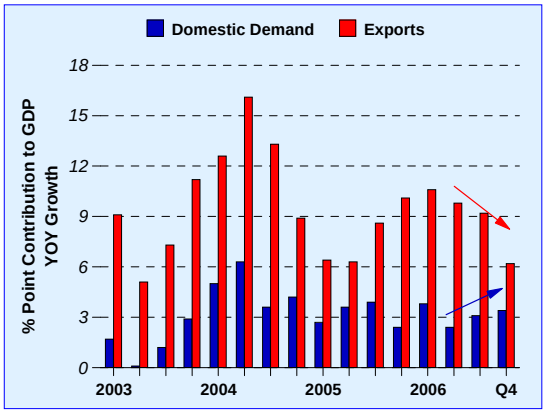
Table 1.1
GDP Growth

y-o-y (%)

	2005	2006	2006	
			Q3	Q4
Total*	**4.7**	**5.0**	**4.9**	**5.0**
Industrial Countries*	2.4	2.9	2.6	3.0
US	3.2	3.3	3.0	3.1
Eurozone	1.5	2.8	2.8	3.3
Japan	1.9	2.2	1.5	2.3
NIE-3*	5.7	5.8	5.8	5.5
Hong Kong	7.5	6.8	6.7	7.0
Korea	4.2	5.0	4.8	4.0
Taiwan	4.0	4.6	5.0	4.0
ASEAN-4*	5.2	5.5	5.6	5.4
Indonesia	5.7	5.5	5.9	6.1
Malaysia	5.2	5.9	5.8	5.7
Thailand	4.5	5.0	4.7	4.2
Philippines	5.0	5.4	5.3	4.8
China	10.4	10.7	10.6	10.4
India	8.7	9.1	9.2	8.6

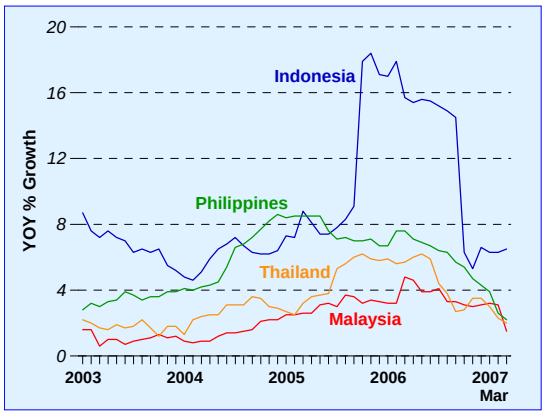
Source: Datastream and CEIC
* Weighted by shares in non-oil domestic exports.

Chart 1.2
Contribution to GDP Growth in EA-8 Economies



Source: CEIC

Chart 1.3
CPI Inflation



Source: CEIC

[1] This refers to the demand of the East Asia-8 (EA-8) economies, namely Hong Kong, Indonesia, Korea, Malaysia, Singapore, the Philippines, Taiwan and Thailand.

1.2 Domestic Economy

The IT Drag

Despite somewhat softer conditions in the global IT industry ...

While conditions in the external environment remained generally positive in 2006, there were some pockets of weakness in global manufacturing activity towards the latter half of the year. Manufacturing output has been expanding at a slower pace since Q3 last year in line with an unintended inventory build-up, which has been particularly pronounced in the global semiconductor industry. (Chart 1.4)

... the Singapore economy expanded strongly in Q4 2006.

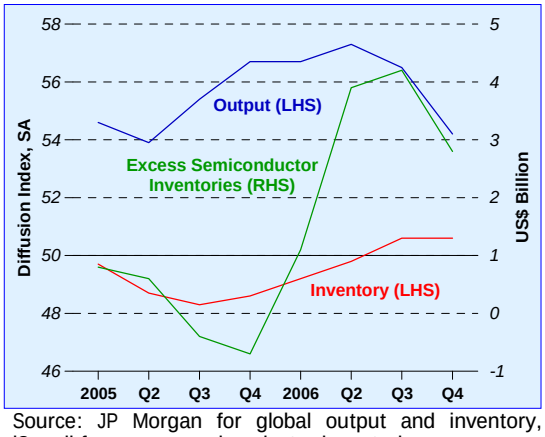
Despite this, the Singapore economy continued to gather momentum in Q4, expanding by 7.9% q-o-q SAAR, and extending the trend of uninterrupted growth to 14 quarters. Weakness in the IT-related industries was more than offset by support from other economic sectors, particularly the non-electronics manufacturing and financial services industries. (Chart 1.5)

The mainstay IT-related industries remained weak.

The IT-related industries – comprising electronics manufacturing and supporting services – softened further in Q4. Most significantly, domestic electronics output fell by 10.5% q-o-q SAAR during the quarter.

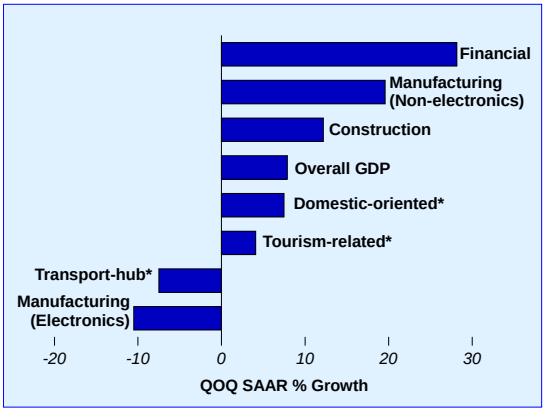
The Q4 weakness was concentrated in the midstream segment, as rising semiconductor inventories worldwide took a toll on domestic chip production. The cyclical slowdown in semiconductors was compounded by structural weakness in the data storage segment (Chart 1.6), as Maxtor ceased its operations completely during the quarter. For the year as a whole, the data storage segment contracted by a hefty 28%, dragging down electronics output by almost 5% points. Overall, since Seagate's announcement in 2005 of its takeover of Maxtor, Singapore's data storage output has contracted by more than 40%. Compounded by the global

Chart 1.4
Global Manufacturing Output and Inventory



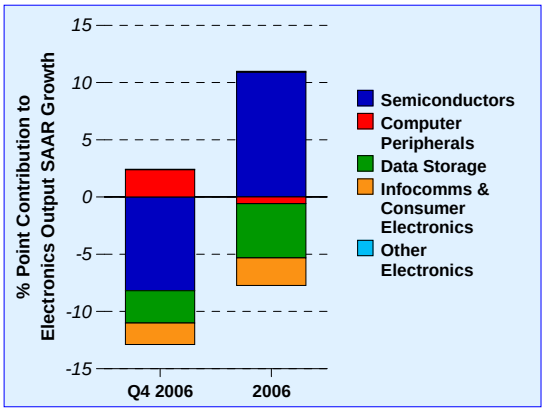
Source: JP Morgan for global output and inventory, iSuppli for excess semiconductor inventories
Note: A reading of above 50 indicates expansion, while a sub-50 reading indicates contraction.

Chart 1.5
GDP Growth, Q4 2006



* Source: EPD, MAS internal estimates

Chart 1.6
Contribution to Electronics Output Growth



Source: EPD, MAS internal estimates

semiconductor inventory overhang in the second half of the year, electronics output only managed to grow by 3.2% in 2006, a sharp decline from the 9.2% expansion in the preceding year.

Further downstream, an uptick in computer peripherals provided some upside to the flagging electronics industry in Q4. Production of computer peripherals received a boost from Windows Vista, Microsoft's latest operating system, in anticipation of increased PC demand following Vista's consumer launch in January 2007. (See Section 3.2 for more on the impact of Vista on Singapore's electronics production.)

The decline in re-exports was largely due to the weakness in the electronics industry.

Transport-hub services were also affected by the weakness in the global IT industry. Specifically, entrepôt trade suffered a 1.1% q-o-q SAAR decline in Q4 2006, following seven consecutive quarters of growth. Electronics re-exports – which account for slightly more than half of total non-oil re-exports (NORX) – saw contractions to the G3 and Malaysian markets. There was also a concomitant fall in the volume of direct air cargo, which is a common mode of distribution for electronics components.

Manufacturing growth was shored up by the solid performance of the non-electronics segment.

In comparison, the non-IT industries from both the manufacturing and services sectors saw very strong growth in Q4. EPD's estimates indicate that this group of industries contributed 9.2% points to GDP growth during the quarter.

The biomedical and transport engineering clusters of the manufacturing sector chalked up significant gains. The pharmaceutical industry recorded a near-quadrupling of output growth in Q4 compared to the quarter before, as companies switched temporarily to the manufacture of higher-priced active pharmaceutical ingredients. At the same time, sustained demand for oil exploration equipment in Asia-Pacific and the Middle East kept the local shipyards running at full capacity in the closing months of the year. (Chart 1.7)

Indeed, the non-electronics segments – particularly the biomedical and transport engineering clusters – were

Chart 1.7
Contribution to Manufacturing Output Growth by Cluster

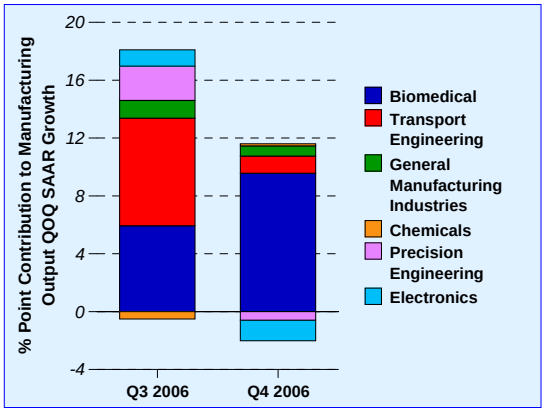
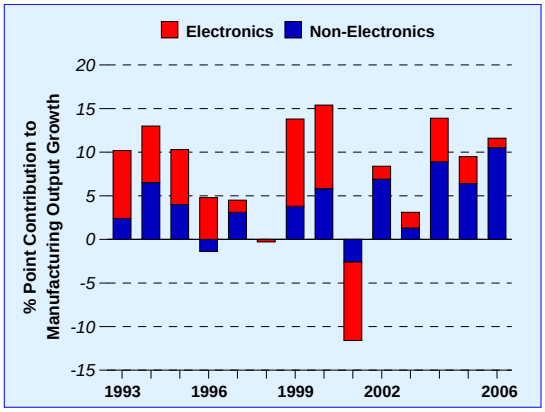


Chart 1.8
Contribution to Manufacturing Output Growth



the main pillars of support for manufacturing growth in 2006, contributing slightly over 10% points to total output last year. This represented the non-electronics cluster's highest contribution towards overall manufacturing growth in recent years. (Chart 1.8)

The biomedical cluster, especially pharmaceuticals, has recorded solid growth since 2000. Notwithstanding the somewhat sharp fluctuations in monthly output, the biomedical cluster has witnessed an almost fourfold increase in production within a brief span of six years, alongside the steady inflow of investment commitments. (Chart 1.9) Currently, the biomedical cluster accounts for nearly a quarter of total manufacturing value added, second only to electronics.

The marine & offshore engineering industry accounts for only 6% of manufacturing output, but it has been outperforming other larger industries in terms of its growth contribution in recent periods. After a slump in the 1990s, there has been a revival of late, as booming regional trade has spurred a corresponding rise in the demand for ship repair and conversion. (Chart 1.10) At the same time, the burgeoning global appetite for energy has translated into more rig-building business for the local shipyards.

Since 2000, the marine & offshore engineering industry has posted a 22% annual compound growth rate, more than four times that of the overall manufacturing sector. This figure includes the dip in 2003, when the Sars outbreak resulted in several diversions of ships' calls and re-scheduling of projects. Excluding this outlier, the industry has, on average, expanded at an impressive 30% per annum.

Chart 1.9
Biomedical Output and Investment Commitments

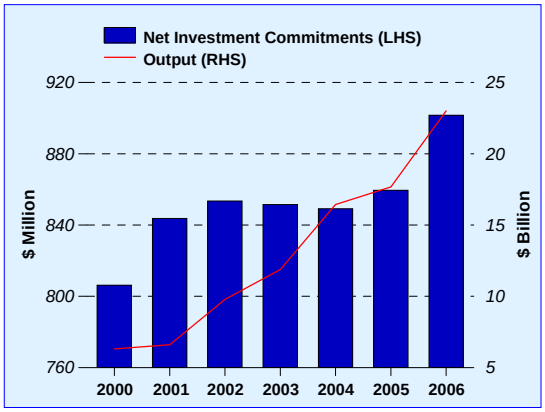
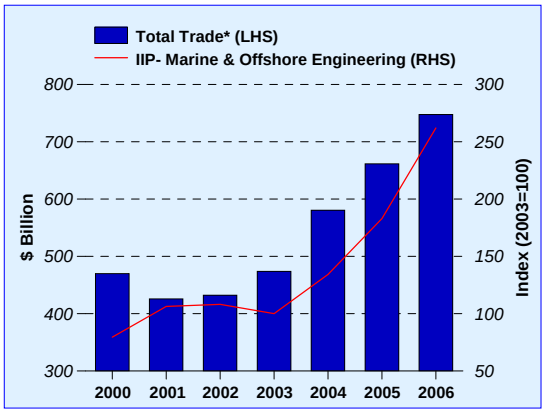


Chart 1.10
Marine & Offshore Engineering



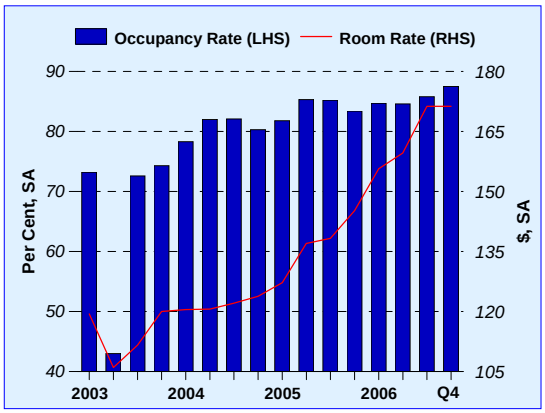
* Data excludes trade with Indonesia.

Tourism-related services powered ahead ...

The tourism-related industries posted healthy growth in Q4, alongside strong visitor arrivals. Correspondingly, hotels' average occupancy rate reached 88%, while the average room rate remained at a record high of $170 during the quarter. (Chart 1.11)

Overall, 2006 was a boom year for the tourism industries. Tourist arrivals into Singapore reached a record 9.7 million, surpassing STB's initial target of 9.4 million, and represents an estimated 17.5% of total visitor arrivals to the ASEAN region.

Chart 1.11
Hotel Occupancy and Room Rates



Source: EPD, MAS internal estimates

… while domestic-oriented services continued to see steady growth.

Apart from the externally-driven sectors, the domestic-oriented industries also saw stronger growth in the final quarter of 2006. Bolstered by the buoyant economy and steady growth in visitor arrivals, overall retail sales grew by 3.4% q-o-q SA in the final quarter of the year. Motor vehicle sales were the main source of support during this period, although department stores and supermarkets also performed well. (Chart 1.12)

The construction sector picked up pace.

Amidst the sustained recovery in property prices, the construction sector saw its second consecutive quarter of double-digit growth in Q4 2006. For 2006 as a whole, construction value added grew by 2.7%, an improvement over the 0.7% growth the year before and the average contraction of 6.1% per annum between 1999 and 2004.

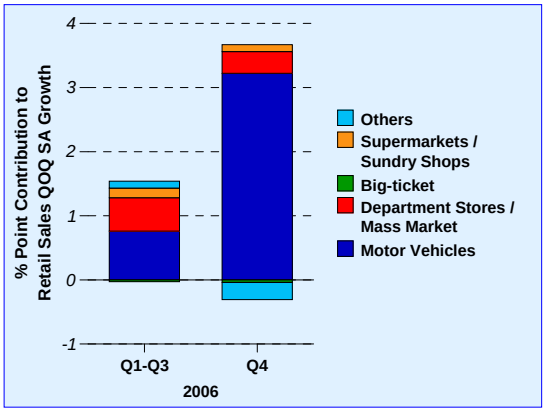
The upturn in building activity reflected in part the pickup in the residential property market, which recorded positive growth for the 11th consecutive quarter in Q4 2006, but has seen a concerted pickup only since Q3 2006. Private property prices rose by 3.8% during the quarter, bringing full year growth to 10%, more than double the 3.9% increase in the previous year. Nonetheless, the residential property market's recovery has been largely underpinned by the high-end segment, where prices rose by 17% in 2006. This compares with the 3.0% and 4.2% increases in the mid-tier and low-end segments, respectively. (Chart 1.13)

Noticeably, the current upturn has been more gradual than in previous episodes. For instance, property prices have risen by just 16% over the 11 quarters since Q2 2004, compared to the 40% gain within six quarters during the previous run-up in 1998. (Chart 1.14)

Financial services closed the year strongly.

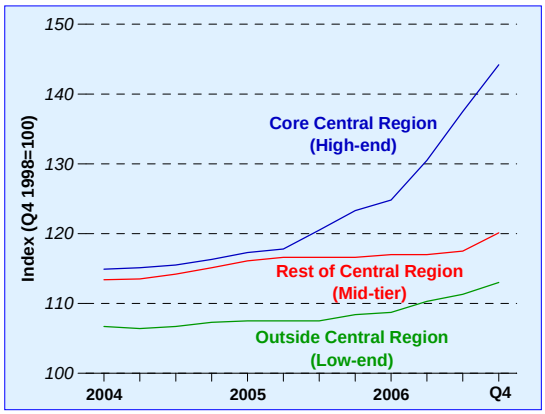
Amongst the non-IT services, financial services saw the strongest performance, with quarterly sequential growth in Q4 hitting a three-year high of 28%. For the year as a whole, growth came in at 9.2%, bettering the sector's 7.6% growth in 2005 and outpacing the overall economy's expansion.

Chart 1.12
Contribution to Retail Sales Growth



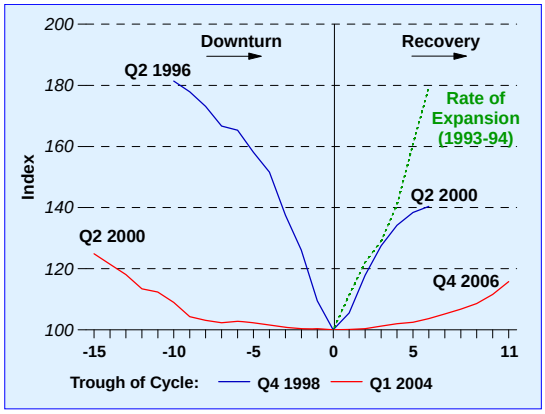
Source: EPD, MAS internal estimates

Chart 1.13
Price Indices of Non-landed Properties by Locality



Note: Core Central Region consists of postal districts 9,10,11, Downtown Core and Sentosa. Rest of Central Region refers to central regions outside postal districts 9,10,11, Downtown Core and Sentosa.

Chart 1.14
Private Residential Property Price Index



The sequential expansion in Q4 was led by the sentiment-sensitive clusters. (Chart 1.15) Wealth advisory and brokerage & treasury services both outperformed, on the back of continued investor interest in Asia, as well as the sustained rally in regional and domestic stock markets.

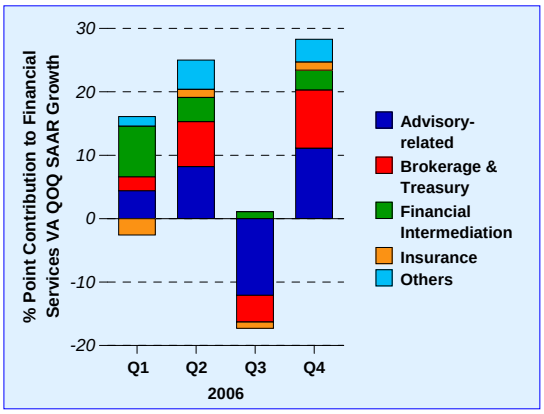
Trading activity in the domestic stock market was buoyant, as investors sought to take advantage of the sustained run-up in equity prices, which ended the year at fresh highs. Indeed, turnover volumes on the Singapore Exchange (SGX) were 49% higher in Q4 than in the quarter before (Chart 1.16), underpinned by robust corporate earnings and stronger-than-expected economic growth. The strong upturn was broad-based across different sectors, although the property & construction, commerce and transport & communications segments contributed the bulk of the surge in trading volumes. The property segment, in particular, benefited from the optimism over the successful tender of the second IR site, as well as signs that the uptrend in high-end real estate prices had begun to trickle down to the broader housing market.

Recent rise in broad money growth has not led to a concomitant increase in domestic credit expansion.

The recent rise in property and stock prices has taken place amidst strong growth in key monetary aggregates. Broad money, or M2, for instance, expanded by 5.9% q-o-q SA in the final quarter of 2006 (or 19% y-o-y in December 2006), compared with flat growth in the same period a year ago (6% y-o-y in December 2005). (Chart 1.17) This was due, in part, to increased investor interest (including foreign investors) in holding S$ assets.

Movements in M2 can be decomposed using the monetary survey, which consolidates the balance sheets of the entire banking system in Singapore (commercial banks plus the MAS). The survey shows the combined assets and liabilities of the banking system with respect to non-bank entities and non-residents. On the liabilities side, the survey gives the overall liquidity generated by the banking system, or the components of M2. The asset side of the survey consists of a consolidation of the net assets of the central bank and the commercial banks.

Chart 1.15
Contribution to Financial Services Growth



Source: EPD, MAS internal estimates

Chart 1.16
Stock Market Turnover and Straits Times Index (STI)

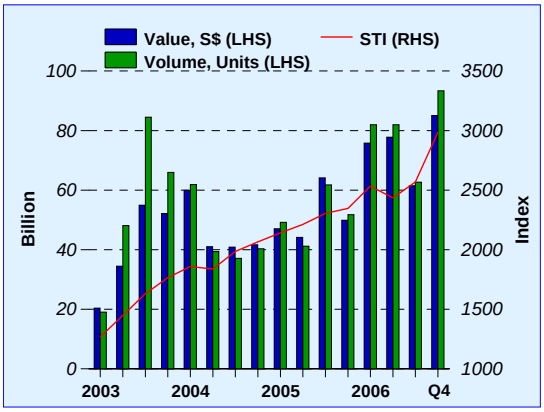
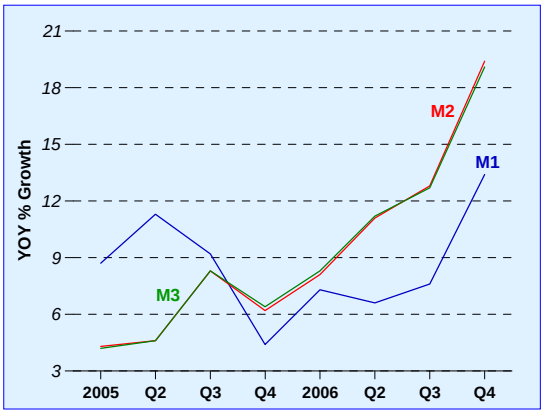


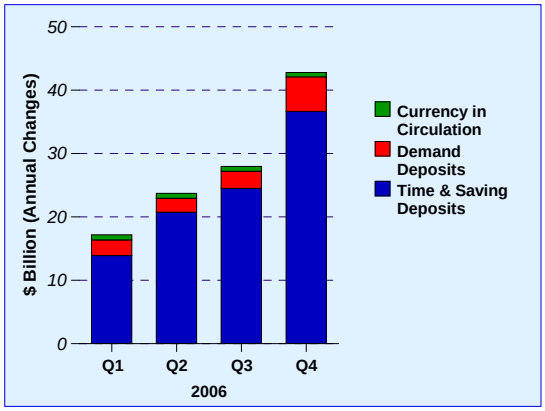
Chart 1.17
Domestic Monetary Aggregates



The monetary survey shows that the recent expansion in broad money was mainly due to a surge in the quasi-money supply, i.e. time and saving deposits. (Chart 1.18a) In 2006, 86% of the increase in M2 of $43 billion was due to the rise in these deposits. The main counterpart of this rise in liabilities was an increase in net foreign assets, with net domestic credit growing at a more moderate rate. Looking at the asset side (Chart 1.18b), we see that the bulk of the increase amounting to $32 billion represented a rise in the net foreign assets of the banking system. Importantly, the strong M2 growth has not led to a sharp increase in domestic credit expansion. Indeed, deposit growth – driven in part by strong capital inflows – has continued to outpace domestic credit growth, leading to a decline in banks' loan-to-deposit ratio. (Chart 1.19)

Domestic credit activity did in fact slow toward the end of 2006, after a modest upturn in previous quarters. Non-bank loan growth was generally flat in Q4 2006, as business loans – which had grown at an average sequential rate of 5.6% between Q2 and Q3 2006 – dipped by 0.5%. Consumer loans saw a mild pickup, reflecting an increase in housing loans. Housing loans have risen gradually since the middle of 2006, as the recovery at the high-end of the residential property market began to broaden. Although domestic credit expansion has lagged behind the increase in net foreign assets (Chart 1.20), it is expected to gain pace as domestic economic activity continues to grow.

Chart 1.18
Monetary Survey
(a) Liabilities



(b) Assets

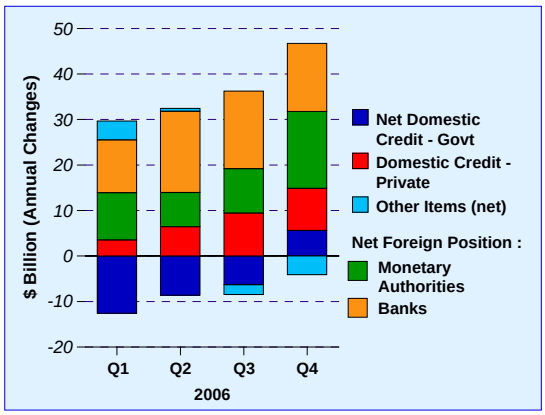
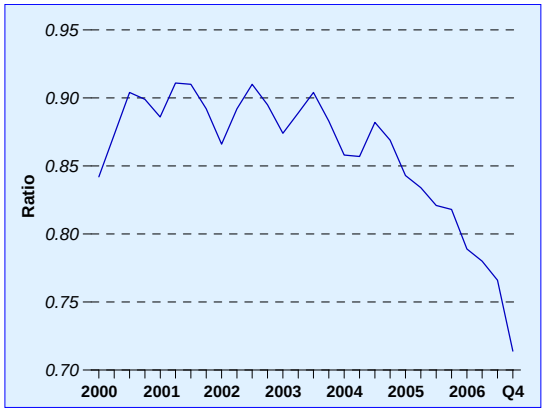


Chart 1.19
Banks' Loan-to-Deposit Ratio

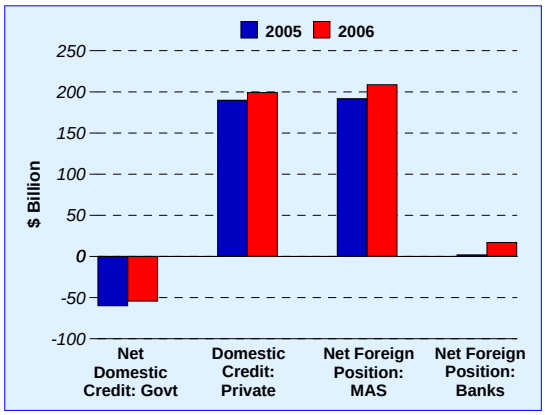


The increased contribution of non-IT industries to GDP growth in 2006 underscores Singapore's diversification efforts.

For 2006 as a whole, the Singapore economy grew by 7.9%, marking the third consecutive year of robust growth. Indeed, the economy has expanded at an average pace of 7.8% per annum over the past three years, the longest stretch of above 6% growth since the Asian Financial Crisis.

The economy's performance last year was supported by the non-IT industries, while the IT sector slowed significantly. Indeed, the non-IT industries accounted for slightly more than three quarters of GDP growth in 2006, compared to about two-thirds over the period 2003-05. (Chart 1.21)

Chart 1.20
Monetary Survey – Assets



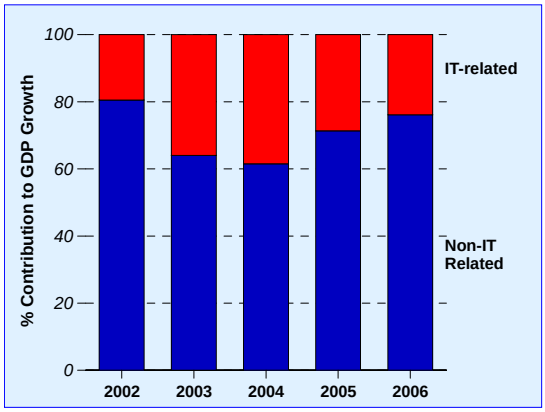
A Reversal of Fortunes?

The steady pace of expansion continued into early 2007 ...

Overall, the domestic economy continued to post steady growth into early 2007. Following the sharp contractions in Q4, the IT-related industries appeared to regain some ground in early 2007. In contrast, the non-IT industries consolidated somewhat in the first quarter of 2007, following strong growth in the preceding quarter.

According to the *Advance Estimates*, GDP growth is estimated to have come in at an annualised rate of 7.2% on a sequential basis in Q1 2007, slightly lower than the 7.9% registered in the previous quarter.

Chart 1.21
Contribution to GDP Growth

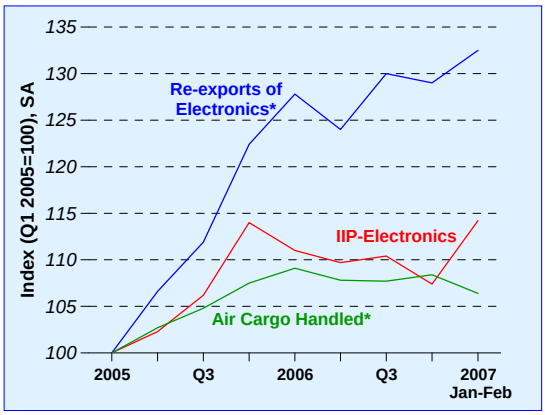


Source: EPD, MAS internal estimates

... with the IT-related industries regaining some ground.

The IT-related industries saw some tentative signs of recovery in the early months of 2007. Electronics output grew by an average of 4.4% m-o-m SA in Jan-Feb, following an improvement in the semiconductor segment, together with signs of a bottoming-out in the data storage segment. (Chart 1.22) Electronics NORX also rebounded, with strong demand from China and Hong Kong. In particular, re-exports of computers and semiconductors, which had fallen in Q4 2006, turned around to register increases of 11.3% and 6.3% respectively.

Chart 1.22
Performance of IT-related Industries



* Source: EPD, MAS internal estimates

Non-electronics manufacturing, however, dipped into negative territory.

Meanwhile, the rest of the economy generally recorded slower growth in early Q1, compared with the rapid pace in Q4 last year. In particular, the non-electronics manufacturing industries moderated significantly, largely due to the temporary switch to lower value added pharmaceutical products in January. (Chart 1.23) The persistent softening of refining margins and routine plant shutdowns also weighed on the petroleum segment, which contracted by an average of 2.6% m-o-m SA over Jan-Feb 2007.

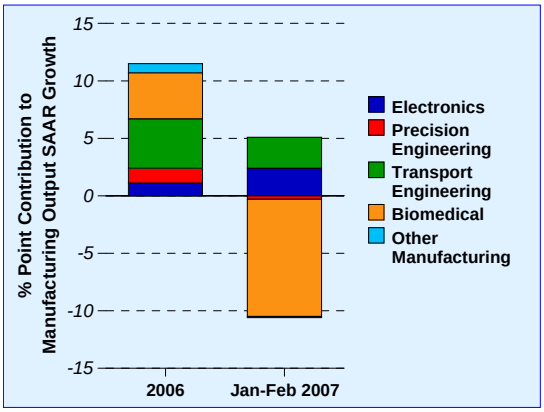
Likewise, the domestic and tourism-related services also saw weaker performance.

Amongst the services industries, the domestic-oriented sectors moderated somewhat in the early months of the new year. Besides motor vehicle sales, other segments such as telecommunications equipment & computers and food & beverages also dipped into negative territory. Similarly, growth in the tourism-related industries appeared to have reached a plateau following gains in the previous few quarters. Hotel room occupancy and room rates declined marginally in sequential terms in Jan-Feb, from Q4 2006. A possible reason for this is the slowdown in visitor arrivals, which fell by an average 0.6% m-o-m SA over Jan-Feb 2006.

Financial services powered on in Q1 2007.

In contrast to the rest of the services industries, the financial services sector continued its stellar performance moving into 2007, fuelled mainly by banking-related activities, particularly from the Asian Dollar Market. Trading volume in the domestic stock market however, dipped by 11% in March following the volatility in international financial markets. This was sparked by the sharp correction in global equity prices in late February, on selloffs in the Chinese and New York bourses. Nonetheless, conditions appear to have stabilised since then. Wealth advisory activities, meanwhile, have generally remained resilient.

Chart 1.23
Contribution to Manufacturing Output Growth

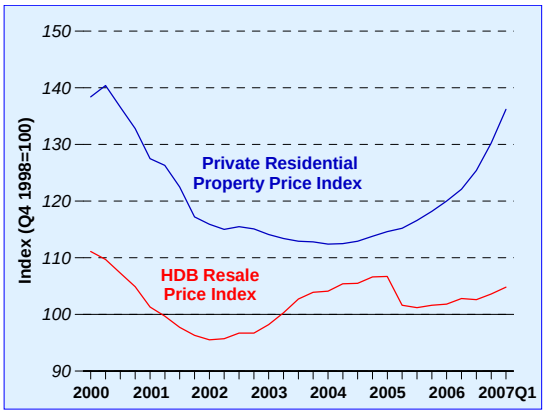


The property and construction sector continued to gather momentum.

Private home prices registered their largest quarterly gain of 4.6% in the first quarter of 2007, surpassing the 3.8% expansion a quarter earlier. (Chart 1.24) Similarly, HDB resale prices rose by 1.2%, the strongest increase since Q4 2004.

Meanwhile, the construction sector's recovery continued to be underpinned by ongoing activity in both the residential and non-residential segments. Work has begun on a number of large-scale residential projects such as The Sail @ Marina and the condominiums at Sentosa Cove, which were launched in the latter half of 2005 when private home prices – particularly those at the luxury end – started to climb. Non-residential developments, such as retail malls along Orchard Road, also contributed to the strong growth in the construction sector.

Chart 1.24
Private Residential Property and HDB Price Indices



IT vs non-IT industries: A reversal of fortunes?

Recent incoming data suggest that there has been some reversal in the relative performances of the IT and non-IT industries. Notwithstanding the incipient recovery in the IT-related industries in early 2007, forward-looking indicators point to lingering weakness in the global IT industry in the months ahead. The non-IT industries, in comparison, are likely to remain a key pillar of support for the rest of the year. A more detailed discussion on the outlook for the Singapore economy can be found in Chapter 3 of the *Review*.

1.3 Corporate Sector Developments[2]

Broadening Strength on the Corporate Front

The sustained growth of the domestic economy has resulted in higher corporate profits across a broad range of industries and firms, including the Small and Medium Enterprises (SMEs).

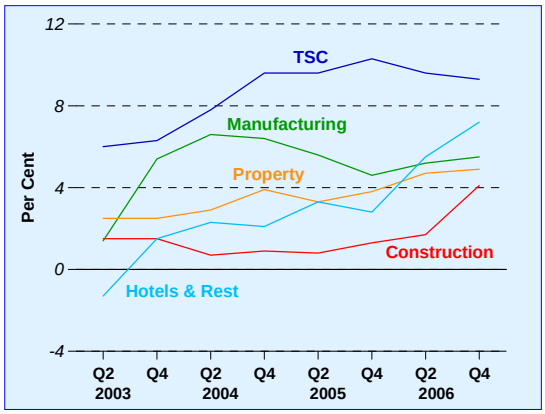
Corporate profits strengthened further in the second half of 2006.

Corporate profits continued to strengthen in the second half of 2006, as listed non-financial firms reported a median return on assets (ROA) of 5.8% in Q4 2006 compared to 5.4% in Q2 2006. The improvement in earnings was broad-based, spanning the hotels, construction, property and manufacturing sub-sectors. (Chart 1.25) MSD's profitability diffusion index[3] shows that the number of firms reporting positive earnings has increased steadily since December 2001. (Chart 1.26) This trend was even more pronounced in 2006.

Among the corporate sub-sectors, property and construction firms further shored up their leverage positions in Q4 2006 compared to Q2 2006. The median debt-to-equity ratio of construction firms rose further from 57.4% in Q2 2006 to 62.4% in Q4 2006, while that of property firms increased from 61.9% to 65.0% over the same period, reflecting the pickup in growth of bank credit to the building and construction sector. (Chart 1.27)

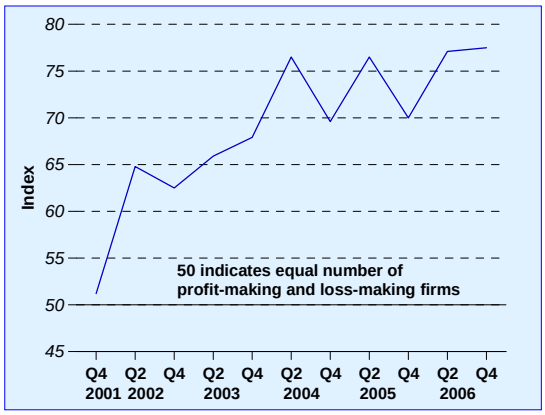
Despite the higher leverage positions, there were no indications of any severe deterioration in the debt-servicing ability of firms in these sectors. In fact, the median interest coverage for property and construction firms remained comfortable at 6.0 and 3.7 times in Q4 2006 respectively. (Chart 1.28) The level of liquidity for

Chart 1.25
Median Return On Assets



Source: Thomson Financial

Chart 1.26
Profitability Diffusion Index



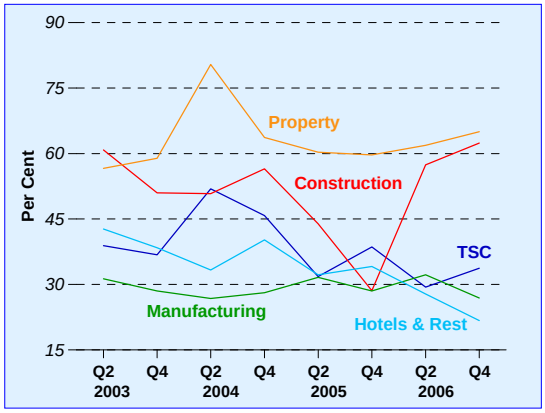
Source: Thomson Financial; MSD, MAS internal estimates

[2] All corporate data cover listed firms only. The latest data point provided is Q4 2006 as most firms that are not required to conduct quarterly reporting tend to report only in Q2 and Q4 of each year.

[3] A value of 50 indicates an equal number of profit-making and loss-making firms, while a value of 100 indicates that all the firms are profit-making. The methodology used is similar to that of other diffusion indices. Some 270 non-financial firms listed on the SGX were used to construct this index.

all sub-sectors was also adequate in Q4 2006, as indicated by current ratios of above one. (Chart 1.29) In particular, the property and construction sub-sectors saw significant improvements in their current ratios in Q4 2006, compared to six months ago. The strength of their debt servicing ability and their better liquidity positions could be due to higher profitability. In Q4 2006, the median ROA of the construction sector rose markedly to 4.1% from 1.7% in Q2 2006, while that of the property sector increased marginally from 4.7% in Q2 2006 to 4.9%. These firms could be benefiting from the recent increase in private sector construction projects. The value of contracts awarded for these projects rose by 67% to $12.5 billion in 2006 from a year ago.

Chart 1.27
Median Leverage Ratio*



Source: Thomson Financial
* Debt-to-Equity

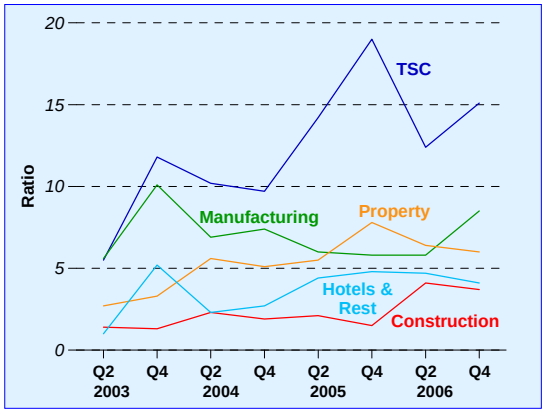
SMEs displayed strong profitability in 2006, comparable with listed firms.

The profitability of SMEs[4] in Singapore, as measured by the median return on equity (ROE), strengthened from 5.4% in 2003 to a peak of 11.9% in 2006, slightly higher than the 11% for non-financial listed firms. (Chart 1.30) The improvement was driven by SMEs in the transport, storage and communications (TSC), property, manufacturing and services sub-sectors. (Chart 1.31)

Notably, the median ROE of SMEs in the construction sector hovered at around 6% in the last two years, although listed firms in the same sector showed a much stronger improvement from a lower base of 2.5% in 2005 to 7.6% in 2006.

Overall, in Singapore's corporate sector, insolvency cases declined further in 2006 and a total of 138 firms were wound up, some 14% lower than in the preceding year. (Chart 1.32)

Chart 1.28
Median Interest Coverage Ratio*

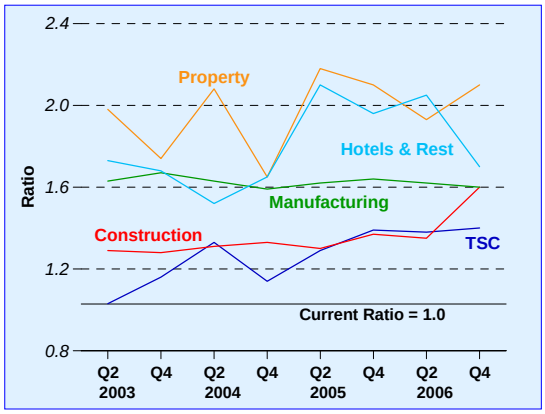


Source: Thomson Financial
* Earnings before interest and tax divided by interest expense

Surveys show expectations of a moderation in business conditions for H1 2007.

Recent business outlook surveys[5] of Singapore firms point to a moderation in business conditions in the

Chart 1.29
Median Current Ratio*



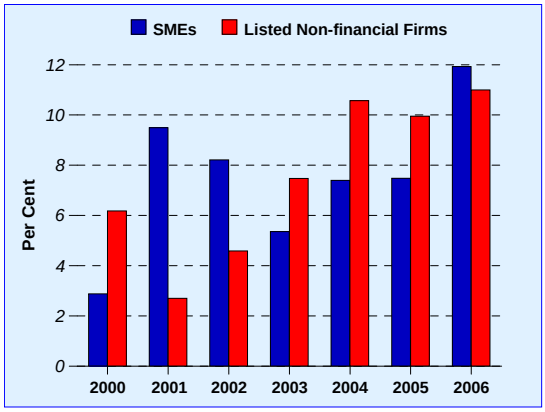
Source: Thomson Financial
* Current assets over current liabilities

[4] Based on the *SME 500 Rankings* conducted by DP Information Group, the turnover criteria for a firm to be considered an SME is less than S$80 million for 2006, and less than S$50 million in earlier periods. This dataset may be subject to selection bias as firms with better financial statements would have a higher incentive to participate in a survey that ranks performance.

[5] The *Survey of Business Expectations of the Manufacturing Sector* by the Economic Development Board and *Business Expectations Survey* for the services sector by the Singapore Department of Statistics.

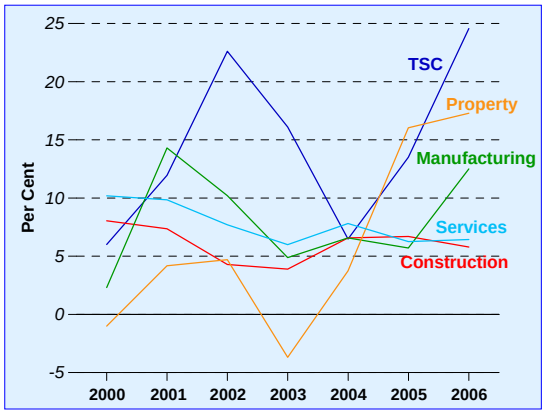
first six months of the year. A net balance[6] of 7% of manufacturers expect an improved business environment compared to 15% a year ago. Firms in the services sector showed more optimism, with a net balance of 18% of firms anticipating positive business conditions ahead.

Chart 1.30
Median Return on Equity



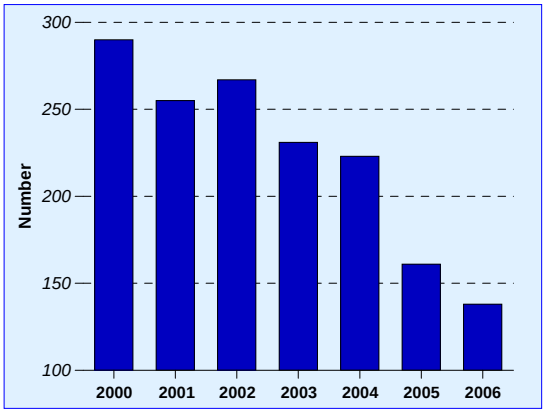
Source: DP Information Group; Thomson Financial; EPD, MAS internal estimates

Chart 1.31
Median Return on Equity for SMEs



Source: DP Information Group; EPD, MAS internal estimates

Chart 1.32
Number of Firms Wound Up



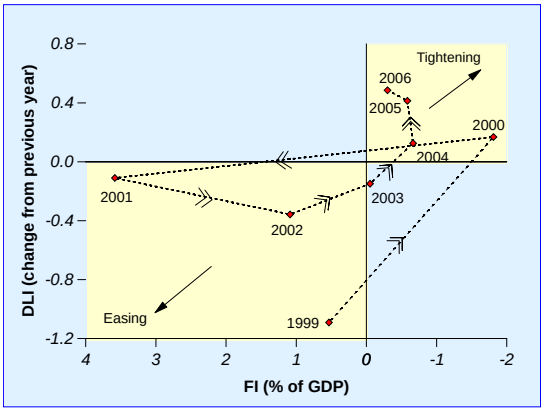
Source: Ministry of Law

[6] The net balance refers to the difference between the weighted percentages of "ups" and "downs". A plus sign indicates a net upward trend and a minus sign denotes a net downward trend.

1.4 Macroeconomic Policy

Singapore's macroeconomic policy stance has evolved in line with the economy's cyclical developments. This is shown in Chart 1.33, which is a scatter plot of the Fiscal Impulse (FI)[7] measure on the horizontal axis and the Domestic Liquidity Indicator (DLI)[8] on the vertical axis over the period 1999-2006. A point in the southwest and northeast quadrants (shaded in yellow) indicates a general easing and tightening of the macroeconomic policy stance, respectively. Over the past three years, there was a general tightening of the policy stance given the robust growth of the economy. In this section, recent developments in monetary and fiscal policies are reviewed.

Chart 1.33
Scatter Plot of DLI against FI



MONETARY POLICY

MAS reaffirmed its policy of a modest and gradual appreciation of the S$NEER in April 2007.

In October 2006, MAS reaffirmed the policy of a modest and gradual appreciation of the S$ nominal effective exchange rate (S$NEER) policy band, which has been in place since April 2004. This policy stance has contributed to the low inflation environment despite buoyant economic conditions in the past few years.

Following a strong performance in 2006, the Singapore economy is expected to grow at a slower pace this year, in tandem with the moderation in the global economy and IT industry. At the same time, inflationary pressures should remain well-contained under the current policy stance, despite the emergence of domestic cost pressures in some segments of the economy. Against this backdrop, MAS announced in its Monetary Policy Statement (MPS) of 10 Apr 2007 that it would maintain the policy of a modest and gradual appreciation of the S$NEER policy band, with no re-centring of the policy band, or changes to its slope or width. MAS noted that there were potential downside risks to growth and underscored the importance of closely monitoring external economic and financial developments. Section 3.5 provides a more detailed discussion of the monetary policy stance.

[7] For more details on the methodology used to calculate the FI measure, please refer to the January 2002 issue of the *Review*.

[8] The DLI is a measure of overall monetary conditions, reflecting changes in the S$NEER and domestic interbank rate.

Over the past six months since the MPS in October 2006, the S$NEER has fluctuated near the upper end of the policy band. (Chart 1.34) This resulted from the broad-based weakness of the US$, a resurgence of capital flows into the region, as well as a relatively buoyant Singapore economy.

The S$REER was found to be aligned with fundamentals.

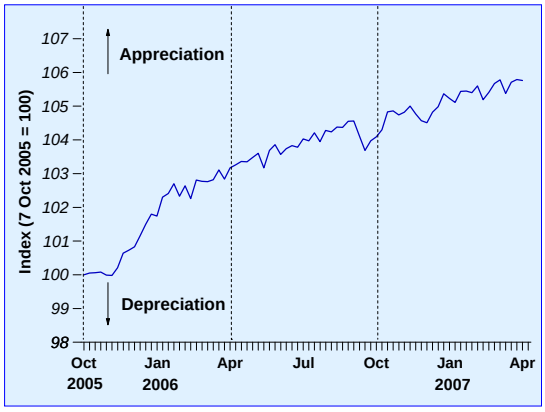
The S$ real effective exchange rate (S$REER) – deflated by either manufacturing unit labour cost (ULC) or CPI – rose in H2 last year, largely driven by the appreciation of the S$NEER, rather than increases in domestic costs and prices. (Chart 1.35) In fact, Singapore's ULC has edged down over the last two quarters.

To see if Singapore's REER is in line with the underlying fundamentals of the economy, the long-run behavioural equilibrium exchange rate (BEER) series was re-estimated.[9] The BEER is based on the idea that a well-founded measure of the equilibrium value of the exchange rate could be constructed from a relatively small set of fundamental variables such as the terms of trade, property prices, net foreign assets and a measure of openness, and this could be used to assess periods of currency misalignment. The BEER was then calibrated to remove business cycle effects from the data. The fitted and smoothed BEER estimates are plotted against the actual REER, as shown in the top panel of Chart 1.36. Clearly, there is a fairly close alignment between the actual and equilibrium rates (within two standard deviation bands as shown in the lower panel of Chart 1.36), suggesting that the currency remains largely in line with fundamentals.

Tighter monetary conditions were due to the stronger exchange rate, even as interest rates eased.

Since the last policy review, liquidity conditions in the domestic money market have continued to move in a tightening direction, albeit to a much lesser extent than in early 2006. A disaggregation of the DLI indicates that the tightening of monetary conditions was due entirely to the appreciation of the S$NEER, as the three-month domestic interbank interest rate had eased over this period. (Chart 1.37)

Chart 1.34
S$NEER



Note: --- indicates release of Monetary Policy Statement

Chart 1.35
S$REER

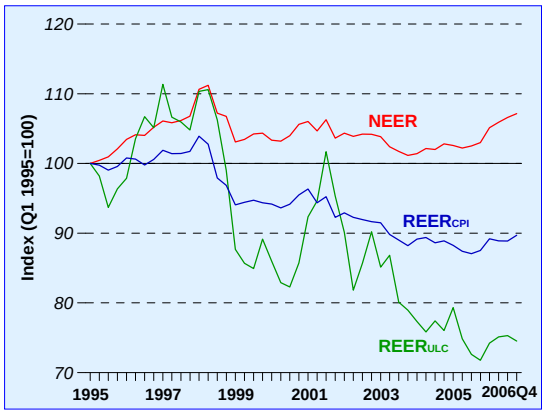
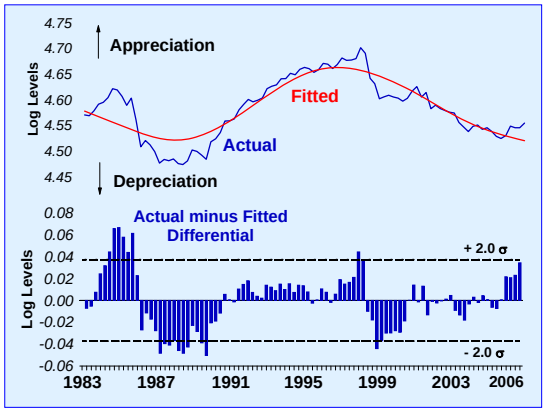


Chart 1.36
Singapore's Equilibrium Effective Exchange Rate



[9] For more details on Singapore's long-run REER, please refer to Special Feature 1 in the October 2004 issue of the *Review*, and *MAS Staff Paper* No. 36, December 2004, both available at the MAS website.

With global interest rates having peaked, interest rates in Singapore followed suit. The three-month S$ interbank offer rate (S$ SIBOR) hovered around 3.44% over the period November 2006 to January this year, before falling to 2.94% at end-March. (Chart 1.38) During this period, the US Fed funds rate remained unchanged at 5.25%, resulting in the relatively flat three-month US$ SIBOR. As a result, the spread widened to 2.41% as at end-March.

Unlike in the past two years, when banks tried to attract depositors with higher returns on fixed deposits (as they were considered a cheaper source of funds compared to the interbank market), fixed deposit rates have fallen in recent months, along with the decline in the interbank rate. Banks' 12-month fixed deposit rate edged down to 0.87% as at end-March this year, compared to 0.89% at end-September 2006. (Chart 1.39) Meanwhile, mortgage rates also appeared to have stabilised since the second half of last year after the sharp increases in 2005 and early 2006. More recently, banks have introduced mortgage packages that are pegged to the SIBOR in an effort to increase transparency of the factors determining mortgage rates.

Since the second half of 2006, loan growth to the non-bank sector has picked up steadily. This was supported largely by loans to the corporate sector, particularly building & construction and transport & communications. At the same time, consumer loans also saw a mild improvement, due to an increase in credit card lending and housing loans. The latter reflected the broadening of buyer sentiment in the private residential market. Going forward, credit growth is expected to be supported by the continued pickup in the property market, as well as the many large-scale projects coming onstream such as the integrated resorts and other commercial developments.

Chart 1.37
Domestic Liquidity Indicator

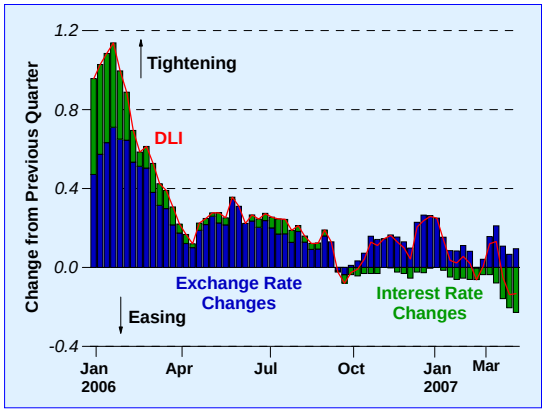


Chart 1.38
3-month S$ SIBOR and US$ SIBOR

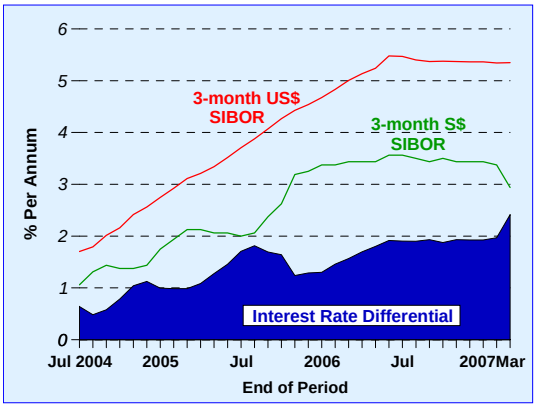
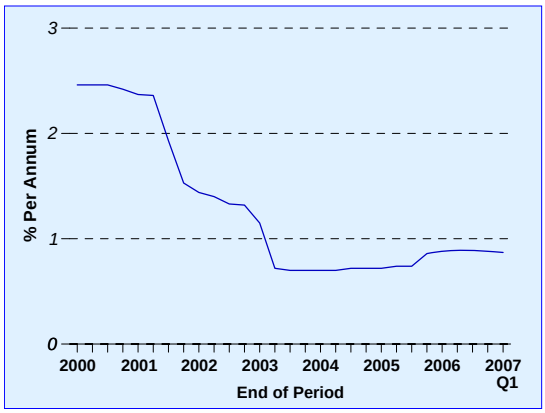


Chart 1.39
Banks' 12-month Fixed Deposit Rate



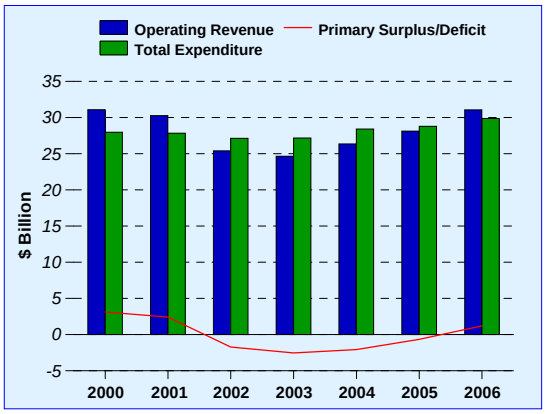
Note: This is the simple average of the top 10 banks' 12-month fixed deposit rates. The deposit sizes are usually within the range of S$5,000 to S$50,000 (retail banking). The information is compiled from submissions by banks required under MAS Notice 756.

FISCAL POLICY

The government's primary budget returned to a surplus in 2006.

The government recorded a primary surplus[10] of $1.2 billion (0.6% of GDP) in CY2006, turning around from deficits averaging $1.8 billion in the four preceding years. (Chart 1.40) This was due to a marked increase in operating revenue last year, which exceeded the rise in expenditure.

Chart 1.40
Primary Surplus/Deficit

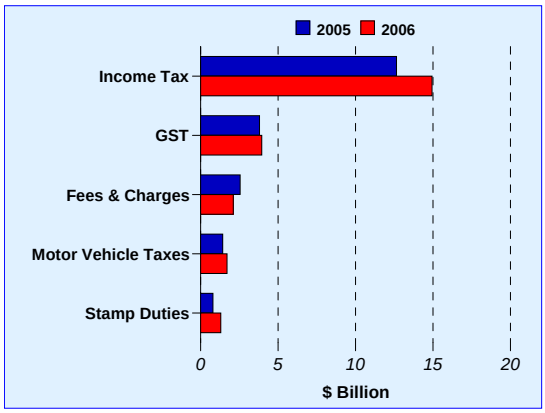


Operating revenue increased against the backdrop of strong economic growth.

The $3.0 billion increase in government's operating revenue in CY2006 brought total revenue for the year to $31.1 billion (14.8% of GDP), close to the previous peak in 2000. Indeed, robust economic growth has boosted the various sources of operating revenue.

The largest increase, of $2.3 billion, came from income tax collections, in particular from the corporate sector, as companies' profits were boosted by strong growth over the past two years.[11] (Chart 1.41) Personal income tax collections also rose in CY2006, notwithstanding the 1% point reduction in the tax rate to 21%.

Chart 1.41
Selected Components of Operating Revenue



In terms of indirect taxes, stamp duties recorded the most significant increase of $0.5 billion, to reach a six-year high of $1.3 billion in CY2006. This was largely driven by the pickup in the property market last year. With the withdrawal of the stamp duty deferment concession[12] from 15 Dec 2006, stamp duty collections should see a transient increase in the near term when there is an overlap between the old and the new regimes. It should be noted however that stamp duties account for only a small share – typically less than 5% – of total operating revenue.

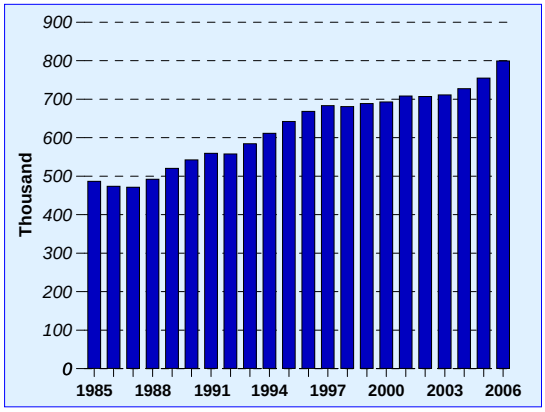
[10] This is defined as operating revenue (excluding net investment income contributions) less operating and development expenditure.

[11] Note that income tax assessment is based on a preceding year basis. Companies are required to file their tax returns three months after the close of their financial year based on their estimates of chargeable income for that year.

[12] The concession, which was introduced in June 1998 as part of the off-Budget measures to cushion the impact of economic slowdown, allowed property buyers to pay the stamp duty at a later date, instead of within 14 days from the date of acceptance of the Option to Purchase. Buyers who have accepted their Options to Purchase before 15 Dec 2006 would continue to enjoy the stamp duty deferment concession.

Motor vehicle taxes, the bulk of which comprise road tax and Additional Registration Fees (ARF), rose by $0.3 billion in CY2006, due to the surge in the population of motor vehicles to 799,373 as at end-2006, an increase of around 44,000 compared to end-2005. (Chart 1.42) Nevertheless, the rise in motor vehicle taxes was offset by the fall in vehicle quota or Certificate of Entitlement (COE) premiums – a component of fees and charges in the government's operating revenue. COE premiums have been trending down in recent years, reflecting the annual 3% expansion in total outstanding quotas. (Chart 1.43) The increased registration of off-peak cars also dented the collections from COE premiums, due to the COE rebates claimed for these cars.[13]

Chart 1.42
Motor Vehicle Population



Operating expenditure rose in 2006, while development expenditure fell.

Government expenditure rose by $1.1 billion in CY2006 to $29.9 billion (14.2% of GDP), with the increase coming entirely from operating expenditure, as development spending declined during the year. (Chart 1.44)

Operating expenditure was $23.5 billion (11.2% of GDP) in CY2006, an increase of $2.8 billion from the previous year. This was largely due to increased spending on security and external relations, education and, to a smaller extent, national development, which includes public housing.

Meanwhile, development expenditure was $1.7 billion lower, at $6.4 billion (3.1% of GDP) in CY2006. There were a number of contributing factors, including the reclassification of capital grants to the Housing Development Board (HDB) from development to operating expenditure. In addition, the winding down of Phase 2 programmes under HDB's Selective En bloc Redevelopment Scheme (SERS) and the near-completion of development projects under the early phases of the Programme for Rebuilding and Improving Existing Schools and those undertaken by Institutes of Higher Learning, also led to a fall in development expenditure.

Chart 1.43
COE Premiums (Category A)

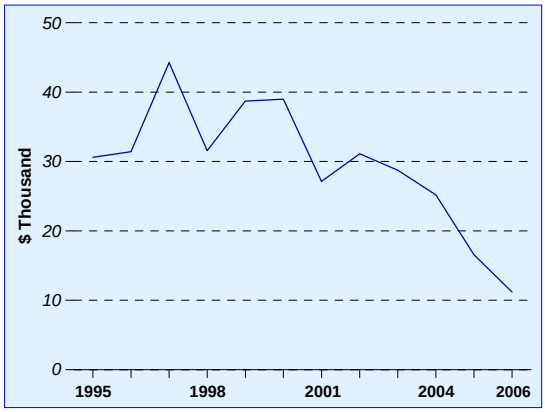
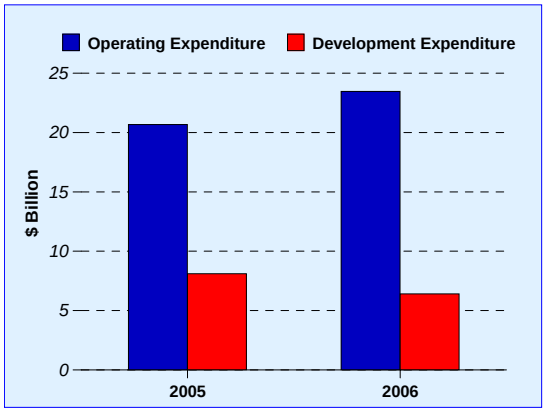


Chart 1.44
Government Expenditure

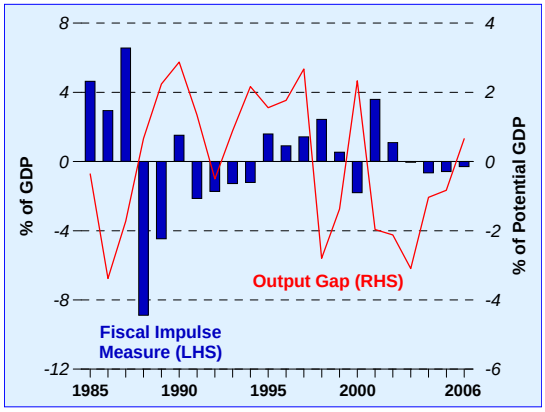


[13] For registration of an off-peak car, an upfront rebate up to a maximum of $17,000 on the COE premium and the ARF is given. The rebate is first offset against the COE premium payable. Any excess is then offset against the ARF payable.

Fiscal policy remained contractionary in 2006.

The FI measure provides a useful summary of the overall fiscal stance, with a positive FI indicating a more expansionary stance compared to the previous year and vice versa. Given the better-than-expected budget outturn last year on the back of higher revenue collections, the FI measure was negative for a third consecutive year in CY2006, at -0.3% of GDP. (Chart 1.45) This contractionary fiscal stance was appropriate, given the healthy growth in domestic economic activity, and the turnaround to a positive output gap from the last quarter of 2005.

Chart 1.45
Fiscal Impulse Measure



CHAPTER 2

WAGE-PRICE DYNAMICS

2.1 Consumer Price Developments

Domestic CPI inflation rose in 2006, largely on account of higher oil prices.

From a mild 0.5% in 2005, headline CPI inflation rose to 1.0% in 2006. This was within the forecast range of 0.5-1.5% announced during the October 2006 policy review. The MAS underlying inflation measure, which excludes accommodation and private road transport costs, also came in higher at 1.7% compared to 1.3% in 2005.

The higher CPI inflation last year was largely due to the increase in energy-related costs. With global oil prices up by almost 20%, direct energy-related items (electricity, gas, LPG and petrol) in the CPI basket contributed a significant 0.7% point to CPI inflation during the year. In response to the sharp 19% upward revision in electricity tariffs, housing costs rose significantly and were the largest contributor (0.6% point) to overall inflation in 2006. (Chart 2.1)

However, direct pass-through effects from oil prices have tapered off since Q3 2006 ...

While full year CPI inflation was higher compared to 2005, the monthly trend was generally one of continued moderation after the peak in January 2006. (Chart 2.2) This downtrend persisted into Jan-Feb 2007, during which inflation averaged a mere 0.4%. The general easing of inflation particularly in the second half of the year was attributable to the smaller direct pass-through effects of oil prices.

... reflecting base effects and the sharp pullback in global oil prices since Sep 2006.

Indeed, the contribution of direct energy-related items to CPI inflation tapered off significantly in the second half of last year (Chart 2.3) due to the pullback in global oil prices and the strengthening S$.

The price of the benchmark West Texas Intermediate (WTI) oil surged from about US$63 per barrel in early January 2006 to a record high of US$78.40 per barrel in July 2006 on the back of heightened geopolitical

Chart 2.1
Contribution to CPI Inflation, 2005 vs 2006

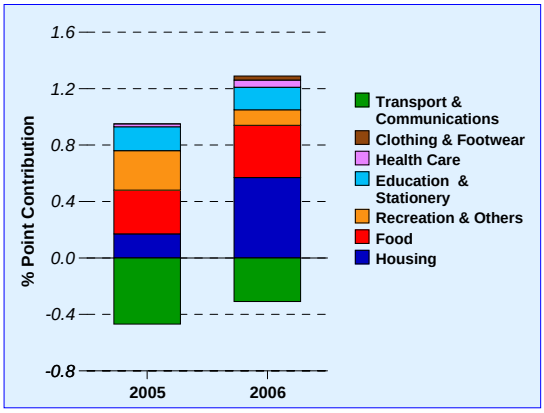


Chart 2.2
CPI Inflation and MAS Underlying Inflation

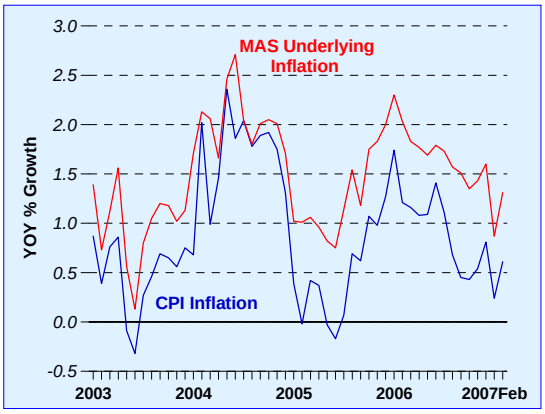
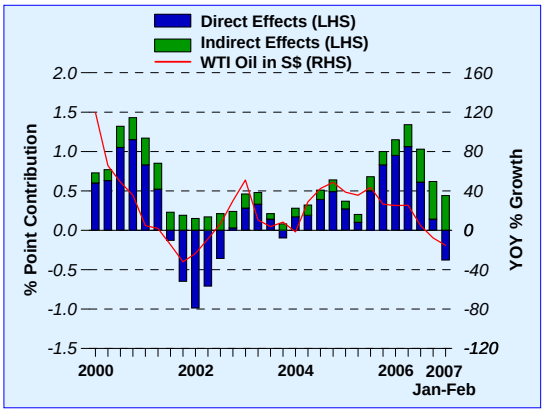


Chart 2.3
Contribution to CPI Inflation from Oil-related Items



Source: Bloomberg for WTI oil in US$; EPD, MAS internal estimates for pass-through effects.

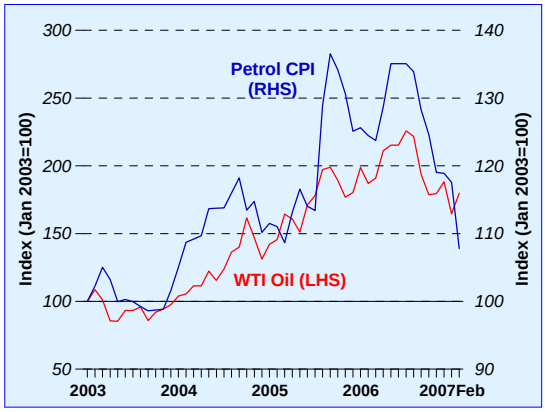
tensions and supply outages, which together lifted the "risk premium" in oil prices. However, in the second half of the year, oil prices plummeted following the unwinding of some of the risk factors. Additionally, the warmer-than-usual start to the winter in the northern hemisphere led to softer demand for heating oil and inventories, further easing price pressures. As a result, the WTI oil price fell to an average of about US$58 per barrel in the first quarter of 2007.

Responding to the movements in global oil prices, domestic petrol companies raised pump prices several times throughout 2006 before making the first of several cuts in September. (Chart 2.4) Larger loyalty card and credit card discounts were also given out in early 2007 as competition amongst petrol companies intensified. Net petrol prices, as measured in the CPI basket, rose by 8% from January to July 2006 but have since fallen by some 20% as of February 2007.

As electricity tariffs track global oil prices with a lag, they were only adjusted downwards in Q1 2007. [1] Nevertheless, the increase in y-o-y terms had already started to moderate in Q3 2006 due to the higher base in the second half of 2005.

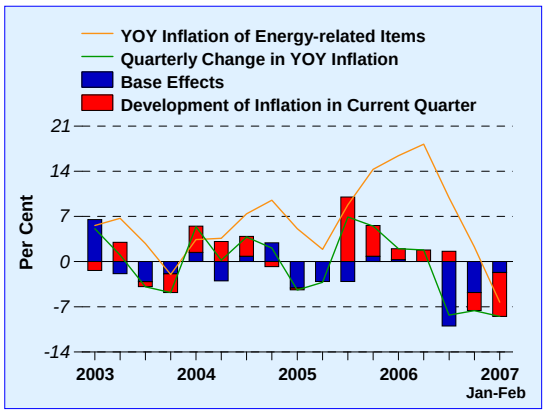
Indeed, base effects have contributed to the fading of the direct pass-through effects of oil prices on inflation since Q3 2006. Adopting the European Central Bank's (ECB) methodology,[2] the quarterly change in the y-o-y inflation rate of domestic energy-related items is decomposed into "base effects" and "development of inflation in current quarter". As illustrated in Chart 2.5, base effects contributed substantially to the decline in the inflation rate of these items in Q3-Q4 2006. This was because oil prices had risen sharply in Q3 and Q4

Chart 2.4
WTI Oil Prices and Petrol CPI



Source: Bloomberg for WTI oil

Chart 2.5
Decomposition of Quarterly Changes in Inflation Rate of Direct Energy-related Items*



* Weighted price of energy-related items

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1 This is because tariffs for a specific quarter are based on forward fuel prices and exchange rates quoted in the first month of the previous quarter. As such, tariffs rose to a record high in Q4 2006 as they were pegged to high fuel prices in July 2006, while tariffs for Q1 2007 were marked down by 7.5% (q-o-q) to reflect lower fuel prices in October 2006.

2 The methodology was adapted from the box titled "Base Effects and Their Impact on HICP Inflation in Early 2005" in the January 2005 issue of the *ECB Monthly Bulletin*. Essentially, the annual inflation rate (π_t), defined as the percentage difference between the consumer price index in a given quarter (p_t) and the index value four quarters before (p_{t-4}), can be approximated by:

$$\pi_t = \left[\ln(p_t) - \ln(p_{t-4})\right]*100$$, where ln is the natural logarithm operator.

The difference between the annual inflation rates in subsequent quarters is approximately the same as the difference between the q-o-q rate in the current quarter and the q-o-q rate four quarters before:

$$\pi_t - \pi_{t-1} = \left[(\ln(p_t) - \ln(p_{t-1})) - (\ln(p_{t-4}) - \ln(p_{t-5}))\right]*100$$

This illustrates the fact that the change in the y-o-y inflation rate from one quarter to the next reflects the impact of both recent price changes and price movements in the base quarter, i.e. four quarters earlier. For example, if the price index jumps in the period from *t*-5 *to t*-4, this will reduce the change in annual inflation between *t*-1 and *t*. The contribution to the change in the annual inflation rate from the q-o-q rate of change one year earlier is referred to as a base effect.

2005 following severe damage to oil infrastructure in the US arising from Hurricane Katrina.

It is also noteworthy that the impact of higher oil prices on domestic inflation in 2006 was somewhat dampened by the appreciation of the S$. For example, the price of fuel oil for electricity generation rose by 40% in S$ terms compared to 44% in US$ terms last year. (Chart 2.6)

In comparison, the indirect pass-through effects of higher oil prices strengthened.

In contrast to the direct effects, the indirect pass-through effects of oil prices increased in 2006 and remained high at the beginning of 2007. (Chart 2.3) For example, the cost of public transport continued to increase after bus and MRT operators raised fares by about 1.5% in October 2006 following a 40% increase in their fuel cost in the past financial year. Similarly, taxi operators had earlier increased fares on the basis of higher fuel cost. Meanwhile, cooked food prices rose further due to the increase in utility charges.

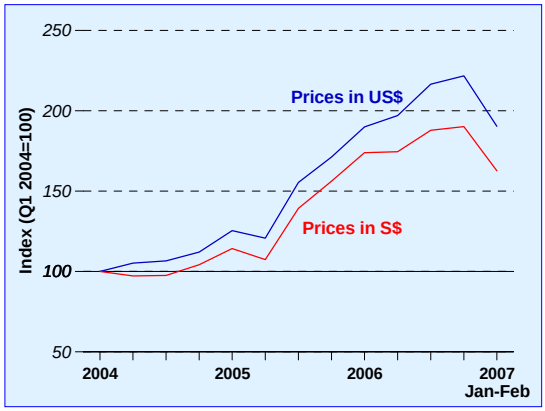
Food prices continued on an uptrend, underpinned by unfavourable external factors.

Various non-cooked food items in the CPI basket also registered stronger price increases in 2006. (Chart 2.7) Food prices were the second largest contributor to CPI inflation last year, after housing costs. (Chart 2.1) In the early part of this year, food prices became the largest contributor to CPI inflation, as energy-related inflation eased.

Seafood prices rose by a considerable 3.2% in 2006 and another 4.7% in Jan-Feb this year due to increased global demand. Notably, income growth and urbanisation in developing countries, in particular China, have led to higher demand for animal products, including fish.

Domestic prices of sugar and confectionery items also continued to rise sharply as domestic retailers raised prices further, even though global sugar prices have plummeted by 41% from their peak in February 2006. The correction followed a 105% surge in global sugar prices over the period January 2005-February 2006 on the back of increased demand for sugarcane-derived ethanol for fuel. (Chart 2.8)

Chart 2.6
High Sulphur Fuel Oil Prices in US$ and S$ Terms



Source: SP Services Ltd

Chart 2.7
Contribution of Non-cooked Food Items to CPI Inflation, 2006 vs 2000-2005 Average

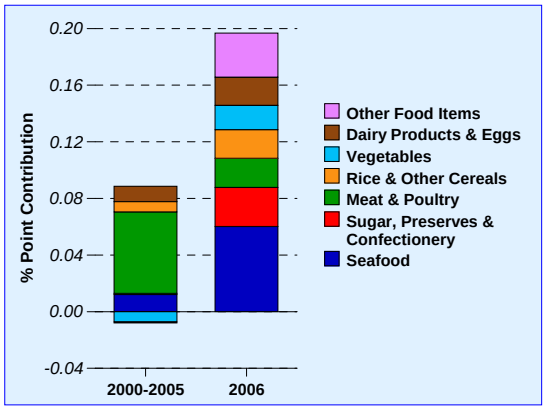
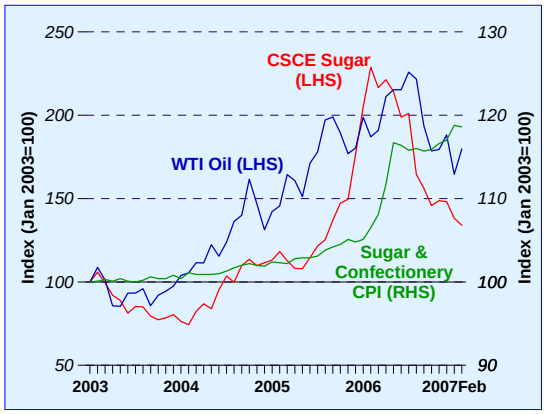


Chart 2.8
CSCE Sugar Prices and Sugar & Confectionery CPI



Source: Bloomberg for CSCE sugar and WTI oil prices

In addition, prices of some food items were affected by adverse El Niño[3] conditions. Domestic prices of vegetables tend to rise sharply when the Southern Oscillation Index (SOI) turns negative, which indicates El Niño conditions and the associated prolonged dry weather in the Asia-Pacific region, the main source of our vegetable imports. (Chart 2.9) This was borne out in the 1.3% rise in vegetable prices in 2006 when the SOI dipped. More recently, vegetable prices were further pushed up by supply disruptions in Malaysia due to severe floods there.

The El Niño-associated drought also drove wheat prices up to a record high following drastically reduced production in Australia, the world's third largest wheat exporter. At the same time, corn prices rallied due to mounting demand for corn-derived ethanol. The increased prices for corn and wheat have translated into more expensive animal feed, and consequently meat products such as poultry, beef and pork, as well as dairy products. Correspondingly, domestic prices of meat & poultry and dairy products & eggs have risen by 2.2% and 2.7%, respectively, since the beginning of 2006.

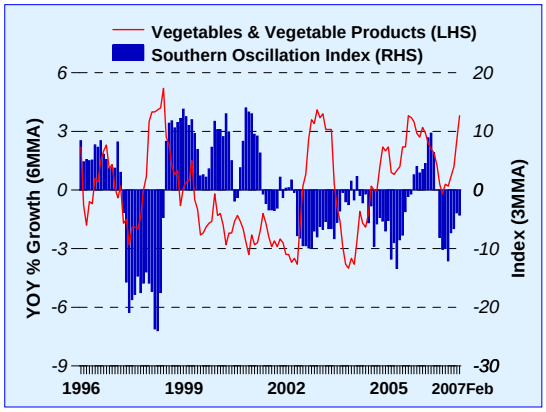
Car prices fell amidst weak replacement demand.

In contrast, domestic sources of inflation remained benign. In particular, falling car prices continued to drag down CPI inflation in 2006, by 0.6% point. Although the total quota for the Certificate of Entitlement (COE) was almost unchanged from 2005, the average COE premium for cars slumped by 26% in 2006. This was due to the declining share of replacement demand in new car sales. Replacement demand had formed the bulk of new car sales and provided support to COE premiums in the last few years when the quota was increased. However, the share of replacement demand has tapered off as the average age of the car population continued to fall. This has contributed to the slide in COE prices. (Chart 2.10)

Inflation of consumer services remained mild, ...

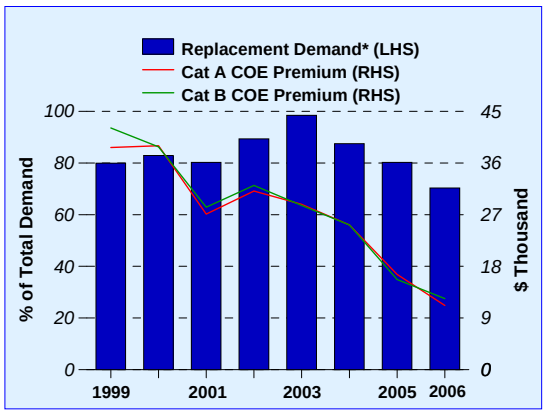
Meanwhile, consumer services in the CPI basket continued to see modest price increases in 2006 and early this year. (Chart 2.11) For example, costs of tuition and other fees rose by 3.0% in 2006, compared to 3.1% in the preceding year. The increase remained

Chart 2.9
Southern Oscillation Index and Vegetables CPI



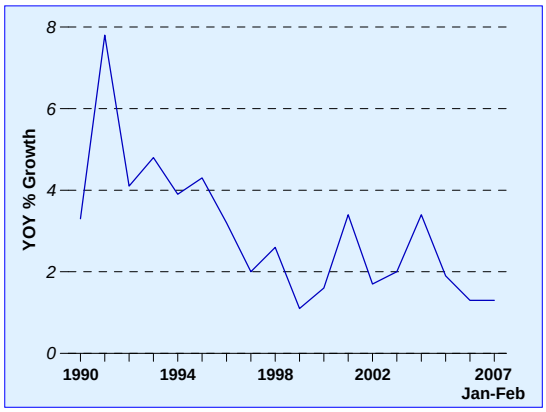
Source: Bureau of Meteorology, Australian Government for the SOI

Chart 2.10
COE Premiums and Replacement Demand



* Source: EPD, MAS internal estimates

Chart 2.11
Inflation of Selected Consumer Services*



* Average of the following CPI components: education & tuition fees, medical treatment, dental treatment, recreation & entertainment and personal care

[3] El Niño conditions are the result of an abnormal warming of the sea surface in the tropical Pacific, and are often associated with increased rainfall and destructive flooding across the southern tier of the US and in Latin America, and with droughts in Australia and parts of Asia.

relatively small compared to other developed countries. (Chart 2.12) Costs of medical treatment also rose modestly by 0.6%. However, the increase was slightly higher at 1.3% (y-o-y) over Jan-Feb 2007 after some government restructured hospitals raised charges on the basis of higher wage costs.

Overall, the generally low inflation in the services categories could be attributed to subdued wages and other intermediate services costs.

... an outcome of modest increases in labour costs ...

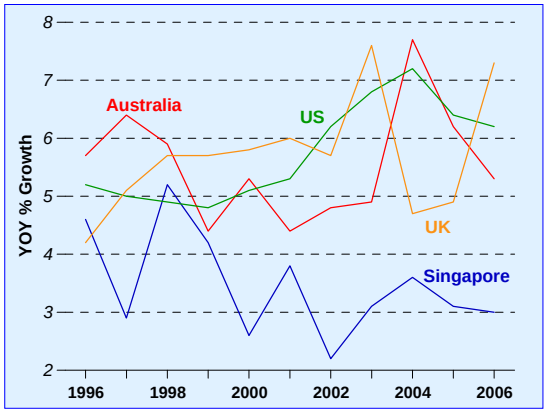
In the labour market, nominal wage growth remained modest at 3.2% in 2006, compared to 3.5% in 2005. Coupled with continued gains in productivity, overall unit labour costs fell by 0.5% in 2006, albeit less steeply than the 1.4% decrease a year earlier.

This subdued wage growth can be explained by a number of factors. Globally, wages have been dampened by competitive pressures from emerging economies. In Singapore's case, our open foreign labour policy also helps to ease labour market tightness and contain wage pressures. Moreover, firms could have been reluctant to raise wages sharply due to uncertainties in the business environment.

... as well as benign cost conditions in the services sector.

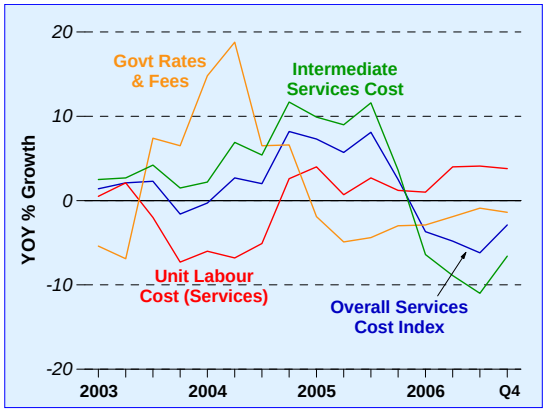
Meanwhile, cost pressures in the domestic service industries, as indicated by EPD's unit services cost index (USCI),[4] remained subdued. The USCI continued to fall by 2.9% in the last quarter of 2006, although this was less steep compared to the 4.9% average decline in Q1-Q3 2006. While unit labour cost has increased, it was more than offset by the sustained drop in intermediate services cost and government rates & fees. (Chart 2.13) Among the intermediate services cost components, rental costs have been rising at a double-digit pace since Q2 2006 and by as much as 18% in Q4 2006. However, the share of rental cost is relatively small, at about 10% of total intermediate services cost.

Chart 2.12
Education Cost Inflation in Australia, UK, US and Singapore



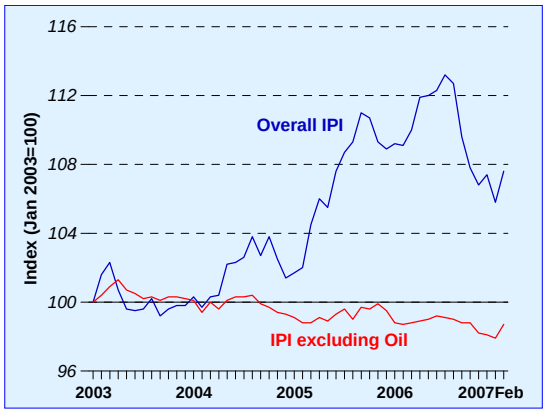
Source: Australian Bureau of Statistics and Bloomberg for Australia, DataStream for UK and CEIC for US
Note: For Singapore and the US, indices of sub-categories reflecting tuition fees were used for comparability instead of the overall education CPI, which includes other components, such as the cost of books, newspapers and computers.

Chart 2.13
Unit Services Cost Index (USCI) and Components



Source: EPD, MSD internal estimates

Chart 2.14
Import Price Index (IPI), Overall vs Non-oil

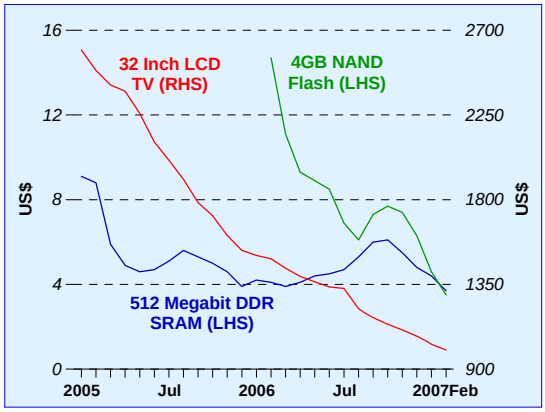


[4] Please refer to Box B of the April 2005 *Review* for further details on the USCI.

Non-oil import costs continued on a downward trend, mainly due to lower electronics prices.

At the same time, import price pressures remained muted as reflected in the sustained fall in non-oil import prices. (Chart 2.14) Despite rising prices of food and industrial metallic products, non-oil import prices declined by 0.5% in 2006 as the former was more than offset by falling prices of machinery & transport equipment. In particular, electronics items[5], such as memory chips, disk drives and LCD devices, continued to witness steady price declines amidst keen producer competition, ongoing technological improvements and ramped-up production. For instance, the prices of 4GB NAND flash memory and 32-inch LCD TV panels have plunged by 76% and 35%, respectively, since early 2006. (Chart 2.15) Various CPI categories[6] which include electronics and electrical items dragged down the overall CPI by 0.1% point in 2006.

Chart 2.15
Prices of Selected Electronics Items



Source: Bloomberg
Note: Prices of 4GB NAND Flash are available from February 2006.

2.2 Labour Market

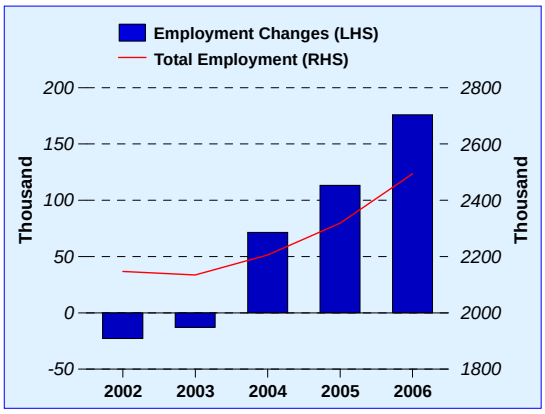
Job creation in 2006 was the strongest to date, with broad-based gains across sectors.

Amidst strong economic growth over the past three years, employment gains hit a record of 51,500 in Q4 2006. This brought total employment gains to an all-time high of 176,000 in 2006, far exceeding the 113,300 in the previous year. The total number of employed persons also reached a new high of 2,495,900. (Chart 2.16)

The record job creation was broad-based, as shown by the Employment Diffusion Index.[7] The index climbed to 92 in 2006, the highest since it was started in 1991. (Chart 2.17)

The services sector continued to account for the bulk (64% or 112,700) of the employment gains in 2006. (Chart 2.18) A large proportion of these jobs went to administrative & support services (15,800) and professional services (13,800) in the business services

Chart 2.16
Total Employment and Employment Changes



[5] Electronics items are subsumed under the Import Price Index (IPI) category "machinery & transport equipment".

[6] These CPI categories are "household durables" (includes LCD TVs, MP3 players, etc.), "communications" (includes mobile phones) and "school textbooks & stationery" (includes computers and IT accessories).

[7] The index is equal to 100 when all the industries are increasing employment and 0 when they are all decreasing employment. An index of 50 indicates an equal balance between industries with increasing and decreasing employment.

sector. The strong job creation in these industries was largely fuelled by the sustained growth in the economy.

Financial services also turned in significant employment gains of 11,300. In fact, employment growth in financial services was much higher at 9.7% than the 7.6% for the overall economy. This can be explained by rising demand for workers in middle and back office operations.

Employment in the manufacturing sector also grew significantly by 41,600, much higher than the 29,100 in the previous year. Most of the gains (92% or 38,300) were in the non-electronics industries, particularly the transport equipment industry, which was shored up by the strong demand for oil rigs, offshore vessels and ship repair. As for the electronics industry, the job creation (3,300) in 2006 was slightly higher than in the previous year (2,700) despite the ongoing restructuring in the industry, notably the takeover of Maxtor by Seagate.

In line with the strong turnaround in the property market, total job creation in the construction sector amounted to 20,500, which was more than double the gains in the previous year.

The unemployment rate was lower and job vacancies higher amid a tight labour market.

With robust job gains, the headline unemployment rate fell from 3.1% in 2005 to 2.7% in 2006, the lowest in five years. (Chart 2.19) Similarly, the resident unemployment rate improved from 4.1% in 2005 to 3.6% in 2006. This brought the total number of unemployed residents to 67,500, down from 74,900 a year earlier.

The impact of the tighter labour market was to raise the ratio of vacancies to unemployed persons further from 0.6 in Q4 2005 to a high of 0.82 (or 82 job openings per 100 job seekers) in Q4 2006, the highest in almost six years. The job vacancy rate for all sectors continued to rise, after hitting a trough in 2003. (Chart 2.20)

The robust job market benefited locals.

Locals continued to benefit from the record job growth, accounting for slightly more than half of the new jobs (52% or 90,900) created last year. The result was an increase in the resident labour force participation rate from 63% in 2005 to 65% in 2006.

Chart 2.17
Employment Diffusion Index

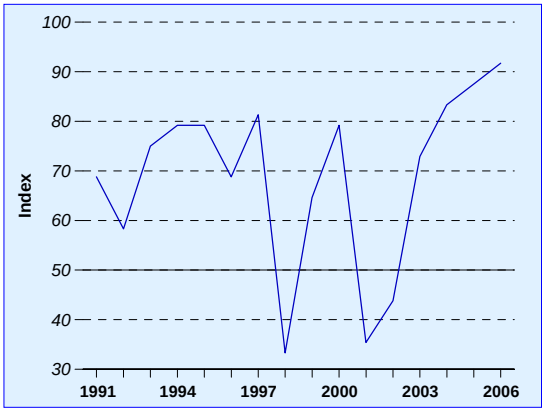
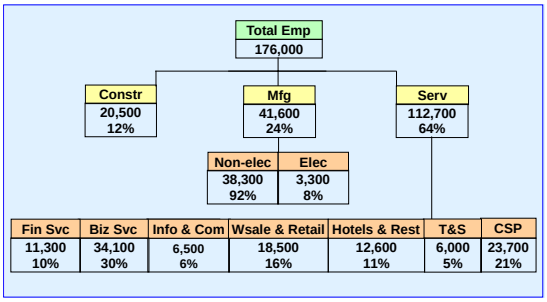
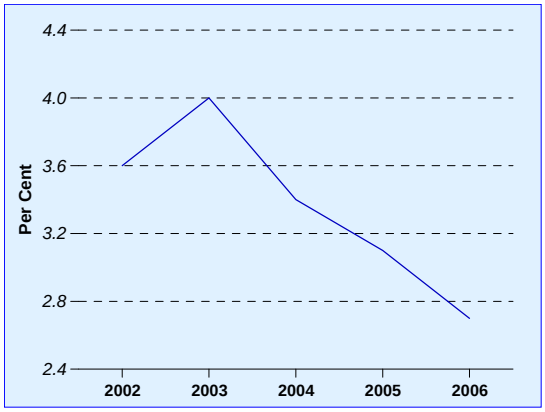


Chart 2.18
Employment Changes by Sector, 2006



Note : Business Services include Real Estate and Leasing Services, Professional Services and Administrative and Support Services.

Chart 2.19
Unemployment Rate



The rise in participation rate was evident for all age groups, but more apparent for workers aged 50 years and above. (Chart 2.21) Workers in the 50-54 age group may have benefited from the 2% points cut in the employers' CPF contribution rate in 2006. At the same time, the higher participation rate for those aged 60-64 years may reflect the general trend towards re-employment of workers beyond their retirement age of 62,[8] one of the key recommendations of the Tripartite Committee on Employability of Older Workers.

The inflow of foreign workers helped to meet the rising manpower demand.

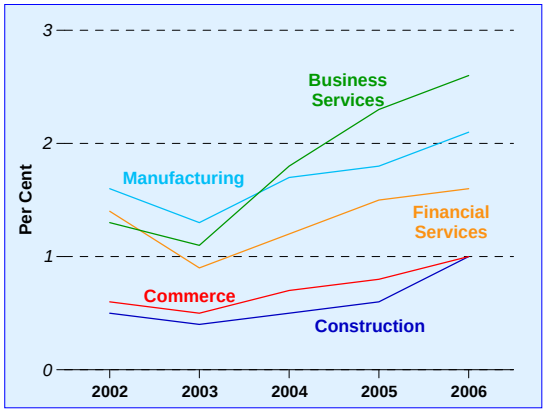
Apart from more local workers joining the workforce, the inflow of foreign labour also helped to meet the strong labour demand last year. This was especially the case in the manufacturing and construction sectors, where seven out of every ten new jobs went to foreigners. These were mostly lower value added jobs that could have been shunned by locals. In contrast, only three out of every ten new jobs went to foreigners in the services sector.

Foreign labour plays an important part in our economic development by providing companies the flexibility to cope with changes in manpower needs quickly. This is illustrated by the greater responsiveness of foreign employment to changes in GDP, compared with local employment. In particular, foreigners bear the brunt of job losses during downturns but are brought back quickly in times of expansion to fill the manpower shortages in the economy. (See Box A)

Overall, wages rose moderately although some sectors saw quite strong increases.

With the increase in resident labour force participation and inflows of foreign labour, wage growth remained modest at 3.2% in 2006 compared to 3.5% in 2005. However, the pace of wage increases varied considerably across sectors in 2006, with financial services registering a much stronger wage growth (5.7%) than the other major sectors (Charts 2.22a and 2.22b), in line with robust economic activity and employment growth. (Chart 2.23)

Chart 2.20
Job Vacancy Rate by Industry



Note: Commerce includes Hotels and Restaurants and Wholesale and Retail Trade.

Chart 2.21
Change in Resident Labour Force Participation Rates by Age Group, 2002-2006

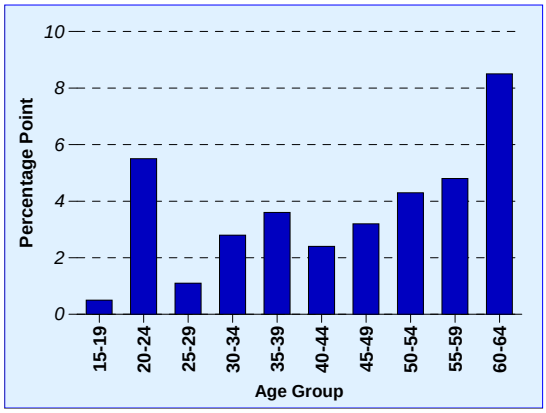
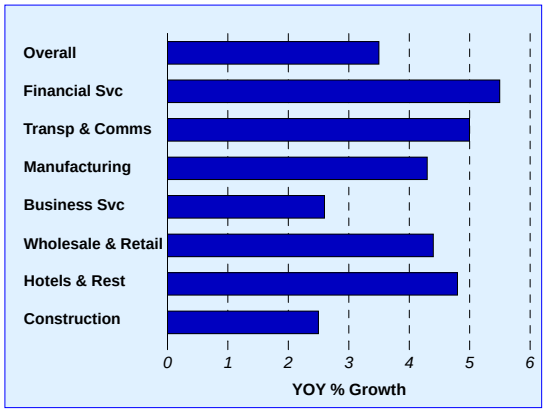


Chart 2.22a
Wage Growth by Industry, 2005



[8] The re-employment of workers beyond the age of 62 was introduced under the ADVANTAGE! Scheme by the Tripartite Committee on Employability of Older Workers. As at September 2006, 145 companies have committed to hiring about 2,300 mature workers and re-employing 1,300 workers beyond their retirement age. The Committee also recommended that the government consider legislation for the extension of the retirement age beyond 62.

Retrenchments increased in 2006 despite the strong employment gains, especially in manufacturing.

Notwithstanding the sharp increase in employment, total retrenchments edged up to 12,400 in 2006, higher than the previous two years but much lower than in 2001-03. (Chart 2.24) Around 71% or 8,800 of total retrenchments were from the manufacturing sector, up from 6,800 in 2005. Seven out of every ten retrenched workers in manufacturing came from the electronics industry due to its ongoing restructuring and the closure of Maxtor's plants.

It is notable that retrenchments in manufacturing rose in the last three years when employment in the sector was expanding. This is in contrast to earlier years when increased retrenchments were accompanied by net declines in job creation. (Chart 2.25) This could be a consequence of ongoing restructuring. Indeed, retrenchments and job increases within the same industries are very much part of a growing and dynamic economy as companies embrace the latest and most efficient production processes.

Similarly, the number of retrenchments in the construction sector increased from 200 in 2005 to 400 in 2006. However, the services sector witnessed a fall in retrenchments, from 3,300 in 2005 to 3,100 in 2006. Within this sector, the number of layoffs in financial and business services declined to 900 last year compared to 1,100 in 2005.

Chart 2.22b
Wage Growth by Industry, 2006

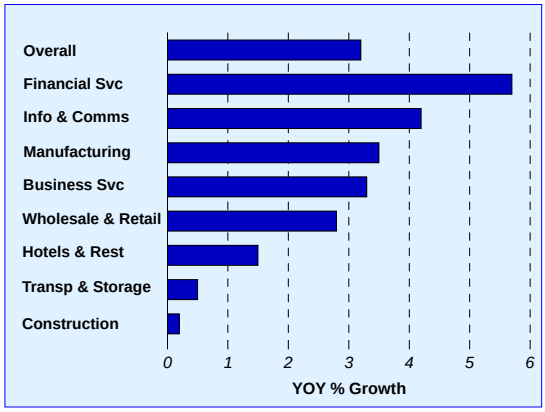
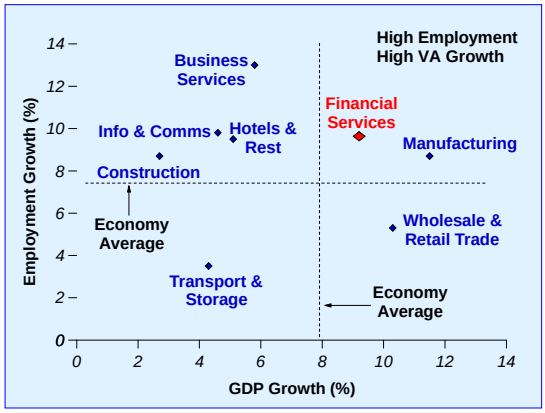


Chart 2.23
Output and Employment Growth, 2006



Note: Business services covers Real Estate and Leasing Services, Professional Services and Administrative and Support Services under MOM's classification.

Chart 2.24
Retrenched Workers

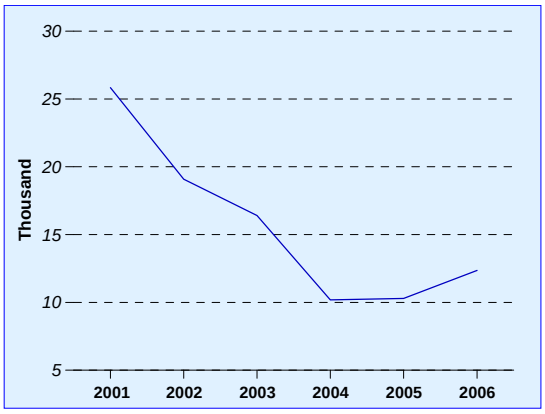
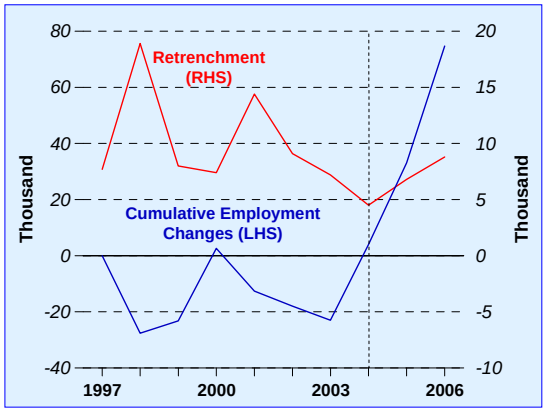


Chart 2.25
Cumulative Employment Changes and Retrenchments in Manufacturing



Box A
Asymmetry in Labour Market Adjustments across the Business Cycle

Introduction

In the April 2005 issue of the *Review*, it was noted that the employment recovery after the 2001 recession was slower than in previous economic upturns. This was attributed to several factors, including the stronger procyclical behaviour of productivity and consecutive negative shocks hitting the economy.

This box item supplements the April 2005 *Review* by examining whether there is a difference in the pace of employment adjustment between recessionary and non-recessionary periods. Employment decisions may not respond to changes in real output in a timely manner reflecting uncertainties about the longer-term business outlook, adjustment costs arising from contractual employment agreements or concerns about industrial relations. The delays in these decisions and the extent of adjustment could also vary over different stages of the business cycle, as observed by Dixon *et al.* (2005) for the Australian economy. They noted that employment responds to a change in output much more quickly during recessionary than non-recessionary periods. Given Singapore's open foreign labour policy, it is also interesting to assess whether there are differences in the response of local and foreign employment across the business cycle.

Error Correction Model

The error correction model (ECM) is used to examine the impact on employment arising changes in real GDP using an adaptation of the Dixon *et al.* (2005) methodology. It is specified as follows:

Long–run Path

$$\ln N_t = \beta_0 + \beta_1 \ln Q_t + \beta_2 \ln RW_t + \beta_3 trend_t + v_t \quad (1)$$

Short-run Dynamics around Long-run Path

$$\Delta \ln N_t = (\alpha_1 + \alpha_2 D_t) v_{t-1} + \delta_1 \Delta \ln Q_t + \delta_2 \Delta \ln RW_t + \varepsilon_t$$

N_t, Q_t and RW_t refer to total employment, real GDP and the real wage, respectively. The error correction term v_{t-1} accounts for labour market adjustment in the long run, while the first-difference terms seek to explain any additional short-term dynamic responses. The long-run specification can be derived from a constant elasticity of substitution (CES) production function, yielding a standard labour demand equation. The lagged term $trend_t$ is included to explain long-run trend growth in employment. We constrain β_1 to unity, thereby assuming constant returns to scale.

Note that a dummy variable D_t is imposed on the error correction term to allow for asymmetry in the long-run employment adjustment between recessions and other phases of the business cycle. D_t takes a value of 1 if it is a recession period and 0 otherwise.[1/]

[1/] A recession is defined as two consecutive quarters of negative q-o-q SA GDP growth. The model assumes that GDP and wages are strictly exogenous and does not take into account the simultaneity effects between employment and GDP or wages.

Estimation and Results

Quarterly data from Q1 1980 to Q4 2006 are used for the estimation of Equation (1).

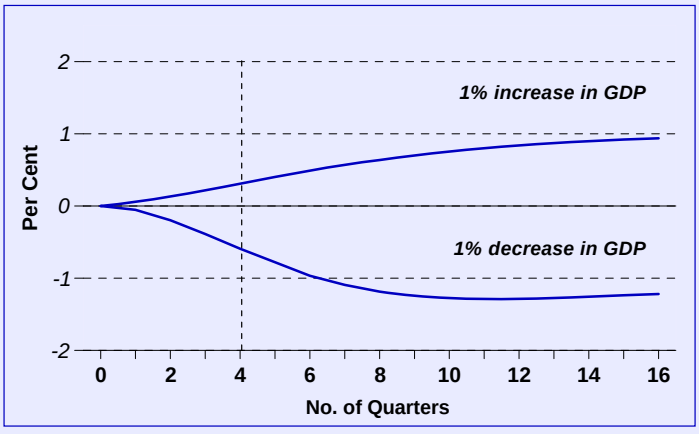
Table A1: Estimation

Variable	Coefficient	Standard Error	*P*-value
v_{t-1}, α_1 (non-recessions)	-0.045	0.018	0.004
$v_{t-1}, \alpha_1 + \alpha_2 D_t$ (recessions)	-0.101	-	-
$\Delta \ln Q_t$, δ_1	0.053	0.026	0.003
$\Delta \ln RW_{t-1}$, δ_2	-0.046	0.037	0.040
Specification/Fit of the Model			
Adjusted R-squared		0.83	
Std. Error		0.39%	
Durbin-Watson		2.49	

Table A1 reports the results and diagnostics of the key estimates in the ECM that allows for asymmetric employment responses at different stages of the business cycle. The error correction parameter during recessionary periods (-0.101) is observed to be higher than that during non-recessionary periods (-0.045). To verify that the error correction parameters are significantly different between recessions and non-recessions, a formal Wald test was conducted on the restriction α_2=0 which was rejected (*p*-value = 0.0222). The results therefore suggest that employment adjusts by 0.101% towards its long-run equilibrium level each quarter during recessions, which is much larger than the 0.045% adjustment during non-recessionary periods. In addition, the coefficients of the first-difference terms indicate that short-run employment responds positively to changes in real output and negatively to changes in real wages.

To better illustrate the dynamics of the equation, we simulated the impact of a 1% increase and decrease in GDP on employment change over 16 quarters using the ECM estimated in Table A1. The cumulative employment response to the changes in GDP over time is illustrated in Chart A1.[2/] The bottom line represents the labour adjustment given a 1% decrease in GDP, which is much faster as seen from its steeper slope compared to the top line. In particular, during recessions, employment adjusts by 0.6% downwards after four quarters. In contrast, during non-recessionary periods, employment increases by only 0.3%[3/] towards its long-run equilibrium after four quarters.

Chart A1
Cumulative Effect on Employment from a 1% Shock to GDP

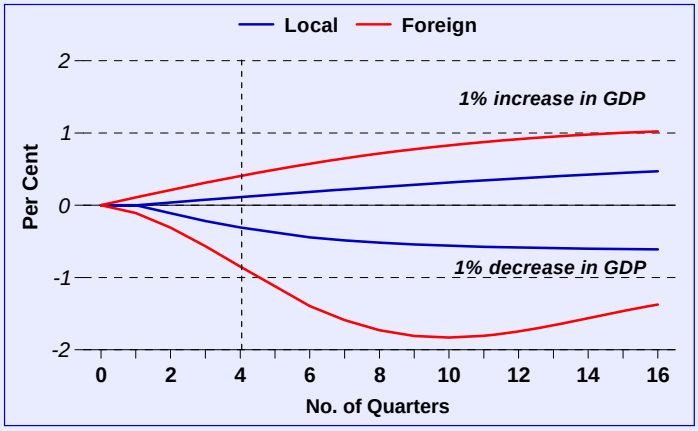


2/ Given the assumption of constant returns to scale in the model, a 1% increase/decrease in GDP will lead to a 1% increase/decrease in employment in the long run.

3/ This is consistent with our estimates in the April 2005 *Review* where a 1% increase in GDP results in a 0.52% increase in employment after 4 quarters. However, the results are not directly comparable because of differences in specification and time period. In the earlier study, a distributed lag model with productivity as the dependent variable was used.

The faster response of employment during recessions could be the result of many firms being forced to close down or reduce labour costs to rationalise operations. In effect, the pressure on businesses to reduce their workforce is greater in times of economic downturns. During boom times, however, uncertainties about the sustainability of the recovery, the time needed to fill vacancies or adjust hiring patterns could account for the more moderate response in employment.

Chart A2
Cumulative Effect on Local & Foreign Employment from a 1% Shock to GDP



Using the same methodology, we further examined the simulated impact of a 1% increase and decrease in GDP on local and foreign employment over 16 quarters. As shown in Chart A2, foreign employment appears to be more responsive to changes in GDP and the real wage, compared to local employment, especially in times of recession. When GDP falls by 1%, foreign employment adjusts by -0.8% over four quarters, compared to only -0.3% for local employment. When GDP expands by 1%, the adjustment in employment is much smaller, with a 0.4% and 0.1% increase in foreign and local employment respectively after four quarters.

These results illustrate the greater flexibility in adjusting foreign labour input during both recessionary and non-recessionary periods. In economic downturns, foreign workers may provide a buffer to the labour market by bearing the brunt of the shock. This might be due, in part, to the lower 'separation costs' of foreign workers as well as the need for companies to comply with the foreign worker dependency ceilings. In comparison, during the early stages of a recovery, foreign workers are hired to meet immediate manpower shortages especially in areas where there is a lack of local workers. Thus, given the difference in job specifications and skill profiles between local and foreign workers, Singapore's open foreign labour policy allows firms to respond quickly when there is an economic recovery which leads to further job creation that ultimately benefits local workers as well.

Sum-up

Our empirical work appears to verify the tendency for the labour market in Singapore to respond more quickly during recessions as compared to other stages of the business cycle. Furthermore, it reaffirms the important role played by foreign workers in the domestic labour market.

Reference

Dixon, R., Freebairn. J. and Lim, G.C. (2005), "An Employment Equation for Australia", *The Economic Record,* Vol. 81, No. 254, pp. 204-214.

Reference

European Central Bank (2005), "Base Effects and Their Impact on HICP Inflation in Early 2005", *Monthly Bulletin* Jan 2005.

CHAPTER 3

OUTLOOK

3.1 External Outlook

Growth Rebalancing

Some shifts in growth dynamics in the year ahead.

Since the turn of the year, the global economy has been confronted with the twin risks of a sharp slowdown in the US, and weakness in the global IT industry. However, latest indicators are pointing to continued resilience in most of the major economies. Going forward, a further rebalancing of growth towards the Eurozone and Asia is expected alongside some softening in the US economy. In Asia, firm domestic demand could help to offset a slowdown in exports. For the Singapore economy, the oversupply in the global IT industry is likely to weigh on domestic electronics-related industries, but other non-IT related industries are expected to provide support this year.

Global growth remains supportive amidst possible risks.

The global economy will moderate in 2007 after robust expansion last year. (Table 3.1) The OECD Composite Leading Indicators for developed economies, for example, have been pointing down since June 2006, suggesting softer conditions in the quarters ahead. (Chart 3.1) In particular, growth in the US economy is likely to slow in line with the ongoing correction in the housing market. At this juncture, a recession is not anticipated as private consumption continues to be supported by favourable labour market conditions. The current slowdown is more cyclical than structural in nature and should not affect the US economy's long-term growth prospects. (See Box C at the end of this Chapter.) In the Eurozone, growth is also expected to ease after a five-year high in 2006, with sustained domestic demand providing a cushion against weaker exports. Of the G3 economies, only Japan is projected to maintain its growth momentum as the nascent recovery in domestic demand becomes more entrenched.

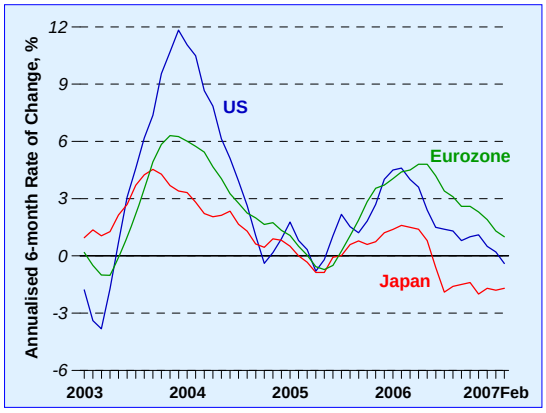
Table 3.1
Forecasts of GDP Growth

y-o-y (%)

	2006	2007F
Total*	**5.0**	**4.5**
Industrial Countries*	2.9	2.4
US	3.3	2.3
Eurozone	2.8	2.4
Japan	2.2	2.2
NIE-3*	5.8	4.7
Hong Kong	6.8	5.3
Korea	5.0	4.4
Taiwan	4.6	4.1
ASEAN-4*	5.5	5.4
Indonesia	5.5	6.0
Malaysia	5.9	5.6
Thailand	5.0	4.2
Philippines	5.4	5.5
China	10.7	10.0
India	9.1	8.0

Source: Consensus Economics Inc., April 2007
* Weighted by shares in Singapore's non-oil domestic exports.

Chart 3.1
OECD Composite Leading Indicators



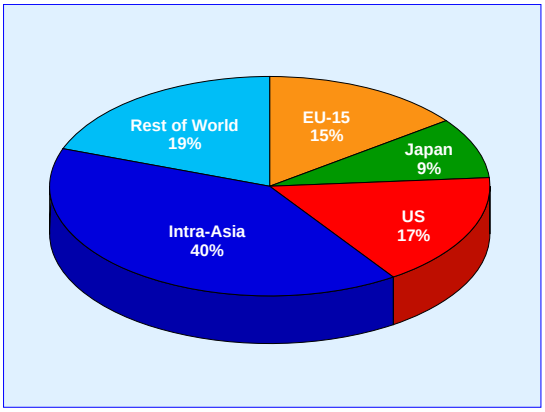
Source: Datastream

According to the latest forecasts by the World Trade Organisation (WTO), global trade growth in volume terms will moderate to 6% in 2007 from 8% last year. Asia is expected to witness more modest export growth in the months ahead, given its continuing dependence on the US economy for its final products. Although trade data show that the US directly accounts for only 17% of Asian exports (Chart 3.2), this understates its importance due to the presence of strong indirect trade flows. For example, the Asian Development Bank (2007) has estimated that over 70% of intra-Asian exports consist of intermediate goods which are assembled into final products, many of which are then exported to countries outside Asia. Taking this indirect export channel into account, the exposure to the US market would be higher than 17%.

There are, however, some mitigating factors in relation to Asia's dependence on the US. First, to the extent that the current US slowdown remains confined to specific sectors, such as housing, the spillover from a US slowdown on Asia's exports may be limited in magnitude.[1] Second, any weakness in Asian exports is also likely to be cushioned by strengthening domestic demand, which will continue to be supported by strong labour markets and relatively accommodative monetary conditions.

On balance, the global economy is projected to expand at a more moderate pace this year. While this outlook remains generally benign, there are some downside risks. One is a significant tightening of financial conditions in the US, which could lead to a sharper-than-expected contraction in the economy. This could be triggered by a number of events, including the unwinding of global imbalances and currency carry trade positions, and/or a fallout from increasing sub-prime mortgage defaults which will raise risk premiums. As a consequence, asset prices would likely undergo a significant correction. The combination of a deterioration of balance sheets and higher borrowing costs could amplify the risk of a more severe and protracted weakness in US consumer spending and corporate investment. Already, non-residential fixed investment in the US has declined by 3.1% q-o-q SAAR in Q4 2006, the first contraction in nearly four years, and new orders for non-defence capital goods (ex aircraft) remained weak in the first two months of this year. The re-pricing of risk and tighter lending standards could also further exacerbate the correction in the housing market.

Chart 3.2
Geographical Composition of Asian* Exports (2006)



Source: CEIC; MSD, MAS internal estimates
* Asia comprises China, Indonesia, Hong Kong, Korea, Malaysia, the Philippines, Singapore, Taiwan and Thailand.

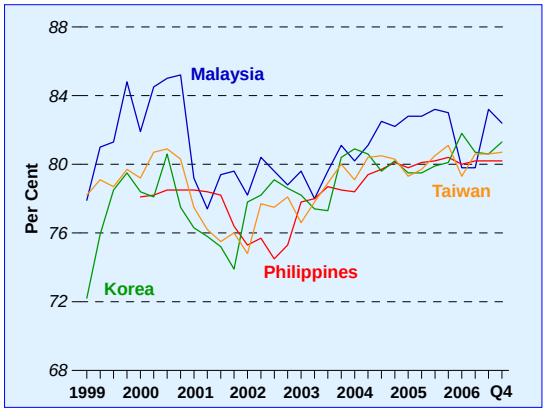
[1] A similar point was raised by the IMF in its April 2007 issue of the *World Economic Outlook*.

Under such a scenario, the rest of the world would experience a sharper slowdown as the spillover channels would extend beyond the export sector. One channel of transmission could be through linkages across international financial markets. A large correction in US financial markets would have contagion effects on bond and equity markets around the world. Furthermore, Asia, which has recently seen a large inflow of capital, might be vulnerable to a sudden, and large-scale, pullback of funds from the region.

Inflation is expected to remain benign, despite tighter capacity utilisation.

Even though the global economy is entering its fifth year of uninterrupted growth, inflation should remain generally well-contained. This reflects, in part, the impact of globalisation, particularly the competitive pressures that continue to be exerted by low-cost emerging economies such as China and India. This has had a dampening effect, not only on the global prices of goods and services but also on wages. In addition, oil prices are expected to be lower in 2007, which will help to contain the rise in business costs. However, capacity constraints have become more apparent and could have an impact on production costs in the region, especially at this late stage of the economic cycle. (Chart 3.3) This could put upward pressure on business costs – including wage costs – though they are likely to be contained over the near term. Food prices could also face upward pressure, given that the greater use of bio-fuels will increase demand for soybeans, corn and wheat, while dry weather conditions could reduce agricultural output at a time when global inventories are extremely low.

Chart 3.3
Capacity Utilisation Rates in the Region



Source: CEIC

3.2 Outlook for the Singapore Economy

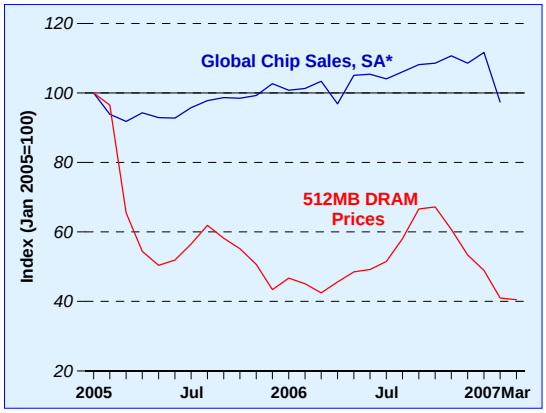
Lingering Weakness in Global IT Industry

Current softness in the global IT industry stems largely from the supply side.

The weakness in the global semiconductor industry has persisted into early 2007. Average selling prices (ASPs) of semiconductors, particularly in the mainstream DRAM segment, have tumbled by 23% since the beginning of the year. Overall global chip sales contracted by 4.3% in Jan-Feb 2007 on a sequential basis, down from a growth of 2.2% q-o-q SA in Q4 last year. (Chart 3.4)

The current softness in the IT industry appears to be largely a supply-side phenomenon, arising from the over-estimation of demand on the part of semiconductor manufacturers. According to a report by iSuppli,[2] there were capacity shortages in the back-end semiconductor testing and packaging segments in Q1 last year. Although the back-end constraints were resolved in the following quarter, a misreading of signals by front-end semiconductor manufacturers (such as the foundries) led to a ramp-up in production levels. This triggered an accumulation of semiconductor inventories in Q2, and the supply of semiconductors has outstripped demand in the months since.

Chart 3.4
Global Chip Sales and DRAM prices

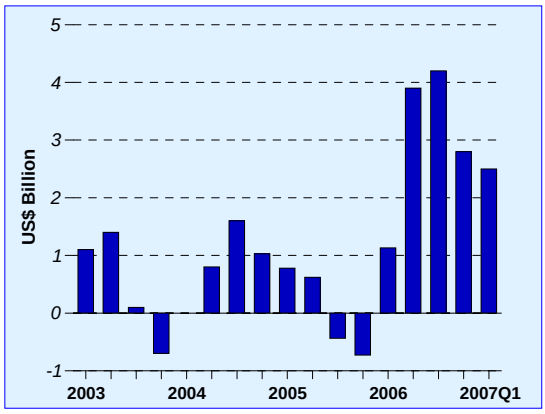


* EPD, MAS internal estimates
Source: Bloomberg for DRAM prices, Semiconductor Industry Association for global chip sales

The supply glut is expected to ease in the latter half of the year.

The overhang in semiconductor inventories should dissipate in the second half of 2007. Semiconductor manufacturers have been trimming production levels to draw down inventory since Q4 2006, paving the way for a recovery later this year. Indeed, inventory accumulation peaked in Q3 last year, falling by a third to US$2.8 billion in Q4 and edging down further to US$2.5 billion in Q1 2007. (Chart 3.5)

Chart 3.5
Excess Semiconductor Inventories



Source: iSuppli

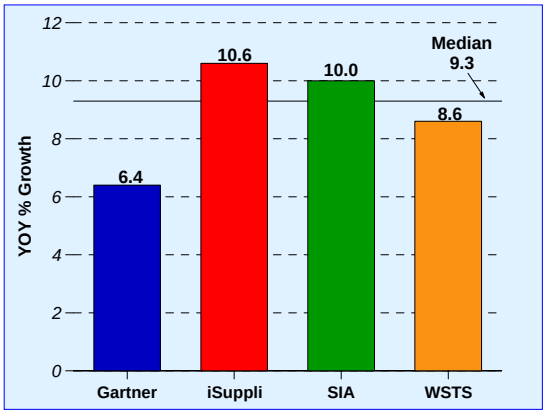
[2] Jelinek, L (2007), "Chip Foundries Fret over the Downturn", http://www.eetimes.com/showArticle.jhtml?articleID=198001735

New product launches should provide support for semiconductor demand.

In addition, multiple launches of new IT products this year – such as Windows Vista and the Apple iPhone – will provide some support to semiconductor demand. Notably, Windows Vista is expected to provide a direct boost to PC shipments by triggering replacement demand over the next two years, which in turn will drive semiconductor demand, particularly for memory and graphics chips.[3] Meanwhile, NAND-based next-generation Apple products, such as the iPhone and video iPods (to be launched possibly late this year), may inherit the mantle from the 2005 iPod Nano as the next killer applications to drive NAND flash demand.

Overall, a sustained pickup in H2 will be predicated on macroeconomic conditions in the global environment, which are currently expected to remain favourable. For the year as a whole, the industry's median growth forecast for global chip sales is 9.3%, although Gartner has recently revised its forecast down substantially to 6.4%. (Chart 3.6) This compares with growth of 8.9% in 2006.

Chart 3.6
2007 Global Chip Sales Forecasts



Source: Gartner, iSuppli, Semiconductor Industry Association (SIA) and World Semiconductor Trade Statistics (WSTS)

Non-IT industries to be the main pillars of support

Domestic IT-related industries are expected to remain weak in the months ahead.

Notwithstanding the ongoing adjustments in inventories, the domestic IT-related industries are expected to remain sluggish in the next few months. The weaker near-term prognosis is borne out by leading indicators, such as the MAS Electronics Leading Index (ELI), which points to lingering softness in the domestic electronics sector for the first half of 2007. (Chart 3.7) The ELI has recently been reviewed and upgraded. Box B discusses the changes made to the ELI and improvements in its forecasting properties.

Chart 3.7
Electronics Leading Index

Source: EPD, MAS

[3] On average, Vista requires the upgrading of DRAM content to 1GB for optimal performance and a graphics card with 256 MB RAM to run premium graphics features. Currently, DRAM content per PC averages 512 MB, while graphics cards have 128 MB RAM.

Box B
Assessing the Forecasting Performance of the MAS Electronics Leading Index

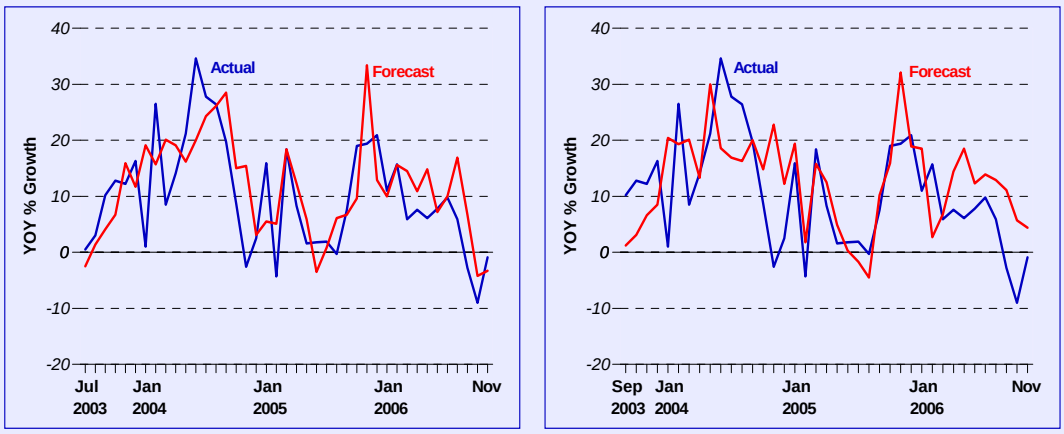
Introduction

In 2003, EPD developed the Electronics Leading Index (ELI), which is a composite index of activity to predict turning points in the global electronics cycle, and to generate quantitative forecasts of the growth in Singapore's electronics industry.[1/] Since then, the ELI has been tracked and used every month to generate forecasts of domestic electronics IIP at forecast horizons of 1-6 months. While the ELI is a useful tool for assessing the health of the electronics sector in Singapore, it tends to be quite volatile from month to month. Therefore, earlier this year, having accumulated around 40 out-of-sample predictions, EPD embarked on a formal assessment of the forecasting performance of the ELI based on several empirical tests, with a view to refining the index and enhancing its predictive accuracy.[2/]

Past Predictive Performance

A simple way to review the past predictive performance of the ELI is to plot the actual values of electronics IIP growth together with the values predicted by the ELI, as in Chart B1. The forecast values and turning points are generally close to the actual in most months, regardless of forecast horizon, thus validating the predictive ability of the ELI. Nevertheless, past experience has shown that when the ELI is updated with incoming data on a monthly basis, it fluctuates rather significantly at times and sends mixed signals about the prospects for the electronics industry. This is due to the volatile nature of some of the components of the index, particularly domestic leading indicators such as retained imports of electronics and the electronics finished goods Purchasing Managers' Index or PMI. Mitigating this volatility through smoothing techniques should lead to an improvement in the forecasting performance of the ELI.

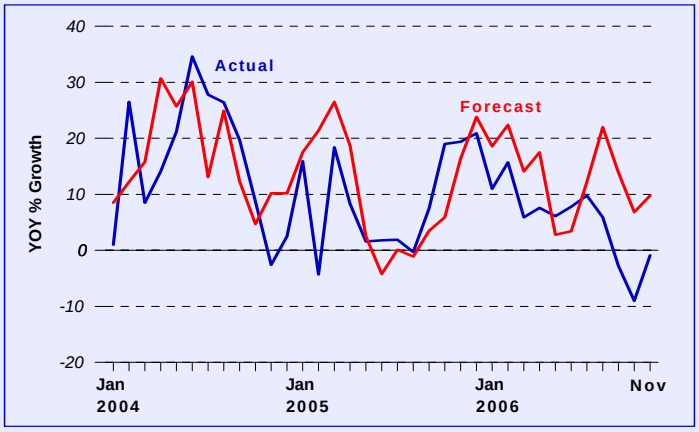
Chart B1
Actual and Forecast Values of Electronics IIP Growth



1/ For further details on the components of the ELI, see the April 2004 issue of the *Review*, and *MAS Staff Paper* No. 30 "Using Leading Indicators to Forecast the Singapore Electronics Industry".

2/ The review was done in collaboration with Choy Keen Meng from the Division of Economics, School of Humanities & Social Sciences, Nanyang Technological University, who was also involved in the original construction of the ELI.

(c) 6-month Forecast



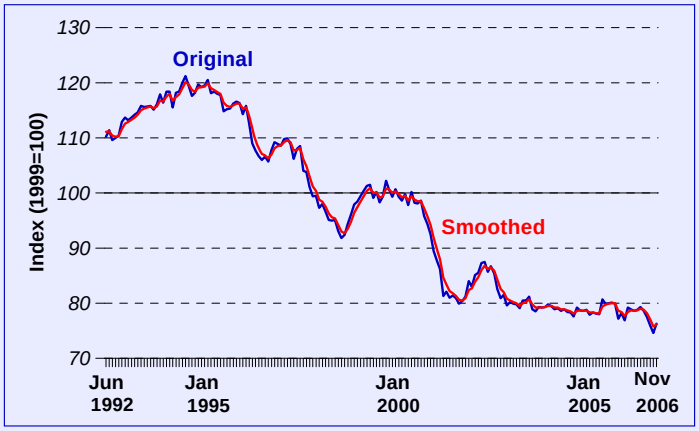
Smoothing the ELI

The exponentially weighted moving average (EWMA) smoothing technique was applied to the ELI time series. The EWMA is a basic smoothing algorithm that is commonly used in forecasting. It is model-free and based on a simple algebraic formula:

$$y_t^{EWMA} = \sum_{j=0}^{T-1} \alpha(1-\alpha)^j y_{t-j} = \alpha y_t + (1-\alpha) y_{t-1}^{EWMA}$$

where α is the smoothing parameter restricted to the unit interval, $\alpha \in [0,1]$. The smaller α is, the smoother the estimated index. As α approaches 0, the smoothed series approaches constancy, and as α approaches 1, the smoothed series approaches point-by-point interpolation. This smoothing methodology in effect delivers a one-sided moving average with exponentially declining weights, where the distant past is discounted more heavily than the recent past. After some experimentation, we decided to set α = 0.5. The smoothed ELI series is shown in Chart B2. It removes the short-term volatility in the ELI without delaying turning points, thus making interpretation easier while preserving the lead of the index.[3/]

Chart B2
Original and Smoothed ELI Series



3/ We also considered another smoothing method used by the US Department of Commerce, using: $y_t^{smooth} = \frac{1}{6}(y_t + 2y_{t-1} + 2y_{t-2} + y_{t-3})$, but it was found to induce a greater phase shift compared to the EWMA technique.

Testing the Forecasting Accuracy of the Smoothed ELI

To evaluate the predictive ability of the smoothed ELI, Theil's *U*-statistic and the Diebold-Mariano (DM) test were used, over the sample period July 2003 to November 2006. The *U*-statistic is a ratio used to compare the accuracy of a forecast (in the numerator) with a näive forecast (in the denominator) based on an in-sample forecast of electronics IIP generated by an autoregressive model with three lags. If $U = 1$, it implies that the forecast is only as good as the näive forecast. If U is less than 1, the forecast is better and if U is greater than 1, the forecast is of little use.

In contrast to the *U*-statistic, the DM test is a formal test of equal forecast accuracy and provides a statistical comparison of the ELI's predictive ability *vis-à-vis* the näive forecast. The cost of forecast errors is measured by a particular loss function and in our case, both the squared error loss and absolute error loss are computed. The null hypothesis in the DM test is equal predictive accuracy between the two methods, while the alternative hypothesis is that one of them is better. If the null is not rejected, it suggests that the näive forecast is as good as that from the ELI.

The test results are summarised in Table B1. We find that the *U*-stat is less than 1 at forecast horizons of 1, 3 and 6 months for both squared and absolute errors, confirming the forecasting superiority of the ELI. The DM test statistic rejects the null hypothesis at the 5% significance level at the 1-month and 3-month forecast horizons (for the absolute error in the former, and both squared and absolute errors in the latter). However, it appears that the improvement in accuracy from the ELI is not significant at the 6-month horizon. This suggests that the smoothed ELI generally improves on the näive forecast, but it appears to perform best at the 3-month forecast horizon.

Table B1
Predictive Accuracy Tests Using Smoothed ELI

Forecast Horizon	Squared errors		Absolute errors	
	U-stat	DM-stat	*U*-stat	DM-stat
1-month	0.935	1.360	0.925	2.703**
3-month	0.869	2.696**	0.918	2.480**
6-month	0.882	0.829	0.915	1.413

Note: * (**) indicates that the null hypothesis of equal forecast accuracy is rejected at the 10% (5%) significance level.

Sum-Up

Since its inception in mid-2003, the ELI has proven to be a useful leading indicator for forecasting Singapore's electronics sector. An empirical review of the ELI shows that its forecasting ability could be further enhanced by correcting for its month-to-month volatility. Beginning from this issue of the *Review*, both the original and smoothed ELI series will be published in the Statistical Appendix. EPD will continue to use the ELI as a tool to complement its surveillance and assessment of the economic outlook for Singapore.

References

Diebold, F.X. and Mariano, R.S. (1995), "Comparing Predictive Accuracy", *Journal of Business and Economic Statistics*, 13, pp. 253-63.

Diebold, F.X. (2004), *Elements of Forecasting*, South-Western, Thomson.

The outlook for the second half of this year is more upbeat. In particular, domestic semiconductor output should pick up in tandem with the easing of semiconductor inventories. The data storage segment should also recover gradually as the fallout from the closure of Maxtor diminishes. Moreover, as shown in Table 3.2, Singapore stands to benefit from the new end-demand drivers, with most of the impact captured by the midstream segment. Taking into account these factors, domestic electronics output is likely to achieve modest single-digit growth this year, similar to the 3.2% in 2006.

Likewise, IT-related services, such as air cargo and re-exports of electronics, are also likely to experience some pickup in the latter half of the year, alongside the recovery in electronics manufacturing across the region.

Table 3.2
Domestic Impact of Global End-demand Drivers

	Upstream	Midstream	Downstream
Windows Vista	Foundry	Memory Chips Hard Disk Drives Printed Circuit Boards	Computer Peripherals
iPhone	---	CPU and Video Processing Chips Baseband Hardware	---

Prospects for the domestic electronics industry are bright, particularly for the medium term.

Going forward, the outlook for the electronics industry is bright, particularly over the medium term horizon. Singapore continues to be a key node in global production networks, particularly in higher-end products. The disk drives industry is a case in point. While domestic exports of hard disk drives have been trending down since Q3 2005, that of disk media[4] products have seen significant gains over the same period. Although still a relatively small segment of the electronics industry, exports of disk media rose by more than 30% in 2006, compared with the 15% contraction in disk drives exports. In September last year, Seagate – the global market leader in hard disk drives – unveiled plans to channel $1.3 billion into a third disk media plant in Singapore, with production likely to commence by mid-2008.

[4] Disk media is the key component of hard disk drives, on which data is stored and from which it is retrieved. Production of disk media is of higher value added compared to the assembly of hard disk drives.

Once production from Seagate's third plant comes onstream, Singapore will become the world's largest producer of recording media, building on a 25% global market share in disk media in 2005. Apart from moving up the manufacturing value chain for hard disk drives, Singapore will remain a global distribution hub, as well as a leading centre for R&D of disk drives, supported by research facilities such as the Data Storage Institute.[5]

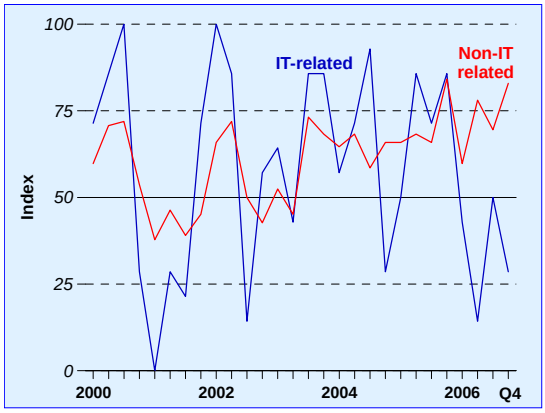
The main support in 2007 will come from non-IT related industries.

For the remainder of 2007, the non-IT industries will be the main pillar of support for the Singapore economy. These industries, which cut across a wide range of activities in manufacturing and services, have become a relatively stable source of growth in recent years.

Indeed, the sectoral diffusion index suggests that growth within the non-IT industries has been more broad-based than in the IT-related industries, particularly in recent quarters. (Chart 3.8) Moreover, growth of the non-IT cluster has also been less volatile. (Chart 3.9)

Broadly, the non-IT industries may be classified into three groups: non-electronics manufacturing, external-oriented services and domestic-oriented industries, each underpinned by a different set of growth drivers. (Figure 3.1)

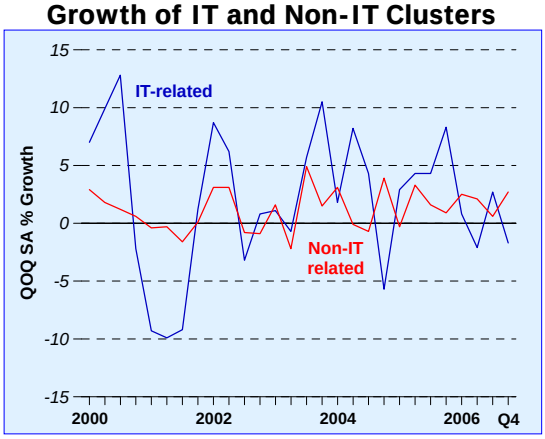
Chart 3.8
Sectoral Diffusion Index



Source: EPD, MAS internal estimates

Note: A value of 50 indicates an equal number of expanding and contracting industries within each of the IT or non-IT clusters, while a value of 100 indicates that all the industries are expanding. The methodology used in this chart is similar to that of other diffusion indices.

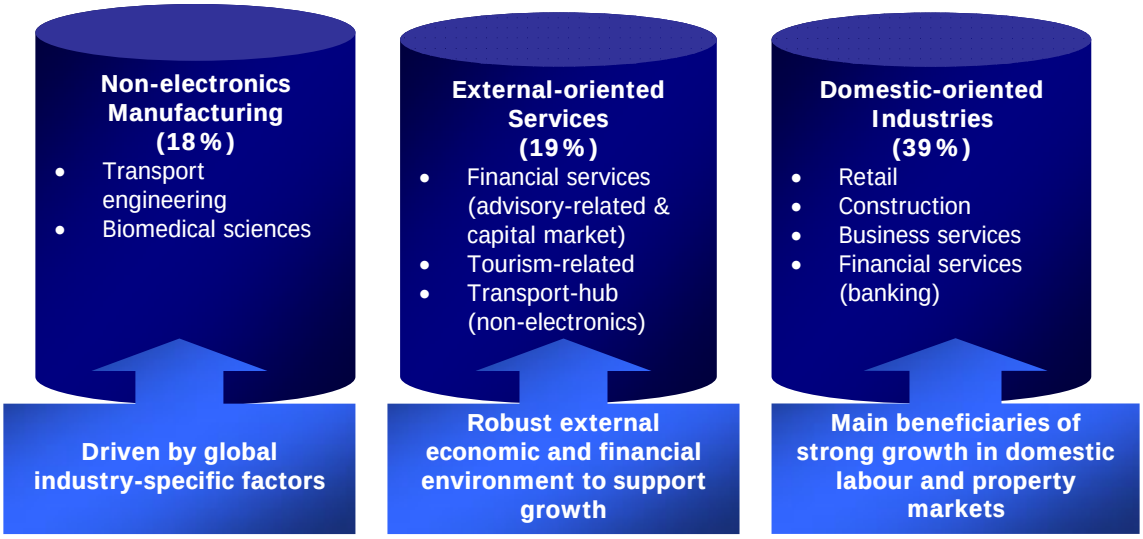
Chart 3.9
Growth of IT and Non-IT Clusters



Source: EPD, MAS internal estimates

[5] The Data Storage Institute (DSI) was set up by A*STAR in 1996 to spearhead research and development in next generation data storage technologies in Singapore, in part through collaboration with data storage companies.

Figure 3.1
Three Key Clusters of Non-IT industries



Source: EPD, MAS internal estimates
Note: Figures in parentheses refer to estimates of % share of real GDP.

Non-electronics Manufacturing

Non-electronics manufacturing will be driven by industry-specific factors.

The non-electronics manufacturing clusters, which are estimated to comprise around 18% of GDP, will see continued healthy growth this year, albeit at a somewhat slower pace. In particular, the transport engineering and biomedical clusters will remain the two star performers.

With oil prices forecast to stay firm, the demand for oil rigs and rig-conversion projects will keep the domestic marine & offshore engineering segment buoyant. In fact, as at end-2006, the total net book order of the two main local shipyards, Keppel Offshore and Marine and SembCorp Marine, amounted to some $17.6 billion, with delivery dates stretching to 2010. (Table 3.3) This represents an almost six-fold increase in orders between 2002 and 2006.

The biomedical cluster is also set for further expansion this year, notwithstanding its characteristic output volatility.

Table 3.3
Net Book Orders of Local Shipyards

$ Billion

	Keppel	SembCorp	Total
2002	1.6	1.4	3.0
2003	1.9	1.1	3.0
2004	3.4	2.3	5.7
2005	6.5	5.9	12.4
2006	10.5	7.1	17.6

Source: Compiled from publicly-available financial statements of Keppel Corporation and SembCorp Industries.

External-oriented Services

Wealth advisory and brokerage & treasury clusters are poised for further growth this year.

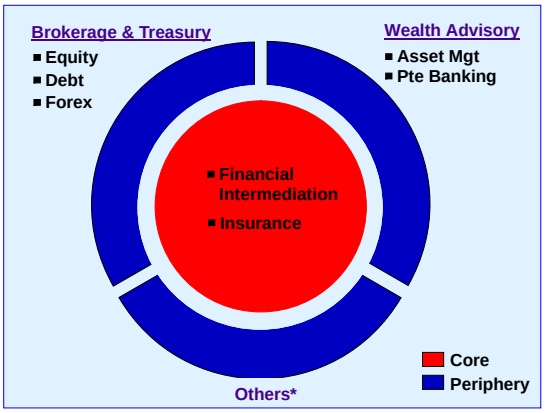
In the financial services sector, the offshore-oriented segments are poised to record another year of steady expansion. These sentiment-sensitive industries, which are strongly tied to conditions in international financial markets, include the wealth advisory and brokerage & treasury clusters. Figure 3.2 depicts the key clusters within the financial services industry. The sentiment-sensitive industries constitute an emerging "periphery", around a "core" that consists of the larger incumbent financial intermediation and insurance segments.

Within the periphery, clusters such as wealth advisory and brokerage & treasury services have seen higher growth rates in recent years, compared with that in the core clusters. Indeed, the former grew at an average annual rate of 9.5% over the 2001-06 period, more than double that of the core clusters. (Chart 3.10) Consequently, the share of the emerging clusters has increased. (Chart 3.11)

Going forward, the performance of the emerging clusters will be boosted by a number of growth drivers. First, Asia – for which Singapore is a key investor base – remains an attractive draw, given the strengthening outlook for Japan and the strong performance of China and India. In anticipation of further expansion in activity, the number of wealth management firms which have either newly established or expanded operations here, has continued to increase. Hiring activity in the industry has also intensified, as private banks strive to keep pace with demand from the growing pool of high net worth individuals in the region.

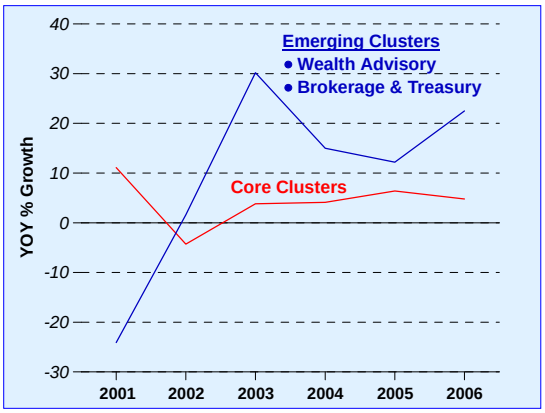
Second, the domestic capital markets are expected to remain healthy, having weathered the recent correction rather well. An added boost to capital market trading could come from the recent move to permit collective investment schemes – such as unit trusts and bond funds – to invest in financial derivatives, which was previously allowed only for the purposes of hedging risk. Nevertheless, further upside to trading activity could be capped as turnover volumes on the local bourse are already at all-time highs.

Figure 3.2
Financial Sector Clusters



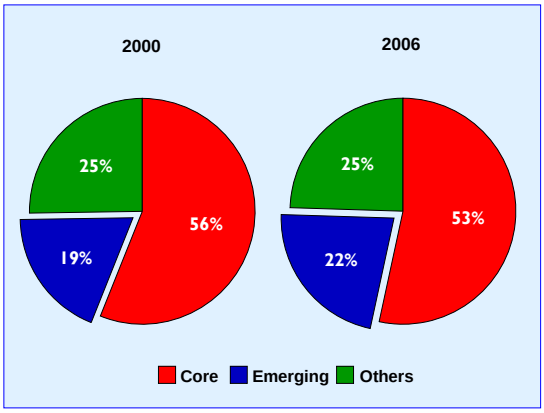
* Comprises mainly credit agencies, investment holding companies, public financial institutions such as MAS and CPF Board, and banks' fee & commission incomes.

Chart 3.10
Disaggregation of Financial Services Growth



Source: EPD, MAS internal estimates

Chart 3.11
Share of Financial Sector Clusters



Source: EPD, MAS internal estimates

Tourism-related industries will be boosted by major international conferences.

Singapore's tourism-related industries should continue to benefit from strong inflows of visitors this year. For 2007, the STB is expecting visitor arrivals of 10.2 million (an increase of 4.6% over 2006) and tourist receipts of $13.6 billion (9.7% higher than in 2006), supported by a number of major international conferences including the Global Entrepolis @ Singapore, which alone is likely to draw some 15,000 visitors. This comes on the back of the launch of the "Business Events in Singapore" incentive scheme last year, which promoted Singapore's attractiveness as a location for hosting major business events.

In addition, STB is stepping up its promotional efforts in emerging markets – including Russia and the Middle East – which have shown strong development potential. Russian visitor arrivals, for example, hit 38,000 last year, a 44% surge from the year before. Closer economic linkages with these two regions have also contributed to a rise in the number of business and medical tourists.

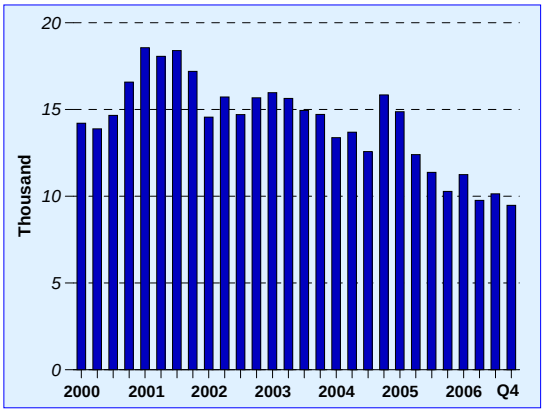
Domestic-oriented Industries

The upturn in the property market will have positive spillovers on construction and financial services.

In line with a general pickup in property prices and a strengthening of consumer sentiment, the domestic-oriented sectors should post steady growth this year.

House prices are expected to continue their ascent following the sequential gain of 4.6% in the first quarter of the year, a seven-year high. Aside from the luxury end of the market,[6] other mid- to high-end segments could also benefit from the steady stream of buyers who have sold their houses in en bloc sales. At the same time, on the supply side, the unsold stock of uncompleted private residential units has fallen to 9,500 in Q4 2006, from a high of 18,600 in Q1 2001. (Chart 3.12)

Chart 3.12
Unsold Stock of Uncompleted Private Housing Units

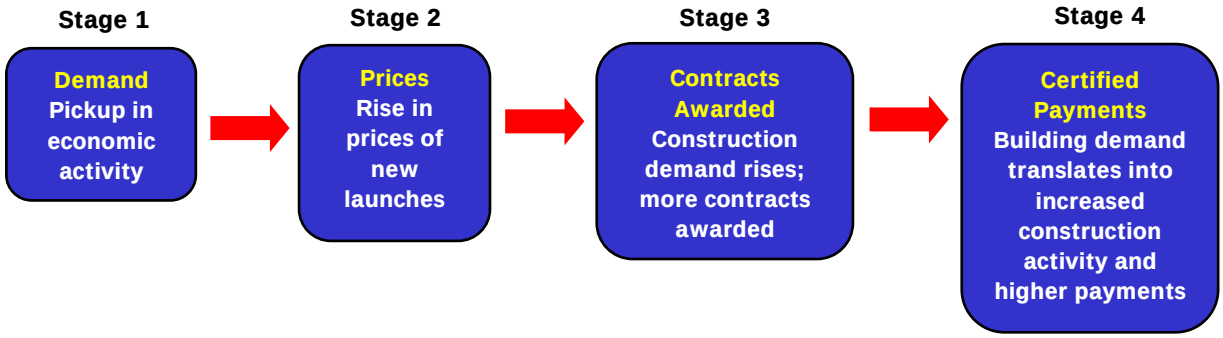


[6] With the prices of private residential property reaching new highs in recent months, the luxury end of the market is now a distinct segment, comprising property that is selling for around $2,000 psf and above.

The sustained recovery of the property market should trigger increased construction activity going forward. Figure 3.3 characterises the property-construction value chain. At present, the domestic property market appears to be approaching stage four of the cycle. Contracts awarded have trended up steadily from 2003 to reach $16.1 billion last year, a level not seen since 2000. This is expected to translate into higher certified payments and value added for the sector in the near term.

Indeed, the recovery of the construction sector continued in early 2007, underpinned by ongoing work in the residential segment. The recent spike in raw material costs arising from the sand supply disruptions has not resulted in delays in building projects, although in the future, new developments could be slowed or delayed if sand and concrete become more difficult to obtain. A number of ongoing major projects including the construction of the Marina Bay Financial and Business Centre, the integrated resorts and the downtown MRT extension will further fuel the recovery in the construction sector.

Figure 3.3
Property-Construction Value Chain



The large number of impending new commercial developments should also provide some impetus to credit extended to the building & construction industry, and other activities within the core financial intermediation cluster of financial services. On the consumer loans front, mortgage loan growth has remained tepid in recent quarters, but could see some upside in the months ahead as the residential property uptick at the luxury end begins to spread to the broader market.

The retail sector should see continued growth despite the impending GST hike.

Meanwhile, the domestic retail sector should continue to post healthy growth, amidst a positive outlook for the labour market. The sanguine near-term outlook for the retail sector in Q1 2007 is reflected in the *Business Expectations Survey*. (Chart 3.13) In particular, department store owners and retailers of furniture and furnishing are upbeat about business prospects in the first half of this year.

Nonetheless, there could be some volatility in retail spending arising from the GST hike on 1 July 2007. Based on the experience of the GST introduction in 1994 and the subsequent increases in 2003 and 2004, retail spending – in particular on big ticket items – can be expected to experience a spike in the immediate months before the increase in July. (Chart 3.14)

However, previous GST hikes did not appear to have a sustained impact on retail sales. Apart from 1994, when retail sales contracted for the year as a whole, following the imposition of GST, robust gains were recorded in 2003 and 2004. This suggests that factors such as prevailing economic conditions, including those in the labour market, are more important in influencing retail sales.

GDP growth to come in between 4.5% and 6.5% this year.

While there could be some moderation in growth momentum for the rest of H1 2007, due largely to weaknesses in the IT-related industries, some pickup is anticipated in the second half of the year. The recovery in domestic IT production in H2 should reinforce the steady growth momentum of the non-IT industries. On balance, GDP growth is likely to be within the 4.5-6.5% range this year, down from almost 8% in 2006.

This forecast is predicated on a relatively healthy external macroeconomic environment. As discussed in Section 3.1, there are some downside risks to growth, arising mainly from a sharper-than-expected contraction in the US economy. EPD will be closely monitoring external economic and financial developments.

Chart 3.13
Business Expectations for Retail Sales (Outlook for the next 6 months)

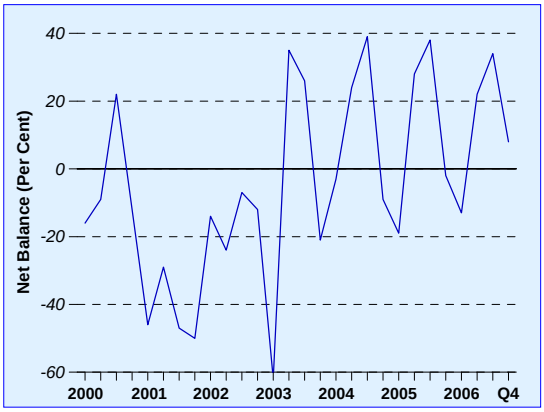
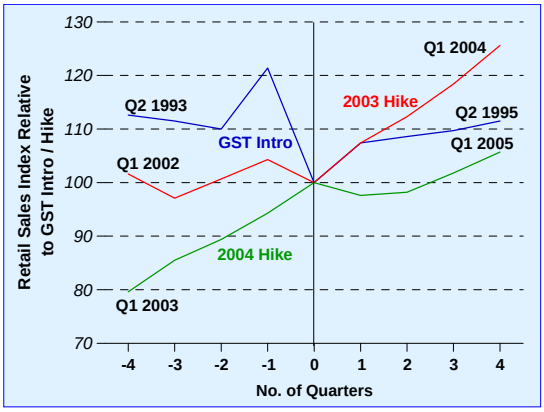


Chart 3.14
Retail Sales Volume



Note: Retail sales corresponding to point '0', i.e. the quarter when GST is introduced/increased, are normalised at an index reading of 100.

3.3 Labour Market

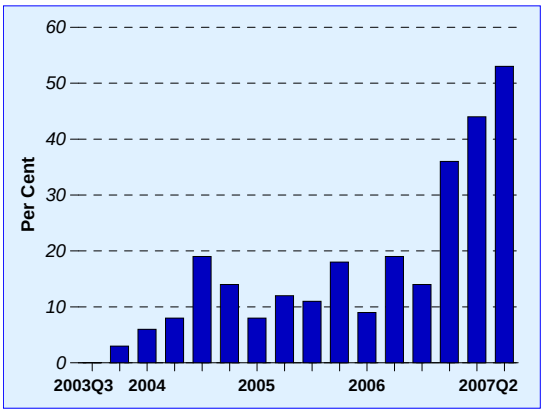
Hiring prospects remain firm in the first half of 2007.

Various surveys point to a positive employment outlook for the first half of this year. For instance, in its latest poll for Q2 2007, Manpower Inc. reported the strongest employment outlook since the establishment of the survey in 2003. (Chart 3.15) More than half (55%) of the 854 companies from various sectors indicated that they would increase headcount in Q2 this year and only 2% foresee a decrease in staffing levels. The remaining firms are likely to maintain current levels of employment.

The outlook for the financial services sector is especially bullish, as global banks centralise certain middle and back office functions in Singapore. Hiring expectations in the other services sectors are also expected to stay firm in tandem with sustained economic growth.

In the manufacturing sector, job prospects for the non-electronics segment remain favourable. According to the *Survey of Business Expectations of the Manufacturing Sector* by EDB, the marine & offshore engineering industry will continue to see significant hirings, while the pharmaceutical industry will increase headcount for new production lines. In contrast, hiring sentiment in the electronics industry has been dampened by weak demand in the semiconductor market.

Chart 3.15
Net Employment Outlook



Source: Manpower Inc.
Note: The net employment outlook is derived by taking the percentage of employers anticipating total employment to increase in the next quarter, and subtracting from this, the percentage expecting to see a decrease in employment.

Strong job gains are anticipated in the next few years, especially in high growth sectors.

According to MOM, the labour market will remain tight in the next five years. It has projected that 450,000 jobs will be added over this period if the economy sustains a growth rate of 4.5% to 6.5% each year. In growth sectors such as process technology, which supports the chemical, petrochemical and pharmaceutical industries, 10,000 supervisory jobs will be needed for the next three to five years. Similarly, the information and communications industry and the integrated resorts should generate 10,000 and 60,000 new jobs respectively over the same period.

Older local workers and foreign workers will be important sources of labour supply.

To support the creation of the 450,000 jobs over the next five years, MOM estimates that on the supply side, the overall labour force would need to grow at 3.5% each year, which is much higher than the average annual growth of 2.4% from 2000 to 2006.

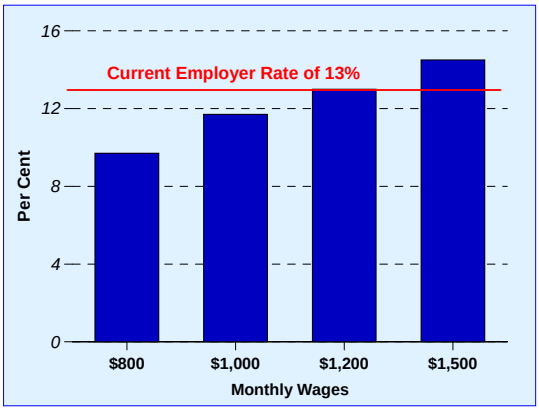
There is, therefore, a need to encourage workers to remain in the workforce longer and more locals to join the workforce. Specifically, MOM aims to raise the employment rate of older workers aged 55-64 years, from about 55% in 2006 to 65% in the next three years.

To facilitate the hiring of older low-wage workers, the employers' CPF contribution rate will remain at 13% or be reduced for employees aged 35 and above who are earning $1,200 or less. The employers' CPF contribution rates will be lower for those with lower wages, as shown in Chart 3.16. The rates for those aged 50 and above will also be scaled down. In addition, to incentivise these older workers to remain in the workforce longer, the employees' CPF contribution rate will be lowered to increase their take-home pay. To make up for the reductions in the CPF contributions, the government will give top-ups to these workers under the new Workfare Income Supplement Scheme (WIS).

The Tripartite Committee on Employability of Older Workers is also considering a re-employment law under which workers can continue to work even after retirement. The Committee will encourage firms to keep mature women in the workforce by adopting more flexible and family-friendly arrangements. With the CPF restructuring and the efforts of the Tripartite Committee, employment prospects for older workers could, therefore, improve if overall business conditions remain good.

However, even with the increase in older workers, the supply of local workers is still insufficient, given that growth of the resident workforce is expected to moderate from 3.5% per annum currently to about 1.7% beyond 2010. Hence, foreign labour will need to serve as a supplement to the local workforce to ease the tightness in the labour market.

Chart 3.16
Employers' CPF Contribution Rate with effect from July 2007



Note: For employees aged above 35 to 50 years.

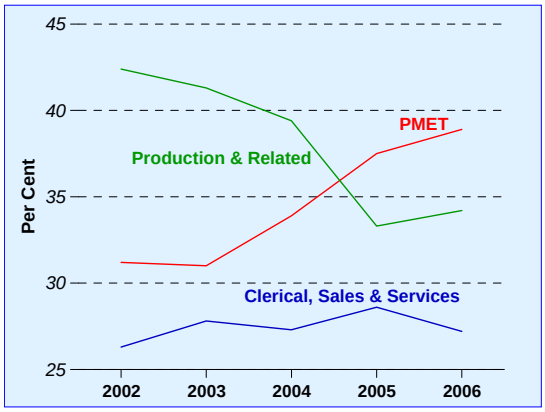
Several key changes have been made to the foreign worker policy to facilitate the hiring or retention of foreign labour. Notably, the Dependency Ratio (DR) for the construction and process sectors was raised from 1:4 to 1:5 in April 2007 in anticipation of several upcoming major projects. The S-Pass quota will also be increased from 10% to 15% from 1 June 2007, with the additional 5% coming from the companies' existing Work Permit Holders (WPH) quota. In addition, the maximum employment period for unskilled and skilled WPH will be extended by two and three years respectively, enabling employers to retain their WPH for a longer period.

The cost of hiring foreign workers in the manufacturing and services sectors will also be reduced, with the cut in the second tier foreign worker levy from $310 to $280 in April 2007.

Demand for PMETs will remain strong.

At the occupational group level, Professionals, Managers, Executives and Technicians (PMETs) will be the main beneficiaries of the increase in job opportunities over the next five years. MOM estimates that 50% to 60% of the 450,000 new jobs created will go to PMETs, reflecting the rising demand for software engineers, electronics engineers and budgeting & financial accounting managers in several industries. For instance, one-fifth of the 15,000 jobs to be created in the marine sector this year will go to engineers and technicians. There will also be an increase in job openings for PMETs in the IRs, with about 2,000 job offers. Indeed, the increased demand for PMETs is evident from the rising proportion of job vacancies for such jobs in recent years. (Chart 3.17)

Chart 3.17
Proportion of Job Vacancies by Occupational Group



New initiatives will be introduced to enhance job matching amidst ongoing restructuring in the economy.

PMETs also formed a significant 30% of total retrenchments in the economy, and as high as 50% of retrenchments in the services sectors in 2006. This follows from the changing requirements of PMET jobs and the need for workers to continue upgrading their skills. In view of this, the WDA will be launching the Professionals Conversion Programme (PCP) this year targeted at PMETs to prepare them for new careers in growth sectors, such as finance, marine and tourism.

In addition to the PMETs, lower skilled workers are given assistance in job placement. For instance, the Job Recreation Programme (JRP) launched in 2005 re-designed and found jobs for over 7,000 workers last year, with more than half of them having low skills. Similarly, the CareerLink Plus (CLP) scheme placed more than 200 long-term unemployed persons in 2006. These programmes will continue to increase the employability of structurally unemployed workers.

3.4 Inflation

Inflationary pressures in the domestic economy are well-contained.

For 2007, we expect inflationary pressures to remain well-contained. In particular, with the recent pullback in global oil prices, a moderation in the cost of energy-related items will dampen headline CPI inflation in 2007. At the same time, other price pressures remain benign. The effects of globalisation, coupled with Singapore's highly competitive business environment, have capped price increases across a broad range of consumer items. The open foreign labour policy has also helped to moderate wage growth and, in turn, price pressures. The 2% GST hike in July 2007 will lift inflation in 2007 and 2008, but the impact will be partially offset by other fiscal measures.

Oil prices are forecast to be lower in 2007 despite some risk factors.

Global oil prices have receded to an average of US$58 per barrel in the first quarter of 2007. Nevertheless, prices are likely to stay relatively high, as demand-supply conditions remain tight. For instance, the US Department of Energy has projected oil prices to average US$64 per barrel in both 2007 and 2008, only slightly lower than the US$66 per barrel in 2006.

Indeed, recent oil market developments point to prices remaining fairly firm. The steep decline in OECD oil inventories relative to seasonal norms in early 2007 suggests that there is already some tightening in the underlying supply and demand conditions. Oil demand is expected to stay robust amidst brisk growth in the global economy, notably China. The International Energy Agency (IEA) is projecting demand to climb by 1.5 million barrels per day (bpd) in 2007, compared to 0.9 million bpd in 2006.

On the supply side, OPEC has cut production quotas and the oil industry has been more susceptible to shocks because of limited spare capacity globally. This is largely the result of underinvestment in oil production facilities since the 1980s.

Consequently, the global oil market has become more volatile, reacting to supply disruptions and geopolitical instability involving major oil producers, and adverse weather conditions.

Consequently, energy-related items are expected to moderate headline CPI inflation.

Based on the assumption of a lower average oil price in 2007 and the high base in 2006, direct energy-related components will put downward pressure on headline CPI inflation this year. Indeed, electricity tariffs have already been reduced substantially, by 7.5% q-o-q in Q1 2007 and 5.7% in Q2. Similarly, the indirect pass-through effects of oil are likely to weaken in 2007.

Food prices will emerge as the dominant factor influencing CPI inflation.

With the pullback in energy prices, food prices will be the dominant contributor to inflation in 2007. For instance, imported prices of poultry, meat products and seafood look set to climb higher due to stronger demand from developing countries, where income has grown rapidly.

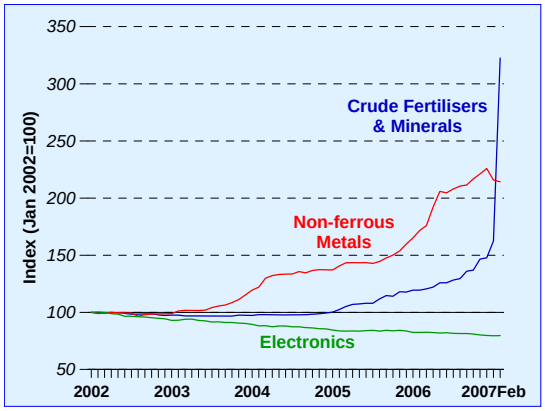
The prices of agricultural products that are used in bio-fuel production, such as sugar, corn and

soybeans, will also have more upside. A number of countries are encouraging the use of renewable bio-fuel, such as ethanol and biodiesel, in reaction to sustained high oil prices. As explained in Chapter 2.1, increased prices of these agricultural products will translate into higher prices of agricultural-derived products, including poultry and meat products. In addition, dry weather conditions associated with the La Niña phenomenon could hit the US, lowering its agricultural production at a time when global inventories are extremely low.

Non-oil import costs could remain on a downward trend.

Overall non-oil imported inflation is expected to be subdued due to sustained downward pressure on the prices of machinery & transport equipment and, specifically, electronics products. The prices of metallic products are also likely to increase at a slower pace, as a result of increased global production capacity for aluminium, copper and zinc. This should more than offset the inflationary impact of higher import prices of crude fertilisers and minerals, such as sand and granite. These have already risen by 98% (m-o-m) in February following the recent sand export ban in Indonesia. (Chart 3.18)

Chart 3.18
Crude Fertilisers & Minerals, Non-ferrous Metals and Electronics IPI



Modest labour cost increases are anticipated.

On the domestic front, the pace of job creation is likely to ease this year from the record high in 2006, on account of slower economic growth. This, in turn, will cap wage pressures. In addition, the 1.5% point increase in the employers' CPF contribution rate will translate into additional wage costs for employers, who are likely to take this into account and offer a smaller take-home salary increase to workers. This was the case between 1990 and 1994, when there were five rounds of hikes in the employers' CPF contribution rate but wage growth did not pick up noticeably. This was also the case in 2001.

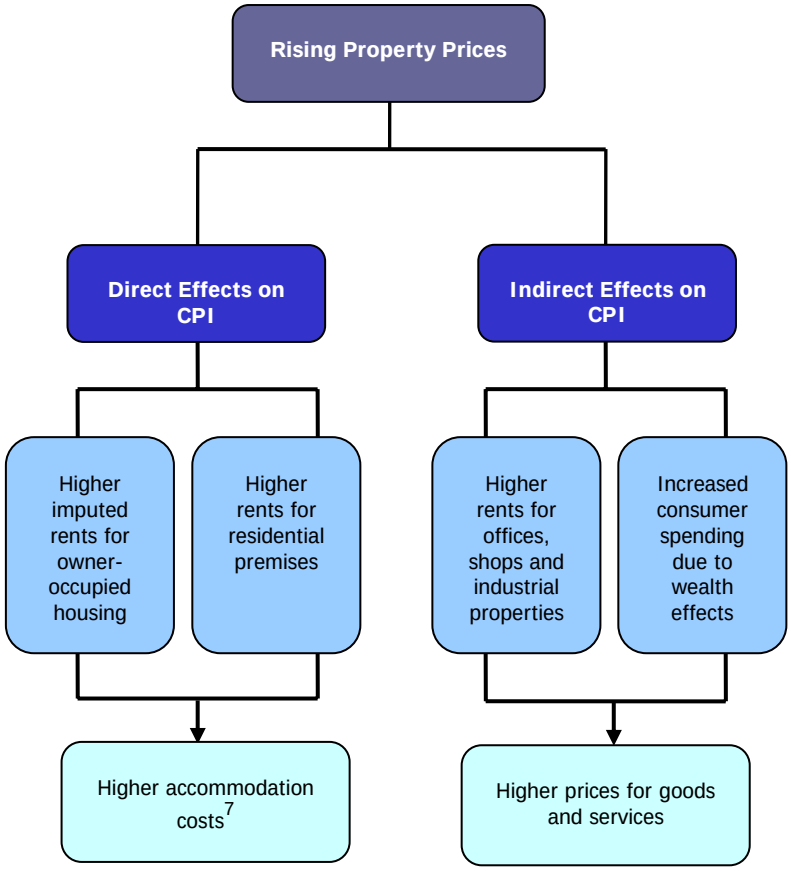
Nonetheless, with productivity growth projected to slow from 1.2% in 2006 to 0.5-1.0% this year, overall unit labour costs will probably edge up this year after five years of decline. However, this increase, at around 1.5%, is fairly modest, especially for this current advanced stage of the business cycle.

The property market upturn will impact positively on CPI inflation.

The impact of the recent upswing in property prices on CPI inflation in 2007 will be small. In Figure 3.4, we illustrate the direct and indirect channels through which the property market boom can influence the CPI.

Increased valuations for both HDB and private residential property will lead directly to higher imputed rents for the owner-occupied housing component of the CPI. The concomitant increase in residential rentals will also be reflected in the overall accommodation costs in the CPI. These direct effects are, however, expected to be mild, given that substantial price increases in the near term should be largely confined to the upper and middle segments of the private residential market.

Figure 3.4 : Transmission Channels from Property Prices to CPI Inflation



[7] The weight of accommodation costs in the CPI basket is 14%.

Indirectly, the prices of consumer goods and services could edge up as businesses pass on the higher costs of office, industrial and shop rentals. Consumer prices could also pick up due to increased spending from the wealth effects of higher property values.

On balance, the impact of rising property prices on CPI inflation is likely to be modest, with the direct impact contributing only 0.1% point in 2007, compared to the average of -0.2% point over the past three years. Going forward, EPD will be monitoring these property-related costs closely.

Health care cost inflation may rise due to fee adjustments at public medical institutions.

In the consumer services sector, health care cost inflation is likely to be moderately higher in 2007. Various polyclinics have already raised treatment charges after fee hikes in some government restructured hospitals this year.

On the whole, consumer services should continue to experience benign price increases given the modest wage pressures domestically.

However, private road transport costs continue to drag down CPI inflation.

The drag on CPI inflation arising from falling car prices is likely to taper off this year, given that the total number of COEs available for the period May 2007–April 2008 is 9.3% lower than in the same period a year ago. However, overall private road transport costs should fall in 2007 due to the decline in petrol prices.

CPI inflation in 2007 and 2008 will rise by 0.4-0.6% point each following the GST increase...

In 2007 and 2008, the CPI will be lifted by the increase in the Goods and Services Tax (GST) from 5% to 7%, effective July 2007. We estimated the impact to be a 0.4-0.6% point increase in baseline CPI inflation each year in 2007 and 2008. (See Special Feature B for our detailed analysis of the impact of GST on CPI inflation.)

...but will be dampened by other fiscal measures.

However, some of the measures announced in the 2007 Budget will partially offset the GST impact on the CPI. These include the reduction in road tax and the maid levy, as well as the extension of rebates on Service & Conservancy Charges (S&CC) and HDB rentals. In total, these will lower CPI inflation by about 0.2% point each year in 2007 and 2008. (Table 3.4)

Table 3.4
Impact of Selected Fiscal Measures on CPI Inflation

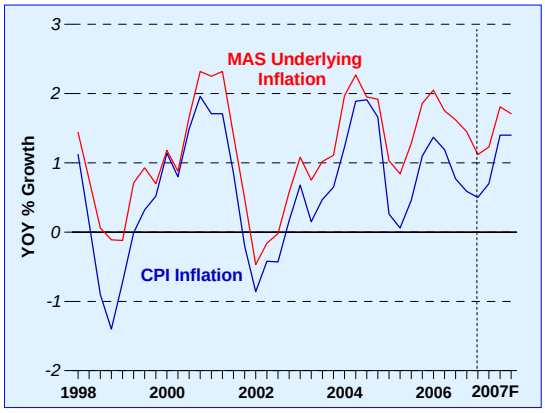
% point

Fiscal Measure	2007	2008
S&CC rebates	-0.09	-0.04
Rentals rebates	-0.003	-0.004
Road tax reduction	-0.03	-0.06
Maid levy reduction	-0.08	-0.08
Total Impact of Tax Reductions and Rebates	**-0.20**	**-0.18**

CPI inflation to be around 0.5-1.5% for 2007.

Taking all factors into account, including a softer oil price outlook and the 2% points GST increase, we expect overall CPI inflation to come in at 0.5-1.5% in 2007. The MAS underlying inflation measure, which excludes accommodation and private road transport costs, is forecast at around 1-2% for 2007. (Chart 3.19)

Chart 3.19
CPI Inflation and MAS Underlying Inflation



3.5 Assessing the Macroeconomic Policy Mix

Monetary Policy

The economy is expected to post continued growth in 2007, with inflationary pressures contained under the current policy stance.

The Singapore economy continued to expand at a steady pace in early 2007, following its strong performance in 2006. According to the *Advance Estimates*, GDP is estimated to grow by 7.2% on a q-o-q SAAR basis in Q1 2007, slightly slower than the 7.9% registered in Q4 last year.

The outlook for the external environment is fairly benign, with world economic growth expected to moderate somewhat in 2007 from the brisk pace seen last year. The global IT industry is likely to remain

sluggish in H1, with knock-on effects on the domestic electronics manufacturing segment. However, domestic economic activity will be supported by strong growth in specific non-electronics manufacturing industries such as marine and transport engineering, as well as continued steady expansion in the services and construction sectors. Overall, domestic GDP growth is projected to come in at a slower, but still firm, 4.5-6.5% in 2007.

Nevertheless, there are several downside risks. In the US, problems in the sub-prime mortgage market could lead to a tightening in financial conditions, resulting in a further correction in the housing market and curtailment of housing spending, with spillovers into the broader US economy and the rest of the world. Further, the global IT industry could remain sluggish for some time due to the overhang of inventories and competitive price pressures.

Domestic price pressures remain fairly well-contained, with the economy expanding only slightly above its potential output trajectory. (Chart 3.20) While the 2% points GST hike with effect from July 2007 is estimated to raise CPI inflation by about 0.5% point in both 2007 and 2008, the impact will be partially offset by other fiscal measures. In the labour market, employment gains hit a historical high of 176,000 in 2006, with the headline unemployment rate falling to a five-year low of 2.7%. Despite this, overall wage pressures have been capped by the inflow of foreign labour, although pockets of tightness have emerged in some industries. With the expected moderation in job creation and the recent changes in labour market policies, such as those to facilitate the hiring of foreign workers this year, wage growth should remain well-contained. Overall CPI inflation is forecast to come in at 0.5-1.5% under the current monetary policy stance.

MAS announced on 10 April 2007 that it would maintain the policy of a modest and gradual appreciation of the S$NEER policy band in the period ahead, with no change in its level, slope or width. This policy is consistent with the baseline scenario of stable growth in the Singapore economy along its potential output path, with inflationary pressures remaining well-contained.

Indeed, the MAS exchange rate policy of targeting a gradual and modest appreciation since April 2004 has played an important role as a nominal anchor for price expectations over the last three years of robust GDP growth, averaging 7.8% per annum. To gauge inflation expectations, we use CPI forecast data from the *Asia*

Chart 3.20
Real GDP and Output Gap

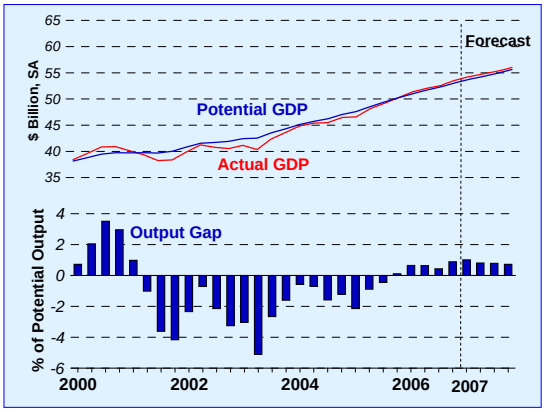
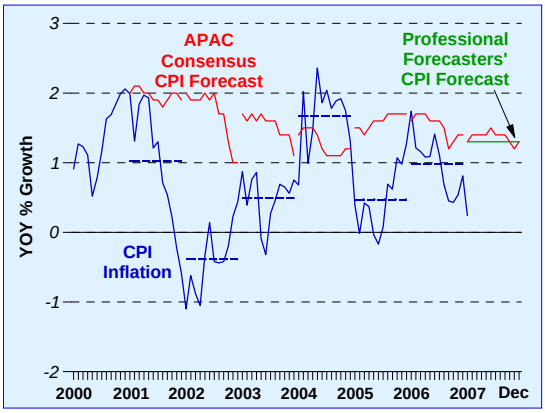


Chart 3.21
CPI Inflation Forecast
(One-year Ahead)

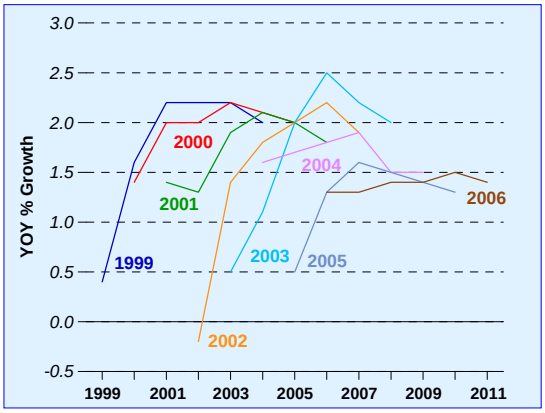


Source: Consensus Economics Inc.

Note: The blue line is the actual CPI inflation. Dotted lines represent the average CPI inflation rate for the whole year. The red and green lines show the one-year ahead forecasts of CPI inflation from the year before.

Pacific Consensus Survey. As shown in Charts 3.21 and 3.22, inflation expectations tend to hover between 1% and 2%. The profile of the five-year CPI inflation forecasts has also flattened in recent years to around 1.5%. (Chart 3.22) This suggests that inflation expectations have generally been well-anchored against the monetary policy framework and stance of the MAS.

Chart 3.22
CPI Inflation Forecast
(Five-year Ahead)



Source: Consensus Economics Inc.

Fiscal Policy

The FY2007 Budget measures embrace globalisation, while managing its negative consequences for income distribution.

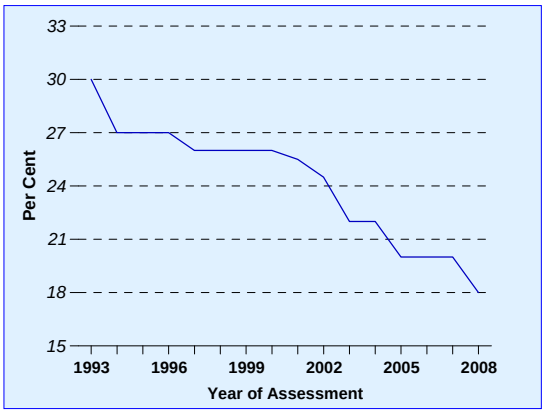
The FY2007 Budget contained a broad range of measures aimed at further preparing Singapore for the opportunities and challenges of globalisation. While the government pressed on with efforts to sharpen Singapore's competitive edge and strengthen its capabilities to reap the benefits of globalisation, it also took significant steps to manage the downside of a more integrated world, in particular, its adverse impact on income distribution. In this section, we highlight some key measures that were introduced.

Key Measures

The government continues to foster a pro-business environment.

Similar to previous years, the government continued to strengthen the operating environment for businesses. It is also promoting Singapore in a more targeted fashion as a hub for a range of "high-trust" services, such as high-end arbitration work in legal services, wealth management and Islamic finance in financial services, as well as logistics, maritime and aviation activities. To this end, various schemes and tax incentives were introduced or enhanced. In particular, the corporate income tax rate will be reduced to 18% from 20% with effect from YA2008 (Chart 3.23), to maintain competitiveness in the face of a trend decline in direct taxes worldwide. In addition, the partial tax exemption threshold was raised from $100,000 to $300,000, which effectively lowers the tax rate to below 10% for almost 80% of taxable companies in Singapore. The latter measure will especially benefit SMEs, and will enhance Singapore's attractiveness as a location for companies to start-up, grow and globalise.

Chart 3.23
Corporate Income Tax Rates



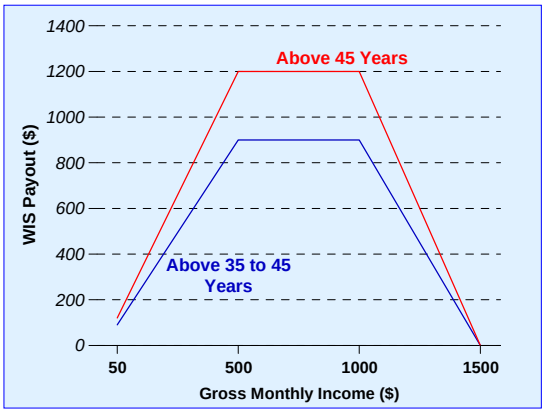
A permanent income supplement scheme for low-wage workers was introduced, representing an important shift in the government's policy on social spending.

Although the government continues to focus on pro-growth business strategies, it also recognises that the rewards of growth are not broadly distributed across all segments of society. Therefore, in recent years, the government has been helping the lower-income groups through various targeted assistance measures, while ensuring that the financing of such social assistance schemes remains sustainable. While the Budget this year was no exception in terms of fiscal prudence and discipline, it introduced measures to strengthen the social security system through the Workfare Income Supplement (WIS) Scheme, which supplements the market wages of low-income workers. Unlike the ad-hoc Workfare Bonus which was introduced during last year's Budget, the WIS Scheme is meant to be a permanent and more systematic programme aimed at encouraging workers at the lower end of the labour force to seek out jobs, stay employed and save for the future. The scheme supplements the income of low-wage workers to augment their life-cycle income. With assistance explicitly tied to work as a pre-condition, workfare aims to avoid the erosion in work ethic that is associated with a welfare system. (A discussion of the economic arguments supporting workfare can be found in Box E in the April 2006 issue of the *Review*.)

The WIS Scheme is expected to benefit over 400,000 Singaporeans, at a cost of around $400 million a year. The payout that a worker is entitled to receive is based on his age and income, as shown in Chart 3.24. The scheme is structured such that the payout is gradually phased in as income increases from the lowest end ($50 to $500 per month), so as to avoid creating disincentives to work more. The payout peaks at a gross monthly income of between $500 and $1,000, before gradually phasing out for incomes above $1,000 to $1,500. While the principal target group is full-time workers aged above 45 years and earning $1,000 or less, the WIS Scheme also benefits – albeit at lower payout rates – those between 35 and 45 years old who earn $1,500 or less per month.

Compared to last year's Workfare Bonus Scheme which applied only to low-wage workers aged 40 years and above, the WIS Scheme has a wider coverage. Based

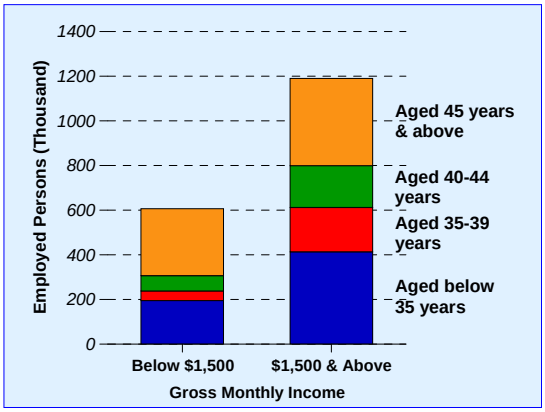
Chart 3.24
Annual WIS Scheme Payout for Employees



on MOM's *Report on Labour Force in Singapore*, it was estimated that a further 43,000 workers would benefit from this scheme. (Chart 3.25) In fact, as many as two-thirds of the workers earning less than $1,500 a month would be entitled to the payouts.

About 70% of the payouts would be credited into workers' CPF accounts, with the remaining disbursed in the form of cash. This will more than offset the reduction in employer and employee CPF contribution rates for older low-wage workers that was also announced in this Budget, which is aimed at increasing their take-home pay and improving their employability.

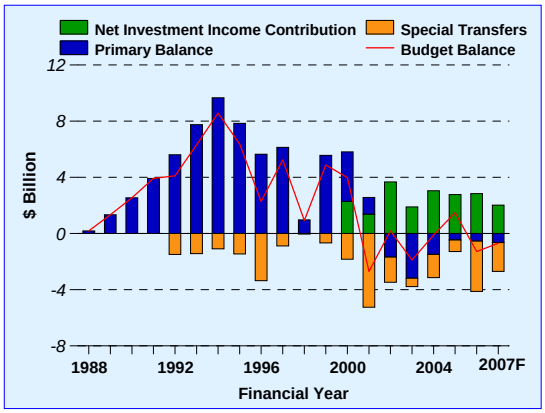
Chart 3.25
Employed Persons by Income and Age Group, 2006



To release more revenue to meet rising expenditures, the government plans to factor in capital gains for net investment income.

With the reduction in direct taxes, coupled with rising expenditure needs (for social security and healthcare), the government's primary budget – defined as operating revenue less total expenditure – has been in deficit in recent years, compared to the generally strong surpluses recorded in the 1990s. (Chart 3.26) In the FY2007 Budget, the government announced two ways of augmenting its revenue sources to ensure long-term fiscal sustainability. First, it will be including capital gains (in addition to interest and dividends) in net investment income (NII) that is made available to fund current expenditure.[8] This represented another significant shift – apart from the introduction of a permanent income supplement – in the government's thinking on budgetary financing issues. On the basis of fiscal prudence, the government had in the past adopted a very conservative definition of income from reserves available for current expenditure. While the details are still being worked out, the amount of contribution from NII to revenue will be boosted going forward.

Chart 3.26
Components of Budget Position



There will also be a 2% point increase in the GST rate.

The second approach to augment revenue is through indirect taxation in the form of the GST. In this Budget, the government announced an increase in the GST rate from 5% to 7% with effect from 1 Jul 2007. This is expected to raise an additional $1.5 billion of revenue per year. (Please refer to Special Feature B for an analysis of the impact of the GST hike on CPI inflation.)

[8] The existing 50% cap of NII that can be included in the Budget each year for the current spending needs of the government remains.

To alleviate the increased burden on households arising from the GST hike, the government has put in place a comprehensive offset package amounting to $4 billion over five years. For the majority of Singaporeans, the offset package would cover at least five years of the increase in their GST payable; while for lower-income groups, it could be worth as much as 19 years of their additional GST payable, based on MOF's estimates.

The GST offset package is weighted more towards the lower-income group, compared to the FY2002 Budget.

The items in the offset package include direct cash transfers, rebates and other additional help for the lower-income households.

A comparison with the offset package from the FY2002 Budget, during which the previous GST rate increase was announced, shows that the current package will cost the government the same amount (about $4 billion), and is also sufficient to offset the additional GST that almost all Singaporeans will pay for at least five years. Nevertheless, it is clear that the current offset package is weighted more heavily towards the lower-income groups. This is achieved, in part, by a carefully targeted implementation scheme whereby recipients are identified by more stringent criteria.

For example, in the FY2002 Budget, the direct transfers that an individual received, in the form of the Economic Restructuring Shares (ERS), depended only on the value of the home that he or she had lived in. For the equivalent direct transfers in the form of GST Credits in the latest Budget, there is an additional criterion based on income. Thus, a person with an annual assessable income of less than $100,000 living in a landed property would have received $600 of ERS, but will receive only $400 of GST Credits. If his income were more than $100,000, he will get only $100 of GST Credits. In addition, even within the housing value criterion, there is greater differentiation for GST Credits (compare Tables 3.5a with Table 3.5b). The Senior Citizens' Bonus, which is a new measure in the current Budget, also adopts a structure similar to the GST Credits, in that the distribution of payouts is dependent on both housing value and income.

Table 3.5(a)
Structure of GST Credits (FY2007 Budget)

<table>
<tr><th colspan="2" rowspan="2"></th><th colspan="3">Annual Value of Home</th></tr>
<tr><th>$5,000 or less</th><th>More than $5,000 and up to $10,000</th><th>More than $10,000</th></tr>
<tr><td rowspan="3">Annual Assessable Income</td><td>$24,000 or less</td><td>$1,000 ($250 per year for 4 years)</td><td rowspan="2">$800 ($200 per year for 4 years)</td><td rowspan="2">$400 ($100 per year for 4 years)</td></tr>
<tr><td>More than $24,000 and up to $100,000</td></tr>
<tr><td>More than $100,000</td><td colspan="3">$100 (for 1 year)</td></tr>
</table>

Table 3.5(b)
Structure of Economic Restructuring Shares (FY2002 Budget)

Annual Value of Home	
Up to $10,000	**Above $10,000**
$1,200 ($400 per year for 3 years)	$600 ($200 per year for 3 years)

The government expects to run a small budget deficit in this fiscal year.

Taking the budgetary measures into account, the government expects to run a budget deficit of $0.7 billion (0.3% of GDP) in FY2007, smaller than the $1.3 billion (0.6% of GDP) deficit in FY2006. (Table 3.6) This takes into account the special transfers totalling $2.1 billion, as well as the net tax gain of $0.3 billion (arising from the 2% point increase in GST and the 2% point cut in corporate income tax). Excluding the special transfers, there would be a budget surplus of $1.4 billion in FY2007.

Table 3.6
Summary of the Budget

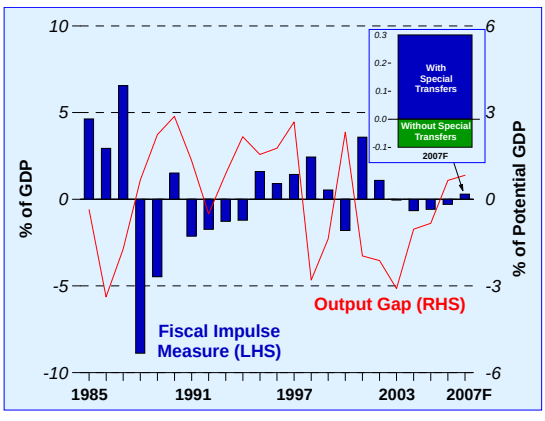
	FY2006 Revised		FY2007 Budgeted	
	$ billion	% of GDP	$ billion	% of GDP
Operating Revenue	30.0	14.0	32.4	14.3
Total Expenditure	30.5	14.3	33.0	14.6
Operating Expenditure	24.4	11.4	25.9	11.4
Development Expenditure	6.1	2.9	7.1	3.2
Primary Surplus/Deficit (-)	-0.5	-0.3	-0.6	-0.3
Add: Net Investment Income Contribution	2.8	1.3	2.0	0.9
Less: Special Transfers	3.6	1.7	2.1	0.9
Budget Surplus/Deficit (-)	-1.3	-0.6	-0.7	-0.3

Note: Figures may not tally due to rounding.

The fiscal policy stance is slightly expansionary in 2007.

The overall macroeconomic impact of the budget can be characterised by the fiscal impulse measure, which is the stimulus to aggregate demand from fiscal policy during a given year. Following three consecutive years of contractionary fiscal policy, when stimulus was gradually withdrawn as the economy returned to its potential growth path, the FI measure is estimated to switch to a small positive of 0.3% of GDP in CY2007, indicating a mild boost to the economy this year.[9] (Chart 3.27) This takes into account the special transfers amounting to about $1 billion,[10] which have the effect of directly increasing private disposable income. Nevertheless, these measures were not designed to provide a

Chart 3.27
Fiscal Impulse Measure and Output Gap



[9] Note that this analysis is done on a CY basis, while the FI measure in MOF's *Budget Highlights* is on a FY basis.

[10] These include the GST Credits ($530 million), the second payout of the Workfare Bonus announced last year ($200 million), Senior Citizens' Bonus ($68 million), as well as rebates for utility, service & conservancy charges and rental. Note that the first payout of the WIS Scheme announced in this budget will only take place in January 2008.

short-term stimulus to the economy, but rather to give support to the lower-income groups with a view to narrowing the income gap. Abstracting from these special transfers, the fiscal impulse is estimated to remain contractionary at -0.1% of GDP this year.

We also simulated the effects of the budgetary measures using the Monetary Model of Singapore (MMS). The richness of the MMS allows us to trace through these effects as they percolate through the economy. The fiscal measures will have an income effect on households, as well as change key relative prices in the economy, which will cause economic agents to alter their behaviour. For example, the special transfers will add to households' disposable income (a positive income effect), which will in turn provide a boost to private consumption, with positive spillovers on the rest of the economy. In the case of firms, the corporate tax reduction will lower the cost of capital relative to labour, thereby increasing the returns to capital and leading to a boost in investment. In the longer term, the permanent corporate tax cut will also enhance Singapore's attractiveness as an investment destination vis-à-vis other countries.

The simulation results show that the overall budget package is largely neutral in its effect on GDP in 2007 and boosts it slightly by 0.3% point in 2008. Over the next two years, private consumption will not be too adversely affected by the GST hike, as the dampening effect of the tax increase will be substantially offset by the special transfers given to low-income households which have a higher propensity to consume. In 2008, investment will be mildly boosted by the reduction in the corporate tax rate, which comes into effect in YA2008.

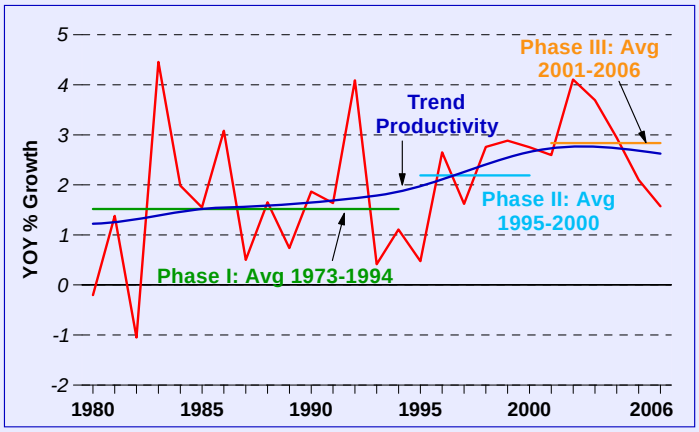
Box C
Is US Potential Growth Declining?

Though the US economy appears to have expanded faster than its long-term trend growth rate in recent years, some analysts have recently expressed concern that its *potential* growth rate may be on the verge of a structural decline. Two factors that could result in a structural decline are (a) slower labour productivity growth; and (b) a smaller potential labour force.[1/] This box item reviews the key issues behind this debate and concludes that US potential growth is unlikely to fall off sharply over the medium term despite declining labour force participation rates, as the factors underpinning sustained productivity growth are likely to remain in place.

(a) Slower trend labour productivity growth?

In 2006, output-per-hour in the US non-farm business[2/] sector grew by 1.6%, the slowest pace in over a decade, and more in line with the sluggish average productivity growth during 1973-1994. (Chart C1) Moreover, after reaching a peak in 2002, the trend rate of productivity growth has eased, albeit slowly, every year since, suggesting that the recent decline in the growth rate may be more permanent (or structural) in kind.

Chart C1
Phases in US Non-farm Productivity Growth



Source: CEIC. Trend productivity estimated with the Hodrick-Prescott filter.

To examine this issue in closer detail, Jorgenson *et al.* (2007) decompose US productivity growth into the following components:

$$Y(Y_{IT}, Y_n) = A(A_{IT}, A_n) \bullet f(K(K_{IT}, K_n), L) \qquad (1)$$

where Y denotes labour productivity, and the subscripts IT and n refer to productivity gains accruing to the IT-producing and non-IT producing sectors, respectively. In equation (1), A refers to total factor productivity (TFP) growth or technological progress accruing to the two sectors, K refers to capital services derived from IT and non-IT assets, and L denotes labour quality.

Economists are generally in agreement that the rapid productivity gains in Phase II (as identified in Chart C1) can be attributed largely to technological improvements in the IT-producing sectors (A_{IT}). In particular, these

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1/ An economy's output (potential and actual) can be broken down into the following components:

Output = Labour Productivity x Avg Hours Worked x Employment Rate x Labour Force Participation Rate x Working Age Population

2/ Hereafter, the terms productivity, or labour productivity will be used to denote non-farm business labour productivity.

improvements led to significantly cheaper IT-capital, and firms responded by increasing investment in this area.

Interestingly, the gains from IT-related investments appear to be concentrated in relatively few industries. McKinsey (2005) estimated that six out of 59 industries in the US accounted for nearly all the productivity gains during 1995-1999. These were mostly IT-producers or sectors using IT to enhance business processes: semiconductors, computer manufacturing, wholesale trade, retail trade, telecommunications and securities.

The "IT-biased" nature of productivity gains in Phase II has led some sceptics to doubt the ability of IT to generate *sustainable* boosts to potential growth. For example, Gordon (2000) argued that the IT-driven "new economy" ran on technological advances that were smaller in scale (and impact) than the five major groups of invention in the late 19th century.[3/] Gordon expects US trend productivity growth to decline steadily once the IT-related gains work their way through the economy.

The current dip in actual productivity growth notwithstanding, there appears to be little evidence to support a structural decline hypothesis for US trend productivity growth. Despite the burst of the tech bubble, US productivity growth has remained surprisingly strong during 2000-04, and largely driven by technological innovations in the non-IT sectors (A_n) as well as investment in non-IT capital (K_n). In particular, productivity growth has accelerated in service industries that traditionally did not produce nor use IT-services, such as administrative support services, scientific and technical services, construction and restaurants. Bosworth and Triplett (2006) found that between 2000-04, TFP growth in services-producing sectors accelerated to 1.7% p.a., compared to 1.1% p.a. over the preceding five years. This more than offset the smaller contribution to productivity growth from IT-capital, as well as stagnant productivity gains from the goods-producing sectors.[4/] These findings concur with the estimates of Oliner *et al.* (2007) that productivity contributions from non-IT producing/using sectors, such as professional services, ambulatory health care, and food, beverages and tobacco, remained high, or even accelerated in Phase III as compared to Phase II.

In addition, changing corporate incentive structures and competitive product markets in the US will likely continue to be a significant driver of productivity growth. Feldstein (2003) postulated that US managers' pay is increasingly bonus/options based, which encourages them to undertake potentially risky or difficult activities which enhance productivity growth. Empirically, these incentive structures are associated with R&D that creates more useful innovations, as measured by the extent to which patents are cited (Lerner and Wulf, 2006). Comin and Hobijn (2007) found that while *innovation* raises *trend* productivity, it is the *implementation* of technology that affects *actual* productivity. Managers who are incentivised to adopt new technologies enhance technological diffusion, thereby increasing the rate of return to R&D firms. This generates a virtuous cycle of innovation that raises long-run potential growth. Resource reallocation is also intense in industries facing competitive pressures. Firms are compelled to minimise increases in headcount or working hours, thereby raising productivity.

(b) Decline in the potential labour force?

Unlike trend productivity growth, the decline in the trend labour force participation rate (LFPR) is clearly more evident. Aaronson *et al.* (2006) found that the absence of a significant rebound in the LFPR after 2005 indicates that there might be structural forces at work.

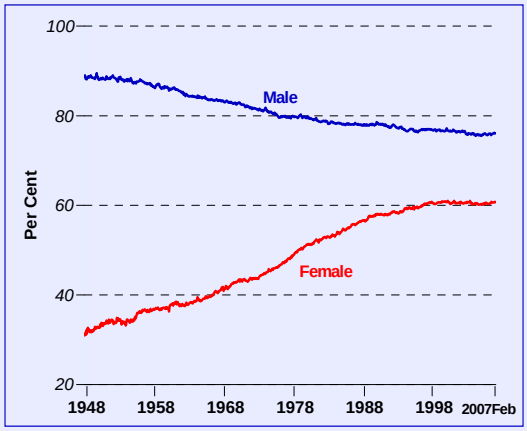
3/ The "Group of Five" refer to electricity; the internal combustion engine, which enabled automotives, motor transport and air travel, as well as highways and supermarkets (which rely on timely, large-scale deliveries by trucks and planes); chemicals and materials, such as cement, petroleum and its by-products; the entertainment, communication and information innovations such as the television, radio, the movies and mass-communication media; and health and sanitation infrastructure.

4/ Bosworth and Triplett (2006) estimates of productivity are derived from economic value added, and not gross output.

First, after increasing from 38% in 1960 to 60% by 2000 (Chart C2) the female LFPR appears to have peaked. Second, given the size of the baby-boomer cohort and the relatively low LFPR of those aged 65 and above (Chart C3), the aging of the baby-boomers will drive the overall LFPR down over the medium-term. Third, an increasing proportion of young people (16-24) are now entering the labour force later in the life cycle, reflecting, in part, increased education opportunities as well as the higher returns to education.

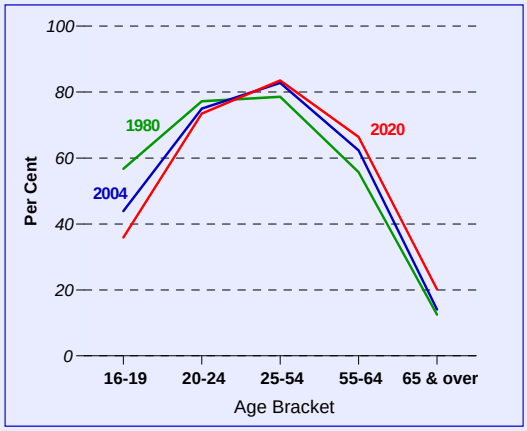
While lower mortality rates and a degree of work restructuring to suit more elderly workers might raise the LFPR of those aged 65 and over, the US Bureau of Labour Statistics (BLS) predicts only a small positive contribution to LFPR from this factor by 2020. They also show that this contribution is not sufficient to offset the negative factors described above, with the result that trend LFPR is projected to decline going forward. (Chart C4)

Chart C2
Male & Female Labour Force Participation Rates 1948-2007



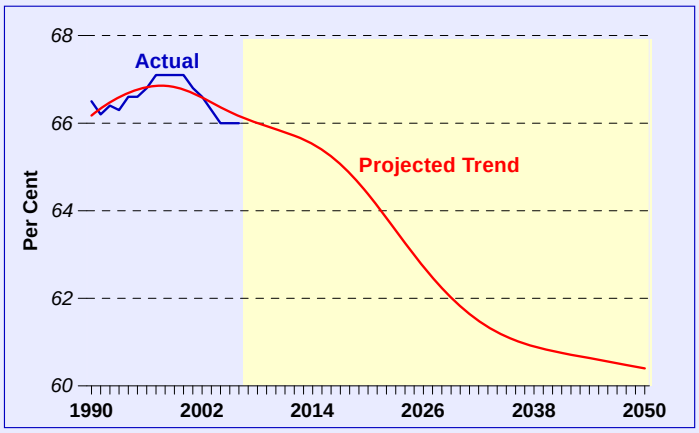
Source: US Bureau of Labour Statistics

Chart C3
LFPR distribution by age



Source: US Bureau of Labour Statistics

Chart C4
Projection for trend LFPR (2006-2050)



Source: US Bureau of Labour Statistics

Nonetheless, a number of mitigating factors could alter the mix of workers in the labour force to raise labour productivity growth. First, prime-age and older workers tend to have more experience and knowledge than those in the 16-24 years age bracket. Moreover, as the baby-boomer cohort approaches retirement age, a higher proportion of them are projected to remain in the workforce, which should help raise labour quality (L). Second, to the extent that potential workers are holding off labour force participation for more education, this should also increase future labour productivity. As these highly educated and innovative workers enter the labour force later on in life, labour quality (L) and total factor productivity growth (A_{IT} and A_n) should be enhanced, thereby helping to sustain potential GDP growth.

These hypotheses are not without contention. More recently, Jones (2005) argued that even if innovation did not run into diminishing returns to scale, workers are limited in their capacity to absorb knowledge. As innovations are becoming more complex, firms will require more workers with highly-specialised and complementary knowledge that are able to operate in 'teams'. With a smaller labour force, it would become increasingly more difficult to generate the marginal innovation.

To assess these competing views and account for the impact of slower trend productivity growth due to a declining labour force, we estimated the following equation 2:

$$\Delta(gdp)_t = \alpha + \beta_1 \Delta(pdty)_t + \beta_2 \Delta(lfpr)_{t-1} + \beta_3 \Delta(unemployment)_t + \varepsilon_t \qquad (2)$$

We regressed GDP growth on non-farm productivity $\Delta(pdty)$, the change in the labour force participation rate $\Delta(lfpr)$ and the change in non-farm business employment $\Delta(employment)$ using annual data over the period 1950 to 2006.[5/] The regression produced statistically significant coefficients at the 5% level for productivity growth (+0.79), lagged LFPR change (-0.39), and employment growth (+0.88).

Next, to forecast trend GDP growth forward (2007 to 2015), we used the following forecasts for the independent variables: for productivity, we used baseline point estimates from Oliner *et al.* (2007), which augment the Jorgenson *et al.* (2007) productivity growth framework to take into account adjustment costs arising from the installation of new capital goods and an estimate of investments in intangible assets. This baseline productivity growth scenario implies an average productivity growth rate of approximately 2.3% p.a. over 2007-15. The change in the LFPR is derived from the US Bureau of Labour Statistics' projections of labour force participation rates. Non-farm employment follows Jorgenson *et al.* (2007), and is set to grow at the average of the 1990-2004 rate. Under our assumptions, the parameter estimates imply that US potential growth will ease from 3.1% currently to 2.8% by 2015.

Sum-Up

Though the US economy appears to have expanded faster than its long-term trend growth rate in recent years, some analysts have recently expressed concern that its potential growth rate may be on the verge of a structural decline. This box has reviewed the key issues behind this debate and concludes that potential growth in the US is not expected to fall off sharply, as there appear to be a number of supply-side factors, such as technological innovations, cost-savings, competition-driven new business processes and product enhancements, that will mitigate the effects of the projected decline in the potential labour force.

5/ The original equation also included the growth in potential non-farm hours worked and population growth but these two variables were not statistically significant, and were dropped in the final specification. The subscript t refers to the time period. The equation produced an R^2 of 0.95, with a Durbin-Watson test statistic of 1.61.

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SPECIAL FEATURES

Special Feature A

Assessing the Performance of Professional Forecasters

If I could look at your most recent forecasts and accurately say,"Your next forecast will be 2% lower than today's," then you can surely improve your forecasts.

William Nordhaus (1987)

Introduction

The January 2002 issue of the *Review* carried a special feature that highlighted the challenges encountered by economic forecasters when making predictions over periods of uncertainty. Specifically, the feature examined the forecasts of Singapore's real GDP growth made in 2000-01 by EPD and private sector analysts participating in the *MAS Survey of Professional Forecasters*. An interesting finding was that, although the bulk of forecast errors had been caused by random shocks, forecasters in general tended to react sluggishly to new information.

Since this early feature, the structure of the *Survey* has evolved and it now provides a fairly rich source of information on the prognostications of private sector analysts regarding key macroeconomic variables of the Singapore economy. It is therefore timely to take a further look at these economic predictions.

There are several motives for doing this. First, evaluations of forecast rationality and efficiency are closely linked to tests of the rational expectations hypothesis, first formulated by Muth (1961). Muth asserted that expectations about an economic variable are "informed predictions of future events", and that they are rational if formed in a way that is consistent with the underlying economic theory. Second, the findings from a study of private sector forecasters in Singapore can be compared to similar research reported for other countries.

Third, the results of an *ex post* forecast evaluation can provide suggestions and hints on how predictions could be improved in future. Suppose that our findings show that historical forecasts were biased or did not fully take into account information which had been available to economic agents at the time the forecasts were made. Then in principle, the accuracy of *ex ante* predictions could be enhanced if such information had been taken into consideration.

This special feature represents the first attempt to rigorously assess the performance of Singapore's professional forecasters using survey data. It begins by discussing the concept of rationality in its weak (unbiasedness) and strong (efficiency) forms. Next, we describe the forecast evaluation methodology in detail and the statistical tests used to examine the rationality of the different types of forecasts contained in the *Survey*.

The empirical results we obtain put Singapore's forecasters in a favourable light *vis-à-vis* their counterparts elsewhere. In particular, we find that their short-term predictions are generally unbiased except in the case of inflation and are more likely to be biased when they are evaluated against revised outcomes – a rather stringent yardstick given the substantial revisions made to macroeconomic data. Moreover, in contrast to the previous study, we find that forecasters have been relatively efficient in incorporating the latest information into their forecasts for GDP growth.

This feature was done in collaboration with Choy Keen Meng from the Division of Economics, School of Humanities and Social Sciences, Nanyang Technological University.

Rationality: Unbiasedness and Efficiency of Forecasts

The most widely accepted means of assessing the performance of forecasters is through the twin criteria of *unbiasedness* and *efficiency*. These concepts are enshrined in the different notions of forecast rationality. "Weak" rationality or unbiasedness is the stipulation that forecasters do not make systematic errors in their forecasts, and it can be tested by comparing actual and predicted time series. "Strong" rationality or efficiency requires forecast errors to be uncorrelated with the relevant economic variables representing the information available at the forecast origin. Studies of the rationality of macroeconomic forecasts and of survey-based predictions include Mincer and Zarnowitz (1969), Figlewski and Wachtel (1981), Zarnowitz (1985), and Keane and Runkle (1990).

Rolling Event Forecasts

The two-pronged concept of rationality has been applied to different types of forecasts, namely "rolling event" and "fixed event" forecasts. Rolling event forecasts refer to predictions whose forecast length is fixed as we move along the available sample of forecasts and outcomes. In other words, these are forecasts of the value of a variable at different points in time but made with a fixed lead. In the *Survey*, for example, the rolling event forecasts of GDP growth in Q1 2001, Q2 2001 etc. are always made one quarter in advance of the outcome.

Almost all forecast evaluation studies have focused on the rationality of rolling event forecasts. Specifically, many papers have analysed the trade-off between the prediction lead and the size of the errors made in such forecasts.

Within this framework, tests of unbiasedness are often based on the Mincer-Zarnowitz regression:

$$A_{t+h} = \alpha + \beta P_{t+h|t} + \varepsilon_{t+h} \qquad (1)$$

where A_t is the actual outcome for the variable of interest, $P_{t+h|t}$ is the *h*-step ahead prediction made at time *t*, and ε_t is a random error term. Forecasts are deemed to be unbiased if the null hypotheses $\alpha = 0$ and $\beta = 1$, individually and jointly, are not rejected under a specified level of significance.[1] This can be tested with the usual Wald tests.

Fixed Event Forecasts

We also investigate the rationality of fixed event forecasts which, unlike rolling event forecasts, are projections of the same event (also called the target date) made with different lead times. In the *Survey*, the multiple forecasts of full-year GDP growth made at different quarters are of this nature. In practice, however, only a small number of forecasts are available for any given target date, rendering statistical analysis of the sequence of forecasts unreliable. To compensate for this, we pool together the forecasts of a particular macroeconomic variable over a number of different target dates.[2]

Fixed event forecasts are ideal for testing if new information is immediately and fully reflected in the latest predictions. The techniques we employ for examining efficiency in this restricted sense follow Nordhaus (1987) and Clements (1995, 1997). These studies test for efficiency in pooled data by using the revisions in forecasts made of the same event but at different horizons. The two conditions needed for efficiency to hold are: (a) the forecast error made with a *h*-period lead is independent of all forecast revisions made with a lead longer than *h* periods; and (b) the revision made with a lead of

[1] Holden and Peel (1990) show that the test provides a sufficient, but not necessary, condition for unbiasedness.

[2] Pooling fixed event forecasts requires the assumption that the revisions made to forecasts are independent across all target dates and forecast horizons. As Clements (1997) argues, this is likely to be a poor assumption in practice. We relax it partially below by including year-specific fixed effects into our estimation procedures. Furthermore, to guard against heteroscedasticity in the regressions carried out in this study, we report White's heteroscedasticity-robust standard errors throughout.

h periods is independent of all earlier revisions. To check if the second condition holds, we run the following type of regression as in Clements (1997):

$$\upsilon_{\tau|\tau-h} = \gamma \upsilon_{\tau|\tau-h-1} + \xi_{\tau,\tau-h} \quad (2)$$

where $\upsilon_{\tau|\tau-h}$ is defined as the revision between the *h* and *h* + 1 steps ahead forecasts of a fixed event occurring at time τ :

$$\upsilon_{\tau|\tau-h} = P_{\tau|\tau-h-1} - P_{\tau|\tau-h} \quad (3)$$

and ξ is an error term.

The test of efficiency in equation (2) is based on whether the autoregressive coefficient γ differs significantly from zero. Again, this can be ascertained using the standard *t*-test, assuming that forecast revisions constitute a stationary series. More generally, if the revisions are found to obey an autoregressive moving average (ARMA) process, then this contradicts the hypothesis that forecast revisions are uncorrelated, implying that smoothing of forecasts takes place or there is some inertia on the part of analysts in revising their forecasts.

Survey Data

We use data from various issues of the *Survey*, which provide a regular and comprehensive reference on the collective expectations of key macroeconomic indicators held by private sector forecasters based in Singapore. In order for forecasters to incorporate the latest available information into their predictions, the *Survey* is conducted and released to the public in the last month of each quarter of the year following the release of economic data for the preceding quarter by the government.[3]

Since its inauguration in December 1999, the *Survey* has undergone a number of changes in its reporting format and write-up. However, a key feature that remains unchanged is the focus on reporting "consensus" forecasts – notably the mean and median forecasts – rather than individual forecasts. In terms of forecast objects, there have been no significant changes to the list of macroeconomic indicators polled. There have, nonetheless, been revisions to the forecast spans. Moreover, the *Survey* draws a distinction with regard to the relative importance of variables. For instance, in addition to the one-quarter ahead and current year forecasts that are required of all variables, survey participants are also requested to provide a quarterly breakdown of their current-year and next-year predictions of GDP growth. The one-quarter ahead forecasts are available from the first quarterly survey in December 1999 to December 2006, yielding a total of 29 data points.[4]

Macroeconomic Variables

We focus on four key macroeconomic variables which are routinely projected by our sample of professional forecasters. They are:

- *GDP growth*
- *CPI inflation*
- *NODX growth*
- *unemployment rate*

The first three variables are expressed in terms of y-o-y quarterly percentage changes, whereas in the case of *unemployment rate*, the figure at the end of each quarter has been utilised.[5]

At the outset, we decide to run the Mincer-Zarnowitz regressions on both the mean and median one-quarter ahead rolling event predictions

[3] In addition to economic data for the preceding quarter, the forecasters would also have the information on the performance of selected macroeconomic variables, such as NODX, in the first month of the contemporaneous quarter.

[4] The total number of data points for *unemployment rate* is 28.

[5] Standard unit root tests reveal that all the variables are stationary except for *unemployment rate*, which has undergone structural breaks.

to ensure that our results are robust to departures from symmetry in the underlying forecast distribution. If the forecast distribution is skewed, the median projections would be a better measure of central tendency.

Following Keane and Runkle (1990), we also recognise the frequent revisions made to macroeconomic data, which are often brought about by improvements in data collection methodologies, weight changes and additional information gathering. Keane and Runkle emphasise that forecasters are more likely to predict the early releases of the data rather than the subsequent revisions. This is in recognition of the fact that the art of forecasting, almost by definition, involves the reckoning of future events based on inadequate and often inaccurate information. There is thus an intuitive appeal in the argument that forecasters should be evaluated on the contemporaneous information set available to them when making their predictions.

Hence, it is worthwhile to compare the predictions made by forecasters against the preliminary and updated macroeconomic estimates. We therefore ran the Mincer-Zarnowitz regressions using both the preliminary releases (*real-time*) and the final macroeconomic data (*revised*) as the dependent variable.[6]

Preliminary Analyses

To convey an idea of the relative sizes of forecast errors, we tabulate the root mean squared errors (RMSE) and mean absolute errors (MAE) for the one-step ahead predictions of the selected macroeconomic variables in Table 1. For valid comparisons across the different macroeconomic variables, we also standardise the RMSEs and MAEs using their respective means.

Table 1 shows that the non-standardised forecast errors for *GDP growth* are in the region of 1-2.5% points, which are not large compared to the mean growth rate of 5.6% over the forecast period. Indeed, based on the standardised errors, *GDP growth* turns out to be one of the most accurately predicted variables. Depending on which measure of forecast accuracy one looks at, either *NODX growth* or *CPI inflation* is the most poorly predicted variable. Interestingly, there is no discernable difference in the accuracy of *GDP growth* predictions when forecasters are evaluated against the revised as opposed to real-time data.

The rolling event forecasts are also plotted against the different outcomes in Chart 1. A visual inspection of the charts suggests that there is a routine upgrading of official *GDP growth* rates from the preliminary to the final rounds, and conversely, a downward adjustment of *unemployment rate* data. Also apparent from the plots is the observation that forecasters have generally under-predicted the strength of economic recoveries following recessions. In recent years, they have also over-estimated the inflation rate just as it was decelerating. At the same time, we observe that the survey respondents consistently overstated the extent of unemployment, even though their forecast errors had been exacerbated by subsequent data revisions.

[6] There is little difference between the real-time and revised data for *NODX growth*.

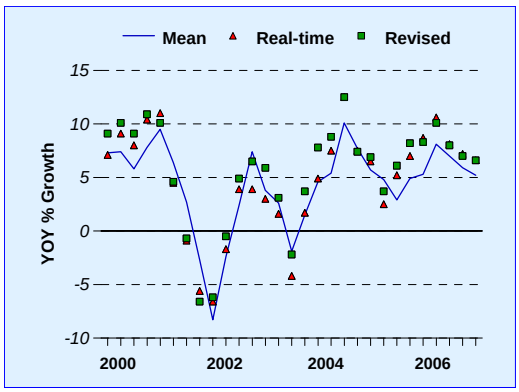
Table 1
Preliminary Analysis of Mean and Median Forecasts

Macroeconomic Variable		Root Mean Square Error % Point		Mean Absolute Error % Point	
		Mean	*Median*	*Mean*	*Median*
GDP Growth	*Revised*	2.31 (0.41)	2.34 (0.42)	1.44 (0.26)	1.44 (0.26)
	Real-time	1.99 (0.41)	2.01 (0.42)	1.34 (0.28)	1.35 (0.28)
CPI Inflation	*Revised*	0.40 (0.50)	0.38 (0.48)	0.52 (0.66)	0.52 (0.66)
	Real-time	0.47 (0.53)	0.49 (0.55)	0.58 (0.65)	0.59 (0.66)
NODX Growth	*Revised*	4.80 (0.63)	4.79 (0.63)	1.99 (0.26)	1.98 (0.26)
	Real-time	4.80 (0.63)	4.79 (0.63)	1.99 (0.26)	1.98 (0.26)
Unemployment Rate	*Revised*	0.91 (0.29)	0.93 (0.30)	0.86 (0.27)	0.87 (0.28)
	Real-time	0.56 (0.16)	0.58 (0.16)	0.67 (0.19)	0.70 (0.19)

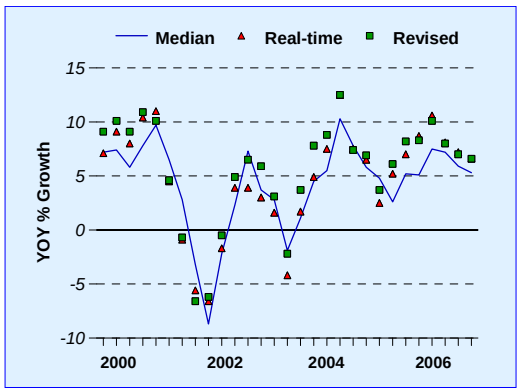
Note: Figures in parentheses denote error statistics that are standardised using the variables' respective means.

Chart 1
Forecast versus Actual Values

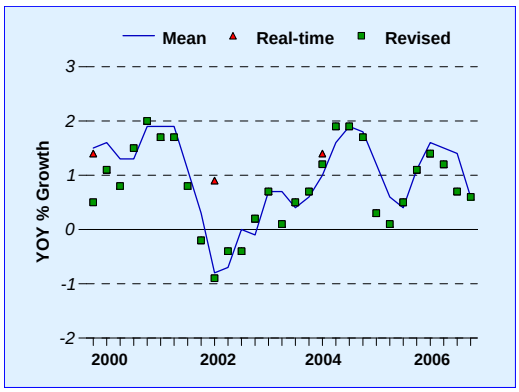
Mean Forecasts of *GDP Growth*



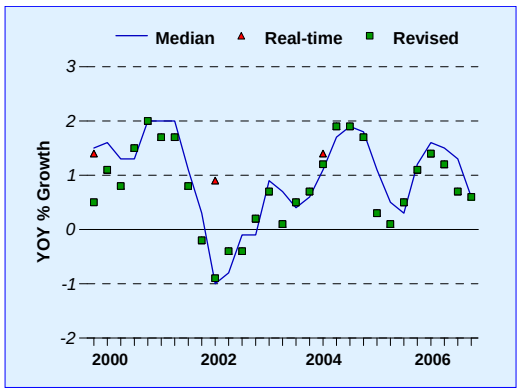
Median Forecasts of *GDP Growth*



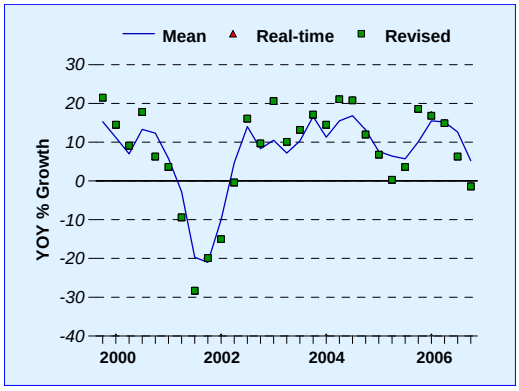
Mean Forecasts of *CPI Inflation*



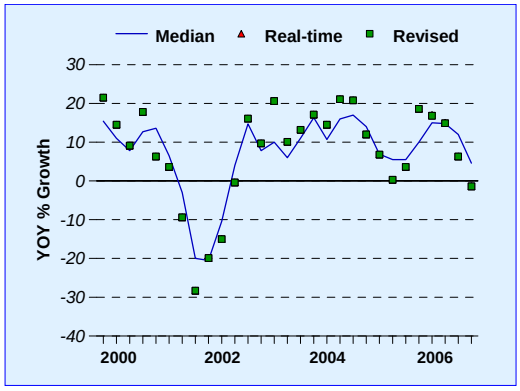
Median Forecasts of *CPI Inflation*



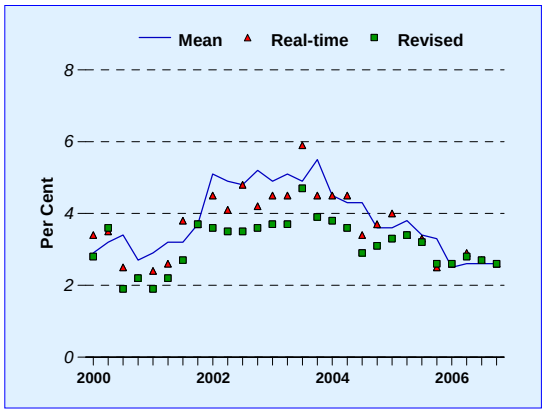
Mean Forecasts of *NODX Growth*



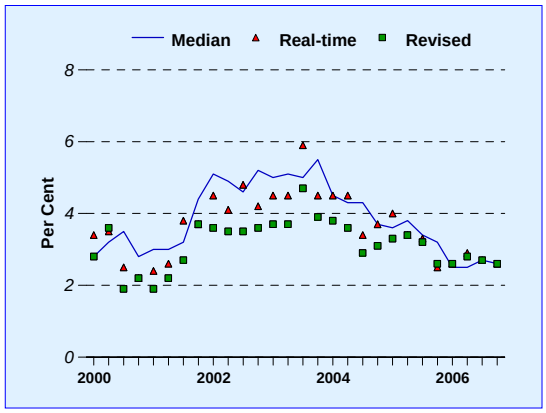
Median Forecasts of *NODX Growth*



Mean Forecasts of *Unemployment Rate*



Median Forecasts of *Unemployment Rate*



Results

Tests of Unbiasedness

The conclusions from the Mincer-Zarnowitz regressions using both mean and median rolling event forecasts are summarised in Table 2. We report the *t*- and *F*-statistics for testing the null hypotheses of unbiasedness based on real-time and revised data.

On the whole, there does not appear to be compelling evidence to reject the hypothesis that forecasters in Singapore have been unbiased in their predictions, except for inflation forecasts. In addition, apart from those regressions involving *unemployment rate*, the choice of mean or median forecasts does not appear to have any significant effects on the regression results. Consequently, we do not distinguish between them in the ensuing discussion.

GDP Growth

The results show that professional forecasters have been unbiased in their one-quarter ahead predictions of the initial releases of *GDP growth* rates. This result is not only encouraging but also intuitively plausible, since forecasters are likely to pay particular attention to leading indicators of growth, many of which are available on a monthly basis. In comparison, growth forecasts are biased when compared to the revised numbers. This is perhaps to be expected given that output revisions – sometimes issued a few years later – have averaged around 1% point over the period concerned. It is therefore unreasonable to expect our sample of participants to have anticipated these changes in advance.

CPI Inflation

In stark contrast to *GDP growth*, the forecasts of *CPI inflation* are found to be biased, even when evaluated against the preliminary statistics. One explanation for this observation is that inflation rates are somewhat difficult to predict for a small open economy like Singapore, which is vulnerable to foreign price shocks. Moreover, inflation forecasts could be self-defeating: there is the possibility of policymakers factoring inflationary expectations into their reaction function, thereby frustrating forecasters' predictions.

NODX Growth

Private sector forecasters appear to be largely unbiased in generating their predictions of *NODX growth* (the *t*-statistics for the slope coefficient are significant at the 5% level but the corresponding *F*-statistics are not). Singapore's heavy reliance on trade means that NODX is the *de facto* barometer of domestic economic growth, so forecasters are likely to have a fairly good grasp of their growth profile when submitting quarterly returns. Furthermore, information on NODX is released on a monthly basis, which means that forecasters would already have a month's worth of data when making their quarterly predictions.

Unemployment Rate

The choice of mean or median forecasts as the independent variable makes a slight difference to the regression results for the unemployment rate. Forecasters are biased in their median forecasts of both real-time and revised outcomes, but unbiased in the mean forecast of real-time data. The positive and significant constant terms in the regressions on revised data confirm our earlier observation that forecasters tend to over-predict the rate of unemployment.

An alternative way of displaying the test results is by plotting the *confidence regions* associated with the estimated α and β parameters. These are shown in Chart 2 for the mean forecasts, where the red dots pinpoint the parameter estimates and the black asterisks give the location of the (0,1) point specifying the null hypotheses, relative to the boundaries of the confidence regions and defined in relation to the estimated parameters. The concentric ellipses for each variable are computed for increasing confidence levels of 90%, 95% and 99%, corresponding to significance levels of 10%, 5% and 1% used in the *F*-tests, respectively.

It is noteworthy that only two of the black asterisks completely lie outside the ellipses, namely, those for *GDP growth* and *unemployment rate*, both based on revised data. This confirms our earlier impression that there is no unambiguous evidence of biasedness in the rolling event forecasts.

Table 2
Tests of Unbiasedness Using the Mincer-Zarnowitz Regression[#]

Dependent Variable		Independent Variable				
		Regression Results	*Using Mean Forecast*		*Using Median Forecast*	
			$\alpha = 0$	$\beta = 1$	$\alpha = 0$	$\beta = 1$
GDP Growth	*Revised*	Coefficient	0.88	1.08	1.03	1.06
		t-statistic	1.31	0.82	1.57	0.58
		(*p*-value)	0.20	0.42	0.13	0.56
		F-statistic	8.20		7.61	
		(*p*-value)	0.00*		0.00*	
	Real-time	Coefficient	-0.07	1.12	0.09	1.09
		t-statistic	-0.11	1.13	0.14	0.89
		(*p*-value)	0.91	0.27	0.89	0.38
		F-statistic	1.72		1.51	
		(*p*-value)	0.20		0.24	
CPI Inflation[§]	*Revised*	Coefficient	-0.08	0.90	-0.04	0.86
		t-statistic	-0.93	-1.38	-0.56	-2.14
		(*p*-value)	0.36	0.18	0.58	0.04*
		F-statistic	4.29		6.18	
		(*p*-value)	0.02*		0.01*	
	Real-time	Coefficient	0.18	0.73	0.22	0.69
		t-statistic	0.86	-1.65	1.00	-1.85
		(*p*-value)	0.40	0.11	0.33	0.08
		F-Statistic	3.63		4.95	
		(*p*-value)	0.04*		0.01*	
NODX Growth	*Revised*	Coefficient	-1.63	1.23	-1.45	1.22
		t-statistic	-1.39	2.35	-1.35	2.55
		(*p*-value)	0.18	0.03*	0.19	0.02*
		F-statistic	2.85		3.31	
		(*p*-value)	0.08		0.05	
	Real-time	Coefficient	-1.63	1.23	-1.44	1.22
		t-statistic	-1.38	2.35	-1.35	2.56
		(*p*-value)	0.18	0.03*	0.19	0.02*
		F-statistic	2.87		3.33	
		(*p*-value)	0.07		0.05	
Unemployment Rate[§]	*Revised*	Coefficient	1.13	0.53	1.09	0.53
		t-statistic	3.66	-6.30	3.50	-6.21
		(*p*-value)	0.00*	0.00*	0.00*	0.00*
		F-statistic	59.03		65.00	
		(*p*-value)	0.00*		0.00*	
	Real-time	Coefficient	0.54	0.81	0.57	0.79
		t-statistic	1.46	-1.92	1.51	-2.05
		(*p*-value)	0.16	0.07	0.14	0.05
		F-statistic	3.05		3.78	
		(*p*-value)	0.06		0.04*	

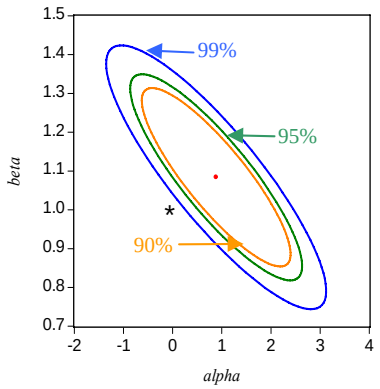
The test statistics are computed using heteroscedasticity-robust standard errors.

* Indicates the rejection of the null hypotheses of $\alpha = 0$ and/or $\beta = 1$ at the 5% significance level.

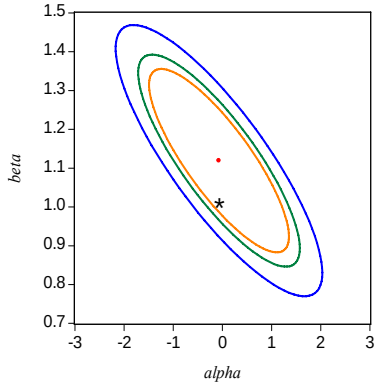
§ The revisions in CPI and unemployment data could in part be attributed to adjustments in the CPI basket and changes in coverage and estimation procedures in the quarterly *Labour Force Survey*.

Chart 2
Confidence Regions#

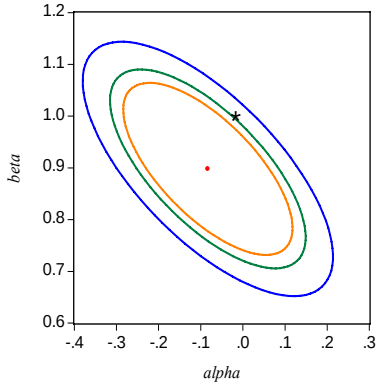
Mean Forecasts of Revised *GDP Growth*



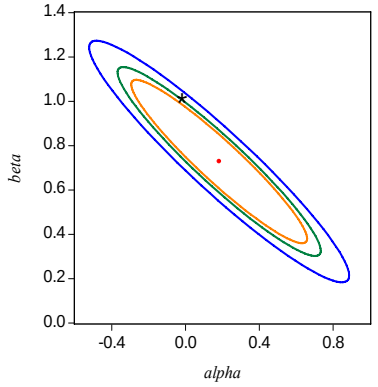
Mean Forecasts of Real-Time *GDP Growth*



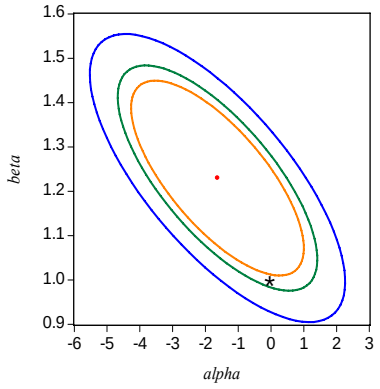
Mean Forecasts of Revised *CPI Inflation*



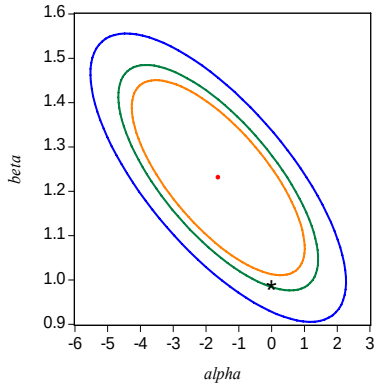
Mean Forecasts of Real-Time *CPI Inflation*



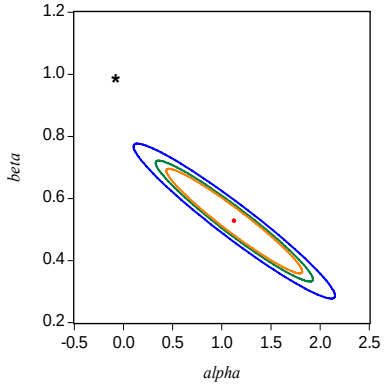
Mean Forecasts of Revised *NODX Growth*



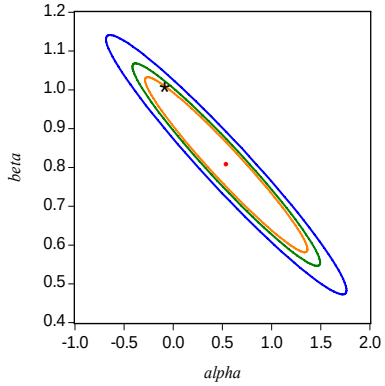
Mean Forecasts of Real-Time *NODX Growth*



Mean Forecasts of Revised *Unemployment Rate*



Mean Forecasts of Real-Time *Unemployment Rate*



The black asterisk gives the location of the (α, β) = (0,1) point specifying the null hypothesis of unbiasedness. If the asterisk lies outside the confidence region indicated by the coloured ellipse, we reject the null hypothesis at the corresponding level of significance.

Tests of Efficiency

We next turn to the rationality tests for fixed event forecasts. These are implemented by estimating the pooled regression in equation (2). The test results for the null hypothesis of efficiency, or equivalently, $\gamma = 0$, are presented in Table 3 together with the estimated coefficients.

Looking first at the third column, the results indicate that in the case of *GDP growth* and *NODX growth*, the autoregressive coefficients for the revised forecast series are positive and statistically significant at 5%, i.e. we reject the null hypothesis of efficiency. This would suggest that the forecasts of these variables made by survey participants are "smooth". In other words, there is slow adjustment to new information and this has been variously attributed to inertia, the need to achieve a consensus view, or a reluctance to adjust to surprises. Conversely, we do not reject the null hypothesis of efficiency at the 5% level for *CPI inflation* and *unemployment rate.*

When using pooled data, however, we should expect that the error term in equation (2) associated with forecast revisions made at the same point in time, but for two different target years, to be correlated. For example, a downward revision to the forecast for 2000 is likely to be accompanied by a similar revision for the subsequent year. Consequently, the estimate of the autoregressive coefficient in a simple regression will be inconsistent, resulting in unwarranted rejections of the hypothesis of rationality.

To remedy this problem, we re-estimated the pooled regressions but this time augmenting them to include target year-specific fixed effects. The results are shown in the last column of Table 3. The null hypothesis of efficiency is now not rejected at the 5% significance level for either *GDP growth* or *unemployment rate*. This implies that professional forecasters tend to absorb new information on these variables very quickly. The finding should not be surprising, given the attention paid to economic growth and employment conditions in Singapore.

The pooled regressions with fixed effects also provide evidence of negative autocorrelation in forecasters' revisions to *CPI inflation* and *NODX growth*. Negative autocorrelation in these series means that revisions in one direction are followed by further revisions in the opposite direction. This has proven more difficult to interpret than positive serial correlation (Clements, 1995). Nevertheless, Clements (1997) argues that this is not inconsistent with weakly efficient behaviour in the absence of significant news over the period in question. He shows that, under circumstances where forecasters see no reason to change their initial prediction substantially, negative autocorrelation is induced in forecast revisions due to a random component.

Table 3
Tests of Efficiency Using Pooled Regression#

Macroeconomic Variable	Regression Results	$\gamma = 0$	
		Without Fixed Effects	With Fixed Effects
GDP Growth	Coefficient	0.45	0.16
	t-Statistic	2.33	0.58
	(*p*-value)	0.02*	0.57
CPI Inflation	Coefficient	0.15	-2.10
	t-Statistic	0.66	-5.30
	(*p*-value)	0.52	0.00*
NODX Growth	Coefficient	0.34	-0.85
	t-Statistic	4.86	-6.77
	(*p*-value)	0.00*	0.00*
Unemployment Rate	Coefficient	0.00	-0.52
	t-Statistic	-0.03	-1.49
	(*p*-value)	0.98	0.16

The test statistics are computed using heteroscedasticity-robust standard errors.
* Indicates the rejection of the null hypothesis of $\gamma = 0$ at the 5% significance level.

Conclusion

This special feature set out to determine whether the analysts participating in the quarterly *Survey* have been rational in their forecasts of four key macroeconomic variables, with rationality defined in terms of the unbiasedness and efficiency of their predictions. In general, Singapore's professional forecasters have issued unbiased predictions, with the exception of inflation forecasts. They have also been relatively efficient in incorporating the latest information into their successive projections of the state of the economy. In particular, the forecasters have been efficient in their predictions of *GDP growth*, the primary focus of public attention and policy discourse in Singapore.

These results should be interpreted in the context of the published assessments of forecasters participating in surveys in the OECD countries (Zarnowitz, 1985; Öller and Barot, 2000; and Loungani, 2001), where respondents usually failed to foresee periods of economic slowdown or contraction. With regard to rationality tests, the findings of these studies have been mixed, though growth forecasts usually fare better than inflation predictions. Given the comparatively short history of the *Survey*, it is remarkable that our participants have been found to be rational. With the accumulation of experience and advances in forecasting methods, it is hoped that the forecasting performance of professional analysts will improve further over time.

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Special Feature B

The Impact of GST on CPI Inflation in Singapore

Introduction

The Goods and Services Tax (GST) was first introduced in Singapore in April 1994, with the initial rate set at 3% on most goods and services. Subsequently, the GST was raised, by 1% point in both January 2003 and 2004, to 5%. More recently, the Ministry of Finance has announced that the GST will be increased to 7%, effective July 2007.

A change in the GST will have an impact on CPI inflation, as businesses pass on the tax burden to consumers. *A priori*, GST changes should only have a one-off and transitory effect on inflation, although the absolute level of the CPI will be lifted permanently.

In the January 2003 issue of the *Review*, we estimated the *ex post* impact of the 1994 GST introduction on CPI inflation using the inflation-differential approach, as well as the corresponding degree of pass-through to final consumer prices. In view of the impending 2% GST hike in July 2007, this special feature seeks to provide an update of the earlier study. We also employed an alternative methodology – intervention analysis – to quantify the inflationary impact of the GST changes since 1994. This serves to provide a consistency check on our findings. Finally, we present the *ex ante* forecasts of the impending 2% GST hike on CPI inflation in 2007-08 using both approaches.

The Inflation-Differential Approach

The Methodology

This approach involves estimating the underlying long-run trend in consumer prices over the periods surrounding GST changes, and then identifying the movement in prices due specifically to the tax change. The basic premise is that the long-run trend in CPI inflation should not be affected by the implementation of the GST. The long-run trend is obtained by smoothing the quarterly CPI series for the period Q1 1976-Q4 2006 using the Hodrick-Prescott (HP) filter.[1] The "abnormal" rise in the actual CPI series above the long-run trend around the time of the GST implementation is then assumed to be attributed to the tax increase.

In order to assess the extent of pass-through to consumer prices, this deviation is compared to the maximum possible GST impact, which is determined by the share of items in the CPI basket that is subject to the GST. Given that not all items in the basket are subject to GST, changes in the GST will not raise CPI inflation by the full amount of the tax. For example, accommodation costs and businesses with an annual turnover of less than $1 million are exempted from GST. The government has also absorbed GST-related costs of public health care and education services over the years.

[1] The CPI series was smoothed using the HP filter with a smoothing parameter of 1600.

In the January 2003 issue of the *Review*, we estimated the proportion of items in the CPI basket that is subject to GST to be 75%. This excluded all accommodation, health care and education costs. This time round, we improved on this estimate by identifying more specific items to be excluded from the CPI basket based on information paper *Revision and Rebasing of the Consumer Price Index (Base Year 2004=100)* by the Department of Statistics. As a result, the revised share of the CPI basket that is subject to GST is lower at about 71%.

Impact of the GST Introduction in 1994

A priori, GST changes should result in only a transitory increase in actual y-o-y inflation over trend inflation.[2] In particular, significantly positive inflation differentials should only persist for about four quarters after the GST implementation.

Nevertheless, the effects of the GST change may appear before the implementation of the policy (pre-implementation effects) and/or persist beyond the period of implementation (persistent effects). Pre-implementation effects may arise if businesses raise prices prior to the policy change either in response to "frontloading" of demand by consumers or simply to take advantage of the GST hike to pass on earlier increases in operating costs. In addition, the GST increase may lead to some residual momentum of further price increases after the transitory period. For instance, wages may rise later to account for the higher cost of living arising from the GST hike, thus inducing another round of price increases. Moreover, businesses may profit at the expense of consumers, especially in the environment of strong demand conditions.

Table 1 shows the time series of actual CPI inflation, trend CPI inflation and the differentials surrounding the 3% GST introduction in April 1994. It is observed that the inflation differential rose for four quarters from Q2 1994-Q1 1995, but narrowed or turned negative subsequently. As such, the inflationary impact of GST was largely confined to the year of implementation. Some pre-implementation effects emerged one quarter before the GST introduction, but these were relatively small. The profile of the inflation differentials is represented graphically in Chart 1.

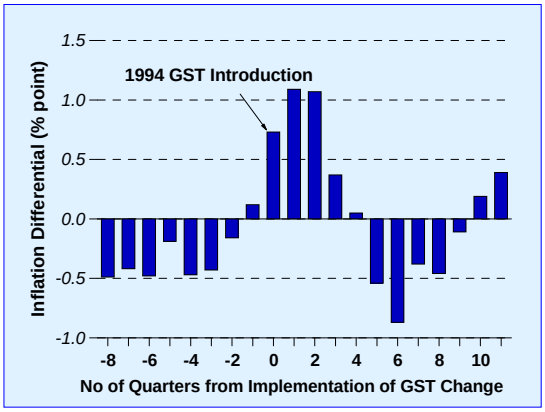
To quantify the impact of the GST introduction, we averaged the four inflation differential data points over trend CPI inflation for the period Q2 1994-Q1 1995, which came to 0.81% point. Given that the maximum possible impact of the 3% GST hike would be 2.1% points (71% of CPI basket subject to 3% GST), this translates into a pass-through of about 38% (= 0.81% point / 2.10% points) over a one-year period.

Table 1
Inflation Differentials between
Actual CPI and Trend CPI, Q3 1993-Q4 1995

	Actual CPI	Trend CPI	YOY Growth of Actual CPI (%)	YOY Growth of Trend CPI (%)	Inflation Differential (% point)
1993 Q3	88.9	89.1	2.15	2.58	-0.43
Q4	89.5	89.7	2.37	2.52	-0.16
1994 Q1	90.2	90.2	2.58	2.46	0.12
Q2	91.2	90.7	3.11	2.39	0.73
Q3	91.9	91.2	3.40	2.31	1.09
Q4	92.4	91.6	3.29	2.22	1.07
1995 Q1	92.5	92.1	2.49	2.13	0.37
Q2	93.1	92.5	2.08	2.03	0.05
Q3	93.2	92.9	1.39	1.93	-0.54
Q4	93.3	93.3	0.95	1.83	-0.87

[2] The difference between actual y-o-y CPI inflation and trend CPI inflation is termed "inflation differential" in this feature.

Chart 1
Profile of Inflation Differentials, Q2 1992-Q1 1997



Impact of the GST Hikes in 2003 and 2004

Table 2 and Chart 2 show the inflation differentials between actual and trend CPI surrounding the 1% point GST increases in January 2003 and January 2004.

Due to the Sars outbreak that started in March 2003, the profile of the inflation differentials is different from that observed for the introduction of GST in 1994. Except for Q1 2003, the GST impact on CPI inflation for the remainder of the year was overridden by the disinflationary effects of the Sars outbreak. As such, the average inflation differential between actual and trend CPI turned out to be -0.1% point for the whole of 2003.

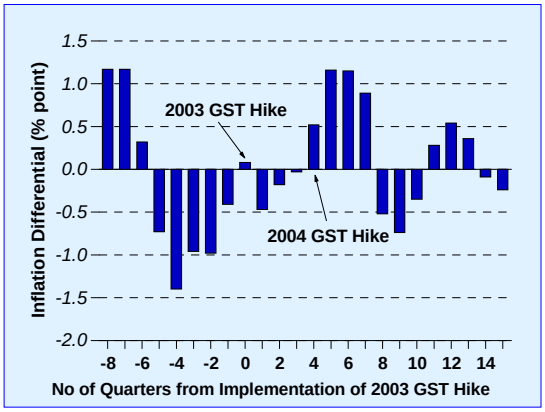
With the strong recovery in domestic economic activity in 2004, headline inflation rose substantially by 0.93% point above trend on average. Given that the maximum impact of a 1% GST hike is 0.71% point (= 0.71 * 1% point), this translates into an exceptionally strong pass-through of 132% (= 0.93% point / 0.71% point) in 2004. However, this is likely to reflect not only the GST hike in January 2004 but also pent-up price pressures, as businesses might not have passed on the GST hike in January 2003 to consumers during the Sars outbreak.

Adjusting for this, the average effect of the 2003 and 2004 GST hikes was to raise CPI inflation by 0.47% point per annum. Based on a maximum impact of 0.71% point each year, this implies a pass-through of 66%.

Table 2
Inflation Differentials between
Actual CPI and Trend CPI, Q3 2002-Q4 2005

	Actual CPI	Trend CPI	YOY Growth of Actual CPI (%)	YOY Growth of Trend CPI (%)	Inflation Differential (% point)
2002 Q3	97.9	98.4	-0.43	0.55	-0.98
Q4	97.9	98.5	0.16	0.57	-0.41
2003 Q1	98.3	98.7	0.68	0.59	0.08
Q2	98.1	98.8	0.15	0.62	-0.47
Q3	98.4	99.0	0.47	0.65	-0.18
Q4	98.6	99.2	0.65	0.68	-0.03
2004 Q1	99.5	99.4	1.23	0.70	0.52
Q2	99.9	99.6	1.89	0.73	1.16
Q3	100.3	99.7	1.91	0.75	1.15
Q4	100.2	99.9	1.66	0.77	0.89
2005 Q1	99.7	100.1	0.26	0.79	-0.52
Q2	100.0	100.3	0.06	0.80	-0.74
Q3	100.7	100.6	0.46	0.81	-0.35
Q4	101.3	100.8	1.10	0.82	0.28

Chart 2
Profile of Inflation Differentials, Q1 2001-Q4 2006



Intervention Analysis

The Theoretical Framework

Next, we applied the methodology of Valadkhani and Layton (2004) and Valadkhani (2005) to evaluate the impact of the GST hikes in Singapore. This analysis uses the Box-Jenkins methodology in which an autoregressive integrated moving average (ARIMA) model is augmented by pulse dummy variables to examine the effects of abnormal events.[3] The following general ARIMA process of the order (k,d,q) is estimated:

$$\phi_k(L)\Delta^d p_t = \mu + \Theta_q(L)\varepsilon_t + \beta_j D_{j,t} \qquad (1)$$

where $\phi_k(L)$ represents a *k*-order polynomial lag operator with k autoregressive terms, Δ^d denotes the difference operator with $d=4$ to obtain the y-o-y CPI inflation rate, and p_t is the natural logarithm of CPI. μ is a constant, $\Theta_q(L)$ denotes a q-order polynomial lag operator, q is the number of moving-average terms, ε_t is a white noise process, $D_{j,t}$ are the pulse dummy variables that are unity in period j, and β_j are the corresponding coefficients on the intervention variables.

Although the ARIMA model does not behaviourally explain the inflation process, it is nonetheless able to account for the systematic time series patterns in the data so as to determine the impact of the unusual event.

The intervention dummy variables $D_{j,t}$ surrounding the GST changes are expected to capture the impact of the GST increases on y-o-y inflation. This includes the pre-implementation, transitory and persistent impacts as described in the previous section. The pulse dummy variables take the value of zero, except in the period specified. The dummy variables were named according to the respective year and quarter for which they take on a unit value. For instance, $DUM94Q2$ implies that the dummy variable is unity for the period Q2 1994. The magnitudes of β_j then represent the effects of the GST changes on CPI inflation beyond what could have been expected on the basis of the discernible systematic pattern of fluctuations in the price data.

A total of 12 dummy variables were included to capture the pre-implementation effects a year before the quarter of the policy change, the transition effects during the year of the policy change, and the persistent effects in the year after the transition effects have waned. The duration of the GST effect on inflation was then determined by testing the statistical significance of these dummy variables.

[3] The ARIMA representation offers an alternative to the HP filter for data series smoothing.

Empirical Results

Quarterly CPI data were used to estimate the model, whose differences were found to be stationary under the usual Augmented Dickey-Fuller (ADF) tests. Spikes in the autocorrelation function and the partial autocorrelation function were used to determine k and q, respectively. The estimated model was then subject to various diagnostic tests to ensure that all systematic variation in the time series has been adequately accounted for by the model.

In order to allow for structural differences in inflation dynamics, we separated the full sample into two sub-samples and estimated separate equations to capture the respective impact of the 1994 and 2003/04 GST changes. The first sub-sample covers the period Q1 1983-Q4 1996, while the second sub-sample uses data from Q1 1997-Q4 2006.[4]

Specification (1) in Table 3 shows the estimated results for equation (1) over the period Q1 1983-Q4 1996, with 12 pulse dummy variables surrounding the April 1994 GST introduction.

The coefficients β_5 through β_8, corresponding to dummy variables that capture the transition effects over the period Q2 1994-Q1 1995, are positive and statistically significant at the 1% level (with the exception of β_8, which is significant at the 5% level). This confirms that the 3% GST introduction had a significant positive impact on CPI inflation in the first year of implementation. β_4, which corresponds to the quarter before the GST implementation, is also positive and significant, suggesting the presence of some pre-implementation effects. There appears to be little persistence in GST-related price momentum after the first year, as β_9 through β_{12} are statistically insignificant.

Specification (2) in Table 3 shows the estimation results after removing the dummies that are insignificant. Again, coefficients β_4 through β_8, corresponding to $DUM94Q2$ through $DUM95Q1$, are positive and significant, confirming the pre-implementation and transition effects of the GST introduction.

To quantify the average impact of the 1994 GST introduction, the magnitude of the five significant coefficients β_4 through β_8 were de-annualised i.e. divided by four and then summed up. This yields a realised impact of 0.95% point. Given that the maximum impact of the 3% GST hike is 2.1% points, this translates into a pass-through of about 45% (= 0.95% point / 2.1% points) over five quarters.

[4] We note that the average inflation rate of 1.8% for the period Q1 1983-Q4 1996 before the Asian Financial Crisis was much higher than the 0.7% for the ensuing period, Q1 1997-Q4 2006, as the latter encompassed a series of economic shocks, namely the global IT bubble burst, the September 11 terrorist attacks and the Sars outbreak.

Table 3
Estimates for the Intervention Model, Q1 1983-Q4 1996

Dependent Variable $\Delta^{d=4}p_t$				
Specification	**(1)**		**(2)**	
Independent Variable	**Coefficient#**	***p*-value**	**Coefficient#**	***p*-value**
Constant, μ_0	1.844***	0.004	1.840***	0.001
DUM93Q2, β_1	-0.138	0.406	-	-
DUM93Q3, β_2	-0.094	0.596	-	-
DUM93Q4, β_3	0.265	0.310	-	-
DUM94Q1, β_4	0.514*	0.068	0.225*	0.055
DUM94Q2, β_5	1.156***	0.001	0.896***	0.000
DUM94Q3, β_6	1.472***	0.000	1.161***	0.000
DUM94Q4, β_7	1.496***	0.000	1.173***	0.000
DUM95Q1, β_8	0.748**	0.042	0.338***	0.002
DUM95Q2, β_9	0.480	0.200	-	-
DUM95Q3, β_{10}	-0.173	0.639	-	-
DUM95Q4, β_{11}	-0.441	0.211	-	-
DUM96Q1, β_{12}	-0.015	0.965	-	-
$\Delta^{d=4}p_{t-2}$, φ_1	0.712***	0.000	0.706***	0.000
e_{t-1}, θ_1	0.997***	0.000	0.997***	0.000
Specification/Fit of the Model				
Adjusted R-squared	0.803		0.824	
Std. Error of Regression	0.006		0.006	
LM Statistic (4 lags)	1.777		1.855	
No. of observations	56		56	

*, ** and *** indicate statistical significance levels at 10%, 5%, and 1%, respectively.
Coefficients for the constant term and dummy variables are scaled by 100 to represent impact in percentage terms.

Turning now to the impact of the January 2003 and January 2004 GST hikes, specification (3) in Table 4 shows the estimated results for equation (1) over the period Q1 1997-Q4 2006. 16 pulse dummy variables were included to capture the impact of the two GST hikes.

β_1 through β_8, which correspond to the dummy variables for the period Q1 2002-Q4 2003, are insignificant and mostly negative in sign. The negative coefficients reflect the disinflationary effects of the 2002 recession following the September 11 terrorist attacks and the 2003 Sars outbreak that masked the effect of the 2003 GST hike. In contrast, the estimated coefficients β_9 through β_{12}, which correspond to $DUM04Q1$ through $DUM04Q4$, are all positive. β_{10} through β_{12} are significant at the 1% level while β_9 has a significance level slightly above 10%. Yet again, persistent effects appear to be non-existent as the coefficients corresponding to dummy variables for 2005 are negative and statistically insignificant.

We then re-estimated the model by excluding the dummy variables that are well above the 10% significance level. The results are presented in specification (4) of Table 4. The estimated coefficients β_9 through β_{12} are all positive and highly significant.

Averaging the coefficients β_9 through β_{12} for 2004 yields a realised inflationary impact of 0.75% point. As this is likely to include the delayed impact of the GST hike in 2003, taking the average yields an annual impact of 0.38% point over two years. This translates into an average annual pass-through of 53% (= 0.38% point / 0.71% point).

Table 4
Estimates for the Intervention Model, Q1 1997-Q4 2006

Dependent Variable $\Delta^{d=4}p_t$				
Specification	**(3)**		**(4)**	
Independent Variable	**Coefficient#**	***p*-value**	**Coefficient#**	***p*-value**
Constant, μ_0	0.680***	0.002	0.552***	0.000
DUM02Q1, β_1	-0.276	0.386	-	-
DUM02Q2, β_2	-0.092	0.871	-	-
DUM02Q3, β_3	-0.623	0.424	-	-
DUM02Q4, β_4	-0.762	0.412	-	-
DUM03Q1, β_5	-0.401	0.640	-	-
DUM03Q2, β_6	-0.766	0.262	-	-
DUM03Q3, β_7	-0.280	0.547	-	-
DUM03Q4, β_8	0.014	0.968	-	-
DUM04Q1, β_9	0.614	0.109	0.538***	0.005
DUM04Q2, β_{10}	1.262***	0.008	0.682**	0.015
DUM04Q3, β_{11}	1.277**	0.014	0.725**	0.011
DUM04Q4, β_{12}	1.120**	0.035	1.059***	0.000
DUM05Q1, β_{13}	-0.199	0.699	-	-
DUM05Q2, β_{14}	-0.562	0.194	-	-
DUM05Q3, β_{15}	-0.570	0.112	-	-
DUM05Q4, β_{16}	-0.141	0.434	-	-
$\Delta^{d=4}p_{t-1}$, φ_1	1.297***	0.000	1.252***	0.000
$\Delta^{d=4}p_{t-2}$, φ_2	-0.570**	0.020	-0.561***	0.000
e_{t-4}, θ_1	-0.990***	0.000	-0.955***	0.000
Specification/Fit of the Model				
Adjusted R-squared	0.885		0.901	
Std. Error of Regression	0.003		0.003	
LM Statistic (4 lags)	1.485		0.645	
No. of observations	40		40	

*, ** and *** indicate statistical significance levels at 10%, 5%, and 1%, respectively.
Coefficients for the constant term and dummy variables are scaled by 100 to represent impact in percentage terms.

Implications for the Impact of the 2% GST Increase in 2007

Implications of the *Ex Post* Analysis

The results of both the inflation-differential approach and intervention analysis are broadly consistent. They both suggest that the average pass-through of the 2003/04 GST hikes is somewhat higher than when GST was introduced in 1994. (Table 5)

In 1994, there was considerable frontloading of demand as suggested by the increase in retail sales volume. This could have arisen from uncertainty on the part of consumers as it was the first time that the GST was introduced, and by a hefty 3%.

The strong retail sales, coupled with double-digit growth in the domestic economy during that period, might have

Table 5
Summary of GST Impact

Year	Maximum Possible Impact (% point)	Estimated Realised Impact (% point)	Implied Pass-through (%)
Inflation-Differential Approach			
1994	2.10	0.81	38
2003 & 2004	1.42	0.93	66
Intervention Analysis Technique			
1994	2.10	0.95	45
2003 & 2004	1.42	0.75	53

prompted some retailers to raise prices early, as evident by the pre-implementation effects.

But the subsequent sharp decline in consumer demand could have reined in the price increases, resulting in a relatively lower pass-through in 1994 on the whole. (Chart 3) Some businesses could also be less ready to raise prices to reflect the GST rate when it was first introduced owing to the associated administrative costs (e.g. changes to cash registers to account for GST in sales receipts).

In comparison, in 2003, retailers were initially more cautious in increasing prices when consumer spending was weak amidst a less certain economic environment. However, they passed on the GST hike subsequently as the economy rebounded strongly from the Sars outbreak. (Chart 4)

As far as the 2007 GST hike is concerned, the economy is on a firm footing and job creation has been robust in the last two years. Moreover, energy costs and office rentals have risen significantly since the last GST increase in 2004. Businesses, including those exempted from GST, could thus take the opportunity to raise prices when the rate is revised in July.

Against this backdrop, we estimate the pass-through arising from the 2007 GST hike to range between 60 and 80%. If 71% of the CPI basket is subject to the GST, the maximum impact of a 2% GST increase is 1.42% points above baseline inflation (= 71% * 2% GST). Applying pass-through rates of 60%, 70% and 80%, the estimated increase in CPI inflation over baseline forecast is estimated at about 0.9%-1.1% points. This may occur over five quarters if there are some pre-implementation effects. However, the bulk of the effect is expected to occur in the four quarters after the GST increase, as in the past. On this basis, we estimate that the GST increase will add 0.4-0.6% point to CPI inflation each in 2007 and 2008.

Chart 3
Retail Sales Volume, 1993-1996

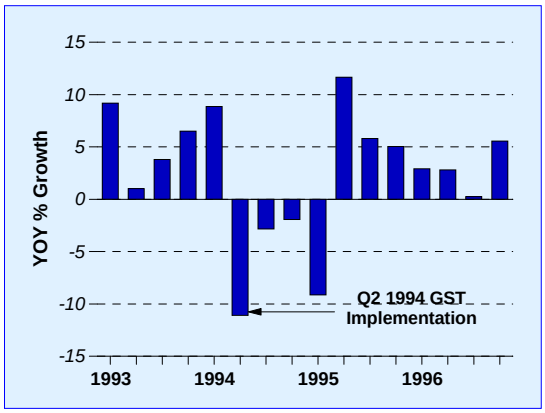


Chart 4
Retail Sales Volume, 2002-2005

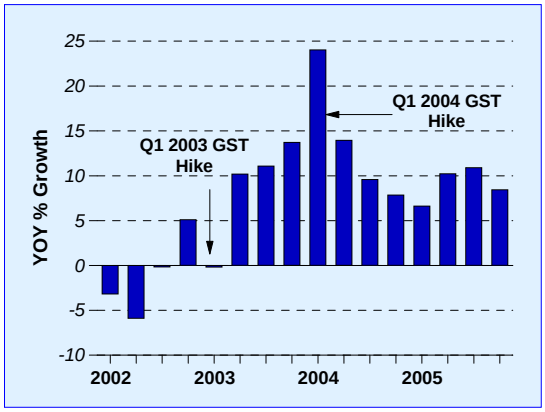


Table 6
Estimated Impact of a 2% Increase in GST

Extent of Pass-through (%)	Estimated Increase in CPI Inflation Over Baseline (% point)
60	0.85
70	0.99
80	1.13

References

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RESEARCH UPDATE

Research Update

The following sections give a brief overview of recent and upcoming MAS Staff Papers. These papers will be available at http://www.mas.gov.sg/publications/staff_papers/index.html.

Checking Out: Exits from Currency Unions

In the recent MAS Staff Paper *"Checking Out: Exits from Currency Unions"* (April 2007), Professor Andrew Rose examines the economic characteristics of the 69 countries that have departed from currency unions since the end of the Second World War, and compares them with the 61 countries which have remained in the unions during the same period. Using an event-study approach, he observes the dynamic behaviour of key macroeconomic variables before, during and after departures from currency unions. These variables include real GDP per capita, population, government spending, investment, trade balances, trade openness, government budget balances, inflation rate, M1 growth and polity. A statistical approach based on probit model estimates is used to examine the effect of the key variables on the probability of a country being inside or outside a currency union.

The results show that there are only a few macroeconomic differences between countries remaining in and those leaving currency unions. The latter tend to be larger, richer and more democratic, and experience somewhat higher inflation. However, there are typically no sharp macroeconomic movements either preceding or following currency union dissolutions, and there is only a poor linkage between monetary and political independence. The paper concludes that the aggregate macroeconomic attributes of an economy perform poorly in predicting currency union exits.

A Survey of the Recent Discourse on Global Imbalances

The unprecedented widening of the US current account deficit – to about US$860 billion or 6.5% of GDP in 2006 – has captured the attention of academics, market participants and policymakers alike. It is synonymous with discussions about the development of global financial imbalances given the sheer size of the deficit and the importance of the US economy. A forthcoming MAS Staff Paper, entitled *"A Survey of the Recent Discourse on Global Imbalances"* discusses the various views in this area.

Over the past one to two decades, the steady deterioration in the US current account deficit has been mirrored by growing imbalances in other countries. Indeed, the widening of imbalances has been attributed in part to the effects of globalisation, which has generally led to more integrated product and financial markets.

In view of the role of the free market in driving these outcomes, some have argued that this intermediation function of the global financial system is a form of efficient "intertemporal trade" that will give rise to gains from trade, consistent with traditional international trade theory. A number of economists have also characterised the present arrangement as a form of Bretton Woods II, with the US as the core country and Asia ex-Japan as the new periphery.

Others, however, are of the view that the sheer size of the global imbalances implies that they are unsustainable. Such imbalances mean ever rising US external debts, persistently low US savings and a declining willingness among foreign investors to add more US assets to their portfolios. The US economy is seen as being more and more "addicted" to foreign capital, and a sharp US dollar

correction would be needed to "resolve" these imbalances. Though the evolution of the deficit and movements in financial markets have been rather benign in recent years, observers have cautioned against complacency.

The Staff Paper reviews a wide spectrum of perspectives on this important issue, including a historical account of the workings of the Bretton Woods arrangement.

Perspectives on Growth: A Political-Economy Framework

According to traditional neoclassical growth models, economic growth is primarily a function of factor accumulation – the more labour, capital, or technology an economy can harness in the production of goods and services, the higher the rate at which output, and thus income, can grow. Neoclassical models also predict that growth disparities, or even absolute income levels, between the rich and poorer countries will narrow over time, as scarcer inputs in the poorer country raise the rate of productivity derived from that input, funnelling more factor resources into the area of scarcity.

The forthcoming MAS Staff Paper *"Perspectives on Growth: A Political-Economy Framework"* reviews global growth performance over the period 1960-2003, using data on internationally comparable income per capita from the *Penn World Table 6.2* (Heston, A., Summers, R. and Aten, B, September 2006). It finds that the absolute income gap between the richest country and the poorest country has widened, with the global average income increasingly diverging from the median income level. In and of itself, neoclassical growth theories are unable to explain *why* such divergences persist.

The literature on growth and economic development has since taken an empirical turn, with the growth experience of many countries and numerous extensive cross-country regressions providing evidence that good policies, sound institutions and geography are important factors in explaining divergent growth outcomes. The Staff Paper follows in the empirical vein, and attempts to develop a political-economy framework with particular emphasis on political economy variables covering geography and natural endowments, institutions, leadership quality, and social consensus. Countries are grouped according to their growth performance, and each group is matched with the scores derived from the set of political economy and institutional variables.

We find that abundant natural endowments do not in themselves guarantee prosperity; rather, indicators measuring institutional and leadership quality matter to growth performance. Political ideologies and systems notwithstanding, strong institutions and capable leaders are relevant in a) formulating good, pro-growth policies; b) implementing these policies; and c) building social consensus and allowing a country's population to be aligned with pro-growth policies. The paper also illustrates the relevance of these factors in Singapore's own growth development experience over the past 40 years.

Statistical Appendix

TABLE 1: REAL GDP GROWTH by sector

Period	Total	Manu-facturing	Financial Services	Business Services	Con-struction	Wholesale & Retail Trade	Hotels & Rest-aurants	Transport & Storage	Informa-tion & Comms	Total	Manu-facturing	Financial Services	Business Services	Con-struction	Wholesale & Retail Trade	Hotels & Rest-aurants	Transport & Storage	Informa-tion & Comms
	Year-on-Year % Change									Seasonally-adjusted Quarter-on-Quarter Annualised % Change								
2005	6.6	9.5	7.6	5.9	0.7	9.6	4.3	4.2	5.5									
2006	7.9	11.5	9.2	5.8	2.7	10.3	5.1	4.3	4.6									
2005 Q1	3.7	3.2	3.7	3.3	-1.3	9.0	2.4	4.1	5.6	0.8	-14.1	8.9	9.6	28.4	0.3	3.5	0.9	-1.6
Q2	6.1	5.8	9.3	4.1	-0.6	10.4	5.9	4.2	5.6	14.5	30.9	21.0	8.1	-14.1	18.8	16.4	8.0	14.2
Q3	8.2	13.6	9.9	7.7	-0.1	11.5	4.0	4.0	5.2	8.5	23.1	-9.1	10.0	-6.9	8.2	-2.1	2.8	7.4
Q4	8.3	14.5	7.6	8.5	4.9	7.5	5.0	4.6	5.6	9.3	20.9	11.7	6.6	18.0	5.9	3.2	6.5	2.2
2006 Q1	10.1	18.6	8.7	6.1	-0.7	14.8	6.2	5.3	5.1	9.1	3.4	13.6	0.1	2.0	26.2	8.0	3.9	-2.0
Q2	8.0	11.9	9.6	6.6	0.9	9.5	3.8	4.0	3.7	5.4	2.3	25.1	9.9	-6.9	0.8	5.7	2.9	7.4
Q3	7.0	9.5	7.4	5.1	5.8	10.4	4.4	4.0	3.6	3.9	12.3	-16.2	4.0	12.5	8.2	1.5	2.9	6.8
Q4	6.6	7.7	11.1	5.4	4.7	6.9	6.1	4.0	6.0	7.9	11.5	28.2	7.9	12.2	-3.5	9.7	6.1	11.6

Source: Singapore Department of Statistics

TABLE 2: REAL GDP GROWTH by expenditure

Year-on-Year % Change

Period	Total Demand	Domestic Demand							Exports of Goods & Services	Imports of Goods & Services
		Total	Consumption			Gross Fixed Capital Formation				
			Total	Private	Public	Total	Private	Public		
2005	9.6	4.0	3.8	3.1	6.8	0.1	0.6	-2.4	11.3	10.9
2006	9.5	6.6	4.2	2.5	11.2	11.5	16.3	-11.8	10.4	10.4
2005 Q1	9.2	3.9	4.8	3.4	9.1	-7.6	-12.4	11.1	11.0	11.8
Q2	6.8	1.8	2.5	3.3	-1.3	-5.5	-5.4	-6.3	8.4	6.9
Q3	8.0	2.7	2.9	2.3	6.0	-3.3	-1.7	-12.0	9.5	8.0
Q4	14.2	7.7	4.9	3.4	11.4	18.3	23.8	-6.1	16.1	16.9
2006 Q1	13.2	4.4	5.2	2.4	13.4	9.5	17.7	-16.0	16.0	14.6
Q2	11.2	3.3	3.4	2.3	8.7	8.3	11.8	-12.2	13.6	12.8
Q3	10.0	10.3	5.3	2.4	18.7	10.3	13.1	-6.4	9.9	11.3
Q4	4.5	8.6	3.0	2.7	3.8	17.1	21.8	-10.6	3.4	3.9

Source: Singapore Department of Statistics

TABLE 3: CONSUMER PRICE INDEX

Period	All Items	Food	Housing	Clothing & Footwear	Transport & Comms	Education & Stationery	Health Care	Recreation & Others	All Items	Food	Housing	Clothing & Footwear	Transport & Comms	Education & Stationery	Health Care	Recreation & Others
	2004 = 100								Year-on-Year % Change							
2005	100.4	101.3	100.8	99.9	97.8	102.0	100.4	101.7	0.5	1.3	0.8	0.0	-2.2	2.0	0.4	1.7
2006	101.4	102.8	103.5	100.6	96.4	104.0	101.3	102.4	1.0	1.6	2.7	0.7	-1.5	1.9	0.9	0.7
2005 Q1	99.7	101.1	99.0	100.4	97.5	101.4	100.1	100.5	0.3	1.6	0.4	0.5	-2.4	1.9	0.3	0.8
Q2	100.0	101.0	99.5	99.6	97.6	101.5	100.2	101.6	0.1	1.7	-0.5	-0.2	-2.5	1.7	0.4	1.0
Q3	100.7	101.2	101.7	98.5	98.3	102.4	100.5	101.6	0.5	1.1	1.1	-1.3	-2.3	2.4	0.4	1.9
Q4	101.3	101.6	102.9	101.1	97.8	102.8	100.8	102.9	1.1	0.9	2.1	1.0	-1.4	2.2	0.7	3.1
2006 Q1	101.1	102.3	102.6	100.6	96.2	103.7	100.9	102.7	1.4	1.2	3.7	0.3	-1.4	2.3	0.8	2.1
Q2	101.2	102.7	103.2	100.1	96.4	103.6	101.3	101.8	1.2	1.6	3.7	0.5	-1.2	2.1	1.0	0.1
Q3	101.5	103.0	103.9	100.8	96.6	104.1	101.4	101.5	0.7	1.8	2.1	2.3	-1.7	1.6	0.9	-0.1
Q4	101.9	103.3	104.3	101.0	96.2	104.4	101.7	103.5	0.6	1.6	1.3	-0.2	-1.6	1.5	0.9	0.6

Source: Singapore Department of Statistics

TABLE 4: LABOUR MARKET (I)

Year-on-Year % Change

Period	Average Monthly Earnings	Labour Productivity									Unit Labour Cost	
		All Sectors	Manufacturing	Construction	Wholesale & Retail Trade	Hotels & Restaurants	Transport & Storage	Information & Communications	Financial Services	Business Services	Overall Economy	Manufacturing
2005	3.5	2.1	2.9	-0.1	5.7	0.9	0.9	2.3	0.4	-1.7	-1.4	-2.6
2006	3.2	1.2	3.6	-3.5	5.7	-1.8	0.8	-3.6	1.0	-4.2	-0.5	-3.6
2005 Q1	4.8	0.3	-2.6	1.0	5.6	-0.7	1.4	3.9	-2.9	-3.0	0.9	3.7
Q2	2.5	1.9	-0.8	-0.4	6.7	2.7	0.8	3.4	2.1	-3.0	-1.3	-0.5
Q3	4.5	3.2	6.7	-2.1	7.1	0.8	0.6	1.6	2.4	-1.1	-2.6	-6.3
Q4	2.2	3.0	7.4	1.3	3.4	0.6	0.8	0.3	0.1	0.1	-2.7	-7.8
2006 Q1	3.0	4.1	10.7	-5.4	10.5	0.8	1.9	-2.4	1.8	-2.6	-3.1	-9.0
Q2	3.8	1.5	4.2	-4.5	5.1	-2.7	0.4	-4.4	1.8	-3.8	-0.2	-3.3
Q3	2.8	0.2	1.6	-0.8	5.8	-2.7	0.3	-4.7	-1.3	-5.0	1.5	-1.0
Q4	3.1	-0.7	-0.7	-3.3	1.8	-2.4	0.5	-3.0	1.6	-5.1	0.1	0.1

Note: Labour productivity figures are based on SSIC 2005 classification.

Source: Singapore Department of Statistics/Central Provident Fund Board

TABLE 5: LABOUR MARKET (II)

Thousand

Period	Changes in Employment										
	All Sectors	Manufacturing	Construction	Wholesale & Retail Trade	Hotels & Restaurants	Transport & Storage	Information & Communications	Financial Services	Business Services	Other Services	Others
2005	113.3	29.1	8.7	12.6	5.7	6.4	3.7	7.7	20.3	17.5	1.7
2006	176.0	41.6	20.5	18.5	12.6	6.0	6.5	11.3	34.1	23.7	1.2
2005 Q1	17.8	5.5	1.5	2.2	-1.2	1.4	0.0	2.1	1.2	4.9	0.3
Q2	31.7	9.2	3.4	2.6	0.4	1.4	1.1	2.1	7.1	4.3	0.1
Q3	28.5	8.0	2.2	2.7	0.9	0.8	1.2	1.7	7.2	4.0	-0.2
Q4	35.3	6.4	1.7	5.1	5.6	2.9	1.3	1.8	4.7	4.4	1.5
2006 Q1	45.0	11.1	5.6	3.5	1.1	1.7	1.2	2.1	10.1	8.3	0.4
Q2	36.4	8.4	3.5	3.0	1.5	1.6	1.8	3.3	8.4	4.7	0.1
Q3	43.0	11.3	5.6	4.5	1.2	1.2	1.2	3.3	8.4	6.1	0.2
Q4	51.5	10.9	5.8	7.5	8.7	1.6	2.3	2.6	7.0	4.6	0.5

Note: Changes in employment numbers are based on SSIC 2005 classification.

Source: Ministry of Manpower

TABLE 6: EXTERNAL TRADE

Year-on-Year % Change

Period	Total Trade	Exports	Domestic Exports					Re-exports	Imports	Exports	Domestic Exports			Re-exports	Imports
			Total	Oil	Non-oil						Total	Oil	Non-oil		
					Total	Electronics	Non-electronics								
	At Current Prices									At 2000 Prices					
2005	13.8	14.0	15.1	41.5	8.2	3.9	12.7	12.7	13.6	12.2	11.0	5.1	12.0	13.7	9.4
2006	13.2	12.8	9.6	12.9	8.5	4.3	12.4	16.6	13.7	11.9	7.9	-3.1	9.7	16.7	11.8
2005 Q1	11.7	11.5	12.6	33.2	7.8	2.8	12.7	10.2	11.9	12.2	12.5	4.9	13.8	11.8	8.9
Q2	10.5	10.8	11.6	47.9	2.1	-0.1	4.3	9.9	10.2	8.8	6.9	8.2	6.7	11.1	6.1
Q3	12.3	12.4	13.8	51.8	3.9	0.5	7.6	10.7	12.1	9.8	8.5	8.0	8.6	11.3	7.4
Q4	20.2	20.7	21.8	32.8	18.6	11.6	26.5	19.4	19.7	17.8	16.0	-0.5	18.7	20.1	15.2
2006 Q1	20.9	22.4	22.5	42.0	16.8	18.1	15.7	22.3	19.1	19.0	16.0	5.6	17.6	22.8	14.6
Q2	17.8	17.3	18.0	26.2	14.9	11.1	18.5	16.4	18.4	15.4	14.2	-3.6	17.5	16.7	14.4
Q3	13.4	12.2	6.9	8.5	6.3	3.0	9.6	18.5	14.8	11.4	6.2	-1.2	7.4	17.5	11.5
Q4	3.0	2.0	-4.9	-15.7	-1.4	-10.2	7.2	10.5	4.2	3.6	-2.4	-12.5	-1.0	11.1	7.3

Source: International Enterprise Singapore

TABLE 7: NON-OIL DOMESTIC EXPORTS by selected countries

Period	All Countries	ASEAN				NIEs				China	EU	Japan	US
		Total	of which			Total	Hong Kong	S. Korea	Taiwan				
			Indonesia	Malaysia	Thailand								
	Year-on-Year % Change												
2005	8.2	13.5	17.7	9.9	23.2	7.7	0.9	9.7	17.2	27.2	5.8	-1.2	-1.7
2006	8.5	7.7	-3.2	13.0	16.7	6.3	14.1	1.1	-0.8	7.5	3.5	2.1	14.4
2005 Q1	7.8	11.4	22.0	9.1	18.8	3.8	4.8	2.2	3.4	30.3	-2.0	-1.9	18.6
Q2	2.1	14.0	27.7	2.3	24.7	-2.7	-10.8	-0.2	9.5	23.3	-4.3	-6.3	-11.8
Q3	3.9	8.9	8.1	5.1	19.6	12.6	4.0	15.7	24.5	26.7	0.8	-4.1	-9.3
Q4	18.6	19.6	15.8	22.6	29.2	16.0	5.9	20.2	28.8	28.6	27.6	7.2	-1.0
2006 Q1	16.8	15.9	8.3	15.4	35.1	21.9	22.2	17.8	24.6	18.7	20.4	14.3	4.0
Q2	14.9	7.9	-5.1	16.5	22.0	22.3	31.6	8.4	18.8	17.1	5.3	7.6	26.4
Q3	6.3	9.7	-0.6	16.5	12.1	-2.3	5.8	-11.7	-7.3	2.4	-9.3	-8.6	22.4
Q4	-1.4	-0.8	-13.1	5.5	2.5	-9.9	1.0	-5.5	-26.7	-3.8	-0.4	-3.2	6.8
	% Share of All Countries												
2005	100.0	23.8	7.7	8.7	4.4	15.0	6.8	3.3	4.9	9.7	18.8	6.7	14.4
2006	100.0	23.6	6.9	9.1	4.8	14.7	7.2	3.1	4.5	9.6	17.9	6.3	15.2

Source: International Enterprise Singapore

TABLE 8: ELECTRONICS LEADING INDEX

Period	Original			Smoothed		
	1999 = 100	Year-on-Year % Change	Quarter-on-Quarter % Change	1999 = 100	Year-on-Year % Change	Quarter-on-Quarter % Change
2005	78.8	0.4		78.7	0.2	
2006	77.0	-2.3		77.2	-1.9	
2005 Q1	78.0	-1.3	-0.6	78.1	-1.3	-0.3
Q2	78.4	-0.1	0.5	78.1	-0.7	0.0
Q3	80.6	3.5	2.8	79.8	2.2	2.2
Q4	78.0	-0.6	-3.2	78.8	0.6	-1.3
2006 Q1	77.9	-0.2	-0.2	77.8	-0.4	-1.3
Q2	78.3	-0.1	0.6	78.3	0.2	0.6
Q3	76.8	-4.7	-1.9	77.5	-2.9	-1.0
Q4	74.9	-4.0	-2.5	75.4	-4.4	-2.7

Source: Monetary Authority of Singapore

TABLE 9: BALANCE OF PAYMENTS – Current Account

	Current Account Balance		Goods Account			Services Balance						Income Balance	Current Transfers (Net)
	S$ Million	% of GNI	Exports	Imports	Balance	Total	Transportation	Travel	Insurance	Government	Other		
			S$ Million										
2005	47,617	25.5	386,701	325,552	61,150	-3,898	-2,160	-6,726	-2,239	-128	7,355	-7,618	-2,018
2006	57,661	28.4	436,632	365,578	71,054	-4,564	-3,153	-5,263	-2,566	-104	6,521	-6,633	-2,197
2005 Q1	9,225	n.a.	85,102	72,952	12,150	-876	-338	-1,765	-437	-59	1,723	-1,543	-505
Q2	11,528	n.a.	92,393	77,721	14,672	-1,351	-726	-1,847	-588	-11	1,821	-1,309	-485
Q3	14,345	n.a.	100,837	83,725	17,112	-423	-464	-1,476	-590	-34	2,141	-1,840	-504
Q4	12,518	n.a.	108,369	91,153	17,216	-1,247	-633	-1,637	-624	-24	1,670	-2,927	-524
2006 Q1	13,239	n.a.	103,936	86,467	17,469	-1,999	-1,112	-1,273	-584	-43	1,012	-1,677	-554
Q2	14,817	n.a.	108,510	91,235	17,275	-1,040	-1,079	-1,317	-644	-47	2,047	-902	-516
Q3	14,289	n.a.	113,405	96,053	17,352	-896	-858	-1,145	-671	-7	1,785	-1,616	-551
Q4	15,317	n.a.	110,781	91,823	18,959	-629	-104	-1,528	-667	-7	1,677	-2,438	-575

Source: Singapore Department of Statistics

TABLE 10: BALANCE OF PAYMENTS – Capital & Financial Accounts

S$ Million

Period	Capital & Financial Account Balance	Capital Account	Financial Account						Errors & Omissions	Overall Balance	Official Foreign Reserves (End of Period)
			Total	Direct Investment	Portfolio Investment	Other Investment					
						Total	Banks	Others			
2005	-31,923	-336	-31,588	16,593	-13,792	-34,389	-10,461	-23,928	4,704	20,397	192,813
2006	-33,262	-360	-32,902	24,757	-22,536	-35,123	-11,675	-23,448	1,601	26,000	208,992
2005 Q1	-7,275	-78	-7,196	4,829	-3,321	-8,704	-7,689	-1,015	2,827	4,778	186,346
Q2	-3,558	-91	-3,466	4,876	-3,329	-5,013	6,148	-11,161	2,010	9,981	194,835
Q3	-14,277	-84	-14,192	4,060	-4,109	-14,144	-6,423	-7,721	1,222	1,290	195,301
Q4	-6,815	-82	-6,733	2,828	-3,033	-6,529	-2,497	-4,031	-1,356	4,347	192,813
2006 Q1	-5,784	-86	-5,698	6,271	-4,163	-7,806	-7,739	-67	933	8,388	196,584
Q2	-9,881	-97	-9,785	9,370	-10,903	-8,252	1,524	-9,776	180	5,116	202,390
Q3	-9,078	-98	-8,980	4,144	-4,099	-9,026	-7,389	-1,637	-1,205	4,006	205,096
Q4	-8,519	-79	-8,439	4,972	-3,372	-10,040	1,928	-11,968	1,692	8,491	208,992

Source: Singapore Department of Statistics/Monetary Authority of Singapore

TABLE 11: EXCHANGE RATES

End of Period	Singapore Dollar Per									
	US Dollar	Pound Sterling	EURO	100 Swiss Franc	100 Japanese Yen	Malaysian Ringgit	Hong Kong Dollar	100 New Taiwan Dollar	100 Korean Won	Australian Dollar
2005	1.6642	2.8717	1.9754	126.91	1.4189	0.4403	0.2146	5.0701	0.1646	1.2207
2006	1.5336	3.0102	2.0176	125.56	1.2887	0.4343	0.1973	4.7071	0.1649	1.2132
2005 Q1	1.6498	3.1010	2.1329	137.68	1.5389	0.4342	0.2115	5.2191	0.1620	1.2732
Q2	1.6832	3.0425	2.0350	131.45	1.5268	0.4429	0.2166	5.3333	0.1639	1.2858
Q3	1.6891	2.9765	2.0354	130.72	1.4947	0.4481	0.2177	5.0966	0.1622	1.2875
Q4	1.6642	2.8717	1.9754	126.91	1.4189	0.4403	0.2146	5.0701	0.1646	1.2207
2006 Q1	1.6183	2.8247	1.9683	124.71	1.3783	0.4390	0.2085	4.9877	0.1660	1.1592
Q2	1.5894	2.9132	2.0198	128.88	1.3818	0.4325	0.2046	4.9039	0.1667	1.1776
Q3	1.5869	2.9792	2.0168	127.32	1.3469	0.4307	0.2037	4.8016	0.1680	1.1862
Q4	1.5336	3.0102	2.0176	125.56	1.2887	0.4343	0.1973	4.7071	0.1649	1.2132
2007 Q1	1.5172	2.9780	2.0241	124.75	1.2880	0.4390	0.1942	4.5869	0.1613	1.2251

Source: Monetary Authority of Singapore

TABLE 12: SINGAPORE DOLLAR NOMINAL EFFECTIVE EXCHANGE RATE INDEX

Index (7 Oct 2005=100)

As at Week Ending	Index	As at Week Ending	Index	As at Week Ending	Index	As at Week Ending	Index	As at Week Ending	Index	As at Week Ending	Index
2005 Oct 7	100.00	2006 Jan 6	101.74	2006 Apr 7	103.17	2006 Jul 7	104.03	2006 Oct 6	104.09	2007 Jan 5	105.23
14	100.05	13	102.30	13	103.26	14	103.97	13	104.30	12	105.11
21	100.06	20	102.41	21	103.36	21	104.21	20	104.83	19	105.44
28	100.08	27	102.70	28	103.35	28	103.95	27	104.86	26	105.45
Nov 4	99.99	Feb 3	102.33	May 5	103.48	Aug 4	104.28	Nov 3	104.74	Feb 2	105.40
11	99.98	10	102.64	11	103.60	11	104.24	10	104.82	9	105.60
18	100.21	17	102.26	19	103.17	18	104.38	17	105.00	16	105.19
25	100.64	24	102.81	26	103.69	25	104.37	24	104.77	23	105.41
Dec 2	100.73	Mar 3	102.77	Jun 2	103.86	Sep 1	104.55	Dec 1	104.57	Mar 2	105.67
9	100.83	10	102.76	9	103.57	8	104.56	8	104.51	9	105.78
16	101.16	17	102.82	16	103.74	15	104.12	15	104.82	16	105.38
23	101.50	24	103.11	23	103.83	22	103.69	22	104.98	23	105.71
30	101.80	31	102.84	30	103.78	29	103.97	29	105.37	30	105.79
										Apr 5	105.76

Source: Monetary Authority of Singapore

TABLE 13: DOMESTIC LIQUIDITY INDICATOR

Change from 3 Months Ago

Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2004	0.109	0.223	0.125	0.416	0.202	0.238	-0.134	0.091	0.407	0.647	0.573	0.280
2005	0.312	0.254	0.366	0.064	0.071	-0.222	-0.105	0.044	0.021	0.055	0.076	0.544
2006	0.920	0.748	0.496	0.209	0.287	0.300	0.266	0.192	0.057	0.064	0.165	0.170
2007	0.171	0.038	0.049									

Source: Monetary Authority of Singapore

Note: The DLI is a measure of overall monetary conditions, reflecting changes in the S$NEER and domestic 3-month interbank rate. A positive (negative) number indicates a tightening (easing) monetary policy stance from the previous quarter. Please refer to the June 2001 issue of MAS ED *Quarterly Bulletin* for more information.

TABLE 14: MONETARY

End of Period	Money Supply								Interest Rates				
	Narrow Money M1	Broad Money M2	Broad Money M3	Reserve Money	Narrow Money M1	Broad Money M2	Broad Money M3	Reserve Money	Prime Lending Rate	3-month Interbank Rate	3-month SIBOR (US$)	Banks	
												Savings Rate	12-month Fixed Deposit Rate
	S$ Billion				Year-on-Year % Change				Rate (% Per Annum)				
2005	46.1	219.8	225.7	23.4	4.4	6.2	6.4	7.2	5.30	3.25	4.54	0.30	0.86
2006	52.2	262.4	268.8	25.8	13.4	19.4	19.1	10.1	5.33	3.44	5.36	0.29	0.88
2005 Q1	45.0	210.4	215.7	22.0	8.7	4.3	4.2	7.8	5.30	2.13	3.11	0.23	0.72
Q2	45.8	213.7	219.2	22.4	11.3	4.6	4.6	8.5	5.30	2.06	3.52	0.23	0.74
Q3	45.7	217.4	223.1	22.3	9.2	8.3	8.3	5.7	5.30	2.38	4.07	0.23	0.74
Q4	46.1	219.8	225.7	23.4	4.4	6.2	6.4	7.2	5.30	3.25	4.54	0.30	0.86
2006 Q1	48.3	227.5	233.6	23.3	7.3	8.1	8.3	5.6	5.30	3.44	5.01	0.30	0.88
Q2	48.8	237.5	243.7	24.0	6.6	11.1	11.2	7.4	5.30	3.56	5.48	0.30	0.89
Q3	49.2	245.1	251.4	24.0	7.6	12.8	12.7	7.6	5.33	3.44	5.37	0.29	0.89
Q4	52.2	262.4	268.8	25.8	13.4	19.4	19.1	10.1	5.33	3.44	5.36	0.29	0.88

Source: Monetary Authority of Singapore

TABLE 15: FISCAL

Period	Operating Revenue							Expenditure			Primary Surplus (+)/ Deficit (–)	Less: Special Transfers	Add: Net Investment Income Contribution	Budget Surplus (+)/ Deficit (–)
	Total	Tax Revenue					Non-tax Revenue	Total	Operating	Development				
		Total	of which											
			Income Tax	Asset Taxes	Stamp Duty	GST								
	S$ Million													
FY2004	27,469	23,799	11,468	2,058	815	3,470	3,671	28,957	20,355	8,602	-1,487	1,661	3,043	-105
FY2005	28,171	25,687	12,912	1,910	967	3,815	2,484	28,634	21,445	7,189	-463	829	2,777	1,486
FY2006 (Revised)	29,999	27,827	13,881	2,028	1,488	3,930	2,171	30,547	24,427	6,120	-549	3,580	2,845	-1,284
FY2007 (Estimated)	32,359	30,004	14,920	2,086	1,490	4,850	2,355	32,998	25,876	7,122	-639	2,071	2,019	-691
	% of Nominal GDP													
FY2004	15.0	13.0	6.3	1.1	0.4	1.9	2.0	15.8	11.1	4.7	-0.8	0.9	1.7	-0.1
FY2005	14.2	12.9	6.5	1.0	0.5	1.9	1.2	14.4	10.8	3.6	-0.2	0.4	1.4	0.7
FY2006 (Revised)	14.0	13.0	6.5	0.9	0.7	1.8	1.0	14.3	11.4	2.9	-0.3	1.7	1.3	-0.6
FY2007 (Estimated)	14.3	13.3	6.6	0.9	0.7	2.1	1.0	14.6	11.4	3.1	-0.3	0.9	0.9	-0.3

Source: Ministry of Finance

List of Selected Publications

Title	Frequency	Online Links
Inflation Monthly	Monthly	http://www.mas.gov.sg/eco_research/eco_dev_ana/Inflation_Monthly.html
Monthly Statistical Bulletin	Monthly	http://www.mas.gov.sg/data_room/msb/Monthly_Statistical_Bulletin.html
Recent Economic Developments	Quarterly	http://www.mas.gov.sg/eco_research/eco_dev_ana/Recent_Economic_Developments.html
Survey of Professional Forecasters	Quarterly	http://www.mas.gov.sg/eco_research/surveys/Survey.html
Financial Stability Review	Semi-annual	http://www.mas.gov.sg/publications/MAS_FSR.html
Macroeconomic Review	Semi-annual	http://www.mas.gov.sg/eco_research/eco_dev_ana/Macroeconomic_Review.html
Monetary Policy Statements	Semi-annual	http://www.mas.gov.sg/eco_research/policy_issues/Monetary_Policy_Statements.html
Economics Explorer	Occasional	http://www.mas.gov.sg/eco_research/eco_education/Economic_Explorer_Series.html
Monographs	Occasional	http://www.mas.gov.sg/publications/monographs/Info_Papers_and_Monographs.html#monographs
Staff Papers	Occasional	http://www.mas.gov.sg/publications/staff_papers/index.html

Monographs

Title	Date	Online Links
MAS' Roles and Responsibilities in Relation to Securities Clearing and Settlement Systems in Singapore	May 2004	http://www.mas.gov.sg/publications/monographs/Securities_Clearing_Settlement_Systems.html
Objectives and Principles of Financial Supervision in Singapore	Apr 2004	http://www.mas.gov.sg/publications/monographs/Financial_Supervision.html
Monetary Policy Operations in Singapore	Jan 2003	http://www.mas.gov.sg/publications/monographs/Monetary_Policy_Operations_in_Singapore.html

Title	Date	Online Links
Singapore's Exchange Rate Policy	Feb 2001	http://www.mas.gov.sg/publications/monographs/Singapore_Exchange_Rate_Policy.html

Staff Papers

Paper No.	Date	Title
44	Apr 2007	Checking Out: Exit from Currency Unions
43	Apr 2006	Singapore's Exchange Rate-Centered Monetary Policy Regime and Its Relevance for China
42	Dec 2005	China's Rise as a Manufacturing Powerhouse: Implications for Asia
41	Dec 2005	The Welfare Analysis of a Free Trade Zone: Intermediate Goods and the Asian Tigers
40	Sep 2005	Macroeconomic Stability in Developing Countries: How Much is Enough?
39	Jul 2005	Two Decades of Macromodelling at the MAS
38	Dec 2004	Macroeconomic Determinants of Banking Financial Performance and Resilience in Singapore
37	Dec 2004	Managed Floating and Intermediate Exchange Rate Systems: The Singapore Experience
36	Dec 2004	The Long-Run Real Effective Real Exchange Rate of Singapore: A Behavioural Approach
35	Nov 2004	Review of Literature & Empirical Research: Is Board Diversity Important for Corporate Governance and Firm Value?
34	Aug 2004	FSAP Stress Testing: Singapore's Experience
33	Aug 2004	Singapore's Balance of Payments, 1965 to 2003: An Analysis
32	Jul 2004	Case Study on Pan-Electric Crisis
31	Jun 2004	Singapore's Unique Monetary Policy: How Does It Work?
30	May 2004	Using Leading Indicators to Forecast the Singapore Electronics Industry
29	Mar 2004	Review of Literature & Empirical Research on Corporate Governance
28	Feb 2004	Why Has There Been Less Financial Integration In Asia Than In Europe?
27	Feb 2004	Does The WTO Make Trade More Stable?
26	Jan 2004	Education for Growth: The Premium on Education and Work Experience in Singapore
25	Jun 2003	Investigating the Relationship between Exchange Rate Volatility and Macroeconomic Volatility In Singapore
24	Sep 2002	Do We Really Know That The WTO Increases Trade?
23	Sep 2002	Assessing Singapore's Export Competitiveness Through Dynamic Shift-Share Analysis

Paper No.	Date	Title
22	Aug 2002	The Effect of Common Currencies on International Trade: Where Do We Stand?
21	Dec 2000	Kicking the Habit and Turning Over A New Leaf: Monetary Policy in East Asia After the Currency Crisis
20	May 2000	Financial Market Integration in Singapore: The Narrow and the Broad Views
19	Feb 2000	Exchange Rate Policy in East Asia After The Fall: How Much Have Things Changed?
18	Jan 2000	A Survey of Singapore's Monetary History
17	Nov 1999	Extracting Market Expectations of Future Interest Rates from the Yield Curve: An Application Using Singapore Interbank and Interest Rate Swap Data
16	Sep 1999	Interbank Interest Rate Determination in Singapore and its Linkages to Deposit and Prime Rates
15	Jul 1999	Money, Interest Rates And Income In The Singapore Economy
14	Jun 1999	The Petrochemical Industry in Singapore
13	May 1999	How Well Did the Forward Market Anticipate the Asian Currency Crisis: The Case of Four ASEAN Currencies
12	May 1999	The Term Structure of Interest Rates, Inflationary Expectations and Economic Activity: Some Recent US Evidence
11	Mar 1999	Capital Account and Exchange Rate Management in a Surplus Economy: The Case of Singapore
10	Dec 1998	Measures of Core Inflation for Singapore
9	Oct 1998	Export Competition Among Asian NIEs, 1991-96: An Assessment
8	Oct 1998	The Impact of the Asian Crisis on China: An Assessment
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