

5. Banking sector performance

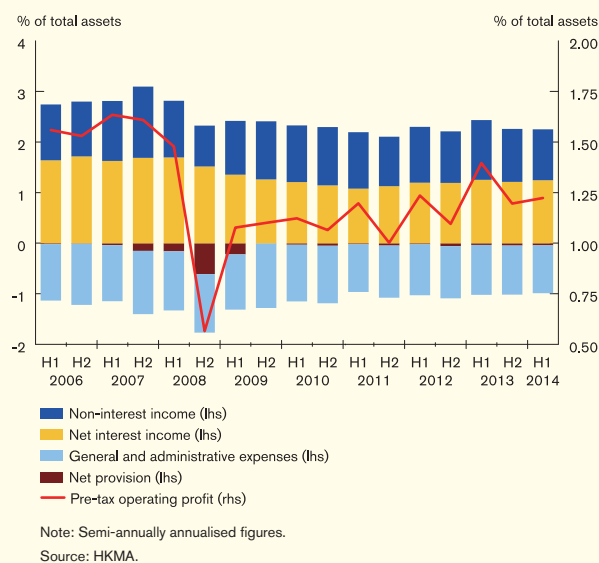
Retail banks maintained solid earnings growth, sound asset quality and a strong capital position. Given their generally favourable liquidity positions, banks in Hong Kong are not expected on the whole to encounter major difficulties in complying with the Basel III liquidity standards that will begin to be phased-in from next year. Nonetheless, banks should remain vigilant to risks associated with rising corporate leverage, increasing household debt-servicing burdens and indebtedness. The continued increase in Mainland related lending coupled with slower economic growth in the Mainland could pose significant challenges for banks in managing the associated credit risk.

5.1 Profitability and capitalisation

Profitability

Despite weaker domestic demand and uncertainties in the external environment, retail banks⁴⁶ continued to register an increase in earnings, with pre-tax operating profits growing by 7.3% in the first half of 2014 from the second half of 2013. Their return on assets⁴⁷ edged up to 1.22% from 1.2% in the previous six months (Chart 5.1). The increase in profitability was mainly driven by a 7.6% growth in net interest income.

Chart 5.1
Profitability of retail banks



⁴⁶ Throughout this chapter, figures for the banking sector relate to Hong Kong offices only, except where otherwise stated.

⁴⁷ Return on assets is calculated based on aggregate pre-tax operating profits.

The net interest margin of retail banks remained largely steady in the first half of 2014, averaging 1.4% in first half of 2014, from 1.39% in the second half of 2013 (Chart 5.2). For licensed banks as a whole, their overall interest costs registered an increase of 5 basis points in the first half of 2014, driven by the rise in both deposit and market-based funding costs (Chart 5.3).⁴⁸ In addition, the composite interest rate, a measure of the average cost of Hong Kong dollar funds for retail banks, increased by 8 basis points to 0.47% at the end of June 2014 (Chart 5.4).

Chart 5.2
Net interest margin of retail banks

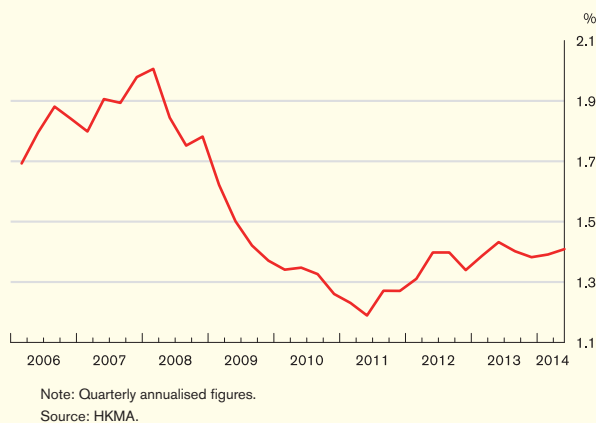


Chart 5.3
Hong Kong and US dollar funding cost and maturity of licensed banks

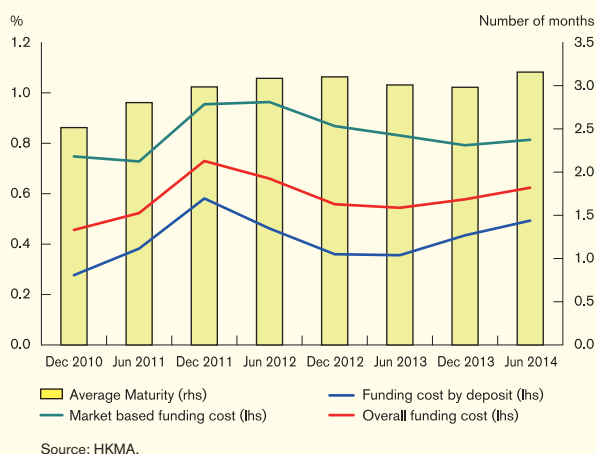
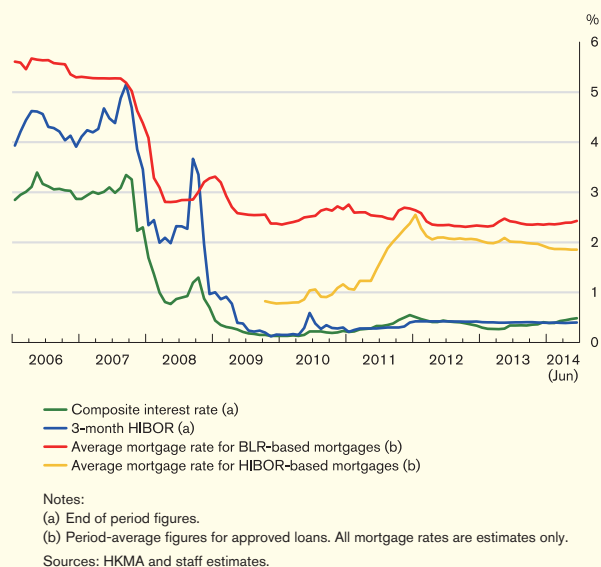


Chart 5.4
Interest rates



During the first half of 2014, the HIBOR-based mortgage rate declined by 7 basis points while the best lending rate-based (BLR-based) mortgage rate increased by the same extent. Partly in response to the widening of the two mortgage rates, the share of HIBOR-based mortgages amongst newly approved mortgage loans increased significantly to 76.7% at the end of June 2014, from 30.5% at the end of December 2013.

⁴⁸ Market-based funding cost is measured by the interest costs of banks' non-deposit interest bearing liabilities.

Capitalisation

Capitalisation of the banking sector remained well above the minimum international standards. The consolidated capital adequacy ratio of locally incorporated AIs increased slightly to 16.1% at the end of June 2014, from 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) remaining unchanged at 13.3%.

Chart 5.5
Capitalisation of locally incorporated AIs

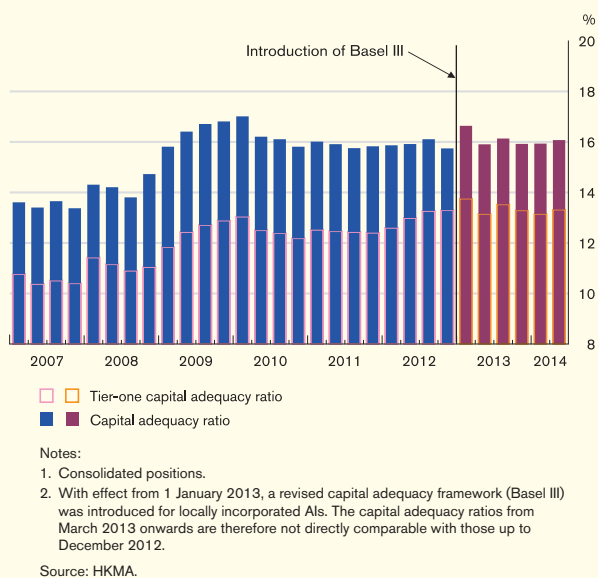
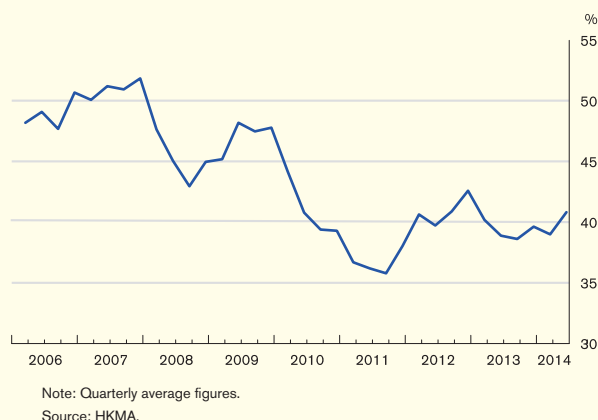
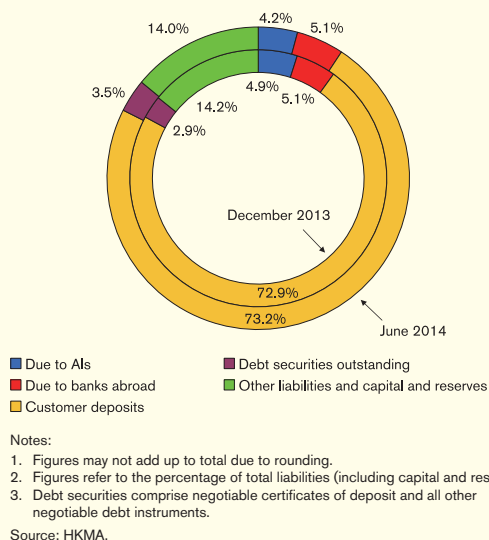


Chart 5.6
Liquidity ratio of retail banks



Customer deposits continued to be the primary funding source for retail banks, underpinning a stable funding structure. The share of customer deposits to banks' total liabilities was 73.2% at the end of June 2014, slightly higher than 72.9% at the end of 2013 (Chart 5.7).

Chart 5.7
Liabilities structure of retail banks



5.2 Liquidity, interest rate and credit risks

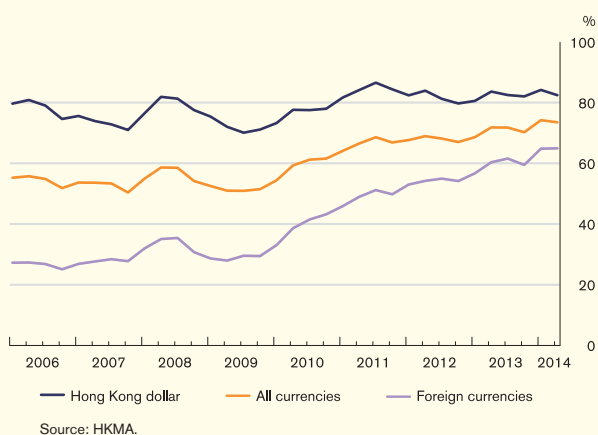
Liquidity and funding

The liquidity position of the banking sector remained favourable, with the average liquidity ratio⁴⁹ of retail banks improving slightly to 40.8% in the second quarter of 2014, from 39.6% in the fourth quarter of 2013 (Chart 5.6), remaining well above the regulatory minimum of 25%.

⁴⁹ 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).

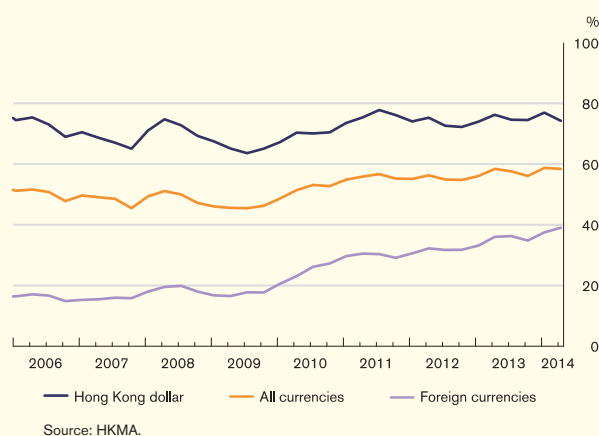
The HKD loan-to-deposit (LTD) ratio of all AIs remained steady at 82.5% at the end of June 2014, compared with 82.1% at the end of 2013 (Chart 5.8). In contrast, the foreign currency LTD ratio rose tangibly by 5.5 percentage points to 65% from 59.5% over the same period, partly driven by a faster increase in foreign currency loans which outpaced the moderate growth of foreign currency deposits. Reflecting this, the all currency LTD ratio went up to 73.6% at the end of June, from 70.3% at the end of 2013.

Chart 5.8
Loan-to-deposit ratios of all AIs



Similarly, retail banks' HKD LTD ratio remained steady at 74.3% at the end of June 2014, while their foreign currency LTD ratio rose notably to 39.1% from 34.8%. The all currency LTD ratio for retail banks rose to 58.5% from 56.1% (Chart 5.9).

Chart 5.9
Loan-to-deposit ratios of retail banks



In light of the rise in the foreign currency LTD ratio and the anticipated normalisation of US monetary policy, the HKMA introduced the Stable Funding Requirement (SFR) with effect from January 2014, with a view to preventing the build-up of funding vulnerability within banks and to ensure that banks have sufficient capacity to withstand potential risks arising from the possible significant fund outflows from Hong Kong.

The HKMA has proposed a two-tiered approach for the adoption of the Basel III liquidity standards in Hong Kong.⁵⁰ The Basel III Liquidity Coverage Ratio (LCR)⁵¹ is scheduled to begin phasing-in from 1 January 2015, with the minimum ratio requirement initially set at 60% and subsequently increasing by 10 percentage points per annum to reach 100% on 1 January 2019.⁵² Assessments based on data regularly collected by the HKMA indicate that AIs in Hong Kong are generally not expected to encounter major difficulties in complying with the new liquidity standards over the transitional period, although some may need to adjust their liquidity profile or liquid asset composition.

⁵⁰ Under the two-tiered approach, larger and more sophisticated AIs will be classified by the HKMA as "Category One" institutions and will be subject to the Basel III liquidity standards, while other AIs will be classified as "Category Two" institutions and will be subject to a modified version of the existing 25% minimum Liquidity Ratio which will be known as the Liquidity Maintenance Ratio (LMR). For details, see HKMA consultation papers "Implementation of Basel III liquidity standards in Hong Kong (L3)", 12 July 2013, and "Consultation on returns for reporting of liquidity maintenance ratio and liquidity monitoring tools", 16 May 2014, which are available on the HKMA website.

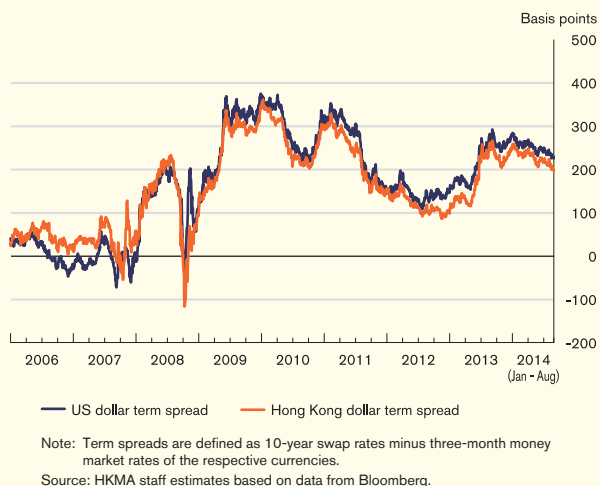
⁵¹ LCR is a new minimum liquidity standard introduced in Basel III, designed to ensure that banks have sufficient high-quality liquid assets to survive a significant stress scenario lasting 30 calendar days.

⁵² The LMR for Category Two institutions will also come into effect on 1 January 2015.

Interest rate risk

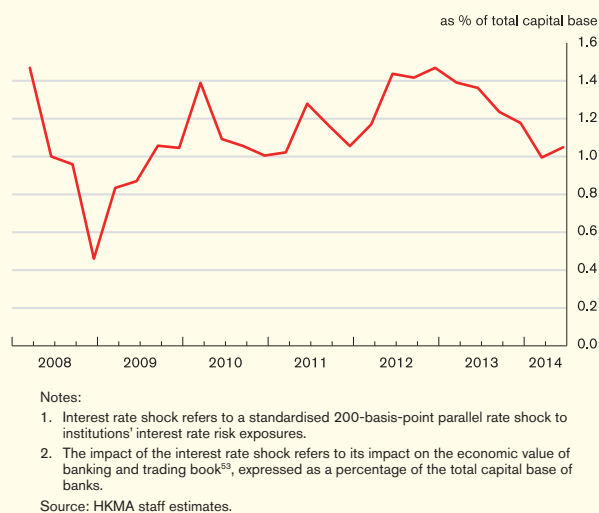
The spreads between the long- and short-term interest rates for the US dollar and Hong Kong dollar hovered over 200 basis points during the first half of 2014 (Chart 5.10). This suggests that the incentive for banks to search for yield by borrowing short-term funds to purchase long-term interest-bearing assets has remained high. This could in turn potentially lead to greater maturity mismatches and increased interest rate risk. Banks should remain alert to this and should seek to prudently manage maturity mismatch between funding sources and loans.

Chart 5.10
Term spreads of Hong Kong and US dollars



Nevertheless, interest rate exposures of retail banks remained manageable. It is estimated that under a hypothetical shock of an across-the-board 200-basis-point increase in interest rates, the economic value of retail banks' interest rate positions could be subject to a decline equivalent to 1.05% of their total capital base as of June 2014 (Chart 5.11).

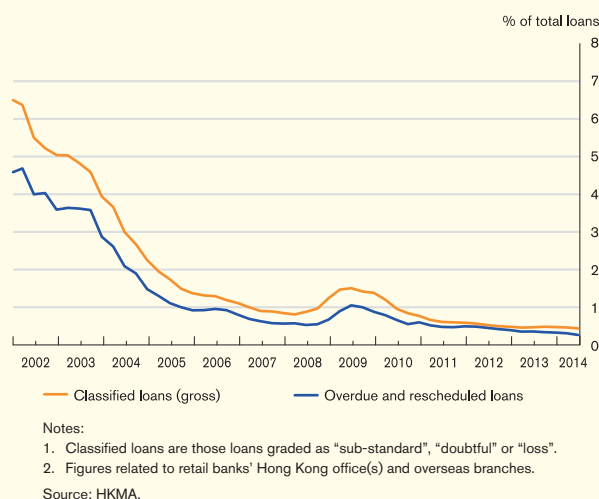
Chart 5.11
Impact of interest rate shock on retail banks



Credit risk

The asset quality of retail banks' loan portfolios remained healthy, with the classified loan ratio declining slightly to 0.44% at the end of June 2014, from 0.48% at the end of 2013, and the ratio of overdue and rescheduled loans falling further from 0.33% to 0.27% during the period (Chart 5.12).

Chart 5.12
Asset quality of retail banks



Loan growth in the banking sector accelerated in the first half of 2014. The domestic lending⁵⁴ of AIs grew notably by 11.3% in the period, following an increase of 3.1% in the second half of 2013. The rapid expansion in credit was

⁵³ 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.

⁵⁴ Defined as loans for use in Hong Kong plus trade-financing loans.

mainly driven by trade finance and loans to corporations.

According to the results of the HKMA Opinion Survey on Credit Condition Outlook of June 2014, the share of surveyed AIs expecting loan demand to remain the same in the next three months had increased notably to 86%, whereas the share expecting higher loan demand had decreased (Table 5.A).

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

As % of total respondents	Sep 2013	Dec 2013	Mar 2014	Jun 2014
Considerably higher	0	0	0	0
Somewhat higher	19	24	24	10
Same	71	71	71	86
Somewhat lower	10	5	5	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

Household loans⁵⁵ grew at a relatively faster pace of 4.6% in the first half of 2014 from 3.3% in the second half of 2013 (Table 5.B). Partly reflecting a more buoyant residential property market and an increase in property transaction volumes since March 2014, mortgage lending expanded by 3.1% in the first half, following a much weaker growth of 0.8% in the second half of 2013.

Other loans for private purposes (i.e. personal loans) grew by 13.9% in the first half of 2014,

compared with 10.5% in the second half of 2013. Personal loans represent one of the key drivers behind the recent rise in household indebtedness. Therefore, the HKMA strengthened prudential requirements on personal lending business in January 2014.⁵⁶ Reflecting partly the impact of prudential requirements, there were signs of moderation in the growth rate of personal loans in the second quarter.⁵⁷

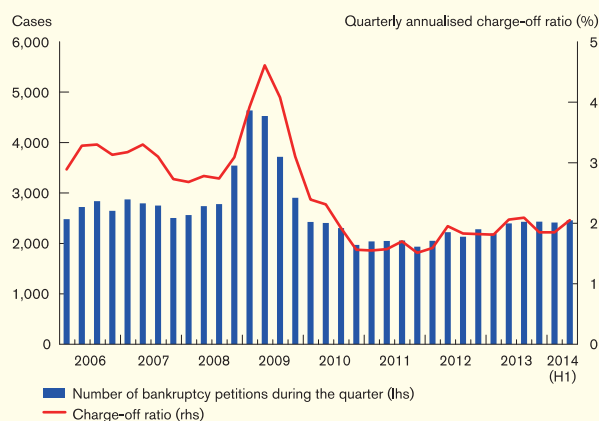
Table 5.B
Half-yearly growth of loans to households of all AIs

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

Source: HKMA.

The credit risk of unsecured household exposure remained contained in the first half of 2014, with the annualised credit card charge-off ratio and the number of bankruptcy petitions staying relatively low (Chart 5.13).

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



Sources: Official Receiver's Office and the HKMA.

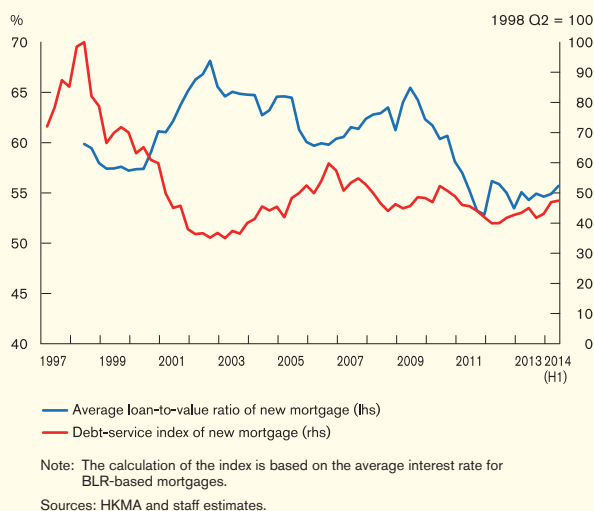
⁵⁵ Loans to households constitute lending to professional and private individuals, excluding lending for other business purposes. Mortgage lending accounts for a major proportion of household loans while the remainder comprises mainly unsecured lending through credit card lending and other personal loans for private purposes. At the end of June 2014, the share of household lending in domestic lending was 27.5%.

⁵⁶ AIs are required to review and assess their policies and risk management systems and take immediate measures to bring them in line with the prudential requirements by the end of March 2014. For details, see circular "Risk Management of Personal Lending Business" issued on 14 January 2014.

⁵⁷ The quarterly growth rate of these loans slowed down to 3.5% in the second quarter of 2014, from 10.1% in the first quarter.

Banks' mortgage portfolios remained healthy, with the delinquency ratio staying at 0.02%. However, it is worth noting that the debt-service index of new mortgages rose to 47 in June 2014 from 43 in December 2013 (Chart 5.14) mainly reflecting an expansion in the average size of mortgage loans. Despite the slight deterioration in household repayment ability, the loan-to-value ratio of new mortgage loans remained stable at low levels of around 55% as compared with 64% before the first round of counter-cyclical measures was introduced in October 2009, suggesting that banks' resilience to property price shocks has strengthened after the six rounds of tightening of loan-to-value ratio caps.

Chart 5.14
Average loan-to-value ratio and household debt-servicing burden in respect of new mortgages



Looking forward, the tangible increase in mortgage loans since March may add additional burden to the already high level of household indebtedness. Once global monetary conditions normalise, interest rates may increase substantially, potentially significantly impacting

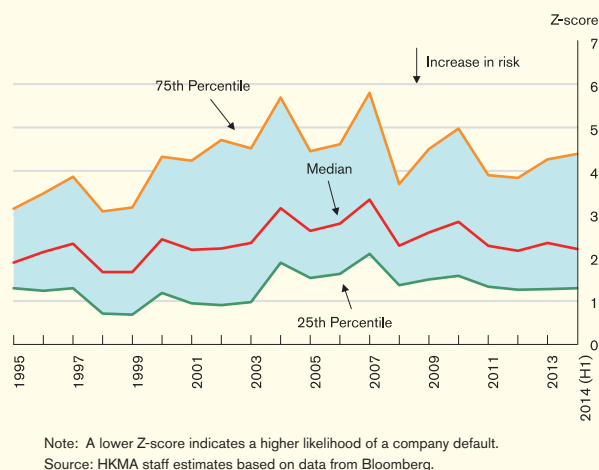
households' debt-servicing ability. Banks should be vigilant to the impact of a rise in interest rates on their household exposure.

Corporate exposure⁵⁸

Domestic loans to corporations also grew at a significantly faster pace of 14.2% in the first half of 2014, after a 3% increase in the second half of 2013. At the end of June, corporate loans accounted for 72.3% of domestic lending.

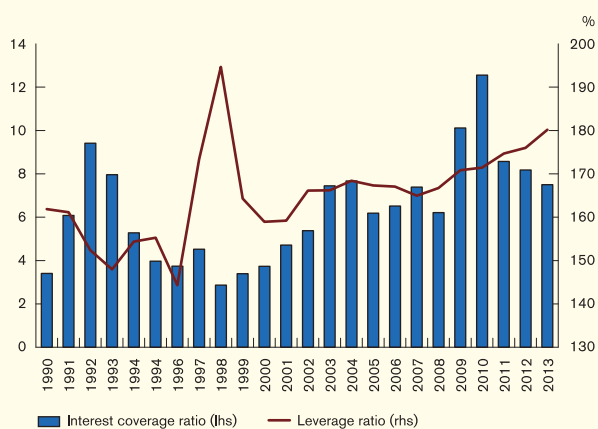
While the Altman's Z-score (Chart 5.15) and the number of compulsory winding-up orders of companies remained broadly steady, there are signs that credit risk in respect of banks' corporate exposures may be building up. In particular, the debt leverage of the corporate sector has increased in recent years, with the ratio of assets to shareholders' funds reaching 1.8 times at the end of 2013 (Chart 5.16). Meanwhile, the decline of interest coverage ratios suggests a deterioration of local corporations' debt-servicing ability.

Chart 5.15
Altman's Z-score: A bankruptcy risk indicator of listed non-financial companies in Hong Kong



⁵⁸ Excluding interbank exposure.

Chart 5.16
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.

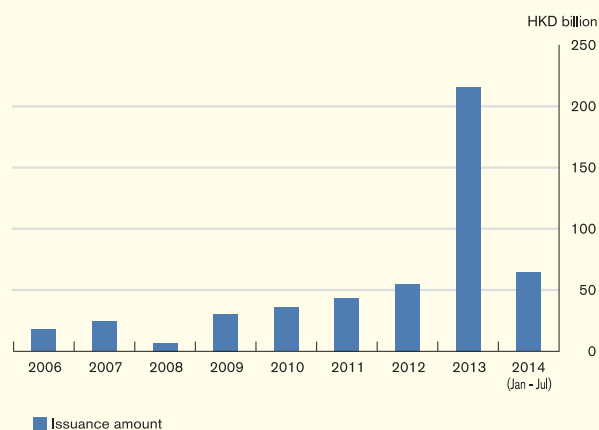
Source: HKMA staff estimates based on data from Bloomberg.

The unprecedented low interest rate environment in major advanced economies may encourage corporations to take excessive foreign exchange exposure if they borrow a particular currency merely because of attractive borrowing rates and without regard to the possible impact on the currency mismatch between their funding and earnings. Such currency mismatch could translate into significant losses and thus increase their default risk if exchange rates move unfavourably.

Publicly available information for assessing corporations' currency mismatch risk, however, is scant. Nevertheless, the risk should not be dismissed, as information from the syndicated loan market suggests that banks in Hong Kong have been actively participating in arranging syndicated loans for regional corporations in recent years and these loans are mostly denominated in currencies other than the home currency of the relevant corporations, e.g. US dollar loans (Chart 5.17). Although the development is consistent with the fact that Hong Kong is a funding hub in the region, the question of how much of these corporate loans is hedged against foreign exchange risk or matched by corporate revenues in US and Hong Kong

dollars could have significant implications for the credit risk of the banking sector. Banks should remain vigilant about currency mismatch risk.

Chart 5.17
Hong Kong banks' involvement in US dollar syndicated loans of overseas corporations in Asia Pacific region



Notes:
1. Regional corporations cover non-financial sector companies in the major economies of the Asia Pacific region, and are defined by their country of risk.
2. Overseas banks also participated in the arrangement of these syndicated loans.

Source: HKMA staff estimates based on data from Bloomberg.

Mainland-related lending and non-bank exposures

The banking sector continued to expand its business in Mainland China during the review period. Total Mainland-related lending increased by 14.2% to HK\$2,956 billion (14.4% of total assets) at the end of the second quarter of 2014 from HK\$2,588 billion (13.3% of total assets) at the end of 2013 (Table 5.C).

Table 5.C
Mainland-related lending

	Dec 2013 HK\$bn	Mar 2014 HK\$bn	Jun 2014 HK\$bn
Mainland-related loans excluding trade finance	2,276	2,461	2,546
Trade finance	312	406	410
Total	2,588	2,867	2,956

Source: HKMA.

Given the sustained development of the Mainland China economy, it is natural for Mainland related lending to expand.

Understanding the risk profile of these loans is however crucial. Unlike homogenous credit products such as residential mortgage loans, Mainland-related lending is characterised by a high degree of heterogeneity among lenders and borrowers (Tables 5.D and 5.E). In particular, borrowers consist of Mainland non-private and private entities, as well as non-Mainland entities. The widely-varying risk profiles among borrowers could pose significant challenges for banks in managing their credit risk for Mainland-related lending.

Table 5.D
Mainland-related lending by type of Als

	Dec 2013 HK\$bn	Mar 2014 HK\$bn	Jun 2014 HK\$bn
Overseas-incorporated Als	1,116	1,244	1,263
Locally-incorporated Als*	971	1,111	1,164
Mainland banking subsidiaries of locally-incorporated Als	501	512	530
Total	2,588	2,867	2,956

* Including loans booked in the Mainland branches of locally-incorporated Als.

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

Table 5.E
Mainland-related lending by type of borrowers

	Dec 2013 HK\$bn	Mar 2014 HK\$bn	Jun 2014 HK\$bn
Mainland non-private entities	1,280	1,453	1,480
Mainland private entities	491	528	561
Non-Mainland entities	817	886	916
Total	2,588	2,867	2,956

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

⁵⁹ These efforts include: (1) regular and thematic onsite examinations of banks' credit underwriting processes; (2) introduction of SFR to ensure banks with high loan growth are supported by adequate long-term funding; and (3) regular supervisory stress testing to assess banks' resilience to credit shocks.

⁶⁰ 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.

⁶¹ For details, refer to section 2.2 of the report.

Table 5.F
Other non-bank exposures

	Dec 2013 HK\$bn	Mar 2014 HK\$bn	Jun 2014 HK\$bn
Negotiable debt instruments and other on-balance sheet exposures	573	530	584
Off-balance sheet exposures	441	415	396
Total	1,014	944	980

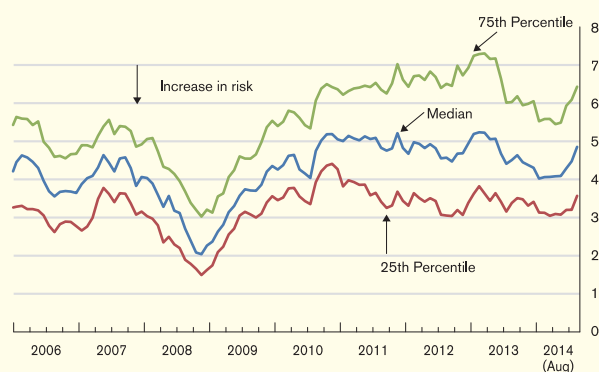
Note: Figures may not add up to total due to rounding.

Source: HKMA

To help banks to manage such risks, the HKMA has continued to step up supervisory efforts⁵⁹ focusing on the robustness of banks' risk management systems, including banks' credit risk and liquidity risk management. Banks are also now required to report more granular information about their Mainland business.

Partly reflecting slower economic growth in the Mainland, the aggregate distance-to-default index⁶⁰ of the Mainland's corporate sector declined from the first quarter of 2013 until the first quarter of 2014 (Chart 5.18). The index has started to improve since then. The improvement may be partly supported by recent measures by Mainland authorities to loosen liquidity, as shown by faster growth in money supply in the Mainland.⁶¹ Nonetheless, since the longer-term effects of these measures on corporations are still uncertain, banks should maintain prudent management of credit risks in the Mainland market.

Chart 5.18
Distance-to-default index for the Mainland corporate sector



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

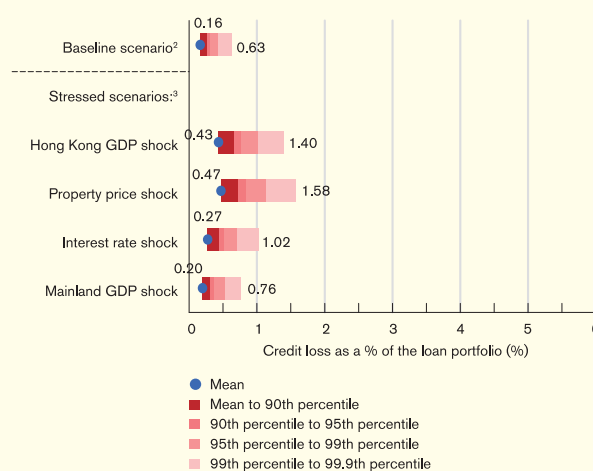
Source: HKMA staff estimates.

Macro stress testing of credit risk⁶²

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 severe macroeconomic shocks, similar to those experienced during the Asian financial crisis. Chart 5.19 presents the simulated future credit loss rate of retail banks in the second quarter of 2016 under four specific macroeconomic shocks⁶³ using information up to the second quarter of 2014. The expected credit losses for retail banks' aggregate loan portfolios two years after the different hypothetical macroeconomic shocks are estimated to be moderate, ranging from 0.2% (Mainland GDP shock) to 0.47% (Property price shock).

Taking account of tail risk, banks' maximum credit losses (at the confidence level of 99.9%) under the stress scenarios range from 0.76% (Mainland GDP shock) to 1.58% (Property price shock), which are significant, but smaller than the loan loss of 4.39% following the Asian financial crisis.

Chart 5.19
The mean and value-at-risk statistics of simulated credit loss distributions¹



Notes:

- The assessments assume the economic conditions in 2014 Q2 as the current environment. The Monte Carlo simulation method is adopted to generate the credit loss distribution for each scenario.
- Baseline scenario: no shock throughout the two-year period.
- 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 Q3 to 2015 Q2.
 - 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 Q3 to 2015 Q2.
 - Interest rate shock:** A rise in real interest rates (HIBORs) by 300 basis points in the first quarter (i.e. 2014 Q3), followed by no change in the second and third quarters and another rise of 300 basis points in the fourth quarter (i.e. 2015 Q2).
 - Mainland GDP shock:** Slowdown in the year-on-year annual real GDP growth rate to 4% in one year.

Source: HKMA staff estimates.

The prospective exit from unconventional monetary policy (UMP) by the US Fed may potentially lead to a disruption in the supply of international US dollar credit. Box 6 studies this issue both theoretically and empirically. The major findings support the view that the contractionary effect of the Fed's exit from UMP on global liquidity would be partly offset by the expansionary effect of UMPs of other central banks. The net effect, however, is crucially dependent on whether the normalisation of liquidity in the US would lead to serious financial market disruption, in particular in the FX swap market. If the exit from UMP by the Fed coincides with a risk-off phase for global investors, a severe dollar shortage in global financial markets is possible. This suggests that liquidity risks associated with the flow of international US dollar credit can be high, which could pose significant challenges for policymakers.

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

⁶² Macro stress testing refers to a range of techniques used to assess the vulnerability of a financial system to "exceptional but plausible" macroeconomic shocks. The credit loss estimates presented in this report are obtained based on a revised framework from J. Wong et al. (2006), "A framework for stress testing banks' credit risk", *Journal of Risk Model Validation*, Vol. 2(1), pages 3 - 23. All estimates in the current report are not strictly comparable to those estimates from previous reports.

⁶³ These shocks are calibrated to be similar to those that occurred during the Asian financial crisis, except the Mainland China GDP shock.

Table 5.G
Key performance indicators of the banking sector¹ (%)

	Jun 2013	Mar 2014	Jun 2014
Interest rate			
1-month HIBOR fixing ² (quarterly average)	0.21	0.21	0.21
3-month HIBOR fixing (quarterly average)	0.38	0.38	0.37
BLR ³ and 1-month HIBOR fixing spread (quarterly average)	4.79	4.79	4.79
BLR and 3-month HIBOR fixing spread (quarterly average)	4.62	4.62	4.62
Composite interest rate ⁴	0.32	0.41	0.47
Retail banks			
Balance sheet developments⁵			
Total deposits	1.4	-0.4	5.3
Hong Kong dollar	0.5	-0.1	7.9
Foreign currency	2.5	-0.8	2.4
Total loans	5.6	4.3	4.8
Domestic lending ⁶	5.2	4.3	4.9
Loans for use outside Hong Kong ⁷	7.3	4.2	4.4
Negotiable instruments			
Negotiable certificates of deposit (NCD) issued	15.1	16.5	-3.3
Negotiable debt instruments held (excluding NCD)	-0.3	-5.8	5.3
Asset quality⁸			
As a percentage of total loans			
Pass loans	98.42	98.42	98.51
Special mention loans	1.11	1.12	1.05
Classified loans ⁹ (gross)	0.47	0.46	0.44
Classified loans (net) ¹⁰	0.33	0.34	0.32
Overdue > 3 months and rescheduled loans	0.36	0.31	0.27
Profitability			
Bad debt charge as percentage of average total assets ¹¹	0.03	0.04	0.04
Net interest margin ¹¹	1.41	1.39	1.40
Cost-to-income ratio ¹²	40.9	40.8	42.9
Liquidity ratio (quarterly average)	38.9	39.0	40.8
Surveyed institutions			
Asset quality			
Delinquency ratio of residential mortgage loans	0.02	0.02	0.02
Credit card lending			
Delinquency ratio	0.25	0.22	0.22
Charge-off ratio — quarterly annualised	2.06	1.85	2.05
— year-to-date annualised	1.88	1.85	1.90
All locally incorporated AIs			
Capital adequacy ratio (consolidated)¹³	15.9	15.9	16.1

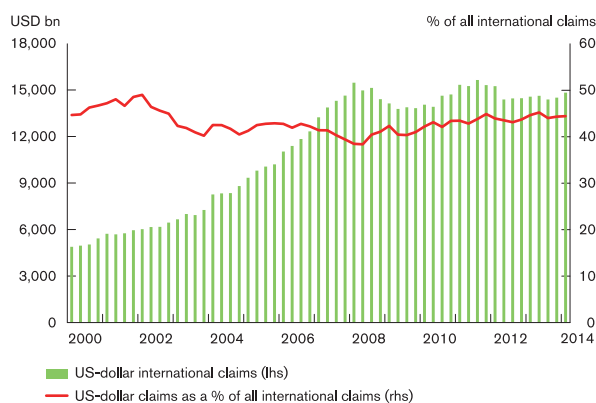
Notes:

- Figures are related to Hong Kong office(s) only except where otherwise stated.
- The Hong Kong dollar Interest Settlement Rates are released by the Hong Kong Association of Banks.
- With reference to the rate quoted by The Hongkong and Shanghai Banking Corporation Limited.
- 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.
- Quarterly change.
- Loans for use in Hong Kong plus trade finance.
- Including "others" (i.e. unallocated).
- Figures are related to retail banks' Hong Kong office(s) and overseas branches.
- Classified loans are those loans graded as "substandard", "doubtful" or "loss".
- Net of specific provisions/individual impairment allowances.
- Year-to-date annualised.
- Year-to-date figures.
- With effect from 1 January 2013, a revised capital adequacy framework (Basel III) was introduced for locally incorporated authorized institutions.

Box 6 Unconventional monetary policies and international US-dollar credit

The prospective exit from unconventional monetary policy (UMP) by the US Fed and tighter dollar liquidity conditions may potentially lead to a disruption of the supply of international US-dollar credit. Such a disruption could have important implications for global financial stability due to the fact that about half of international claims are denominated in the US dollar (Chart B6.1).

**Chart B6.1
US-dollar international claims**



Notes:

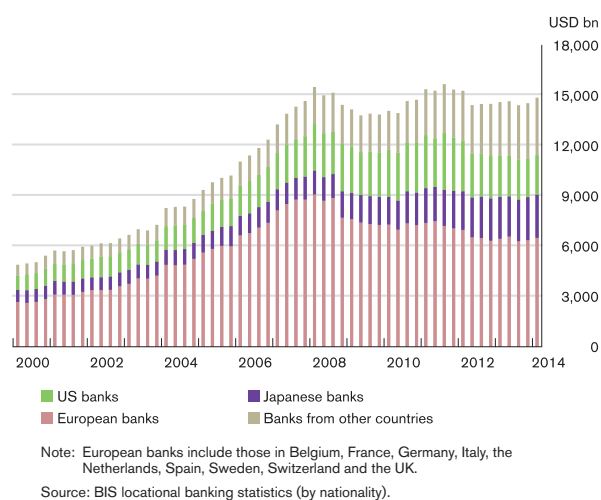
1. The claims are vis-à-vis all sectors and include interoffice claims of banks.
2. US-dollar international claims include US-dollar cross border claims and local credit extended in US dollars in countries other than the US.

Source: BIS locational banking statistics (by nationality).

There is a counter argument that UMP by the Bank of Japan (BoJ) and possibly the European Central Bank (ECB) may help cushion US-dollar liquidity, and thus the Fed's exit from its UMP may not necessarily lead to a significant contraction in international US-dollar credit. This argument is supported by the fact that non-US global banks (i.e. those international banks headquartered outside the US), particularly European and Japanese banks channel the lion's share of international bank credit (Chart B6.2). It is argued that UMP by the BoJ and possibly the ECB would provide ample liquidity for their domestic banks. The home-currency liquidity can be converted into US-dollar funding through foreign exchange (FX) swaps to fill the US-dollar

funding gap. The net impact on the supply of international US-dollar loans is therefore undetermined in theory.

**Chart B6.2
US-dollar international claims by nationality of banks**



Apart from UMPs, the functioning of the FX swap market and default risk of global banks would also affect the supply of international US-dollar credit. As shown during the global financial crisis, the impairment of FX swap markets and heightened default risk of global banks contributed to a prolonged global US dollar shortage.

This box attempts to broaden our understanding of how UMPs, the functioning of FX swap markets and the default risk of global banks would affect the supply of US-dollar lending of global banks. We start off the analysis by introducing a theoretical framework. We will then discuss how far this theoretical framework can account for recent developments in respect of the US-dollar lending of foreign bank branches (FBBs) in Hong Kong. Finally, we will test the theoretical framework econometrically using a novel dataset from the BIS.

The theoretical framework

Our theoretical framework is modified from that developed by Ivashina et al. (2012)⁶⁴: Consider a European bank that provides euro loans (L) in the local market and US-dollar loans (L^*) in the international market. We assume that the bank can raise costless euro and US-dollar funding in the respective markets, but only up to a limit (denoted by D and D^* respectively). Any amount of funding exceeding the limit incurs an increasing marginal cost. The bank is assumed to minimise the FX risk. So, in order to provide US-dollar loans, the bank needs to raise US-dollar funding in the US or to convert its euro funding into US dollars in the FX swap market. In the former case, the funding cost is assumed to factor in a risk premium (P) to compensate for the bank's default risk, while in the swap market a fee (S) is required. The demand curves for L and L^* are assumed to be downward sloping, with θ and θ^* being the respective demand shock parameters.

Under some assumptions on the demand and cost functions, the model can be solved mathematically. The model predicts that in equilibrium, the level of US-dollar loans (L^*) of a profit-maximising European bank is a linear function such that L^* is positively correlated with D , D^* and θ^* , and negatively correlated with θ , P and S .

The model prediction is largely consistent with economic intuition. Most importantly, other things being equal, more abundant liquidity either in home or in the US market (i.e. larger D and D^* respectively) would induce the European bank to lend more US-dollar loans, which is consistent with the hypothesis that monetary policies adopted by the Fed and the home-country central bank are determinants of the supply of US-dollar loans.

For other supply-side factors, higher default risk (higher P) would increase the bank's US-dollar funding cost in the US, thus curtailing its US-dollar loans. Disruption in the FX swap market (higher S) would also reduce the supply of US-dollar loans of the European bank as it becomes more costly to raise cross-currency funding.

Anecdotal evidence from foreign bank branches in Hong Kong

The operation of FBBs in Hong Kong is a natural experiment to test the theoretical framework, as most global banks have branches in Hong Kong, and many of these branches act as regional headquarters to provide loans to borrowers in Asia. So, it can be argued that FBBs in Hong Kong face very similar loan demand conditions. In theory, this feature allows us to properly control demand factors, and as such, significant differences in loan growth among FBBs in Hong Kong would arguably be attributable to supply factors. Therefore, we can assess the explanatory power of the theoretical framework by examining the extent to which D , D^* , P and S can account for recent developments in respect of US-dollar lending of FBBs in Hong Kong.

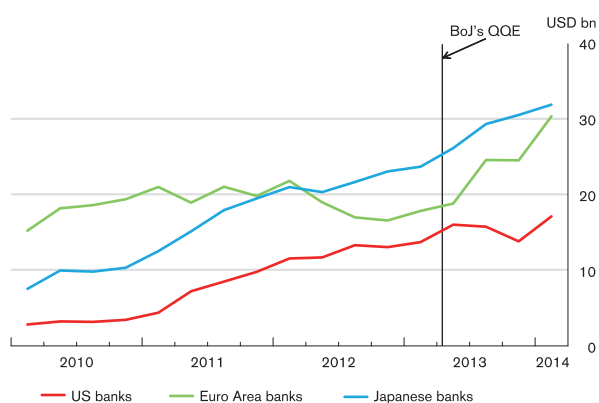
Chart B6.3 presents US-dollar loans since 2010 for the US, Japanese and euro-area bank branches in Hong Kong. For US bank branches, the Fed's UMP would be the dominant factor affecting their lending as US banks' source of US-dollar funding is mainly in the US. The upward trend (i.e. the red line in Chart B6.3) is consistent with the continued expansion of the Fed's balance sheet.

US-dollar loans of Japanese bank branches in Hong Kong exhibited a similar trend (i.e. the blue line in Chart B6.3) to that of US bank branches before April 2013, suggesting the Fed's UMP also affected Japanese bank branches' US-dollar loans. However, since April 2013 when the BoJ started its quantitative and qualitative easing (QQE), the US-dollar loans of Japanese

⁶⁴ Ivashina, Victoria, David S. Scharfstein and Jeremy C. Stein (2012), "Dollar Funding and the Lending Behavior of Global Banks," FEDS paper 2012-74, Federal Reserve Board.

bank branches increased more rapidly as compared with that of the “control group” (i.e. US bank branches). The evidence suggests that BoJ’s QQE does affect the supply of US-dollar loans of Japanese banks, which is consistent with the model prediction.

Chart B6.3
US-dollar loans of foreign bank branches in Hong Kong by selected nationalities



Source: HKMA.

For US-dollar loans of euro-area bank branches in Hong Kong, the development is affected by various factors. There was an upward trend of US-dollar lending until 2011Q1 (i.e. the green line in Chart B6.3), which is broadly in line with that of Japanese and US bank branches. This points to a significant effect of the Fed’s UMP. From 2011Q2 to 2013Q1, the trend reversed, which is consistent with the deceleration of the growth rate of the ECB’s balance sheet (i.e. the green line in Chart B6.4) and high default risk of euro-area banks⁶⁵ (i.e. a rise in P ; see the blue line). There was also a spike in the swap cost

⁶⁵ Default risk is proxied by the sovereign credit default swap (CDS) spread for euro-area countries.

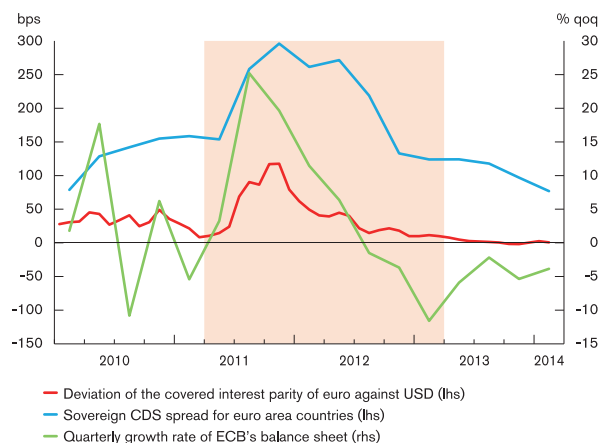
⁶⁶ Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Spain, Sweden, Switzerland, the UK and the US.

⁶⁷ The data are only available for central bank staff of the BIS reporting countries.

⁶⁸ Khwaja and Mian (2008), “Tracing the impact of bank liquidity shocks: Evidence from an emerging market”, *American Economics Review* 98, pp. 1413-1442.

(i.e. higher S ; the red line). The rapid growth of US-dollar loans of euro-area bank branches in Hong Kong since 2013Q2 is underpinned by a continued improvement in the three aforementioned factors.

Chart B6.4
Selected factors potentially affecting the supply of US-dollar loans of euro-area banks



Sources: IMF International Financial Statistics, Bloomberg and HKMA staff estimates.

The empirical model and estimation results

We further test the theoretical framework econometrically using a novel dataset from the BIS. Since June 2012, the BIS has collected quarterly data of dollar-denominated external claims and liabilities of 12 core global bank nationalities⁶⁶ vis-à-vis 76 counterparty countries.⁶⁷ The breakdown by nationality of global banks facilitates an investigation of how monetary policy in the home country would affect US-dollar loans of a global bank. More importantly, the information in respect of home-recipient country pairs is conducive to a clear identification of the supply-side effect using the econometric approach by Khwaja and Mian (2008).⁶⁸ Despite the short length of this dataset (from June 2012 to December 2013), there is a sufficiently large number of samples (more than 4,000 samples), by referring to which a reliable statistical result can be obtained.

Following the theoretical framework, an empirical model is specified as follows:

$$\Delta L_{ijt}^* = \alpha_{it} + \beta_1 \Delta D_{jt} + \beta_2 \Delta D_t^* + \beta_3 \Delta P_{jt-1} + \beta_4 \Delta S_{jt-1} + \gamma X + \varepsilon_{ijt}$$

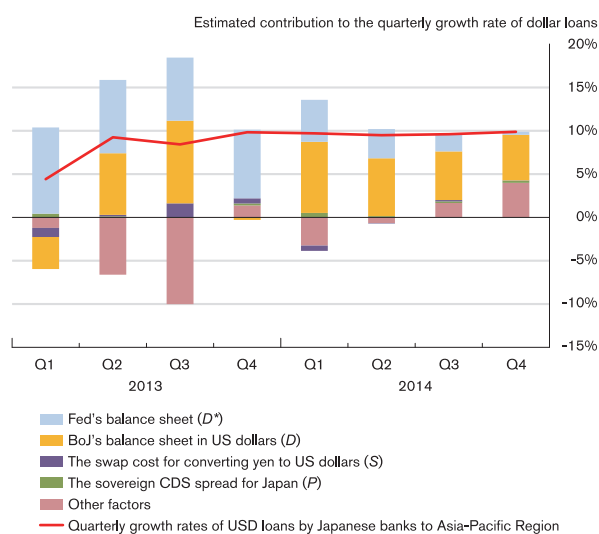
where ΔL_{ijt}^* is the quarterly growth rate of US-dollar loans to a recipient country i by global banks headquartered in country j from $t-1$ to t . α_{it} is recipient country-time fixed effect to account for the demand shock in country i (i.e. θ^*). ΔD_{jt} and ΔD_t^* are funding shocks in country j and the US respectively. They are proxied by the growth rate of the balance sheet of the central bank in country j and that of the Fed respectively. ΔP_{jt-1} is measured by the change in the sovereign CDS spread for country j in $t-1$, while ΔS_{jt-1} is gauged by the two-quarter moving average of the change in the deviation from covered interest parity for converting country j 's currency into the US dollar in $t-1$. X is a vector of control variables.⁶⁹

The preliminary estimation result is broadly in line with the prediction of the theoretical framework, as all the explanatory variables are estimated to have an expected sign. Except for ΔP_{jt-1} , all explanatory variables are found to be statistically significant.

Based on the estimation result, we analyse the contribution by different factors to the quarterly growth rate of US-dollar loans of Japanese banks to the Asia-Pacific region (excluding Japan). The Fed's UMP is found to be a major driver in 2013, but the importance receded in 2014 as the Fed

began to taper its long-term asset purchases (Chart B6.5).⁷⁰ The BoJ's UMP is found to become the principal factor in 2014. The effects of other factors are estimated to be small for the whole period.

Chart B6.5
Estimated contribution by factors to the quarterly growth rate of US-dollar loans of Japanese banks to the Asia-Pacific region



Notes:

1. The Fed's balance sheet is assumed to be determined only by the pace of tapering. The tapering is assumed to be completed by October 2014 such that the Fed's balance sheet remains constant thereafter.
2. The BoJ's balance sheet is assumed to expand by Japanese yen 70 trillion in the fiscal year of Apr 2014 – Mar 2015, consistent with its QQE plan. The size of the BoJ's balance sheet is converted into US dollars in estimation. The exchange rate of yen/USD is assumed to be unchanged since 2014Q3.
3. The change of swap cost and that of sovereign CDS spread for Japan since 2014 Q3 are assumed to follow the respective trends in the recent 4 quarters.

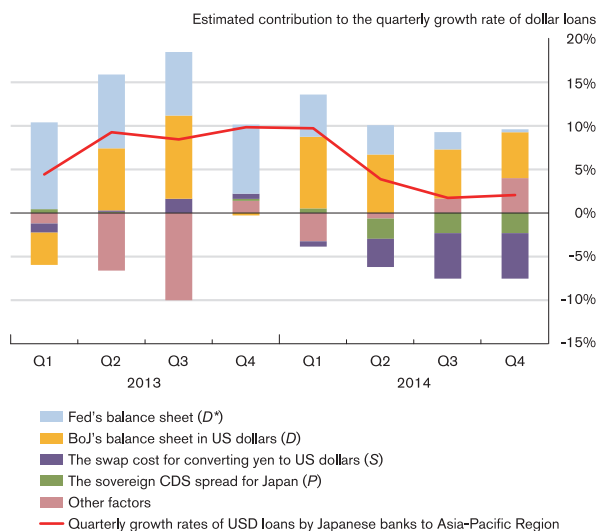
Source: HKMA staff estimates.

One caveat of the analysis is that Chart B6.5 at best only shows the estimated effect for a normal state, which assumes that the swap market would function properly and banks' default risk stays at a low level. To complement the analysis, we consider a hypothetical stress scenario that the interplay of UMPs is accompanied by disruption in the FX swap market and heightened default risk of banks in 2014. The result (Chart B6.6) shows that the supply of US-dollar loans of Japanese banks can be significantly disrupted.

⁶⁹ These include the forecast of nominal GDP growth rate for country j to control for loan demand in country j (i.e. θ) and the average ratio of total funding (excluding the amount due to interoffice and trading liabilities) to assets for country j 's bank branches in the US in $t-1$ to control for the presence of country j 's banks in the US wholesale funding market.

⁷⁰ The result before 2014Q2 is obtained based on the actual movement of the factors, while the result thereafter is generated based on some assumptions on the path of the factors. See footnotes under Chart B6.5 for details.

Chart B6.6
Estimated contribution by factors to the quarterly growth rate of US-dollar loans of Japanese banks to the Asia-Pacific region under a stress scenario



Notes:

- For assumptions on the balance sheets of the Fed and BoJ, see footnotes (1) and (2) under Chart B6.5 respectively.
- The change of swap cost and that of sovereign CDS spread for Japan are assumed to increase linearly from 2014Q1 to 2014Q4 to the respective peaks of 107 basis points and 296 basis points. These assumptions simulate a hypothetical scenario that Japanese banks face a sharp rise in the swap cost and default risk that is similar to that faced by euro-area banks during the European sovereign debt crisis.

Source: HKMA staff estimates.

Conclusion

This study provides both theoretical and empirical findings on how the interplay of the UMPs of major central banks would affect the supply of international US-dollar loans by global banks. On the whole, our findings support the view that the contractionary effect of the Fed's exit from UMP on global liquidity would be partly offset by the expansionary effect of UMPs of other central banks. The net effect, however, is crucially dependent on whether the normalisation of liquidity in the US would lead to serious financial market disruption, in particular in the FX swap market. If the exit from UMP by the Fed coincides with a risk-off phase for global investors, then a severe dollar shortage in the global financial markets is possible. This suggests that liquidity risks associated with the flow of international US-dollar credit can be high, which could pose significant challenges for policymakers.