

5. Banking sector performance

As the economic recession persisted amid the COVID-19 pandemic, coupled with the effects of low-for-long interest rate environment, retail banks' profit declined further alongside a slight deterioration in asset quality in the second half of 2020. However, the Hong Kong banking sector has remained resilient, underpinned by robust capital and liquidity positions. During the review period, the HKMA extended various support measures to further help the economy ride out this difficult period. Looking ahead, although the rollout of vaccines may raise hopes of containing the pandemic and reopening economic activities globally, the pace of economic recovery remained uncertain. The uncertainties, together with lingering geopolitical tensions and the ensuing impact on business activities, will continue to pose challenges to the Hong Kong banking sector. Banks should remain vigilant to the implications of these downside risk factors for asset quality, particularly in view of the weakening ability of corporates and households to repay debt amid the pandemic.

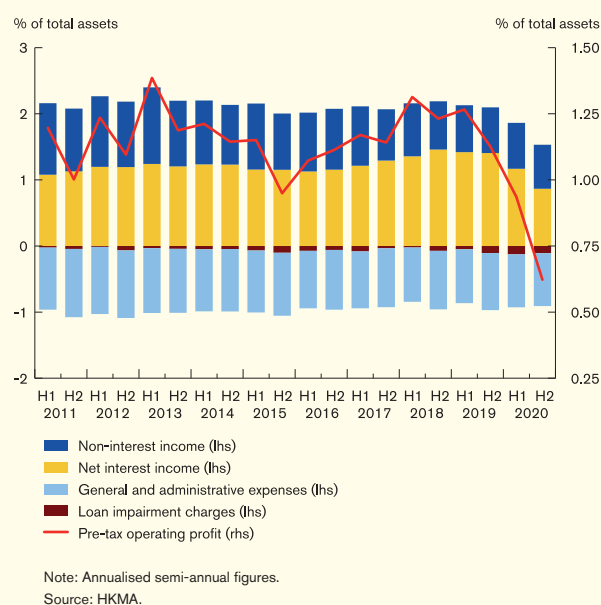
5.1 Profitability and capitalisation

Profitability

The aggregate pre-tax operating profit of retail banks⁴² declined by 38.5% in the second half of 2020, compared with the same period in 2019. As a result, the return on assets fell to 0.62% in the second half of 2020, compared with 1.13% in the same period in 2019 (Chart 5.1). The decline in profit was contributed mainly by falls in net interest income, as the net interest margin (NIM) of retail banks decreased from 1.63% in the second half of 2019 to 1.01% in the same period of 2020 (Chart 5.2). The fall in net interest income more than offset a mild increase in non-interest income during the same period.

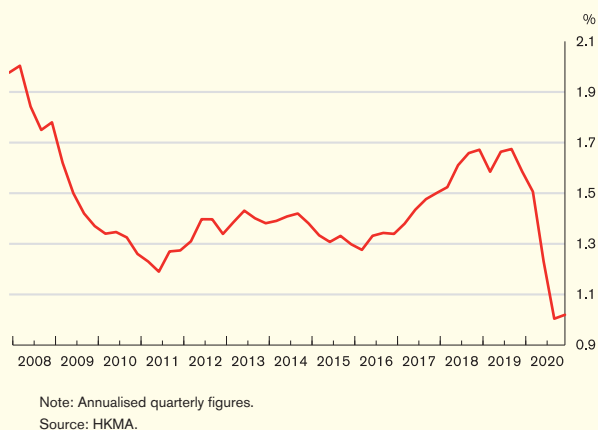
For 2020 as a whole, the aggregate pre-tax operating profit of retail banks decreased by 29.4%, with the return on assets dropping to 0.77% from 1.19% in 2019.

Chart 5.1
Profitability of retail banks



⁴² Throughout this chapter, figures for the banking sector relate to Hong Kong offices only, unless otherwise stated.

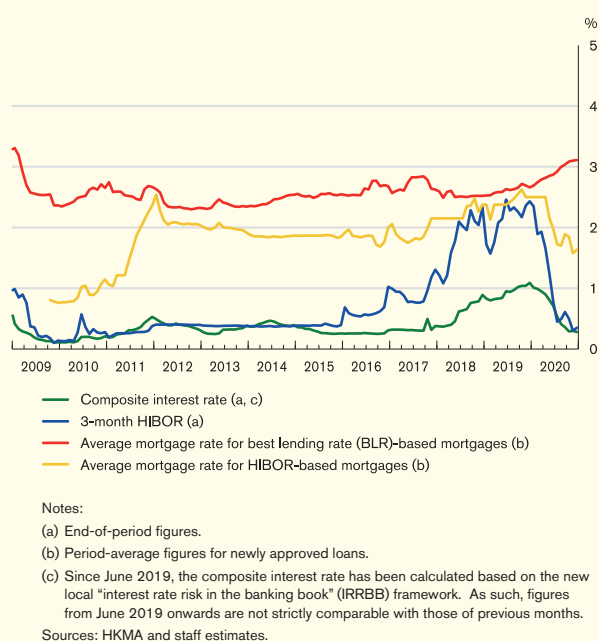
Chart 5.2
NIM of retail banks



Largely reflecting ample Hong Kong dollar liquidity amid sizeable capital inflows⁴³ driven by stock market activities, Hong Kong interbank interest rates further softened in the fourth quarter of 2020. For instance, the three-month Hong Kong Interbank Offered Rate (HIBOR) declined by 43 basis points in the second half to 0.35% at the end of 2020 (blue line in Chart 5.3).

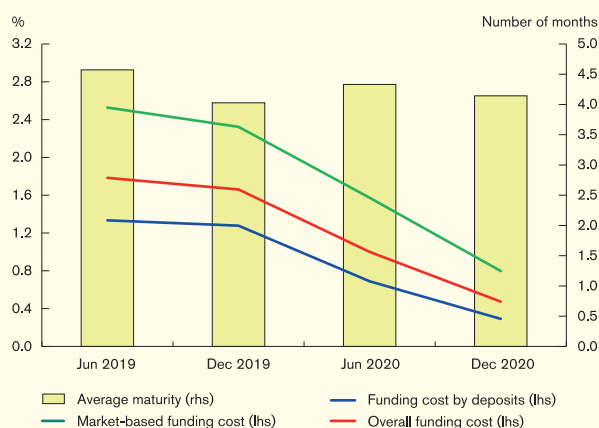
The composite interest rate (a measure of average Hong Kong dollar funding costs for retail banks) also showed a similar development, decreasing notably from 0.71% at the end of June 2020 to 0.28% at the end of 2020 (green line in Chart 5.3). The drop in the composite interest rate was attributable to lower interbank funding costs and lower time deposit rates offered by some major retail banks.⁴⁴

Chart 5.3
Interest rates



From a broader perspective, the overall Hong Kong dollar and US dollar funding costs for licensed banks in Hong Kong declined moderately by 53 basis points during the second half of 2020 (red line in Chart 5.4).

Chart 5.4
Hong Kong dollar and US dollar funding costs and maturity of licensed banks



⁴³ The strong-side Convertibility Undertaking was repeatedly triggered between September and October 2020. For details, see Chapter 4.1.

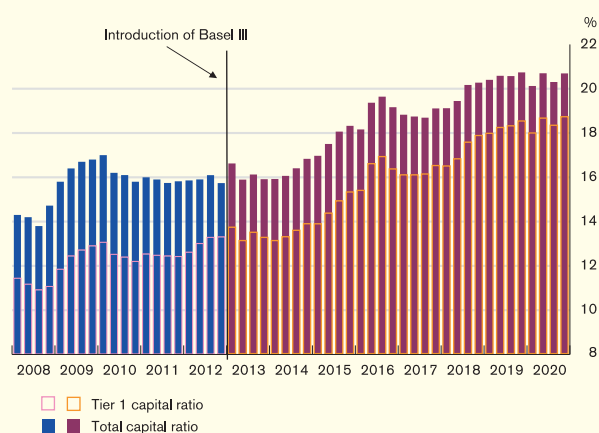
⁴⁴ Although several virtual banks began operations in 2020 and offered competitive deposit rates to customers, their business scale remained small in the second half of 2020.

Looking ahead, the outlook for banks' profitability would remain highly challenging in the near term as the global low interest rate environment is likely to be prolonged, continuing to suppress banks' NIM. In addition, despite some optimism in the global economic outlook arising from the vaccine breakthroughs, the trajectory of economic recovery remains unclear given the significant uncertainties surrounding the distribution and efficacy of vaccines. These risk factors would continue to weigh on banks' loan quality and profitability going forward.

Capitalisation

Capitalisation of the Hong Kong banking sector continued to be strong and well above minimum international standards. The consolidated total capital ratio of locally incorporated authorized institutions (AIs) stood at 20.7% at the end of 2020, exceeding the international minimum requirement of 8% (Chart 5.5). The Tier 1 capital ratio was 18.7% in the same period, with 16.7% being contributed by Common Equity Tier 1 (CET1) capital. In addition, the non-risk-based Leverage Ratio⁴⁵ (LR) of locally incorporated AIs stood at a healthy level of 8.2% at the end of 2020, exceeding the statutory minimum of 3% (Chart 5.6).

Chart 5.5
Capitalisation of locally incorporated AIs

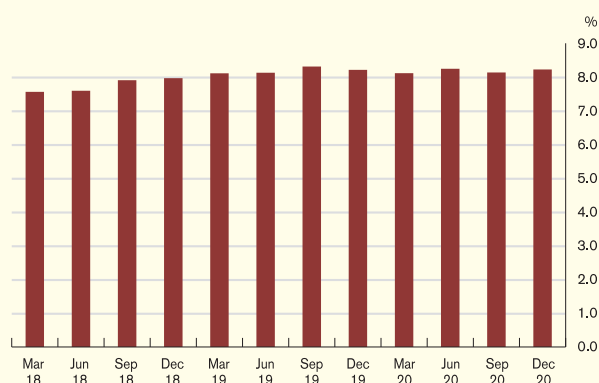


Notes:

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

Source: HKMA.

Chart 5.6
Leverage ratio of locally incorporated AIs



Note: Consolidated basis.

Source: HKMA.

5.2 Liquidity and interest rate risks

Liquidity and funding

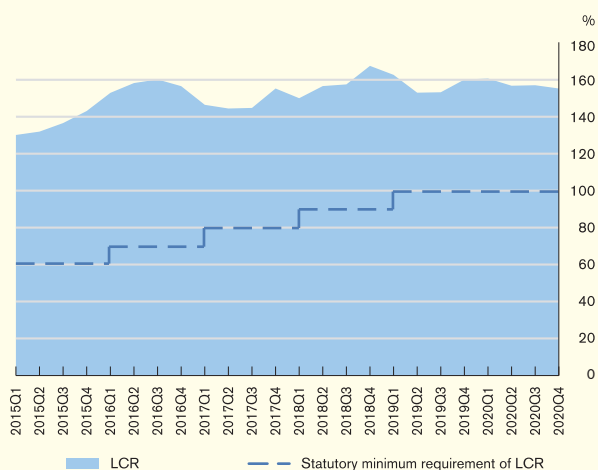
The liquidity positions of the banking sector, as measured by the Basel III Liquidity Coverage Ratio (LCR)⁴⁶, remained sound during the review period. The average LCR of category 1

⁴⁵ The Basel III non-risk-based LR requirement acts as a "backstop" to restrict the build up of excessive leverage in the banking sector. For details, see Banking (Capital) Rules (Cap. 155L).

⁴⁶ The Basel III LCR requirement 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".

institutions was 155.1% in the fourth quarter of 2020 (Chart 5.7), which was well above the statutory minimum requirement of 100%. The average Liquidity Maintenance Ratio (LMR) of category 2 institutions was 57.9% during the same period, also well above the statutory minimum requirement of 25%.

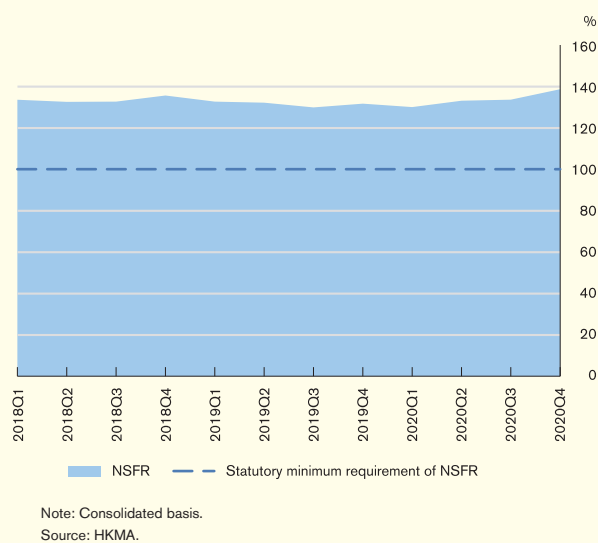
Chart 5.7
Liquidity Coverage Ratio



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

The latest ratios of the Net Stable Funding Ratio (NSFR)⁴⁷ requirement also indicate a stable funding position of AIs. The average NSFR of category 1 institutions and average Core Funding Ratio (CFR) of category 2A institutions stood at the high levels of 138.6% and 139.5% respectively in the fourth quarter of 2020 (Chart 5.8). Both ratios were well above their respective statutory minimum requirements of 100% and 75%. The strong liquidity and stable funding positions of AIs suggest the Hong Kong banking sector is well positioned to withstand liquidity shocks.

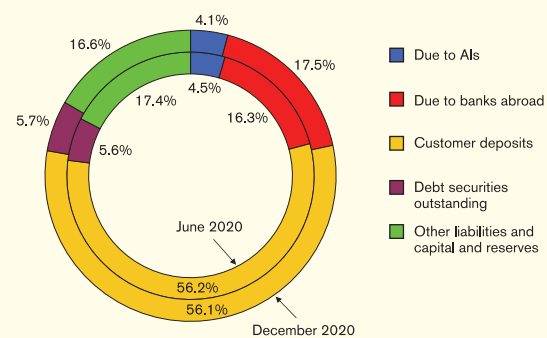
Chart 5.8
Net Stable Funding Ratio



Note: Consolidated basis.
Source: HKMA.

Customer deposits continued to be the primary funding source for AIs, underpinning a stable funding structure in the banking system. At the end of 2020, the share of customer deposits to all AIs' total liabilities hovered around 56.1%, a level similar to six months ago (Chart 5.9).

Chart 5.9
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.

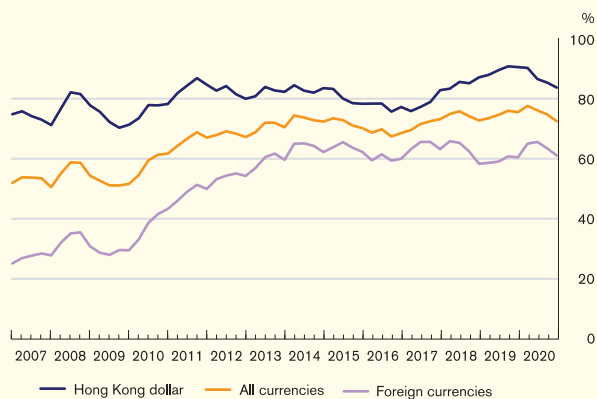
In the second half of 2020, the total deposits of all AIs increased while total loans and advances declined. The average all-currency loan-to-deposit (LTD) ratio of all AIs decreased from 76.0% at the end of June 2020 to 72.3% at the end of 2020 (Chart 5.10). The increase in total deposits was driven by increases in both Hong

⁴⁷ The Basel III NSFR requires banks to maintain a stable funding profile in relation to the composition of their assets and off-balance-sheet activities. 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 CFR. For details, see Banking (Liquidity) Rules (Cap. 155Q).

Banking sector performance

Kong dollar deposits and foreign currency deposits. Reflecting this, the average Hong Kong dollar LTD ratio and foreign currency LTD ratio also declined to 83.5%⁴⁸ and 61.0% at the end of 2020, compared with 86.4% and 65.5% six months ago.

Chart 5.10
Average loan-to-deposit ratios of all AIs



Note: End-of-quarter figures.
Source: HKMA.

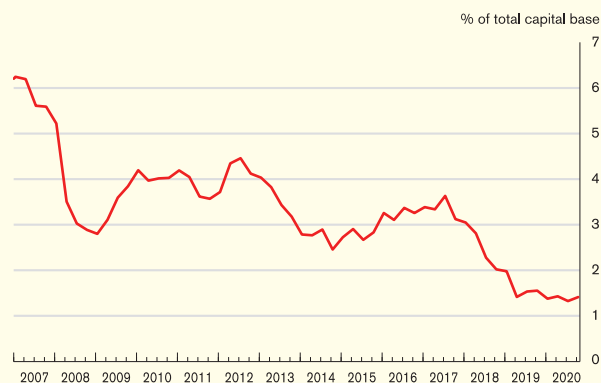
Interest rate risk

The interest rate risk exposure of locally incorporated licensed banks remained relatively low in the fourth quarter of 2020. Under a hypothetical shock of an across-the-board 200-basis-point increase in Hong Kong dollar and US dollar interest rates, the economic value of locally incorporated licensed banks' interest rate positions is estimated to decline to the extent equivalent to 1.41% of their total capital base at the end of 2020 (Chart 5.11).⁴⁹

⁴⁸ If one also takes into account AIs' own capital and reserves as a broader measure of funding liquidity, the adjusted Hong Kong dollar LTD (including customer deposits, capital and reserves, qualifying capital instruments and other capital-type instruments as the denominator) was around 70.7% at the end of December 2020. This reflects a sound Hong Kong dollar liquidity position of the banking sector.

⁴⁹ This estimation does not take into account the effect of any mitigating action by banks in response to the shock. The impact will be smaller if mitigating action is taken.

Chart 5.11
Impact of a Hong Kong dollar and US dollar interest rate shock on locally incorporated licensed banks



Notes:

1. Interest rate shock refers to a 200-basis-point parallel increase in both Hong Kong dollar and US dollar yield curves to institutions' interest rate risk exposure. The two currencies accounted for a majority of interest-rate-sensitive assets, liabilities and off-balance-sheet positions for locally incorporated licensed banks at the end of 2020.
 2. The impact of the interest rate shock refers to its impact on the economic value of the banking and trading book⁵⁰, expressed as a percentage of the total capital base of banks.
 3. Since June 2019, the interest rate risk exposure has been calculated based on the new local IRRBB framework. As such, the figures for June 2019 onwards are not strictly comparable with those of previous periods.
- Source: HKMA.

5.3 Credit risk

Overview

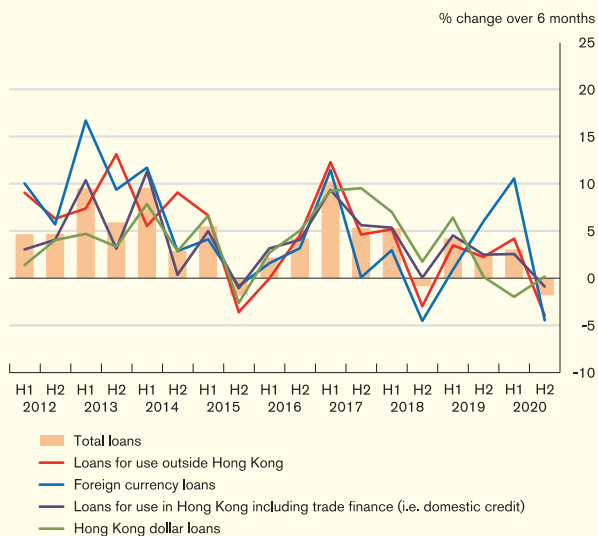
Against the backdrop of the resurgence of virus outbreaks and the tightening of social distancing measures, total loans and advances contracted modestly in the second half of 2020 as the domestic recession continued. Nevertheless, for 2020 as a whole, total credit of the banking sector still recorded a positive growth, despite decelerating notably to 1.2% from 6.7% in 2019.

On a half-yearly basis, total loans and advances of all AIs declined by 1.8% in the second half of 2020, after increasing by 3.0% in the first half. (Chart 5.12). The decline was driven by decreases in both domestic loans (comprising loans for use in Hong Kong and trade financing)

⁵⁰ 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.

and loans for use outside Hong Kong. Domestic loans dropped mildly by 0.9% while loans for use outside Hong Kong contracted by 3.9% during the second half, contrasting with increases of 2.6% and 4.2% respectively in the preceding six months.

Chart 5.12
Loan growth



Note: Since December 2018, figures for loans for use in or outside of Hong Kong have been restated to reflect AIs' reclassification of working capital loans. The reported % changes over six months for 2019 and onwards are calculated based on the reclassified loan data, while the historical % changes until the second half of 2018 are calculated based on the data without such reclassification.

Source: HKMA.

Analysed by currency, Hong Kong dollar loans broadly stabilised at a level similar to six months ago, after decreasing by 2.0% in the first half of 2020. Foreign currency loans declined by 4.5% in the second half after a sharp rise of 10.6% in the first half, partly reflecting lower demand for US dollar loans as liquidity improved globally.

Banks' views on the near-term credit demand outlook became mildly more optimistic, compared with six months ago. According to the results of the HKMA Opinion Survey on Credit Condition Outlook in December 2020, the share of surveyed AIs expecting loan demand to be higher in the following three months increased to 37%, while the share expecting loan demand to be lower for the same period decreased to 13% (Table 5.A).

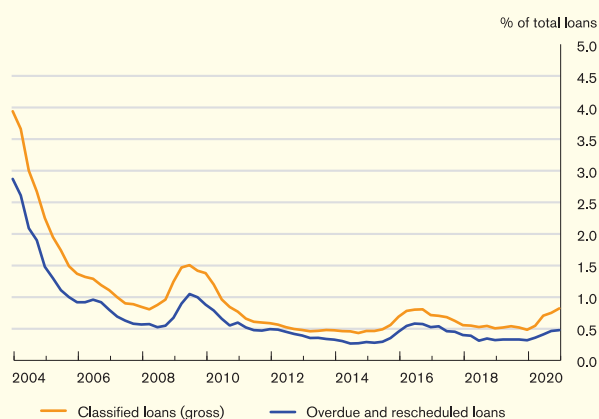
Table 5.A
Expectations of loan demand in the next three months

% of total respondents	Mar-20	Jun-20	Sep-20	Dec-20
Considerably higher	0	0	0	3
Somewhat higher	24	21	33	33
Same	36	55	43	50
Somewhat lower	40	24	23	13
Considerably lower	0	0	0	0
Total	100	100	100	100

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

As the debt repayment abilities of household and corporates were adversely affected amid the pandemic, banks' loan quality deteriorated modestly, though it remained sound by historical and international standards. Also, the pace of deterioration in the loan quality slowed in the second half of 2020. The gross classified loan ratio (CLR) of all AIs increased modestly to 0.9% at the end of 2020 from 0.79% six months ago, while the ratio of overdue and rescheduled loans of all AIs rose to 0.57% at the end of 2020 from 0.49% at the end of June 2020. For retail banks, the gross CLR and the ratio of overdue and rescheduled loans increased to 0.82% and 0.48% respectively (Chart 5.13).

Chart 5.13
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 were 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.

*Household exposure*⁵¹

Half-yearly growth in household debt accelerated to 3.9% in the second half of 2020 from 1.5% in the first half, but at a much slower pace than in 2019, when the annual growth rate was 12.8%. The growth in household debt in the second half of 2020 was driven by an increase in residential mortgage loans and a rebound in personal loans (Table 5.B).

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

(%)	2018		2019		2020	
	H1	H2	H1	H2	H1	H2
Residential mortgages	4.5	2.8	4.7	5.5	3.5	4.7
Personal loans	7.3	5.1	11.2	5.9	-2.4	2.2
of which:						
Credit card advances	-5.0	10.6	-3.8	4.1	-9.0	0.0
Loans for other private purposes	10.5	3.9	14.9	6.2	-1.1	2.6
Total loans to households	5.4	3.5	6.8	5.6	1.5	3.9

Notes:

1. Since December 2018, figures for loans to households have been restated to reflect AIs' reclassification of working capital loans. The half-yearly growth rates for the first half of 2019 and onwards are calculated based on the reclassified loan data, while the historical growth rates until the second half of 2018 are calculated based on the data without such reclassification.
2. The data series of loans to households from 2017 have been revised due to categorisation issues of the data submitted by AIs earlier.

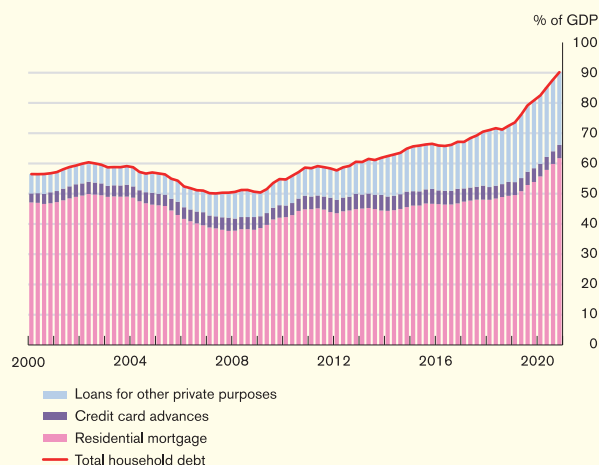
Source: HKMA.

The household debt-to-GDP ratio rose further to 90.2% in the second half of 2020 from 85.2% in the first half, contributed by both growth in household debt (3.3 percentage points) and a decline in nominal gross domestic product (GDP) (1.7 percentage points) (Chart 5.14). More recently, the ratio has risen more significantly, reflecting mainly a decline in nominal GDP since 2019 and more importantly, the impact of the COVID-19 pandemic. As such, although the growth in household debt moderated in 2020, the decline in nominal GDP still pushed the household debt-to-GDP ratio higher. It is worth noting that while economic activities slow down sharply during a recession, households do not usually make early repayment of their debt

⁵¹ Loans to households constitute lending to professional and private individuals, excluding lending for other business purposes. Mortgages account for a major proportion of household loans, while the remainder comprises mainly loans to private banking and wealth management customers secured by financial assets, credit card advances and unsecured personal loans. At the end of 2020, household lending made up 33.1% of domestic lending.

within a short period of time. As such, the adjustment of household debt is usually slower than that of GDP during an economic downturn. The household debt-to-GDP ratio may thus be expected to stay elevated in the near term.

Chart 5.14
Household debt-to-GDP and its components



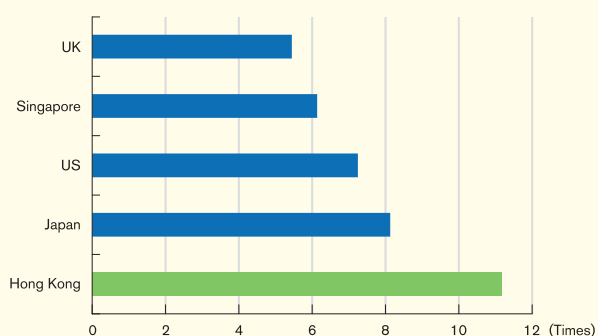
Notes:

1. Only borrowings from AIs are covered.
2. GDP refers to the annualised GDP, which is the sum of the quarterly GDP in the trailing four quarters.
3. Since December 2018, the figure for household debt has been restated to reflect AIs' reclassification of working capital loans.
4. The data series of loans to households from 2017 have been revised due to categorisation issues of the data submitted by AIs earlier.

Source: HKMA.

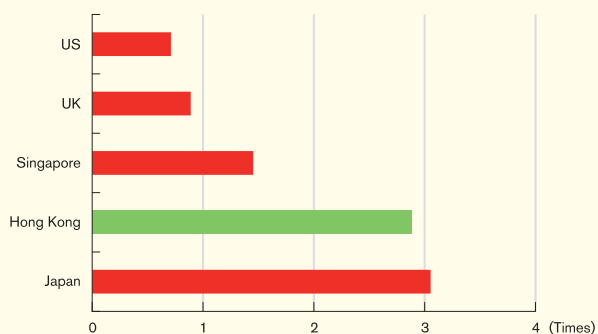
Although the household debt-to-GDP ratio has been a widely used indicator in evaluating households' financial position, a full assessment requires considering the entirety of the household balance sheet as well, including the level of assets and the composition of assets and liabilities. In an assessment, the HKMA found that in Hong Kong, the household net worth-to-liabilities ratio remained high at 11.2 times in 2019 (UK: 5 times, Singapore: 6 times, US: 7 times, Japan: 8 times) (Chart 5.15). The safe assets-to-liabilities ratio for Hong Kong's household sector also stayed high at 2.88 times (the ratio was 1 in the US, the UK and Singapore, and 3 times in Japan) (Chart 5.16). Both ratios are high, and are also greater than most other developed economies, suggesting that Hong Kong's households, on aggregate, are financially sound and have a strong buffer to cushion potential financial and economic shocks.

Chart 5.15
Household net worth-to-liabilities ratio for selected economies



Note: Japan figures refer to those at end-2018, while other figures refer to those at end-2019.
Sources: Statistical agencies or central banks of selected economies, and HKMA staff estimates.

Chart 5.16
Safe assets-to-liabilities ratio for selected economies



Note: Safe assets comprise deposits, as well as currencies if data is available. In the case of Hong Kong, safe assets refer to deposits only. Japan figures are from end-2018, while all other reported figures are from end-2019.
Sources: Statistical agencies or central banks of selected economies, and HKMA staff estimates.

Given the prudent risk management and sound credit quality of these loans, the HKMA considered the associated credit risk as manageable. More than 90% of household debt were collateralised loans, mainly residential mortgages and wealth management advances secured by financial assets.

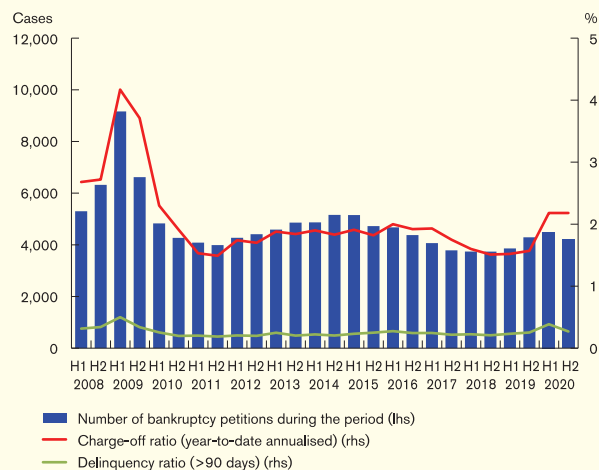
Regarding residential mortgages, following several rounds of countercyclical macroprudential measures introduced by the HKMA since 2009, the average LTV ratio and average debt servicing ratio of newly approved mortgage loans have stayed at healthy levels. For personal loans to wealth management customers secured by financial assets, the HKMA requires

banks to adopt prudent and effective credit risk management measures on this type of business. These measures include imposing a cap on LTV ratios for financial assets pledged as collateral, prompt margin call and forced liquidation mechanisms.

Besides, the HKMA also requires banks to conduct prudent operations on credit card advance and unsecured personal loan businesses. In reviewing credit applications, banks should understand borrowers' credit and financial conditions and carefully assess their repayment ability. As for post-lending, banks should implement effective monitoring that includes regular assessment of the asset quality of the loan portfolios. The HKMA will continue to closely monitor changes in banks' loan quality.

For unsecured household exposure, the associated credit risk remained contained during the review period. The number of bankruptcy petitions presented decreased in the second half of 2020 compared with six months ago (Chart 5.17). The year-to-date annualised credit card charge-off ratio stayed unchanged at 2.18% in the fourth quarter of 2020, while the delinquency ratio dropped to 0.27% in the same period.

Chart 5.17
Charge-off ratio and delinquency ratio for credit card lending and bankruptcy petitions

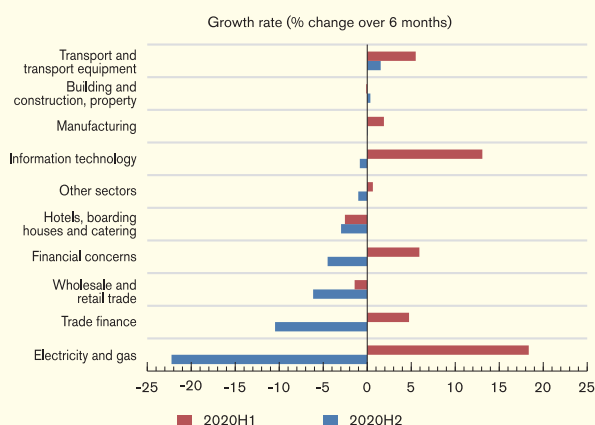


Sources: Official Receiver's Office and HKMA.

Corporate exposure⁵²

Domestic corporate loans (including trade finance) declined by 3.1% on a half-yearly basis at the end of 2020, after recording 3.0% growth during the first half. Lending to major economic sectors recorded broad-based flattening or declines (Chart 5.18). Such changes could be attributed to the subdued credit demand amid the economic recession, and also some corporates have repaid loans with their deposits. For 2020 as a whole, domestic corporate loans were roughly maintained at a similar level to the end-2019 position.

Chart 5.18
Growth in domestic corporate loans by selected sector



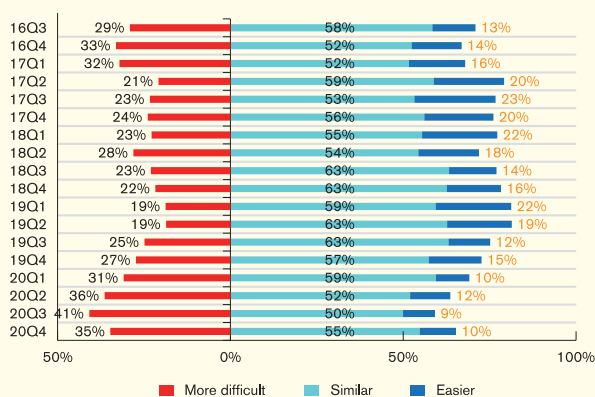
Source: HKMA.

The demand-side survey on the credit conditions of small and medium-sized enterprises (SMEs) showed signs of improvement in the fourth quarter of 2020. Compared with the survey results for the third quarter, SMEs' perception of banks' credit approval stance improved, with 35% of the respondents perceiving credit approval as "more difficult" relative to six months ago, down from 41% in the third quarter (Chart 5.19). Of the respondents with existing credit lines, 5% indicated a tighter stance by banks, lower than the 18% recorded in the third quarter (Chart 5.20).

To ease the cash-flow pressure on SMEs amid the COVID-19 pandemic, the HKMA has been working closely with the banking sector and encouraging banks to continue providing credit by making good use of their lending capacity. Specifically, the HKMA extended the Pre-approved Principal Payment Holiday Scheme to October 2021. By the end of January 2021, banks had granted some 59,000 cases of credit relief for corporate customers including principal payment holidays and other relief measures, involving an aggregate amount of around HK\$750 billion. In addition, the Hong Kong Mortgage Corporation Limited (HKMC) extended the moratorium on principal repayments for the 80% Guarantee Product and the 90% Guarantee Product under the SME Financing Guarantee Scheme by six months to the end of March 2021. As for the new Special 100% Loan Guarantee, in September 2020, the HKMC raised the maximum loan amount per enterprise from the equivalent of six months of employee wages and rents to 12 months (capped at HK\$5 million), and extended the maximum repayment period from three years to five years. As at the end of January 2021, a total of HK\$42.7 billion in loans was approved under the 100% Guarantee Product, benefiting over 20,000 enterprises, involving 260,000 employees. In February 2021, the HKMC announced that the application period of the Special 100% Loan Guarantee would be extended to 31 December 2021. The maximum amount of loan per enterprise would be raised further to 18 months of employee wages and rents (capped at HK\$6 million) and the maximum repayment period of the guaranteed loans would be extended further from five years to eight years. With the overarching objective of maintaining banking stability, the HKMA will from time to time review the case for further extension of the various measures.

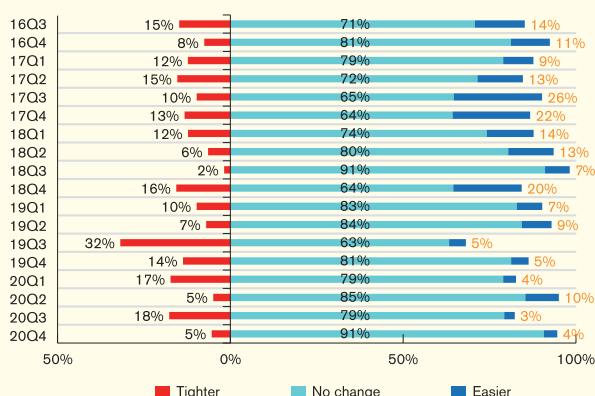
⁵² Excluding interbank exposure. At the end of 2020, the share of corporate loans in domestic lending was 66.8%.

Chart 5.19
SMEs' perception of banks' credit approval stance relative to six months ago



Note: Excluding respondents who answered "no idea / don't know".
Source: HKMA.

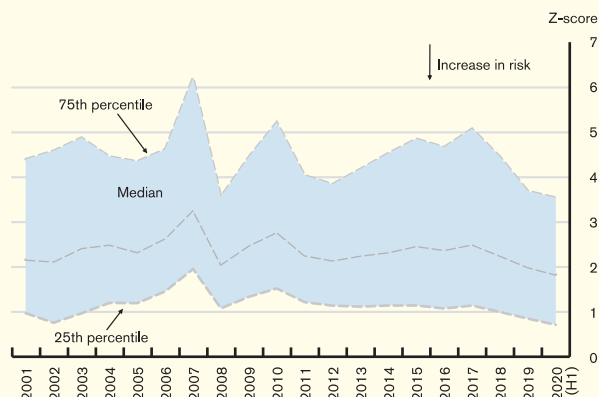
Chart 5.20
SMEs' reported change in banks' stance on existing credit lines



Note: The data covers only respondents with existing credit lines.
Source: HKMA.

The financial health of listed corporates deteriorated slightly as they were broadly hit by the pandemic. Based on accounting data for all non-financial corporates listed in Hong Kong, the Altman's Z-score (a default risk measure for non-financial corporates) saw an across-the-board decline during the first half of 2020, reflecting a weakening in the financial health of these corporates (Chart 5.21). Nevertheless, the number of petitions presented for the compulsory winding-up of companies only edged up to 449 in 2020 from 419 in 2019, partly reflecting the policy effect of support measures.

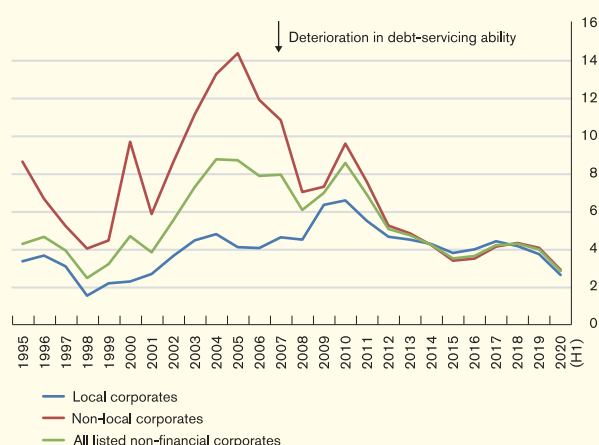
Chart 5.21
Altman's Z-score of listed non-financial corporates in Hong Kong



Notes:
1. All non-financial corporates listed on the Hong Kong Stock Exchange are selected.
2. Figures are calculated based on information up to end-February 2021.
Source: HKMA staff calculations based on estimates compiled by Bloomberg.

Consistent with the observation based on the Altman's Z-score, both local and non-local listed corporates' debt servicing abilities, as indicated by the weighted average interest coverage ratios (ICRs), also deteriorated during the same period (the blue and red lines respectively in Chart 5.22) due mainly to declines in corporate earnings amid the pandemic.

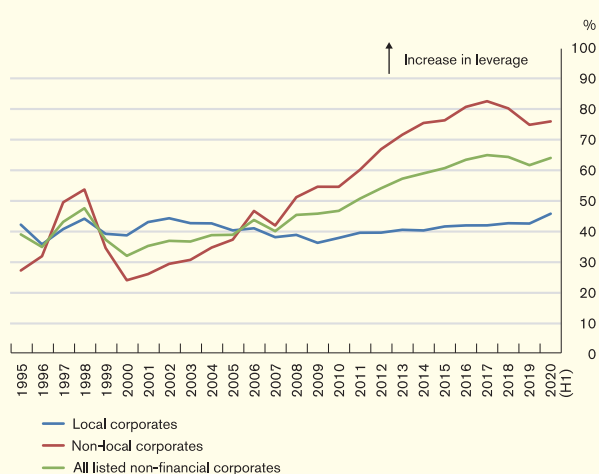
Chart 5.22
Interest coverage ratio of listed non-financial corporates in Hong Kong



Notes:
1. Weighted average figures.
2. The ICR is calculated by dividing the earnings before interest and tax (EBIT) by 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 2021.
Source: HKMA staff estimates based on data from Bloomberg.

Meanwhile, the weighted average debt-to-equity ratio, a common measure of corporate leverage, increased modestly for both local and non-local corporates in the first half of 2020 (Chart 5.23). Such changes could be attributed to a rising demand of corporates for funding to cope with cash-flow pressures during the pandemic or to strengthen their liquidity buffer with cheaper costs amid the low interest rate environment.

Chart 5.23
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 2021.
- Source: HKMA staff estimates based on data from Bloomberg.

The upward trend in the leverage of non-local corporates after the global financial crisis (GFC) has been driven mainly by Mainland corporates listed in Hong Kong. Box 4 provides a comprehensive assessment by analysing key drivers for the rising leverage of Mainland firms amid the low interest rate environment based on a sample of firms listed in Hong Kong.

The analysis found that the increase in investment activities was a significant driver for the rising leverage of Mainland firms listed in Hong Kong after the GFC, as the “low-for-long” interest rate environment reduced external financing costs. Importantly, Mainland firms’ investment on average was found to be more responsive to productive investment

opportunities, and their return on equity (ROE) also improved more relative to the group of local firms in the “low-for-long” interest rate environment.

Looking ahead, since it would take time for the global economy to recover to pre-pandemic level even with the help of vaccines, the challenging business environment is likely to persist for some time, posing continuous pressure on corporates’ financial fundamentals. Banks therefore should stay alert in their credit risk management and closely monitor any changes in the financial fundamentals of borrowers in their corporate exposures.

Mainland-related lending and non-bank exposures

The banking sector’s total Mainland-related lending decreased by 4.9% to HK\$4,553 billion (15.6% of total assets) at the end of 2020, from HK\$4,790 billion (17.2% of total assets) at the end of June 2020 (Table 5.C). Other non-bank exposures increased to HK\$1,826 billion (Table 5.D).

Table 5.C
Mainland-related lending

HK\$ bn	Mar 2020	Jun 2020	Sep 2020	Dec 2020
Mainland-related loans	4,765	4,790	4,827	4,553
Mainland-related loans excluding trade finance	4,435	4,463	4,523	4,292
Trade finance	330	326	304	261
By type of AIs:				
Overseas incorporated AIs	1,973	1,985	1,882	1,733
Locally incorporated AIs*	2,060	2,087	2,208	2,048
Mainland banking subsidiaries of locally incorporated AIs	732	718	737	772
By type of borrowers:				
Mainland state-owned entities	1,993	2,036	1,978	1,809
Mainland private entities	1,313	1,288	1,369	1,309
Non-Mainland entities	1,460	1,466	1,479	1,435

Notes:

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

Table 5.D
Other non-bank exposures

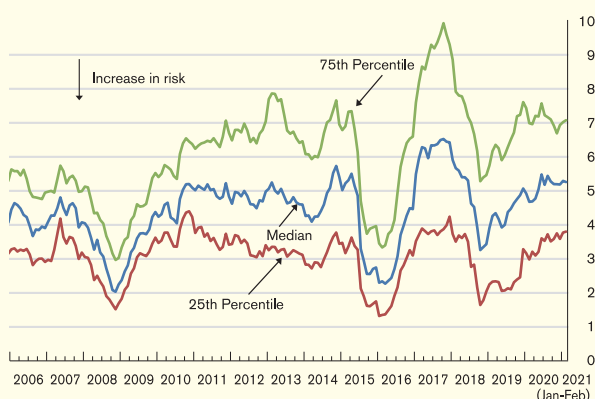
HK\$ bn	Mar 2020	Jun 2020	Sep 2020	Dec 2020
Negotiable debt instruments and other on-balance sheet exposures	1,184	1,202	1,232	1,353
Off-balance sheet exposures	408	404	434	473
Total	1,592	1,607	1,666	1,826

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

The pace of deterioration in asset quality of banks' Mainland-related lending stabilised. The gross CLR of Mainland-related lending of all AIs⁵³ edged up slightly to 0.96% at the end of 2020 from 0.94% at the end of June 2020.

At the same time, a forward-looking market-based indicator also indicated signs of stabilisation in the default risk for the Mainland corporate sector. The median and 25th percentiles of the distance-to-default (DTD) index⁵⁴ hovered at levels similar to six months ago (Chart 5.24). The stabilisation in default risk for the Mainland corporate sector could be driven in part by significant recovery of the Mainland economy.

Chart 5.24
Distance-to-default index for the Mainland corporate sector



Note: The DTD 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.

Nevertheless, it is worth noting that other downside risk factors such as the uncertainty over the China-US relationship and potential business reshuffling after the pandemic, may cloud the future prospects of Mainland corporates. Banks should stay vigilant and

⁵³ Figures cover AIs' Hong Kong offices and Mainland branches and subsidiaries.

⁵⁴ The DTD 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.

closely monitor the financial health of Mainland corporates, and remain alert to the credit risk management of their Mainland-related exposures.

Macro stress testing of credit risk⁵⁵

Results of the latest macro stress testing on retail banks' credit exposure suggest 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 5.25 presents a simulated future credit loss rate of retail banks in the fourth quarter of 2022 under four specific macroeconomic shocks⁵⁶ using information up to the fourth quarter of 2020.

In the stressed scenarios, the expected credit losses two years after different macroeconomic shocks are estimated to be moderate, ranging from 0.66% (Interest rate shock) to 1.48% (Hong Kong GDP shock).

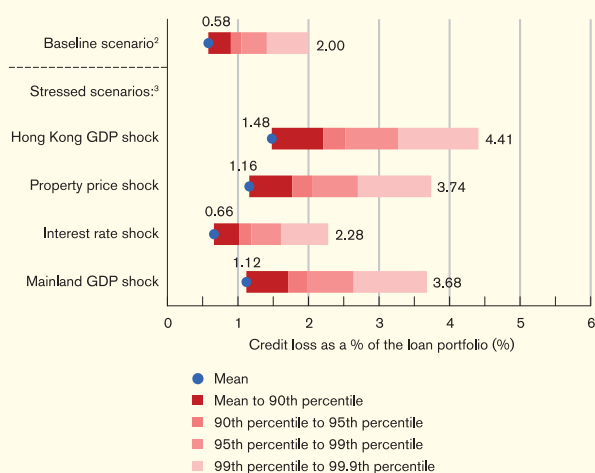
Taking into account tail risk, banks' credit losses (at the confidence level of 99.9%) under the stress scenarios range from 2.28% (Interest rate shock) to 4.41% (Hong Kong GDP shock). Nevertheless, the probability of such extreme scenarios actually occurring is rather remote, given that Hong Kong has already experienced a severe economic downturn over the past two years, and the chance of a further sharp fall in GDP from such a low base is very small.⁵⁷

⁵⁵ 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 estimates from previous reports.

⁵⁶ These shocks are calibrated to be similar to those that occurred during the Asian financial crisis, except the Mainland GDP shock.

⁵⁷ Under the Hong Kong GDP shock scenario where a similar extreme shock to that experienced during the Asian financial crisis is assumed, there would be a chance of less than 0.1% that the loan loss would be similar to that following the Asian financial crisis (i.e. 4.4%).

Chart 5.25
The mean and value-at-risk statistics of simulated credit loss distributions¹



Notes:

- The assessments assume the economic conditions in 2020 Q4 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 2.7%, 2.4%, 1.7% and 1.6% respectively in each of the four consecutive quarters starting from 2021 Q1 to 2021 Q4.
 - Property price shock:** Reductions in Hong Kong's real property prices by an average of 12% in each of the four consecutive quarters starting from 2021 Q1 to 2021 Q4.
 - Interest rate shock:** A rise in real interest rates (HIBORs) by 300 basis points in the first quarter (i.e. 2021 Q1), followed by no changes in the second and third quarters, and another rise of 300 basis points in the fourth quarter (i.e. 2021 Q4).
 - Mainland GDP shock:** An average year-on-year real GDP growth rate of 2% for the four consecutive quarters starting from 2021 Q1.

Source: HKMA staff estimates.

5.4 Systemic risk

Although the rollout of vaccines has brightened the global economic outlook, the potential scarring effect from the lingering pandemic and other downside risk factors will still inevitably pose challenges to the Hong Kong banking sector on various fronts.

The trajectory of economic recovery remains uncertain, as it would hinge on the efficacy of vaccines and the pace of vaccine rollouts among economies. Should the economic recovery turn out to be slower or weaker than expected, the credit risk of banks' loan portfolio would be subject to further deterioration as the repayment ability of both corporates and households has weakened amid the pandemic.

The systemic insolvency risk in Hong Kong has so far been contained, given the proactive relief measures taken by the public sector and banks in Hong Kong. In an effort to further help Hong Kong's economy ride out these difficult times, the HKMA has extended various relief measures to support corporates and individuals in need⁵⁸.

Some corporates, however, may face greater challenges in the medium term as their indebtedness may have risen during the pandemic. The pandemic may also change the business environment for some corporates structurally, calling into question the viability of their business models after the pandemic. These together may pose longer-term challenges for bank in managing the credit risk of corporate loan portfolios. Banks therefore should uphold their credit risk management and assess the potential longer-term impacts of the pandemic on the financial fundamentals of their corporate borrowers.

Geopolitical risks, particularly those related to the China-US relationship, still merit close monitoring. An escalation of these risks could aggravate the already grim economic situation and potentially affect Hong Kong's banking sector.

That said, the robust capital and liquidity positions of the Hong Kong banking sector should provide strong buffers against the downside risks.

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. This buffer can be

⁵⁸ For details, see the webpage <https://www.hkma.gov.hk/eng/key-functions/banking/banking-regulatory-and-supervisory-regime/riding-out-the-covid-19-challenge/>.

deployed in times of a downturn, allowing banks to continue providing credit to support the real economy. The latest applicable jurisdictional CCyB ratio for Hong Kong, announced on 28 January 2021, was 1.0%⁵⁹.

In setting the CCyB rate, the Monetary Authority considered a series of indicators (Table 5.E), including an “indicative buffer guide” (which is a metric providing a guide for CCyB rates based on the gap between the ratio of credit-to-GDP and its long term trend, and between the ratio of residential property prices to rentals and its long term trend)⁶⁰. The setting of the CCyB for Hong Kong is however not a mechanical exercise and the Monetary Authority will always consider a broad range of reference indicators (“Comprehensive Reference Indicators”) in addition to the indicative buffer guide⁶¹.

For the latest situation, the indicative buffer guide, calculated based on the third-quarter data of 2020, signals a CCyB of 2.5% (after rounding down to the nearest multiple of 25 basis points)⁶². The projection, based on all available data at the decision date, suggests the indicative buffer guide is very likely to signal a lower CCyB when all relevant data for the fourth quarter of 2020 becomes available, and the indicative buffer guide is expected to be volatile in the current circumstances.

Nevertheless, information drawn from the series of Comprehensive Reference Indicators, along with all relevant information available at the time of the decision in January 2021, suggests the economic environment in Hong Kong is still subject to a high level of uncertainty. The Monetary Authority therefore considered that it is more appropriate to keep the CCyB unchanged at 1.0% and to continue to monitor the situation for a few more quarters.

The Monetary Authority will continue to closely monitor credit and economic conditions in Hong Kong and review the CCyB ratio on a quarterly basis or more frequently.

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

	07-Jul-20	12-Oct-20	28-Jan-21
Announced CCyB rate	1.0%	1.0%	1.0%
Date effective	07/07/2020	12/10/2020	28/01/2021
Indicative buffer guide	2.3%	2.5%	2.5%
Basel Common Reference Guide	2.5%	2.5%	2.5%
Property Buffer Guide	1.8%	2.5%	2.2%
Composite CCyB Guide	2.3%	2.5%	2.5%
Indicative CCyB Ceiling	None	None	None
<i>Primary gap indicators</i>			
Credit/GDP gap	36.4%	36.6%	24.1%
Property price/rent gap	7.7%	10.5%	9.0%
<i>Primary stress indicators</i>			
3-month HIBOR spread* (percentage points)	0.61%	0.38%	0.21%
Quarterly change in classified loan ratio (percentage points)	0.06%	0.16%	0.04%

Notes:

1. 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 the end of each quarter (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 the end of the quarter) is shown at the top of the column.
2. * Following a review of the appropriate risk-free rate benchmark (previously identified as the three-month OIS rate), the HKMA amended the definition of the interbank market spread to the difference between the three-month HIBOR and the three-month Exchange Fund Bill yield on April 2017.

Source: HKMA.

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

⁵⁹ For details, see the Announcement of the CCyB to AIs on 28 January 2021 (<https://www.hkma.gov.hk/eng/key-functions/banking/banking-legislation-policies-and-standards-implementation/countercyclical-capital-buffer-ccyb/>).

⁶⁰ 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.

⁶¹ These include measures of bank, corporate and household leverage; debt servicing capacity; profitability and funding conditions within the banking sector and macroeconomic imbalances.

⁶² 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 will signal an extant CCyB rate to increase or decrease in multiples of 25 basis points.

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

	Dec 2019	Sep 2020	Dec 2020
Interest rates			
1-month HIBOR fixing ² (quarterly average)	2.16	0.34	0.27
3-month HIBOR fixing (quarterly average)	2.30	0.53	0.42
BLR ³ and 1-month HIBOR fixing spread (quarterly average)	2.88	4.66	4.73
BLR and 3-month HIBOR fixing spread (quarterly average)	2.74	4.47	4.58
Composite interest rate ⁴	1.09	0.36	0.28
All AIs			
Balance sheet developments⁵			
Total deposits	1.3	4.9	-1.8
Hong Kong dollar	0.0	8.4	-4.4
Foreign currency	2.7	1.5	1.1
Total loans	0.7	3.2	-4.8
Domestic lending ⁶	0.6	4.7	-5.3
Loans for use outside Hong Kong ⁷	0.8	-0.4	-3.6
Negotiable instruments			
Negotiable certificates of deposit (NCDs) issued	7.8	-0.1	3.9
Negotiable debt instruments held (excluding NCDs)	-0.4	0.1	3.9
Asset quality			
As a percentage of total loans ⁸			
Pass loans	98.10	97.42	97.29
Special mention loans	1.33	1.74	1.81
Classified loans ⁹ (gross)	0.57	0.84	0.90
Classified loans (net) ¹⁰	0.28	0.47	0.50
Overdue > 3 months and rescheduled loans	0.34	0.56	0.57
Classified loan ratio (gross) of Mainland related lending ¹¹	0.75	0.96	0.96
Liquidity ratios (consolidated)			
Liquidity Coverage Ratio — applicable to category 1 institutions (quarterly average)	159.9	156.8	155.1
Liquidity Maintenance Ratio — applicable to category 2 institutions (quarterly average)	56.4	55.9	57.9
Net Stable Funding Ratio — applicable to category 1 institutions	131.7	133.6	138.6
Core Funding Ratio — applicable to category 2A institutions	134.4	139.2	139.5
Retail banks			
Profitability			
Loan impairment charges as a percentage of average total assets (year-to-date annualised)	0.08	0.11	0.12
Net interest margin (year-to-date annualised)	1.63	1.24	1.18
Cost-to-income ratio (year-to-date)	39.5	44.3	46.8
Surveyed institutions			
Asset quality			
Delinquency ratio of residential mortgage loans	0.03	0.04	0.04
Credit card lending			
Delinquency ratio	0.25	0.33	0.27
Charge-off ratio — quarterly annualised	1.64	2.53	2.17
— year-to-date annualised	1.57	2.28	2.18
All locally incorporated AIs			
Capital adequacy (consolidated)			
Common Equity Tier 1 capital ratio	16.5	16.3	16.7
Tier 1 capital ratio	18.5	18.3	18.7
Total capital ratio	20.7	20.3	20.7
Leverage ratio	8.2	8.1	8.2

Notes:

- Figures are related to Hong Kong offices only except where otherwise stated.
- The Hong Kong Interbank Offered 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-rate-sensitive liabilities, which include deposits from customers, amounts due to banks, negotiable certificates of deposit and other debt instruments, and all other liabilities that do not involve any formal payment of interest but the values of which are sensitive to interest rate movements (such as Hong Kong dollar non-interest bearing demand deposits) on the books of banks. Further details can be found on the HKMA website.
- Quarterly change.
- Loans for use in Hong Kong plus trade finance.
- Including "others" (i.e. unallocated).
- Figures are related to all AIs' Hong Kong offices, as well as locally incorporated AIs' overseas branches and major overseas subsidiaries.
- Classified loans are those loans graded as "substandard", "doubtful" or "loss".
- Net of specific provisions/individual impairment allowances.
- Figures are related to all AIs' Hong Kong offices, as well as locally incorporated AIs' Mainland branches and subsidiaries.

Box 4

Real effects of “low-for-long” interest rates on Mainland firms listed in Hong Kong

Introduction

Amid the “low-for-long” interest rate environment that has been prevailing since GFC, non-financial corporate debts in emerging market economies have risen significantly, from around US\$9 trillion in 2008 to more than US\$31 trillion in 2019, as indicated by Bank for International Settlements statistics. The piling up of debts by non-financial corporates has been on the radar of central banks and international organisations, as high corporate leverage could amplify the impact of negative shocks on financial markets and the real economy, subsequently posing systemic risks to the financial sector.

A rising trend in corporate leverage was also observed in Hong Kong amid the low interest rate environment. Based on the financial information of firms listed in Hong Kong, the weighted average debt-to-equity ratio rose notably from 45.3% in 2008 to 61.6% in 2019⁶³. The increased leverage of these corporates was driven mainly by firms headquartered outside Hong Kong, particularly in Mainland China (hereinafter referred to as Mainland firms), while the leverage of listed firms headquartered in Hong Kong (hereinafter referred to as local firms) was broadly stable⁶⁴.

While the rising trend in the leverage of Mainland firms may be one strong reason for examining its financial stability implications, a comprehensive investigation requires examination of whether and to what extent the funds raised were put into productive investments, as these would directly affect the firms’ debt-servicing ability. If Mainland firms have deployed the borrowed funds into productive investments, it would warrant much less concern on their corporate vulnerability than suggested by rising leverage alone. Therefore, a better understanding of the nature, productivity and efficiency of such investments is warranted from the perspective of financial stability, given that Hong Kong’s financial sector has significant exposure to Mainland corporates.

Against this background, this Box aims to shed light on the following two questions: (1) Was the rise in the leverage of Mainland firms listed in Hong Kong driven by an increase in their investment activities due to the relaxation of financial constraints under the low interest rate environment? (2) If so, how far were these increased investments supported by economic fundamentals rather than unproductive motives, such as “empire building”^{65, 66}.

The empirical framework

This study employs the difference-in-differences (DID) methodology by making use of institutional differences between Mainland firms and local firms. Institutional difference refers to the generally more restricted access of Mainland

⁶³ Non-financial corporate debt to GDP is another common aggregate indicator of corporate leverage. This indicator also surged dramatically, from 128% in 2008 to 225% by the end of 2019. However, caution should be exercised when interpreting the level of this aggregate indicator, as it tends to overstate corporate leverage in Hong Kong. This is mainly due to the fact that Hong Kong is an international financial centre and therefore many multinational and non-local corporates borrow funds from Hong Kong to finance their overseas operations. Their economic activities, and thus their incomes, are not fully reflected in Hong Kong’s GDP.

⁶⁴ For details, see Chart 5.23.

⁶⁵ “Empire building” commonly refers to the act of attempting to increase the size and scope of an individual or organisations’ power and influence.

⁶⁶ For details, see Jin (2021), “Real effects of “low-for-long” interest rates on Mainland firms listed in Hong Kong”, *HKIMR working paper* (forthcoming).

firms to financial markets, which in turn makes their investment decisions more sensitive to changes in external financing costs. By contrast, local listed firms generally have more access to different financing sources and broader investor bases. In that regard, the financing decisions of local firms would be relatively less sensitive than their Mainland counterparts to changes in the interest rate environment. Such an institutional difference provides a backdrop to investigate the consequences of a “low-for-long” interest rate environment, with the identification assumption that local firms could have served as counterfactuals for Mainland firms had the interest rate environment not changed. The model is specified as follows:

$$y_{i,t} = \beta \times Post_t \times Mainland_i + b \times Controls_{i,t} + \alpha_i + \tau_t + \varepsilon_{i,t}, \quad (1)$$

where i indexes firm and t indexes year. Variable y represents the outcome variables, which include the firm’s leverage (measured by the debt-to-asset ratio), total investments and cash holdings (both of which are scaled by the firm’s assets). The latter two variables are used to investigate how the borrowed funds may be utilised. “*Post*” equals one for the period from 2009 onwards, and zero otherwise to represent the period of “low-for-long” interest rates. “*Mainland*” equals one for firms that are defined as Mainland firms, and zero otherwise. “*Controls*” include size, profitability, tangibility and market-to-book⁶⁷. α represents firm fixed effects (FE) and τ represents industry-time FE. The coefficient of interest is β , which captures the difference in the response of Mainland firms as a group relative to the group of local firms in the “low-for-long” interest rate environment⁶⁸.

⁶⁷ The leverage and cash flow of a firm would be included as control variables when the dependent variables are the firm’s investment-to-asset ratio and cash-to-asset ratio.

⁶⁸ After excluding firms that existed only before 2008 or were listed after 2009, this study ends up with a sample of 522 listed Mainland firms and 730 listed local firms from 2003 to 2016.

Analysis of possible drivers behind rising leverage of Mainland firms during “low-for-long” period

The estimation results for equation (1) are presented in Table B4.1. The first column shows that the leverage of Mainland firms on average was more responsive to the “low-for-long” interest rate environment than that of local firms. Specifically, the average rise in the leverage of Mainland firms after the GFC is estimated to be three percentage points higher than that of the local firms. The difference is material, given that the average debt-to-asset ratio of Mainland firms was only around 26% before the GFC.

Table B4.1
Estimation results for corporate policies

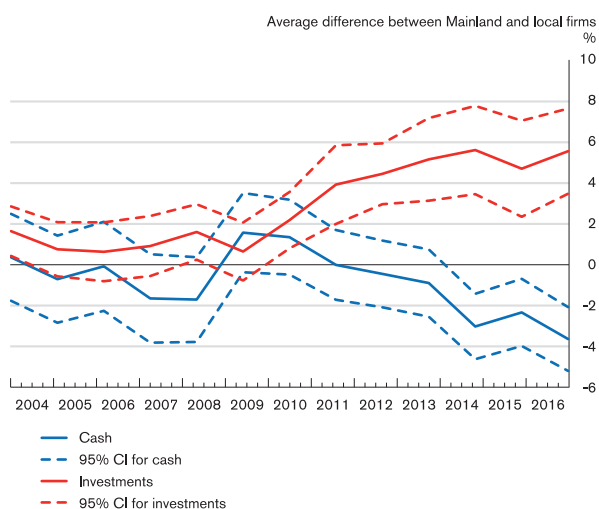
Dependent variable	Leverage	Investments	Cash holdings
Mainland*Post	0.030***	0.015***	-0.002
Size	0.043***	0.011***	-0.036***
Tangibility	-0.107***	0.004	0.023***
Market-to-book	0.168***	0.001	-0.195***
Return on assets	-0.004***	0.005***	0.005***
Leverage		-0.007	-0.105***
Cash flow		-0.022**	0.082***
Firm FE	YES	YES	YES
Industry*Time FE	YES	YES	YES
Observations	13,065	13,059	13,064
Adj R-squared	0.630	0.366	0.614

Note: ***, **, * denote significance level at 1%, 5% and 10%, respectively.

Regarding the usage of funds, our regression results show that the change in the investment-to-asset ratio of Mainland firms is, on average, higher than that of their local counterparts by around 1.5 percentage points amid the low interest rate environment (i.e. column 2 in Table B4.1). Meanwhile, there is no statistically significant difference between the cash holdings of the two groups of firms during the low interest rate period (i.e. column 3). Taken together, our findings suggest that the rising leverage of Mainland firms was driven mainly by investment activities amid the “low-for-long” interest rate environment rather than by other motives (e.g. cash hoarding).

Consistent with the above findings, Chart B4.1 shows that the difference in the average investment-to-asset ratios between Mainland and local firms changed from virtually zero before the GFC to significantly positive afterwards, with the gap widening to around 6 percentage points⁶⁹ in 2016.

Chart B4.1
Differences in investment and cash holdings between Mainland and local firms listed in Hong Kong



Note: The solid line represents the mean difference, while the dotted lines show the 95% confidence interval (CI).

Sources: Bloomberg and HKMA staff calculations.

Assessment of investment efficiency of Mainland firms

In view of the above results, a natural follow-up question is to what extent these borrowed funds were deployed into productive investment opportunities. On the one hand, it can be argued that the relaxation of financial constraints on Mainland firms amid the “low-for-long” interest rate environment may improve their investment efficiency by enabling them to exploit more positive net-present-value (NPV) investments. On the other hand, one can argue that Mainland firms may have undertaken unproductive and excessive investments by

capitalising on lower financial costs, as suggested by the agency theory⁷⁰.

Further empirical work is then conducted to shed light on which view may give a better explanation of the investments of Mainland firms amid the low interest rate environment. We first investigate the investment-Tobin’s q sensitivity⁷¹ of Mainland firms to examine the responsiveness of investments to good investment opportunities (i.e. investments with a positive NPV)⁷². In theory, a firm with an increase in good investment opportunities should optimally conduct more investments to maximise shareholder value. A positive investment- q sensitivity thus indicates efficient investment decisions. By contrast, an insignificant or negative investment-Tobin’s q sensitivity may suggest that Mainland firms’ investment decisions would be based on factors such as managerial preferences rather than the availability of good investment opportunities as proxied by Tobin’s q . Our empirical results show that Mainland firms with a higher Tobin’s q (i.e. with more good investment opportunities) tended to have higher investment responsiveness

⁶⁹ This is higher than the regression result (1.5%), because the regression effectively measures the average investment gap from 2009 to 2016.

⁷⁰ The agency theory suggests that managers have incentives to carry out excessive investment and empire building, as asset growth will expand their power by increasing resources under their control. In these circumstances, firms tend to make more investments when external financing becomes less costly, even though these investments generate negative returns.

⁷¹ Tobin’s q is defined as the ratio between a physical asset’s market value and its replacement value. Specifically, it is measured as (total assets + market value of equity – book value of equity)/book assets. If the ratio takes a value greater than one, it indicates the firms’ future potential value is greater than its current replacement cost. This measure has been widely used as a proxy for investment opportunities.

⁷² Specifically, we rerun equation (1) on the investment of firms, which further includes a triple interaction term of $Post_t \times Mainland_i \times Tobin's\ q$. A positive coefficient term for such an interaction term would suggest that investments undertaken by Mainland firms became more responsive to good investment opportunities in the “low-for-long” interest rate environment.

to the low interest rate environment after the GFC than their local counterparts⁷³.

We further examine whether the operating efficiency of Mainland firms have improved under the low interest rate environment, by conducting the DID estimation on firms' ROE. If Mainland firms' rising investment amid the low interest rate environment was generally excessive and unproductive, we should observe a deterioration in ROE during the same period. Empirical results, however, show that Mainland firms on average had higher rises in ROE in the low interest rate environment relative to local firms (Table B4.2). This finding is consistent with the previous finding that Mainland firms were relatively more responsive to good investment opportunities than local firms amid the low interest rate environment.

Table B4.2
Estimation results for operating efficiency

Dependent variable	ROE
Mainland* Post	0.054***
Controls	YES
Firm FE	YES
Industry* Time FE	YES
Observations	13,988
Adj R-squared	0.217

Note: ***, **, * denote significance level at 1%, 5% and 10%, respectively.

Conclusion

This study finds evidence that the increase in investment activities was a significant driver behind the rising leverage of Mainland firms listed in Hong Kong after the GFC, as the “low-for-long” interest rate environment reduced external financing costs. Importantly, Mainland firms' investment on average is found to be more responsive to productive investment opportunities, and their ROE also improved more, relative to the group of local firms in the “low-for-long” interest rate environment. These empirical results together support the view that after the GFC, the mitigation of financial constraints accounted relatively more for the increase in leverage and investment of Mainland firms listed in Hong Kong. Nevertheless, the findings should be interpreted with caution, as they would explain the economic behaviour of Mainland firms listed in Hong Kong as a whole rather than individual Mainland firms.

One important implication of this study is that while a persistent rise in corporate leverage in the “low-for-long” interest rate environment would raise a red flag about the healthiness of the corporate sector, a comprehensive assessment is required to further investigate the underlying drivers of such increase in corporate leverage so as to obtain clear implications for financial stability. The financial health of Mainland firms should be closely monitored, given the significant exposure of Hong Kong's financial sector to Mainland firms and the possibility of a prolonged low interest rate environment.

⁷³ The coefficient on the triple interaction term $Post_t \times Mainland_i \times Tobin'sq$ is 0.005, significant at 1% level, indicating the average rise in investment- q sensitivity for Mainland firms is estimated to be 0.5 percentage points higher than that of local firms.