HONG KONG MONETARY AUTHORITY
香港金融管理局

HALF-YEARLY MONETARY AND FINANCIAL STABILITY REPORT

March 2015

This Report reviews statistical information between the end of August 2014 and the end of February 2015.

Half-Yearly Monetary and Financial Stability Report
March 2015

Table of Contents

1. Summary and overview

The twin shocks of a significant strengthening of the US dollar and a sharp plunge in oil prices have heightened volatility in the foreign exchange markets in recent months. While emerging market currencies have experienced increased depreciation pressure, the Hong Kong dollar remained stable.

Loan growth in Hong Kong moderated along with slower economic growth, but renewed buoyancy in the local property market and continued build-up of household indebtedness are adding to financial stability risks. Looking ahead, the strengthening of the US dollar and the imminent US interest rate hike would increase uncertainty in local liquidity conditions and heighten credit risks and interest rate risks. The associated effect on banks' leverage could potentially affect banks' lending capacity and therefore merits closer attention.

The external environment

Global foreign exchange markets have experienced a sharp rise in volatility in recent months amid the twin shocks of a significant US dollar appreciation and a sharp plunge in crude oil prices. In particular, the Swiss franc saw sharp appreciation following the Swiss National Bank's (SNB's) removal of the exchange rate cap of Swiss franc with the euro in January, while the Russian rouble experienced sharp depreciation amid the oil prices plunge late last year.

With the US leading the pack among the advanced economies in terms of economic growth and labour market recovery, the divergence of US monetary policy paths with the rest of the world is likely to continue and drive further strengthening of the US dollar. While the US Federal Reserve (Fed) has already started its process of monetary policy normalisation and will begin its rate hike cycle, the European Central Bank (ECB) announced a quantitative easing programme in January 2015 amid lacklustre growth and rising deflationary risk in the euro area. In Japan, the economy has already entered into a tecÚical recession as a result of the April 2014 consumption tax hike and the Bank of Japan (BoJ) has expanded its Quantitative and Qualitative Easing (QQE) programme since late 2014. In Mainland China, growth momentum softened further amid continued adjustments in the property markets. Capital outflow pressures also emerged, in part reflecting concerns over the economic outlook. The People's Bank of China (PBoC) has taken measures to lower borrowing costs and maintain liquidity conditions stable in the banking system. Box 3 (see Page 27) sheds light on Mainland China's corporate leverage across industries and by firm ownership, and concludes that its rise has been driven mainly by implicit government guarantee.

Continued divergence in the growth and monetary policy paths of the major economies is likely to heighten volatility in the foreign exchange market. In particular, volatility in the foreign exchange market is also amplified by recent volatility in the credit default swap markets especially in emerging market and traditional safe haven economies. Box 1 (see Page 14) examines the interactions between currency risk and sovereign credit risk for major currencies.

While the recent fall in oil prices should benefit economic growth in major oil-importing advanced economies by lowering production costs and stimulating spending on other goods and services, 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 is also increasing the uncertainty in the timing and pace of the Fed's interest rate hike. In the near term, the sharp fall in oil prices and concerns over its potential pass-through to core inflation and inflationary expectations have prompted market expectations of a slower pace of Fed's rate hike. However, the good underlying strength of the US recovery and the faster-than-expected narrowing of labour market slack suggest that wage and inflation pressure would eventually pick up some time down the road. The subsequent pace of rate hike by the Fed could be faster than expected if the latter factor eventually dominates.

In East Asia, growth momentum remained modest in the second half of 2014 amid the subdued performance of its external sector. Despite stronger US economic recovery, its contribution to the region's export growth in general is still well below that of the pre-crisis period. Box 2 (see Page 17) examines the reasons behind the weak export demand from the US over the past few years, suggesting that there might be changes in US import pattern since the global financial crisis.

In late 2014, the twin shocks from both a strengthening US dollar and a sharp fall in oil prices have turned investors' sentiment more bearish towards emerging market economies. So far, investors have remained discriminative, as evidenced by less depreciation pressure on the currencies of regional economies with stronger fundamentals. Looking ahead, a stronger US dollar and the expected higher US dollar interest rate could act as a pull factor to induce investors to move away from risk assets in the region, while increasing the debt servicing burden of borrowers of US dollar credit. Meanwhile, central banks in the region would be facing increasing policy dilemma between supporting growth and reining in deflationary pressure on the one hand, and reducing the risk of abrupt capital outflows on the other.

The domestic economy

In Hong Kong, economic growth continued at a below-trend rate in the second half of 2014, with the real GDP growth rate easing back to 0.4% on a quarter-on-quarter basis in the fourth quarter from 1.4% in the third quarter amid a weaker external trade environment. In particular, net exports turned to a notable drag on growth in the fourth quarter as overseas demand weakened. On the other hand, domestic spending strengthened compared with the first half. Private consumption remained supported by the stable labour market conditions, while overall investment spending improved slightly, with vibrant building and construction activities being partly offset by weak capital investment.

Domestic inflation momentum picked up somewhat in the second half of 2014 before softening in early 2015. The annualised three-month-on-three-month underlying inflation rate increased to 4.3% in November from 2.4% in August, and fell to 1.3% in February on the back of weaker housing rental and service inflation. Looking ahead, the expected softening in import prices and moderate domestic growth momentum would keep inflationary pressure in check.

Hong Kong's economic growth is expected to remain moderate in 2015. While stronger US growth should provide some support, a sharp turnaround in Hong Kong's export performance is not likely given that demand from the euro area and Japan remains weak and growth in Mainland China and other emerging market economies is slowing. On the domestic front, private consumption should remain broadly supported by the stable labour market conditions. Large-scale public infrastructure works and private building activities should also hold up quite well, although a mixed business outlook, together with the imminent increase in interest rates ahead, will continue to weigh on capital investment. Private analysts project real GDP growth at an average of 2.6% in 2015, and the Government forecasts growth in the range of 1-3%. The HKMA in-house composite index of leading indicators also points to moderate growth momentum in the first half of 2015.

This growth outlook is subject to a number of uncertainties and risks. In particular, when the interest rate up-cycle starts, monetary conditions in Hong Kong would inevitably tighten and this in turn could weigh on real economic activities. In addition, persistent strengthening of the US dollar, together with higher US interest rates, could increase the risk of a sudden re-pricing of risk assets and capital outflow pressures, as well as a rise in the debt-servicing burden of borrowers of US dollar credit.

Monetary conditions and capital flows

Following sizeable Hong Kong dollar inflows in July and early August amid buoyant equity fund-raising activities and strong commercial demand, the Hong Kong dollar buying interest has subsided since the fourth quarter, as shown by small changes in banks' net spot foreign currency positions. Despite heightened volatility in the international currency markets and depreciation pressures on the emerging-market currencies, the Hong Kong dollar remained stable and continued to trade in an orderly manner.

Over the past decade, Hong Kong's bilateral capital flows with Mainland China have increased considerably amid growing economic integration. Box 4 (see Page 53) analyses these bilateral capital flows under the balance of payments framework and explains how they translate into economic activities in Hong Kong.

The monetary and credit conditions in Hong Kong remained accommodative, with ample liquidity in the banking system. Money market operated smoothly including at times of volatile external environment. The Monetary Base expanded in the second half after staying flat for a year or so, mainly attributable to a rise in the Aggregate Balance following the triggering of the strong-side Convertibility Undertaking (CU) in July and early August. The wholesale funding costs continued to stay low, with the overnight and three-month HIBOR fixings hovering well below the Base Rate of 0.5%. Broadly tracking the

US counterparts, the Hong Kong dollar yields picked up in the medium tenors but declined in the long end. On the retail front, the composite interest rate and the mortgage interest rate were largely steady at low levels.

Loan growth slowed in the second half, reflecting weaker credit demand and in part also the effects of the HKMA prudential measures in place. This brought the full-year loan growth to 12.7% in 2014, down from 16.0% in 2013. Growth in domestic credit decelerated in the second half, reflecting a marked decline in trade finance. On the other hand, loans for use outside Hong Kong continued to expand at a relatively fast pace. Meanwhile, household debt climbed to 65.3% of GDP at the end of 2014 due to faster growth in both mortgage loans and personal loans. In general, banks' funding conditions remained largely stable, as the Hong Kong dollar loan-to-deposit ratio held largely steady and the US dollar loan-to-deposit ratio levelled off.

Offshore renminbi business has expanded further in Hong Kong. The liquidity pool expanded moderately, with robust growth in customer deposits recorded in the second half in part driven by the removal of the daily conversion limit of RMB20,000 for Hong Kong residents in November, which was announced along with the official launch of the Shanghai-Hong Kong Stock Connect (SHKSC) to allow mutual stock market access. The amount of outstanding certificates of deposit (CD) however declined as major Chinese banks reduced CD issuance. During the second half, the HKMA also introduced several measures to facilitate banks' management of renminbi liquidity and strengthen infrastructure of Hong Kong's offshore renminbi market.

Tracking closely the onshore exchange rate (CNY), the offshore renminbi exchange rate (CNH) weakened in late 2014 and early 2015 amid the broad strengthening of the US dollar. The CNH interbank liquidity tightened further, with the three-month CNH HIBOR rising from around 3% in June 2014 to 4.2% in February in part due to increased funding demand along with the expansion in renminbi transactions as well as seasonal liquidity needs.

Asset markets

The Hong Kong equity market has experienced large swings over the past six months. Shortly after last summer, prices plummeted sharply on renewed concerns over the US monetary normalisation process and weaker-than-expected macroeconomic performance of Mainland China. The market subsequently came under further pressure when the rest of the global economy, especially in continental Europe, showed increasing signs of fatigue. Fund raising activities were probably the only bright spot, with initial public offerings amounting to the second highest in the world last year. The market recouped much of the lost ground early this year in view of the Fed's "patient" approach to a rate hike and a new round of quantitative easing by the ECB. Nonetheless, the prospect of monetary tightening in the US and a weaker global economic outlook are likely to keep the market highly uncertain and volatile in the period ahead.

Hong Kong dollar debt outstanding fell marginally last year. Domestic bond yields declined alongside their US counterparts as the US Treasuries market advanced on the back of strong safe-haven demand and lower-than-expected outturn on inflation. This stimulated primary market activities, as issuers from both the private and public sectors were incentivised to take advantage of the bullish sentiment to lock in lower borrowing costs. However, the increase in issuance still ran short of matured debt, causing a slight decline in the total

outstanding amount of debt. Meanwhile, last year continued to see strong growth in offshore renminbi debt. New issuance remained by and large well-received despite a weaker macroeconomic outlook. The market is also becoming more mature as evident by increased product diversity. From market development perspectives, there is still much room for the market to grow in the foreseeable future.

The residential property market has turned more active since the second quarter of 2014 and remained buoyant for the rest of the year and recent months with the support of the ongoing low interest rate environment and a tight demand-supply balance. Transactions bounced up, while housing prices soared by 13.5% in 2014, with most of the gains recorded in the second half. Property valuation has become a lot more stretched relative to household income and economic fundamentals, with the price-to-income ratio rising to a record level and the income-gearing ratio well above its long-term average.

Banking sector performance

Despite a less sanguine external environment, the banking sector recorded healthy growth, characterised by sound asset quality, favourable liquidity conditions, and strong capital positions. Although retail banks' profitability edged down during the second half of 2014 because of lower non-interest income, it remained more favourable for full year 2014 than the previous year, with their pre-tax operating profits registering annual growth of 3.6%. Meanwhile, the net income margin of retail banks hovered around 1.4%.

The average liquidity ratio improved further to 41.1% in the fourth quarter of 2014, well above the 25% regulatory minimum. With the favourable liquidity condition, the market information has so far shown no sign of notable impact associated with the phase-in of the Basel III Liquidity Coverage Ratio (LCR) requirement, which has taken effect from 1 January 2015. Banks in Hong Kong are not expected on the whole to encounter major difficulties in complying with the new liquidity standards over the transitional period.

Partly reflecting the policy effect of the Stable Funding Requirement, the overall loan-to-deposits ratio for all AIs declined slightly to 72.2% at the end of 2014. Liquidity conditions, however, remained highly uncertain amid the divergence of monetary policies in the advanced economies. Specifically, our assessment indicates that the liquidity risk associated with the flow of international US dollar credit remained high, particularly when there is serious disruption in the foreign exchange swap market. Box 5 (see Page 72), which studies the dynamics of banks' leverage, further finds that any initial contraction in global liquidity could be amplified, as banks would react to the liquidity shock by reducing their leverage and thus lending capacity. The implications for liquidity risk and funding costs merit close attention.

Looking forward, banks should continue to be attentive to credit risks associated with rising debt-servicing burdens in both the household and corporate sectors. Meanwhile, the implication of slower economic growth in Mainland China on the credit risk of rising Mainland-related lending should also warrant continued vigilance.

The *Half-yearly Report on Monetary and Financial Stability* is prepared by the staff of the Research Department of the Hong Kong Monetary Authority.

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

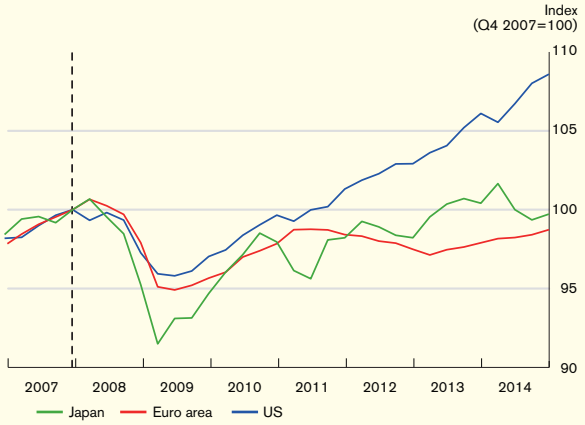
Global foreign exchange markets have seen sharp rise in volatility in recent months. In emerging markets, the Russian rouble has depreciated sharply against the US dollar since June 2014. In developed markets, Switzerland chose to abandon its quasi-currency peg to the euro on 15 January 2015 before the 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.

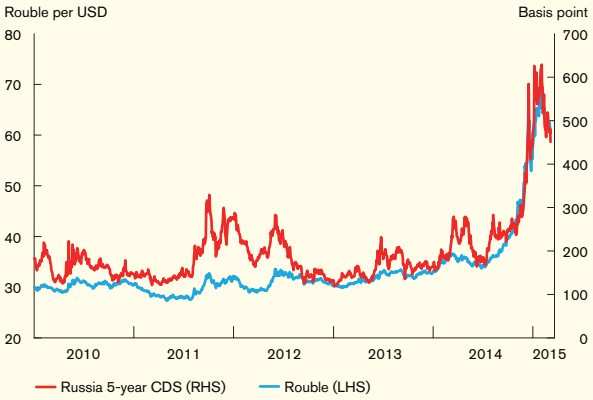
Continued divergence in monetary policy of major economic blocs would continue to drive appreciation of the US dollar, and at the same time likely heighten volatility in the global foreign exchange market. For example, with the weakness of the euro area economy and particularly with the anticipated further 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.

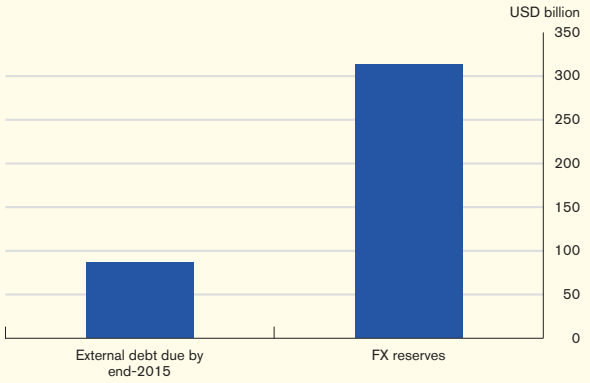
The sharp fall in oil prices has put net oil-exporting countries at great economic and financial risks. If troubles in these emerging market net oil exporters lead to generalised risk aversion and indiscriminate sell-offs, there could be a contagion effect on other emerging market economies. The biggest 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.

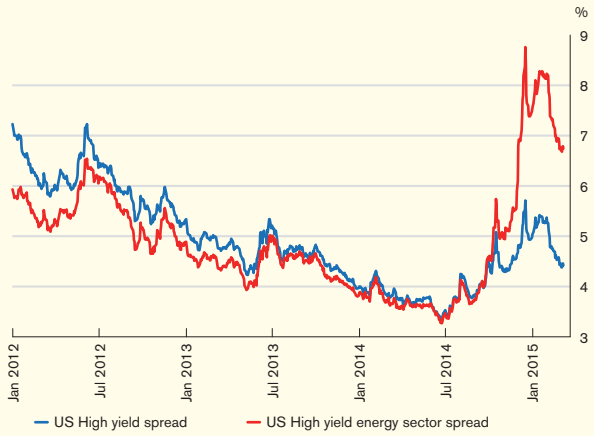
Chart 2.3
Russia: External debt due by end-2015 and foreign exchange reserves



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.

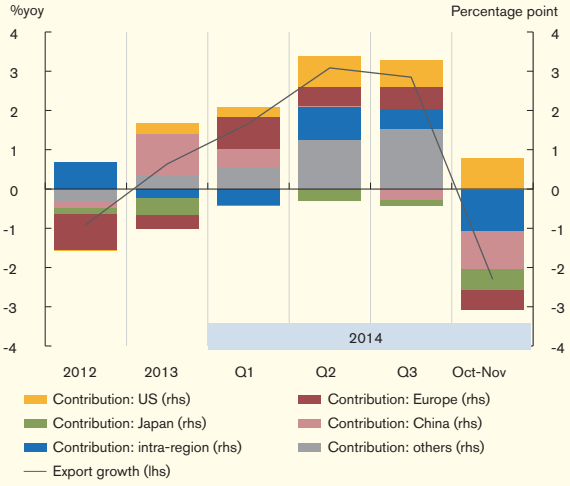
Chart 2.4
US: High yield spreads



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.

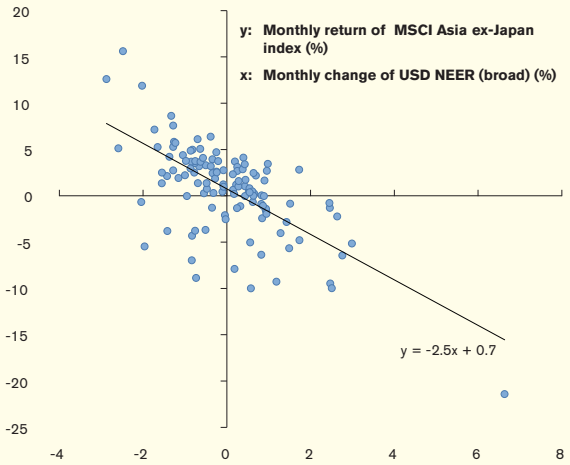
[1] Press Release of Fitch Ratings, "Lenders May Go Easy on U.S. High Yield Energy Issuers in Downturn Scenario", 5 December 2014.

[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]

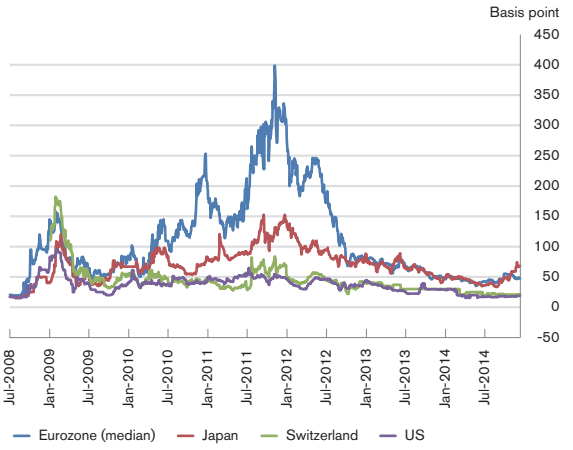
Data and methods

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.

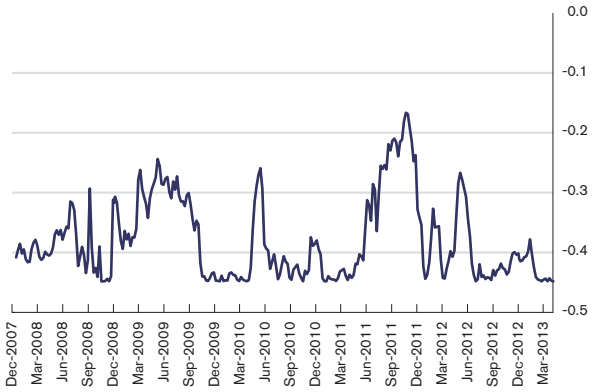
Implications for policymakers

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.

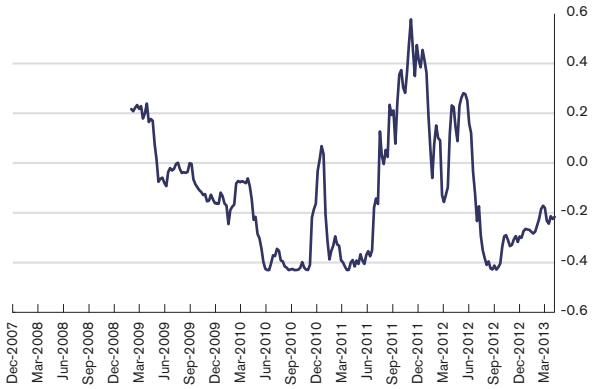
[10] The lead-lag dynamics refer to an adjustment for the price deviation from the long-run equilibrium. When the currency option market leads the adjustment and the sovereign CDS market follows in price discrepancy corrections, the price discovery ratio will be closer to 1. When the sovereign CDS market 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]

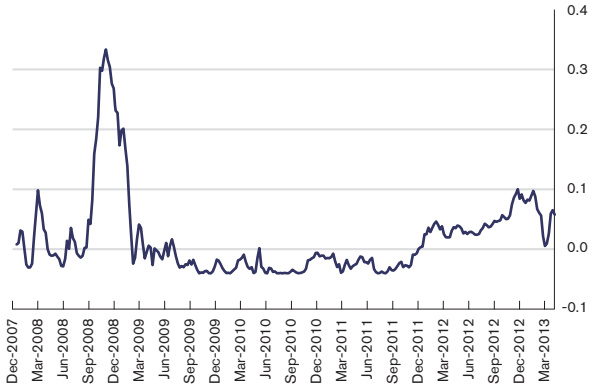
a. Between eurozone's sovereign CDS spread and risk reversal of euro (vis-à-vis US dollar)



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:

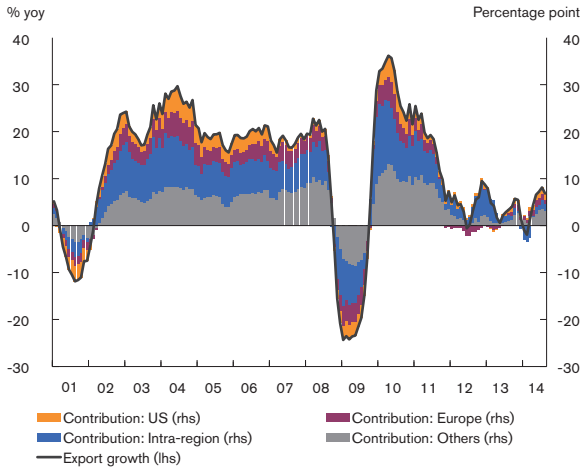
1. The risk reversal of a currency is the implied volatility of an out-of-the-money call of the currency minus that of an out-of-the-money put of the currency at the 25% delta at the 3-month maturity.
2. The estimated conditional correlation begins in January 2009 because the Switzerland's sovereign 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

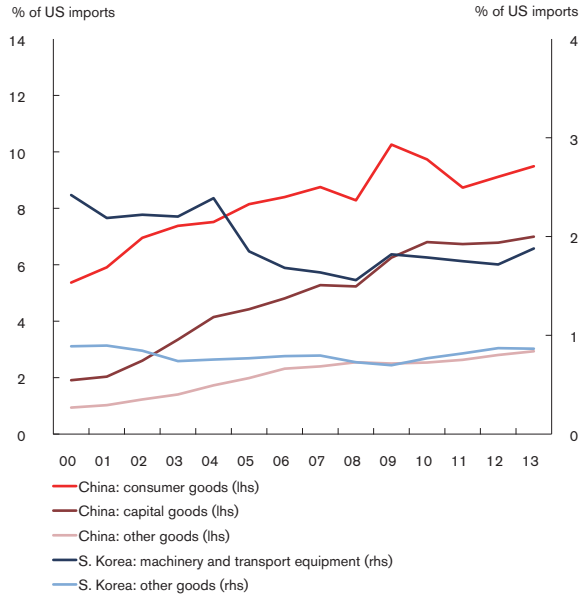


Sources: CEIC and HKMA staff estimates.

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).

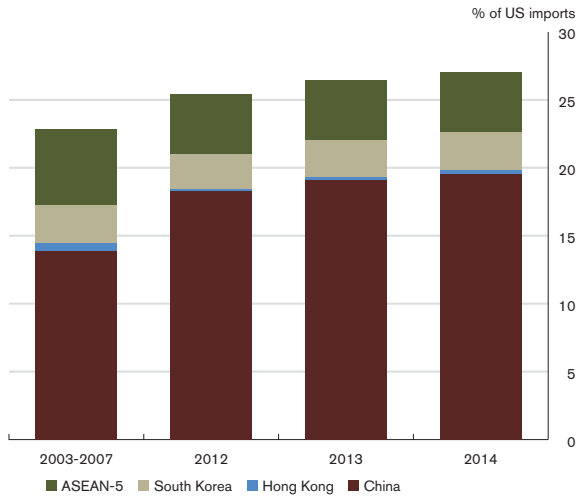
Chart B2.2
US imports from China and Korea



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

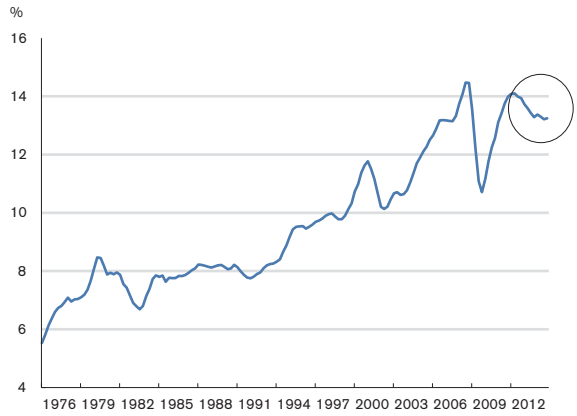


Note: ASEAN-5 refers to Indonesia, Malaysia, the Philippines, Singapore and Thailand
Sources: CEIC and HKMA staff estimates.

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).

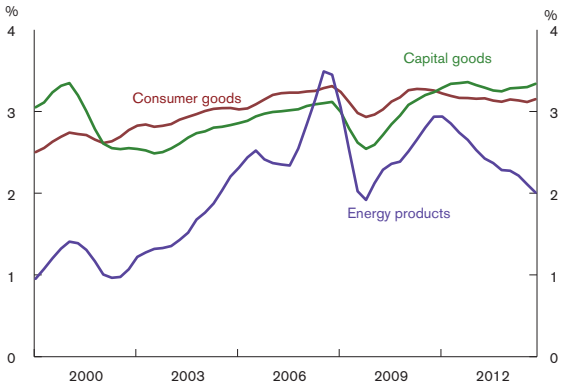
Chart B2.4
US imports-to-GDP ratio



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.

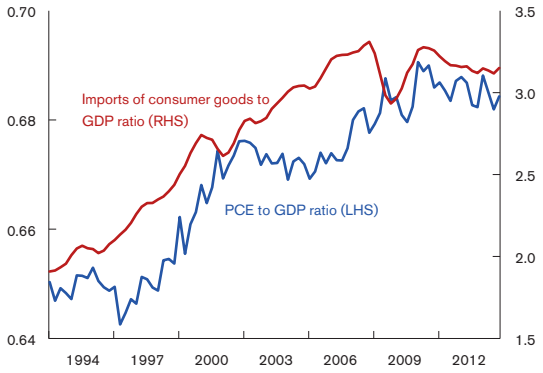
Decline in US imports of energy products

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.

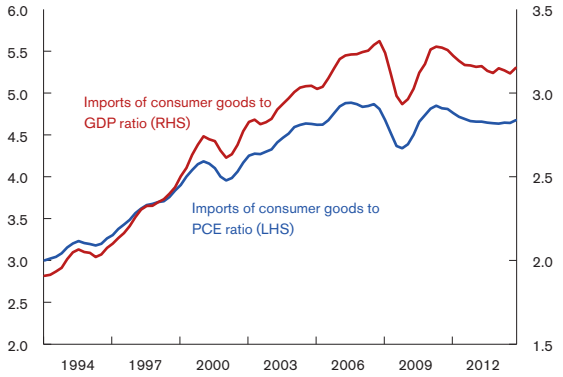
Chart B2.6
US consumers' propensity to consume



Sources: CEIC and HKMA staff estimates.

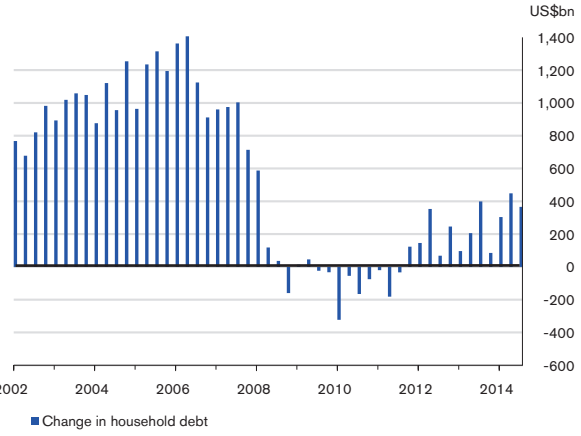
[11] i.e. import of consumer goods/GDP ratio = import of consumer goods/PCE ratio * PCE/GDP ratio.

Chart B2.7
US import share of PCE



Sources: CEIC and HKMA staff estimates.

Chart B2.8
Quarterly Increase in US household debt



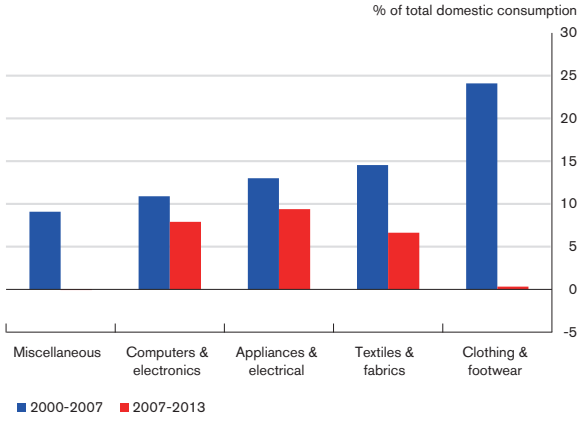
Sources: CEIC and HKMA staff estimate.

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

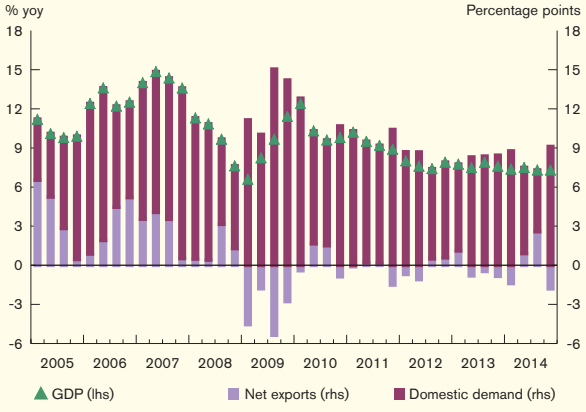
Overall, it appears that emerging Asian economies may not see export growth to the US as strong as they used to enjoy in the pre-crisis period, particularly those economies reliant on energy and consumer goods exports. The plateauing of US propensity to consume from its pre-crisis peak amid tighter prudential 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

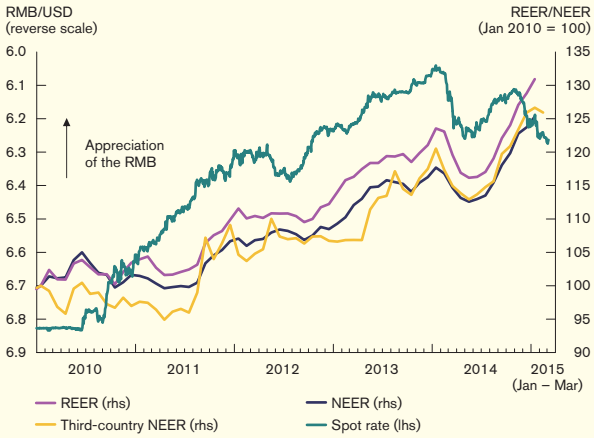


Sources: CEIC and HKMA staff estimates.

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



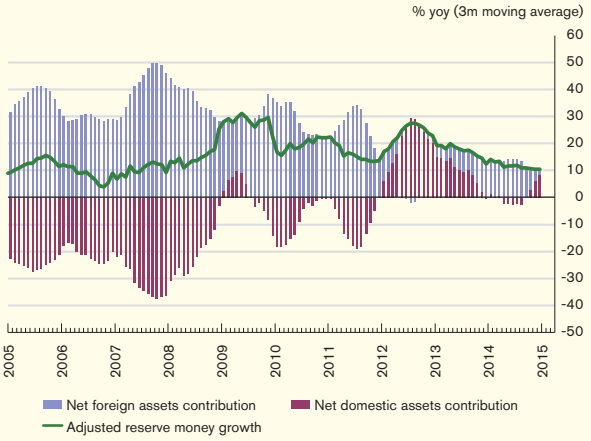
Note: A higher effective exchange rate index indicates a stronger renminbi. The 3rd-country NEER takes into account the competition that China faces in foreign markets from other economies exporting similar products.

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



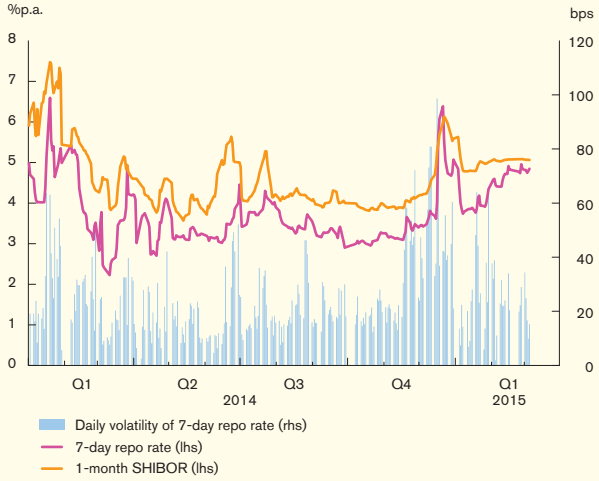
Sources: CEIC and HKMA staff estimates.

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



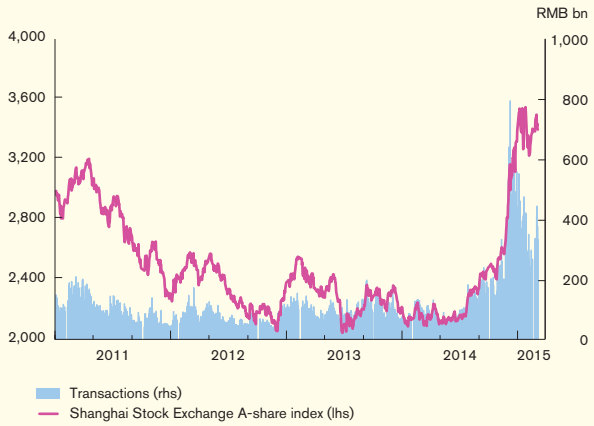
Note: The daily volatility of 7-day repo rate is the standard deviation based on five-minute tick data.

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.

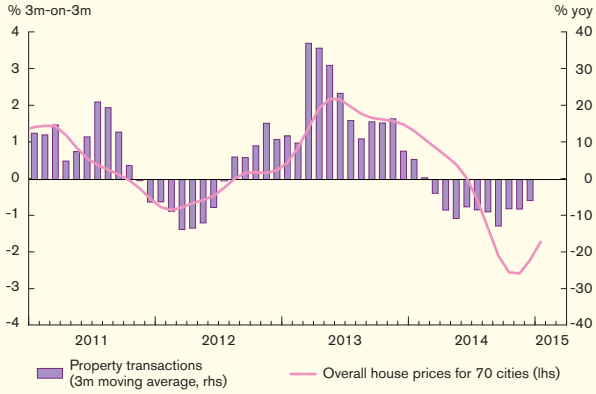
Chart 2.11
Mainland China: Shanghai stock market index and transactions



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.

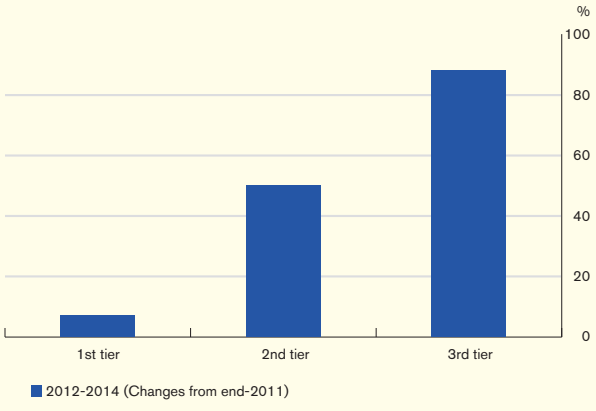
Chart 2.12
Mainland China: house prices and transactions



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).

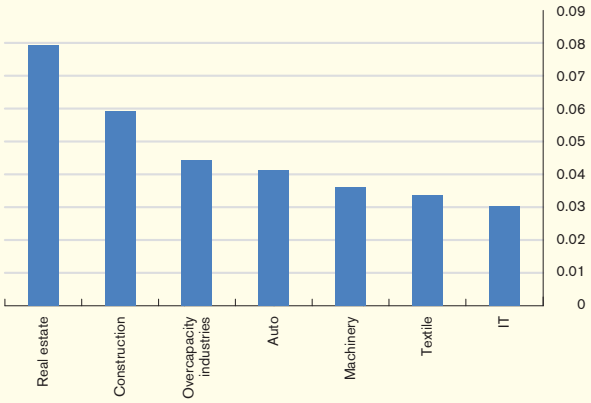
15 Newly completed economic housing amounted to 5.1 million units in 2014, compared with around 11 million units of commodity housing sold in the primary commodity housing market in 2013. Economic housing under construction amounted to around 12.8 million units in December 2014.

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.

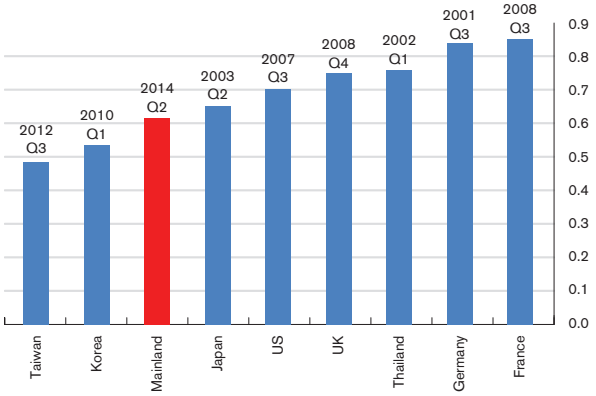
Box 3
Why has the Mainland's corporate leverage increased fast in the past few years?

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

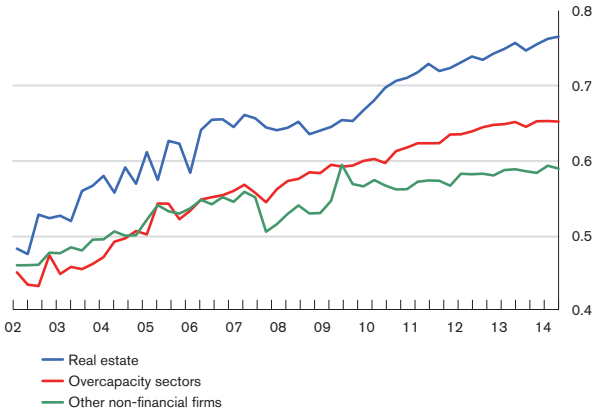
While the level of leverage for the non-financial corporate sector as a whole does not appear to be particularly high, leverage for real estate developers and industries with substantial overcapacity has increased at a fast pace in the past few years. Corporate leverage is measured by the debt-to-asset 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

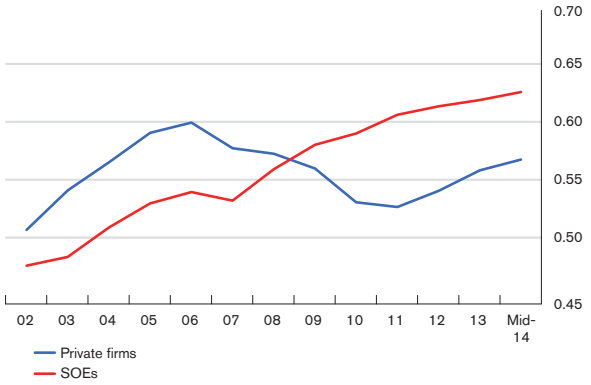


Sources: Bloomberg and HKMA staff estimates.

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

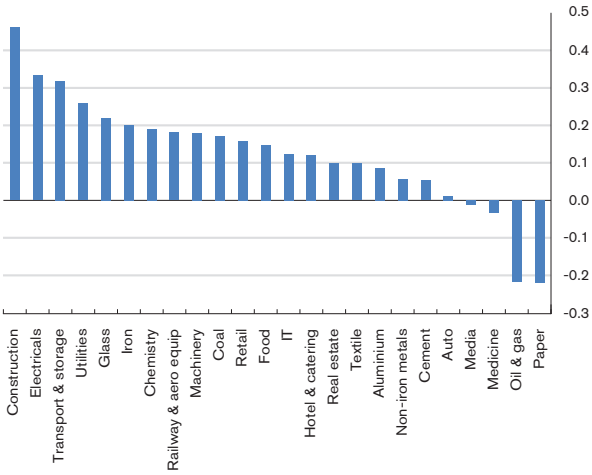
declined further before rising somewhat in the past few years. Among the SOEs, construction, utilities, and overcapacity industries led others in terms of the changes of their leverage ratios after 2009 (Chart B3.4).

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?

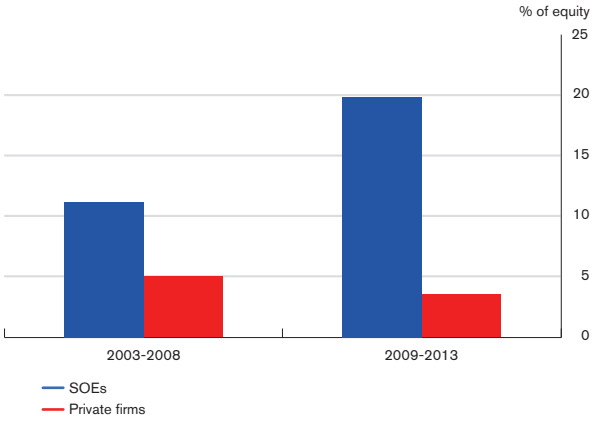
It has been argued that corporate indebtedness in the past few years has been, to a certain extent, driven by implicit government support. Specifically, to counter the economic slowdown, SOEs, which have the policy burden of supporting GDP growth and maintaining labour market stability, may have had 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.

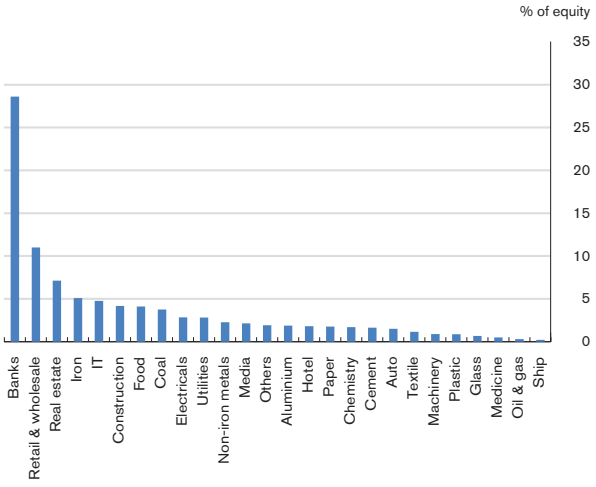
[20] The value of industrial government guarantee is aggregated from that of individual firms within each corresponding industry.

Chart B3.5
Implicit government guarantee for firms by ownership



Sources: Bloomberg and HKMA staff estimates.

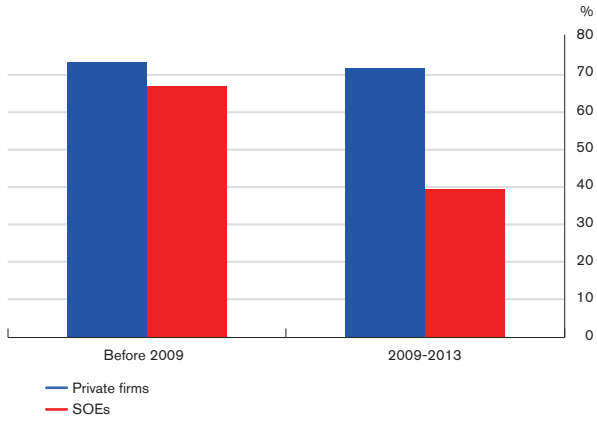
Chart B3.6
Implicit government guarantee by industry



Sources: Bloomberg and HKMA staff estimates.

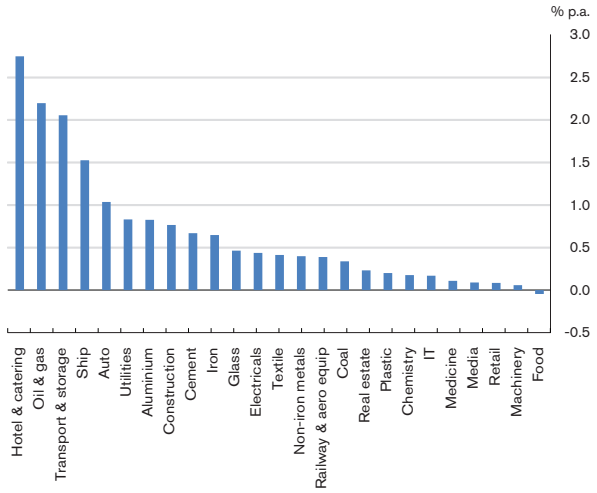
Accordingly, SOEs have borrowed on better terms than private firms. Listed firms' data indicates that less than 40% of SOEs' loans have been collateralised in the past few years, compared with around 70% for private firms (Chart B3.7). Moreover, SOEs in utilities and major heavy industries have been 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)

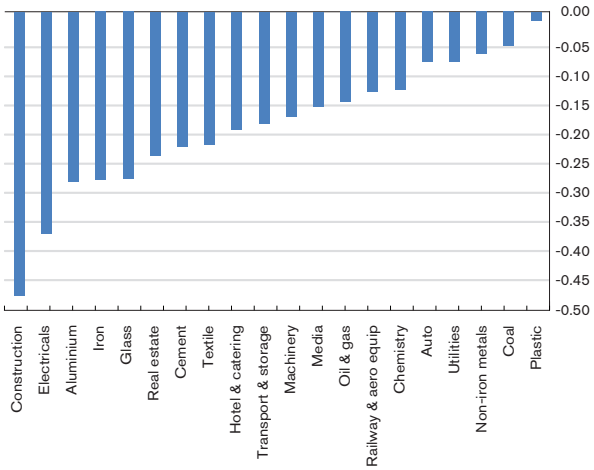


Note: A positive number indicates private enterprises paid higher funding costs than SOEs in the same industry.
Sources: Bloomberg and HKMA staff estimates.

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.

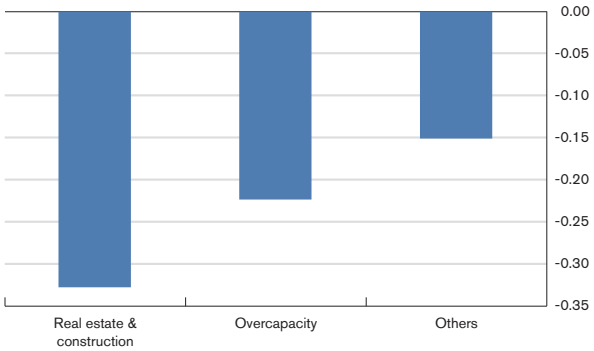
Indeed, the analysis indicates SOEs would have borrowed much less if they had no implicit government guarantee. For the period of 2009-2013, the leverage ratio of SOEs in the construction industry would have been over 45 percentage points lower, and iron, aluminium SOEs would have borrowed much less 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.

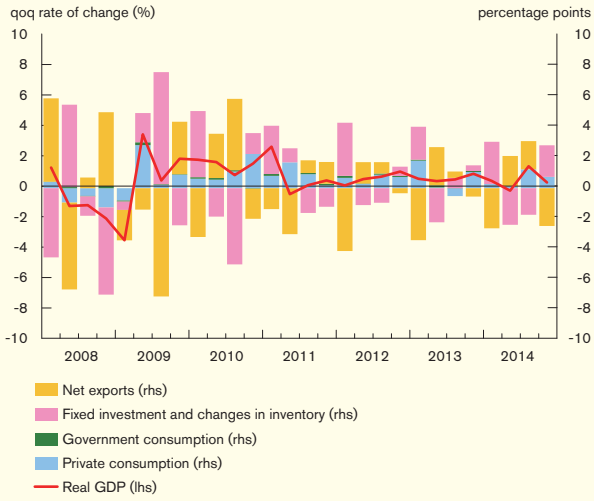
3. Domestic economy

The Hong Kong economy expanded at a moderate pace in the second half of 2014, with continued private consumption growth and slight improvement in overall investment spending offsetting weaker external trade performance. In 2015, economic growth is anticipated to remain moderate, but subject to risks relating to the global growth prospects and monetary conditions. Local inflation momentum is expected to be contained amid the softening in import prices and moderate domestic growth momentum.

3.1 Real activities

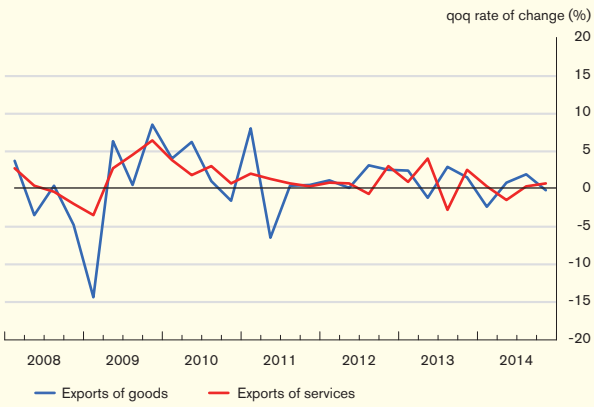
Economic growth in Hong Kong continued at a below-trend rate in the second half of 2014, with the real GDP growth rate easing back to 0.4% on a seasonally adjusted quarter-to-quarter basis in the fourth quarter from 1.4% in the third quarter amid a weaker external trading environment (Chart 3.1). In particular, net exports turned to a notable drag on GDP growth in the fourth quarter as weaker overseas demand weighed on Hong Kong's merchandise exports. In contrast, exports of services recorded modest growth due in part to improvement in inbound tourism (Chart 3.2). Domestic demand strengthened compared with the first half of the year. Overall investment spending improved slightly due to vibrant building and construction activities and inventory stocking, but capital investment stayed weak amid a mixed business outlook. Private consumption growth remained supported by the stable labour market conditions.

Chart 3.1
Real GDP growth and contribution by major expenditure components



Sources: Census and Statistics Department (C&SD) and HKMA staff estimates.

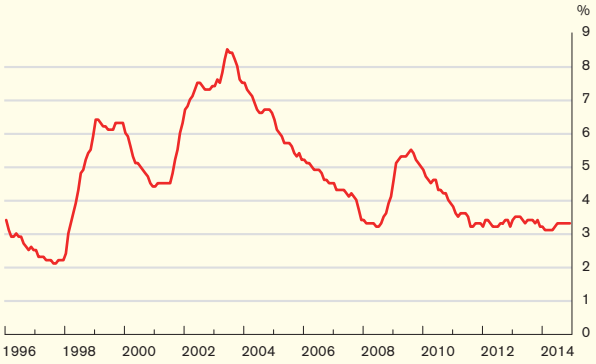
Chart 3.2
Exports of goods and services in real terms



Source: C&SD.

The year-on-year real GDP growth continued to be moderate at 2.7% and 2.2% respectively in the third and fourth quarters. For the whole of 2014, real GDP growth slowed to 2.3%, down from 2.9% a year earlier and still some way off the average annual growth of 3.9% in the past 10 years. This mainly reflected milder growth in domestic demand and sluggish external trade performance. Labour market conditions also eased slightly in the second half, with the unemployment rate edging up to 3.3% from about 3.2% in the first half (Chart 3.3). As a sign of softer labour demand, total employment grew by a modest 0.9% in 2014, the slowest pace in the past four years.

Chart 3.3
Unemployment rate



Source: C&SD.

Hong Kong's economic growth is expected to remain moderate in 2015. Slightly stronger global growth, led by the US, should provide moderate support for Hong Kong's export performance. Still, export growth is not likely to see a sharp turnaround as demand from the euro area and Japan remains weak, while growth in Mainland China and other emerging market economies is slowing. On the domestic front, private consumption growth should remain supported by the stable labour market conditions. Large-scale public infrastructure works and private building activities are also expected to hold up quite well, but a mixed business outlook and possible rises in interest rates in the future will likely continue to weigh on business capital investment. The modestly expansionary fiscal stance in the 2015/16 Budget will also support economic activities with a package of one-off relief measures.

The HKMA in-house composite index of leading indicators points to moderate growth momentum in the first half of 2015, as indicated by the soft six-month growth rate (Table 3.A). Overall for 2015, the Consensus Forecasts project the Hong Kong economy to grow at an average rate of 2.6%, while the Government forecasts growth in the range of 1-3%.

Table 3.A
Recent trends of the coincident economic indicator and the leading economic indicator

	% change over one month		% change over six months	
	CEI	LEI	CEI	LEI
2014				
Jan	2.4	0.5	6.2	2.7
Feb	-2.8	0.4	3.2	2.8
Mar	-0.2	-0.3	2.5	2.1
Apr	-2.2	0.3	-0.1	2.2
May	0.1	0.6	-2.1	2.0
Jun	-1.1	0.4	-3.8	1.9
Jul	0.9	0.3	-5.2	1.8
Aug	0.8	0.2	-1.7	1.6
Sep	3.1	0.1	1.5	2.0
Oct	0.8	0.4	4.6	2.0
Nov	2.5	0.4	7.1	1.8
Dec	-1.9	0.5	6.2	1.9
2015				
Jan	n.a.	0.6	n.a.	2.2

Note: The six-month rate of change of a leading economic indicator is commonly referred to for detection of any business cycles turning points.

Source: HKMA staff estimates.

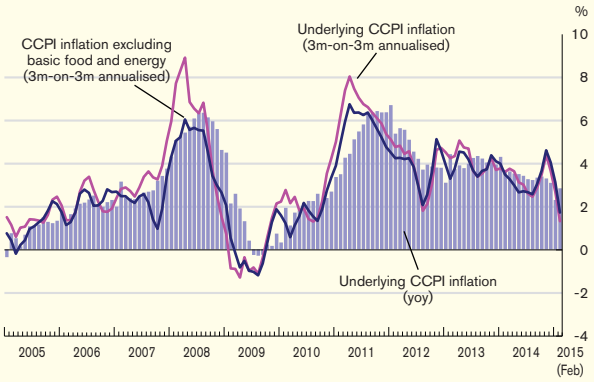
The baseline scenario in which the Hong Kong economy would continue to grow at a moderate pace is subject to a number of uncertainties and risks. The divergence of monetary policy paths in the advanced economies could lead to more volatile exchange rates, fund flows and global financial conditions, with potential negative spillovers to the Hong Kong economy through various financial channels. In particular, the timing and pace of US interest rate normalisation remain a major source of uncertainty. When the interest rate up-cycle starts, monetary conditions in Hong Kong would inevitably tighten and this in turn could weigh on real economic activities. Interest rate hikes could also dampen housing demand in Hong Kong and exert pressures on property prices. In case there is a sharp adjustment in the property market, the broader

economy would also be affected, with repercussions on consumption and business investment. Moreover, persistent strengthening of the US dollar together with higher US interest rates could increase risks of a sudden re-pricing of risk assets and capital outflow pressures, as well as a rise in the debt-servicing burden of borrowers of US dollar credit. The future path of oil prices also remains highly uncertain. In particular, sharp volatilities in oil prices could put some oil-exporting countries and energy producers under financial and credit stress, with possible contagion risks to global financial markets.

3.2 Consumer prices

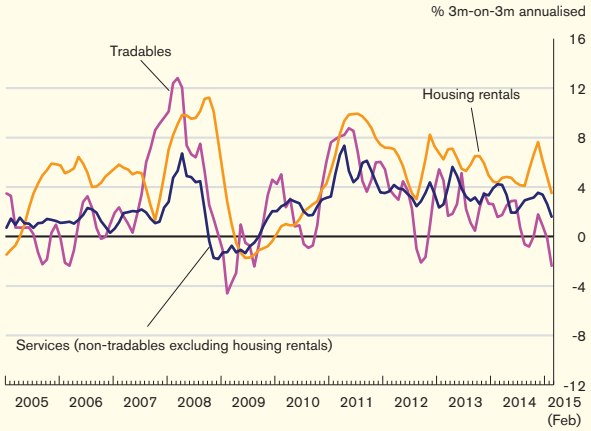
Local inflation momentum picked up somewhat in the second half of 2014 before softening in early 2015. The annualised three-month-on-three-month underlying inflation rate increased to 4.3% in November from 2.4% in August and fell to 1.3% in February on the back of weaker housing rental and service inflation (Chart 3.4). Meanwhile, the underlying inflation rate has declined on a year-on-year basis since the fourth quarter, reaching 2.8% in February.

Chart 3.4
Different measures of consumer price inflation



Sources: C&SD and HKMA staff estimates.

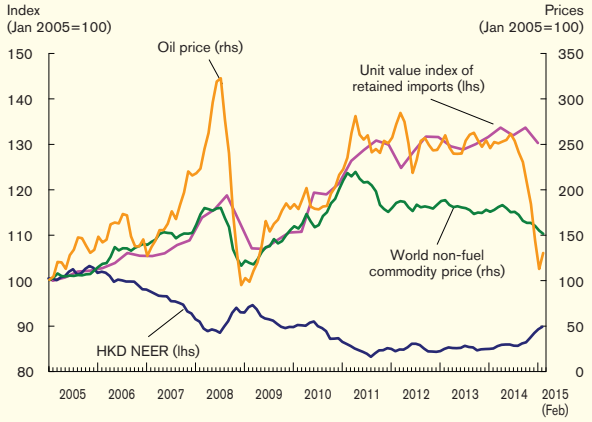
Chart 3.5
Consumer price inflation by broad component



Sources: C&SD and HKMA staff estimates.

The sequential inflation momentum will likely be moderate as the expected softening in import prices and service inflation would help keep inflationary pressure in check. In particular, the expectation of persistently low oil prices, the general softening in global food and commodity prices, a stronger Hong Kong dollar along with the expected appreciation of the US dollar, and the mild inflationary pressure in Mainland China, would limit Hong Kong's import price inflation in the period ahead (Chart 3.6). The moderate domestic growth momentum amid an expected small negative output gap and stable labour market conditions will also help contain inflationary pressure in the service component. On the whole, the annual year-on-year inflation rate for 2015 is likely to decrease, with the latest Government forecast for the underlying inflation rate of 3.0%, down from 3.5% in 2014.

Chart 3.6
Commodity and import prices



Sources: Bloomberg, IMF and C&SD.

The inflation outlook is becoming more uncertain and subject to risks on both sides. On the upside, any delay in the US rate hike cycle as a result of the subdued inflationary pressure, as well as looser-than-expected global monetary conditions due to monetary easing in the euro area and Japan, could add upward pressures on asset prices and more generally on local inflation. In particular, should this fuel greater demand for local properties, it could add upward pressure on property prices and strengthen rental inflation.

On the downside, the risks of further growth deceleration in Mainland China and weaker-than-expected growth in the euro area remain, which could dampen Hong Kong's near-term growth and cloud its inflation outlook. Any further softening in global food and commodity prices resulting from slower-than-expected global growth would also pose downward pressures on import prices. Meanwhile, further increase in capital outflow pressure and shift in market sentiment triggered by a possible surprise in US rate hikes, as well as the uncertain local housing supply conditions, could add to the risk of a downswing in the property market and pose downward pressures on local inflation.

4. Monetary and financial conditions

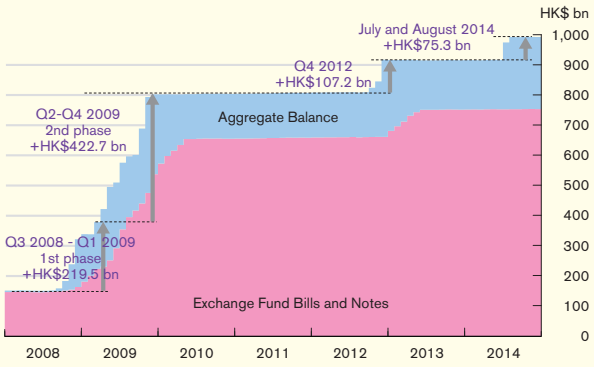
Exchange rate, capital flows and monetary developments

Despite increased volatility in the global financial markets and depreciation pressures on the emerging-market currencies, the Hong Kong dollar remained stable and continued to trade in an orderly manner. While bank liquidity remained abundant, loan growth has slowed quite visibly amid weaker credit demand. Going forward, the divergent growth and monetary policy paths of the advanced economies, particularly with the uncertain timing and pace of US interest rate normalisation, will be a major risk to fund flows and the monetary and financial stability of Hong Kong.

4.1 Exchange rate and capital flows

The Hong Kong dollar spot exchange rate moved between 7.75 and 7.77 against the US dollar in the second half of 2014. There was repeated triggering of the strong-side Convertibility Undertaking in July and early August amid strong commercial and equity-related demand, leading to corresponding increases in the Aggregate Balance (Chart 4.1). The Hong Kong dollar exchange rate then softened in late September and early October due to the broad US dollar strength and corrections in the local stock market on renewed worries about the global economic prospects. The Hong Kong dollar exchange rate strengthened in early December on the back of equity-related demand, but softened again in mid-December on repatriation of IPO proceeds.

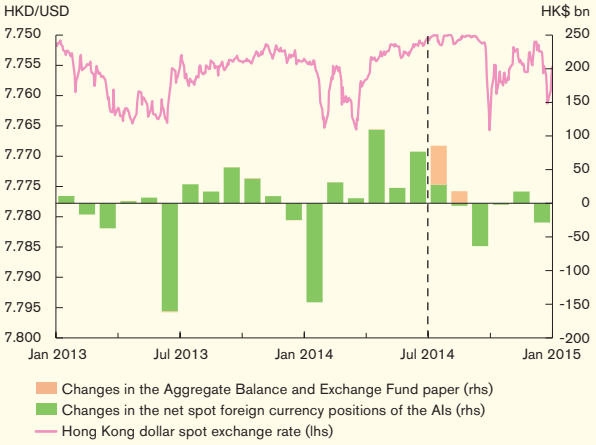
Chart 4.1
Fund flow indicators



Source: HKMA.

On the whole, currency stability remained intact and there were no significant net Hong Kong dollar fund flows into or out of the non-bank private sector in the fourth quarter, as evidenced by the small changes in banks' net spot foreign currency positions (Chart 4.2).

Chart 4.2
Fund flow indicators and exchange rate



Note: For fund flow indicators, a positive value indicates inflows.
Sources: HKMA and staff estimates.

Stepping into early 2015, the Hong Kong dollar continued to trade in an orderly manner, although international currency markets were shocked by the Swiss National Bank's action to remove the exchange rate cap of Swiss franc with the euro. The Hong Kong dollar spot exchange rate briefly strengthened and stayed near 7.75, but it later retraced. The Government and the HKMA reiterated the full commitment to the Linked Exchange Rate system.

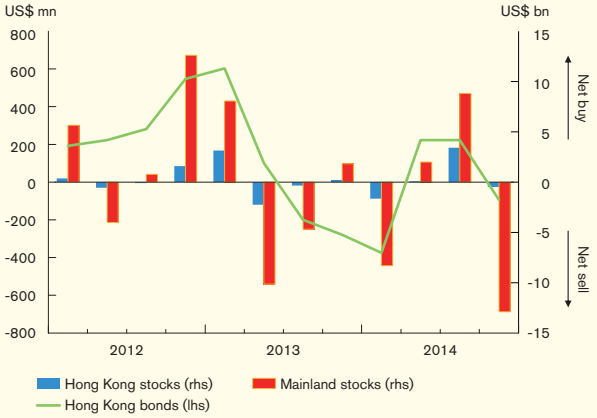
As for portfolio investment flows, sizable capital inflows occurred in the third quarter and this was broadly consistent with the movements in the Hong Kong dollar flows. The Balance of Payments (BoP) statistics also showed notable equity portfolio inflows in the third quarter as Hong Kong residents reduced their holdings of foreign equities and non-residents purchased a large amount of local stocks in Hong Kong (Table 4.A).[21] Debt portfolio investments also showed similar inflow patterns. However, in the fourth quarter, the local investment environment was cast down by worries about weaker global growth prospects, intensified geopolitical tensions, and increased volatility in the international currency markets. Survey results from global mutual funds also pointed to equity and debt portfolio outflows in that quarter (Chart 4.3).

Table 4.A
Cross-border portfolio investment flows

(HK$ bn)	2012	2013	2014 Q1	2014 Q2	2014 Q3
By Hong Kong residents					
Equity and investment fund shares	-159.6	-179.4	-75.7	10.7	32.9
Debt securities	-151.3	-335.2	63.3	-100.3	40.3
By non-residents					
Equity and investment fund shares	224.5	67.6	-8.5	24.7	160.3
Debt securities	54.9	61.0	9.4	11.4	11.9

Note: A positive value indicates capital inflows.
Source: C&SD.

Chart 4.3
Market survey of equity and bond-related flows



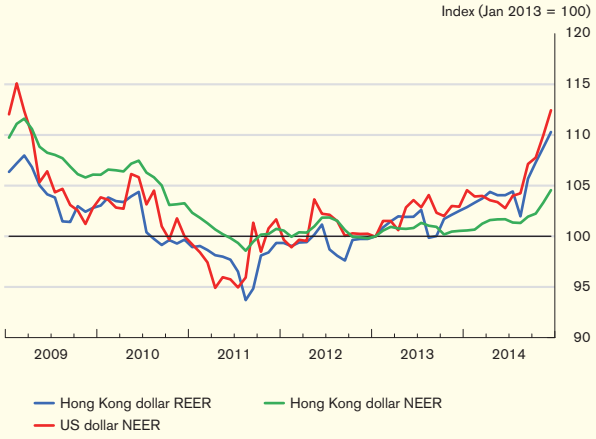
Source: EPFR Global.

With the launch of the Shanghai-Hong Kong Stock Connect in November, two-way equity portfolio flows between Mainland China and Hong Kong have increased. At this initial stage, the north-bound trade was generally larger than the south-bound trade, in part reflecting the relatively stronger global demand for Mainland China stocks. In fact, gross capital flows between Hong Kong and Mainland China have increased considerably over time amid the growing economic integration. Box 4 reviews the developments of these cross-border capital flows and discusses their implications for the Hong Kong economy.

[21] At the time of writing, the fourth-quarter BoP statistics are not yet available.

From a broader perspective, the trade-weighted Hong Kong dollar nominal effective exchange rate index (NEER), which measures the relative strength of the Hong Kong dollar against a basket of trading partner currencies, picked up by 2.8% in the second half of the year along with the strengthening of the US dollar (Chart 4.4). Given the widening of the inflation differential between Hong Kong and its trading partners, the Hong Kong dollar real effective exchange rate index (REER) rose even faster at 6.0%. The relatively high headline inflation in Hong Kong reflected mainly the phasing-out of one-off relief measures domestically and the disinflationary pressures in the major economies.

Chart 4.4
Nominal and real effective exchange rates



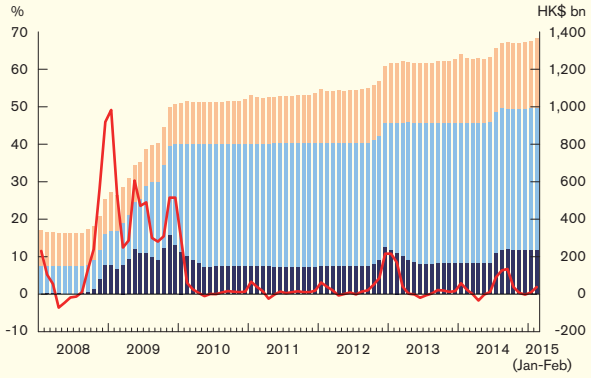
Note: Real effective exchange rate index is seasonally adjusted.
Sources: C&SD and HKMA staff estimates.

Looking forward, the still-uncertain timing and pace of US interest rate normalisation could increase the volatility in fund flows and the risk of reversals from Hong Kong. Indeed, the financial stability risks associated with the strengthening US dollar and the sharp drop in oil prices have led to turbulence in some of the more vulnerable emerging market economies in late 2014. While the Hong Kong dollar has been little affected so far, there is a risk that a sudden rise in risk-off sentiment could threaten negative spillovers to Hong Kong through various financial channels. On the other hand, the ECB's expanded asset purchase programme, together with BoJ's expanded QQE, would still render support to global risk appetite and asset prices, thereby increasing the chance of inflows into Hong Kong. The relative strength of these factors will inevitably affect the scale and volatility of fund flows in Hong Kong. As such, it is expected that the Hong Kong dollar spot exchange rate will be subject to more volatility in the short and medium terms.

4.2 Money and credit

Hong Kong's monetary and credit conditions remained accommodative in the second half of 2014 and early 2015, with ample liquidity in the banking system and interest rates staying at low levels. Money market operation was smooth and without disorderly adjustments, even at times of turbulent external environment. Market liquidity received additional boost, with further expansion in the Aggregate Balance amid the repeated triggering of the strong-side Convertibility Undertaking in July and August. As a result, having stayed flat for a year or so, the Hong Kong dollar Monetary Base jumped by 6.6% in the second half of 2014 (Chart 4.5). Other monetary base components such as Certificates of Indebtedness, notes and coins in circulation, and outstanding Exchange Fund Bills and Notes however showed little change.

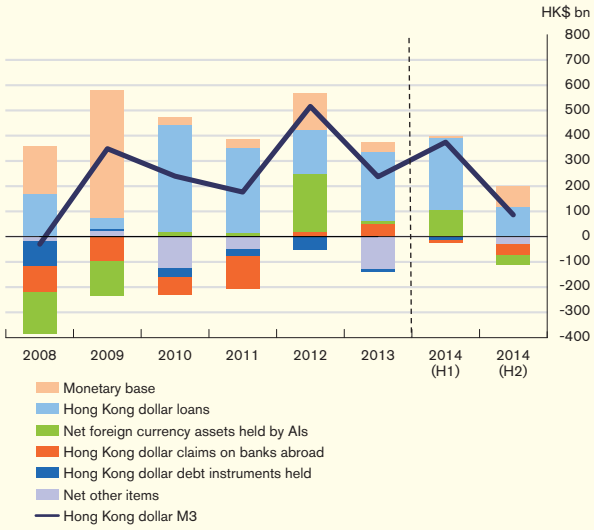
Chart 4.5
Monetary Base components



Source: HKMA.

While the Monetary Base picked up faster in the second half, monetary aggregates as a whole increased at a slower pace. Mainly dragged down by time deposits and negotiable certificates of deposit held by the non-bank sector, Hong Kong dollar broad money supply (HK$M3) only grew by an annualised 3.3% in the second half, down from 14.4% in the first half. Analysed by the asset-side counterparts, the slowdown in money growth in the second half mainly reflected the contractionary forces stemming from decelerated loan growth and a decrease in authorized institutions' (AIs') net foreign currency assets and Hong Kong dollar claims on banks abroad (Chart 4.6).

Chart 4.6
Changes in the HK$M3 and the asset-side counterparts

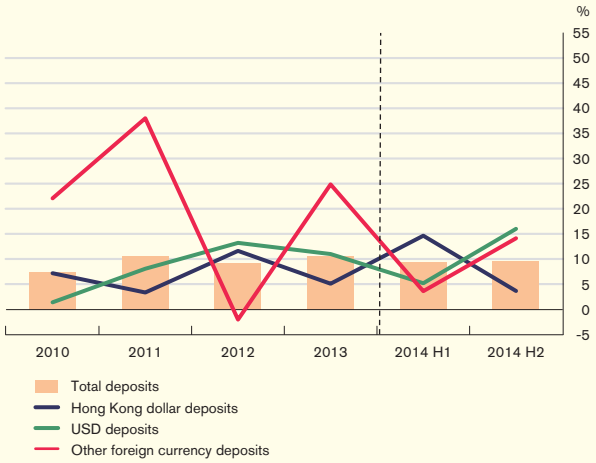


Note: The HK$M3 in the monetary survey has been adjusted to include foreign currency swap deposits and to exclude government deposits and Exchange Fund deposits with licensed banks.

Source: HKMA staff estimates.

As the main component of HK$M3, Hong Kong dollar deposits only increased at an annualised rate of 3.7% in the second half, much slower than the 14.7% growth in the preceding half year (Chart 4.7). On the other hand, growth in US dollar deposits and other foreign currency deposits accelerated to an annualised 16.0% and 14.2% respectively. In particular, renminbi deposits picked up faster by an annualised 16.8%. Overall, total deposits with the AIs rose by an annualised 9.6% in the second half, roughly the same pace as in the first half.

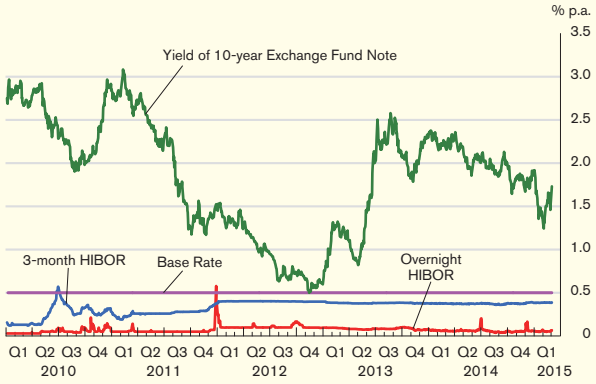
Chart 4.7
Deposit growth



Note: Growth rates in 2014 H1 and H2 are annualised.
Source: HKMA.

Largely reflecting the ample liquidity conditions, the wholesale funding costs continued to stay at low levels during the second half of 2014. The overnight and three-month HIBOR fixing rates were roughly stable at around 0.06% and 0.37% respectively and well below the Base Rate of 0.5% (Chart 4.8). There were only occasional fluctuations in the short-term interbank rates due to increased equity funding demand and banks' liquidity need ahead of the quarter-ends and holiday seasons. Broadly following the US dollar counterparts, the Hong Kong dollar yields picked up in the medium tenor but declined in the long tenor. The average yield of 10-year Exchange Fund Note decreased to 1.79% in December from 2.05% in June. Meanwhile, the composite interest rate, which reflects the average funding costs of retail banks in Hong Kong, decreased to 0.39% from 0.47%. The average lending rate for new mortgages was steadily low at around 1.95% in the second half.

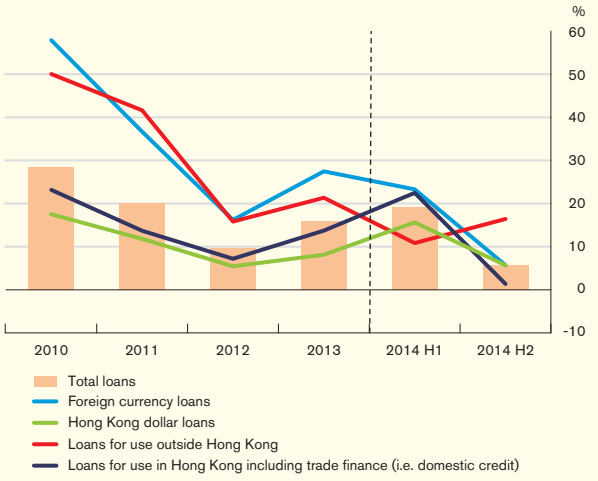
Chart 4.8
Hong Kong dollar interbank interest rates and yield of 10-year Exchange Fund Note



Sources: CEIC and HKMA.

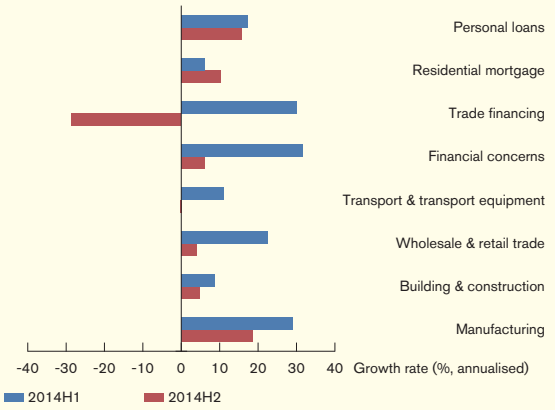
While the interest rates remained at low levels, loan growth decelerated quite noticeably, in part due to somewhat weaker credit demand and the effect of prudential measures in place. The annualised growth rate of total loans and advances slowed to 5.7% in the second half from 19.1% in the first half (Chart 4.9). Both Hong Kong dollar and foreign currency loans recorded slower increases. Analysed by territorial usage, domestic credit (including trade finance) saw a sharp deceleration in growth, to 1.4% (annualised) in the second half from 22.6% in the first half. On the other hand, growth in loans for use outside Hong Kong accelerated to 16.5% (annualised). For 2014 as a whole, total loan growth moderated to 12.7% from 16.0% in 2013.

Chart 4.9
Loan growth



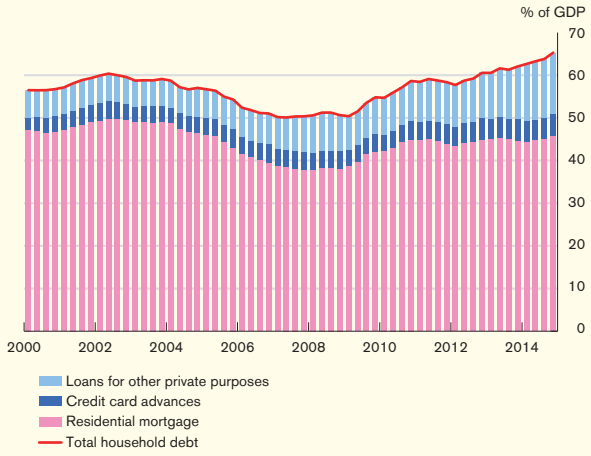
Note: Growth rates in 2014 H1and H2 are annualised.
Source: HKMA.

Chart 4.10
Loans for use in Hong Kong by sector



Source: HKMA.

Chart 4.11
Household debt-to-GDP ratio and its components

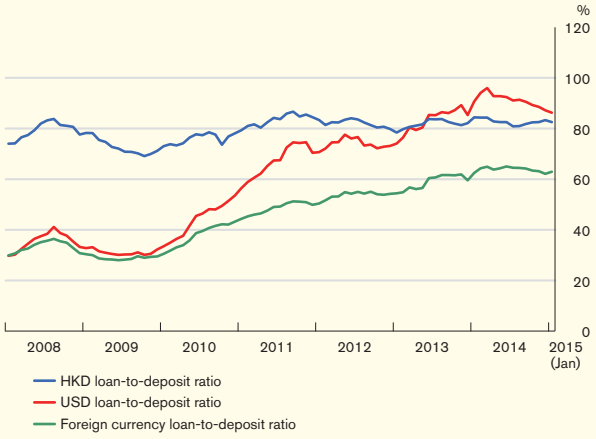


Note: Only borrowings from AIs are covered.
Source: HKMA.

Within domestic credit, trade finance dropped sharply by 28.6% (annualised) in the second half of the year, while loans to other major business sectors saw various degrees of growth moderation (Chart 4.10). In particular, loans to financial concerns and wholesale and retail trade only increased slowly after strong growth in the first half. Household debt however continued to increase quite rapidly. Growth in personal loans (which comprise credit card advances and loans for other private purposes) remained fast at an annualised 15.7% in the second half. Moreover, along with more active property transactions, growth in mortgage loans picked up to an annualised 10.3% from 6.1% in the first half. As a result, the household debt-to-GDP ratio rose to 65.3% at the end of 2014 (Chart 4.11).

Reflecting slower credit demand and partly the effect of the Stable Funding Requirement (SFR)[22], banks' funding conditions have generally improved. The Hong Kong dollar loan-to-deposit ratio remained largely steady at around 82.0% in the second half of 2014, while the US dollar loan-to-deposit ratio levelled off from 92.4% at the end of June to 87.2% at the end of December (Chart 4.12).

Chart 4.12
Loan-to-deposit ratios



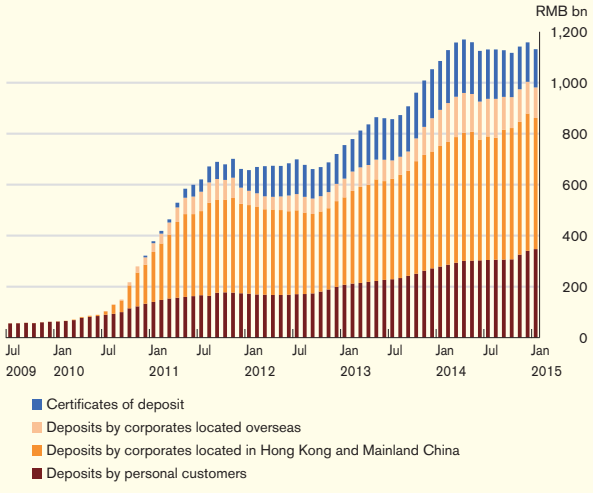
Source: HKMA.

While credit growth slowed and banks' funding conditions showed signs of improvement, there continue to be incentives for excessive borrowing as monetary conditions in Hong Kong would likely stay accommodative in the short term. However, the imminent end to the historically low interest rate environment in the US and hence Hong Kong is one of the key risk factors. When the US policy interest rate rises, monetary conditions in Hong Kong would inevitably tighten. Banks' funding pressures would increase, while the non-bank private sector could be subject to the risk of credit and liquidity squeeze.

Offshore renminbi banking business

The offshore renminbi banking business in Hong Kong maintained solid growth in the second half of 2014. The liquidity pool expanded further, with the total outstanding amount of customer deposits and certificates of deposit (CDs) rising to RMB1,158.3 billion at the end of 2014, up 3.0% (not annualised) from six months earlier and 10.0% year-on-year (Chart 4.13 and Table 4.B). Out of the total, customer deposits recorded robust growth in the second half, with personal deposits increasing visibly after the removal of the daily conversion limit of RMB20,000 for Hong Kong residents in November. Moreover, deposits by corporate customers grew steadily in the second half. However, the amount of outstanding CDs declined as major Chinese banks reduced CD issuance. Meanwhile, the outstanding amount of renminbi bank loans expanded by 34.8% (not annualised) in the second half of 2014.

Chart 4.13
Renminbi deposits and CDs in Hong Kong

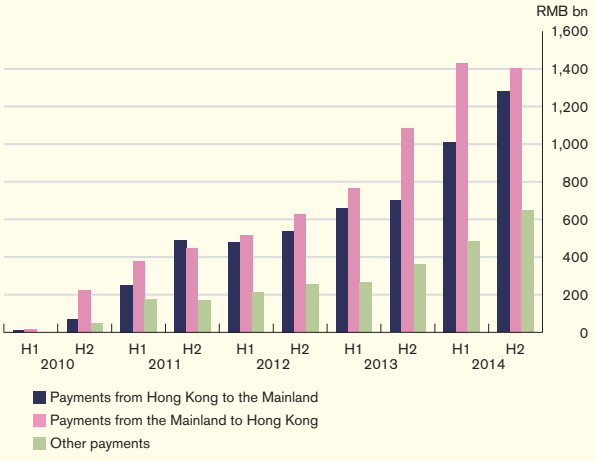


Source: HKMA.

[22] The HKMA introduced the Stable Funding Requirement (SFR) in October 2013 requiring AIs with significant loan growth to ensure adequate stable funding to support their lending business from 2014 onwards. In November 2014, the HKMA announced some refinements of the SFR, which among others, change the loan growth threshold and the frequency of review and report submission with effect from 2015.

Renminbi trade settlement maintained a strong growth momentum, with transactions handled by banks in Hong Kong totalling RMB3,332.1 billion in the second half, an increase of 13.9% (not annualised) from the first half and 55.3% from the same period a year earlier (Chart 4.14 and Table 4.B). Outward remittances to Mainland China continued to grow at a fast pace in the second half, while inward remittances to Hong Kong levelled off. Hong Kong's position as a global hub for offshore renminbi clearing and settlement has further strengthened, with the average daily turnover of renminbi real time gross settlement (RTGS) system climbing to RMB732.7 billion in 2014 from RMB395.4 billion in 2013.

Chart 4.14
Flows of renminbi trade settlement payments



Source: HKMA.

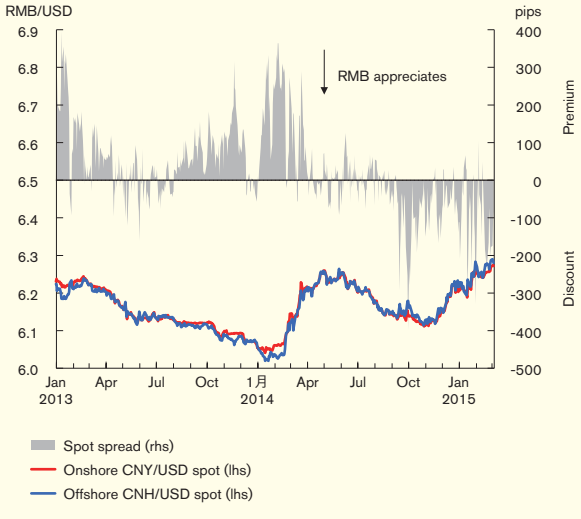
As an important milestone in Mainland China's capital account liberalisation process, the Shanghai-Hong Kong Stock Connect (SHKSC) was launched on 17 November 2014 to allow international investors to invest in the Mainland A-share market through Hong Kong, and Mainland investors to trade Hong Kong shares through Shanghai. On the same day, the renminbi daily conversion limit for Hong Kong residents was removed, making it more convenient for Hong Kong residents to participate in renminbi financial transactions.[23] The HKMA also introduced several measures to facilitate banks' management of renminbi liquidity and strengthen market infrastructure to facilitate offshore renminbi activities.[24] Overall, these initiatives are conducive to the further development of offshore renminbi business in Hong Kong and will strengthen Hong Kong's role as the premier offshore renminbi business centre.

[23] The daily conversion limit of RMB20,000 for Hong Kong residents has been removed with effect from 17 November 2014. Under the new arrangement, banks will square their positions arising from RMB conversions conducted with Hong Kong residents in the offshore market instead of the onshore market. Meanwhile, the restrictions on renminbi cashnote conversions and banks' renminbi lending to Hong Kong residents have been lifted.

[24] Starting from 10 November 2014, the HKMA offers intraday renminbi funds of up to RMB10 billion to banks participating in renminbi business in Hong Kong. The HKMA has also designated seven banks as Primary Liquidity Providers in October 2014. With access to a dedicated repo facility provided by the HKMA, the Primary Liquidity Providers pledged to expand their market-making activities in Hong Kong and use the Hong Kong platform in promoting their global offshore renminbi business.

Broadly tracking the movements of the onshore renminbi exchange rate (CNY), the Hong Kong offshore renminbi exchange rate (CNH) weakened against the US dollar in late 2014 and early 2015 amid the broad strength of the US dollar (Chart 4.15). The CNH showed slightly more volatility in daily movements than the CNY. Its spread vis-à-vis the CNY has also turned to a discount since September and once widened to over 300 pips in October 2014 and again in January 2015. Generally following the trend of the onshore interbank rates, the CNH interbank liquidity saw some signs of tightening in the second half and recent months, with the three-month CNH HIBOR rising from around 3% at the end of June 2014 to 4.21% at the end of February 2015. This was partly attributable to increased funding demand along with expansion in renminbi transactions, as well as seasonal liquidity demand around the year end and ahead of the Chinese New Year Holidays.

Chart 4.15
Onshore and offshore renminbi exchange rates



Source: Bloomberg.

Table 4.B
Offshore renminbi banking statistics

	2013	2014
Renminbi deposits & certificates of deposit (CDs) (RMB bn)	1,053.0	1,158.3
Of which:		
Renminbi deposits (RMB bn)	860.5	1,003.6
Non-Hong Kong residents' renminbi deposits (RMB bn)	19.0	30.8
Share of renminbi deposits in total deposits (%)	12.0	12.4
Renminbi certificates of deposit (CDs) (RMB bn)	192.5	154.7
Renminbi trade settlement in Hong Kong (RMB bn)	3,841.0	6,258.3
Of which:		
Inward remittances to Hong Kong (RMB bn)	1,848.9	2,837.8
Outward remittances to Mainland China (RMB bn)	1,362.9	2,289.3
Ratio of inward to outward remittances to Mainland China	1.4	1.2
Renminbi outstanding loans (RMB bn)	115.6	188.0
Number of participating banks in Hong Kong's renminbi clearing platform	216	225
Turnover in Hong Kong's RMB RTGS system (Daily average during the period; RMB bn)	395.4	732.7
Amount due to overseas banks (RMB bn)	166.0	145.2
Amount due from overseas banks (RMB bn)	164.5	193.3

Source: HKMA.

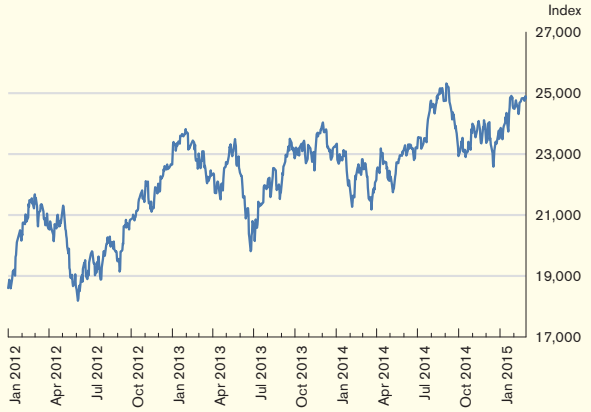
Asset markets

The local equity market has taken a roller coaster ride over the past six months amid increased uncertainties over the external environment. Reflecting this, the option-implied volatility of local equities once rose to a 16-month high before a noticeable downward trend started in late-December. The Hong Kong dollar debt market contracted slightly despite the growth in issuance, while the offshore renminbi debt market has continued its rapid expansion with increased product diversity. The residential property market turned more active with the support of the ongoing low interest rate environment and a tight demand-supply balance.

4.3 Equity market

Reflecting a volatile external and domestic environment, the equity market in Hong Kong has experienced significant swings over the past six months. Right after the last summer break, renewed concerns over the US monetary normalisation process, coupled with weaker-than-expected economic indicators of Mainland China, triggered a selloff in local equities. In September, the equity market posted the worst monthly performance in more than two years, with the Hang Seng Index (HSI) falling by 7.9% (Chart 4.16). Prices came under further pressure in early-December amid sustained weakness of oil prices that aroused concerns about an imminent global economic slowdown. Nevertheless, buoyed by encouraging US economic data and the Fed's commitment to be "patient" about raising interest rates, the local equity market, managed to pare loss by the end of 2014 and continued to gain momentum in 2015 in the wake of the ECB's quantitative easing program starting from March 2015.

Chart 4.16
Equity prices in Hong Kong

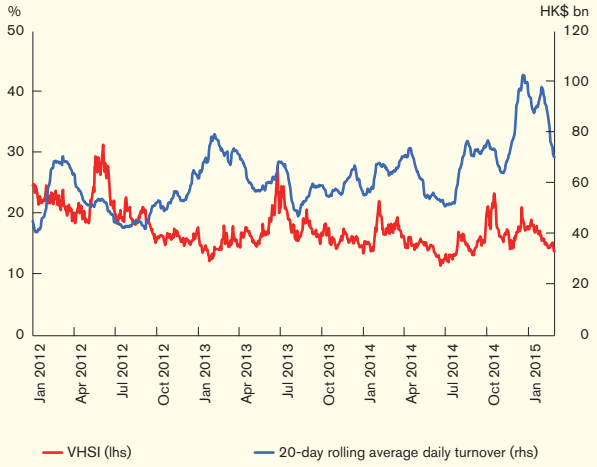


Source: Bloomberg.

Overall, the HSI increased slightly by 0.33% from September 2014 to February 2015, whereas the Hang Seng China Enterprises Index, riding the back of the monetary policy easing cycle on the Mainland, increased by 11.15%. In view of a deteriorating external environment, the option-implied volatility of the HSI (VHSI) touched its 16-month high in October and moved above the 20 mark again in mid-December (Chart 4.17).

Since then, the VHSI has been on a downward path, which is arguably attributable to the recent wave of policy easings by central banks around the world.[25] Meanwhile, trading activities in the equity market surged in the second half of 2014, with the average daily turnover of local equities standing at HK$75,137.7 million over the period.

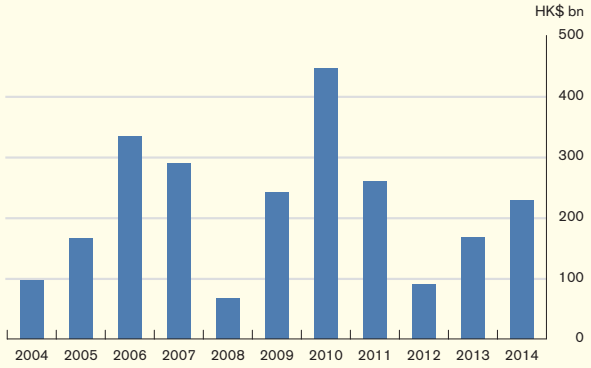
Chart 4.17
Option-implied volatility of the HSI (VHSI) and average daily turnover of the equity market



Sources: Bloomberg.

In the primary market, fund-raising activities in Hong Kong continued to see solid growth in 2014 (Chart 4.18). Despite the slowdown in the three months ended November, the IPO market recorded a strong rebound in December, helping Hong Kong secure the second place in global IPO rankings of the year. Throughout the year, funds raised from IPOs amounted to HK$227.7 billion, representing a 36.8% increase from 2013.

Chart 4.18
The IPO market in Hong Kong

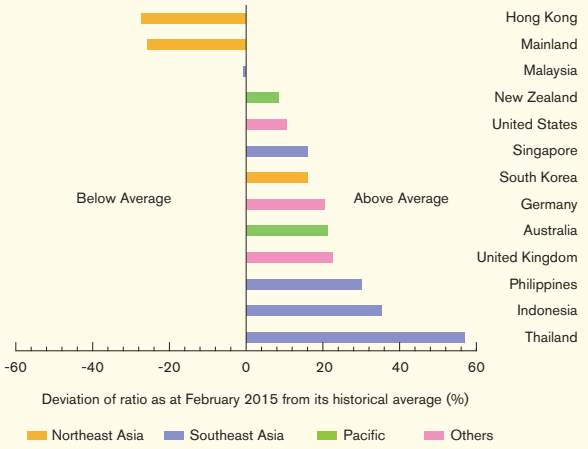


Source: CEIC.

Looking ahead, given the low valuations historically and comparatively in the region, the local market should be resilient to minor setbacks (Chart 4.19). The launch of the Shanghai-Hong Kong Stock Connect last November should benefit the local equity market in the medium term, though it may take some time for market participants to get familiar with the scheme. This important infrastructure will be key to broadening the market's investor base and deepening its integration with the Mainland. That said, trading is likely to be volatile in view of an uncertain global market outlook. In particular, risks of tightening monetary conditions from expected Fed rate hikes and concerns over a global economic slowdown will no doubt cast a shadow on local equity prices. All these suggested that the equity market is unlikely to have a smooth ride for the rest of the year.

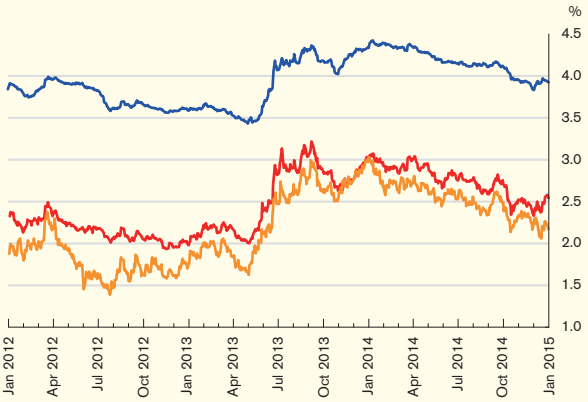
[25] Rey (2013), "Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence," Jackson Hole Economic Symposium, showed that market volatility tends to move in tandem with monetary policy shocks.

Chart 4.19
Price-earnings ratios of Asian Pacific (excluding Japan) and other major markets



Sources: Bloomberg, CEIC and HKMA staff estimates.

Chart 4.20
Average yields of Asian and Hong Kong Local Bonds and US 10-year Treasury bond yield

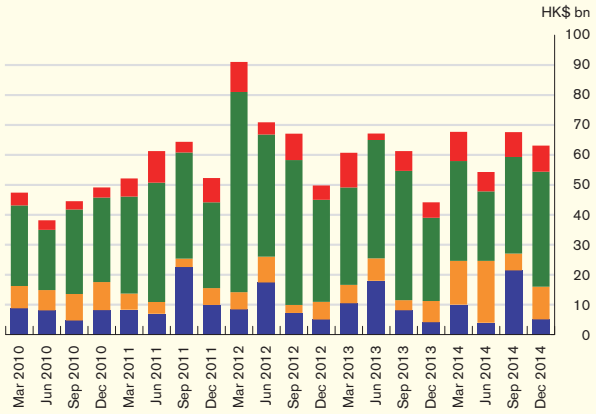


Source: Bloomberg.

4.4 Debt market

Amid heightened volatility in global financial markets, safe-haven demand and favourable inflation outlook pushed US Treasury yields lower in the second half of 2014 despite the end of the Fed's quantitative easing programme in October 2014 (Chart 4.20). Domestic bond yields fell along with those in the US, leading to an increase in primary market activities by the private sector. New debt issued by the private sector jumped by 10.0% to HK$210.9 billion in 2014 (Chart 4.21).[26&27] Meanwhile, the public sector also issued 2.5% or HK$53.6 billion more debt.[28] Overall, total issuance registered a 3.1% growth to HK$2,430.0 billion in 2014. Separately, to further promote the development of the Hong Kong dollar debt market, the HKMA introduced two measures in December 2014, namely, streamlining the tenors of Exchange Fund Notes and Government Bonds (GBs), and the introduction of a discount facility for GBs. By eliminating the overlap of the two types of bonds in longer tenors, the measures aimed at helping establish a single benchmark yield curve for the local currency debt market.

Chart 4.21
New issuance of non-Exchange Fund Bills and Notes Hong Kong dollar debt



Source: HKMA.

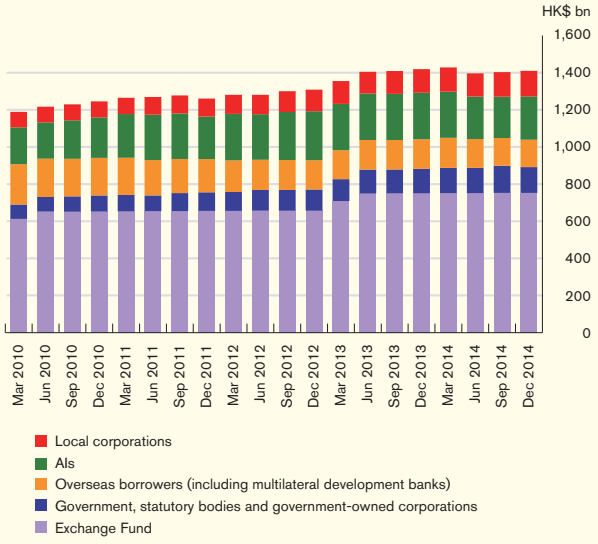
26 Private sector comprises banks, local corporations and overseas borrowers excluding multilateral development banks (MDBs).

27 In 2014, issuance by non-MDB overseas borrowers and local corporations surged by 118.5% and 30.1% year on year to HK$50.5 billion and HK$33.3 billion respectively. Banks, however, issued 11.1% less debt than 2013 at HK$127.1 billion.

28 Issuance by statutory bodies/government-owned corporations declined significantly by 9.5% year on year to HK$9.6 billion, while new debt issued by the Exchange Fund and the Government rose by 2.5% and 2.7% from the preceding year to HK$2,177.3 billion and HK$30.8 billion respectively. Of the total issuance, 89.6% was accounted for by Exchange Fund papers.

With more debt maturing than issued, the Hong Kong dollar debt market saw its outstanding balance falling year-on-year for the third consecutive quarter in the fourth quarter of 2014. At the end of the year, outstanding Hong Kong dollar debt securities stood at HK$1,409.8 billion, down by 0.7% from a year earlier (Chart 4.22). The decline was mainly driven by a reduction of 2.8% in private sector debt outstanding, which more than offset the mild increase of 1.0% in outstanding debt issued by the public sector.

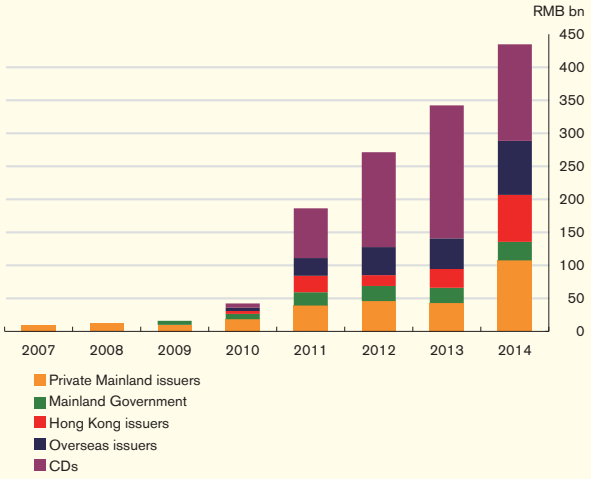
Chart 4.22
Outstanding Hong Kong dollar debt



Source: HKMA.

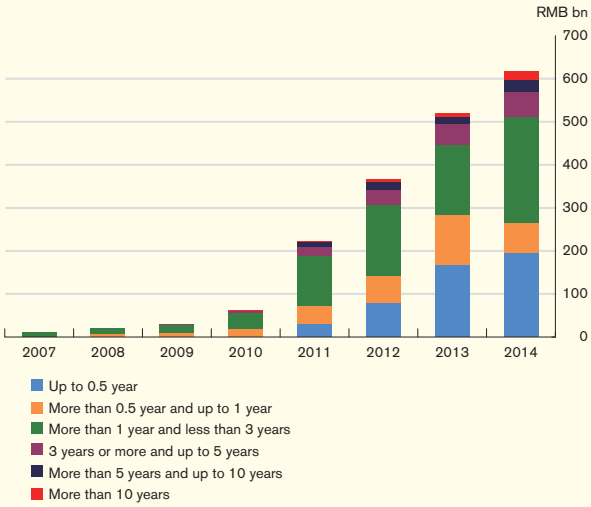
Meanwhile, issuance in the offshore renminbi debt market remained vibrant.[29] Although primary market activities slowed in the second half of 2014, total issuance of offshore renminbi debt securities registered a significant growth of 27.0% to RMB434.7 billion in 2014 (Chart 4.23). In particular, non-Certificate of Deposit (CD) debt issuance reached RMB288.5 billion, more than double the amount recorded in 2013. New debt issued by private Mainland corporations continued to grow despite a slowing economy. In 2014, non-CD debt securities issued by private Mainland issuers reached RMB107.6 billion, up considerably by 150.3%. Hong Kong issuers also contributed significantly to the rapid growth, issuing RMB42.4 billion or 148.4% more debt than in 2013. Strong issuance pushed outstanding amount of offshore renminbi debt securities 18.8% higher year-on-year to RMB618.1 billion as at end-December 2014 (Chart 4.24).

Chart 4.23
New issuance of offshore renminbi debt securities



Sources: Newswires and HKMA staff estimates.

Chart 4.24
Outstanding amount of offshore renminbi debt securities by remaining tenor



Sources: Newswires and HKMA staff estimates.

[29] Our figures include offshore renminbi debt securities that are issued in Hong Kong or without a specified country of issuance.

Apart from issuance, last year also saw increased product diversity in the offshore renminbi debt market. For instance, the United Kingdom issued its first sovereign renminbi bond, while a bank issued its first contingent convertible capital renminbi debt security, which also happened to be the largest private offshore renminbi debt issue on record.[30] These issues should help deepen the market and expand investor base.

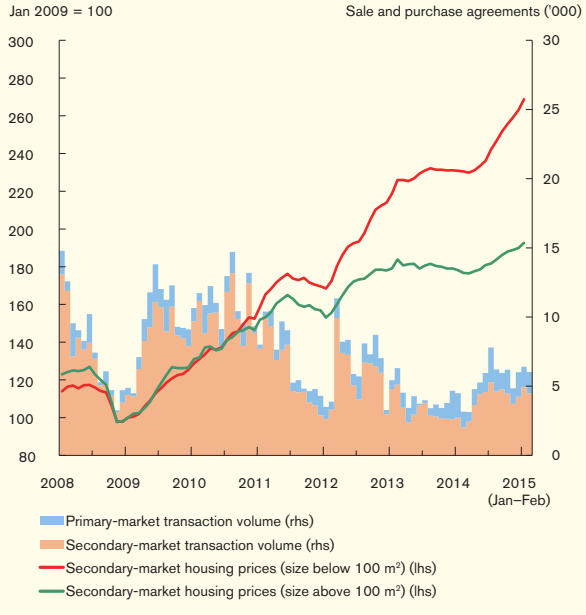
Looking ahead, the market is expected to expand steadily this year. While concerns over the weakening of the currency against the US dollar and the economic slowdown on the Mainland may continue to weigh on investor sentiment, the relatively higher yield of offshore renminbi debt securities is likely to remain attractive to investors. This, coupled with the increasing use of the renminbi in trade and financial transactions outside Mainland China and strong refinancing needs of the market, may lend support to issuance in the coming year (Chart 4.24).[31]

4.5 Property markets

Residential property market

The residential property market turned more active in the second quarter of 2014 and remained buoyant for the rest of the year with the support of the ongoing low interest rate environment and a tight demand-supply balance. For the whole of 2014, transaction volume bounced up by 25.9% to 63,807 units from a record low of 50,676 in 2013, though still lagged behind the high levels in 2010-12 (Chart 4.25). The pick-up was mainly driven by primary-market transactions, which jumped by 52.6% to a seven-year high of 16,857 units and accounted for 26.4% of total transactions, up from 21.8% in 2013. Secondary-market transactions increased by 18.5% from 2013 but remained 31.3% below the level in 2012. On the other hand, with the Government's demand-management measures still in place (in the form of higher stamp duties), speculative and investment activity such as confirmor transactions, short-term flipping trades and company holdings remained weak (Chart 4.26).

Chart 4.25
Residential property prices and transaction volume

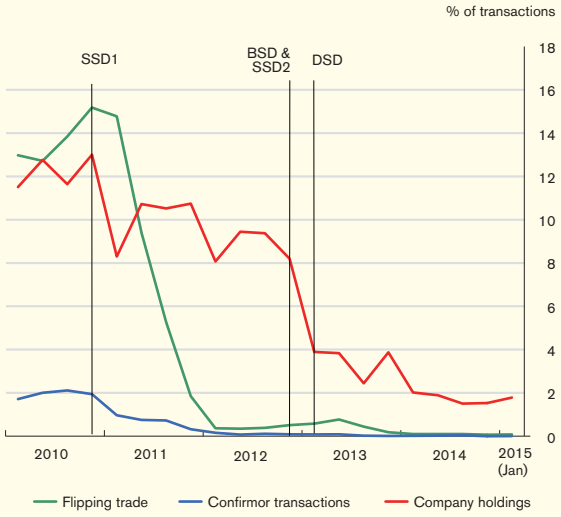


Sources: Rating and Valuation Department (R&VD) and Land Registry.

[30] The bank issue was also the first offshore renminbi debt security qualified as Additional Tier 1 capital under the Basel III framework.

[31] The renminbi has become the fifth most used payment currency in December 2014 according to the Society for Worldwide Interbank Financial Telecommunication (SWIFT).

Chart 4.26
Confirmor transactions, flipping trade and company purchasers



Note: SSD1 and SSD2 refer to Special Stamp Duties introduced in November 2010 and October 2012, respectively; BSD refers to Buyer Stamp Duty introduced in October 2012; DSD refers to doubling of the ad valorem stamp duty introduced in February 2013.

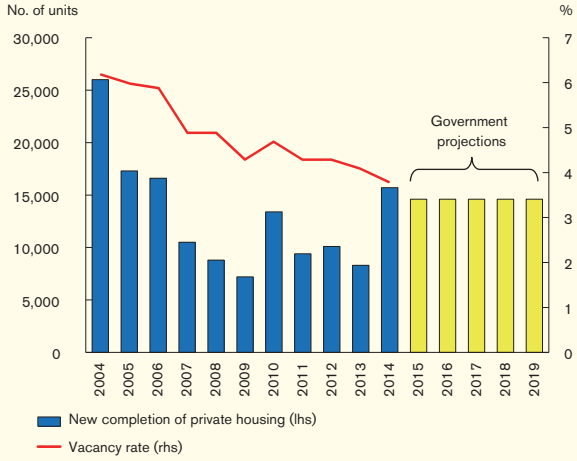
Source: Centaline Property Agency Limited.

Meanwhile, after holding flat for about a year, housing prices have picked up visibly since the second quarter of 2014. This brought the full-year price increase to 13.5%, compared with 7.7% in 2013. The resurgence was most notable in the segment of small and medium-sized flats (with saleable area of less than 100 m^2), while prices of large flats (with saleable area of at least 100 m^2) saw slower increase. Anecdotal information shows that the price premium of new flats over second-hand flats has widened slightly. In early 2015, housing prices continued to rise at a fast pace as indicated by the Centa-City Leading Index, while transactions remained firm before easing in February in part due to seasonal distortions of the Chinese New Year holidays.

In the leasing market, housing rentals rose faster at 6.1% in 2014, compared with 3.4% in 2013. But given a much faster increase in housing prices, the average rental yield edged down to a record low of 2.7% in December, and its spread with the 10-year Government Bond yield declined to a recent low, suggesting strong risk appetite for residential properties.

Overall, the balance of housing demand and supply remained tight, with the vacancy rate falling to 3.8% at the end of 2014, compared with the long-term average of 5.1% over 1994-2013 (Chart 4.27). The increase in new completion of private housing, by almost 90% to 15,700 units in 2014, was from a low base and still below the pace of household formation. For the five years from 2015 to 2019, the Government projects new completion at an average of 14,600 units per year.

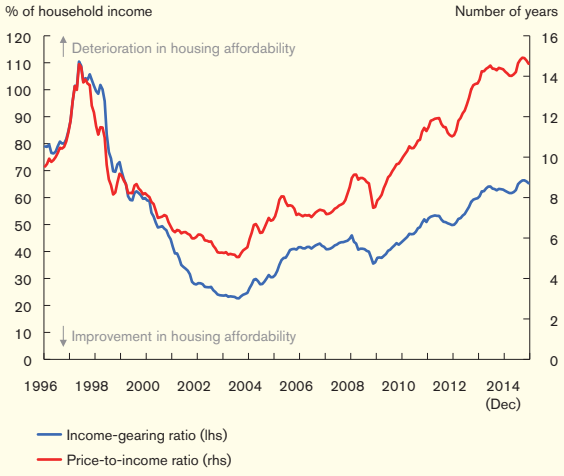
Chart 4.27
Private flat completion



Sources: R&VD, Transport and Housing Bureau, and the 2015 Policy Address by the Chief Executive of the Hong Kong SAR Government.

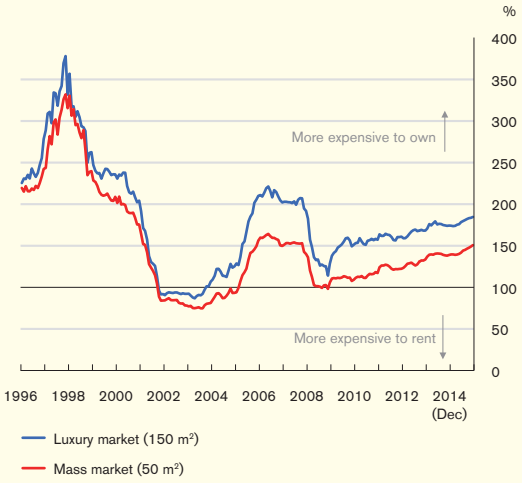
Given the latest market developments, housing affordability has become a lot more stretched relative to household income and the risk of overheating has increased. The housing price-to-income ratio rose to a record high of 14.8 in the fourth quarter of 2014 compared with the 1997 peak of 14.6, while the income-gearing ratio climbed higher to 65.9%, a level well above the long-term average of 50% (Chart 4.28).[32] Moreover, the income gearing ratio is highly sensitive to the interest rate level. If the interest rate returned to a more normal level, say rising by 300 basis points, the income gearing ratio would have soared to 86.0%. As a measure of the relative cost of owning than renting a flat, the buy-rent gap widened further (Chart 4.29).[33]

Chart 4.28
Indicators of housing affordability



Sources: R&VD, C&SD and HKMA staff estimates.

Chart 4.29
Buy-rent gap



Note: This indicator is calculated as the ratio of the cost of purchasing and maintaining a 50 m² flat with that of renting it.

Sources: R&VD, C&SD and HKMA staff estimates.

Following the past six rounds of prudential tightening, the average loan-to-value (LTV) ratio for new mortgage loans has declined to around 55% and the debt servicing ratio (DSR) to 35%. In view of the renewed signs of overheating in the property market, coupled with the increasing household indebtedness, the HKMA introduced a new round of prudential measures in late February 2015, including lowering the LTV ratio cap, the maximum DSR and the stressed DSR limit for residential mortgages.[34] These measures aim to strengthen the risk management of banks in relation to their mortgage lending business and to enhance borrowers' ability to cope with the impact in the event of a property market downturn. At the same time, banks using the Internal Ratings-Based (IRB) approach are required to apply a 15% risk-weight floor to their entire residential mortgage portfolios before the

[32] The price-to-income ratio measures the average price of a typical 50 m² flat relative to the median income of households living in private housing. Alternately, the income-gearing ratio compares the amount of mortgage payment for a typical 50 m² flat (under a 20-year mortgage scheme with a 70% loan-to-value ratio) to the median income of households living in private housing. The income-gearing ratio is not the same as a borrower's actual debt-servicing ratio, which is subject to a cap by the HKMA prudential measures.

[33] The buy-rent gap estimates the cost of owner-occupied housing (under a 20-year mortgage scheme with a 70% loan-to-value ratio) relative to rentals.

[34] The maximum LTV ratio for self-use residential properties with value below HK$7 million is lowered by a maximum of 10 percentage points. Also, the maximum DSR for mortgage loans to borrowers who acquire their second residential property for self-use is reduced to 40% from 50%. At the same time, the stressed-DSR cap is lowered correspondingly to 50% from 60%. Furthermore, for mortgage loans of all types of non-self-use properties, the maximum DSR is lowered to 40% from 50%, and the stressed-DSR cap to 50% from 60%.

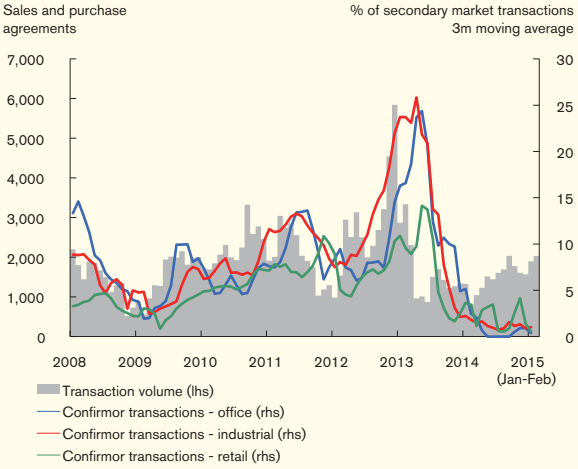
end of June 2016.[35] In early March, the HKMA further tightened the DSR caps for mortgages that require co-financing or mortgage insurance schemes and put banks under more stringent supervisory requirements if they lend to money lenders that engage in the business of mortgage finance.[36]

The outlook for the residential property market will depend on a host of factors including interest rate movements, housing supply conditions, and the global and domestic growth prospects. In particular, when the Fed starts raising the policy interest rate, monetary conditions in Hong Kong would inevitably tighten and this would dampen housing demand and put housing prices under pressure. The overall effect would also hinge on the pace and timing of the rate hikes and the associated financial market responses, which remain highly uncertain. In any case, along with the rise in interest rates, debt repayment and servicing burden would increase (e.g. by an estimated 30.5% for a 20-year mortgage under the assumption of a 300-basis-point rate hike). It should also be noted that rate hikes will not be one-off but in multiple rounds in the coming cycle.

Commercial and industrial property markets

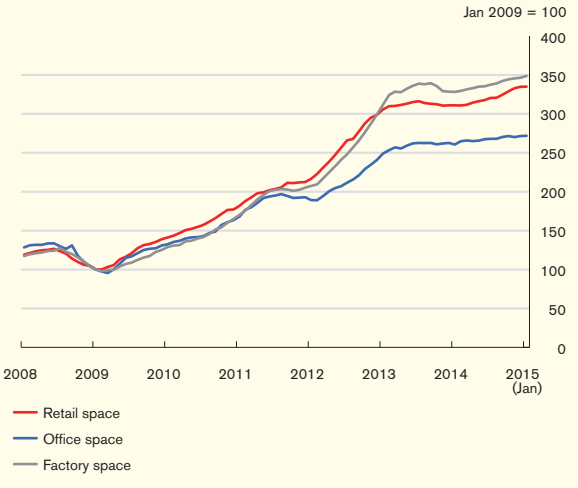
Sentiments in the commercial and industrial property markets also improved gradually. Transaction volume picked up from the lows in the first quarter to an 18-month high in September and stayed firm recently. But given the weak start, transaction volume was still 10.8% lower than in 2013 and remained at relatively low levels by historical standards (Chart 4.30). Speculative activity remained broadly muted, except that confirmor transactions of retail space picked up modestly in recent months (Chart 4.30). Sale prices of office space recorded moderate gains of 3.4% for 2014 as a whole, while sale prices of flatted factories and retail space rose by a faster 5.4% and 7.7% respectively (Chart 4.31). Rentals increased roughly at the same pace as sale prices, and rental yields stayed steadily low at 2.4-2.9%. Looking ahead, the major headwinds for the commercial and industrial property market are interest rate hikes and softening of rental earnings that could bring down capital values.

Chart 4.30
Transactions in non-residential properties



Sources: Land Registry and Centaline Property Agency Limited.

Chart 4.31
Non-residential property price indices



Source: R&VD.

[35] The 15% risk-weight floor was only applicable to new residential mortgage loans, not the entire residential mortgage portfolios as required under the new arrangement. In the interim, banks need to achieve a 10% risk-weight floor to their entire residential mortgage portfolios by the end of June 2015.

[36] When mortgage applicants seek additional financing that results in total mortgage finance amounting to more than 20% over the normal permissible LTV ceilings, there requires a 5-percentage-point knock down on the applicable DSR caps.

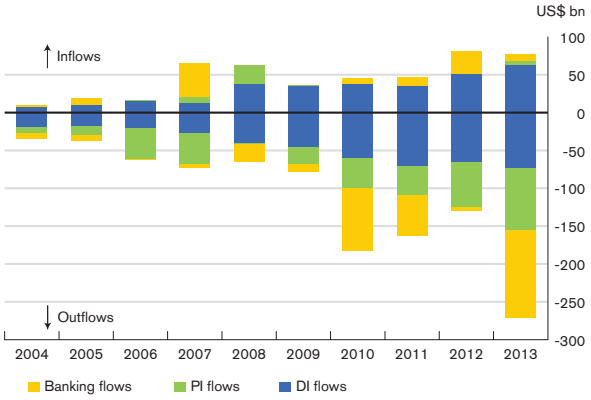
Box 4
Bilateral capital flows with Mainland China: Implications for Hong Kong's real economy

Amid the growing economic integration with Mainland China, Hong Kong's bilateral capital flows with Mainland China have increased at a phenomenal rate, whether in terms of direct investment, portfolio investment or banking flows. This Box studies the recent developments of these different types of bilateral flows with Mainland China and analyses how these flows can affect Hong Kong's real economic activities. Apart from bilateral capital flows, this Box also explains how investment flows intermediated by Hong Kong between Mainland China and the rest of the world translate into real economic activities in Hong Kong.

The trends and nature of bilateral capital flows with Mainland China

While a full set of bilateral capital flows data between Hong Kong and Mainland China under the Balance of Payments (BoP) framework is not available from official sources, some of the major components and sub-components under direct investment (DI), portfolio investment (PI) and banking flows are available or can be estimated by statistical methods. Our estimates of the bilateral capital flows statistics for the period from 2004 to 2013 are presented in Charts B4.1 to B4.4. In line with common perception, gross capital flows between Hong Kong and Mainland China have increased significantly (Chart B4.1). Analysed by various types of capital flows, DI used to be the only major driver behind the overall bilateral flows, but PI and banking flows have increasingly taken shape along with Mainland China's capital account liberalisation process. Nevertheless, capital outflows from Hong Kong to Mainland China remain generally larger than inflows from the other way round.

Chart B4.1
Selected bilateral capital flows between Hong Kong and Mainland China



Notes: Rough and incomplete estimates based on DI, PI and selected banking flows. A positive value indicates an inflow to Hong Kong (an increase in Hong Kong residents' external financial liabilities or a decrease in Hong Kong residents' external financial assets) while a negative value indicates an outflow to Mainland China (an increase in Hong Kong residents' external financial assets or a decrease in Hong Kong residents' external financial liabilities).

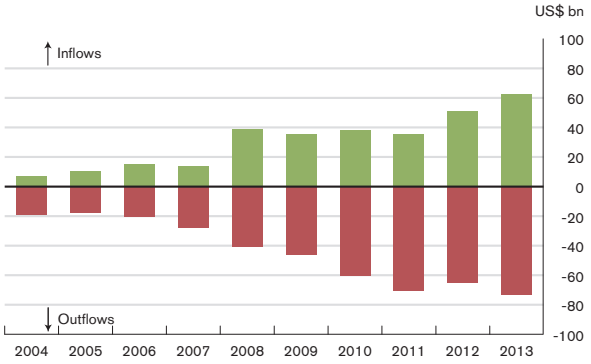
Source: HKMA staff estimates.

a) DI flows

In the past decade, gross DI inflows from Mainland China to Hong Kong expanded from about US$7 billion to over US$60 billion (Chart B4.2).[37] These DI activities involved setting up of new businesses and acquisitions, in sectors such as leasing and commercial services, wholesale and retail trade, and banking and insurance. Gross DI outflows from Hong Kong to Mainland China were even larger, rising from about US$20 billion to over US$70 billion. These DI outflows were mainly in the form of industrial investment to develop processing trade business but have been geared more towards Mainland China's domestic market over the past decade, with the bulk of DI outflows now channelling to information and communication, investment and holding, real estate and professional and business services.

[37] DI inflows are based on Mainland China data published by the Ministry of Commerce.

Chart B4.2
Bilateral DI flows between Hong Kong and Mainland China



Note: * A positive value indicates an inflow to Hong Kong while a negative value indicates an outflow to Mainland China.
Source: The Ministry of Commerce.

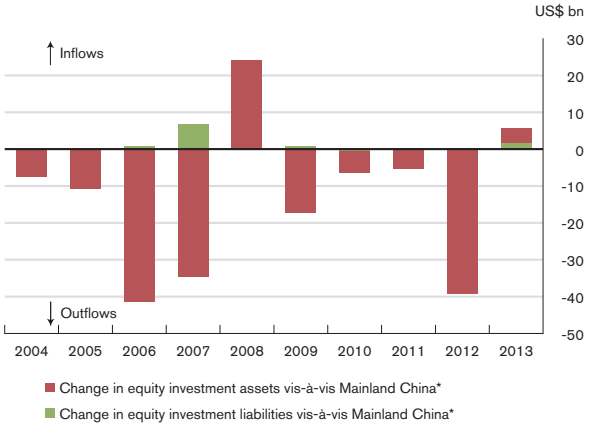
b) PI flows

Gross PI inflows from Mainland China to Hong Kong remained relatively small (Chart B4.3).[38] Among the total, it is estimated that equity PI inflows into Hong Kong were first recorded in 2006 and averaged only less than US$4 billion a year in the period to 2013. The main investment channels are through the Qualified Domestic Institutional Investor (QDII) scheme and more recently the Shanghai-Hong Kong Stock Connect (SHKSC), but they are all subject to quotas. Debt PI inflows were also small at less than US$2 billion a year, according to our estimates based on the QDII data.

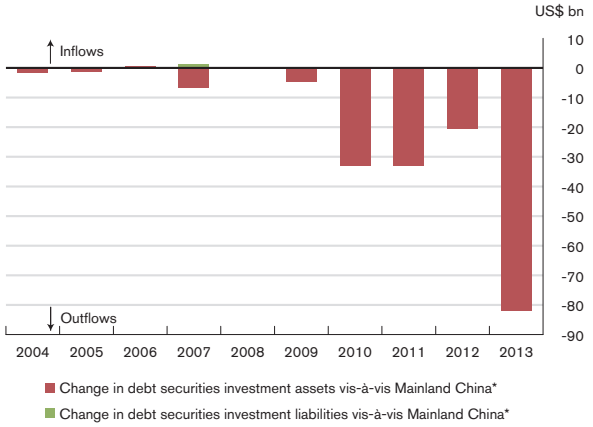
On the other hand, PI outflows have broadly increased on the back of vibrant Mainland-related equity fundraising and debt issuance activities. Equity PI outflows averaged about US$13 billion a year in 2004-13. Nowadays, such outflows include Hong Kong residents' investment through the Qualified Foreign Institutional Investor (QFII) scheme, RMB QFII scheme and the SHKSC. The subscriptions for H-share IPO by local residents are also treated as equity PI outflows because they involve transactions between residents and non-residents. Debt PI outflows were negligible in the past but have risen to over US$20 billion a year since 2010, due partly to the increased issuance of dim sum bonds in Hong Kong and the launch of a pilot scheme for eligible local institutions to invest in the Mainland's interbank bond market.

Chart B4.3
Bilateral PI flows between Hong Kong and Mainland China

a) PI: Equity investment



b) PI: Debt securities investment



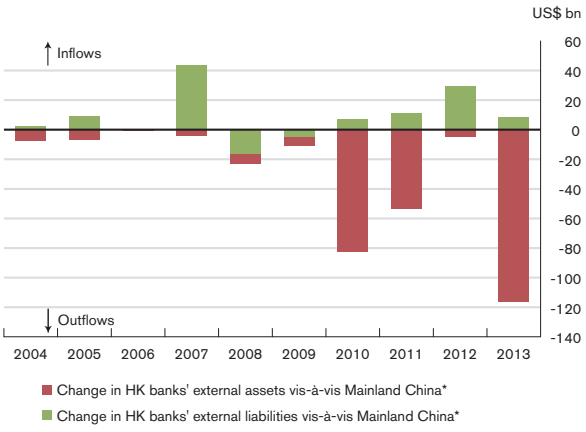
Note: * A positive value indicates an inflow to Hong Kong while a negative value indicates an outflow to Mainland China.
Source: HKMA staff estimates.

[38] PI outflows are estimated using Hong Kong PI stock data from the IMF's Coordinated Portfolio Investment Survey while inflows are mainly from QDII data by applying a proportion for Hong Kong drawn from Yao and Wang (2012) "What are the Challenges and Problems Facing China's Outward Portfolio Investment: Evidence from the Qualified Domestic Institutional Investor Scheme." HKIMR Working Paper No. 31/2012.

c) *Banking flows*

Gross banking inflows from Mainland China to Hong Kong have been fairly volatile, averaging around US$9 billion a year in 2004-13 possibly driven by Mainland customers' deposits in Hong Kong and Mainland banks' lending to local banks (Chart B4.4). In contrast, with the rise of local banks' Mainland-related lending, gross banking outflows from Hong Kong to Mainland China have expanded markedly from an average of around US$5 billion a year in 2004-09 to over US$60 billion in recent years.[39]

Chart B4.4
Bilateral banking flows between Hong Kong and Mainland China



Notes: * A positive value indicates an inflow to Hong Kong while a negative value indicates an outflow to Mainland China. See also footnote 39.

Source: HKMA staff estimates.

How do bilateral capital flows translate into Hong Kong's real economic activities?

Hong Kong's bilateral capital flows with Mainland China are underpinning local real economic activities in a number of ways. While the effect of DI flows is rather straight forward (mainly in terms of new business start-ups, job creation and capital investment), the way in which PI flows and banking flows interact with economic activities is a lot more complicated. In the following section, we focus on how these bilateral flows translate into local real activities through the channels of trade in financial services and external income flows as captured in the Gross National Income (GNI) statistics.

a) *Trade in financial services*

Hong Kong's bilateral capital flows with Mainland China, which are transactions in financial assets and liabilities between Hong Kong residents and Mainland residents, involve the provision and purchase of financial services by Hong Kong and are recorded as exports and imports of financial services respectively.

Broadly speaking, PI inflows are associated with exports of financial services while PI outflows are associated with imports of financial services. The financial services provided include brokerage services, fund management services and other financial intermediation services incurred in the transactions. For instance, when Mainland residents invest in equities, bonds and investment funds in Hong Kong's capital markets, the earnings of local brokers and intermediaries are recorded as Hong Kong's exports of financial services. On the opposite side, when Hong Kong residents invest in the Mainland capital markets, the earnings of Mainland brokers and intermediaries from the PI outflows are treated as imports of financial services.

However, it is worth noting that a large part of PI outflows are related to Hong Kong residents buying H-shares and dim sum bonds being offered locally in Hong Kong, which also generate exports of financial services from Hong Kong. Well before these PI outflows would occur, there are H-share listing, placements and debt issuances by Mainland entities, which would create underwriting and corporate finance

[39] Specific details in Hong Kong banks' external claims and liabilities vis-à-vis Mainland China are used as proxy for banking flows. Still, due to data limitation, some banking flows such as Mainland banks' lending to Hong Kong non-banks are excluded.

business for local banks and financial companies, with earnings from these activities contributing to exports of financial services from Hong Kong.

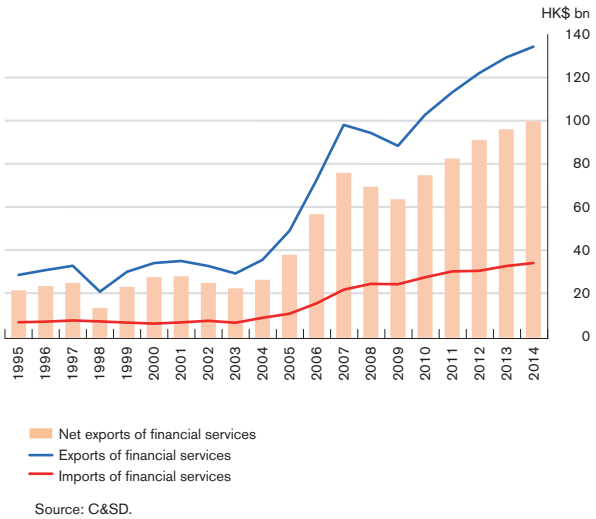
More importantly, transactions between Mainland entities and other non-residents through Hong Kong can also create value-added to GDP as Hong Kong's services earnings, given the unique Mainland China dimension in Hong Kong's capital markets. However, these capital flows are not reported under the BoP framework. In the equity market, for example, Mainland-related enterprises account for more than 50% of Hong Kong's total stock market capitalisation, and overseas investors (mainly from the US, the UK and Continental Europe) made up 46% of total market turnover in 2013, according to the Cash Market Transaction Survey conducted by the Hong Kong Exchanges and Clearing Limited (HKEx). Increased equity and debt security investment by these overseas investors has also contributed to a sharp increase in Hong Kong's exports of financial services.

The SHKSC pilot scheme, which allows both Hong Kong and overseas investors to trade selected Shanghai-listed stocks in Hong Kong, provides another good example of how PI flows can support Hong Kong's financial services exports. Obviously, southbound trade by Mainland residents can generate brokerage fees and levies earned by Hong Kong as exports of financial services. Moreover, while northbound trade by Hong Kong residents causes import leakages, brokerage services provided in Hong Kong to facilitate overseas investors' northbound trade are additional boosts to Hong Kong's financial services exports. As such, while the gross turnover of northbound trade is generally larger than southbound trade, import leakages from Hong Kong will be offset by financial services exports due from Mainland and overseas investors.

With regard to banking flows, their contribution to the Hong Kong economy's value-added comes in the form of banks' earnings from providing financial intermediation services, particularly through interest margins for loans provided to Mainland entities. Interestingly, such loans are recorded as banking outflows but they contributed to Hong Kong's financial services exports. In fact, recent years saw a notable increase in Hong Kong banks' loan outflows arising from Mainland-related lending.

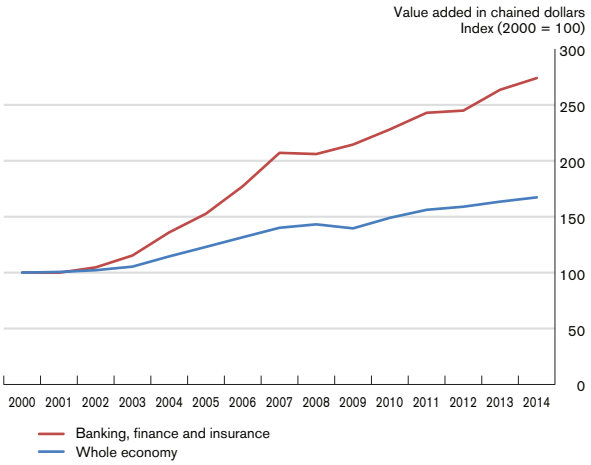
Overall, these developments are reflected in the rising trend of Hong Kong's net exports of financial services and the increasing contribution of the banking, finance and insurance sector to Hong Kong's GDP over the past decade as Mainland China took important steps in capital account liberalisation (Chart B4.5 and Chart B4.6).

Chart B4.5
Hong Kong's exports and imports of financial services



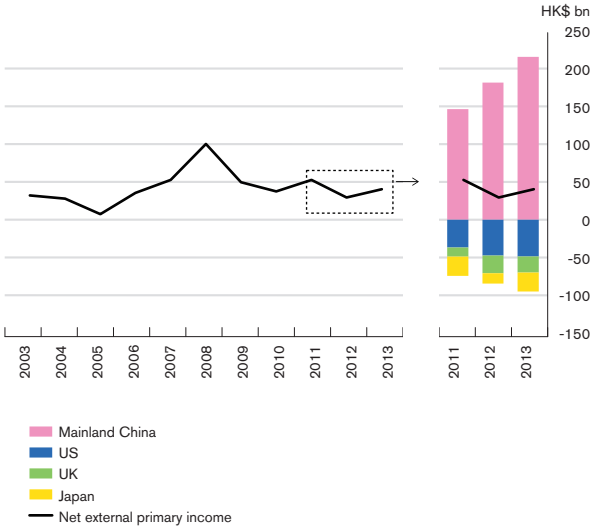
Source: C&SD.

Chart B4.6
Value added of the banking, finance and insurance sector vs. total value added in Hong Kong



Source: C&SD.

Chart B4.7
Hong Kong's external primary income flows



Sources: C&SD and CEIC.

b) External income flows

While capital outflows in general lead to import leakages, they also generate sizable external primary income flows (EPIFs) from abroad for Hong Kong. These are captured in the GNI statistics, yet not in the GDP. Usually, gross capital outflows are associated with external income inflows such as operating profits, dividend payments and interest earnings, while capital inflows are associated with external income outflows. On a net basis, Hong Kong has earned positive EPIFs for more than a decade, which amounted to HK$40.5 billion or 1.9% of GDP in 2013 (Chart B4.7). Income inflows from Mainland China, which totalled HK$215.9 billion (10.1% of GDP) in 2013, actually provided the main support. This is in sharp contrast to the net income outflows vis-à-vis other major economies such as the US, UK and Japan. Moreover, some 70% of the income flows from Mainland China were related to DI, and the remainder was possibly contributed by PI and banking income. In sum, gross capital outflows to Mainland China in the form of DI, PI and banking flows have yielded considerable income inflows for Hong Kong.

Concluding remarks

Our analysis shows that Hong Kong can benefit from increasing capital outflows with Mainland China, rather than just inflows. In particular, despite recent market concerns about investments being diverted to Mainland China, large gross PI and banking outflows can still enhance Hong Kong's GDP and external incomes. This is in part because Hong Kong has a unique Mainland China dimension, in such a way that real economic activities associated with the outflows are generated locally (e.g. the H-share market). Moreover, as a financial intermediary, Hong Kong can gain by serving outflows to the Mainland that are underpinned by overseas demand.

5. Banking sector performance

Despite a less sanguine external environment, the Hong Kong banking sector remained healthy, characterised by a broadly steady level of earnings, favourable liquidity conditions, sound asset quality and strong capital positions. Looking forward, uncertainties in the timing and pace of interest rate rises in the US could pose significant challenges for banks in managing their funding and liquidity risks. Banks should also continue to be attentive to risks associated with the upward trends of corporate leverage and household debt-servicing burdens, as well as the implications of slower economic growth in Mainland China for their increasing Mainland-related lending. As such, banks should continue to maintain stringent prudential management of their credit exposures.

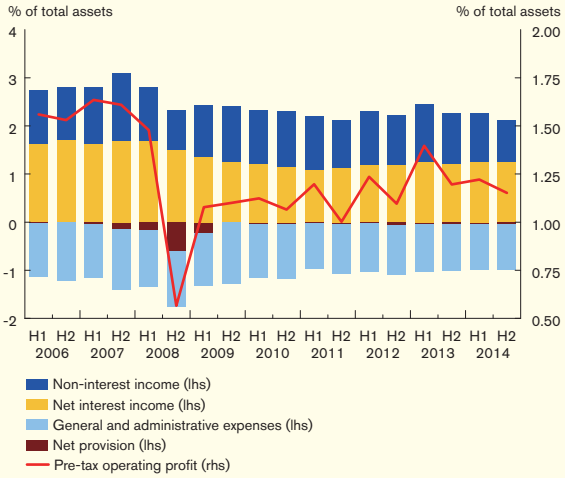
5.1 Profitability and capitalisation

Profitability

Despite a less sanguine external environment, retail banks[40] sustained a broadly steady level of earnings in the second half of 2014, with pre-tax operating profits edging down 0.5% from the first half of 2014. The slight decline in profitability was mainly due to a lower non-interest income, which more than offset an increase in net interest income. Reflecting this, the return on assets of retail banks dropped slightly to 1.15% in the second half of 2014 from 1.22% in the first half (Chart 5.1).

For 2014 as a whole, the aggregate pre-tax operating profits of retail banks registered a moderate increase of 3.6%. The average return on assets, however, dropped to 1.19% from 1.29% in 2013 due to a faster increase in assets. Nonetheless, the performance in 2014 remained better than the average observed after the global financial crisis.

Chart 5.1
Profitability of retail banks

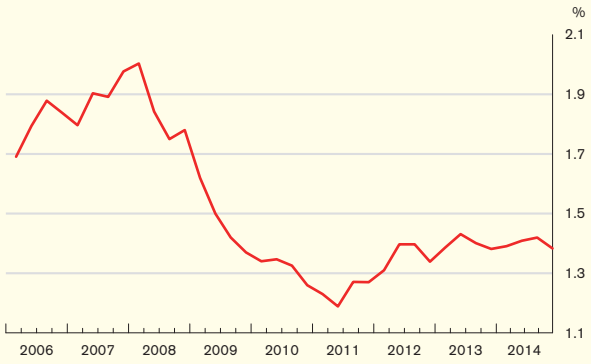


Note: Semi-annually annualised figures.
Source: HKMA.

[40] Throughout this chapter, figures for the banking sector relate to Hong Kong offices only, except where otherwise stated.

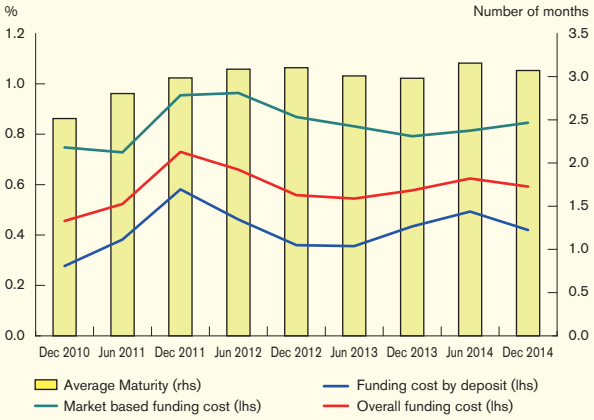
The net interest margin of retail banks remained largely stable, averaging 1.4% in the second half of 2014 (Chart 5.2). For licensed banks as a whole, their overall interest costs registered a mild decrease of 3 basis points in the second half of 2014, driven by a fall in deposit funding cost which outpaced an increase in market-based funding cost (Chart 5.3).[41] Similarly, the composite interest rate, a measure of the average cost of Hong Kong dollar funds for retail banks, declined to 0.39% at the end of 2014 from a recent high of 0.47% at the end of June (Chart 5.4).

Chart 5.2
Net interest margin of retail banks



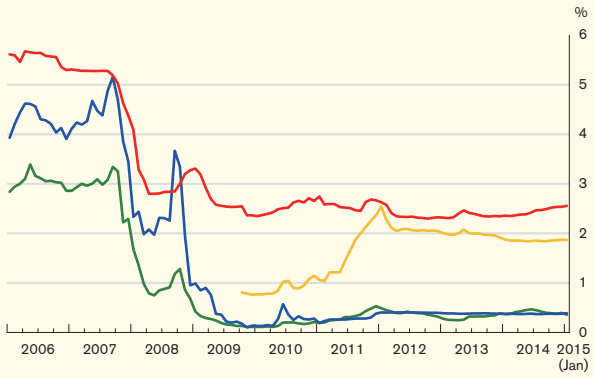
Note: Quarterly annualised figures.
Source: HKMA.

Chart 5.3
Hong Kong and US dollar funding cost and maturity of licensed banks



Source: HKMA.

Chart 5.4
Interest rates



Notes:
(a) End of period figures.
(b) Period-average figures for approved loans. All mortgage rates are estimates only.
Sources: HKMA and staff estimates.

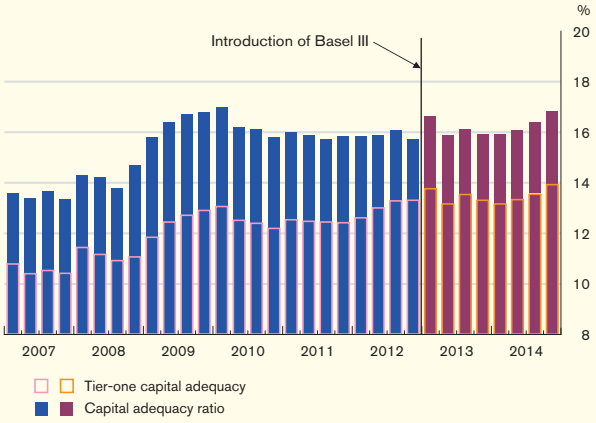
During the second half of 2014, both the HIBOR-based and the best lending rate-based (BLR-based) mortgage rates increased slightly, with the latter rising by a larger extent. Partly in response to the widening gap between the two mortgage rates, the share of HIBOR-based mortgages amongst newly approved mortgage loans increased further to 84.5% at the end of 2014 from 76.7% at the end of June.

[41] Market-based funding cost is measured by the interest costs of banks' non-deposit interest bearing liabilities.

Capitalisation

Capitalisation of the banking sector remained well above the minimum international standards. The consolidated capital adequacy ratio of locally incorporated AIs increased slightly to 16.8% at the end of December 2014 from 16.1% at the end of June (Chart 5.5), with the tier-one capital adequacy ratio (the ratio of tier-one capital to total risk-weighted assets) increasing to 13.9% from 13.3%.

Chart 5.5
Capitalisation of locally incorporated AIs



Notes:
1. Consolidated positions.
2. With effect from 1 January 2013, a revised capital adequacy framework (Basel III) was introduced for locally incorporated AIs. The capital adequacy ratios from March 2013 onwards are therefore not directly comparable with those up to December 2012.

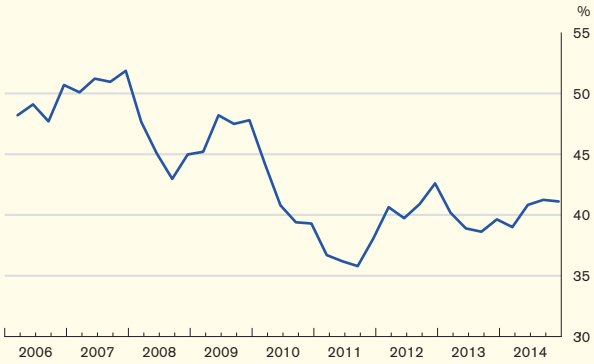
Source: HKMA.

5.2 *Liquidity, interest rate and credit risks*

Liquidity and funding

The liquidity position of the banking sector remained favourable, with the average liquidity ratio[42] of retail banks improving to 41.1% in the fourth quarter of 2014, from 40.8% in the second quarter (Chart 5.6), remaining well above the regulatory minimum of 25%.

Chart 5.6
Liquidity ratio of retail banks

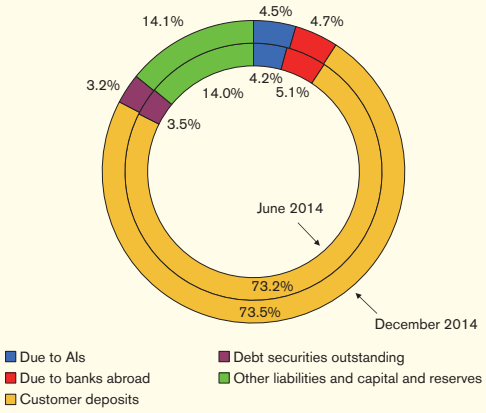


Note: Quarterly average figures.
Source: HKMA.

Customer deposits continued to be the primary funding source for retail banks, underpinning a stable funding structure. The share of customer deposits to banks' total liabilities was 73.5% at the end 2014, slightly higher than 73.2% at the end of June 2014 (Chart 5.7).

[42] This is calculated as the ratio of liquefiable assets (e.g. marketable debt securities and loans repayable within one month subject to their respective liquidity conversion factors) to qualifying liabilities (basically all liabilities due within one month).

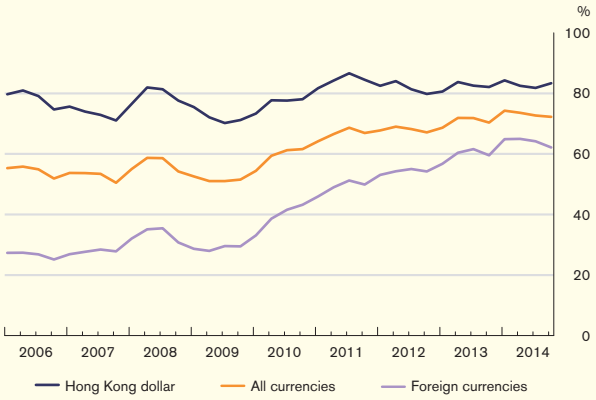
Chart 5.7
Liabilities structure of retail banks



Notes:
1. Figures may not add up to total due to rounding.
2. Figures refer to the percentage of total liabilities (including capital and reserves).
3. Debt securities comprise negotiable certificates of deposit and all other negotiable debt instruments.

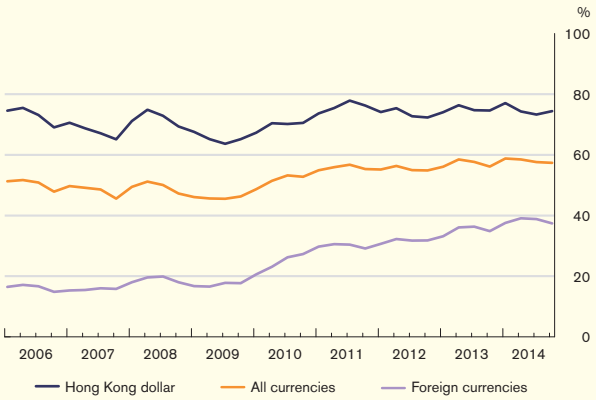
Source: HKMA.

Chart 5.8
Loan-to-deposit ratios of all AIs



Source: HKMA.

Chart 5.9
Loan-to-deposit ratios of retail banks



Source: HKMA.

Partly reflecting the effect of the Stable Funding Requirement[43], the all-currency loan-to-deposit (LTD) ratio for all AIs declined slightly to 72.2% at the end of 2014, compared with 73.6% at the end of June (Chart 5.8). Meanwhile, the foreign currency LTD ratio fell from 65% to 62.1%, while the HKD LTD ratio hovered at 83.3% at the end of 2014.

For retail banks, the HKD LTD ratio remained largely unchanged at 74.4% at the end 2014, while the foreign currency LTD ratio declined to 37.4% from 39.1%. The all-currency LTD ratio also edged down to 57.3% from 58.5% (Chart 5.9).

The Basel III Liquidity Coverage Ratio (LCR) [44] requirement began to be phased-in from 1 January 2015, in accordance with the transitional timeline specified by the Basel Committee on Banking Supervision. Market information so far has revealed no notable impact associated with the introduction of the LCR requirement, although the full impact may take a longer time to emerge. Nevertheless, the smooth phase-in suggests that AIs in Hong Kong are generally not expected to encounter major difficulties in complying with the new liquidity standard over the transition period.

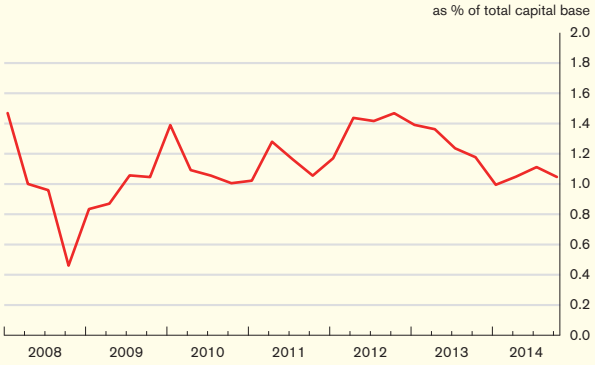
[43] The HKMA introduced the Stable Funding Requirement (SFR) in October 2013 requiring AIs with significant loan growth to ensure adequate stable funding to support their lending business from 2014 onwards. The HKMA implemented several refinements to the SFR with effect from January 2015 to streamline the operation of the SFR and alleviate AIs' reporting burden. Further details of the refinements can be found in the HKMA circular "Stable Funding Requirement" released on 28 November 2014, which is available on the HKMA website.

[44] LCR is a new minimum liquidity standard introduced in Basel III, designed to ensure that banks have sufficient high-quality liquid assets to survive a significant stressed scenario lasting 30 calendar days.

Interest rate risk

Interest rate risk exposures of retail banks remained manageable during the review period. It is estimated that under a hypothetical shock of an across-the-board 200-basis-point increase in interest rates, the economic value of retail banks' interest rate positions could be subject to a decline equivalent to 1.05% of their total capital base as of December 2014 (Chart 5.10).

Chart 5.10
Impact of interest rate shock on retail banks



Notes:

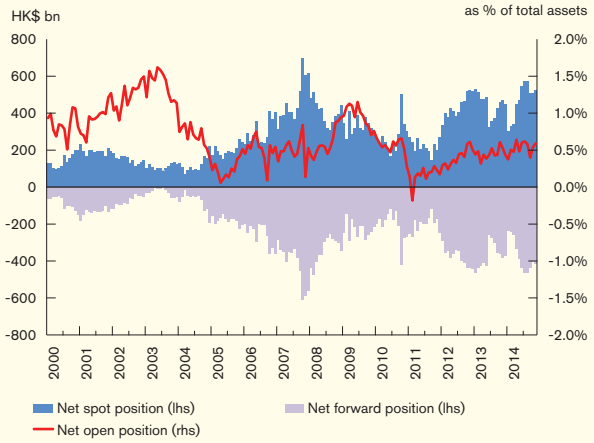
1. Interest rate shock refers to a standardised 200-basis-point parallel rate shock to institutions' interest rate risk exposures.
2. The impact of the interest rate shock refers to its impact on the economic value of banking and trading book[45], expressed as a percentage of the total capital base of banks.

Source: HKMA staff estimates.

Foreign currency position

The exchange rates of some major currencies have shown increasing volatilities amid the divergence of monetary policy stances in advanced economies. Nevertheless the potential impact on the Hong Kong banking sector should be low, as the aggregate foreign currency positions of AIs, including both spot and forward positions, amounted to HK$101 billion at the end of 2014 (Chart 5.11) which was only around 0.6% of total assets.

Chart 5.11
The foreign currency position of AIs



Notes:

1. The net spot position is the spot assets minus spot liabilities of foreign currencies. The net forward position is the forward purchases minus forward sales of foreign currencies.
2. Net open position is defined as the net spot position plus net forward position.
3. Structural assets and liabilities, such as investment in fixed assets and premises, overseas branch capital, investment in overseas subsidiaries and related companies and loan capital, are excluded for the calculations.

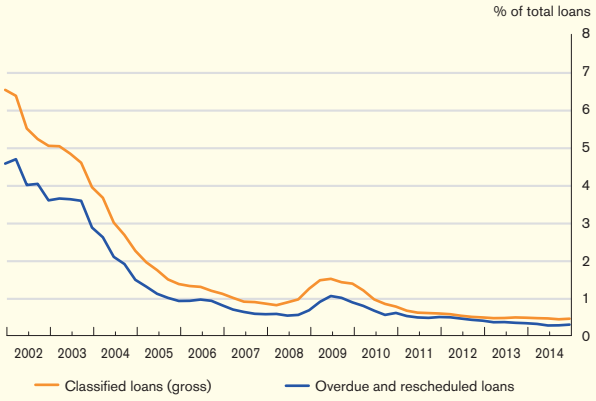
Source: HKMA.

[45] Locally incorporated AIs subject to the market risk capital adequacy regime are required to report positions in the banking book only. Other locally incorporated AIs exempted from the market risk capital adequacy regime and overseas incorporated institutions are required to report aggregate positions in the banking book and trading book.

Credit risk

The asset quality of retail banks' loan portfolios remained healthy, with the classified loan ratio declining slightly to 0.45% at the end of 2014, from 0.46% at the end of June, while the ratio of overdue and rescheduled loans edged up to 0.29% from 0.27% during the period (Chart 5.12).

Chart 5.12
Asset quality of retail banks



Notes:
1. Classified loans are those loans graded as "sub-standard", "doubtful" or "loss".
2. Figures related to retail banks' Hong Kong office(s) and overseas branches.

Source: HKMA.

Credit growth moderated in the second half of 2014, after its rapid expansion in the first half of the year. On a half-year basis, the growth of domestic lending[46] of AIs slowed considerably from 11.3% in the first half to 0.7% in the second half mainly driven by a decline in trade finance.

According to the results of the HKMA Opinion Survey on Credit Condition Outlook of December 2014, the share of surveyed AIs expecting loan demand to remain the same in the next three months had increased to 90%, whereas the share expecting higher loan demand had decreased slightly (Table 5.A).

Table 5.A
Expectation of loan demand in the next three months

As % of total respondents	Mar 2014	Jun 2014	Sep 2014	Dec 2014
Considerably higher	0	0	0	0
Somewhat higher	24	10	19	10
Same	71	86	81	90
Somewhat lower	5	5	0	0
Considerably lower	0	0	0	0
Total	100	100	100	100

Source: HKMA.

Household exposure

Household loans[47] grew at a relatively faster pace of 5.9% in the second half of 2014 from 4.6% in the first half (Table 5.B). Partly reflecting the more buoyant residential property market and a tangible pickup in property transaction volumes since the first quarter of 2014, both the number of new mortgage loans drawn down and the average size of new mortgage loans have risen notably during the same period (Chart 5.13). As a result, the outstanding mortgage lending expanded further by 5.2% in the second half of 2014, following a 3.1% increase in the first half.

Partly reflecting the impact of the strengthened prudential requirements on personal lending business set out by the HKMA in January 2014, there was a moderation in the growth rate of other loans for private purposes (i.e. personal loans). On a half-year basis, the growth rate of these loans slowed to 6.9% in the second half of 2014, from a much stronger growth of 13.9% in the first half.

[46] Defined as loans for use in Hong Kong plus trade-financing loans.

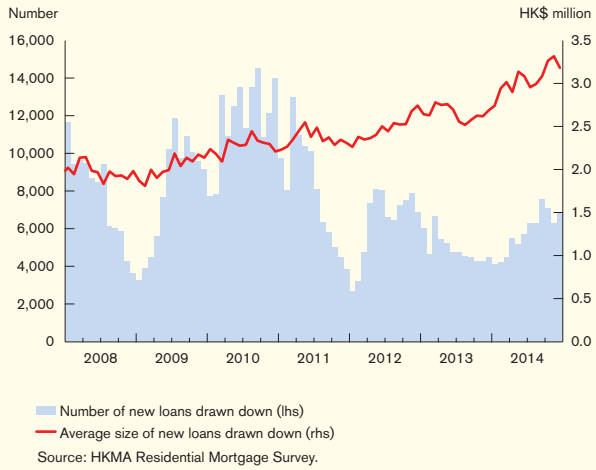
[47] Loans to households constitute lending to professional and private individuals, excluding lending for other business purposes. Mortgage lending accounts for a major proportion of household loans while the remainder comprises mainly unsecured lending through credit card lending and other personal loans for private purposes. At the end of 2014, the share of household lending in domestic lending was 28.9%.

Table 5.B
Half-yearly growth of loans to households of all AIs

	2011		2012		2013		2014	
(%)	H1	H2	H1	H2	H1	H2	H1	H2
Mortgages	5.5	1.2	2.5	5.0	3.1	0.8	3.1	5.2
Credit cards	-1.4	15.9	-1.6	15.3	-4.0	10.2	-4.1	10.4
Other loans for private purposes	9.4	3.8	5.0	9.3	10.6	10.5	13.9	6.9
Total loans to households	5.6	2.7	2.6	6.5	3.8	3.3	4.6	5.9

Source: HKMA.

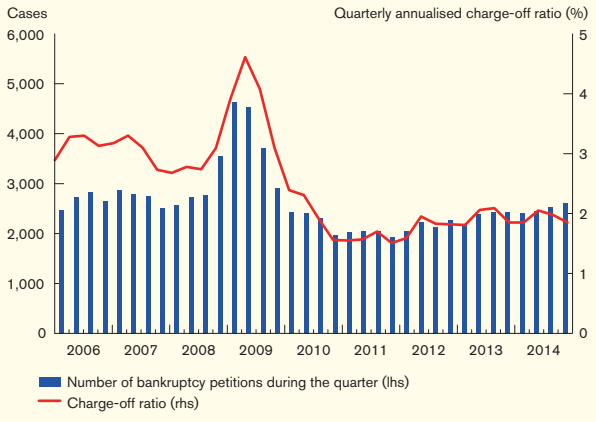
Chart 5.13
New mortgage loans of surveyed AIs



Source: HKMA Residential Mortgage Survey.

The credit risk of unsecured household exposure remained contained in the second half of 2014, with the annualised credit card charge-off ratio and the number of bankruptcy petitions staying relatively low (Chart 5.14).

Chart 5.14
Charge-off ratio for credit card lending and bankruptcy petitions



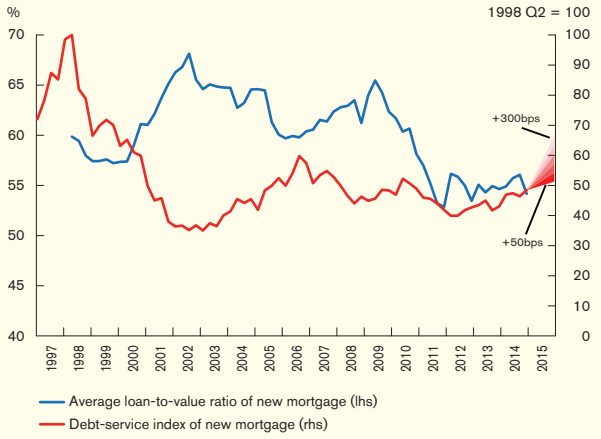
Sources: Official Receiver's Office and the HKMA.

Banks' mortgage portfolios remained healthy, with the delinquency ratio hovering at 0.03%. In addition, the average loan-to-value ratio of new mortgage loans approved edged down to 54.2% at the end of the fourth quarter of 2014 from 55.7% at the end of the second quarter, suggesting that banks' resilience to property price shocks continued to be strong (Chart 5.15). However, the debt-service index of new mortgages[48] rose to 48.5 at the end the fourth quarter of 2014 from 47.4 at the end of the second quarter. The deterioration in household repayment ability mainly reflected an expansion in the average size of mortgage loans, which outpaced the growth in household income. Moreover, a sensitivity test suggests that if interest rates were to increase by 300 basis points and other things being constant, the debt-service index would rise significantly to 66.7. Households' debt servicing ability could come under significant pressures should the US monetary conditions normalise and interest rates rise. In order to strengthen banks' risk management and resilience, the HKMA has introduced a new round of supervisory measures for mortgage lending.[49]

[48] A higher value of the debt-service index indicates that there is either a drop in household income, or an increase in interest rates, or an increase in the average mortgage loan amount drawn by households. Historical movements in the index suggest that a sharp rise in the index may lead to deterioration in the asset quality of household debt.

[49] On 27 February 2015, the HKMA introduced a new round of prudential supervisory measures on property mortgage business, which included lowering the maximum loan-to-value ratio and debt-servicing ratio, to strengthen banks' risk management and resilience. Meanwhile, the HKMA also required AIs using the internal ratings-based approach to extend, by end-June 2016, the risk-weight floor of 15% to residential mortgage loans approved before February 2013. For details, see HKMA press release "Prudential Supervisory Measures for Mortgage Lending" issued on the same date.

Chart 5.15
Average loan-to-value ratio and household debt-servicing burden in respect of new mortgages



Note: The calculation of the index is based on the average interest rate for BLR-based mortgages.

Sources: HKMA and staff estimates.

Corporate exposure [50]

In contrast to household loans, domestic loans to corporations declined by 1.3% in the second half of 2014, after growing robustly by 14.2% in the first half. The decline in corporate loans was driven by a broad-based slowdown in growth in loan to major business sectors and a notable decline in trade financing.[51] At the end of 2014, corporate loans accounted for 70.8% of domestic lending.

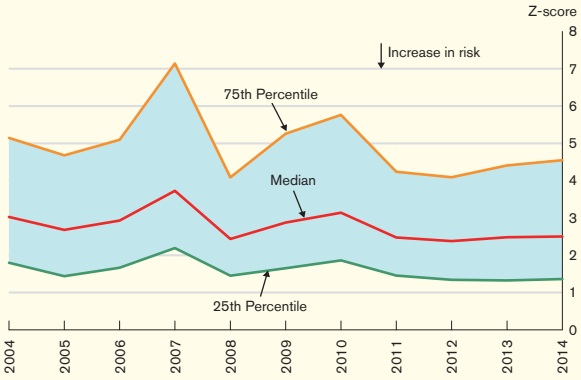
While the Altman's Z-score (Chart 5.16) and the number of compulsory winding-up orders of companies remained broadly steady, there are indicators suggesting that credit risk in respect of banks' corporate exposures may be heightening. In particular, the debt leverage of the corporate sector as measured by weighted average debt-to-equity ratio has continued an upward trend in recent years, with the ratio rising to 63.8% at the end of 2014 (Chart 5.17). Meanwhile, the rise in debt-service ratio, as measured by total interest expenses divided by earnings before interest and taxes (EBIT), suggests a general deterioration of local corporations' debt-servicing ability (Chart 5.18). These indicators suggest that the debt-servicing ability of the corporate sector could be under test and credit risks could be amplified by the high level of leverage when interest rates rise.

Meanwhile, given the prolonged period of low interest rate environment in major advanced economies, corporations may be encouraged to take on excessive foreign exchange exposure due to attractive borrowing rates without regard to the possible impact on the currency mismatch between their funding and earnings. Such currency mismatch could translate into significant losses and thus increase their default risk if exchange rates move unfavourably. Banks should remain vigilant to corporate currency mismatch risk.

50 Excluding interbank exposure.

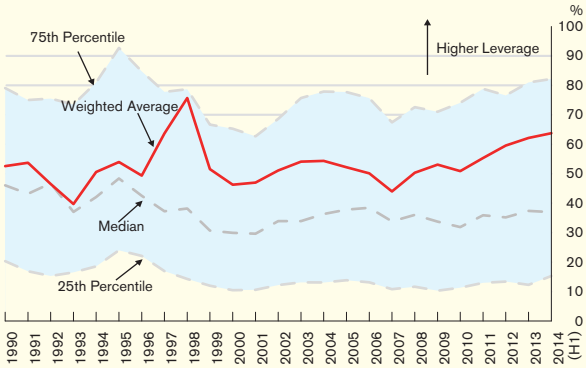
51 Trade financing decreased significantly by 14.3% in the second half of 2014, after growing by 15.1% in the first half of 2014.

Chart 5.16
Altman's Z-score: A bankruptcy risk indicator of listed non-financial companies



Note: A lower Z-score indicates a higher likelihood of a company default.
Source: HKMA staff estimates based on data from Bloomberg.

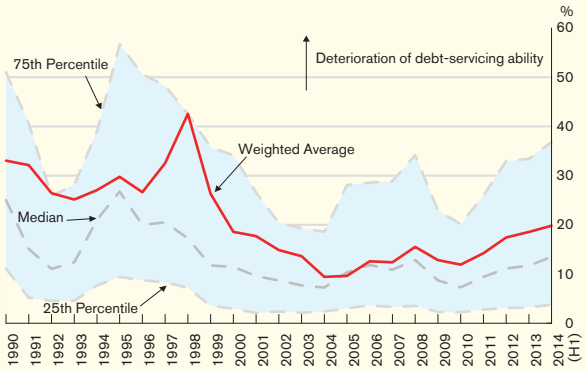
Chart 5.17
Leverage ratio of listed non-financial companies in Hong Kong



Notes:
1. The leverage ratio is defined as the ratio of debt to equity. A higher value indicates higher leverage.
2. All non-financial corporations listed on the Hong Kong Stock Exchange are selected.

Source: HKMA staff estimates based on data from Bloomberg.

Chart 5.18
Debt-service ratio of listed non-financial companies in Hong Kong



Notes:
1. Debt-service ratio is calculated by the total interest expenses divided by the earnings before interest and tax (EBIT). Companies with negative EBIT are excluded from the calculation.
2. All non-financial corporations listed on the Hong Kong Stock Exchange are selected.

Source: HKMA staff estimates based on data from Bloomberg.

Mainland-related lending and non-bank exposures

The banking sector continued to expand its business in Mainland China during the review period. Total Mainland-related lending increased by 5.4% to HK$3,117 billion (14.9% of total assets) at the end of 2014 from HK$2,956 billion (14.4% of total assets) at the end of second quarter of 2014 (Table 5.C). During the review period, other non-bank exposures increased by 1.77% to HK$997 billion (Table 5.D).

Table 5.C
Mainland-related lending

HK$ bn	Mar 2014	Jun 2014	Sep 2014	Dec 2014
Mainland-related loans	2,867	2,956	3,058	3,117
Mainland-related loans excluding trade finance	2,461	2,546	2,638	2,775
Trade finance	406	410	420	341
By type of AIs:				
Overseas-incorporated AIs	1,244	1,263	1,312	1,340
Locally-incorporated AIs*	1,111	1,164	1,205	1,227
Mainland banking subsidiaries of locally-incorporated AIs	512	530	542	550
By type of borrowers:				
Mainland state-owned entities	1,453	1,480	1,425	1,463
Mainland private entities	528	562	566	562
Non-Mainland entities	886	914	1,067	1,092

Notes:
1. * Including loans booked in the Mainland branches of locally-incorporated AIs.
2. Figures may not add up to total due to rounding.

Source: HKMA.

Table 5.D
Other non-bank exposures

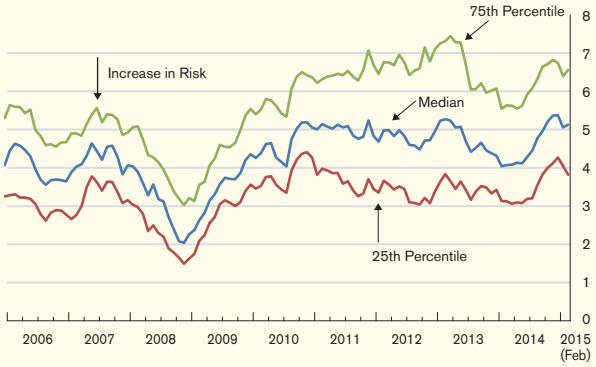
HK$ bn	Mar 2014	Jun 2014	Sep 2014	Dec 2014
Negotiable debt instruments and other on-balance sheet exposures	530	584	597	619
Off-balance sheet exposures	415	396	435	378
Total	**944**	**980**	**1,033**	**997**

Note: Figures may not add up to total due to rounding.

Source: HKMA.

The aggregate distance-to-default index of the Mainland's corporate sector improved notably in 2014, which may reflect the effect of various liquidity loosening measures by Mainland authorities (Chart 5.19).[52&53] However, signs of deterioration in the index have appeared since January 2015, raising a question-mark on the longer-term effects of these measures on the Mainland's corporate sector. Banks should maintain a close focus on the prudent management of credit risk in the Mainland market.

Chart 5.19
Distance-to-default index for the Mainland corporate sector



Note: Distance-to-default index is calculated based on the non-financial constituent companies (i.e. excluding investment companies and those engaged in banking, insurance and finance) of the Shanghai Stock Exchange 180 A-share index

Source: HKMA staff estimates.

Macro stress testing of credit risk[54]

Results of the latest macro stress testing on retail banks' credit exposure suggest that the Hong Kong banking sector remains resilient and should be able to withstand rather severe macroeconomic shocks, similar to those experienced during the Asian financial crisis. Chart 5.20 presents the simulated future credit loss rate of retail banks in the fourth quarter of

52 The distance-to-default is a market-based default risk indicator based on the framework by R. Merton (1974), "On the pricing of corporate debt: the risk structure of interest rates", *Journal of Finance*, Vol. 29, pages 449-470, in which equity prices, equity volatility, and companies' financial liabilities are the determinants of default risk. In essence, it measures the difference between the asset value of a firm and a default threshold in terms of the firm's asset volatility.

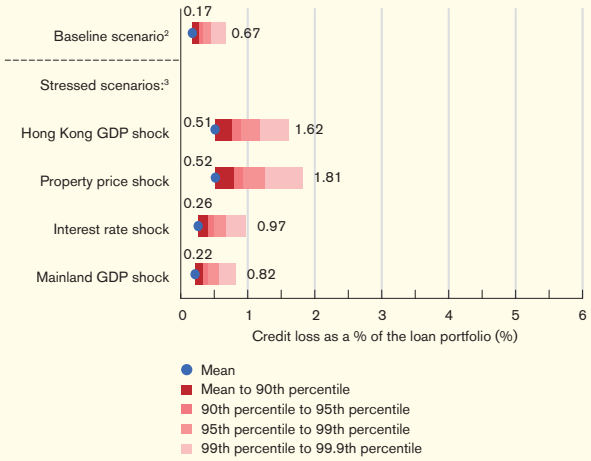
53 These measures include a reduction of the required reserve ratios for targeted financial institutions in April 2014, a cut in the benchmark lending rate in November and a further round of reduction in the benchmark lending rate and the required reserve requirement in February 2015. For details, refer to section 2.2 of the report.

54 Macro stress testing refers to a range of techniques used to assess the vulnerability of a financial system to "exceptional but plausible" macroeconomic shocks. The credit loss estimates presented in this report are obtained based on a revised framework from J. Wong et al. (2006), "A framework for stress testing banks' credit risk", *Journal of Risk Model Validation*, Vol. 2(1), pages 3-23. All estimates in the current report are not strictly comparable to those estimates from previous reports.

2016 under four specific macroeconomic shocks[55] using information up to the fourth quarter of 2014. The expected credit losses for retail banks' aggregate loan portfolios two years after the different hypothetical macroeconomic shocks are estimated to be moderate, ranging from 0.22% (Mainland GDP shock) to 0.52% (Property price shock).

Taking account of tail risk, banks' maximum credit losses (at the confidence level of 99.9%) under the stress scenarios range from 0.82% (Mainland GDP shock) to 1.81% (Property price shock), which are significant, but smaller than an estimated loan loss of 4.39% following the Asian financial crisis.

Chart 5.20
The mean and value-at-risk statistics of simulated credit loss distributions[1]



Notes:
1. The assessments assume the economic conditions in 2014 Q4 as the current environment. The Monte Carlo simulation method is adopted to generate the credit loss distribution for each scenario.
2. Baseline scenario: no shock throughout the two-year period.
3. Stressed scenarios:
   Hong Kong GDP shock: reductions in Hong Kong's real GDP by 2.3%, 2.8%, 1.6%, and 1.5% respectively in each of the four consecutive quarters starting from 2015 Q1 to 2015 Q4.
   Property price shock: Reductions in Hong Kong's real property prices by 4.4%, 14.5%, 10.8%, and 16.9% respectively in each of the four consecutive quarters starting from 2015 Q1 to 2015 Q4.
   Interest rate shock: A rise in real interest rates (HIBORs) by 300 basis points in the first quarter (i.e. 2015 Q1), followed by no change in the second and third quarters and another rise of 300 basis points in the fourth quarter (i.e. 2015 Q4).
   Mainland GDP shock: Slowdown in the year-on-year annual real GDP growth rate to 4% in one year.

Source: HKMA staff estimates.

Impacts of the divergence of monetary policies in advanced economies on US dollar credit

One important question for policymakers in the Asia-Pacific region is how US dollar liquidity would be affected by the divergence of monetary policies in advanced economies. Box 6 "Unconventional monetary policies and international US-dollar credit" of the previous report published in September 2014 shed light on this question by estimating the overall effect of the divergence of monetary policy paths in the US and Japan on dollar credit by Japanese banks. The result concluded that aggressive monetary policy adopted by the Bank of Japan may help cushion US dollar liquidity.

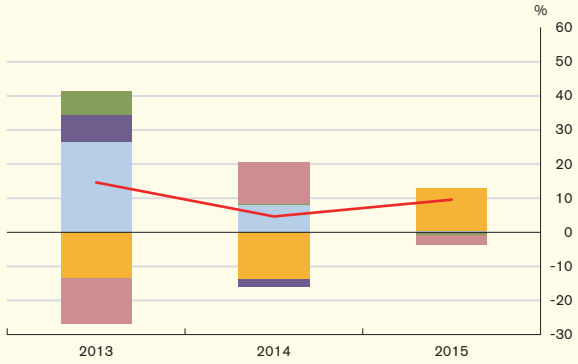
As the ECB announced details of its asset purchase programme on 22 January 2015, a similar estimation on the impact on US dollar credit by euro-area banks and thus a fuller assessment can possibly be conducted.

Charts 5.21 and 5.22 present the estimated annual growth rate of US dollar credit to the Asia-Pacific region by euro-area banks in the baseline and stressed scenarios. Qualitatively, the estimation results are similar to those for Japanese banks presented in Box 6 of the previous report, and point to the same conclusion that the contractionary effect of the US monetary normalisation on global liquidity would be partly offset by the expansionary effect of continued supply of US dollar credit by euro-area and Japanese banks. The results under the baseline scenario show that the US dollar loans extended by euro-area banks to the Asia-Pacific region would grow at a faster pace of 9.6% in 2015 from 4.6% in 2014 (Chart 5.21). The net effect, however, would be crucially dependent on

[55] These shocks are calibrated to be similar to those that occurred during the Asian financial crisis, except the Mainland China GDP shock.

the functioning of the foreign exchange swap market. In particular, if there is a sharp rise in the swap cost, as specified in the stressed scenario, the US dollar loans extended by euro-area banks would decline by 10.8% in 2015 (Chart 5.22).

Chart 5.21
Estimated contribution by factors to the annual growth rate of US dollar loans to the Asia-Pacific region by euro-area banks



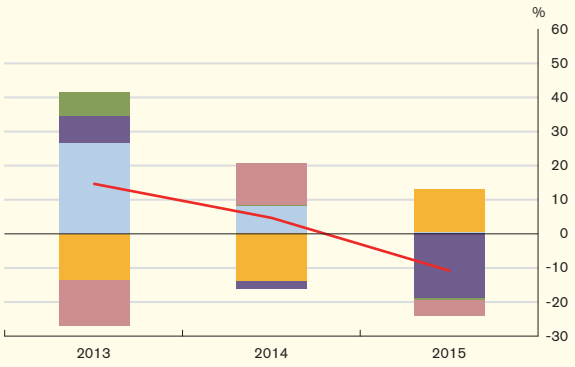
Fed's balance sheet
Eurosystem's balance sheet in US dollars
The swap cost for converting EUR to US dollars
The average CDS spread for euro-area banks
Other factors
Annual growth rates of USD loans by euro-area banks to the Asia-Pacific region

Notes:

1. The growth rates of US dollar loans before 2014 Q3 are computed based on actual data, while the results thereafter are generated based on the estimated contribution by the respective factors.
2. The Fed's balance sheet is assumed to increase at the long-run trend rate from 2014 Q4 onwards and financial assets held by the Fed with a remaining maturity below one year are assumed to be matured by the end of 2015.
3. The Eurosystem's balance sheet is assumed to expand at a monthly pace of 60 billion euro from Jan 2015 onwards, consistent with its latest asset purchase programme introduced in Jan 2015. The size of the Eurosystem's balance sheet is converted into US dollars in estimation. The exchange rate of EUR/USD is assumed to be unchanged since 2014 Q4.
4. The change of swap cost and that of the average CDS spread for euro-area banks since 2014 Q3 are assumed to follow the respective trends in the recent four quarters.

Source: HKMA staff estimates.

Chart 5.22
Estimated contribution by factors to the annual growth rate of US dollar loans to the Asia-Pacific region by euro-area banks under a stressed scenario



Fed's balance sheet
Eurosystem's balance sheet in US dollars
The swap cost for converting EUR to US dollars
The average CDS spread for euro-area banks
Other factors
Annual growth rates of USD loans by euro-area banks to the Asia-Pacific region

Notes:

1. The growth rates of US dollar loans before 2014 Q3 are computed based on the actual data, while the results thereafter are generated based on the estimated contribution by the respective factors.
2. For assumptions on the balance sheets of the Fed and Eurosystem, and the average CDS spread for euro-area banks, see footnotes 2 to 4 under Chart 5.21 respectively.
3. The change of swap cost for euro is assumed to increase linearly from 2014 Q4 to 2015 Q4 to 129 basis points. This assumption simulates a hypothetical scenario that euro-area banks face a sharp rise in the swap cost which is equivalent to half of the magnitude as occurred during the global financial crisis.

Source: HKMA staff estimates.

The assessment highlights that global liquidity remains highly uncertain amid the divergence of monetary policies in advanced economies. Findings in Box 5 further suggest that any initial contraction in global liquidity could be amplified, as banks would react to the liquidity shock by reducing their leverage and thus lending capacity. The implications for liquidity risk merit close attention.

The Countercyclical capital buffer (CCyB) for Hong Kong

The CCyB is part of the internationally agreed Basel III standards and is designed to enhance the resilience of the banking sector against system-wide risks associated with excessive aggregate credit growth. Hong Kong is implementing the CCyB in line with the Basel III implementation schedule.

The HKMA announced on 27 January 2015 that the CCyB for Hong Kong will be 0.625% with effect from 1 January 2016.[56] Under the phase-in arrangement for the CCyB, the maximum CCyB under Basel III will begin at 0.625% of banks' risk-weighted assets on 1 January 2016.[57]

In setting the CCyB rate, the Monetary Authority considered a series of indicators (Table 5.E), including an "indicative buffer guide" (which is a metric providing a guide for CCyB rates based on credit and property price gaps[58]). The credit and property price gaps remain at elevated levels and a simple mapping from the indicative buffer guide would signal a CCyB of 2.5% at the upper end of the Basel III range.

In addition, the Monetary Authority also reviewed other reference indicators[59]. The information drawn from these indicators was, in the view of the Monetary Authority, consistent with the signal from the indicative buffer guide.

Table 5.E
Information related to the Hong Kong jurisdictional CCyB rate

	Q1-2015
Announced CCyB rate	0.625%
Date effective	01/01/2016
Indicative buffer guide	2.50%
Basel Common Reference Guide	2.50%
Property Buffer Guide	2.50%
Composite CCyB Guide	2.50%
Indicative CCyB Ceiling	None
Primary gap indicators	
Credit/GDP gap	32.80%
Property price/rent gap	14.20%
Primary stress indicators	
3-month HIBOR OIS spread (percentage points)	0.17%
Quarterly change in classified loan ratio (percentage points)	-0.01%

Note: The values of all CCyB guides, the Indicative CCyB Ceiling and their respective input variables are based on public data available prior to the corresponding decision, and may not be the most recent available as of each quarter end. (Refer to SPM CA-B-1 for explanations of the variables).

Source: HKMA.

Key performance indicators of the banking sector are provided in Table 5.F.

[56] Further details of the decision can be found in the "Announcement of the CCyB to authorized institutions" released on 27 January 2015 which is available on the HKMA website.

[57] Under the phase-in arrangement, the maximum CCyB rate would be capped at 0.625% on 1 January 2016, with the cap rising by 0.625 percentage points each subsequent year until it reaches 2.5% on 1 January 2019.

[58] The gap between the ratio of credit to GDP and its long term trend, and between the ratio of residential property prices to rentals and its long-term trend.

[59] These included measures of bank, corporate and household leverage; debt servicing capacity; profitability and funding conditions within the banking sector and macroeconomic imbalances.

Table 5.F
Key performance indicators of the banking sector [1] (%)

	Dec 2013	Sep 2014	Dec 2014
Interest rate			
1-month HIBOR fixing [2] (quarterly average)	0.21	0.22	0.23
3-month HIBOR fixing (quarterly average)	0.38	0.37	0.38
BLR [3] and 1-month HIBOR fixing spread (quarterly average)	4.79	4.78	4.77
BLR and 3-month HIBOR fixing spread (quarterly average)	4.62	4.63	4.62
Composite interest rate [4]	0.39	0.40	0.39
		Retail banks	
Balance sheet developments [5]			
Total deposits	5.3	2.4	2.1
Hong Kong dollar	1.5	1.3	0.9
Foreign currency	10.1	3.7	3.4
Total loans	2.6	0.9	1.6
Domestic lending [6]	2.5	-0.3	1.2
Loans for use outside Hong Kong [7]	2.7	6.2	3.2
Negotiable instruments			
Negotiable certificates of deposit (NCD) issued	10.5	-3.9	-4.6
Negotiable debt instruments held (excluding NCD)	3.7	-0.4	-2.7
Asset quality [8]			
As a percentage of total loans			
Pass loans	98.33	98.53	98.56
Special mention loans	1.20	1.04	0.99
Classified loans [9] (gross)	0.48	0.43	0.45
Classified loans (net) [10]	0.34	0.31	0.31
Overdue > 3 months and rescheduled loans	0.33	0.27	0.29
Profitability			
Bad debt charge as percentage of average total assets [11]	0.04	0.05	0.05
Net interest margin [11]	1.40	1.41	1.40
Cost-to-income ratio [12]	42.4	42.5	43.5
Liquidity ratio (quarterly average)	39.6	41.2	41.1
		Surveyed institutions	
Asset quality			
Delinquency ratio of residential mortgage loans	0.02	0.02	0.03
Credit card lending			
Delinquency ratio	0.20	0.22	0.20
Charge-off ratio – quarterly annualised	1.85	1.98	1.85
– year-to-date annualised	1.84	1.90	1.83
		All locally incorporated AIs	
Capital adequacy ratio (consolidated) [13]	15.9	16.4	16.8

Notes:

1. Figures are related to Hong Kong office(s) only except where otherwise stated.
2. The Hong Kong Dollar Interest Settlement Rates are released by the Hong Kong Association of Banks.
3. With reference to the rate quoted by The Hongkong and Shanghai Banking Corporation Limited.
4. The composite interest rate is a weighted average interest rate of all Hong Kong dollar interest-bearing liabilities, which include deposits from customers, amounts due to banks, negotiable certificates of deposit and other debt instruments, and Hong Kong dollar non-interest-bearing demand deposits on the books of banks. Further details can be found in the HKMA website.
5. Quarterly change.
6. Loans for use in Hong Kong plus trade finance.
7. Including "others" (i.e. unallocated).
8. Figures are related to retail banks' Hong Kong office(s) and overseas branches.
9. Classified loans are those loans graded as "substandard", "doubtful" or "loss".
10. Net of specific provisions/individual impairment allowances.
11. Year-to-date annualised.
12. Year-to-date figures.
13. With effect from 1 January 2013, a revised capital adequacy framework (Basel III) was introduced for locally incorporated authorized institutions.

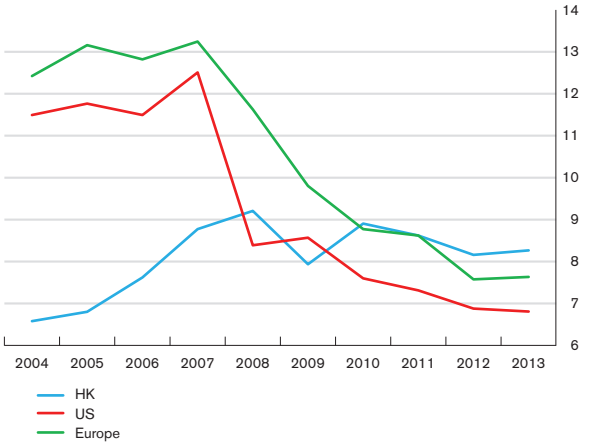
Box 5
Global liquidity and leverage management: A case in Hong Kong

In the aftermath of the global financial crisis, the G20 leaders declared that excessive leverage was one of the root causes for the crisis during the Washington Summit in 2008. Despite sharing the common trend of a rise in leverage prior to the onset of the global financial crisis, banks in Hong Kong have not so far experienced an extended period of deleveraging when compared with banks in the US and Europe (Chart B5.1). This could partly reflect a more benign level of leverage of Hong Kong banks over the observed period. Nevertheless, recent studies have highlighted that the prevailing abundant global liquidity generated from unprecedented monetary policies by central banks in the advanced economies may add further complications to the dynamics of banks' leverage.[60] Against this background, this box examines the extent to which the abundant global liquidity conditions may affect the adjustment mechanism of banks' leverage in Hong Kong.

As a major international financial centre, Hong Kong has a highly competitive banking sector, encompassing more than 200 banks with 27 out of 29 of the global systemically important banks identified by the Financial Stability Board operating in the form of bank branches and subsidiaries. In 2013, 19 of the top 100 global banking organisations had established a foreign bank subsidiary in Hong Kong and 63 of the top 100 global banking organisations had established operations in the form of foreign bank branches.

The strong presence of foreign banks in Hong Kong provides a suitable empirical setting to study how the capital management of a bank may be affected by global liquidity conditions.

Chart B5.1: Cross-country comparison of banks' leverage



Notes:

(1) Figures refer to the median risk-weighted assets over Tier 1 capital (Tier 1 capital leverage) of the respective banking sector.

(2) Hong Kong banks refer to 19 major locally incorporated banks in Hong Kong.

(3) Europe banks refer to Banco Santander, BBVA, BNP Paribas, BPCE Group, Credit Agricole Group, Credit Suisse, Deutsche Bank, ING Bank, Nordea Bank, Societe Generale, UBS, UniCredit SpA, Barclays PLC, HSBC, Lloyds, Royal Bank of Scotland and Standard Chartered PLC. US banks refer to Bank of America, Bank of New York Mellon, Citigroup, Goldman Sachs, JPMorgan Chase, Morgan Stanley, State Street and Wells Fargo.

Source: Bankscope.

The theoretical framework

The theoretical framework is based on the trade-off theory of bank leverage.[61] Specifically, the trade-off theory assumes that banks would actively manage their leverage towards their preferred capital structure (the target leverage), as

[60] For studies that highlight the impact of global liquidity on banks' behaviour, see Rey (2013), "Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence," Jackson Hole Economic Symposium, and Bruno and Shin (2013), "Capital Flows, Cross-Border Banking and Global Liquidity," NBER working paper No. 19038.

[61] The trade-off theory is a commonly used framework to examine non-financial firms' leverage. A number of studies have found that bank's behaviour towards capital structure is not much different from that of non-financial firms. See Gropp and Heider (2010), "The Determinants of Bank Capital Structure," Review of Finance 14: 587-622. Berger et.al (2008), "How do Large Banking Organizations Manage their Capital Ratios?" Journal of Financial Services Research 34: 123-49.

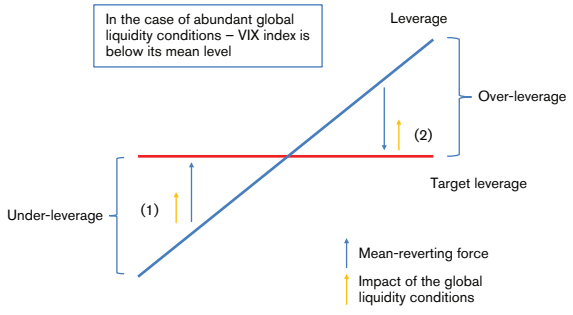
opposed to keeping the capital level at the minimum capital requirement. The model is consistent with survey results that banks consider a target leverage ratio or range when making their capital decisions.[62]

Meanwhile, the fact that the capital adequacy ratio of locally incorporated AIs in Hong Kong has been consistently above the minimum international standard with variations over time appears to support the predictions from the trade-off theory of leverage.[63]

The theory postulates that banks' target leverage could be inferred by standard determinants of leverage which include a bank's profitability, growth potential, tangibility, size and asset quality. However, the adjustment costs involved in changing the leverage prevent banks from attaining the target ratio quickly. Instead, the model assumes that a bank closes a constant proportion of the gap between its current and target leverage each period. The implication from the model is that there is a mean-reverting force which acts as a self-correcting mechanism for banks' leverage, with over-leveraged banks (i.e., banks with actual leverage level higher than the targeted level) having a tendency to decrease their leverage, and vice versa. Because of the prevailing abundance of liquidity globally, which could complicate the dynamics of bank leverage, we further hypothesise the mean-reverting force could at times be unduly disturbed by the global liquidity conditions.

To better understand this, a graphical illustration of the model mechanism is provided (Chart B5.2). The upward sloping line indicates the actual leverage of a bank and the horizontal line is its target leverage, which is assumed to be constant for simplicity. The intersection of the two lines occurs when a bank is neither over-leveraged nor under-leveraged. On the left side of the intersection (Region 1), a bank is under-leveraged while the same bank is over-leveraged on the right side (Region 2). Suppose a bank is initially in Region 1, the mean-reverting factor predicts an increase in leverage to narrow the gap. Given that favourable liquidity conditions also induce a bank to increase leverage, this further accelerates the bank's adjustment towards its target. However, the net impact is uncertain when a bank's leverage is above its target (Region 2). As shown by the opposite direction of the arrows, while the mean-reverting factor predicts a decrease in leverage, more abundant global liquidity exerts an opposite effect which could lead to an increase in leverage; the net impact depends on which force is bigger. If the mean-reverting factor dominates, the net impact is a decrease in leverage. However, if global liquidity is a more important factor, the net impact is an increase in leverage and a further widening of the gap.

Chart B5.2: A graphical illustration of how global liquidity may affect the dynamics of banks' leverage



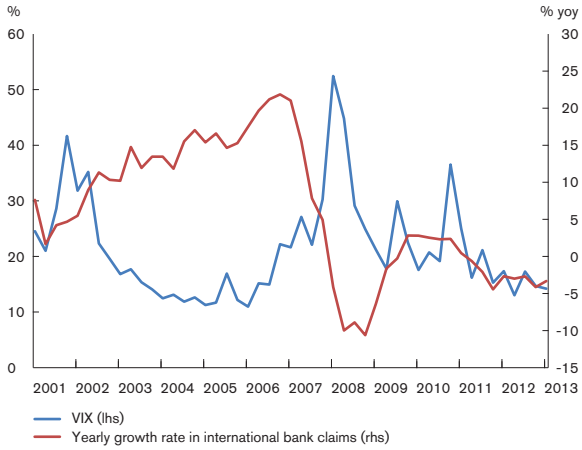
[62] See Wong et.al (2005), "Determinants of the Capital Level of Banks in Hong Kong," HKMA Research Memorandums, 13/2005.

[63] See Chart 5.5 of Chapter 5.

The empirical model and estimation results

Using a panel dataset of annual frequency between 1998 and 2012, the model is tested empirically for 19 major locally incorporated banks in Hong Kong, of which 13 are foreign bank subsidiaries and 6 are domestic banks.[64] A number of studies have found that the Chicago Board Options Exchange Market Volatility (VIX) is inversely correlated with various proxies of global liquidity, such as the yearly growth rate of international bank claims (Chart B5.3).[65] This box follows previous studies and uses VIX as an indicator of global liquidity conditions in the estimations, where a lower than historical average value of VIX indicates more abundant global liquidity conditions, and vice versa.[66] An asset-to-equity ratio is used as the measure of banks' leverage in the econometric analysis.[67&68]

Chart B5.3: Year-on-year rate of growth in international bank claims and VIX

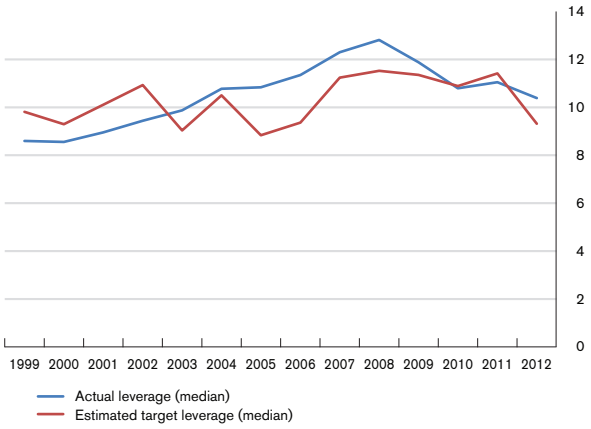


Note: Includes all BIS reporting banks' cross-border credit and local credit in foreign currency.

Sources: Bloomberg and BIS.

The results show evidence of mean-reversion of leverage for banks in Hong Kong as advocated by the trade-off theory, but that the leverage dynamics could at times be unduly affected by global liquidity conditions. To illustrate this, Chart B5.4 presents the actual and the estimated target leverage levels for the median bank in our sample. Theoretically, mean reversion of banks' leverage implies that a bank would reduce its leverage when its leverage is high relative to the target, and vice versa. However, it is observed that the bank's leverage continued to increase between 2006 and 2008 despite it being above the target, which could be largely due to the additional effect of more favourable global liquidity conditions during the period.

Chart B5.4: Comparison between estimated median target leverage and actual median leverage



Source: HKMA staff calculation.

64 The start and end point of our sample is determined by the data available from Bankscope.

65 VIX has been selected by the BIS as one of the key indicators for monitoring global liquidity, and it is updated and published regularly on the BIS website (http://www.bis.org/statistics/gli.htm). For academic studies that use VIX to proxy global liquidity, see footnote 60 of this box.

66 The empirical results are robust to alternative proxies of global liquidity conditions. For details of the empirical specification and results, see Ho et al. (2015), "Capital management and leverage of foreign bank subsidiaries in a host country: A case in Hong Kong," HKIMR working paper, No. 03/2015.

67 While the Tier 1 capital leverage can better reflect how the riskiness of banks' assets may evolve with the change in market conditions, there is a problem of data comparability as the definition of risk-weighted assets has been refined significantly since the adoption of Basel II.

68 Asset-to-equity ratio has the advantage of a sufficiently long enough time series for the econometric analysis.

The net impact of the mean-reverting force and global liquidity conditions on banks' leverage depends on how far leverage deviates from its target and the abundance of global liquidity. Table B5.1 provides a simulation analysis of how the gap between actual and target leverage is affected by its initial value and global liquidity conditions. In the row shaded in yellow, VIX is fixed to its historical mean level to illustrate the mean-reverting phenomenon of leverage, in which an over-leveraged bank is estimated to experience a decline in leverage and vice versa. However, there are instances where the mean-reverting force would be more than offset by favourable global liquidity conditions. For example, in one simulation, it is estimated that when the initial state of the bank is over-leveraged by 0.5 and there is abundant global liquidity (indicated by a ten percentage points below the historical mean of VIX), bank leverage increases by 0.33. This leads to a further widening of the deviation from target leverage, instead of a narrowing of the gap as predicted by the mean-reverting factor alone.[69]

Table B5.1: Net impact of global liquidity conditions on bank leverage

		Over-leverage (target – leverage) <0		Deviation	Under-leverage (target – leverage) >0	
		-1	-0.5	0	0.5	1
	-10	0.14	0.33	0.53	0.73	0.93
	-8	0.03	0.23	0.43	0.62	0.82
improved liquidity condition	-6	(0.08)	0.12	0.32	0.52	0.72
	-4	(0.18)	0.01	0.21	0.41	0.61
	-2	(0.29)	(0.09)	0.11	0.30	0.50
VIX-historical mean	0	(0.40)	(0.20)	0.00	0.20	0.40
	2	(0.50)	(0.30)	(0.11)	0.09	0.29
	4	(0.61)	(0.41)	(0.21)	(0.01)	0.18
worsened liquidity condition	6	(0.72)	(0.52)	(0.32)	(0.12)	0.08
	8	(0.82)	(0.62)	(0.43)	(0.23)	(0.03)
	10	(0.93)	(0.73)	(0.53)	(0.33)	(0.14)

Notes:
1. Numbers in the table refer to the estimated net change in leverage.
2. Numbers in brackets denote negative values.

Source: HKMA staff calculation.

Conclusion

This box finds empirical evidence of mean-reversion for banks' leverage, as advocated by the trade-off theory, and that global liquidity conditions also play an important role in the dynamics of banks' leverage. With the eventual exit from unconventional monetary policies by the US Fed, the findings in this box suggest that the associated tightening of global liquidity could have significant implications for bank leverage adjustment.[70] Specifically, banks that are initially above their target leverage would accelerate the deleveraging process further. Conversely, the tightening global liquidity conditions would impede under-leveraged banks in reverting back to their target leverage levels swiftly. The impact on banks' leverage could potentially affect banks' lending capacities and therefore merits closer attention.

[69] One caveat of the analysis is that the estimation is based on balance sheet information which suffers a certain degree of time lag. As such, it cannot examine whether banks in Hong Kong are over-leveraged or under-leveraged in real time.

[70] While the aggressive easing measures pursued by the Bank of Japan and the European Central Bank may partly offset the contractionary effect on global liquidity due to the exit from the Fed's unconventional monetary policy, the net effect on global liquidity conditions is crucially dependent on whether the normalisation of liquidity in the US would lead to serious financial market disruption. For details, see Box 6 of the September 2014 issue of this Report.

Glossary of terms

Aggregate Balance

The sum of balances in the clearing accounts and reserve accounts maintained by commercial banks with the central bank. In Hong Kong, this refers to the sum of the balances in the clearing accounts maintained by the banks with the HKMA for settling interbank payments and payments between banks and the HKMA. The Aggregate Balance represents the level of interbank liquidity, and is a part of the Monetary Base.

Authorized Institution (AI)

An institution authorized under the Banking Ordinance to carry on the business of taking deposits. Hong Kong maintains a Three-tier Banking System, which comprises licensed banks, restricted licence banks and deposit-taking companies.

Best Lending Rate

A benchmark interest rate that banks use to price loans. In Hong Kong, the Best Lending Rate is used as a base for quoting interest rates on mortgage loans.

Certificates of Indebtedness (CIs)

Certificates issued by the Financial Secretary under the Exchange Fund Ordinance, to be held by note-issuing banks as cover for the banknotes they issue.

Composite Consumer Price Index (CCPI)

The headline consumer price index (CPI) for Hong Kong. The Census and Statistics Department compiles three separate CPI series relating to households in different expenditure ranges. The CPI(A) relates to about 50% of households in the relatively low expenditure range; the CPI(B) relates to the next 30% of households in the medium expenditure range; and the CPI(C) relates to the next 10% of households in the relatively high expenditure range. The Composite CPI is compiled based on the aggregate expenditure pattern of all of the above households taken together.

Composite Interest Rate

The composite interest rate is a weighted average interest rate of all Hong Kong dollar interest bearing liabilities, which include deposits from customers, amounts due to banks, negotiable certificates of deposit and other debt instruments, and Hong Kong dollar non-interest bearing demand deposits on the books of banks. Data from retail banks, which account for about 90% of the total customers' deposits in the banking sector, are used in the calculation. It should be noted that the composite interest rate represents only average interest expenses. There are various other costs involved in the making of a loan, such as operating costs (e.g. staff and rental expenses), credit cost and hedging cost, which are not covered by the composite interest rate.

Convertibility Undertaking

An undertaking by a central bank or currency board to convert domestic currency into foreign currency and vice versa at a fixed exchange rate. In Hong Kong, the HKMA operates Convertibility Undertakings on both the strong side and the weak side. Under the strong-side Convertibility Undertaking, the HKMA undertakes

to buy US dollars from licensed banks at 7.75. Under the weak-side Convertibility Undertaking, the HKMA undertakes to sell US dollars at 7.85. Within the Convertibility Zone between 7.75 and 7.85, the HKMA may choose to conduct market operations consistent with Currency Board principles with the aim of promoting the smooth functioning of the money and foreign exchange markets.

Convertibility Zone

The Hong Kong dollar-US dollar exchange rate band, defined by the levels of the strong- and weak-side Convertibility Undertakings, within which the HKMA may choose to conduct market operations consistent with Currency Board principles.

Exchange Fund Bills and Notes (EFBN)

Debt instruments issued by the HKMA for the account of the Exchange Fund. These instruments are fully backed by the foreign reserves. The HKMA has undertaken that new Exchange Fund paper will only be issued when there is an inflow of funds, thus enabling the additional paper to be fully backed by the foreign reserves. Since 1 April 1999, interest payments on Exchange Fund paper have been allowed to expand the Monetary Base. Additional Exchange Fund paper is issued to absorb such interest payments. This is consistent with the Currency Board discipline since interest payments on Exchange Fund paper are backed by interest income on the US dollar assets backing the Monetary Base.

Liquidity Ratio

All authorized institutions in Hong Kong are required to meet a minimum monthly average liquidity ratio of 25%. This is calculated as the ratio of liquefiable assets (e.g. marketable debt securities and loans repayable within one month subject to their respective liquidity conversion factors) to qualifying liabilities (basically all liabilities due within one month). The method of calculation and its components are specified in the Fourth Schedule to the Banking Ordinance.

Monetary Base

A part of the monetary liabilities of a central bank. The monetary base is defined, at the minimum, as the sum of the currency in circulation (banknotes and coins) and the balance of the banking system held with the central bank (the reserve balance or the clearing balance). In Hong Kong, the Monetary Base comprises Certificates of Indebtedness (for backing the banknotes issued by the note-issuing banks), government-issued currency in circulation, the balance of the clearing accounts of banks kept with the HKMA, and Exchange Fund Bills and Notes.

Nominal and Real Effective Exchange Rate (NEER and REER)

An indicator of the overall exchange rate value of the Hong Kong dollar against a basket of currencies of Hong Kong's principal trading partners. The nominal effective exchange rate (NEER) is a weighted average of the exchange rates between Hong Kong and its principal trading partners. The real effective exchange rate (REER) is obtained by adjusting the NEER for relative movements in the seasonally adjusted consumer price indices of those selected trading partners.

Abbreviations

3m moving average	Three-month moving average
3m-on-3m	Three-month-on-three-month
ASEAN	Association of Southeast Asian Nations
AIs	Authorized Institutions
BIS	Bank for International Settlements
bn	Billion
BLR	Best lending rate
BoJ	Bank of Japan
BoP	Balance of Payments
BSD	Buyer's stamp duty
CBRC	China Banking Regulatory Commission
CCPI	Composite Consumer Price Index
CCyB	Countercyclical capital buffer
CDs	Certificates of deposit
CDS	Credit default swap
CEI	Composite index of coincident economic indicators
CIs	Certificates of Indebtedness
CNH	Offshore renminbi exchange rate in Hong Kong
CNY	Onshore renminbi exchange rate
C&SD	Census and Statistics Department
CPI	Consumer Price Index
CU	Convertibility Undertaking
DF	Deliverable forward
DI	Direct investment
DSD	Doubling of the ad valorem stamp duty rates
DSR	Debt servicing ratio
ECB	European Central Bank
EFBN	Exchange Fund Bills and Notes
EMEs	Emerging Market Economies
EPIFs	External primary income flows
EUR	Euro
FBBs	Foreign bank branches
Fed	Federal Reserve
FOMC	Federal Open Market Committee
FSB	Financial Stability Board

FX	Foreign exchange
GARCH	Generalised autoregressive conditional heteroscedasticity
GBs	Government Bonds
GDP	Gross Domestic Product
GFC	Global financial crisis
GNI	Gross National Income
G-SIBs	Global systemically important banks
HIBOR	Hong Kong Interbank Offered Rate
HK	Hong Kong
HKD	Hong Kong dollar
HKEx	The Hong Kong Exchanges and Clearing Limited
HKMA	Hong Kong Monetary Authority
HK$M3	Hong Kong dollar broad money supply
HSI	Hang Seng Index
IMF	International Monetary Fund
IPO	Initial Public Offering
IT	Information technology
LCR	Liquidity Coverage Ratio
LEI	Composite index of leading economic indicators
LERS	Linked Exchange Rate system
LGFPs	Local government financing platforms
LIBOR	London Interbank Offered Rate
lhs	Left-hand scale
IRB	Internal-Ratings Based Approach
LTD	Loan-to-deposit
LTV	Loan-to-value ratio
mn	Million
MDBs	Multilateral Development Banks
MTN	Medium-term Note
NBS	National Bureau of Statistics
NCD	Negotiable certificates of deposit
NEER	Nominal effective exchange rate
NIE	Newly industrialised economies
NPL	Non-performing loan
OIS	Overnight indexed swap
OLS	Ordinary least squares
OTC	Over-the-counter
p.a.	Per annum

PBoC	People's Bank of China
PC	Principal component
PI	Portfolio investment
PMI	Purchasing Managers' Index
PPI	Producer Price Index
qoq	Quarter-on-quarter
QDII	Qualified Domestic Institutional Investor
QE	Quantitative Easing
QFII	Qualified Foreign Institutional Investor
QQE	Quantitative and Qualitative Monetary Easing
R&VD	Rating and Valuation Department
REER	Real effective exchange rate
Repo	Repurchase operation
rhs	Right-hand scale
RMB	Renminbi
ROA	Return on assets
RTGS	Real time gross settlement
SARS	Severe acute respiratory syndrome
SFR	Stable Funding Requirement
SHIBOR	Shanghai Interbank Offered Rate
SHKSC	Shanghai-Hong Kong Stock Connect
SOEs	State-owned enterprises
SSD	Special stamp duty
SSE	Shanghai Stock Exchange
SVAR	Structural vector autoregression
SWIFTs	Society for Worldwide Interbank Financial Telecommunication
S&P	Sale and Purchase Agreements of Building Units
S&P 500	Standard & Poor's 500 Index
TLTRO	Targeted Longer-Term Refinancing Operation
UK	United Kingdom
UMP	Unconventional monetary policy
US	United States
USD	US dollar
VAR	Vector auto-regression
VIX	Chicago Board Options Exchange Market Volatility Index
yoy	Year-on-year

Full text of this Report is available on the
HKMA website at **www.hkma.gov.hk.**

Hong Kong Monetary Authority
55th Floor, Two International Finance Centre,
8 Finance Street, Central, Hong Kong
Telephone: (852) 2878 8196
Facsimile: (852) 2878 8197
E-mail: hkma@hkma.gov.hk
www.hkma.gov.hk

Printed in Hong Kong
ISSN 2221-5727 (Print version)
ISSN 2222-1514 (Online version)
HK$60