1.1 External Developments

The Global Economic Recovery Broadens

The global recovery has been stronger than expected.

Global economic activity has improved over the past six months. After falling by 20% from peak to trough, world trade has rebounded and was just 10% shy of its previous peak in December 2009. (Chart 1.1) Recent data from the J.P. Morgan Global Manufacturing PMI confirms that the expansion has continued, with the index touching a cyclical high in March 2010. (Chart 1.2)

With the benefit of hindsight, it is clear that the steep contraction in global manufacturing and trade in late 2008 and early 2009 was made worse by a "crisis of expectations" which exacerbated the effects of the fall in actual final demand in the G3 markets. Nevertheless, the implementation of supportive policies helped to stabilise both the developed and developing economies, boost production and trade, and improve the outlook.

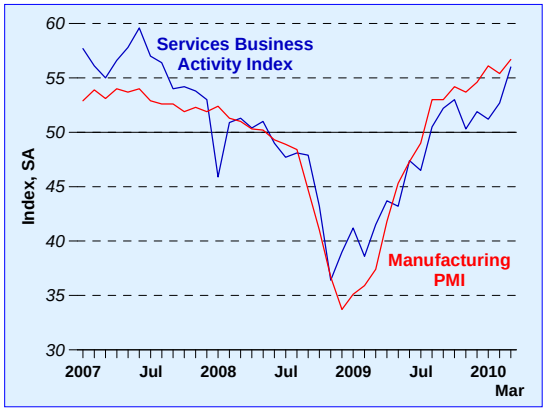
Indeed, the recovery has broadened beyond the manufacturing sector and the short-term spike in inventory rebuilding. The J.P. Morgan Global Services Business Activity Index indicates that services have been expanding, albeit at a slower pace compared to manufacturing. (Chart 1.2) As of March 2010, services activities have been rising for eight months, and the gap between the manufacturing and services indices has narrowed.

As a result of this strong turnaround, IMF estimates show that global GDP had returned to its previous peak by Q4 2009. Among Singapore's major trading partners, the step-up in activity was led by the Asia ex-Japan economies, which have rebounded since Q2 2009.[1] The turnaround broadened when the G3 economies exited the global recession in H2 2009. (Table 1.1)

Chart 1.1
Global Trade Index

Source: CPB Netherlands Bureau for Economic Policy Analysis, World Trade Monitor (Mar 2010)

Chart 1.2
J.P. Morgan Global Purchasing Manager and Services Business Activity Indices



Source: Markit Economics

[1] Unless stated otherwise, Asia comprises China, Hong Kong, India, Indonesia, Korea, Malaysia, the Philippines, Taiwan and Thailand.

Within the G3, the recovery seems to be on stronger footing in the US …

The G3 economies have benefited from the sharp rebound in global manufacturing and exports. (Chart 1.3) Moreover, there is some evidence that the growth momentum has extended beyond exports and industrial production to the broader economy in the US.

The recovery in the US appears to have gained traction as GDP growth accelerated to 5.6% q-o-q SAAR in Q4 2009, compared to 2.2% in the previous quarter. Notably, private demand has strengthened in the past two quarters even as the contribution from government spending faded. (Chart 1.4) Recent asset market gains have bolstered household net worth and may have supported consumption: the latter grew by 1.6% as a rise in spending on non-durables and services more than offset the steep slowdown in durables spending when the "cash for clunkers" incentive programme expired. Non-residential investment also revived as firms resumed spending on equipment and software and ran down stocks at a slower pace. Meanwhile, the economy started to create jobs: nonfarm payrolls fell by an average of 89,700 each month in Q4 2009, but rose by 54,000 jobs each month in the first quarter of this year.

… but has yet to gain traction in Japan and the Eurozone.

After faltering in the third quarter, the Japanese economy resumed its growth trajectory and expanded by 3.8% q-o-q SAAR in Q4 2009. The recovery also broadened as the export turnaround fed back into domestic demand in a virtuous cycle. Real exports rose by 22% sequentially, with strong shipments to Asia. (Chart 1.5) Concomitantly, business investment turned around after six quarters of sequential contraction to expand by 3.8%. Consumer spending also increased 2.9% sequentially in the fourth quarter on the back of sustained fiscal support. Nonetheless, domestic demand does not yet appear to be self-sustaining, given that workers' cash earnings have stagnated.

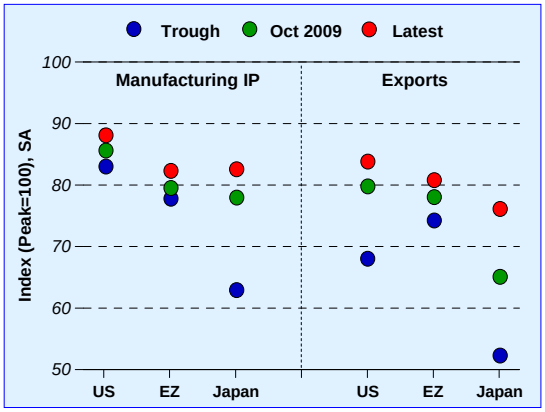
Table 1.1
GDP Growth

(%)

	2009	2009		
		Avg H1	Q3	Q4
		q-o-q SAAR		
US	-2.4	-3.6	2.2	5.6
Eurozone	-4.1	-4.1	1.6	0.2
Japan	-5.2	-3.8	-0.6	3.8
UK	-4.9	-6.4	-1.1	1.8
Hong Kong	-2.7	0.3	1.7	9.5
Korea	0.2	5.4	13.4	0.7
Taiwan	-1.9	4.1	10.2	18.0
		y-o-y		
Indonesia	4.5	4.3	4.2	5.4
Malaysia	-1.7	-5.1	-1.2	4.5
Thailand	-2.3	-6.0	-2.7	5.8
Philippines	0.9	0.7	0.4	1.8
China	8.7	7.1	9.1	10.7
India	6.4	6.0	7.9	6.0

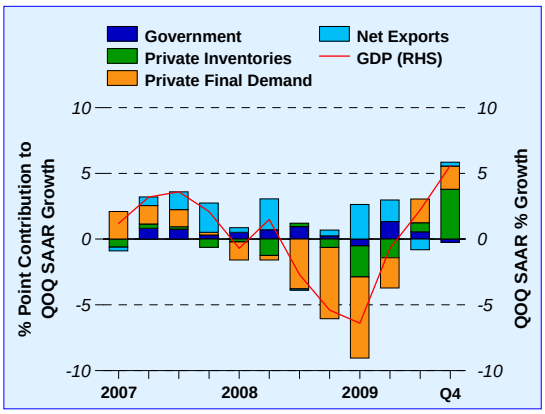
Source: CEIC, Datastream and Eurostat

Chart 1.3
Manufacturing IP and Exports Relative to Pre-crisis Peak



Source: CEIC

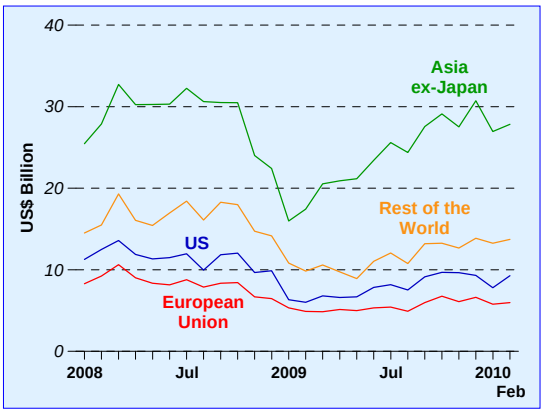
Chart 1.4
Contribution to US GDP Growth



Source: US Bureau of Economic Analysis

The recovery in the Eurozone economies has been less balanced and more fragile in comparison to the US. In Q4 2009, real GDP edged up 0.2% q-o-q SAAR, significantly lower than the 1.6% in the third quarter. Growth was driven almost entirely by the turnaround in the industrial cycle with exports rising 7.6% sequentially while domestic demand fell. Renewed sovereign debt concerns and persistent excess capacity had depressed fixed investments, while government spending contracted as fiscal stimulus schemes expired. The narrow base of recovery was mirrored in Germany, where domestic demand shrank by 8.2% q-o-q SAAR despite a double-digit surge in exports.

Chart 1.5
Japan's Exports by Destination



Source: CEIC

Asia is riding on a broad-based recovery in exports, driven by both domestic and foreign demand.

Asian exports have recovered strongly, with intra-regional shipments surpassing pre-crisis levels. (Chart 1.6) This was partly due to the increasing importance and greater resilience of Asian demand. In addition, the strong cross-border production networks in the region, especially in electronics manufacturing, meant that more intermediate inputs were shipped to multiple destinations before the final product was exported to end markets. In the same way that a decline in final demand has a multiplier effect on intra-industry regional exports, so will exports rebound strongly with the improvement in consumer and business confidence and the recovery in end demand.

Chart 1.6
Asian Exports by Destination

Source: CEIC and EPG, MAS estimates
* Asia here excludes India. The G3 refers to the US, European Union and Japan.

During the current upturn, EPG estimates that intra-Asian exports accounted for 61% of the pickup in overall Asian exports. The resumption of growth in the G3 in H2 2009 has also generated a positive ripple-effect on Asia's exports to these markets, which increased by 2.9% on a compounded monthly basis between August 2009 to January 2010. (Table 1.2)

Table 1.2
Compounded Monthly Growth Rate of Asia's Exports by Destination

(%)

	Jan to Aug 2009	Aug 2009 to Jan 2010
G3	-0.5	2.9
China	5.3	5.0
Rest of Asia	2.5	5.0
Rest of the World	0.3	4.9
Total	1.1	4.0

Source: CEIC and EPG, MAS estimates
* Asia here excludes India. The G3 refers to the US, European Union and Japan.

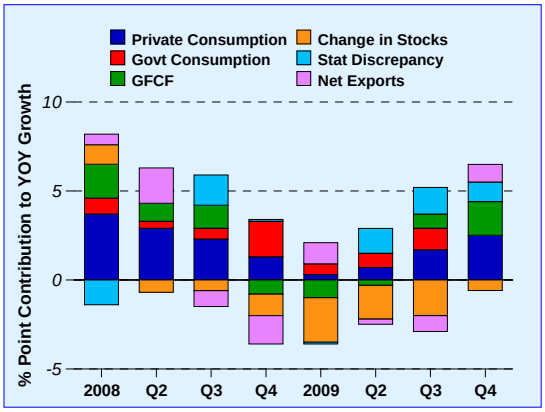
With several months of sequential improvement, y-o-y Asian export growth has also turned around. For the first time in three quarters, net exports contributed positively to Q4 2009 GDP growth. (Chart 1.7) Strong external demand has also translated into a pickup in fixed investment, as businesses ramped up spending to take advantage of the recovery. Importantly, Asian economies appear to be transiting to private demand-led growth as household consumption held up in Q4 2009, even as the contribution to GDP growth from government spending tapered off.

Global inflation has picked up alongside higher energy prices.

Global inflation has increased as energy prices picked up in Q4 2009. Headline CPI inflation in the G3 rose by 0.5% y-o-y in Q4 2009 after two quarters of decline, and remained positive in the first two months of this year. This was despite deflation in Japan, which was caused by a sizeable negative output gap as well as a strong yen. (Chart 1.8) Japanese consumer prices have been falling since February 2009 and declined more rapidly in the second half of last year.

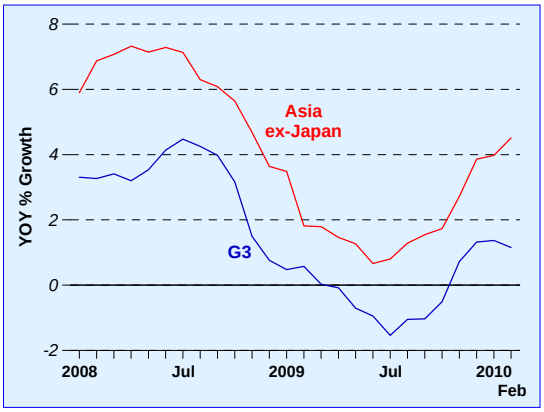
With rising energy prices, inflation turned positive in the Asian ex-Japan economies and continued to rise in the first two months of this year. Price pressures were particularly visible in India, where CPI inflation averaged 13% in Q4 and accelerated to 16% in the first two months of the year. Soaring prices of food, and, more recently, manufactured goods, contributed to this acceleration.

Chart 1.7
Contribution to Asian GDP Growth



Source: CEIC
* Excludes China, where quarterly GDP expenditure is not available.

Chart 1.8
Global CPI Inflation



Source: CEIC
* Weighted by 2008 nominal GDP.

1.2 Domestic Economy

The Return of Final Demand

Growth in the domestic economy accelerated over the last two quarters.

The recovery of the Singapore economy started to take root in the last quarter of 2009. (Chart 1.9) Although GDP fell 2.8% q-o-q SAAR in Q4, this masked the underlying strength in the domestic economy. The decline largely stemmed from a sharp plunge in pharmaceuticals manufacturing, amidst scheduled maintenance shutdowns and temporary changes in the product mix. Excluding this, the Singapore economy expanded by 12% in Q4, the third consecutive quarter of strong growth. The domestic economy continued to expand rapidly into early 2010, with Q1 growth of 32.1%, according to the *Advance Estimates*. Excluding the spike in pharmaceutical output, growth was still robust at around 16%.

The firmer recovery of the domestic economy reflects the shifts in the dynamics of Singapore's growth. Six months ago, the uplift to growth was underpinned largely by inventory restocking and the easing of global financial market conditions, with only nascent signs of support from final demand. Since then, end demand has strengthened, while the boost provided by the two transitory factors has dissipated somewhat.

GDP is now 2.8% above its previous peak …

As a result of the recent surges in growth, the Singapore economy has now recovered all the output lost during this downturn. As at Q1 2010, all the key sectors of the economy were close to, or have exceeded, their levels in Q1 2008. In fact, GDP is now some 2.8% above its previous peak in Q1 2008. (Table 1.3) Thus, the current recovery has been stronger than that of the 2001 and 1998 recessions. (Chart 1.10)

Chart 1.9
Singapore's GDP Growth

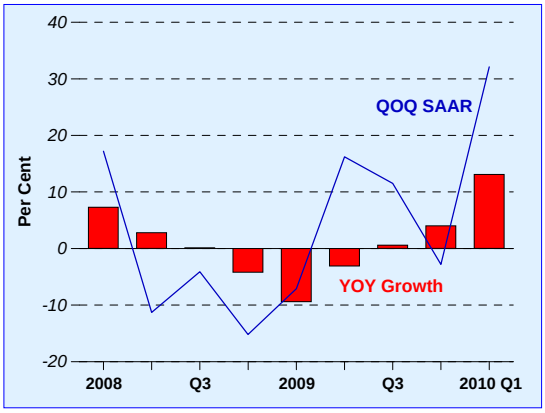
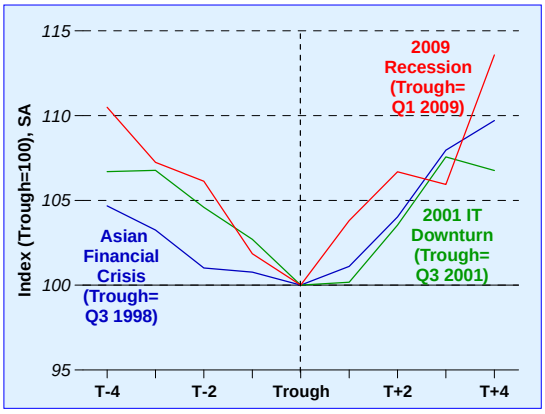


Table 1.3
Comparison of GDP SA Levels

	% Change from Previous Peak to Trough	% Change from Previous Peak to Q1 2010
GDP	-9.5	2.8
Mfg	-23.5	-0.4
Services	-7.0	1.1

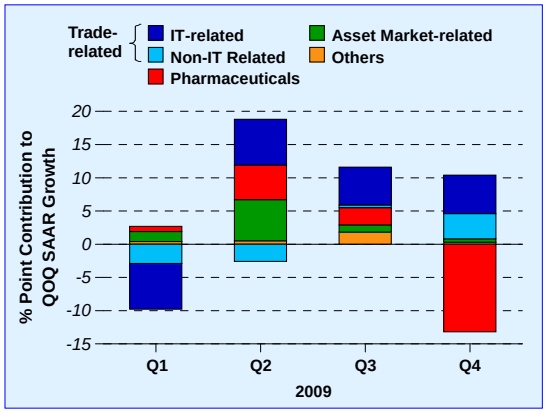
Chart 1.10
GDP Recession Profile



… with trade-related activities as the main driver.

At the beginning of Q3 last year, activity in the manufacturing sector and trade-related services were significantly below their pre-crisis peaks, but these sectors have caught up over the past six months. Indeed, disaggregated data suggest that slightly more than half of the growth in trade-related activities in Q4 can be attributed to the IT industry, which remained firm in Q1 2010. (Chart 1.11) IT-linked activities, such as electronics production, exports and air cargo, continued to expand at double-digit sequential rates. In particular, electronics production has rebounded past its pre-crisis peak. (Chart 1.12)

Chart 1.11
Contribution to GDP Growth



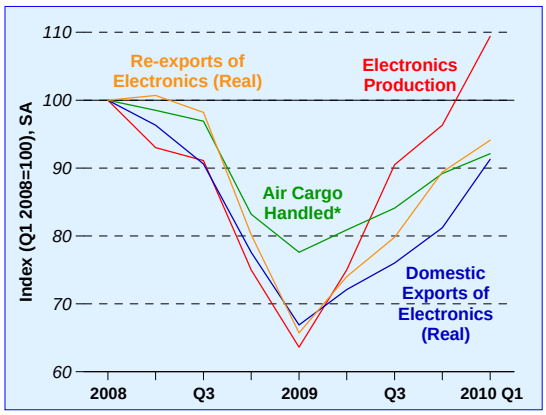
Source: EPG, MAS estimates

IT-related activities have bounced back alongside a three-stage recovery in the global IT industry.

The uptick in domestic IT-related activities has taken place alongside a three-stage recovery in the global IT industry. (Chart 1.13) The **first stage** involved a catch-up in *supply*, in the form of inventory restocking. In the first quarter of last year, amidst widespread uncertainty and pessimism about global economic prospects, IT firms cut back production and drew down inventories strongly. Subsequently, as the external environment stabilised in Q2 and Q3, the contraction in supply appeared to have exceeded the fall in demand and this prompted IT firms to ramp up production as they scrambled to rebuild inventories, particularly in the upstream foundries. (Chart 1.14)

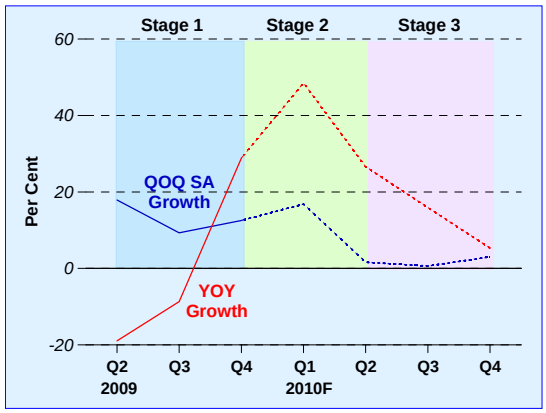
The IT industry entered the **second stage** of recovery at the turn of the year, as pent-up demand caught up with supply. Beyond the initial burst in production targeted at replenishing inventories, IT firms continued to underestimate the demand for IT products amidst lingering uncertainty over consumer confidence. However, confounding these expectations, consumer demand for IT products proved to be resilient, especially in China where sales momentum remained strong throughout 2009, and particularly in Q3 as government stimuli to encourage IT spending took effect. Meanwhile electronics retail sales in the US picked up in Q4 2009 during the festive shopping season. (Chart 1.15)

Chart 1.12
IT-related Activities



* EPG, MAS estimates

Chart 1.13
Global Chip Sales



Source: Semiconductor Industry Association, iSuppli and EPG, MAS estimates

US corporate IT spending also recovered strongly in Q4, on the back of pent-up demand from delayed IT investment. (Chart 1.16) In China, the continued rise in business formation, as well as the upgrading of the wireless network infrastructure to 3G also contributed to strong corporate IT demand.

This "demand catch-up" hypothesis is further supported by EPG's econometric work on the determinants of global chip sales, which suggest that in the long run, a 1% decline in global GDP will lead to a 1.6% contraction in global chip sales. Chart 1.17 plots the percentage deviation of actual global chip sales from the level which is consistent with the long run equilibrium. As can be seen, global chip sales have rebounded sharply in recent quarters, following the severe fall in Q4 2008 and remain well supported by underlying demand factors.

The **third stage** of the IT recovery is characterised by sustainable growth, underpinned by strong demand and well-balanced supply. This will be covered in Chapter 3 of the *Review*.

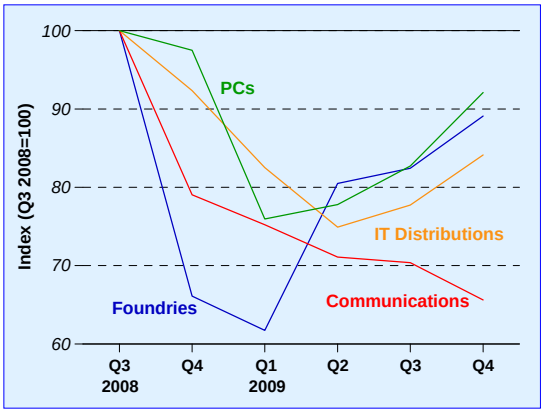
Other trade-related activities also picked up alongside a recovery in regional demand.

Non-IT trade-related services have also fared well. For instance, non-oil non-electronics re-exports strengthened from 0.3% q-o-q SA in Q3 last year to 4.6% in Q4. This was largely driven by petrochemicals re-exports to East Asia, which rose by 19% q-o-q SA in Q3 to 57% in Q4 last year, in line with strengthening domestic demand.

The brisk regional recovery has benefited tourism-related industries.

The recovery by Asian economies in H2 2009 has helped to drive demand for other services in Singapore as well. In Q4 2009, visitor arrivals, of which East Asian tourists comprise two-thirds, leapt by 21% q-o-q SAAR. Arrivals from Malaysia and China, in particular, increased by 78% and 106% respectively, offsetting the sluggishness in the G3 markets. As a result, overall tourist arrivals hit an all-time high of 971,000 in December. This rise in tourism numbers has continued into the early months of 2010. (Chart 1.18)

Chart 1.14
Inventory Levels in the IT Supply Chain



Source: Company data, Gartner, Goldman Sachs Research and EPG, MAS estimates

Chart 1.15
Electronics Retail Sales

Source: CEIC and EPG, MAS estimates

Chart 1.16
US Corporate IT Spending

Source: CEIC

Visitor inflows have lifted hotel occupancy rates as well as room rates, even though newly-opened hotels have added to the room supply. After falling below 70% in January last year, hotel occupancy steadily recovered to 82% in Q4. In fact, November 2009 marked the first time in 16 months that occupancy had exceeded 80%. In the first two months of this year, occupancy continued to improve, reaching a seasonally-adjusted 86% on average.

In addition, domestic consumer demand appears to have picked up significantly. Retail sales volumes, which are largely driven by local demand, grew by 11% q-o-q SAAR in Q4 2009 after five successive quarters of contraction. Excluding motor vehicle sales, which relate mostly to changes in policies for COE quotas, monthly retail volumes climbed to a 17-month high in January 2010, after emerging from the trough of early 2009. Strong January and February sales volumes at apparel & footwear shops and jewellery & watch retailers have also signalled the return of discretionary spending.

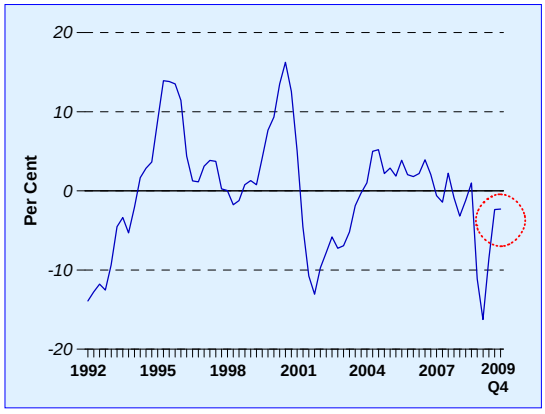
Financial sector activity moderated further in Q4 2009.

In comparison, activity in the financial sector saw some consolidation in the latter part of 2009. This compared with the strong double-digit gains achieved in earlier quarters when global crisis conditions stabilised and financial markets rebounded.

In Q4 2009, the domestic financial sector contracted by 8.2% q-o-q SAAR, as a result of slower activity in the brokerage & treasury cluster, wealth management and the insurance industry. (Chart 1.19)

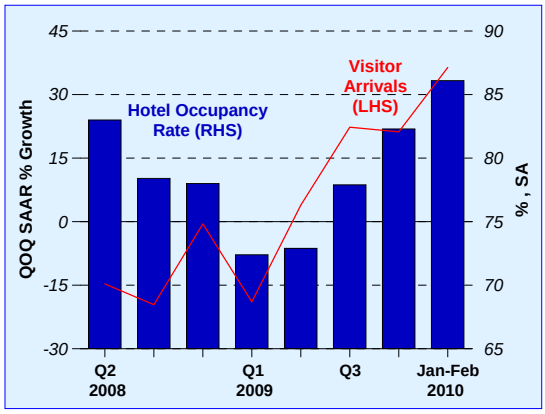
A key reason was the heightened caution in overall investor sentiment, amidst concerns about global growth prospects. For example, the December 2009 Merrill Lynch Global Fund Manager Survey reported that while a majority of investors held the view that the global economy would strengthen in 2010, most expected growth to be below-trend.

Chart 1.17
% Deviation of Global Chip Sales from Equilibrium Demand



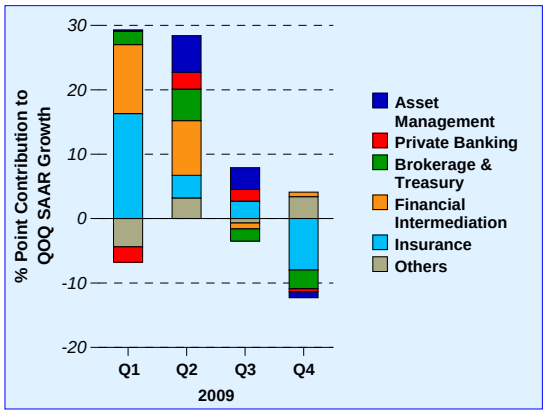
Source: EPG, MAS estimates

Chart 1.18
Visitor Arrivals and Hotel Occupancy



Source: EPG, MAS estimates

Chart 1.19
Contribution to Financial Services GDP Growth



Source: EPG, MAS estimates

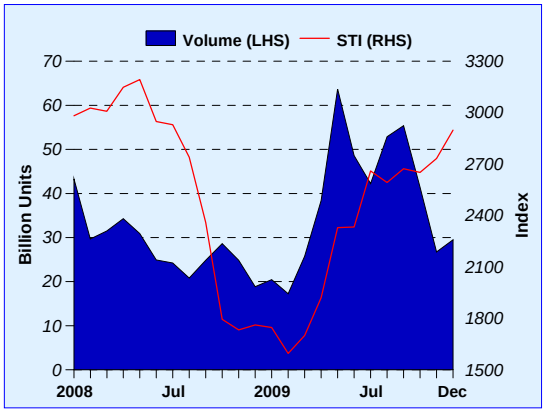
In the absence of new major trading themes, markets wound down and investors closed out their positions for the year. In the stock market, turnover volumes fell 35% on a sequential basis as the global equity rally, which had stretched over Q2 and most of Q3, waned. (Chart 1.20) Compared to the 37% surge in Q2 and the 15% increase in Q3, the STI rounded off Q4 just 8.4% higher at 2,897.62. Similarly, fund management activity, which had picked up in the preceding two quarters, softened in Q4, as institutional investors rebalanced their portfolios in line with rising valuations. Within the insurance segment, earned premiums (net of claims paid) in the general insurance industry also fell.

Meanwhile, the financial intermediation cluster put up a mixed performance, with the pullback in the ACU segment partially offsetting the recovery in the DBU market. (Chart 1.21) On the offshore front, overall lending fell for the second consecutive quarter, weighed down by continued weakness in the interbank segment. In comparison, DBU lending improved, albeit at a gradual pace, buoyed by gains in the consumer housing segment. Business lending, which had been contracting for four quarters, managed flat growth in Q4, supported by loans to non-bank financial institutions, commerce and business services.

There were bouts of renewed optimism at the start of this year, following clearer signs of recovery in the global economy. However, market sentiment has continued to be fragile and susceptible to fresh shocks. Near-term indicators for financial services, particularly for the sentiment-sensitive industries, have remained weak. For instance, the 61% m-o-m surge in equity market activity in January was followed by a 47% drop in turnover volumes in February. Forex turnover volumes, which slipped 0.3% m-o-m in January, fell a further 11% in February. Interbank lending in both the domestic and offshore markets also saw renewed weakness in February following upticks in the previous month. Thus, the improved market outlook has not yet translated into a steady rise in overall volumes in the financial sector.

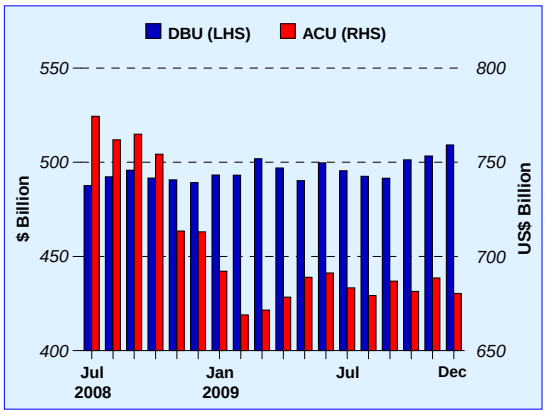
The prospects for the domestic economy will be further discussed in Chapter 3.

Chart 1.20
Stock Market Turnover Volumes and the Straits Times Index



Source: SGX

Chart 1.21
Overall ACU and DBU Loans



A Decade in Review: Three Major Themes

For the whole of 2009, the Singapore economy contracted by a milder-than-expected 2.0%, despite suffering the after-effects of an unprecedented global financial meltdown. As a result, growth slowed in the last decade (2000-09) to 4.9%, compared to an average of 7.6% in the 1990s.

The decade of the 2000s or the "noughties" was marked by three important developments that had significant implications for the Singapore economy. The following section explores two major themes from the past decade: increased volatility and the China effect. The third theme – employment-driven growth – will be discussed in detail in the Special Feature, which compares the sources of Singapore's economic growth over the past two decades.

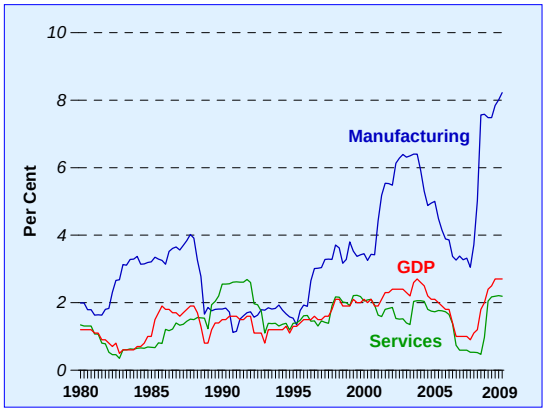
Increased Volatility

Frequent and prolonged shocks hit Singapore and the region in the 2000s.

Compared to previous decades, the 2000s was characterised by more frequent and prolonged shocks for Singapore and the region. Following the 1997-98 Asian Financial Crisis, the region was hit by the dotcom crash in 2001, the SARS episode in 2003 and, most recently, the 2008-09 global recession. This can be seen from the spike in overall GDP volatility over the past decade. (Chart 1.22) The standard deviation of Singapore's q-o-q SA GDP growth rose from 1.4% in the 1980s, to 1.6% in the 1990s, before jumping to 2.3% in the 2000s.

Due to its strong external orientation, the manufacturing sector experienced the highest volatility in the past decade.[2] In fact, manufacturing accounted for almost half of aggregate volatility in the 2000s, compared with 16% in the previous decade. The pharmaceuticals segment (biomedical) was one of the key contributors, particularly in the first half of the

Chart 1.22
Volatility of GDP Growth



Note: Volatility was computed by taking the 3-year rolling standard deviation of q-o-q SA GDP growth of the overall economy and the various sectors respectively.

[2] See also Ministry of Trade and Industry (2009), "Is Smoother Always Better? Understanding Singapore's Volatility-Growth Relationship", *Annual Economic Survey of Singapore*.

2000s and reflected the early stage of development of the industry, which was dominated by a small number of firms. (Chart 1.23) Moreover, pharmaceutical output can vary significantly when plants change product line-ups or close for maintenance.

However, volatility in the pharmaceuticals industry stabilised in the latter half of the decade, alongside the broadening of the industry base. In particular, the number of pharmaceutical companies in the domestic industry rose from 25 in 2000 to 46 in 2008.

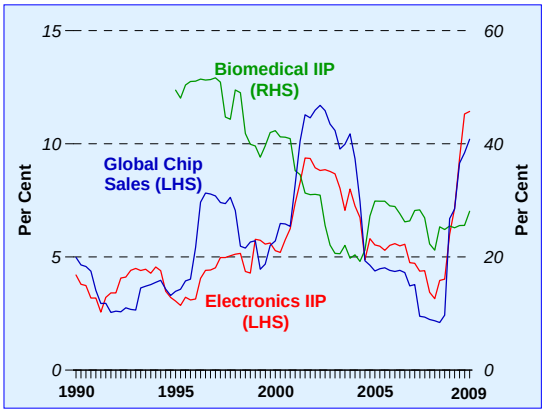
In contrast, the volatility of domestic electronics production has increased in recent years against the backdrop of a more volatile global IT cycle, including the collapse of global IT in 2001, and most recently, in 2008-09. (Chart 1.23) The former was a consequence of the excessive build-up of capacity during the dotcom bubble, while the latter was due to a fall-off in global demand for IT products, which was exacerbated by pronounced inventory destocking and restocking across vertically-integrated cross-border production networks.

Volatility in the financial sector declined.

The financial sector, which has been buffeted by relatively fewer sector-specific shocks over the last two decades, has seen a general decline in volatility since the early 1990s. (Chart 1.24) While the sector is inherently volatile, given its exposure to global financial markets, the fluctuations in growth largely arise from swings in global investor sentiment which affect the sentiment-driven industries. As such, shocks experienced by the Singapore financial sector are typically shorter in nature and tend to dissipate relatively quickly.

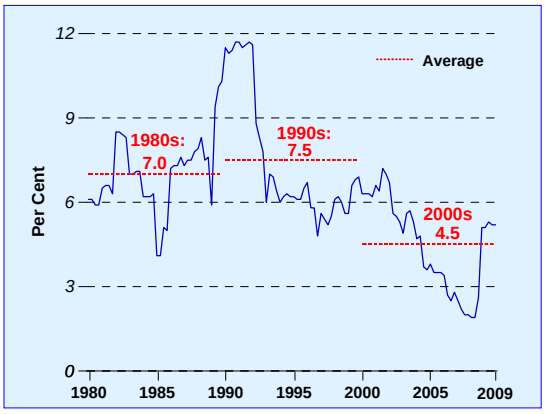
The deepening and broadening of the domestic financial landscape could have also contributed to the drop in financial sector volatility. The financial sector now has a wider range of services across its emerging market segments such as equity, debt and wealth management as well as greater depth within the mainstay financial intermediation and insurance industries as measured by increased assets and liquidity. This has, in turn, helped it to cushion external shocks and counterbalance global financial market volatility.

Chart 1.23
Volatility of Manufacturing Sector Growth



Source: Semiconductor Industry Association and EPG, MAS estimates
Note: Volatility was computed by taking the 3-year rolling standard deviation of q-o-q SA GDP growth of the manufacturing sector.

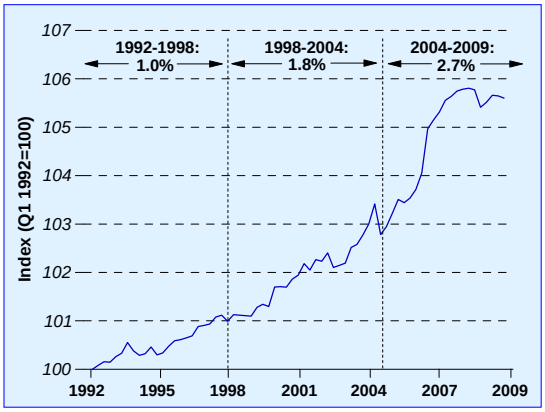
Chart 1.24
Volatility of Financial Sector Growth



Note: Volatility was computed by taking the 3-year rolling standard deviation of q-o-q SA GDP growth of the financial sector.

EPG has constructed a Financial Development Index to track progress in Singapore's financial sector. (The October 2006 issue of the *Review* has more details on the components of the index.) The index, which incorporates both macro indicators and micro survey data, indicates that Singapore's financial sector development has gathered pace since the second half of 2004, helped by the emergence of new growth clusters in the latter half of the decade, such as asset management and private banking. (Chart 1.25) A combination of factors lies behind the rapid development in the domestic financial sector, including rising affluence in the region, and growing sophistication of financial markets and investors, which have together increased demand for a wide array of financial services.

Chart 1.25
Overall Financial Development Index

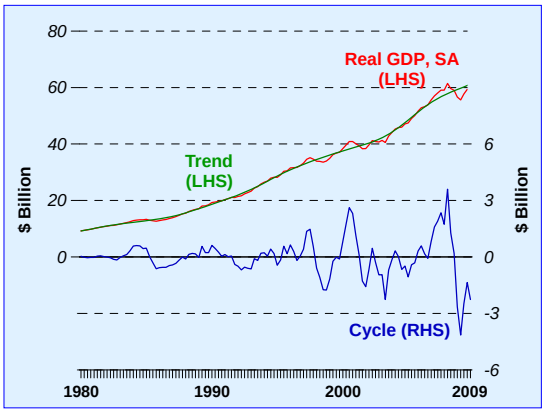


Source: EPG, MAS estimates

The economy remains on an uptrend.

Overall, the 2000s have been a decade of lower growth accompanied by higher volatility in the Singapore economy. Nonetheless, GDP levels have generally remained on an uptrend, indicative of the resilience of the economy. (Chart 1.26) By 2009, real GDP was 1.6 times higher than in 1999, which was, in turn, double that of a decade earlier. This ability to withstand the ups and downs of the external environment is underscored in Box A, which highlights how intra-sector diversification and macroeconomic stability have helped to cushion the impact of global shocks on aggregate volatility in Singapore.

Chart 1.26
Real GDP in Singapore



Source: EPG, MAS estimates

Box A
A Decomposition of Singapore's Output Volatility

In Section 1.2, it was shown that output volatility had increased for Singapore in the context of a higher frequency of exogenous shocks. This box item presents an alternative approach to identify and quantify the sources of this volatility in Singapore's GDP growth.

Accordingly, aggregate GDP growth volatility is decomposed into three components that capture the volatility emanating from global sectoral influences, idiosyncratic sectoral effects and country-specific factors. The findings highlight the importance of global sectoral volatility on GDP growth in Singapore over the past three decades. Singapore's country-specific volatility, a proxy for macroeconomic stability, is also compared against the OECD countries.

Decomposing the Aggregate Volatility of GDP Growth

The decomposition approach adopted here is based on Koren and Tenreyro (2007).[1/] In essence, the methodology is derived from a statistical decomposition of sectoral innovations, which can be expressed as:

$$\text{Aggregate Volatility} = a_j^{\mathrm{T}}\mathrm{E}\left(\lambda\lambda^{\mathrm{T}}\right)a_j + a_j^{\mathrm{T}}\Omega_{\varepsilon_j}a_j + \mathrm{E}\left(\mu_{\mathrm{j}}^{\mathrm{T}}\right) + 2\left(a_j^{\mathrm{T}}\mathrm{E}\left(\lambda\mu_{\mathrm{j}}\right)\right) \qquad (1)$$

where a_j is the vector of sectoral shares; λ is the vector of sectoral shocks; Ω_{ε_j} is the diagonal matrix containing sector and country specific residuals; μ_j is the vector of country shocks; and E and T refer to the expectations and transpose operators, respectively.[2/]

This methodology yields three volatility components for GDP growth in Singapore. The first two, namely global and idiosyncratic sectoral volatility, relate to the volatility of sectoral shocks. **Global sectoral volatility (GSECT)**, the first term in equation (1), represents volatility that is specific to a sector, but is common to all countries included in the study. GSECT is especially large when sectors exposed to strong and frequent global shocks account for a high proportion of the country's value-added. For example, if manufacturing is highly volatile in all countries, then countries with high shares of value-added in manufacturing will tend to have higher values of GSECT. Sectors that are affected by global price and technology shocks typically fall into this category. In comparison, **idiosyncratic sectoral volatility (ISECT)**, the second term in the equation, refers to the volatility in a sector that is specific to a particular country.

The last volatility component refers to **country-specific volatility (CNT)**, the third term in the equation, which captures country-specific shocks. Countries that are subject to greater policy and political instability tend to experience higher aggregate volatility in GDP.

1/ Unlike Koren and Tenreyro (2007), the weights here are based on the value-added of the sector as a share of GDP, not the share of employment for each sector.

2/ Values of the parameters and residuals in equation (1) are obtained from a set of cross-sectional regressions of the sectoral growth rates on country and sector dummy variables based on the following specification:

$$y_{jst} = \lambda_{1t}d_1 + \ldots\ldots + \lambda_{St}d_S + \mu_{1t}h_1 + \ldots\ldots\mu_{Jt}h_J + \varepsilon_{jst},$$

where d_s, s = 1,…..,S, are dummy variables that take the value of 1 for sector s, and 0 otherwise; and h_j, j = 1,….,J, are dummy variables that take the value of 1 for country j, and 0 otherwise. λ_{st}, μ_{jt} and ε_{jst}, are the global sector-s-specific shock, country-j-specific shock, and the country-and-sector specific shock at time t, respectively.

Data and Empirical Results

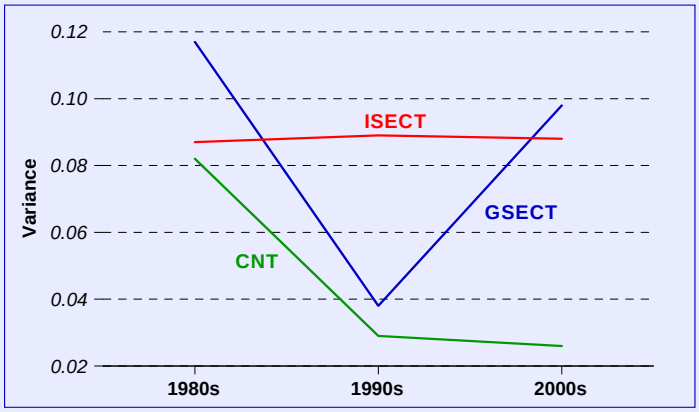
Annual data from eight broad sectors in Singapore and seventeen OECD countries was used, over the period 1981 to 2006.[3/]

Chart A1 shows the decomposition of Singapore's GDP growth over three decades. The results suggest higher volatility in the 1980s across all three volatility components. GSECT fell sharply in the 1990s, before rebounding in the 2000s. This is broadly consistent with increased volatility as a result of the sharp decline in the global IT industry in 1985, the dotcom bust in 2001, and more recently, during the global financial crisis of 2008.

ISECT remained relatively stable across all three decades, suggesting that while GSECT has increased, diversification within the sectors themselves has cushioned the impact of idiosyncratic sectoral volatility. Moreover, the values for GSECT and ISECT appear to converge, showing that both global and local sectoral volatility have an equally strong impact on aggregate volatility in the 2000s.

Although CNT was almost as high as ISECT in the 1980s, CNT fell sharply in the 1990s and further moderated in the 2000s. This implies that Singapore has achieved a higher level of macroeconomic stability, which has helped to reduce the impact of domestic shocks on economic growth. According to Koren and Tenreyro (2007), higher levels of macroeconomic stability could be the result of greater political stability and better fiscal and monetary policies.

Chart A1
Estimates of GDP Volatility Components

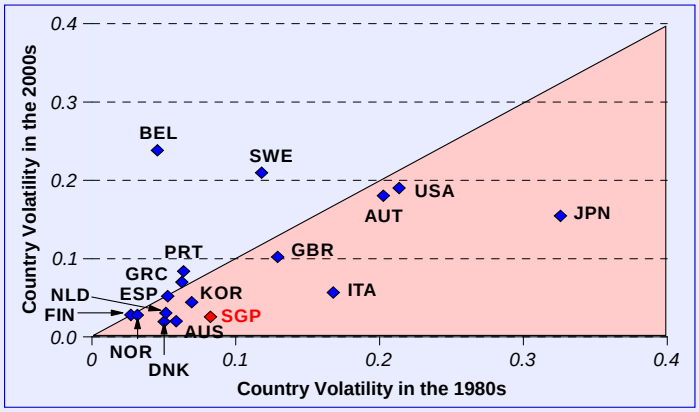


Note: The three risk measures are components of the variance of GDP growth and have been multiplied by 100.

3/ Data on the seventeen OECD countries were obtained from OECD's STAN Industrial Structure Analysis, which provides annual GDP data disaggregated into sectors. A number of sectors were aggregated to allow more meaningful comparisons with Singapore data, resulting in eight broad sectors, as follows: agriculture, hunting, forestry and fishing; manufacturing; electricity, gas and water supply; construction; wholesale and retail trade and restaurants and hotels; transport, storage and communications; finance, insurance, real estate and business services; and community, social and personal services. The sample of OECD countries comprises Australia (AUS), Austria (AUT), Belgium (BEL), Denmark (DNK), Finland (FIN), France (FRA), Greece (GRC), Italy (ITA), Japan (JPN), Korea (KOR), the Netherlands (NLD), Norway (NOR), Portugal (PRT), Spain (ESP), Sweden (SWE), the UK (GBR) and the US (USA).

Chart A2 shows the country-specific volatility of Singapore and the sample of OECD countries. Countries appearing in the lower shaded triangle achieved lower CNT values in the 2000s relative to the 1980s. Singapore is one of ten countries that recorded a significant reduction in country-specific volatility over this period. Moreover, Singapore's ranking among the OECD countries has improved dramatically, from 11th in the 1980s to 3rd place in the 2000s.

Chart A2
Country-Specific Volatility



Note: Country-specific volatility is a component of the variance of GDP growth and has been multiplied by 100.

Sum-up

This box item has presented a new approach to identify and quantify the relative importance of sectoral influences on the aggregate volatility of Singapore's GDP growth based on a decomposition suggested by Koren and Tenreyro (2007). The findings suggest that macroeconomic stability and sectoral diversification may have been instrumental in counterbalancing the increasing impact of global sectoral shocks on aggregate volatility in Singapore.

Reference

Koren, M and Tenreyro, S (2007), "Volatility and Development", *Quarterly Journal of Economics*, Vol. 122, No. 1, February 2007, pp. 243-287.

The China Effect

China's rise has benefited Singapore's manufacturing sector …

A second major theme of the 2000s is the impact that China, as an economic powerhouse, has had on Singapore's manufacturing and services sectors.

In the 1980s and 1990s, regional trade was still characterised by the "flying geese" model, with largely Japanese MNCs locating production of final goods in different Asian countries according to their technological capabilities. Medium-tech production was relocated to the NIEs, while low-tech production of "white" goods was transferred to the ASEAN economies. Regional trade, therefore, essentially involved the shipping of final goods to final markets. (Figure 1.1)

The rise of China as a manufacturing base for global firms in the 2000s gave rise to a new model of regional trade flows centred around China, known as "cross-border production networks" (CPNs). CPNs are characterised by fragmented product lines, where lower-tech components tend to be manufactured in ASEAN and higher-tech components in the NIES and Japan. Many of these components are eventually shipped to China, where they are assembled into final goods for export to end demand markets in the G3. (Figure 1.2)

The emergence of a China-centric production network has led to some shifts in trade patterns between Singapore and the rest of the world. Asia has become more important as an export destination, while the G3's share in Singapore's NODX has declined. In particular, Singapore is trading more with China, reflecting the latter's role as the lynchpin of the CPNs. China's share in Singapore's NODX more than quadrupled, from 1.9% in the 1990s to 7.9% in the 2000s.

However, globalisation and increased competition from China has meant some consolidation in Singapore's IT manufacturing. Exports of Machinery & Transport Equipment (M&TE), which includes IT goods, accounted for just over half of NODX in 2009, down from a peak of 80% in the mid-1990s.

Figure 1.1
"Flying Geese" Model

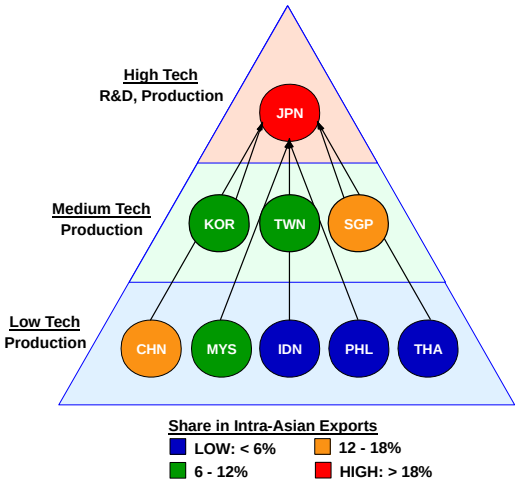
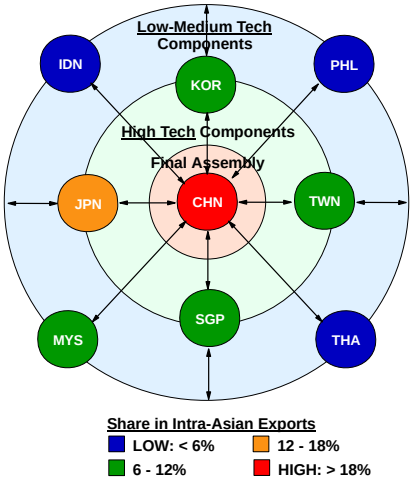


Figure 1.2
Cross-border Production Networks



Source: CEIC and EPG, MAS estimates

Exports of hard disk drives and telecom equipment were particularly badly hit by the relocation of production to China in the 2000s, including Western Digital in 1998-99, Maxtor in 2006, and Motorola in 2008. (Chart 1.27)

Nevertheless, the domestic IT sector has responded by raising its capital intensity in production (Chart 1.28) and expanding into higher value-added activities. R&D expenditure by IT firms has increased (Chart 1.29), while more IT companies are housing their HQ activities in Singapore, in addition to factory production. Singapore has also branched out into high value-added IT testing services, underscoring its role in the CPN as a major hub for re-exports.[3] Indeed, growth in NORX outpaced NODX growth in the 2000s, at 7.5% and 3.1%, respectively.

… as well as our services industries.

China has also become an important end market for Singapore's exports of services. According to WTO estimates, China has been one of the fastest growing markets for services, particularly transportation and other commercial services, over the last decade.

Apart from trade-related services, China has become a high-growth market for Singapore's tourism and modern services. For instance, China's share of visitor arrivals increased from 2.8% in the 1990s to 9.2% in the 2000s, while their average expenditure per trip rose from $605 to $691 over the same period.[4]

Within modern services, offshore reinsurance activities have benefited substantially from increased Chinese demand. China's share of Singapore's offshore reinsurance premiums increased from 2.6% in 1998 to 18% in 2008, with the bulk coming from the property and marine insurance business lines. (Chart 1.30) Nevertheless, China is still a relatively small market for Singapore's financial services exports and may offer further scope for expansion.

Chart 1.27
Share of Singapore's NODX

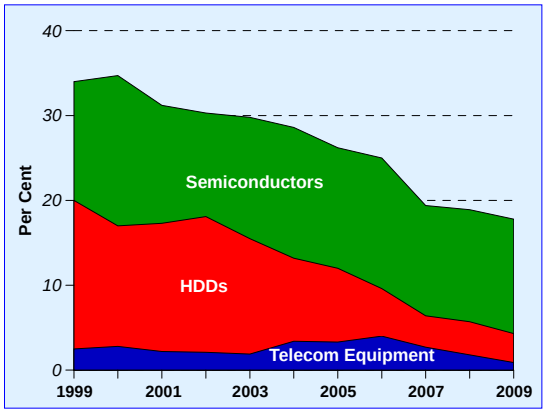
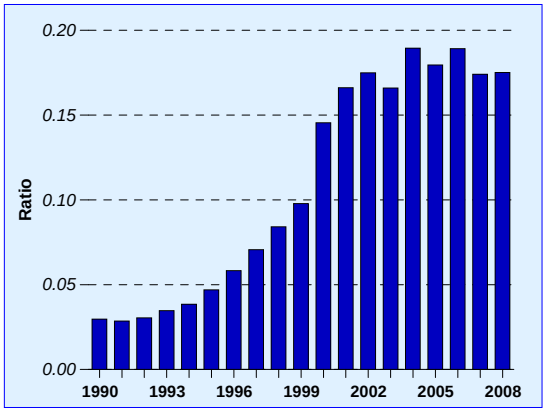
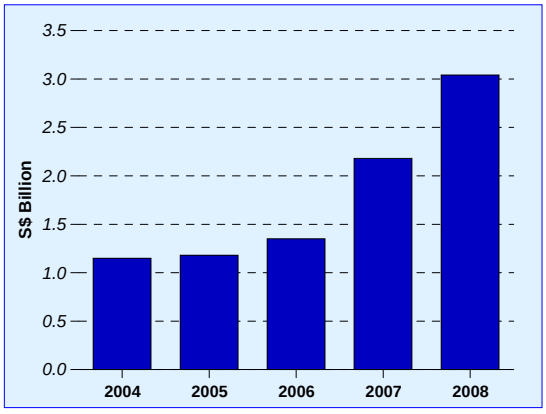


Chart 1.28
Capital-Labour Ratio of Singapore's IT Sector



Source: EPG, MAS estimates

Chart 1.29
R&D Expenditure by IT Firms in Singapore



Source: National R&D Survey of Singapore 2004-08

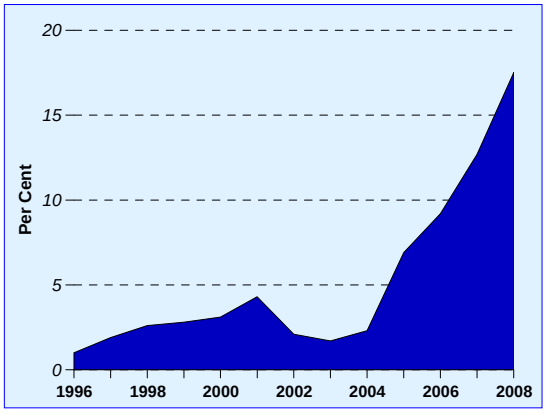
[3] Re-exports refer to goods which are exported from Singapore in the same form as they have been imported. IT components that are tested in Singapore are usually classified as re-exports.

[4] Expenditure data for China visitors to Singapore is available for 1992 to 2008. Thus, $605 is the average expenditure for 1992 - 1999 and $691 is the average for 2000 - 2008.

Singapore has gained global market share in services, but not in goods.

On balance, Singapore has just about maintained its market share in global merchandise exports over the previous decade, while exporting more services to China and the rest of the world. (Chart 1.31) Indeed, Singapore was one of the top gainers in the region for services exports, and was ranked 9th worldwide by the WTO. Going forward, services will play an increasingly important role in driving overall growth, even though manufacturing will continue to be a key pillar of the domestic economy.

Chart 1.30
China's Share of Offshore Reinsurance Premiums in Singapore

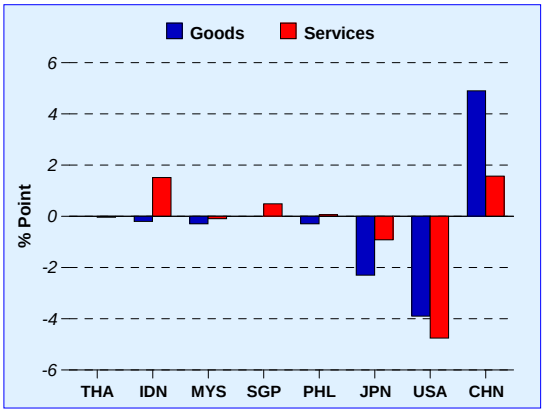


Supply-side Dynamics

Most of Singapore's GDP growth has come from employment growth.

EPG's estimates of the sources of Singapore's GDP growth from a supply-side perspective show that the bulk of growth over the past decade had come from employment growth. By contrast, productivity growth has not been a major contributor in the 2000s. This imbalance is particularly apparent in Singapore's services sector. The Special Feature in this *Review* presents EPG's findings on this issue and assesses the prospects for Singapore's productivity growth over the next decade.

Chart 1.31
Change in Singapore's Share of Global Merchandise and Services Exports



Source: WTO
* Taken from 2000-2007.
** Services include transport, travel, communications, construction, insurance, financial services, computer & information services; royalties & licence fees, other business services, and recreation, personal & cultural services.

1.3 Macroeconomic Policy

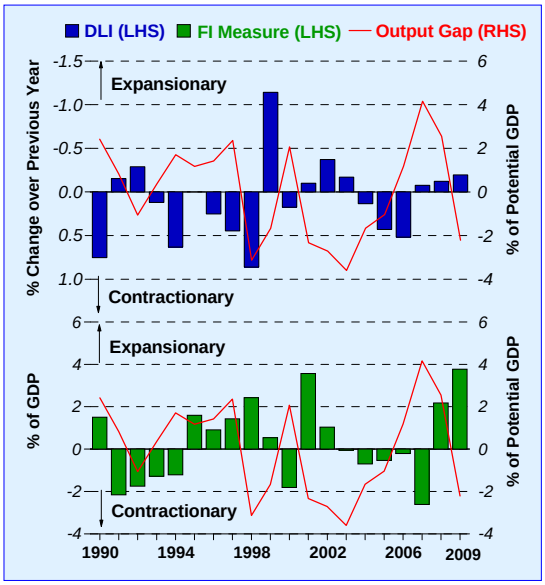
Macroeconomic policies in Singapore have a medium-term orientation, but also play a countercyclical role.

Singapore's macroeconomic policies are formulated with a medium-term orientation, aimed at promoting sustained, non-inflationary economic growth. Monetary and fiscal policy work in tandem to achieve this objective. Monetary policy, which is centred on the management of the exchange rate, is focused on maintaining medium-term price stability, while fiscal policy aims to balance the budget over the business cycle.

Macroeconomic policies have also played a countercyclical role in smoothing the business cycle, particularly when the economy is hit by external shocks. While it is not possible for macroeconomic policies to completely offset the collapse in external demand, they can help to prevent an even more severe deterioration in economic activity. Generally in past downturns, including the most recent one, both monetary and fiscal policies have been used to mitigate the impact of the external shock on the economy.

The Domestic Liquidity Indicator (DLI)[5] and Fiscal Impulse (FI) measure[6] are used to proxy the monetary and fiscal policy stance, respectively. Chart 1.32 plots both measures against the output gap. A positive output gap signals that the economy is growing above potential, leading to bottlenecks and inflationary pressures. Conversely, a negative output gap means the economy is producing below capacity, resulting in lower cost and price pressures. Apart from the size of the output gap, directional changes are also important in determining inflationary pressures. Movements in the DLI and/or FI measure in the opposite direction to the output gap indicate that macroeconomic policy is countercyclical. As seen from Chart 1.33, this has generally been the case, including the most recent downturn, when the DLI and FI measure switched to an expansionary mode.

Chart 1.32
DLI, FI and Output Gap



Source: EPG, MAS estimates

[5] The DLI is a measure of overall monetary conditions, represented by changes in the S$NEER and three-month domestic interbank rate.

[6] See the January 2002 issue of the *Review* for more details on the methodology used to calculate the FI measure.

Monetary Policy

Monetary policy has responded to the recent downturn in a measured manner.

MAS adopted a gradualist approach in its monetary policy decisions during the recent economic crisis, taking into account the nature of the external shock and the crucial role played by the exchange rate as an anchor of stability, especially in times of uncertainty.

In October 2008, MAS eased monetary policy by shifting to a zero per cent appreciation of the S$NEER policy band. This took place amidst expectations of moderating inflationary pressures and the risk of further deterioration in the external economies following the blow-up in global financial markets. The policy band was then re-centred downwards in April 2009, and kept at that level in the subsequent policy announcement in October. This policy stance was deemed to be appropriate, given the weakness and uncertainty in global and domestic economic prospects during that period.

The S$NEER has fluctuated in the upper half of the policy band in the past six months.

In the six months following the policy announcement in October 2009, the S$NEER fluctuated in the upper half of the policy band. (Chart 1.33) This reflected large capital inflows to the region, amidst growing optimism about the strength of the economic recovery in Asia, which lifted investor risk appetite for Asian assets.

Liquidity conditions have remained broadly accommodative since the beginning of last year.

Monetary conditions have eased in recent months, as indicated by the switch in the DLI to negative values in February and March. (Chart 1.34) On a cumulative basis, liquidity conditions in the economy were also broadly accommodative. Since early 2009, the DLI has been entirely driven by changes in the S$NEER, as the three-month domestic interbank rate has stabilised at a low level of 0.69%.

Chart 1.33
S$NEER

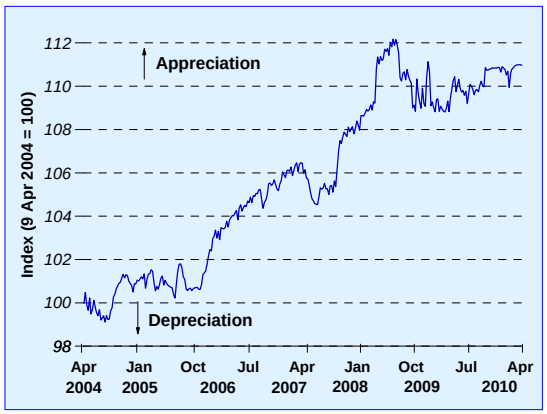
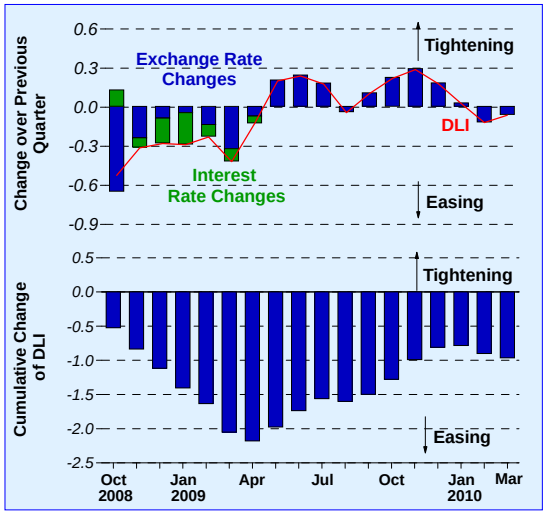


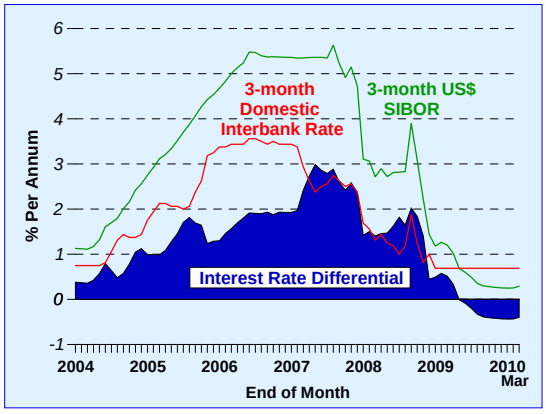
Chart 1.34
Domestic Liquidity Indicator



Source: EPG, MAS estimates.

As a consequence of abundant global liquidity, the three-month US$ SIBOR continued to edge down in recent months, from 0.30% at end-September 2009 to 0.25% at end-February this year, before picking up to 0.29% at end-March. (Chart 1.35) In the FOMC statement in March 2010, the US Federal Reserve maintained its view that economic conditions would likely warrant exceptionally low levels of the Fed funds rate (kept at a target range of 0-0.25%) for an extended period. Accordingly, the US$ SIBOR has stayed below the static S$ interbank rate since May 2009, with the negative differential stabilising at around 0.4% in recent months. This "premium" is anomalous, and follows from prolonged near zero US$ interest rates and the zero bound property of nominal interest rates.

Chart 1.35
3-month Domestic Interbank Rate and US$ SIBOR



Movements in credit and monetary aggregates have been consistent with the recovery.

In tandem with the low interest rate environment, domestic credit has shown tentative signs of recovery as the outlook improves. In particular, business loan growth reached a trough in Oct 2009, but has slowly recovered in 2010. Consumer loan growth also gathered pace in the latter half of 2009, supported by a revival in housing loans. (Chart 1.36)

More broadly, the loan-to-deposit ratio has stabilised at around 0.72, following a sharp decline from its peak of 0.80 in Q3 2008. (Chart 1.37) EPG's empirical model for DBU non-bank loans also suggests that the nascent recovery in credit growth has been in line with the improvement in macroeconomic conditions.[7]

Recent movements in money aggregates have been consistent with the economic recovery. Growth of the broader monetary aggregates, M2 and M3, has been stable at around 10%, following the recovery from the trough in Q2 2008. M1 growth has been more volatile, averaging around 20% since Q1 2009. (Chart 1.38)

The money supply in the economy represents the net outcome of the ability of the banking system to create broad money (M2) out of one unit of monetary base (notes and coins held by the public, banks' vault cash and banks' current accounts with MAS).

Chart 1.36
Domestic Credit to Private Sector

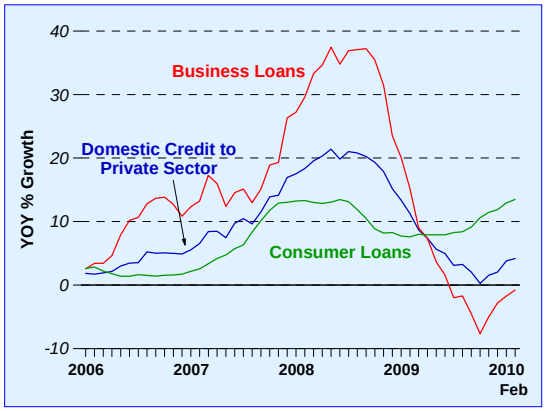
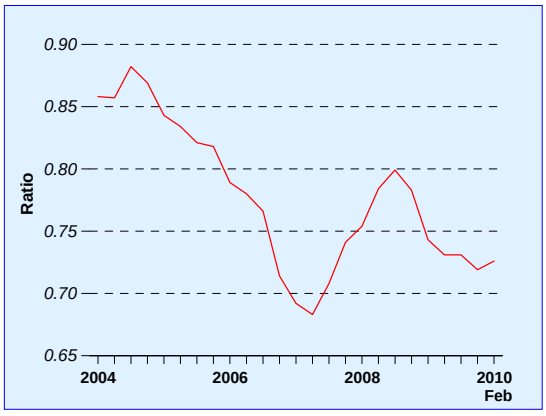


Chart 1.37
Banks' Loan-to-Deposit Ratio



[7] For details on the model, see "Box C: A Bank Credit Model for Singapore" in the October 2009 issue of the *Review*.

The relationship between M2 and the monetary base can be expressed as:

$$M2 = \text{Monetary Base} * mm, \qquad (1)$$

where mm is the money multiplier.

Through this bank intermediation process, the money supply adjusts to facilitate transactions in the economy. A higher level of economic activity requires a corresponding increase in money supply, either through an increase in the monetary base, or through the money multiplier.

In Singapore, nominal GDP and the monetary base have been tracking each other fairly closely, notwithstanding temporary divergences in 1999 and the last two years. (Chart 1.39) The growth of the monetary base outpaced that of GDP substantially during these periods due to the additional liquidity injected into the banking system in the run-up to Y2K and during the global financial crisis in 2008, respectively. The latest data for February suggest a renewed pickup in monetary base growth which is consistent with the robust expansion in the economy in Q1 2010.

The size of the multiplier is influenced by the percentage of banks' assets required to be held as reserves with the central bank, as well as longer-term factors such as the efficiency of liquidity management systems, the depth and breadth of money and capital markets, and the availability of a variety of liquid instruments which can be converted into cash at short notice.

Structural factors aside, recent short-run fluctuations in the multiplier, albeit fairly small, have tended to track cyclical changes in nominal GDP closely. For example, the money multiplier rose strongly in 2006-07 to a peak in Q2 2007 in line with robust economic growth between 2004 and 2007.[8] The subsequent slowdown and contraction in economic activity was then reflected in a downward shift in the money multiplier. It has picked up since end-2008, due to the upturn in economic activity. (Chart 1.40)

Chart 1.38
Monetary Aggregates

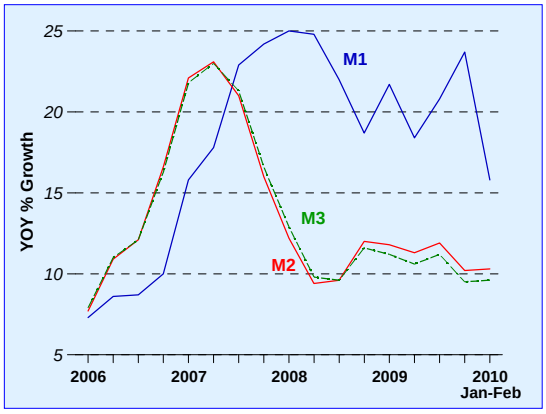
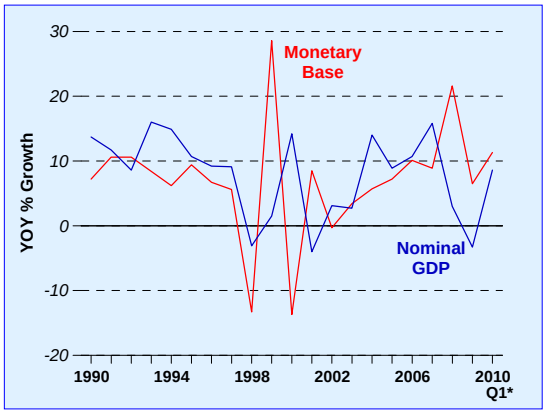
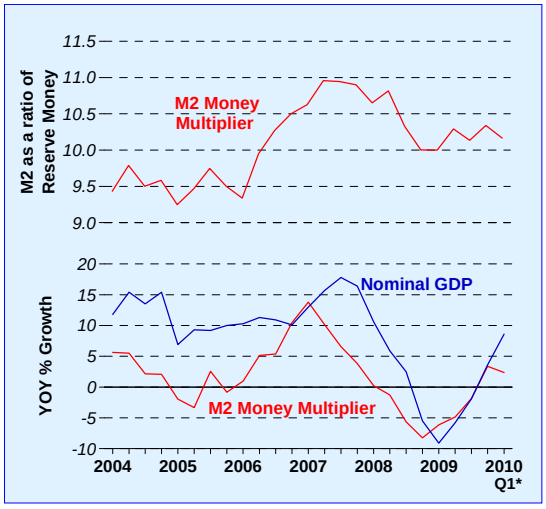


Chart 1.39
Monetary Base and Nominal GDP



* February data for money multiplier; EPG, MAS estimates for nominal GDP.

Chart 1.40
M2 Multiplier and Nominal GDP



* Same as Chart 1.39.

[8] The sharp pickup in the multiplier also reflected regulatory changes in liquidity and capital management. The Tier 1 capital adequacy ratio (CAR) requirement was lowered from 7% to 6% in March 2007. At the same time, a broader range of instruments was recognised as Tier 2 capital.

MAS' sterilisation has effectively absorbed the liquidity impact of its intervention operations.

Domestic money creation can also take place via an increase in capital inflows. In such instances, MAS may intervene in the foreign exchange markets to curb excessive volatility in the S$. The intervention operations lead to an increase in foreign assets on MAS' balance sheet (via the purchase of US$ from banks) and a corresponding rise in banks' current accounts with MAS on the liability side (through the credit of S$ to banks). (Chart 1.41) These larger current account balances of banks, in turn, expand the monetary base. To offset the liquidity impact of its intervention operations, MAS engages in sterilisation via SGS reverse repos, FX reverse swaps, and direct borrowing.

Recent data on capital flows suggest a return of foreign investor interest in S$-denominated assets, given the improved growth prospects for the domestic economy. To dampen upward pressures on the S$, MAS intervenes in the foreign exchange market and sterilises the liquidity impact of its intervention. This helps to moderate the growth of the monetary base and broad money creation. (Chart 1.42)

Chart 1.41
MAS' Balance Sheet, Assets

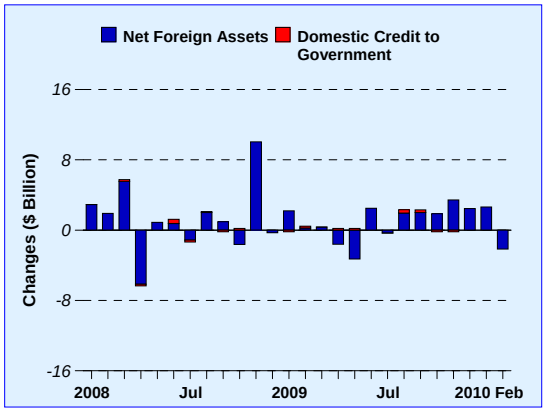
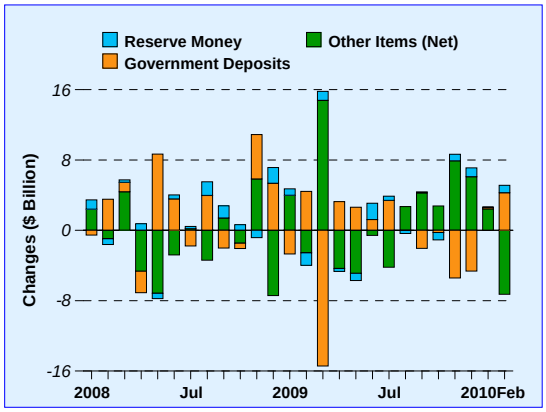


Chart 1.42
MAS' Balance Sheet, Liabilities



Fiscal Policy

The government incurred a primary deficit in 2009.

Amidst the economic downturn, the government recorded a primary deficit[9] of $2.6 billion (1% of GDP) in CY2009, after chalking up three consecutive years of surpluses averaging $4.4 billion. The shift to a deficit was due to both a large decline in operating revenue and higher expenditure. (Chart 1.43)

The fall in operating revenue was largely due to lower income tax receipts.

Operating revenue fell to $37.9 billion (15% of GDP) in 2009 from $41.4 billion (16% of GDP) in the previous year, reflecting a lower collection of income taxes, fees and charges, and asset taxes. (Chart 1.44)

The government received $16.9 billion of income taxes from businesses, individuals and statutory boards, about $1.7 billion less than the preceding year. This can be attributed to lower corporate taxes and statutory board contributions, while personal income taxes added to the government's coffers. The economic contraction in the fourth quarter of 2008 dampened corporate profits and hence corporate tax collections; however, wages tend not to be as volatile as profits and thus personal income taxes did not fall.

Collections from fees and charges fell by $1.3 billion to $2.4 billion in 2009. The bulk of the decline was due to development charges i.e. taxes levied on the enhancement in the value of land that is being redeveloped, which have been classified as tax revenue with effect from FY2009. There was also a reduction in receipts from Certificates of Entitlement (COEs), with fewer new cars registered last year. While COE premiums moved up over the course of 2009, they were, on average, slightly lower than that in 2008. (Chart 1.45)

Chart 1.43
Primary Surplus/Deficit

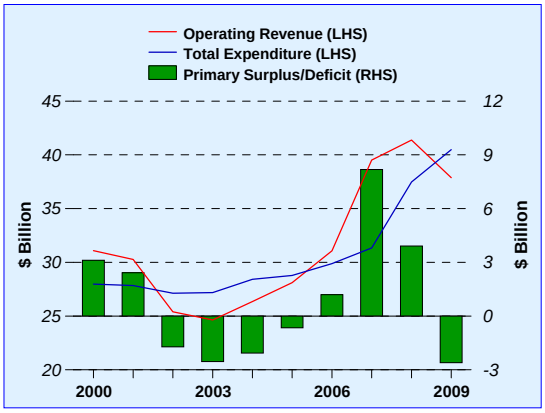


Chart 1.44
Components of Operating Revenue

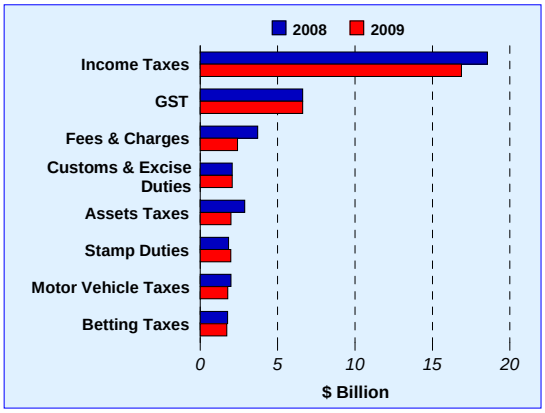
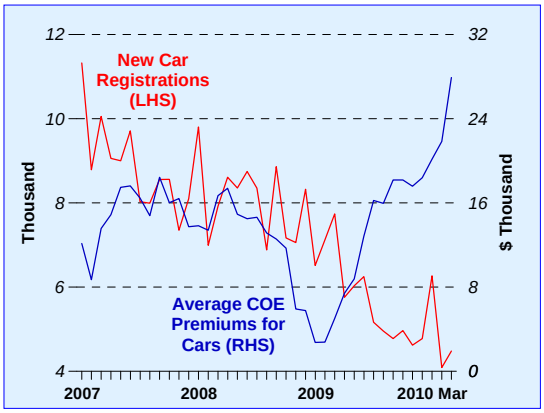


Chart 1.45
New Car Registrations and COE Premiums



[9] The primary surplus/deficit is defined as operating revenue (excluding net investment income/returns contribution) less the sum of operating and development expenditure.

Asset taxes, the bulk of which are property taxes, fell by $0.9 billion last year. This was a result of measures introduced in the Resilience Package,[10] namely, the rebates granted for commercial and industrial properties, tax deferral for land under development, and rebates for owner occupied residential properties.

There were two main components in operating revenue that were relatively more resilient during the downturn. First, GST receipts – which are the second largest component of operating revenue after income taxes – was almost unchanged at $6.6 billion in 2009 compared to 2008. While collections hit a low of $1.4 billion in Q1, these picked up gradually over the course of the year, alongside the recovery in consumer demand. Second, stamp duty collections increased by $0.2 billion in 2009, rising sharply from a three-year low of $0.2 billion in Q1 to an average of $0.7 billion in the final two quarters, on the back of bullish sentiment in the property market.

There were increases in both operating and development expenditure.

Total government expenditure rose by $3.0 billion in 2009 to $40.5 billion (16% of GDP), as a result of increased spending on both operating and development items. (Chart 1.46)

Operating expenses, which typically account for about three-quarters of total government expenditure, amounted to $29.9 billion (12% of GDP) last year, $1.3 billion more than in 2008. The increase was led by the Ministry of Health, which incurred a higher outlay during the H1N1 outbreak, as well as funding the restructured hospitals and new healthcare initiatives. (Chart 1.47) The next largest increase in spending was on manpower. This was mainly due to the Workfare Income Supplement Scheme (WIS) and Skills Programme for Upgrading and Resilience (SPUR). The WIS aims to enhance the retirement adequacy of Singaporeans and improve the income security of vulnerable low-wage workers. SPUR is an enhanced financial support scheme developed by the Workforce Development Agency (WDA) in consultation with the tripartite partners – the National Trades Union Congress (NTUC) and the Singapore National Employers Federation (SNEF) – to help businesses cope with manpower challenges during the downturn.

Chart 1.46
Government Expenditure

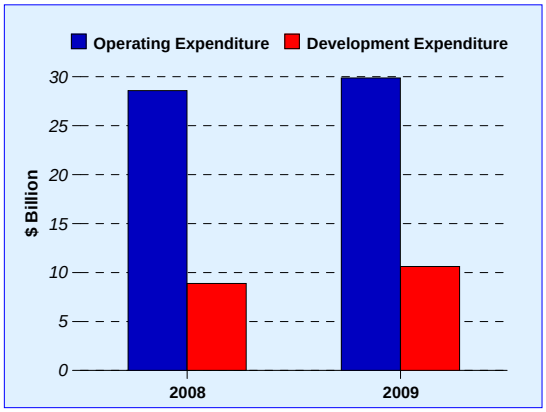
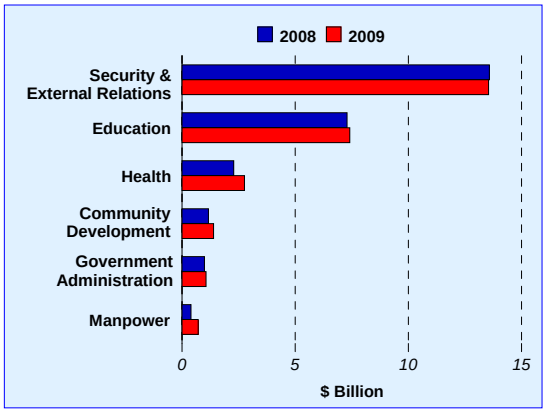


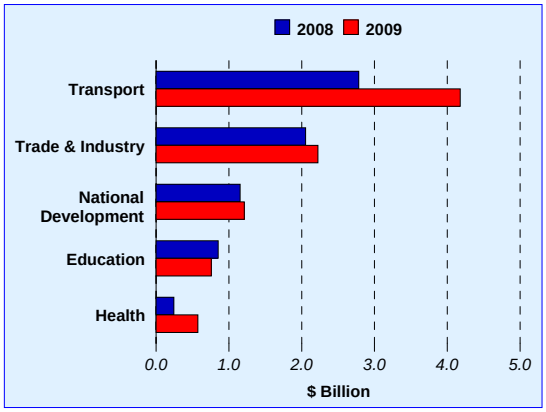
Chart 1.47
Selected Components of Operating Expenditure



[10] The Resilience Package was unveiled in the FY2009 Budget to cushion the economy from the downturn.

Development expenditure rose by $1.7 billion to $10.6 billion (4.1% of GDP) in 2009, with the bulk of the increase arising from larger investment on rail and road transport projects, including the Circle Line and Downtown Line. (Chart 1.48) Infrastructure spending in the healthcare sector was also higher, reflecting the construction of the National University Hospital Integrated Medical Complex and Khoo Teck Puat Hospital.

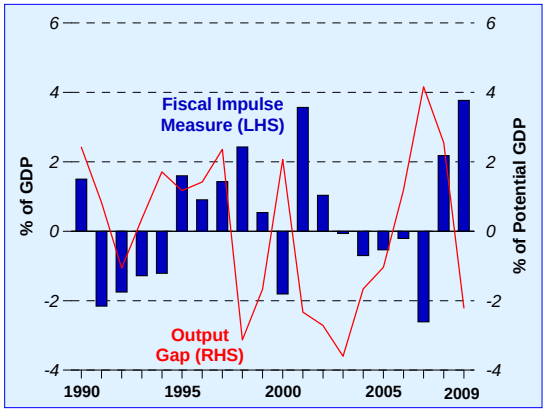
Chart 1.48
Selected Components of Development Expenditure



The fiscal policy stance was expansionary in 2009, in part, a consequence of the Resilience Package.

The FI measure provides a useful summary of the overall fiscal policy stance, which takes into account targeted special transfers disbursed by the government to improve the cash flow of households and businesses. In CY2009, the fiscal stance was more expansionary than in the previous year, as shown by the positive FI at 3.8% of GDP. (Chart 1.49) This was supported by the Resilience Package announced in the FY2009 Budget, including payouts under the Jobs Credit Scheme. An expansionary fiscal stance was entirely appropriate in view of the sharp output losses incurred in early 2009.

Chart 1.49
Fiscal Impulse Measure



Source: EPG, MAS estimates