HONG KONG MONETARY AUTHORITY
香港金融管理局

HALF-YEARLY MONETARY AND FINANCIAL STABILITY REPORT

March 2014

This Report reviews statistical information between the end of August 2013 and the end of February 2014.

Half-Yearly Monetary and Financial Stability Report
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1. Summary and overview

Tapering of asset purchases by the US Federal Reserve has led to a new bout of volatility affecting emerging market economies. Against this stormy external environment, the Hong Kong dollar exchange rate has been broadly stable and local financial markets have remained orderly.

As the authorities in Mainland China aim to steer the economy toward a slower but more sustainable growth path and achieve a gradual reduction in corporate and local government leverage, local banks need to be alert to and be prepared for possible increases in the credit risks of their Mainland exposures. At the same time, they need to brace themselves for risks associated with possible fund outflows and property market adjustments.

The external environment

The US Federal Reserve began tapering its large-scale asset purchase programme in January. The move signalled the start of what could be a prolonged and complex monetary normalisation process. Global financial markets initially reacted calmly, helped by improved prospects for advanced economies and expectations that major central banks would maintain loose monetary conditions for a prolonged period. However, a new bout of market volatility soon resurfaced as markets assessed how well emerging markets economies would withstand the withdrawal of US monetary stimulus.

The beginning of the US Federal Reserve's monetary policy normalisation process may reflect improved growth momentum in the US economy, but there are still some concerns about the US economy. Continued decline in the labour participation rate and subdued capital investment may indicate lower potential output growth, which could complicate the judgment about inflation risks and the conduct of monetary policy. Indeed, the path of exit is not necessarily smooth, and interest rate volatility could be higher than currently anticipated. In the euro area, while the recovery has steadied, continued financial fragmentation and the debt overhang in both the private and public sectors make a stronger recovery difficult to attain. In Japan, growth and inflation have both improved but the outlook remains uncertain amid sluggish wage growth and current account deficits. High public debt and limited fiscal room to manoeuvre also mean if growth falters or government bond yields jump, sovereign debt dynamics may worsen in Japan.

In East Asia, some capital outflow pressures were felt in a number of economies after the announcement of tapering of asset purchases by the US Federal Reserve late last year, but financial markets have in general reacted more calmly compared to the heavy sell-off in the summer last year. Looking ahead, capital flows may have become more sensitive to shocks or events that could trigger risk aversion, and market volatility is likely to remain high as concerns over emerging markets linger amid the normalisation of monetary policy in the US. On a more positive note, most governments in the region have room to adopt counter-cyclical policies to cushion the impact of capital flow reversals.

Capital flow volatility in the region may also reflect market concerns for slower growth in Mainland China. As growth slows, concerns for excess leverage in local governments and in the corporate sector could also cause market volatility. The authorities in Mainland China have indicated their determination to steer the economy toward a slower but more sustainable growth path, and given their experiences in the 1990s, are in a position to manage an orderly process of deleveraging.

The property market on the Mainland is central to both macroeconomic and financial stability. Box 1 (see Page 19) explores the linkages between real estate and other sectors. The analysis suggests that the real estate sector's linkages with others have strengthened in the past several years, and credit risks of the real estate sector could potentially generate spillover effects on other sectors in the Mainland economy.

The domestic economy

Real GDP growth in Hong Kong accelerated to a quarter-on-quarter rate of 0.7% in the third quarter and 1.1% in the fourth quarter of 2013 on the back of stronger domestic demand and gradual recovery in external demand. Private consumption held up well, while investment strengthened due to robust machinery and equipment acquisition. Export performance improved with the gradual recovery of the advanced economies and the Mainland economy, but net exports remained a drag on growth due to much stronger retained imports.

For the whole of 2013, real GDP growth picked up to 2.9% from 1.5% a year ago but remained below the annual average of 4.5% in the past 10 years. Labour market conditions however remained broadly stable, with the unemployment rate edging down to 3.2% in the fourth quarter and total employment growing at a robust pace. Box 2 (see Page 25) discusses some possible reasons behind the stable labour market conditions in spite of the relatively slower GDP growth in recent years.

Local inflation pressure eased from the first half of 2013, with the annualised three-month-on-three-month underlying inflation rate declining to 4.0% in January 2014 from an average rate of 4.6% in the first six months of 2013. Such easing momentum will likely continue, as gentler residential property rental increases should continue to restrain inflationary pressures.

Hong Kong's real GDP growth will likely pick up moderately faster towards the trend rate in 2014. Export performance is expected to improve further amid stronger recovery in the advanced economies and the broadly resilient Mainland economy. Domestic demand will likely remain robust with solid growth in private consumption and investment. The housing wealth effect, however, could weaken or even turn to a drag on consumption amid the cooling of the property market. Moreover, the fiscal stance has become slightly contractionary due to cutbacks in the size and scope of relief measures.

Private-sector analysts now project Hong Kong's real GDP growth to average around 3.5% in 2014, while the Government sees growth strengthening to the range of 3.0-4.0%. The HKMA in-house composite index of leading indicators also points to moderately faster growth ahead. This relatively more favourable outlook is however subject to a number of uncertainties and risks, particularly those associated with volatile capital flows in the region.

Monetary conditions and capital flows

The Hong Kong dollar spot exchange rate continued to move within a tight range near the strong-side convertibility rate of 7.75 in the second half of 2013 despite a sell-off in some

emerging market currencies during the period. Indeed, alongside a pickup in local stock market activities, there were mild inflow pressures in the non-bank private sector between July and November. In December, when the US Federal Reserve announced its tapering plan, the Hong Kong dollar spot exchange rate softened only slightly. But on the whole, fund flow pressures were modest and the Linked Exchange Rate system continued to enjoy a high degree of market credibility.

Monetary conditions remained accommodative, with interest rates still hovering at low levels and the money supply growing faster. The wholesale funding costs of the banking sector continued to stay at low levels, with the overnight and 3-month HIBOR fixing rate moving around 0.08% and 0.38% respectively. Retail interest rates have also remained stable at low levels. Nevertheless, the long-dated Hong Kong dollar yields increased gradually along with the US dollar counterparts amid concerns about the US Federal Reserve's plan to reduce asset purchases. Meanwhile, reflecting a stronger increase in bank customers' deposits and negotiable certificates of deposits held by the non-bank sector, the Hong Kong-dollar broad money supply (HK$M3) rose at a faster pace of 5.5% in the second half.

On the asset side, despite signs of moderation in the fourth quarter, total loan growth reached 16.0% in 2013, compared with 9.6% in 2012. There was a sharp increase in foreign currency lending and loans for use outside Hong Kong, and the US dollar loan-to-deposit ratio reached 85.4% at the end of 2013. To prevent further build-up of funding vulnerability, the HKMA introduced the Stable Funding Requirement which came into effect from January 2014, under which Authorized Institutions (AIs) with total loan growth exceeding 20% are required to maintain specific level of stable funds.

Hong Kong dollar lending and domestic credit also grew faster. While growth in residential mortgage lending has already slowed due to sluggish property market activities and the dampening impact of prudential measures, personal loans increased by 16.8%, bringing the household debt-to-GDP ratio to a record 62%. In view of these developments, the HKMA issued a circular in January 2014 to require the AIs to review the underwriting standards for their personal lending business and enhance their risk management practices.

The development of Hong Kong as an offshore renminbi business centre gained further momentum. Total renminbi deposits and certificates of deposit (CDs) rose significantly by 46.2% in 2013, largely driven by the rise in renminbi trade settlement, and to a lesser extent, stronger renminbi demand due to higher interest rates against other currencies and expectations for currency appreciation. Renminbi loans also grew notably by 46.3% from a year ago. Despite tightened liquidity conditions on the Mainland leading to sizeable fluctuations in the onshore interbank interest rates, the offshore interbank rates remained relatively stable. But forward-implied yields moved closely with those onshore. Box 3 (see Page 38) highlights the key findings of a study on the interactions between CNY and CNH deliverable forward markets. On average, spillovers from the onshore to the offshore market were larger than spillovers in the opposite direction, and both markets were found to contribute to the price discovery process for renminbi forward exchange rates.

Asset markets

Hong Kong equities have underperformed global equities over the past six months. Concerns about the spillover effects of US tapering and slowdown of the Mainland China economy cast a shadow over the local market. The brighter

spot was probably the primary market which saw a sharp increase in the initial public offerings of Mainland firms in the second half of the year. Looking ahead, while downside risks appear to be limited at the current level of valuations, trading is likely to be volatile as the US Federal Reserve goes further down its tapering path.

The domestic debt market expanded steadily amid increased volatility in global bond markets. As tapering talks kept investors on the sideline, debt issued by the private sector declined considerably. This, however, was more than offset by a marked increase in public debt issuance. Meanwhile, the offshore renminbi market registered another year of fast growth in 2013. Primary market activity grew remarkably and featured an increasingly diversified issuer and product mix. Looking forward, the market is likely to see steady growth in the coming year, in view of an increase in refinancing need and strong demand from private Mainland issuers. Swap-based issuance by overseas firms, whose recent strong growth is analysed in Box 4 (see Page 45), is also expected to gain further popularity, adding to the vigour of the market.

Property market activities remained weak in the second half of 2013 and recent months, with transaction volume shrinking considerably and housing prices facing some downward pressure amid rising expectation of future interest rate hikes and the dampening effect of the counter-cyclical measures. Primary-market transactions revived more recently as developers offered discounts and concessions. At the same time, there are signs that more home owners are willing to lower their asking prices and banks become relatively more conservative on home appraisal. While analysts generally envisage further consolidation this year, there are no strong signs of a definitive turn in the property cycle. Property valuation remains highly stretched, with the price-to-income ratio and the income gearing ratio staying at elevated levels.

Banking sector performance

The banking sector continued to record healthy growth, characterised by sound asset quality, favourable liquidity conditions, and strong capital positions by international standards. While the sector's profitability moderated somewhat during the second half of 2013, from the very strong results of the first half, it remained more favourable than the same period of the previous year, with retail banks registering a pre-tax return on assets of 1.2%, compared with 1.4% in the first half of the year and 1.1% in the second half of 2012. For 2013 as a whole, the aggregate pre-tax operating profits of retail banks recorded an increase of 22.1%, with the average return on assets rising to 1.3%, from 1.2% in 2012.

In the second half of 2013, liquidity conditions continued to be favourable, and domestic interest rates were generally steady. As the growth of deposits outpaced credit expansion, the overall loan-to-deposit (LTD) ratio for all AIs fell to 70.4% in December 2013, from 71.9% in June 2013. Box 5 (see Page 63) assesses the liquidity risk of the Hong Kong banking sector. In short, the liquidity stress test shows that the systemic liquidity risk of Hong Kong banking sector would be contained in the face of severe economic and financial shocks. While the sensitivity test points to the same conclusion, it highlights that banks' liquidity risks are sensitive to interest rate movements. Banks should therefore be vigilant for the potential effect and pace of normalisation of interest rates.

Given the strong presence of global banks in Hong Kong, the liquidity and funding conditions of the banking sector cannot be immune to inward spillovers of shocks from global banks' home countries. Box 6 (see Page 67) examines factors determining the extent of shock transmissions through intra-group funding activities of global banks and the associated

impact on the operation of foreign bank branches in Hong Kong. The findings suggest that while funding shocks of parent banks could exert significant pressure on the credit availability and loan pricing in host countries, the ongoing regulatory reforms should help reduce the adverse effect.

Looking forward, as global monetary conditions continue to normalise, the possible impacts on banks' balance sheets should be closely monitored. In particular, in view of the recent rise in the level of household indebtedness and corporate leverage, the debt servicing abilities of borrowers could be under test should interest rates increase markedly or a significant correction in the local property market take place. To prevent further build-up of funding vulnerability in banks' balance sheets, the HKMA introduced a Stable Funding Requirement with effect from January 2014. Following the announcement, credit growth in late 2013 somewhat slowed down. Meanwhile, the expansion of the sector's credit exposure to Mainland China-related business remains a challenge, and banks should continue to manage conservatively the credit risks on their Mainland China-related exposure. To step up surveillance of such activities, the HKMA required all banks to report more granular information on their non-bank Mainland exposures by introducing a new quarterly Return of Mainland Activities. In addition, the HKMA required banks active in such activities to conduct thematic review on their risk management and internal controls.

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 financial markets initially reacted calmly to the US Federal Reserve's tapering of its large-scale asset purchase programme before concerns over emerging market economies later resurfaced. Prospects for advanced economies have improved, but unresolved structural issues in these economies may constrain global growth, while financial markets would continue to be very sensitive to any sudden changes in the expected paths of monetary policy.

In East Asia, net capital outflows have been mild so far, and there were few signs of foreigners fleeing the markets. Nevertheless, market volatility is likely to remain high as concerns over emerging market economies linger, and capital flows would become more vulnerable to any shocks that could trigger risk aversion.

The Mainland China economy appeared to have embarked on a path of slower but more sustainable growth. There have been market concerns about fast growth in local government and corporate debt, but the authorities have shown their determination to achieve a gradual and orderly reduction in leverage while preventing sharp swings in domestic demand. Monetary conditions have generally tightened, and regulation and supervision over banks' off-balance sheet activities have been strengthened.

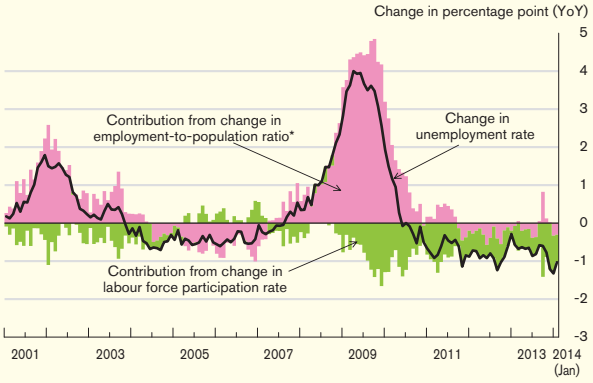
2.1 External environment

The US Federal Reserve has begun to taper its large-scale asset purchase programme, signalling the start of a complex monetary normalisation process. Global financial markets initially reacted calmly, helped by improved prospects for advanced economies and expectations that major central banks would maintain loose monetary conditions for a prolonged period. Nevertheless, concerns over how well emerging market economies can withstand the withdrawal of US monetary stimulus eventually resurfaced. Looking ahead, unresolved structural issues in advanced economies may constrain global growth, while financial markets would continue to be very sensitive to any sudden changes in the expected paths of monetary policy. Indeed the outlook for monetary policy in advanced economies remains highly uncertain, particularly as the forward guidance on interest rate is complicated by the unstable and uncertain relationship between growth, inflation and unemployment.

In the US, activities and employment growth have picked up since the second half of 2013, but structural challenges remain. In particular, the

fall in the unemployment rate has continued to be driven by falling labour force participation rate rather than rising employment-to-population ratio (Chart 2.1). While some of the outflow from the labour force may have been caused by cyclical rather than demographic factors, their increasing number and duration out of work mean there is a risk that these workers could eventually become permanently detached from the labour market. In fact, with the slow pace of labour market improvement having lasted for over 5 years in the US, a structural shift in the Beveridge curve now looks increasingly convincing (Chart 2.2). All these signal a rise in structural unemployment.

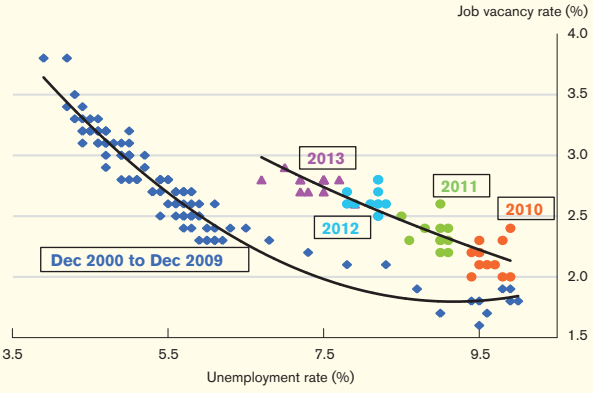
Chart 2.1
US: Decomposition of the unemployment rate



* Positive contribution denotes falling employment-to-population ratio

Sources: CEIC and HKMA staff calculations.

Chart 2.2
US: Shift in the Beveridge curve



Source: US Bureau of Labour Statistics.

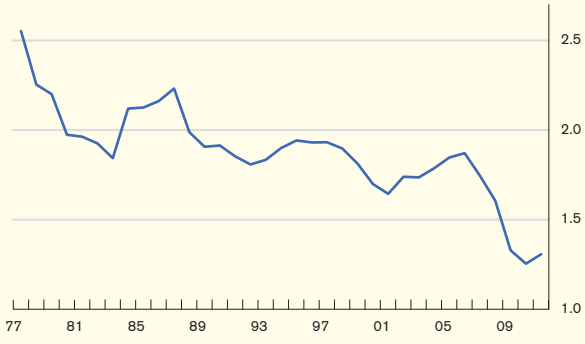
The slow recovery of the labour market may be partly explained by the weak growth in business fixed investment. The latter, together with reduced public infrastructure investment has resulted in slower accumulation of capital (Chart 2.3) which may also have impacted adversely on productivity. Indeed, new business start-up, which has been the key driver of innovation and investment in the US, has nosedived since the global financial crisis despite its marginal pick-up in recent years (Chart 2.4). All of these suggest growth potential of the US economy could turn out to be lower than currently expected. This may have implications for inflation, which could pick up faster than expected, leading to sharper-than-expected interest rate hikes once commenced.

Chart 2.3
US: Net change in capital stock

Note: Net change in capital stock is calculated by subtracting consumption of fixed capital from gross fixed investment for both public and private sectors.

Source: CEIC.

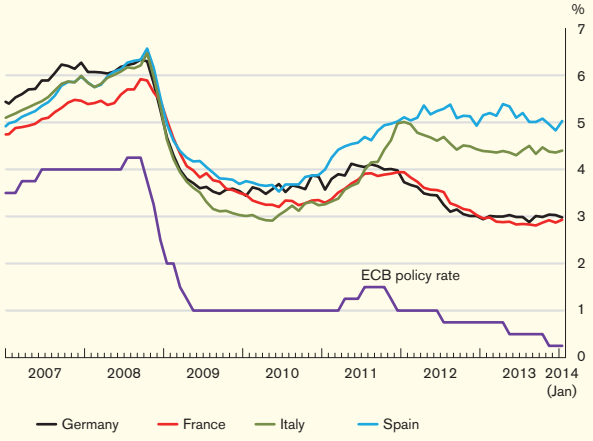
Chart 2.4
US: New business start-up



Source: US Census Bureau.

Across the Atlantic, recovery in the euro area remains broadly on track although growth is expected to remain tepid and structural challenges remain. In addition to high public debt, high private sector indebtedness continues to hamper the monetary transmission mechanism in peripheral countries as banks appear less willing to lend given their weak balance sheets and higher credit risks in the non-bank private sector. As a result, financial fragmentation continues with higher lending rates in the peripheral economies despite successive cuts in the policy rates by the European Central Bank (Chart 2.5). These structural weaknesses make a stronger recovery in the euro area difficult to achieve.

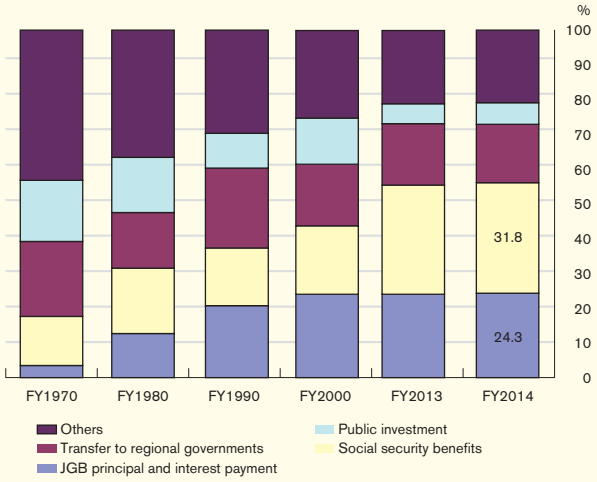
Chart 2.5
Euro area: Lending and ECB's policy rates



Source: European Central Bank.

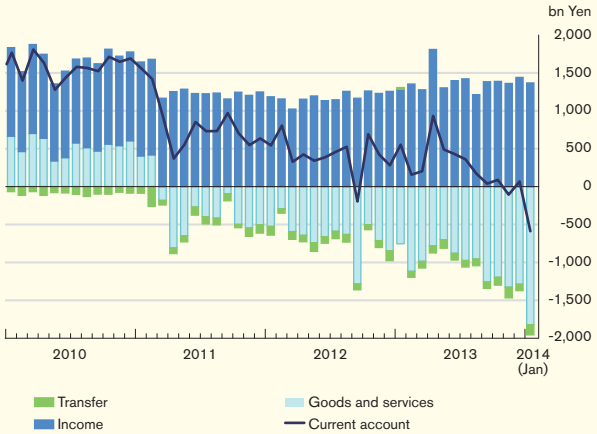
In Japan, economic conditions are improving with inflation moving gradually toward the 2% target. That said, uncertainties still cloud the economic outlook with wage growth remaining sluggish, the current account moving into deficits and a consumption tax hike coming into force in April. High public debt remains a concern for Japan. The current fiscal policy path suggests the Japanese government plans to return to primary surplus by 2020 but fiscal consolidation appears difficult as a large proportion of the government's expenditure goes into social security benefits (which is difficult to cut in view of an ageing population) and on principal and interest payments on the Japanese Government Bonds (JGB) (which makes fiscal position vulnerable to interest rate rise) (Chart 2.6). As such, there is a risk that if growth falters or JGB yields surge, the sovereign debt dynamics may worsen in Japan. In particular, Japan's seasonally adjusted current account position has swung into deficit in recent months (Chart 2.7). The risk is that continuing current account deficits could undermine investor confidence on the JGBs, calling into question Japan's fiscal sustainability.

Chart 2.6
Japan: Government expenditure by component



Source: Ministry of Finance, Japan.

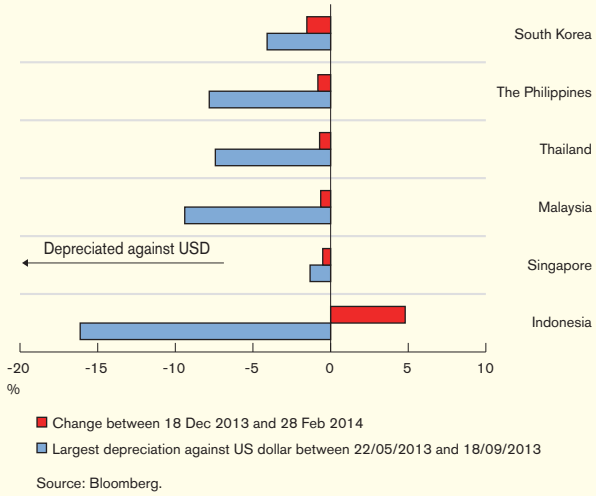
Chart 2.7
Japan: Current account position



Source: Ministry of Finance, Japan.

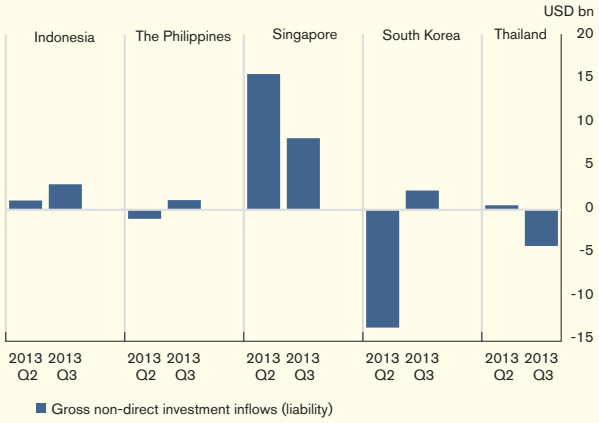
While emerging market economies that have weaker fundamentals have faced more pressure following the Fed's announcement of tapering its asset purchases in December 2013, financial market reactions in East Asia have in general been relatively calm (Chart 2.8), possibly reflecting stronger fundamentals of the region. The recent sell-off was also relatively mild compared to the episode last summer, but even then capital outflows from the region had been rather muted, with few signs of foreigners fleeing the East Asian markets. According to the Balance of Payments (BoP) statistics, the net portfolio and loan outflows in the second and third quarters of 2013 in many East Asian economies were much smaller than those recorded when the global financial crisis first hit in 2008. At the same time, some regional economies had continued to see gross non-direct investment inflows[1], albeit smaller, from non-residents (Chart 2.9).

Chart 2.8
Asia: Change in exchange rate against the USD



Source: Bloomberg.

Chart 2.9
Asia: Gross non-direct investment capital inflows



Source: CEIC.

The growth prospect of East Asia is subject to uncertainties in the pace of normalisation of monetary policy and economic growth in the US. On the one hand, uncertainties in the pace of normalisation of US monetary policy would keep financial market volatility elevated and pose risks of capital flow reversal and tighter financial conditions, which could dampen domestic demand in the region. On the other hand, to what extent the recovery in US demand could provide a significant boost to the region's exports to offset any drag from a tightening in financial conditions still remains to be seen. Meanwhile, slower-than-expected growth in Mainland China would also pose downside risks to the region's outlook.

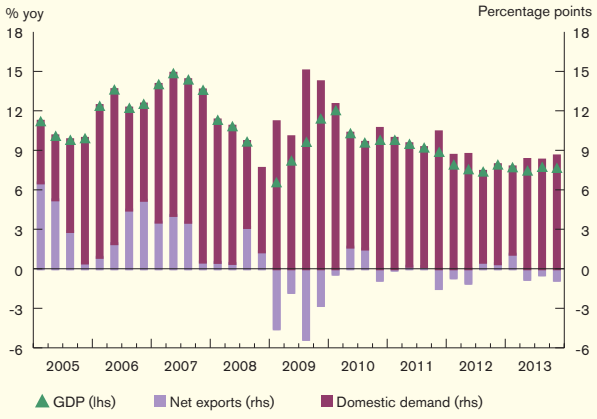
Looking ahead, market volatility in the region is expected to remain high as concerns over emerging markets linger. The alternate risk-on/ risk-off sentiment will likely continue amid the US Fed's normalisation of monetary policy, slower growth in Mainland China and the regional economies' domestic vulnerabilities and imbalances. In particular, capital flows are likely to have become more sensitive to any shocks that could trigger risk aversion.

[1] Gross non-direct investment inflows refer to increase in resident liability due to non-resident portfolio investment, bank inflows and other non-direct investment inflows in domestic economy.

2.2 Mainland China

Economic growth momentum in Mainland China recovered somewhat in the second half of 2013, with GDP rising by about 7.8% year on year in real terms, compared with 7.6% in the first half (Chart 2.10). Consumption growth remained largely stable, while exports and manufacturing investment improved. Inflationary pressures were well contained, with headline CPI inflation rate being around 2.7% year on year on average and changes in PPI being around -1.6% over the review period.

Chart 2.10
Mainland China: contributions by domestic demand and net exports to GDP growth

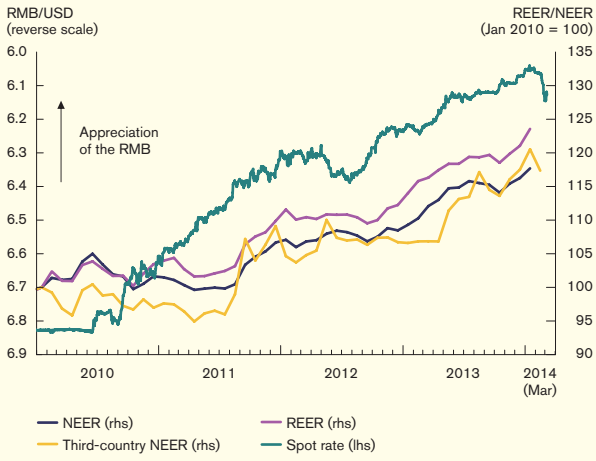


Sources: CEIC and HKMA staff estimates.

GDP growth is expected to be largely stable in the near term. The gradually improving global demand would lend more support to Mainland exports, whereas domestic demand may continue to be dampened by overcapacity problems and deleveraging pressures in a number of manufacturing industries. The authorities released a comprehensive reform package following the Third Plenum of the 18th Party Congress. These reform measures will set the stage for more sustainable economic growth over a longer-term horizon, but may not boost near-term growth significantly. Inflationary pressures are expected to be mild in the near term amid moderate growth momentum. The consensus forecasts in March project the Mainland economy to grow by 7.4% in 2014, while CPI inflation rate could be 2.9%.

Capital inflow pressures increased in the fourth quarter alongside the recovery in growth momentum, while the renminbi continued to appreciate against the US dollar before weakening somewhat recently (Chart 2.11). The wide interest rate differential between the renminbi and the US dollar may have provided additional incentives for capital inflows. The People's Bank of China (PBoC) continued to reform the renminbi exchange rate regime and widened the daily trading band of the RMB/USD exchange rate from ±1% around the central parity rate to ±2% in mid-March.

Chart 2.11
Mainland China: the renminbi exchange rates

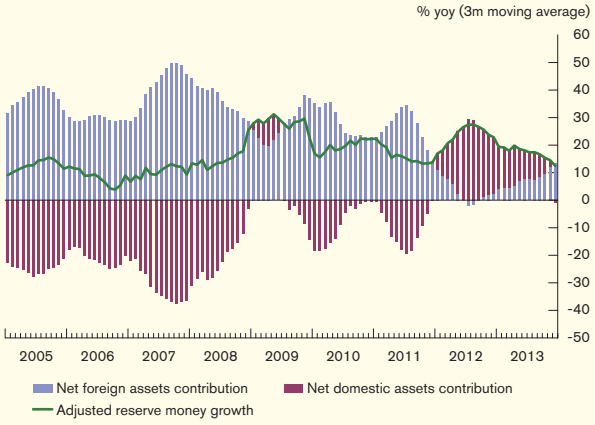


Note: A higher effective exchange rate index indicates a stronger renminbi. The third-country nominal effective exchange rate takes into account the competition that China faces in foreign markets from other economies exporting similar products. The methodology of constructing the third-country effective exchange rate is presented in Box 2 of the December 2006 issue of this Report.

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

The monetary policy stance of the PBoC appeared to have had a tightening bias. While benchmark interest rates and reserve requirement ratios were unchanged, reserve money growth continued to decline (Chart 2.12). Broad money and total social financing growth also eased, though loan growth remained largely stable. Overall monetary conditions have tightened somewhat, while borrowing costs continued to diverge in real terms across industries amid significant differentials in inflationary pressures.

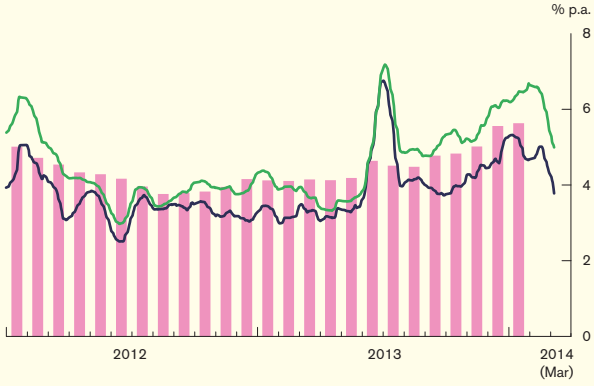
Chart 2.12
Mainland China: contributions to reserve money growth



Note: Total reserve money is adjusted for the changes in the reserve requirement ratio.
Sources: CEIC and HKMA staff estimates.

Liquidity conditions in the interbank market have generally tightened as well, reflecting the interplay of seasonal factors, as well as structural issues, such as financial innovation and the lengthening of the financial intermediation chain. It might also reflect the tightening bias in the monetary policy stance. Money market rates generally trended up before the Chinese New Year holidays and dropped somewhat afterwards, while yields of bank wealth management products also rose in the past few months (Chart 2.13).

Chart 2.13
Mainland China: money market rates and bank wealth management product yields



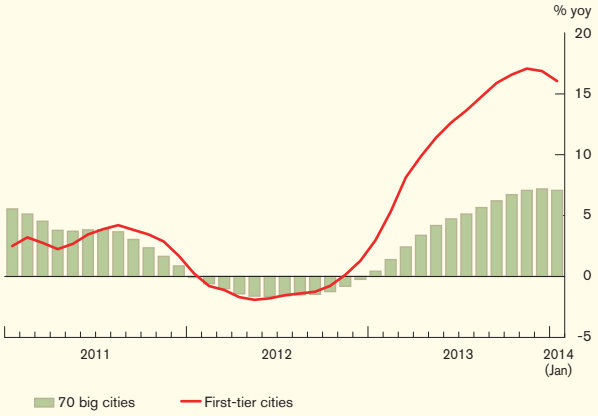
Sources: CEIC and HKMA staff estimates.

Higher interbank interest rates tend to have a greater impact on smaller banks given their relatively heavy reliance on borrowing from large banks and their sizeable exposures to off-balance sheet activities. As the process of interest rate liberalisation continues to unfold, interest rate volatility could increase. In response, the PBoC has strengthened its liquidity support facilities.

Equity prices rebounded in the third quarter but then fell back over the past few weeks, while housing markets remained vibrant on the whole.

Property prices continued to rise in most urban areas, particularly in top-tier cities (Chart 2.14). However, property prices in a number of low-tier cities have been trendless or even softened amid emerging property oversupply risks. Accordingly, policy makers in some big cities launched further measures to cool down housing markets over the past few months, while a handful of low-tier cities fine-tuned policies to support the markets.

Chart 2.14
Mainland China: house prices



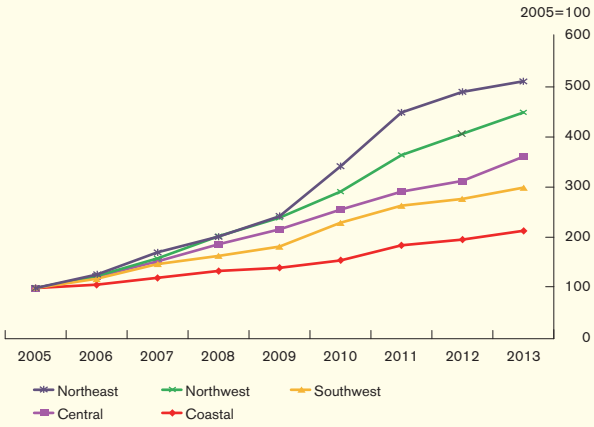
Note: The house price for the first-tier cities is the simple average of the year-on-year increase in price indices for Beijing, Guangzhou, Shanghai and Shenzhen published by the National Bureau of Statistics.

Sources: CEIC and HKMA staff estimates.

The diverse outlook for housing markets is expected to continue across geographical locations in the near term. Demand should remain strong in big cities along with the ongoing urbanisation process and robust home improvement needs. In contrast, housing markets in some small cities, especially in inland areas, may remain under pressure amid a fast increase in property supply in recent years and downside risks to population as residents tend to move from smaller cities to larger ones during the urbanisation process.

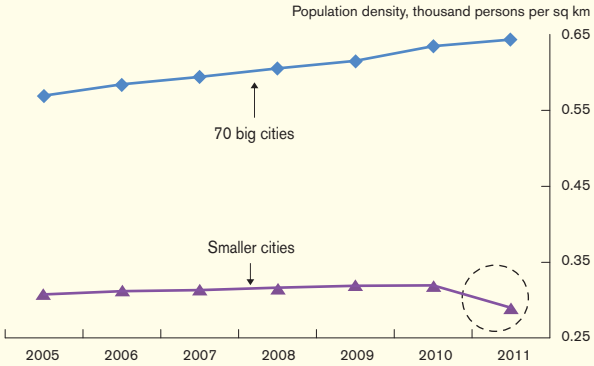
Indeed, per capita floor space under construction in inland urban areas has grown much faster than in coastal urban areas (Chart 2.15). On the other hand, while population density has been continuously rising in bigger cities, it showed signs of declining in smaller ones (Chart 2.16). An estimate by the China Index Academy, an independent property research organisation, suggests if housing sales continue at the current pace, it would take more than ten years for smaller cities to absorb the land inventory, compared with around two years for big cities (Chart 2.17).

Chart 2.15
Mainland China: per capita floor space under construction in urban areas



Sources: CEIC and HKMA staff estimates.

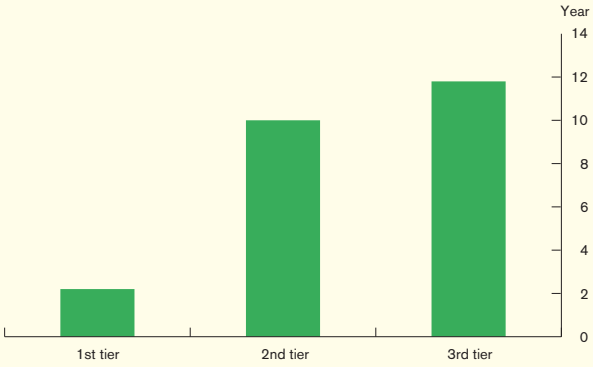
Chart 2.16
Mainland China: population density



Note: The sample for smaller cities includes 120 small cities.

Sources: CEIC and HKMA staff estimates.

Chart 2.17
Mainland China: estimated time to absorb land inventory



Note: 1st tier cities include Beijing, Guangzhou, Shanghai and Shenzhen. 2nd tier cities are mainly provincial capitals and cities specially designated in the state plan. 3rd tier cities mainly include prefectural-level cities.

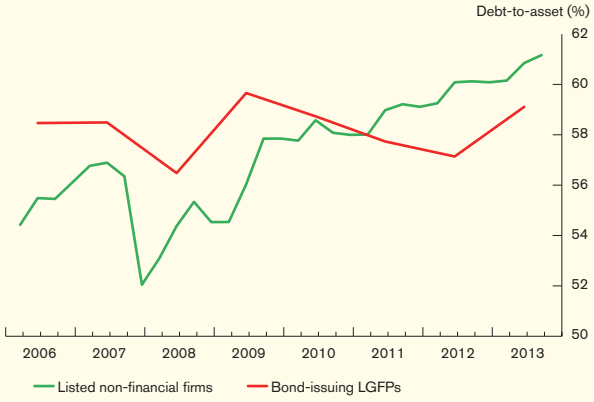
Source: The China Index Academy.

Although the number of cities facing house oversupply risks does not appear to be large, close monitoring of related risks is warranted, especially in view of the increasing linkages between real estate and other sectors (see Box 1 for more discussions on the real estate sector's linkages with others).

The banking sector continued to post solid income growth and sound capital positions in recent quarters, but asset quality has remained under pressure.[2] Overcapacity problems in a number of manufacturing industries and local government debt would continue to overshadow banks' asset quality.

Official data suggest local government indebtedness is not yet excessive despite fast growth in recent years. The latest report by the National Audit Office (NAO) shows total local government debt (including contingent liabilities) amounted to around 33% of GDP as of mid-2013. For illustration purpose, we also analysed the financial conditions for up to 900 local government financing platforms (LGFPs) that have issued bonds.[3] Their leverage has not been particularly high, with the aggregate debt-to-asset ratio being largely stable at less than 60% in recent years, compared with a continued rise in the leverage ratio for listed non-financial firms to more than 60% over the same period (Chart 2.18).

Chart 2.18
Mainland China: leverage of bond-issuing LGFPs and listed non-financial firms



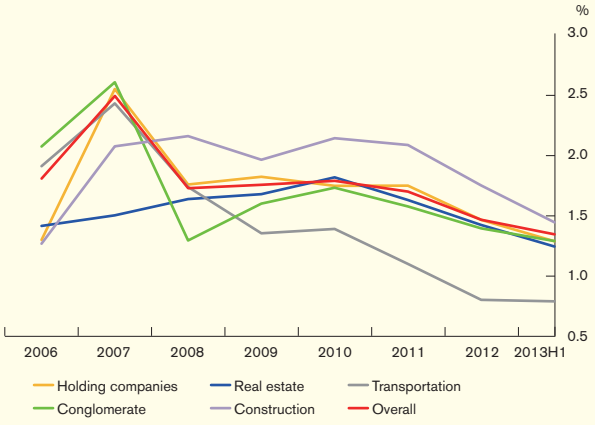
Sources: Bloomberg, WIND and HKMA staff estimates.

[2] Net profit growth was 14.5% in 2013, while capital adequacy ratio of commercial banks was 12.2% at end-2013.

[3] The firm-level data contains up to 900 LGFPs which have issued bonds classified by the WIND data provider. Due to data limitation, the sample sizes are not necessarily balanced across different time periods and indicators.

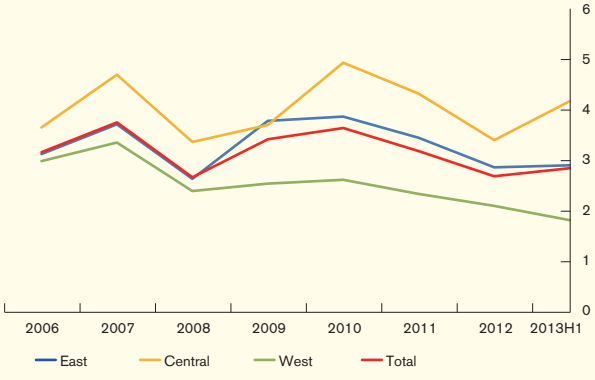
However, the profitability of some projects supported by local government debt might be fragile (Chart 2.19). Accordingly, debt servicing capacity of some local governments might be under pressure. According to the NAO survey, 10.6% of the liabilities directly borne by local governments were overdue in mid-2013. The interest coverage ratio of the bond-issuing LGFPs has also edged down in the past couple of years (Chart 2.20). Local government entities in some inland areas appear to be more of a concern. For instance, bond-issuing LGFPs in West China have had a lower interest coverage ratio than others.

Chart 2.19
Mainland China: bond-issuing LGFPs' return on asset



Sources: WIND and HKMA staff estimates.

Chart 2.20
Mainland China: bond-issuing LGFPs' interest coverage ratios

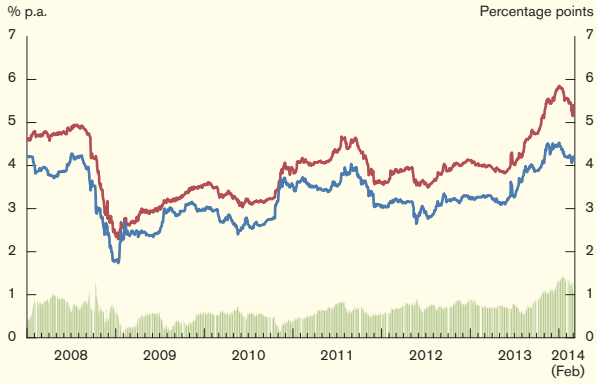


Sources: WIND and HKMA staff estimates.

Despite the increasing importance of bond issuance, banks are still a main channel for local governments to raise funds. The share of bank loans in total local government debt has declined notably in the past couple of years but was still over 55% as of mid-2013. Banks have also been major purchasers of bonds related to local governments. Non-bank financial institutions such as trust and security companies have become more important sources of funding and accounted for around 10% of total local government debt over the same period.

Concerns over banking risks have been reflected in the rising yields of bonds issued by financial institutions. For instance, the yield spread of financial bonds over government bonds widened during the review period (Chart 2.21). However, the rising spreads do not indicate an alarmingly high stress level.

Chart 2.21
Mainland China: financial and government bond yields



Sources: WIND and HKMA staff estimates.

The authorities have stepped up efforts to contain related risks. The size of banks' off-balance sheet and other non-bank intermediaries' financing activities is relatively small compared with other major economies, but they have continued to grow at a firm pace in recent periods. The State Council has reportedly clarified the responsibilities of different regulatory bodies in supervising such activities, which showed signs of slowing down more recently. The supervisory framework on local government debt has also been enhanced.[4] The Third Plenum and other high-level meetings outlined a number of measures to contain the size of local government debt and improve the efficiency of infrastructure investment.[5] These measures should help contain systemic risks arising from local government debt. While the relatively strong net asset positions of both the Central Government and local governments suggest there is ample space for policymakers to provide financial backstops if needed, the authorities will likely aim to strike a balance between preventing financial instability and containing moral hazard.

[4] For instance, 28 provincial-level, 254 city-level and 755 county-level local governments have set up reserves totalling some RMB320 billion as of mid-2013 to strengthen debt-servicing ability.

[5] For example, some local governments have established a risk monitoring system for local government debt. The size and growth of debt will also become important elements of performance assessment for local governments.

Box 1
Linkages between real estate and other sectors in Mainland China[6]

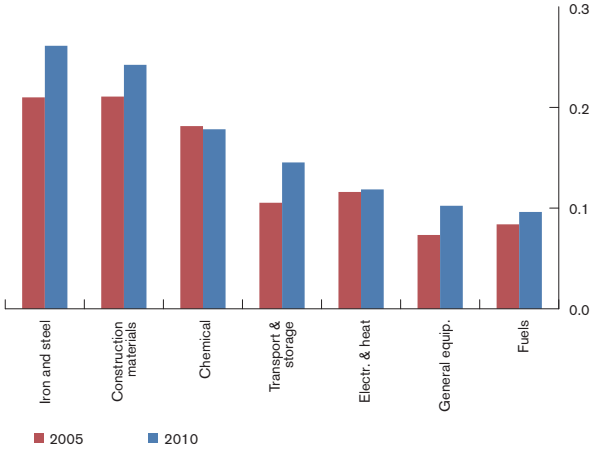
International experiences point to the critical role of sound property markets in maintaining financial stability. In Mainland China, the real estate sector has also become increasingly important for the economy. Value added generated by housing services as a percentage of the economy's total value added rose from less than 4.5% in 2005 to 5.6% in 2010, while mortgage and property development loans together accounted for around 20% of total bank loans in recent years, compared with less than 15% in early 2005. That said, such evidence likely understates the importance of the property sector as it ignores the linkages between real estate and other sectors. Against this backdrop, the analysis in this Box attempts to shed some light on the real estate sector's linkages with others through both real and financial channels.

Linkages between real estate and other sectors through real channels

Inter-sectoral linkages through real channels have been typically explored via marginal-impact analysis using input-output tables. Specifically, total input coefficients, which illustrate how much output from each sector is used as intermediate input to meet a unit of increase in the final demand of a specific sector with both direct and indirect effects considered, are often used to capture inter-sectoral linkages. As the real estate sector in Mainland input-output tables mainly refers to services provided by developers and agencies and excludes housing construction activities, we combine real estate and construction sectors in input-output tables to explore how a change in real estate related activities may affect other sectors.

We find that the real estate-construction sector's linkages with others have generally tightened, as evidenced by the increases in the total input coefficients during 2005-2010 (Chart B1.1). Iron and steel, construction materials, and chemical sectors have been most closely linked with the real estate-construction sector, followed by transport and storage, electricity and heat, general equipment, and fuels sectors. Specifically, a one yuan increase in the final demand for real estate-construction would lead to around a quarter yuan increase in the gross output of the iron and steel sector in 2010, compared with an increase of a fifth yuan in 2005.

Chart B1.1
Total input coefficients for the real estate-construction sector



Sources: CEIC and HKMA staff estimates.

Accordingly, the real estate-construction sector has been much more important to the Mainland economy's output than suggested by the share of its value added in the economy's total value added. To explore the importance of the real estate-construction sector attributable to its linkages with other sectors, we estimate the loss in the economy's value added caused by a hypothetical extraction of this sector from the input-output tables. The Mainland economy's total value added would be 32% less in 2010 if the real estate-construction sector were extracted,

[6] This box is adapted from "How Strong Have Been the Linkages between Real Estate and Other Sectors in China?" by W. Zhang, G. Han and S. Chan (2014), Hong Kong Institute for Monetary Research Working Paper, forthcoming.

much larger than the share of this sector's value added in the economy's total value added of around 12% (Chart B1.2), as eliminating the real estate-construction sector would also hurt the production of other sectors. Similarly, a hypothetical extraction of the real estate-construction sector would mean a loss of 28.5% and 26.7% in the economy's total value added in 2007 and 2005 respectively, much higher than the share of this sector's value added in the economy's total value added of around 10% over the same periods.

Chart B1.2
Loss in total value added caused by extracting the real estate-construction sector

Sources: CEIC and HKMA staff estimates.

Linkages between real estate and other sectors through financial channels

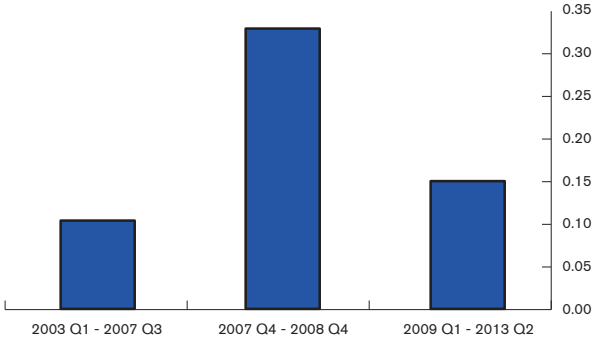
Financial linkages between real estate and other sectors may be reflected in various aspects. First of all, adjustments in property markets may affect the profitability of those industries that are closely linked with the property sector and hence the quality of their debt. Secondly, it is common for firms to use property as collateral to borrow from banks, and property price changes would affect the collateral value and asset quality.

According to the International Monetary Fund (IMF), 30-45% of loans extended by the five largest Mainland banks have been backed by collateral in recent years, the majority of which is real estate.[7] In addition, as local government debt has been in part supported by land sales revenue, property market adjustments would affect the quality of local government debt.

As it is difficult to directly quantify the financial linkages across sectors due to data constraints, we shed light on this issue by studying the spillover of credit risks. Credit risks are proxied by default likelihood estimated using financial data of listed firms, such as stock prices, asset growth and volatility, and liabilities.[8] The real estate sector is represented by listed real estate developers.[9] Our analysis shows that the leverage ratio (debt to asset) is the key indicator for default risks, while liquidity conditions and firm sizes are also quite informative.

Corporate credit risks appear to have increased in recent years. Aggregate corporate default likelihood was around 0.10 during 2003 Q1 - 2007 Q3, but surged to over 0.30 on the eve of the global financial crisis (Chart B1.3). It declined thereafter but has been still higher than that of 2003-2007. Specifically, real estate, construction and industries with severe overcapacity problems, such as cement, aluminium, ship-building, iron and glass, have seen higher risks than other sectors, reflecting relatively faster growth in their leverage as well as a weakening in their profitability.

Chart B1.3
Aggregate corporate default likelihood in Mainland China



Sources: Bloomberg and HKMA staff estimates.

7 See "People's Republic of China: Financial System Stability Assessment", the IMF, 2011, page 17.

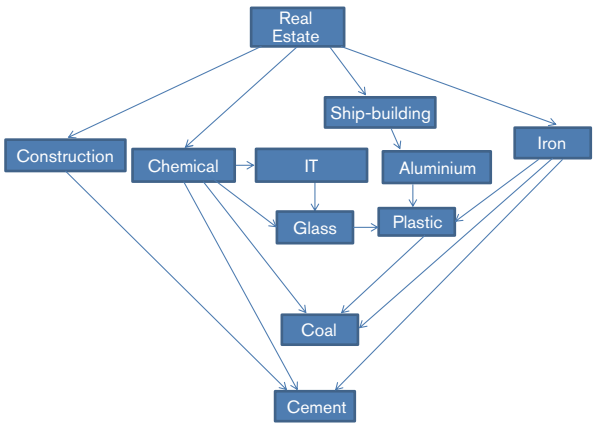
8 In our analysis, default occurs when the stock-price-implied total asset value of a firm is less than its total liabilities.

9 Housing construction activities are also in part captured by real estate developers' data.

In order to analyse the inter-sectoral linkages of credit risks, we use the network analysis and set up a vector auto-regression (VAR) model to identify the directions and quantify the magnitude of credit risk spillovers across sectors. Spillover directions are determined by correlation and predictive causality of default likelihood variation across sectors. Simply put, if a sector's default likelihood variation is correlated with and adds explanatory power to that of another sector, then there will be spillovers from the former to the latter. The sizes of spillover effects are estimated with forecasting error variance decomposition in the VAR.

Our research shows that the real estate sector could be an important source of credit risks across sectors. The analysis of contemporaneous spillover effects demonstrates that upstream industries, such as plastic, cement, coal, glass and information technology and telecom (IT), are in general receivers of spillovers, while machinery, auto, real estate, and chemical sectors are sources of risks. Specifically, real estate and machinery sectors have the largest number of receivers of spillover effects. Credit risks of the real estate sector may spill-over directly into construction, chemical, ship-building and iron industries, which would in turn spread their credit risks to other industries including glass, coal, plastic, cement, etc. (Chart B1.4).

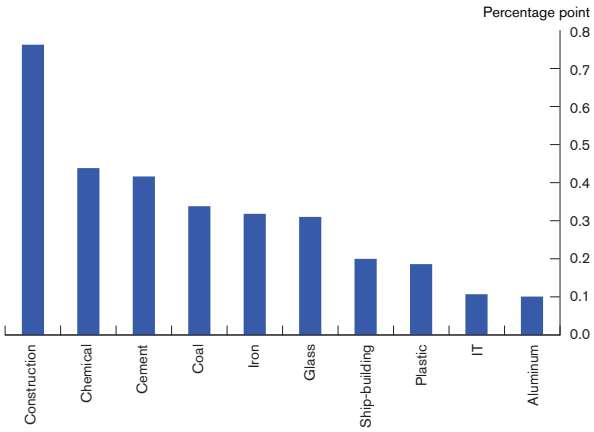
Chart B1.4
Spillover of real estate industry's credit risks



Sources: Bloomberg and HKMA staff estimates.

Real estate and machinery industries would also be most influential in terms of the magnitude of contemporaneous spillover effects. Specifically, a one percentage point increase in the real estate industry's default likelihood may lead to around 0.76 and 0.44 percentage point increases in the default probability of construction and chemical industries, followed by cement, coal, iron and glass industries (Chart B1.5).

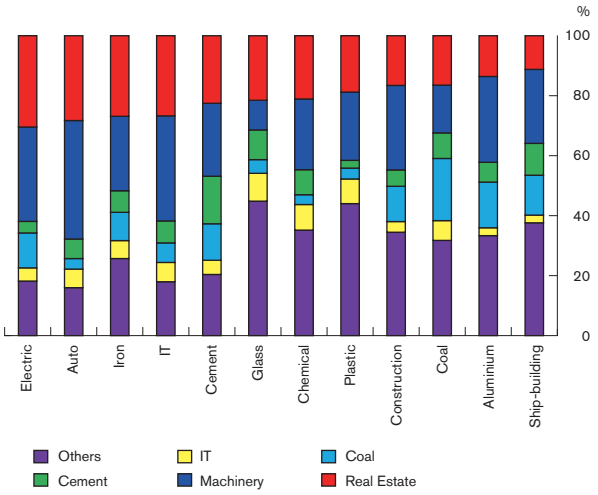
Chart B1.5
Contemporaneous impact of one percentage point increase in property sector's default likelihood



Sources: Bloomberg and HKMA staff estimates.

Real estate and machinery industries are still most influential if dynamic spillover effects are taken into account. The two industries together could explain nearly 50% of the volatility of other sectors' default likelihood on average (Chart B1.6). Specifically, credit risks of the real estate sector may have significant spillover effects on electric, auto, iron, IT, cement, glass, chemical, plastic, and construction industries when both contemporaneous and dynamic effects are considered.

Chart B1.6
Contributions to volatility of major industries' default likelihood



Sources: Bloomberg and HKMA staff estimates.

The spillover effects of credit risks from the real estate sector are not only brought about by its rising input-output linkages with other sectors, but possibly the fact that properties have been used as collateral to back loans in many sectors. Indeed, our analysis shows that construction, iron, coal, auto, IT, chemicals, cement, and electric, which would be significantly affected by credit risks in the real estate sector, have been the major borrowers in recent years. In addition, as cement, glass, construction, and coal industries are closely related to infrastructure investment, their exposure to the credit risks of the real estate sector might also reflect the importance of land sales revenue for local governments to support their debt used to finance infrastructure investment.

Concluding remarks

The main messages of this Box are summarised as follows:

- Input-output analysis shows that the linkages between real estate and other sectors have strengthened through real channels. Accordingly, the real estate sector has been much more important to the Mainland economy's output than suggested by the share of its value added in the economy's total value added.

- The real estate industry has also been closely linked to other sectors through various financial channels. Specifically, our analysis shows that credit risks of the real estate sector could generate spillover effects on other sectors in the Mainland economy.

3. Domestic economy

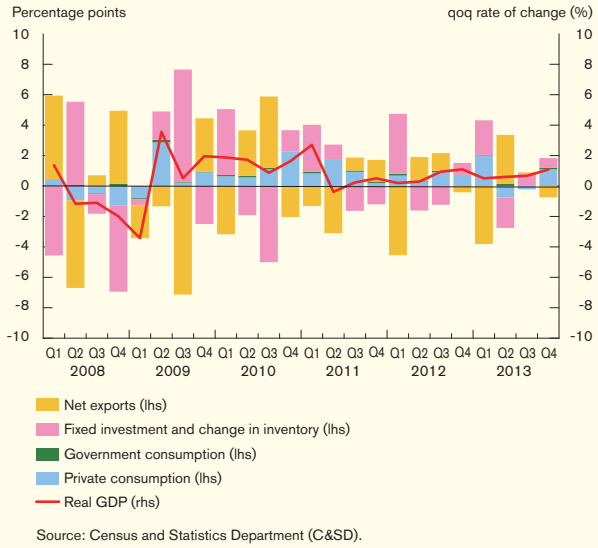
The Hong Kong economy picked up faster in the second half of 2013 with the support of stronger domestic demand and improving export performance. The growth momentum is expected to strengthen further in 2014, but subject to uncertainties mainly stemming from the US monetary policy normalisation process. Meanwhile, domestic inflation will likely remain contained along with slower increase in residential property rentals.

3.1 Real activities

Hong Kong's real GDP growth accelerated to a quarter-on-quarter rate of 0.7% in the third quarter and 1.1% in the fourth quarter of 2013 on the back of stronger domestic demand and gradual recovery in external demand (Chart 3.1). Private consumption held up well amid stable employment conditions and broadly improved incomes, while government consumption increased steadily. Overall investment strengthened due to robust machinery and equipment acquisition, which helped offset weaker building and construction activities. Meanwhile, export performance improved with gradual recovery of the advanced economies and continued support from a resilient Mainland China economy (Chart 3.2). However, as retained imports grew much faster than exports, net exports continued to be a drag on real GDP growth.

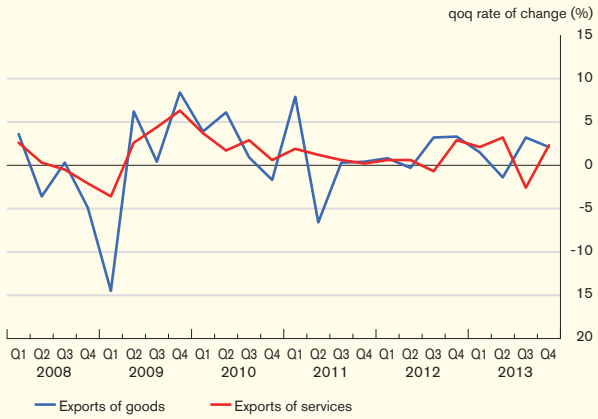
The year-on-year real GDP growth rate remained steady at 2.8% and 3.0% in the third and fourth quarters respectively. For the whole of 2013, real GDP growth was 2.9%, up from 1.5% a year earlier but still below the annual average of 4.5% in the past 10 years. Labour market conditions however remained broadly stable, with the unemployment rate edging down to 3.2% in the fourth quarter and total employment growing at a robust pace. Box 2 discusses some possible reasons behind the stable labour market conditions in spite of the below-trend GDP growth in recent years.

Chart 3.1
Real GDP growth and contribution by major expenditure components



Source: Census and Statistics Department (C&SD).

Chart 3.2
Exports of goods and services



Source: C&SD.

The Hong Kong economy is expected to grow at a moderately faster pace in 2014. External demand would lend further support to export performance as recovery in the advanced economies has become more entrenched and the Mainland China economy remains broadly resilient. As for domestic demand, private consumption would grow moderately with the support of still-positive consumer confidence, stable labour market conditions and improving income prospects amid global trade recovery. The housing wealth effect, however, could weaken or even turn to a drag on consumption amid the cooling of the property market. Ongoing infrastructure works, a pick-up in private-sector building and construction activities, as well as sustained increase in machinery and equipment acquisition due to improving business outlook would also contribute to GDP growth. Nevertheless, the fiscal stance has become slightly contractionary due to cutbacks in the size and scope of relief measures.

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
2013				
Jan	1.1	0.9	7.5	4.0
Feb	0.1	0.3	6.1	4.1
Mar	0.9	0.4	5.5	4.0
Apr	1.3	0.5	5.9	3.6
May	-0.8	0.3	3.8	3.2
Jun	0.0	-0.1	2.6	2.3
Jul	-1.2	0.3	0.2	1.8
Aug	0.0	0.3	0.1	1.8
Sep	0.5	0.5	-0.3	1.9
Oct	0.4	0.3	-1.2	1.6
Nov	2.1	0.8	1.8	2.2
Dec	0.6	0.5	2.4	2.8
2014				
Jan	2.5	0.5	6.2	3.0
Feb	n.a.	0.4	n.a.	3.1

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 HKMA in-house composite index of leading indicators predicts a moderately faster growth path for the Hong Kong economy in the first half of 2014, as shown in the solid six-month growth rate (Table 3.A). Overall for 2014, private-sector analysts project Hong Kong's real GDP growth to be in the range of 2.8-4.0% and average around 3.5%. The Government also sees growth strengthening to the range of 3.0-4.0%.

The relatively more favourable outlook for the Hong Kong economy is subject to a number of uncertainties and risks. On the downside, the predominant external risk came from the still-uncertain pace and scale of the US Fed's tapering and interest rate normalisation. Any significant adverse developments could aggravate volatilities in the financial market conditions, fund flows and liquidity situations, and overshadow Hong Kong's growth prospects through the trade and financial channels. Elsewhere, a slower-than-expected growth in the Mainland China economy could cause negative spillovers to Hong Kong given the increasingly close economic relations between the two places. Domestically, the property market remains a major concern. The overvalued and thinly-traded market is prone to downward pressures in view of eventual rate hikes and rises in medium-term flat supply. Should the market react unfavourably to the US Fed's monetary actions or there be a significant reversal of fund flows, it could exacerbate downward adjustments in property prices, thereby threatening broader macroeconomic adjustments and asset price corrections.

On the upside, better-than-expected economic performance of the advanced economies and the Mainland China economy could lift global growth and international trade flows, thereby raising Hong Kong's external demand and boosting consumption expenditure perhaps through improved consumer sentiment.

Box 2
Revisiting the tight labour market puzzle in Hong Kong

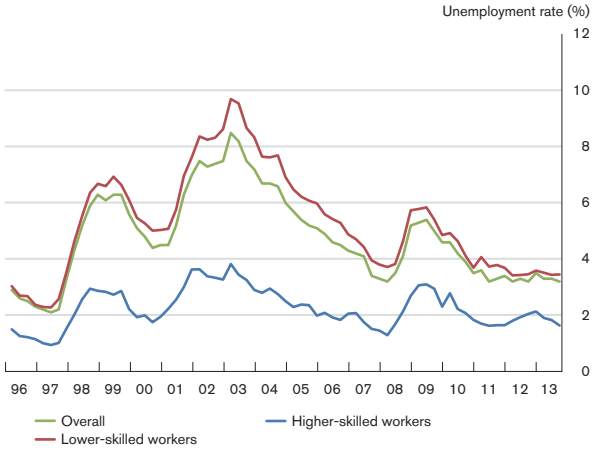
Labour market conditions in Hong Kong have been considered tight in recent years despite the continued moderate growth of the domestic economy. The unemployment rate only moved little around a low of 3.3% in both 2012 and 2013, with robust employment growth offsetting a rise in the labour force participation. The real GDP growth, on the other hand, slowed to 1.5% and 2.9% respectively compared with the long-term average of 4.5% over the past ten years. This situation seems contrary to the general observation that negative output gaps usually coincide with rising unemployment.

This Box provides some possible reasons for the tight labour market puzzle in recent years. Our analysis suggests that certain structural factors have increased the resilience in the unskilled segment of the labour market. Moreover, we find empirical support for lesser skill mismatch in the labour market and a decline in frictional unemployment. We also find that Hong Kong's potential GDP growth might have decreased somewhat after the global financial crisis (GFC). As such, the actual growth rate, while seeing some slowdown, might not have been too far away from its potential.

Structural factors for increased labour market resilience

The overall unemployment rate may mask diverse developments in different segments of the labour market. A breakdown by work skill level shows that the unemployment rate for lower-skilled workers actually edged down and has been resilient against the GDP growth slowdown during this period (Chart B2.1).[10] In fact, there has been a declining trend in the unemployment rate for lower-skilled workers since 2003.

Chart B2.1
Unemployment rate by skill segment



Sources: C&SD and HKMA staff estimates.

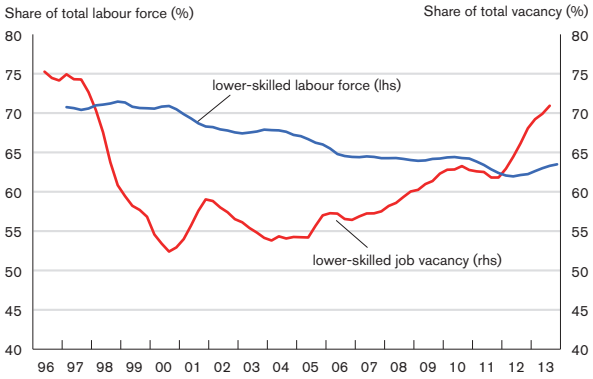
In the September 2012 issue of this report, we pointed out that labour market resilience has increased in the lower-skilled segment due to demographic changes and vibrant growth in inbound tourism following the implementation of the individual travel scheme (IVS).[11] Specifically, with the size of the young cohort population declining and more of them entering into the higher-skilled segment, there has been a decline in the supply of young people in the lower-skilled segment of the labour market. In the meantime, the implementation of the IVS created more jobs in tourism-related sectors,

[10] In this study, skill level is classified by occupation. Lower-skilled workers include clerical support workers, service and sales workers, craft and related workers, plant and machine operators and assemblers, and workers in elementary occupations. Higher-skilled workers include managers and administrators, professionals, and associate professionals.

[11] For details, please refer to the HKMA (2012), "The Tight Labour Market Puzzle: Will It Remain Resilient?" *HKMA Half-Yearly Monetary & Financial Stability Report,* September, pp 30-32.

which are relatively more labour intensive. As a result of restrained supply and strengthened demand (Chart B2.2), labour market tightness in the lower-skilled segment has structurally increased.

Chart B2.2
Labour force and job vacancy in the lowered-skilled segment



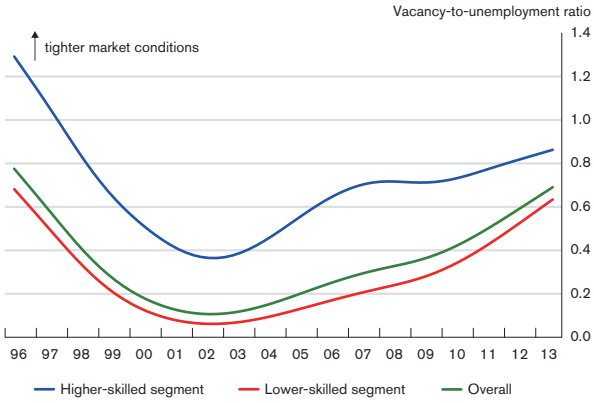
Sources: C&SD and HKMA staff estimates.

Increased skill matching

In relation to the increased tightness in the lower-skilled segment of the labour market, it is likely that frictional unemployment has declined in Hong Kong over the past few years. A cursory look at the vacancy-to-unemployment ratios shows that labour market tightness has been converging across skill segments (Chart B2.3), in the sense that the level of ease/ difficulty in finding a job has become increasingly similar for both the higher-skilled and lower-skilled. This can be interpreted as lesser skill mismatch. In this notion, skill mismatch refers to the ability of the labour market to match unemployed workers to jobs in a suitable *skill segment*. However, it should be noted that lesser skill mismatch does not preclude imbalances in manpower demand and supply in certain *sectors*, such as what was reported in the domestic construction industry recently.

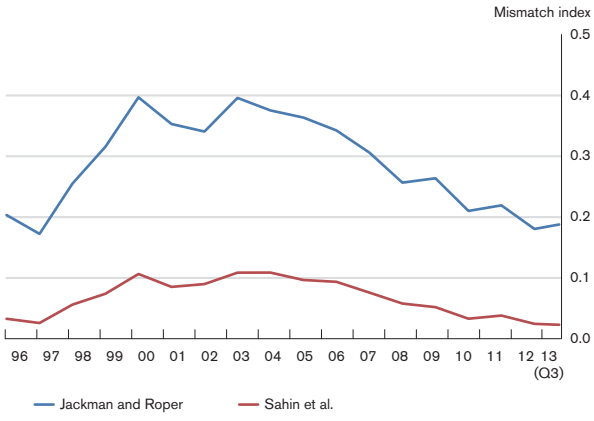
Following Jackman and Roper (1987), we compile a skill mismatch index and find empirical support for lesser skill mismatch in Hong Kong's labour market.[12] The index measures the extent of misallocated unemployed workers in the total unemployment under eight broad occupational categories. It ranges between zero and one, equal to zero when all occupations are in perfect alignment and equal to one when in complete misalignment. Chart B2.4 shows that the skill mismatch index has followed a downward trend since 2003 and a similar index following Sahin et. al. (2012) gives like results.[13]

Chart B2.3
The vacancy-to-unemployment ratio by skill segment (Hodrick-Prescott filtered)



Source: HKMA staff estimates.

Chart B2.4
Mismatch indices



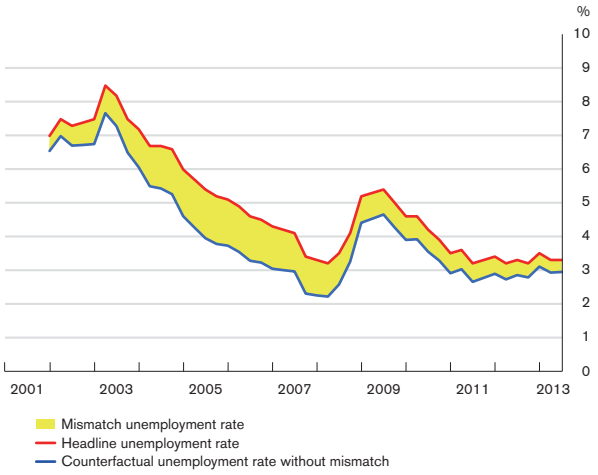
Source: HKMA staff estimates.

[12] Jackman, R. and S. Roper (1987), "Structural Unemployment", *Oxford Bulletin of Economics and Statistics*, 49, pp 9-36.

[13] Sahin, A., J. Song, G. Topa, and G.L. Violante (2012), "Mismatch Unemployment", Federal Reserve Bank of New York Staff Reports, No. 566.

We then derive a measure of mismatch unemployment rate following Sahin et. al., which is defined as the difference between the actual unemployment rate and the counterfactual unemployment rate in the absence of skill mismatch. This measure (the yellow area) has fallen in recent years, from 1.5 percentage points in late 2005 to 0.4 percentage points in the third quarter of 2013 (Chart B2.5). This supports the view that labour market frictions arising from skill mismatch and hence frictional unemployment have declined in Hong Kong.

Chart B2.5
Mismatch unemployment



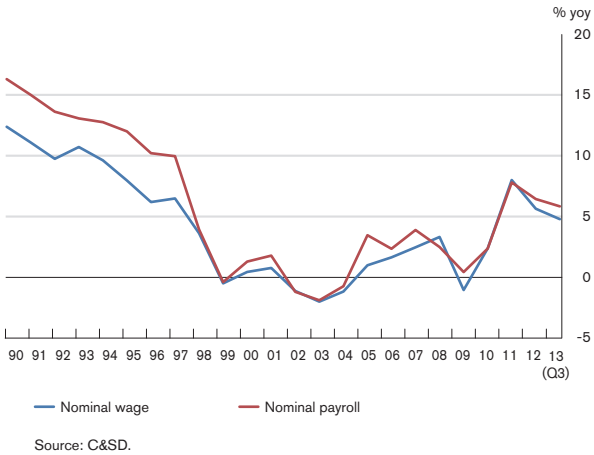
Source: HKMA staff estimates.

The decrease in skill mismatch can be due to structural improvement in the job finding and hiring technology, particularly with the proliferation of online tools for job search and the rise of recruitment agencies. Nevertheless, the level of skill mismatch may also be subject to cyclical fluctuations. In the US, for example, researchers find that skill mismatch decreases in the later stage of expansions and increase in the early stages of recoveries.[14] While we do not have enough data points to study this issue, there could be a similar cyclical pattern in Hong Kong.

As frictional unemployment has declined, the level of unemployment rate commensurate with full employment – the natural rate – may have decreased in Hong Kong. As such, the unemployment gap, which is the difference between the actual unemployment rate and the natural rate, may not be as large as otherwise under a higher natural rate. In this sense, the same headline unemployment rate may suggest less tightness in the labour market today than in the period when the natural rate was higher.

Despite all these findings, it should be noted that the overall labour market conditions are still considered relatively tight. In particular, labour earnings and wages have faced more upward pressure in recent years, with the annual growth rates of both nominal wage and nominal payroll picking up to more than 5% in 2011 and 2012, well above the benign growth during most of the 2000s (Chart B2.6).

Chart B2.6
Nominal payroll and nominal wage



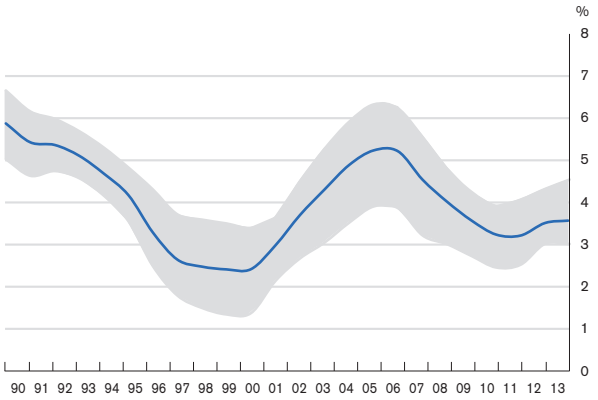
Source: C&SD.

[14] Barnichon, R. and A. Figura (2011), "What Drives Matching Efficiency? A Tale of Composition and Dispersion," Board of Governors of the Federal Reserve System, Finance and Economics Discussion Series 2011-10.

Moderation in potential GDP growth

If the unemployment gap may not be as large as originally thought, how about the output gap, which is the difference between the actual GDP growth rate and its potential growth rate? Indeed, our estimates of Hong Kong's potential GDP growth rate point to a declining trend after the GFC (Chart B2.7). This is conceivably due to the negative spillover of slower potential growth in the advanced economies and in Mainland China after the GFC. Therefore, the output gap of Hong Kong may not be as large as otherwise expected if the potential GDP growth rate were higher.

Chart B2.7
Estimates of potential GDP growth[15]



Source: HKMA staff estimates.

Nevertheless, it should be noted that there have been some positive signs in Hong Kong's potential growth developments more recently. While still below the pre-GFC level, our estimates of potential growth rate rose again in mid-2011 (Chart B2.7). Inputs of production have picked up positively in Hong Kong and this should help lift Hong Kong's potential growth in the medium to longer term. Capital accumulation has increased, with private-sector gross investment in machinery and equipment rising at an annual average rate of 10.2% in real terms between 2010 and 2013. Annual growth in the labour force also accelerated to more than 2% in the past three years compared with the ten-year average of 1.1%, as a result of higher participation rate. Total factor productivity growth has remained steady around its ten-year annual average rate.

Concluding remarks

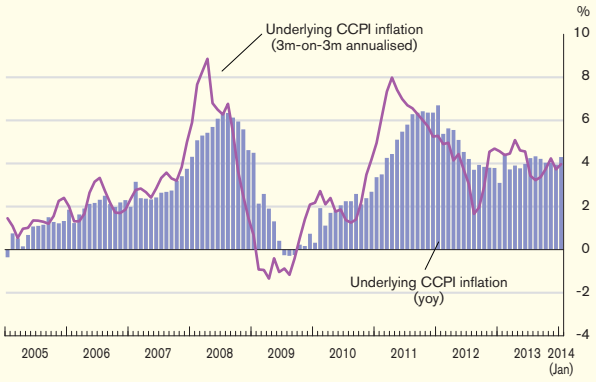
The relation between unemployment and GDP growth is never static but varies over time along with the structural and cyclical developments of an economy. Our analysis shows that certain structural developments have increased the resilience in the lower-skilled segment of the labour market in Hong Kong. But at the same time, we find that labour market efficiency has improved and frictional unemployment has decreased so that the overall labour market may not be as tight as thought in concord with the currently low level of the headline unemployment rate. The labour market might not have been as tight as thought also because Hong Kong's potential growth might have declined after the GFC. However, with GDP growth reaccelerating in recent months, the labour market is likely to have tightened again to pose some upward pressure on wages.

[15] Four estimation methods are used: (1) the production function approach; (2) the Hodrick-Prescott filter; (3) the Kalman filter; and (4) the IMF multivariate filter. The blue line shows the mean of the four methods and the shaded area provides the upper and lower boundaries, all smoothed using the five-year centred moving average. For details, please refer to Cheng, M., L. Chung and I. Yu (2011), "On the Estimation of the Output Gap of Hong Kong", HKMA Occasional Paper 03/2011.

3.2 Consumer prices

Local inflation momentum eased in the second half of 2013. Despite a pick-up in the momentum of services inflation excluding rentals, the annualised three-month-on-three-month underlying inflation rate[16] fell to 4.0% in January from an average rate of 4.6% in the first half of 2013 along with slower increase in housing rentals (Chart 3.3). The year-on-year underlying inflation rate remained stable at around 4.1% since mid-2013, but edged up to 4.3% in January, due to difference in the timing of Chinese New Year.

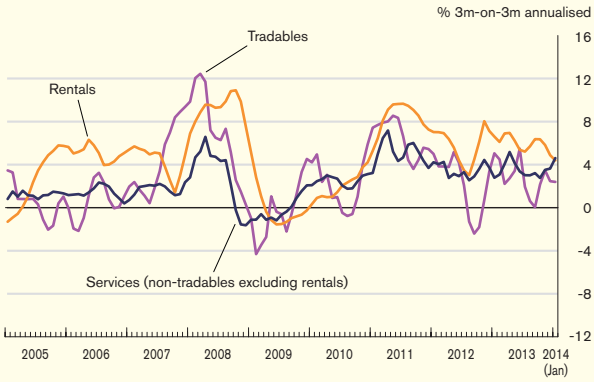
Chart 3.3
Different measures of consumer price inflation



Sources: C&SD and HKMA staff estimates.

The sequential inflation momentum will likely continue to moderate. First, easing commercial rental increase is expected to offset some of the labour cost pressures, leading to a more moderate increase in services inflation. While real payroll per person continued to grow modestly at 0.4% in the third quarter of 2013, the further decline in the seasonally adjusted three-month moving-average unemployment rate to 3.1% in February from around 3.3% in the second half of 2013 suggests increased tightness in the labour market. Latest survey indicators such as the Quarterly Business Tendency Survey (QBTS) suggest that this situation is likely to hold up and could put some upward pressures on labour costs (Chart 3.4). This is also in line with the possible closing of the output gap in 2014, which could pose some upward demand pressures on the local economy. However, the significant slowdown in the year-on-year growth of retail property rental from double digit in the first half of 2013 to single digit in the second half suggests that the overall commercial property rental could grow more moderately in the near term, thereby provide some relief to rising business costs and hence the services inflation component.

Chart 3.4
Consumer price inflation by broad components



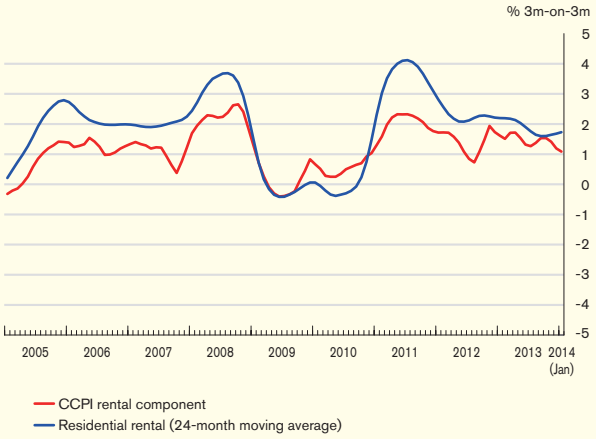
Sources: C&SD and HKMA staff estimates.

Other factors are also expected to keep inflationary pressures contained in the near term. The increase in import prices is expected to be mild as global commodity prices will likely remain broadly stable due to anticipated increase in supply, hence reducing inflation pressure on

[16] The underlying CCPI inflation rate nets out the effects of all Government's one-off relief measures from the headline CCPI inflation rate.

tradables. More importantly, sequential inflation is likely to ease amid a more moderate increase in housing rentals, which accounts for about 30% of total inflation (Chart 3.5). Overall, the annual year-on-year inflation rate for 2014 is likely to decline, with the latest Government forecast projecting an underlying inflation rate of 3.7%, down from 4.0% in 2013.

Chart 3.5
CCPI rental component and market rentals



Note: CCPI rental component excludes the effects of one-off special relief measures.
Sources: Rating and Valuation Department, C&SD and HKMA staff estimates.

The inflation outlook is subject to risks stemming mainly from the strength of external demand and local property market performance. On the upside, faster-than-expected growth in the advanced economies and Mainland China could increase demand pressure and labour market tightness further in Hong Kong, putting more upward pressures on local inflation. On the downside, given the backdrop of the US Fed's normalisation of monetary policy, global financial market volatility could heighten further amid lingering concerns over emerging markets, which could result in capital outflows and tighter financial conditions in Hong Kong. Any rise in local mortgage rates could pose downward pressures on property prices which would further weigh on rentals and dampen inflationary pressures.

4. Monetary and financial conditions

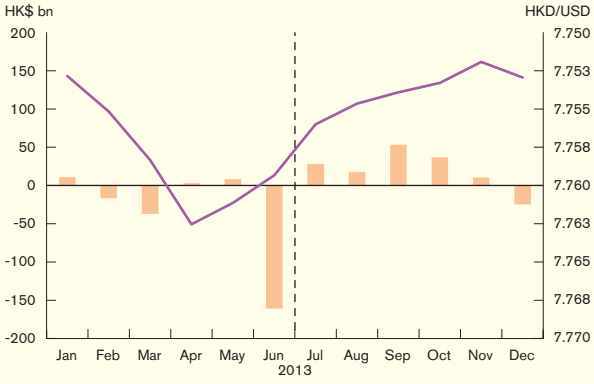
Exchange rate, capital flows and monetary developments

The Hong Kong dollar has remained stable despite volatile global financial conditions. Total loan growth reaccelerated prompting the HKMA to strengthen its prudential supervision of liquidity risk of dollar funding. It is expected that the uncertainty stemming from the normalisation of the US monetary policy will remain a major risk to fund flows and Hong Kong's monetary and financial stability.

4.1 Exchange rate and capital flows

The Hong Kong dollar remained stable during the second half of 2013 and the Linked Exchange Rate system (LERS) continued to command a high degree of market credibility, despite a sell-off in some emerging market currencies during the period. Specifically, the Hong Kong dollar spot exchange rate against the US dollar traded close to the strong-side Convertibility Undertaking within a tight range of 7.7515–7.7584. The strength of the Hong Kong dollar reflected mild inflow pressures in the non-bank private sector, as also evidenced by increases in the net spot foreign currency positions of the Authorized Institutions (AIs) in the five months to November (Chart 4.1). A pick-up in local stock market activities and reportedly some safe-haven demand amid the emerging market economies (EMEs) turmoil in the summer helped support the stronger demand for Hong Kong dollar assets. In December, although the US Federal Reserve announced its tapering plan, the Hong Kong dollar spot exchange rate softened only slightly. The net spot foreign currency positions of the AIs also posted a modest decline.

Chart 4.1
Fund flow indicator and exchange rate in 2013



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

Behind the scene diverse patterns in portfolio flows largely reflected the market reactions to the emerging market turbulence in the summer of 2013 and the ongoing worries about the US Federal Reserve's tapering plan. According to the latest Balance of Payments (BoP) statistics[17], non-residents resumed their equity portfolio investments in Hong Kong in the third quarter, spurring a faster pick-up in the local stock market

[17] Note that at the time of writing the fourth-quarter BoP statistics are not yet available.

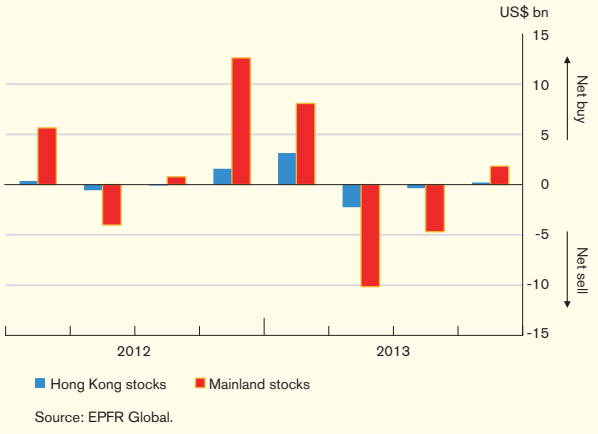
relative to that of the EMEs as a whole. A survey of global mutual funds also suggested some net buying of Hong Kong-listed stocks in the fourth quarter (Table 4.A and Chart 4.2). On the other hand, there was retrenchment in debt security investment in the second half of the year. The BoP statistics showed reduced debt security investments by non-residents in the third quarter, while survey data revealed that bond funds investing in Hong Kong debt instruments faced redemption throughout the second half, as opposed to the sizeable subscription in 2012 and early 2013 (Chart 4.3). Essentially, the outflows from bond funds have been a global phenomenon, partly because market participants reallocated their assets away from debt securities in view of potential monetary tightening in the US.

Table 4.A
Cross-border portfolio investment flows

	2011	2012	2013		
(HK$ bn)			Q1	Q2	Q3
By Hong Kong residents					
Equity and investment fund shares	-237.3	-159.6	24.8	-151.4	35.4
Debt securities	81.5	-151.3	-39.8	117.5	-214.7
By non-residents					
Equity and investment fund shares	47.1	224.5	46.2	-27.9	45.0
Debt securities	97.7	54.9	2.6	30.2	11.0

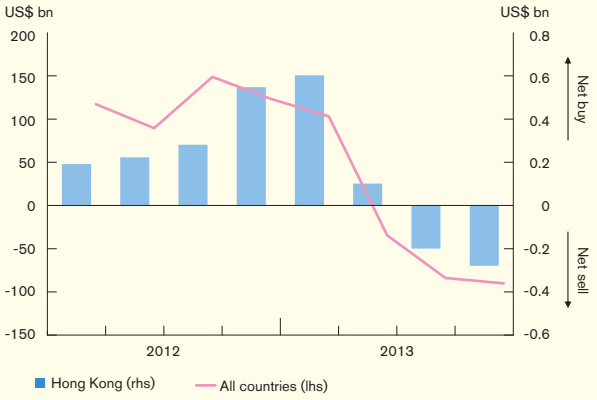
Note: A positive value indicates capital inflows.
Source: C&SD.

Chart 4.2
Market survey of equity-related flows



Source: EPFR Global.

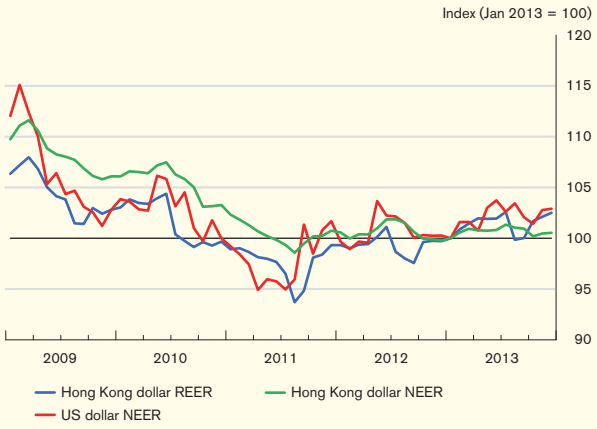
Chart 4.3
Market survey of bond-related flows



Source: EPFR Global.

From a broader perspective, the trade-weighted Hong Kong dollar nominal effective exchange rate index (NEER), which measures the relative value of the Hong Kong dollar to a basket of trading partner currencies, was largely stable in the second half of 2013 and in line with similar movement of the US dollar NEER (Chart 4.4). The Hong Kong dollar real effective exchange rate index (REER) showed similar patterns, but with more fluctuations in the third quarter due to the artificial swings in Hong Kong's headline inflation rate as a result of the phasing-out of some one-off relief measures.

Chart 4.4
Nominal and real effective exchange rates



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

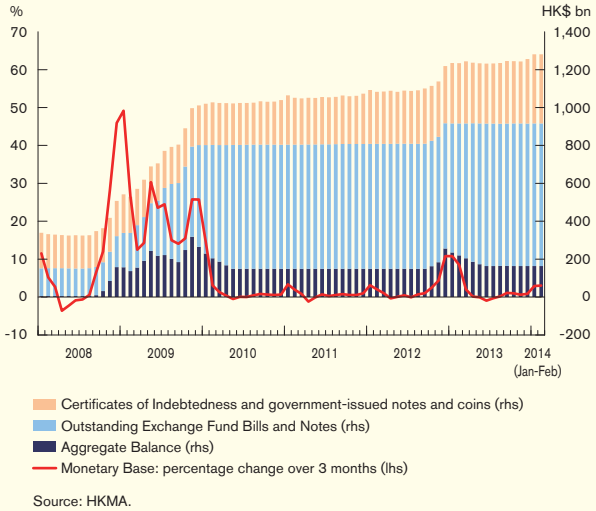
Going forward, the US Federal Reserve's decision to exit quantitative easing, coupled with the still-uncertain pace and scale of tapering and interest rate normalisation, could increase the volatility in fund flows and the risk of fund flow reversals for Hong Kong. Episodes of large Hong Kong dollar inflows in the fourth quarter of 2012 and of outflow pressures in May and June 2013 demonstrated that a shift (or just a hint of a possible shift) in the US monetary policy would have non-negligible impact on risk appetite and capital flows. Turbulence in some vulnerable EMEs, seen for example in early 2014, could also threaten adverse spillovers to Hong Kong through various financial channels. In addition, Mainland China factors such as further reforms in the financial sector and the recurrent macro-financial concerns could heighten volatility in the local money and currency markets. Indeed, the Hong Kong dollar spot exchange rate softened to the 7.76 level in January 2014, alongside the broad-based weakness in Asian currencies and equities, although increased US dollar demand from the note-issuing banks for seasonal issuance of banknotes ahead of the Chinese New Year holidays and repatriation of initial public offering (IPO) proceeds also contributed to the softening.

In the near to medium term, it appears that the pull factors which have attracted capital flows into the EMEs (e.g. stronger growth) are slowing while the push factors that have driven capital out of the advanced markets (e.g. ultra-loose monetary conditions in the US) are fading. The relative strength of these factors will inevitably affect the scale and volatility of fund flows in Hong Kong.

4.2 Money and credit

The monetary conditions remained accommodative in the second half of 2013, with the money supply growing faster and interest rates still hovering at low levels. The Hong Kong-dollar Monetary Base increased modestly by 1.9% between June and December to HK$1,255.8 billion at the end of the year, driven by rises in Certificates of Indebtedness (Chart 4.5). On the other hand, the Aggregate Balance was virtually unchanged in the absence of any triggering of the Convertibility Undertaking or any monetary operations by the HKMA. The outstanding amount of Exchange Fund paper also showed very little change.

Chart 4.5
Monetary Base components

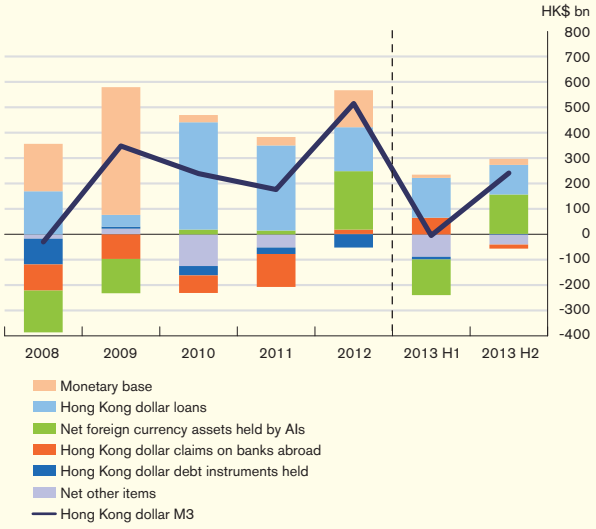


Source: HKMA.

Despite modest growth in the Monetary Base, the Hong Kong-dollar broad money supply (HK$M3) picked up faster at 5.5% in the second half as a result of a stronger increase in bank customers'

deposits and negotiable certificates of deposit held by the non-bank sector. Analysis by the asset-side counterparts under the framework of monetary survey suggested that growth in bank loans and AIs' net foreign currency assets, the latter reflecting inflow pressures into the non-bank private sector, was expansionary on broad money supply (Chart 4.6).

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

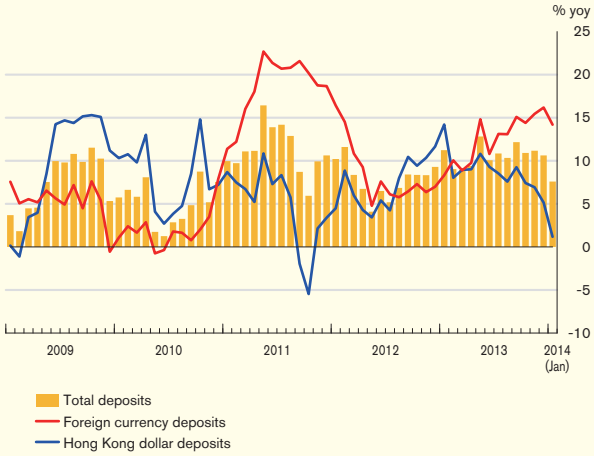


Note: The HK$M3 in the monetary survey has been adjusted to include foreign currency swap deposits and to exclude government deposits and Exchange Fund deposits with licensed banks.

Source: HKMA staff estimates.

As the main component of HK$M3, Hong Kong dollar deposits rose at a quicker pace in the second half after staying flat in the first half. The rebound was largely driven by increased demand for Hong Kong dollar assets alongside more buoyant stock market activities. But compared with the 11.7% growth in 2012 that was in large part driven by fund inflows, Hong Kong dollar deposits only increased by 5.1% in 2013 (Chart 4.7). Foreign currency deposits also increased faster in the second half, and this brought the full-year growth to a solid 16.2%. Renminbi deposits were a main driver and their recent developments are discussed in further detail later in this section. Overall, total deposits with the AIs grew by 10.6%, roughly the same pace as in previous two years.

Chart 4.7
Deposit growth

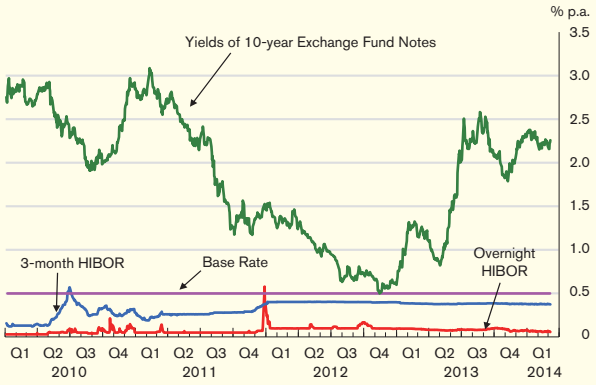


Source: HKMA.

Largely reflecting the abundant liquidity conditions, the wholesale funding costs of the banking sector continued to stay at low levels throughout the second half of 2013. The overnight and 3-month HIBOR fixing rate hovered at 0.08% and 0.38% respectively, only with occasional fluctuations stemming from banks' funding demand for quarter-end liquidity and equity fund-raising activities (Chart 4.8).

The long-dated Hong Kong dollar yields however increased gradually along with the US dollar counterparts on market concerns about the US Federal Reserve's plan of tapering its asset purchase programme. For example, the yield of the 10-year Exchange Fund Notes climbed to 2.31% from 2.00% between June and December. The low wholesale funding cost also diffused to the retail interest rates. The savings deposit rate continued to stay close to zero, while the mortgage interest rate for new loan applications remained roughly stable at 2.2–2.3%, compared with an average of around 5.3% in the past 20 years.

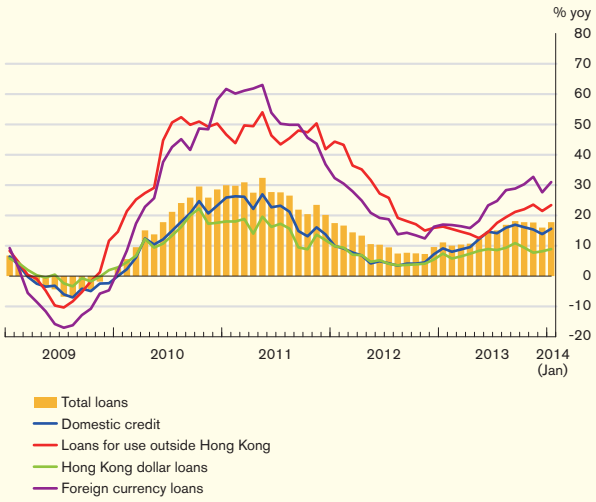
Chart 4.8
Hong Kong dollar interbank interest rates and yield of 10-year Exchange Fund Notes



Sources: CEIC and HKMA.

Against the backdrop of accommodative monetary conditions and the low interest rate environment, the risks of rapid credit expansion continue to warrant attention. Despite signs of moderation in the fourth quarter, growth in total loans accelerated to 16.0% in 2013 from 9.6% in 2012, largely reflecting a sharp increase in foreign currency lending and loans for use outside Hong Kong due to stronger cross-border liquidity demand (Chart 4.9). Meanwhile, Hong Kong dollar lending and domestic credit also grew somewhat faster.

Chart 4.9
Loan growth

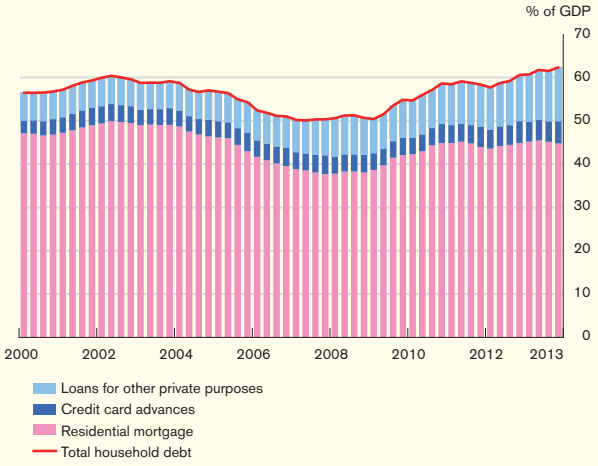


Source: HKMA.

Within domestic credit, trade finance saw a sizeable expansion of 43.8%, while lending to sectors of wholesale and retail trade, manufacturing, and financial concerns and stockbrokers also posted solid double-digit growth. On the other hand, there was only tepid growth in residential mortgage due to sluggish property market activities and the accumulating effect of the prudential measures. However, with personal loans (which comprise credit card advances and loans for other private purposes) increasing at a hefty 16.8%, total household indebtedness rose to a record level of 62% of GDP at the end of 2013 (Chart 4.10). In view of such developments, the HKMA issued a circular in January 2014 to require the AIs to review the underwriting standards for their personal lending business and enhance their risk management practices.[18]

[18] Specifically, these practices involve prudent uses of instruments such as debt-servicing ratio limit, maximum loan tenor, portfolio-based limit structure, and internal stress testing.

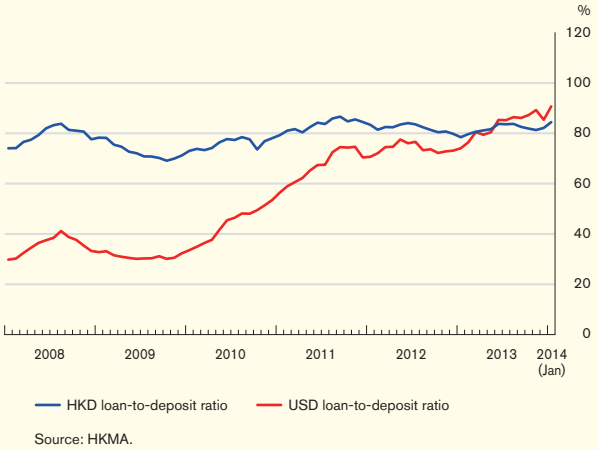
Chart 4.10
Household debt-to-GDP ratio and its components



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

Rapid growth in US dollar loans has led to a surge in the US dollar loan-to-deposit ratio to 85.4% at the end of 2013 (Chart 4.11). The Hong Kong dollar loan-to-deposit ratio also hovered around the 80% level in recent years. To prevent further build-up of funding vulnerability, the HKMA introduced the Stable Funding Requirement which came into effect from January 2014, under which AIs with total loan growth exceeding 20% are required to maintain specific level of stable funds.

Chart 4.11
Loan-to-deposit ratios



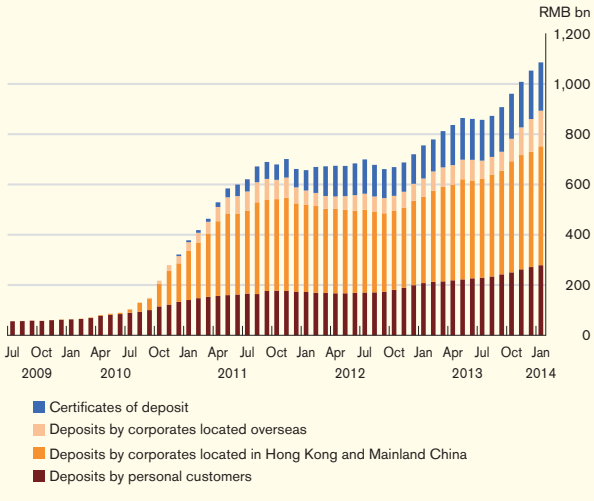
Source: HKMA.

In the face of prudential requirements for stable funding and the risks associated with the normalisation of the US monetary policy, banks' credit stance could turn slightly more conservative going forward. Moreover, the average funding cost of retail banks, as shown in the composite interest rate, has also edged up gradually. Therefore, credit access for the non-bank private sector could become slightly more constrained while the borrowing costs would face upward pressures.

Offshore renminbi banking business

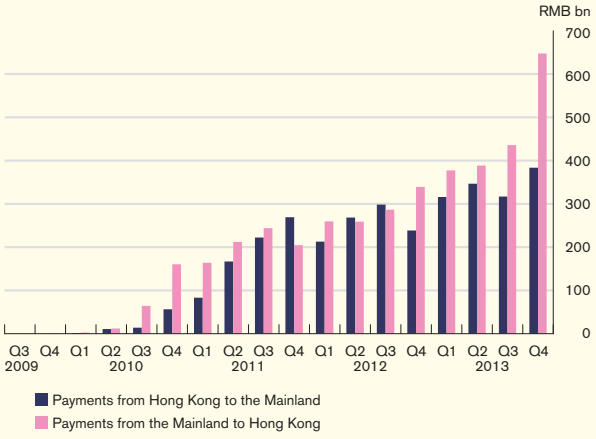
Renminbi business of Hong Kong banks gained further momentum in the second half of 2013. The total outstanding amount of renminbi deposits and certificates of deposit (CDs) rose at a quickened pace of 22.3% between June and December. This brought the full-year growth rate to 46.2% for 2013 as a whole (Chart 4.12, Table 4.B). The remarkable growth largely reflected more popular use of renminbi in trade settlement (particularly inward remittances to Hong Kong) (Chart 4.13), and to a lesser extent, stronger renminbi demand due to higher interest rates against other currencies and expectations for currency appreciation. Meanwhile, the outstanding amount of renminbi bank lending grew notably by 46.3% from a year ago.

Chart 4.12
Renminbi deposits and CDs in Hong Kong



Source: HKMA.

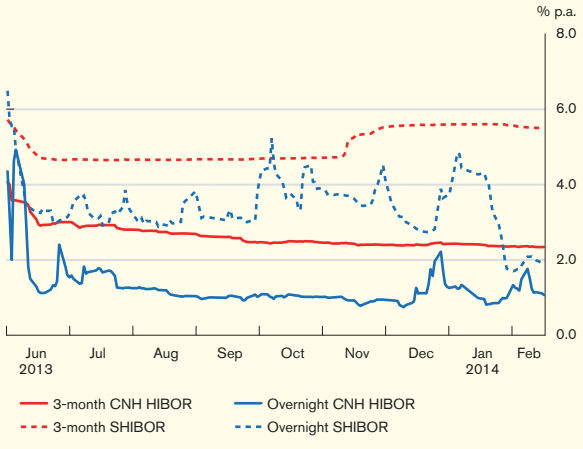
Chart 4.13
Flows of renminbi trade settlement payments



Source: HKMA.

The Hong Kong offshore renminbi exchange rate (CNH) tracked closely with the onshore counterpart (CNY) and generally traded at a premium that widened to 57 pips on average in the second half of 2013. The CNH interbank interest rates remained relatively stable, even though a tightening in the CNY liquidity conditions led to sizeable fluctuations in the onshore market in the fourth quarter (Chart 4.14). Forward-implied yields in the CNH market, however, were more volatile. Box 3 discusses interactions between the onshore and offshore deliverable forward markets.

Chart 4.14
Onshore and offshore renminbi interbank interest rates



Sources: TMA and CEIC.

There are also indications that Hong Kong has continued to strengthen its position as a global hub for offshore renminbi business. There has been vibrant growth in the turnover of the renminbi real time gross settlement (RTGS) system, with 90% of its transactions conducted purely in the offshore markets in 2013. Also, the amounts due to and due from overseas banks have grown at a solid pace (Table 4.B), suggesting a key role played by Hong Kong banks in the offshore renminbi market.

Table 4.B
Offshore renminbi banking statistics

	2012	2013
Renminbi deposits and certificates of deposit (CDs) (RMB bn)	720.2	1,053.0
Renminbi deposits (RMB bn)	603.0	860.5
Of which:		
Personal customer renminbi deposits by non-Hong Kong residents (RMB bn)	4.4	19.0
Share of renminbi deposits in total deposits (%)	9.1	12.0
Renminbi certificates of deposit (CDs) (RMB bn)	117.3	192.5
Renminbi trade settlement in Hong Kong (RMB bn)	2,632.5	3,841.0
Of which:		
Inward remittances to Hong Kong (RMB bn)	1,144.2	1,848.9
Outward remittances to Mainland China (RMB bn)	1,017.8	1,362.9
Ratio of inward to outward remittances to Mainland China	1.1	1.4
Outstanding renminbi loans (RMB bn)	79.0	115.6
Number of participating banks in Hong Kong's renminbi clearing platform	204	216
Turnover in Hong Kong's RMB RTGS system (Daily average during the period; RMB bn)	213.7	395.4
Amount due to overseas banks (RMB bn)	99.1	166.0
Amount due from overseas banks (RMB bn)	117.1	164.5

Source: HKMA.

Box 3
Interactions between CNY and CNH deliverable forward markets

Since the introduction of a series of landmark policies in 2010[19], Hong Kong's RMB offshore market, also known as the CNH market, has seen a proliferation of a wide range of financial products including dim sum bonds and foreign exchange deliverable forward contracts. As a result of these developments, there has been growing interest in understanding the interactions of the CNH market with the Mainland market.

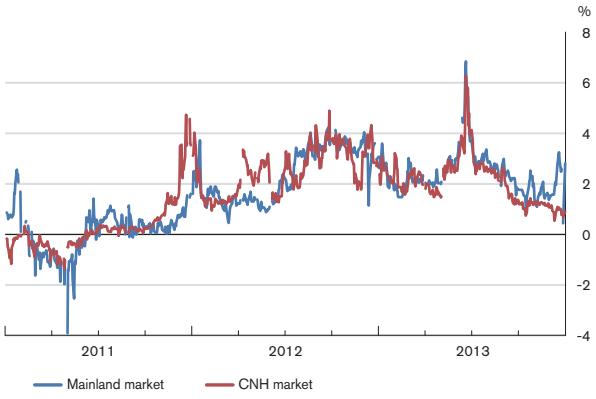
Against this backdrop, this Box highlights the key findings of a quantitative analysis we conducted on the RMB forward exchange rates in Mainland China and the CNH market. The analysis focuses on two issues, namely, cross-market spillovers between the two markets and the functioning of these markets in the price discovery process.

Overview of RMB forward exchange markets

The implied yields of RMB deliverable forward (DF) contracts traded in the Mainland and CNH markets in 2011-13 are used for this analysis, computed on the condition that covered interest rate parity holds.[20] Given the active trading of DF in both markets, DF implied yields should be able to capture RMB forward premium dynamics.

The one-month DF implied yields for the two markets on a daily basis are plotted in Chart B3.1. It is noteworthy that the two series moved more or less in tandem, except for occasional periods of disparities.[21] This suggests a close relationship between the two markets, and statistical tests confirmed such a cointegrated relationship.[22] Another feature is that the DF implied yields are not subject to the lower zero bound, and they were negative in some periods of time.[23]

Chart B3.1
One-month forward implied yields



Source: HKMA staff estimates using data from Bloomberg.

Cross-market spillovers

The analysis on cross-market spillovers is to assess the impacts of a shock originating from one market on the volatilities of the other market. A shock could be a policy surprise or unanticipated changes in supply/demand conditions. As a first step, we used the technique of variance decomposition to attribute the volatilities of the two markets to shocks from

19 For details, see Box 3 in the HKMA Half Yearly Monetary and Financial Stability Report, September 2010.

20 The implied yield is backed out by the covered interest rate parity as follows: $F=S(1+r_{RMB})/(1+r_{USD})$, where F is DF rate, S is RMB/USD spot exchange rate, r_{RMB} is the implied yield and r_{USD} is US dollar interest rate (LIBOR).

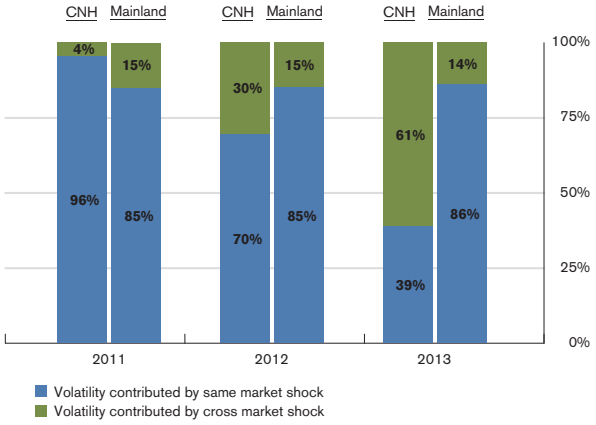
21 For a discussion of the disparities of Mainland and CNH RMB forward exchange rates, see K.F. Li, C.H. Hui and T.K.Chung (2012) "Determinants and dynamics of price disparity in onshore and offshore renminbi forward exchange rate markets", Hong Kong Institute for Monetary Research Working Paper.

22 The results of Engle-Granger test and Philips-Ouliaris test suggested that the onshore and offshore RMB DF implied yields are co-integrated.

23 For a discussion that DF implied yields could be negative, see G. Ma and R. McCauley (2008) "Efficacy of China's capital controls: evidence from price and flow data", *Pacific Economic Review*, 12:1 pp.104-123.

either one of these markets.[24] As shown in Chart B3.2, the results suggest that for the CNH market, Mainland shocks have played an increasingly important role in driving volatilities – for example, up to 61% of the average volatilities of DF implied yields in 2013, compared with 4% in 2011. For the Mainland market, such pattern is not apparent, and same market shocks consistently played a leading role in driving the forward premium.

Chart B3.2
Breakdown of volatility in the Mainland and CNH implied yields



Source: HKMA staff estimates using data from Bloomberg.

To further assess cross-market linkages, a bivariate generalised autoregressive conditional heteroscedasticity (GARCH) model is constructed and estimated. In the mean equation of this model, S&P VIX Index is included so that global shocks affecting both markets are controlled for.[25] Given the co-integration between the Mainland and CNH implied yields, a vector error correction (VEC) form is specified in the mean equation. As shown in Table B3.A, our findings suggest very limited cross-market spillovers during 2011-12 as most of the pairs of estimated coefficients are not statistically significant, and the patterns are not clear-cut. During 2013, spillovers from onshore towards offshore were found to be larger than spillovers in the opposite direction in most of the cases. This probably reflects the fact that the CNH market, though rapidly growing, is small compared to the Mainland market, and possibly more subject to onshore influences. Furthermore, the increasing use of RMB in cross-border trade and other transactions might have allowed more room for Mainland RMB market to affect the CNH market since 2013.

Table B3.A
Cross-market shock spillover coefficients under the VECM-BEKK model

	Maturity of DF implied yields			
	1-month	3-month	6-month	12-month
2011				
Mainland-to-CNH	0.000	0.004	0.000	0.024*
CNH-to-Mainland	0.003	0.000	0.003	0.003**
2012				
Mainland-to-CNH	0.002	0.003	0.004	0.006
CNH-to-Mainland	0.000	0.094***	0.006	0.179***
2013				
Mainland-to-CNH	0.447***	0.056***	0.480***	0.103***
CNH-to-Mainland	0.110***	0.048***	0.224***	0.173***

Notes:
1. Larger the coefficients, stronger the cross-market shock spillover.
2. ***, ** and * denote significance at 1%, 5% and 10% levels respectively.

Source: HKMA staff estimates using data from Bloomberg.

Price discovery

Price discovery refers to the process in which new information about the fundamentals of an asset is incorporated into its market price. For identical or similar assets traded in multiple markets, two methods have been commonly used in the research literature to assess the price discovery of respective markets. The first one, proposed by Gonzalo and Granger, focuses on the speed of adjustment to measure price discovery.[26] The second, proposed by Hasbrouck, focuses on the information shares of the two markets in price variance.[27] These two methods

[24] For details, see F.X. Diebold and K. Yilmaz (2012) "Better to give than to receive: predictive directional measurement of volatility spillovers", *International Journal of Forecasting*, 28 (1), 57-66.

[25] The S&P VIX index is a key measure of market expectations of near-term volatility conveyed by S&P 500 stock index option prices and has been widely regarded as a major indicator of investor sentiment and market volatility.

[26] For details, see J. Gonzalo and C.W.J. Granger (1995) "Estimation of common long memory components in cointegrated systems", *Journal of Business and Economic Statistics*, 13:1, 27-36.

[27] For details, see J. Hasbrouck (1995): "One security, many markets: Determining the contributions to price discovery", *Journal of Finance,* Vol.50, 1175–1199.

are used in this study, based on a VEC model that is part of the GARCH model for the analysis of cross-market spillovers.

In short, the two methods found that neither market played a leading role in the price discovery of forward exchange rates, suggesting that the two markets contributed to different aspects of the price discovery process (Table B3.B). On the one hand, as the CNH market is subject to fewer regulations than the Mainland market, it is probably more flexible to reflect supply and demand conditions in the offshore market itself, which may also be affected by global financial conditions. On the other hand, to the extent that market movements are driven by changes in policies or financial conditions in the Mainland domestic market, market participants located in the Mainland might be in a better position to incorporate such information into the market price.

Table B3.B
Price discovery between Mainland China and CNH markets

	Maturity of DF implied yields			
	1-month	3-month	6-month	12-month
Gonzalo and Granger	0.302	0.548	0.832	-0.149
Hasbrouck MID	0.309	0.579	0.832	0.081
Leading role in price discovery	CNH	Mainland	Mainland	CNH

Note: Both Gonzalo and Granger, and Hasbrouck MID provide a relative measure of price discovery across multiple markets instruments. Measure less than 0.5 here represents a leading role of the CNH market in the price discovery process.

Source: HKMA staff estimates using data from Bloomberg.

Implications

In summary, this study found evidence of two-way cross-market spillovers in 2013 but influences from the onshore market to the offshore market were on average much larger than in the opposite direction. At the same time, the two markets were found to contribute to the price discovery process of RMB forward exchange rates in different aspects. The results suggest that these markets have interacted with and influenced each other through various channels. Understanding how these channels work is also useful. It appears that the major channel is based on cross-market information disparity.[28] To illustrate, participants in one market might perceive that prices in the other market are more effective in reflecting certain types of information. Then, the price movements of the other market could serve as useful indicators, prompting them to follow suit. For example, CNH market participants might interpret forward rate movements in the onshore markets as a proxy of, say, Mainland monetary conditions. On the other hand, Mainland market participants might perceive that forward rate movements in the CNH market better reflect global market conditions due to its openness and connectedness with global financial markets.

Finally, it is useful to take a broader perspective by examining similar cases of onshore-offshore market spillovers in other countries. In this regard, the historical experiences of the Eurodollar market might provide us some food for thought. Applying the econometric methods of this study to the weekly data of the offshore US dollar market in London during 1964-1995, our results show that the magnitude of the volatility spillover increased since 1980 when Regulation Q interest rate ceiling imposed by the Federal Reserve and other capital control measures were removed. Also, the spillover from the offshore market to the onshore market became more tangible than before. Similarly, for the case of the Mainland and CNH markets, spillovers between these two markets are expected to become increasingly two-way as the Mainland liberalises interest rate regulations and capital control measures. Nevertheless, the onshore markets are expected to continue to play a leading role in onshore-offshore money and foreign exchange market interactions since these markets will be ultimately dominated by the monetary policy stance of the onshore authorities.

[28] In theory, cross-market arbitrage could be a channel for spillovers. However, given the effectiveness of Mainland's capital control measures, this channel appears to play a much more limited role in cross-market spillovers compared with the information channel.

Asset markets

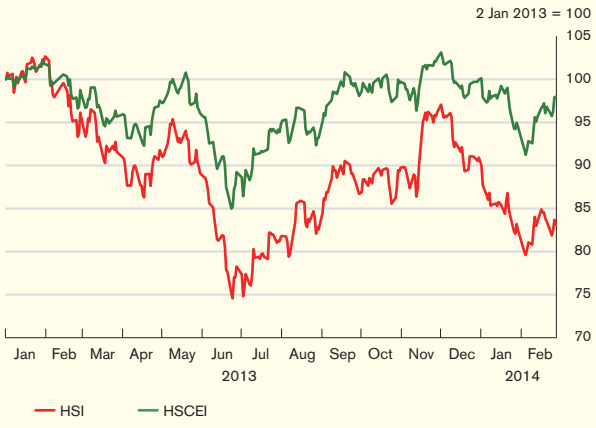
Hong Kong equities have been heavily influenced by external market conditions over the past six months. With the commencement of the Fed's QE tapering, the market is expected to remain volatile in 2014. By contrast, the domestic debt market was resilient despite reduced investor appetite. In particular, the offshore renminbi debt market continued to grow rapidly with increased product and issuer diversity. Property prices faced some downward pressure amid concerns over the Fed's tapering and the dampening effect of policy measures. With highly-stretched valuation, the property market could be sensitive to interest rate hikes and reversal of fund flows.

4.3 Equity market

In contrast with the sharp rally in major equity markets around the world, the performance of the Hong Kong market has been relatively lacklustre over the past six months. Local stocks have remained susceptible to external market conditions, particularly the US monetary policy outlook and the prospect of Mainland China's economy. Reiterating its stance on keeping interest rates low in its forward guidance after the December FOMC meeting, the Fed successfully convinced financial markets that tapering asset purchases and raising interest rates are separate policy actions. Global equities rebounded sharply as a result. However, the equity market in Hong Kong barely improved as optimism was partially offset by growing concerns over the liquidity condition in the Mainland, as reflected by a surge in the 7-day SHIBOR in late December. Market sentiment deteriorated further in early 2014 amid a massive selloff in emerging market currencies and renewed concerns over the global economy.

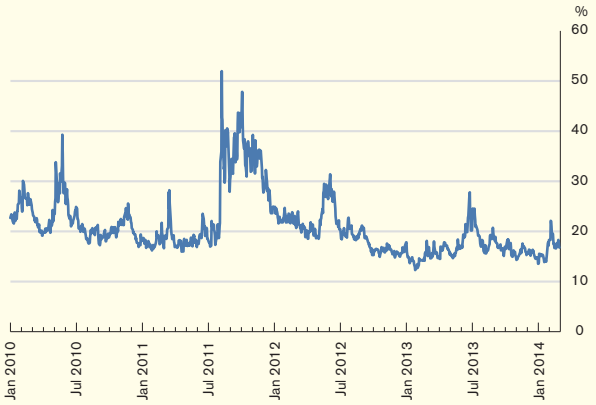
Overall, the Hang Seng Index (HSI) increased by 5.1% from September 2013 to February 2014, whereas the Hang Seng China Enterprises Index (HSCEI), also known as the H-share index, edged up slightly by 0.7%, suggesting that fears of a slowdown of the Mainland economy and the tight funding conditions continued to put pressure on the H-share market (Chart 4.15). Meanwhile, the implied volatilities of HSI jumped to a six-month high in February (Chart 4.16).

Chart 4.15
The Hang Seng Index and Hang Seng China Enterprises Index



Source: Bloomberg.

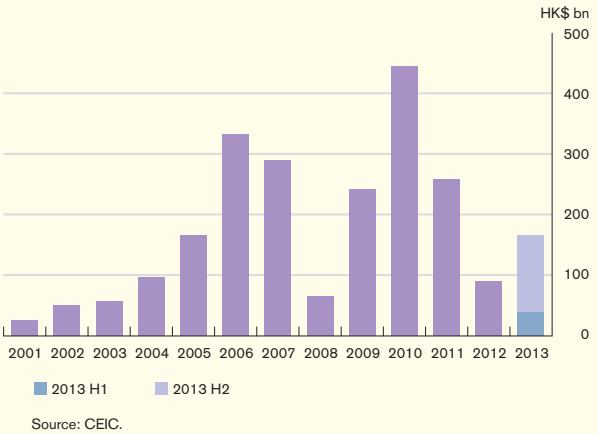
Chart 4.16
Option-implied volatility of the HSI



Source: Bloomberg.

In the primary market, despite more volatile market conditions, fund-raising activities in Hong Kong picked up strongly in the second half of 2013 (Chart 4.17). The listings of Chinese companies rose particularly sharply in December on the back of improved sentiment following the Third Plenum, which helped the city secure second place among global markets in terms of IPO volume in 2013. Throughout the year, funds raised from IPOs amounted to HK$166.5 billion, an 85.6% increase from 2012.

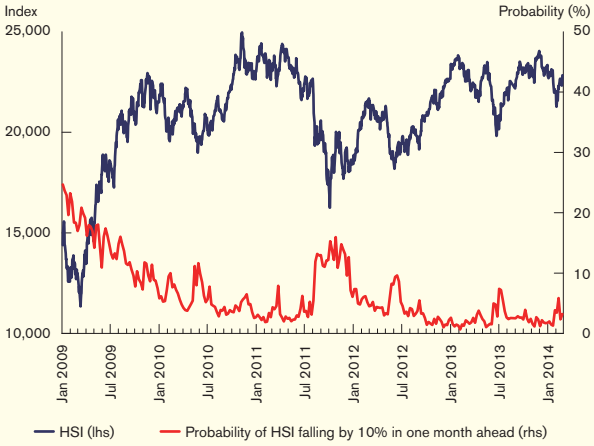
Chart 4.17
The IPO market in Hong Kong



Source: CEIC.

Looking ahead, the downside risk to the local equity market, as measured in terms of the option-implied probability of a 10% fall in HSI in one-month ahead, appears limited, given that the low interest rate environment still provides support to asset prices (Chart 4.18). That said, the market will remain clouded by uncertainties over the pace of the Fed tapering for quite some time and, should the resulting capital outflow eventually materialise, whether the exit will be an orderly one. The reactions of international investors will also depend on the performance of major economies, especially the Mainland, in the period ahead.

Chart 4.18
The Hang Seng Index and its option-implied probability of falling by 10% in one-month

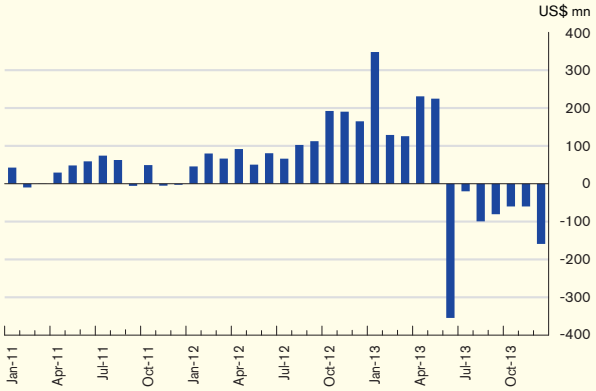


Sources: Bloomberg and HKMA staff estimates.

4.4 Debt market

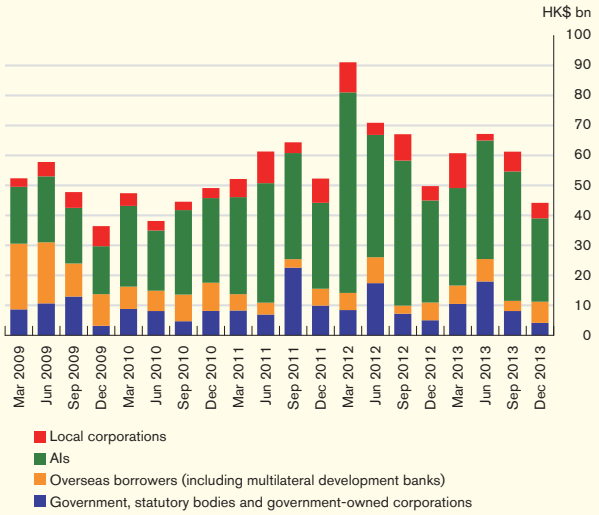
The Hong Kong dollar debt market grew steadily despite the volatility in global bond markets. Amid uncertainties over the course of the Fed's QE tapering and its potential impact on emerging markets, investor appetite for bonds receded in the local market in the second half of 2013, as reflected in significant bond fund outflows and a surge in the yields of Exchange Fund Bills and Notes (Charts 4.8 and 4.19). Against this backdrop, the public sector was the main driver of growth for the domestic debt market, issuing HK$274.5 billion or 14.5% more debt than the previous year (Chart 4.20).[29] New debt issued by the local private sector, which comprises AIs and local corporations, declined considerably.[30] As the increase in public sector debt issuance more than offset the decline in new debt issued by the local private sector, total issuance in 2013 grew by 10.6% year on year to HK$2,356.8 billion.

Chart 4.19
Bond fund flows into Hong Kong



Source: EPFR Global.

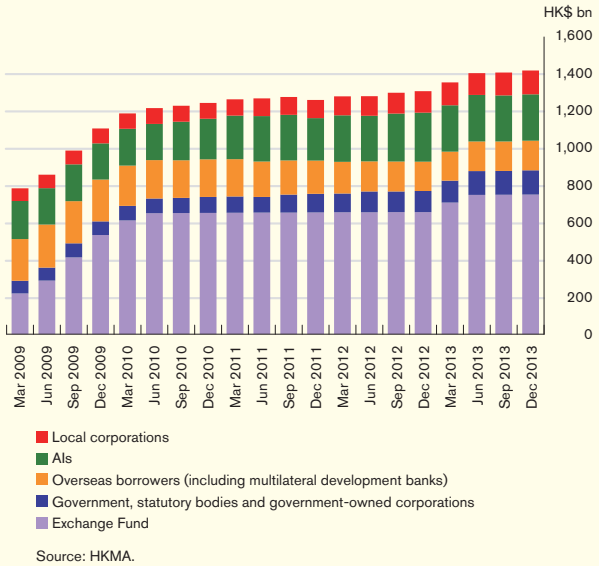
Chart 4.20
New issuance of non-Exchange Fund Bills and Notes Hong Kong dollar debt



Source: HKMA.

With the sizeable growth in total issuance, the outstanding amount of Hong Kong dollar debt surged by 8.5% year on year to a record level of HK$1,419.4 billion as at end-December 2013 (Chart 4.21).[31] The rapid growth in issuance pushed public sector debt outstanding higher by 14.5%. Among the local private sector, the outstanding amount of debt issued by AIs dropped by 5.1%, while local corporations saw its debt outstanding rise by 10.1% despite its reduced activity in the primary market.

Chart 4.21
Outstanding Hong Kong dollar debt



Source: HKMA.

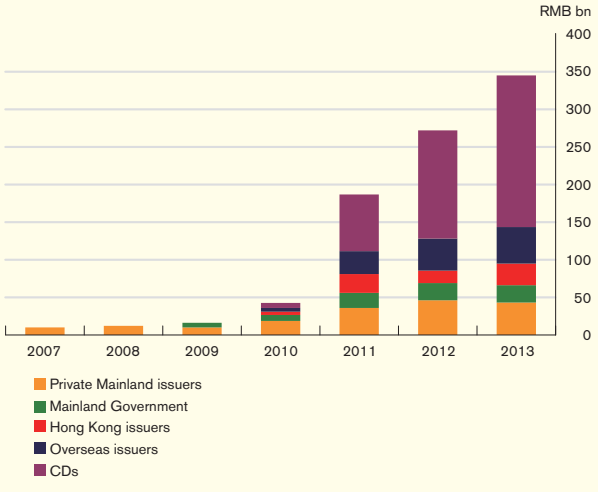
[29] Exchange Fund paper issuance accounted for 90.1% of total issuance in 2013. A total amount of HK$30.0 billion worth of debt securities were issued under the Government Bond Programme, up by 15.4% from the previous year. Debt issued by statutory bodies/ government-owned corporations, however, dropped by 11.3% to HK$10.7 billion.

[30] In 2013, new issuance by AIs and local corporations declined by 24.8% and 7.6% to HK$143.0 billion and HK$25.6 billion respectively.

[31] This was equivalent to 29.5% of the Hong Kong dollar M3 or 24.5% of Hong Kong dollar denominated assets of the entire banking sector.

The offshore renminbi debt market in Hong Kong also expanded tremendously in 2013. Although reduced investor appetite kept issuance subdued in the third quarter of 2013, primary activity rebounded sharply towards the end of the year. Overall, total issuance in 2013 amounted to RMB344.3 billion, up by 26.9% from the preceding year (Chart 4.22). Private Mainland issuers accounted for the majority of non-CD debt issuance prior to 2012, but overseas issuers have since increased substantially. In 2013, the proportion of debt issued by overseas issuers in total issuance excluding CDs rose to 33.9%, surpassing the share of debt issued by private Mainland issuers (Chart 4.22). The strong growth in issuance pushed the outstanding amount of offshore renminbi debt securities in Hong Kong sharply higher by 42.7% year on year to a record level of RMB522.2 billion as at end-December 2013 (Chart 4.23).

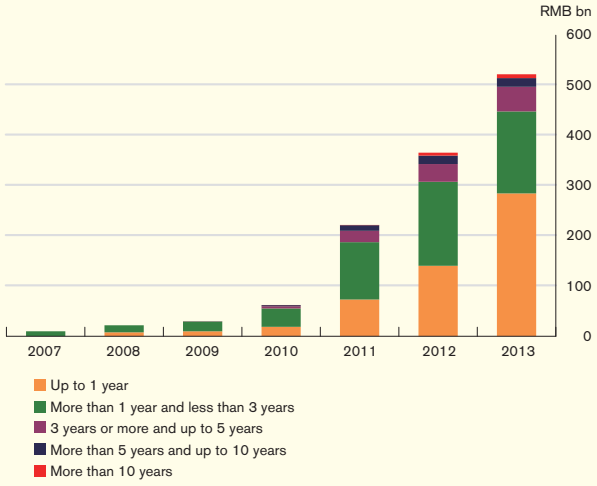
Chart 4.22
New issuance of offshore renminbi debt securities



Sources: Newswires and HKMA staff estimates.

Apart from the strong growth and issuer mix, the market also saw two other positive developments, namely, the issuance of the first floating-rate bond priced with reference to the CNH HIBOR and the first foreign provincial government bond. On 13 November 2013, the China Development Bank issued the first

Chart 4.23
Outstanding amount of offshore renminbi debt securities by remaining tenors



Sources: Newswires and HKMA staff estimates.

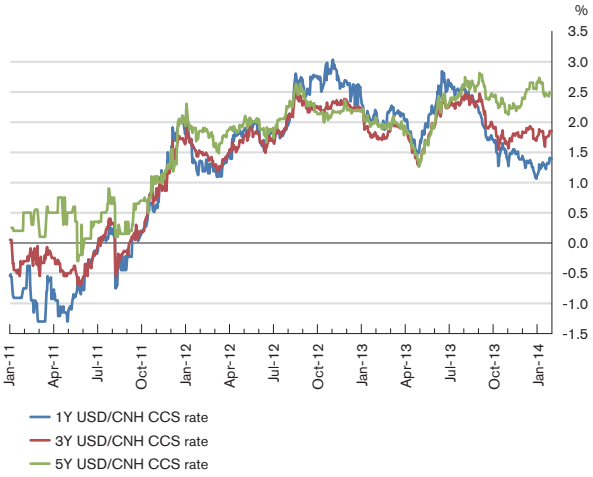
offshore RMB floating-rate bond priced with reference to the CNH HIBOR fixing, which was launched on 24 June 2013. On the same day, the Province of British Columbia also issued the first foreign provincial government bond. These bonds certainly marked another step forward of the market towards greater product and issuer diversity.

Looking ahead, the market is expected to grow further in view of a promising primary market. Firstly, the increase in refinancing need is likely to help sustain the pace of issuance. As at end-December 2013, the outstanding debt maturing within one year amounted to RMB284.8 billion, more than double the RMB140.6 billion at end-December 2012 (Chart 4.23). Secondly, liquidity conditions are likely to remain more favourable in the offshore market, hence allowing bond issuers to raise renminbi funds at relatively lower costs. Lastly, a rising USD/CNH cross-currency swap (CCS) rate, together with greater product diversity in the CCS market, may add momentum to swap-based issuance by issuers seeking USD funds. Box 4 analyses the driving forces behind the rising CCS rate over the past two years and discusses its outlook.

Box 4
What has been driving the USD/CNH cross-currency swap rate?

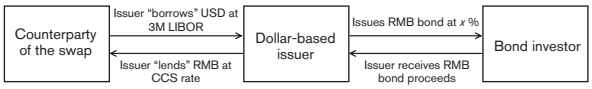
The offshore RMB bond market has grown remarkably over the past few years. Excluding bonds issued by the Mainland Government, issuance of non-CD debt securities reached RMB135.3 billion in 2013, more than four times the amount recorded in 2010. Meanwhile, the market also saw greater issuer diversity, with the proportion of non-CD debt securities issued by overseas issuers rising from 17.9% in 2010 to 40.6% in 2013.[32] The rapid growth of the market, in particular the issuance by overseas issuers, was reportedly attributable to an increase of swap-based issuance amid a rising USD/CNH cross-currency swap (CCS) rate quoted as a fixed rate for the CNH leg over the past two years. For instance, the 3-year USD/CNH CCS rate increased by more than 250bps over the period from 2011 to 2012 (Chart B4.1). The pick-up in the USD/CNH CCS rate provided an opportunity for companies to issue RMB bonds and obtain USD funding at lower costs (compared with issuance of USD bonds) by swapping their RMB bond proceeds into USD (Chart B4.2).[33] The counterparties of the USD/CNH CCS are mostly investors interested in gaining RMB exposure but do not have access to the CNH capital market. Indeed, the USD/CNH CCS market has also become increasingly popular, with a number of market participants seeing an increasing trading volume over the past two years. In light of these developments, this Box analyses the driving forces behind the rising CCS rate in order to gauge the prospects for the swap-based bond issuances.

Chart B4.1
USD/CNH CCS rates



Source: Bloomberg.

Chart B4.2
Swapping RMB bond proceeds into USD funding



What determines the USD/CNH CCS rate?

In theory, CCS involves only a pure exchange of cash flows between two parties. This implies that the present values of all the payments made by the two parties should be the same at inception. In other words, the initial value of the swap to both parties should be zero. Nevertheless, after the contract begins, the value of the swap to each party may become positive or negative depending on market conditions, including changes in the exchange rate and interest rates. Hence, an appropriate swap rate should be one that will lead to a zero value of the swap at inception after taking into account future

[32] Overseas issuers include multilateral development banks, financial and non-financial corporations with headquarters located outside Hong Kong and Mainland China.

[33] An example of swap-based issuance in the offshore RMB debt market was the bond issued by the Export-Import Bank of Korea in July 2012. The bond proceeds of RMB1.75 billion were swapped into US$280 million through the USD/CNH CCS market. This has allowed the bank to raise USD funding at a cost of 10bps lower than direct bond issuance in the USD market. For details, see the press release by the Export-Import Bank of Korea at http://www.koreaexim.go.kr/en/bbs/noti/view.jsp?no=10963&bbs_code_id=1316753474007&bbs_code_tp=BBS_2&req_pg=20.

movements in interest rates and exchange rate over the life of the contract. In light of this, we postulate that the USD/CNH CCS rate is a function of the US interest rate, the future volatility in the US interest rate, the offshore RMB interest rate and the expectation of RMB appreciation against the USD.

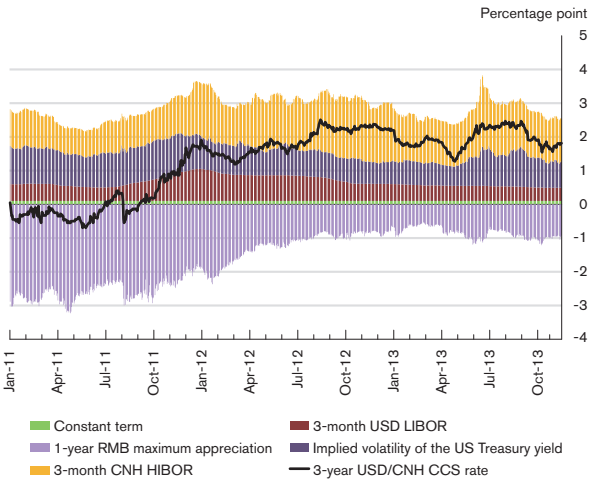
An econometric model is estimated based on daily data covering the period from January 2011 to November 2013. As the USD/CNH CCS market is most active at the 3-year tenor, the 3-year CCS rate is used as the dependent variable. Given the abovementioned factors, we regress the CCS rate on four explanatory variables, namely, (1) the 3-month USD LIBOR which is used as a measure of the US interest rate; (2) the Merrill Option Volatility Expectations Index which is used to proxy the future volatility in the US interest rate; (3) the 3-month CNH HIBOR which is used to control for the cost of funds in the offshore RMB market; and (4) an estimated 1-year maximum appreciation of the RMB which proxies the expected appreciation of the RMB against the USD.[34, 35 & 36]

Results

All the explanatory variables are found to have the expected signs: the maximum appreciation of the RMB is significantly negative and the other three variables significantly positive. This suggests that, other things being equal, the USD/CNH CCS rate would rise when (1) the US interest rate goes up; (2) the future volatility of the US interest rate increases; (3) the cost of offshore RMB funds increases; or (4) the expected appreciation of the RMB against the USD declines.

The results of the above estimation are then used to identify the factors that contributed to the increase in the USD/CNH CCS rate over the sample period. Chart B4.3 presents the decomposition of the increase in the USD/CNH CCS rate into various contributing factors. In the first half of 2011, the USD/CNH CCS rate generally remained negative given the high expectation of RMB appreciation. Reduced expectation of RMB appreciation, together with the pick-up in both the level and future volatility of the US interest rate, pushed the USD/CNH CCS rate sharply higher since late 2011. Although the level and uncertainty in the US interest rate declined subsequently, the USD/CNH CCS rate remained relatively stable as the expectation of RMB appreciation accounted for most of its changes over this period after controlling for the cost of funds in the offshore RMB market.

Chart B4.3
Decomposition of the USD/CNH CCS rate



Sources: Bloomberg and HKMA staff estimates.

34 The Merrill Option Volatility Expectations Index is developed by Merrill Lynch to reflect a market estimate of future Treasury bond yield volatility. The index used in this study, which is constructed based on 3-month options on Treasury securities in a wide range of tenors, measures the uncertainty about long-term yields over a 3-month horizon. Thus, it could be used to proxy the volatility in short-term interest rates in the distant future.

35 Prior to the launch of CNH HIBOR fixing on 24 June 2013, the 3-month CNH HIBOR refers to the 3-month CNY(HK) Interbank Offered Rate contributed by the Bank of China (Hong Kong).

36 Hui, C.H., Lo, C.F., Chung, T.K., 2008. "Market Expectation of Appreciation of the Renminbi". Working Paper no. 03/2008, Hong Kong Monetary Authority.

Conclusion

To sum up, reduced expectation of RMB appreciation has been the main driving force behind the rising USD/CNH CCS rate over the past two years. This provided a favourable condition for institutions seeking USD funds to tap the offshore RMB bond market as they could "lend" their RMB bond proceeds at higher rates through the CCS market to investors who are keen on gaining RMB exposure but do not have access to the CNH capital market. Looking ahead, the market for swap-based issuance is likely to remain favourable for two reasons.

First of all, the USD/CNH CCS rate is likely to remain attractive to issuers in the foreseeable future. On the one hand, a strong USD – on the back of the recovery of the US economy and the QE tapering of the Fed – will likely contain market expectation of RMB appreciation, thus pushing the USD/CNH CCS rate up. On the other hand, the USD/CNH CCS rate may also be subject to greater upward pressure stemming from higher volatility of the US interest rate given greater uncertainty over the course of QE tapering.

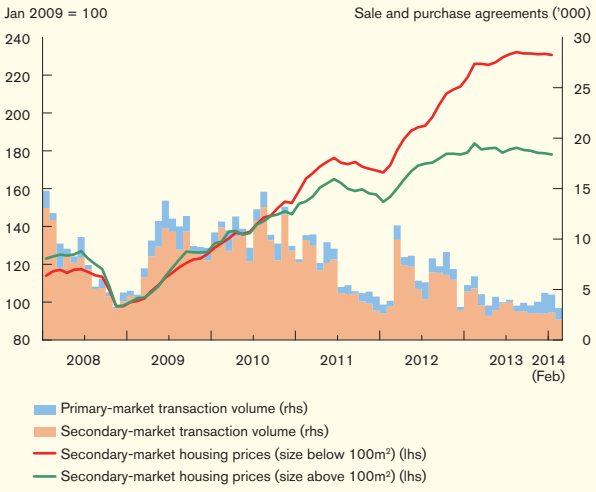
Apart from pricing, the attractiveness of the CCS also depends on product diversity. While the tenor of the USD/CNH CCS swap is available up to 10-year, the market becomes less liquid beyond 5-year tenor, partly due to the lack of a reliable pricing benchmark. Greater issuance of long-dated offshore RMB bonds by the Mainland Government could foster the development of a benchmark yield curve at the longer end and thus facilitate the liquidity of the CCS market at longer tenors. Meanwhile, with the launch of CNH HIBOR fixing on 24 June 2013, the swap volume of the USD/CNH CCS market may increase if the fixing can evolve into a reliable benchmark for pricing floating-for-floating CCS, offering market participants an alternative to the fixed-for-floating CCS. Greater product diversity in the CCS market opens more options for institutions to hedge against interest rate and exchange rate risks, rendering swap-based issuance more attractive.

4.5 Property markets

Residential property market

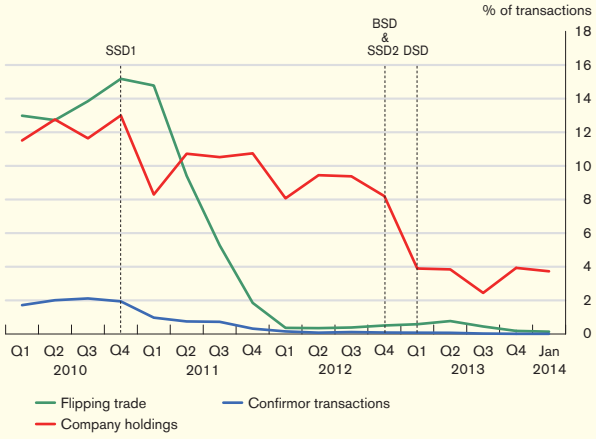
Residential property market activities remained weak in the second half of 2013 and recent months, with transaction volume shrinking considerably and housing prices facing some downward pressure. The new rounds of stamp duty measures and prudential measures introduced since February 2013 have dampened housing demand, while the weak property market performance was also partly attributable to concerns over the Federal Reserve's tapering of the asset purchase programmes and rising expectation of future interest rate hikes. The number of residential transactions fell by 37.7% to a total of 50,676 in 2013, the lowest on record (Chart 4.24). In recent months, secondary-market transactions remained sluggish but primary-market transactions revived as developers offered more discounts and concessions. Speculative and investment activities remained subdued, and there has been a sharp decline in confirmor transactions, flipping trade and company purchasers (Chart 4.25).

Chart 4.24
Residential property prices and transaction volumes



Sources: R&VD and Land Registry.

Chart 4.25
Confirmor transactions, flipping trade and company purchasers



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

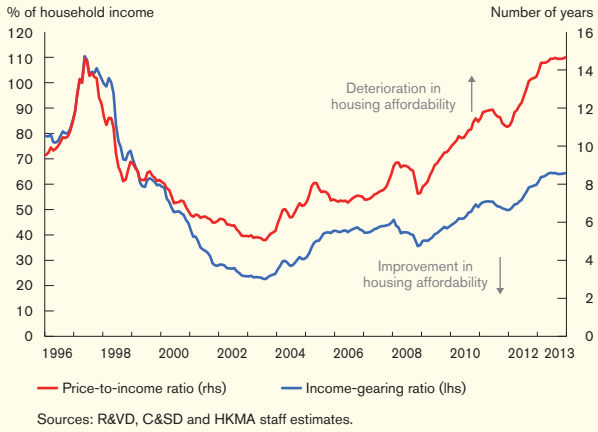
Source: Centaline Property Agency Limited.

While facing some downward pressure, housing prices remained relatively resilient in the secondary market, only edging down on average by less than 1% after hitting a high in August. The modest price adjustment in the secondary market reflected a relatively strong holding power of home owners, with the prevailing mortgage interest rate staying low and the labour market environment still broadly favourable. However, there are signs in recent months that a few more home owners are willing to lower their asking prices while banks become relatively more conservative on home appraisal. In the primary market, the effective sales prices of new projects after discounts and concessions have fallen quite noticeably, and are getting closer to the prices in the secondary market.

Despite the modest downward adjustment in the prices, property valuation is still highly stretched relative to household income and the fundamentals. Housing affordability remains

low, with the price-to-income ratio reaching 14.6 in the fourth quarter, a level comparable to the 1997 peak and the income gearing ratio staying high at 64.1% compared with its long-term average of 50% (Chart 4.26).[37] The income gearing ratio is sensitive to mortgage interest rates. If mortgage interest rates move higher, say by 300 basis points, to a more normal level, the income gearing ratio would soar to 83%.

Chart 4.26
Indicators of housing affordability



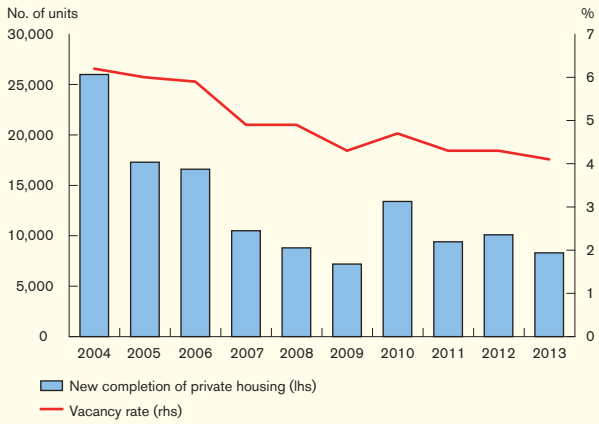
Sources: R&VD, C&SD and HKMA staff estimates.

Private-sector analysts now generally envisage further consolidation in housing prices in 2014. While the low interest rate environment has fuelled the rapid upsurge in housing prices in the past few years, such favourable conditions may reverse earlier and sharper than expected. The long-dated interest rates in Hong Kong have recently increased along with the US Treasury yields. Mortgage interest rates are expected to move higher, particularly when the Fed eventually raises the Fed Funds target rate. Should the mortgage interest rate return to a more normal level, it could lead to a sharp rise in mortgagors' debt repayment and servicing burden. Our in-house estimates show that under a 20-year mortgage, a 300-basis-point increase in the mortgage interest rate can lead to a 30.2% rise in mortgage repayment. Moreover, a rise in the long-dated interest rates relative to a rental yield of just around 2-3% has made property investment less attractive, and this could also exert downward pressure on the property market.

Uncertainties over the pace of the Federal Reserve's tapering and the interest rate normalisation path could increase financial market volatility and affect market sentiment. Should there be a significant reversal of fund flows, it could exacerbate downward adjustments in property prices and severely hit the broader economy.

The demand-supply imbalance of the property market will however likely remain in the near term. Actual completion of new private residential units dropped by 17.8% to 8,300 units in 2013, while the vacancy rate fell to 4.1% at the end of the year, the lowest since 1997 and well below the long-term average of 5.0% in the past twenty years (Chart 4.27). With the Government proactively boosting land supply, supply of private flats (including stock of unsold flats) is expected to increase to a total of 71,000 units in the next three to four years.

Chart 4.27
Private flat completion and vacancy rate



Sources: Transport and Housing Bureau and R&VD.

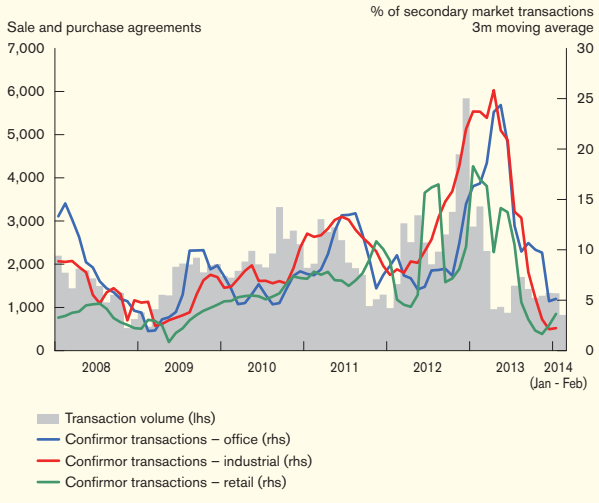
[37] The price-to-income ratio measures the average price of a typical 50 square-metre flat relative to the median income of households living in private housing. The income-gearing ratio compares the amount of mortgage payment for a typical flat of 50 square metres (under a 20-year mortgage scheme with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

The prudential measures implemented so far have helped bring down the actual loan-to-value ratio for new mortgage from an average of 64% before policy measures to 55% recently, and the debt-servicing ratio from an average of over 40% to a low of 35% in December. Banks should continue to strengthen their risk management in mortgage lending business and maintain a conservative credit stance to mitigate the risks of interest rate hikes and the rapidly changing macro-financial conditions. Meanwhile, home buyers should stay vigilant on property market and interest rate developments and avoid stretching themselves with excessive borrowing.

Commercial and industrial property markets

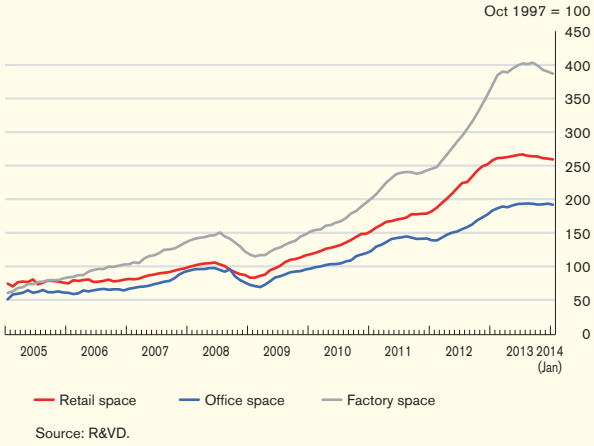
The non-residential property markets were also under consolidation. Investment demand weakened as a result of the lingering worries about future interest rate hikes and the stamp duty measures (particularly the doubling of the stamp duty rates), with the total number of transactions falling by 42.0% to a four-year low of 19,827 units in 2013. Confirmor transactions, as an indicator of speculative activities, dropped even more sharply in recent months (Chart 4.28). Prices only saw moderate downward adjustments of around 1-4% (Chart 4.29), while rentals softened mildly by less than 1%.

Chart 4.28
Transactions in non-residential properties



Sources: Land Registry and Centaline Property Agency Limited.

Chart 4.29
Non-residential property price indices



Source: R&VD.

Potential overvaluation risks in the non-residential property market however remain a key concern. As rental earnings have softened, the trend of higher long-dated interest rates could bring down the capital values and exert further downward pressure on non-residential property prices. Investment sentiment would also continue to be dented by uncertainties surrounding the Fed's tapering of asset purchases and interest rate normalisation process. In terms of banking and financial stability, it remains critically important that banks should restrain their exposure to property-related lending and maintain a prudent stance when granting new mortgages and asset-backed loans.

5. Banking sector performance

The Hong Kong banking sector continued to show healthy growth, characterised by sound asset quality, favourable liquidity conditions, and strong capital positions by international standards. Looking forward, as global monetary conditions normalise, the possible impacts on banks' balance sheets should be carefully monitored. In particular, in view of the recent rise in household indebtedness and corporate leverage, the debt servicing abilities of borrowers could be under test should interest rates increase markedly or a significant correction in the local property market take place. Banks should also continue to be vigilant about credit risks on their Mainland China-related exposure.

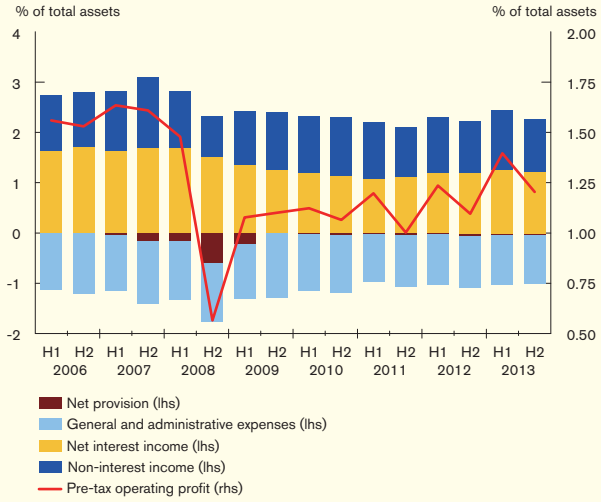
5.1 Profitability and capitalisation

Profitability

The profitability of retail banks[38] moderated during the second half of 2013 from the very strong results of the first half, due to a mild decline in net interest income and non-interest income. Nevertheless, their performance remained more favourable than the same period of 2012, with a return on assets[39] of 1.2%, compared with 1.4% in the first half of the year and 1.1% in the second half of 2012 (Chart 5.1).

For 2013 as a whole, the aggregate pre-tax operating profits of retail banks recorded an increase of 22.1%, with the average return on assets rising to 1.3%, from 1.2% in 2012.

Chart 5.1
Profitability of retail banks



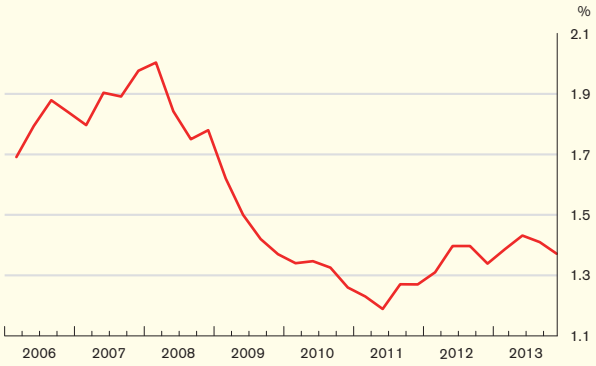
Note: Semi-annually annualised figures.
Source: HKMA.

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

[39] Return on assets is calculated based on aggregate pre-tax operating profits.

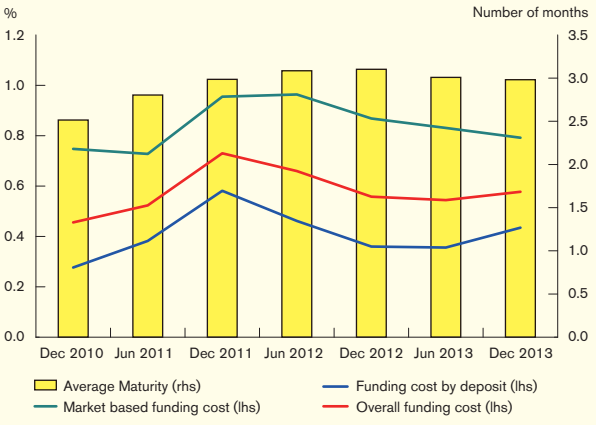
The net interest margin of retail banks held largely steady in 2013, averaging 1.39% in the second half, compared with 1.41% in the first half (Chart 5.2). For licensed banks as a whole, their overall interest costs registered an increase of 4 basis points in the second half, with the fall in market-based funding cost more than offset by the rise in deposit funding cost (Chart 5.3).[40] The composite interest rate, a measure of the average cost of Hong Kong dollar funds for retail banks, increased by 7 basis points during the second half to 0.39% at the end of December 2013 (Chart 5.4).

Chart 5.2
Net interest margin of retail banks



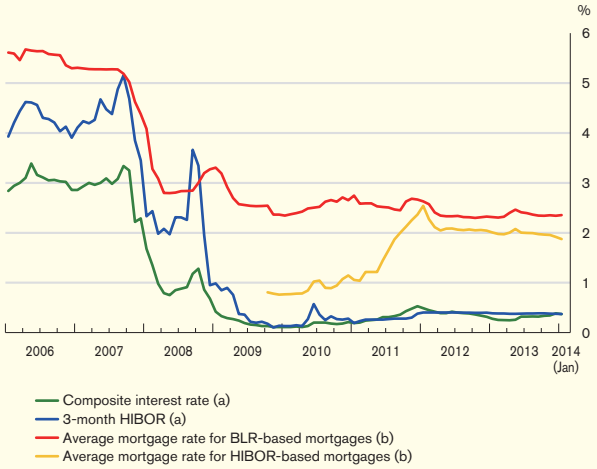
Note: Quarterly annualised figures.
Source: HKMA.

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.

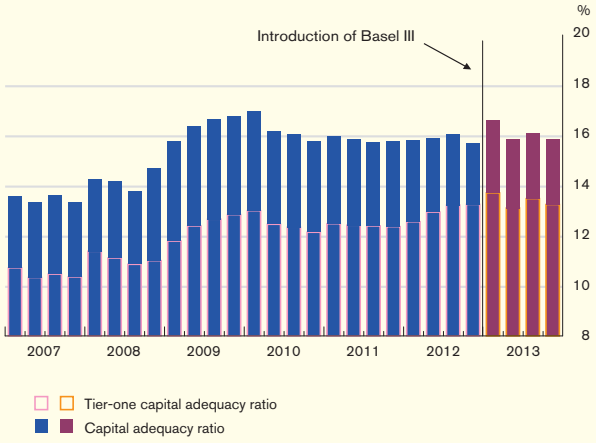
During the second half of 2013, both best lending rate-based (BLR-based) and HIBOR-based mortgage rates softened marginally. The share of HIBOR-based mortgages amongst newly approved mortgage loans increased to 30.1% in the second half, from 14.6% in the first half.

[40] 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 remained unchanged at 15.9% at the end of 2013 (Chart 5.5), with the tier-one capital adequacy ratio (the ratio of tier-one capital to total risk-weighted assets) edging up to 13.3%, from 13.1% six months earlier.

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.

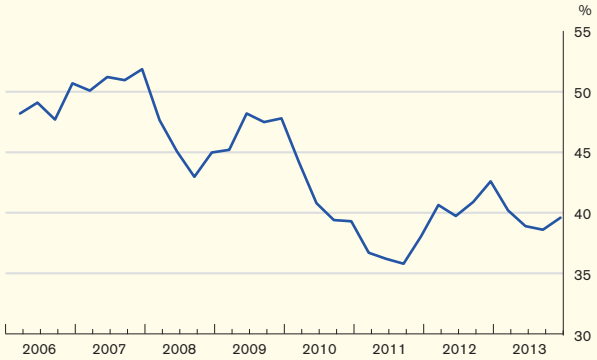
Source: HKMA.

5.2 *Liquidity, interest rate and credit risks*

Liquidity and funding

Liquidity conditions of the banking sector continued to be favourable, with the average liquidity ratio of retail banks rising slightly to 39.6% at the end of December 2013, from 38.9% at the end of June (Chart 5.6), and remaining well above the regulatory minimum of 25%.

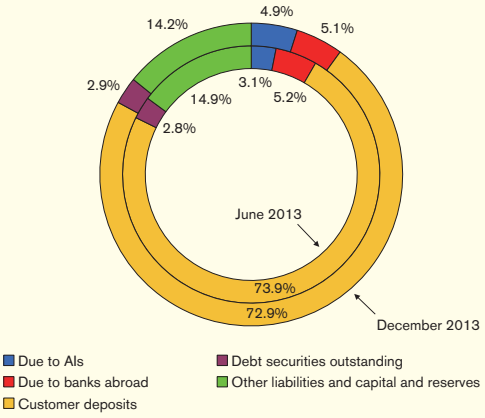
Chart 5.6
Liquidity ratio of retail banks



Note: Quarterly average figures.
Source: HKMA.

Customer deposits, which are typically less volatile than other funding sources, continued to be the primary funding source for retail banks. The share of customer deposits to banks' total liabilities was 72.9% at the end of 2013, marginally lower than the 73.9% at the end of June (Chart 5.7).

Chart 5.7
Liabilities structure of retail banks

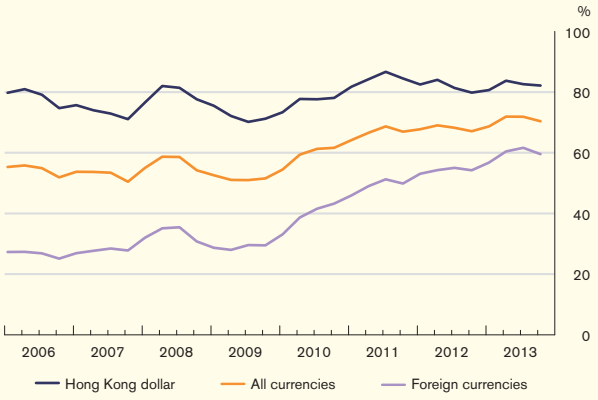


Notes:
1. Figures may not add up to total due to rounding.
2. Figures refer to the percentage of total liabilities (including capital and reserves).
3. Debt securities comprise negotiable certificates of deposit and all other negotiable debt instruments.

Source: HKMA.

The HKD loan-to-deposit (LTD) ratio of all AIs receded slightly to 82.1% at the end of December 2013, from 83.8% at the end of June (Chart 5.8), reflecting slower credit growth towards the end of the year. The foreign currency LTD ratio also edged down to 59.6% at the end of December, from 60.4% at the end of June. As a whole, the all currency LTD ratio fell to 70.4% at the end of December, from 71.9% at the end of June.

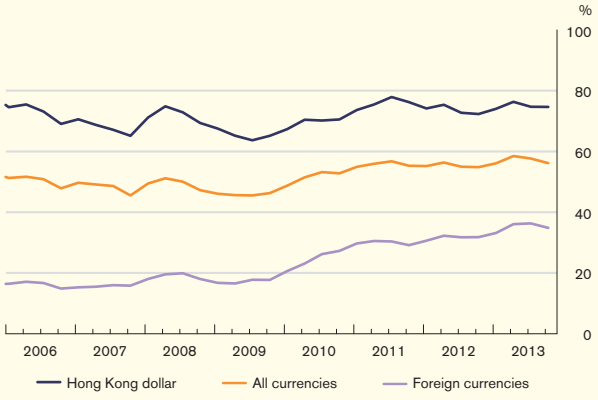
Chart 5.8
Loan-to-deposit ratios of all AIs



Source: HKMA.

For retail banks, the all currency LTD ratio fell from 58.5% to 56.2%, with both the Hong Kong dollar and foreign currency LTD ratios decreasing notably (Chart 5.9).

Chart 5.9
Loan-to-deposit ratios of retail banks



Source: HKMA.

Notwithstanding the favourable liquidity condition of banks, it is crucial to assess their ability to withstand stress. Box 5 assesses the liquidity risk of the Hong Kong banking sector. In short, the liquidity stress test shows that the systemic liquidity risk of Hong Kong banking sector would be contained in the face of severe economic and financial shocks. While the sensitivity test points to the same conclusion, it highlights that banks' liquidity risks are sensitive to interest rate movements. Banks should therefore be vigilant for the potential effect and pace of normalisation of interest rates. To prevent further build-up of funding vulnerability in banks' balance sheets, the HKMA introduced a Stable Funding Requirement with effect from January 2014.

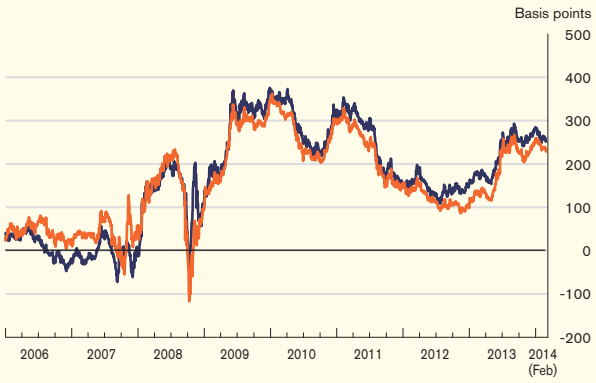
Foreign currency position

The banking sector's capability to repay liabilities denominated in foreign currencies can be assessed by reference to the aggregate net open position of AIs for all foreign currencies. This position amounted to HK$73 billion at the end of 2013, which was equivalent to 0.4% of total assets of AIs, indicating that the overall exposure of AIs to foreign exchange risks may not be of significant concern.

Interest rate risk

The spreads between the long- and short-term interest rates for the US dollar and Hong Kong dollar hovered more than 200 basis points during the second half of 2013 (Chart 5.10). This suggests that the incentive for banks to search for yield by borrowing short-term funds to purchase long-term interest-bearing assets has remained high. This could potentially lead to greater maturity mismatches and increased interest rate risk. Banks should prudently manage maturity mismatch between funding sources and loans.

Chart 5.10
Term spreads of Hong Kong and US dollars

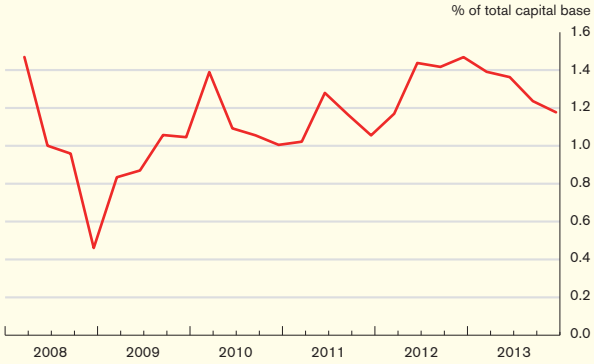


Note: Term spreads are defined as 10-year swap rates minus three-month money market rates of the respective currencies.

Source: HKMA staff estimates based on data from Bloomberg.

Such interest rate risk should not be underrated, as the possible impact of any significant shift in the yield curve or rise in interest rates on banks' balance sheets in the process of the normalisation of US monetary policy could be severe. It is estimated that under a hypothetical shock of an across-the-broad 200-basis-point increase in interest rates, the economic value of retail banks' interest rate positions could be subject to a decline equivalent to 1.2% of their total capital base as of December 2013 (Chart 5.11). While the impact appears to be manageable[41], a significantly larger interest rate hike or an unfavourable change in the shape of the yield curve could result in a much bigger impact.

Chart 5.11
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[42], expressed as a percentage of the total capital base of banks.

Source: HKMA staff estimates.

Credit risk

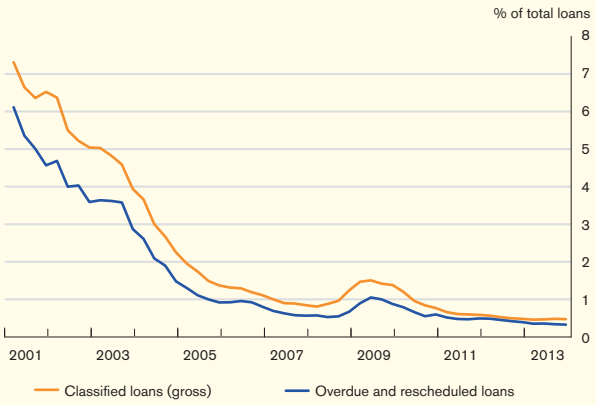
The asset quality of retail banks' loan portfolios remained healthy, with the classified loan ratio steady at a low level of 0.48% at the end of December, compared with 0.47% at the end of

41 The HKMA will be particularly attentive to the capital sufficiency of "outlier AIs" – those whose interest rate risk leads to an economic value decline of more than 20% of their capital base as a result of applying the standardised interest rate shock to the banking book. For details, see HKMA Supervisory Policy Manual's module "Interest Rate Risk Management" issued in December 2002.

42 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.

June, and the ratio of overdue and rescheduled loans falling from 0.36% to 0.33% during the period (Chart 5.12). Nevertheless, as global monetary conditions normalise, rising interest rates could test the debt-servicing ability of borrowers and may consequently affect the loan quality of AIs.

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 towards the end of the year, after its rapid expansion during the first three quarters. On a half-yearly basis, the growth of domestic lending[43] of AIs slowed from 10.2% in the first half to 3.3% in the second half.

According to results of the HKMA Opinion Survey on Credit Condition Outlook of December 2013, the share of surveyed AIs expecting higher loan demand in the next three months had increased from the previous survey, while the share of more than two-thirds of the respondents expecting loan demand to remain the same was unchanged (Table 5.A).

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

As % of total respondents	Mar 2013	Jun 2013	Sep 2013	Dec 2013
Considerably higher	0	0	0	0
Somewhat higher	10	10	19	24
Same	67	71	71	71
Somewhat lower	24	19	10	5
Considerably lower	0	0	0	0
Total	100	100	100	100

Note: Figures may not add up to 100% due to rounding.

Source: HKMA.

Household exposure

The growth of household loans[44] slowed further to 3.3% in the second half of 2013 from 3.8% in the first half (Table 5.B). The moderation was mainly due to the slowdown in mortgage lending, in line with a decline in property transaction volumes. However, other loans for private purposes registered further fast growth of 10.1%, after rising by 10.9% in the first half.[45]

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

	2011		2012		2013	
(%)	H1	H2	H1	H2	H1	H2
Mortgages	5.5	1.2	2.5	5.0	3.1	0.8
Credit cards	-1.4	15.9	-1.6	15.3	-4.0	10.3
Other loans for private purposes	9.4	3.8	5.0	9.3	10.9	10.1
Total loans to households	5.6	2.7	2.6	6.5	3.8	3.3

Source: HKMA.

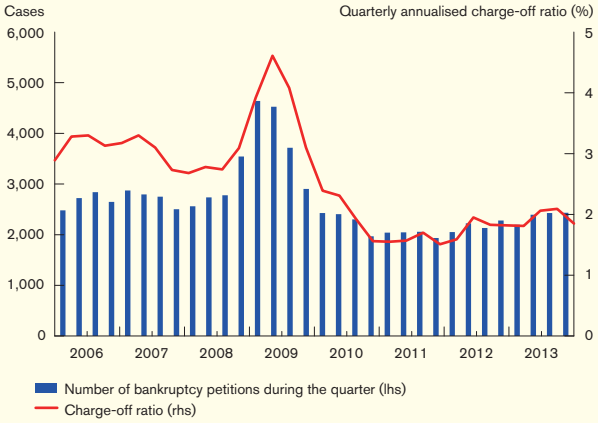
43 Defined as loans for use in Hong Kong plus trade-financing loans.

44 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 December 2013, the share of household lending in domestic lending was 29%.

45 Personal loans represent one of the key drivers behind the recent trend of rising household indebtedness. In view of this, the HKMA has issued circulars to banks about the prudential requirement on personal lending business to be adopted. For details, see circular "Risk Management of Personal Lending Business" issued on 14 January 2014.

The credit risk of unsecured household exposure remained contained, with the annualised credit card charge-off ratio and the number of bankruptcy petitions staying low (Chart 5.13).

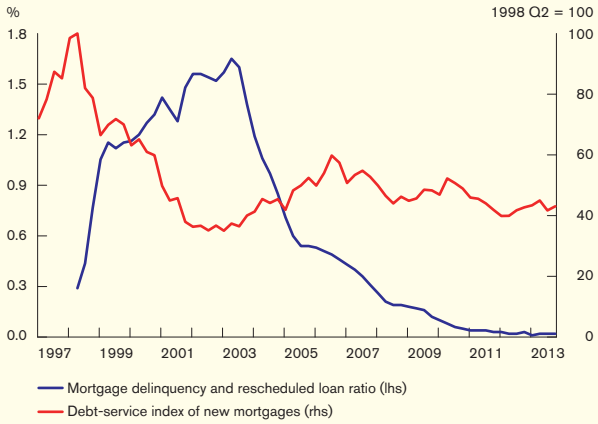
Chart 5.13
Charge-off ratio for credit card lending and bankruptcy petitions



Sources: Official Receiver's Office and HKMA.

Meanwhile, banks' mortgage portfolios remained healthy, with the delinquency ratio staying at 0.02% and the debt-service index of new mortgages improving slightly to 43 in December 2013 from 45 six months earlier (Chart 5.14). The improvement in the debt-service index mainly reflected lower mortgage rates and the reduced size of an average mortgage loan.

Chart 5.14
Delinquency ratio of banks' mortgage portfolios 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.

Looking forward, despite the recent slowdown in household loan growth, household indebtedness is still at relatively high levels[46] and could come under pressures as global monetary conditions normalise and interest rates increase. Banks should be vigilant about the impact of a rise in interest rates on their mortgage portfolios.

Corporate exposure[47]

Domestic loans to corporations[48] grew at a slower pace of 3.2% in the second half of 2013, after a 13.2% increase in the first half. At the end of December 2013, corporate loans accounted for 70.4% of domestic lending.

There are some initial signs that the credit risk of banks' corporate exposures may be building up. While the number of compulsory winding-up orders of companies and the Altman's Z-score[49]

46 For details, see Section 4.2 of this report.

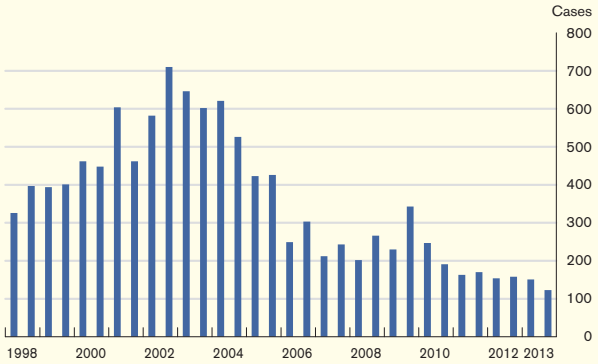
47 Excluding interbank exposure.

48 Loans to corporations comprise domestic lending except lending to professional and private individuals.

49 Altman's Z-score is a credit risk measure based on accounting data. It is a typical credit risk measure to assess the health of the corporate sector based on an array of financial ratios reported in companies' financial statements. The accounting ratios used to derive the Z-score are working capital/total assets, retained earnings/total assets, earnings before interest and taxes/total assets, market value of equity/book value of total liabilities, and sales/total assets.

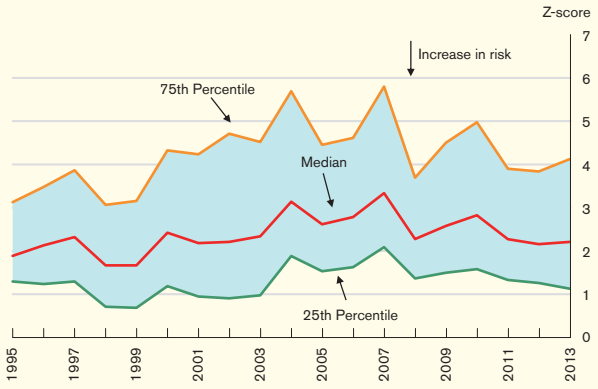
remained broadly steady (Charts 5.15 and 5.16), the debt leverage of the corporate sector has increased in recent years, with the ratio of assets to shareholders' fund reaching 1.79 times at the end of June 2013 (Chart 5.17). Meanwhile, the interest coverage ratio of local corporations, which gauges their abilities to cover interest expenses by earnings, has in general deteriorated. These indicators suggest that the debt-servicing ability of the corporate sector could be under test when interest rates rise.

Chart 5.15
Number of winding-up orders of companies



Source: Official Receiver's Office.

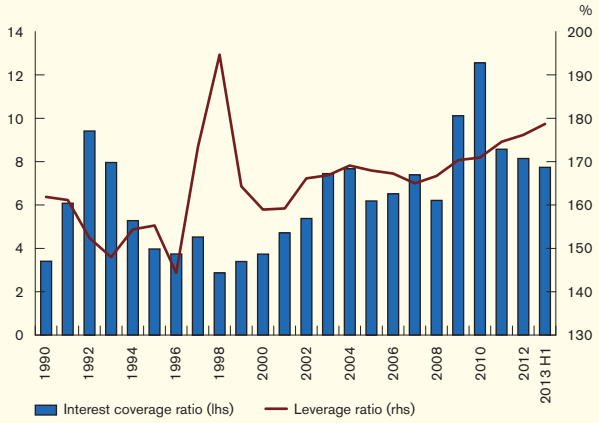
Chart 5.16
Altman's Z-score: A bankruptcy risk indicator of listed non-financial companies



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 and interest coverage ratio of listed non-financial companies in Hong Kong



Notes:

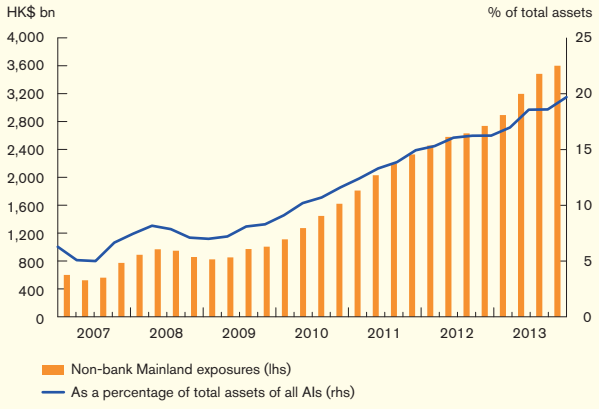
1. The leverage ratio is defined as the ratio of total assets to shareholders' funds. A higher value indicates higher leverage.
2. Interest coverage ratio is defined as the ratio of earnings before interest and taxes to interest expense.

Source: HKMA staff estimates based on data from Bloomberg.

Mainland exposure

The credit exposure of the domestic banking sector to Mainland-related business continued to grow. The total non-bank Mainland exposure of all AIs reached HK$3,602 billion (19.7% of total assets) at the end of 2013, from HK$3,197 billion (18.6% of total assets) six months earlier (Chart 5.18). Of this, retail banks' non-bank Mainland exposure [50] rose to HK$2,279 billion (19.8% of total assets) from HK$2,003 billion (18.2% of total assets).

Chart 5.18
Non-bank Mainland exposures of all AIs



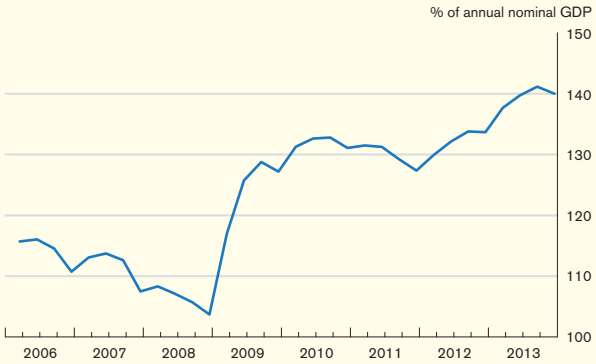
Note: Figures include exposures booked in AIs' banking subsidiaries in Mainland China.

Source: HKMA.

[50] Including exposure booked in retail banks' banking subsidiaries in Mainland China.

The rising share of banks' Mainland exposure continues to be a key risk factor to watch for. While a significant share of the non-bank Mainland exposure is backed by guarantees or collateralised, in view of the Mainland's high level of credit-to-GDP ratio (Chart 5.19), the recent deterioration of the aggregate distance-to-default index[51] of Mainland's corporate sector (Chart 5.20) and the rise in the amount of non-performing loans in its banking system (Chart 5.21), it is important for Hong Kong banks to maintain their stringent prudential management of their Mainland exposure. To step up surveillance of such activities, the HKMA required all banks to report more granular information on their non-bank Mainland exposures by introducing a new quarterly Return of Mainland Activities. In addition, the HKMA required banks active in such activities to conduct thematic review on their risk management and internal controls.

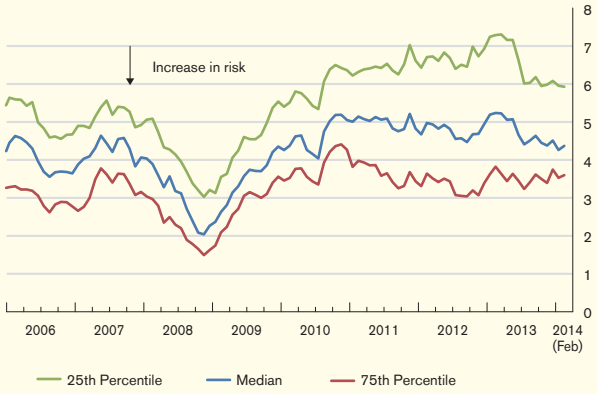
Chart 5.19
Credit-to-GDP ratio in Mainland China



Note: Credit-to-GDP ratio is defined as the ratio of claims on private sector to the sum of quarterly nominal GDP for the latest four quarters.

Sources: IMF International Financial Statistics and CEIC.

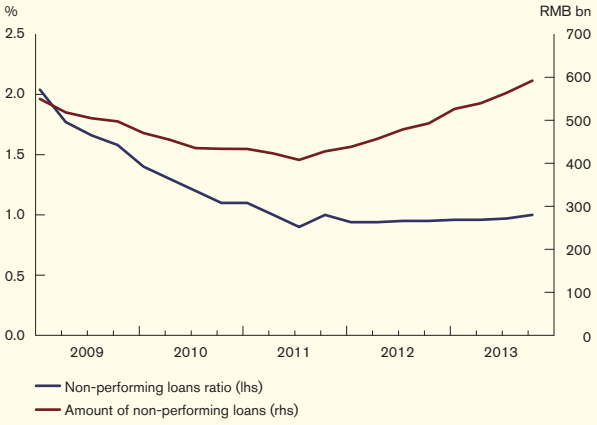
Chart 5.20
Distance-to-default index for the Mainland corporate sector



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.

Chart 5.21
Non-performing loans in Mainland China



Source: China Banking Regulatory Commission.

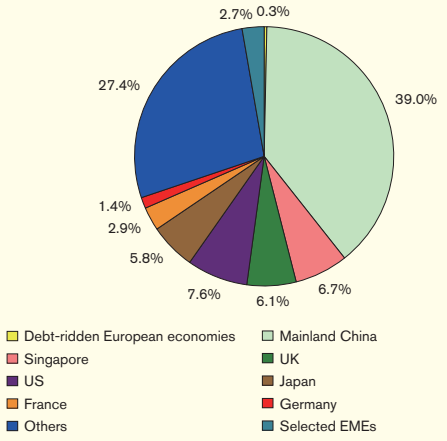
Impact of possible contagion from emerging market economies

Concerns about the vulnerability of emerging market economies (EMEs) with large current account deficits have escalated in recent months. In this regard, it is noteworthy that direct exposure of Hong Kong's banking sector to these economies is not substantial (Chart 5.22), and

[51] 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.

together they accounted for 2.7% of banks' overall external claims at the end of December.

Chart 5.22
External claims of the Hong Kong banking sector on major economies (all sectors) at the end of December 2013



Notes:
1. Figures may not add up to 100% due to rounding.
2. Debt-ridden European economies refer to Greece, Ireland, Italy, Portugal and Spain.
3. Sample of EMEs with large current account deficits refer to Brazil, India, Mexico, Indonesia, Turkey, Poland, Argentina, South Africa and Colombia.

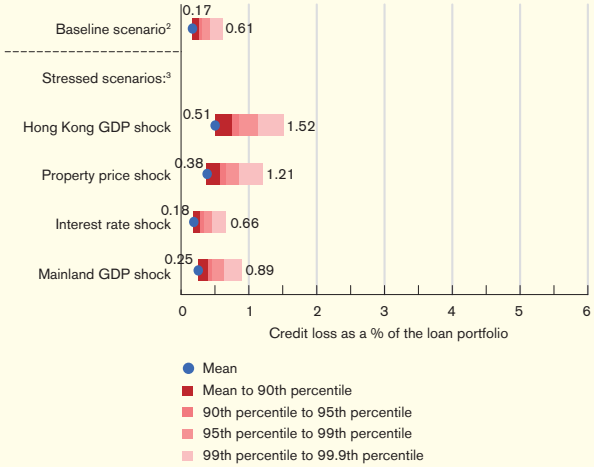
Source: HKMA.

Macro stress testing of credit risk [52 & 53]

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 5.23 presents the simulated future credit loss rate of retail banks in the fourth quarter of 2015 under four specific macroeconomic shocks[54] using information up to the fourth quarter of 2013. 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 0.18% (interest rate shock) to 0.51% (Hong Kong GDP shock).

Taking account of tail risk, banks' maximum credit losses (at the confidence level of 99.9%) under the stress scenarios range from 0.66% (interest rate shock) to 1.52% (Hong Kong GDP shock), which are significant, but smaller than the loan loss of 4.39% following the Asian financial crisis.

Chart 5.23
The mean and value-at-risk statistics of simulated credit loss distributions[1]



Notes:
1. The assessments assume the economic conditions in 2013 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 2014 Q1 to 2014 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 2014 Q1 to 2014 Q4.
   Interest rate shock: A rise in real interest rates (HIBORs) by 300 basis points in the first quarter (i.e. 2014 Q1), followed by no change in the second and third quarters and another rise of 300 basis points in the fourth quarter (i.e. 2014 Q4).
   Mainland GDP shock: Slowdown in the year-on-year annual real GDP growth rate to 4% in one year.

Source: HKMA staff estimates.

52 Macro stress testing refers to a range of techniques used to assess the vulnerability of a financial system to "exceptional but plausible" macroeconomic shocks. Details of the model adopted in this exercise can be found in J. Wong et al. (2006), "A framework for stress testing banks' credit risk" *Journal of Risk Model Validation*, Vol. 2(1), pages 3 - 23. An updated framework is used for the current estimations.

53 All estimates of credit loss for the overall loan portfolio of Hong Kong banks presented in this report are based on a revised stress testing framework. They are not strictly comparable to those estimates from the past framework that appeared in previous reports due mainly to different definitions of credit losses in these two frameworks. Specifically, credit losses in two years after any shock under the revised framework are measured by the estimated specific provision ratio at the end of the second year plus 50% of the estimated specific provision ratio at the end of the first year after the shock, while credit loss estimates from the past framework are derived based on an estimated delinquency ratio at the end of the second year multiplied by a loss-given-default estimate, which is determined by the simulated property price change over the two-year horizon.

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

Given the strong presence of global banks, the liquidity and funding conditions of the Hong Kong banking sector cannot be immune to inward spillovers of shocks from global banks' home countries. Box 6 examines factors determining the extent of shock transmission through intra-group funding activities of global banks and the associated impact on the operation of foreign bank branches in Hong Kong. The findings suggest that while funding shocks of parent banks could exert significant pressure on the credit availability and loan pricing in host countries, the ongoing regulatory reform may help reduce the adverse effect.

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

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

	Dec 2012	Sep 2013	Dec 2013
Interest rate			
1-month HIBOR fixing[2] (quarterly average)	0.28	0.21	0.21
3-month HIBOR fixing (quarterly average)	0.40	0.38	0.38
BLR[3] and 1-month HIBOR fixing spread (quarterly average)	4.72	4.79	4.79
BLR and 3-month HIBOR fixing spread (quarterly average)	4.60	4.62	4.62
Composite interest rate[4]	0.32	0.32	0.39
		Retail banks	
Balance sheet developments[5]			
Total deposits	3.1	4.9	5.3
Hong Kong dollar	3.5	4.9	1.5
Foreign currency	2.7	4.9	10.0
Total loans	2.8	3.5	2.6
Domestic lending[6]	2.6	3.0	2.6
Loans for use outside Hong Kong[7]	3.7	5.9	2.7
Negotiable instruments			
Negotiable certificates of deposit (NCD) issued	-2.8	5.3	10.5
Negotiable debt instruments held (excluding NCD)	6.8	8.8	3.7
Asset quality[8]			
As a percentage of total loans			
Pass loans	98.16	98.25	98.33
Special mention loans	1.36	1.27	1.20
Classified loans[9] (gross)	0.48	0.48	0.48
Classified loans (net)[10]	0.32	0.35	0.34
Overdue > 3 months and rescheduled loans	0.39	0.34	0.33
Profitability			
Bad debt charge as percentage of average total assets[11]	0.04	0.03	0.04
Net interest margin[11]	1.36	1.41	1.40
Cost-to-income ratio[12]	45.8	41.9	42.2
Liquidity ratio (quarterly average)	42.6	38.6	39.6
		Surveyed institutions	
Asset quality			
Delinquency ratio of residential mortgage loans	0.02	0.02	0.02
Credit card lending			
Delinquency ratio	0.20	0.22	0.20
Charge-off ratio — quarterly annualised	1.82	2.09	1.85
— year-to-date annualised	1.70	1.93	1.84
		All locally incorporated AIs	
Capital adequacy ratio (consolidated)[13]	15.7	16.1	15.9

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 Janurary 2013, a revised capital adequacy framework (Basel III) was introduced for locally incorporated authorized institutions.

Box 5
Liquidity stress tests of the Hong Kong banking sector

Introduction

This Box assesses the liquidity risk of the Hong Kong banking sector using a model-based framework that incorporates interactions between market and credit risks (henceforth referred to as "the model-based framework").[55] The assessment contains two parts. In the first part, we will discuss the stress-testing result using data up to mid-2013. To complement the analysis, we rerun another set of tests for the end-2007 position and compare them with the mid-2013 result. Some possible factors contributing to the change in banks' resilience to liquidity risk during the period will then be identified by examining banks' balance sheets. In the second part of this Box, sensitivity tests will be conducted to assess how the banking sector would fare in various hypothetical stressed scenarios that capture different paces of normalisation of interest rates.

The liquidity stress testing result

In the model-based framework, the cash flow pattern of banks is determined endogenously by asset price shocks in a one-year stress horizon. These hypothetical shocks lead prices of corporate bonds, equities and structured financial securities to decline significantly.[56] Other assumptions of shocks include an interest rate hike by 125 basis points (bps) and an increase in the classified loan ratio by 200 bps.

The liquidity stress test results are evaluated by the ratio of cumulative cash inflows to cumulative cash outflows at the end of one-year stress horizon (i.e. the cash flow ratio) for 17 local banks. Cash shortage occurs if the cash flow ratio is below 100%. No cash shortage is found in the liquidity stress test based on mid-2013 data, suggesting that the Hong Kong banking sector would be able to weather severe liquidity shocks.

Developments in the post-crisis period

To assess how the ability of the Hong Kong banking sector to weather liquidity shocks has evolved after the global financial crisis (GFC), we compare the mid-2013 result to that of end-2007. The end-2007 result is obtained by repeating the test using the same dataset in our previous assessment in 2009.[57] The dataset contains financial information of 12 listed Hong Kong

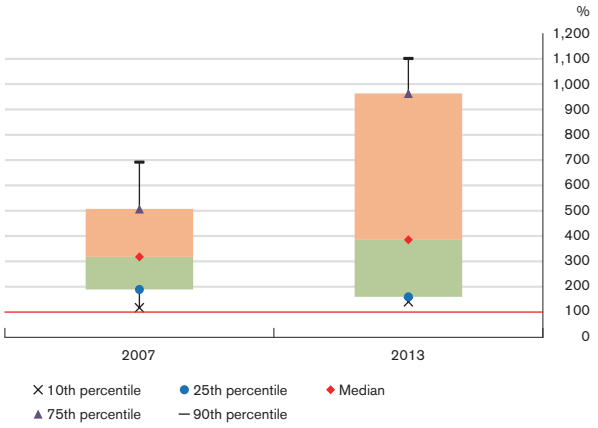
[55] The model-based framework was developed by Wong, E. and Hui, C. (2009), "A Liquidity Risk Stress-Testing Framework with Interaction between Market and Credit Risks", HKMA Working Paper 06/2009. The framework captures how mark-to-market losses on banks' holding of risky assets due to a prolonged period of negative asset price shocks would increase banks' solvency risk and reduce the ability to generate liquidity from asset sales.

[56] Most asset price shocks are generated from pre-defined distributions, including shocks on the risk-free interest rate. At the 90th percentile, the credit spreads of corporate bonds with credit ratings of "AA" or higher, "A" and "BBB" are assumed to rise by 0.4, 1.7 and 1.74 percentage points respectively. The credit spread of non-investment grade and unrated corporate bonds is assumed to rise by 10.5 percentage points. Equity prices and the market value of structured financial securities are assumed to fall by 27% and 32% respectively. Further, it is assumed that cash inflow from income drops by 10%, and 15% of committed credit lines are granted to special investment vehicles, with drawdown rate negatively correlated with the price of structured financial securities. The model-based framework does not take into account any possible mitigation measure by parent banks and central banks.

[57] See footnote 55.

banks at the end of 2007. The results of the two stress tests (Chart B5.1) are broadly consistent[58] and suggest that severe asset price shocks coupled with a moderate pace of monetary tightening would not pose significant systemic liquidity risk to the Hong Kong banking sector. As revealed from the estimated distributions of the cash flow ratio, some banks are found to have a higher cash flow ratio than before, indicating an improvement in the ability to withstand liquidity shocks.

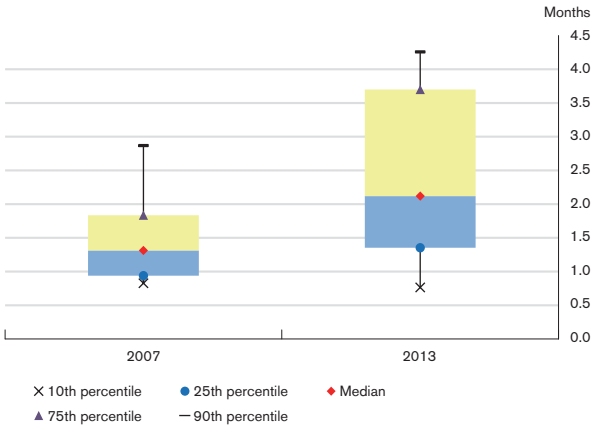
Chart B5.1
Cash flow ratio at the end of a one-year stress period



Source: HKMA.

Some balance sheet developments may be conducive to the improvement. In particular, many sample banks have taken deposits with longer average maturities than before (Chart B5.2), which may reduce their vulnerability to deposit outflows in times of stress.

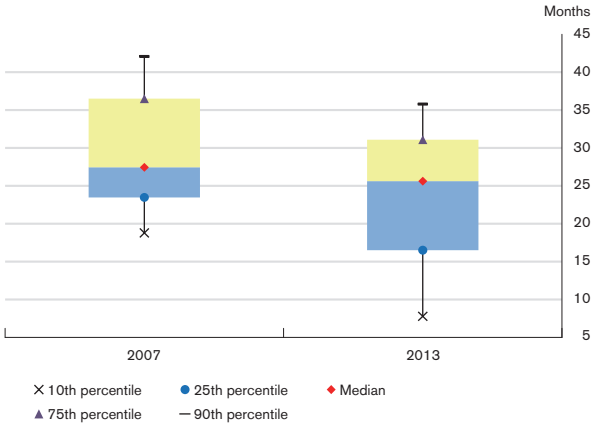
Chart B5.2
Weighted average maturity of deposits



Source: HKMA staff estimates based on banks' financial information.

Another notable development is that banks have reduced their holdings of debt securities. The aggregate amount of debt securities held was 16% of total assets of the sample banks in mid-2013, down from 20% in end-2007. The maturities of debt securities held are also found to be shorter than before (Chart B5.3). All else equal, debt securities with shorter maturities are less sensitive to changes in interest rates. In other words, the decline in prices of debt securities resulting from an interest rate hike would be more moderate than before. For those

Chart B5.3
Weighted average maturities of debt securities

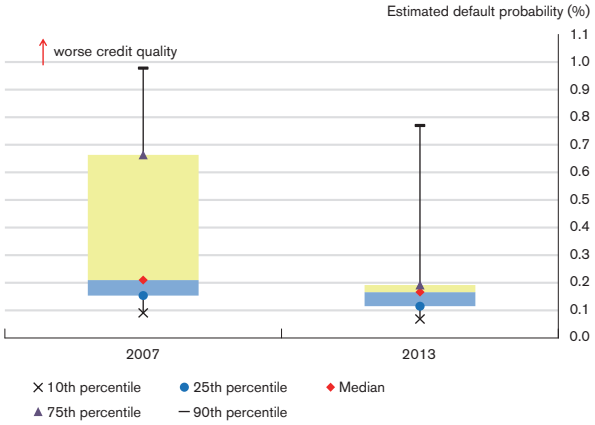


Source: HKMA staff estimates based on banks' financial information.

[58] Comparison based on end-2007 and mid-2013 positions should be interpreted with caution due to different sample sizes and availabilities of information.

corporate debt securities held by banks with credit ratings, the average credit quality has also improved (Chart B5.4). These factors together may explain why some banks have a higher estimated cash flow ratio after the GFC.

Chart B5.4
Weighted average credit rating-implied default probability of corporate debt securities



Notes:
1. Weighted average credit rating-implied default probabilities are derived from historical default rates estimated by Standard and Poor's.
2. For mid-2013 position, the amounts of corporate debt securities by rating held by bank are actual figures; for end-2007 position, the corresponding amounts are estimated due to insufficient information.

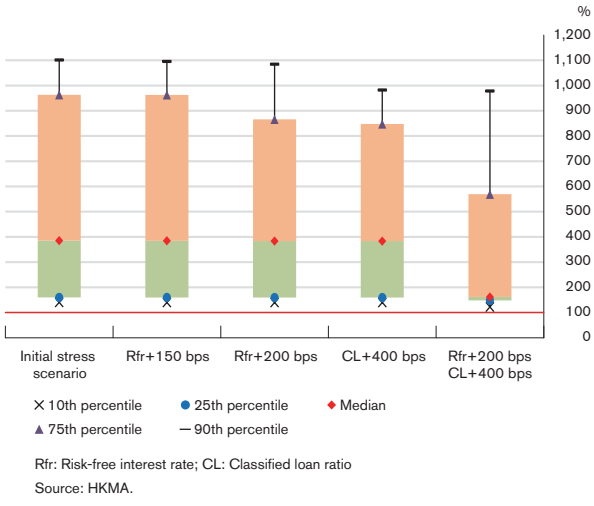
Source: HKMA staff estimates based on banks' financial information.

However, development of some risk factors may merit attention. First, the share of unrated corporate debt securities held by banks has increased.[59] The credit quality and marketability of these unrated debt securities are less clear. From a liquidity management perspective, banks could face significant difficulties in selling these unrated debt securities to raise liquidity during market turmoil. Second, contingent liabilities and commitments have grown. The amount averaged 32% of total assets for the sample banks in 2013, compared with 27% in 2007. This could expose banks to significant contingent liquidity risk.

Sensitivity tests

In the model-based framework, the movement of the risk-free interest rate is one key risk factor determining the mark-to-market losses of banks. For the stress scenario considered above, a hypothetical hike of 125 bps in the risk-free rate is assumed. We conduct some sensitivity tests by considering interest-rate hikes of 150 bps and 200 bps. Consistent with the more drastic interest rate hikes, we assume that the classified loan ratio increases by 400 bps, a more drastic increase than that in the initial stress scenario. Chart B5.5 depicts the result of sensitivity tests. As expected, banks' cash flow ratios deteriorate when more severe shocks are imposed. In particular, a scenario of a 200-basis-point hike coupled with a jump of 400 bps in the classified loan ratio is expected to result in a more pronounced drop in the cash flow ratio. However, even in such severe scenario, no bank is found to experience cash shortage in the one-year horizon.

Chart B5.5
Cash flow ratio under sensitivity tests



Rfr: Risk-free interest rate; CL: Classified loan ratio

Source: HKMA.

[59] In our samples, unrated corporate debt securities is estimated to increase to around 5% of total debt securities held in mid-2013 from around 2% in end-2007. This observation is consistent with the findings of the Survey on Selected Debt Securities that the share of unrated non-structured debt securities in total non-structured debt securities held by AIs rose to 9.1% in June 2013 from 4.9% in December 2008 (see the HKMA Quarterly Bulletin).

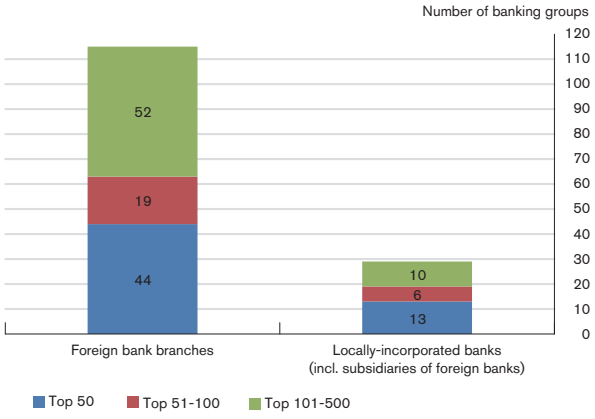
Conclusion

The liquidity stress test shows that the systemic liquidity risk of Hong Kong banking sector would be contained in the face of severe economic and financial shocks. Although the result of the sensitivity tests points to the same conclusion, it highlights that banks' liquidity risks are sensitive to the movement of interest rates. Banks should therefore be vigilant for the potential effect and pace of normalisation of interest rates.

Box 6
Implications of liquidity management of global banks for the Hong Kong banking sector

The global financial crisis (GFC) highlights a pivotal role of global banks in transmitting financial shocks internationally. The strong presence of global banks (Chart B6.1) in Hong Kong implies that the local banking sector is not immune to inward spillovers[60] of shocks from global banks' home countries. Indeed, 27 out of the 29 global systemically important banks (G-SIBs)[61] operated in Hong Kong at the end of 2013 in the form of bank branches. Many of these branches played a significant funding role before the GFC, and their intra-group funding activities (i.e. internal capital markets) are one channel through which financial shocks are propagated. This Box provides empirical evidence regarding factors determining the extent of shock transmission through this channel and the associated impact on the operation of foreign bank branches in Hong Kong.

Chart B6.1
Presence of global banks in Hong Kong by consolidated asset size and mode of operation



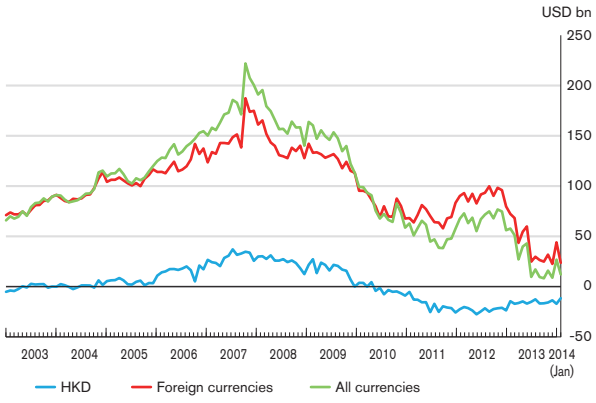
Note: The rank is based on consolidated asset size in 2013. Some global banks operate both branches and subsidiaries in Hong Kong.

Source: HKMA.

Internal capital markets of global bank branches in Hong Kong

Reflecting largely strong demand for US-dollar liquidity by global banks, total supply of cross-border banking funds by the Hong Kong banking sector, on a net basis, increased rapidly before the GFC and reached its peak at US$222 billion in October 2007 (Chart B6.2). To provide perspective on the scale of these cross-border flows, the peak amount of US$222 billion is comparable to 40% of the peak outstanding amount of the Federal Reserve's central bank liquidity swap lines recorded in the fourth quarter of 2008.

Chart B6.2
Hong Kong banking sector's net amount due from banks abroad #



"Net amount due from banks abroad" refers to the amount due from banks abroad less the amount due to banks abroad. A positive (negative) figure means that the Hong Kong banking sector is a net lender (borrower).

Source: HKMA.

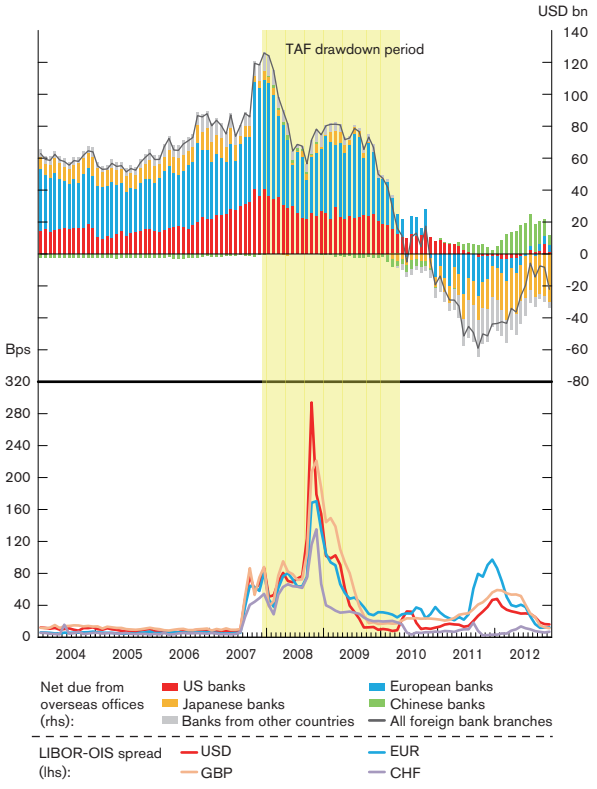
These cross-border funding flows are driven largely by intra-group funding flows of global banks' branches in Hong Kong. The cyclical movement of their foreign-currency "net due from overseas offices" (*NDF*), defined as "due from overseas offices" minus "due to overseas

60 Inward spillover of shocks refers to a situation that the Hong Kong banking sector is a receiver of external financial shocks emerging from home countries of global banks.

61 The 29 G-SIBs were identified by the Financial Stability Board in November 2013.

offices", is shown in Chart B6.3. By definition, a positive (negative) *NDF* means that Hong Kong branches are net lenders (borrowers) to the rest of their respective banking groups. We break down the aggregate *NDF* by country group based on their headquarter locations. The chart shows that in the run-up to the GFC, European banks and to a lesser extent US banks increasingly channelled funds from Hong Kong through their internal capital markets to support their parents' funding needs. Importantly, the increase in *NDF* was broadly associated with the first spike in funding stress in the second half of 2007 measured by the spread between interbank rate and overnight indexed swap rate (i.e. LIBOR-OIS spread). This observation suggests that in response to a parent-bank funding shock in home country, global banks buffered parents' liquidity by activating internal fund transfer from branches overseas.

Chart B6.3
Foreign-currency net due from overseas offices of foreign bank branches in Hong Kong and Libor-OIS spreads

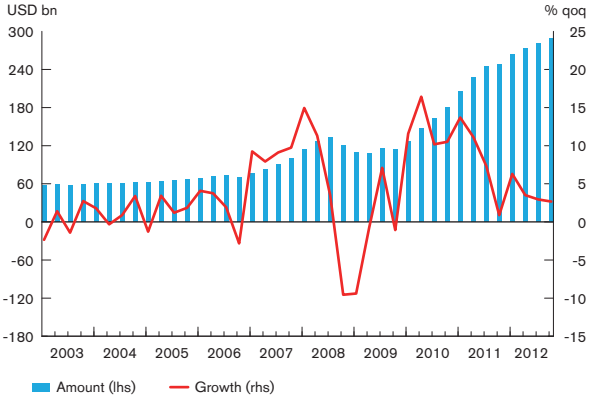


Sources: HKMA, data of LIBOR-OIS spreads are contributed by the International Banking Research Network.

The scale of internal fund transfer from Hong Kong branches, however, has dropped since the fourth quarter of 2007. The timing is in line with the launch of the Term Auction Facility (TAF) by the Federal Reserve in December 2007. As global banks gained access to liquidity measures by the Federal Reserve, their Hong Kong branches have played a less important funding role, contributing to a reversal of the funding pattern as early as mid-2010. Since then, many foreign bank branches in Hong Kong have become net recipients of internal funds (i.e. negative *NDF*).

The change in the funding pattern is particularly clear for European and Japanese banks, which is consistent with Shin's (2011)[62] hypothesis that non-US banks, by taking advantage of central bank liquidity measures during the crisis from the Federal Reserve, channelled US-dollar liquidity to emerging market economies. Indeed, published bank-level data by the Federal Reserve show that many global banks with branches in Hong Kong had access to the TAF. The ample liquidity of global banks due to unprecedented central bank measures arguably is one important contributor to the sharp foreign-currency loan growth in Hong Kong since 2010 (Chart B6.4).

Chart B6.4
Foreign-currency loans and advances to customers of the Hong Kong banking sector



Source: HKMA.

62 See H.S.Shin (2011) "Global Liquidity", remarks at the IMF conference on "Macro and Growth Policies in the Wake of the Crisis", Washington DC, 7-8 March 2011.

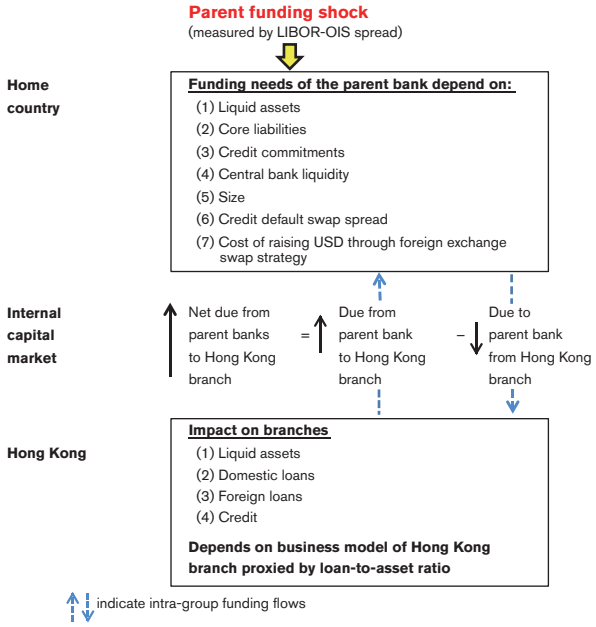
These observations together support the hypothesis that global banks propagate home-country funding shocks and central bank liquidity to host countries through their internal capital markets, which in turn affects the loan supply of their branches in Hong Kong. We test this hypothesis econometrically in the next section.

The empirical model and estimation results

To test the hypothesis, we adopt a two-stage econometric approach similar to that in Cetorelli and Goldberg's (2012) study.[63] The empirical strategy can be broadly described as follows: In the first-stage regression, we estimate how the parent's funding needs drive the change in *NDF* of its Hong Kong branch (*ΔNDF*). The predicted value of *ΔNDF*, which by construction captures the part of *ΔNDF* that is driven by the parent's funding needs, is then used as an instrumental variable in the second-stage regression to explain the branch operation, including the adjustment for liquid assets, (foreign and domestic) loans and credit (i.e. the sum of loans and credit commitments).

Instead of detailing the econometric specification of the model, we provide the economic intuition of the model using an example of a European bank. The structure of the model is also shown by Chart B6.5. Consider an exogenous liquidity shock in the euro area that leads to a sharp rise in the euro LIBOR-OIS spread. To cope with the parent's funding needs, European global banks would activate their internal capital markets by increasing the net internal funding flows from their overseas branches, with the intensity presumably being more pronounced for those banks that at the consolidated level hold less liquid assets and core liabilities (i.e. the sum of customer deposits and equity), and have more credit commitments. Size is also conjectured to be a significant determinant.

Chart B6.5
Structure of the empirical model



Note: In the model, the amount due from (to) parent bank to (from) Hong Kong branch is proxied by the amount due from (to) overseas offices to (from) Hong Kong branch.

We further assume that the parent takes into account the business model of its Hong Kong branch when adjusting *NDF*. Specifically, the parent tends to withdraw more internal funding from those overseas branches that *ex ante* play a more obvious funding role, contribute less to loan intermediation and investment activities, and price loans less favourably.

In addition, those global banks that gain access to central bank liquidity tend to reduce their reliance on internal funding support from branches overseas. Finally, the ability to raise external funding (measured by its credit default swap spread) and the cost of raising funds through swapping home-country currency to US dollars also affect the scale of internal funding support from overseas branches.

[63] See Cetorelli, N. and L.S. Goldberg (2012), "Follow the Money: Quantifying Domestic Effects of Foreign Bank Shocks in the Great Recession", *American Economic Review*, 102(3), pages 213-218.

From the perspective of a Hong Kong branch, branch assets would need to be adjusted to counterbalance the "withdrawal" of internal funding by the parent. The adjustment would take various forms, including selling liquid assets, cutting domestic and foreign loans. The branch would also be cautious about granting credit commitments. How the adjustment is distributed across asset types is assumed to be dependent on the business model of the Hong Kong branch, which is proxied by a loan-to-asset ratio of the branch.

The models are estimated using a panel dataset of 37 foreign bank branches in Hong Kong, covering from the first quarter of 2006 to the fourth quarter of 2012. Branch-level variables are constructed using regulatory data filed by these branches to the HKMA, while parent-level variables are constructed using data of their respective parents from *Bankscope*. All dependent variables are defined using US-dollar denominated balance sheet items. So, the estimation results allow us to understand better how global banks managed their US-dollar liquidity during the GFC.

The preliminary estimation result is broadly in line with our expectations and supports the hypothesis. Key findings are summarised as follows:

(1) Global banks are found to react to a parent-bank funding shock by increasing the net internal funding from their Hong Kong branches, with the intensity being more pronounced for those parents holding less liquid assets.

(2) Global banks that gained direct access to central bank liquidity are found to rely less on internal funding from their Hong Kong branches, suggesting a significant effect of central bank liquidity measures in alleviating funding pressure of global banks during the GFC.

(3) The estimation results support the *locational pecking order* hypothesis (Cetorelli and Goldberg, 2012).[64] Specifically, a parent would withdraw more internal funding from Hong Kong if its Hong Kong branch is regarded as core from a funding perspective. By contrast, the parent is more likely to commit stable internal funding to its Hong Kong branch if loan prices in Hong Kong are more attractive.

(4) Regarding the impact on branch operation, the estimation result indicates that higher internal fund transfer in support of the parent reduces loan supply of global banks' Hong Kong branches, with the adjustment being more intense for those branches that operate with a higher loan-to-asset ratio. Comparatively, the branch reduces the supply of US-dollar loans for use outside Hong Kong[65] more than that of US-dollar loans for use in Hong Kong. An even more drastic downward adjustment is found for credit commitments, suggesting that the parent funding shock would produce a prolonged effect on the branch's loan supply.

Conclusion

Our study finds that global banks' cross-border internal funding flows, and thus their foreign branches' loan supply are significantly responsive to central bank liquidity. Therefore, normalisation of liquidity in advanced economies, even assuming a limited impact on interest rates, could in theory change the pattern of internal funding flows of global banks and thus lead to a significant loan curtailment in host

[64] Cetorelli, N. and L.S. Goldberg (2012), "Liquidity management of US global banks: Internal capital markets in the great recession", Journal of International Economics, pages 299-311.

[65] Including US-dollar loans for trade finance.

countries. The resulting pressure on credit availability and loan pricing (particularly for foreign-currency loans) in host countries could be significant. The potential impact on the real economy merits close attention.

Nevertheless, our findings support the view that the ongoing regulatory reform may act as a dampening factor that helps to reduce the extent of cross-border transmission of financial shocks through the channel of global banks' internal capital markets. Specifically, our finding indicates that from a liquidity management perspective, liquid assets held by parents and internal funding from their Hong Kong branches are regarded as close substitutes by global banks. Therefore, liquidity requirements of Basel III, which requires banks to hold adequate high-quality liquid assets to cover their cash outflows, may reduce global banks' reliance on cross-border internal funding support in times of stress.

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. Introduced in March 1990, the Exchange Fund Bills and Notes programme has expanded over the years, with a maturity profile ranging from three months to 15 years. 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
CCPI	Composite Consumer Price Index
CCS	Cross-currency swap
CDs	Certificates of deposit
CEI	Composite index of coincident economic indicator
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
DSD	Doubling of the ad valorem stamp duty rates
ECB	European Central Bank
EFBN	Exchange Fund Bills and Notes
EMEs	Emerging Market Economies
EUR	Euro
Fed	Federal Reserve
FOMC	Federal Open Market Committee
FSB	Financial Stability Board
FX	Foreign exchange
GARCH	Generalised autoregressive conditional heteroscedasticity
GDP	Gross Domestic Product
GFC	Global financial crisis
G-SIBs	Global systemically important banks

HIBOR	Hong Kong Interbank Offered Rate
HKD	Hong Kong dollar
HKMA	Hong Kong Monetary Authority
HKTDC	Hong Kong Trade Development Council
HK$M3	Hong Kong dollar broad money supply
HSCEI	Hang Seng China Enterprises Index
HSI	Hang Seng Index
IMF	International Monetary Fund
IPO	Initial Public Offering
IT	Information technology and telecom
LEI	Composite index of leading economic indicator
LERS	Linked Exchange Rate system
LGFPs	Local government financing platforms
LIBOR	London Interbank Offered Rate
lhs	Left-hand scale
LTD	Loan-to-deposit
mn	Million
MTN	Medium-term Note
NAO	National Audit Office
NCD	Negotiable certificates of deposit
NEER	Nominal effective exchange rate
NIE	Newly industrialised economies
NPL	Non-performing loan
OIS	Overnight indexed swap
OTC	Over-the-counter
p.a.	Per annum
PBoC	People's Bank of China
PMI	Purchasing Managers' Index
PPI	Producer Price Index
QBTS	Quarterly Business Tendency Survey
qoq	Quarter-on-quarter
QQE	Quantitative and Qualitative Monetary Easing
R&VD	Rating and Valuation Department
REER	Real effective exchange rate
rhs	Right-hand scale
RMB	Renminbi
RTGS	Real time gross settlement
SGD	Singapore dollar
SSD	Special stamp duty
S&P 500	Standard & Poor's 500 Index

TAF	Term Auction Facility
TMA	Treasury Markets Association
UK	United Kingdom
US	United States
USD	US dollar
VAR	Vector auto-regression
VEC	Vector error correction
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.**

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