

## 5. Banking sector performance

The profitability of retail banks improved in the second half of 2017 as compared with the same period of 2016 mainly due to higher net interest income. Capital and liquidity conditions remained sound and robust. Credit growth moderated in the second half of 2017 after strong growth in the first half, and asset quality remained sound by historical standards. Despite notable rises in Hong Kong dollar interbank interest rates, Hong Kong dollar funding costs of retail banks remained low, underpinned by low retail deposit interest rates. However, banks should remain vigilant against the risks of more volatile interest rates, possible capital outflows amid the normalisation of US monetary policy, and geopolitical risks. Banks should assess the possible impacts of sharper-than-expected interest rate rises on their asset quality given the rising corporate leverage and high levels of household debt-servicing burdens. To strengthen banks' resilience against systemic risks, the countercyclical capital buffer ratio for Hong Kong will rise to 2.5% with effect from 1 January 2019.

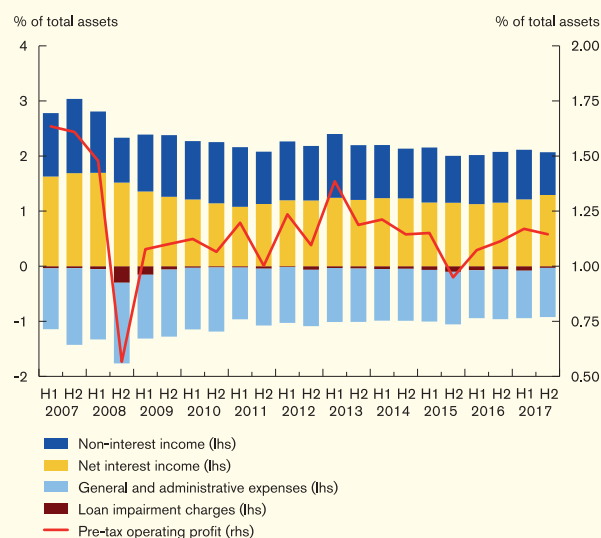
### 5.1 Profitability and capitalisation

#### Profitability

The aggregate pre-tax operating profit of retail banks<sup>52</sup> rose by 13.6% in the second half of 2017 compared with the same period last year. The improvement was mainly driven by a significant increase in net interest income and a reduction in loan impairment charges, which more than offset the fall in non-interest income. However, reflecting the relatively faster growth in assets than earnings, the return on assets of retail banks receded slightly to 1.15% in the second half of 2017 from 1.17% in the first half. Yet, the return on assets in the second half was still higher than 1.11% in the same period of 2016 (Chart 5.1).

For 2017 as a whole, the aggregate pre-tax operating profits of retail banks increased by 15.8%, with the return on assets rising to 1.16% from 1.09% in 2016.

**Chart 5.1**  
Profitability of retail banks



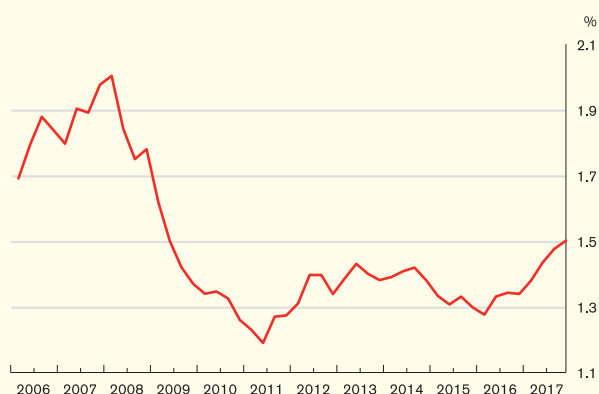
Note: Semi-annually annualised figures.  
Source: HKMA.

<sup>52</sup> Throughout this chapter, figures for the banking sector relate to Hong Kong offices only unless otherwise stated.

## Banking sector performance

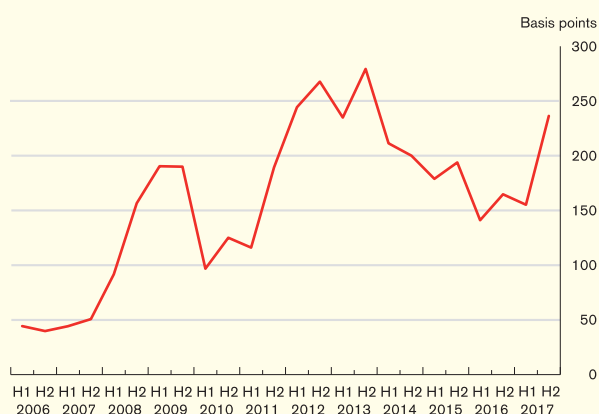
The net interest margin (NIM) of retail banks widened further to 1.5% in the fourth quarter of 2017 from 1.34% in the same period of 2016 (Chart 5.2). The improvement in NIM was in line with anecdotal evidence of a rising average spread of Hong Kong dollar corporate loans that emerged from the syndicated loan market in Hong Kong (Chart 5.3).

**Chart 5.2**  
**NIM of retail banks**



Note: Quarterly annualised figures.  
Source: HKMA.

**Chart 5.3**  
**Average spread of Hong Kong dollar syndicated loans**

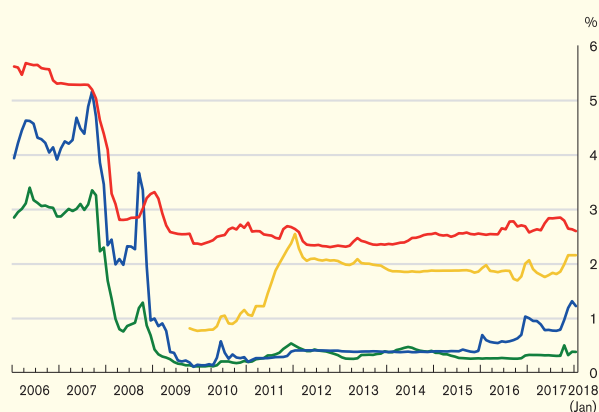


Note: The spread refers to the average spread over HIBOR for HIBOR-based Hong Kong dollar loans syndicated in Hong Kong, weighted by loan amounts.  
Source: HKMA staff estimates based on data from LoanConnector.

There was a broad-based increase in Hong Kong Interbank Offered Rates (HIBORs) from September 2017, largely driven by initial public offering (IPO)-related funding demand and banks' liquidity needs towards year-end, as well as the expectation of US interest rate hikes. In particular, the three-month HIBOR rose by 53 basis points from the end of June 2017 to a post-crisis high of 1.31% at the end of December. However, the level was still low by historical standards (the blue line in Chart 5.4). Entering 2018, HIBORs appeared to stabilise as banks' year-end liquidity needs eased.

Despite the recent rise in HIBORs, the Hong Kong dollar funding costs for retail banks remained accommodative. This was largely attributable to the low retail deposit interest rates during the review period. Reflecting this, the composite interest rate, a measure of the average cost of Hong Kong dollar funds for retail banks, stayed at a low level of around 0.3% throughout most of the second half of 2017, until recently when it edged up to 0.38% at the end of December (the green line in Chart 5.4).<sup>53</sup>

**Chart 5.4**  
**Interest rates**



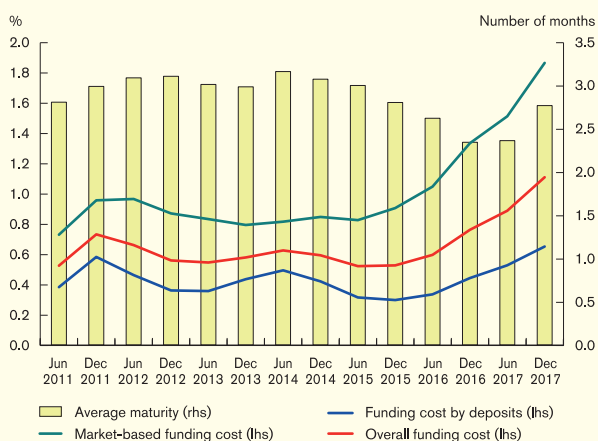
— Composite interest rate (a)  
— 3-month HIBOR (a)  
— Average mortgage rate for Best Lending rate (BLR)-based mortgages (b)  
— Average mortgage rate for HIBOR-based mortgages (b)

Notes:  
(a) End of period figures.  
(b) Period-average figures for newly approved loans.  
Sources: HKMA and staff estimates.

<sup>53</sup> The spike at the end of October was due to an increase in the weighted funding cost for short-term deposits as a result of IPO straddling the month-end. The composite interest rate returned to the previous level at the end of November.

The aggregate Hong Kong and US dollar funding cost of licenced banks in Hong Kong also exhibited a similar picture. The banks' average market-based Hong Kong and US dollar funding cost increased by 35 basis points during the second half, while their average deposit funding cost saw a mild increase of 12 basis points. On the whole, their average overall Hong Kong and US dollar funding cost increased by 22 basis points (the red line in Chart 5.5).

**Chart 5.5**  
Hong Kong and US dollar funding cost and maturity of licensed banks



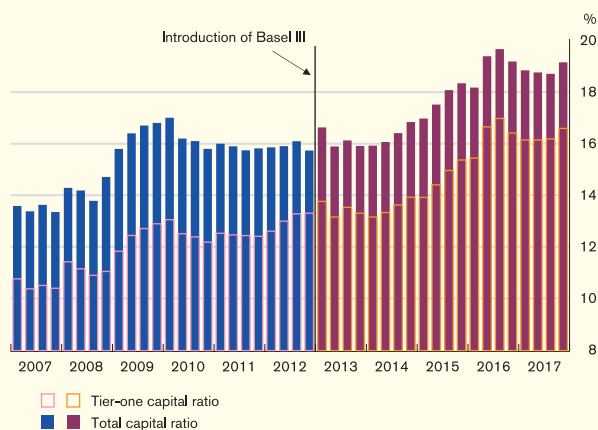
Source: HKMA.

The steeper rise in HIBORs than the overall funding cost of banks in Hong Kong would likely improve banks' margins on HIBOR-based assets. However, such an improvement in lending margins could be partially offset by keen competition in the mortgage market. In particular, market information suggests that some banks reduced their mortgage rate spreads or promoted fixed rate mortgage terms to attract new customers. With further US interest rate hikes expected this year, banks may soon face a more significant upward pressure on their funding costs. This could potentially weigh on banks' NIMs if the increased costs are not fully passed on to their customers given the competition in the loan markets.

### Capitalisation

The consolidated capital adequacy ratios (CARs) of locally incorporated AIs remain well above the minimum international standards, indicating the Hong Kong banking sector is well capitalised. The total capital ratio increased to 19.1% at the end of December 2017 from 18.7% at the end of June (Chart 5.6). The tier-one capital ratio<sup>54</sup> also rose to 16.6%, whereby 15.4% was contributed by common equity tier-one (CET1) capital.<sup>55</sup>

**Chart 5.6**  
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 CARs from March 2013 onwards are therefore not directly comparable with those up to December 2012.

Source: HKMA.

The HKMA recently published a consultation paper on prescribing loss-absorbing capacity (LAC) requirements for AIs as envisaged by the Financial Institutions (Resolution) Ordinance. While increasing the LAC of AIs is likely to benefit the society generally by reducing the probability of financial crises, it will inevitably incur costs. Box 5 provides a cost-benefit assessment of the potential impact of LAC requirements on Hong Kong. Our assessment suggests that the implementation of these requirements is likely to provide net benefits for Hong Kong's economy.

<sup>54</sup> The ratio of tier-one capital to total risk-weighted assets.

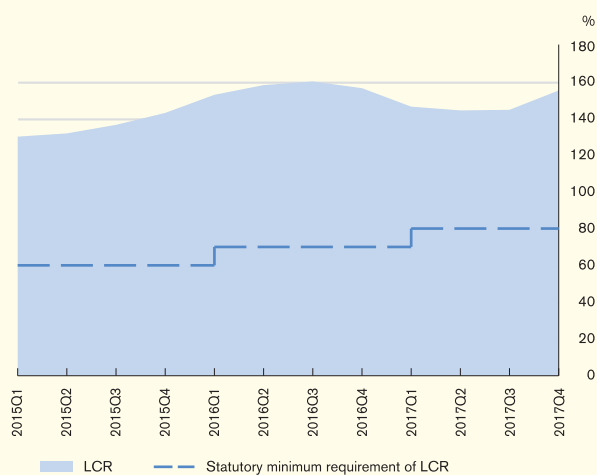
<sup>55</sup> CET1 capital comprises the core capital of an authorized institution (AI) including ordinary shares and retained earnings. Details of the definition can be found in the Banking (Capital) Rules, which are available online on the Hong Kong e-legislation website.

## 5.2 Liquidity and interest rate risks

### Liquidity and funding

The liquidity position of the banking sector, as measured by the Basel III Liquidity Coverage Ratio (LCR)<sup>56</sup> requirement, remained sound during the review period. The average LCR of category 1 institutions rose to 155.1% in the fourth quarter of 2017 from 144.2% in the second quarter (Chart 5.7), which were well above the statutory minimum requirement of 80% applicable in 2017. Although the average Liquidity Maintenance Ratio (LMR) of category 2 institutions declined slightly to 49.4% in the fourth quarter from 49.7% in the second quarter, it remained well above the statutory minimum requirement of 25%. The strong liquidity positions of AIs suggest the Hong Kong banking sector will be able to withstand liquidity shocks arising from possible capital outflows from Hong Kong.

**Chart 5.7**  
Liquidity Coverage Ratio (LCR)



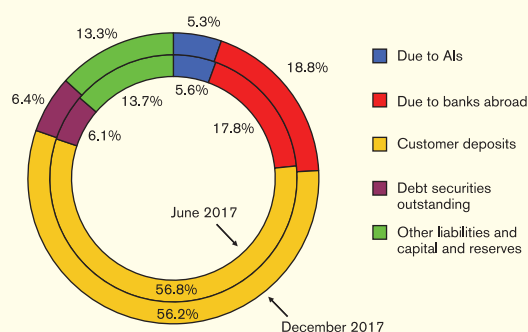
Notes:  
1. Consolidated positions.  
2. Quarterly average figures.  
Source: HKMA.

<sup>56</sup> The Basel III LCR requirement, phased-in from 1 January 2015, is designed to ensure that banks have sufficient high quality liquid assets to survive a significant stress scenario lasting 30 calendar days. In Hong Kong, AIs designated as category 1 institutions adopt the LCR; while category 2 institutions adopt the LMR. For details, see the HKMA's Supervisory Policy Manual (SPM) LM-1, "Regulatory Framework for Supervision of Liquidity Risk".

The Net Stable Funding Ratio (NSFR) came into effect on 1 January 2018 as part of the Basel III liquidity requirements. The NSFR is designed to reduce banks' funding risk over a longer time horizon by requiring banks to fund their activities with sufficient stable sources of funding. Specifically, category 1 institutions must at all times maintain an NSFR ratio of not less than 100%.<sup>57</sup>

Customer deposits continued to be the primary funding source for AIs, underpinning a stable funding structure in the banking system. At the end of December 2017, the share of customer deposits to all AIs' total liabilities remained largely unchanged at 56.2% from six months ago (Chart 5.8).

**Chart 5.8**  
The liability structure of all AIs

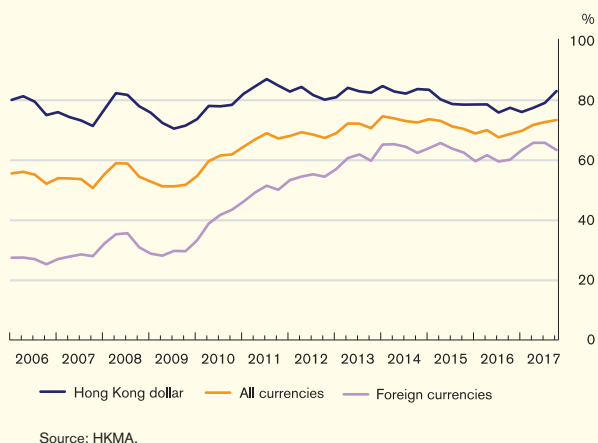


Notes:  
1. Figures may not add up to total due to rounding.  
2. Figures refer to the percentage of total liabilities (including capital and reserves).  
3. Debt securities comprise negotiable certificates of deposit and all other negotiable debt instruments.  
Source: HKMA.

<sup>57</sup> In Hong Kong, category 1 institutions are required to comply with the NSFR; while category 2 institutions designated as category 2A institutions must comply with the requirements relating to the local Core Funding Ratio (CFR). According to the Banking (Liquidity) Rules, a category 1 institution must at all times maintain an NSFR of not less than 100%. A category 2A institution must maintain a CFR of not less than 50% on average in each calendar month of the year. The minimum CFR will rise to 75% on 1 January 2019. For details, see Banking (Liquidity) Rules (Cap. 155Q).

The Hong Kong dollar loan-to-deposit (LTD) ratio of all AIs increased to 82.7% at the end of December 2017 from 77.1% at the end of June (Chart 5.9), reflecting a faster growth in Hong Kong dollar loans and advances than deposits during the review period. Meanwhile, as foreign currency-denominated deposits grew faster than the loans, the foreign currency LTD ratio fell to 63.1% at the end of December 2017 from 65.5% at the end of June. Overall, the all-currency LTD ratio increased to 73.0% from 71.4% six months ago. Banks should assess how the rises in the LTD ratios affect their liquidity management.

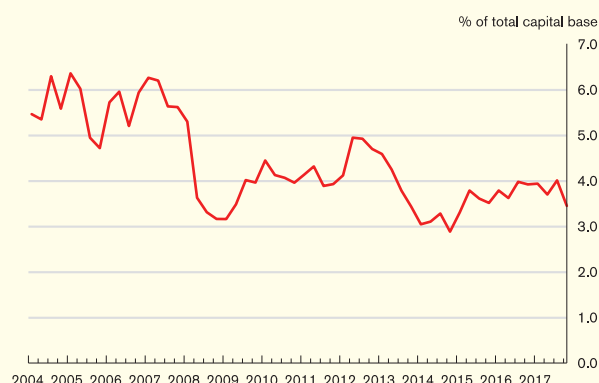
**Chart 5.9**  
Average LTD ratios of all AIs



### Interest rate risk

The interest rate risk exposure of locally incorporated licensed banks remained low. It is estimated that under a hypothetical shock of an across-the-board 200-basis-point increase in interest rates, the economic value of locally incorporated licensed banks' interest rate positions could be subject to a decline equivalent to 3.45% of their total capital base at the end of December 2017 (Chart 5.10).<sup>58</sup> Nevertheless, with expected US interest rate hikes and the Fed's balance sheet reduction, banks should assess the implications for their interest rate risk management.

**Chart 5.10**  
Impact of an interest rate shock on locally incorporated licensed banks



Notes:  
 1. Interest rate shock refers to a standardised 200-basis-point parallel rate shock to institutions' interest rate risk exposure.  
 2. The impact of the interest rate shock refers to its impact on the economic value of the banking and trading book<sup>59</sup>, expressed as a percentage of the total capital base of banks.  
 Source: HKMA.

## 5.3 Credit risk

### Overview

Amid the moderating but still benign economic environment, total loans and advances of all AIs expanded at a slower pace of 5.3% in the second half of 2017, after growing strongly by 10.2% in the first half. For 2017 as a whole, total loans registered solid growth of 16.1% after two years of slower growth.

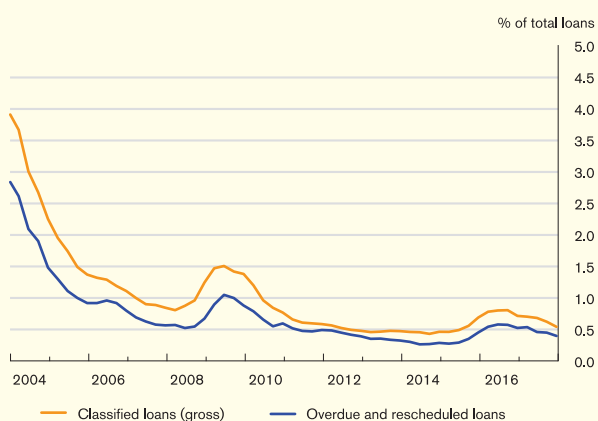
The asset quality of banks' loan portfolios was sound and continued to improve in the second half of 2017. The gross classified loan ratio and the ratio of overdue and rescheduled loans of all AIs reduced to 0.67% and 0.52% at the end of December 2017 respectively, compared with 0.84% and 0.61% at the end of June. For retail banks, both the gross classified loan ratio and the

<sup>58</sup> This estimation does not take into account the effects of any mitigating action by banks in response to the shock. The impact would be smaller if mitigating action is taken.

<sup>59</sup> 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 are required to report aggregate positions in the banking book and trading book.

ratio of overdue and rescheduled loans fell to 0.54% and 0.4% respectively (Chart 5.11). Nevertheless, the credit risk of banks should warrant close monitoring, as their asset quality could be more sensitive to the external environment given the rapid rise in loans for use outside Hong Kong in recent years.

**Chart 5.11**  
Asset quality of retail banks



Notes:  
 1. Classified loans are those loans graded as "sub-standard", "doubtful" or "loss".  
 2. Figures prior to December 2015 are related to retail banks' Hong Kong offices and overseas branches. Starting from December 2015, the coverage was expanded to include the banks' major overseas subsidiaries as well.  
 Source: HKMA.

Robust credit growth is likely to be sustained, as expectations for the near term have become more optimistic. The results of the HKMA Opinion Survey on Credit Condition Outlook in December 2017 showed that 29% of surveyed AIs expected loan demand to be higher in the next three months, while the remaining 71% were expecting loan demand to remain the same (Table 5.A).

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

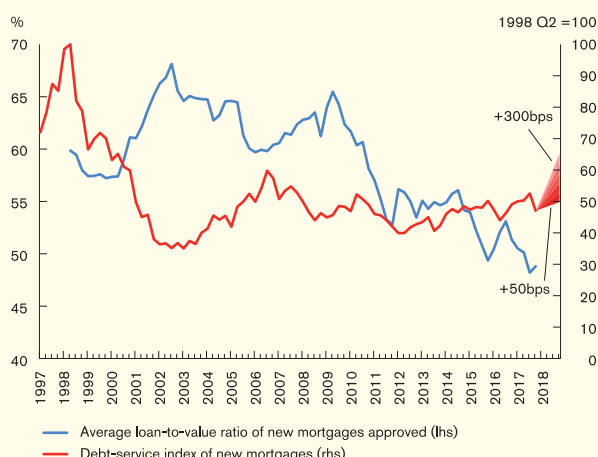
% of total respondents	Mar-17	Jun-17	Sep-17	Dec-17
Considerably higher	0	0	0	0
Somewhat higher	5	5	24	29
Same	81	86	71	71
Somewhat lower	14	10	5	0
Considerably lower	0	0	0	0
Total	100	100	100	100

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

*Household exposure*<sup>60</sup>

The credit risk of household loans stayed low during the review period. Banks' mortgage portfolios remained healthy, with the delinquency ratio staying at a low level of 0.03% at the end of 2017. The average loan-to-value ratio (LTV) of new mortgage loans approved decreased further to 48.8% in the fourth quarter of 2017 from 50.1% in the second quarter of 2017 (Chart 5.12). The figure was well below the ratio of 64% in September 2009, just before the implementation of the first round of countercyclical macro-prudential measures by the HKMA.

**Chart 5.12**  
Average LTV ratio and household debt-servicing burden for new mortgage loans



Note: The calculation of the index is based on the average interest rate for BLR-based mortgages.  
 Sources: HKMA and staff estimates.

The debt-service index of new mortgages<sup>61</sup> reduced to 47.0 in the fourth quarter of 2017, after rising to 52.5 in the third quarter from 50.2 in the second quarter (the red line in Chart 5.12).

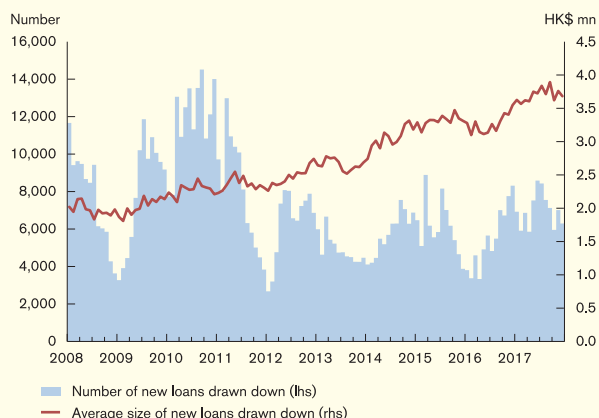
<sup>60</sup> Loans to households constitute lending to professional and private individuals, excluding lending for other business purposes. Mortgage lending accounts for a major proportion of household loans, while the remainder comprises mainly unsecured lending through credit card lending and other personal loans for private purposes. At the end of December, the share of household lending in domestic lending was 28.7%.

<sup>61</sup> A higher value of the debt-service index indicates there is either a drop in household income, or an increase in interest rates, or an increase in the average mortgage loan amount drawn by households. Historical movements in the index suggest that a sharp rise in the index may lead to a deterioration in the asset quality of household debt.

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The recent drop in the index mainly reflected a slight decline in the average size of new mortgage loans in the fourth quarter of 2017 (Chart 5.13). However, as the average mortgage rate for new loans saw more upward pressure in the second half, along with the rise in HIBORs, the continuing US rate hikes and the potential pass through to domestic interest rates could weigh on the household debt-servicing burden going forward. In particular, a sensitivity test suggests that the index could rise significantly to 65.3 in a four-quarter period if interest rates were to increase by 300 basis points<sup>62</sup>, other things being constant. Therefore, the affordability of households could be under significant pressure if interest rates were to rise rapidly. Banks should stay alert to the risks associated with a rising level of household debt-servicing burden.

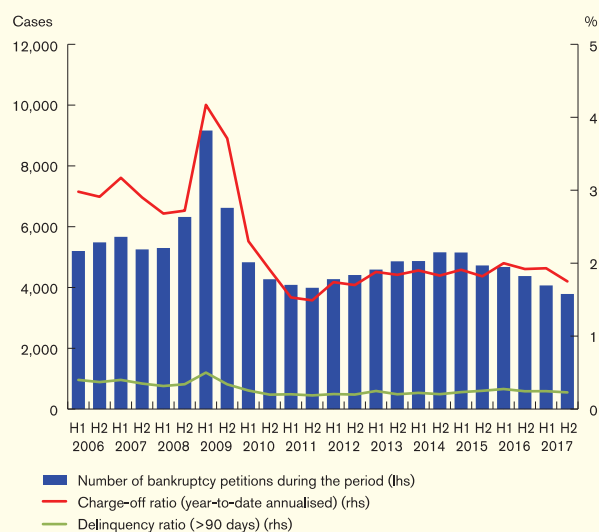
**Chart 5.13**  
New mortgage loans of surveyed AIs



Source: HKMA Residential Mortgage Survey.

The credit risk of unsecured household exposure remained contained in the second half of 2017, with the annualised credit card charge-off ratio and the delinquency ratio reduced to 1.75% and 0.23% (Chart 5.14) at the end of 2017 respectively. In addition, the number of bankruptcy petitions continued to fall.

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



Sources: Official Receiver's Office and HKMA.

## Corporate exposure<sup>63</sup>

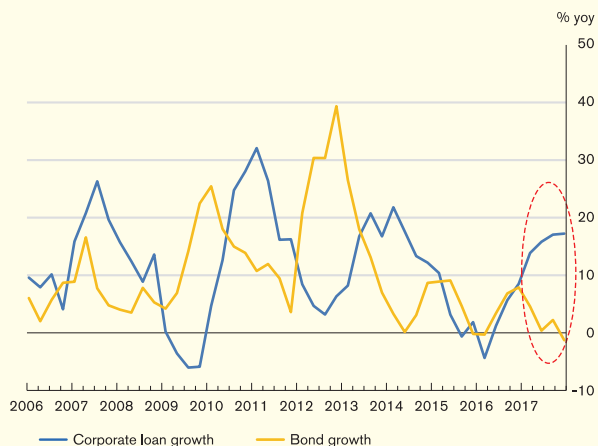
The growth in corporate loans moderated somewhat to 5.3% in the second half of the year on a half-yearly basis, after growing strongly by 11.3% in the first half.<sup>64</sup> For 2017 as a whole, the growth in corporate loans accelerated to 17.2% from 8.5% in 2016. However, at the same time, the acceleration in corporate loan growth coincided with a slowdown of growth in Hong Kong's non-bank corporate debt market (Chart 5.15), suggesting that the total credit for Hong Kong's corporates may not have expanded as rapidly as expected.

<sup>62</sup> The assumption of a 300-basis-point rise in interest rates is consistent with the prudential measure that requires AIs to have a 3-percentage-point mortgage rate upward adjustment for stress testing property mortgage loan applicants' debt servicing ability.

<sup>63</sup> Excluding interbank exposure. At the end of December, the share of corporate loans in domestic lending was 71.2%.

<sup>64</sup> Corporate loans comprise domestic lending except lending to professional and private individuals.

**Chart 5.15**  
**Growth in outstanding amount of corporate loans and non-bank corporate debt in Hong Kong**



Notes:

1. We follow Dealogic's definition of deal nationality which is based on the nationality of the issuer's parent if there is a credit support or guarantee for the issuing subsidiary. For deals without that support or guarantee, the nationality of the deal refers to that of the issuing subsidiary.
2. The outstanding amounts are estimated based on data about the issuance of debt securities by assuming that all debt securities will be matured on their original maturity date.

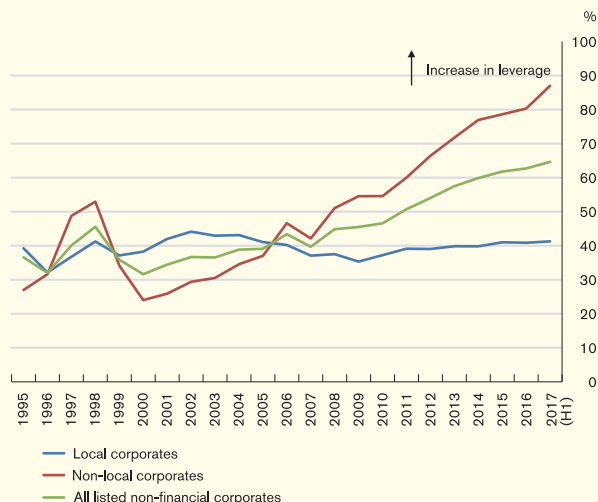
Sources: HKMA and staff estimates based on data from Dealogic.

Nevertheless, the tangible rise in corporate loans raise concerns about the level of corporate leverage and the associated credit risk in relation to banks' corporate exposures, particularly with the continuing US interest rate normalisation. Based on accounting data for non-financial corporates listed in Hong Kong, the weighted average debt-to-equity ratio, as a measure of corporate leverage, picked up further in the first half of 2017 (the green line in Chart 5.16), which was largely driven by non-local corporates (the red line). In contrast, the leverage for local corporates remained broadly stable at low levels, suggesting their credit risks were largely contained.

Non-local corporates also registered a deterioration in their debt-servicing ability in the same period, as indicated by the decline in the interest coverage ratio (Chart 5.17). The higher levels of leverage and the debt-servicing burden for non-local corporates imply these corporates would be more vulnerable to interest rate shocks. Therefore, banks should assess how the faster-than-expected US interest rate rises stemming from the Federal Reserve (Fed) balance sheet

reduction and the US tax reform will affect the credit risk in relation to their exposure to non-local corporates.

**Chart 5.16**  
**Leverage ratio of listed non-financial corporates in Hong Kong**

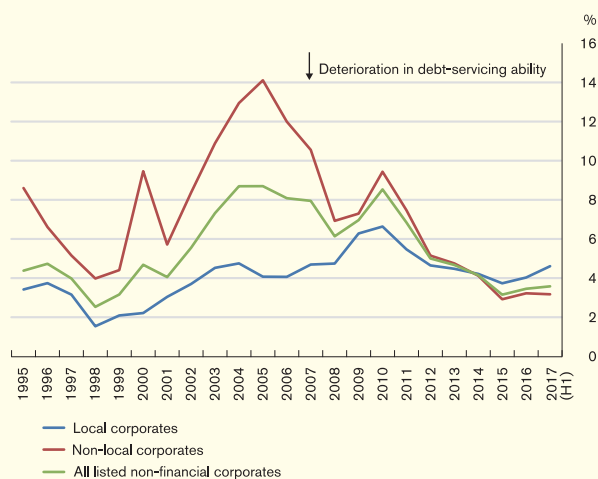


Notes:

1. Weighted average figures.
2. The leverage ratio is defined as the ratio of debt to equity. A higher value indicates higher leverage.
3. All non-financial corporates listed on the Hong Kong Stock Exchange are selected. Local and non-local corporates refer to listed firms that are domiciled in and outside Hong Kong respectively.
4. Figures are calculated based on information up to end-February 2018.

Source: HKMA staff estimates based on data from Bloomberg.

**Chart 5.17**  
**Interest coverage ratio of listed non-financial corporates in Hong Kong**



Notes:

1. Weighted average figures.
2. The interest coverage ratio is calculated by the earnings before interest and tax divided by the total interest expenses. A lower value indicates deterioration of debt-servicing ability.
3. All non-financial corporates listed on the Hong Kong Stock Exchange are selected. Local and non-local corporates refer to listed firms that are domiciled in and outside Hong Kong respectively.
4. Figures are calculated based on information up to end-February 2018.

Source: HKMA staff estimates based on data from Bloomberg.



## Banking sector performance

### Mainland-related lending and non-bank exposures

The banking sector's total Mainland-related lending increased by 4.9% to HK\$4,188 billion (16.7% of total assets) at the end of December 2017, from HK\$3,992 billion (16.6% of total assets) at the end of June (Table 5.B).

Other non-bank exposures also edged up by 1% to HK\$1,311 billion (Table 5.C).

**Table 5.B**  
**Mainland-related lending**

HK\$ bn	Mar 2017	Jun 2017	Sep 2017	Dec 2017
Mainland-related loans	3,808	3,992	4,073	4,188
Mainland-related loans excluding trade finance	3,509	3,695	3,755	3,878
Trade finance	299	297	318	310
By type of Als:				
Overseas incorporated Als	1,686	1,777	1,785	1,853
Locally incorporated Als*	1,548	1,613	1,663	1,691
Mainland banking subsidiaries of locally incorporated Als	574	603	625	644
By type of borrowers:				
Mainland state-owned entities	1,545	1,660	1,672	1,711
Mainland private entities	921	972	972	1,017
Non-Mainland entities	1,342	1,361	1,429	1,460

Notes:

1. \* Including loans booked in Mainland branches of locally incorporated Als.

2. Figures may not add up to total due to rounding.

Source: HKMA.

**Table 5.C**  
**Other non-bank exposures**

HK\$ bn	Mar 2017	Jun 2017	Sep 2017	Dec 2017
Negotiable debt instruments and other on-balance sheet exposures	764	815	871	920
Off-balance sheet exposures	483	483	503	411
<b>Total</b>	<b>1,248</b>	<b>1,298</b>	<b>1,374</b>	<b>1,311</b>

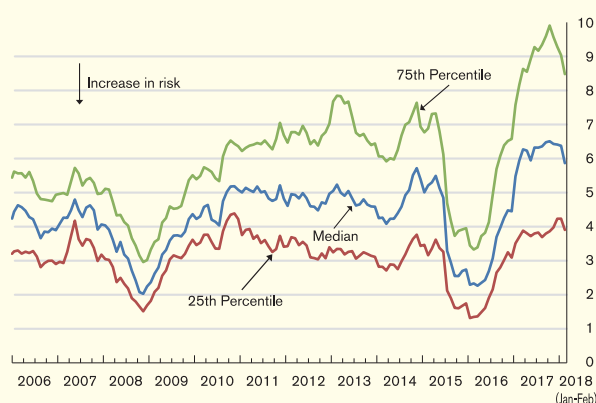
Note: Figures may not add up to total due to rounding.

Source: HKMA.

Despite the rising share of banks' Mainland-related lending, the associated credit risks should remain manageable as 76% of the Mainland-related lending at the end of 2017 was for state-owned enterprises and non-Mainland multinational companies, with the majority of loans to Mainland private entities being secured with collaterals or guarantees.

In addition, reflecting the recent strong market sentiment in Mainland China due to the country's solid economic performance, the distance-to-default index,<sup>65</sup> a market-based default risk indicator, remained steady at a low risk level during the review period. This suggests a low default risk for the Mainland corporate sector (Chart 5.18). The gross classified loan ratio of Mainland-related lending of all AIs<sup>66</sup> edged down to 0.67% at the end of December 2017 from 0.88% at the end of June.

**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 based on data from Bloomberg.

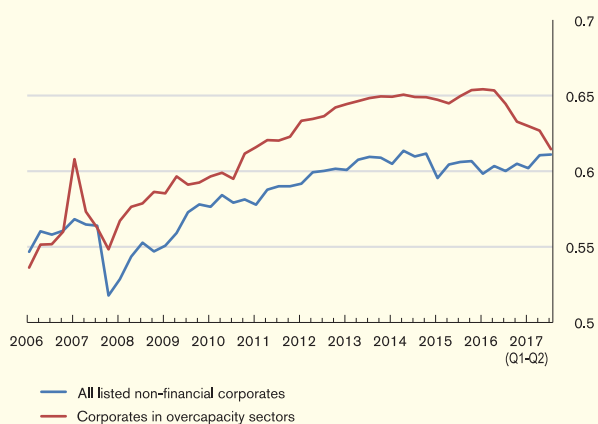
However, the overall corporate leverage in Mainland China continued to trend upwards (the blue line in Chart 5.19), despite the progress of deleveraging in overcapacity sectors since mid-2016.<sup>67</sup> In view of this rising trend, banks are reminded to maintain prudent credit risk management for their Mainland-related lending.

<sup>65</sup> 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.

<sup>66</sup> Figures cover AIs' Hong Kong offices and Mainland branches and subsidiaries.

<sup>67</sup> Overcapacity industries include glass, cement, steel, photovoltaic, aluminium, shipbuilding and coal chemical.

**Chart 5.19**  
Leverage ratio for the Mainland corporate sector



Notes:

1. The leverage ratio is defined as the ratio of total liabilities to total assets.
2. It is calculated based on all non-financial corporates listed on the Shanghai Stock Exchange and the Shenzhen Stock Exchange.
3. Overcapacity industries include glass, cement, steel, photovoltaic, aluminium, shipbuilding and coal chemical.
4. Figures are calculated based on information up to end-February 2018.

Source: HKMA staff estimates based on data from Bloomberg.

**Macro stress testing of credit risk<sup>68</sup>**

Results of the latest macro stress testing on retail banks' credit exposure suggest that the Hong Kong banking sector remains resilient and should be able to withstand rather severe macroeconomic shocks similar to those experienced during the Asian financial crisis. Chart 5.20 presents the simulated future credit loss rate of retail banks in the second quarter of 2019 under four specific macroeconomic shocks<sup>69</sup> using information up to the fourth quarter of 2017.

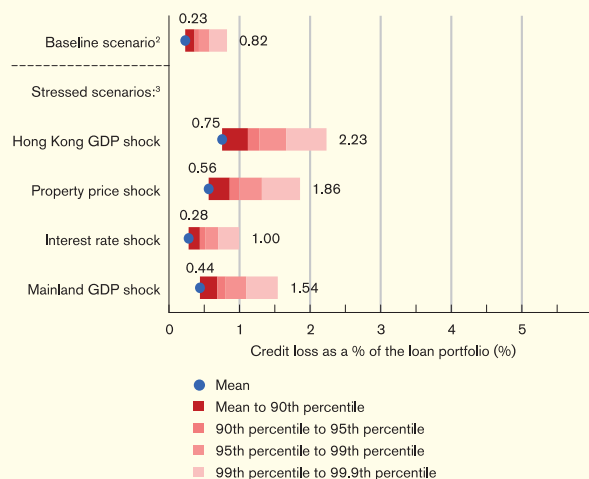
Taking account of tail risk, banks' credit losses (at the confidence level of 99.9%) under the stress scenarios range from 1% (Interest rate shock) to

<sup>68</sup> 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.

<sup>69</sup> These shocks are calibrated to be similar to those that occurred during the Asian financial crisis, except the Mainland GDP shock.

2.23% (Hong Kong GDP shock), which are significant, but smaller than the estimated loan loss of 4.39% following the Asian financial crisis.

**Chart 5.20**  
The mean and value-at-risk statistics of simulated credit loss distributions<sup>1</sup>



Notes:

1. The assessments assume the economic conditions in 2017 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 2018 Q1 to 2018 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 2018 Q1 to 2018 Q4.
  - Interest rate shock:** A rise in real interest rates (HIBORs) by 300 basis points in the first quarter (i.e. 2018 Q1), followed by no change in the second and third quarters and another rise of 300 basis points in the fourth quarter (i.e. 2018 Q4).
  - Mainland GDP shock:** Slowdown in the year-on-year annual real GDP growth rate to 4% in one year.

Source: HKMA staff estimates.

**5.4 Systemic risk**

The external environment appeared to be favourable during the review period, as reflected by the synchronised global economic growth and strong market sentiment in equity markets. However, policy uncertainties in major advanced economies could potentially affect the global outlook which in turn may affect the systemic risk of the Hong Kong banking sector.

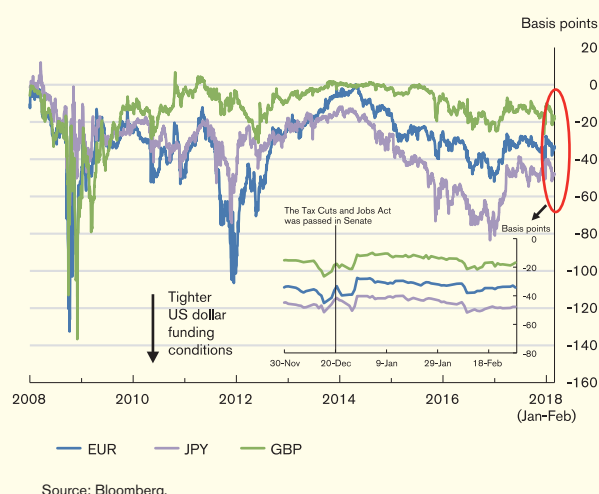
In the US, while the tax reform measures are expected to provide a boost to economic output, they may pose an upward inflationary pressure given the US economy is now operating at its full potential. Should this lead to a sharp rise in

inflation, it could trigger a faster pace of US interest rate normalisation. The possible sharper-than-expected rises in US interest rates could pose challenges to the Hong Kong banking sector as it could translate into higher financing costs for both corporates and households, which affect their debt servicing ability. This could in turn put pressure on banks' credit risk management in view of the rising levels of leverage among non-local corporates and high levels of household debt servicing burdens.

Despite the recent market concerns over US inflation, the current Fed funds futures market is still expecting a flatter interest rate path than the Fed's projections (Chart 2.4). If the pace of US rate hikes is faster than expected, this could lead to an abrupt repricing of interest rate expectation. This in turn could heighten the risk of a significant reversal of capital flows which would result in an overshooting of interest rates in Hong Kong.

In addition to the effects on US interest rates, the US tax reforms may affect the global dollar liquidity when US corporates begin to repatriate their corporate profits that are currently parked overseas. This together with the continuing US monetary policy normalisation could drain dollar liquidity from offshore markets. However, during the review period, the cross-currency basis swap between major currencies and the US dollar remained broadly stable, suggesting the dollar liquidity has so far not been affected by the tax reform measures (Chart 5.21).<sup>70</sup>

**Chart 5.21**  
1-year cross-currency basis swap spreads of major currencies against the US dollar



Across the Atlantic, the uncertainty related to the Brexit negotiations is one of the geopolitical risks that merits close monitoring. If the Brexit negotiations lead to an abrupt shift in cross-border banking flows between the UK and euro-area economies, the subsequent impact of spillover risks to the Hong Kong banking sector could be large, given the unmatched role of the UK banking system in distributing international banking flows and the significant interbank linkage between Hong Kong and the UK.

Nevertheless, during the review period, there was no major deterioration in interbank funding conditions. The spread between the three-month US dollar LIBOR and its corresponding overnight index swap (OIS) rate<sup>71</sup>, a common indicator of systemic liquidity risks in the short-term dollar funding market, widened to around 40 basis points at the end of February 2018 which was still a low level by historical standards (Chart 5.22).

<sup>70</sup> For illustration, in a cross currency basis swap for a EUR/USD, a party borrowing US dollars (which lends EUR at the same time to the counterparty) will pay US dollar London Interbank Offered Rate (LIBOR) and receive EUR LIBOR plus a spread (shown in Chart 5.21) during the contract. When the contract expires, these two parties exchange the principal. A negative spread means that the US dollar borrower accepts a lower EUR interest rate paid by the counterparty than EUR LIBOR. Therefore, a negative spread indicates a tighter US dollar funding condition, which could reflect differences in demand and supply of the two currencies involved, monetary policies and counterparty risks.

<sup>71</sup> An OIS is an interest rate swap in which the floating leg is linked to an index of daily overnight rates. The two parties agree to exchange at maturity, on an agreed notional amount, the difference between interest accrued at the agreed fixed rate and interest accrued at the floating index rate over the life of the swap. The fixed rate is a proxy for expected future overnight interest rates. As overnight lending generally bears lower credit and liquidity risks, the credit risk and liquidity risk premiums contained in the OIS rates should be small. Therefore, the LIBOR-OIS spread generally reflects the credit and liquidity risks in the interbank market.

**Chart 5.22**  
3-month US dollar LIBOR-OIS spreads



Source: Bloomberg.

### *The countercyclical capital buffer (CCyB) for Hong Kong*

The CCyB is part of the internationally agreed Basel III standards and is designed to enhance the resilience of the banking sector against system-wide risks associated with excessive aggregate credit growth. Hong Kong is implementing the CCyB in line with the Basel III implementation schedule. The Monetary Authority announced on 10 January 2018 that the CCyB ratio for Hong Kong will increase to 2.5% with effect from 1 January 2019, from the current 1.875%.<sup>72</sup> This reflects the fact that, under the Basel III phase-in arrangements, the maximum CCyB under Basel III will increase to 2.5% of banks' risk-weighted assets on 1 January 2019 from 1.875% effective from 1 January 2018.<sup>73</sup>

<sup>72</sup> Further details of the decision may be found in the press release "Monetary Authority Announces Countercyclical Capital Buffer for Hong Kong" issued on 10 January 2018 which is available on the HKMA website.

<sup>73</sup> Under the Basel III phase-in arrangements, the maximum CCyB rate was capped at 0.625% on 1 January 2016, with the cap rising by 0.625 percentage points each subsequent year until it reaches 2.5% on 1 January 2019.

In setting the CCyB rate, the Monetary Authority considered a series of indicators (Table 5.D), including an "indicative buffer guide" (which is a metric providing a guide for CCyB rates based on credit-to-GDP and property price-to-rent gaps<sup>74</sup>). Based on the information up to the latest announcement date, the credit-to-GDP gap and the property price-to-rent gap were 19.3% and 8.3% respectively. Both gaps remained at elevated levels and a simple mapping from the indicative buffer guide of 2.4% would signal a CCyB rate of 2.25%, 25 basis points lower than the current CCyB ratio absent the Basel III phase-in mechanism.<sup>75</sup>

Nevertheless, the indicative buffer guide only provides guidance for CCyB decisions, and the determination of a CCyB ratio is not a mechanical exercise. In addition to the indicative buffer guide, the Monetary Authority also reviewed a range of other reference indicators.<sup>76</sup> The information drawn from these indicators, in the view of the Monetary Authority, suggests that a CCyB of 2.5% would be more appropriate at this stage.

<sup>74</sup> The credit-to-GDP gap is the gap between the ratio of credit to GDP and its long term trend, while the property price-to-rent gap is the gap between the ratio of residential property prices to rentals and its long-term trend.

<sup>75</sup> According to section 3.2.5 of the HKMA's SPM CA-B-1, the CCyB rate will be expressed in multiples of 25 basis points (without rounding up). Thus, the indicative buffer guide would signal an extant CCyB rate to increase or decrease in multiples of 25 basis points.

<sup>76</sup> These included measures of bank, corporate and household leverage; debt servicing capacity; profitability and funding conditions within the banking sector and macroeconomic imbalances.

## Banking sector performance

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

	27-Jan-17	Q2-2017	10-Jan-18
Announced CCyB rate	1.875%		2.5%
Date effective	01/01/2018		01/01/2019
Indicative buffer guide	2.4%	2.5%	2.4%
Basel Common Reference Guide	2.5%	2.5%	2.5%
Property Buffer Guide	2.0%	2.5%	2.0%
Composite CCyB Guide	2.4%	2.5%	2.4%
Indicative CCyB Ceiling	None	None	None
<i>Primary gap indicators</i>			
Credit/GDP gap	11.5%	13.4%	19.3%
Property price/rent gap	8.2%	10.0%	8.3%
<i>Primary stress indicators</i>			
3-month HIBOR spread (percentage points)	0.75%	0.47%*	0.06%
Quarterly change in classified loan ratio (percentage points)	0.01%	-0.02%	-0.06%

Notes:

- The values of all CCyB guides, the Indicative CCyB Ceiling and their respective input variables are based on public data available prior to the corresponding review/announcement date, and may not be the most recent available as of each quarter end (refer to SPM CA-B-1 for explanations of the variables). If there is a CCyB announcement, the date of the announcement is shown at the top of the respective column. If there is no CCyB announcement, the quarter in which a CCyB review takes place (normally close to quarter end) is shown at the top of the column.
- \* Following a review of the appropriate risk-free rate benchmark (previously identified as the 3-month OIS rate), the HKMA has decided to amend the definition of the interbank market spread to the difference between 3-month HIBOR and 3-month Exchange Fund Bill yield, effective from April 2017.

Source: HKMA.

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

**Table 5.E**  
**Key performance indicators of the banking sector<sup>1</sup> (%)**

	Dec 2016	Sep 2017	Dec 2017
<b>Interest rates</b>			
1-month HIBOR fixing <sup>2</sup> (quarterly average)	0.43	0.45	0.84
3-month HIBOR fixing (quarterly average)	0.71	0.76	1.04
BLR <sup>3</sup> and 1-month HIBOR fixing spread (quarterly average)	4.57	4.55	4.16
BLR and 3-month HIBOR fixing spread (quarterly average)	4.29	4.24	3.96
Composite interest rate <sup>4</sup>	0.31	0.30	0.38
<b>All AIs</b>			
<b>Balance sheet developments<sup>5</sup></b>			
Total deposits	0.9	1.0	2.0
Hong Kong dollar	1.3	2.3	-0.1
Foreign currency	0.4	-0.4	4.3
Total loans	2.5	2.3	2.9
Domestic lending <sup>6</sup>	2.5	2.7	2.8
Loans for use outside Hong Kong <sup>7</sup>	2.7	1.4	3.2
Negotiable instruments			
Negotiable certificates of deposit (NCDs) issued	2.1	0.9	3.3
Negotiable debt instruments held (excluding NCDs)	-0.6	4.5	3.0
<b>Asset quality</b>			
As a percentage of total loans <sup>8</sup>			
Pass loans	97.32	97.79	97.98
Special mention loans	1.82	1.41	1.35
Classified loans <sup>9</sup> (gross)	0.85	0.79	0.67
Classified loans (net) <sup>10</sup>	0.51	0.42	0.35
Overdue > 3 months and rescheduled loans	0.67	0.61	0.52
Classified loan ratio (gross) of Mainland related lending <sup>11</sup>	0.80	0.84	0.67
<b>Liquidity ratios (quarterly average, consolidated)</b>			
Liquidity Coverage Ratio — applicable to category 1 institutions	156.3	144.5	155.1
Liquidity Maintenance Ratio — applicable to category 2 institutions	51.0	50.2	49.4
<b>Retail banks</b>			
<b>Profitability</b>			
Loan impairment charges as a percentage of average total assets (year-to-date annualised)	0.07	0.06	0.06
Net interest margin (year-to-date annualised)	1.32	1.43	1.45
Cost-to-income ratio (year-to-date)	43.2	41.2	41.9
<b>Surveyed institutions</b>			
<b>Asset quality</b>			
Delinquency ratio of residential mortgage loans	0.03	0.02	0.03
Credit card lending			
Delinquency ratio	0.24	0.23	0.22
Charge-off ratio — quarterly annualised	1.89	1.95	1.64
— year-to-date annualised	1.92	1.91	1.75
<b>All locally incorporated AIs</b>			
<b>Capital adequacy (consolidated)</b>			
Common Equity Tier 1 capital ratio	15.5	15.1	15.4
Tier 1 capital ratio	16.4	16.1	16.6
Total capital ratio	19.2	18.7	19.1

## Notes:

1. Figures are related to Hong Kong offices unless otherwise specified.
2. The Hong Kong Interbank Offered 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 on 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 all AIs' Hong Kong offices, as well as locally incorporated AIs' overseas branches and major overseas subsidiaries.
9. Classified loans are those loans graded as "substandard", "doubtful" or "loss".
10. Net of specific provisions/individual impairment allowances.
11. Figures are related to all AIs' Hong Kong offices, as well as locally incorporated AIs' Mainland branches and subsidiaries.

## Box 5

### A cost-benefit assessment of loss-absorbing capacity requirements for authorized institutions in Hong Kong

#### Introduction

The HKMA recently published a consultation paper (CP) setting out proposals for rules prescribing loss-absorbing capacity (LAC) requirements for AIs as subsidiary legislation under the Financial Institutions (Resolution) Ordinance.<sup>77</sup> As discussed in the CP and an earlier issue of the *HKMA Quarterly Bulletin*, requiring AIs to have sufficient LAC resources (consisting of regulatory capital and certain other liabilities that meet specific eligibility criteria), is a key precondition to achieving an orderly resolution, as LAC can be used to absorb losses of an AI should it fail or to recapitalise the AI or its transferee.<sup>78</sup>

While increasing the LAC of AIs likely brings economic benefits by enhancing AIs' resilience to shocks and their resolvability, it will also inevitably incur costs. In particular, where AIs are required to issue more LAC, their funding costs could rise, which in turn could lead to higher costs of financial services if the increased funding costs are passed on to AIs' customers, and may dampen investment and output. Against this background, this box provides a cost-benefit assessment to examine whether increases in the LAC-to-RWA (risk-weighted assets) ratios (LAC ratios) of locally incorporated AIs would bring net benefits to the Hong Kong economy. The analysis largely follows the methodology adopted in other studies, in particular those conducted by the Bank of England and the US Federal Reserve Board.<sup>79</sup>

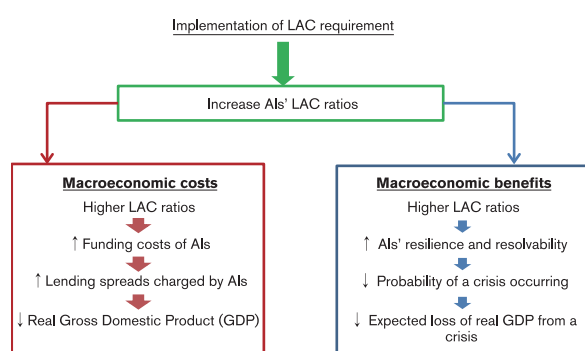
<sup>77</sup> See "Consultation paper on rules prescribing loss-absorbing capacity requirements for authorized institutions", issued by the HKMA on 17 January 2018.

<sup>78</sup> See "Developing rules on loss-absorbing capacity requirements for authorized institutions in Hong Kong", *HKMA Quarterly Bulletin*, September 2017.

<sup>79</sup> Brooke, M. et al., (2015), "Measuring the macroeconomic costs and benefits of higher UK bank capital requirements", *Bank of England Financial Stability Paper* No. 35. Firestone, S. et al., (2017), "An empirical assessment of the costs and benefits of bank capital in the US", *Finance and Economics Discussion Series* 2017-034. Board of Governors of the Federal Reserve System.

The structure of the assessment is summarised in Chart B5.1.

**Chart B5.1**  
The structure of the cost-benefit assessment



#### Macroeconomic costs of increased LAC ratios for locally incorporated AIs

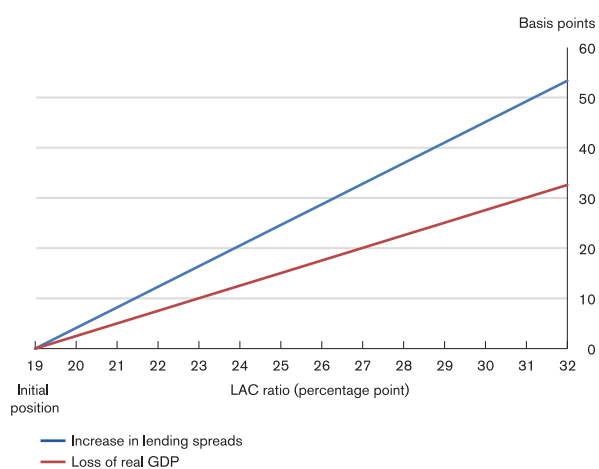
We first focus our analysis on the macroeconomic costs of higher LAC ratios. To gauge the effect of higher LAC ratios on the funding costs of AIs, the following assumptions are made. First, it is assumed that increases in LAC ratios are met two-thirds with equity and one-third with non-capital LAC eligible debt (LAC debt), and this new LAC funding replaces the most expensive non-LAC funding currently on AIs' balance sheets. We also account for the forgone tax-shield cost to the extent that the additional LAC funding is met by replacing non-LAC funding with equity. Based on data submitted to the HKMA by locally incorporated AIs, it is estimated that the weighted average funding cost of AIs would rise by 1.81 basis points in response to a one-percentage-point rise in LAC ratios.<sup>80</sup> Secondly, the resulting increases

<sup>80</sup> The annual cost of equity, LAC debt and the next most expensive non-LAC funding currently on AIs' balance sheets are assumed to be 9%, 4% and 1.7% respectively.

in AIs' funding cost are assumed to be fully passed on to their customers through higher lending spreads.<sup>81</sup>

An error-correction model is employed to translate the impact of higher lending spreads on Hong Kong's real GDP.<sup>82</sup> Using the aggregate consolidated total capital ratio of locally-incorporated AIs at the end of September 2017 (i.e. 18.7%) as a proxy of the initial LAC ratios, Chart B5.2 presents the estimated rise in lending spreads and the associated loss of real output in response to an increase in the LAC ratios. Specifically, our estimation result suggests that in response to a one-percentage-point rise in the LAC ratios, the lending spreads would rise by 4.11 basis points, which leads to a decline of real GDP by 2.51 basis points.

**Chart B5.2**  
**Estimated impact of higher LAC ratios on lending spreads and Hong Kong's real GDP**



Note: The aggregate total capital ratio of locally incorporated AIs at the end of September 2017 is taken as a proxy for the initial LAC ratios of AIs.

Source: HKMA staff estimates.

<sup>81</sup> In practice, AIs are unlikely to be able to pass on 100% of the increased costs. To the extent AIs do not pass on all the costs (for example, as a result of competitiveness considerations, or improved efficiency), the estimates of the macroeconomic costs would be smaller. Therefore, the estimated increase in lending spreads should be treated as the upper bound estimates.

<sup>82</sup> The error-correction model of Wong et al. (2010), "An assessment of the long-term economic impact of the new regulatory reform on Hong Kong", *HKMA Research Note 05/2010*, is updated for the period from 1998 to 2017.

### *Macroeconomic benefits of increased LAC ratios for locally incorporated AIs*

The macroeconomic benefits of increased LAC ratios are assumed to take place mainly through reducing the probability of financial crises occurring. As such, the benefit is estimated by multiplying (i) the reduction in the probability of a crisis with (ii) the impact of a crisis.

For (i) the reduction in the probability of a crisis, we employ an econometric model on a dataset of Organisation for Economic Co-operation and Development (OECD) and Executives' Meeting of East Asia-Pacific Central Banks (EMEAP) economies (including Hong Kong) to estimate the probability of a crisis. This probability is assumed to be determined by LAC ratios and other factors including the credit-to-GDP gap, real GDP growth, real exchange rate growth, Chicago Board Options Exchange Market Volatility Index and the LTD ratio.<sup>83</sup> In line with our expectation, the probability of a crisis is found to be negatively correlated with the level of LAC ratios. Based on the estimation result, a schedule of estimated probabilities of a crisis for different levels of LAC ratios can be obtained. Following the approach taken in Firestone et al. (2017), the modelled probabilities of a crisis are reduced by 30% to account for the potential effect of an operational resolution regime in Hong Kong.<sup>84</sup>

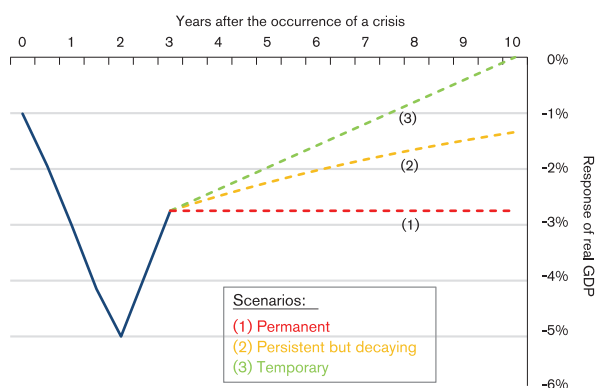
<sup>83</sup> Using Hong Kong's experience alone may not be adequate as the occurrence of a financial crisis in Hong Kong is rare and the impact of a crisis is typically much milder than in other economies. To improve reliability of the estimates for the probability as well as the severity of a crisis, we include crisis episodes in both OECD and EMEAP economies in our estimation.

<sup>84</sup> This is justified by the fact that an operational resolution regime would result in stronger market discipline (i.e. AI shareholders and other investors are less willing to tolerate excessive risk-taking if they envisage a bail-in instead of bail-out). It should be noted that the adjustment made to the probability of a crisis in this analysis of the cost of higher LAC requirements has an element of circularity, because higher LAC requirements themselves make a major contribution to enhancing the credibility of a resolution regime. However, this will lead to an understatement, rather than an overstatement, of the net benefits of higher LAC ratios, and so is in keeping with the conservative approach adopted in the cost-benefit assessment.



For (ii) the impact of a crisis, we apply the model of Romer and Romer (2017)<sup>85</sup> on a dataset of OECD and EMEAP economies to project the short-to-medium term adverse impact on real GDP following an occurrence of a crisis.<sup>86</sup> For the longer term impact, three different scenarios are assumed, i.e. (1) a permanent output loss; (2) a persistent but decaying output loss with a 5% rate of decay; and (3) a temporary output loss that would be fully dissipated ten years after the onset of a crisis, which is similar to Hong Kong's experience following the Asian financial crisis. Chart B5.3 illustrates the output loss under the three scenarios. To represent the cost of a crisis in a net present value term, we discount the projected loss of real GDP with the average real yield of 10-year Exchange Fund Notes.

**Chart B5.3**  
**Estimated impact of a crisis under three different scenarios**



Notes:

- The blue line represents the short-to-medium term impact of a crisis, which is estimated based on the empirical model of Romer and Romer (2017) and the impact has been adjusted following the approach adopted in Firestone et al. (2017).
- For longer term impact, three different scenarios are considered in this analysis. They include (i) a permanent output loss (red line); (ii) a persistent but decaying output loss with a 5% decaying rate (orange line); and (iii) a temporary output loss fully dissipated in ten years after the occurrence of a crisis, which is similar to the experience for Hong Kong after the Asian financial crisis (green line).

Source: HKMA staff estimates.

<sup>85</sup> Romer, C. D. and D. H. Romer (2017), "New evidence on the aftermath of financial crisis in advanced countries", *American Economic Review*, 107(10), 3072–3118.

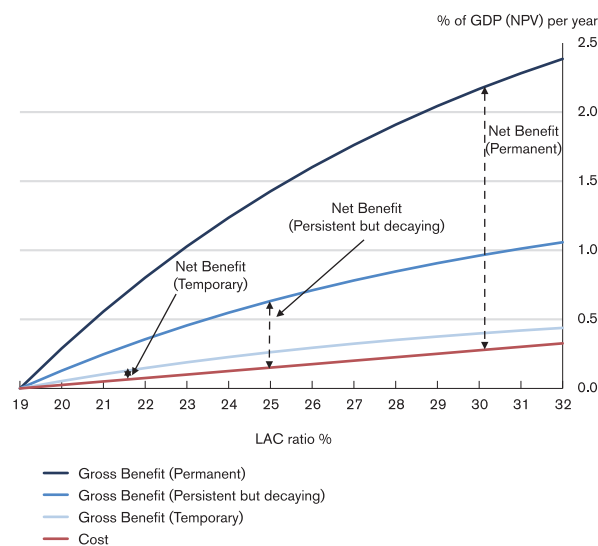
<sup>86</sup> Following similar adjustments made in Firestone et al (2017), the duration of crisis effect has been shortened to three years from five years to account for the prompt recapitalisations that are facilitated by an operational resolution regime. Again, the adjustment will lead to an understatement, rather than an overstatement, of the net benefits of higher LAC ratios, and so is in keeping with the conservative approach adopted in the cost-benefit assessment.

The gross macroeconomic benefit of higher LAC ratios is calculated for each of the three scenarios by multiplying the adjusted reduction in the modelled probability of a crisis by the net present value of the cost of a crisis for each scenario.

*Net economic impact of the LAC requirements for Hong Kong*

Chart B5.4 illustrates the results of the cost-benefit assessment for each of the three scenarios. The value of the net benefit is the difference between the blue line (gross benefit) and the red line (cost) for each scenario. The net benefit of a higher LAC ratio is positive across all three scenarios, although the extent of the estimated net benefit is highly dependent on whether the adverse impact of a crisis on output is temporary or not. For instance, in the temporary output loss scenario, increasing the LAC ratio higher than 30% would lead to a smaller marginal net benefit.

**Chart B5.4**  
**Net economic benefit of higher LAC ratios for three scenarios**



Notes:

- The aggregate total capital ratio of locally incorporated AIs at the end of September 2017 is taken as a proxy for AIs' initial LAC ratios.
- See footnote 2 in Chart B5.3 for the details of the three scenarios of output loss from a crisis.

Source: HKMA staff estimates.

However, it should be noted that this cost-benefit assessment has not exhaustively incorporated all possible channels through which higher LAC ratios would affect the economy due to difficulties in their empirical quantification.<sup>87</sup> Therefore, this assessment can at best only provide a broad assessment of the likely net impact of higher LAC ratios. Nevertheless, the fact that this assessment indicates a positive net economic benefit for higher LAC ratios across all three scenarios provides supportive evidence for introducing LAC requirements for AIs in Hong Kong.

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<sup>87</sup> Brooke et al. (2015) lists a number of other possible channels, including the contagion effect of resolution, the effect of non-crisis downturn and the impact on total factor productivity growth, etc.