

macroeconomic ●

# review



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## LIST OF ABBREVIATIONS

bps	basis points
COE	Certificate of Entitlement
CPF	Central Provident Fund
CPI	consumer price index
DLI	Domestic Liquidity Indicator
DOS	Department of Statistics
EDB	Economic Development Board
EIA	Energy Information Administration
EPD	Economic Policy Department
ESU01	Econometric Studies Unit Model
FI	fiscal impulse
FX	foreign exchange
FY	financial year
GDP	Gross Domestic Product
GST	goods and services tax
HDB	Housing and Development Board
ICs	integrated circuits
IEA	International Energy Agency
IIP	index of industrial production
IRAS	Inland Revenue Authority of Singapore
LPG	liquid petroleum gas
LTA	Land Transport Authority
M&A	merger and acquisition
MCB	minimum cash balance
MICE	meeting, incentive, convention and exhibition
MMOs	money market operations
MMS	Monetary Model of Singapore
MOM	Ministry of Manpower
m-o-m	month-on-month
MRT	Mass Rapid Transit
MSD	Macroeconomic Surveillance Department
MPS	Monetary Policy Statement
NEER	nominal effective exchange rate
NODX	non-oil domestic exports
NORX	non-oil re-exports
OPEC	Organisation of the Petroleum Exporting Countries
PMETs	Professionals, Managers, Executives and Technicians
q-o-q	quarter-on-quarter
REER	real effective exchange rate
SAAR	seasonally adjusted annualised rate
SIBOR	Singapore Interbank Offer Rate
SGS	Singapore Government Securities
STB	Singapore Tourism Board
STI	Straits Times Index
UBC	unit business cost
UBCI	unit business cost index
ULC	unit labour cost
USCI	unit services cost index
USPCE	US personal consumption expenditures on goods
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)** analyses 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 supported by the Macroeconomic Surveillance Department (MSD). Associate Professor Peter Wilson, consultant with EPD, edited the publication and provided comments and guidance. The publication also benefited from useful comments by Professor Sam Ouliaris.

We are pleased to have been able to work with Tilak Abeysinghe, Associate Professor, Department of Economics, National University of Singapore and Choy Keen Meng, Assistant Professor, Division of Economics, Nanyang Technological University on Special Feature A of the *Review*. We look forward to similar collaborations in the future.

The data used in the *Review* were drawn from the following government agencies: CAAS, CPF Board, DOS, EDB, HDB, IE Singapore, IRAS, 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](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

The Singapore economy is in its fourth year of robust growth and has performed better than expected thus far in 2007. Concomitantly, a record number of jobs was created, which reduced the unemployment rate to a six-year low of 2.3% in June. Notwithstanding the moderation in growth momentum in Q3, underlying economic conditions remain supportive amidst a generally favourable external environment. Against this backdrop, and with GDP growth averaging around 8% in the first three quarters, the economy is on track to achieve a full-year growth rate at the upper end of the 7-8% forecast range.

Looking ahead, the global economy should continue to expand in 2008, albeit at a more moderate pace. Strong domestic demand and trade in the Asian region will continue to provide support, even though there may be some weakening in the industrialised economies. Singapore's GDP is therefore expected to grow at its medium-term potential rate of 4-6% in 2008. Nevertheless, two key concerns continue to cloud the economic horizon and bear close monitoring. First, there is the possibility of a sharp downturn in US consumer spending arising from the ongoing correction in the housing market; and second, global oil prices could remain at an elevated level.

Chapter 1 of the *Review* describes in detail the recent performance of the domestic economy. We highlight how non-IT activities, particularly those associated with the financial and property markets, have propelled growth in the first half of this year. In this chapter, we also assess the macroeconomic policy setting and, in particular, document MAS' monetary policy stance since 2001, which has been focused on the preservation of price stability over the course of the business cycle.

Chapter 2 examines the wage-price dynamics in the Singapore economy. CPI inflation picked up in the third quarter as a result of both external and domestic sources of cost pressures. The increase in global food prices was a key external influence on inflation, although its impact was dampened by Singapore's diversified food import sources. Domestic factors also contributed to higher consumer prices. Apart from the one-off impact of the GST hike, which was introduced in July, there was some pass-through of business costs, such as wages and rentals. Underlying cost

pressures are expected to stay firm alongside the strong and sustained expansion in the global and domestic economies.

Chapter 3 contains our assessment of the growth, labour market and inflation outlook for Singapore. We provide the background for our baseline forecast of domestic growth next year, highlighting the strong momentum in non-IT manufacturing, construction and business services. We also point to early indications of some strengthening in the IT sector. Amidst lingering uncertainty, however, financial markets are likely to be particularly sensitive to information from incoming data. This chapter includes an assessment of the extent to which domestic macroeconomic data releases have impacted on the short-term level and volatility of the S\$/US\$ exchange rate.

Finally, the *Review* incorporates two Special Features which highlight some of the Department's research work. The first takes a look at two major macroeconomic models of the Singapore economy – the MAS Monetary Model of Singapore (MMS) and the NUS Econometric Studies Unit Model (ESU01). In collaboration with the ESU01 architects, we compare the key characteristics of the two models and highlight some interesting differences in their modelling approach, for example, in the specification of the trade block of equations. The simulation of a negative demand shock sheds further light on the peculiarities of the transmission mechanisms built into the two models. Such comparative exercises are invaluable in allowing modellers to explore the different interpretations of macroeconomic developments in the Singapore economy and to gain deeper insights for forecasting and policy analysis. The second Feature revisits the US-Asia decoupling hypothesis. Distinguishing between long-run and short-run influences, we find little evidence of structural decoupling so far, but there could be weaker synchronisation in the short term as the impact of a temporary US slowdown on Asia is mitigated by growth in other parts of the world, as well as domestic demand in the region.

The next issue of the *Review* will be released in April 2008.

Economic Policy Department  
Monetary Authority of Singapore  
30 October 2007



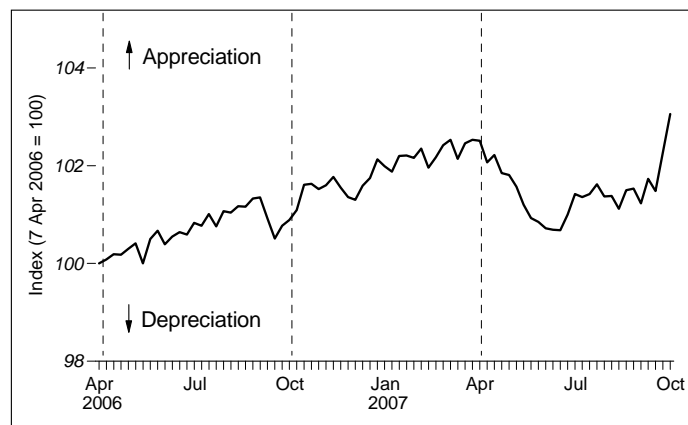
10 October 2007

# Monetary Policy Statement

## INTRODUCTION

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

**Chart 1**  
**Nominal Effective Exchange Rate (S\$NEER)**



- - - - indicates release of Monetary Policy Statement

2. Since the last policy review, the S\$NEER has eased from the upper end of the policy band, although in recent weeks it has edged up following the renewed weakness of the US\$. (Chart 1) Despite the turbulence in global financial markets arising from the US subprime mortgage problems, financial markets in Singapore, in particular the money markets, have continued to function in an orderly manner.

3. The three-month domestic interbank interest rate fell from 3.5% at end-February to 2.5% in June. While the disruption of US and European money markets in early August had led to a temporary spike in the domestic three-month rate to about 3%, it has since eased to around 2.5%.

## OUTLOOK FOR 2007 AND 2008

4. The Singapore economy has performed better than expected thus far in 2007, with robust growth recorded across most industries. Notably, the non-IT industries and asset market-related activities – that is, those associated with the property market as well as the financial advisory and capital markets – contributed significantly to overall GDP growth in the first half of the year. In Q3, Advance Estimates

released by the Ministry of Trade and Industry pointed to a moderation in economic momentum, largely on account of a pullback in some asset market-related activities. Nonetheless, financial markets have rebounded recently and underlying economic conditions remain supportive. GDP growth is therefore on track to come in at the upper end of the 7-8% forecast range this year, up from the 4.5-6.5% forecast during the April review.

5. Looking ahead, growth prospects of the US economy have weakened in line with the ongoing correction in the housing market and tighter credit conditions. Other economies are also likely to see some softening in the near term. However, the global economy is expected to remain resilient, particularly in Asia, where domestic demand and regional trade should continue to be firm. In the Singapore economy, growth will be led by non-IT manufacturing, construction and business services, which have built up a strong momentum and are more dependent on regional and domestic sources of demand as well as developments in specific product markets.

6. At this stage, our assessment is that the Singapore economy is likely to expand at a slower rate in 2008 than in the recent past, reflecting weaker global economic growth. Singapore's GDP growth rate is expected to come in within its potential of 4-6% next year.

7. CPI inflation in Singapore came in within expectations at 0.8% in the first half of this year, compared with 1% in 2006. Inflationary pressures have since picked up amidst the buoyant domestic economic conditions and the recent rise in global oil and food prices. Wage and rental increases have strengthened, and the unemployment rate has fallen to a six-year low of 2.3% in June. Inflation rose to an average of 2.8% in July-August, with about half the increase attributed to the one-off impact of the GST hike. The higher inflation also reflected stronger economic conditions and the pass-through of rising business costs to retail prices. As a result, CPI inflation is now projected to come in at 1.5-2% for 2007, from the 0.5-1.5% range expected at the time of the last policy review.

8. Domestic price pressures are expected to persist due to heightened supply constraints, while externally, oil, food, and other commodity prices will remain firm into next year. Further, rising residential property prices and rentals will lead to a more significant increase in CPI accommodation costs. For the first half of 2008, headline CPI inflation is projected to rise to about 3.5% on a year-on-year basis on account of the GST hike, as well as the base effects of lower energy and car prices in H1 2007. In the second half of the year, inflation should ease, and come in at 2-3% for 2008 as a whole.<sup>1</sup> The MAS underlying inflation measure, which excludes accommodation and private road transport costs, is projected at 1.5-2.5% in 2008.

## MONETARY POLICY

9. The Singapore economy has expanded at a rapid pace in 2007, underpinned by robust growth in non-IT manufacturing and asset market-related activities in the first half of the year. Going forward, while the economy is expected to moderate to a more sustainable pace, inflationary pressures stemming from external sources, as well as domestic conditions including a tight labour market and rising rental costs, will persist.

10. Against this backdrop, MAS will continue with the policy of a modest and gradual appreciation of the S\$NEER policy band in the period ahead. However, we will increase slightly the slope of the S\$NEER policy band. There will be no re-centring of the policy band, or any change in its width. In our assessment, this policy stance will remain supportive of economic growth while capping inflationary pressures and ensuring price stability over the medium term.

<sup>1</sup> The GST increase is expected to have a one-off impact of around 0.7% point on the annual inflation rate in 2007 and 2008.



**CHAPTER 1**

**MACROECONOMIC  
DEVELOPMENTS**

## 1.1 External Developments

### Growth Moderated in Developed Economies but Remained Resilient in Asia

Following three consecutive years of strong growth, the G3 economies expanded at a more moderate pace of 2% in H1 2007, from around 3% in 2006. (Chart 1.1) However, the impact of the slowdown in the G3 economies has, to some extent, been offset by the continued strong expansion in the larger emerging economies, such as China and India. Against this fairly sanguine backdrop and lifted by stronger domestic demand – especially private consumption – most East Asian economies performed well in H1 this year.

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**The US economy grew at a more moderate pace in H1, with weakness in housing and consumer spending.**

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The US economy grew at a slower pace of 2.2% in H1 2007, compared to around 3% for the whole of 2006. Growth rebounded to 3.8% q-o-q SAAR in Q2 2007, from a weak 0.6% in Q1. Notwithstanding the stronger headline GDP growth in Q2, there were weaknesses in some areas of the economy. In particular, housing remained sluggish, with residential investments contracting for the sixth consecutive quarter. This mirrored the poor existing home sales, which declined on a sequential basis during the quarter and continued to fall to a record low in September. The sustained weakness in house prices (Chart 1.2), job cuts in housing-related sectors and higher gasoline prices also weighed on consumer spending, which rose by 1.4% q-o-q SAAR, the slowest since Q4 2005.

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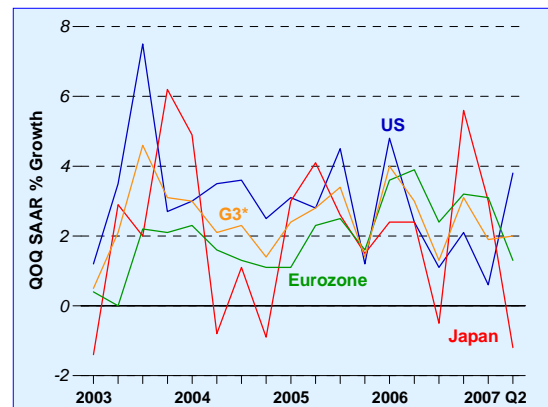
**GDP growth in the Eurozone and Japan also slowed.**

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Economic growth in the Eurozone eased to 1.3% q-o-q SAAR in Q2 2007, from a buoyant 3.1% in the first quarter. Fixed investments contracted marginally after posting a strong 7.8% growth in Q1, as business confidence moderated from previously elevated levels.

However, consumer spending picked up on the back of a strong labour market, with unemployment rate at a historic low. Meanwhile, Japan's real GDP contracted by

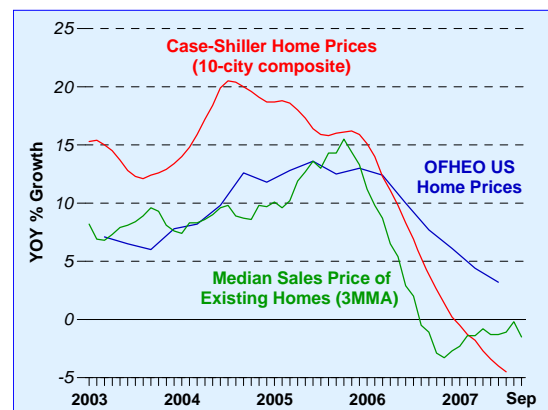
**Chart 1.1**  
**G3 GDP Growth**



Source: Datastream

\* Weighted by 2005 nominal GDP in US\$

**Chart 1.2**  
**US House Prices**



Source: CEIC and Bloomberg

1.2% q-o-q SAAR in Q2 2007, after expanding by a robust 3% in Q1. Averaging the quarterly fluctuations, the Japanese economy grew by around 1% in H1, a fairly significant slowdown from the 2.2% growth in 2006. The weakness in the second quarter was broad-based, with residential and non-residential fixed investments contracting, while exports and personal consumption slowed.

**Economic activity in Asia remained buoyant,  
supported by firm domestic demand.**

Apart from Japan, many Asian economies continued to grow at a rapid pace in Q2 2007, led by China, which expanded by 12% y-o-y, up from 11% in Q1 2007. (Table 1.1) While export growth eased across much of Asia in line with the consolidation in the global IT industry, overall economic activity was supported by firmer domestic demand, which expanded by 4.9% y-o-y in Q2 2007, the fastest in three years. (Chart 1.3) In particular, household spending was strong, buttressed by sustained employment and disposable income growth, which boosted consumer confidence. Fixed investments also grew strongly in most countries, in part to address increasingly tight capacity and emerging infrastructure bottlenecks.

**Global financial conditions tightened temporarily  
in July and August, but eased following the Fed  
rate cut in mid-September.**

Financial and credit market conditions tightened across a number of major economies in July and August. In the ensuing rise in risk aversion and flight to quality, short-term interest rates rose sharply in a number of countries (Charts 1.4 and 1.5), as banks hoarded liquidity and tightened lending criteria. Asset prices, especially for equities and US subprime mortgage securities, also corrected sharply in August.

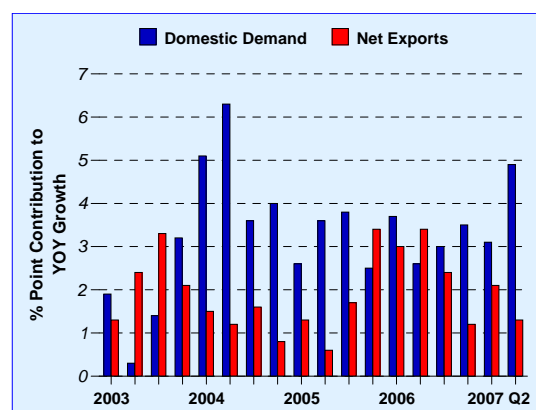
More recently, global financial conditions have eased after the US Federal Reserve cut the overnight Fed funds rate by 50 bps on 18 September. Likewise, stock prices have staged a recovery after the sharp decline in August.

**Table 1.1  
East Asian GDP Growth  
y-o-y (%)**

	2005	2006	2007	
			Q1	Q2
China	10.4	11.1	11.1	11.9
Hong Kong	7.1	6.8	5.6	6.6
Indonesia	5.7	5.5	6.0	6.3
Korea	4.2	5.0	4.0	5.0
Malaysia	5.0	5.9	5.5	5.7
Philippines	4.9	5.4	7.1	7.5
Singapore	6.6	7.9	6.5	8.7
Taiwan	4.1	4.7	4.2	5.1
Thailand	4.5	5.0	4.2	4.4

Source: CEIC

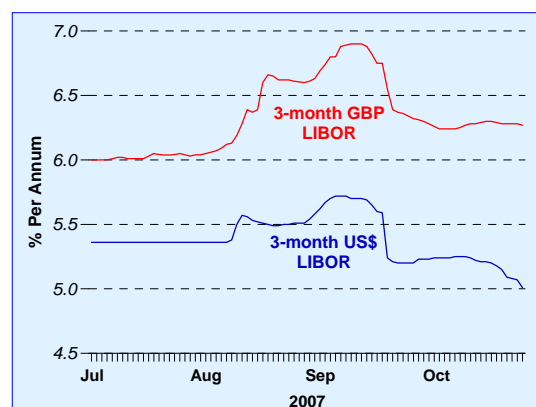
**Chart 1.3  
Contribution to EA-8 GDP Growth**



Source: CEIC

Note: EA-8 refers to the East Asia-8 economies, namely Hong Kong, Indonesia, Korea, Malaysia, Singapore, Philippines, Taiwan and Thailand.

**Chart 1.4  
Interbank Interest Rates**



Source: CEIC

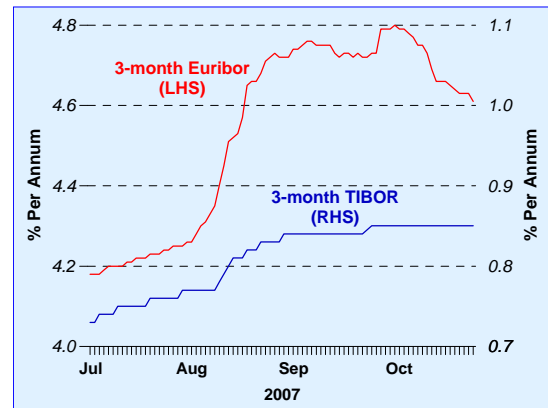
**Inflationary pressures are generally contained,  
allowing some central banks to adopt a less  
hawkish monetary policy.**

Global inflation has remained generally well-contained this year. The housing market correction in the US has checked the increase in the prices of housing-related items in the CPI, while headline inflation in the Eurozone fell to a 10-month low in August. The Japanese economy remained in mild deflation in the second quarter. While headline CPI has edged up in some Asian countries in recent months, particularly in China, this largely reflected near-term supply factors. Nevertheless, strong global demand has resulted in higher food and/or energy prices in a number of countries.

Core inflation has remained at moderate levels in most economies. This provided some room for a number of central banks to mitigate the potentially adverse impact of tighter financial conditions on economic activity. Notably, the US Federal Open Market Committee lowered the overnight Fed funds target rate by 50 bps to 4.75% at its September policy meeting. Meanwhile, the European Central Bank and the Bank of Japan opted to keep policy rates on hold, but injected liquidity in the interbank markets to ease the credit crunch.

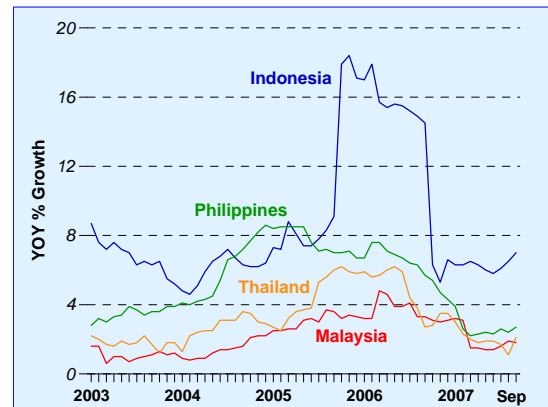
Central banks in the Southeast Asian economies of Thailand, Indonesia and the Philippines have also kept monetary policy on hold, as inflationary pressures remained relatively contained. (Chart 1.6) In comparison, central banks in Northeast Asia have generally maintained a tight monetary policy stance in view of stronger inflationary pressures. For example, overheating concerns prompted the People's Bank of China to raise the reserve requirement ratio and policy interest rate by a total of 300 bps and 117 bps respectively since the start of this year. The Central Bank of the Republic of China (Taiwan) also raised interest rates at its September meeting, citing concerns about rising price pressures due to higher import costs, solid underlying growth momentum and a tight labour market.

**Chart 1.5  
Interbank Interest Rates**



Source: CEIC

**Chart 1.6  
CPI Inflation**



Source: CEIC

## 1.2 Domestic Economy

### Seemingly Unrelenting Growth

**Strong momentum was seen in the Singapore economy at the half-year mark.**

The Singapore economy grew strongly in H1 2007, expanding by 7.6% compared to the same period last year. Growth momentum reached 14% q-o-q SAAR in Q2 2007, on the heels of an 8.9% expansion in the preceding quarter. The expansion was broad-based, with rapid growth recorded in financial services, non-electronics manufacturing and construction. (Chart 1.7)

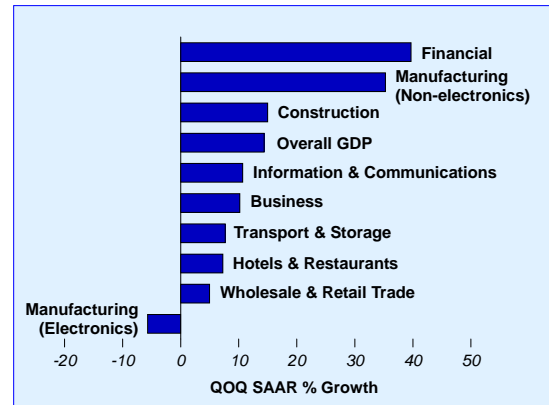
**Electronics manufacturing was the exception.**

The IT-related cluster – comprising electronics manufacturing and its related services industries – was the only laggard in Q2. Electronics production shrank by 5.7% q-o-q SAAR in Q2 amidst lacklustre conditions in the global IT market, reversing the 23% growth in the preceding quarter. (Chart 1.8)

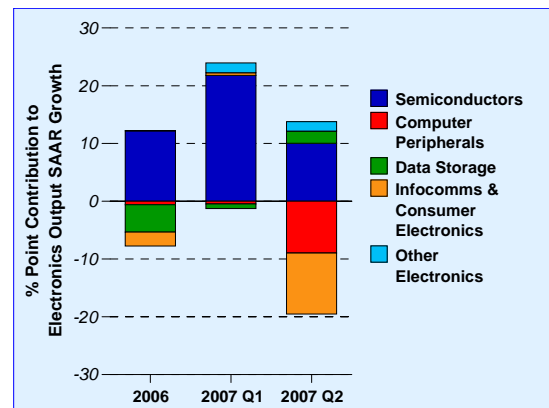
Production of semiconductors – the largest segment within the domestic electronics industry – moderated sharply in Q2 alongside severe price pressures in the global chip industry. Chip prices, as estimated by the US Producer Price Index (PPI) of integrated circuits (ICs), began their steep descent at the beginning of the year and fell a further 6.8% q-o-q in Q2, triggered by overcapacity and an escalation of the inventory build-up worldwide. (Chart 1.9) Heightened midstream competition – as producers of final products sourced from a wider range of semiconductor suppliers – further intensified price pressures in the global semiconductor industry, squeezing operating margins across chip companies.

Meanwhile, output of the other electronics segments, including computer peripherals and infocomms & consumer electronics, were affected by company-specific factors. The fall in overall output, for example, was due to declines in the global market share of manufacturers of particular products.

**Chart 1.7  
GDP Growth, Q2 2007**

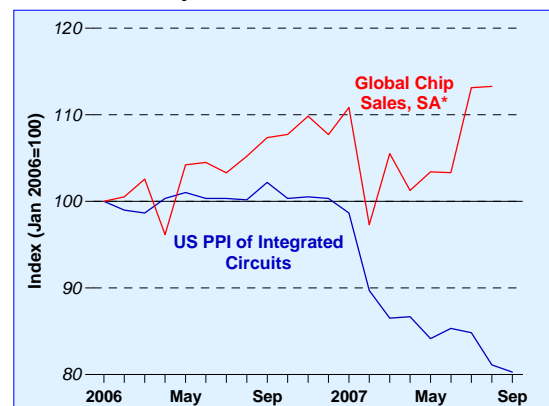


**Chart 1.8  
Contribution to Electronics Output Growth**



Source: EPD, MAS estimates

**Chart 1.9  
Global Chip Sales and US PPI of ICs**



\* EPD, MAS estimates

Source: Semiconductor Industry Association for global chip sales, US Bureau of Labour Statistics for US PPI of ICs

The general weakness in the domestic and regional IT industries caused some spillover to transport-hub services. Entrepôt trade fell by 6.6% q-o-q SAAR in Q2, dragged down by a 19% drop in electronics re-exports. The weakness was concentrated in the semiconductor re-export segment, which saw a 24% decline, and was reflective of the pricing squeeze in the global chip industry.

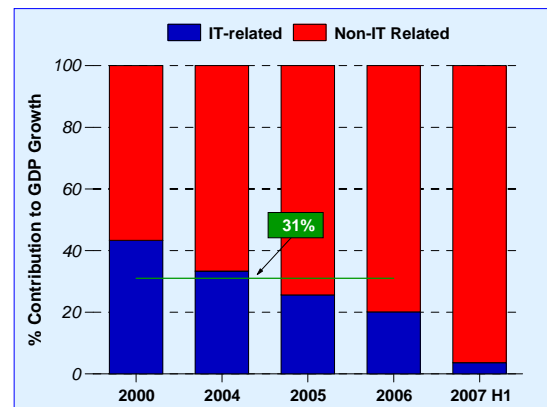
### **IT's contribution to GDP growth declined in H1.**

The contribution of the IT-related industries to overall GDP growth has accordingly declined in importance this year. Chart 1.10 illustrates the contribution of IT and non IT-related industries during various "strong-growth" years since 2000 when GDP growth was above 6%. Together, electronics manufacturing and IT-related services have been an important pillar of growth, contributing about one-third to overall GDP growth over the period 2000-06. However, the contribution of this IT-related cluster fell to about 4% in the first half of 2007.

### **Non-IT drivers of growth have emerged from both external and domestic sources.**

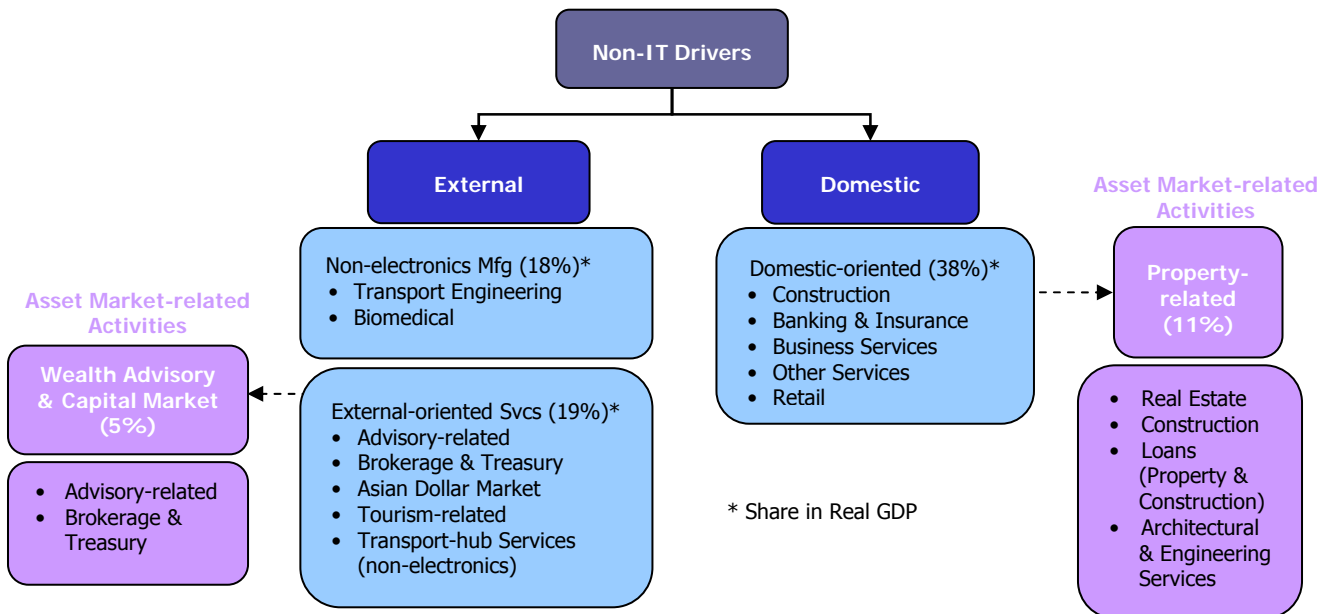
In comparison, the non-IT engines of growth have provided a significant boost to the economy this year. In the April 2007 issue of the *Review*, these non-IT industries were categorised into non-electronics manufacturing, external-oriented services and domestic-oriented industries. This categorisation helped to identify the other relatively stable sources of growth in the economy in light of the weakening IT-related cluster. Each of these non-IT industries has very different dynamics and supports. (Figure 1.1)

**Chart 1.10**  
**Contribution to GDP Growth**



Source: EPD, MAS estimates

**Figure 1.1  
Non-IT Drivers of Growth**



Source: EPD, MAS estimates  
Note: Only a selected list of key activities is shown in the boxes.

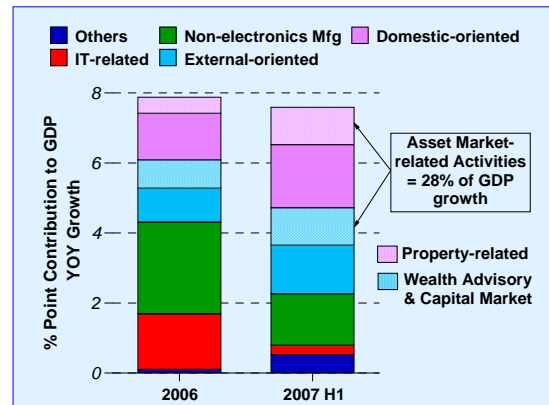
**Strong growth in asset market-related activities was observed in H1 2007 ...**

An interesting trend within the non-IT segment is the strong performance and increased contribution of “asset market-related” activities to overall growth. (Chart 1.11) These activities cut across the external-oriented services and domestic-oriented industries, which have seen their contributions soar in H1 2007. Asset market-related activities alone contributed almost 30% to GDP growth in H1, up from 16% last year. (Chart 1.12)

**... reflecting the rapid expansion of emerging segments within the financial services sector ...**

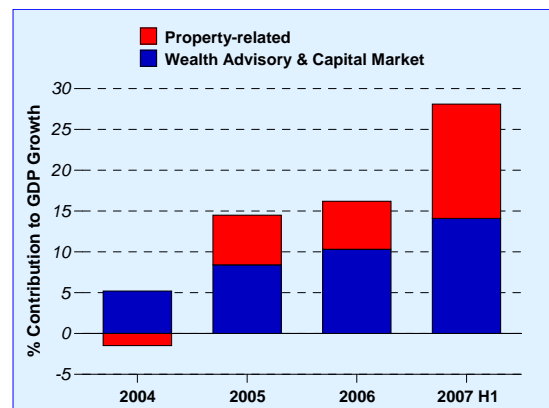
Selected segments in financial services make up the first group of asset market-related activities. (Chart 1.12) These are the wealth advisory and capital market segments, which have benefited from the buoyant investment climate in the first half of the year. In the wealth advisory segment, demand was also boosted by the rapid growth of private investible wealth in Asia-Pacific, including Singapore. The latest *Asia Pacific Wealth Report* by Merrill Lynch and Capgemini reported an 8.6% expansion in Asian high net worth individuals in the region in 2006, with Singapore showing a strong 21% increase.

**Chart 1.11  
Contribution to GDP Growth**



Source: EPD, MAS estimates

**Chart 1.12  
Asset Market-related Activities**



Source: EPD, MAS estimates

The strong performance of Asia as a whole has also enhanced Singapore's standing as an investment destination for global investors. Domestic capital markets turned in a solid showing in H1 2007. Trading activity in the stock market surged, as equity prices saw a sustained rise. Turnover volumes were markedly higher in Q2, growing by 45% over the previous quarter. (Chart 1.13) In the debt market, activity was boosted by the issuance of project bonds by developers to meet infrastructure financing demands, alongside the ongoing property market boom. Meanwhile, forex market activity surged to new highs in Q1-Q2 2007 (Chart 1.14), fuelled in part by the continued buildup in yen carry trades. At the same time, the non-interest income of the offshore banking segment has been driven in part by the rise in M&A activities, as corporates sought to buy into the fast-growing regional telecommunication market.

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... as well as property-related activities.

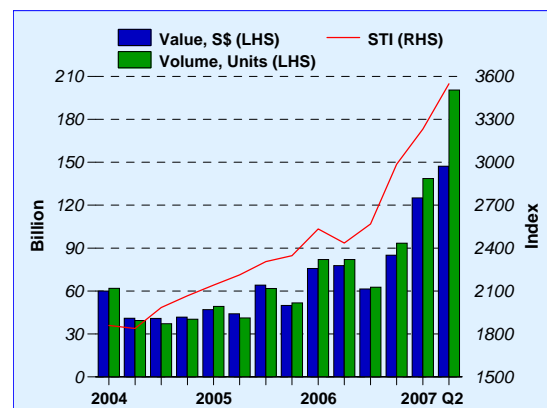
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The second group of asset market-related activities is linked to the property market.

The Singapore property market saw a sustained upturn in Q2. Private property prices climbed by 8.3% during the quarter, the strongest quarterly increase since Q2 1999. This brought the price appreciation in the first six months of the year to 13.5%. (Chart 1.15) The price increase in Q2 was more broad-based than in previous quarters, with the Rest of Central Region (RCR) and Outside Central Region (OCR) recording strong growth in tandem with the Core Central Region (CCR).<sup>1</sup> (Chart 1.16)

In addition, the increase in property prices has extended to the public segment. The HDB resale price index rose by 3.0% in Q2, following a 1.3% gain in the first quarter. (Chart 1.15) Property analysts have partly attributed this to the purchase of large HDB units – five-room and executive flats – by property owners who had sold their apartments in en bloc transactions.

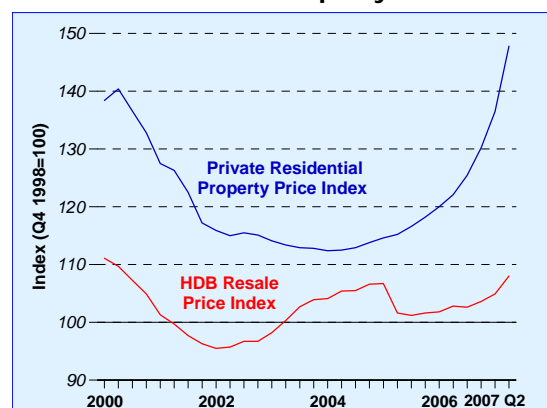
**Chart 1.13**  
Stock Market Total Turnover and  
Straits Times Index (STI)



**Chart 1.14**  
Total Forex Turnover



**Chart 1.15**  
Private Residential Property Price Index



<sup>1</sup> CCR consists of postal districts 9, 10, 11, Downtown Core and Sentosa. RCR broadly refers to the districts bordering the CCR. OCR refers to the remaining districts.

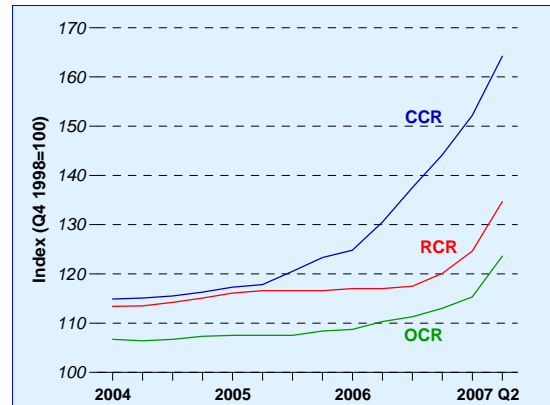


The strong recovery in the property market has spurred the growth of a number of related activities in other sectors of the economy. Figure 1.2 shows the timeline and typical stages of a construction project from excavation to finishing work. The table below it attempts to map the economic activities that are associated with each stage of the project.

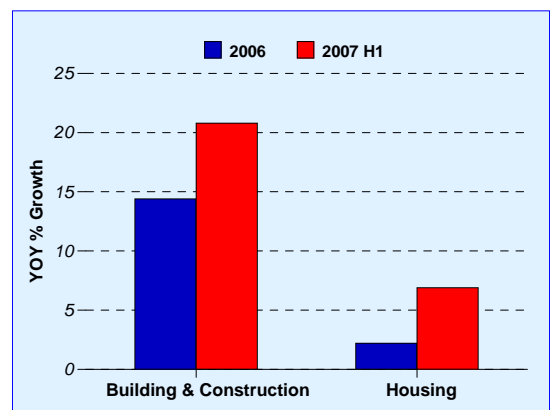
The first half of 2007 witnessed a significant amount of upstream Stage 1 construction activity, driven by the start-up of large-scale non-residential projects such as the Marina Sands Integrated Resort and the Marina Bay Financial Centre. Indeed, certified payments from the non-residential segment surged by 32% in H1, significantly higher than the 11% growth for 2006.

The uptick in construction activity has spilled over into financial and business services. (Chart 1.17) For example, loans to the building and construction industry have registered double-digit growth since H2 last year. More recently in Q2, there was a concerted pickup in housing loans as well, with growth hitting 11% as of end-August. The business services sector also grew more rapidly this year, with the property-related segments such as real estate and architectural & engineering services being the main beneficiaries.

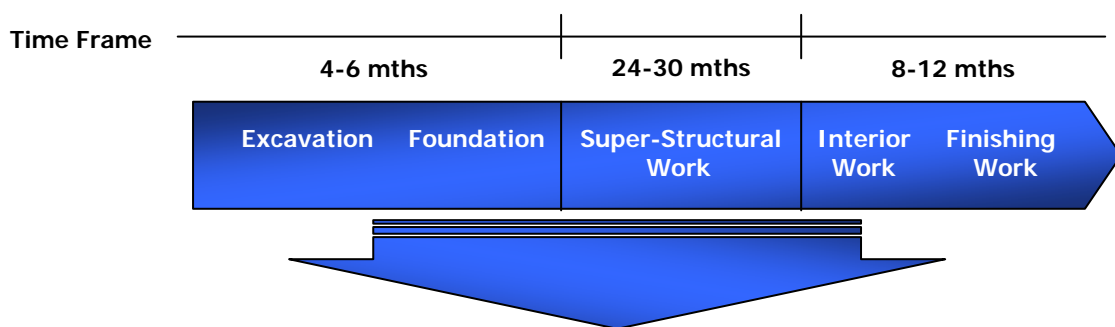
**Chart 1.16**  
Price Indices of Non-landed Properties by Locality



**Chart 1.17**  
DBU Loans



**Figure 1.2**  
Property-related Activities



Sectors	Stage 1	Stage 2	Stage 3
Construction	Certified Payments	Certified Payments	-
Financial Services	Bank Loans (Building & Construction)	Bank Loans (Housing)	Bank Loans (Housing)
Business Services	Real Estate (Developers) Architectural Services	-	Real Estate (Consulting & Marketing) Engineering Services

### The other non-IT segments also performed well.

Meanwhile, the other non-IT segments also turned in strong growth in the first half of this year.

In the non-electronics manufacturing segment, output expanded strongly by 35% q-o-q SAAR in Q2, more than reversing the 20% decline in Q1. Growth was bolstered by the biomedical and transport engineering clusters, which surged by 100% and 34% respectively.

Biomedical output was lifted by the sharp turnaround in pharmaceutical production, which reflected a short-term shift in the product mix to higher value added active ingredients. At the same time, the marine & offshore engineering segment expanded rapidly, as shipyards continued to ramp up to meet robust demand for oil exploration equipment in locations such as the Northern Atlantic Ocean and the Gulf of Mexico, in tandem with the strong global demand for energy.

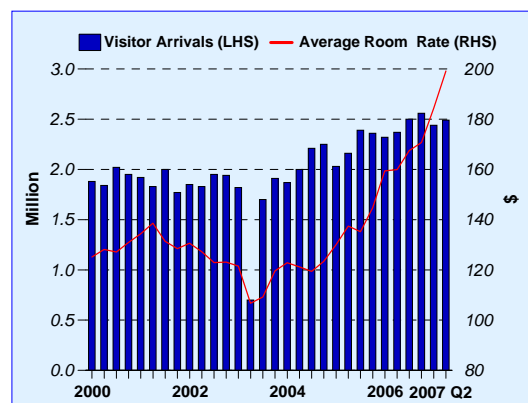
The tourism-related services cluster in H1 continued to be supported by growth in visitors from the Asian region. Average hotel room rates scaled new heights to hit \$210 per night in June as the hospitality industry benefited from the increase in visitor arrivals in Q2. (Chart 1.18)

Growth in the domestic-oriented services also remained firm in Q2, amidst generally positive consumer sentiment and a healthy labour market. In particular, retail sales volume grew by 14% q-o-q SAAR, significantly higher than the 5% increase in Q1. For most of 2006, retail sales were driven by motor vehicles. In comparison, sales were dominated by big-ticket items and department store merchandise in H1 this year. (Chart 1.19)

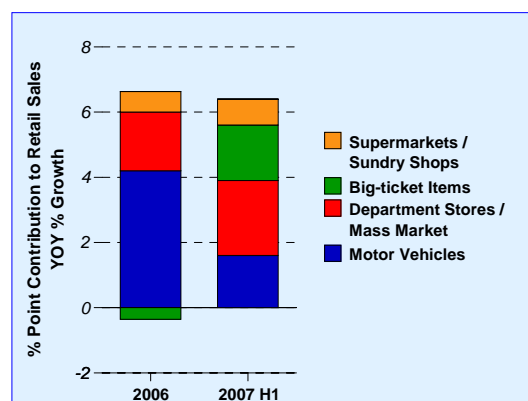
### Some slowdown in growth momentum in Q3 ...

Following the blistering pace in H1, growth momentum in the Singapore economy slowed in Q3. According to the Advance Estimates, sequential GDP growth moderated to 6.4% in Q3. The non-electronics manufacturing industries were the key supports to growth, largely as a result of the spike in pharmaceutical output, which surged by 170% q-o-q SAAR.

**Chart 1.18**  
Visitor Arrivals and Average Hotel Room Rate



**Chart 1.19**  
Contribution to Retail Sales Growth



Source: EPD, MAS estimates

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**... following a pullback in asset market-related activities.**

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The moderation in the economy was attributed to a pullback in asset market-related activities, in the face of the global financial market turmoil in August.

In the domestic financial services sector, the equity market plunged sharply, with the STI falling from a high of 3,648 around end-July to 3,130 in mid-August. Turnover volumes also declined by 42% in August, compared to strong double-digit growth in the preceding months. However, there were some tentative signs of recovery in late August, when investor sentiment was lifted by the Fed's decision to cut its discount rate. More recently, investors were cheered by a 50 bps reduction in the Fed funds rate in September, which sparked a rebound in equity prices and trading activity globally. Regional markets have also been on the mend, as witnessed by the climb in the MSCI (ex-Japan) since end-August. (Chart 1.20) In the Singapore bourse, the decline in turnover volumes also levelled off, although activity has remained modest compared to the highs registered in Q2. (Chart 1.21)

The weaker investment climate also temporarily affected activity in the wealth advisory cluster. Investor sentiment dived as several major investment banks announced potentially large exposures to the US subprime housing market.

In the property market, sentiments were affected by the financial market turmoil as well. Private residential property transactions fell to 1,144 units in September, less than half the volume in August, and about a third of that in July. This reflected more muted new sales and resale activity.

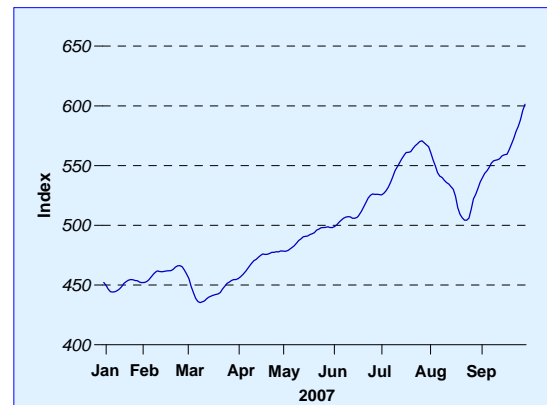
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**The GST hike in July led to a temporary cutback in consumption spending.**

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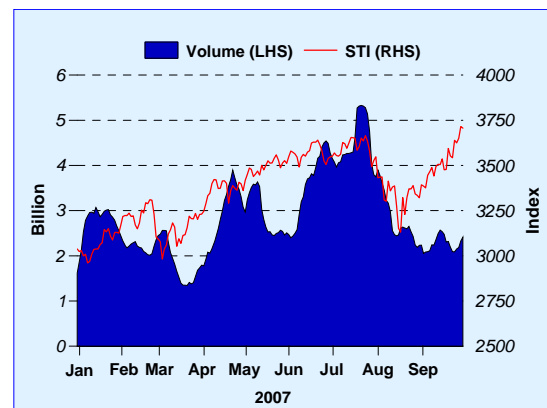
Activity elsewhere in the economy slowed as well. The expected pullback in consumption following the implementation of the GST in July has impacted the retail and restaurant businesses. The 16% m-o-m SA decline in retail sales in July was mostly due to the contraction in sales of motor vehicles and big ticket items, by 28% and 29% respectively.

**Chart 1.20  
MSCI Asia (ex-Japan)**



Source: Bloomberg

**Chart 1.21  
Stock Market Turnover Volume and  
Straits Times Index (STI)**



However, the pullback in overall retail sales was less severe compared to 1994. Chart 1.22 plots an estimate of the "GST effect" on retail sales during the episodes of GST implementation/hike. Typically, there would be a surge in retail spending a month prior to the GST hike, followed by a sharp fall-off in the subsequent month, as consumers bring forward their purchases to avoid the tax hike. Following the most recent hike, the GST impact is estimated to have subtracted about 13% points from July's retail sales, compared to the 23% points in April 1994.

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### IT-related cluster rebounded in Q3.

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Reflecting some improvement in the global IT industry, the IT-related cluster recovered in Q3. Electronics output registered a strong upturn of 24% q-o-q SAAR in Q3, while electronics NORX rose by 30% to climb back firmly into positive territory. The volume of air cargo handled through Singapore, which is the main mode of distribution for electronics components, also expanded by 7.9%, in line with improvements in electronics output and re-exports. (Chart 1.23)

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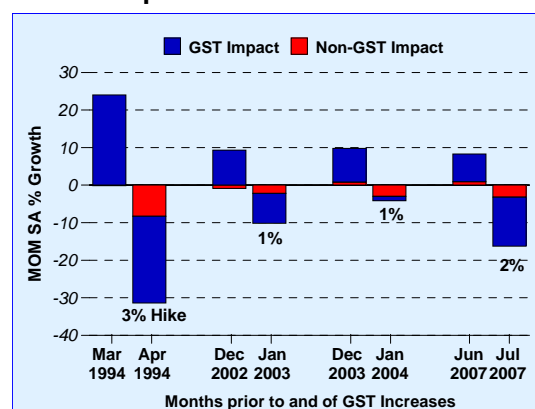
### The economic expansion remained intact.

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The Singapore economy is in a strong position, notwithstanding some moderation in growth in the third quarter. The global financial turmoil caused market sentiments to turn bearish, which dampened activity in the asset market-related sectors. In addition, there was some temporary pullback in consumption following the GST hike. However, the latest incoming data indicates that the negative impact from these factors has been contained and other drivers of growth, such as non-electronics manufacturing, have taken up some of the slack.

With growth in the first three quarters averaging some 8.2%, the economy remains on track to reach the upper end of the 7-8% range in 2007. The near-term economic outlook is further discussed in Chapter 3.

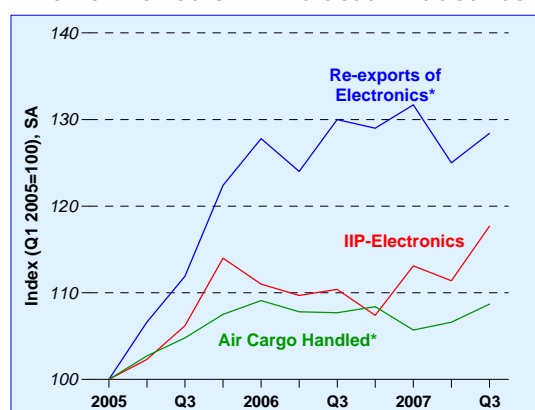
**Chart 1.22**  
GST Impact on Retail Sales Volume



Source: EPD, MAS estimates

Note: Dummy variables are used to isolate the impact of the GST implementation/increase in an OLS regression model of retail sales volume.

**Chart 1.23**  
Performance of IT-related Industries



\* Source: EPD, MAS estimates

## 1.3 Macroeconomic Policy

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**Singapore's macroeconomic policy stance has evolved in line with the economy's cyclical developments.**

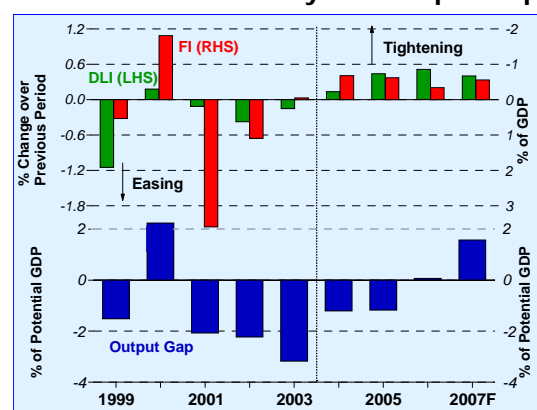
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The macroeconomic policy setting in Singapore has a medium-term orientation aimed at providing the basis for sustained and non-inflationary growth and stability. In the short term, it has also evolved in a countercyclical fashion in response to developments in the economy. Over the last four years, including 2007, the policy stance has been in the direction of tightening, against the backdrop of robust economic growth averaging almost 8% per annum.

This is shown in Chart 1.24, which plots the macroeconomic policy stance – proxied by the Domestic Liquidity Indicator (DLI)<sup>2</sup> for monetary policy and Fiscal Impulse (FI) measure<sup>3</sup> for fiscal policy – in the top panel and the corresponding output gap in the bottom panel over the period 1999-2007. In the top panel, a point above the horizontal axis indicates a tightening policy, while one that is below the axis represents an easing policy. In the bottom panel, a positive output gap signals that economic output is above potential, leading to inflationary pressures as the economy is unable to meet demand; conversely, when the output gap is negative, the economy is producing at below full capacity, resulting in an easing of cost and price pressures. However, it should be noted that *changes* in the output gap can be just as important in determining inflationary pressures.<sup>4</sup>

In the rest of this section, the most recent developments in monetary and fiscal policies are reviewed.

**Chart 1.24**  
**Macroeconomic Policy and Output Gap**



<sup>2</sup> The DLI is a measure of overall monetary conditions, reflecting changes in the S\$NEER and domestic interbank rate.

<sup>3</sup> For more details on the methodology used to calculate the FI measure, please refer to the January 2002 issue of the *Review*.

<sup>4</sup> For more details on the relationship between the output gap and inflation, please refer to Box D in the April 2006 issue of the *Review*.

## MONETARY POLICY

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**MAS continued its policy of a modest and gradual appreciation of the S\$NEER band, but with a slightly steeper slope.**

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In its Monetary Policy Statement (MPS) in April 2007, MAS announced that it was maintaining 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 low and stable inflation amidst the robust economic growth over the past few years.

Thus far in 2007, the Singapore economy has performed better than expected, with non-IT manufacturing and asset market-related activities, in particular, recording strong expansions in the first half of the year. Notwithstanding the moderation in growth momentum in Q3, underlying economic conditions remain supportive and GDP growth is on track to come in at the upper end of the 7-8% forecast range in 2007. In 2008, given the weaker global economic outlook, the domestic economy is expected to expand at a more moderate pace of 4-6%, in line with its potential growth rate.

Singapore's CPI inflation rose by an average of 2.8% in Jul-Aug 2007, compared to 0.8% in the first half of the year and 1% in 2006. This can be attributed to three factors: the one-off impact of the GST hike, imported inflation with the recent rise in global food and oil prices, and domestic inflationary pressures especially wage and rental increases, as a consequence of short-term supply constraints and strong GDP growth. These sources of inflationary pressures are likely to persist. Accordingly, headline CPI inflation is projected to come in at 1.5-2% in 2007, and 2-3% in 2008.

Taking all these factors into consideration, MAS announced in its MPS of 10 Oct 2007 that it would continue with the policy of a modest and gradual appreciation of the S\$NEER policy band, but the slope of the band would be increased slightly. There was no re-centring of the policy band, or any change in its width.

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**Monetary policy focuses on price stability over the course of the business cycle.**

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Chart 1.25 documents the movements in the S\$NEER and changes in monetary policy decisions since the release of the first MPS in February 2001. It also shows the corresponding output gap, inflation and GDP growth over the same period.

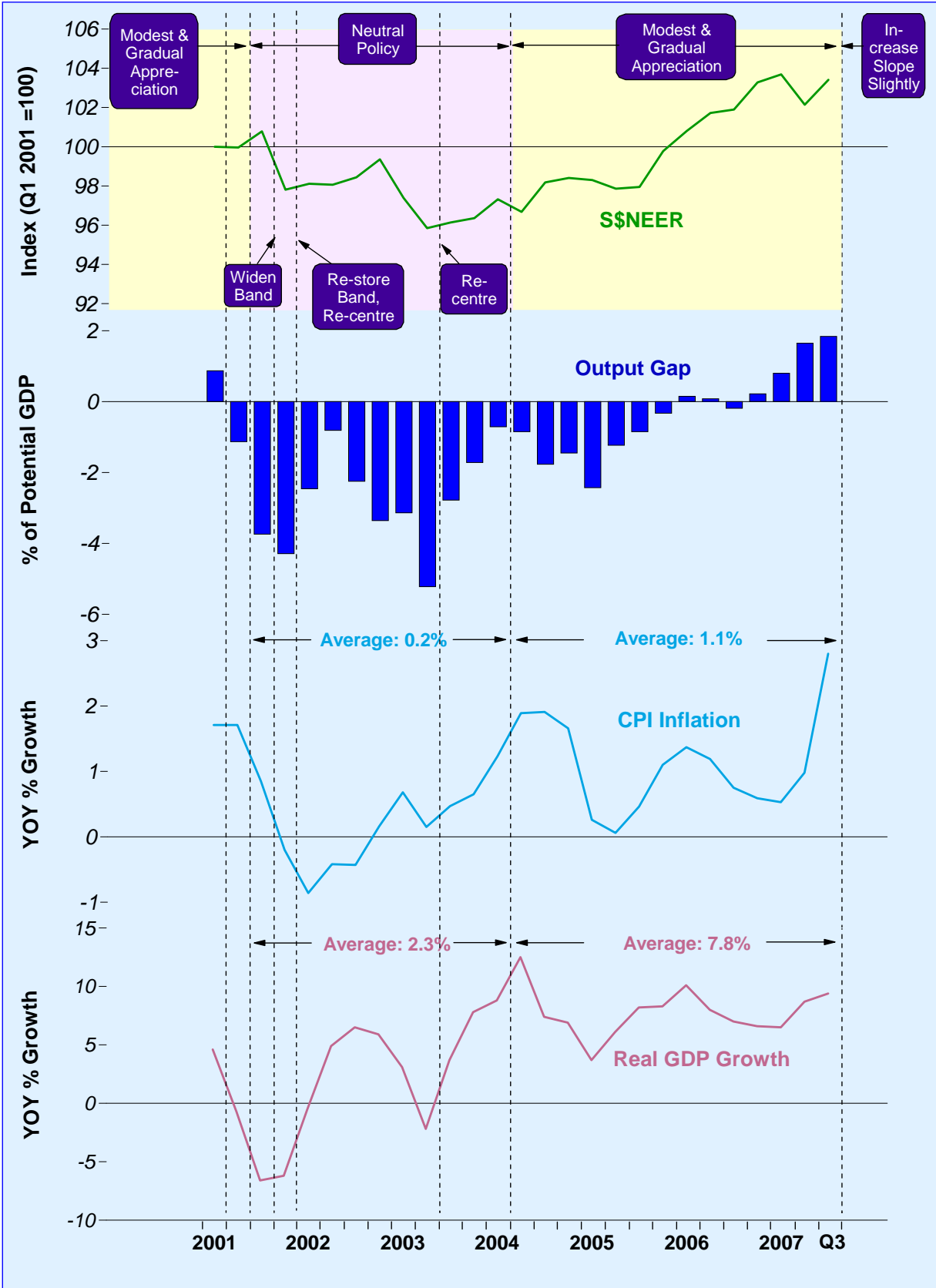
The objective of MAS' monetary policy is the attainment of medium-term price stability. In line with this objective, the monetary policy setting has evolved with the stages of the business cycle as reflected in the output gap and inflation.

For example, policy was eased – either by adopting a gentler slope of the policy band or re-centring the band to a lower level – on three occasions since 2001 in the face of weak economic conditions and benign inflationary pressures: the global electronics downturn in 2001, the September 11 terrorist attack, and the Sars crisis in 2003.

The economy rebounded strongly in H2 2003, following the rapid containment of Sars. In April 2004, MAS restored the tightening policy of a modest and gradual appreciation of the S\$NEER policy band. It was a pre-emptive move at that time in light of the continuing robust recovery in the domestic economy and external environment, and signs of intensifying price pressures. Notably, MAS formulates policy in a forward-looking manner, given the inherent lags in the impact of monetary policy on real economic activity. Since Q2 2004, the economy has chalked up strong growth averaging almost 8%, with CPI inflation kept low at around 1%.

More recently, in October 2007, the policy stance was tightened slightly by allowing a steeper appreciation of the policy band. This recommendation took into account the emergence of a positive output gap in the economy and attendant pickup in inflationary pressures. Further analysis of the inflation outlook is provided in Chapter 3 of the *Review*.

Chart 1.25  
Key Macroeconomic Variables and Changes in Monetary Policy Stance



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**The S\$NEER eased from the upper end of the policy band, before trending up again recently.**

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Since the policy review in April 2007, the S\$NEER has eased from the upper end of the policy band. (Chart 1.26) However, in the weeks leading up to the MPS announcement in October, the trade-weighted index trended upwards, reflecting the renewed weakness of the US\$, and market expectations of MAS maintaining its appreciating policy stance.

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**The S\$REER has remained competitive due to relatively modest price increases.**

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Given the strong appreciation in the S\$NEER in early 2007, the S\$ real effective exchange rate (S\$REER) deflated by the CPI edged up in Q1 2007, before dipping in the subsequent quarter as the S\$NEER weakened. During this period, Singapore's CPI relative to its trading partners continued on its gradual declining trend. In fact, domestic consumer prices have consistently lagged behind those of our trading partners. (Chart 1.27)

As a result, Singapore's REER has remained relatively low since the downward adjustment of prices and costs following the Asian Financial Crisis, despite the subsequent appreciation of the trade-weighted S\$. In addition, movements in Singapore's REER have generally been in line with those of the other regional economies. (Chart 1.28)

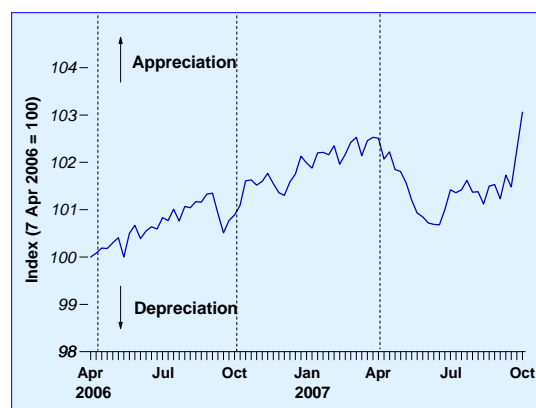
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**Liquidity conditions softened over the past few months before tightening again.**

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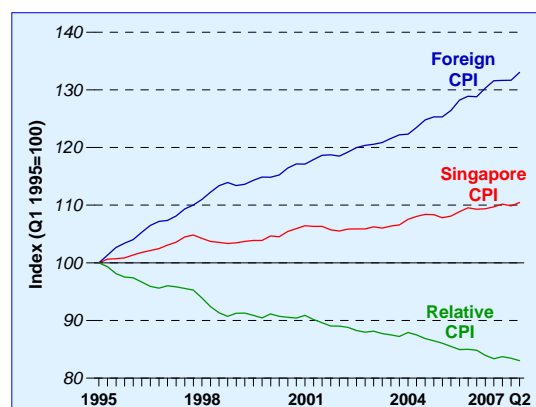
Since mid-March this year, liquidity conditions in the economy have generally softened, as shown by the DLI. (Chart 1.29) This loosening from Q2 this year was due initially to the fall in interest rate, but subsequently, the depreciation of the S\$NEER played a major part. The loosening also coincided with a marked increase in asset prices in the domestic economy. In August and September, however, the DLI turned positive, with the tightening in both the exchange rate and interest rate.

**Chart 1.26**  
**S\$NEER**

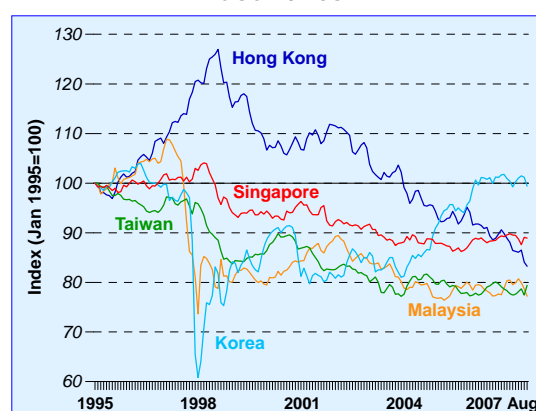


Note: --- indicates release of Monetary Policy Statement

**Chart 1.27**  
**Relative CPI**



**Chart 1.28**  
**REER in Singapore and the Regional Countries**



Source: Datastream

Note: JP Morgan Real Trade-weighted Index, except for Singapore.

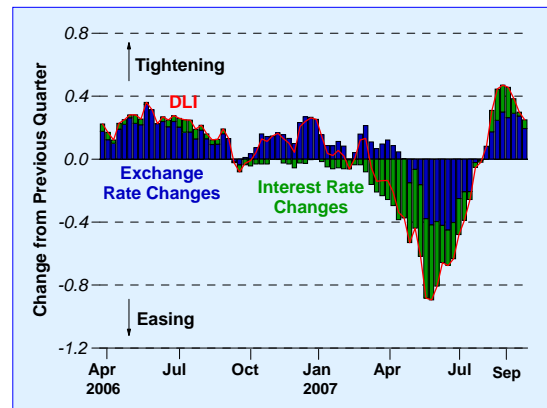


Domestic interest rates softened over the period March to May 2007, with the three-month S\$ interbank offer rate (S\$ SIBOR) falling by 100 bps from 3.38% at end-February to 2.38% at end-May. (Chart 1.30) With the three-month US\$ SIBOR remaining constant during this period (given the unchanged Fed funds rate of 5.25%), the spread between US and Singapore interest rates widened. While the disruption of US and European money markets in early August led to a temporary spike in the domestic interbank rate to around 3%, it has since fallen to 2.63% as at end-September, following the 50 bps reduction in the Fed funds rate to 4.75% around the middle of the month.

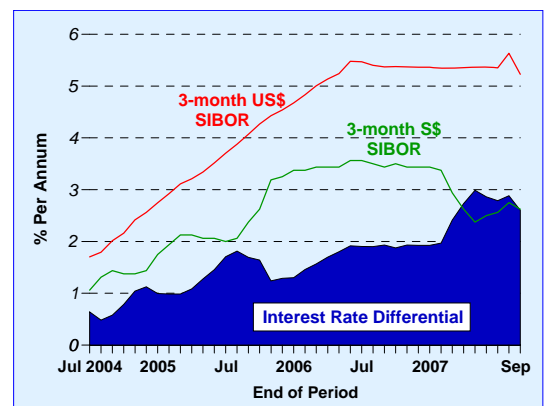
Home loan rates have edged up slightly though they remain relatively low. The 12-month fixed deposit rate has also been fairly stable this year, at about 0.8% to 0.9%.

Over the course of the year, MAS' money market operations (MMOs) ensured that there was sufficient liquidity in the banking system to meet banks' demand for reserve and settlement balances. The amount of liquidity in the banking system was estimated by taking into consideration the banking sector's demand for funds and the net liquidity impact of autonomous money market factors. Box A at the end of the chapter provides a review of MAS' MMOs in FY2006/07.

**Chart 1.29**  
**Domestic Liquidity Indicator**



**Chart 1.30**  
**3-month S\$ SIBOR and US\$ SIBOR**



## FISCAL POLICY<sup>5</sup>

### Government operating revenue hit a record high in H1 2007, boosted by income tax and stamp duty collections.

The government's operating revenue surged to a record high of \$18.3 billion (16.3% of GDP) in the first half of 2007, compared to \$15.2 billion in the same period last year, and the previous half-year peak of \$15.4 billion in 2001. The jump in operating revenue in H1 2007 was largely accounted for by the marked increase of more than \$1 billion each in collections from income taxes (corporate and personal) and stamp duty. (Chart 1.31)

Income tax collections were boosted by strong earnings, which resulted from the robust economic growth in 2006 (income tax is assessed on a preceding year basis). This was in spite of the cut in the top personal income tax rate from 21% to 20%, with comparable reductions in all other tax brackets. However, the increase in corporate and personal income tax collections was partially offset by the fall in statutory boards' contributions to the government, which tend to be more lumpy and concentrated in particular quarters. A breakdown of corporate income tax collection by economic sector shows that the financial sector has been the largest contributor in recent years relative to its share in GDP. (Chart 1.32)

Of all the revenue components, the government's collection of stamp duty picked up the most in H1 2007, to \$2.1 billion, a more than threefold increase from the \$0.6 billion raised in H1 2006. Stamp duty is a tax on commercial and legal documents used in certain transactions, the bulk of which comes from property purchases.<sup>6</sup> (Chart 1.33) As shown in Chart 1.34, the recent boom in the property market – with increases in both the number of property transactions and prices – contributed to the surge in stamp duty collections. In addition, stamp duty collections in 2007 were boosted by the withdrawal of the stamp duty deferment

Chart 1.31  
Selected Components of Operating Revenue

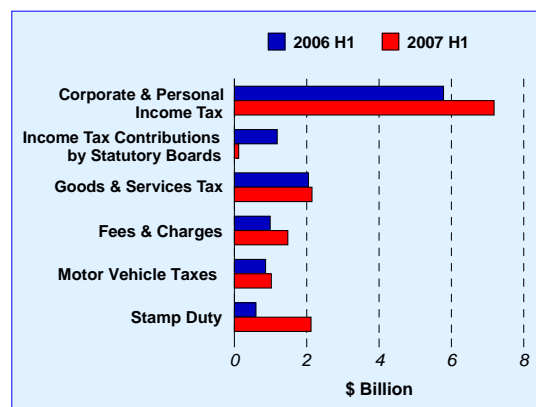


Chart 1.32  
Corporate Tax Collection and GDP by Economic Sector (2005-06 Avg)

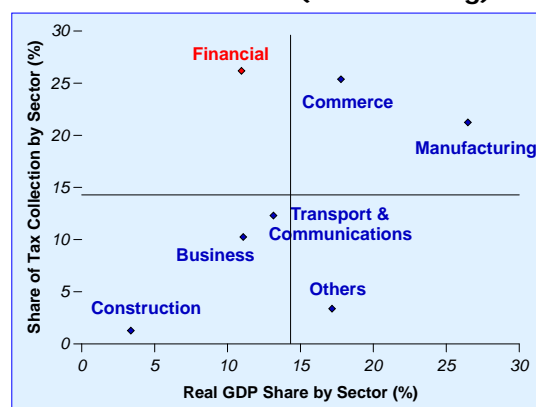
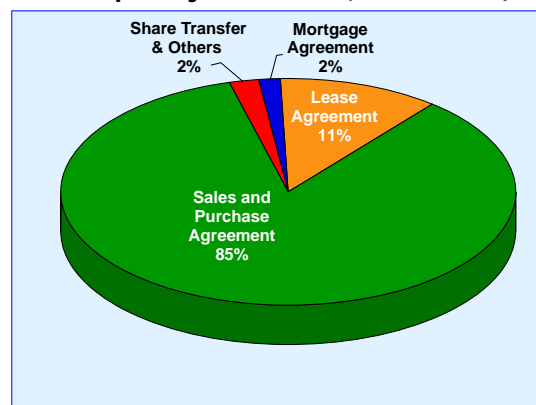


Chart 1.33  
Stamp Duty Assessed (FY2006/07)



<sup>5</sup> This section reviews the government's budget outcome on a y-o-y basis.

<sup>6</sup> For immovable property, stamp duty is calculated as a percentage ranging from 1% to 3% of the property purchase price.

concession with effect from December 2006.<sup>7</sup> The takings for the first six months of this year have surpassed the \$1.3 billion recorded for 2006 as a whole, and the \$1.8 billion collected in 1996 at the peak of the last property cycle. (Chart 1.35) In H1 2007, stamp duty was the third largest contributor to the government's operating revenue – after income tax and GST – with its share rising to 11.6%, from an average of less than 5% in previous years. (Chart 1.36)

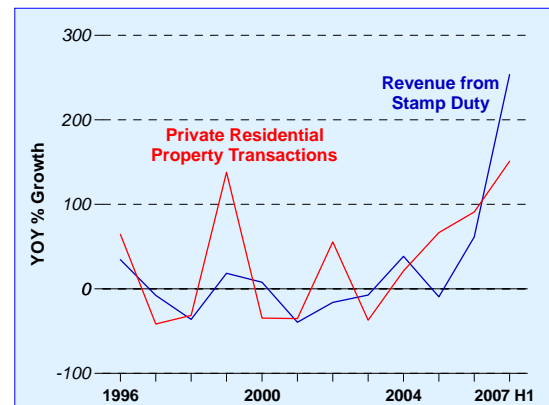
#### Government's operating expenditure rose in H1 2007, while development expenditure fell.

Government expenditure rose from \$15.9 billion in H1 2006 to \$16.4 billion (14.6% of GDP) in the first half of this year. The increase came entirely from operating expenditure, while development spending declined over this period. (Chart 1.37)

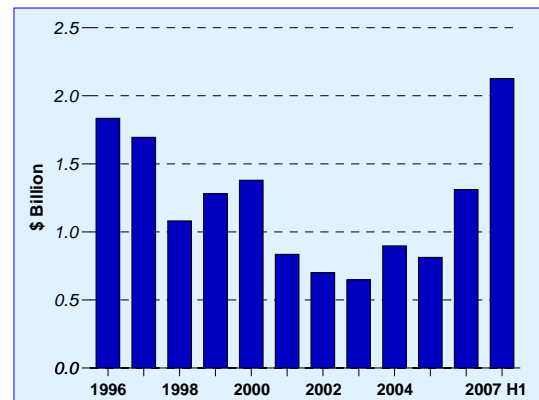
Operating expenditure was \$1 billion higher at \$13.1 billion (11.7% of GDP), with increases across all major categories, except for security. Education spending in particular, recorded the largest rise of \$0.8 billion. This was mainly due to the larger grants provided to higher education institutions. The changes in the funding model for universities, whereby they are now provided with annual sinking fund for future renovation and redevelopment projects, also led to the increase in education spending. Spending on health and national development increased by about \$0.1 billion each, with the former partly the result of new health initiatives, and the latter from the reclassification of capital grants to the Housing Development Board (HDB) as operating expenditure instead of development expenditure.

Meanwhile, development expenditure was lower at \$3.3 billion (3% of GDP) in H1 2007, compared to \$3.7 billion in the same period last year. The largest decline was in the area of transport – a fall of \$0.2 billion – with lower expenditure for the MRT Circle Line project.

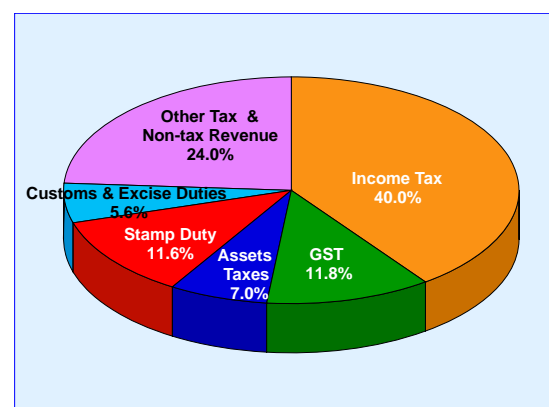
**Chart 1.34**  
Property Cycle and Stamp Duty Collection



**Chart 1.35**  
Stamp Duty Collection



**Chart 1.36**  
Sources of Operating Revenue, H1 2007



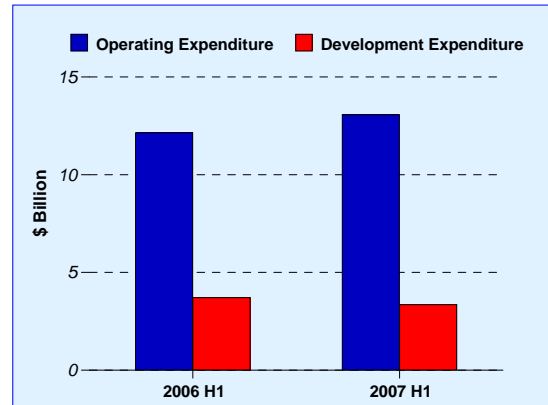
<sup>7</sup> The concession was reintroduced in June 1998 as part of the off-Budget measures to cushion the impact of the economic slowdown. The concession allowed property buyers to pay the stamp duty at a later date. For newly constructed properties, the due date was the date of Temporary Occupation Permit (TOP). For completed properties, the payment was due when the property sale was completed. Without the concession, property buyers are required to pay the stamp duty within 14 days from the date of acceptance of the Option to Purchase, instead of deferring the payment.

**Fiscal policy stance will remain slightly contractionary in 2007 amidst robust economic growth.**

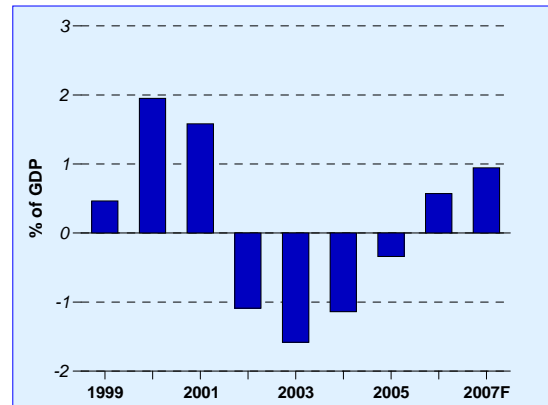
Overall, the government recorded a primary surplus of \$1.9 billion (1.7% of GDP) in the first half of 2007, reversing the deficit of \$0.6 billion in the same period a year ago.<sup>8</sup> For 2007 as a whole, the government's primary surplus is estimated to increase further to \$2.2 billion<sup>9</sup> (0.9% of GDP), from \$1.2 billion (0.6% of GDP) in 2006. (Chart 1.38)

To get a more accurate measure of the stimulus to aggregate demand arising from fiscal policy, the FI measure can be used. A positive (negative) FI measure implies a more expansionary (contractionary) fiscal stance compared to the previous year. In 2007, the FI measure is expected to remain negative at -0.6% of GDP, suggesting a more contractionary fiscal stance. (Chart 1.39) This is appropriate, given the sustained robust expansion in the domestic economy since 2004 and the output gap turning positive in 2006 and 2007.

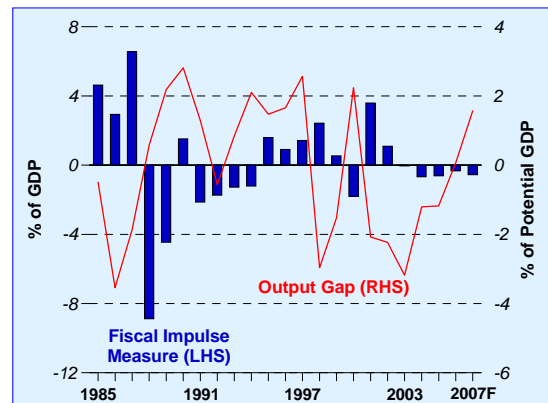
**Chart 1.37  
Government Expenditure**



**Chart 1.38  
Primary Fiscal Surplus/Deficit**



**Chart 1.39  
FI Measure and Output Gap**



Source: EPD, MAS estimates

<sup>8</sup> The primary surplus/deficit is defined as operating revenue (excluding net investment income contributions) less operating and development expenditure.

<sup>9</sup> MAS' estimates are based on previous years' trends and take into consideration the primary surplus budgeted for FY2007.

**Box A**  
**Review of MAS' Money Market Operations in FY2006/07**

This box reviews the conduct of MAS' Money Market Operations (MMOs) in FY2006/07. As explained in the monograph on "Monetary Policy Operations in Singapore" first published in January 2003, MAS' MMOs are undertaken to manage the liquidity within the banking system and are distinct from the implementation of its exchange rate policy.

We first provide a brief description of how MMOs are conducted, followed by a review of the banks' demand for cash balances with MAS, and the behaviour of autonomous money market factors in FY2006/07. We complete the box with an examination of the MMOs conducted during this period.

***Conduct of MMOs***

As a result of Singapore's open capital account and its exchange rate-centred monetary policy, domestic interest rates and the money supply are endogenous. This is the principle underlying the open-economy trilemma, which states that a country cannot simultaneously manage its exchange rate and domestic interest rates while maintaining an open capital account. MAS' MMOs are therefore not targeted at any level of interest rate or money supply. Instead, they are aimed at ensuring that there is sufficient liquidity in the banking system to meet banks' demand for reserve and settlement balances.

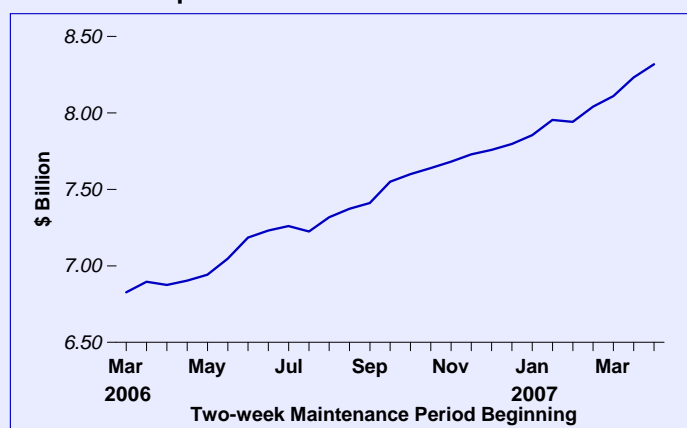
MMOs are conducted daily by the Monetary Management Division in MAS. The amount of liquidity in the banking system is estimated by taking into consideration the banking sector's demand for funds and the net liquidity impact of autonomous money market factors. Money market transactions are then carried out, after which market and liquidity conditions are monitored throughout the day.

***Banks' Demand for Cash Balances***

Banks hold cash balances with MAS to meet reserve requirements and for settlement purposes. In particular, banks in Singapore are required to maintain a Minimum Cash Balance (MCB) equivalent to 3% of their liabilities base with MAS on a two-week average basis.

In FY2006/07, banks' demand for balances to meet reserve requirements rose strongly as a result of a growing liabilities base. (Chart A1) This in turn reflected rising bank intermediation activity on account of strong economic growth.

**Chart A1**  
**Average Reserve Requirements over a Two-week Maintenance Period**



This box is contributed by the Monetary Management Division of the Reserve & Monetary Management Department.

### Demand for Settlement Balances

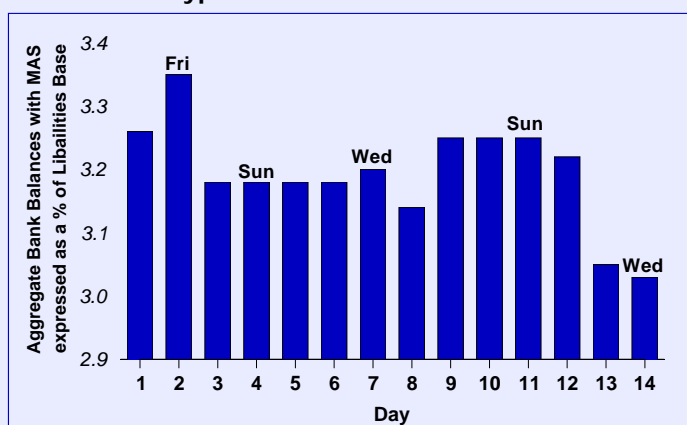
MAS also takes into account banks' demand for settlement balances when planning its MMOs, apart from meeting banks' demand for reserve balances. Based on historical experience, a liquidity buffer of about 0.1-0.3% in excess of reserve requirements has generally been adequate for meeting banks' demand for settlement balances.

### Patterns in Bank's Daily Demand for Cash Balances with MAS

Although banks are required to keep an average MCB ratio of 3% over the two-week maintenance period, their daily MCB ratios can fluctuate between 2% and 4% of their liabilities base, giving them more flexibility in their liquidity management. Hence, within each maintenance period, there may be day-to-day variations in banks' demand for cash balances with MAS.

Chart A2 illustrates the daily fluctuations in the MCB ratios within a typical maintenance period in FY2006/07. Two observations continue to hold since our last review in 2006. First, banks tend to keep higher MCB ratios on most Fridays (day two and day nine of the maintenance period) to cover their positions over the weekends. Second, banks keep slightly higher MCB ratios during the earlier part of the maintenance period so as not to be caught short of cash towards the end of the period. As a result, the daily MCB ratios required by the banking system during the last few days of a typical maintenance period are generally lower.

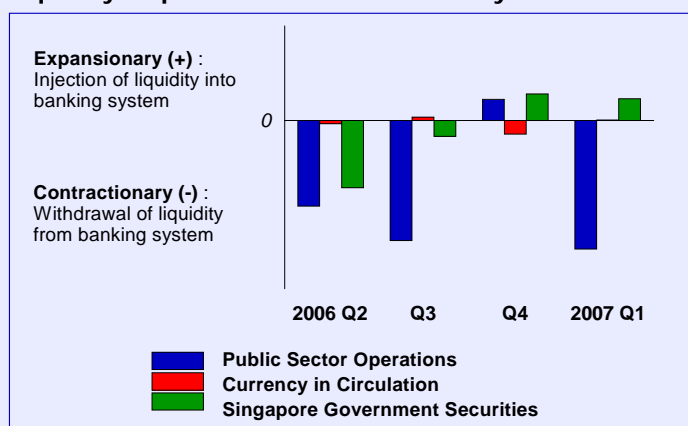
**Chart A2**  
**Daily MCB Ratio over a Typical Two-week Maintenance Period in FY2006/07**



### Liquidity Impact of Autonomous Money Market Factors

Chart A3 shows the liquidity impact of each of the autonomous money market factors, which include (i) public sector operations, (ii) currency in circulation, and (iii) Singapore Government Securities (SGS) issuance, redemption and coupon payments, over FY2006/07. Public sector operations include the government's and CPF Board's net transfers of funds between their accounts with MAS and their deposits with commercial banks.

**Chart A3**  
**Liquidity Impact of Autonomous Money Market Factors**



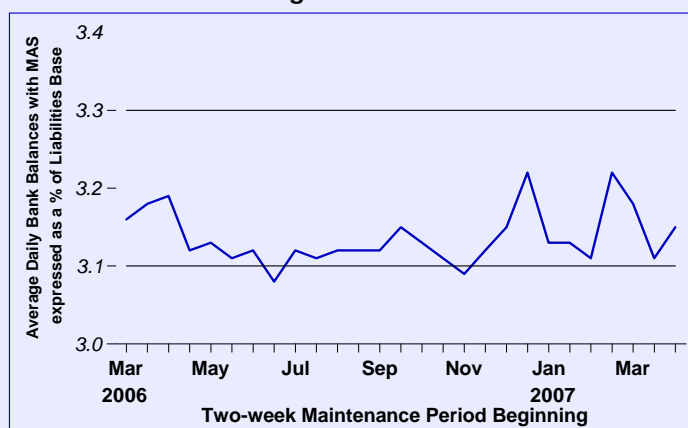
In FY2006/07, the liquidity impact of the autonomous money market factors was largely dictated by public sector operations, which continued to have a contractionary impact on the banking system. SGS issuance and redemption was expansionary in Q4 2006 and Q1 2007, because maturing SGS bonds exceeded new issuances. The liquidity impact of currency in circulation was negligible.

### *Money Market Factors*

#### **Net Liquidity Impact of MAS' MMOs**

Over FY2006/07, MAS' MMOs took into consideration the impact of autonomous money market factors and MAS' foreign exchange (FX) intervention operations on liquidity. Due to improvements in banks' liquidity management, the average effective bank balances as a ratio of liabilities base was generally at the lower half of the range of about 3.1-3.3% for the two-week maintenance periods. (Chart A4)

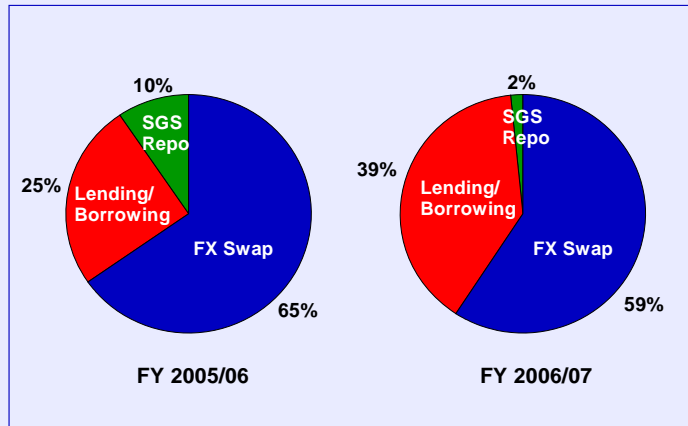
**Chart A4**  
**Effective Average Two-week MCB Ratios**



#### **Instruments for MMOs**

For its MMOs, MAS uses three key instruments to inject liquidity into the banking system and to withdraw liquidity from it, namely (i) FX swaps or reverse swaps; (ii) SGS repos or reverse repos; and (iii) clean lending or borrowing. Chart A5 illustrates the distribution of MMOs amongst the three key instruments.

**Chart A5**  
**Distribution of MMOs by Instrument**





## **CHAPTER 2**

# **WAGE-PRICE DYNAMICS**

## 2.1 Consumer Price Developments

### Domestic CPI inflation was benign in H1 2007 but picked up after the GST hike in July.

CPI inflation averaged a mild 0.8% in H1 2007, after coming in at 1% in 2006. However, partly due to the 2% GST hike in July, inflation rose to 2.7% in Q3. This brought CPI inflation to 1.4% over the first nine months of the year. (Chart 2.1) All categories of the CPI basket registered more rapid price increases in Q3 following the GST hike. (Chart 2.2)

On a m-o-m basis, CPI inflation rose by 2.1% after the GST rate was raised on 1 July. However, in August and September, m-o-m CPI changes slowed to 0.3% and -0.3% respectively, and were generally in line with previous average m-o-m CPI changes.<sup>1</sup>

Meanwhile, the MAS underlying inflation measure, which excludes accommodation and private road transport costs, slowed from 1.7% in 2006 to 1.2% in H1 2007, before rising to 2.8% in Q3 2007.

### Direct energy-related inflation was lower this year ...

In H1 2007, CPI inflation was weighed down by lower electricity tariffs, as reflected in the decline in the housing cost component. (Chart 2.2) The cut in electricity tariffs was a lagged adjustment to the sharp pullback in global oil prices from over US\$70 per barrel in August 2006 to US\$50 in January 2007. Along with a reduction in petrol prices earlier in the year, the contribution of direct energy-related items<sup>2</sup> to inflation fell from 0.7% point in 2006 to -0.3% point in H1 2007. (Chart 2.3) However, following the run-up in oil prices to over US\$83 per barrel in September, the negative contribution from direct energy-related items dissipated in Q3 2007. Overall, for the first nine months of this year, the contribution of these items to overall CPI inflation averaged -0.2% point.

Chart 2.1  
CPI Inflation and MAS Underlying Inflation

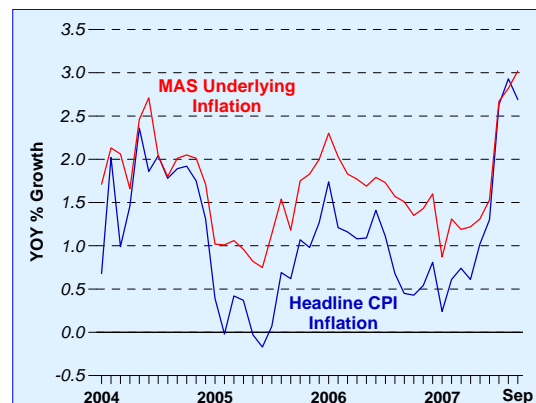


Chart 2.2  
Contribution to CPI Inflation

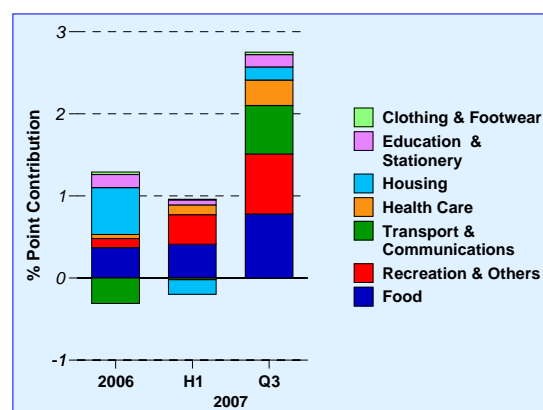
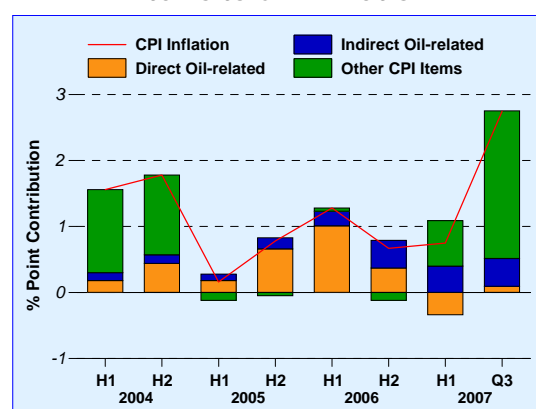


Chart 2.3  
Contribution of Oil and Non Oil-Related Items to CPI Inflation



Source: EPD, MAS estimates

<sup>1</sup> Average of 0.1% over the period Jan 2004–Jun 2007.

<sup>2</sup> Direct energy-related items in the CPI basket are electricity, residential piped gas, LPG and petrol. Indirect energy-related items are cooked food, public road transport and other travel & transport.

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**... but non oil-related items contributed more strongly to price increases.**

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In comparison, price increases in non oil-related items in the CPI basket (the green bars in Chart 2.3), which had generally been muted in 2005-06, added to inflation this year, particularly after July. These non oil-related price pressures stemmed from both external and domestic influences. The cost of food – the main source of imported inflation – rose, while holiday travel also became more expensive. (Chart 2.4) On the domestic front, car prices climbed in recent months after years of decline, and consumer services such as healthcare also registered stronger price gains.

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**Food prices were the principal external influence on inflation ...**

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Higher imported food prices were a significant contributor to inflation this year as almost all non-cooked food categories in the CPI basket registered stronger price increases, compared to previous years. (Chart 2.5)

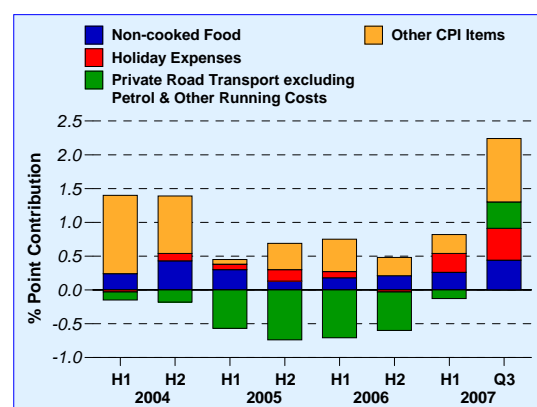
The surge in world food prices was underpinned by positive income effects arising from the strong global economic expansion in recent years. In particular, rising incomes in developing nations, such as China, have led to greater demand for protein-rich and staple food products.

Meanwhile, stronger demand for biofuel drove prices of biofuel crops such as corn, palm oil, soybean and sugar to new highs. Increased crop prices, in turn, raised the cost of animal feed which translated into more expensive meat products and eggs.

Short-term supply-side factors also played a part in pushing food prices up. Higher vegetable, fruit and wheat prices were partly the result of dry climatic conditions in the Asia-Pacific region arising from the El Niño effect. In particular, the severe drought in Australia has affected livestock, dairy and crop outputs, causing the prices of these items to rise sharply.

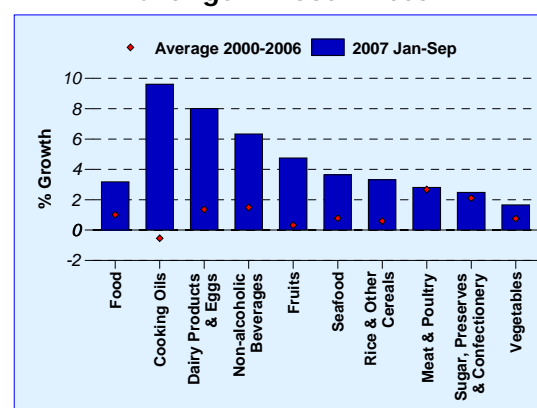
Separately, the removal of export subsidies for milk powder in the EU sent global milk prices soaring, while vibrant international trade also sent freight charges to record high levels which added to the cost of domestic food imports.

**Chart 2.4**  
**Contribution to Non Oil-related Inflation**



Source: EPD, MAS estimates

**Chart 2.5**  
**Change in Food Prices**



**... although their impact was dampened by diversification of Singapore's food import sources.**

Despite rising costs of imported food, food price inflation has actually been more benign in Singapore than in many other economies, including those in the Asian region over the period Jan 1995-Aug 2007. (Chart 2.6) Singapore also exhibited lower food price volatility compared to other Asian countries, with the exception of Japan. (Chart 2.7)

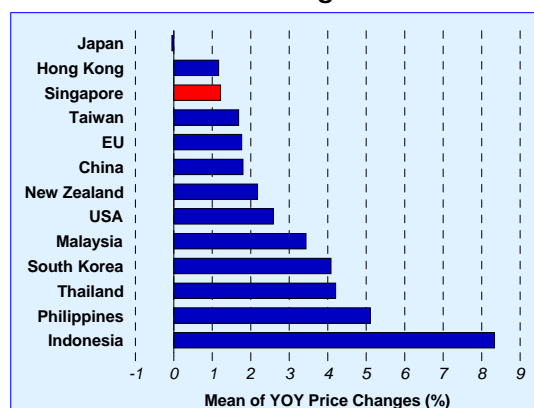
The relatively more stable food prices in Singapore could be due to the ability of domestic importers to source for food products from many countries. Over the years, domestic food importers have widened their network of suppliers across countries, facilitated by stronger international trade ties and more efficient transport and communication links.

In addition, the Agri-Food & Veterinary Authority of Singapore, in collaboration with the private sector, has actively sought out new sources of supply to ensure continued food deliveries in the event of a disruption in supply from any particular source.

We further examined the recent trends in food source diversification in Singapore with the use of some tools commonly employed in industrial organisation economics. First, we calculated the concentration ratio, which gives the share of the top  $n$  import sources (in per cent). Second, we computed the Herfindahl Index, which is typically used to assess market concentration and competition in an industry. The index is obtained by summing the squares of the share of each individual import source, thus giving more weight to sources with larger shares. A Herfindahl index of less than 0.1 indicates well-diversified import sources while an index above 0.18 indicates high concentration of imports from a small number of countries. A fall in the index thus represents a decline in concentration.

Using annual data from 1995-2006, the concentration ratios show that about 78% of our food is imported from only 10 countries – including our traditional import suppliers, such as Malaysia and Australia. The next 10 largest sources include countries as far away as South Africa and Chile, suggesting some success in sourcing from alternative markets. (Chart 2.8) While Singapore remains dependent on the top 10 import sources, the Herfindahl index (for all import sources) has largely been close to, or less than, 0.1, confirming that Singapore's food sources are well-diversified. (Chart 2.9)

**Chart 2.6**  
Average Monthly Food Price Inflation,  
Jan 1995-Aug 2007



Source: CEIC and Statistics New Zealand

Note: For EU, China and Indonesia, data starts from January 1997, January 2002 and January 2003, respectively. For comparability, the overall food and beverage CPI which includes both fresh and cooked food (consumed away from home) was used for all countries.

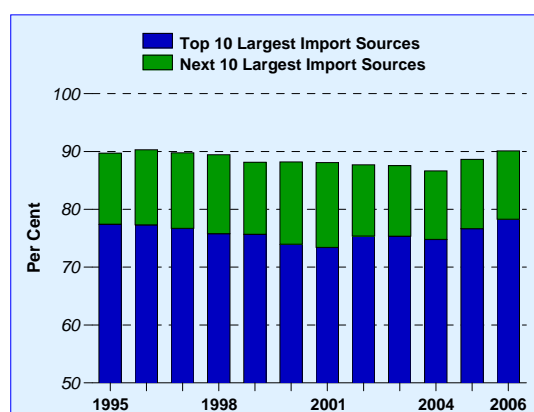
**Chart 2.7**  
Volatility of Consumer Food Prices,  
Jan 1995-Aug 2007



Source: CEIC and Statistics New Zealand

Note: Volatility is calculated as the standard deviation of y-o-y changes in monthly food CPI. The time periods used are the same as in Chart 2.6.

**Chart 2.8**  
Concentration of Top 20 Food Import Sources



Source: EPD, MAS estimates

### Overall import price inflation remained subdued due to falling prices of machinery and equipment.

Apart from food, the import prices of primary commodities and intermediate inputs, such as crude materials and manufactured goods<sup>3</sup>, continued to soar in 2007. (Chart 2.10) However, these were offset by the continued decline in the prices of final products. (Chart 2.11) For instance, lower prices of machinery & transport equipment translated into cheaper household durables and electronics products for consumers. Overall, the non-oil import price index (IPI) fell by 3.2% y-o-y in Jan-Aug 2007, after declining by 0.9% last year.

### Travel costs were higher due to strong global demand for travel and accommodation.

The boom in global economic activity has given rise to more frequent business and holiday travel. Room rates of hotels in the Asia-Pacific region rose as a consequence, as supply lagged demand. Air fares also increased this year, amidst strong demand and higher oil prices. Together, these factors caused holiday travel (classified under "recreation & others" in the CPI basket in Singapore) to rise by 7.2% y-o-y in Jan-Sep 2007, which was stronger than in previous years.

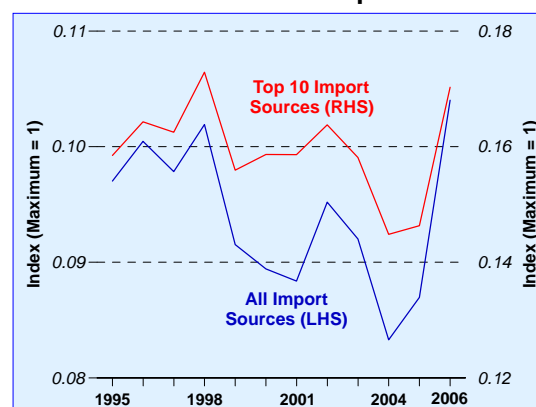
### The GST hike led to a one-off increase in consumer prices.

Turning to domestic sources of inflation, the GST hike and other costs had an anticipated one-off impact on prices in Q3 2007. In principle, with about 71% of the CPI basket subject to GST, the maximum impact of the 2% GST hike would be about 1.4% points (=  $0.7 \times 2\%$  GST hike). However, actual inflation was higher, averaging 2.7% in Q3. This was a step up from the average inflation of 0.8% in H1 2007, even after abstracting from the GST impact.

Thus, apart from the GST, there was a pass-through of other business costs in July as well. For example, with the run-up in import prices of non-cooked food items, cooked food items rose sharply in July. (Chart 2.12)

Indeed, indicators show that underlying cost pressures are building up as the economic expansion reaches a fairly advanced stage. The Unit Business Cost Index

Chart 2.9  
Herfindahl Index for Import Sources



Source: EPD, MAS estimates

Chart 2.10  
Import Prices of Primary and Intermediate Products

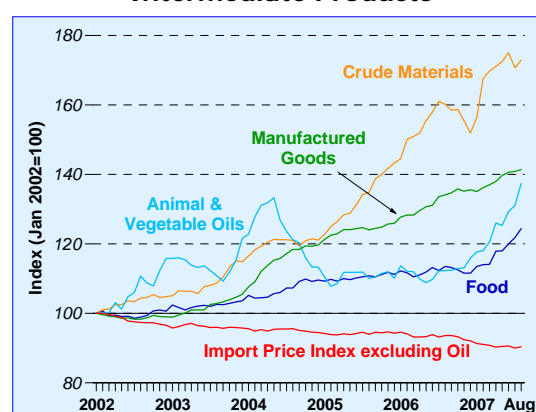
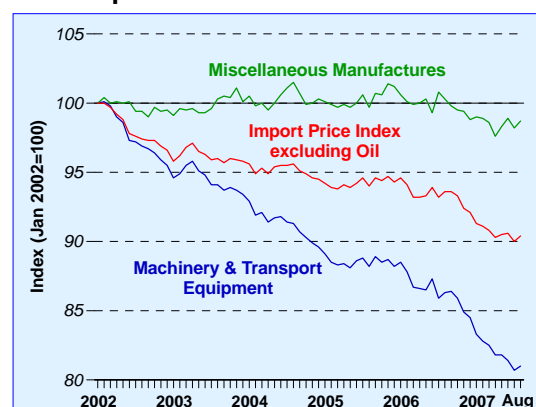


Chart 2.11  
Import Prices of Final Products



<sup>3</sup> The category "Manufactured Goods" in the IPI basket consists mainly of intermediate products, such as metallic products, rubber, wood products etc.

(UBCI) for the manufacturing sector registered its fifth consecutive quarter of y-o-y growth in Q2 2007 of 1.9%, after staying negative from Q3 2005 until early 2006. (Chart 2.13) This was mainly due to the increase in Unit Labour Cost. Similarly, the Unit Services Cost Index (USCI) – EPD’s internal gauge of cost pressures in the services sector – posted strong y-o-y growth of 5.7% in H1 2007. (Chart 2.14) Labour cost contributed to about half of the increase in the USCI while rentals accounted for another 30% (1.6% points).

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**Wage growth accelerated as the labour market tightened further.**

---

Sustained economic growth has led to unprecedented job creation in recent quarters. With a tighter labour market, nominal earnings grew by 6.9% in H1 2007. In comparison, wage growth had averaged just 3.3% over the 2005-06 period despite rapid job creation since end-2004. There could have been some pent-up wage pressures over the last two years. However, wage growth varied across sectors, according to their performance.

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**Commercial rentals surged as demand outstripped supply.**

---

At the same time, business costs were pressured by rising commercial rentals, particularly in the Central Business District. For example, office rentals in the central region surged by 41% in the first nine months of 2007, after jumping by 30% in 2006. This compares with the average increase of 1.9% over the preceding three years. Strong demand for retail space also pushed up rentals in the central region by 17% in Jan-Sep 2007 compared to the 5.6% increase last year. (Chart 2.15)

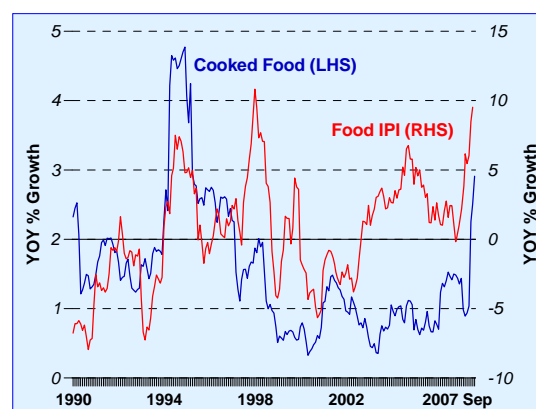
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**Prices of domestic consumer services continued to rise.**

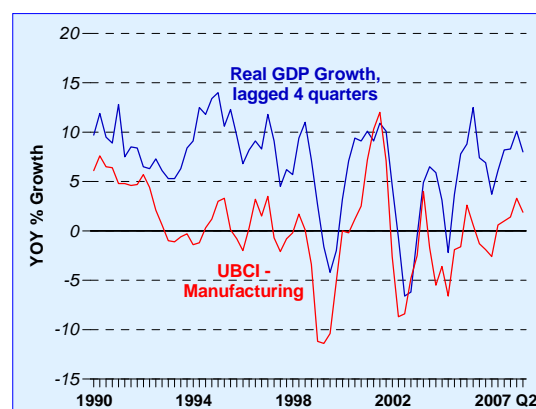
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With the run-up in domestic operating costs, prices of some consumer services went up further in 2007. In particular, health care costs rose by 2.2% in y-o-y terms in H1 due to higher treatment/ward charges at government restructured hospitals and polyclinics. Similarly, average y-o-y price increases ranging from 0.5% to 4.2% over Q1-Q3 were observed for other services such as education, personal care, public road transport, recreation & entertainment and cooked food.

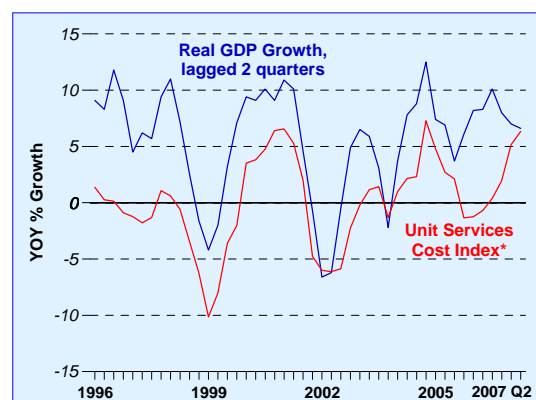
**Chart 2.12  
Food IPI vs Cooked Food CPI**



**Chart 2.13  
Unit Business Cost Index for the Manufacturing Sector and Real GDP Growth**



**Chart 2.14  
Unit Services Cost Index and Real GDP Growth**



\* Source: EPD, MAS estimates

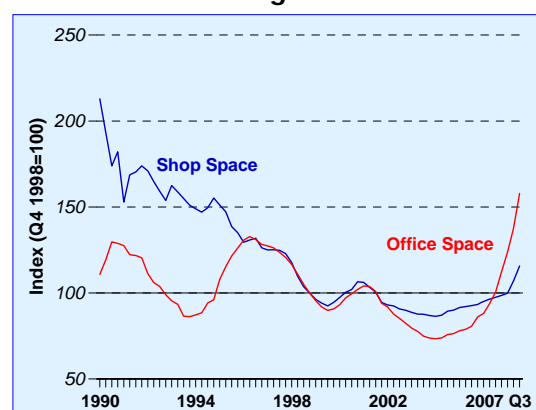
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**Car prices started to contribute positively to inflation in mid-2007.**

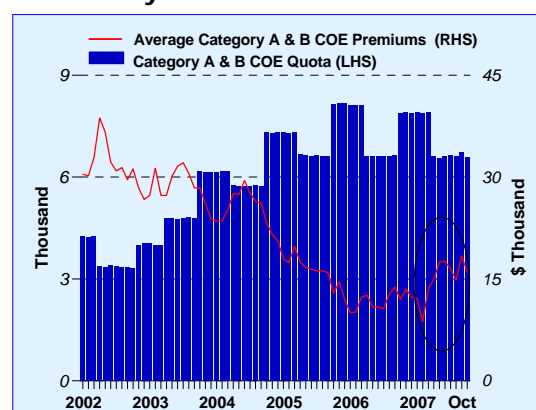
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Car prices have added to CPI inflation since May, after nearly four consecutive years of negative contribution. Following the announcement of a 9.3% cut in the COE quota for cars in the new quota year (May 2007-Apr 2008), average COE premiums for Category A and B cars jumped from below \$10,000 in February 2007 to above \$18,000 in September. (Chart 2.16) Prices were supported by resilient car demand amidst healthy wage growth in a robust economic environment.

**Chart 2.15**  
**Office and Shop Rentals in the Central Region**



**Chart 2.16**  
**Monthly COE Premiums and Quota**



## 2.2 Labour Market

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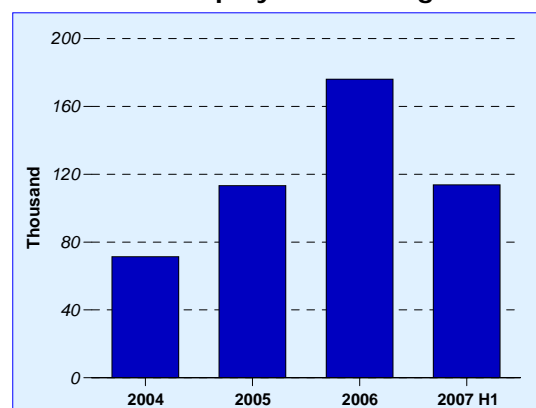
**Unprecedented job creation reduced the unemployment rate to its lowest level in six years.**

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Employment gains rose to 113,800 in H1 2007, after reaching an all-time high of 176,000 in 2006. (Chart 2.17) In fact, the number of jobs added in H1 this year exceeded all the annual gains in the period 1998-2005.

As a consequence, the headline unemployment rate fell to 2.3% in Q2 this year, the lowest since Q2 2001 before the labour market felt the full impact of the 2001 recession. Indeed, given strong labour demand and declining unemployment, the seasonally adjusted ratio of job vacancies to unemployed persons rose to 0.89 (89 openings for every 100 job seekers) in Q2, up from 0.68 in the previous quarter. (Chart 2.18)

**Chart 2.17**  
**Total Employment Changes**



The expansion in employment was, however, less broad-based than in previous quarters, with the employment diffusion index<sup>4</sup> registering 89.6 in Q2 this year compared to a quarterly average of 93.0 over the past two years. (Chart 2.19)

---

**Job creation was boosted by the upturn in construction and property-related segments.**

---

Indeed, employment growth varied across industries. Fuelled by the rebound in building activities and the property market boom, the property-related industries (including the construction sector and real estate & leasing activities within the business services sector) witnessed pronounced growth (6.9%) in H1 2007. (Chart 2.20) Employment increased significantly by 7.0% (or 17,000) for business services (excluding real estate), which benefited from the sustained economic growth.

The upturn in construction and property also boosted employment in the financial services sector. (Chart 2.21) The banking cluster increased hiring due to the pickup in construction/property loans as well as expansion in the middle and back offices. The strong performance in property-related stocks and investment instruments also contributed to a pickup in job creation in the wealth advisory and treasury & brokerage clusters this year.

Within manufacturing, the non-electronics segment added jobs much faster (6.9% or 27,900) than the rest of the manufacturing industries. This was on account of the expansion in the marine & offshore engineering segment, which was supported by the growth in oil rig fabrication and ship repair/building activities.

In contrast, the electronics industry saw net job losses (-1.7% or -1,900) in the first half of this year. This reflected weak external demand as well as ongoing restructuring, particularly in the semiconductor and hard disk drive industries.

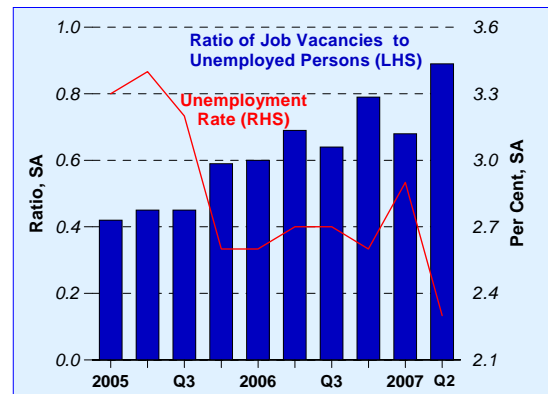
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**Layoffs in manufacturing were due to ongoing restructuring.**

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The impact from the restructuring in the electronics industry appeared to have spilled over on to other

**Chart 2.18**  
Ratio of Job Vacancies to Unemployed Persons and Unemployment Rate



**Chart 2.19**  
Employment Diffusion Index



**Chart 2.20**  
Employment Growth by Sector, H1 2007



\* Business Services in this chart consists of Professional Services and Administrative & Support Services only. Real Estate & Leasing Activities is combined with Construction in the Property-related segment.

<sup>4</sup> The index is equal to 100 when all 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.



supporting industries in manufacturing such as fabricated metal products and machinery & equipment. As such, the manufacturing sector as a whole accounted for seven out of every ten retrenched workers this year.

The impact of upgrading in the manufacturing sector was also evident from the increased proportion of the lower skilled<sup>5</sup> among the retrenched. Specifically, as many as 80% of the retrenched in manufacturing were from this lower skilled group in Q2 2007, compared to 75% in Q4 2006.

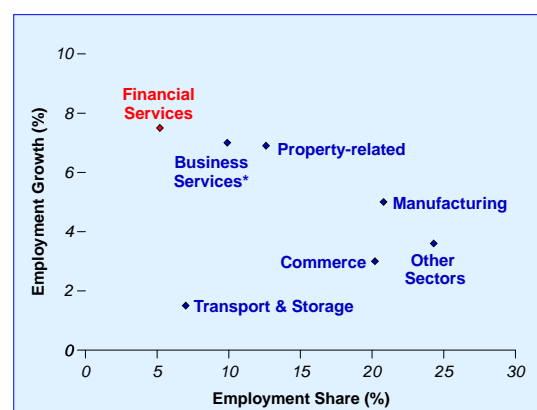
### Higher turnover especially in services sectors.

In tandem with the generally buoyant job market, turnover increased in Q2. This is proxied by the overall resignation rate which edged up further to 2.2% in Q2 2007, from 2.0% in Q1 2007. The higher turnover was more evident in the services sector. In particular, financial services saw a spike in the resignation rate, from 1.7% in Q1 to 2.4% in Q2, the highest on record. Hotels & restaurants, administrative & support services, real estate & leasing services saw even higher resignation rates of 4.9%, 3.8% and 3.5% respectively. (Chart 2.22) Among the occupational groups, resignation rates rose for the professionals, managers, executives & technicians (PMETs) and clerical, sales & service workers, but remained the same for production & transport operators and cleaners & labourers.

### Robust wage growth in the high-growth segments and PMETs.

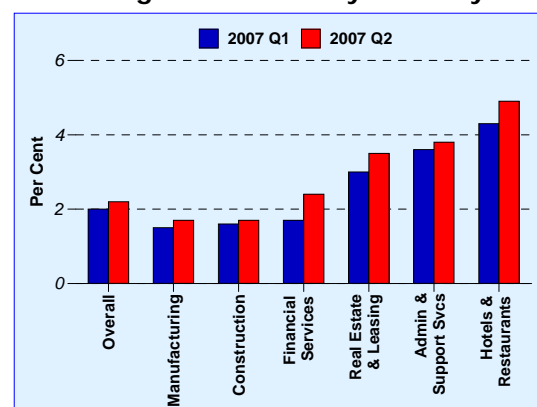
In tandem with robust job creation and high turnover, the property-related segments (9.5%) and financial services sector (8.2%) registered high wage growth in H1 this year. The community, social and personal services (CSP) sector also saw strong wage gains mainly due to the salary revision in the public sector. (Chart 2.23) However, other industries such as manufacturing (4.3%) and hotels & restaurants (4.5%) experienced smaller increases in earnings. Excluding the property-related segments, financial services and CSP, which accounted for about 40% of total employment, wage growth was more modest at 4.8%.

**Chart 2.21**  
Employment Growth and Share, H1 2007

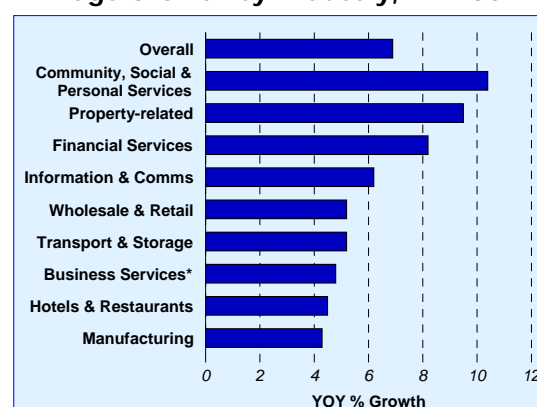


\* Refer to note for Chart 2.20

**Chart 2.22**  
Resignation Rates by Industry



**Chart 2.23**  
Wage Growth by Industry, H1 2007



\* Refer to note for Chart 2.20

<sup>5</sup> The lower skilled group comprises Clerical, Sales & Service Workers, Production & Transport Operators and Cleaners & Labourers.

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**Wage growth has been uneven across  
different skills groups.**

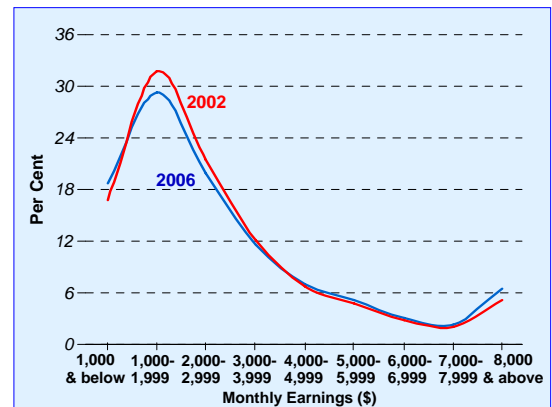
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Wage growth has been uneven across different skills groups in the last two years. Specifically, the median gross monthly wages of lower skilled residents are estimated to have remained stagnant in 2005-06. This contrasts with the estimated 2.8% average nominal wage growth among the PMETs.

Indeed, the number of lower skilled residents who found employment increased by 4.1% p.a. in 2005-06 which was lower than the average 6.1% employment growth for PMETs. In addition, the vacancy rate for production & transport operators and cleaners & labourers (1.9%) remained much lower than those for PMETs (3.2%) and clerical, sales & service workers (2.9%).

Given the diverse wage growth across industries and occupations, the distribution of earnings has become more uneven among the various income groups. As shown in Chart 2.24, there was a slightly larger proportion (18%) of residents earning below \$1,000 in 2006 compared to the 16% in 2002. In comparison, the proportion of residents in the high income brackets of \$8,000 & above increased from 4.7% to 6.0% over the same period.

**Chart 2.24  
Earnings Distribution of Employed  
Residents**



## **CHAPTER 3**

# **OUTLOOK**

## 3.1 External Outlook

### Modest Global Growth Slowdown

#### Global growth is expected to remain supportive.

Following concerted interventions by the world's major central banks via liquidity injections and/or interest rate cuts, global financial markets have calmed down after the turbulence in August. Against this backdrop, the global economy is expected to expand at a more moderate pace in 2008. (Table 3.1)

In the US, problems in the subprime mortgage market appear to be fairly well contained so far, with limited spillovers on the rest of the economy. Nonetheless, the US is expected to experience sub-trend growth in the short term, as the ongoing correction in the housing market weighs on both consumer and business confidence. This is supported by the Conference Board's leading indicator, which points to a moderation in economic activity in the coming months. After an initial pullback, however, growth should pick up in the second half of 2008. As of October 2007, the full-year consensus growth forecast for 2008 stood at 2.4%.

In the Eurozone, exports are likely to ease on the back of the strong euro, which has appreciated by nearly 8% against the US\$ since the beginning of this year. Nevertheless, the decline in the unemployment rate to a record low of 6.9% in August will provide an important pillar of support for private consumption spending.

In Japan, the latest Tankan survey indicates that both large and small businesses are slightly more cautious about the economic outlook. Nonetheless, corporate capital expenditure is still likely to drive the economy as firms continue to re-invest profits to sustain growth. Exports are also set to remain firm, particularly to emerging economies.

In non-Japan Asia, the outlook appears to be reasonably bright. Exports to the EU and Japan should hold up, supported by the expected modest recovery in the global IT market, even though US-bound exports may slow in the first half of the year. (Chart 3.1) In addition, fixed investments are likely to increase in some countries, particularly those targeted at relieving infrastructure bottlenecks, while robust labour market

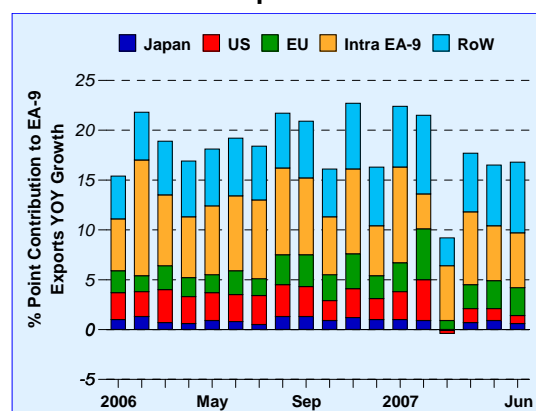
**Table 3.1**  
Forecasts of GDP Growth

	2007F	2008F
<b>Total*</b>	<b>4.8</b>	<b>4.6</b>
Industrial Countries*	2.4	2.2
US	2.0	2.4
Eurozone	2.6	2.0
Japan	2.0	1.9
NIE-3*	5.2	5.0
Hong Kong	5.8	5.2
Korea	4.8	5.1
Taiwan	4.6	4.6
ASEAN-4*	5.6	5.7
Indonesia	6.1	6.2
Malaysia	5.7	5.9
Thailand	4.3	4.8
Philippines	6.3	5.8
China	11.4	10.7
India	8.5	8.2

Source: Consensus Economics Inc., October 2007

\* Weighted by shares in Singapore's non-oil domestic exports.

**Chart 3.1**  
Asian Export Growth



Source: CEIC

Note: EA-9 refers to the East Asia-9 economies, namely China, Hong Kong, Indonesia, Korea, Malaysia, Singapore, Philippines, Taiwan and Thailand.

conditions will help to underpin private consumption. Improved fiscal positions will also give governments the scope to raise public spending, should the need arise.

Overall, developed countries and emerging Asian economies are forecast to expand by about 4.6% in 2008, slightly less than this year but still firmly above the average of 3.8% over the past decade.

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### Concerns remain over the impact of the US housing market correction.

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A lingering concern is that the weak US housing market could precipitate a significant erosion of household wealth and trigger a sharp downturn in consumer spending. Lending conditions might also tighten further, as lenders reassess their credit risks amidst rising mortgage payment defaults, which would have further negative effects on other parts of the economy, including business spending.

Being trade-dependent, Asia would not be insulated from a sharp downturn in the US economy. In addition, intra-Asian export growth would be adversely affected, as a significant proportion of regional trade is ultimately dependent on final demand in the developed countries. (See Special Feature B.) However, the likelihood of a severe US downturn is low at the moment.

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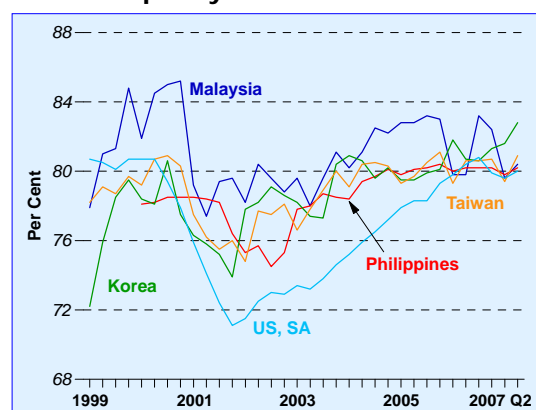
### Inflation should be contained, but there are upside risks.

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With global growth moderating slightly next year, inflationary pressures are likely to be contained. Based on consensus estimates, CPI inflation is expected to moderate in the US, remain steady in the Eurozone and rise slightly in Japan in 2008. Within the East Asian region, inflation is projected to stay broadly unchanged from 2007.

Nonetheless, there are upside risks arising from tight capacity after five straight years of above-trend global growth. (Chart 3.2) As a result, disinflationary effects due to positive supply shocks in emerging economies are dissipating and being offset by cost pressures in the resource market. The inflation risk could come from a number of sources. First, wage pressures are building up in a number of countries, particularly in Asia. Second, global crude oil prices could surprise on the upside despite reaching new highs recently. Third, global food prices continue to face an upward

**Chart 3.2**  
**Capacity Utilisation Rates**



Source: CEIC

bias, reflecting in part prices continue to face an upward bias, reflecting in part stronger demand for corn and soybeans from the biofuel industry. In some Asian economies, weather-related supply shortages have also contributed to higher food prices.

## 3.2 Domestic Outlook

### Holding Firm for the Rest of 2007

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**The domestic economy should expand at a moderate pace for the rest of the year.**

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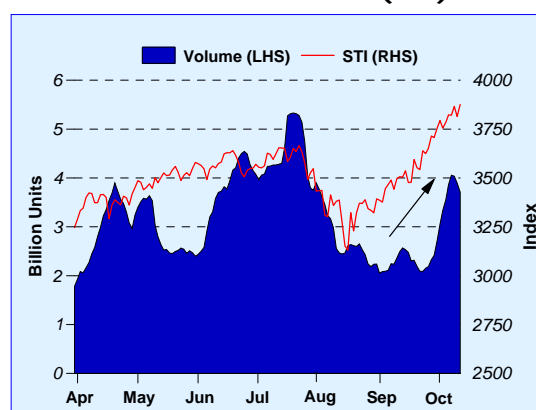
The Singapore economy has performed better than expected thus far in 2007, with robust growth in most industries, notably the non-IT industries and asset market-related activities.

Although the latest Q3 figures point to a moderation in growth momentum in the economy, financial markets have rebounded recently and underlying economic conditions have remained supportive amidst a generally favourable external environment. (See Chapter 1 for details.) GDP growth is on track to come in at the upper end of the 7-8% forecast range this year, up from the 4.5-6.5% forecast in April 2007.

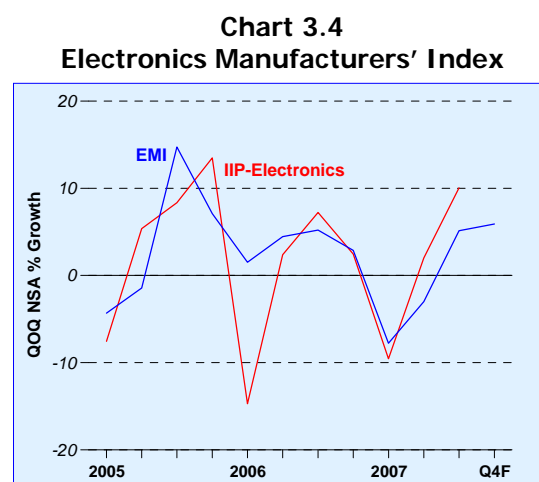
Barring a major fallout from the subprime mortgage crisis, domestic asset market-related activities should see some tentative improvement in Q4, especially in the financial services sector. Stock market volumes have recovered somewhat since mid-September, reflecting restored confidence in the global financial markets. In addition, there has been renewed interest in Asian equities and particularly in Chinese stocks, some of which are listed on the local bourse. Domestic equity prices also picked up sharply, in tandem with the turnaround in stock market volumes. Notably, the STI surged past the 3,800 mark in early October, exceeding the previous high of 3,665 in July, prior to the correction in August. (Chart 3.3)

The IT-related cluster will see modest growth in the near term, in line with a recovery in the global IT industry. This is evident from EPD's Electronics Manufacturers' index (EMI), which provides a one-quarter ahead forecast for domestic electronics production. (Chart 3.4) The EMI is based on consensus

**Chart 3.3**  
Stock Market Turnover Volume and Straits Times Index (STI)



revenue projections for key electronics MNCs based in Singapore. Representative companies within each electronics segment are selected and revenue forecasts for their global operations next quarter are compiled and weighted by the relevant segment's share in overall domestic electronics output. Chart 3.4 compares the EMI with the actual sequential growth of electronics industrial production. It shows that the EMI has been useful in tracking turning points in the industry, although it does not necessarily predict the magnitude of change. Our estimates, which exploit the information content of the EMI, suggest a modest single-digit growth in Q4 this year.



Source: Bloomberg, 26 Oct 2007; EPD, MAS estimates

## Reversion to Potential Growth in 2008

### GDP growth is expected to moderate to its potential rate next year ...

The outlook for next year is more uncertain, as it hinges on the severity of the weakness in the US housing sector. At this stage, the US economy is envisaged to slow significantly in the earlier part of next year, but begin recovering in the second half. Under this scenario, the rest of the world economy should continue to be fairly resilient and Singapore is expected to grow at its potential rate of 4-6%. This forecast has incorporated the possibility of further (temporary) bouts of volatility in the global financial markets as well as higher oil prices. More broadly, the slower rate of GDP growth in 2008 reflects in part the moderation in growth in the asset market-related sectors in Singapore, as investors turn more cautious.

### ... reflecting greater uncertainty on the external front.

Continued risk aversion among investors could also cap activity in the asset market-related clusters in the early part of 2008. Amidst uncertainty, financial markets, including those in Singapore, are likely to remain volatile and be particularly sensitive to information from incoming data. A recent study conducted by EPD, presented in Box B at the end of this chapter, suggests that domestic macroeconomic data releases do indeed impact the level and volatility of the S\$/US\$ exchange rate.

Although the domestic equity market has picked up since the sharp pullback in August, trading activity in 2008 is generally not expected to match the highs registered this year. While activity should improve in the domestic debt market, businesses might initially adopt a wait-and-see approach given lingering concerns over the credit market. Within the wealth advisory cluster, the prevailing uncertainties in global financial markets could also dampen demand for wealth management services into 2008. However, some fresh impetus could come from renewed interest in regional markets, which appear to have been able to distance themselves from the subprime mortgage crisis. Latest data suggests that a full recovery in equity fund flows to Asia has yet to materialise. (Chart 3.5) Going forward, investors could seek to strategically re-balance portfolios towards Asia, so as to mitigate potential downturns in the mature markets.

Merger and acquisition (M&A) activity has come back strongly after the dip in Q3, and this recovery is likely to continue into 2008. One positive factor has been the broadening of M&A deals, which were previously dominated by highly-leveraged private equity buyout firms in specific sectors across the region. A number of analysts have suggested that the decline in M&A deals associated with these firms – amidst tighter credit conditions following the subprime mortgage crisis – has provided more opportunities for M&A activities by regional businesses. In addition, there appears to be a growing number of mid-sized deals, which have been relatively more resilient in the face of economic downturns in the past.

Prospects for the property-related industries, especially construction, are decidedly more sanguine. Figure 3.1 provides a stylised mapping of the progress of mega non-residential projects over different stages of each project. It can be seen that most of the projects are moving into the third phase – building of the external structure – where the largest payment occurs. This should translate into higher value added growth in construction activity in the latter part of this year and into 2008.

**Chart 3.5**  
**Net Equity Flows,**  
**Selected Asian Markets**

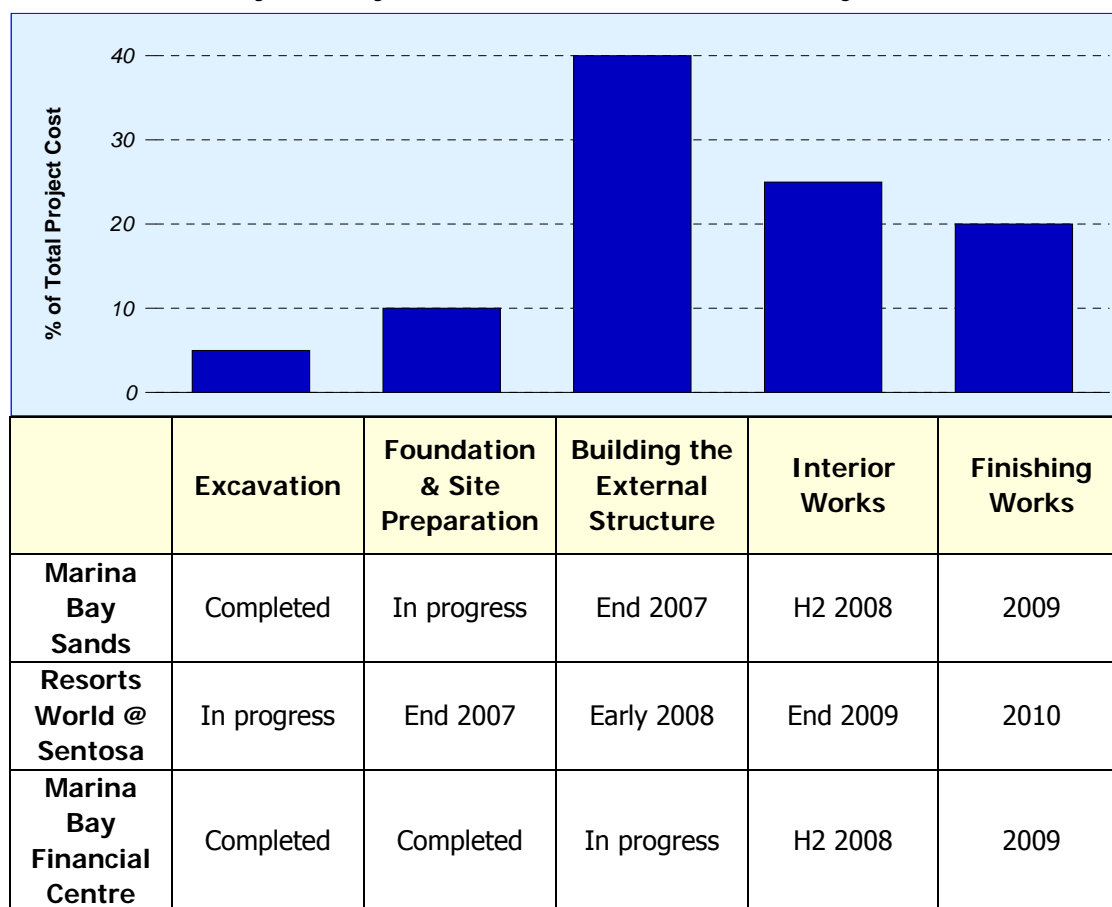


Source: Bloomberg, 23 Oct 2007

Note: Markets included are Indonesia, Korea, Taiwan, Thailand and the Philippines.



**Figure 3.1**  
Stylised Payment Streams of Construction Projects

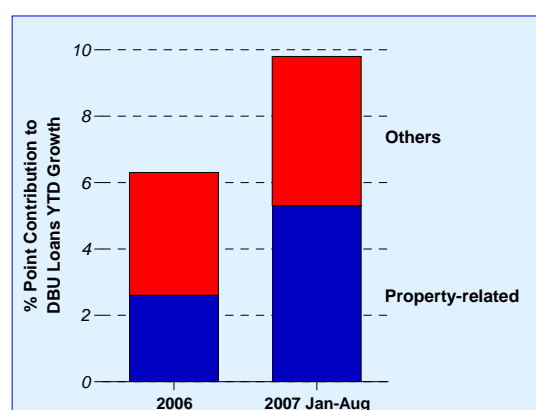


Likewise for the residential segment, there will be a significant number of high-end and mid-tier projects that are due for completion by year 2010. These projects in the pipeline should be sufficient to support fairly robust growth for the construction sector next year, even if new launches are held back by the recent financial market turmoil. With this supportive backdrop, property-related loans, which have contributed about 50% to total domestic loan growth thus far this year (Chart 3.6), should continue to grow.

**The rest of the economy should see healthy growth in 2008.**

Apart from asset market-related activities, the rest of the economy is poised for healthy growth in 2008. Similar to 2007, the non-electronics manufacturing cluster should again emerge as one of the strong performers next year.

**Chart 3.6**  
Contribution of Property-related Loans to Growth in DBU Loans



In the marine and offshore engineering industry, high oil prices will continue to drive oil exploration efforts, further spurring demand for oil rigs and rig-conversion projects. Net order books of the two major shipyards in Singapore point to robust growth in 2008, with a record number of oil rigs to be delivered next year. (Chart 3.7) The other mainstay of the non-electronics manufacturing segment is the biomedical industry. Despite its inherent volatility, the industry is expected to continue its strong growth in 2008, given the anticipated production pipeline.

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**Regional growth will support the services industry.**

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Singapore's tourism-related industries would benefit from continued strong inflows of tourists and big-scale events in 2008, including the Singapore Formula One (F1) Grand Prix in September. Hotels along the F1 course have announced that room rates will be raised by as much as three-fold for the five-day period between 24-28 September, boosting revenues in the hospitality and related businesses. Other STB initiatives include the strengthening of Singapore's position as a leading hub in Asia for Meeting, Incentive, Convention and Exhibition (MICE), as well as ongoing marketing activities in emerging markets such as China, India, the Middle East and Russia.

Air passenger volumes are also projected to rise in tandem with increased visitor inflows in the coming year, underpinned by the increasing affordability of air travel due to the proliferation of low cost carriers and the rising affluence of emerging economies. Meanwhile, recent initiatives by NOL, a leading shipping line in Singapore, to expand its fleet of container ships in the Asia-Europe and Transpacific routes, will raise sea cargo volumes.

The domestic-oriented sectors, such as retail sales, should also do relatively well, given the generally favourable outlook for the labour market. In particular, retail sales are set to rebound from the pullback in consumer spending following the GST hike in July, boosted by recent initiatives such as Saturday Late Night Shopping and ongoing efforts to revitalise the shopping belt along Orchard Road.

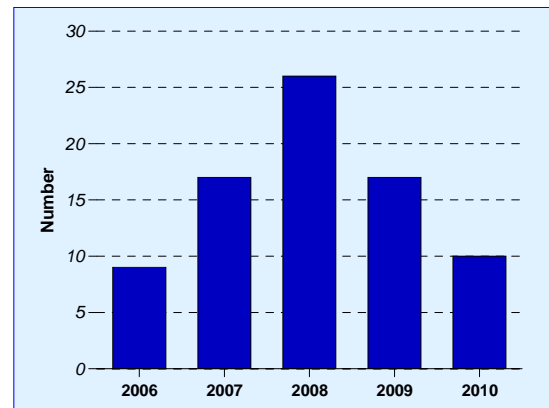
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**IT output should rebound modestly.**

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Barring a major slowdown in the US economy, the IT-related cluster, which has seen some nascent signs of

**Chart 3.7  
Rigs Delivery Schedule**



Source: Keppel Shipyard and SembCorp Marine company reports

recovery in H2 2007, is likely to pick up further in 2008, albeit at a moderate pace. This will be an important boost to the economy, given the relatively large share of the IT-related cluster and its extensive linkages with the rest of the economy.

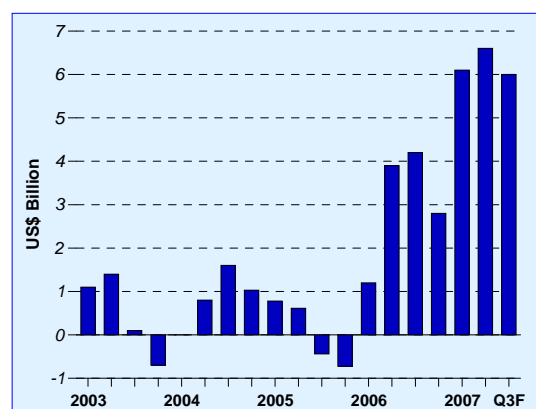
The current weakness in domestic IT-related activities can partly be attributed to the buildup in global inventories in the mid-stream semiconductor segment, which placed downward pressure on chip prices, thus muting gains in revenue growth. Indeed, excess semiconductor inventories doubled in the first quarter of 2007, before hitting a peak in Q2. (Chart 3.8) According to iSuppli, overcapacity was most pronounced in the memory segment, which saw production increase by 94% in the first half of the year, a quantum leap from the industry average annual growth of 55-60%.

The excess global supply and its subsequent impact on prices have affected Singapore-based electronics manufacturers as well. This is evident from the increased divergence between domestic electronics output (IIP) and nominal exports since the latter half of 2006, largely due to the erosion in export prices, which have fallen by 8.9% y-o-y since August this year. (Chart 3.9) In addition, inventory has built up over the same period, in line with the mounting chip overhang in global IT markets.

More recently, the global IT market appears to have turned the corner, with capacity cutbacks trimming the chip inventory overhang and providing a boost to global chip sales. Global semiconductor capacity utilisation – a forerunner of chip sales – also picked up in Q2, suggesting possible upsides to semiconductor revenues over the next few quarters. (Chart 3.10)

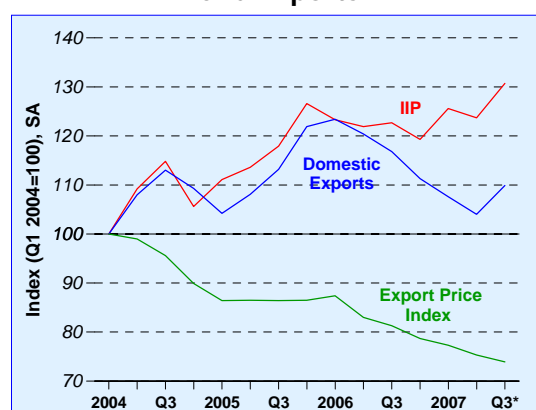
A firm recovery in global IT hinges on strong end demand. In particular, the year-end holiday season is pivotal for the electronics industry and typically accounts for a quarter of annual electronics stores sales in the US.<sup>1</sup> In view of the uncertainties arising from the subprime mortgage crisis, the US National Retail Federation has projected holiday sales to rise by 4% this year, the slowest in five years. Nevertheless, unfavourable credit and housing market conditions have yet to make a significant dent on purchases of consumer electronics items. Notably, the latest US September retail sales for consumer electronics has remained healthy, with high demand for iPods, handsets and laptops. (Chart 3.11)

**Chart 3.8**  
Excess Semiconductor Inventories



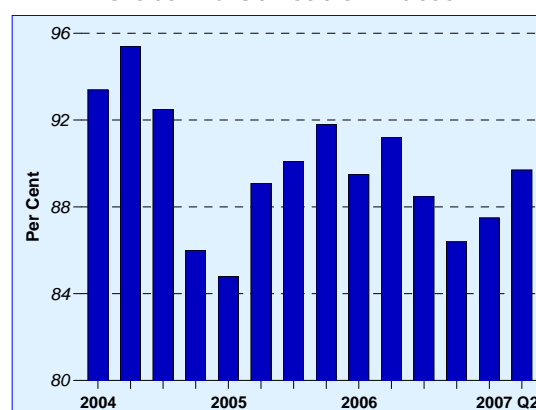
Source: iSuppli

**Chart 3.9**  
Domestic Electronics Output and Exports



\* Average Jul-Aug data for export price index.

**Chart 3.10**  
Global IC Utilisation Rates



Source: Semiconductor International Capacity Statistics (SICAS)

<sup>1</sup> Holidays which boost US retail sales in this period include Thanksgiving, Christmas and Hanukkah.

Key demand drivers are also poised to boost consumer spending during the US holiday season. Apple's recent offerings – which include an iPhone price cut and European launch, as well as the roll-out of a new generation of iPods and new Macintosh operating system – are expected to spur demand for consumer electronics, mopping up about a quarter of global NAND Flash supply in the second half of this year, according to InSpectrum. Strong shipment growth in the PC market, which is forecast by Gartner to grow by 12% in 2007 and 11% in 2008, compared to 9.5% in 2006, also bodes well for a sustained DRAM uptake alongside firm IT demand in emerging countries.

On the supply side, capacity expenditure should decline in 2008, as reflected in the capex schedules of leading semiconductor manufacturers. This will further ease price pressures in the semiconductor market and lend some support to chip revenues. Ongoing industry consolidation – joint ventures this year include Intel-STMicroelectronics for NOR Flash in May and Sony-Qimonda for DRAMs in October – will also pave the way for more robust pricing in the memory market. Overall, global chip sales should witness slightly stronger growth in the 7-10% range next year, up from the 3-4% estimated for 2007.

---

#### **New capacity should buttress domestic IT output in 2008.**

---

Generally favourable global conditions should translate into increased activity in the domestic IT-related cluster next year. In terms of product profile, semiconductors are expected to remain the key pillar of growth, boosted by capacity expansion in the second half of 2008. These include the expansion of Chartered Semiconductor's 300-mm wafer fabrication facility, new production from Qimonda and Samsung-Siltronic wafer fabs, as well as the production of NAND Flash memory chips by Intel-Micron's new plant in Singapore. The latter, under the name of IM Flash Technologies, will fabricate NAND Flash RAM for Apple's new line-up of iPods, thus plugging Singapore firmly into the highly lucrative iPod supply chain. Singapore also stands to benefit from the testing of AMD's latest quad-core Opteron processors on its shores.

Aside from the semiconductor sector, new capacity from the hard disk drive industry will also provide support to the domestic IT industry. Production at Seagate's third hard disk media plant is expected to kick off in

**Chart 3.11**  
**US Retail Sales**  
**(Electronics and Appliance Stores)**



Source: CEIC

mid-2008, lending support to hard disk media manufacturing, which is a key higher value added component of hard disk drives. (Table 3.2)

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**Slower GDP growth expected in 2008 as the economy returns to its potential growth rate.**

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The slowdown in growth in 2008 needs to be viewed in perspective, as the economy moderates back to its potential growth rate following four years of strong growth.

This easing largely reflects the anticipated short-term weakness in external demand in the first half of the year, arising from uncertainties associated with problems in the US housing sector. With the subprime mortgage problem assumed to be largely contained within the financial markets, other growth drivers in the economy will be largely intact and set for further expansion in 2008.

A temporary slowdown in the US, largely confined to the housing sector with moderate impact on the US consumer, should not derail the Singapore economy from this baseline growth scenario. Indeed, over the past decade, there have been times when the Singapore economy powered ahead although US GDP growth slowed significantly, suggesting weak synchronicity between US and Singapore business cycles over the near term. For example, when the US economy contracted by 0.2% in 1991, the Singapore economy grew by 6.6%, supported by strong growth in financial services and construction activities.

Indeed, if the US economy performs better than expected – aided by expansionary monetary policy – the second half of 2008 could surprise on the upside. In this case, asset market-related activities could bounce back swiftly and strongly.

On the other hand, a scenario of a more protracted and severe slowdown in the US economy, with its attendant knock-on effects on the rest of the global economy, cannot be ruled out. Figure 3.2 traces through the transmission mechanism of such an external financial shock on the Singapore economy, based on similar episodes in the past. Asset market-related activities would be more severely hit and this would spread to other domestic-oriented industries, such as retail trade, through a weakening of consumer sentiment. A sharper slowdown in the US, and concomitantly the rest of the

**Table 3.2  
New IT Capacity in mid-2008**

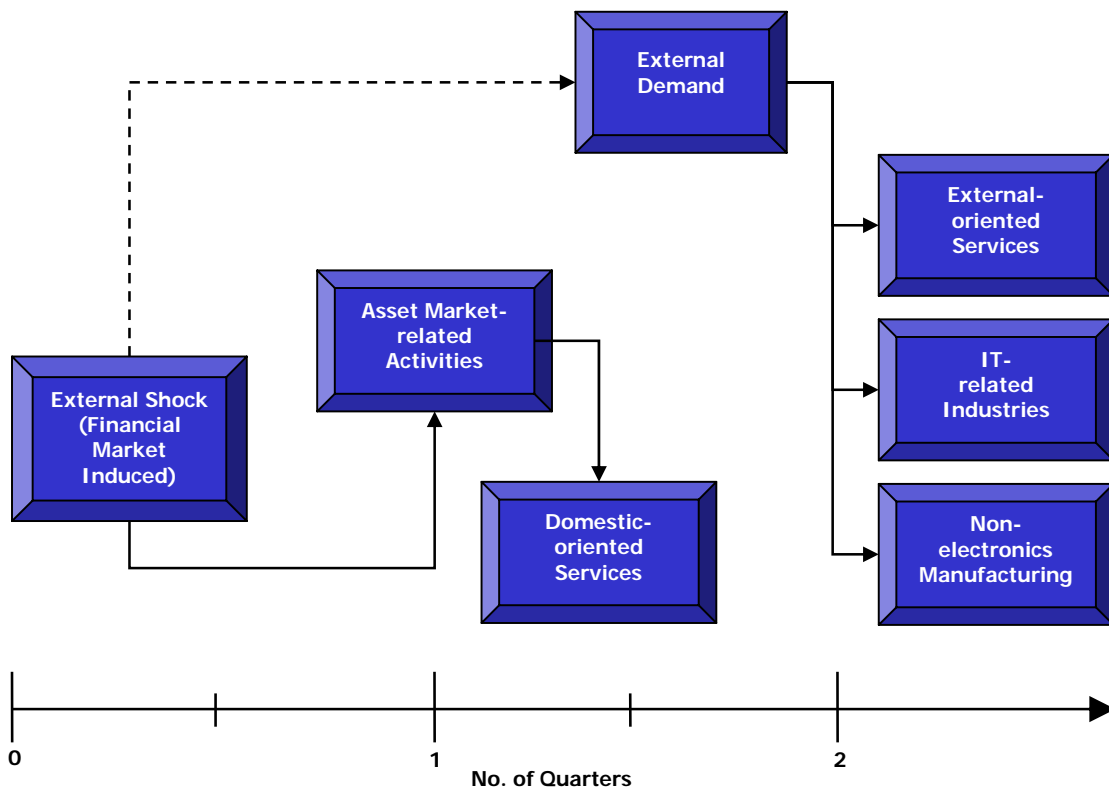
	Sector	Investments (US\$ billion)
Intel-Micron	Semiconductor (NAND Flash)	Multi-billion
Qimonda	Semiconductor (DRAM)	2.7
Samsung-Siltronic	Semiconductor	1
Soitec	Semiconductor	0.45
Seagate	HDD (Disk Drive Media)	0.82

Source: Company reports

world, would also hit the domestic manufacturing and external-oriented services sector adversely. Previous episodes of external shocks have shown that this can take place within two quarters. Under this scenario, domestic economic growth will slow more sharply to below potential growth next year. Nevertheless, the probability of such a scenario remains low.

On balance, our forecast is for the Singapore economy to achieve its potential growth rate of 4-6% next year.

**Figure 3.2**  
**The Transmission of Financial Market Volatility to Real Economic Activities**



### 3.3 Labour Market

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#### Employment outlook remains optimistic, especially in strong growth sectors.

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A number of surveys suggest that the job market will remain tight in the near term, in line with generally firm business conditions. In the latest survey by Manpower Inc., for example, 51% of 759 companies from different sectors indicated that they would increase recruitment in Q4 this year, while 31% expected no change in staffing levels and only 2% planned to cut headcount. (Chart 3.12) This employment outlook is slightly less optimistic compared to the last two quarters, when a larger proportion of the survey participants reported positive hiring intentions – 55% in Q2 and 54% in Q3.

The finance, insurance & real estate industry, one of the largest contributors to job gains this year, has the most favourable job prospects, as the growing role of Singapore as a financial hub continues to fuel demand for staff in the middle and back offices. In addition, strong construction activities and the boom in the property market will increase labour demand in the real estate industry.

As for the manufacturing sector, the employment outlook is generally optimistic in the non-electronics industries, according to the latest *Survey of Business Expectations of the Manufacturing Sector* by EDB. In particular, the marine & offshore engineering cluster is looking to increase hiring, driven by higher demand for ship repair works and oil rigs. In contrast, job prospects for the electronics cluster remain weak, in line with sluggish conditions in the global IT industry.

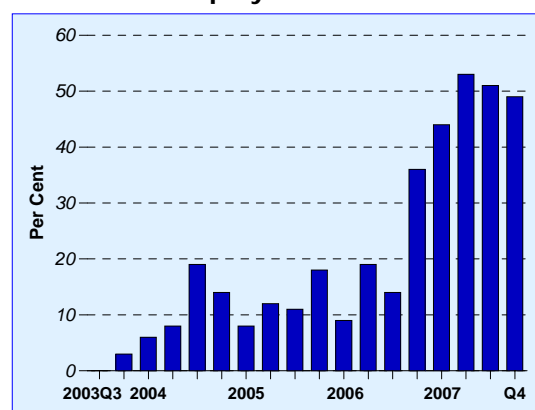
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#### Shortage of skilled workers is an increasing challenge for employers.

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With a tight labour market, employers have reported difficulties in the recruitment and retention of workers. In the latest Hudson report, a shortage of required skill sets was cited as the most significant recruitment problem by respondents from all sectors. The problem is especially severe in the manufacturing sector, particularly in the oil and gas industries where specific technical and engineering skills are highly sought after. At the same time, banks require workers for back office treasury and securities operations, credit risk, compliance and relationship management.

**Chart 3.12**  
Net Employment Outlook



Source: Manpower Inc.

Note: The net employment outlook is derived by subtracting the percentage expecting to see a decrease in employment from the percentage of employers anticipating an increase in total employment in the next quarter.

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**PMETs are more sought after.**


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With the strong demand for specialised skills, the resident unemployment rate of professionals declined further to a low of 2.3% in 2006 as compared to 4.1% in 2004. (Chart 3.13) In comparison, lower skilled workers faced higher unemployment rates. In particular, the resident unemployment rates of services & sales workers and cleaners & labourers were more than twice those of professionals and managers, at 6.4% and 6.0% respectively, although they were lower than the 7.8% and 8.6% in 2004.

Indeed, lower skilled workers remain vulnerable to job losses, as evident from the high proportion – some 60% of production & transport operators and cleaners & labourers – among those laid off in Q2 2007. (Chart 3.14) In addition, the number of retrenched workers from this group increased, whereas those from the higher skilled group fell.

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**Labour market conditions will remain strong in 2007 and 2008.**


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Given the buoyant economy and growing demand for manpower, employers have been paying more to attract or retain talent. Wage pressures will persist, particularly in fast-growing industries where there is strong demand for specialised skilled workers. In an annual survey by Michael Page International, a global recruitment firm, professionals in the finance sector – especially those in private banking and wealth management – could expect a pay rise of 15-30% in the next 12 months. Professionals in the booming property and construction sectors could also expect a salary increase of 15-20%.

### 3.4 Inflation

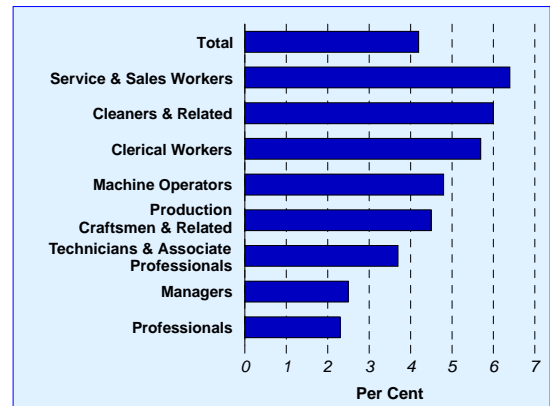
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**Domestic cost pressures are rising and risks from external price developments remain.**

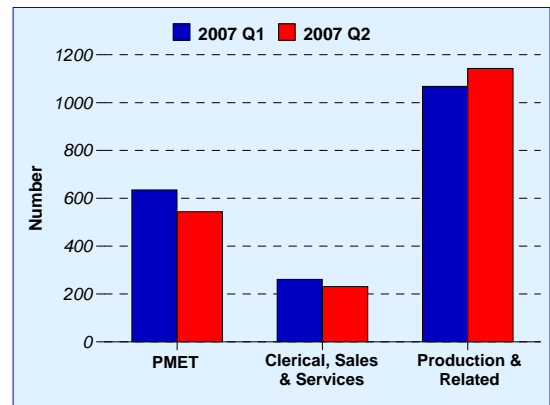

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The Singapore economy has performed better than expected in 2007, with robust growth across a number of sectors. Going into 2008, the domestic economy is expected to continue to expand, albeit at a more moderate pace. As a result, domestic cost pressures are likely to remain firm, along with upside risks from external factors, such as oil and food prices.

**Chart 3.13**  
Resident Unemployment Rate by Previous Occupation, June 2006



**Chart 3.14**  
Retrenchments by Occupational Group



Note: Production and related workers refer to production & transport operators, cleaners & labourers.



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### Wage pressures will persist into 2008.

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As noted above, recent survey results suggest that the job market will remain tight in the near term, although there could be some moderation in employment gains from the record high in H1 2007. With the tight labour market, wage growth is likely to remain firm as employers offer higher salaries to attract and retain workers. As such, overall nominal wage growth in 2007 and 2008 is projected to be higher than that in the last few years, coming in at 6-7% and 5-6% respectively.

Correspondingly, overall unit labour costs are projected to rise by 4.5-5.5% this year and 3.5-4.5% next year, following five years of decline.

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### Impact of rising property rentals on CPI will become more apparent.

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The upturn in the residential property market has yet to significantly impact accommodation costs in the CPI. The bulk of accommodation costs comprises those from owner-occupied housing costs, which are computed on the basis of imputed rents, i.e. the expected rental that a property would fetch if it was rented. Imputed rents generally lag market prices since they are based on Annual Values assessed by IRAS for tax purposes, which are reviewed periodically. As the AVs are revised to take into account higher residential rentals, accommodation costs in the CPI basket would rise accordingly.

Meanwhile, office and retail rentals should remain elevated in 2008 given that a significant increase in the supply of office/retail space will only become available in 2009. As such, the pass-through from rising commercial rentals could strengthen going forward, as businesses raise prices to offset mounting costs.

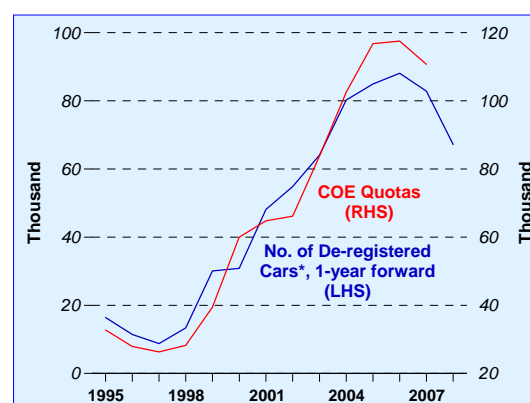
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### Car prices are likely to contribute positively to inflation in 2008.

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Car prices could be one of the key contributors to CPI inflation in 2008. According to the LTA, COE quotas for each quota year are based on a 3% car population growth rate, including provisions for projected car de-registrations. With falling de-registrations in 2006 and 2007, COE quotas are expected to drop in the next quota year (Apr 2008-Mar 2009), thus providing some support for car prices. (Chart 3.15) In addition, the LTA has indicated that the target car population growth rate of

**Chart 3.15**  
Number of De-registered Cars  
and COE Quota



\* EPD, MSD estimates for 2007. Estimates are obtained by annualising the realised de-registration in the first nine months of the year.

3% is unsustainable in the long run, and will review this policy in 2008.

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**Contribution of oil-related items will strengthen  
with higher oil prices.**

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On the external front, tight oil market conditions in recent months have driven global oil prices to new highs. On 26 Oct 2007, the price of WTI oil (front-month futures) surged to a new record of US\$92.22 per barrel.

Looking ahead, the oil market will remain tight, with prices staying high. Both the International Energy Agency (IEA) and the US Energy Information Administration (EIA) are forecasting oil demand to increase at an even faster pace in 2008 relative to 2007. Moreover, there is limited spare capacity in OPEC and its planned increase in production quota of 0.5 million barrels per day in November is perceived to be inadequate to alleviate market tightness. Supply increases from non-OPEC producers are also expected to be modest in the coming year. Overall, WTI oil prices are projected to rise from an average of US\$66 per barrel in 2006 to around US\$70-75 per barrel in 2007. Currently, WTI oil futures are predicting prices to average US\$86 in 2008. (Chart 3.16)

With the recent jump in global oil prices, domestic energy-related items can be expected to witness price increases in H2 2007 and 2008. Indeed, after falling sequentially by 13% y-o-y in the first two quarters, electricity tariffs were raised by 11% in Q3 2007 and another 4.3% in Q4. Direct energy-related items will add to overall CPI inflation going forward, after acting as a drag in H1 2007. At the same time, indirect pass-through effects will likely persist, through increases in public road transport fares and cooked food prices.

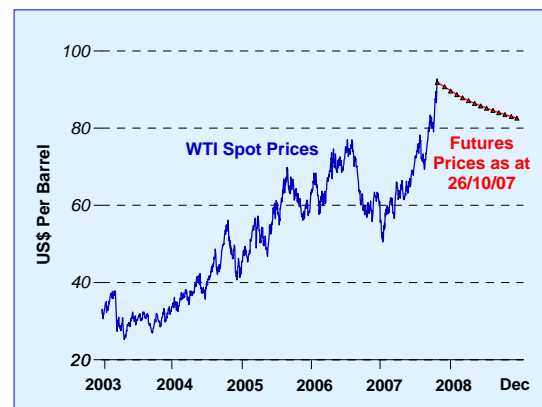
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**Food prices will continue to rise, albeit more  
moderately.**

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Global and domestic food prices are likely to trend up, given strong demand and tight supply due to cyclical and structural factors. (See Section 2.1.) For example, the dry weather in Australia will continue to constrain the output of livestock and crops. Strong income growth in emerging economies and government incentives for biofuel production globally will also increase demand for food items and continue to exert upward pressure on food prices.

**Chart 3.16  
WTI Oil Futures Prices**



Source: Bloomberg

**However, overall imported inflation will remain muted.**

Besides oil and food, prices of other primary commodities, such as metals and wood, could also stay high, with demand being supported by the rapid infrastructure buildup in developing countries. In comparison, inventory overhangs continue to depress the prices of electronics products, providing a cushion against rising commodity prices and helping to keep overall imported inflation subdued.

While the prices of China's exports have risen with the increase in wages and other production costs, the impact on Singapore's overall import prices is likely to be minimal given our diversified sources of imports. (Chart 3.17) Non-oil import prices are expected to continue falling this year and in 2008. Nonetheless, imported disinflationary forces are weakening in the context of continued robust global growth.

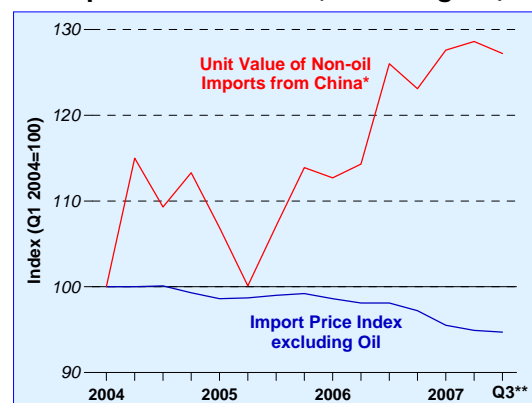
**CPI inflation is expected to be around 1.5-2% in 2007 and 2-3% in 2008.**

The GST hike will continue to have an impact on CPI inflation in H2 2007 and H1 2008. For the whole of 2007 and 2008, the impact will be about 0.5-0.7% point each year. In addition, barring a sharp slowdown in the global economy, domestic price pressures are likely to persist due to short-term supply constraints such as the shortage of commercial space and tight labour market conditions. Domestic cost factors are thus likely to play catch-up and contribute more to inflation, after staying muted in the last few years. Both global oil and food prices are also likely to trend up, reflecting a confluence of short-run supply factors and sustained strong demand in world markets.

We expect CPI inflation to come in at 1.5-2% in 2007 and 2-3% in 2008. (Table 3.3) CPI inflation will continue to rise and possibly average around 3.5% y-o-y in H1 2008. (Chart 3.18) This results from the impact of the GST hike as well as base effects arising from the low prices of cars and energy-related items in H1 2007.<sup>2</sup> Nevertheless, on a sequential basis, CPI inflation should trend down after the GST-induced spike in July 2007, largely in line with the historical average. (Chart 3.19)

<sup>2</sup> For a particular month or quarter, the maximum GST impact is estimated at 1.4% point for CPI inflation on a year-on-year basis. For example, in H1 2008, the GST effect is up to 1.4% point of the 3.5% y-o-y increase in the CPI.

**Chart 3.17**  
**Unit Value of Singapore's Non-oil Imports from China and Singapore's Import Price Index (excluding Oil)**



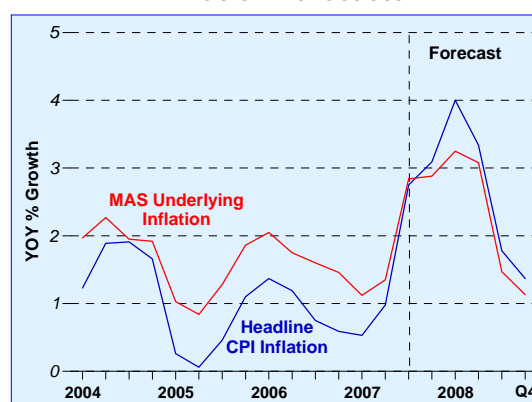
\* EPD, MAS estimates,  
\*\* Average Jul-Aug data for import price index.

**Table 3.3**  
**Contribution to CPI Inflation Forecast (% point)**

	2007F	2008F
Direct oil-related items	0	0.6
Cars	0.1	0.5
Other price pressures	1.4-1.9	0.9-1.9
CPI Inflation*	1.5-2	2-3

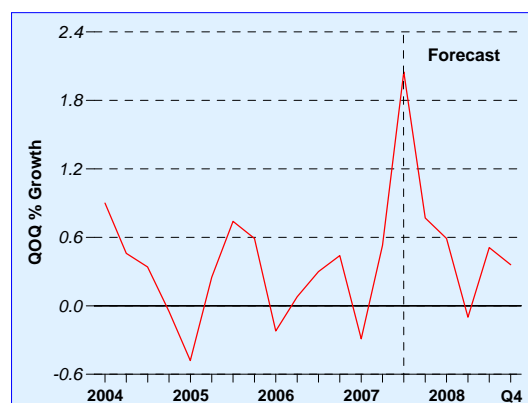
\* Includes an estimated GST impact of 0.5-0.7% point each year.

**Chart 3.18**  
**Headline and MAS Underlying Inflation Forecasts**



Meanwhile, the MAS underlying inflation measure, which excludes accommodation and private road transport costs, is expected to be 1.5-2.5% in 2008.

**Chart 3.19**  
Q-O-Q Forecasts for  
Headline CPI Inflation



### Box B

#### Assessing the Effects of Macroeconomic News on the Singapore Dollar

##### *Introduction*

This box examines the extent to which intraday movements in the S\$/US\$ exchange rate are impacted by major macroeconomic data releases in Singapore, using techniques applied by Galati and Ho (2001) and Almeida *et al.* (1998). First, the direction and magnitude of exchange rate changes and exchange rate volatility are assessed following key data releases. We then examine if there are asymmetric and persistent effects on the S\$/US\$ following these announcements. Our results are generally similar to those found in studies for other countries, which show that scheduled announcements have statistically significant effects on the level and volatility of the exchange rate. Our analysis also shows that there is a tendency for a positive (above-expectations) data release to affect the S\$/US\$ in a more persistent manner compared to a negative (below-expectations) data announcement. However, negative news tend to have a stronger impact on the S\$/US\$.

##### *Foreign Exchange Market Responses to Data Releases*

##### General Market Reaction to Macroeconomic Data "Surprises"

We build our analysis upon a familiar empirical framework in the exchange rate literature, based on the idea that if markets are efficient, expectations about upcoming macroeconomic data announcements should have been priced into exchange rate movements. Consequently, only the unanticipated components of these announcements drive exchange rate movements. For the purpose of our analysis, this unanticipated portion is defined as "news" or "surprises", and is measured by the difference between the actual and expected y-o-y growth rates of the relevant macroeconomic variables. The median of survey data from Reuters and Dow Jones is used to measure market expectations.

A standard GARCH (1,1) specification is used to assess the response of both the level and volatility of hourly S\$/US\$ changes to "surprises" from key economic data releases closely watched by market participants, namely the Index of Industrial Production (IIP), Non-Oil Domestic Exports (NODX) and the Advanced GDP Estimates (GDPAE). The GARCH approach efficiently exploits the dynamic information in both the first and second moments of changes in the S\$ exchange rate.<sup>1/</sup>

In particular, in the mean equation (1) of the GARCH model, we regress the hourly log difference in the S\$/US\$  $\Delta s_t$ , on a constant  $\alpha$  and a "surprise" variable,  $X_{k,t}$  which measures the unexpected component of the  $k^{\text{th}}$  macroeconomic announcement for IIP, NODX and GDPAE. The "surprise" variable takes the value of zero if there are no announcements or if expectations are realised.  $Z_t$  is a vector of additional conditional variables

including lags of the dependent variable. In the variance equation (2) which models the volatility of the S\$/US\$ exchange rate, the linear combination of one lag of the squared residuals ( $\varepsilon_t$ ) from the mean equation and one lag of the variance ( $h_t^2$ ) is supplemented with similar "surprise" variables and conditional variables included in the mean equation. All "surprise" variables enter the regressions contemporaneously to capture the immediate response of the exchange rate to the arrival of news. The model is estimated using Reuters hourly S\$/US\$ bid price data over the period 1 Mar 2007 (0:00 hrs) to 17 Aug 2007 (23:59 hrs).

$$\Delta s_t = \alpha + Z_t + \sum_{k=1}^3 \sum_{j=0}^1 \beta_{k,t-j} X_{k,t-j} + \varepsilon_t \quad (1)$$

$$h_t^2 = \beta + Z_t + \sum_{k=1}^3 \sum_{j=0}^1 \gamma_{k,t-j} X_{k,t-j} + \sum_{i=1}^1 \phi_i \varepsilon_{t-i}^2 + \sum_{i=1}^1 \sigma_i h_{t-i}^2 \quad (2)$$

The results of the full-sample GARCH estimation of equations (1) and (2) are summarised in Table B1. We also report the contemporaneous coefficients of each "surprise" variable and their respective  $p$ -values.<sup>2/</sup>

**Table B1**  
Estimates of the Effect of Announcements on the S\$/US\$ Exchange Rate

Dependent Variable	Coefficient	$p$ -value
<i>β</i> coefficients from Conditional Mean Equation (1)		
NODX	-0.0074	0.00
IIP	-0.0032	0.00
GDPAE	-0.1420	0.00
<i>γ</i> coefficients from Conditional Variance Equation (2)		
NODX	0.0000	0.70
IIP	0.0003	0.00
GDPAE	0.0866	0.41
Adjusted R-squared	0.01	
Std. Error	0.05	
Durbin Watson	2.28	

The contemporaneous coefficients on the NODX, IIP and GDPAE "surprise" variables are significant at the 1% level. In general, over the sample period, the positive macroeconomic data announcements tend to lead to an appreciation in the S\$/US\$. For instance, a 1% "surprise" increase in GDPAE, NODX and IIP leads to a 14, 0.7 and 0.3 basis point appreciation in the S\$ respectively within the hour of the data release. This is consistent with economic intuition and findings in the literature: positive "surprises" which indicate stronger-than-expected activity are found to be supportive of the exchange rate. The magnitude of the "surprise" variables is small, although comparable to those found in similar studies. For example, Galati and Ho (2001) found that European data releases tend to have an average impact of about 20 basis points in absolute terms on the US\$/euro exchange rate.

The results from the conditional variance equation suggest that the volatility of the S\$/US\$ exchange rate is affected only by the IIP "surprise" variable in a statistically significant manner. However, it is possible that announcements may have a discernible impact on exchange rate volatility if tested using higher frequency data, i.e. minute-by-minute or tick-by-tick. Even at an hourly frequency it is possible that the effects on the exchange rate could have been "washed-out" as a result of exchange rate fluctuations within the hour.

<sup>1/</sup> Baillie and Bollerslev (1989) and Andersen and Bollerslev (1998) have shown that a simple GARCH (1,1) model provides a reasonable and consistent discrete time approximation to continuous time diffusion processes. We also tried an integrated GARCH model, typically used for high frequency financial data, but there was no substantial improvement in the fit.

**Asymmetry and Persistence between Positive and Negative "Surprises"**

Next, we extend the intraday analysis by assessing whether the S\$ reacts asymmetrically to positive and negative news. We also test the persistence of the effect of "surprises" on the S\$/US\$ by examining the impact of the unanticipated information on exchange rate returns measured over various intervals post-announcement. Following Galati and Ho (2001) and Almeida *et al.* (1998), equation (1) is modified to take into account the possibility of asymmetry in "surprises" and the extent to which these "surprises" continue to have an effect on the S\$/US\$. We estimate the log differences in S\$/US\$ as a function of a constant and hourly lags of unsigned occurrence dummy variables  $D^{Positive}$  and  $D^{Negative}$ . These dummies take the value of one if the "surprise" from IIP, NODX and GDPAE is positive or negative, and zero if there are no announcements. The model is estimated with Reuters hourly S\$/US\$ bid price data over the period 1 Mar 2007 (0:00 hrs) to 17 Aug 2007 (23:59 hrs).

$$\Delta s_t = \alpha + Z_t + \sum_{j=0}^{48} \beta_{t-j}^{Positive} D_{t-j}^{Positive} + \sum_{j=0}^{48} \beta_{t-j}^{Negative} D_{t-j}^{Negative} + \varepsilon_t \quad (3)$$

The results are presented in Table B2. The magnitudes of  $\beta_t^{Positive}$  and  $\beta_t^{Negative}$  represent the effects of the positive and negative news respectively, while the hourly lagged coefficients of  $\beta_t^{Positive}$  and  $\beta_t^{Negative}$  show the extent to which "positive" and "negative" surprises affect the S\$/US\$. If the estimated lagged coefficient is significantly different from zero, it implies that the surprise has been fully factored in by that particular period and the possibility of a subsequent surprise is also priced in.

For example, if  $\beta_{t-1}$  is not statistically different from zero, it is an indication that the positive surprise has been fully passed through within one hour of the announcement. A positive and statistically significant  $\beta_{t-2}$  coefficient suggests that the market is already pricing in the possibility of a subsequent news release by the second hour.

**Table B2**  
**Estimation: Asymmetry and Persistence of Macroeconomic "Surprises"**

Effects	Positive "Surprises"	Negative "Surprises"
$\beta_t$ Contemporaneous	-0.0037 (0.0126)	0.0064 (0.0363)
$\beta_{t-1}$ , 1-hour pass-through	0.0021 (0.0129)	0.0343** (0.0168)
$\beta_{t-2}$ , 2-hour pass-through	0.0487 (0.0386)	-0.0043 (0.0150)
$\beta_{t-3}$ , 3-hour pass-through	-0.0239*** (0.0078)	0.0147 (0.0197)
$\beta_{t-5}$ , 5-hour pass-through	-0.0305*** (0.0106)	-0.0330 (0.0243)
$\beta_{t-10}$ , 10-hour pass-through	-0.0166 (0.0114)	0.0078 (0.0148)
$\beta_{t-24}$ , 24-hour pass-through	0.0061 (0.0124)	-0.0278* (0.0138)
$\beta_{t-48}$ , 48-hour pass-through	-0.0685 (0.0712)	-0.0052 (0.0183)
Adjusted R-Squared	0.02	
Std. Error	0.06	
Durbin-Watson	2.02	

Note: Numbers in parentheses are Newey-West heteroscedasticity and autocorrelation-consistent standard errors. \*\*\*, \*\* and \* represent significance at the 1%, 5% and 10% levels, respectively.

<sup>2/</sup> In line with most other studies, the overall fit of exchange rate regressions using high frequency data is typically not high.

The results reported in Table B2 show that the one-hour pass-through coefficient for the negative surprise,  $\beta_{t-1}^{Negative}$  is positive and significant at the 5% significance level, and imply that a negative "surprise" leads to a 3 basis points depreciation in the S\$/US\$. The results also show that the market prices in the possibility of a subsequent surprise after one hour. In comparison, positive news leads only to a 2 basis points appreciation of the S\$/US\$ on average and it takes 3 hours ( $\beta_{t-3}^{Positive}$  is negative and significant at 1%) before the market prices in the possibility of a subsequent surprise.

This suggests that negative macroeconomic data surprises have a stronger effect on the S\$/US\$ than positive surprises, although the latter tend to be more persistent. However, these results could also be influenced by noise from concurrent releases of other economic data, comments by senior government officials and foreign exchange intervention activities before and after the data releases, which are not necessarily captured by the dummy and other control variables used in our analysis.

### ***Sum Up***

This study analyses the S\$/US\$ exchange rate responses to the release of the Advance GDP Estimate, IIP and NODX data. Our results suggest that these data releases do impact the level and volatility of the S\$/US\$ exchange rate. Negative "surprises" also have a stronger impact than positive surprises, although the effects of positive surprises are more persistent.

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# **SPECIAL FEATURES**

## Special Feature A

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# Impact of a Foreign Demand Shock on the Singapore Economy – Perspectives from Two Macroeconometric Models<sup>1</sup>

## Introduction

Quantitative macroeconometric models of national economies have gone through several generations of theoretical development and empirical calibration to become a standard tool in the analysis and design of macroeconomic policies. Having been temporarily eclipsed during the 1980s by new developments in econometric modelling, there has been an apparent “revival” since the 1990s in macromodelling by public policy institutions, such as central banks, and the incorporation of the results of macroeconometric models in their policymaking process.

In Singapore, econometric modelling forms an integral part of the academic and policymaking scene. Several academic and public policy institutions – National University of Singapore (NUS), Nanyang Technological University (NTU) and MAS – maintain macroeconometric models for forecasting and policy evaluation. It is rare for one model to be superior in all circumstances, and alternative models are needed for different purposes. A comparison of existing models will thus help to enhance our understanding of key relationships and linkages in the Singapore economy, as well as contribute to improved modelling practices.

This Special Feature undertakes a detailed comparison of two extant macroeconometric models of the Singapore economy – the MAS Monetary Model of Singapore (MMS) and the NUS Econometric Studies Unit Model (ESU01).<sup>2</sup> Our focus is on drawing out the different perspectives and insights provided by these two models on the impact of a negative demand shock on the Singapore economy.

The MMS was formally introduced in 2000 for use in forecasting and policy simulation. In particular, it plays a key role in the central bank’s monetary policy formulation process, where it is used extensively to simulate alternative policy paths under different scenarios. The ESU01 model was constructed in 2001 by the Econometric Studies Unit of NUS and further refined in 2005. It can be utilised for economic analysis, policy simulation and forecasting. While both models were constructed for broadly similar purposes, policy analysis features more prominently as an objective of the MMS while the ESU01 is designed primarily for structural analysis and forecasting.

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<sup>1</sup> This feature was written in collaboration with Tilak Abeysinghe, Department of Economics, National University of Singapore and Choy Keen Meng, Division of Economics, Nanyang Technological University.

<sup>2</sup> MMS was featured in MAS (2000) and in Enzler *et al.* (2005). A complete documentation of the ESU01 model is presented in the recently published book by its architects (Abeysinghe and Choy, 2007).

The next section describes the similarities and differences between the MMS and ESU01 in terms of model structures and modelling approaches, thereby showing also where they complement each other.

## Comparison of the Models

### Overview

Table 1 summarises the features of both the MMS and the ESU01 models. Both are structural macroeconomic models of the Singapore economy and are derived from strong theoretical foundations to ensure that their systemic properties are consistent with widely-accepted theories and models. The parameters in the two models are estimated econometrically from quarterly time series data, although MMS also relies on calibration techniques to some extent.

The MMS is a macro computable general equilibrium model that is essentially derived from microeconomic optimisation theory, while the ESU01 is an economic system built on behavioural relationships which are mostly, albeit not exclusively, motivated by standard macroeconomic theory. Broadly speaking, the equations in both models can be placed into four blocks: trade, industrial sector, labour market and domestic demand. In both models, the supply side is integrated with the expenditure or demand side. However, they differ in the modelling of the long run. In the case of MMS, the economy converges to a steady state growth path dictated by supply-side constraints, while the ESU01 converges to long-run equilibrium relationships that bind key macroeconomic variables together.

In terms of the approach to econometric modelling, both models are specified according to an error correction framework. Error correction models ensure that both the short- and long-run aspects of behavioural relationships are taken into consideration, thus allowing maximum flexibility for the equation dynamics to fit Singapore data.

The modelling of the production sectors in the MMS and ESU01 draws upon the Singapore Input-Output

We then compare the two models' responses to a negative demand shock by tracing the impact through their respective transmission mechanisms.

Tables, which is one of the best sources of detailed information on the economy. The MMS utilises these tables to compute price elasticities, such as those pertaining to sector-specific exports and imports. In addition, these tables are an important ingredient in the calibration of the sectoral parameters in both models.

### Trade Block

As Singapore is a small and very open economy, both models emphasise the pivotal role of the external economic environment through clearly defined processes. In general, since the volumes of Singapore's imports and exports are small relative to world trade, export and import prices are assumed to be determined by global markets. Foreign prices and the exchange rate also have a significant impact on domestic prices since imports account for a large part of domestic expenditures on consumption and capital requirements.

Beyond these common features, distinct differences are found in the design of the trade blocks of the two models. Export and import demand functions are modelled for various *sectors* in the MMS such as manufacturing, and financial and business services. By comparison, in the ESU01, export and import functions are estimated for disaggregated trade *categories* such as non-oil exports and retained imports. (Table 1)

### Sectoral Block

Given the richness of Singapore's data on the industrial and service sectors, both the MMS and ESU01 take advantage of this information in the choice of modelling strategies for the sectoral block.

**Table 1**  
**Model Description**

	MMS	ESU01
<b>Date of Model Development</b>	1999	2001
<b>Frequency of Data</b>	Quarterly	Quarterly
<b>Size</b>		
Total Number of Equations	248	62
Behavioural Equations	38	36
<b>Key Blocks</b>		
Trade	Export and import demand functions for three sectors: <ul style="list-style-type: none"> <li>• Manufacturing</li> <li>• Finance &amp; Business Services</li> <li>• Other Goods and Services</li> </ul>	Equations for export and import categories: <ul style="list-style-type: none"> <li>• Non-oil domestic exports (NODX)</li> <li>• Oil domestic exports</li> <li>• Re-exports</li> <li>• Service exports</li> <li>• Retained imports</li> <li>• Service imports</li> </ul>
Sectoral	Production functions for five sectors: <ul style="list-style-type: none"> <li>• Manufacturing</li> <li>• Finance &amp; Business Services</li> <li>• Construction</li> <li>• Housing Services</li> <li>• Other Goods and Services</li> </ul>	Supply functions for six sectors: <ul style="list-style-type: none"> <li>• Manufacturing</li> <li>• Finance &amp; Business Services</li> <li>• Construction</li> <li>• Transport &amp; Communications</li> <li>• Commerce</li> <li>• Others</li> </ul>
Domestic Demand <i>Households</i>	Ando-Modigliani Consumption Function	Parsimonious specification of the consumption function to fit historical data
<i>Firms</i>	<ul style="list-style-type: none"> <li>• CES Production Functions</li> <li>• Tobin's 'q' Theory of Investment</li> </ul>	<ul style="list-style-type: none"> <li>• Supply functions in the sectoral block based on final demand</li> <li>• Forward-looking variables in investment equations to incorporate agents' anticipations</li> </ul>
Labour Market	Inflation Expectations Augmented Phillips Curve	Disequilibrium term in real wage equation incorporates influence of foreign workers
<b>Theoretical Underpinning</b>	<ul style="list-style-type: none"> <li>• Keynesian in the short run</li> <li>• Neoclassical in the long run</li> </ul>	<ul style="list-style-type: none"> <li>• Demand driven with long-run cointegrating restrictions</li> </ul>
<b>Econometric Approach</b>		
Specification Estimation	Error Correction Model <ul style="list-style-type: none"> <li>• Ordinary Least Squares</li> </ul>	Error Correction Model <ul style="list-style-type: none"> <li>• Ordinary Least Squares</li> <li>• Autoregressive Distributed Lag</li> <li>• Johansen's Maximum Likelihood</li> </ul>
<b>Expectations</b>	Explicitly Modelled	Implicitly Modelled
Financial Markets	Rational Expectations	
Goods/Factors Markets	Adaptive Expectations	
<b>Special Features</b>	<ul style="list-style-type: none"> <li>• Detailed decision-making processes of factors of production</li> <li>• Rational expectations in the financial markets</li> </ul>	<ul style="list-style-type: none"> <li>• Trade equations take into account both demand and supply factors</li> <li>• CPI equation incorporates Balassa-Samuelson effect</li> </ul>

In the MMS, GDP on the supply side is disaggregated into five sectors. Each sector has its own production function derived from optimisation theory to obtain fully-consistent equations for employment, investment, export supply, import demand and pricing. The decision-making processes with regard to the demand for primary factors are embedded in these equations. The *production* functions allow for substitution between the primary factors, capital and labour, given a Constant Elasticity of Substitution production technology. In addition, these functions incorporate the rate of technological progress by means of labour and capital efficiency indices.

Instead of explicitly estimating production functions, the ESU01 model employs a novel approach to estimate *supply* functions for the six sectors covered. Specifically, the value added of each sector is made dependent on the final demand for the sector's output, thereby creating linkages between the domestic demand and trade blocks in the model.

To summarise so far, the two models differ mainly in the emphasis given to the sectoral and trade blocks. The MMS pays particular attention to the modelling of the sectoral block. By contrast, the ESU01 focuses on Singapore's trade relationships with the rest of the world. Hence, an exogenous shock transmission mechanism in MMS works through the production side of the economy via the sectoral block whereas in the ESU01, an external disturbance is propagated through the expenditure side of the economy via the trade equations. This key difference in transmission mechanisms will be explored further through a simulation experiment in the next section.

### **Labour Market Block**

Both the MMS and ESU01 adopt a structural approach to the modelling of the labour market, in which labour demand, supply and wage equations are estimated in a disequilibrium framework. The aggregate wage equations resemble a Phillips curve in that the wage rate depends on some form

of capacity constraint (also known as the disequilibrium term). However, there is a clear distinction between the two econometric specifications. In the MMS, the disequilibrium term in the wage equation is the unemployment rate. The ESU01, on the other hand, utilises the gap between the actual and market-clearing real wage as the disequilibrium term. This attempts to explicitly account for the influence of foreign workers in the wage adjustment process through their impact on labour supply.<sup>3</sup>

### **Domestic Demand Block**

In the MMS and the ESU01, the domestic demand block comprises the behavioural equations for private consumption and investment. However, government spending is assumed to be an exogenous policy variable in both models.

The MMS includes an Ando-Modigliani consumption function in which equilibrium private consumption is determined by current labour income and non-human wealth. Consumers are then assumed to allocate their equilibrium consumption spending between consumer goods produced by the four sectors.<sup>4</sup> This in turn provides the consumption demand for each of the four sectors, taking into account the private sector's intertemporal budget constraint. In contrast, the ESU01 takes an empirical approach in searching for the most parsimonious specification of the consumption function that can incorporate the observed decline in the average propensity to consume in Singapore.

In MMS, a Tobin's 'q' style model of private business investment is adopted in each sector. This recognises the costs involved in adjusting the capital stock and allows it to adjust gradually to a new equilibrium level where the actual and required rates of return on capital are equal. The ESU01 does not utilise conventional investment models. Instead, since fixed capital formation is predominantly driven by expected demand and profitability, the ESU01 includes two forward-looking expectations-laden variables in its specification and estimation of investment

<sup>3</sup> Until January 2007, all foreign workers had to leave Singapore if they were unemployed. Hence, the inflow or outflow of foreign workers had an impact on wages by affecting the labour supply. Since the beginning of 2007, a limited number of foreign workers can remain unemployed in Singapore for up to six months.

<sup>4</sup> The construction sector does not produce consumer goods.

functions: Net investment commitments in the manufacturing sector, and building contracts awarded in the construction sector. This greatly simplifies the task of incorporating agents' expectations into the modelling of private capital expenditures.

### Treatment of Expectations

In response to the Lucas critique, the MMS incorporates forward-looking or rational expectations in the financial markets. This property enables the model to capture the widely-recognised fact that financial markets respond virtually instantaneously to all kinds of new, relevant information. Rational expectations in financial markets are modelled through two key relationships – uncovered interest rate parity and the term structure of interest rates. The MMS assumes that expectations are mainly backward-looking in other markets.

To address the Lucas critique, the ESU01 models expectations implicitly by including current and lagged variables in estimated equations and using proxies for agents' expectations as in the investment equations discussed above. Another solution was to add policy variables directly into the regressions and to ensure that the parameter estimates remain invariant under structural and policy shifts.

### Long-run Properties

The primary objective of the MMS is policy simulation. As such, the medium- to long-run

properties of the model are more important than the short-run behaviour of the economy. In contrast, the ESU01 model places more emphasis on cointegration relationships and short-run dynamics.

The MMS is Keynesian in the short run and neoclassical in the long run.<sup>5</sup> Thus, the model incorporates a formal structure for the economy, with well-defined long-run properties to ensure that the economy reverts to its steady-state balanced growth path, determined by technical progress and the rate of growth in the labour force. In particular, all variables in the model settle to their long-run equilibrium levels and are mutually consistent, i.e. they all "add up".

The MMS also models the fiscal policy rule using the government's intertemporal budget constraint to account for the distinctive feature that the Singapore government is a net creditor over time. This ensures a sustainable fiscal policy in the long run.

In comparison, the ESU01 does not have explicit steady-state restrictions, reflecting the model-builders' concern that the imposition of such restrictions may result in misleading inferences from policy simulations. In their place are empirically-tested cointegration restrictions, which are themselves long-run equilibrium relationships derived from economic theory. These relations also provide guidance in the specification of the model's behavioural equations. In the short run, the ESU01 model is essentially demand-driven, with inventories acting as a buffer against shortfalls and excesses in aggregate demand.

<sup>5</sup> In a Keynesian short run, firms maximise profit subject to the constraints of domestic demand and the capital stock that they have in place. Over time, the price of domestic demand gradually adjusts to its marginal cost of production, thus relaxing the domestic demand constraint. In the long run, the Tobin's 'q' formulation for business investment results in the lifting of the constraint on capital. This yields a neoclassical long run of profit maximisation subject only to the production technology constraint.

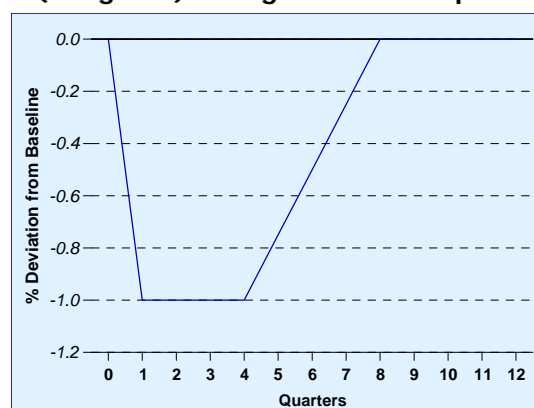
## Analysing the Impact of a Foreign Demand Shock

In this section, we illustrate the different transmission mechanisms of the two models by simulating an adverse foreign demand shock. Figures 1 and 2 depict how the shock is transmitted through the Singapore economy in the MMS and ESU01 respectively.

A fall in foreign demand is introduced by changing the composite foreign GDP index that serves as a proxy for external demand in the two models. The shock is assumed to be temporary: foreign GDP is reduced by 1% below baseline for four quarters before recovering by 0.25% in each successive quarter to the baseline level by the end of the second year. Chart 1 shows the alternative path assumed for the foreign GDP index under the simulation.

An important caveat is that while we have attempted to analyse a common demand shock via a controlled 1% decline in the composite foreign GDP index across the models, the different ways in which the index is constructed in the respective models imply that the stimuli provided by the shock and its impact on the economy are only broadly comparable.<sup>6</sup> Therefore, we do not aim to compare the differences in multiplier effects on key economic indicators arising from the shock. Rather, the emphasis is on highlighting the different transmission channels and the dynamic properties embedded in each model.

**Chart 1**  
**(Weighted) Foreign GDP Assumption**



<sup>6</sup> The foreign GDP indices used in the MMS and ESU01 models are not identical because the coverage of countries and the weights given to them are different.

### Transmission Mechanism in MMS

In the MMS, the slowdown in economic activity in Singapore's main trading partners affects exports immediately and severely, with knock-on effects on investment and consumption. Chart 2 illustrates the impact on key macroeconomic indicators over time.

The shock is transmitted through the MMS via two main channels – the direct short-run effect and the profit-maximisation response by producers. (Figure 1) The first transmission channel is the immediate short-run effect of a decline in foreign GDP on manufacturing exports and output as export orders fall. NODX declines sharply by 2.0% in the immediate quarter, reaching a trough of 2.9% below baseline by the first quarter after the shock.

The second transmission channel is via the profit-maximising decisions of producers in the various sectors, as they adjust their overall production and pricing decisions in response to the decline in external demand.<sup>7</sup> This subsequently reduces their demand for domestic and imported intermediate inputs, resulting in further negative spillovers to the rest of the economy. Production for domestic and export markets thus adjust to a lower (short-run) equilibrium level, as does the demand for imports.

Producers reduce their own derived demand for labour, causing employment and, subsequently, wages to decrease. Employment falls by 0.14% in the immediate quarter with lower employment levels persisting for about six quarters after the shock. The unemployment rate reaches a peak of 0.15% point above the baseline in the second quarter. Households are then impacted as lower wages lead to a decline in private disposable income and hence private consumption.

Concomitantly, the actual rate of return on capital falls against the backdrop of a weaker economic environment. Non-residential investment falls by as much as 2.0% as a consequence.

Overall, real GDP declines by an average of 1.2% compared to the baseline scenario in the first year, with the manufacturing sector being the most adversely affected given its strong exposure to external demand. The CPI declines by 0.3% over the same period as cost and price pressures ease in the factor and product markets.

The economy begins to recover after the fourth quarter in tandem with the improvement in the external environment and as producers re-adjust their output levels in response to lower production costs. In particular, the collapse in demand in the earlier periods lowers the cost of inputs, including that of labour. This results in a reduction in sales/output prices, thereby stimulating domestic demand. The pickup in domestic demand, coupled with the relatively lower cost of labour, induces producers to increase their demand for labour inputs. Subsequently, the unemployment rate falls by 0.2% point below the baseline rate 10 quarters after the shock and investment slowly recovers to about 2.4% above the baseline level two years after the initial shock.

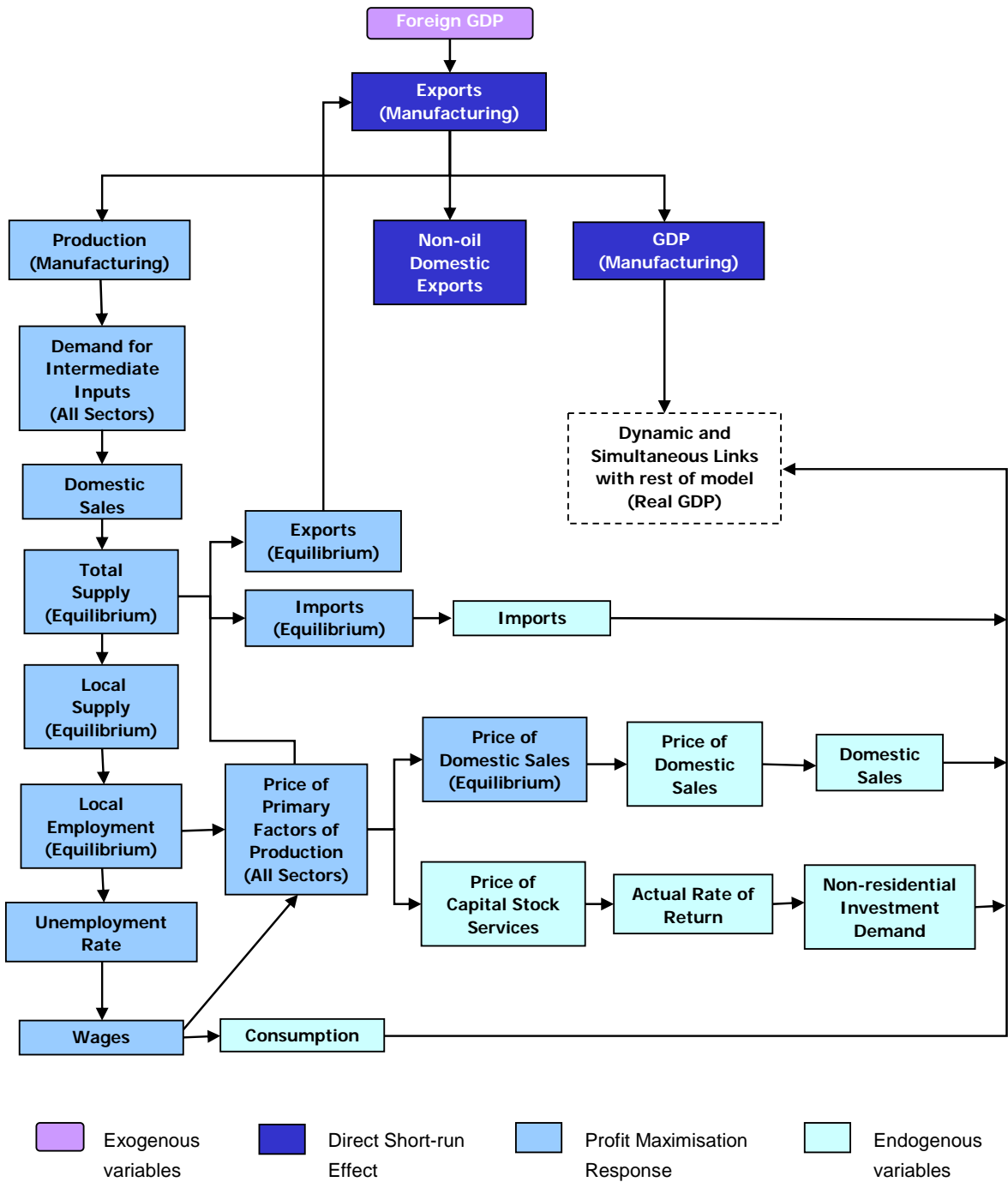
The domestic economic recovery is further boosted by the improvement in external demand into the second year, supporting a pickup in export activity. NODX and overall exports recover to 2.6% and 1.9% respectively above baseline levels two years after the shock. Accordingly, real GDP improves to an average of 1.4% above baseline in the second year.

As the foreign demand shock is assumed to be temporary, the impact on key macroeconomic variables dissipates in the long run.

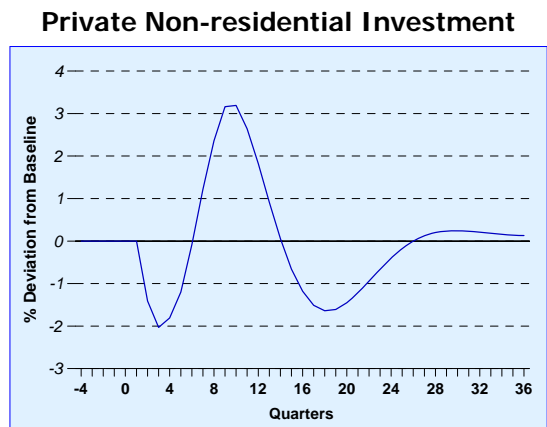
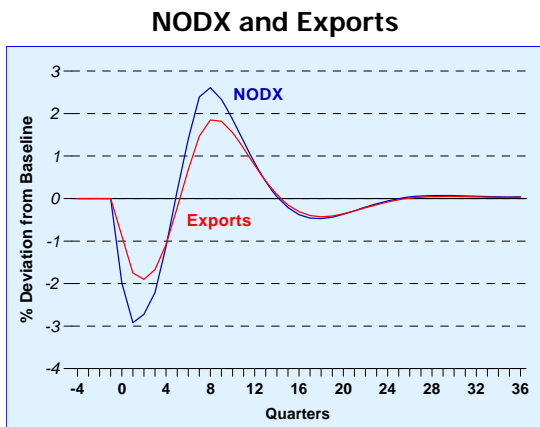
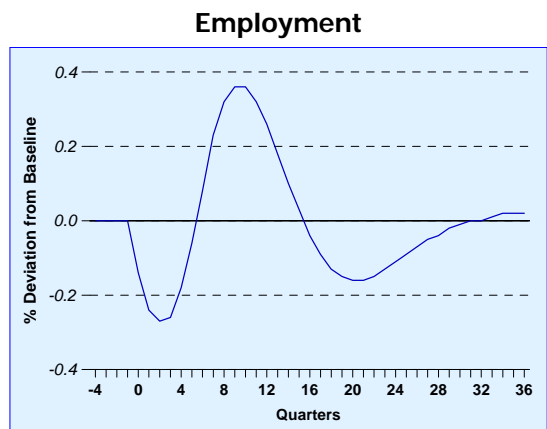
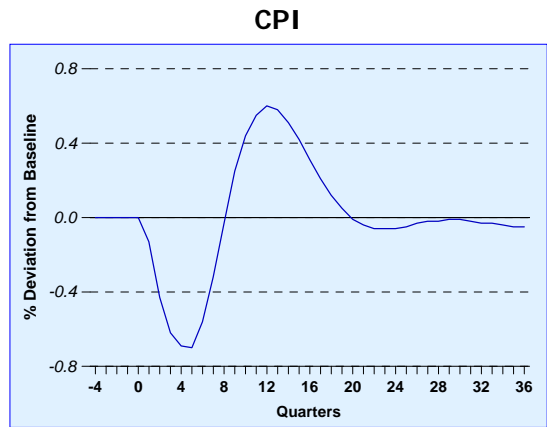
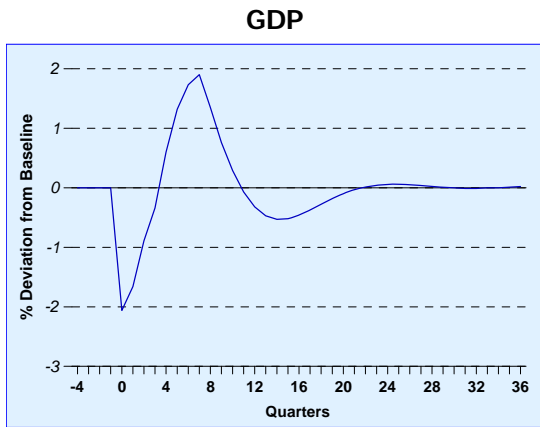
<sup>7</sup> For the short-run profit maximisation problem, it is assumed that in each industry, firms choose their inputs of labour, intermediates and imports to maximise profit from domestic sales and exports, while taking their stocks of capital as fixed. Instead of the traditional closed-economy production function that relates output to inputs of capital and labour, the open-economy production function used in MMS extends the production function by deriving exports and domestic sales.



**Figure 1**  
Transmission Mechanism of a Foreign Demand Shock in the MMS



**Chart 2**  
**Macroeconomic Effects of a Foreign Demand Shock in the MMS**



### Transmission Mechanism in the ESU01

The transmission mechanism that serves to propagate the effects of a foreign demand impulse in the ESU01 model is shown in Figure 2.

A decline in foreign GDP has a negative hump-shaped impact on all the modelled trade categories, namely NODX, oil exports, services exports and re-exports. NODX, for example, are lower by 2.8% compared to the baseline scenario at the end of the first year after the shock, after which a gradual recovery towards the baseline begins. (Chart 3) The other export components fall by smaller amounts but share the same dynamic responses, except in the case of services exports, which drop immediately and sharply by 2.3%. As a result, Singapore's total exports will be curtailed by an average quantum of 1.2% over 10 quarters.

The reduction in external demand in turn depresses the final demand for the goods and services produced by the various sectors of the economy. In response, firms cut their output across the board. However, the brunt of the foreign shock is not surprisingly borne by the manufacturing and commerce sectors, in view of the heavy dependence of industrial enterprises on merchandise exports and commercial firms on both services exports and re-exports.

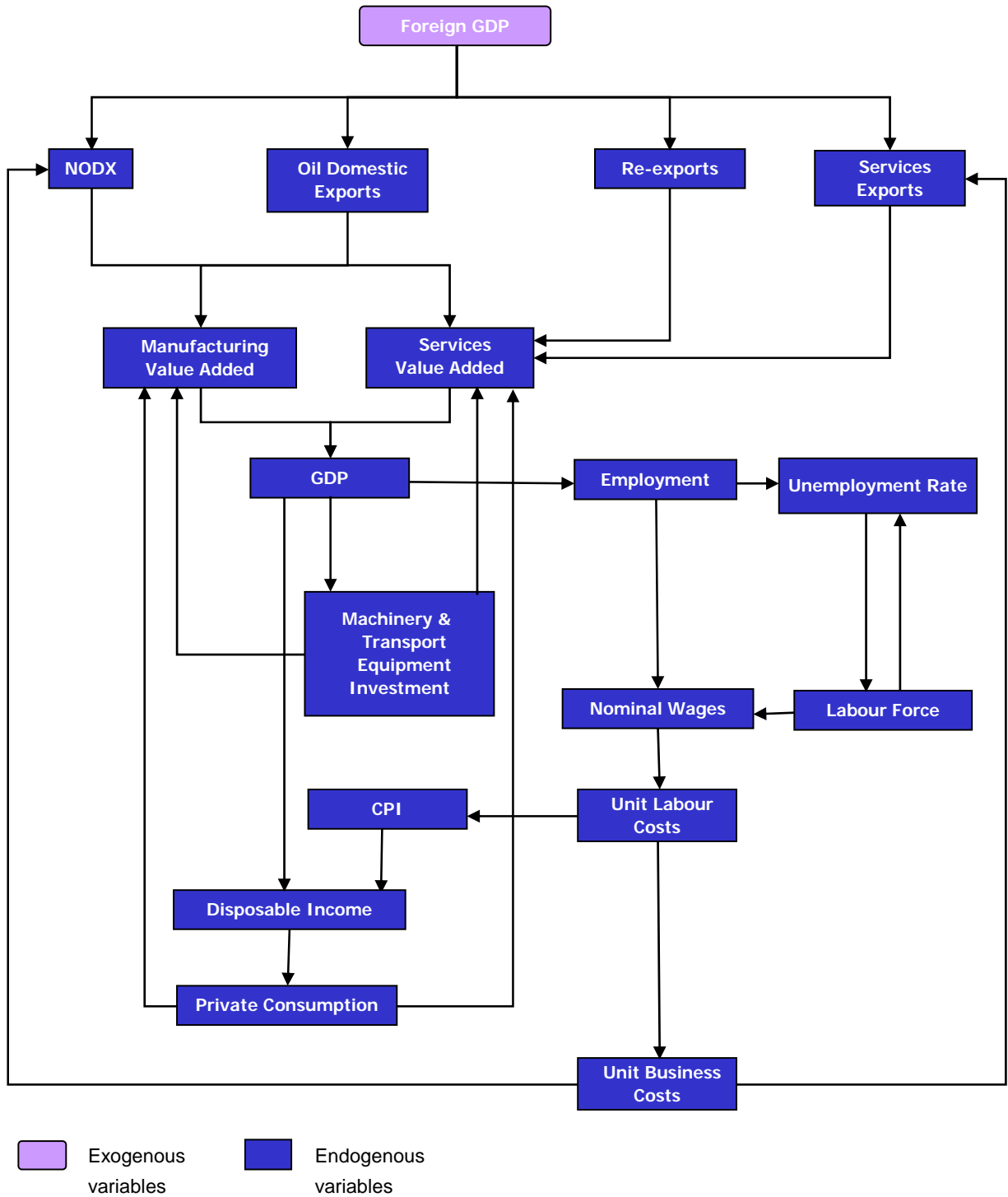
The cutbacks in sectoral production cause real GDP to spiral down after one year to 0.7% below the level that would have prevailed in the baseline scenario. Weaker income growth leads to lower private consumption expenditures and business

investment spending, with outlays on new machinery and equipment falling by 1.2%. These spillover effects on domestic demand depress aggregate and sectoral output further through multiplier effects. They also partly account for the long-drawn-out impact of the foreign income shock on real GDP that is apparent in Chart 3. From a sectoral perspective, the persistent effects can be traced to the output of the service industries, which cater to both external and domestic demand.

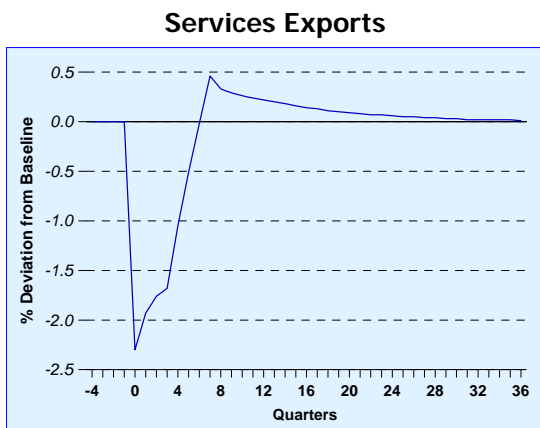
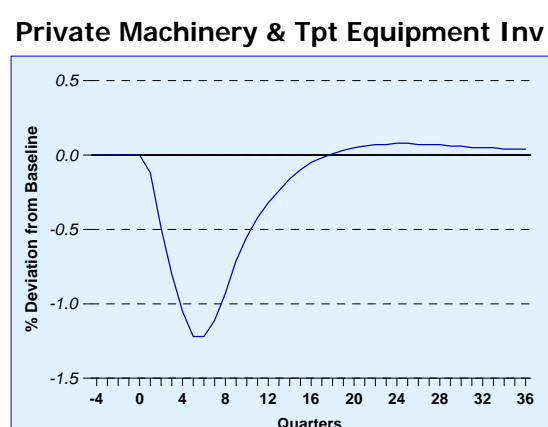
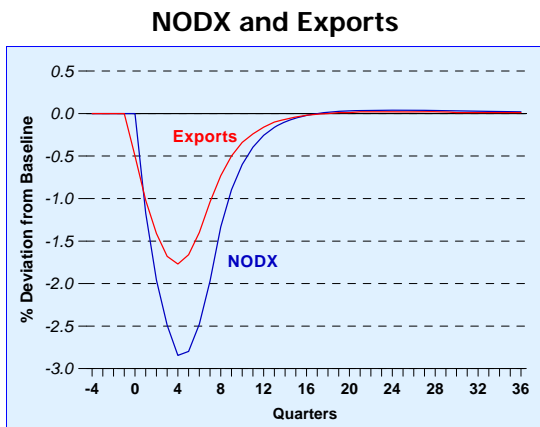
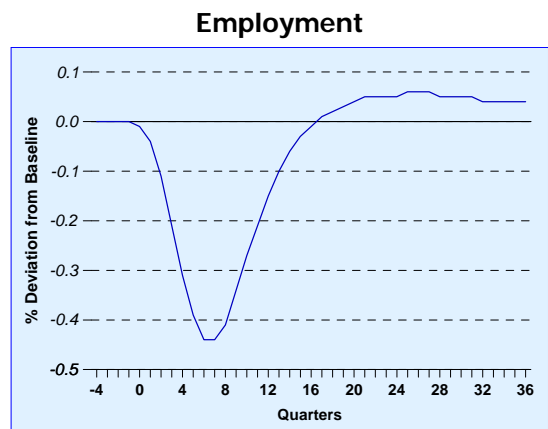
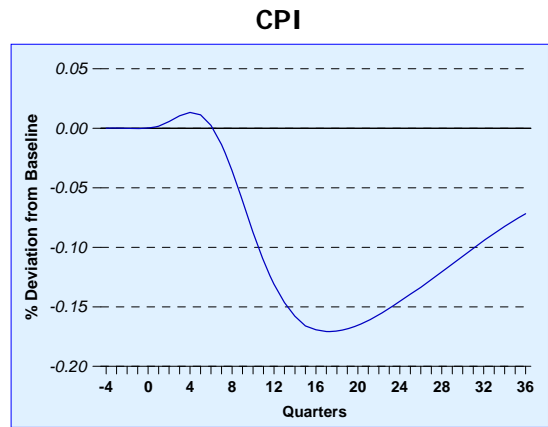
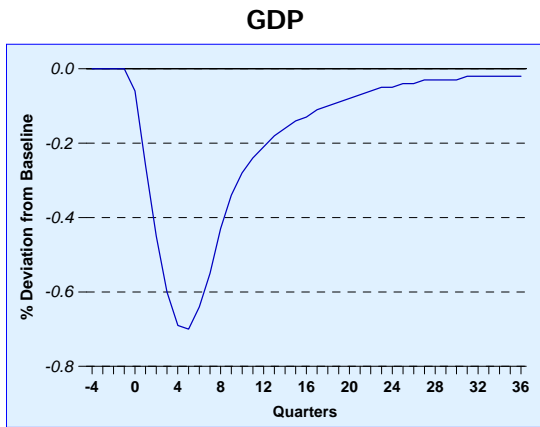
The contraction in aggregate demand has further repercussions on the labour market. After a lag of 1-2 quarters caused by adjustment frictions, employment creation slows down as firms react by reducing their demand for labour. The maximum impact of about -0.4% is felt after six quarters, although job losses persist for another two years. Reflecting this, the overall unemployment rate moves up by 0.2-0.3% point in the second year.

At the same time, a fall in nominal wages lowers economy-wide unit labour costs (ULC) and the manufacturing sector's unit business costs (UBC), with salutary effects. The decline in UBC partially restores Singapore's export competitiveness, thereby hastening the economy's recovery to its long-run baseline equilibrium. By the end of the third year, GDP would have rebounded to just 0.2% off its baseline solution as the effects of the foreign shock peter out. In comparison, a lower ULC translates eventually into a more subdued inflation rate. Compared to the baseline path, the CPI would also have been lower by 0.1-0.2% after 10 quarters as a consequence of the foreign demand shock.

**Figure 2**  
**Transmission Mechanism of a Foreign Demand Shock in the ESU01**



**Chart 3**  
**Macroeconomic Effects of a Foreign Demand Shock in the ESU01**



## Discussion

The simulations have revealed interesting similarities and differences in the responses of the MMS and the ESU01 to an external shock. These in turn are reflective of the different modelling approaches and structures reviewed in the earlier section.

The MMS places a greater emphasis on the modelling of the production side of the economy. Accordingly, a fall in demand and subsequent price changes – a direct outcome of a worsening in global economic conditions – signal to producers the need to re-adjust their profit maximising level of output. This leads to a ripple effect on other derived demand decisions, causing spillovers on the rest of the economy.

In comparison, the ESU01 stresses the linkages in the expenditure-based trade block of equations through which the negative demand shock impacts the rest of the economy. Specifically, the impact from the trade block is transmitted through to domestic demand, then to the sectoral and labour market blocks.

Notwithstanding the caveat above on the differences between the MMS and ESU01 with regard to the definition of the composite foreign GDP variable, there are many similarities between the two models in the dynamic responses of the economy to the external shock. Specifically, the hump-shaped decline and recovery exhibited by many economic variables is shared by both models. In terms of magnitudes, an inspection of Charts 2 and 3 suggests that the negative impact of the

foreign demand shock is broadly similar across the various sectors. Moreover, the delayed changes in employment, unemployment rate and the general price level in both models indicate that these are lagging indicators of economic activity.

That said, it does appear that the MMS exhibits a stronger and quicker impact on domestic real GDP compared to the ESU01 model. The more distinct hump-shaped impact profile in the latter points to a deteriorating phase in economic activity before the maximum impact point is reached. The relatively larger swings evident in the MMS dynamic transition profile are in themselves a reflection of differential adjustment speeds within sectors and markets in the model, as well as the stronger role for stock-flow adjustments emanating from the investment equation. (see discussion above) Nevertheless, it is reassuring that both models place some emphasis on the role of self-adjusting market-driven processes in steering the economy back to its pre-shock level.

Both models, therefore, chart a well-defined transmission path for the effects of an external shock in a small open economy. They illustrate vividly the reach and pervasiveness of such a shock as it permeates through the domestic economy and highlight Singapore's heavy dependence on export demand in driving domestic economic activity. The quantitative results from the MMS and the ESU01 also establish a range of plausible multiplier estimates that will be useful in the policymaking and forecasting process.<sup>8</sup>

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<sup>8</sup> In this Special Feature, the multiplier for a given endogenous variable is defined to be the percent difference between the shock and baseline levels for a given 1% change in the exogenous variable.

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## Sum-up

This Special Feature has reviewed two macroeconometric models of the Singapore economy – the MMS and ESU01.

Both models provide a well-structured representation of the entire economy while keeping track of the individual relationships and linkages among all the key variables in the economy. They thus help to provide greater clarity in macroeconomic analysis, although from different perspectives.

Comparative exercises, such as the one reported in this Special Feature, provide the opportunity to improve and fine-tune our economic models. Mishkin (2007) summarises this point rather well: "Active, and sometimes bitter, debates about which modelling approaches are the right ones are ongoing in macroeconomics, and there often is not a consensus on the best model. As a result, central banks must express some degree of humility regarding their knowledge of the structural relationships..."

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## Special Feature B

# Revisiting the US-Asia Decoupling Hypothesis

## Introduction

Near-term growth prospects for the US economy have weakened in recent months, in line with the ongoing correction in the housing market. Moreover, financial and credit conditions have tightened, potentially compounding the slowdown in the housing sector and extending it to the broader economy. Analysts now expect US GDP growth to slow from 2.9% in 2006 to a sub-trend pace of 2% this year and 2.4% next year.<sup>1</sup>

In the light of these developments, and the historical importance of the US economy to Asian growth, this Special Feature re-examines the US-Asia “decoupling” hypothesis, which postulates that Asia’s<sup>2</sup> growth cycle is now less dependent on the US. Proponents of this view argue that, compared to the 1990s, Asian economies now have more diversified export markets. They also point to more robust domestic and intra-regional growth drivers that are independent of the US and other developed economies.

This Special Feature will emphasise the important distinction between short-run and long-run influences when assessing the relevance of the decoupling hypothesis.

In particular, we find that the long-run elasticity of regional goods exports to changes in US personal consumption expenditure remains relatively high. These findings are more in line with previous studies looking at intra-regional and extra-regional trade flows which suggest that final demand in the US and other developed economies continues to have a large impact on Asian exports and overall output.

In comparison, there might be scope for *weaker synchronisation* over a shorter horizon. In the event of a soft landing in the US economy, other regions of the world may provide some short-term buffer to Asian growth, and there appears to be some scope for domestic demand in the region to shore up economic activity. Asian growth may, therefore, be supported by these factors during a contained US downturn, but the region will not be able to escape the effects of a full-blown US recession.

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<sup>1</sup> Consensus Economics, Inc., October 2007.

<sup>2</sup> Asia refers to China, Hong Kong, Korea, Taiwan, Singapore, Indonesia, Malaysia, Thailand and the Philippines.



## Decoupling in the Long Run

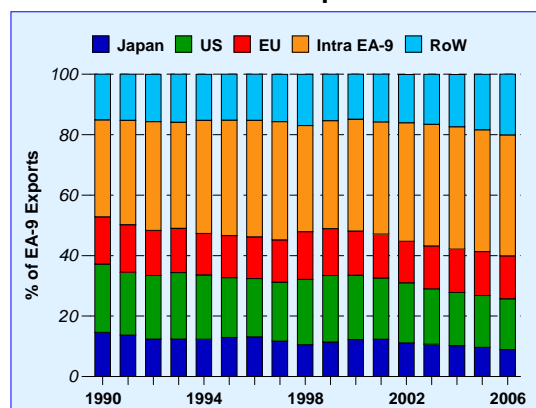
For decoupling to be true as a long-run phenomenon, Asia needs well-diversified export markets, specifically markets that are clearly distinct from the US. While the share of Asia's exports to developed economies (the G3) has indeed been on the decline in recent years, the US remains one of the largest export markets for most of the Asian economies. (Chart 1) *A priori*, this may lead one to conclude that Asia is diversifying away from the US and the G3.

### Final Demand for Asian Exports

To examine this issue more carefully, it is useful to disaggregate Asian exports into three major components: final goods that are directly consumed within the region; intermediate goods that are processed within the region for export either within or outside Asia; and final goods that are directly exported out of the region. This is necessary because Asian economies are increasingly specialising in the intermediate stages of the production chain, with the final assembly into final goods done in China. These final goods are then shipped to their destination markets within and outside the region, including to the G3. With China as the end node, most Asian economies now ship less goods to the US directly, although intra-regional shipments of intermediate goods continue to rise.

By examining within-country production structures and bilateral trade patterns between the region and its final markets, the Asian Development Bank (2007) found that while the G3 accounted for less than half of Asia's total exports, 61.3% of regional exports were still ultimately consumed in developed economies (Figure 1).<sup>3</sup> The declining share of US-bound exports can thus be partly explained by changes in Asian production structures, and is not sufficiently indicative of more diversified final export markets *per se*.

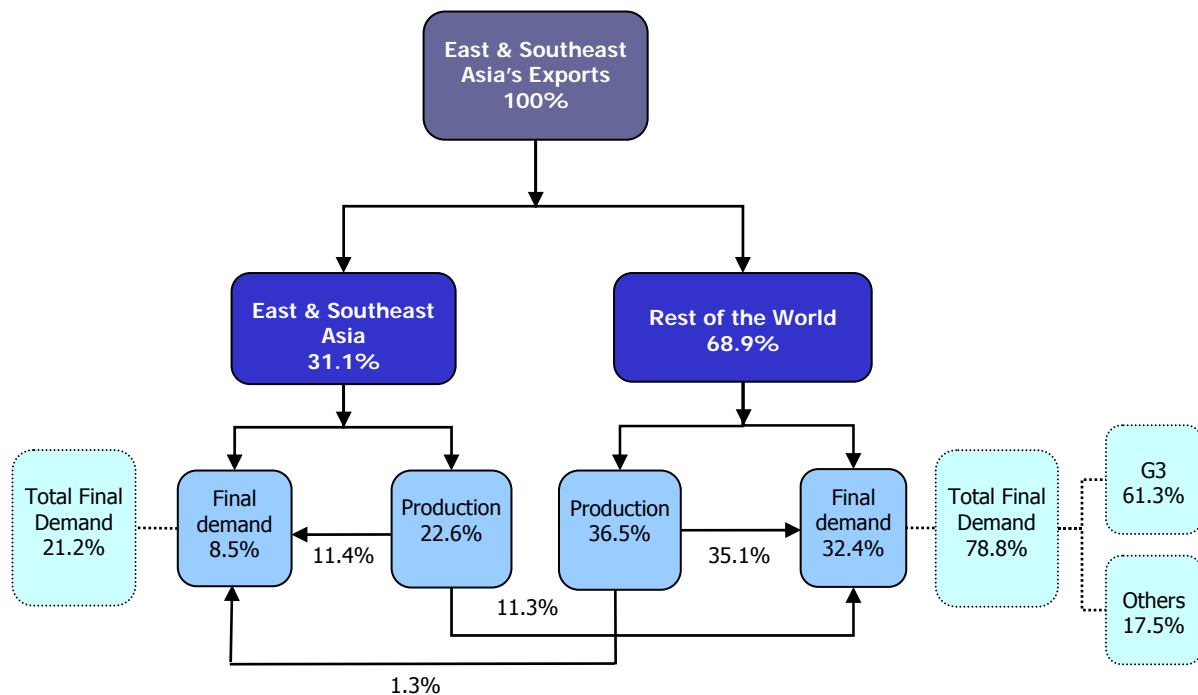
**Chart 1**  
Shares of Asia's Export Markets



Source: IMF, Direction of Trade Statistics; CEIC

<sup>3</sup> The ADB methodology is similar to an earlier estimation framework used by EPD, MAS. (Please refer to the January 2003 issue of the *Review*).

**Figure 1**  
**Asia's Export Destinations**



Source: ADB (2007). Data calculated from Global Trade Analysis Project v6.2, which corresponds to the state of the economies as at 2001.

### Asia's Capacity to Absorb Regional Exports

A closely related issue concerns whether demand from within Asia itself can substitute for weaker export demand from the US. Figure 1 demonstrates that Asia's absorption capacity remains weak, at slightly over a fifth of its exports. This issue was examined more closely by Meng *et al.* (2006), who compared the 1995 and 2000 data from the *Asian International Input-Output Tables*. Indonesia aside, they found that final demand from the US is still more important to each Asian country's total output than demand from other ex-Japan Asian economies combined. (Table 1, columns 4 and 1)

With few exceptions, countries within the region have generally become more important to each other, with China's final demand for regional output rising over the period for all Asian countries. (Table 1, columns 1 and 2) At the same time, however, US final demand has remained as important or become more so for several economies. Indeed, the US contribution remains large in Malaysia, Singapore, and Taiwan, although it has declined as compared to 1995. Demand in Asia thus appears insufficient to take up the slack from weaker final demand in the US.

**Table 1**  
**Contribution Rate of Final Demand in X to Output in Y (% of Total Output in Y)**

Y \ X		1	2	3	4	5	6
		Asia ex-Japan <sup>^</sup>	of which China	Japan	USA	Rest of the World*	Total External Final Demand
Indonesia	1995	3.0	0.6	4.2	2.9	9.3	19.4
	2000	6.1	1.7	7.3	5.4	15.8	34.6
Malaysia	1995	9.4	1.6	6.8	13.7	29.8	59.7
	2000	10.9	2.6	8.4	13.0	28.9	61.2
Philippines	1995	2.4	0.3	3.2	8.1	13.8	27.5
	2000	3.9	1.1	4.5	10.6	18.0	37.0
Singapore	1995	10.9	1.6	4.5	12.2	37.9	65.5
	2000	7.8	1.9	2.7	8.0	42.8	61.3
Thailand	1995	3.6	0.7	4.1	5.3	19.0	32.0
	2000	4.7	1.4	4.6	7.2	22.8	39.3
China	1995	1.6	79.2	3.7	3.2	12.3	20.8
	2000	1.4	78.6	3.1	5.2	11.7	21.4
Taiwan	1995	5.0	1.5	3.8	7.5	22.4	38.7
	2000	5.6	3.6	3.1	7.2	19.5	35.4
Korea	1995	3.6	1.4	2.8	4.3	14.6	25.3
	2000	3.7	2.1	2.3	4.7	15.3	26.0

Adapted from Meng *et al.* (2006)

<sup>^</sup> excludes the originator economy on the leftmost column

\* excludes the economies listed on the leftmost column

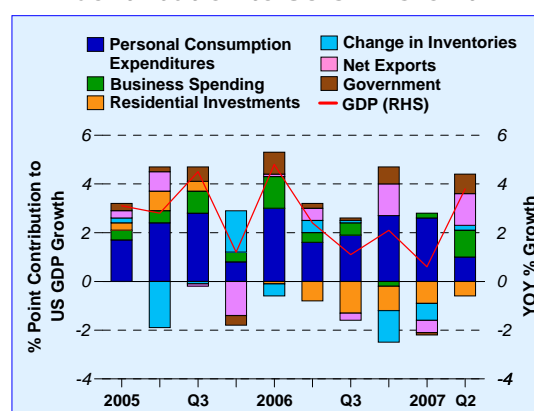
## Weaker Synchronisation in the Short Run

In the short term however, the impact of a US slowdown on Asia might be less severe, and dependant on three factors: the contained nature and extent of the current US slowdown; Europe's and Japan's ability to provide temporary offsetting demand for Asian exports; and relatively stronger domestic demand in the region.

### Nature and Extent of Current US Slowdown

In this current cycle, US economic activity has slowed owing, in part, to a substantial correction in the housing market. (Chart 2) Looking at five-year rolling correlations, we find that the relationship between Asian exports and overall US activity (as proxied by the US coincident indicator) has fallen sharply since the beginning of the year. This is consistent with the observation that Asian exports generally do not feed into the US homebuilding process, and are thus unlikely to be hit by a housing-led US slowdown. In contrast, the mild US recession in 2001 resulted in a protracted period

**Chart 2**  
**Contribution to US GDP Growth**

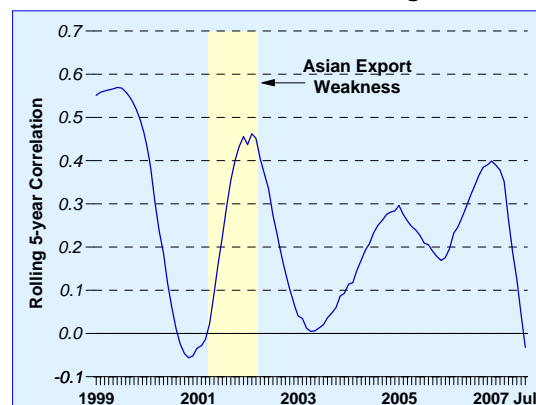


Source: US Bureau of Economic Analysis

of negative export growth for Asia<sup>4</sup>, and correlations with correlations with US economic activity rose sharply over the period. (Chart 3)

This shows that the dynamics between US growth and Asian exports are quite different during a US recession as compared to a mild slowdown. Table 2 highlights the largest percentage point deviations of US GDP growth from the business cycle peak during periods of recessions.<sup>5</sup> On average, US GDP growth drops by 3.4% points from its peak over the course of all recessions since 1965. The maximum deviations in Asian export growth rates are also tabulated. Although the effects of improved supply management and leaner inventories may have dampened the business cycle and reduced the length of recessions in recent years, regional exports are still likely to slow significantly in the event of a severe US recession. Notably, short recessions are not necessarily less painful for Asia than long-drawn-out ones. The record since 1965 shows that while the shortest three recessions lasted an average of seven months each, Asian export growth rates fell by 35% points from the business cycle peak.

**Chart 3**  
Rolling 5-year Correlation between Asian Exports and US Coincident Indicator (3-month lag)



Source: CEIC; MSD, MAS estimates

**Table 2**  
Deviations in US GDP Growth and Asian Export Growth  
During US Recessions since 1965

	% Point Deviation from Growth Recorded at US Business Cycle Peak	
	GDP	Asian Exports
Average of all recessions since 1965	-3.4	-24.2
Average of all recessions excluding 2001	-3.7	-30.6
Average of past 2 recessions (1990 & 2001)	-1.4	-3.8
Largest single deviation within the 3 longest recessions (lasting an average of 14 months each)	-5.1	-39.4
Largest single deviation within the 3 shortest recessions (lasting an average of 7 months each)	-7.2	-35.7

Source: NBER; CEIC; MSD, MAS estimates

<sup>4</sup> Export data is taken from seven Asian countries, namely Hong Kong, Korea, Singapore, Indonesia, Malaysia, Thailand and the Philippines. Data from China prior to 1981 and Taiwan prior to 1987 are not available.

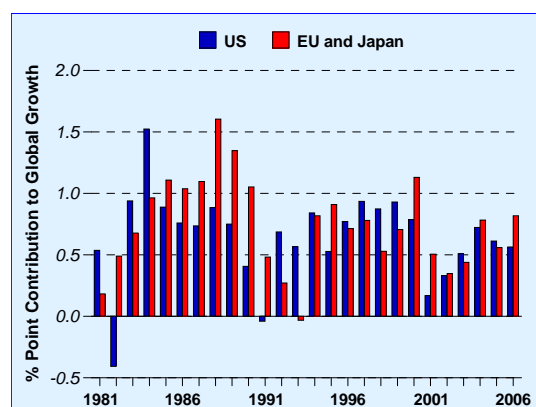
<sup>5</sup> The NBER defines a recession as a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production and wholesale-retail sales.

### Offsetting Support from the EU and Japan

In the current cycle, the EU and Japan have contributed an equivalent, or larger share of global growth than the US. (Chart 4) It follows that, in the short run, Asia's exports to the EU or Japan should hold up during a US slowdown if GDP growth between the US and the EU and Japan is now more weakly correlated.

We examine this issue by extracting the cyclical components of European and Japanese growth using the Hodrick-Prescott (HP) filter. Pairwise correlations show that the EU would be a poor substitute for the US, since the cyclical fluctuations in its GDP are significantly correlated with the US. (Table 3) This result is strengthened by Granger causality tests which show that the null hypotheses that the US and the EU do not Granger-cause one another cannot be rejected at the 5% probability level. (Table 4) Growth in the EU could either slow with weaker US growth, or itself be the cause of slower economic activity in the US. Japan, in comparison, appears to be a stronger candidate as a substitute market for Asian exports.

Chart 4  
Contribution to Global Growth



Source: IMF WEO

Table 3  
Correlation in Cyclical Components of GDP

	Correlation	Student's t-stat
US-JP	0.03	0.244
US-EU	0.41	3.125

Source: CEIC; MSD, MAS estimates

Table 4  
Granger Causality Tests

Lags	Null Hypothesis F-Stats			
	US does not Granger cause EU	EU does not Granger cause US	US does not Granger cause JP	JP does not Granger cause US
1	22.29*	11.04*	0.35	0.26
2	4.68*	9.76*	0.92	1.20
3	2.26	3.84*	0.99	0.59
4	1.24	2.97*	0.69	1.43

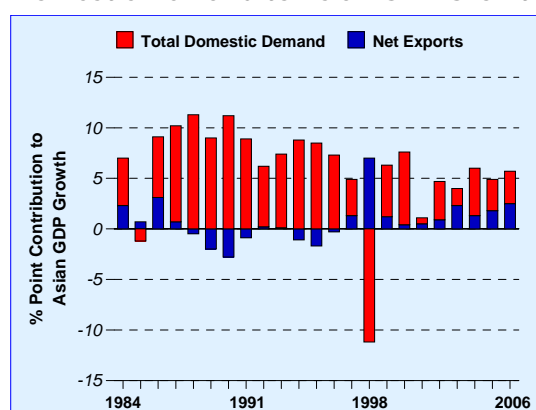
\* Statistically significant at 5% level

Source: MSD, MAS estimates

### Temporary Offsetting Support from Asian Demand

After declining sharply during the Asian Financial Crisis, domestic demand in the region now accounts for a larger share of GDP growth than net exports. (Chart 5a) While the recovery in domestic demand is in place, it has occurred at a diminished pace relative to its historical record. (Chart 5b) The contribution of private consumption to GDP growth has stabilised at lower levels than previously, while the investment recovery is still in its early stages. As a share of GDP, both components of domestic demand are still below their 1996 levels, with fixed investments still nearly 10% points lower. (Chart 6)

Chart 5a  
Contribution of Net Exports and Domestic Demand to Asian GDP Growth



Source: CEIC

Note: Excludes China, which only provides expenditure-side breakdown on a nominal basis

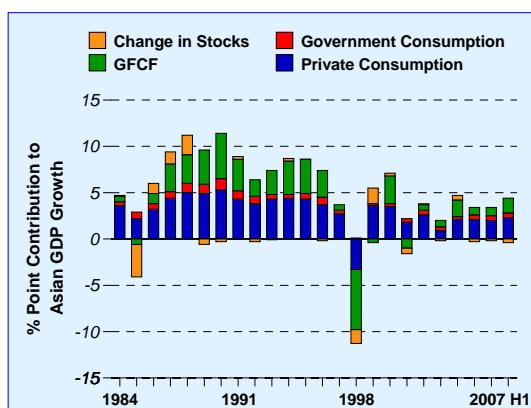
Yet, the outlook for Asian domestic demand appears fairly bright. The excess capacity that came about with over-investment in the pre-Crisis years and in 2001 has largely been worked off, or has become obsolete, necessitating new investment. Activity in regional property markets has also increased, and home and office construction has picked up in line with improved consumer and business confidence.

Should domestic demand recover more quickly, there could be important cyclical buffers for regional growth in the event of a temporary US slowdown.

### Closer Financial "Coupling"

At this point, however, it is worthwhile noting that nearly all the region's financial markets have become increasingly correlated with those in the US. (Table 5) This could be the result of financial globalisation, and it provides another channel through which shocks in the US could be transmitted to the Asian economies in the short term. Funke (2002) examines the hypothesis that stock market developments impact private consumption in 16 emerging economies (including eight in Asia). Stock market changes are found to have a small but statistically significant impact on household spending, and the sensitivity of the latter to the former appears to have increased in the post-Asian Financial Crisis period. Asian stock markets and consumption thus remain "coupled" to US financial markets.

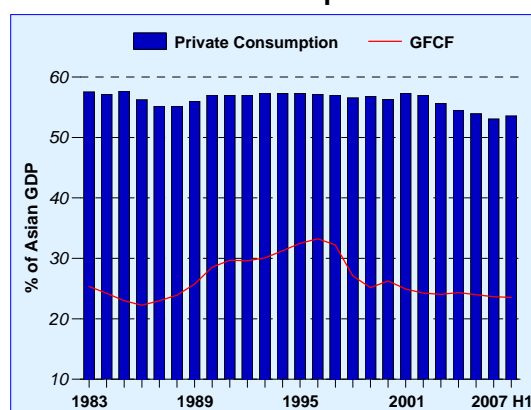
**Chart 5b**  
**Contribution of Components of Domestic Demand to Asian GDP Growth**



Source: CEIC

Note: Excludes China, which only provides expenditure-side breakdown on a nominal basis

**Chart 6**  
**Asian Private Consumption and GFCF**



Source: CEIC

**Table 5**  
**Pairwise Correlation of Asian Stock Market Indices with the US Dow Jones Industrial Index**

	Pre-Crisis (1990-1996)	Post-Crisis (1999-2007)
China	0.42	0.64
Hong Kong	0.90	0.92
Korea	0.46	0.78
Taiwan	-0.11	0.72
Singapore	0.81	0.92
Indonesia	0.52	0.79
Malaysia	0.84	0.80
Philippines	0.48	0.87
Thailand	0.56	0.54

Source: CEIC; MSD, MAS estimates

Note: US DJIA returns are lagged by one day

## Econometric Evidence

As a final overall test of the structural decoupling hypothesis, we estimate the long-run response (elasticity) of Asia's goods exports (*exports*) in response to a change in US personal consumption expenditures on goods (*uspce*) using monthly data from 1994 to 2007. The equation is specified in (1) below, and controls for exchange rates (*exchange*) and lagged values of Asian *exports* and *uspce*.<sup>6</sup>

$$\log(exports)_t = a_0 + a_1 \log(exports)_{t-1} + a_2 \log(uspce)_t + a_3 \log(uspce)_{t-1} + a_4 \log(exchange)_{j,t} + \xi_t \quad (1)$$

The equation is run over a five-year rolling window, and the coefficient estimates at the end period in each window were extracted. (Chart 7) The results of the full-sample OLS estimation are summarised in Table 6.

The long-run elasticity (LRE) for each window is calculated as per equation (2):

$$\text{LRE} = (a_2 + a_3)/(1 - a_1) \quad (2)$$

From our estimates, every 1% change in US PCE results in a 2.2% change in Asian exports. This does not suggest that Asia has structurally decoupled or de-linked from the US.

## Sum-up

This Special Feature has looked again at the Asian decoupling hypothesis. We find little evidence of structural decoupling so far, and a better description of the current economic environment is that the US and Asia remain firmly coupled in the long run, but are experiencing weaker synchronisation in the short run owing to a number of moderating factors. These include the modest nature of the slowdown in the US economy thus far, which has been largely confined to housing-related sectors, and the fact that Asia's short-term growth trajectory has been buffered by a recovery in domestic demand. In the event of a severe recession in the US, however, it is unlikely that Asian exports and growth will be unaffected.

**Chart 7**  
Long-run Elasticity of Asian Exports with Respect to US Personal Consumption Expenditures



Source: MSD, MAS estimates

**Table 6**  
Coefficient Estimates

Dependent Variable	Coefficient	t-stat
EXPORTS(-1)***	0.732	16.85
USPCE	0.023	0.10
USPCE(-1)**	0.565	2.21
SGPDOLLAR***	-0.453	-5.99
CHNRMB***	-0.080	-4.04
Adjusted R-squared	0.996	
Std Error	0.030	
Durbin Watson	2.510	

\*\*\* and \*\* represent significance at the 1% and 5% levels respectively.

<sup>6</sup> We originally included a number of other Asian currencies but found them to be statistically insignificant.

Indeed, as Asian financial markets appear to be even more closely correlated with those in the US than before, any further fallout from the ongoing financial and credit market turmoil could be transmitted rapidly to the region.

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# Statistical Appendix

**Table 1:** Real GDP Growth by Sector

**Table 2:** Real GDP Growth by Expenditure

**Table 3:** Consumer Price Index

**Table 4:** Labour Market (I)

**Table 5:** Labour Market (II)

**Table 6:** External Trade

**Table 7:** Non-oil Domestic Exports by Selected Countries

**Table 8:** Electronics Leading Index

**Table 9:** Balance of Payments – Current Account

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**Table 11:** Exchange Rates

**Table 12:** Singapore Dollar Nominal Effective Exchange Rate Index

**Table 13:** Domestic Liquidity Indicator

**Table 14:** Monetary

**Table 15:** Fiscal

**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	
2007 Q1	6.4	4.4	13.8	6.8	12.0	7.5	4.8	4.3	6.4	8.8	-6.2	24.7	5.7	32.8	26.0	2.3	5.2	1.0	
Q2	8.6	8.3	17.0	6.9	17.6	8.2	5.2	5.5	7.5	14.4	17.2	39.7	10.2	15.0	5.0	7.3	7.7	10.7	

Source: Singapore Department of Statistics

**TABLE 2: REAL GDP GROWTH by expenditure**

Period	Total Demand	Domestic Demand								Exports of Goods & Services		Imports of Goods & Services	
		Total	Consumption			Gross Fixed Capital Formation			Exports of Goods & Services	Imports of Goods & Services			
			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			
2007 Q1	7.7	9.5	1.9	2.5	0.2	17.5	22.3	-3.1	7.1	8.2			
Q2	6.8	11.6	4.7	5.8	-0.4	26.0	30.4	-6.3	5.4	6.0			

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
2007 Q1	101.6	104.4	102.3	100.9	95.0	104.9	102.4	103.9	0.5	2.0	-0.3	0.2	-1.3	1.1	1.4	1.2
Q2	102.2	104.1	101.7	100.3	97.5	103.9	104.3	104.9	1.0	1.4	-1.4	0.2	1.1	0.2	3.0	3.1

Source: Singapore Department of Statistics

**TABLE 4: LABOUR MARKET (I)**

Period	Average Monthly Earnings	Labour Productivity									Year-on-Year % Change 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	-0.8	-3.3	1.7	-2.5	0.4	-3.2	1.5	-5.1	0.1	0.1
2007 Q1	5.5	-1.3	-4.0	2.8	1.4	-4.7	1.4	-3.1	2.0	-5.6	5.9	7.1
Q2	8.5	0.4	-1.0	6.4	2.4	-5.4	2.5	-2.1	4.1	-5.2	5.7	3.1

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	1.1
2005 Q1	17.8	5.5	1.5	2.2	-1.2	1.4	0.0	2.1	1.3	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
2007 Q1	49.4	10.1	5.4	4.9	1.8	-0.3	1.2	5.1	10.1	10.9	0.3
Q2	64.4	15.9	10.9	3.9	4.6	3.0	2.1	4.4	11.8	7.2	0.7

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 2006 Prices					
2005	13.8	14.0	15.1	41.5	8.2	3.9	12.7	12.7	13.6	10.7	9.0	5.1	10.7	12.8	8.2
2006	13.2	12.8	9.6	12.9	8.5	4.3	12.4	16.6	13.7	11.4	6.4	-2.8	10.1	17.4	11.0
2005 Q1	11.7	11.5	12.6	33.2	7.8	2.8	12.7	10.2	11.9	9.9	9.0	4.9	10.7	11.2	9.8
Q2	10.5	10.8	11.6	47.9	2.1	-0.1	4.3	9.9	10.2	7.8	5.8	8.2	4.7	10.4	5.6
Q3	12.3	12.4	13.8	51.8	3.9	0.5	7.6	10.7	12.1	9.0	7.3	8.0	7.0	11.0	5.9
Q4	20.2	20.7	21.8	32.8	18.6	11.6	26.5	19.4	19.7	15.7	13.8	-0.5	19.8	18.2	11.7
2006 Q1	20.9	22.4	22.5	42.0	16.8	18.1	15.7	22.3	19.1	16.3	12.7	7.5	14.8	20.8	10.6
Q2	17.8	17.3	18.0	26.2	14.9	11.1	18.5	16.4	18.4	13.3	11.0	-1.1	16.6	16.2	13.3
Q3	13.4	12.2	6.9	8.5	6.3	3.0	9.6	18.5	14.8	11.6	5.2	-3.3	8.6	19.2	13.1
Q4	3.0	2.0	-4.9	-15.7	-1.4	-10.2	7.2	10.5	4.2	5.4	-1.6	-13.5	2.6	14.0	7.3
2007 Q1	2.9	3.4	-1.4	-11.6	2.1	-11.2	14.2	9.1	2.3	8.7	4.0	-7.8	8.4	14.3	7.3
Q2	2.6	2.9	0.0	-3.7	1.5	-13.6	14.7	6.2	2.4	7.0	3.7	-2.0	6.0	10.7	6.1

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	7.6	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	30.2	-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	-11.9
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	24.5	18.7	20.4	14.2	4.0
Q2	14.9	7.9	-5.1	16.5	22.0	22.3	31.6	8.3	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
2007 Q1	2.1	3.7	-5.6	10.1	-2.6	-11.5	-12.4	-0.4	-17.6	1.8	-0.6	-7.5	14.3
Q2	1.5	5.6	0.8	6.3	-1.1	-9.5	-10.9	11.6	-20.6	-3.6	4.3	7.4	1.0
% 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	79.5	0.5		79.4	0.3	
2006	78.1	-1.7		78.3	-1.4	
2005 Q1	78.6	-1.5	-0.7	78.7	-1.3	-0.3
Q2	79.1	0.0	0.7	78.8	-0.5	0.1
Q3	81.4	3.7	2.9	80.5	2.4	2.2
Q4	78.8	-0.3	-3.1	79.6	0.8	-1.1
2006 Q1	79.0	0.5	0.2	78.8	0.1	-1.0
Q2	79.4	0.4	0.6	79.4	0.8	0.7
Q3	77.9	-4.2	-1.9	78.6	-2.4	-1.0
Q4	76.1	-3.5	-2.4	76.5	-3.9	-2.6
2007 Q1	72.1	-8.7	-5.3	73.6	-6.6	-3.7
Q2	70.1	-11.8	-2.8	70.6	-11.0	-4.1

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		
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
2007 Q1	16,646	n.a.	107,465	87,718	19,748	-2,990	-1,739	-1,006	-588	-58	401	574	-685
Q2	18,152	n.a.	111,565	93,231	18,334	-1,309	-1,264	-1,360	-649	-29	1,993	1,824	-697

Source: Singapore Department of Statistics

**TABLE 10: BALANCE OF PAYMENTS – Capital & Financial Accounts**

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	2,597	26,996	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	2,688	9,487	208,992
2007 Q1	-14,091	-93	-13,999	9,893	1,028	-24,919	-14,392	-10,527	-1,039	1,515	208,876
Q2	-8,116	-97	-8,019	2,836	-1,762	-9,094	13,514	-22,608	-900	9,136	220,504

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
Q2	1.5326	3.0684	2.0595	124.32	1.2421	0.4437	0.1961	4.6654	0.1656	1.2998
Q3	1.4909	3.0180	2.1123	127.34	1.2936	0.4363	0.1921	4.5538	0.1625	1.3157

Source: Monetary Authority of Singapore

**TABLE 12: SINGAPORE DOLLAR NOMINAL EFFECTIVE EXCHANGE RATE INDEX**

Index (7 Apr 2006=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
2006 Apr 7	100.00	2006 Jul 7	100.83	2006 Oct 6	100.89	2007 Jan 5	101.99	2007 Apr 5	102.51	2007 Jul 6	101.42
13	100.08	14	100.77	13	101.09	12	101.88	13	102.07	13	101.36
21	100.19	21	101.01	20	101.61	19	102.20	20	102.22	20	101.42
28	100.18	28	100.76	27	101.63	26	102.21	27	101.85	27	101.62
May 5	100.30	Aug 4	101.07	Nov 3	101.52	Feb 2	102.16	May 4	101.81	Aug 3	101.37
11	100.41	11	101.04	10	101.60	9	102.35	11	101.57	10	101.38
19	100.00	18	101.17	17	101.77	16	101.96	18	101.20	17	101.12
26	100.50	25	101.16	24	101.55	23	102.17	25	100.93	24	101.50
Jun 2	100.67	Sep 1	101.33	Dec 1	101.36	Mar 2	102.42	Jun 1	100.85	31	101.53
9	100.39	8	101.35	8	101.30	9	102.53	8	100.72	Sep 7	101.23
16	100.55	15	100.92	15	101.59	16	102.14	15	100.69	14	101.73
23	100.64	22	100.51	22	101.75	23	102.46	22	100.68	21	101.48
30	100.59	29	100.77	29	102.13	30	102.53	29	101.00	28	102.27
										Oct 5	103.06

Source: Monetary Authority of Singapore

**TABLE 13: DOMESTIC LIQUIDITY INDICATOR**

Period	Change from 3 Months Ago											
	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	0.927	0.753	0.499	0.210	0.288	0.302	0.267	0.193	0.057	0.064	0.166	0.171
2007	0.172	0.038	0.048	-0.162	-0.511	-0.629	-0.288	0.180	0.369			

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	268.7	25.8	13.4	19.4	19.1	10.1	5.33	3.44	5.36	0.25	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	0.26	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	0.26	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	0.25	0.89
Q4	52.2	262.4	268.7	25.8	13.4	19.4	19.1	10.1	5.33	3.44	5.36	0.25	0.88
2007 Q1	55.4	279.8	286.8	25.5	14.8	23.0	22.8	9.7	5.33	2.94	5.35	0.25	0.87
Q2	59.8	293.6	301.3	26.6	22.5	23.6	23.6	10.7	5.33	2.50	5.36	0.25	0.83

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	31,289	28,827	14,135	2,112	2,015	3,978	2,462	29,905	23,925	5,980	1,384	3,570	2,131	-55	
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	14.6	13.4	6.6	1.0	0.9	1.9	1.1	13.9	11.1	2.8	0.6	1.7	1.0	0.0	
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
<b>Inflation Monthly</b>	Monthly	<a href="http://www.mas.gov.sg/eco_research/eco_dev_ana/Inflation_Monthly.html">http://www.mas.gov.sg/eco_research/eco_dev_ana/Inflation_Monthly.html</a>
<b>Monthly Statistical Bulletin</b>	Monthly	<a href="http://www.mas.gov.sg/data_room/msb/Monthly_Statistical_Bulletin.html">http://www.mas.gov.sg/data_room/msb/Monthly_Statistical_Bulletin.html</a>
<b>Recent Economic Developments</b>	Quarterly	<a href="http://www.mas.gov.sg/eco_research/eco_dev_ana/Recent_Economic_Developments.html">http://www.mas.gov.sg/eco_research/eco_dev_ana/Recent_Economic_Developments.html</a>
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<b>Monetary Policy Operations in Singapore</b>	Apr 2007	<a href="http://www.mas.gov.sg/publications/monographs/Monetary_Policy_Operations_in_Singapore.html">http://www.mas.gov.sg/publications/monographs/Monetary_Policy_Operations_in_Singapore.html</a>

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