

The economic impact of Severe Acute Respiratory Syndrome (SARS)

SARS has severely disrupted the economies of some of Australia's major trading partners in the region and is expected to reduce GDP growth in East Asia by around ½ to 1 percentage point in 2003. This has occurred in an environment of an already subdued global economy. SARS has caused a large demand shock in East Asia, particularly to the consumption of services, especially travel. However, barring further outbreaks, the economic disruption should be relatively short-lived, with the worst of the economic impact expected in the June quarter 2003. Tourism should gradually recover over coming months. For some regional economies, SARS will add to existing stresses, especially fiscal pressures as governments respond by investing greater resources in public health. The overall economic impact of SARS on the Australian economy has been relatively limited, although tourist arrivals from East Asia have fallen sharply.

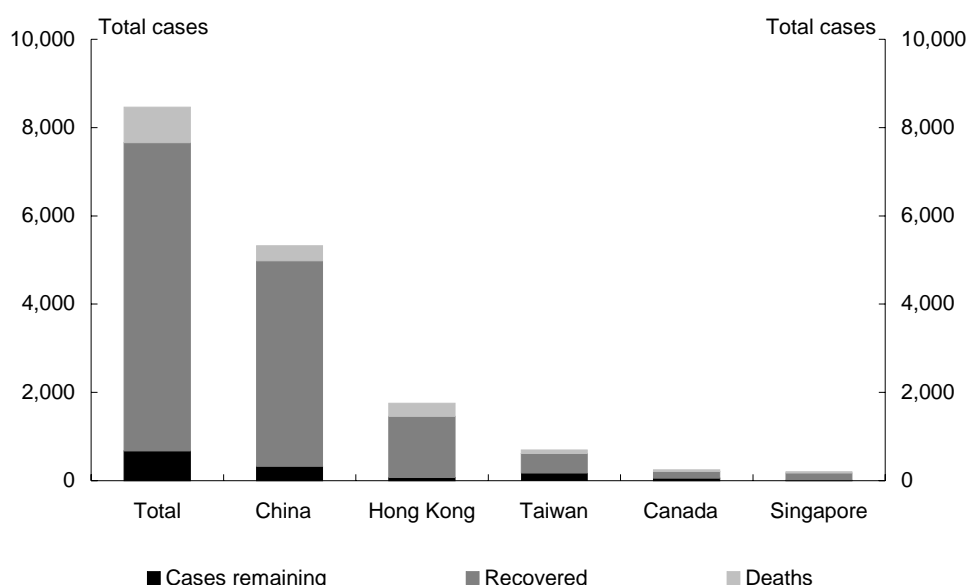
The outbreak of SARS

Severe Acute Respiratory Syndrome (SARS) is a deadly atypical pneumonia that became publicly recognised at the end of February 2003. It first appeared in the Chinese province of Guangdong in November 2002 and spread to Hong Kong during late February. By mid-June 2003, the SARS virus had infected around 8500 people worldwide and caused around 800 deaths (Chart 1). SARS has largely affected the greater China area. To mid-June 2003, close to 63 per cent of cases occurred in China, with 85 per cent in China and Hong Kong together. The third largest outbreak has been in Taiwan. Canada and Singapore also experienced significant outbreaks.

The World Health Organisation began reporting the daily spread and rising death toll of the disease outside of China in mid-March. Information on the spread of SARS in China became available from late March, following international pressure for China to publicly address the growing health concerns within its borders. During these early stages, governments and individuals were required to make decisions about how to best deal with the situation, with scant knowledge about the epidemiology of the virus or how it spread. These uncertainties created a lot of fear that strongly influenced

economic behaviour and SARS also raised questions about the adequacy of the public health systems in affected countries¹.

Chart 1: Cumulative number of SARS cases, deaths and recoveries (to mid-June 2003)

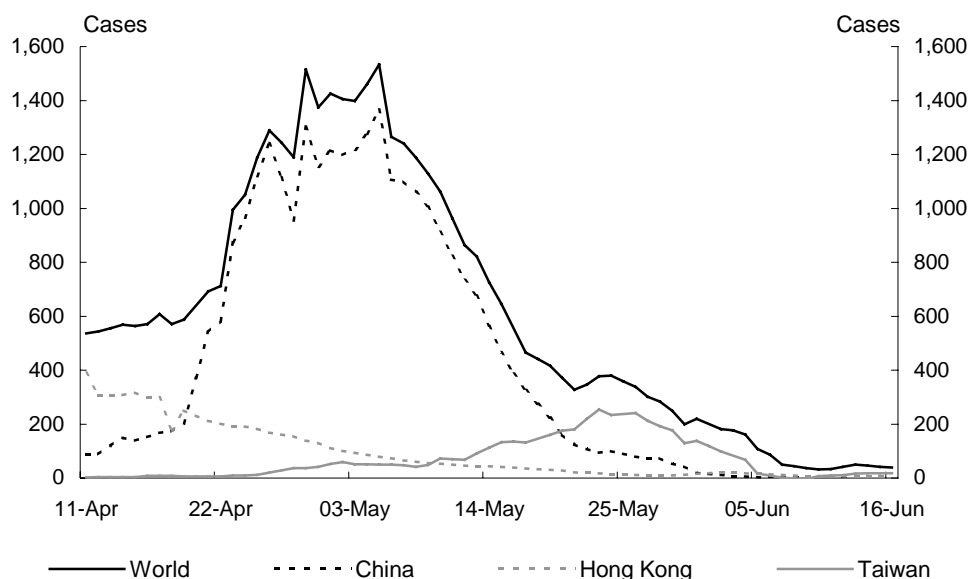


Source: Cumulative number of reported probable cases of SARS, World Health Organization (WHO), www.who.int.

Measures taken by governments (including quarantine and pre-departure checks at airports and seaports), along with attempts by individuals to limit exposure, appear to have successfully limited the spread of the virus. By mid-June 2003, the spread of SARS appeared to have waned, after peaking in early May 2003 (Chart 2). The number of countries with SARS cases remaining has declined from 32 to 10. However, the possibility of future outbreaks remains, as displayed by developments in Canada where a significant outbreak occurred when the disease was thought to be almost eliminated. The risk remains of further outbreaks in China's rural areas, or to other densely populated countries with poor medical facilities. In addition, it remains to be seen if SARS is affected by seasonal patterns.

¹ Compared with other contagious diseases, SARS has had a relatively small impact in terms of overall health and deaths. For example, the influenza virus causes between 250,000 to 500,000 deaths annually.

Chart 2: Through-the-week change in new SARS cases



Source: Derived from WHO data.

The economic impact of SARS

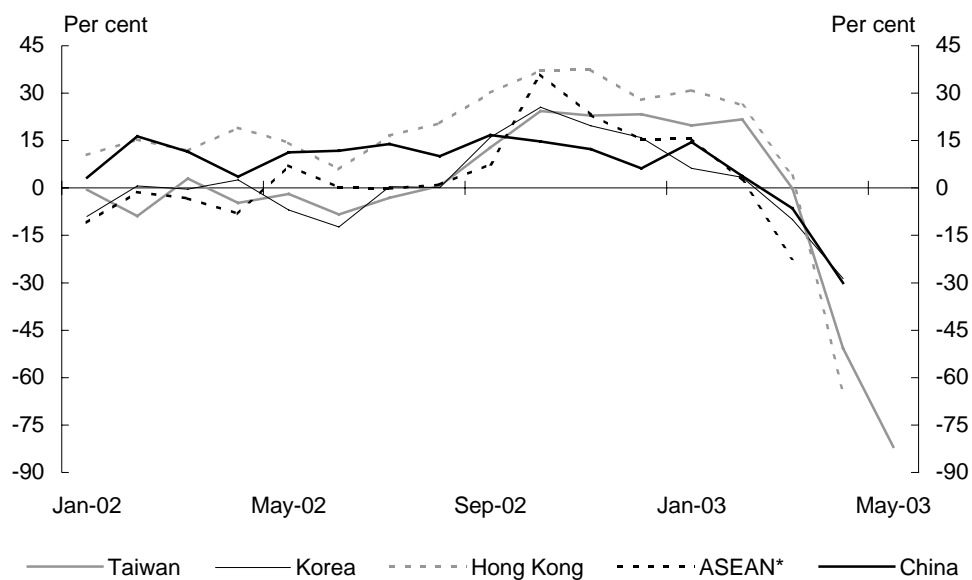
In economic terms, SARS represents a crisis of confidence and a demand shock that hit East Asia, especially China, hard. This occurred at a time when East Asian growth prospects were already clouded by geopolitical uncertainties and high oil prices, the stalling in technology exports, and overall weak economic growth in major industrialised economies. GDP growth slowed significantly in a number of East Asian economies in the first quarter of 2003.

Fear of contracting SARS influenced the behaviour of individuals, making them avoid public places, travel and face to face contact. In Hong Kong, Singapore, and parts of China, schools closed, meetings and conventions were postponed or unattended, while restaurants and shopping malls experienced declining patronage. As a consequence, consumption expenditure and especially the consumption of services fell sharply.

SARS has heavily reduced domestic and international travel and tourism in East Asia, with tourist arrivals (Chart 3), airline travel and hotel occupancy rates plummeting. Tourism accounts for well over 5 per cent of GDP for several economies in the region (Chart 4) and was already weak following the Bali bombing on 12 October 2002 and the events of September 11. Weakness in these sectors aggravated the shock to consumption demand, with retail sales

falling in a number of East Asian economies (Chart 5) in the early part of the outbreak period.

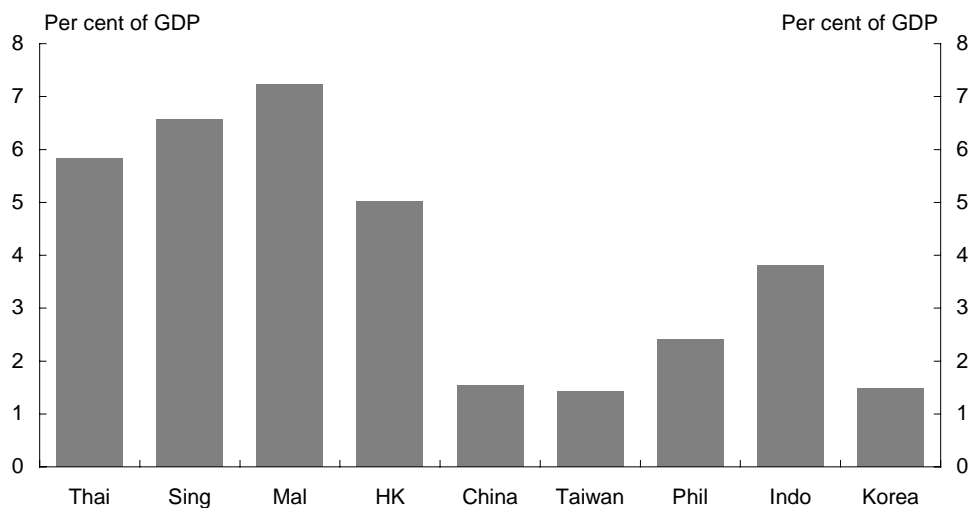
Chart 3: Tourist arrivals (per cent change, through-the-year)



*ASEAN countries comprising of Malaysia, Philippines, Singapore, and Thailand.

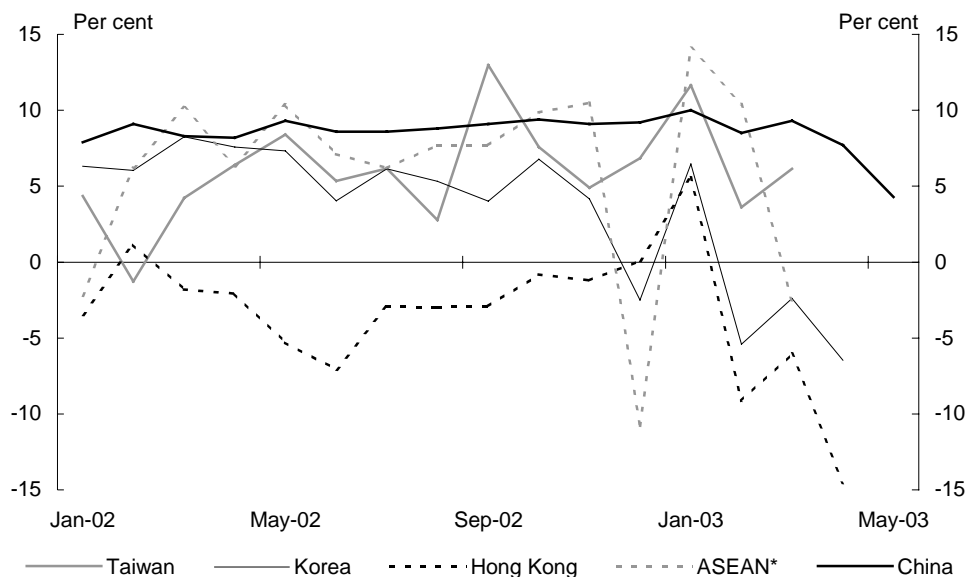
Source: CEIC.

Chart 4: Tourism as per cent of GDP (2001)



Source: CEIC.

**Chart 5: Retail sales
(per cent change, through-the-year)**



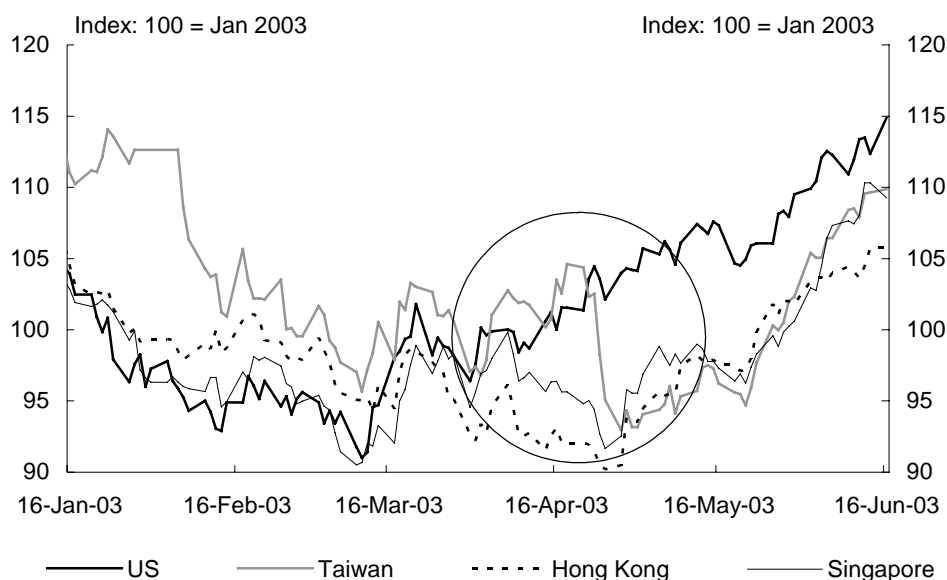
* ASEAN countries comprising of Indonesia, Singapore and Thailand.
 ASEAN retail sales growth calculated using purchasing power parity (PPP) weights.
 Source: CEIC and IMF WEO April 2003 for PPP weights.

Business costs have risen somewhat since February 2003 due to the loss of working hours from SARS-related illness or absences, and the introduction of precautionary measures to prevent the spread of SARS. International and regional shipments of inputs and final goods may have also been delayed, with cross-border trade hampered. The loss of confidence was also reflected in East Asian financial markets, with stock prices falling following news of the outbreak. When US stocks rallied following reduced uncertainty surrounding Iraq in late March, East Asian stocks continued to fall. Stock prices in Hong Kong and Singapore hit their lowest levels since the Asian financial crisis, although they have since recovered as the outbreak appears to have been largely contained (Chart 6).

As the outbreak appears to be coming under control, the worst of the economic decline in East Asia should be largely limited to the June quarter. Anecdotal evidence suggests that economic activity and behaviour is gradually returning to normal in East Asia. This suggests that the SARS-induced economic shock to East Asia should be relatively short-lived, and the overall impact on world economic growth should be relatively small.

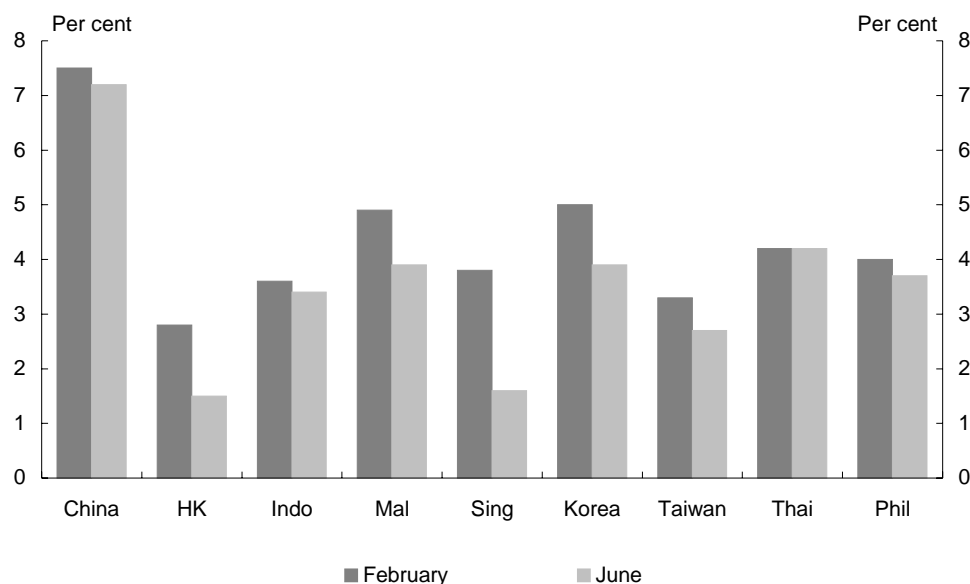
The country most affected by SARS is Hong Kong, with the largest number of infections and deaths relative to its population. With services, business travel and tourism comprising a very high proportion of economic activity (around 80 per cent of GDP), the negative impact on growth will be significant. Real GDP in the March quarter 2003 contracted by 0.3 per cent from the December quarter as the effect of SARS on services and inbound tourism commenced. April data reveal severe falls in tourism, the retail sector and international trade (Charts 3, 5, and 8). Private sector forecasters have slashed GDP growth forecasts for Hong Kong in 2003 from around 3 per cent prior to the outbreak to around 1½ per cent after the outbreak (Chart 7).

Chart 6: US and East Asian stock prices



Source: Thomson Financial Datastream.

Chart 7: Consensus GDP growth forecasts for 2003

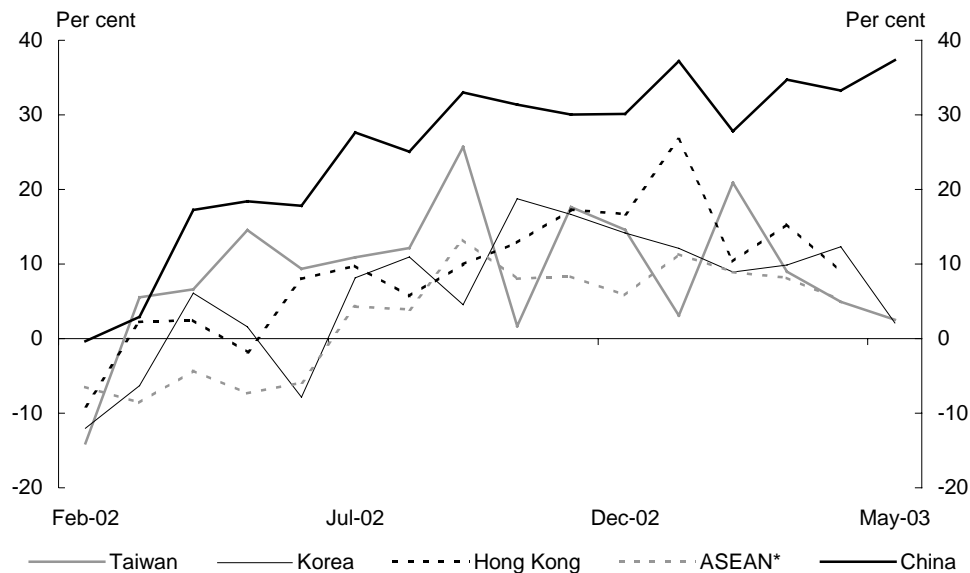


Source: Asia-Pacific Consensus Forecasts.

In Hong Kong, there has been a deterioration in labour market conditions in the manufacturing and construction sectors since the mid-1990s. Job losses have fallen mainly on low-skilled workers, with the service sector providing some cushion. However, the severe impact of SARS on the service sector has also created significant job losses in this sector, causing a further deterioration in labour market conditions. Since the SARS outbreak, the unemployment rate has risen in Hong Kong from 7.2 per cent in January to 8.3 per cent in May.

China experienced the greatest absolute number of SARS infections and deaths of any country. SARS was only publicised widely in China towards the end of April and government measures to contain SARS, including public investment in a medical facility were implemented in May. China's exceptionally strong GDP growth of 9.9 per cent in the year to March 2003 declined to 8.6 per cent in the year to April. Growth in retail sales to May slowed sharply to the lowest expansion rate in five years (Chart 5). In addition, foreign direct investment growth also slowed, rising by only 18 per cent in the year to May after growing by over 60 per cent in the year to March. However, Chinese exports have continued to boom, growing by over 35 per cent in the year to May (Chart 8), in part due to China's increasing competitiveness with its currency linked to the decline in the value of the US dollar.

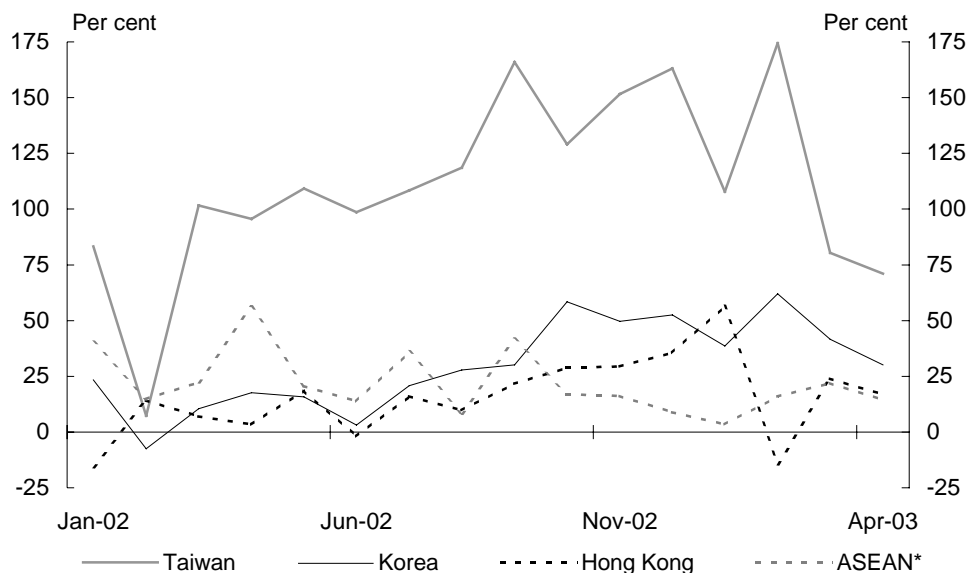
**Chart 8: Merchandise exports
(percent change, through-the-year)**



* ASEAN countries comprising of Indonesia, Malaysia, Philippines, Singapore and Thailand.
 ASEAN export growth calculated using purchasing power parity (PPP) weights.
 Source: CEIC and IMF WEO April 2003 for PPP weights.

With the Chinese economy being an increasingly important driver of intra-regional trade and production growth (China accounted for around 20 per cent of intra-regional trade and over 10 per cent of the region's total trade in 2001), a significant slowing in China could have a substantial impact on regional trade. Trade data to April show that export growth to China for most East Asian economies fell significantly, particularly from Taiwan (Chart 9). Private sector GDP growth forecasts for China in 2003 have been downgraded to between around 6½ to 7¼ per cent, compared with around 7½ per cent prior to the outbreak (Chart 7).

**Chart 9: Merchandise exports to China
(per cent change, through-the-year)**



*ASEAN countries comprising of Malaysia, Philippines, Singapore and Thailand.

ASEAN export growth to China calculated using purchasing power parity (PPP) weights.

Source: CEIC and IMF WEO April 2003 for PPP weights.

The outbreak of SARS in Taiwan occurred later than in other countries. While the outbreak in Taiwan was on a smaller scale than in China and Hong Kong, it was broad enough to require large-scale containment policies and is likely to cause a significant negative economic impact. Consensus GDP growth forecasts for Taiwan in 2003 have been downgraded by more than $\frac{1}{2}$ of a percentage point from February to June 2003, partly due to the SARS outbreak.

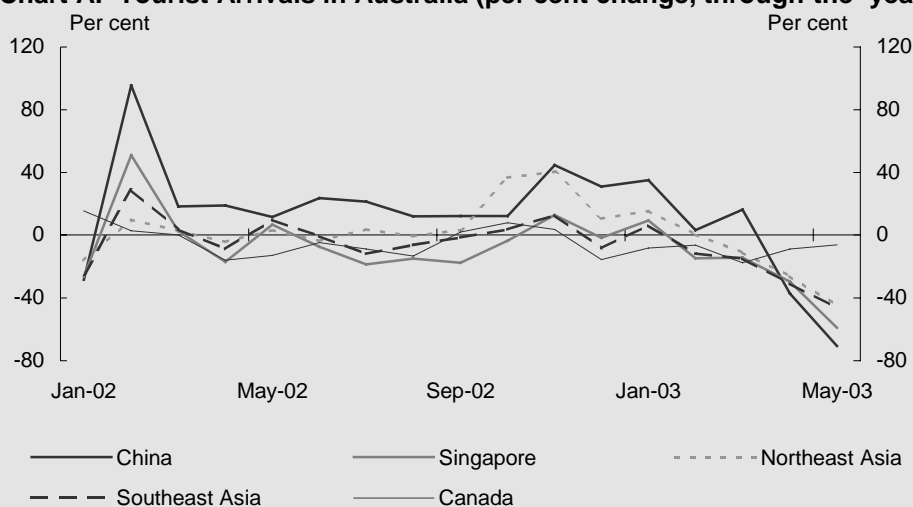
Singapore was one of the first countries to experience a large SARS outbreak, which was effectively contained. Vietnam was also successful in containing an outbreak. Thailand, Malaysia and other East Asian countries only experienced a few SARS cases. However, these economies are likely to also experience negative economic impacts due to weaker tourism and spillover from slower economic activity and intra-regional trade with their more affected neighbours. With the exception of Thailand, Consensus GDP growth forecasts for these economies have been revised downwards since the SARS outbreak (Chart 7).

The economic impact of SARS on Australia has been relatively limited, falling mainly on the tourism sector (see Box 1).

Box 1: Economic Impact of SARS on the Australian Economy

The recent outbreak of SARS will have a mild and temporary impact on the Australian economy — primarily through weaker growth in Asia that has reduced some exports, disrupted tourism and possibly reduced business confidence. The limited impact of the SARS epidemic on the Australian economy will nevertheless be predicated on the continued containment of the virus and no substantial outbreak of SARS in Australia; however, this latter risk appears to be diminishing.

Chart A: Tourist Arrivals in Australia (per cent change, through-the-year)



Source: Australia Bureau of Statistics Catalogue No. 3401.0.

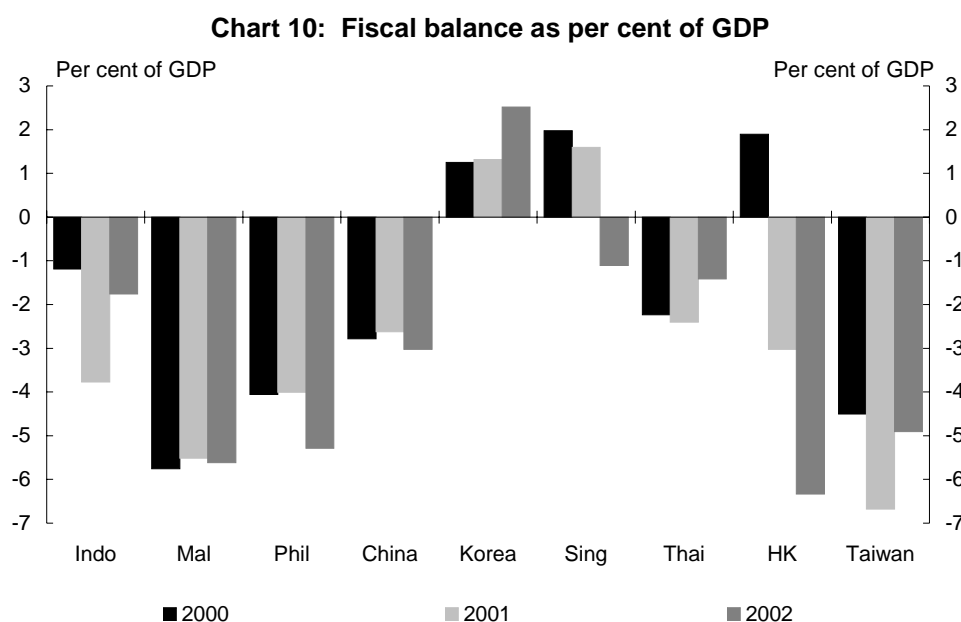
Australia's tourism industry, which accounts for 4.5 per cent of the economy, has seen a substantial decline in the number of inbound tourists. The preliminary short-term arrival data reported a month-on-month fall of 2.6 per cent for May 2003, following an 8.5 per cent fall in April. There is little doubt that the war in Iraq and related geo-political tensions were major factors contributing to the overall decline in inbound tourists, but a large proportion may be attributed to SARS. Short-term arrivals from SARS affected East Asian countries fell sharply in the year to May (see Chart A). These trends are expected to reverse gradually over coming months. The downturn in tourist arrivals has been offset somewhat as Australians have deferred or cancelled their overseas travel in favour of Australian destinations. Short-term month-on-month departures of Australian residents fell 5.9 per cent in April, following an 11.9 per cent decline in March.

Aside from travel, SARS is expected to have a broader economic effect through its impact on Australia's major trading partner growth in Asia, which may depress Australia's overall export performance. However, as outlined, the SARS-induced economic shock to Asia should be relatively short lived.

Fiscal responses

Most governments in the region responded to the outbreak of SARS with fiscal measures to support economic activity and to fund containment and treatment policies. However, these measures have been relatively modest due to most countries' budget positions already being in significant deficit. In the longer term, additional government expenditures on health across the region will create budgetary pressures that will be funded by increasing the fiscal deficit or by a reallocation of government spending away from other public expenditure.

The severely SARS affected economies of China, Hong Kong and Taiwan already have significant budget deficits, limiting flexibility in combating further outbreaks of SARS and/or supporting economic activity (Chart 10). In contrast, Singapore has more scope to respond to any long-term fiscal pressure due to SARS.



Source: Asian Development Bank-Asia Recovery Information Centre database (aric.adb.org) and CEIC.

- China's budget deficit for 2003 is estimated to rise by around ½ per cent of GDP due to SARS, which could make current fiscal targets for the year difficult to achieve.
- Hong Kong's anti-SARS measures (of around 1 per cent of GDP) are likely to bring the 2003-04 budget deficit to around 7 per cent of GDP, raising

concerns about the HK\$ peg and its longer-term fiscal position. However, Hong Kong remains in a strong net asset position.

- Taiwan's anti-SARS package worth over US\$3.0 billion (around 1 per cent of GDP) will further deteriorate Taiwan's fiscal position, which has been in deficit for over a decade.
- Singapore's anti-SARS measures are equivalent to less than ¼ of a per cent of GDP. Moreover, Singapore only has a small budget deficit and the government is in a strong net asset position.

The less directly SARS affected economies of Thailand and Korea have also announced budgetary measures in response to SARS. Both economies have fiscal flexibility to respond to the pressures being caused by SARS, as Korea has a budget surplus and the Thai government expects to be in a budget surplus position this fiscal year.

The other less directly SARS affected economies of Malaysia, Indonesia, the Philippines and other low-income Southeast Asian countries may have less capacity to respond to any long-term fiscal pressures due to SARS, given their current budget deficit positions.

Long-term implications

The severe economic impact of SARS struck at the epicentre of growth in East Asia. The spillover effects on the rest of the region emphasised the high degree of regional integration, with countries such as China, Hong Kong, Taiwan and Singapore being highly interlinked with the rest of East Asia in terms of travel, production and trade. This has highlighted how a SARS-induced or similar type of economic shock in one country is readily transmitted to other countries in the region. Any further SARS or similar outbreaks could have long-term implications for regional growth and could potentially hamper moves toward greater integration in the region.

The eventual economic impact of SARS on East Asia's economic growth hinges on how long the outbreak lasts, how widely the disease spreads, and whether any future outbreaks are preventable or manageable. In order to model the economic impact of SARS, the approach taken in a recent paper by Lee and McKibbin (2003) has been modified to take account of more recent information on the spread of SARS. Using a multi-country general equilibrium macroeconomic model, temporary and persistent SARS shocks have been simulated to assess the potential economic impact. In both simulations, the

SARS shock causes a major slowdown in GDP growth (from baseline) in the most affected economies of China, Hong Kong and Taiwan in 2003. If the SARS shock persists in the greater China area, the model shows that economic growth could weaken significantly in Australia's major trading partners (MTP) as a whole (see Attachment A for more details).

The SARS outbreak also may have long-term implication in terms of investors' perceptions. Investors could be influenced to place more weight on government responsiveness, governance and transparency rather than direct production costs in their investment decisions. In this regard, China's initial fragmented response and capacity to manage the crisis may have caused some market concerns, although later moves towards greater transparency may have gone some way to mitigate these concerns.

The long term economic impact of SARS will depend largely on whether governments can quickly implement effective public health policies. This will require increased investment in public health and will have implications in terms of increased fiscal outlays. The provision of accurate, timely and transparent information on the nature and extent of any further SARS outbreak will also be important in assisting to contain and reduce public fears and uncertainty.

Attachment A: Modelling the economic impact of SARS

Using the APG cubed model², the potential economic impact of SARS is modelled under two different scenarios. In both scenarios, it is assumed that both demand and supply shocks originate in China and Hong Kong, which are then transmitted to other countries. It is further assumed that it is only in China, Hong Kong and Taiwan that the country risk premium rises. The magnitude and transmission of SARS shocks to other economies are estimated using the methodology presented in Lee and McKibbin (2003)³ which we have modified in light of recent SARS developments. The initial shocks to China and Hong Kong are assumed to be represented by:

- a demand shock — a 15 per cent reduction of demand for the exposed industries in the services sector;
- a supply shock — a 5 per cent cost increase in the vulnerable industries within the services sector; and
- a confidence shock — a 200 basis points (bps) rise in the country risk premia.

Scenario 1 — Temporary SARS shock

In the first scenario, it is assumed that the SARS shocks last for a year. The SARS outbreak dissipates and a subsequent outbreak of a significant magnitude is assumed to be unlikely or preventable.

2 The Asia-Pacific-G-cubed multi-country model developed by McKibbin and Wilcoxon is a sophisticated general equilibrium macroeconomic model that recognises the important trade and financial linkages that exist between countries. The model has a detailed country coverage (18 economies) and links between countries through goods and asset markets. Each economy consists of several economic agents, covering households, the government, the financial sector and 6 production sectors. The behaviour of each type of agent is modelled, includes inter-temporal budget constraints and forward-looking behaviour in investment and consumption.

3 Lee and McKibbin (2003) assumed the transmission of the SARS shocks to be influenced by the country's 'intensity of exposure to SARS (IES)' and 'sectoral exposure to SARS (SES)'. The IES is based on the number of cumulated cases for each country and information on (amongst others) tourist flows, geographical distance to China and sanitary conditions. The SES is assumed to be proportional to the share of retail sales and the travel sector in the country's service sector relative to China. (Lee and McKibbin, *Globalisation and Disease: The Case of SARS*, paper presented to the Asian Economic Panel held in Tokyo, May 11-12, 2003.)

The simulation results⁴ show that the economic loss from temporary SARS shocks is largely confined to 2003. Table 1 summarises the results for the percentage change in GDP from baseline for 2003 and provides a breakdown of the impact from each shock.

As expected, the results show that the temporary shocks have the largest impact on China, Hong Kong and Taiwan. However, the loss in Hong Kong (5.3 per cent of GDP) is greater than China (2.2 per cent of GDP) and Taiwan (1.3 per cent of GDP). This arises because of the larger share of the service sector in Hong Kong, the higher share of affected industries within the service sector and Hong Kong's greater reliance on trade. In Hong Kong and Taiwan, the supply shock which leads to higher costs in the services sector contributes most to the loss in GDP, while in China the three shocks contribute evenly to the GDP loss.

Table 1: Percentage change in GDP from baseline in 2003 due to SARS

	Total Impact	Demand shock(a)	Supply shock(b)	Confidence shock(c)
Australia	-0.13	-0.01	-0.12	0.00
China	-2.17	-0.75	-0.69	-0.73
Hong Kong	-5.30	-0.13	-4.74	-0.43
India	-0.09	0.00	-0.09	0.00
Indonesia	-0.16	0.02	-0.18	0.00
Japan	-0.15	-0.03	-0.12	0.00
Korea	-0.20	-0.04	-0.16	0.00
Malaysia	-0.30	0.02	-0.32	0.00
New Zealand	-0.15	0.02	-0.17	0.00
Philippines	-0.20	0.07	-0.27	0.00
Singapore	-0.94	-0.05	-0.89	0.00
Taiwan	-1.30	-0.20	-1.08	-0.02
Thailand	-0.31	0.00	-0.31	0.00
United States	-0.14	-0.03	-0.11	0.00

(a) 15 per cent reduction of demand for the exposed industries in the service sector.

(b) 5 per cent rise of costs in the exposed industries in the service sector.

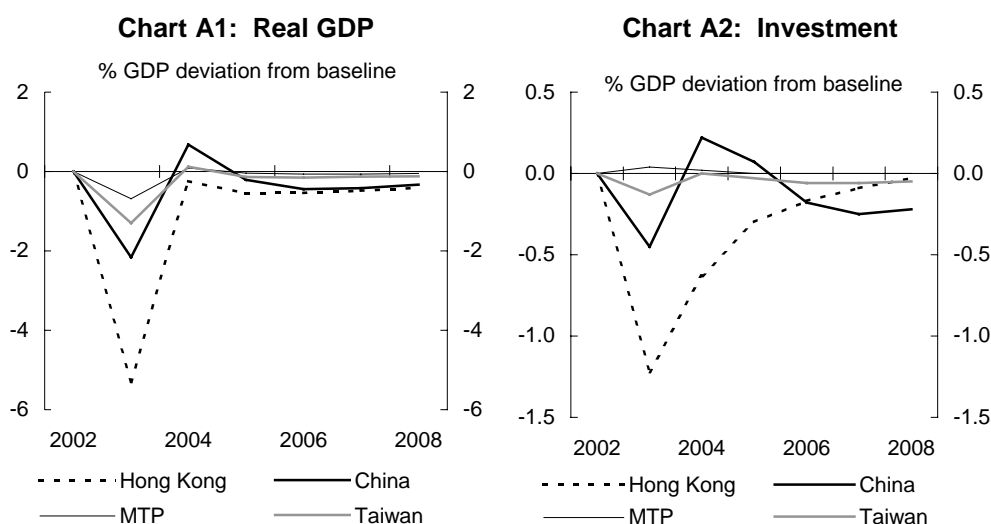
(c) 200 bps rise in the country risk premia for China and Hong Kong.

In the model, the impact on GDP (Chart A1) for the three most affected economies of China, Hong Kong and Taiwan are caused by sharp falls in consumption and investment. The initial reduction in demand for the exposed

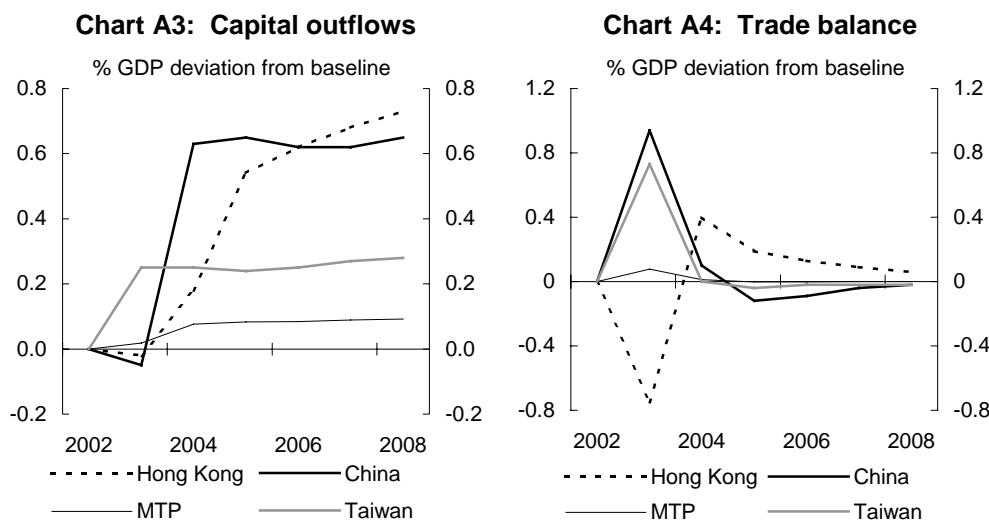
4 It should be stressed that the results generated by the Asia-Pacific G-cubed model should not be interpreted as a definitive prediction of the outcome following a shock to the system. This model, as with all models, is a simplification of a very complex set of relationships. It provides a particular theoretical path of adjustment that reflects the model structure. Models that are structured differently will give different results. The model results therefore only provide a broad indicative guide to possible outcomes.

service industries leads to an overall decline in consumption expenditure. Due to the negative spillovers from the exposed sectors, the total reduction in consumption is greater than the initial decline in demand for the exposed industries.

The increase in production costs associated with SARS leads to a reduction in investment (Chart A2). This occurs as increased production costs reduce the expected return from each additional dollar of investment. As marginal returns on investment fall, the level of investment declines, reducing overall GDP growth. In addition, higher production costs reduce expected future profits, lowering equity prices and increasing the cost of raising capital.



The increase in the country risk premium implies that assets in the affected country require a rate of return 200 bps above baseline over less risky foreign assets. This causes a capital outflow into less risky assets in other economies (Chart A3).



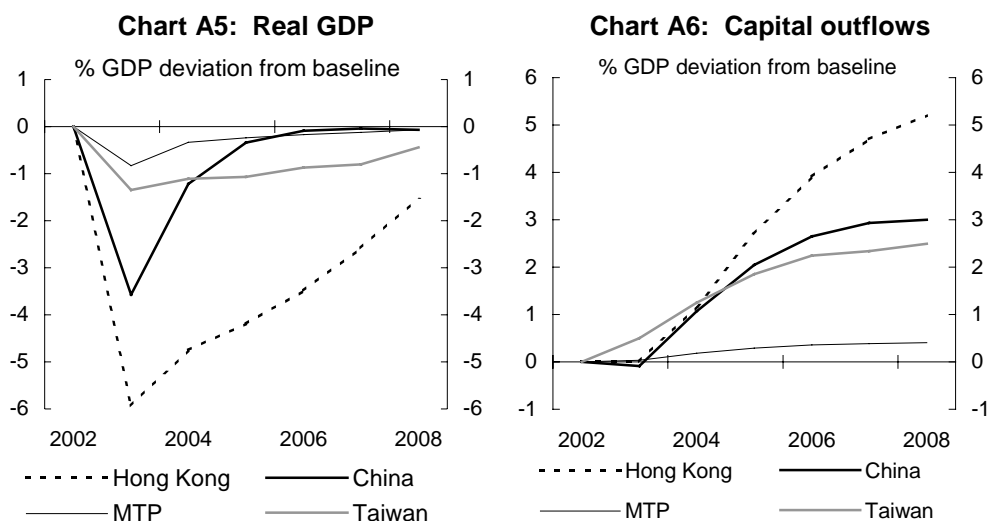
A net capital outflow creates downward pressure on the currency of the affected country. If the affected country has a floating exchange rate regime, this leads to a depreciation of the country's nominal exchange rate. However, in the case of China and Hong Kong, where the currencies are linked to the US dollar, the nominal exchange rate is inflexible. In order to maintain the peg, the central bank is forced to purchase the home currency. In doing so, money supply falls, causing prices to fall and nominal and real interest rates to rise, leading to an additional reduction in investment expenditure.

In China and Hong Kong where the nominal exchange rate is linked to the US dollar, the fall in prices improves competitiveness, leading to a depreciation of the real effective exchange rate (REER) and an increase in net exports. In the case of Hong Kong, the capital outflow is not large enough to lower the REER until 2004, leading to an initial decline in net exports (Chart A4). In contrast, the improvement in the trade balance in the other affected economies partly offsets the fall in domestic demand in 2003.

Scenario 2 — Persistent SARS shocks in China, Hong Kong and Taiwan

The second scenario assumes that the SARS shocks to China, Hong Kong and Taiwan persist for 5 years, albeit at a diminishing rate, while the SARS shocks to the other countries only last for a year. The transmission of the SARS shocks in the persistent scenario is similar to those in the temporary scenario, in that GDP is adversely affected through lower consumption and investment.

However, the economic decline in China, Hong Kong and Taiwan is more serious (Chart A5).



Notably, the persistence of the shock causes a much larger capital outflow from the affected economies (Chart A6), leading to a sharper reduction in investment, and a longer-term loss in production capacity. As such, GDP remains below baseline for a much longer period than under the temporary scenario.

Overall, the adverse impact of SARS on the GDP of Australia's MTP in both scenarios is relatively small, as the impact on the US and Japan, Australia's largest trading partners, is limited. However, if the shocks persist in the severely affected economies of China, Hong Kong and Taiwan, real GDP in Australia's MTP would remain below baseline for some time.

Both the outbreak of SARS and the associated fear of the virus appear to be waning. If this trend continues, it is likely that the adverse economic impact in East Asia will be relatively short lived and mainly felt in the June quarter 2003. As the APG-cubed model only simulates shocks on an annual basis, the results in this study, even under the temporary shock scenario, are likely to overstate both the size of the shocks and the potential economic impacts.