



Monetary Authority of Singapore

financial stability

review

The word 'review' is written in a large, white, serif font. The letters are semi-transparent, allowing a background image of a city skyline with various skyscrapers to be visible through them.

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PREFACE

The Monetary Authority of Singapore (MAS) conducts a regular assessment of Singapore's financial system. Potential risks and vulnerabilities are identified, and the ability of the financial system to withstand potential shocks is reviewed. The analysis and results are contained in the Financial Stability Review (FSR), which is published twice a year. The FSR aims to contribute to a better understanding among market participants, analysts and the public on issues affecting Singapore's financial system.

Section 1 of the FSR provides a discussion of the macroeconomic environment and financial markets both globally and in East Asia. This is followed by an overview of the Singapore economy. Against this backdrop, Section 2 analyses the non-financial sector. This includes both the corporate sector and household sector. Section 3 focuses on the banking sector, given its dominant role in Singapore's financial landscape. A review of the insurance sector is also provided. Section 4 highlights the major developments in the financial infrastructure. Finally, Section 5 contains a special feature on the assessment of default risks for the corporate sector using the Merton-KMV Model.

The production of the Review is coordinated by the Macroeconomic Surveillance Department (MSD). It incorporates contributions from the following departments: Banking Supervision Department, Complex Institutions Supervision Department, Economic Policy Department, Insurance Supervision Department, Prudential Policy Department, Reserve and Monetary Management Department, Risk and Technology Office, Securities and Futures Supervision Department and Specialist Risk Supervision Department. The FSR reflects the views of the staff of the Macroeconomic Surveillance Department and the contributing departments.

The FSR may be accessed in PDF format on the MAS website:
http://www.mas.gov.sg/masmcm/bin/pt1MAS_FSR.htm

HIGHLIGHTS

After four years of robust and uninterrupted growth, the world economy is transiting to a slower pace of expansion. Global GDP growth is expected to ease to around 4.9% in 2007 from just above 5% this year. In the financial markets, equities have rebounded since the mid-year sell-offs and continue to post healthy returns in an environment of sustained low volatility.

The baseline scenario in this FSR is that the global slowdown will be a smooth adjustment process supported by the strong buffers being built up by financial institutions, corporates and households.

However, the nature of the US-led slowdown, arising from adjustments in the housing sector, carries with it the possibility of a more severe correction. With equity markets possibly not having fully priced in the transition and credit spreads remaining narrow, a sharper-than-expected slowdown could lead to overshooting of asset prices and greater volatility in global financial markets. Furthermore, while inflationary pressures in the G3 economies have eased since July, they have not completely receded and major central banks have yet to adopt a rate-cutting bias.

Against this backdrop, the FSR assesses financial stability conditions across East Asia and in Singapore. East Asian economies slowed in the period under review due to slower exports, tightening liquidity conditions and higher oil prices. They are also likely to be weighed down by the US slowdown going forward. However, the impact should be cushioned by further expansion in China and India, easier domestic monetary policy and infrastructure spending.

Moreover, these economies are in a strong position to withstand the slowdown, as they have taken advantage of buoyant growth in the past few years to build up buffers and strengthen balance sheets.

The health of Singapore's financial system has remained sound, supported by the improving financial position of banks, corporates and households. The profits of firms across a broad range of industries have increased, while their debt-servicing capacity and liquidity positions remain sound. Indeed, available data for the Small and Medium-Sized Enterprise (SME) sector confirm that corporates' financial positions have strengthened along with the local economy, now into its twelfth quarter of virtually uninterrupted expansion. Household debt accumulation is flat while wage income and wealth have risen. Scenario analysis suggests that the mortgage servicing ratio should see only a modest increase in 2007 for all income groups.

Demand for credit from commercial banks has been strong throughout the year. Domestic Banking Unit (DBU) loan demand expanded significantly. In particular, demand for credit by non-bank financial institutions, building and construction firms, and firms within the transport, storage and communication (TSC) sector and business services recovered sharply. Asian Currency Unit (ACU) loan activity was also robust despite some moderation in growth in recent months, and continues to be driven by exposures to the G3 countries. Local banks' operating performance also looks strong. Looking ahead, while the operating environment may become more challenging as GDP growth slows, the financial sector is well positioned to withstand some expected moderation in domestic economic activity.

Macroeconomic Surveillance Department
Monetary Authority of Singapore
30 November 2006

1 MACRO ENVIRONMENT

1.1 Global Financial Markets

After experiencing four years of robust uninterrupted growth, the world economy is transiting to a slower pace of expansion, led by the US. The most likely scenario is one where this adjustment takes place smoothly. In general, financial institutions, corporates and households have built up strong buffers, enabling them to cope with the slowdown.

However, as in any turning point, there are risks, particularly given the possibility of weaker-than-expected growth. This contrasts with the earlier part of this year when inflation risk was uppermost. This FSR, while adopting a baseline scenario of orderly transition to a more sustainable growth path, will highlight some of the risks associated with the alternative scenario of a sharper-than-expected slowdown in the global economy. Indeed, the US-led slowdown, arising from adjustments in the housing sector, carries with it the risk of a sharper correction. Such a correction could result in a broad-based adjustment in asset prices leading to stress in global financial markets. Meanwhile, inflation risks, though not entirely absent, have receded.

Global economy is slowing to a more sustainable pace

Since the last FSR, global growth has slowed, led by an easing of US economic activity. An exceptionally strong expansion of the US economy in Q1 2006 was followed by deceleration in Q2 and Q3. (Table 1.1) Growth in the third quarter moderated to 2.2% q-o-q SAAR, as residential investments contracted 18% in line with the ongoing correction in the housing market. While growth eased in the US, it gathered pace in the euro zone in Q2 2006, to reach a six-year high of 3.8% q-o-q SAAR before moderating in Q3 2006 to 2.1% q-o-q SAAR. Improved corporate profitability and business confidence underpinned a strong pickup in corporate investment, which provided the main support for growth.

Table 1.1
Real GDP Growth of G3 Economies
(q-o-q SAAR % Change)

	2005	2006f	Q3 2005	Q4 2005	Q1 2006	Q2 2006	Q3 2006
US	3.2	3.3	4.2	1.8	5.6	2.6	2.2
Japan	2.7	2.7	2.0	4.1	3.2	1.5	2.0
Euro zone	1.5	2.6	2.5	1.5	3.1	3.8	2.1

Source: Datastream and Consensus Forecast

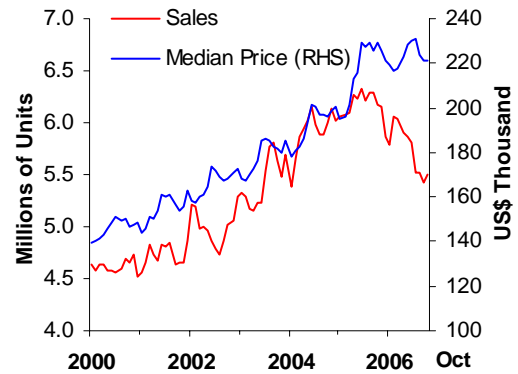
In Japan, following robust performance in Q4 2005 and Q1 2006, growth slowed to 1.5% q-o-q SAAR in Q2 2006, before picking up mildly to 2% in Q3. Personal consumption contracted in Q3, but this was offset by continued firmness in private capital expansion and a rebound in net exports.

In the US, residential investments have weakened sharply, as housing starts in October 2006 fell 27.4% from a year ago to the lowest level in more than six years. This is reflective of softer demand for houses and a build-up in housing inventories. Demand for houses declined significantly on a y-o-y basis, with existing single-family home sales falling by 11% in October. (Chart 1.1) At the October sales rate, it would take 7.2 months to clear the stock of unsold homes, up from 4.8 months a year ago. (Chart 1.2) Consequently, prices fell for three consecutive months on a y-o-y basis. (Chart 1.1)

The housing sector slowdown seems unlikely by itself to lead to a recession in the US, as residential investment accounts for only 6% of GDP. However, a sharper-than-expected weakening of house prices would be of concern since it could have substantial knock-on effects on household spending. In the past, rising house prices have bolstered households' net worth positions, and created a cushion of equity. Households have tapped this equity through mortgage equity loans to fund personal investments, debt service and retail purchases. (Chart 1.3) Therefore, weaker house prices could lead to a weakening of consumption by households.

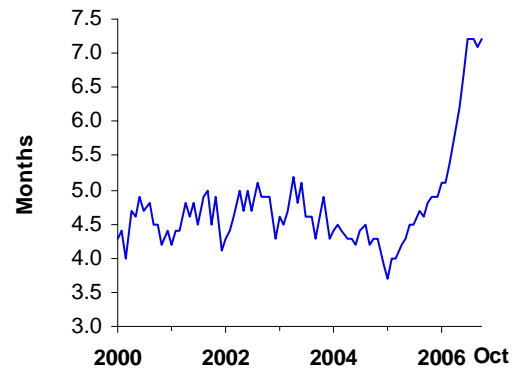
However, two factors may mitigate the impact of the housing sector slowdown and support consumer spending. First, the labour market remains firm. Job creation in a number of service sectors has been sustained, while the unemployment rate has fallen to 4.4%, the lowest since May 2001. Second, households have received a boost from relatively strong growth in wages and other incomes, such as dividends.

Chart 1.1
US Sales and Prices of Existing Single-Family Homes



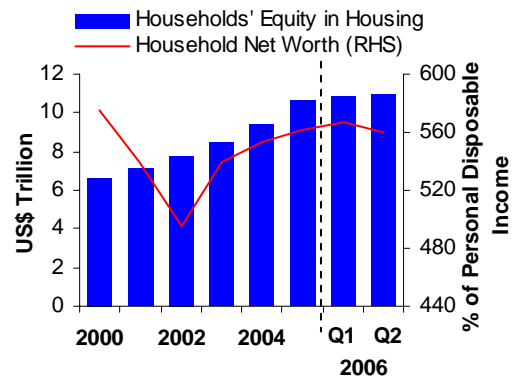
Source: National Association of Realtors

Chart 1.2
US Existing Single-Family Homes: Months of Supply at Current Sales Rate



Source: National Association of Realtors
Note: Single-family homes account for the bulk of housing sales. Other categories are condos/ co-op sales

Chart 1.3
US Household Net Worth and Housing Equity



Source: US Federal Reserve

In the absence of a sharper-than-expected weakening of house prices, the US economy is likely to avoid a sharp slowdown. This may help bring global expansion down to a more sustainable rate. World GDP is forecasted to ease to 4.9% in 2007, down from the 5.1% predicted for 2006. (Chart 1.4)

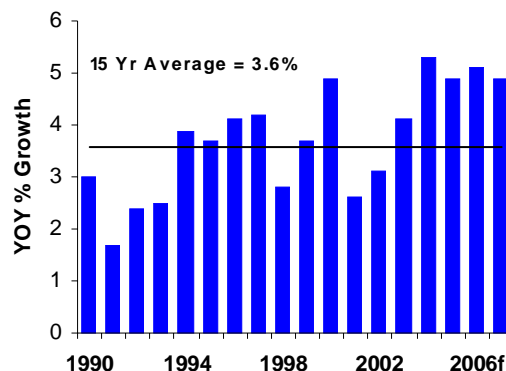
Financial markets, especially equity markets, may not have fully priced in the moderation in growth

Global equity markets have continued to post healthy returns on the back of expectations of sustained non-inflationary growth. For instance, the MSCI World Index has increased by 15.6% since the beginning of the year and on 3 October the Dow Jones surpassed its previous record set in January 2000. The benchmark indices for the G3 countries and emerging markets have recovered from the May-Jun levels. (Chart 1.5)

Despite signs of moderation in the global economy, investors may not have fully priced in the prospects of slower growth. The near historical low level of volatility and spreads could reflect some degree of complacency over the growth outcome into 2007. (Chart 1.6) A sharper growth slowdown might lead to a broad-based re-pricing of assets and to sharp spikes in risk premiums as well as corrections in equity prices. A spike in volatility for an extended period could lead to significant de-leveraging of positions, causing contagion across several asset classes.

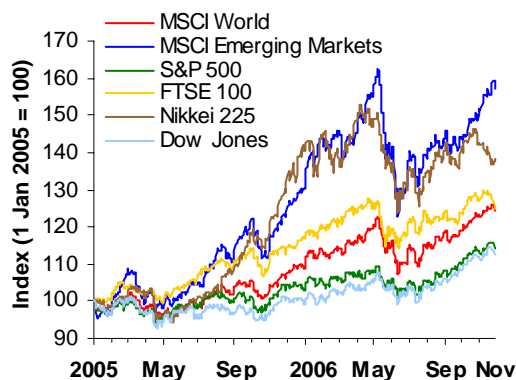
Thus, in the same way that upside risks to inflation induced the sharp market correction in May-Jun this year, sporadic episodes of heightened risk aversion with its effect on market volatility cannot be ruled out going forward, particularly if incoming data on the economy surprises on the downside. This risk is even more pertinent given the underlying vulnerabilities in the financial system that have been building up: (i) saving-investment imbalances; and (ii) exposures resulting from the search for yield with the potential for far-reaching spillovers.

**Chart 1.4
World GDP Growth**



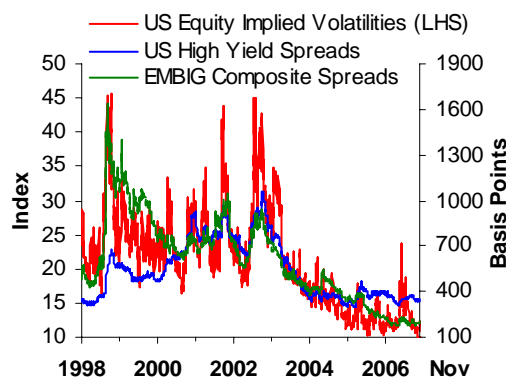
Source: IMF WEO Database

**Chart 1.5
Equity Indices**



Source: Bloomberg

**Chart 1.6
US Equity Implied Volatilities & Bond Spreads**



Source: JP Morgan, Datastream, Chicago Board Options Exchange

While the speedy recovery from the May-Jun sell-offs attests to the resilience of the financial system, there is no assurance that future reassessment and re-pricing of risks in response to a shock will continue to remain benign.

The slowdown in the US could lead to renewed weakness in the US\$

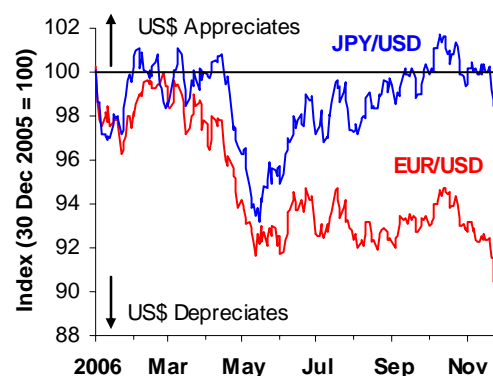
A disorderly adjustment in the US\$ remains a concern in view of the large global imbalances; the US current account deficit was 6.6% of GDP in Q2 2006 and the portfolio holdings of US\$ assets by foreign investors amounted to about 21% of global GDP (excluding the US).¹ Any abrupt shift in investor sentiment could cause a disorderly adjustment in the US\$ with significant adverse spillover effects.

Up till the most recent period, the US\$ appears to have found some support in yen carry trades. (Chart 1.7) While evidence of carry trades remains inconclusive, there has been a sharp increase in speculative short positions on the yen since the middle of 2006. (Chart 1.8) Nevertheless, against the backdrop of persistent global imbalances and the narrowing of growth and interest rate differentials between the US and other G3 economies, the weakening of the US\$ could continue.

An unwinding of alternative investments might expose households to volatility

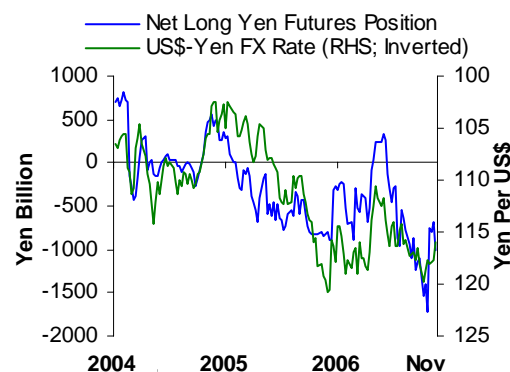
The increase in commodity and oil prices in the earlier part of the year was driven mainly by demand from emerging countries and the search for yield by institutional investors. However, the recent losses at hedge-fund manager Amaranth Advisors LLC, signals a need for caution as it shows that conditions in the growing market for alternative investments, including commodities, can deteriorate rapidly. Amaranth, which reportedly managed US\$9.5 billion worth of assets, collapsed in September after making wrong bets on natural gas prices.

Chart 1.7
US\$ against Euro & JPY



Source: Bloomberg

Chart 1.8
Yen Position of Non-Commercial Traders at the Chicago Mercantile Exchange



Source: Bloomberg and Commodities Futures Trading Commission

¹ IMF Global Financial Stability Report, September 2006 (Table 1.8: Characteristics of Foreigners' Portfolio Holdings of US assets).

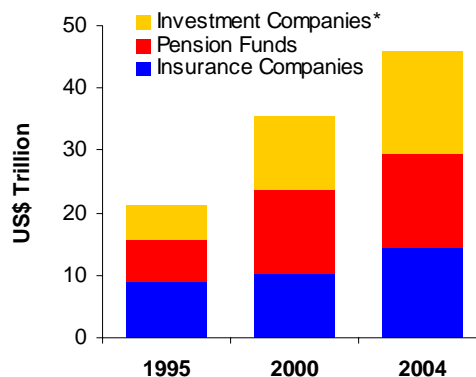
The market reaction to Amaranth's losses was very different from that to LTCM's near collapse in 1998 and shows that financial markets were generally more resilient. This was partly because Amaranth was less leveraged and its positions were concentrated mainly in a single market and were widely known in the natural gas investing community.

Assets managed by institutional investors, such as pension funds and insurance companies, have grown over the last decade and were estimated at over US\$ 45 trillion at the end of 2004. (Chart 1.9) These institutions have increased their asset allocation to alternative investments, such as real estate, private equity and hedge funds, as part of the general search for yield and to help meet the post-retirement needs of an aging population. (Chart 1.10) Looking forward, allocations to alternative investments are expected to increase further, most notably by institutional investors in Japan. Institutional investors are an important medium for household savings. While small investors do not typically invest directly in hedge funds, the increased allocations to alternative investments by institutional investors can indirectly expose small investors to the risks emanating from such asset classes.

Emerging market assets are another class of alternative investments which have become popular with institutional investors recently. The attractiveness of these assets, partly attributable to the improved fundamentals of emerging economies, has led to the continued narrowing of their sovereign spreads. (Chart 1.11)

However, emerging markets tend to be much smaller and less liquid than mature markets and positions taken by large investors can be quite concentrated relative to the size of the overall market. In such cases, a quick unwinding by a large investor could have serious implications.

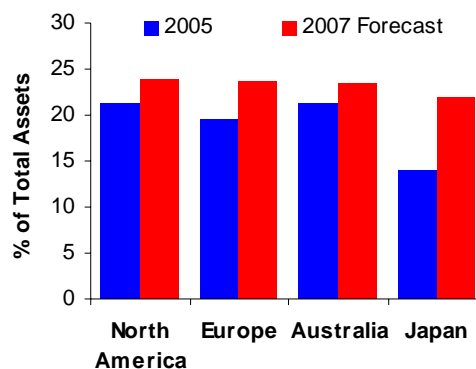
Chart 1.9
Assets under Management by Class of Institutional Investors



*Investment companies include closed-end and managed investment companies, mutual funds and unit trusts.

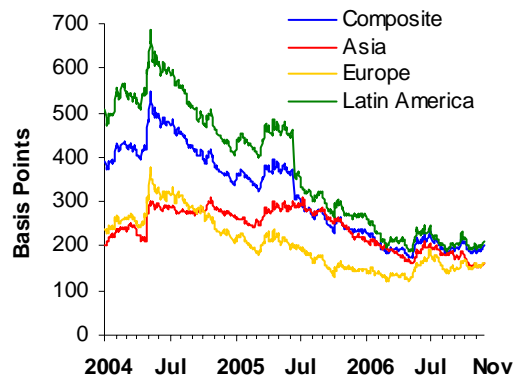
Note: The data may reflect some double-counting of assets, such as those owned by defined contribution pension funds and managed by investment companies. Source: IMF Global Financial Stability Report, September 2005

Chart 1.10
Alternative Investments of Institutional Investors in Different Regions



Note: Mean allocations based on the 2005-06 survey. Source: The 2005-2006 Russell Survey on Alternative Investing, Russell Investment Group

Chart 1.11
EMBIG Spreads



Source: JP Morgan

1.2 East Asian Financial System

East Asian economies slowed due to weaker domestic demand

East Asian economies slowed during Q2 and Q3 2006 as tightening liquidity conditions, higher oil prices and a moderation in export demand constrained personal consumption and private investment. (Table 1.2) Indeed, the continued moderation of the US economy seems likely to weigh further on East Asia. The US market is important for the region not only as a direct destination for exports, (Table 1.3) but also because much of the intra-regional trade in intermediate goods is indirectly linked to conditions in the US economy.

However, the regional economies are in a stronger position than before to withstand the slowdown as they have taken advantage of the robust growth in the past few years to build up buffers and strengthen their balance sheets.

The impact from the slower growth in the US is likely to be cushioned to some degree by continued expansion in China and India, domestic demand growth from easier monetary policy, and infrastructure spending.

Corporate sector coped well despite higher oil prices and rising interest rates

In the first half of 2006, corporate debt levels continued to fall in some Asian economies while profitability² strengthened. For example, the Q2 return-on-asset ratios (ROA) were sustained or improved for several East Asian countries while profit margins increased in the Philippines, China and Taiwan compared to 2005. (Table 1.4) Higher profitability has in part helped to sustain firms' debt-servicing ability as shown by their relatively high interest rate coverage ratios. (Chart 1.12) As firms continue to reduce leverage, their vulnerability to interest rate hikes has lessened.

Table 1.2
Real GDP Growth (y-o-y %)

	2003	2004	2005	2006f	Q2 2005	Q3 2005	Q4 2005	Q1 2006	Q2 2006	Q3 2006
Southeast Asia										
Malaysia	5.5	7.2	5.2	5.5	4.1	5.3	5.2	5.9	6.2	5.8
Indonesia	4.8	5.1	5.6	5.4	5.6	5.6	4.9	4.8	5.1	5.5
Philippines	4.9	6.2	5.0	5.4	5.4	4.8	5.3	5.7	5.8	4.8
Singapore	2.9	8.7	6.4	7.6	5.7	7.6	8.7	10.7	8.2	7.2
Thailand	7.0	6.2	4.5	4.4	4.6	5.4	4.7	6.1	4.9	...
Northeast Asia										
China	10.0	10.1	10.2	10.5	10.1	9.8	9.9	10.3	11.3	10.4
Hong Kong	3.2	8.6	7.3	5.9	7.2	8.2	7.5	8.0	5.5	6.8
Korea	3.1	4.7	4.0	5.0	3.2	4.5	5.3	6.1	5.3	4.6
Taiwan	3.4	6.1	4.0	4.0	2.9	4.2	6.4	4.9	4.6	5.0
Other										
India ¹	8.5	7.5	8.4	8.1	8.5	8.4	7.5	9.3	8.9	...

Source: CEIC and Consensus Forecast

¹ Reported annual data is by fiscal year

² Data for listed companies only.

Table 1.3
East Asia's Trade Dependence on US
(Per Cent)

	US Bound Exports as % of Nominal GDP	US Bound Exports as % of Total Exports	Total Exports as % of Nominal GDP
1990	7.6	22.5	33.8
1995	7.5	19.8	37.8
2000	9.1	21.2	43.0
2005	8.4	17.2	48.8

Source: CEIC, IMF Direction of Trade Database, IMF WEO Database, MSD estimates

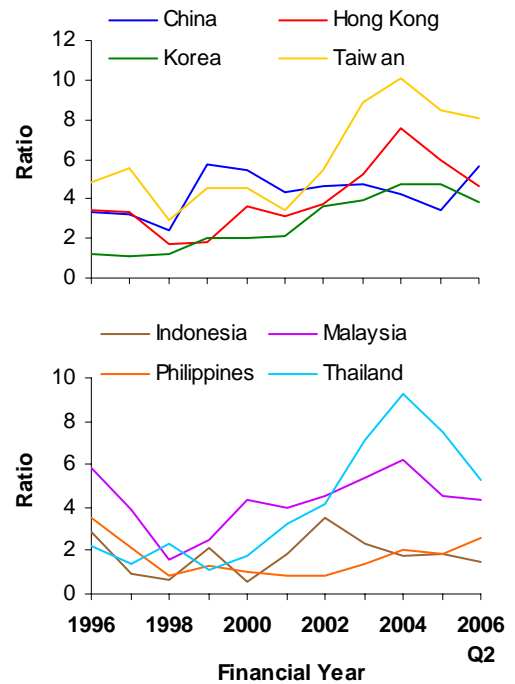
Note: East Asia includes China, Hong Kong, South Korea, Taiwan, Malaysia, Indonesia, Philippines, Thailand and Singapore. Taiwan's data prior to 1998 excludes re-exports, and Singapore's exports exclude Indonesia.

Table 1.4
Financial Ratios of Non-Financial Corporates (Median)

Financial year	2002	2003	2004	2005	2006 Q2
Return-on-Assets (%)					
Malaysia	3.7	4.0	4.5	4.4	4.4
Indonesia	6.0	4.5	4.3	4.8	4.6
Philippines	1.1	1.7	3.5	4.3	n.a.*
Singapore	3.0	4.4	6.2	5.6	5.5
Thailand	6.8	7.7	8.7	7.1	6.8
China	4.1	4.5	4.2	3.5	n.a.*
Hong Kong	2.7	3.7	4.9	4.9	5.2
Korea	5.5	5.0	5.3	5.2	n.a.*
Taiwan	4.8	5.3	6.0	5.0	5.4
Net Profit Margins (Net profit as % of sales)					
Malaysia	5.1	5.3	6.0	4.8	4.5
Indonesia	4.9	2.8	1.4	2.2	0.9
Philippines	0.5	2.2	4.2	4.4	5.2
Singapore	3.9	4.9	5.9	5.4	5.2
Thailand	5.7	7.3	7.2	6.1	5.9
China	6.3	5.7	4.8	3.5	4.2
Hong Kong	3.3	3.5	4.9	4.5	4.5
Korea	3.8	3.6	3.7	3.7	n.a.*
Taiwan	4.4	5.1	5.3	4.1	4.5
Debt-to-Equity Ratio (%)					
Malaysia	27.8	29.9	30.4	30.3	33.5
Indonesia	34.8	44.4	45.2	49.7	43.1
Philippines	17.8	14.7	16.0	17.2	17.1
Singapore	30.0	31.5	29.6	28.3	27.1
Thailand	37.7	43.4	38.8	40.6	44.6
China	49.9	55.6	57.5	58.2	61.9
Hong Kong	20.5	21.6	20.5	21.7	22.7
Korea	52.1	45.0	40.0	37.9	n.a.*
Taiwan	37.1	40.5	44.2	39.6	38.7

Source: Thomson Financial
*Small sample size

Chart 1.12
Interest Coverage Ratios*
(Median)



Source: Thomson Financial

*Earnings before interest expense & tax divided by interest paid

Table 1.5
Return-on-Equity of Banks (Median)

%	2002	2003	2004	2005	2006 Q2
Malaysia	7.9	9.7	10.3	11.0	10.4
Indonesia	11.0	15.1	22.3	11.8	10.0
Philippines	5.2	6.4	7.7	11.8	n.a.*
Singapore	7.3	8.0	10.7	7.6	10.9
Thailand	12.6	13.5	15.2	17.5	18.0
China	14.9	14.3	13.5	14.7	n.a.*
Hong Kong	9.4	10.1	11.5	11.9	14.4
Korea	18.0	8.5	14.3	19.6	n.a.*
Taiwan	-12.1	7.6	6.5	2.2	-6.3

Source: Thomson Financial

*Small sample size

Banks' balance sheets and profitability remain broadly healthy

Banks' profitability has remained strong, and continues to improve in a number of countries in the region. (Table 1.5) The exception is Taiwan, where banks are facing defaults on cash and credit card loans. The lower profitability could be in part due to these banks putting up more provisions to guard against their non-performing loans. A few of Taiwan's leading card issuing banks, including Chinatrust Commercial Bank, Taishin International Bank and Far Eastern International Bank, were downgraded to "negative" from "stable" by Fitch Ratings in March this year.

Regional banks' balance sheets have continued to strengthen. (Table 1.6) While loan growth has contributed to the decline in non-performing loan (NPL) ratios for the past few years, absolute levels of NPL have generally come down due to improved risk management and continued effort to clean up balance sheets. The situation in Indonesia appears to be improving after the regulatory change in NPL classification last year, which resulted in a one-off spike in the first quarter of this year. Despite the recent credit downgrades for Taiwanese banks, their NPL have remained low as cash advances and credit card lending represent less than 5% of total lending.

Most economies in the region have also seen improvements in Capital Adequacy Ratios (CAR), which have stayed above the minimum Basel requirement.

Bank credit expansion has been stable over the business cycle, and has not generally exceeded growth rates observed in the period before the crisis. (Chart 1.13) Indeed, as a share of GDP, bank credit has declined somewhat in economies such as Malaysia, Indonesia, the Philippines and Thailand. (Chart 1.14)

Table 1.6
NPLs and CAR¹

	2004	2005	Q4 2005	Q1 2006	Q2 2006	Q3 2006
Non-Performing Loans (as % of commercial bank loans)						
Malaysia	6.8	5.6	5.6	5.6	5.4	5.0
Indonesia	5.8	8.3	8.3	9.4	8.7	n.a.
Philippines	12.7	8.5	8.5	8.0	7.2	7.4
Singapore	4.0	3.0	3.0	2.9	2.7	2.4
Thailand	10.9	8.3	8.3	8.1	8.3	8.2
China ²	15.6	10.5	10.5	9.8	9.5	9.3
Hong Kong ³	1.6	n.a.	n.a.	n.a.	n.a.	n.a.
Korea	1.7	1.1	1.1	1.0	0.9	n.a.
Taiwan	2.8	2.2	2.2	2.5	2.4	2.4
Capital Adequacy Ratio (%)						
Malaysia	14.3	13.6	13.6	12.9	12.7	12.8
Indonesia	19.4	19.5	19.5	21.7	20.5	n.a.
Philippines	18.7	n.a.	n.a.	n.a.	n.a.	n.a.
Singapore	16.2	15.8	15.8	15.4	15.9	15.4
Thailand	12.7	14.2	14.2	14.1	14.2	14.9
Hong Kong	15.4	14.9	14.9	15.0	15.2	n.a.
Korea	12.1	13.0	13.0	13.2	13.1	n.a.
Taiwan	10.7	10.3	10.3	n.a.	10.3	n.a.

Note: Annual figures are as at year-end.

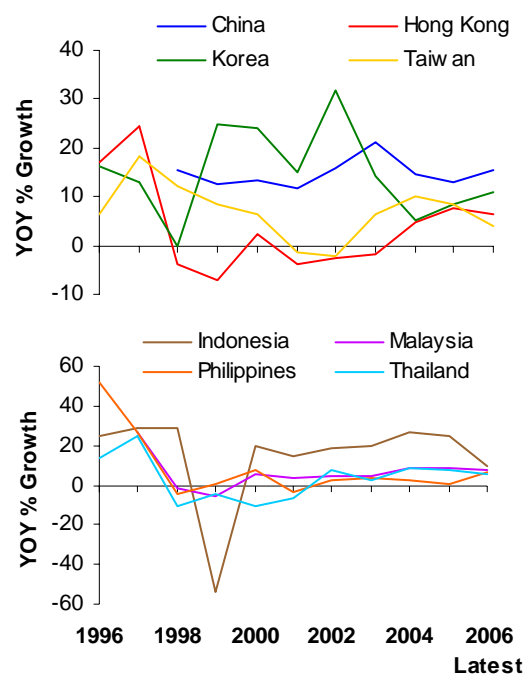
Source: CEIC and National Sources

¹Definitions may vary across countries. Data from official sources may differ from private sources

²State-owned commercial banks

³Data not available from January 2005 due to new accounting standards

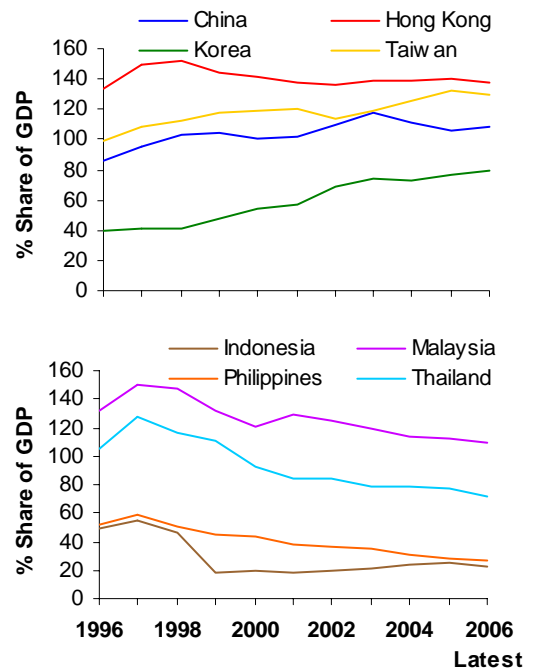
Chart 1.13
Growth of Total Bank Loans



Source: CEIC

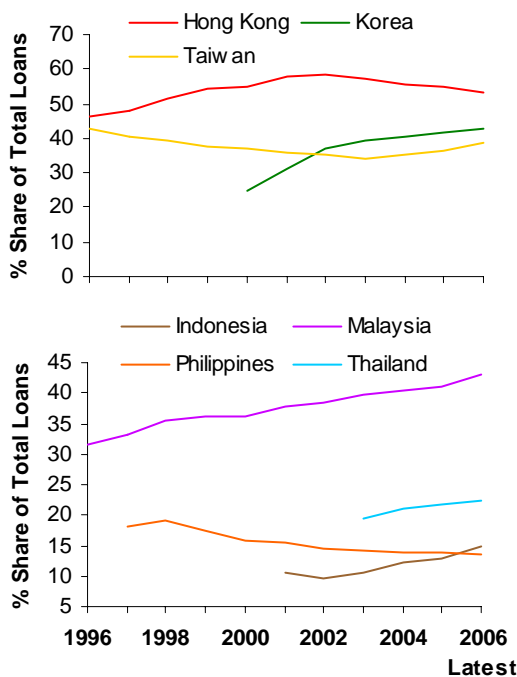
The risk of over-exposure to the property sector remains small. The concentration ratios for property sectors remain generally in comfortable ranges. (Chart 1.15) In recent quarters, growth of loans to the property sector has softened in several regional economies. (Chart 1.16) An exception is South Korea, where growth has picked up, after hitting a trough in 2004. This follows the continued rise in house prices despite the anti-speculation measures unveiled by the government in March 2006. In response to the continued rise in apartment prices, the government unveiled further measures in November 2006 to curb housing demand, including lower loan-to-value ratios at non-bank financial institutions.

Chart 1.14
Total Bank Loans as Share of Nominal GDP



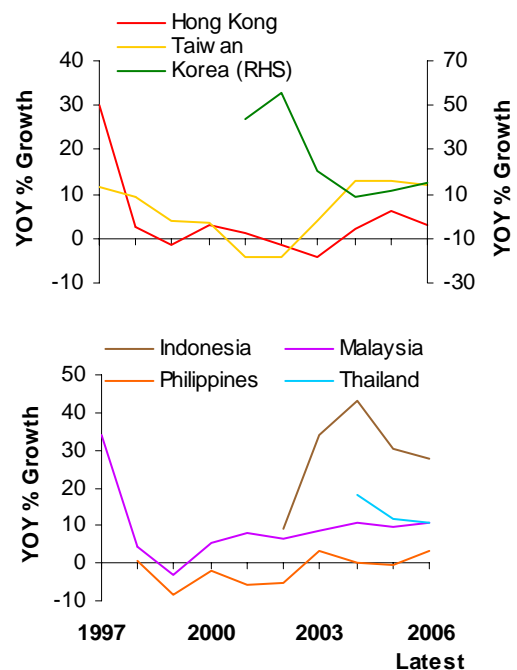
Source: CEIC

Chart 1.15
Property Loans as Share of Total Bank Loans



Source: CEIC
Note: Definitions vary across countries. Thailand's total loans include interbank loans

Chart 1.16
Growth of Property Loans



Source: CEIC
Note: Definitions vary across countries. Thailand's total loans include interbank loans

Household debt levels are not excessive and have moderated for some economies

Furthermore, household debt levels are not excessive. In fact, over the past few quarters, household indebtedness, as measured by loans to GDP, has remained stable against sustained income growth. (Chart 1.17) The moderation in non-mortgage lending was reflected in weaker retail and motor vehicle sales. The lower share of mortgage loans to GDP in Malaysia and Thailand may also be attributed to slower growth in residential property prices.

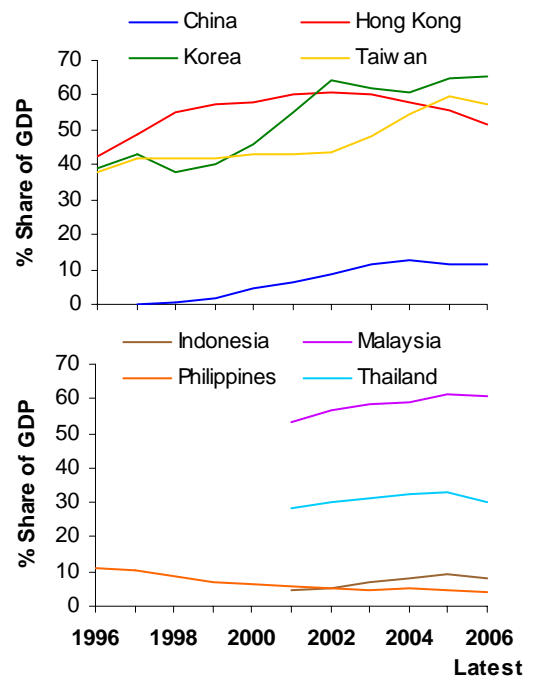
Monetary tightening continues in Northeast Asia but pauses in Southeast Asia

Central banks in Northeast Asia have generally been in a tightening mode since the last FSR. (Chart 1.18) The People’s Bank of China raised the reserve requirement in July by 50 bps and the benchmark lending rate in August by 27 bps. The Bank of Korea increased the target overnight call rate twice by 25 bps each time in June and August. The Central Bank of China (Taiwan) raised the discount rate by 12.5 bps on 28 September, maintaining that the real interest rate was still below its neutral level.

As for Southeast Asia, monetary policy tightening has paused since June 2006 except in Indonesia where the policy rate was cut from 12.5% in June to 10.25% in November 2006.

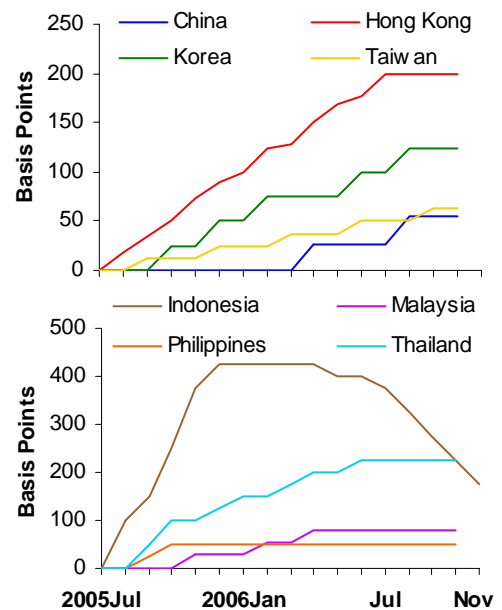
These moves follow the easing of inflationary pressures. The impact of previous fuel price increases has translated into higher base effects, thereby lowering y-o-y measures of inflation rates. (Chart 1.19) The appreciation of Asian currencies against the US\$, together with the lagged effects of past monetary tightening by Asian central banks has also played a role in containing inflation.

Chart 1.17 Household Indebtedness



Source: CEIC and National Sources
Note: Definitions vary across countries

Chart 1.18 Changes in Policy Interest Rates



Source: Bloomberg

Stock markets have risen strongly since the mid-year sell-offs

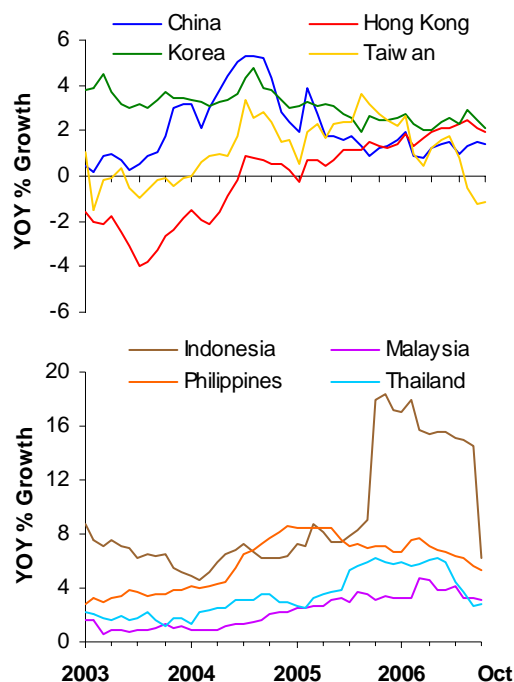
Since the last FSR, most stock markets in Southeast Asia have risen strongly above pre sell-offs levels in May. The stock market in Indonesia has rallied on the back of lower interest rates and improved economic growth prospects, while the Philippines' stock market has been buoyed by the country's improved fiscal position and better second-quarter results from firms. (Chart 1.20)

The mid-year sell-offs in the regional equity markets did not seem to be a result of over-valuation concerns, given the relatively low and stable price-to-earnings (P/E) ratios. It was more of a correction as markets that saw the greatest sell-off were the ones that had earlier recorded the strongest gains. Despite the sell-offs, by 28 November, regional markets had broadly exceeded their previous highs. (Chart 1.21)

Geopolitical developments have had a limited impact on regional markets

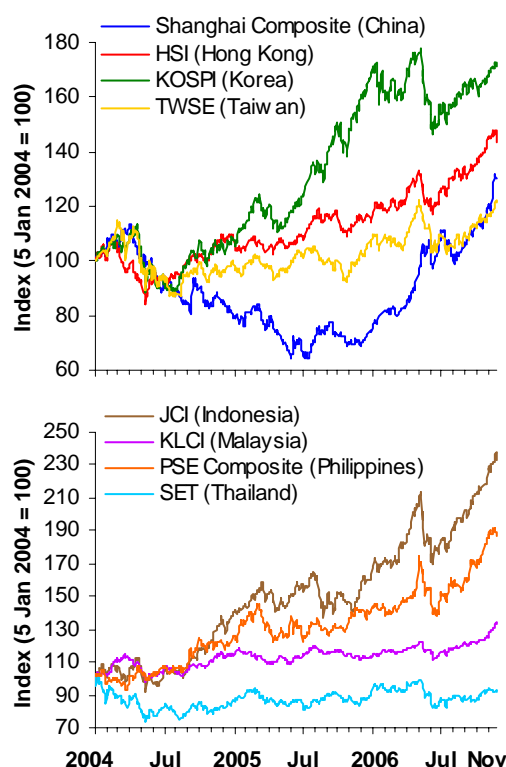
Geopolitical developments have had only a limited impact on regional financial markets. While the regional stock markets were affected by negative sentiment in the immediate aftermath of the coup in Thailand, they subsequently recovered as the coup was bloodless and the transition to an interim government was relatively smooth. The nuclear test conducted by North Korea affected the South Korea equity market, which fell by 2.4% on the same day. However, the effect on other regional markets was relatively small. The net foreign outflows into equity markets during June and August was largely due to net sales in South Korea. Net foreign purchases of Asian equities entered positive territory in September. (Chart 1.22) Foreign investors' holdings of Thai stocks increased by US\$699 million between 20 September (the day after the military coup) and 10 November as foreign investors bought equities on expectations of higher economic growth.

**Chart 1.19
Inflation Rates**



Source: CEIC

**Chart 1.20
Equity Indices**



Source: Bloomberg

While S&P had issued a negative rating watch on Thailand immediately after the coup, the agency reaffirmed its sovereign rating at BBB+ with a stable outlook by end-October, principally due to the assurance of a swift return to political stability.

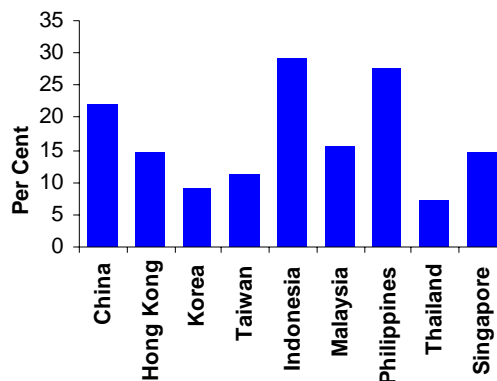
A sharp slowdown in US growth as well as further escalation of geopolitical risks could have a negative impact on the regional markets. However, continued growth in intra-regional trade, a firm recovery in Japan and strong growth in China and India should provide some offsetting support to the region.

Sovereign spreads in the regional economies continue to tighten

Since the last FSR, sovereign spreads have continued to tighten in the regional economies, due to improved fiscal positions and lower risk aversion. (Chart 1.23) The demand for Philippine and Indonesian government debt has been driven by attractive yields.

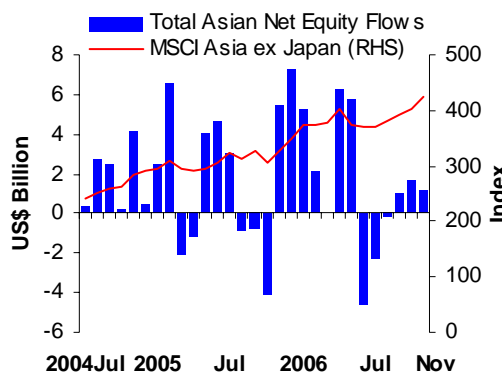
In the Philippines, the narrowing fiscal deficit, the introduction of a value-added tax and prospects of a balanced budget and lower debt-to-GDP ratio, supported narrowing spreads. S&P upgraded Indonesia’s foreign currency rating to BB- on 26 July prompted by declining government debt as well as improving fiscal and external performance. Spreads in Indonesia have continued to tighten, supported by interest rate cuts amounting to 225 bps since the last FSR. With inflation easing and further rate cuts on the horizon, bond yields could experience downward pressure. Bank Negara Malaysia’s (BNM) decision to keep the policy rate unchanged into October following lower inflation figures also provided some downward pressure on yields. The yield on ten-year local currency Thai government bonds maturing in 2016 tightened by 41 bps between 21 September and 28 November on expectation of a rate cut in future following lower inflation figures.

Chart 1.21
Changes in Benchmark Indices between end-June and 28 Nov 2006



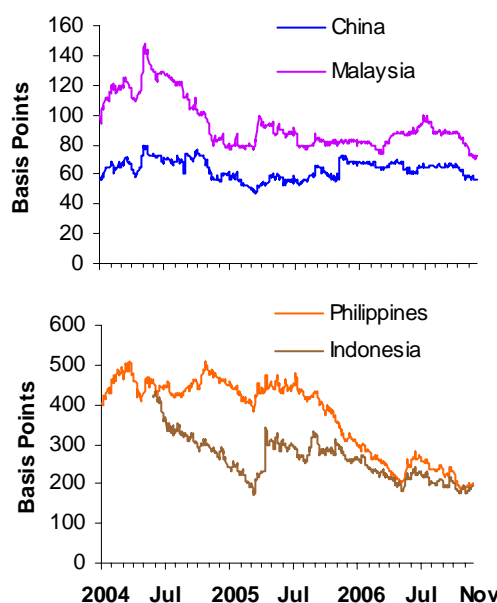
Source: Bloomberg

Chart 1.22
Net Foreign Purchases of Asian Equities



Source: Bloomberg
Note: Data for November is up to the 28th

Chart 1.23
Sovereign Spreads



Source: JP Morgan

Asian currencies appreciate against US\$

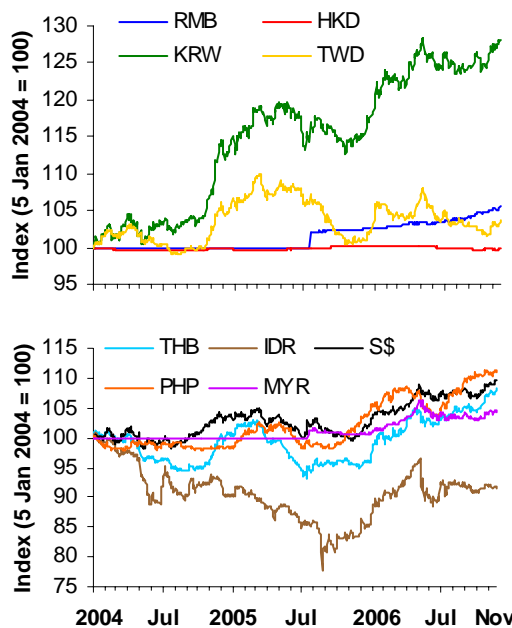
Regional currencies have bounced back from the downward pressure experienced during the sell-offs in the equity markets. (Chart 1.24) As of 28 November, the Philippine peso had gained 6% against the US\$ since July due to strong overseas remittances, improved fiscal performance and bond purchases by foreigners. In Thailand, the political uncertainty leading up to the coup capped further appreciation of the baht. However, the baht hit a multi-year high in October and continued to strengthen on the back of strong portfolio inflows. Moderate export growth and lower interest rate differentials with the US compared to other regional markets capped the gains in the ringgit. The rupiah has seen modest gains since June but has yet to reach the levels seen before the sell-offs.

Risk of higher market volatility from increasing risk aversion remains

Lower volatility in asset prices has had a positive impact on the financial markets. Asset prices seem to be factoring in sustained global economic growth, relatively contained inflationary pressures as well as limited impact of geopolitical risks. In addition, markets do not appear to be concerned about a disorderly adjustment of global imbalances. A shift in these expectations could lead to a reassessment of risks and a rapid change in asset prices.

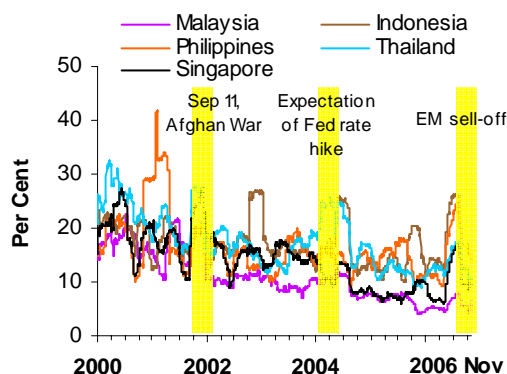
Indeed, volatility in regional stock markets has broadly declined since 2000. The last two episodes of higher volatility in financial markets (May-Jun 2006 and May 2004) were linked to market expectations about changes in the monetary policy cycle in the G3 economies, especially the US. (Chart 1.25) They were not necessarily related to concerns over the domestic economic fundamentals. Indeed, compared to the Latin American equity markets, the markets in East Asia have generally been less volatile over the last two years.

**Chart 1.24
Currency Indices (Against US\$)**



Source: Bloomberg

**Chart 1.25
Stock Market Volatility in Southeast Asia**



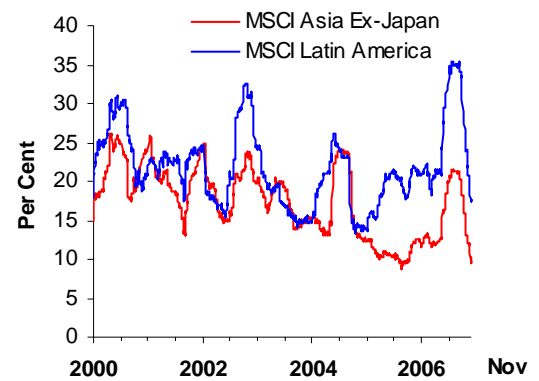
Source: Bloomberg

Note: Volatility is measured as the rolling standard deviation of daily returns over a 90 day period

The MSCI Latin America gained about 150% between January 2004 and April 2006 compared to 60% for the MSCI Ex-Japan Asia during the same period. While volatility fell in Asia during 2005, it increased in Latin American equity markets. (Chart 1.26)

Nevertheless, a key risk which could result in higher volatility arises from the proliferation of mechanisms for wider risk sharing and the increasing integration of global financial markets. While generally seen as positive, these developments mean that if risk aversion were to rise, any contagion effect could be more severe than in the past and volatility could rise sharply. For the most part, however, the region should be resilient to any sharp increase in volatility on account of the generally strong buffers that have been built up.

Chart 1.26
Stock Market Volatility in Latin America and Asia



Source: Bloomberg

Note: Volatility is measured as the rolling standard deviation of daily returns over a 90 day period

Singapore Economy

The domestic economy saw robust growth in the first three quarters of the year

After expanding by 6.4% in the previous year, the Singapore economy continued to grow at a healthy pace in 2006. Despite the headwinds of high oil prices and hikes in US interest rates, Singapore chalked up impressive growth of 8.7% in the first three quarters of the year. (Chart 1.27) This reflected broad-based expansion across the manufacturing and services sectors. Barring any shocks, GDP growth is on track to reach 7.5-8% this year.

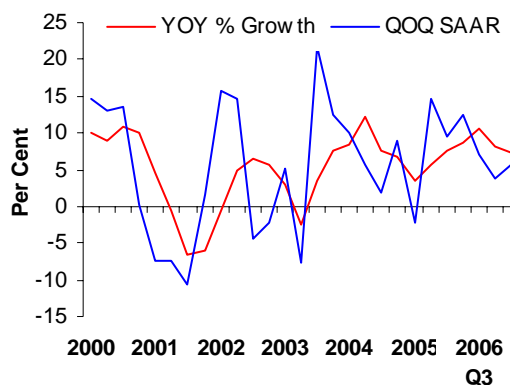
While several risk factors hover on the horizon, including uncertainties over oil prices, the severity of the slowdown in the US economy, and the extent of a downturn in the global IT market, these appear limited at this stage, and the external environment is likely to remain broadly conducive to growth. Against this backdrop, Singapore's economy is expected to grow at around 4-6% in 2007.

The labour market posted record highs in employment gains

Strong economic growth has underpinned a surge in labour market performance. Following the strong gains in the first half of 2006, a further 41,600 jobs were added in Q3. This brought total employment gains for the Q1-Q3 period to 123,100, surpassing annual gains in any year since 1995. (Chart 1.28) The bulk of the gains in Q1-Q3 this year came from the services sector, with the manufacturing and construction sectors adding jobs as well. The headline unemployment rate remained low at 2.7% as at end-September.

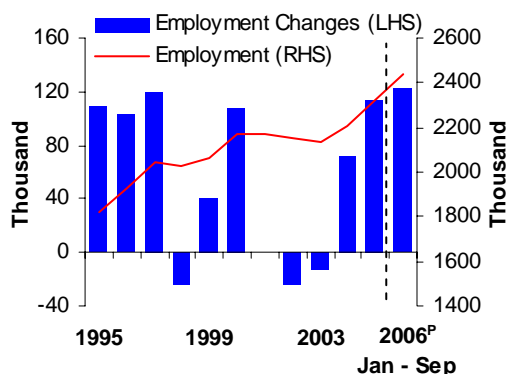
Looking ahead, the Ministry of Manpower anticipates bright employment prospects for the rest of this year and the first quarter of next year.

Chart 1.27
Singapore's GDP Growth



Source: Department of Statistics

Chart 1.28
Total Employment and Employment Changes



Source: Ministry of Manpower
P: Preliminary estimates from MOM

Positive hiring intentions are also revealed in the latest Hudson survey, with 52% of the 641 executives surveyed expecting to increase headcount in the fourth quarter in 2006, an improvement from the 47% in Q4 2005.

External price pressures pushed CPI inflation higher in 2006

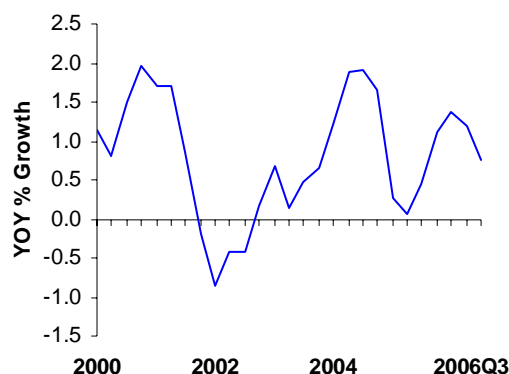
Amidst rising external inflation, domestic CPI inflation rose to 1.1% over the period Jan-Sep 2006, up from a mild 0.5% in 2005. (Chart 1.29) Prices rose in all categories of the CPI basket except transport & communications, which was dragged down by declining car prices. Meanwhile, the MAS underlying inflation measure, which excludes accommodation and private road transport costs, came in at 1.8% in the first nine months of 2006, up from 1.3% in 2005. Headline CPI inflation for 2007 is forecast at this stage to be in the 0.5-1.5% range, similar to that in 2006. The underlying inflation measure, which averaged 1.8% in the first nine months of this year, is expected to remain within 1-2% in 2007.

MAS reaffirmed its policy of a modest and gradual appreciation of the S\$NEER

In the Monetary Policy Statement of 11 April 2006, MAS reaffirmed the policy of a modest and gradual appreciation of the S\$ nominal effective exchange rate (S\$NEER) policy band, with no change to its slope and width. (Chart 1.30) MAS' assessment was that despite the continuing risks to external demand, the outlook for the Singapore economy remains generally positive. While growth momentum is likely to moderate it should be close to its potential in 2007. At the same time, CPI inflation will be contained.

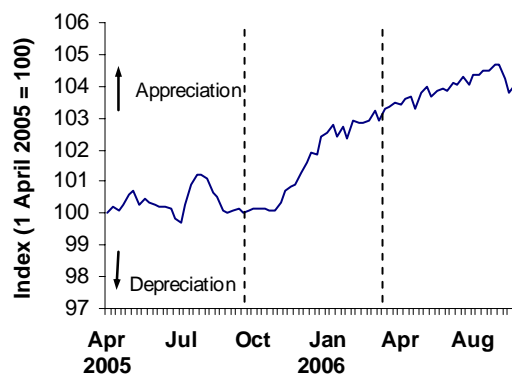
Since the last policy review in April 2006, the S\$NEER has stayed in the upper half of the policy band, although it eased in mid-September due, in part, to the strengthening of the US\$ following the G7 meeting. The earlier strength seen in the S\$NEER reflected a number of factors, including weak US\$ sentiment, strong investment flows into emerging Asian markets and a relatively buoyant Singapore economy.

Chart 1.29
CPI Inflation



Source: Department of Statistics

Chart 1.30
Movements in S\$NEER



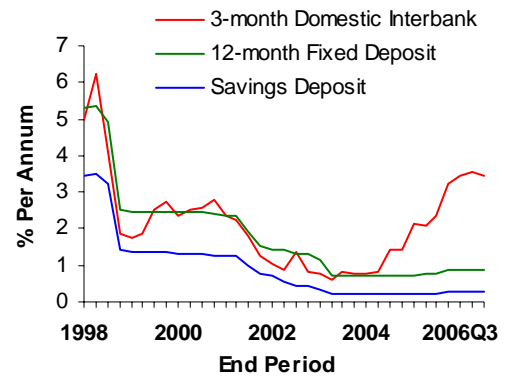
Source: MAS

Note: - - - indicates release of Monetary Policy Statement

In particular, both short-term and long-term capital inflows increased significantly in the first half of this year.

The three-month S\$ interbank rate (S\$ SIBOR) hovered around 3.44% over the period March to May 2006, after rising strongly late last year. (Chart 1.31) It rose to 3.56% by the end of June and into July, spurred on by the 17th consecutive increase in the US Fed funds rate to 5.25% on 29 June. As at end-Q3, the interbank rate had eased back to 3.44%. In terms of deposit rates, banks have continued to look to fixed deposits as a cheaper source of funds compared to the interbank market. Nevertheless, compared to late last year, the competition for deposits has eased somewhat as the interbank rate stabilised. On the whole, the savings deposit rate and 12-month fixed deposit rate have remained largely unchanged over the period April to September 2006.

Chart 1.31
Domestic Interest Rates



Source: MAS

2 NON-FINANCIAL SECTOR

2.1 Non-financial Corporate Sector³

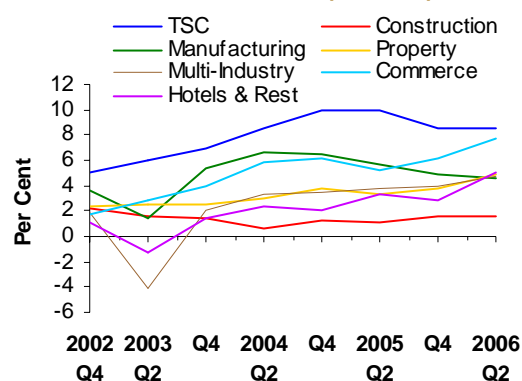
The Singapore banking sector's lending to non-financial firms forms an important component of its balance sheet, accounting for about two-fifths of non-bank loans. Firms' profits across a broad range of industries have increased, while their debt-servicing capacity and liquidity positions have remained healthy. Indeed, available data for the SME sector also confirm the generally strong financial picture associated with sustained growth in the economy, now into its twelfth quarter of virtually uninterrupted expansion.

Corporate profits strengthened further in the first half of 2006

Corporate profits strengthened further in the first half of 2006 as listed non-financial firms reported a median ROA of 5.3% in Q2 2006 compared to 4.8% in Q4 2005. The improvement in earnings was broad-based, spanning the commerce, hotels, construction, property and multi-industry sub-sectors. (Chart 2.1) MSD's profitability diffusion index⁴ shows that the number of firms reporting positive earnings has increased steadily since December 2001. This trend was even more pronounced in the first half of 2006, when the corporate sector was able to build up financial surpluses. (Chart 2.2)

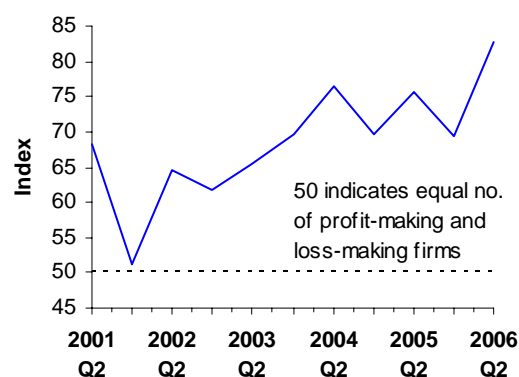
Among the corporate sub-sectors, property and construction firms displayed higher leverage ratios in Q2 2006 compared to Q4 2005. The median debt-to-equity ratio of construction firms rose from 28.7% in Q4 2005 to 45.8% in Q2 2006, while that of property firms increased from 59.7% to 78.4% over the same period, reflecting the pickup in bank credit growth noted earlier. (Chart 2.3)

Chart 2.1
Return On Assets (Median)



Source: Thomson Financial

Chart 2.2
MSD's Profitability Diffusion Index



Source: Thomson Financial, MSD estimates

³ All corporate data cover listed firms only. The latest data point provided is Q2 2006 as most of the firms that are not required to do quarterly reporting tend to report in Q2 and Q4 of each year only.

⁴ A value of 50 indicates an equal number of profit-making and loss-making firms, while a value of 100 indicates that all the firms are profit-making. The methodology used is similar to that of other diffusion indices. Some 270 non-financial firms listed on the SGX were used to construct this index.

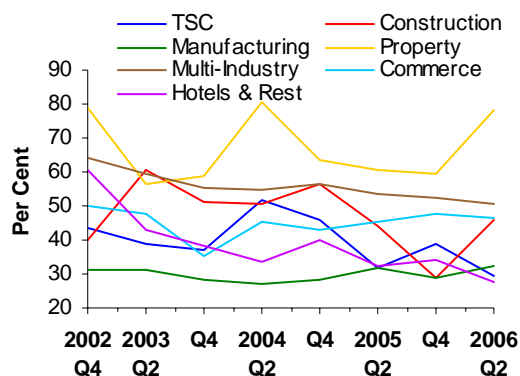
Despite the higher leverage positions, there were no indications of deterioration in the debt-servicing ability of firms in these sectors. In fact, the median interest coverage for construction firms improved markedly to 4.1 times in Q2 2006, from 1.5 times in Q4 2005 while the median interest coverage for property firms remained comfortable at 6.4 times in Q2 2006. (Chart 2.4) The improvement in interest coverage could be due to the higher profitability of these firms. In Q2 2006, the median ROA of the property sector rose to 4.9% from 3.8% in Q4 2005, while the median ROA of the construction sector increased marginally to 1.6% from 1.5% in Q4 2005. These firms could be benefiting from the recent increase in private-sector construction projects. The value of contracts awarded for these projects rose by 3.4% y-o-y to S\$4.5 billion in the first half of 2006.

The level of liquidity for all sub-sectors remained adequate in Q2 2006, as indicated by current ratios of above one. (Chart 2.5) In particular, the hotel & restaurants and multi-industry sub-sectors saw significant improvements in their current ratios in Q2 2006 compared to six months ago. The property sub-sector has remained one of the sub-sectors with the highest current ratios, which could be partly attributed to developments of the REITs market that have helped unlock liquidity for firms. (See Box A.)

Number of firms with high leverage and low liquidity decreased between 2000 and 2005

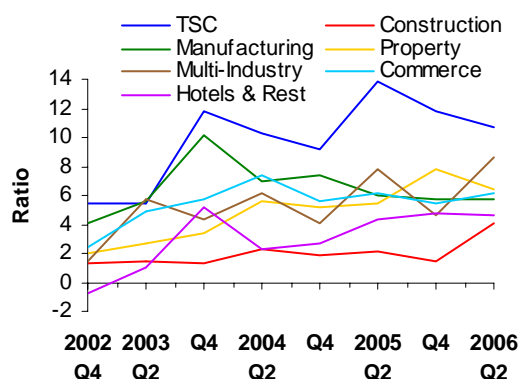
In assessing the vulnerability of the corporate sector, an analysis of micro-level data, such as the distribution of debt and liquidity positions across firms, provides additional insights. Generally, firms are more vulnerable to economic shocks if their debt-to-equity ratios exceed 100% or their current ratios are less than one. Firms are most vulnerable when both conditions hold simultaneously – we label this the “vulnerable” quadrant in Charts 2.6 and 2.7. The charts show that the number of firms in the “vulnerable” quadrant decreased between 2000 and 2005.

**Chart 2.3
Leverage Ratio* (Median)**



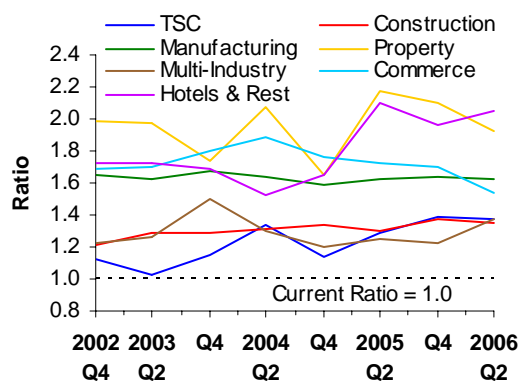
Source: Thomson Financial
*Debt-to-Equity

**Chart 2.4
Interest Coverage Ratio* (Median)**



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

**Chart 2.5
Current Ratio* (Median)**



Source: Thomson Financial
*Current assets divided by current liabilities

A cross-country comparison of the market capitalisation of firms in the “vulnerable” quadrant as a share of total market capitalisation shows this percentage decreased for firms in South Korea, Malaysia and Indonesia, indicating a general strengthening of corporate balance sheets. (Table 2.1) This bodes well for Singapore banks which have exposures to the region.

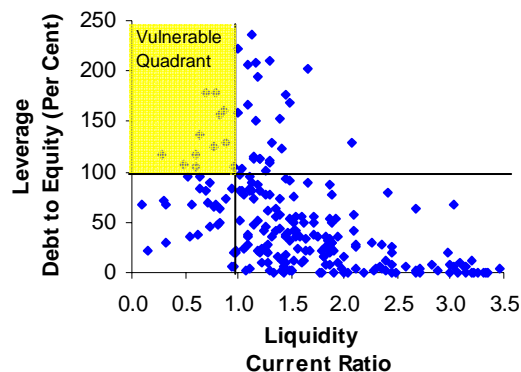
In line with the continued expansion of the economy, the SME sector has seen improved profitability in recent years. Improvements in ROE have broadly been driven by SMEs in the TSC and property sub-sectors. (See Box B.)

Surveys of manufacturing and services suggest a generally positive outlook

Notwithstanding moderating global economic growth, recent business outlook surveys⁵ of Singapore firms suggest optimism about business conditions in the six months between September 2006 and March 2007. A net balance of 22% of manufacturers expected an improved business environment. This was higher than the 16% recorded a year ago. Similarly, firms in the services sector were optimistic, with a net balance of 24% of firms anticipating positive business conditions ahead.

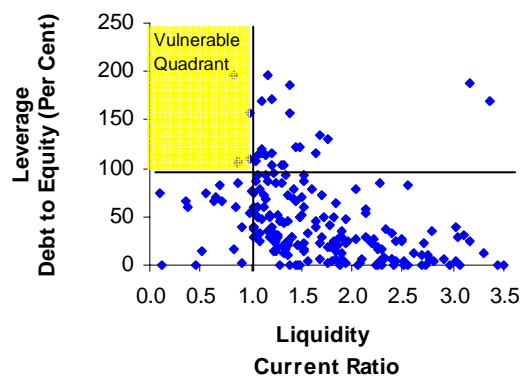
Consistent with this optimism, the number of corporate insolvency cases declined further this year. The number of firms that were wound up between January and September 2006 was 29% lower than that in the same period last year. (Chart 2.8)

Chart 2.6
Distribution of Firms by Leverage and Liquidity Ratios (2000)



Source: Thomson Financial, MSD estimates

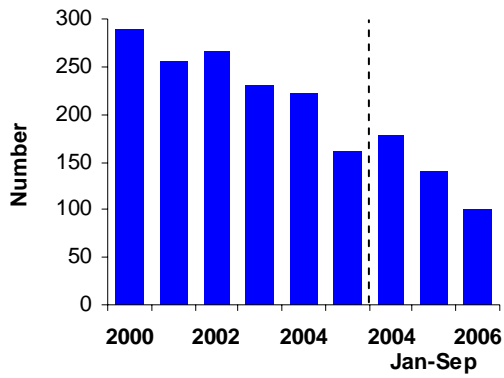
Chart 2.7
Distribution of Firms by Leverage and Liquidity Ratios (2005)



Source: Thomson Financial, MSD estimates

⁵ The Survey of Business Expectations of the Manufacturing Sector by the Economic Development Board and Business Expectation Survey for the service sector by the Singapore Department of Statistics.

Chart 2.8
Number of Firms Wound Up



Source: Ministry of Law

Table 2.1
Cross-Country Comparison of Firms in “Vulnerable” Quadrant

	Market Capitalisation of Firms in Vulnerable Quadrant as a Share of Total Market Capitalisation (%)	
	2000	2005
Singapore	0.8	2.5
Hong Kong	0.5	1.6
Korea	30.9	8.8
Malaysia	16.6	1.4
Thailand	10.6	19.2
Indonesia	5.9	0.3

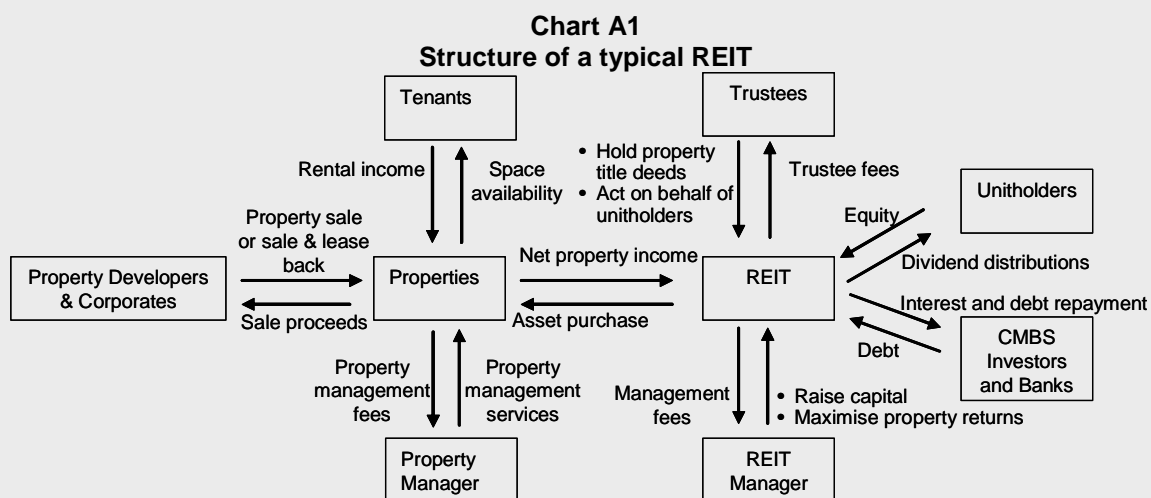
Source Thomson Financial, MSD estimates

Box A
Singapore Real Estate Investment Trusts (REITs)

Structure and growth of the Singapore REIT Market

REITs are trusts, typically set up by property developers by transferring their property assets to the trust. (Chart A1) They do so by selling their assets to the trusts while the title deeds are held by the trustees. The trusts (or REITs) finance the purchase by offering units to investors for subscription (raising equity) and through borrowing. The latter may take the form of Commercial Mortgage Backed Securities (CMBS) or loans.

REITs generally have tax transparency status, which means that income is taxed at the investors' level and not at the REITs' level, subject to a minimum dividend distribution. They also have to observe guidelines on gearing and on investment in property development. REITs in Singapore are typically managed by an external REIT manager, a separate legal entity which manages the property portfolio in return for a fee.



REITs have a long history in the US and Australia. In Asia, this form of investment has only taken shape during the past five years. (Table A1) In the 1980s the real estate industry in Singapore showed a brief interest. However, a serious attempt to introduce Singapore REITs did not occur until May 1999 when MAS released its first set of guidelines. In 2001 the Inland Revenue Authority of Singapore (IRAS) granted a case-by-case ruling that offered tax transparency treatment. Spurred by favourable initiatives from the authorities, the first Singapore REIT was listed in July 2002.

Table A1
Listing of first REIT

Country	Year
United States	1965
Australia	1971
Japan	2001
Korea	2002
Singapore	2002
Hong Kong	2005
Taiwan	2005

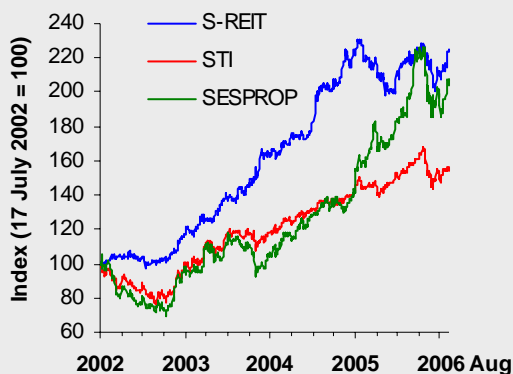
Table A2
Recent changes to tax incentives in Singapore

<ul style="list-style-type: none"> Tax exemption on dividend distributions to local and foreign individual investors
<ul style="list-style-type: none"> Reduction of withholding tax on dividend distributions to foreign non-individual investors from 20% to 10% for five years starting 18 Feb 2005
<ul style="list-style-type: none"> Waiver of stamp duties for the transfer of properties into REITs for five years starting 18 Feb 2005

Since then, the Singapore Government has been proactive in refining the regulations to enhance the competitiveness of Singapore as a regional REIT centre. (Table A2) Consequently, the Singapore REIT market (S-REIT) has seen strong growth. (Chart A2) Thirteen REITs are now listed on the Singapore stock exchange with a combined market capitalisation of more than S\$15 billion.

Properties acquired by the REITs range from retail malls, hotels and office buildings to industrial parks, carparks, and logistics and distribution centres. The penetration of REITs is estimated at 8% of investable real estate in Singapore.^{1/} (Table A3) As at end-October 2006, the value of properties held by the REITs reached S\$21 billion of which less than 20% was invested in regional countries.

Chart A2
S-REIT Index (Market Capitalisation)



Source: Bloomberg, MSD estimates

Note: The S-REIT index is not free float adjusted. STI is the Straits Times Index. SESPROP is the Singapore Property Equities Index, which is a capitalisation-weighted index of all the property sector stocks traded on the Singapore stock exchange.

Table A3
Value of properties under REITs
(as at end-Oct 2006)

REIT	Date of listing	Value of properties (\$ mn)
Capitamall Trust	17 Jul 02	3,427
Ascendas REIT	19 Nov 02	2,856
Fortune REIT	12 Aug 03	1,751
Capitacommercial Trust	11 May 04	3,570
Suntec REIT	9 Dec 04	2,750
Mapletree Logistics Trust	28 Jul 05	1,145
Macquarie MEAG Prime REIT	20 Sep 05	1,327
Allco Commercial REIT	30 Mar 06	680
Ascott Residence Trust	31 Mar 06	879
K-REIT Asia	28 Apr 06	631
Frasers Centrepoint Trust	5 Jul 06	936
CDL Hospitality Trusts	19 Jul 06	846
Cambridge Industrial Trust	25 July 06	515

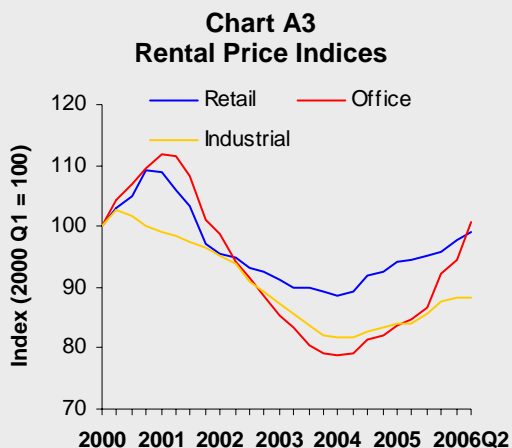
Source: Latest available financial results or REIT prospectuses

Financial Stability Implications for the Property Sector

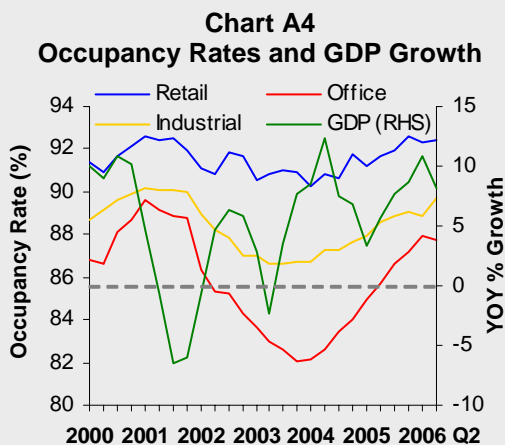
REITs are generally considered a boon to the property sector. By turning chunky properties into simpler, divisible units for investors, they inject greater liquidity into that sector. Companies can release capital invested in illiquid and non-core assets through a sale or a sale-and-leaseback deal with the REITs.

Nevertheless, there are concerns that REITs may amplify the cyclicity of property and rental prices. In order to increase their asset base, REITs managers may continue to buy properties and as a result, bid up property prices. The need to maintain attractive distributions to investors may also put pressure on rentals. Since Q1 2004, rental prices in industrial, retail and office space have indeed risen for nine consecutive quarters. (Chart A3) However, preliminary assessment suggests that this trend is more a consequence of the generally favourable economic climate and increased occupancy rates across all segments of the property market. (Chart A4)

^{1/} Real Estate Global Analyser, UBS Investment Research, 21 Aug 2006.



Source : URA



Source: URA, DOS

In fact, some industry observers believe that REITs can moderate boom/bust cycles in the property sector because they introduce greater market discipline into that sector. This is because (i) REITs generally have a higher level of free float compared to the property companies in the SESPROP, which means that they are more likely to be subjected to market discipline;^{2/} (Table A4) (ii) REITs are required to obtain two independent valuations of the properties when transacting with interested parties; and (iii) REITs are required to distribute at least 90% of their taxable income to unitholders. Such a high payout ratio leaves them with limited retained earnings and makes them more dependent on the debt and equity markets.

Table A4
Free Float (%)

REIT	Range	Median
S-REIT	22.5 to 100	60.8
SESPROP	16.8 to 83.6	37.5
STI	19.4 to 99.9	62.4

Source: Bloomberg

The above factors may cause REITs to be more sensitive to external ratings and more conservative in their acquisitions compared to property companies. However, there is currently no conclusive evidence that REITs have indeed moderated boom/bust cycles in the property sector across a range of country experiences.^{3/}

REITs in general benefit the financial system as they add breadth and liquidity to the capital markets. They reduce the property sector's dependence on bank loans by broadening the financing options. As more REITs enter the market and competition intensifies, in a search for yield, more REITs managers may be driven to invest in offshore properties. This potentially increases the risks for REITs as they would be subject to the macroeconomic fluctuations of the offshore economies. Thus over time, as REITs expand, the financial stability dynamics between the REITs, the property sector and the financial system will evolve and need to be monitored.

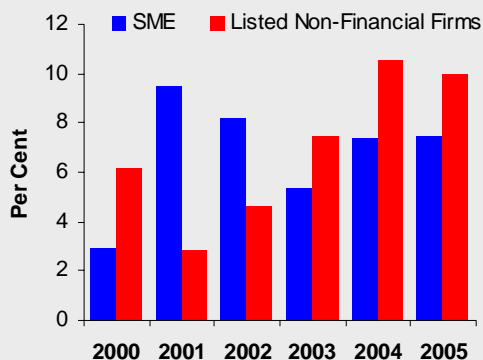
^{2/} The free float of a company is the number of shares that are not held by company insiders for strategic purposes but are available for public trading. This is an indicator of the company's openness to investor control and market discipline.

^{3/} BIS Papers No.21, Real estate indicators and financial stability, April 2005, pp. 9-29

Box B
DuPont Analysis of Singapore's Small and Medium-Sized Enterprises

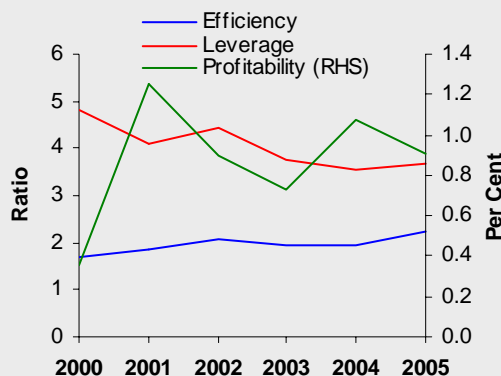
In this box we examine the financial performance of the Small and Medium-Sized Enterprise (SME) sector in Singapore. We make use of data from the top 500 SME Survey by DP Information.^{1/} Singapore SMEs employed 52% of the workforce in the manufacturing and services sector and contributed 29% of value added to these sectors.^{2/} The profitability of SMEs in Singapore, as measured by the median return on equity (ROE) for the SME sector has shown improvement in recent years as it strengthened from 5.4% in 2003 to 7.5% in 2005, although still below the peak of 9.5% in 2001. (Chart B1) Non-financial listed firms have had better ROE performance in recent years compared to the SMEs. However, over the period 2000 to 2005, the ROE of SMEs averaged 6.4%, compared to 6.9% for the listed non-financial companies.

Chart B1
ROE (median) Trends



Source: DP Information, Thomson Financial, MSD estimates

Chart B2
Decomposition of ROE (median) for SMEs in Singapore



Source: DP Information, MSD estimates

A DuPont analysis decomposes the drivers of ROE into its constituent ratios: profit margin, which measures the profitability or productivity of the firm's operations; asset turnover or asset utilisation, a measure of the efficiency of its investments; and leverage, an indicator of its debt taking position. (Table B1) Chart B2 shows that the movements in ROE in most years have been determined largely by the profit margin component.

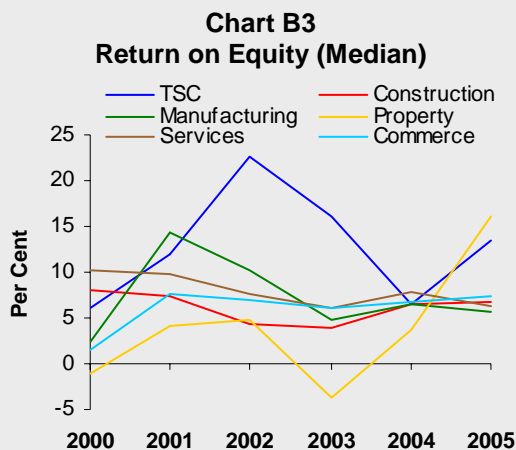
Table B1
Decomposition of Return On Equity

ROE = Profit Margin x Asset Turnover x Leverage Ratio		
Ratios	Descriptions	Impact on ROE of an increase in ratio
Profit margin = $\frac{\text{Net profit}}{\text{Sales}}$	The margin between income and costs	Positive – Indicates higher profitability
Asset Turnover = $\frac{\text{Sales}}{\text{Total Assets}}$	The degree of risk-taking	Positive – Indicates higher efficiency
Leverage Ratio = $\frac{\text{Total Assets}}{\text{Equity}}$	The degree of leverage taking	Negative – Generally, one should be mindful of large increases in leverage

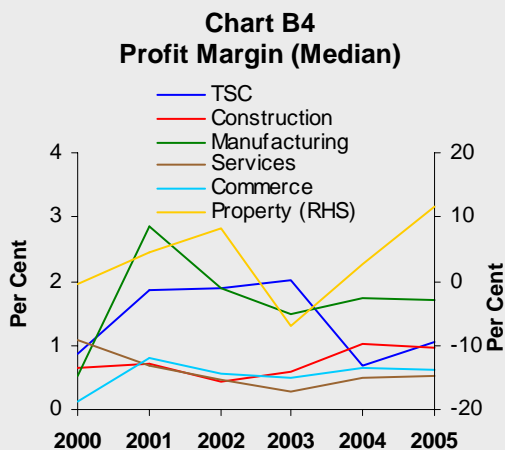
^{1/} According to this survey, for a firm to be considered an SME, it has to satisfy the following criteria: (i) registered as a limited or private limited firm; (ii) have sales/turnover of less than S\$ 50 million; (iii) have fixed assets of less than S\$ 15 million; (iv) have less than 200 employees (for non-manufacturing firms); and (v) have at least 30% local equity ownership. However, this dataset may be subjected to selection bias as firms with better financial statements would have a higher incentive to participate in a survey that ranks financial performance.

^{2/} Based on Economic Survey of Singapore 2005, figures quoted are for 2003.

Improvement in the ROE of Singapore's SMEs has been broad-based in recent years. In particular, the property and TSC sub-sectors were the most responsive to the economic upturn after 2003, with median ROE rising significantly to 16% and 13.5% respectively in 2005. (Chart B3) Nevertheless, they tend to have higher fluctuations, with a standard deviation of more than 6% in median ROE compared with the standard deviation of 2.2% for the SME sector. Profit margins were the highest for SMEs in the property, TSC and manufacturing sub-sectors in 2005, although again the ratios have fluctuated quite a bit. (Chart B4)

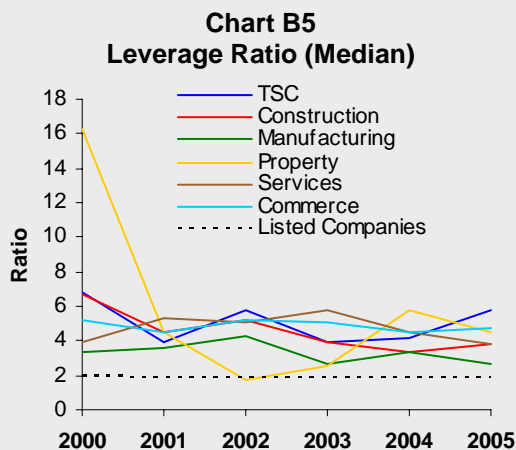


Source: DP Information, MSD estimates

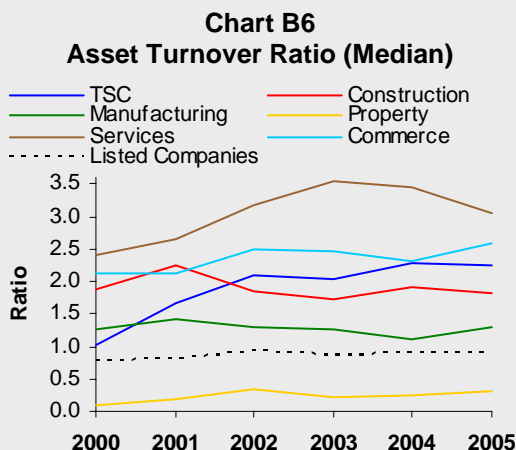


Source: DP Information, MSD estimates

The leverage ratios across industry sub-sectors averaged about 3.7 times for the past three years, although this is higher than the listed non-financial firms' ratio of 1.9 times over the same period. (Chart B5) However, it appears that this reliance on credit has been put to good use. The increase in the asset turnover ratios indicate that investment efficiency has improved since 2000, with many SMEs having higher asset turnover ratios than listed firms. (Chart B6) The higher efficiency could have resulted from more SMEs moving their businesses into higher value added activities, just as Multinational Corporations (MNCs) have done.



Source: DP Information, Thomson Financial, MSD estimates



Source: DP Information, Thomson Financial, MSD estimates

To sum up, the profitability of SMEs in Singapore has improved since 2003, led mainly by firms in the property and TSC sub-sectors. Although the financial ratios of the SMEs have not been as strong as those of listed firms in recent years, they are nevertheless quite favourable and indicative of a fairly strong and vibrant performance.

2.2 Household Sector⁶

Households play an important role in the banking system as depositors and borrowers. As borrowers, they account for about three-fifths of non-bank loans. Therefore, changes in their financial wealth can have significant effects on both the real economy and financial sector activity. Indeed, a deterioration of households' repayment capacity, which could materialise if indebtedness rises rapidly without a corresponding increase in wealth and income, can create stress in the banking system and undermine financial stability.

Household debt accumulation remained flat in recent years, accompanied by strong growth in wealth and wage income

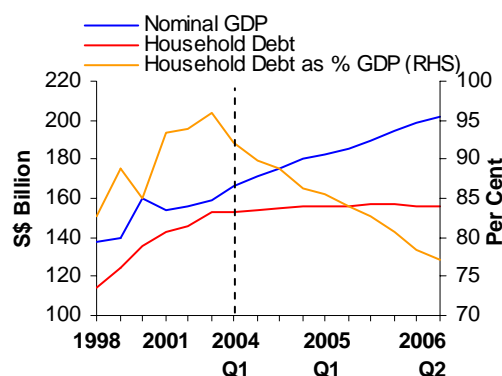
In Singapore, households' total borrowing remained flat in the first half of 2006 as the growth in mortgage loans extended by banks was offset by the fall in mortgage loans by HDB and personal loans. (Chart 2.9) On the asset side, the healthy economic environment improved households' balance sheet positions as property prices and wages increased. (Charts 2.10 and 2.11)

Reflecting the faster pace of economic growth, household liabilities as a percentage of nominal GDP fell to 77% in Q2 2006 from 96% in Q4 2003. (Chart 2.9) This level of household indebtedness is now lower than that in developed countries such as the US and the UK and the five-year average growth of household debt in Singapore has been slow compared to that in many countries. (Chart 2.12)

Growth of household wealth due to gains in property and financial markets

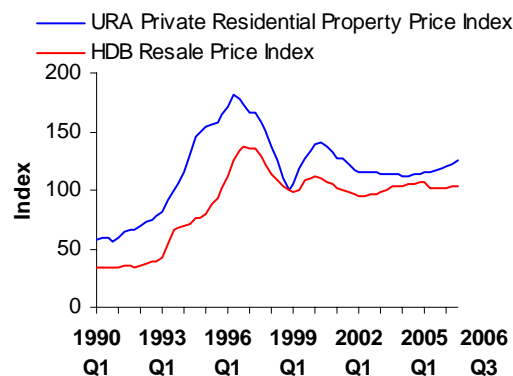
Household wealth, defined as household assets less household liabilities, grew by 8% y-o-y in Q2 2006, to S\$752 billion, which was about four times Singapore's nominal GDP. (Chart 2.13)

**Chart 2.9
Household Debt**



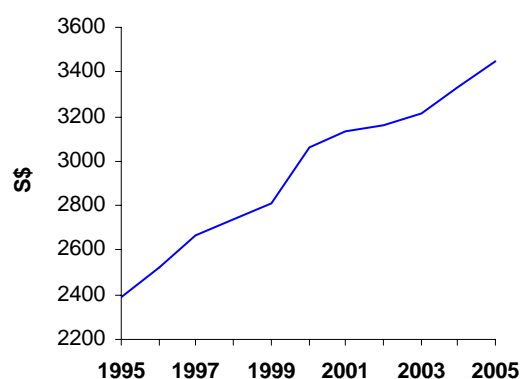
Source: MSD estimates

**Chart 2.10
Residential Property Prices**



Source: URA and HDB, MSD estimates

**Chart 2.11
Economy-wide Monthly Wages (Median)**



Source: MOM, MSD estimates

⁶ Data in this section are mostly MSD estimates based on data and other information from other ministries and statutory boards.

The growth of households' total assets in the first half of 2006 was boosted by gains in both the property and equity markets. Property assets which accounted for about two-fifths of total household assets grew by 2.1% y-o-y in Q2 2006. (Chart 2.14) This reflects the turnaround in property prices especially in the private high-end segment.

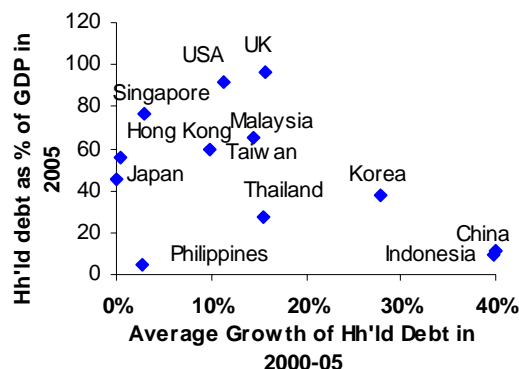
Households' financial assets that comprise stocks, unit trusts and investment-linked insurance, grew by 14.5% y-o-y in Q2 2006. Despite the mid-year corrections in financial markets, household wealth was not adversely affected as equity prices rebounded quickly. Moreover, financial assets, excluding deposits and CPF savings, accounted for a relatively small share, at 27% of total household assets.

The recent rise in property prices further improved the negative housing equity situation in Singapore. An MAS survey of six banks that account for almost the entire housing loan market shows that negative equity for private residential properties fell to 4.7% of the total value of outstanding mortgage loans in September 2006, compared with 7.1% a year ago. Similarly, in terms of the number of mortgage accounts, 5.1% were in negative equity in September 2006 compared with 7.6% a year earlier. (Chart 2.15)

Scenario analysis suggests the mortgage servicing burden will see modest increase next year

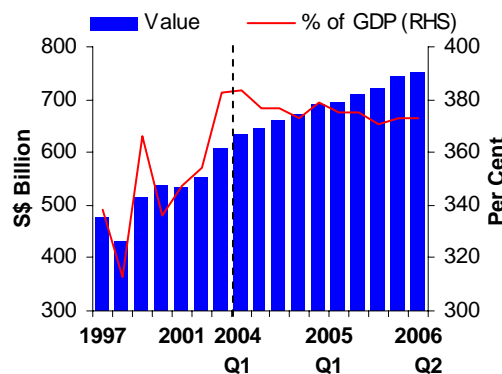
In the last FSR, we assessed households' vulnerability to an increase in mortgage rates. The simulations showed that the mortgage servicing burden was manageable across income groups. In this FSR, we conducted an analysis based on an adverse scenario, where GDP and wage growth were reduced by about 3% points and 1% points respectively in 2007 compared with the baseline forecast. Table 2.2 shows that the mortgage servicing ratio would see only modest increase in 2007 for all income groups. However, the lowest 20% income households may be relatively more affected given that their base mortgage servicing burden is higher than that of the other income groups.

Chart 2.12
Cross-Country Comparison of Household Debt



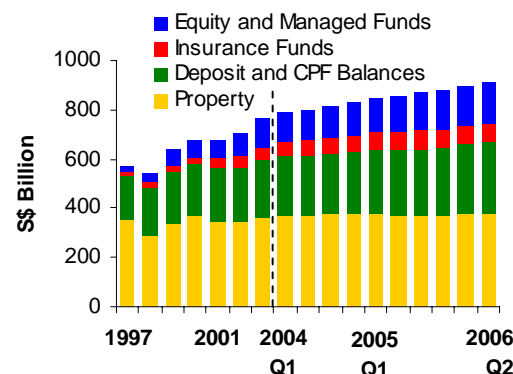
Source: CEIC, MSD estimates, Global Financial Stability Report, September 2006
Note: All data where available are for end 2005 or latest 2006

Chart 2.13
Household Wealth



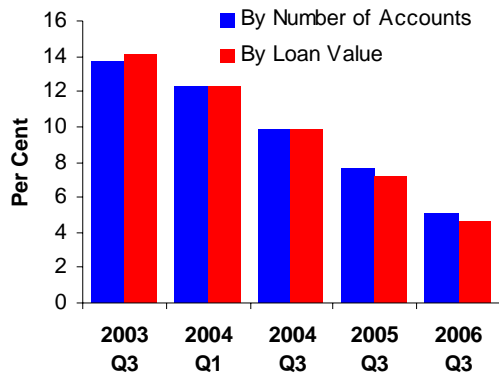
Source: MSD estimates

Chart 2.14
Household Assets



Source: MSD estimates

Chart 2.15
Negative Housing Equity



Source: MSD estimates

Table 2.2
Scenario Analysis of Slower Wage Growth on Mortgage Payments

	2006	2007	2007
Mortgage Payment as % of Total Income	Baseline	Baseline	Adverse Scenario
All households	14.1	13.8	14.0
Lowest 20% income group	32.4	31.7	32.1

Source: MSD estimates. Monthly income includes employers' and employees' CPF contributions.

3 FINANCIAL SECTOR

3.1 Banking Sector

Against the backdrop of sustained global and domestic economic growth, the demand for credit from commercial banks has expanded by around 10%, on average, in the first nine months of the year. Growth in DBU loans to firms has increased significantly, while growth in ACU loans to non-bank customers has been healthy. Looking ahead, while the operating environment may become more challenging as economic growth slows, local banks' strong capital positions and diversified income streams should contribute to their capacity to absorb shocks.

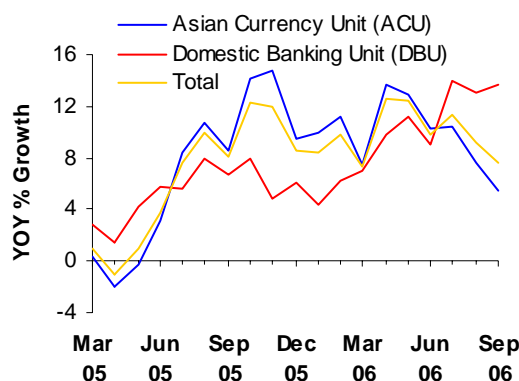
Growth of ACU lending remained at double digit in H1 2006 before moderating slightly in recent months

The ACU market saw double-digit growth in loan demand in H1 2006 before moderating slightly in recent months. (Chart 3.1) Robust demand for ACU loans came against the backdrop of sustained global and domestic economic growth.

Growth in ACU interbank loans was dominated by exposures to the G3 countries and largely reflected funding for head offices and related subsidiaries and branches.

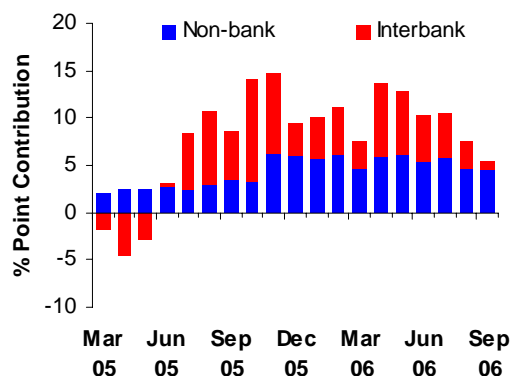
Growth in ACU non-bank lending remained steady, with lower volatility than in interbank activity (Chart 3.2), and was a key driver of the ACU credit cycle. While this type of lending carries higher credit risk than interbank lending, it has remained diversified geographically. As at September 2006, 90% of the loan stock was spread out among the top-20 markets, while the remaining 10% was accounted for by 85 countries. (Chart 3.3) Loans to firms in East Asia remained the most significant ACU non-bank exposure.

**Chart 3.1
Growth in Loan Demand**



Source: MAS

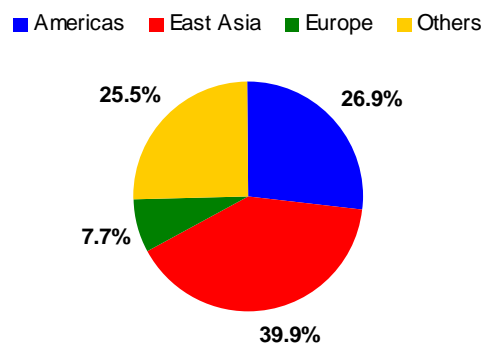
**Chart 3.2
Contributions to ACU Loan Growth**



Source: MAS

Note: Interbank data exclude inter ACU-DBU transactions

**Chart 3.3
ACU Non-bank Loans by Destination
(Excluding Singapore)
as at Sep 2006**



Source: MAS

In comparison, growth of DBU lending has been rising steadily

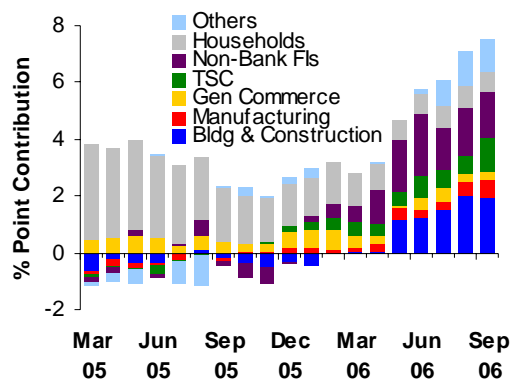
In comparison, the growth of DBU lending has been rising steadily this year from 4.4% y-o-y in January to 13.7% y-o-y in September. The June FSR highlighted that firms' demand for credit was subdued, despite healthy GDP growth and low interest rates. Since then, loan demand has recovered quite sharply, especially that by non-bank financial institutions, building & construction firms, and firms in the TSC and business services sectors. (Chart 3.4)

However, growth in credit to households (comprising mortgages and personal loans) has remained relatively low, even slipping below the rates in 2005. (Chart 3.4) For example, household credit increased 7% y-o-y in March 2005, slowing to 2.2% in March 2006, and to 1.4% in September. Anecdotal evidence suggests there has been an increase in the incidence of housing loans repayment, as mortgage rates exceeded CPF rates and were expected to rise further. Repayments may have been one of the factors contributing to sluggish growth in housing loans. Interbank lending continued to be a key support for domestic banking activity, partly stimulated by the favourable interest rate environment.

Local banks' operating profit for the first nine months was higher than that in the past three years

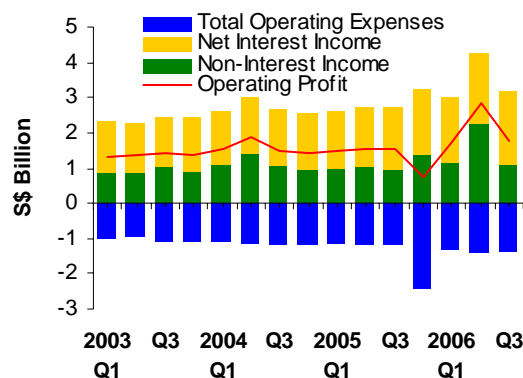
The local banks' aggregated operating profit for the first nine months (before provisioning) was higher than that in the past three years, although the operating profit in Q2 2006 also reflected one-off gains of S\$1.2 billion, dominated by divestments. (Chart 3.5)

Chart 3.4
Contribution to Growth of DBU Non-bank Loans



Source: MAS

Chart 3.5
Components of Local Banks' Operating Profit



Source: Local banks' financial accounts

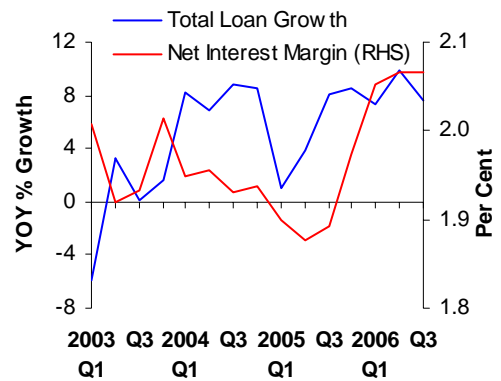
Underlying profits have been driven by contributions from net interest income given strong economic activity (Chart 3.6), favourable loan demand and interest margins, coupled with greater non-interest income especially from commissions and wealth management.

The local banks' performance in regional markets (ASEAN, Hong Kong) and in the rest of the world (ROW) improved compared to the same period last year. (Chart 3.7) Higher loan volumes, robust interbank money market activities and insurance sales contributed to profits.

Looking ahead, the operating environment could present some challenges for the banking industry. In particular, a sharper-than-expected slowdown in economic activity could depress loan demand and cause some deterioration in borrowers' debt servicing ability.

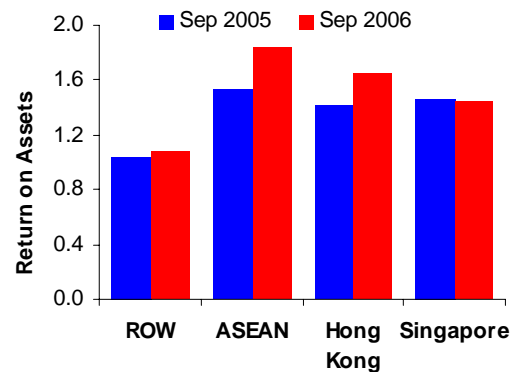
Market-based indicators suggest there has been no significant change in investors' risk perception of the local banks since the last FSR. Local banks' share prices have remained firm, with volatility in line with overall market movements. (Chart 3.8)

Chart 3.6
Drivers of Net Interest Income



Source: MAS, Local banks' financial accounts

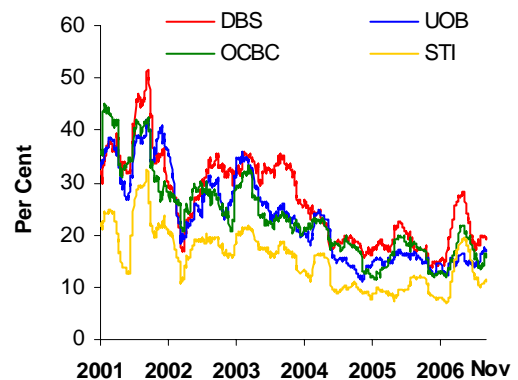
Chart 3.7
Local Banks' Performance in Various Regions *



Source: Local banks' financial accounts

*Some banks do not provide details of their ASEAN exposures. These exposures are thus aggregated under the rest of the world (ROW).

Chart 3.8
Share Price Volatility*



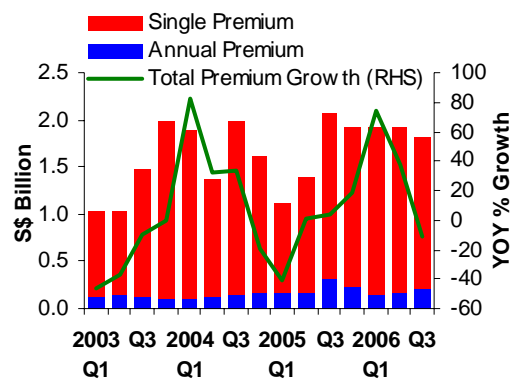
Source: Bloomberg

*Annualised standard deviation of daily stock price returns (90 day moving window)

3.2 Insurance Sector

Overall, the strong financial buffers and healthy balance sheets of the insurance sector underpin its resilience against an economic slowdown. The direct life insurance industry continued to see healthy premium growth in the first nine months of 2006 compared with the same period in 2005, primarily from single-premium products. Demand for investment-linked products (ILPs) has been rising, fuelled by attractive returns from the rising stock markets. Life insurers have been developing products which allow policyholders to bear more market risks in exchange for possible higher returns. General insurers' profitability was driven mainly by investment income which benefited from rising interest rates and to some extent, from the rallying equity markets. However, net investment income remains exposed to volatility in financial markets.

Chart 3.9
Direct Life Insurance: New-Business Premium (SIF)



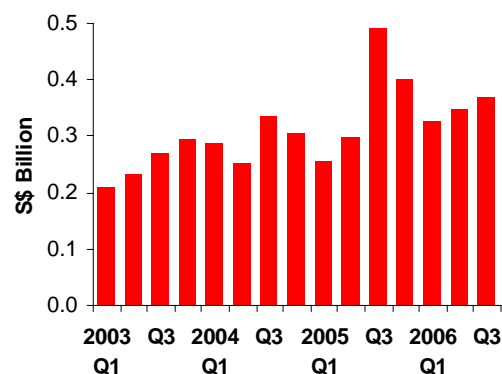
Source: MAS

Singapore Life Insurance

Singapore life insurance new-business premiums grew, driven by single premiums

Life insurers' total new-business premium receipts for the Singapore Insurance Fund (SIF) grew by 24% y-o-y in the first nine months of 2006, despite a y-o-y contraction in Q3 2006.⁷ (Chart 3.9) This growth reflected the strength of the economy and confidence in financial markets. On a weighted-premiums basis⁸, receipts for the life insurance sector remained broadly stable (Chart 3.10), largely driven by the growth in sales of single-premium products at 31.3% y-o-y which compensated for the contraction in annual-premium growth in the first nine months of 2006.

Chart 3.10
Direct Life Insurance: Weighted Premium (SIF)



Source: MAS

⁷ Recent data for total new business premiums have contracted by 11.7% y-o-y in Q3 2006 mainly due to the one-time transfer of the Dependent's Protection Scheme (DPS) from the Central Provident Fund to the private life insurance sector in Q3 2005 last year.

⁸ Weighted premiums consist of 10% single premiums and 100% regular premiums of both individual and group policies. These provide an approximate measure of weighted sales across companies to allow for differences in mix between regular- and single-premium businesses.

Market risks remain a concern, but potential adverse effects on balance sheets limited

Looking ahead, an economic slowdown could increase market risks as the possible increase in the volatility of financial markets could present challenges for insurers' asset-liability management. Nevertheless, the continued growth in sales of investment-linked products (ILPs) arising from growing demand has seen policyholders bear more market risks in return for possible higher returns from the rising stock markets. The new-business premiums of ILPs grew by 55% y-o-y in the first nine months of 2006, despite slower growth in Q3 2006. (Chart 3.11)

Strong financial buffers suggest resilience against adverse shocks

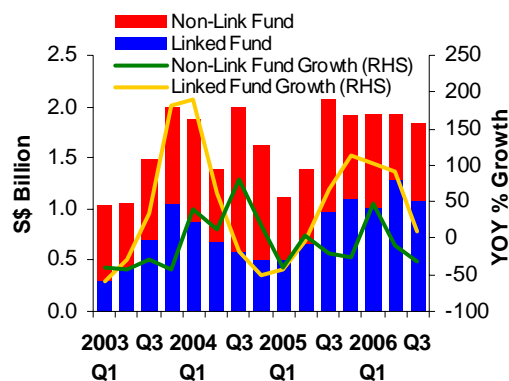
Strong financial buffers suggest that the balance sheets of direct life insurers remain resilient to adverse shocks arising from an economic slowdown. These buffers include an industry CAR of more than two times the minimum regulatory requirement as at Q3 2006, robust industry net income growth of 45% y-o-y in the first nine months of 2006 (Chart 3.12), and an industry claims liquidity ratio of four.⁹

Singapore General Insurance

Global reinsurance outlook stable but tensions persist

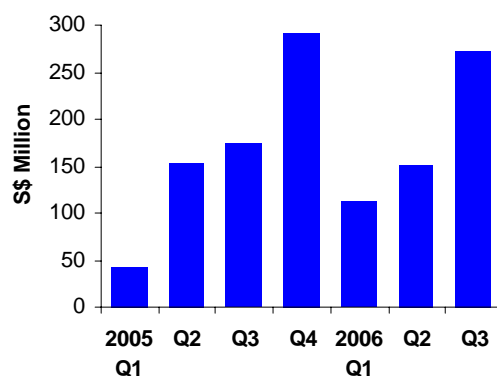
The outlook for the global reinsurance sector has remained broadly stable. Even though fewer major global reinsurers were rated 'A' and above this year compared to last year, (Chart 3.13) the financial strength of the industry is improving in light of a favourable hurricane season in the US and global reinsurers exercising greater underwriting caution. Rating agencies are not expecting any further downgrades for the rest of this year and early 2007.

Chart 3.11
Direct Life Insurance: New Business Premium - Non-linked vs Investment Linked (SIF)



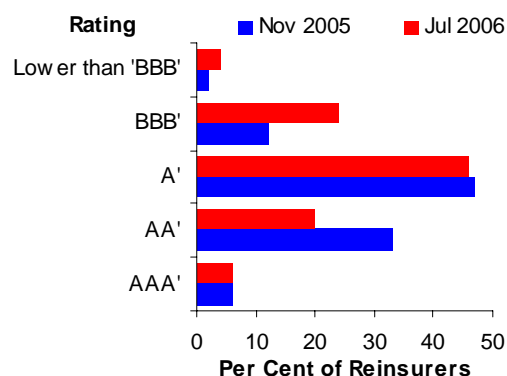
Source: MAS

Chart 3.12
Direct Life Insurance: Net Income (SIF)



Source: MAS

Chart 3.13
S&P Ratings of Global Reinsurers



Source: Standard and Poor's

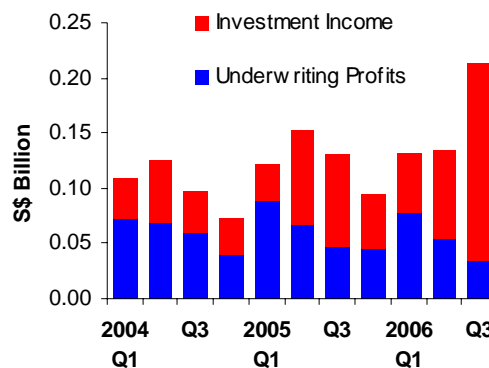
⁹ The claims liquidity ratio of four suggest that liquid assets of direct life insurers is able to meet current liabilities and total expected claims for the next three years as at end 2005. Liquid assets are defined as the sum of cash and deposits and government securities while current liabilities are defined as total liabilities minus policy liabilities. Claims for the next three years have been estimated by direct life insurers as at end 2005.

Moreover, almost all the global reinsurers that have a presence in Singapore have continued to enjoy healthy ratings. On the back of strong parental support, Singapore-based branches and subsidiaries have registered healthy gross premiums and underwriting profits throughout 2006. However, the somewhat reduced financial strength of global reinsurers (post-Hurricane Katrina), their greater conservativeness in underwriting high-risk businesses together with gradual rate tightening could mean that primary insurers and even reinsurers have to retain more risks in future. This, in turn, implies greater pressure on general insurers to maintain underwriting and pricing discipline and improve asset-liability management.

General insurers registered strong operating profits, driven by net investment income

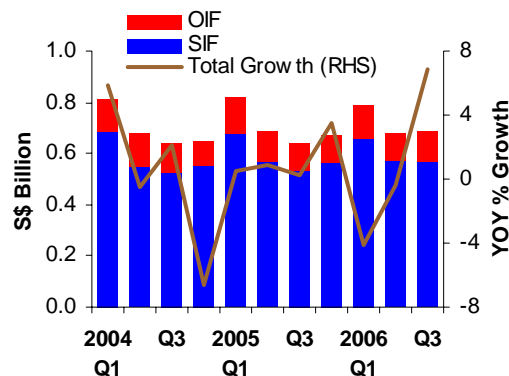
General direct insurers registered strong operating profits for the first nine months of 2006 mainly due to substantial gains in investment income. Overall net investment income¹⁰ for the first nine months this year stood at a healthy S\$ 314 million driven by significant gains (including unrealised gains) from the rising stock markets in recent quarters. (Chart 3.14) General direct gross premium receipts for both the SIF and the Offshore Insurance Fund (OIF) grew by about 7% y-o-y in Q3 2006. (Chart 3.15) However, gross premiums in the first nine months of 2006 remained broadly unchanged. This could be attributed to competitive pricing pressures and a marginal decline in gross premiums in the earlier part of the year. Against this backdrop, underwriting profits continued to fall in all the three quarters in 2006 leading to an overall 17.5% y-o-y decline. (Chart 3.14) This reflects some slowdown in the performance of business lines such as motor and fire, and greater losses from workmen compensation.

Chart 3.14
General Direct Insurance: Underwriting Results & Investment Income (SIF & OIF)



Source: MAS

Chart 3.15
General Direct Insurance: Gross Premiums (SIF & OIF)



Source: MAS

¹⁰ Net Investment Income includes interest, rental and dividend income earned from investments together with any unrealised changes in the market value of investments compared to the previous reporting period.

General direct insurers remain adequately capitalised with strong CAR ratios

General direct insurers are in a strong position to accommodate an economic slowdown, given that they continue to maintain strong balance sheets and remain adequately capitalised. As of September, the industry CAR was more than twice the minimum regulatory requirement. However, going forward, operating performance could be adversely affected if underwriting profits continue to fall. Net investment income remains exposed to volatility in financial markets and may decline with a slowdown in the economy. Thus, insurers should continue to work towards improving underwriting results in key business lines.

4 Financial Infrastructure

Business Continuity Management

Recent events have sharpened worldwide focus on business continuity management (BCM). Financial institutions and regulators have realised that the scope of BCM should be much wider than was defined in the past, and they are increasingly devoting more attention and resources to this. The BCM efforts of Singapore's financial sector are summarised in the following sections.

MAS guidelines aim to enhance preparedness of financial institutions

MAS has for the past few years emphasised the importance of financial institutions having in place well-tested business continuity plans to ensure that critical operations could continue even in the event of major operational disruptions. To improve the overall resilience of the financial sector in Singapore, MAS published a set of principle-based BCM guidelines in 2003 to help financial institutions enhance their preparedness and encourage greater cooperation among industry participants. The guidelines comprise the following key principles:

- (i) Boards of directors and senior management should be responsible for their institutions' business continuity management;
- (ii) Institutions should embed business continuity management into their usual business operations;
- (iii) Institutions should test their business continuity plan regularly, completely and meaningfully;
- (iv) Institutions should develop recovery strategies and set time objectives for recovery of critical business functions;
- (v) Institutions should understand and appropriately mitigate interdependency risks of critical business functions;
- (vi) Institutions should plan for wide-area disruptions;
- (vii) Institutions should implement a separation policy to mitigate concentration risk of critical business functions.

The guidelines serve as standards which financial institutions are encouraged to adopt in formulating sound BCM policies and practices. Institutions may adapt the guidelines as necessary, taking into account the size, nature and complexity of their operations and business activities.

MAS issued additional guidelines on avian influenza pandemic and terrorism

Terrorism and the looming threat of an avian influenza pandemic have further reinforced the importance of BCM and the need for financial institutions to continually enhance their ability to respond and recover quickly. At the annual International Monetary Fund-World Bank meeting held in Singapore in September 2006, the World Bank warned that a severe bird flu pandemic among humans could cost more than 3% of global GNP. The World Health Organisation (WHO) has also announced that monitoring developments related to avian influenza with a view to keeping its spread under control and preparing for a future pandemic are its top priorities.

To provide further guidance to all financial institutions in their BCM efforts to address the threat of an avian influenza pandemic and terrorism attacks, MAS issued a circular in January 2006. The circular highlighted the key challenges arising from an influenza pandemic, including low staff availability disrupting operations for prolonged periods. It emphasised the need to put in place measures to mitigate the impact of such a pandemic. Financial institutions were also encouraged to adopt a holistic BCM approach to deal with disruptions resulting from terrorist attacks. This should include actively performing assessments of threats and vulnerabilities, implementing appropriate preventive and deterrent measures, and devising comprehensive immediate response plans.

Exercise Raffles: Industry-wide Business Continuity Exercise 2006

On 9 May 2006, the Association of Banks in Singapore (ABS), supported by MAS, conducted an industry-wide business continuity exercise (IWE) to assess the resilience of Singapore's financial sector against major operational disruptions. Codenamed "Exercise Raffles", the large-scale exercise tested the communications and decision-making processes of individual financial institutions, as well as industry-wide coordination in response to a major disruption arising from a terrorist attack. It enabled participants, including MAS, to execute and validate their business continuity plans using the market-wide scenario.

Through real-time minute-by-minute simulation of events and scenarios, the exercise tested the disruptive effects of a few bomb blasts within the central business district on the financial sector in the areas of payment systems, banking operations, and financial markets.

More than 4,000 participants from over 170 financial institutions, infrastructure providers, civil authorities and MAS were involved in the half-day exercise. Apart from London, Singapore is the only financial centre to have conducted such a large-scale business continuity exercise.

5 SPECIAL FEATURE

5.1 Assessing Default Risk for the Corporate Sector: Application of the Merton-KMV Model

Introduction

The analysis of credit risk posed by the corporate sector has become an integral part of financial stability monitoring, given the close relationship between corporate vulnerabilities and the occurrence of banking and financial crises in many countries. The development of effective monitoring tools that can help detect corporate vulnerability in terms of default risk is important to forewarn the potential of any widespread corporate failures.

Different methods for measuring default risks are discussed in the literature on credit risk modeling. Among them, the structural approach (also known as the contingent claim approach) proposed by Merton (1974) is frequently used by market participants and increasingly by central banks. The Merton approach was further developed by Kealhofer, McQuown and Vasicek (KMV). The modified approach came to be referred to as the Merton-KMV model.

This special feature uses the Merton-KMV approach¹¹ to assess the default risk of listed firms in Singapore and regional countries. This framework complements existing financial indicators and provides some forward-looking elements for anticipating corporate distress that may in turn affect the stability of Singapore's and the region's banking system.

Methodology and Data

The Merton-KMV approach uses information from both corporate balance sheets and equity prices. The latter, especially, contain forward-looking information on the credit quality of the firm. There are three main elements in the Merton-KMV model for quantifying default risk: (i) the market value of the firm's assets; (ii) the volatility of its asset value; and (iii) the liabilities of the firm. The default event is determined by the market value of the firm's assets in conjunction with its liability structure. This approach assumes that the default process is related to the capital structure of a firm.

Chart 5.1 shows the broad framework. The blue line represents one possible path over time of the value of the firm's assets reflecting the nature of its business and the shocks it faces. The range of possible outcomes and their likelihood are represented by the probability distribution function for the firm's asset value. If the firm's asset value is lower than its debt, then the firm is in default. Hence, the probability of default as shown by the shaded area, can be evaluated from the firm's market asset value, the book value of its debt and its share price movements.

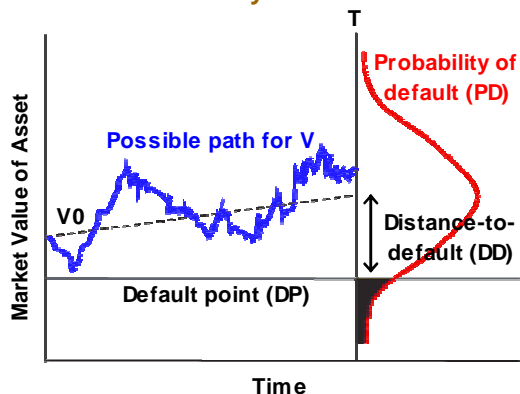
In estimating the probability of default (PD), we assume that the firm's equity can be regarded as a call option written on its underlying assets with the strike price being the book value of its debt.

We are grateful to Professor Andrew K. Rose, Acting Director, Risk Management Institute, National University of Singapore for helpful comments on this study.

¹¹ This study follows the Merton model that uses the Black-Scholes option pricing formula. This equation assumes the market value of assets follow the geometric lognormal process. See Merton, R. C. (1974): "The Pricing of Corporate Debt: the Risk Structure of Interest Rates", for more details.

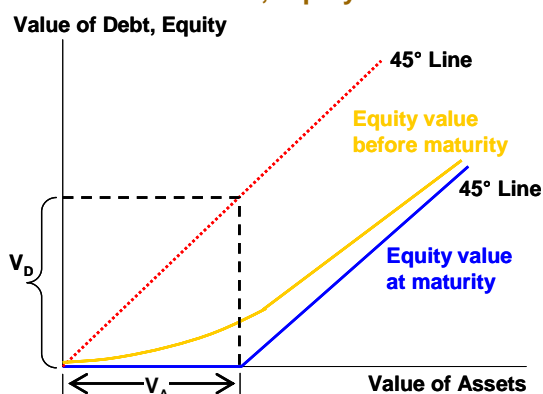
For example, Chart 5.2 shows that when the debt matures, the value of the equity, like an option, depends on the final value of the asset. When the value of the asset (V_A) is less than the value of debt (V_D), the option becomes worthless and the firm is considered to be in default. Before the debt matures, the equity still has value even if the value of the asset is below that of the debt.

Chart 5.1
Probability of Default



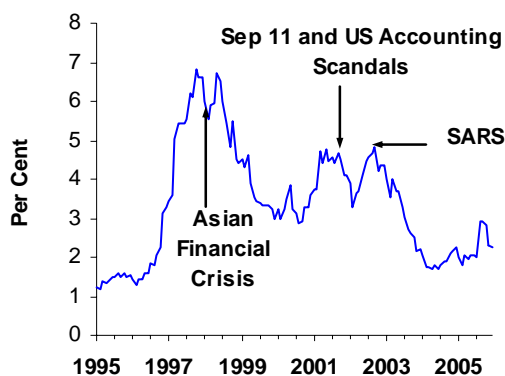
Data on listed non-financial companies used in this study were obtained from Thomson Financial. For each country, the set of firms is selected based on available data for total debt, market value and prices from January 1995 to December 2005.¹² We were able to include 123 firms in Singapore, 249 in Malaysia, 168 in Thailand, 225 in Hong Kong, 87 in China, and 162 in South Korea.

Chart 5.2
Value of Asset, Equity and Debt



Results

Chart 5.3
Aggregated Probability of Default of Singapore's Corporate Sector



Source: Thomson Financial, MSD estimates

Chart 5.3 shows that the aggregate probability of default (PD) for Singapore was stable and maintained at below 2% before the Asian Financial Crisis. The aggregate PD rose sharply from less than 1.5% in September 1996 to a peak of 7% in October 1997. This increase was driven mainly by firms in the property and construction sub-sectors. (Chart 5.4) More generally, the low level of PD for most firms, even during the crisis, shows that failures were viewed as unlikely.

As the crisis in 1997-98 receded, the PDs across all industries also fell gradually. The aggregate PD increased to about 4% following September 11 and accounting scandals in the US. The increase in PD during late 2002 and early 2003 coincided with the outbreak of the Sars epidemic in 2003. TSC firms were most affected during this period.

¹² The volatility of equity prices is estimated by the exponentially weighted moving average (EWMA) method. Equity volatility is given by $\sigma_t^2 = (1 - \lambda)R_t^2 + \lambda\sigma_{t-1}^2$, where R_t is the monthly log return of equity price and λ is the decay factor which is set to be 0.94. The initial σ_t^2 is the average of the first 12 months of the data series.

For instance, the aviation industry of Sars-affected countries was severely disrupted. The likelihood of corporate default has eased substantially for the corporate sector in recent years. However, some industries did experience higher PDs recently although the likelihood of failures was still low with PDs of less than 1.5%.

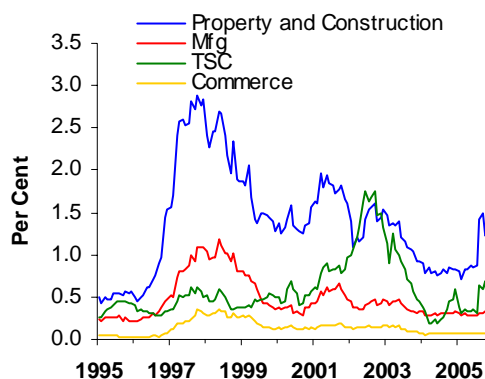
In this study, we construct an equally weighted composite PD for the firms in the regional economies such as Malaysia, Thailand, Hong Kong, China and South Korea. In the sample period of 1995 to 2005, the likelihood of default for firms in the region was higher than that in Singapore. For instance, during the stress period of the Asian Financial Crisis, the PD for the regional countries reached more than 20%, which was higher than the 7% for Singapore. (Chart 5.5)

In a similar study by the IMF¹³, a PD range of about 12% to 34% was found for the corporate sector in South Korea, Malaysia and Thailand during the peak of the stress period from end-1999 to the first half of 2000. The PDs for these countries receded gradually to about 6% to 15% as at end-2003.

Conclusions

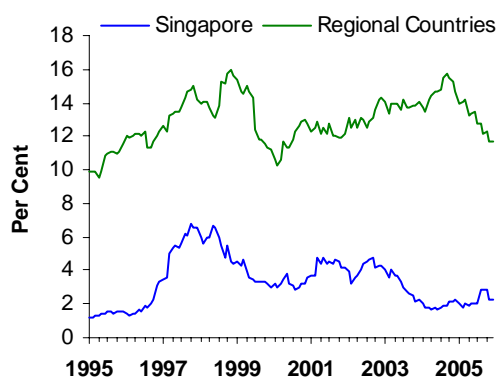
To sum up, this study describes the Merton-KMV approach to quantify default risk. We find that this indicator may be useful for highlighting which firms may have a higher probability of defaulting on their debts. This indicator may complement existing financial indicators and may be used for some forward-looking analysis. For instance, the levels of PD indicated a higher level of stress for Singapore and regional countries during episodes of financial and economic difficulties.

Chart 5.4
Probability of Default of Singapore's Corporate Sector by Industry



Source: Thomson Financial, MSD estimates

Chart 5.5
Aggregated Probability of Default of Corporate Sector in Singapore & the Region



Source: Thomson Financial, MSD estimates

The limitation of this study is that only listed firms were used. So the sample of firms may not be fully representative of the corporate sector. We were also unable to analyse smaller non-listed firms, which may have had higher PDs and actual incidences of default during periods of stress. Furthermore, there may be an issue of survivorship bias as the listed firms used in the sample tend to be stronger firms that have survived various periods of difficulty.

¹³ Jorge, A, Chan-Lau and Gravelle, T (2005), "The END: A New Indicator of Financial and Non-financial Corporate Sector Vulnerability", *IMF Working Paper*.

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Statistical Appendix

SINGAPORE NON-FINANCIAL SECTOR

Table A.1: Corporate Sector's Financial Ratios

Table A.2: Household Sector's Financial Indicators

SINGAPORE FINANCIAL INSTITUTIONS

Table B.1: Banking Sector's Financial Soundness Indicators

Table B.2: Local Banks' Selected Financial Soundness Indicators

Table B.3: Life Direct Insurers' Financial Indicators

Table B.4: General Direct Insurers' Financial Indicators

SINGAPORE NON-FINANCIAL SECTOR

Table A.1: Corporate Sector's Financial Ratios

	Q4 2002	Q2 2003	Q4 2003	Q2 2004	Q4 2004	Q2 2005	Q4 2005	Q2 2006
Median Return-on-Assets (Per Cent)								
Transport, Storage & Communications	5.1	6.0	6.9	8.6	10.0	10.0	8.5	8.5
Property	2.3	2.5	2.5	2.9	3.7	3.3	3.8	4.9
Multi-Industry	1.9	-4.1	2.0	3.3	3.5	3.8	3.9	4.8
Manufacturing	3.6	1.4	5.4	6.6	6.4	5.7	4.9	4.6
Hotels & Restaurants	1.1	-1.3	1.5	2.3	2.1	3.3	2.8	5.0
Construction	2.1	1.5	1.5	0.7	1.3	1.0	1.5	1.6
Commerce	1.7	2.9	3.9	5.8	6.2	5.2	6.1	7.8
Median Current Ratio (Ratio)								
Transport, Storage & Communications	1.1	1.0	1.2	1.3	1.1	1.3	1.4	1.4
Property	2.0	2.0	1.7	2.1	1.7	2.2	2.1	1.9
Multi-Industry	1.2	1.3	1.5	1.3	1.2	1.3	1.2	1.4
Manufacturing	1.6	1.6	1.7	1.6	1.6	1.6	1.6	1.6
Hotels & Restaurants	1.7	1.7	1.7	1.5	1.7	2.1	2.0	2.1
Construction	1.2	1.3	1.3	1.3	1.3	1.3	1.4	1.4
Commerce	1.7	1.7	1.8	1.9	1.8	1.7	1.7	1.5
Median Total Debt/Equity (Per Cent)								
Transport, Storage & Communications	43.5	38.9	36.8	51.9	45.8	31.8	38.6	29.4
Property	78.7	56.6	58.9	67.3	55.3	49.1	49.5	78.4
Multi-Industry	64.2	59.6	55.1	54.6	56.4	53.3	43.0	50.5
Manufacturing	29.1	31.4	30.5	27.2	26.2	27.3	31.6	32.2
Hotels & Restaurants	38.2	40.4	25.5	31.6	33.6	28.5	26.7	27.8
Construction	39.9	60.8	51.0	50.8	56.5	43.9	28.6	45.8
Commerce	49.9	47.8	35.6	45.4	42.7	45.3	47.8	46.7
Median Interest Coverage Ratio* (Ratio)								
Transport, Storage & Communications	5.4	5.5	11.8	10.2	9.1	13.9	11.7	10.7
Property	1.9	2.7	3.3	5.6	5.1	5.5	7.8	6.4
Multi-Industry	1.5	5.8	4.3	6.1	4.1	7.9	4.6	8.6
Manufacturing	4.1	5.6	10.1	6.9	7.4	6.0	5.8	5.8
Hotels & Restaurants	-0.8	1.0	5.2	2.3	2.7	4.4	4.8	4.7
Construction	1.4	1.4	1.3	2.3	1.9	2.1	1.5	4.1
Commerce	2.4	4.9	5.8	7.3	5.6	6.1	5.4	6.1

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

Table A.2: Household Sector's Financial Indicators

	Q4 2003	Q1 2004	Q2 2004	Q3 2004	Q4 2004	Q1 2005	Q2 2005	Q3 2005	Q4 2005	Q2 2006
Per Cent (unless otherwise stated)										
Household Assets (S\$ billion)	762.1	788.9	799.4	814.4	829.1	846.4	852.6	867.0	877.1	908.3
Household Residential Property Assets as % of Total Assets (%)	47.7	46.8	46.8	46.0	45.7	44.7	43.9	42.9	42.7	42.1
Household Liabilities (S\$ billion)	152.8	152.9	153.9	155.2	155.7	155.8	156.0	156.5	156.8	155.8
Household Liabilities to Assets Ratio (%)	20.0	19.4	19.2	19.1	18.8	18.4	18.3	18.1	17.9	17.2
Household Liabilities as % of GDP (%)	96.0	92.2	89.8	88.8	86.2	85.6	84.0	82.6	80.7	77.2

Source: MSD estimates, Ministry of National Development, Urban Redevelopment Authority and Singapore Department of Statistics.

SINGAPORE FINANCIAL INSTITUTIONS

Table B.1: Banking Sector's Financial Soundness Indicators

	Q3 2004	Q4 2004	Q1 2005	Q2 2005	Q3 2005	Q4 2005	Q1 2006	Q2 2006	Q3 2006
Loan Concentrations (% of Total Commercial Bank Loans)									
Bank Loans	65.6	66.0	65.4	65.1	65.4	64.2	64.2	63.6	63.5
Non-bank Loans	34.4	34.0	34.6	34.9	34.6	35.8	35.8	36.4	36.5
Loans through the Asian Dollar Market (% of Total Commercial Bank Loans)									
Total ADM Loans	72.7	72.6	71.5	71.7	73.1	73.3	71.5	72.0	71.6
Of which to (% of Total Asian Dollar Market Loans):									
United Kingdom	18.7	20.2	20.3	19.5	16.6	15.0	15.4	15.6	15.7
Japan	21.2	19.3	17.3	18.1	20.8	21.4	17.4	17.2	14.5
Hong Kong	8.2	9.0	8.6	8.5	7.8	8.4	7.8	8.6	10.0
USA	5.6	6.3	5.6	6.3	5.5	7.8	7.5	8.4	8.2
Switzerland	4.8	5.6	6.2	5.7	6.2	6.0	6.6	6.5	6.1
Banks	80.1	80.0	79.2	78.3	78.4	76.2	76.3	75.4	75.2
Non-bank	19.9	20.0	20.8	21.7	21.6	23.8	23.7	24.6	24.8
Loans through Domestic Banking Units (% of Total Commercial Bank Loans)									
Total DBU Loans	27.3	27.4	28.5	28.3	26.9	26.7	28.5	28.0	28.4
Of which to (% of Total DBU Loans):									
Manufacturing	4.2	3.9	3.9	3.9	3.9	3.8	3.7	3.7	3.8
Building & Construction	9.6	9.4	8.9	8.8	8.9	8.6	8.3	8.9	9.0
Housing	23.9	23.4	23.4	23.2	23.7	23.2	22.5	21.8	21.3
Professionals & Private Individuals	13.3	13.0	12.5	12.4	12.7	12.2	11.6	11.2	10.9
Non-bank Financial Institutions	8.7	8.8	8.4	7.9	8.0	8.2	8.2	8.6	8.0
Banks	26.9	28.8	30.9	31.4	30.1	31.3	33.7	33.5	33.9
Profitability (Per Cent)									
DBU Net Interest Income to Total DBU Loans	2.39	2.42	2.35	2.32	2.38	2.26	2.22	2.22	2.22
Liquidity (Per Cent)									
Liquid DBU Assets to Total DBU Assets	12.0	11.4	11.1	11.4	11.4	10.3	9.7	10.1	10.3
Liquid DBU Assets to Total DBU Liabilities	13.2	12.5	12.4	12.6	12.5	11.3	10.6	11.0	11.2
All DBU Loans to All DBU Deposits	88.2	86.9	84.3	83.4	82.1	81.8	78.9	78.0	76.6
DBU Non-bank Loans to DBU Non-bank Deposits	98.3	100.8	98.8	98.8	95.9	96.3	95.3	95.4	94.7
DBU Non-bank Loan Growth (y-o-y)	6.0	4.5	2.7	2.6	1.9	2.2	2.8	5.7	7.5
DBU Non-bank Deposit Growth (y-o-y)	8.6	6.1	4.6	5.5	9.5	8.5	9.8	13.0	15.2

Source: MAS

Note: Data relates to all commercial banks, Singapore operations only.

Table B.2: Local Banks' Selected Financial Soundness Indicators

	Q3 2004	Q4 2004	Q1 2005	Q2 2005	Q3 2005	Q4 2005	Q1 2006	Q2 2006	Q3 2006
Capital Adequacy (Per Cent)									
Regulatory Capital to Risk-Weighted Assets	16.3	16.2	15.9	14.8	15.3	15.8	15.4	15.9	15.4
Regulatory Tier I Capital to Risk-Weighted Assets	11.8	11.5	11.5	10.4	10.8	11.4	11.2	11.3	11.0
Shareholders' Funds to Total Assets	10.4	10.3	10.4	10.1	10.2	10.4	10.5	10.3	10.2
Asset Quality (Per Cent)									
Non-bank NPLs to Non-bank Loans	5.4	5.0	4.6	4.2	4.0	3.8	3.8	3.4	3.1
NPLs to Total Loans	4.4	4.0	3.6	3.5	3.2	3.0	2.9	2.7	2.4
NPLs to Regulatory Capital	26.7	24.4	22.1	21.8	19.5	17.9	17.4	15.3	14.5
NPLs Net of Specific Provisions to Regulatory Capital	16.0	14.3	12.8	12.6	11.5	10.5	10.4	9.2	8.7
Total Provisions to NPLs	72.8	76.0	77.8	78.9	80.0	80.9	81.3	83.8	86.9
Specific Provisions to NPLs	40.0	41.6	42.0	41.9	41.2	41.1	40.5	40.1	40.1
Loan Concentrations (% of Total Loans)									
Bank Loans	23.3	24.2	25.6	22.0	22.6	24.3	25.6	23.5	25.2
Non-bank loans	76.7	75.8	74.4	78.0	77.4	75.7	74.4	76.5	74.8
Of which to (% of Total Loans):									
Manufacturing	7.3	7.3	7.2	7.7	7.8	7.6	7.8	8.3	8.4
Building & Construction	8.6	8.4	8.9	9.1	8.9	8.8	9.0	9.2	9.2
Housing	22.7	22.5	22.3	22.6	22.4	21.7	21.4	21.1	20.4
Professionals & Private Individuals	10.2	10.1	9.8	9.9	9.7	9.4	9.1	8.9	8.5
Non-bank Financial Institutions	9.8	9.8	9.2	10.0	9.8	10.0	9.6	10.4	10.3
Profitability (Per Cent)									
ROA Cash Basis (Simple Average)	1.37	1.25	1.11	1.21	1.23	1.15	1.22	1.83	1.27
ROE Cash Basis (Simple Average)	12.7	11.8	10.6	11.9	12.0	11.1	11.8	17.2	12.4
Net Interest Margin (Simple Average)	1.93	1.94	1.90	1.88	1.89	1.97	2.05	2.07	2.07
Non-Interest Income to Total Income	41.2	37.6	37.6	38.2	36.0	43.3	37.1	53.2	34.8
Operating Expenses to Income	40.1	45.2	40.5	40.7	42.6	44.0	42.0	32.4	42.2

Source: The local banks' published quarterly financial accounts. All data subject to revision.

Table B.3: Life Direct Insurers' Financial Indicators

	2003	2004	2005	Q4 2004	Q1 2005	Q2 2005	Q3 2005	Q4 2005	Q1 2006	Q2 2006	Q3 2006
Total New-Business Gross Premiums (y-o-y % Growth)											
Policies	-55.4	10.6	288.9	3.9	-5.9	-2.3	834.2	222.8	46.4	29.1	2.6
Annual Premiums	-27.2	10.0	60.8	50.7	43.9	39.6	107.1	45.1	-6.6	-1.7	20.7
Single Premiums	-26.0	30.3	-11.0	-22.6	-46.1	-3.2	-4.2	16.1	87.0	43.7	-7.5
Sum Insured	-7.1	21.0	177.5	32.3	30.1	61.7	533.3	-9.8	37.5	-12.2	11.1
Assets Distribution of Singapore Insurance Fund (Non-Linked Assets)[†] (\$ Million (% of Total Assets))											
Debt Securities	29,309 (55.8)	35,439 (60.3)	41,936 (61.6)	35,460 (60.3)	38,612 (60.1)	40,478 (60.9)	41,787 (61.0)	41,703 (61.3)	40,268 (58.5)	40,953 (59.7)	42,573 (60.2)
Equity Shares	11,367 (21.7)	11,640 (19.8)	15,131 (22.2)	11,414 (19.4)	14,002 (21.8)	14,616 (22.0)	15,008 (21.9)	15,166 (22.3)	16,504 (24.0)	15,675 (22.9)	16,156 (22.8)
Cash & Deposits	4,161 (7.9)	4,625 (7.9)	3,887 (5.7)	4,611 (7.8)	4,114 (6.4)	3,861 (5.8)	3,998 (5.8)	3,902 (5.7)	4,555 (6.6)	4,425 (6.5)	4,478 (6.3)
Loans	4,024 (7.7)	3,685 (6.3)	3,380 (5.0)	3,686 (6.3)	3,559 (5.5)	3,480 (5.2)	3,487 (5.1)	3,377 (5.0)	3,355 (4.9)	3,350 (4.9)	3,422 (4.8)
Land & Buildings	2,344 (4.5)	2,188 (3.7)	1,997 (2.9)	2,172 (3.7)	2,057 (3.2)	2,023 (3.0)	1,997 (2.9)	1,970 (2.9)	1,988 (2.9)	1,985 (2.9)	1,879 (2.7)
Other Assets	1,292 (2.5)	1,241 (2.1)	1,751 (2.6)	1,437 (2.4)	1,886 (2.9)	2,012 (3.0)	2,248 (3.3)	1,938 (2.8)	2,178 (3.2)	2,186 (3.2)	2,256 (3.2)
Total Assets	52,498 (100.0)	58,818 (100.0)	68,082 (100.0)	58,780 (100.0)	64,230 (100.0)	66,470 (100.0)	68,525 (100.0)	68,056 (100.0)	68,848 (100.0)	68,574 (100.0)	70,764 (100.0)

Source: MAS

[†] Since 2005, assets have been evaluated based on the Risk Based Capital (RBC) framework which requires assessment of assets at "fair value". Prior 2005, under the old framework, assets were reported using the "lower of cost or market value".

Table B.4: General Direct Insurers' Financial Indicators

	2003	2004	2005	Q4 2004	Q1 2005	Q2 2005	Q3 2005	Q4 2005	Q1 2006	Q2 2006	Q3 2006
Gross Premiums* (S\$ Million)											
Total Operations	2,798.3	2,711.2	2,818.0	649.1	819.4	684.3	642.4	671.7	785.6	681.4	686.7
SIF	2,433.1	2,246.0	2,346.7	557.4	676.9	571.5	533.0	563.6	658.9	573.5	570.4
OIF	365.2	465.2	471.3	91.7	142.5	112.8	109.4	108.1	126.7	107.9	116.3
Composition of Net Premiums of Singapore Insurance Fund (S\$ Million)											
Marine & Aviation											
- Cargo	94.1	105.3	110.7	26.0	28.5	26.4	29.4	26.1	29.1	25.8	29.4
- Hull & Liability	42.1	47.2	51.9	14.7	17.2	6.9	12.2	15.0	9.8	12.2	18.2
Fire	100.5	99.4	110.1	21.8	33.4	30.9	25.9	22.1	31.5	28.6	29.1
Motor	646.0	627.5	644.2	149.5	181.4	161.3	155.0	145.2	186.7	154.7	152.1
Workmen's Compensation	133.0	129.2	136.5	24.2	47.9	34.9	26.8	27.1	44.8	35.2	32.4
Personal Accident**	-	-	177.4	-	49.0	45.6	44.2	39.1	47.7	48.7	41.0
Health**	-	-	109.2	-	33.0	25.7	27.1	23.7	42.5	29.6	23.0
Miscellaneous	530.3	422.1	209.5	110.9	58.0	54.9	46.6	49.0	62.0	60.8	56.0
Total	1,546.0	1,430.7	1,549.5	347.1	448.4	386.6	367.2	347.3	454.1	395.6	381.2
Incurred Loss Ratio of Singapore Insurance Fund											
Marine & Aviation											
- Cargo	23.9	22.7	23.0	30.3	18.6	22.6	21.8	40.8	14.4	21.5	33.0
- Hull & Liability	93.9	56.2	40.0	57.5	22.8	48.5	48.4	64.3	35.0	10.2	36.8
Fire	30.5	28.7	22.2	17.9	25.7	14.6	23.9	25.1	19.4	33.2	22.0
Motor	80.5	70.3	64.3	65.9	65.5	60.6	67.9	65.6	61.8	68.1	76.8
Workmen's Compensation	83.0	82.5	92.5	77.8	78.4	80.3	99.1	72.7	80.8	79.8	98.8
Personal Accident**	-	-	29.6	-	22.4	28.0	30.9	30.8	27.5	28.1	24.7
Health**	-	-	59.6	-	57.2	59.5	58.3	64.9	64.5	60.1	57.4
Miscellaneous	42.9	42.4	39.3	40.3	36.5	41.8	37.3	47.2	32.1	31.1	35.3
Total	61.5	55.8	52.6	51.8	49.4	49.8	54.6	55.1	48.5	51.1	57.2

Source: MAS

* Gross premium figures are according to the new RBC approach whereby, SIF and OIF gross premiums for general business are derived from gross premiums in respect of direct business and total reinsurance business accepted. Prior to the new framework, gross premiums typically excluded reinsurance accepted or ceded in Singapore.

** Individual data for Personal Accident and Health lines of business is available only since Q1 2005. Prior to this, figures for Net Premiums (SIF) and Incurred Loss Ratio (SIF) for these two lines of business were reported under Miscellaneous.