2. Global setting and outlook

Global foreign exchange markets have recently seen rising volatility in the face of the twin shocks of sharp US dollar strengthening and significant plunge in crude oil prices. In advanced economies, the outperformance of the US economy versus other major economic blocs has led to global monetary divergence and appreciation of the US dollar. Separately, lower oil prices would in general benefit global economic growth by lowering production costs and stimulating spending, but there could be potential negative financial contagion from increasing credit risks of oil exporting economies and of energy producers in the US high yield market.

In East Asia, growth momentum remained modest in the second half of 2014 amid subdued performance of the external sector. A stronger US dollar and the impending rate hike in the US would induce international investors to move away from risk assets in the region, and the depreciation of local currency would also increase the debt servicing burden of borrowers of US dollar credit. Meanwhile, the region's policymakers would be facing increasing challenges in striking a delicate balance between supporting growth and reining in disinflationary pressure, on the one hand, and preventing capital outflows, on the other.

In Mainland China, growth momentum softened further in the second half of 2014 amid continued adjustments in the property markets. Capital outflow pressures have emerged, whereas equity markets remained buoyant. Banks' asset quality has continued to weaken, but unconventional financing activities generally slowed down in the light of tighter regulations. Growth momentum is expected to be moderate in the near term, and inflationary pressures would be subdued amid the ongoing deleveraging process.

2.1 External environment

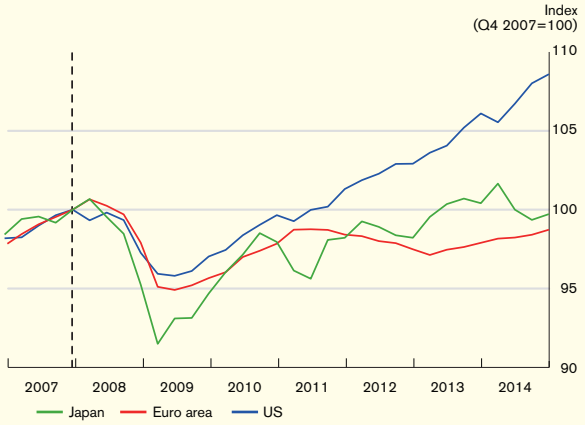
Global foreign exchange markets have seen sharp rise in volatility in recent months. In emerging markets, the Russian rouble has depreciated sharply against the US dollar since June 2014. In developed markets, Switzerland chose to abandon its quasi-currency peg to the euro on 15 January 2015 before the European Central Bank (ECB) announced its quantitative easing (QE) programme, causing sharp fluctuations in the Swiss franc-euro exchange rate.

These abrupt currency movements took place amid the twin shocks of sharp US dollar appreciation as a result of global economic and monetary policy divergence, as well as the significant plunge in oil prices since mid-2014.

In advanced economies, growth and monetary policy paths of the US diverge from those of other major economies (Chart 2.1). The US appears to be almost the only bright spot among the major economies where growth remains well on track and labour market has been solidly

improving. By contrast, growth has been sluggish in the euro area and deflation risk is a major concern, prompting the ECB to launch a QE programme. In Japan, the economy emerged from the technical recession in the fourth quarter of 2014 on the back of strong exports, but the recovery in domestic demand remains weak. The Bank of Japan has expanded its Quantitative and Qualitative Easing (QQE) programme since late 2014.

Chart 2.1
Real GDP



Source: CEIC

While monetary policies are likely to follow the current paths of continued divergence in major advanced economies, there remain uncertainties in the conduct and effectiveness of monetary policies. In the US, market participants generally expect the Fed to normalise monetary policy this year, but the uncertainty in the timing and pace has increased as a number of opposing factors are at play. In the near term, the sharp fall in oil prices and concern over its potential pass-through to core inflation and inflation expectations have prompted some market participants to believe that the pace of the Fed's rate hike would be slow. However, the good underlying strength of the US recovery and the faster-than-expected narrowing of labour market slack suggest that wage and domestic demand pressure would eventually pick up some time down the road. The pace of rate hike by the Fed could be faster than expected if the latter factor eventually dominates. In the euro area, sluggish economic performance and deflation have prompted the ECB to announce a QE programme. The programme may have some boosting effect on growth mainly through depreciation of the euro exchange rate, but the effect through the portfolio rebalancing channel is limited by the fact that the European financial system is predominantly bank-based rather than capital market-based, with balance sheet weaknesses of banks in the weaker peripheral countries hampering the credit intermediation process in these countries. The effectiveness of the QE programme in containing deflationary pressure would be limited by the fact that intra-euro area imports account for as much as 40-65% of total imports in most economies such that the exchange rate pass-through from a weaker euro to inflation would be low. In Japan, the fact that the economy could not withstand the April 2014 consumption tax hike and fell into a recession despite the QQE highlights the fragile state of the recovery in Japan. It is uncertain whether the expanded QQE programme can help jumpstart lacklustre domestic demand in the Japanese economy.

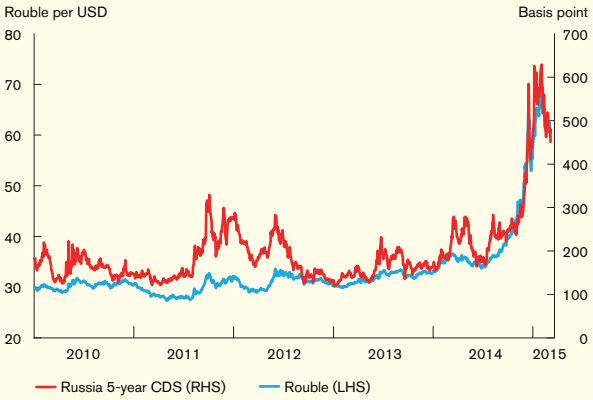
Continued divergence in monetary policy of major economic blocs would continue to drive appreciation of the US dollar, and at the same time likely heighten volatility in the global foreign exchange market. For example, with the weakness of the euro area economy and particularly with the anticipated further monetary policy easing by the ECB versus normalisation by the Fed, many non-euro area European countries have been experiencing capital inflows and heightened volatility in their foreign exchange markets. These pressures were so strong that the Swiss National Bank (SNB), for example, had to impose a minimum exchange rate of 1.2 Swiss franc per euro on 6 September 2011. Subsequently, in anticipation of the announcement of QE by the ECB, the SNB surprised the market by abandoning its minimum exchange rate on 15 January 2015,

sending the Swiss franc appreciating abruptly by 23% against the euro in a single day. In this case, central banks' policy action to stem inflows such as foreign exchange interventions and unexpected policy changes further added to volatility in the foreign exchange market. Recently, volatility in the foreign exchange market has also been heightened by the fact that credit default swap (CDS) markets have become more volatile in both emerging market and traditional safe haven economies, given the close linkages between the CDS markets and the foreign exchange markets (see Box 1 for a more detailed discussion).

In respect of the impact of oil price fluctuations, lower oil prices would help lower production costs and stimulate spending on other goods and services in most advanced and emerging Asian economies, given that most of them are net oil importers. However, there could be potential negative contagion from increasing credit risks of emerging market oil exporting economies as well as of US energy producers in the US high yield market.

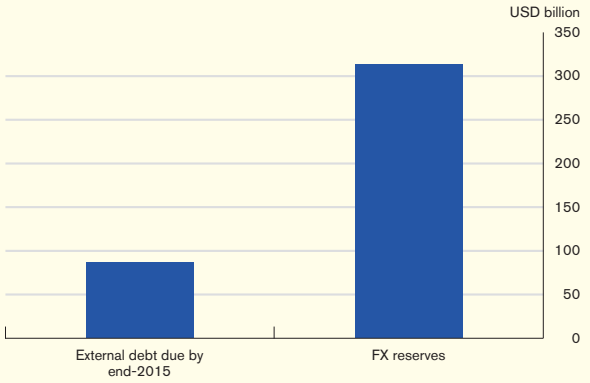
The sharp fall in oil prices has put net oil-exporting countries at great economic and financial risks. If troubles in these emerging market net oil exporters lead to generalised risk aversion and indiscriminate sell-offs, there could be a contagion effect on other emerging market economies. The biggest focus in this area is the foreign exposure to Russia. The Russian rouble has already depreciated by about 43% since mid-June 2014, and market concern about rising default risks in Russia has pushed Russia's 5-year sovereign CDS yield up by about 274 bps over the same period (Chart 2.2). With the rouble having depreciated sharply, this calls into question the repayment ability of Russian corporates and banks. The Russian central bank has estimated that external debt due for repayment by end-2015 amounts to US$87 billion, which accounts for about 28% of total foreign exchange reserves (Chart 2.3).

Chart 2.2
Russia: Rouble exchange rate and sovereign CDS



Source: Bloomberg.

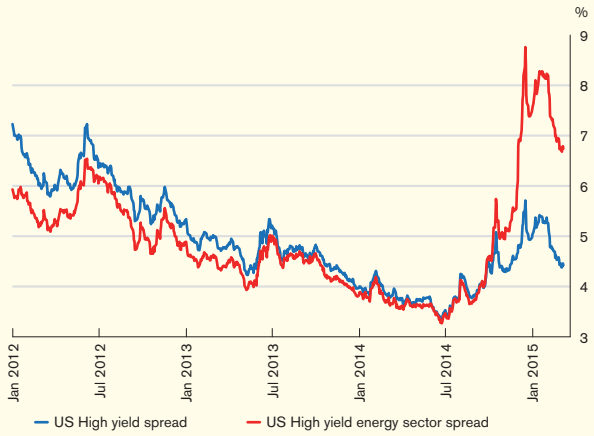
Chart 2.3
Russia: External debt due by end-2015 and foreign exchange reserves



Source: Russian central bank.

Another possible channel of contagion from lower oil prices is the US high-yield bond market. Fitch estimated that the total outstanding high yield debt of energy-related companies amounted to US$225 billion as of 2014, about 17% of total US high-yield bonds outstanding.[1] Many of these high-yield bonds are issued by oil and gas producers, who also have plenty of bank debts. The rapid fall in oil prices has worsened their cash flows and liquidity conditions, increasing their credit default risk and widening their credit spreads by 347 basis points since mid-2014, with some contagion effect on the overall US high-yield credit spread which rose by 107 basis points over the same period (Chart 2.4). Any disruptions in the US high yield market may have implications for the US or even global financial stability hence warrant close monitoring.

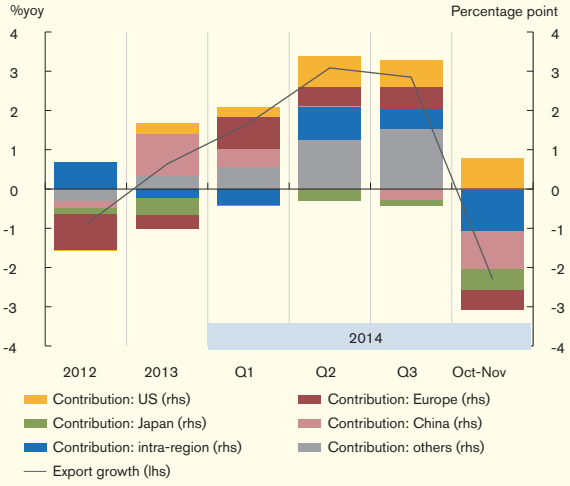
Chart 2.4
US: High yield spreads



Note: Data are compiled by Bank of America Merrill Lynch. The spreads are option-adjusted and calculated over the Treasury curve.
Sources: CEIC and staff calculations.

In East Asia[2], growth momentum remained modest in the second half of 2014 amid subdued performance of the external sector as the struggling European and Japanese economies and moderated demand from Mainland China weighed on the region's export growth (Chart 2.5). Although demand from the US appears to have picked up gradually along with a firmer economic recovery, its impact on export growth in the region as a whole is still well below that of the pre-crisis period. Box 2 analyses the reasons behind the recent subpar demand for Asian exports from the US, suggesting some changes in US import pattern.

Chart 2.5
Asia: Export growth



Sources: CEIC and HKMA staff calculations.

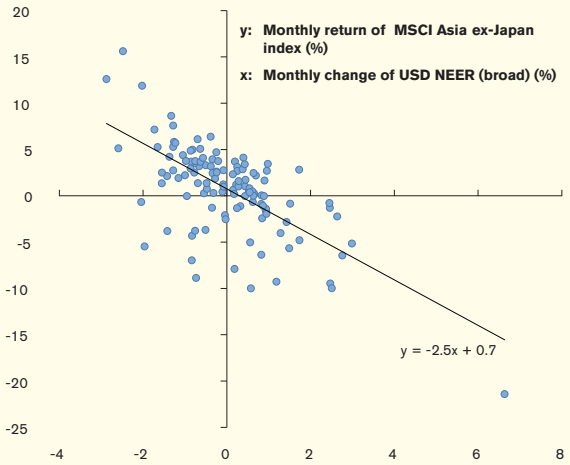
[1] Press Release of Fitch Ratings, "Lenders May Go Easy on U.S. High Yield Energy Issuers in Downturn Scenario", 5 December 2014.

[2] East Asian economies refer to Indonesia, Malaysia, the Philippines, Singapore, South Korea, Taiwan and Thailand.

In the financial markets, sentiment has turned more bearish towards the emerging market economies, including those in East Asia, in face of the twin shocks from both a strong US dollar and a sharp fall in oil prices in late 2014. With the continued strengthening of the US dollar, many economies in the region have seen their currencies weakening against the US dollar and their foreign exchange reserves declining since last September. In particular, things took an even bigger turn towards the end of last year when the sharp fall in oil prices had triggered fear about default risk of oil exporters, most notably the slide in the Russian rouble. So far, investors have appeared to discriminate across markets, as evidenced by less depreciation pressure on currencies of regional economies which are oil importers and with stronger fundamentals.

However, a strengthening US dollar and the expected higher US dollar interest rate would continue to act as pull factors to induce investors to move away from risk assets in East Asia, putting pressure on the region's capital flows. Indeed, experience over the past 10 years suggests that stock prices in the region tend to underperform during periods of US dollar appreciation (Chart 2.6).

Chart 2.6
Asia: Correlation between stock return and value of the US dollar



Note: The chart depicts monthly return of the MSCI Asia ex-Japan index and monthly change of the USD NEER (broad) from January 2005 to December 2014.
Sources: Bloomberg, CEIC and HKMA staff calculations.

Moreover, US dollar appreciation would also increase the debt servicing burden of borrowers of US dollar credit given the rapid expansion in corporate leverage in recent years. In aggregate terms, corporate credit risk stemming from currency mismatch is not large and the rollover risk remains moderate, as 71% of the total outstanding corporate debt in the region is in local currency and the average remaining tenor of the debt is at about 5.2 years.[3] However, the risk is not evenly distributed across firms and pockets of risk exist in some sectors. Moreover, local currency debts are not necessarily immune from the effect of US dollar strengthening. Firms with a high leverage ratio could still face the risk of an abrupt increase in domestic bond yield if currency weakness triggers heavy selling from foreign investors with sizable amount of bonds in the region's domestic currencies. Meanwhile, highly leveraged sectors that are more cyclical in nature may be more vulnerable to the tightening of global financial conditions led by the US dollar appreciation and interest rate hike.

The region's policymakers would be facing increasing challenges in striking a delicate balance between supporting growth and reining in disinflationary pressure, on the one hand, and preventing capital outflows, on the other. Slowing economic growth momentum in the region and low oil prices are already posing disinflationary and deflationary pressure in some East Asian economies. To rein in the deflationary risk and to support growth, most central banks in the region are maintaining their accommodative monetary policy stance. However, the US interest rate hike cycle ahead, and the accompanying increasing capital outflow pressure from the region, would constrain the room for monetary easing by regional central banks, particularly given the pro-cyclicality of the region's capital flows.

[3] Estimates are based on data of outstanding bonds of Indonesia, Malaysia, the Philippines, Singapore, South Korea and Thailand available at end of Q3 2014 from Dealogic.

Box 1
Interactions between currency risk and sovereign credit risk

In theory, there is a relationship between the risk of a currency and the risk of default of the economy concerned. A sharp fall of a currency can lead to anxieties of a possible default by the economy concerned and vice versa. However simple or obvious it may sound, the relationship brings out a potential loophole that policymakers may watch out for: the relatively smaller size of the sovereign credit risk market may invite market speculation and amplify currency volatility. This box draws from the findings of a recent HKMA study to examine the interactions between currency risk and sovereign credit risk for three of the most-traded currencies in the world.[4]

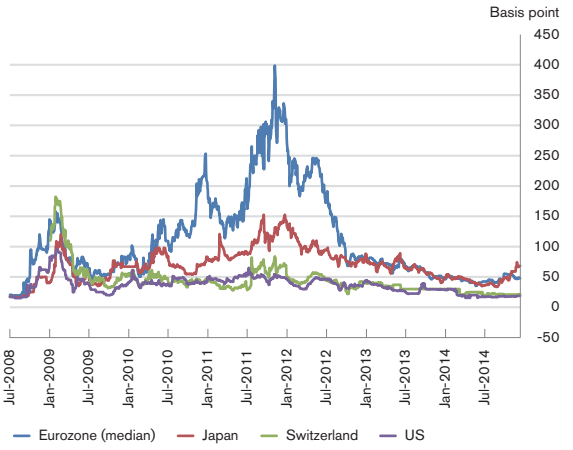
Data and methods

The study focuses on three currencies, namely, the euro, Japanese yen and Swiss franc covering the turbulent period from mid-2007 to the end of 2013. In the empirical analysis, the risk of a currency is proxied by the risk reversal of the currency, which is essentially the price difference between the call and put options of the currency (Chart B1.1).[5] Put it another way, it measures how asymmetric the market is in expecting a rise or fall in the currency. A positive risk reversal reflects a higher cost of hedging against an appreciation of the currency than against a depreciation, which can be taken to mean that the market by and large expects the currency to appreciate, rather than depreciate and vice versa. The sovereign credit risk of an economy is proxied by the sovereign credit default swap (CDS) spread of the economy (Chart B1.2).[6] A larger (smaller) CDS spread means a higher (lower) cost of hedging against the risk of default.

Chart B1.1
Currency risk reversals

Source: JP Morgan Chase.

Chart B1.2
Sovereign CDS spreads



Source: Thomson Reuters.

[4] More details can be found in Hui and Fong (2015) "Price cointegration between sovereign CDS and currency option markets in the financial crises of 2007-2013", *International Review of Economics and Finance,* forthcoming.

[5] For the euro and yen, their risk reversal vis-à-vis the US dollar is used. For the Swiss franc, the risk reversal vis-à-vis the euro is used in view of its greater foreign exchange trading volume.

[6] The eurozone CDS spread is measured by the median sovereign CDS spread of the eleven eurozone countries. These countries include Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Portugal, the Netherlands and Spain. There is no active sovereign CDS on Cyprus, Luxembourg, Malta, Slovakia, and Slovenia.

Under the framework of cointegration and error correction, the risk reversal of the currency and the CDS spread are first proved to be cointegrated.[7] A modified error correction model with major macro-financial factors set as control variables is then used to estimate the long-run and short-run dynamics.[8] Based on these model estimates, a time series of conditional correlation and a price discovery ratio are computed to assess the contemporaneous changes and lead-lag dynamics in the two variables for each of the economies.

Empirical results

The test results show that the risk reversal of each of the currencies and its corresponding CDS spread are cointegrated (Table B1.A), meaning that the risk reversal and CDS spread, ceteris paribus, tend to move hand-in-hand in the long run. Given this long-run equilibrium relationship, any short-term deviation between the two variables are only temporary. Therefore, when the currency of an economy depreciates against the currency of another economy, the sovereign CDS spread of the economy would increase relative to that of the other in the long run.

Table B1.A
Cointegration tests and price discovery ratios[1]

Risk reversal: Sov. CDS Spread:	JPY/USD Japan	EUR/USD Eurozone	CHF/EUR Switzerland
Unit root test[2]			
ADF test statistic	-2.96**	-3.79**	-2.77*
PP test statistic	-2.90**	-2.94**	-2.86*
Lead-lag dynamics[3]			
Price discovery ratio	0.2188	0.9371	0.3869
The price that leads another one	Sov.CDS spread	Risk reversal	Sov.CDS spread

Notes:
1. ** and * indicate significance at a level of 5% and 10% respectively.
2. The cointegration test uses the Augmented Dickey-Fuller and Phillips-Perron tests to check the null hypothesis that the residuals of the regression of a risk reversal on a relative CDS spread are non-stationary assuming nonzero mean in the test equation. The critical value of the test is obtained from MacKinnon (1996).
3. When the currency option market leads and the sovereign CDS market follows in price discrepancy corrections, the price discovery ratio will be closer to 1. When the sovereign CDS market leads in price discovery, the price discovery ratio will be closer to 0.

In the short run, the correlation between the two variables is not constant over time (Charts B1.3). Between the euro's risk reversal and the eurozone's CDS spread, the correlation is negative (Chart B1.3a), suggesting that the lower the risk reversal, the higher is the spread. During the period under study, this correlation was usually close to -0.5, which suggests that changes in one of the variables will negatively impact the other in a short period of time.

Between the Swiss franc's risk reversal against the euro and the Switzerland's CDS spread, the correlation was -0.4 normally after 2009, but it rose to +0.6 in the fourth quarter of 2011 amid concerns about the introduction of the one-sided cap of the currency vis-à-vis the euro by the Swiss National Bank (Chart B1.3b).[9] The positive correlation suggests that in the short run the sovereign CDS spread can increase significantly while the Swiss franc appreciates against the euro amid increase in demand for safe-haven currency in times of market turbulence.

However, between the yen's risk reversal and the Japan's CDS spread, the correlation was insignificant except for the fourth quarter of 2008 during which the US dollar played an exceptionally prominent role of safe haven when the US sovereign CDS spread shot up following the US subprime crisis (Chart B1.3c). This

7 We use the single equation test proposed by Engle and Granger (1987) which determines whether the residuals of the linear combination of the cointegrated variables are stationary. The method is generally regarded easy and super-consistent in estimation.

8 These control variables include interest rate differentials between economies' interbank rates, general currency volatility proxied by the USD index, risk appetite proxied by stock market volatility indices, funding liquidity constraint proxied by the TED spreads, and macro-financial conditions proxied by stock market indices.

9 The cap was removed on 15 January 2015.

suggests that the contemporaneous changes in the two variables are normally independent of each other except for periods of market uncertainty.

Apart from the contemporaneous relationship, the two variables are also driven by their lead-lag dynamics in the short run.[10] The results of the price discovery ratios suggest that the sovereign CDS spreads of Japan and Switzerland tend to lead the risk reversals of the Japanese yen and the Swiss franc respectively (Table B1.A). In the case of the eurozone, the sovereign CDS spread tends to lag behind the risk reversal of the euro.

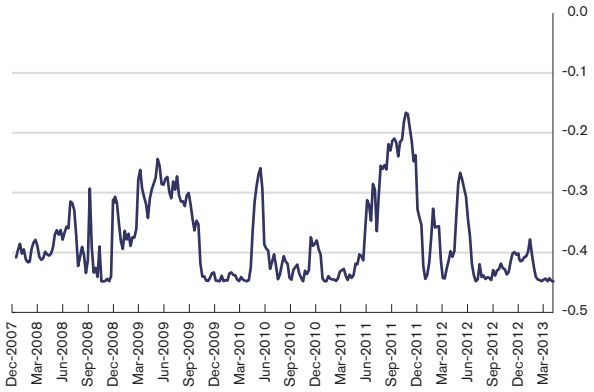
Implications for policymakers

The above study has provided some food for thought to policymakers. It supports the notion that currency movements, regardless of whether they are triggered by changing economic fundamentals including changes in economic conditions and policies, would ultimately be reflected in the sovereign CDS market through short-term dynamics and long-term relationships. The concern is that the fact that currency option prices and sovereign CDS spreads are closely related may provide speculators with opportunities to take advantage of the relationship by manipulating the smaller market. For instance, a thinly-traded sovereign CDS market can potentially be manipulated by relatively large players to create extreme market conditions to influence the respective currency market. Such manipulation can amplify market volatility and, in the long run, damage the stability and integrity of the international financial system. This study calls for greater vigilance from policymakers to guard against the risk.

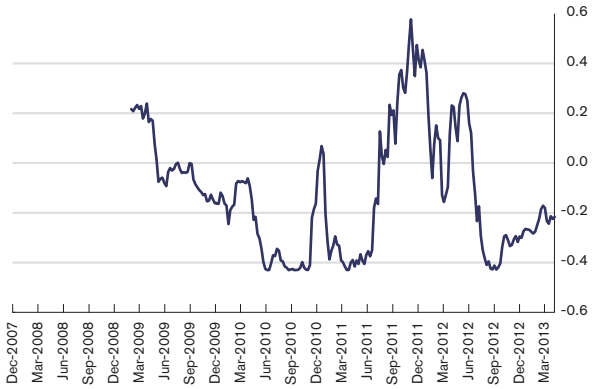
[10] The lead-lag dynamics refer to an adjustment for the price deviation from the long-run equilibrium. When the currency option market leads the adjustment and the sovereign CDS market follows in price discrepancy corrections, the price discovery ratio will be closer to 1. When the sovereign CDS market leads the adjustment, the price discovery ratio will be closer to 0. See details in Gonzalo and Granger (1995) "Estimation of common long-memory components in cointegrated systems", *Journal of Business & Economic Statistics* 13 (1): 27-35.

Chart B1.3
Estimated conditional correlation between risk reversals and sovereign CDS spreads in the short-run[1]

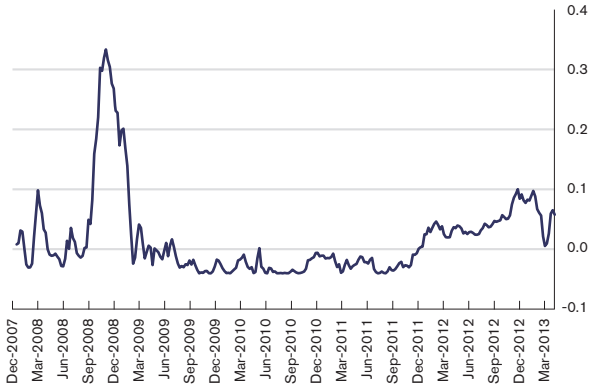
a. Between eurozone's sovereign CDS spread and risk reversal of euro (vis-à-vis US dollar)



b. Between Switzerland's sovereign CDS spread and risk reversal of Swiss franc (vis-à-vis euro)[2]



c. Between Japan's sovereign CDS spread and risk reversal of yen (vis-à-vis US dollar)



Notes:

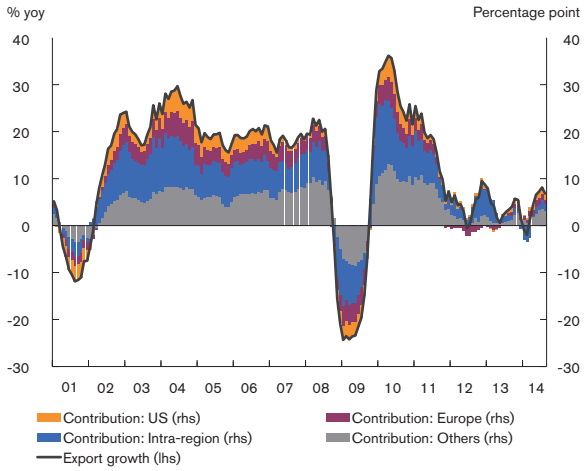
1. The risk reversal of a currency is the implied volatility of an out-of-the-money call of the currency minus that of an out-of-the-money put of the currency at the 25% delta at the 3-month maturity.
2. The estimated conditional correlation begins in January 2009 because the Switzerland's sovereign CDS spreads is only available since January 2009 in the data source (JP Morgan Chase).

Box 2
Asian export performance amid changes in US import demand pattern

In principle, stronger US growth can benefit Asian exports, but there are increasing signs that the recent pick-up in growth momentum in the US has not translated into strong Asian export growth as it used to. While exports of emerging Asia to the US have picked up, their growth rate remains low by historical standard. In particular, the contribution from the US to regional export growth has remained low notwithstanding the US economy having recovered to its trend growth in the second half of 2014. In the five-year period before the global financial crisis (i.e. 2003–2007), demand from the US on average contributed more than 2.5 percentage points to the region's year-on-year export growth. However, the contribution stayed low at about 1.2 percentage points in the second half of 2014 (Chart B2.1). This means that although the recovery of the US has gained firmer footing over the past few quarters, the faster US GDP growth had less impact on the region's export growth compared with the pre-crisis period. Against this background, this Box attempts to shed light on the underlying reasons for the weak growth in Asian exports to the US since the global financial crisis.

By definition, the ratio of US imports from emerging Asia to US GDP is equal to the share of US imports from emerging Asia times the US imports-to-GDP ratio. The relatively weak growth in Asian exports to the US for the same rate of US GDP growth could therefore only be attributable either to (1) a loss of market share of Asian exporters in US imports or (2) a change in US import's sensitivity to US GDP growth. The former is related to competitiveness issue of Asian exporters, while the latter is related to a shrinkage of the size of the pie that affects all exporting countries.

Chart B2.1
Exports of EM Asia economies

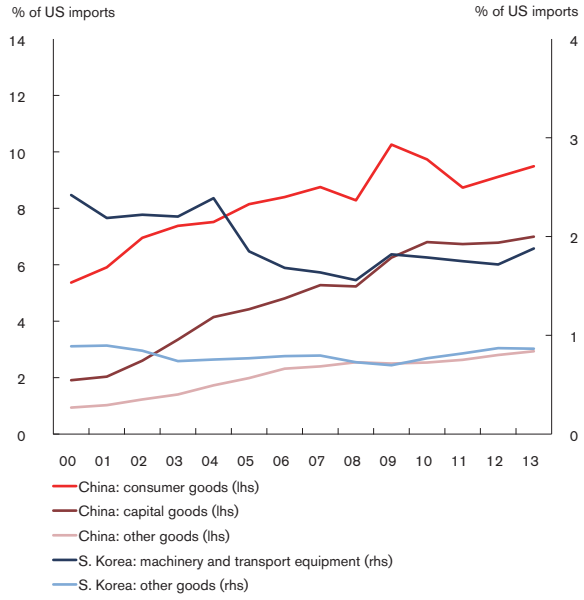


Sources: CEIC and HKMA staff estimates.

Market share of Asian exports as a whole has held up

Our analysis suggests that the weaker regional export performance in the US does not appear to be attributable to a loss in aggregate market share in the US, though the situation does vary across different Asian economies. In fact, the market share for the region as a whole in 2012-2014 was larger than that during the pre-crisis period. For example, the market share of Chinese goods in US imports has been on an uptrend over the past decade, overtaking Canada to become the largest source of US imports since 2007, with broad-based increase in demand for both consumer and capital goods imports from Mainland China (Chart B2.2). Meanwhile, South Korea has recently seen its market share in US imports rising back to the 2007 level, amid steady demand for Korean manufactured machinery and transport equipment (Chart B2.2).

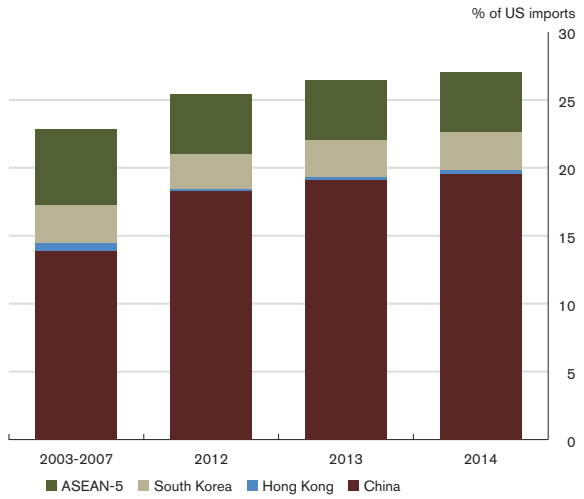
Chart B2.2
US imports from China and Korea



Sources: CEIC and HKMA staff estimates.

In contrast to the performance of Mainland China and South Korea, market shares of ASEAN economies have been edging down slightly during the same period. In aggregate terms, the gain in market shares by Northeast Asian economies has outweighed the loss of market shares by Southeast Asian economies, resulting in a rise in aggregate market share of Asian economies in recent years (Chart B2.3).

Chart B2.3
Shares of US imports from emerging Asian economies

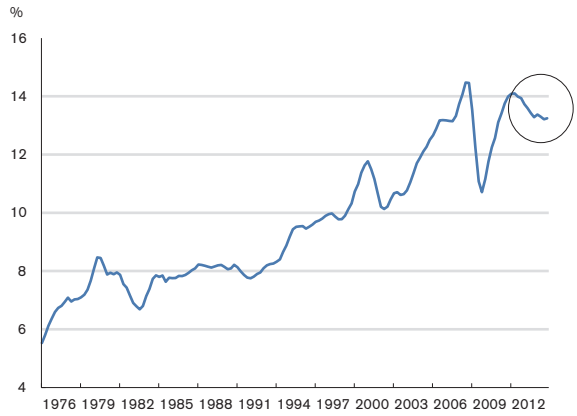


Note: ASEAN-5 refers to Indonesia, Malaysia, the Philippines, Singapore and Thailand
Sources: CEIC and HKMA staff estimates.

Decrease in sensitivity of US imports to GDP growth has been the key driver

Rather than an aggregate decline in Asian exporters' market share in the US, the decline in the ratio of US imports from emerging Asia to US GDP in the post-crisis period has been due to decrease in US imports-to-GDP ratio (Chart B2.4).

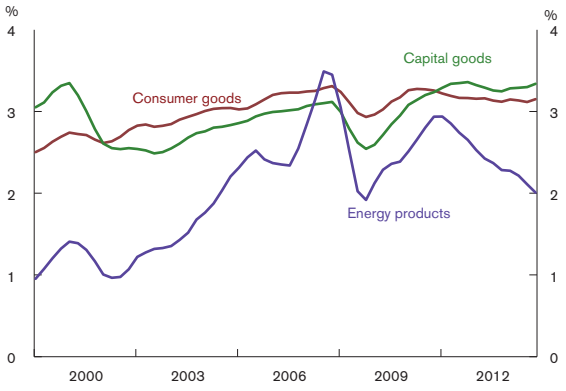
Chart B2.4
US imports-to-GDP ratio



Sources: CEIC and HKMA staff estimate.

The decrease in US imports-to-GDP ratio has been concentrated in energy products and consumer goods, while capital goods imports have held up quite well. The ratio of energy product imports to GDP in the US has experienced notable declines in recent years, and the ratio of consumer goods imports has also eased gradually after the post-crisis rebound (Chart B2.5). Meanwhile, the ratio of capital goods imports to GDP has bounced back from the crisis slump and stays firm at its pre-crisis peak (Chart B2.5).

Chart B2.5
US imports by end-use



Sources: CEIC and HKMA staff estimates.

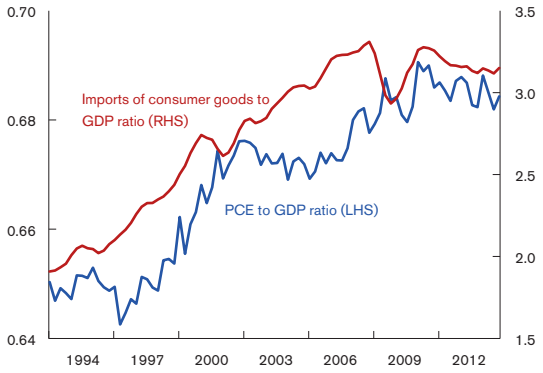
Decline in US imports of energy products

While imports of energy products in the US are significantly affected by cyclical fluctuations in energy prices, the shale oil and gas revolution implies that part of the easing of energy imports is structural. International crude oil prices have dropped sharply since June 2014, weakening the imported value for energy products in the US. Cyclically, the price decline has in part been due to sluggish global growth which has weakened oil demand. Structurally, the price decline has also been related to shale oil and gas revolution in the US, which over the past few years has raised domestic production of energy in the US. Reflecting this, the Energy Information Administration expects US's net imports of crude oil to shrink by 42% from 2011 to 2016, while the US would swing from a net importer to a net exporter of natural gas from 2018 onwards. The shale oil and gas revolution is a structural factor that would enable the US to become less reliant on energy product imports over time.

Decreased sensitivity of US imports of consumer goods to US GDP

Of more importance to Asian exporters are US imports of consumer goods. By definition, US imports of consumer goods to GDP ratio is affected by US consumers' propensity to consume (i.e. Personal Consumption Expenditure (PCE) to GDP ratio) as well as the import share of PCE (i.e. consumer goods imports to PCE ratio),[11] both of which have plateaued in the post-crisis period. The ratio of US consumer goods imports to GDP has broadly followed the trend of US consumers' propensity to consume, rising rapidly before the global financial crisis and plateauing afterward (Chart B2.6). Meanwhile, the US consumer goods imports-to-GDP ratio has been tracking closely movements of the import share of PCE (Chart B2.7). The crucial question to emerging Asia's export performance is to what extent these changes in the patterns of US marginal propensity to consume and the import share of PCE represent a lasting phenomenon.

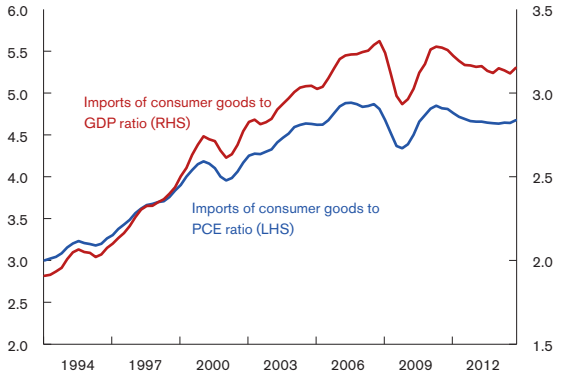
Chart B2.6
US consumers' propensity to consume



Sources: CEIC and HKMA staff estimates.

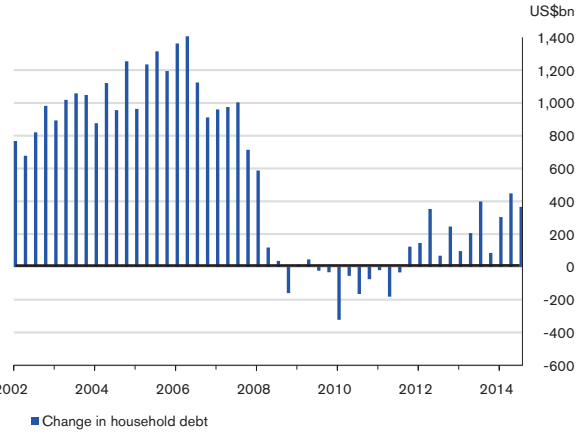
[11] i.e. import of consumer goods/GDP ratio = import of consumer goods/PCE ratio * PCE/GDP ratio.

Chart B2.7
US import share of PCE



Sources: CEIC and HKMA staff estimates.

Chart B2.8
Quarterly Increase in US household debt



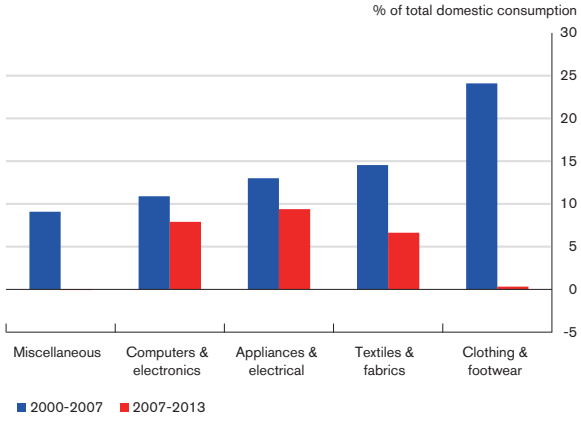
Sources: CEIC and HKMA staff estimate.

In terms of US consumers' marginal propensity to consume, the room for much further rise is questionable given the already very high PCE-to-GDP ratio which has seen plateauing from its peak following slower consumer credit growth in the US in the post-crisis period. In the pre-crisis period, the PCE-to-GDP ratio in the US had been rising until it reached its peak of slightly below 70% during the global financial crisis (Chart B2.6). This reflected the relatively loose credit standard of US banks before the crisis that encouraged consumers to borrow excessively to consume. However, with tightened prudential regulation and a less exuberant housing market in the post-crisis period, consumer credit has been growing at a much slower pace than that during the pre-crisis period (Chart B2.8). This has dampened further rise in US consumers' marginal propensity to consume and reduced import demand for consumer goods.

Meanwhile, the pre-crisis pace of increase in the import share of PCE may not continue given the deceleration in the manufacturing offshoring trend in the US. Before the global financial crisis, industries which experienced larger shift from domestic production to imports were labour intensive ones such as clothing and footwear. Their production was offshored to emerging market economies where labour costs were considerably lower. Such offshoring trend increased the import share of PCE in the pre-crisis period. After the global financial crisis, the pace of shift for these industries has slowed markedly (Chart B2.9). For example, over the 2000-2007 period, about 25% of domestic consumption of clothing and footwear shifted from domestic to overseas production, while during 2007-2013 the shift was less than 0.5%. The business decision of choosing where to produce goods depends on a variety of factors such as proximity to customers, ease of doing business, tax benefits, access to key materials and direct cost of production. In labour intensive industries, labour cost plays a very important if not the dominant role. In this regard, the trend of rising wages in Mainland China, which is the main exporter of consumer goods to the US, has significant implications for the offshoring trend in the US. According to the IMF, Mainland

China's long period of cheap labour is set to end soon as demographic changes are set to reduce the pool of working-age population in Mainland China.[12] Furthermore, Mainland China's manufacturing sector has already started to shift up the value chain from lower value-added goods to higher value-added goods. The rise in wages in Mainland China associated with these developments means that the deceleration of offshoring trend in the US is unlikely to be a temporary phenomenon, with the implication that the pre-crisis pace of increase in the import share of PCE may not continue.

Chart B2.9
Shift from domestic to overseas production across different US industries



Sources: US Bureau of Economic Analysis and HKMA staff estimates.

Conclusion

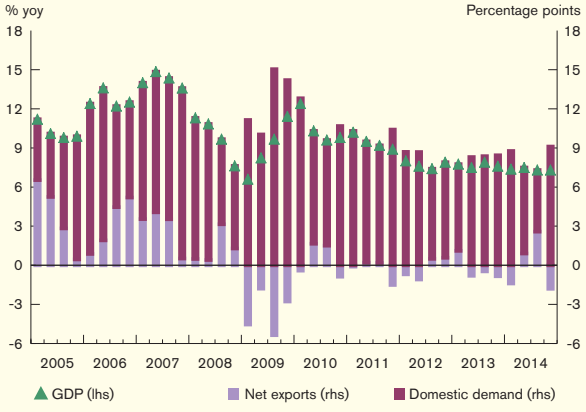
Overall, it appears that emerging Asian economies may not see export growth to the US as strong as they used to enjoy in the pre-crisis period, particularly those economies reliant on energy and consumer goods exports. The plateauing of US propensity to consume from its pre-crisis peak amid tighter prudential regulation and a less exuberant housing market, together with the slowdown in the manufacturing offshoring trend in the US could continue to keep the sensitivity of US consumer goods import demand to US GDP growth lower than its pre-crisis level. These developments would restrain US imports from Asia despite the solid US recovery.

[12] "The End of Cheap Labour", Finance and Development, June 2013, IMF.

2.2 Mainland China

GDP growth on the Mainland recorded 7.3% year on year in the fourth quarter of 2014 (the same as in the previous quarter), resulting in 7.4% growth for the year as a whole (Chart 2.7). Export growth continued to hold up, but, despite robust infrastructure spending, overall domestic demand moderated further along with the softening real estate investment. Inflationary pressures remained subdued, with the year-on-year headline CPI inflation rate being 1.7% on average in the second half and the PPI declining by around 2% year on year.

Chart 2.7
Mainland China: contributions by domestic demand and net exports to GDP growth

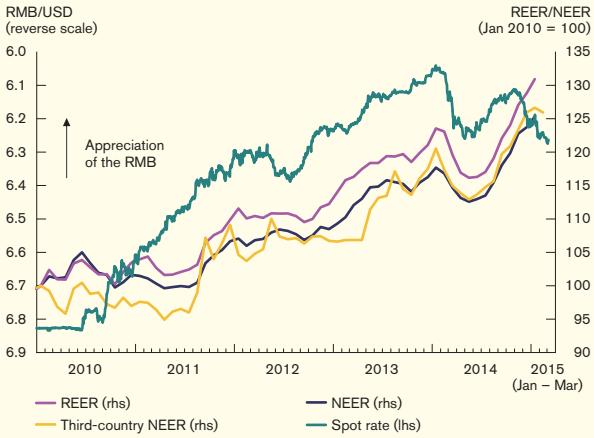


Sources: CEIC and HKMA staff estimates.

Growth momentum is expected to be under pressure in the near term. Increased spending on transport infrastructure, energy facilities and environment preservation would support GDP growth, but continued adjustment in the property market and excess capacity in a few heavy industries would remain a drag on growth. Inflation will remain contained in view of the tepid demand pressures and weakening global commodity prices. Consensus forecasts in March projected the Mainland economy to grow by 7% in 2015, and CPI inflation would be 1.5%.

Capital outflow pressures have emerged in recent months, partly reflecting concerns over the economic outlook. Meanwhile, the RMB/USD exchange rate weakened by 2.5% in November-February after strengthening by 0.5% in September-October (Chart 2.8). However, the renminbi has continued to appreciate in effective terms along with the more notable weakening in major trading partners' currencies against the US dollar. Going forward, incentives for capital outflows may remain given the moderate growth momentum, potentially narrowing interest rate differential between the renminbi and the US dollar, and weaker renminbi appreciation expectation.

Chart 2.8
Mainland China: renminbi exchange rates



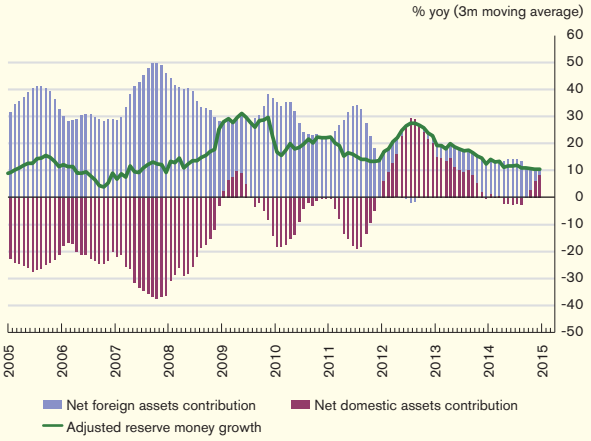
Note: A higher effective exchange rate index indicates a stronger renminbi. The 3rd-country NEER takes into account the competition that China faces in foreign markets from other economies exporting similar products.

Sources: Bank for International Settlements, Bloomberg and HKMA staff estimates.

The PBoC has taken measures to lower borrowing costs and maintain liquidity conditions stable in the banking system. Reserve money grew at a steady pace along with continued liquidity injection into the banking system through targeted measures (Chart 2.9). The PBoC cut the benchmark lending and deposit rates in late-November and early-March, and lowered the reserve requirement ratio by 50 basis points for all financial institutions in early-February.[13] In the meantime, it pushed ahead with interest rate liberalisation by raising the ceiling of the deposit rate twice from 1.1 to 1.3 times the benchmark rate during the review period.

[13] The PBoC reduced the reserve requirement ratios of targeted city commercial banks and non-county rural commercial banks by 100 basis points in early-February.

Chart 2.9
Mainland China: contributions to reserve money growth



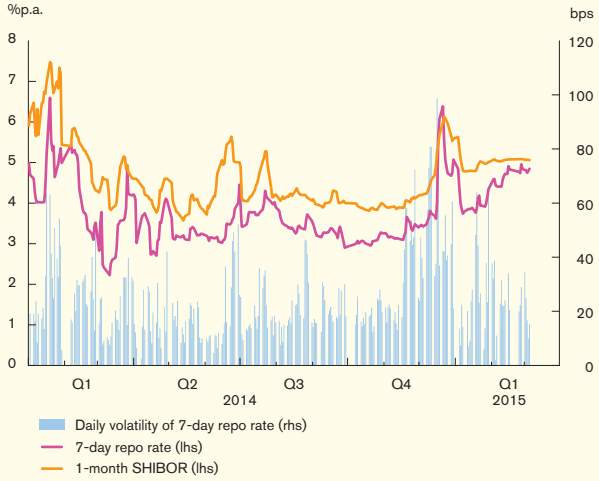
Sources: CEIC and HKMA staff estimates.

The transmission of benchmark rate cuts appeared to be incomplete. Some banks tended to set their deposit rates at the ceiling rates amid intense competition for deposits, while their lending rates fell less than the benchmark lending rates, reflecting rising risk premium amid the moderating growth momentum and unabated funding costs. For instance, the loan prime rate dropped by 46 basis points between late-November and early-March, less than the cut in the benchmark lending rate of 65 basis points.

Broad money (M2) growth continued to soften, mainly reflecting less foreign exchange purchase by commercial banks, while banks' loan growth recovered somewhat on a year-on-year basis towards the end of the year. Unconventional financing activities generally slowed down partly due to tighter regulation. For instance, entrusted and trust loans together declined by around 30% in the second half of 2014 from the first half on a flow basis.[14] Box 3 discusses credit allocation and the driving forces for corporate leverage growth on the Mainland.

Liquidity conditions in the interbank market have been volatile over the review period (Chart 2.10). Money market rates had been largely stable in earlier months but increased sharply in December, partly reflecting greater liquidity demand approaching the year end and intense fund raising through initial public offering activities. The China Securities Depository and Clearing Corporation's decision to exclude corporate bonds rated lower than AAA from being used for repurchase transactions may have contributed to the liquidity tightening as well. Liquidity conditions eased back in January but then tightened again in February due to seasonal demand prior to the Chinese New Year holidays and fund-raising activities in the stock markets.

Chart 2.10
Mainland China: Money market interest rates



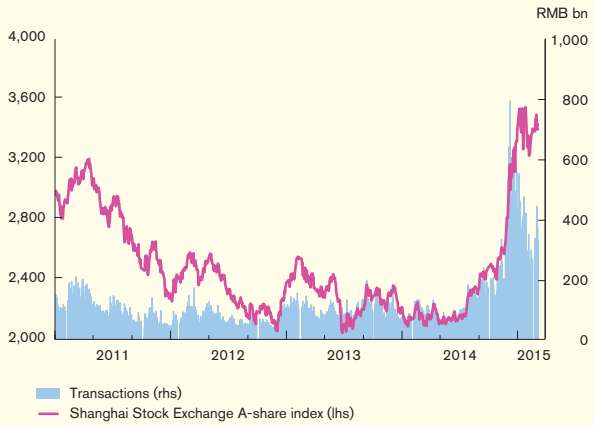
Note: The daily volatility of 7-day repo rate is the standard deviation based on five-minute tick data.

Sources: Bloomberg, CEIC and HKMA staff estimates.

[14] Entrusted lending rebounded in December, reportedly supported by the increased local government-related financing activities ahead of the new regulations. For instance, selected debt issued by local government-related parties before 2015 could be taken over as local government debt.

Equity markets strengthened further during the review period despite the generally softening corporate profitability. The Shanghai Stock Exchange A-share index rose to the highest of 3,545 in January from around 2,500 in September before showing some consolidation in February, and average daily market transactions increased from RMB211 billion in October-November to RMB405 billion in December-February (Chart 2.11). The buoyancy reflected the result of multiple factors such as the launch of the Shanghai-Hong Kong Stock Connect, interest rate cuts, and market expectation of speeding up of economic reforms.

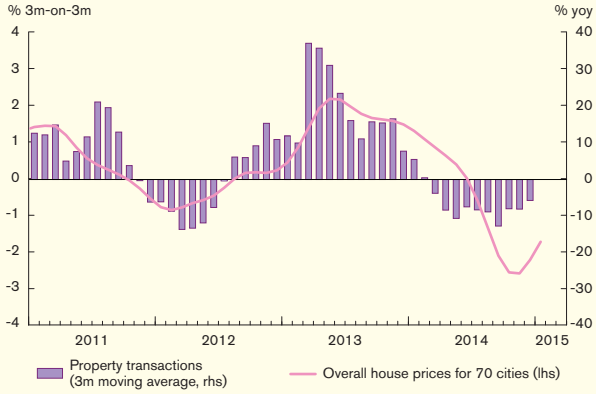
Chart 2.11
Mainland China: Shanghai stock market index and transactions



Sources: CEIC and HKMA staff estimates.

The property market adjusted further over the review period, as indicated by continued weakening in property prices and transactions (Chart 2.12). The authorities introduced various measures to support the market in late September, such as easing the mortgage lending standards and cutting the mortgage rate floor. The property markets in a number of big cities improved somewhat accordingly towards the end of the year. For instance, the floor space sold in Beijing and Shanghai resumed positive growth in December, while the decline in their house prices slowed. Nevertheless, overall property market conditions remained weak.

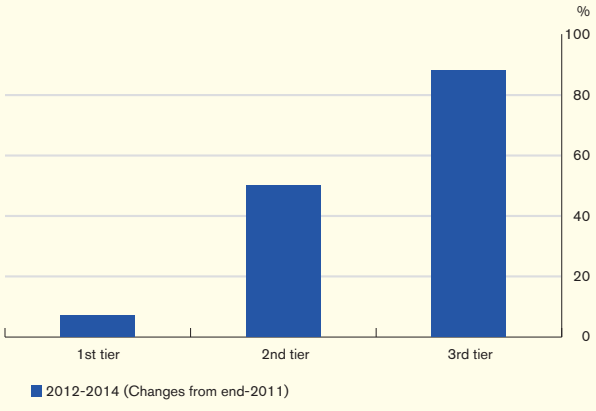
Chart 2.12
Mainland China: house prices and transactions



Sources: CEIC and HKMA staff estimates.

The housing market will remain under pressure in the near term, particularly in smaller cities where housing inventory has risen faster than in bigger cities due to a sharp increase in property supply in the past few years (Chart 2.13). The floor space started on the private housing market has dropped significantly in 2014, but the supply of economic housing has grown at an impressive pace and might add to supply-demand imbalances.[15] Developers' financial conditions have reportedly weakened further in general, which would strengthen the incentives for them to cut prices going forward.[16] Underlying demand, including housing improvement needs, would remain robust, but factors that used to support investment demand appear to have weakened along with the softening growth momentum and the increasingly accessible investment alternatives such as banks' wealth management products.

Chart 2.13
Mainland China: changes in unsold floor space in the primary housing markets



Note: 1st-tier cities include Beijing, Guangzhou and Shenzhen. 2nd-tier cities include 10 cities which are mainly provincial capitals. 3rd-tier cities consist of 9 cities that mainly include prefectural-level cities.
Sources: CREIS and HKMA staff estimates.

Pressure on the banking sector's asset quality intensified, with the aggregate non-performing loan (NPL) ratio edging up from 1.16% at end-September to 1.25% at the end of 2014. Specifically, the wholesale industry and manufacturing industries with substantial overcapacity problems have seen higher NPL ratios than others.[17] By geographical location, coastal areas have registered a higher NPL ratio, possibly reflecting heavier dependence on exports and more visible exposure to local government financing platforms (LGFPs) which have seen continued deterioration in debt servicing capacity. Indeed, our analysis based on data of bond-issuing LGFPs indicates that their return on assets (ROA) has edged down from 1.44% on average in end 2013 to around 1.35% at end-June 2014, while their interest coverage ratio also dropped from 2.5 to 2.3 over the same period.

Continued adjustment in the property market and excess capacity in a few manufacturing industries would remain a major drag on banks' asset quality. Indeed, our analysis indicates that the share of loss-making firms in major upstream industries such as steel, and fuel processing was higher than that of the same period last year.[18] Furthermore, estimates based on listed firms' data indicate the default likelihood of these industries remained higher than that of other industries in recent quarters (Chart 2.14).

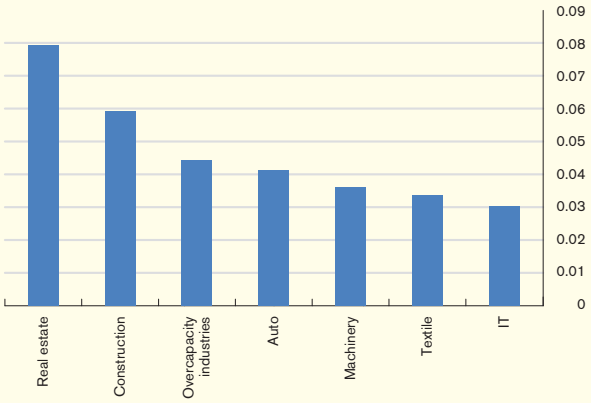
15 Newly completed economic housing amounted to 5.1 million units in 2014, compared with around 11 million units of commodity housing sold in the primary commodity housing market in 2013. Economic housing under construction amounted to around 12.8 million units in December 2014.

16 For instance, the return on assets for listed developers dropped further from 2.76% in the second quarter of 2014 to 2.58% in the third quarter.

17 For reference, China Construction Bank's data indicates that its wholesale/retail industry's NPL ratio exceeded 5% as of end June 2014.

18 For instance, the share of loss-making firms in the fuel-processing industry rose from 24.6% in 2013 to 26.7% in 2014.

Chart 2.14
Mainland China: default likelihood for major industries (2013 Q3-2014 Q4)



Note: Overcapacity industries include cement, coal, glass, iron, ship-building and aluminium.
Sources: Bloomberg and HKMA staff estimates.

Reflecting these concerns, the authorities have strengthened the management of risks related to both formal and unconventional financing activities. The government issued a guideline to strengthen the management of local government debt in October 2014. For instance, financing activities of local governments would be included in the budgetary management. Following the regulations introduced to manage trust business risks in the first half of 2014, the China Banking Regulatory Commission (CBRC) has also issued draft rules in early January 2015 to tighten the supervision of entrusted loans. Specifically, five categories of funds (bank lending to companies, for instance) must not be used for entrusted lending.

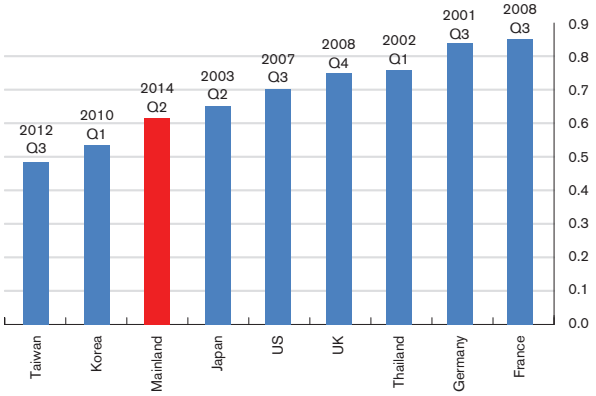
Box 3
Why has the Mainland's corporate leverage increased fast in the past few years?

Rapid credit expansion in the past few years, together with the softening growth momentum, has ignited market concerns over the indebtedness of the Mainland China corporate sector. Using firm-level data, this box studies the Mainland corporate leverage across industries and by firm ownership. Specifically, we explore the driving forces for corporate indebtedness in the past few years, and discuss the implications for financial stability.

A disaggregate picture of corporate indebtedness

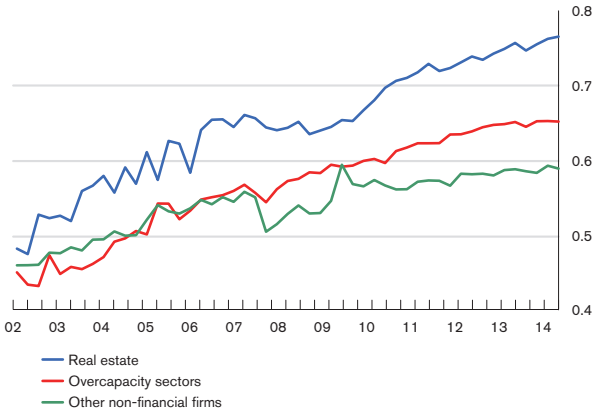
While the level of leverage for the non-financial corporate sector as a whole does not appear to be particularly high, leverage for real estate developers and industries with substantial overcapacity has increased at a fast pace in the past few years. Corporate leverage is measured by the debt-to-asset ratio in our analysis. As shown in Chart B3.1, the Mainland's non-financial corporate leverage ratio has been lower than the peaks of corporate leverage ratios of advanced economies and some emerging economies, such as Thailand. That said, the leverage ratio for real estate developers has risen from 0.64 in 2008 to a peak of 0.76 in the third quarter of 2014 (Chart B3.2). The leverage ratio for industries with substantial overcapacity (e.g. steel, glass, coal) had been close to the average ratio for other non-financial firms during 2005-2007 but has been higher than it since 2008.

Chart B3.1
Peaks of non-financial corporate leverage ratios across economies after 2000



Sources: Bloomberg and HKMA staff estimates.

Chart B3.2
Debt-to-asset ratios for listed non-financial firms across industries

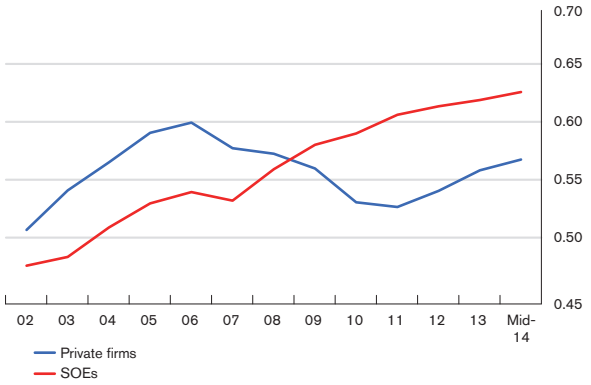


Sources: Bloomberg and HKMA staff estimates.

By ownership, it is mainly state-owned enterprises (SOEs) that increased the leverage after the global financial crisis (Chart B3.3). Private enterprises' debt-to-asset ratio had been much higher than that of SOEs on average before 2008 but the opposite has been true since 2009. SOEs' leverage ratio continued to rise after 2008 while that of the private firms as a whole

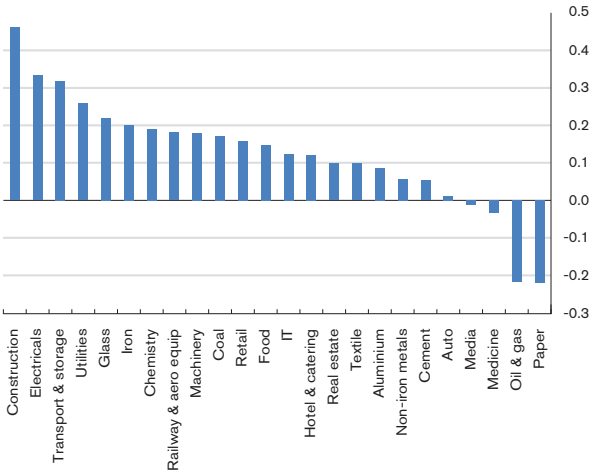
declined further before rising somewhat in the past few years. Among the SOEs, construction, utilities, and overcapacity industries led others in terms of the changes of their leverage ratios after 2009 (Chart B3.4).

Chart B3.3
Debt-to-asset ratio for listed non-financial firms by ownership



Sources: WIND and HKMA staff estimates.

Chart B3.4
Changes in SOEs' leverage ratio in 2009-2013 from 2003-2008



Sources: Bloomberg and HKMA staff estimates.

What has driven up the Mainland's corporate leverage in the past few years?

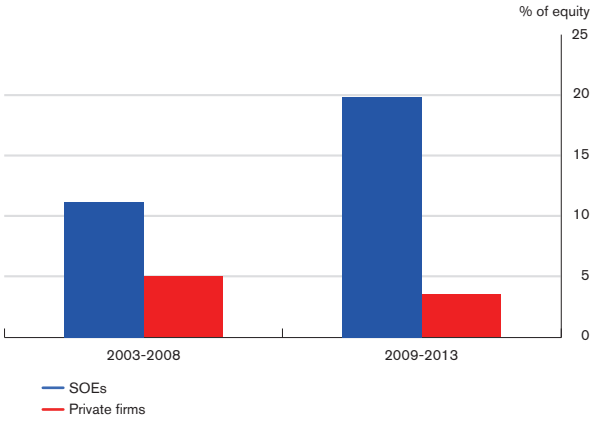
It has been argued that corporate indebtedness in the past few years has been, to a certain extent, driven by implicit government support. Specifically, to counter the economic slowdown, SOEs, which have the policy burden of supporting GDP growth and maintaining labour market stability, may have had stronger incentives to borrow than private firms amid government support. On the other hand, banks may have considered SOEs as safer borrowers and thus have had stronger incentives to lend to them than to private firms, particularly during an economic downturn.

Indeed, our analysis suggests that investors generally think that SOEs had more implicit government guarantee than private enterprises, particularly after 2008 (Chart B3.5). The size of implicit government guarantee, which reflects market perception of the magnitude of government support to an enterprise in case of default, is estimated as the difference between the expected loss in case of default calculated from a put option and that backed out from the credit spread using data of bond issuers and listed firms.[19] By industry, our estimates suggest that investors think that construction, real estate and major heavy industries, which have been considered as growth engine, have had more implicit guarantee than other non-financial industries (Chart B3.6).[20]

[19] The put option is based on the Merton model with an exercise price being equal to the debt value, and the credit spread is the yield spread between corporate bonds and government bonds net of liquidity risk component.

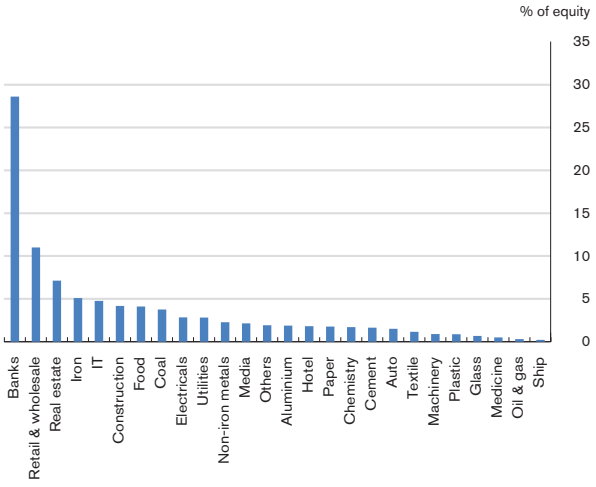
[20] The value of industrial government guarantee is aggregated from that of individual firms within each corresponding industry.

Chart B3.5
Implicit government guarantee for firms by ownership



Sources: Bloomberg and HKMA staff estimates.

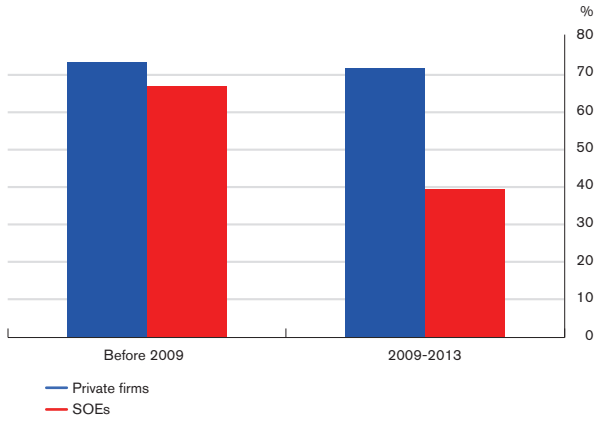
Chart B3.6
Implicit government guarantee by industry



Sources: Bloomberg and HKMA staff estimates.

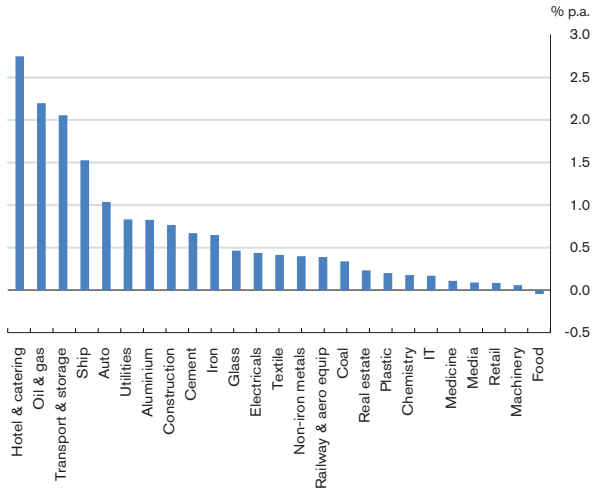
Accordingly, SOEs have borrowed on better terms than private firms. Listed firms' data indicates that less than 40% of SOEs' loans have been collateralised in the past few years, compared with around 70% for private firms (Chart B3.7). Moreover, SOEs in utilities and major heavy industries have been charged lower funding costs than private enterprises, particularly for those in catering, transport, oil & gas, and ship building industries (Chart B3.8).

Chart B3.7
Number of collateralised loans as share of total number of loans for firms across ownership



Note: Before 2009 covers data from 1988 to 2008.
Sources: Bloomberg and HKMA staff estimates.

Chart B3.8
Funding cost differentials between private enterprises and SOEs (2009-2013)

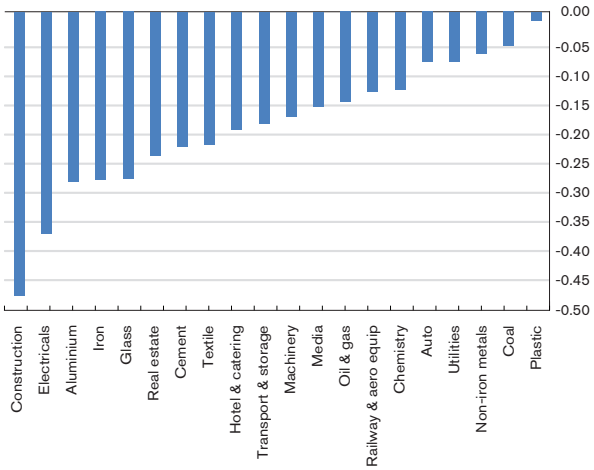


Note: A positive number indicates private enterprises paid higher funding costs than SOEs in the same industry.
Sources: Bloomberg and HKMA staff estimates.

To explore to what extent the Mainland's corporate leverage has been driven by implicit government support, we conduct a counter-factual analysis under the assumption that SOEs had borrowed on a market-driven basis with no government guarantee. The exercise is done using an optimal capital structure model which assumes SOEs have no policy burden, and decide how much to borrow only to maximise their firm value. In the counter-factual analysis, we also assume SOEs pay the same funding costs as private enterprises. Major determinants of borrowing in the model include asset volatility, tax rate, bankruptcy costs, and risk-free interest rate. Specifically, an increase in an enterprise's asset volatility generally reduces its capacity to borrow, while a rise in its funding costs would dampen its incentive to borrow.

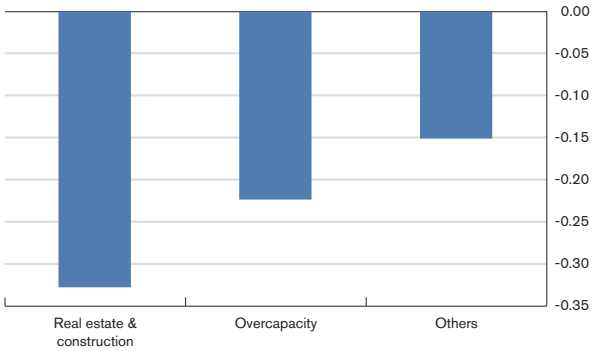
Indeed, the analysis indicates SOEs would have borrowed much less if they had no implicit government guarantee. For the period of 2009-2013, the leverage ratio of SOEs in the construction industry would have been over 45 percentage points lower, and iron, aluminium SOEs would have borrowed much less as well (Chart B3.9). The leverage ratio for SOEs in the real estate industry would have been nearly 25 percentage points lower. By group, the leverage ratio for SOEs in the real estate-construction group would have been over 30 percentage points lower, compared with some 20 percentage points drop for overcapacity industries (such as iron, aluminium, glass & cement), and about 15 percentage points for SOEs in other industries (Chart B3.10). In short, these estimates suggest that corporate leverage has indeed been in large part driven by implicit government guarantee following the launch of the big stimulus.

Chart B3.9
Changes in SOEs' leverage ratios in a counter-factual analysis across industries (2009-2013)



Sources: Bloomberg and HKMA staff estimates.

Chart B3.10
Changes in SOEs' leverage ratios in a counter-factual analysis across groups (2009-2013)



Sources: Bloomberg and HKMA staff estimates.

The finding that Mainland China's corporate leverage growth has been mainly driven by implicit government support points to a possibly lower fund-use efficiency and poses uncertainty to banks' asset quality. Indeed, profitability and debt servicing capacity of overcapacity industries and real estate developers, which have seen a continued rise in leverage, weakened in recent years. Specifically, the average ROA for listed firms in overcapacity industries has been only around 1% in recent quarters. Their interest coverage ratio has been trending downwards over the past decade and has been only around unity in recent quarters.

Reflecting these concerns, the government has taken measures to enhance credit allocation in recent periods, such as restraining bank loans to inefficient firms in overcapacity industries and implementing targeted measures to promote bank lending to small and micro-sized enterprises and rural-related sectors. Fund-use efficiency would improve accordingly if these measures are well implemented.

Concluding remarks

The main messages of this box are summarised as follows:

- While the level of leverage for the non-financial corporate sector as a whole is not yet excessive, SOEs, particularly developers and enterprises in industries with overcapacity problems, have seen a fast increase in leverage.

- The rise of SOEs' leverage has been mainly driven by implicit government guarantee. This is particularly true for construction firms, developers and enterprises in overcapacity industries.

- Indebtedness driven by implicit government support points to a weakening in fund-use efficiency and deterioration in corporate debt-servicing capacity. The government has taken measures to enhance credit allocation in recent periods, and fund-use efficiency would improve accordingly if these measures are well implemented.