The macroeconomic impact on Hong Kong of hypothetical Mainland shocks[1]

by the External Department

Hong Kong has benefited greatly from the strong performance of the Mainland economy as a result of increasing economic and financial integration. Nevertheless, concerns have been raised over how Hong Kong will fare if the Mainland is hit by major economic shocks, which could derail the economy from its forecast robust medium-term growth.

To address these concerns, we use a global economic model developed by Oxford Economic Forecasting to quantify the impact on Hong Kong of a range of Mainland macroeconomic shocks. To assess Hong Kong's resilience under unusual circumstances, the magnitudes of the shocks considered are deliberately set to be large. The simulation results show that the impacts of most of these shocks on Hong Kong are relatively modest, and pale in comparison with that experienced by Hong Kong during the Asian financial crisis. The analysis suggests that Hong Kong is able to withstand shocks of considerable magnitudes, thanks to a number of in-built sources of strength in the economy. Hong Kong's macroeconomic resilience against Mainland shocks reflects the observation that the rest of the world is as important as the Mainland in influencing the external trade performance of Hong Kong. Also, Hong Kong's interest rates are fundamentally anchored to those of the United States under the Linked Exchange Rate system. Last but not least, flexible labour and product markets as well as strong net asset positions of both the Government and private sectors further enhance Hong Kong's capacity to absorb adverse shocks.

I. Introduction

Hong Kong has enjoyed an economic boom in the past two years, registering growth of 8.6% in 2004 and 7.3% in 2005. Apart from a generally conducive global economic environment, the Mainland factor has played an important role. Hong Kong's external trade has grown strongly as the Mainland expands its export market, while growing financial links between the two economies have opened up business opportunities in other sectors.

However, these increasing links have also raised concerns about how Hong Kong will fare if the Mainland is hit by economic shocks that could divert the economy from its anticipated strong medium-term growth. In the case of a positive shock, Hong Kong can expect even stronger growth. But the economy is likely to be adversely affected if there are unfavourable developments in Mainland China.

This study uses a global economic model to describe macroeconomic linkages between the two economies and assesses the impact on Hong Kong of shocks emanating from the Mainland. Section II discusses the shock transmission mechanisms. Section III suggests some scenarios of macroeconomic shocks on the Mainland and

[1] A full technical version of the study is published as He, Dong, *et al.*, 'The Macroeconomic Impact on Hong Kong of Hypothetical Mainland Shocks', Research Memorandum 15/2005, HKMA (http://www.info.gov.hk/hkma/eng/research/RM15-2005.pdf).

describes the modelling approach to quantifying their impact on Hong Kong. Section IV presents the simulation results on assessing the impacts, and Section V concludes.

II. Shock transmission channels

The Hong Kong economy will be affected by Mainland shocks through two main channels—trade and financial linkages .

First, Hong Kong's trade performance will be affected by shocks that have an impact on the Mainland's external sector due to Hong Kong's status as an *entrepôt*, intermediating goods between the Mainland and the rest of the world. The Mainland is Hong Kong's largest partner, accounting for close to 50% of total trade. About 60% of Hong Kong's imports for re-exports are sourced from the Mainland, and about half of the re-exports go to the Mainland market. A setback in the Mainland's external sector will, therefore, weigh on Hong Kong's trade performance, with the negative impact of reduced export earnings and changes in terms of trade spilling over to the domestic economy.

Secondly, monetary and financial conditions in Hong Kong may be altered by changes in investor confidence and in fund flows stemming from shocks on the Mainland, with the resulting change in Hong Kong dollar interest rates impacting on asset prices and domestic demand. While primarily following the movements of US interest rates under the Linked Exchange Rate system, local interest rates will also reflect the risk premium for the Hong Kong dollar. The risk premium is, in turn, affected by Hong Kong's current account and fiscal positions, levels of foreign reserves as well as by the Mainland's growth prospect and general emerging market risk. Consequently, shocks to the Mainland economy may lead to a sharp rise in the risk premium for emerging markets in general, and for Hong Kong in particular, due to its close proximity and economic links with the Mainland. The resulting rate hike will depress domestic demand.

III. Shock scenarios and modelling approach

The Mainland economy is expected to grow at a robust pace in the medium term, providing a conducive environment for Hong Kong's economic growth. However, there are risks to this benign picture, which could cause short-term deviations from the medium-term trend path. As Mainland China becomes increasingly integrated into the world economy, its economic growth is more closely aligned with global trade cycles, and can therefore be affected by adverse external developments, such as unfavourable exchange rate movements, a surge in protectionism, weakening in world demand and oil price volatility. Risks of a domestic origin also exist, including swings in investment spending and instability in the financial system.

In assessing the impacts of these risks on the Hong Kong economy, we run simulations on a global macroeconomic model developed by *Oxford Economic Forecasting*. This model is widely used for a range of purposes by central banks, international organisations, policy-making institutions and analysts in the financial markets. The model contains detailed specifications for eight of the most important economies including Mainland China with more than 250 equations for each. Another 36 economies are modelled with varying degrees of details. There are also blocks of equations to describe variables for the world as a whole, as well as for different geographic regions and different types of economies such as the OECD and emerging markets.

In running the simulations, the types of risks suggested are based on the economic characteristics of the Mainland and uncertainties present in the global economy. In quantifying the shocks, however, the magnitudes are deliberately set to be large — typically taken as two standard deviations of the shock variable based on historical observations over a 10-year period — to assess Hong Kong's resilience even under unusual circumstances (Table 1).[2] It needs to be emphasised that these risk scenarios are highly **hypothetical**. Given the Mainland's continued strong economic performance and sustained structural reforms,

[2] Under the assumption of a normal distribution, a two-standard-deviation shock has a small probability of occurring (less than 5%).

TABLE 1

Shock scenarios

Scenarios	Assumption
External shocks	
1 Renminbi revaluation	10% renminbi revaluation in one step
2 Trade war	Export growth declines by 20ppt for 1 year
3 US economic slowdown	US private consumption growth declines by 2ppt for 1 year
4 Oil price hike	Oil price rises permanently by US$20 per barrel
Domestic shocks	
5 Investment retrenchment	Investment growth declines by 15ppt for 1 year
6 Credit crunch	Credit growth declines by 20ppt for 1 year
7 Banking and currency instability	Interest rate rises by 10ppt, exchange rate depreciates by 50% and credit growth declines by 20ppt for 1 year

domestic shocks of such large magnitudes are highly unlikely.

IV. Macroeconomic impacts on Hong Kong

The simulation analysis suggests that for most of the Mainland shock scenarios considered (including the renminbi revaluation), the overall impacts on Hong Kong are relatively modest, with economic growth declining by less than 1.5 percentage points cumulatively in the two years following a shock.[3] However, the trade war, investment retrenchment and financial instability shocks will have a larger impact on Hong Kong, leading to a reduction in economic growth by 3-6 percentage points cumulatively over two years (Table 2).

TABLE 2

Summary on impacts of Mainland shock scenarios

Scenarios	GDP (%, yoy)		Inflation (%, yoy)	
	Year 1	Year 2	Year 1	Year 2
External shocks				
1 Renminbi revaluation	0.0	-0.2	0.0	0.0
2 Trade war	-3.2	-3.0	-0.5	-1.5
3 US economic slowdown	-0.9	0.2	-0.1	-0.1
4 Oil price hike	-0.6	-0.9	0.1	-0.1
Domestic shocks				
5 Investment retrenchment	-1.9	-1.4	-0.3	-0.8
6 Credit crunch	-0.9	-0.5	-0.1	-0.2
7 Banking and currency instability	-4.1	-0.3	-0.7	-1.2

Note: Figures are deviations in percentage points from the baseline.

[3] By virtue of Hong Kong's position as an entrepôt, the impact of a renminbi appreciation on Hong Kong is mixed. Re-exports originated from the Mainland to the rest of the world via Hong Kong will fall along with the Mainland's exports. On the other hand, a positive terms-of-trade effect for the Mainland will stimulate re-exports via Hong Kong from the rest of the world to the Mainland. Also, inbound tourism will potentially benefit as the renminbi appreciation boosts the purchasing power of Mainland visitors. As a result, these largely offsetting movements in different types of trade in the aftermath of a renminbi exchange rate shock result in relatively minor impacts on Hong Kong's external sector.

Similarly, most shocks have limited effects on inflation in Hong Kong. More significant impacts are seen in the trade war and financial instability scenarios, with the headline inflation rate declining by 1.5 - 2 percentage points in two years.

The rest of this section discusses in more detail the trade war, investment retrenchment and financial instability shocks.

(1) Trade war: Mainland's export growth declines by 20 percentage points for one year

As exports are an important growth driver for the Mainland, simulation results show that the setback to the Mainland's exports will depress its growth by as much as nine percentage points in two years. Given the close trade relationship between the two economies, Hong Kong's export growth will decline by 16 percentage points over two years, which is a severe shock on the economy's external front.

In addition to the spillover effects from the external sector, Hong Kong's domestic demand will be adversely affected by a two-percentage-point rise in local interest rates in each of the first two years. This mainly reflects a higher risk premium for the Hong Kong economy amid the sharp economic downturn on the Mainland. As a result, Hong Kong's consumption and investment growth will be reduced by about four percentage points over two years.

Overall, there is a six-percentage-point reduction in Hong Kong's GDP growth over two years. The headline inflation will decline by two percentage points, reflecting slower economic activity (Chart 1 and Table 3).

CHART 1

Trade war: Headline growth and inflation (%, yoy)

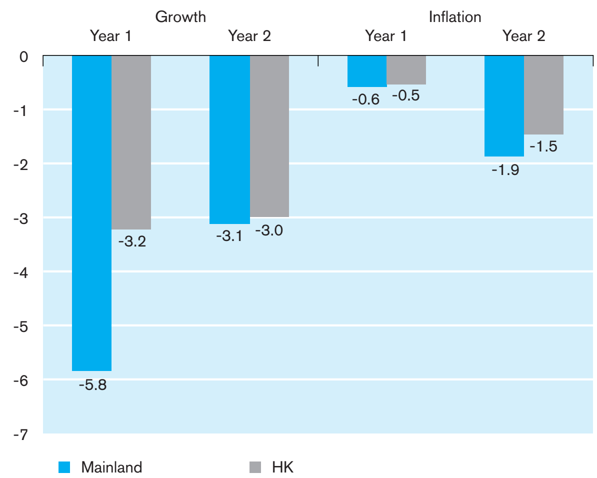


TABLE 3

Trade war: Other key economic variables

	Mainland		Hong Kong	
	Year 1	Year 2	Year 1	Year 2
GDP (%, yoy)	-5.8	-3.1	-3.2	-3.0
Consumption (%, yoy)	-1.3	-1.9	-1.6	-2.6
Investment (%, yoy)	-2.8	-9.9	-1.7	-2.4
Exports (%, yoy)	-20.0	0.0	-10.4	-5.7
Imports (%, yoy)	-12.2	-9.5	-10.3	-5.6
Inflation (%, yoy)	-0.6	-1.9	-0.5	-1.5
Unemployment Rate (%, per annum)	0.8	0.9	0.8	2.0
Current account (% of GDP)	-3.1	0.1	-3.7	-5.0
Fiscal balance (% of GDP)	-0.6	-0.4	-0.1	-0.8

Note: Figures are deviations in percentage points from the baseline.

(2) Investment retrenchment: Mainland's investment growth declines by 15 percentage points for one year

With a share of 45% in GDP, investment spending has played a key role in driving the Mainland's recent business cycles, and an investment retrenchment shock will have a significant impact on the economy. In the simulated case of a 15-percentage-point decline in investment expansion, growth in the Mainland economy will be pulled down significantly by eight percentage points over two years.

Hong Kong's trade will be depressed by weak domestic demand on the Mainland. At the same time, the setback to the Mainland economy in overall terms will lead to a two-percentage-point increase in Hong Kong's risk premium in each of the first two years, thereby further depressing the domestic economy.

Overall, Hong Kong's economic growth will fall by around three percentage points over two years, and inflation will decline by around one percentage point (Chart 2 and Table 4).

CHART 2

Investment retrenchment: Headline growth and inflation (%, yoy)

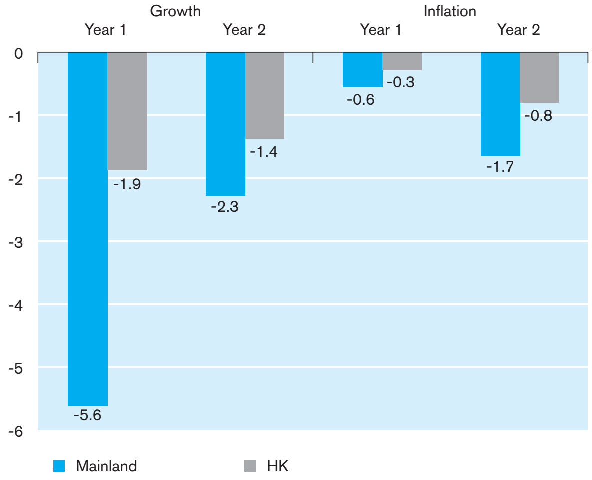


TABLE 4

Investment retrenchment: Other key economic variables

	Mainland		Hong Kong	
	Year 1	**Year 2**	**Year 1**	**Year 2**
GDP *(%, yoy)*	-5.6	-2.3	-1.9	-1.4
Consumption *(%, yoy)*	-1.4	-1.7	-1.4	-1.1
Investment *(%, yoy)*	-15.0	-5.8	-1.7	-1.1
Exports *(%, yoy)*	-0.9	0.9	-3.5	-2.4
Imports *(%, yoy)*	-11.3	-5.1	-3.4	-2.3
Inflation *(%, yoy)*	-0.6	-1.7	-0.3	-0.8
Unemployment Rate *(%, per annum)*	0.7	0.6	0.5	1.1
Current account *(% of GDP)*	3.7	6.3	-0.8	-1.2
Fiscal balance *(% of GDP)*	-0.4	-0.1	0.0	-0.3

Note: Figures are deviations in percentage points from the baseline.

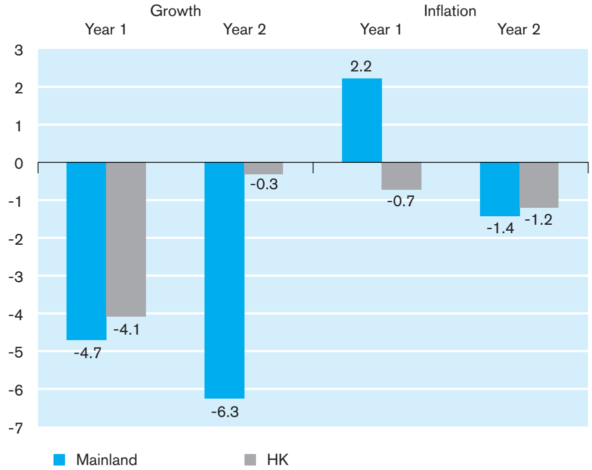
(3) Financial instability: the Mainland's interest rate rises by 10 percentage points, the exchange rate depreciates by 50% and credit growth declines by 20 percentage points for one year

For the financial instability scenario, conditions close to those faced by South Korea during the Asian financial crisis are used for the simulation. Compared with the other scenarios, the Mainland economy is hardest hit by this shock. Domestic demand dwindles sharply as the surging interest rates and a credit crunch severely depress consumption and investment. On the external front, improved competitiveness brought about by the sharp depreciation only starts to boost exports in the second year, and even then it is not sufficient to offset the strong contractionary impact of very tight domestic monetary conditions. The overall impact on the Mainland is drastic, with GDP growth declining by 4-6 percentage points in each of the first two years.

Under these conditions, Hong Kong's trade will initially deteriorate amid a slowdown in the Mainland's imports, but the decline in total trade narrows subsequently when the Mainland's exports start to improve. The major impact comes through the financial market linkages, when the shocks on the Mainland lead to a sharp rise in Hong Kong's interest rate to over nine percentage points in the first year – a situation seen during the Asian financial crisis – thereby severely depressing domestic demand.

CHART 3

Financial instability: Headline growth and inflation (%, yoy)



The financial instability scenario will reduce Hong Kong's overall growth by around four percentage points in the first year. But when the renminbi exchange rate stabilises in the second year, the market perceives a smaller likelihood of depreciation in the Hong Kong dollar. Local interest rates therefore fall back by five percentage points, and the economy begins to stabilise. During the two years following the shock, the headline inflation declines by around two percentage points (Chart 3 and Table 5).

TABLE 5

Financial instability: Other key economic variables

	Mainland		Hong Kong	
	Year 1	Year 2	Year 1	Year 2
GDP *(%, yoy)*	-4.7	-6.3	-4.1	-0.3
Consumption *(%, yoy)*	-2.1	-1.9	-5.0	-0.3
Investment *(%, yoy)*	-12.8	-14.8	-5.8	0.1
Exports *(%, yoy)*	-0.1	3.5	-2.9	-0.9
Imports *(%, yoy)*	-9.8	-1.9	-3.2	-0.8
Inflation *(%, yoy)*	2.2	-1.4	-0.7	-1.2
Unemployment Rate *(%, per annum)*	0.6	0.6	1.1	1.7
Current account *(% of GDP)*	5.0	5.1	0.8	0.7
Fiscal balance *(% of GDP)*	1.0	-0.8	0.0	-0.5

Note: Figures are deviations in percentage points from the baseline.

V. Hong Kong will be resilient in absorbing Mainland shocks

Overall, the simulation analysis of this study suggests that Hong Kong is able to withstand macroeconomic shocks that were deliberately calibrated to be low-probability events, but of considerable magnitude. In most of the scenarios we consider, Hong Kong's economic growth falls moderately, by less than 1.5 percentage points cumulatively in the two years following the shock. But the trade war, investment retrenchment and financial instability shocks would have greater impacts, shaving 3-6 percentage points cumulatively off Hong Kong's economic growth.

Nevertheless, even in the worst cases, the size of the output losses pales in comparison with that experienced by Hong Kong during the Asian financial crisis (Table 6). Even in that extreme case, however, the Hong Kong economy endured without major defaults by the corporate sector, the household sector, or the Government. The simulations also have not assumed any policy response by either the Mainland or the Hong Kong Government to cushion the impact of the shocks. In fact, with a strong net asset position, the Hong Kong Government has sufficient room for policy manoeuvre, and can use fiscal policy to provide support to the domestic economy when deemed necessary.

Overall, this study demonstrates that Hong Kong can withstand Mainland shocks of considerable magnitudes thanks to a number of built-in sources of strength in the economy. This resilience reflects the observation that the rest of the world is as important as the Mainland in influencing the external trade performance of Hong Kong, which reduces Hong Kong's reliance on the domestic demand of the Mainland economy. Hong Kong's interest rates are also fundamentally anchored to the US rates under the Linked Exchange Rate system, and deviations from the anchor rates should thus be temporary. Last, but not least, flexible labour and product markets, as well as strong net asset positions of both the public and private sectors, give the Hong Kong economy considerable capacity to absorb adverse shocks.

TABLE 6

Historical episodes

	Macroeconomic Adjustment (1994-1996)		Asian Financial Crisis (1997-1998)	
	Mainland	Hong Kong	Mainland	Hong Kong
GDP (%, yoy)	-3.9	-2.1	-1.8	-9.7
Consumption (%, yoy)	1.0	-1.8	-3.6	-12.2
Investment (%, yoy)	-19.2	7.1	2.9	-18.4
Exports (%, yoy)	-2.3	-7.4	2.6	-9.4
Imports (%, yoy)	-25.1	-7.8	-3.2	-10.7
Inflation (%, yoy)	+9.6 (1994) -15.9 (1995-96)	-2.5	-9.1	-3.4
Unemployment Rate (%, per annum)	0.4	0.8	0.1	1.6
Current account (%, GDP)	2.9	-8.2	2.5	2.1
Fiscal balance (%, GDP)	0.0	-0.2	-0.5	-1.2

Note: Figures are changes in percentage points during a historical episode.