HONG KONG MONETARY AUTHORITY
香港金融管理局

HALF-YEARLY MONETARY AND FINANCIAL STABILITY REPORT

September 2017

This Report reviews statistical information between the end of February 2017 and the end of August 2017.

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

Global economic conditions improved with a synchronous cyclical rebound in real activities. Nevertheless, optimism about the global economic outlook has driven asset market valuations to elevated levels as well as a pick-up in credit growth in many Asian economies, thereby increasing the vulnerability of global and regional economies to financial stability risks. In particular, the global economy is still subject to numerous uncertainties, including the sustainability of global growth momentum, the impact of monetary policy normalisation by the US Federal Reserve and possibly other major central banks, as well as heightened geopolitical tensions.

The Hong Kong dollar exchange rate eased gradually reflecting increased interest rate arbitrage activities amid widened negative spreads between the Hong Kong dollar interbank interest rates and their US dollar counterparts. Despite the US interest rate hikes in March and June, local interest rates remained soft in part reflecting ample liquidity, and there was broad-based growth in total loans. Housing affordability remained stretched, although the residential property market showed tentative signs of moderation after the prudential measures introduced in May.

Looking ahead, in view of the widened interest rate differential between Hong Kong and the US, banks should stay vigilant about the risks of significant capital outflows and their impact on local interest rates amid the Fed's ongoing rate hikes and the forthcoming balance sheet normalisation. Banks should also maintain prudent credit risk management as sharp rises in interest rates could test banks' asset quality given the rising levels of corporate leverage and increasing household debt-servicing burdens.

The external environment

The cyclical rebound in global economic activity, which emerged in the latter part of 2016 amid a synchronous upturn in global trade and production, has extended into the first half of 2017. Economic and political uncertainty in major advanced economies has also receded along with easing concerns over the rise of populist and anti-establishment sentiments in the run-up to elections in Europe. Against this background, global equity markets maintained their post US election rallies, propelling valuations to elevated levels in some markets, especially in the US.

Nonetheless, the current benign global macro-economic and financial market environment is still subject to numerous uncertainties, including the sustainability of

global growth momentum, the impact of monetary policy normalisation by the US Federal Reserve (Fed) and possibly other major central banks, trade-off between containing financial risks and sustaining growth in Mainland China, and the recent escalation of geopolitical risks.

The US economy is showing signs of a maturing expansion. While the modest inflationary pressures and a pickup in growth in the second quarter are suggestive of an early-to-intermediate stage of recovery, developments in several other aspects of the economy more closely resemble the situation of a maturing expansion. Indeed, recent movements in financial market and labour market indicators, such as the flattening of the Treasury yield curve slope and the sustained drop in the unemployment rate, are indicative of the US economy entering the late-cycle phase of expansion. If this were indeed the case, the presently rich equity market valuation and the current cyclical recovery in global demand would likely be called into question. In this connection, Box 1 (see page 15) assesses the latest stage of the US economy's business cycle, by examining how various economic indicators behaved during different stages of the business cycles using a statistical classification technique known as cluster analysis.

Another development of significance is the Fed's intention to implement balance sheet normalisation in the near term. Given the measured pace of balance sheet reduction, it is likely the resulting rise in longer-term yields would be gradual. Yet, it remains to be seen how it would affect the US Treasury market and its spillover effects on domestic and international financial conditions.

In East Asia, although most economies seem to be benefitting from the synchronous improvement in global trade activities and renewed capital inflows for now, risk exists that tighter global financial conditions stemming from on-going interest rate hikes and balance sheet normalisation by the Fed could lead to capital flow reversals in the region going forward. Meanwhile, weaker-than-expected growth in the US could lead to a disruption of the region's recovery, and the recent pick-up in credit growth as well as the increasingly stretched financial asset valuation amid resumed portfolio inflows are increasing the vulnerability of the regional economies to shocks, particularly given the rise in Sino-US trade tensions amid protectionist sentiment and the heightening geopolitical tensions in the Korean Peninsula.

In Mainland China, growth momentum improved further in the first half of 2017. The better-than-expected economic performance was in part underpinned by better export performance amid greater external demand and a rebound in private investment growth amid buoyant property market conditions. While the near-term growth outlook for the Mainland economy remains positive, it also hinges on how the authorities strike a balance between supporting the economy and preventing systemic risks, such as those potentially associated with the exuberance in the property market and the increased exposure of banks to non-bank institutions. On the external front, capital outflow pressures continued to ease in tandem with improved economic conditions, but the uncertainties in monetary conditions among major economies as well as global market sentiment would still play an important role in shaping the near-term outlook for cross-border fund flows.

The soaring property prices in Mainland China have raised concerns, given the strong link between real estate cycles and financial stability. While the direct exposure of Mainland banks to the property market should be manageable, bank exposure to the property market through the collateral channel should not be ignored, given the key role played by the property market in the collateral-based lending system. Box 2 (see page 31) discusses the risk associated with banks' exposure to the property market by

examining the effect of property prices on corporate borrowing through the collateral channel. Our analysis shows that property price changes have a positive effect on firms' debt growth, especially for financially constrained firms such as smaller and non-state-owned companies, suggesting that banks' heavy reliance on properties and land as collateral may lead to a pro-cyclical swing in the indebtedness of these firms.

The domestic economy

The Hong Kong economy maintained its sequential growth momentum during the first half of 2017. The quarter-on-quarter real Gross Domestic Product (GDP) growth was 0.7% in the first quarter and 1.0% in the second, similar to the average growth rate of 1% over the preceding two quarters. Compared with the second half of 2016, private consumption held up alongside favourable labour market conditions, and overall investment spending revived on improving business sentiment towards mid-2017. Externally, Hong Kong's exports of goods recorded four consecutive quarters of brisk growth before moderating somewhat in the second quarter. Exports of services fell back due in part to reduced demand for tourism-related services. Meanwhile, growth in imports of services continued amid strong travel interest among residents. Overall, net exports contributed positively to GDP growth in the first quarter but turned into a drag on growth in the second.

In the second half of the year, domestic economic growth is expected to sustain momentum, albeit at a slightly softer but still solid pace amid a higher comparison base in the first half. For 2017 as a whole, the Government has revised upward its range forecast of real GDP growth to 3–4% from 2–3% as announced earlier in February. That said, this growth outlook is subject to various uncertainties in the external environment as mentioned above, as well as Mainland's economic performance and the pace of recovery in inbound tourism.

Local inflationary pressures stayed moderate in the first half of 2017 despite a drop of unemployment rate to 3.2% from 3.4% in 2016. However, the sequential momentum has accelerated in recent months, mainly driven by the increases in the prices of tradables. Looking ahead, inflationary pressures are likely to be limited on the back of benign imported inflation and moderate rises in local costs.

Monetary conditions and capital flows

The Hong Kong dollar spot exchange rate has eased gradually since early 2017 driven by increased interest rate arbitrage activities amid widened negative spread between the Hong Kong dollar Interbank Offered Rate (HIBOR) and the US dollar London Interbank Offered Rate (LIBOR) after the two US rate hikes in March and June. The Convertibility Undertaking (CU) was not triggered during the review period, and the pace of Hong Kong dollar depreciation has been orderly so far.

Going forward, the ongoing US monetary policy normalisation process could widen the negative HIBOR-LIBOR spreads further. Interest rate arbitrage activities are expected to lead to the further easing of the Hong Kong dollar exchange rate. The possibility of triggering the weak-side CU, which is a normal process under the Currency Board system, should not be ruled out.

Despite the US interest rate hikes, the Hong Kong dollar interest rates remained soft in part reflecting ample liquidity in the banking system. Contrary to the increases in LIBOR, HIBOR decreased across-the-board over the first eight months of 2017, with the overnight and the three-month HIBOR fixings declining by 36 and 26 basis points respectively. Against the background of the widened negative HIBOR-LIBOR spreads, Box 3 (see page 49) discusses the

fundamental drivers of the Hong Kong dollar-US dollar interest rate spreads. Meanwhile, in the mortgage market, intensifying competition among banks amid low funding costs also lowered the average mortgage rate to around 1.8% recently.

Amid the accommodative domestic liquidity conditions and the improved economic environment, growth in total loans accelerated to 10.2% in the first half of 2017. The faster expansion was underpinned by broad-based increases in domestic loans to most economic sectors, as well as loans for use outside Hong Kong to both domestic and multinational corporations.

Despite the strong credit growth, banks' funding conditions were broadly stable underpinned by a large deposit base. The Hong Kong dollar loan-to-deposit (LTD) ratio stayed unchanged at 77.1% at the end of June as Hong Kong dollar loans and deposits grew at a similar pace. The foreign-currency LTD ratio increased to 65.5% due to faster growth in loans than deposits.

The onshore (CNY) and offshore (CNH) renminbi exchange rates reversed their weakening trend to appreciate against the US dollar. This partly reflected the improved Mainland economy and a general weakening of the US dollar against other major currencies. Along with the renminbi exchange rate movements, there were signs of stabilisation in Hong Kong's offshore renminbi liquidity pool (including outstanding customer deposits and certificates of deposits), as renminbi customer deposits reverted to a modest increase in the second quarter. However, in the first half of 2017 as a whole, the renminbi liquidity pool still recorded a mild decrease. As for other renminbi banking business, the outstanding amount of renminbi bank loans and the renminbi trade settlements handled by banks in Hong Kong declined somewhat, while the average daily turnover of the renminbi real time gross settlement system remained high. Against the background of continuing internationalisation of the renminbi, Box 4 (see page 54) analyses the extent to which the renminbi has been perceived as a safe-haven currency over the past few years. The empirical results found that the CNY and CNH ranked consistently quite high on the safe-haven currency scale by both dollar-based and euro-based investors. Within the Special Drawing Rights basket, they are regarded as riskier than the Japanese yen and the US dollar but safer than the euro and British pound.

Asset markets

The domestic equity market staged a strong rally alongside other major markets over the past six months, as a result of better-than-expected macroeconomic performances and corporate earnings. The review period saw a considerable net inflow of funds following two consecutive years of net outflow. Market volatility remained subdued despite geopolitical risk events, for example more frequent terrorist attacks in Europe and increasing tensions over the Korean Peninsula. Against this backdrop, the price-earnings ratio of local stocks climbed to a six-year high, although it remained attractive in relative terms both globally and within the region. Nevertheless, this renders the market more vulnerable to shocks, especially since the current levels of the US SKEW index reflect a high level of tail risk.

The Hong Kong dollar debt market registered a steady expansion in the first half of the year, with credit spreads over US Treasury yields generally trending downwards. Like the stock market, it also experienced a net inflow of funds, partly attributable to the fact that the two US interest rate hikes were well anticipated. In contrast, the offshore renminbi debt market in Hong Kong shrank further, amid continued lower funding costs onshore. However, the uncertainty over the exchange rate and onshore-offshore funding cost gap is likely to cast a shadow over

near-term market development. Over the longer term, the development will hinge on future offshore-onshore market interactions in view of more policy initiatives, such as the recent Bond Connect, and continuing market evolution with, for example, the inclusion of onshore bonds into benchmark global indices.

The residential property market has become buoyant again since March, with property prices in the secondary market surpassing the peak in September 2015. Transactions in the primary and secondary markets also picked up. The rising property prices stretched housing affordability further. Partly as a result, it is more common for recent homebuyers to receive financial support from their parents or to take up high-LTV mortgages provided by property developers. In response to the latter, on 12 May the HKMA introduced prudential measures to strengthen banks' credit risk management for exposures to property developers offering mortgages. On 19 May, the HKMA further announced the eighth round of prudential measures for property mortgage loans in view of rising property prices and intensifying competition for mortgage loan business among banks. Housing price growth showed signs of moderation following the prudential measures in May, while average transactions declined in July and August compared with the first half of the year.

Looking ahead, the residential property market outlook remains highly uncertain. Low interest rates, perceived housing shortage, aggressive promotion and financing plans provided by property developers may continue to boost the demand for properties in the near term, but the expected increase in housing supply would narrow the housing supply-demand gaps and normalisation of domestic interest rates would raise the debt servicing cost of mortgage loans to contain property price appreciation pressure over a longer time horizon.

Banking sector performance

The profitability of retail banks improved, with the return on assets increasing to 1.17% in the first half of 2017 compared to 1.07% in the first half of 2016. The improvement was due to higher net interest income and non-interest income. The net interest margin of retail banks also widened to 1.43% in the second quarter of 2017 from 1.33% in the same period of 2016.

Banks maintained strong capital positions, with the consolidated capital adequacy ratio (CAR) of locally incorporated authorized institutions (AIs) staying at a high level of 18.7%. Although the CAR fell slightly by 0.5 percentage points, it remained well above the minimum international standards. To reinforce banks' resilience to systemic risks, the countercyclical capital buffer ratio for Hong Kong will rise to 1.875% with effect from 1 January 2018 from the current 1.25%.

Notwithstanding US interest rate hikes, the Hong Kong dollar interbank interest rates remained soft, reflecting ample liquidity in the banking sector. The Hong Kong dollar funding costs of retail banks, as reflected by the composite interest rate, also remained low and stable. Meanwhile, liquidity positions of AIs were generally sound as measured by Basel III standards. Both the average Liquidity Coverage Ratio for category 1 institutions and the average Liquidity Maintenance Ratio of category 2 institutions remained high at 144.2% and 49.7% respectively in the second quarter of 2017, which were significantly higher than their statutory minimums of 80% and 25% respectively.

While bank lending grew more rapidly by a rate of 10.2% in the first half of 2017 compared to 4.2% in the preceding six months, asset quality remained sound by historical standards and improved further during the review period.

However, the banking sector is expected to face various challenges ahead. In particular, policy uncertainties in major advanced economies are one important risk factor affecting the Hong Kong banking sector. Box 5 (see page 79) examines how changes in monetary policies by major central banks may affect foreign banks in Hong Kong. Our findings suggest that the negative spillover effects arising from the joint tightening of monetary policies in major advanced economies could exert significant pressure on US dollar credit availability in Hong Kong. Nevertheless, continuing regulatory reforms and prudential measures that encourage banks to develop more resilient capital and liquidity positions will help mitigate the adverse impact.

In view of the widened interest rate differential between Hong Kong and the US, banks should stay vigilant against the risks of significant capital outflows and their impact on local interest rates amid the Fed's ongoing rate hikes and the forthcoming balance sheet normalisation. Banks should also maintain prudent credit risk management as sharp rises in interest rates could put banks' asset quality under the test, given the rising levels of corporate leverage and increasing household debt-servicing burdens.

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

2. Global setting and outlook

Global economic conditions improved with a synchronous cyclical rebound in real activities, diminished political and policy uncertainties in major advanced economies, and a more favourable macroeconomic backdrop for emerging market economies (EMEs). The improved prospects, in turn, drove up asset market valuations. Nonetheless, the global economy is still subject to numerous uncertainties, including the sustainability of global growth momentum, the impact of monetary policy normalisation by the US Federal Reserve and possibly other major central banks, as well as heightened geopolitical tensions.

Benefiting from stronger external demand, growth momentum in East Asia remained stable in the first half of 2017. However, the region faces multiple headwinds. While weaker-than-expected growth in the US could disrupt East Asia's export recovery, the recent pick up in credit growth and the increasingly stretched financial asset valuation amid resumed portfolio inflows are amplifying the region's vulnerability to shocks, particularly given the rise in Sino-US trade tensions amid protectionist sentiment and the ongoing situation on the Korean Peninsula.

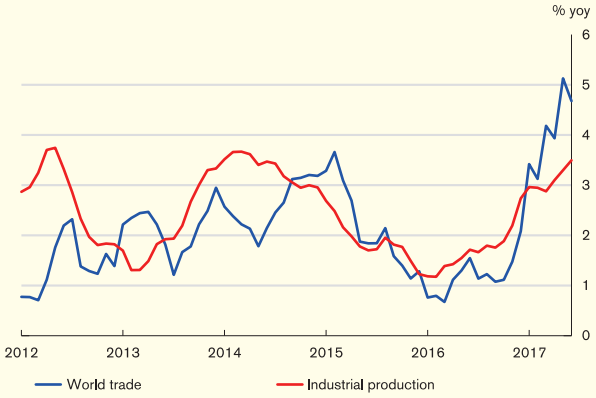
In Mainland China, growth momentum improved further in the first half of 2017. While the near-term growth outlook remains positive, it also hinges on how the authorities strike a balance between supporting the economy and preventing systemic risks. During the review period, Mainland authorities stepped up measures to curb speculative activities in the property market and pushed ahead with financial and corporate deleveraging. Externally, capital outflow pressures continued to ease in tandem with improved economic conditions, but the uncertainties in global monetary conditions and market sentiment would still play an important role in shaping the near-term outlook of cross-border fund flows.

2.1 External environment

Global growth experienced a cyclical rebound from the latter part of 2016 along with a pickup in world trade and industrial production (Chart 2.1). The previously uneven pace of global recovery, characterised by the outperformance of US growth vis-à-vis other advanced economies, has also converged amid stronger performance in Japan and the euro area. The diminishing political and policy uncertainties in the US and Europe since early 2017 were also conducive to the improvement, partly reflecting easing concerns over the rise of populist and anti-establishment sentiments in the run-up to elections in Europe (Chart 2.2). Outside the major advanced economies, EMEs enjoyed a more favourable macro-economic backdrop, benefiting from stronger global trade flows and a softening of the US dollar. The softer US dollar, in turn, was fostered by reduced market expectations of a near-term US fiscal

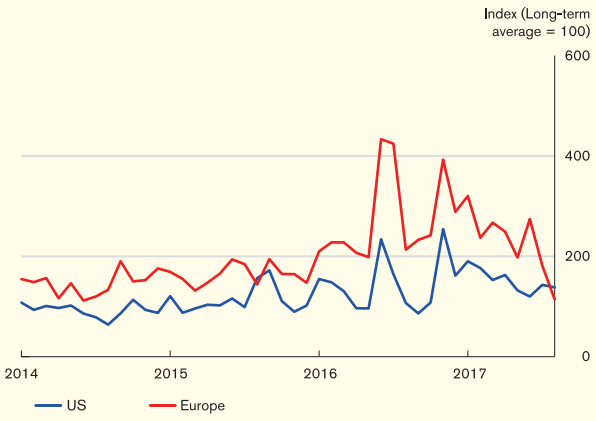
stimulus that led to a retreat in US inflation expectations and weighed on the prospects of interest rate hikes (Chart 2.3), as well as market expectations of a tapering in asset purchases by the European Central Bank (ECB) that lent support to the euro exchange rate at the expense of the US dollar. These developments helped insulate EMEs from capital outflow pressures, notwithstanding two additional Fed rate hikes in the first half of 2017. In July, the International Monetary Fund (IMF) projected global output growth to accelerate from an estimated 3.2% in 2016 to 3.5% in 2017.

Chart 2.1
World trade and industrial production in volume terms



Note: Figures shown are 3-month moving averages.
Source: CPB Netherlands Bureau for Economic Policy Analysis.

Chart 2.2
Policy uncertainty index in the US and Europe



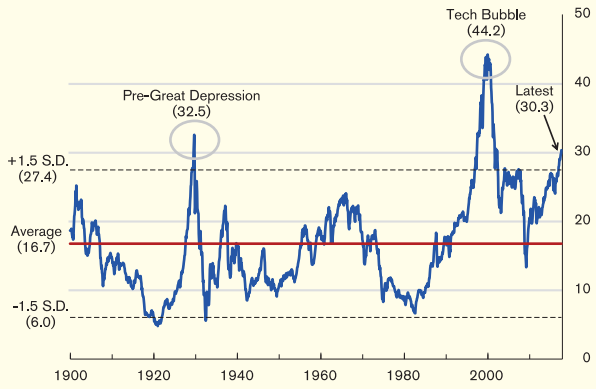
Source: Economic Policy Uncertainty.

Chart 2.3
US dollar index and market-based US inflation expectations

Sources: Bloomberg and St. Louis Fed.

Supported by the recent improvements in global economic conditions and a more dovish US interest rate expectation, global equity markets sustained their post US election rallies, with the S&P 500 index hitting an all-time high in August 2017. Accordingly, despite the recent corrections amid escalating geopolitical tensions between the US and North Korea, equity market valuations rose to elevated levels. Indeed, the latest cyclically adjusted price earnings (PE) ratio of the S&P 500 index surpassed its peak reached just prior to the global financial crisis (GFC) and was not far from the level seen in the run-up to the 1929 stock market crash (Chart 2.4).

Chart 2.4
Cyclically adjusted PE ratio of the S&P 500

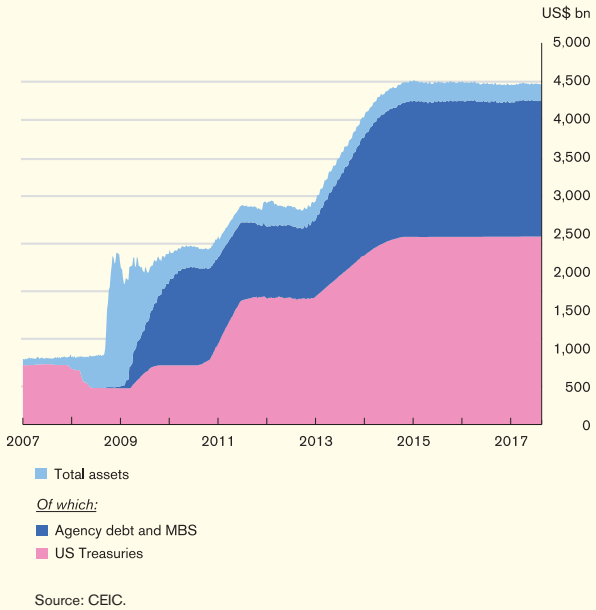


Note: The cyclically adjusted PE ratio is calculated by dividing the price of the S&P 500 by the average inflation-adjusted earnings from the previous 10 years.
Source: Multpl.com.

Notwithstanding the current benign global macroeconomic and financial market environment, two major developments in the US – emergent signs of a maturing economic expansion and the Fed's impending balance sheet normalisation, could pose downside risks to the global economic outlook and financial market stability. In the US, core consumer price index (CPI) inflation decelerated from 2.2% year-on-year (yoy) in the first quarter to 1.8% yoy in the second quarter, partly attributable to one-off factors such as a sharp fall in the prices of wireless telephone services and used vehicles. Meanwhile, real Gross Domestic Product (GDP) growth accelerated from 1.2% to 3.0% on a quarter-on-quarter annualised (qoqa) comparison over the same period, supported by a rebound in consumer spending and a reduced drag from inventory destocking. While the combination of modest inflation and firming growth is generally observed during an early-to-intermediate stage of recovery, developments in several other segments of the economy nonetheless are suggestive of a more advanced stage of expansion. For example, the recent flattening in the US Treasury yield curve and compressed corporate bond spreads resembled financial conditions usually observed during the late-cycle stage of economic expansion, while the increasingly tight labour market conditions (with the unemployment rate falling to 4.4% in August, below the Fed's estimated natural rate of 4.6%) also point to a maturing economic expansion. Box 1 assesses the latest stage in the US economy's business cycle, by examining how various economic indicators behaved during different stages of business cycles using a statistical classification technique known as cluster analysis.

Another development of significance is the Fed's intention to implement balance sheet normalisation in the near term. Following the June Federal Open Market Committee (FOMC) meeting, the Fed described in detail the strategy for reducing the size of its balance sheet by gradually raising the limits beyond which principal payments from its securities holdings would be reinvested going forward. More specifically, the Fed expects that eventually only payments of principal in excess of US$30 billion (for Treasury securities) and US$20 billion (for agency debt and mortgage-backed securities) will be reinvested every month. As noted by Fed Chair Yellen's remarks in the July semi-annual Monetary Policy Report to the Congress, the FOMC expected the long-run level of the reserve balance to be "appreciably below recent levels but larger than before the financial crisis" (Chart 2.5). Given the measured pace of balance sheet reduction, it is likely that the resulting rise in longer-term yields would be gradual. Yet, it remains to be seen how it would affect the US Treasury market and its spillover effects on domestic and international financial conditions.

Chart 2.5
Size of Fed's balance sheet

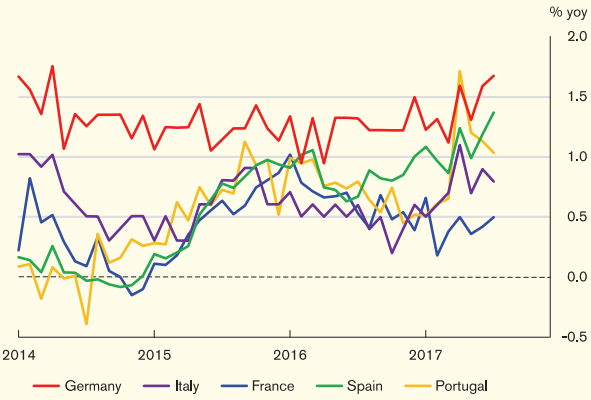


Source: CEIC.

Outside the US, the monetary policy outlook in other major advanced economies also remains uncertain. In the euro area, the economy enjoyed a broad-based recovery underpinned by both domestic demand and exports, with real GDP expanding by 0.6% on a quarter-on-quarter

(qoq) comparison in the second quarter of 2017, up from 0.5% in the preceding quarter. Labour market slack continued to diminish, with the unemployment rate edging down to 9.1% in July, the lowest since February 2009. At the same time, the political situation stabilised following the victory of Emmanuel Macron, a pro-Europe candidate, in France's presidential election in May, mitigating concerns about the rise in Eurosceptic sentiment that prevailed in the run-up to the election. In spite of the stronger growth momentum, however, inflation remained subdued across member countries and stayed well below the ECB's 2% target (Chart 2.6), partly constrained by weak wage growth amid the still-substantial labour market slack. Against this background, the ECB is likely to face a delicate balancing act in its future monetary policymaking, in the midst of a strengthening growth momentum on one hand but below-target inflation on the other.

Chart 2.6
Core CPI inflation in selected member countries of the euro area

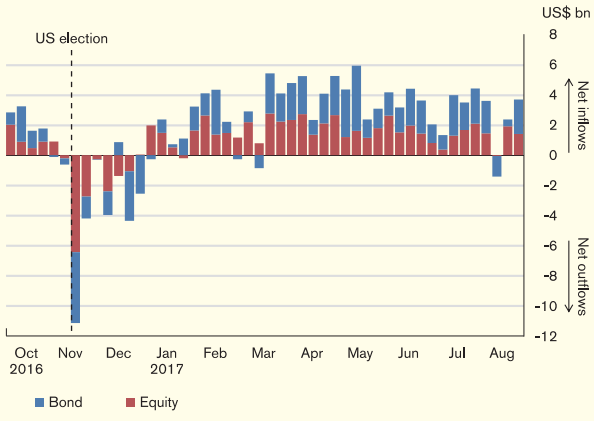


Source: Datastream.

In Japan, the economic outlook also improved, with real GDP expanding for the sixth straight quarter by a solid 0.6% qoq in the second quarter of 2017, supported by growth in private consumption and public spending. The economic and labour market slack has also been dwindling, with the closing of the output gap according to estimates by the Bank of Japan (BoJ) and the unemployment rate falling to a 23-year low of 2.8% in July. Nonetheless, the problem of dual labour market, characterised by an increasing share of part-time workers, is likely to continue to constrain wage growth and complicate the BoJ's effort in achieving its 2% inflation target.

For the rest of the world, especially EMEs, the synchronous improvement in global activities and the recent unwinding of the post US election strength of the US dollar is likely to continue to provide a favourable macro-economic backdrop in the near term. Indeed, in spite of two additional Fed rate hikes in the first half of 2017, EMEs continued to enjoy portfolio capital inflows (Chart 2.7), partly reflecting investor optimism over their economic prospects. That said, as discussed before, the risks of tighter global financial conditions stemming from the Fed's balance sheet normalisation plan could heighten the risks of capital flow reversals in EMEs in the period ahead.

Chart 2.7
Portfolio capital flows into EMEs

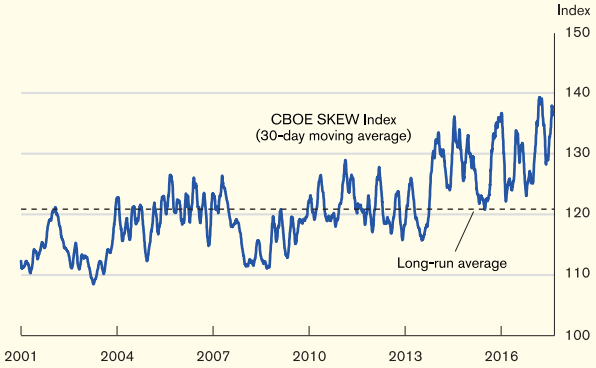


Source: EPFR.

In addition, despite the diminished economic policy and political risks in advanced economies, there has been a recent escalation in geopolitical tensions. In particular, elevated tensions between North Korea and the US could cloud the Asian and global economic outlook, and the risks

of military conflicts, while still deemed low at present, cannot be ruled out. At the same time, there is a risk that the rise in Sino-US trade tensions amid US investigations into Mainland's trade practices could fuel protectionist sentiment and pose downside risks to the nascent recovery in global trade flows. In the presence of rising geopolitical tensions, market perceptions of tail risks have recently risen sharply above the long-run average (Chart 2.8).

Chart 2.8
SKEW index by the Chicago Board Option Exchange (CBOE)



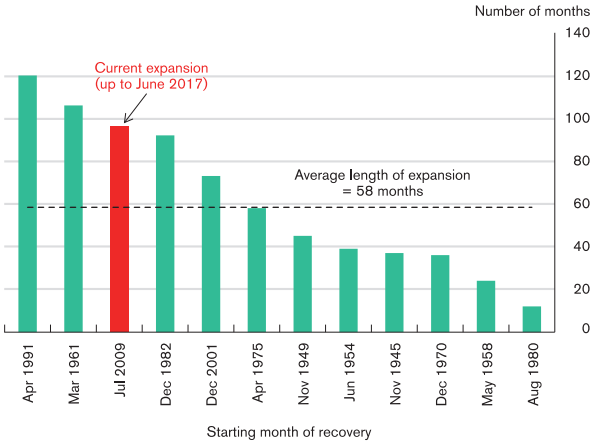
Note: The SKEW index, derived from prices of the S&P 500 out-of-money options, is a measure of market perceptions of tail risks, with a higher value indicating a greater perceived probability of tail events.
Source: Bloomberg.

Box 1
Identifying the latest stage of the US business cycle with cluster analysis

Introduction

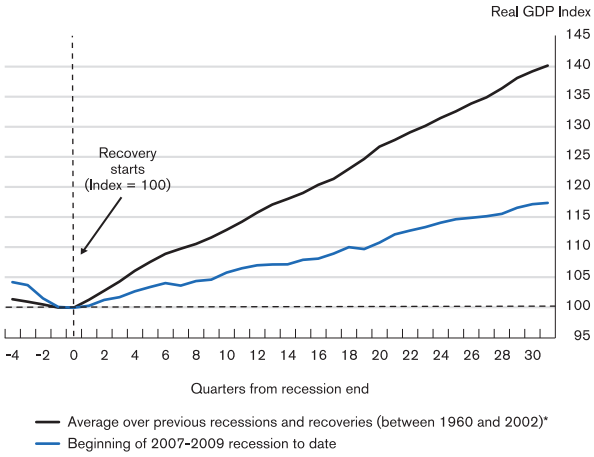
According to the National Bureau of Economic Research (NBER), the US economy has remained in expansion since June 2009, making it the third longest recovery episode in post-World War II history (Chart B1.1), although it is also much shallower than past recoveries (Chart B1.2). While a prolonged expansion does not necessarily imply imminent risks of recession, it nonetheless raises concerns that the US expansion may have already entered the late-cycle stage.

Chart B1.1
Length of post-World War II recovery episodes in the US



Source: NBER.

Chart B1.2
Changes in real GDP from end of recessions



Note: (*) Excluding the 1970, 1974 and 1980 double-dip recessions.
Sources: US Bureau of Economic Analysis and HKMA staff calculations.

Determining whether the US economy is in the late-cycle stage of expansion is important. If this were indeed the case, the optimistic earnings prospects on which the presently rich US equity market valuation is predicated would likely be called into question. A maturing expansion could also have profound implications for the future pace of US monetary policy normalisation.

To identify the latest stage of the US business cycle, this analysis applies a statistical classification technique known as k-medians clustering to partition the post-1960 period into four distinct classes that correspond to four different stages of a business cycle: (1) early expansion, (2) mid-cycle expansion, (3) late-cycle expansion and (4) recession. Based on the classification results, we then calculate the average duration of each of these four stages to gain an idea of how long the US economy can be expected to stay in the current stage before progressing to the next one.

Dating of US business cycle stages using k-medians clustering

Conceptually, k-medians clustering is a statistical classification technique that divides a set of uncategorised data into a predetermined number of groups or clusters (k), in such a way that observations in the same cluster are more "similar" (in terms of a given metric, usually Euclidean distance) to each other than to those in other clusters.

Adopting the ideas from Theis and Weihs (2000) and Dawsey (2014), we apply k-medians clustering to a set of 20 US economic indicators between January 1960 and March 2017, with the aim of partitioning this time interval into four clusters that can be associated with the four stages of a business cycle. These 20 indicators, listed in Table B1.A, relate to five key aspects of the US economy and are assumed to jointly determine the stage of the US business cycle.

By themselves, the four clusters obtained from k-medians clustering do not carry any economic meaning. Nonetheless, they can be associated with the notions of early expansion, mid-cycle expansion, late-cycle expansion and recession, based on their temporal proximity to NBER recessions. More specifically, clusters that include observations immediately before, during and after NBER recessions can be taken to represent late-cycle expansions, recessions and early expansions respectively, while the remaining cluster, which happens to straddle early and late-cycle expansions, is taken to represent mid-cycle expansions.

Table B1.A
Economic indicators used in cluster analysis

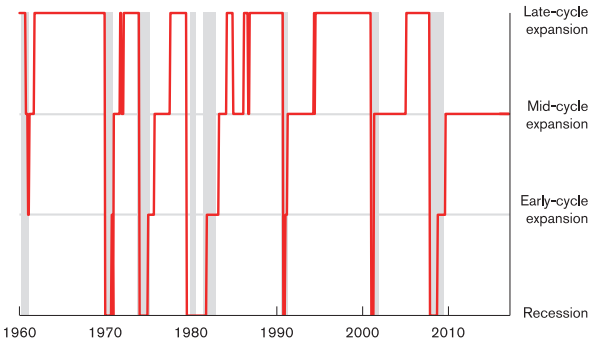
Aspects of the US economy	Economic indicators
Financial conditions	• Treasury yield curve slope (difference between 10-year and 3-month Treasury yields) • 12-month change in real Fed funds rate • Realised monthly volatility of S&P 500 index • Yield spread between Baa-rated and Aaa-rated US corporate bonds • 12-month change in real commercial and industrial loans
Labour market conditions	• Employment gap (as defined in Erceg and Levin (2013)) • Unemployment rate • Average weekly hours worked in manufacturing sector • Real average hourly earnings*
Growth	• 12-month change in real GDP • Difference between actual and potential real GDP growth • ISM manufacturing PMI • 12-month change in industrial production
Inflation	• Core CPI inflation index* • Unit labour cost index* • 12-month change in GDP deflator • 12-month change in import prices of goods and services
Business conditions	• Industrial utilisation rate • Manufacturing inventory-to-shipping ratio* • Corporate profits

Note: All data series are standardised to have zero mean and one standard deviation. Quarterly data are converted into monthly data by interpolation. Indicators marked with (*) are detrended using Hodrick-Prescott filter prior to standardisation.

Results and discussions

The classification results from k-medians clustering are illustrated in Chart B1.3, which shows the model-based chronology of the US business cycles between January 1960 and March 2017. Our results appear to be reasonable, being able to capture all but one of the NBER recessions since 1960 and showing generally smooth transitions of the US economy from recession to early, mid and late stages of expansion over time (except the mid-1980s with relatively erratic results). Of particular interest is that, based on the model results, the US economy could still be classified as in the mid-cycle stage of expansion at the end of the sample period (i.e. March 2017).

Chart B1.3
Chronology of US business cycles based on k-medians clustering



Note: Periods shaded in grey are recessions as defined by NBER.
Sources: NBER and HKMA staff calculations.

Next, we perform out-of-sample classification of the latest US economic situation using partially available data for the second quarter of 2017[1]. To do so, we compute the centroids of the four clusters, followed by a comparison of the Euclidean distances between the latest data vector and the four centroids, with a shorter distance implying a closer match[2]. The results (Table B1.B) show that the US economy has since transitioned to the late-cycle stage of expansion, based on partially available data for the second quarter.

Table B1.B
Distances between the vector of latest observations and the four cluster centroids

	Recession	Early	Mid	Late
Financial conditions	2.3	3.8	1.6	1.3
Labour market	2.4	4.1	2.3	1.0
Growth	1.8	3.6	0.4	0.9
Inflation	3.5	3.4	0.7	0.8
Business conditions	1.3	3.1	0.7	1.5
Overall	5.3	8.1	3.0	2.6

Note: Cells highlighted in green refer to the closest match to the latest observations.
Source: HKMA staff calculations.

1 Missing values are not allowed in cluster analysis algorithms.

2 In our case, a centroid is a 20-dimensional vector of the individual means of the 20 economic data series within a cluster. The Euclidean distance between the centroid of a cluster (x) and the data vector (y) is given by

$$dist(x,y) = \sqrt{\sum_{i=1}^{20}(x_i - y_i)^2}$$

The distances between the centroids and the vector of latest data for each of the five sub-sets are calculated analogously.

The classification results are broadly in line with intuition. In terms of financial conditions, the recent flattening of the Treasury yield curve, subdued equity market volatility and compressed corporate bond spreads are common indicators of a late-stage expansion. Meanwhile, the progressive tightening of labour market conditions (with the unemployment rate falling to 4.4% in August, below the Fed's estimated natural rate of 4.6%) and above-average real wage growth are also suggestive of a late-stage expansion of the employment cycle. On the other hand, the unusually weak pickup in GDP growth compared with previous recoveries, the recent softening of inflation and the still-below-average industrial utilisation rate have led the model to classify the latest growth, inflation and business conditions sub-cycles as in the mid-stage expansion. Taking the 20 economic indicators together, their latest values are closest in distance to the cluster representing the late-cycle stage of expansion.

Next, we calculate the historical average length of each of the four stages of the business cycle, based on results from the classification exercise (Table B1.C). Of particular interest is that the late-cycle expansion stage in the US typically lasted for four years on average, with a range between two and eight years. These results suggest that the current US economic expansion, while likely just having entered the late-cycle stage, could still last for some time before transitioning to a recession.

Table B1.C
Summary statistics on the past length of the four business cycle stages (in years)

	Recession	Early	Mid	Late
Average length	0.9	0.8	3.0	4.2
Range	0.3 – 2.3	0.2 – 1.8	0.6 – 7.6	1.8 – 8.3

Source: HKMA staff calculations.

Limitations of methodology

As a statistical technique, clustering algorithms solely rely on patterns of historical data to classify current observations. Nonetheless, due to structural changes in the US economy since the GFC, economic indicators may behave differently from the past, thereby introducing the risk of misclassification. In particular, the latest signal of a late financial cycle from the flattening of the yield curve could simply be the result of distortions by the Fed's quantitative easing, which could potentially be reversed when the Fed implements balance sheet normalisation. Moreover, the notable post-GFC decline in the labour force participation rate, if turned out to be temporary, could imply a larger-than-expected degree of labour market slack and hence a lower-than-envisaged natural rate of unemployment. These possibilities could help prolong the current expansion relative to historical norms, and suggest that it should be classified as in the mid-cycle, rather than late-cycle, stage.

Conclusion

In summary, our empirical results suggest that the US economy has just transitioned to the late-cycle stage of expansion, although it could be expected to last for a certain period based on past experience. Yet, structural changes in the US economy since the GFC may prolong the current expansion relative to historical norms and introduce risks of misclassification due to the backward-looking nature of clustering analysis.

References

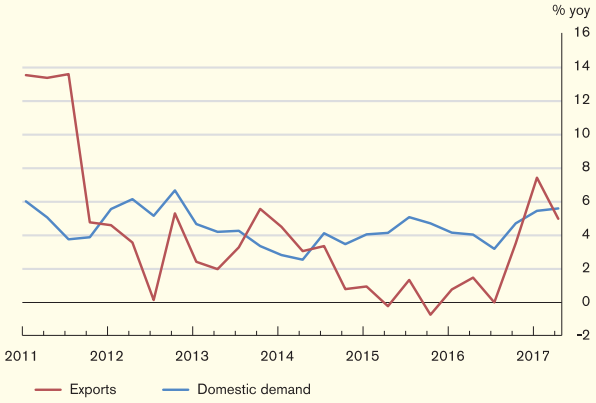
Dawsey, K. (2014), "Don't call the expansion old", Goldman Sachs client note.

Erceg, C. J., & Levin, A. T. (2013), "Labor force participation and monetary policy in the wake of the great recession", IMF Working Paper 13/245.

Theis, W. & Weihs, C. (2000), "Clustering techniques for the detection of business cycles", In *Classification and Information Processing at the Turn of the Millennium* (pp. 127 – 134). Springer, Berlin, Heidelberg.

In East Asia[3], real economic growth remained stable in the first half of 2017, maintaining the momentum that commenced in late 2016. Benefiting from the stronger-than-expected demand from advanced economies and Mainland China, the external sector has been a key driver of economic growth in the region (Chart 2.9). Trade-dependent economies such as South Korea, Singapore and Taiwan have seen a strong rebound in merchandise exports since late 2016, while net commodity exporters such as Indonesia and Malaysia have also benefited from improved global demand.

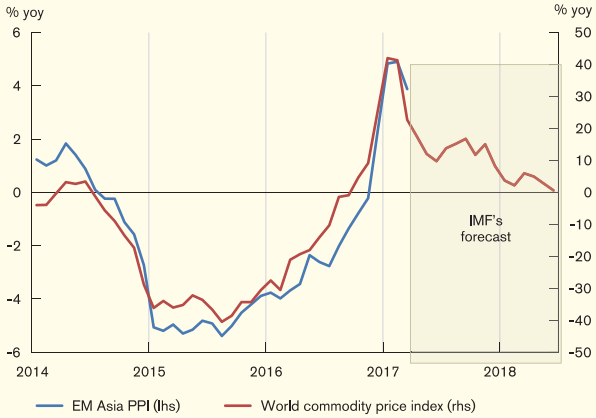
Chart 2.9
East Asia: Domestic demand and exports



Note: The chart shows the weighted-average growth in domestic demand and exports in the national account of Indonesia, Malaysia, the Philippines, Singapore, South Korea and Thailand.
Sources: CEIC and IMF.

Meanwhile, concerns over the return of inflationary pressure in the region have receded in recent months. Stable global commodity prices, including food and oil, have helped restrain inflation. Indeed, the surge in producer price index in the region since late 2015 is likely to have peaked in early 2017 amid the slowdown in commodity inflation (Chart 2.10). In addition, the region's moderate domestic demand is not likely to bolster inflation in the near-term.

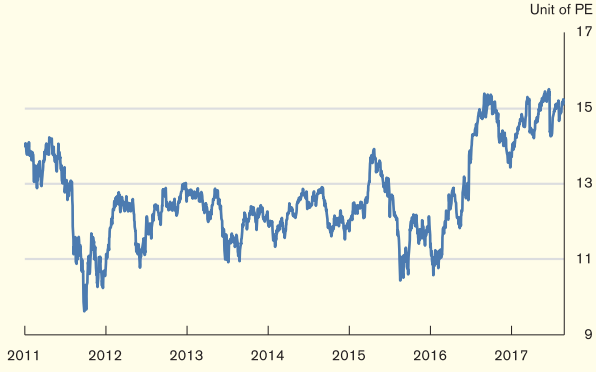
Chart 2.10
East Asia: Producer price index and commodity prices



Note: The chart shows the simple average producer price index inflation of Indonesia, Malaysia, the Philippines, Singapore, South Korea and Thailand.
Sources: CEIC and IMF.

In the face of marginal yet continued improvement in real activities, financial markets in the region rallied in recent months. Regional currencies have generally strengthened against the US dollar since early this year, with the Bloomberg Asia Dollar index rising by 4.9% in the first eight months of 2017. Equity prices have also increased significantly since the second quarter of this year, with the valuation in terms of the PE ratio of the Morgan Stanley Capital International (MSCI) Asia ex-Japan index rebounding significantly over the past few months (Chart 2.11). Meanwhile, the return of portfolio fund inflows since the second quarter has also kept domestic sovereign bond yields in East Asian economies at low levels.

Chart 2.11
PE of MSCI Asia ex-Japan



Source: Bloomberg.

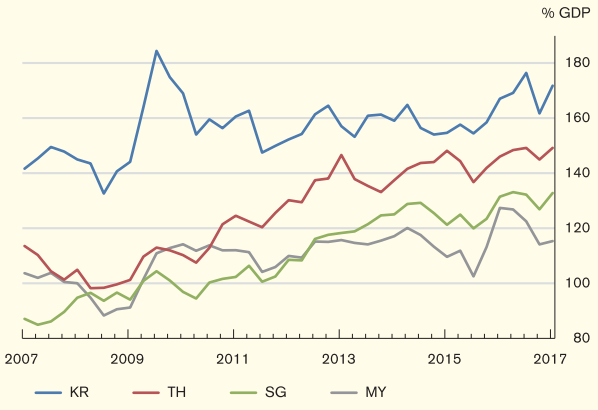
[3] East Asian economies refer to Indonesia, Malaysia, the Philippines, Singapore, South Korea, Taiwan and Thailand.

Although the real sectors and financial markets have stayed on a positive note recently, East Asian economies still face multiple headwinds:

– Firstly, on the trade front, concerns over a trade war between the US and Mainland China have been intensifying as the US government is planning to impose stronger trade restrictions on Mainland China. A deteriorating Sino-US trade relationship might have a large negative spill over effect on other East Asian economies amid the high degree of regional trade integration. The weaker-than-expected economic performance in the US in recent months could also put a brake on the region's export recovery.

– Secondly, on the domestic front, the pace of private sector credit growth in many regional economies has picked up recently after a brief period of deleveraging in 2015-2016, with the total outstanding private credit rebounding to a relatively high level (Chart 2.12). Against this background, any tightening in financial conditions could put pressure on the debt repayment capability of those heavily indebted companies and households. In that case, as credit growth has been providing significant support to the region's domestic demand over the past few years, any deleveraging triggered by financial tightening could weigh on Asian economic growth.

Chart 2.12
East Asia: Credit to private sector



Sources: CEIC and HKMA staff calculations.

– Thirdly, on the financial market front, while the valuation of the region's financial assets is still relatively attractive and continues to induce more portfolio inflows, a further stretch in valuation would narrow the gap with advanced economies and thus increase the risk of fund flow reversals and price corrections.

In addition to these challenges, the recent intensifying geopolitical tensions on the Korean Peninsula have cast a great shadow over the stability of the region. Should any tail-risk events materialise, including military conflicts, the corresponding shock could abruptly destabilise the region's economy and financial markets.

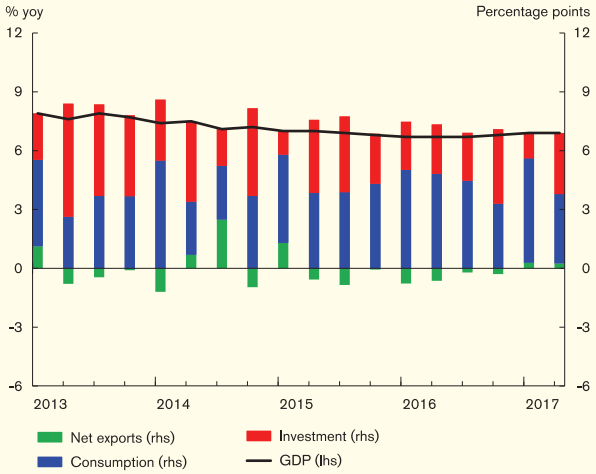
Given the challenges ahead and the still subdued inflationary pressure, most regional central banks are likely to keep their policy interest rates unchanged in the near-term, maintaining an accommodative monetary policy stance to support growth.

2.2 *Mainland China*

Real sector

Growth momentum in Mainland China improved further in the first half of 2017 underpinned by solid consumption, a rebound in investment growth and better export performance. In particular, real GDP expanded by 6.9% year on year in the first and second quarters from 6.8% in the fourth quarter of 2016 (Chart 2.13).

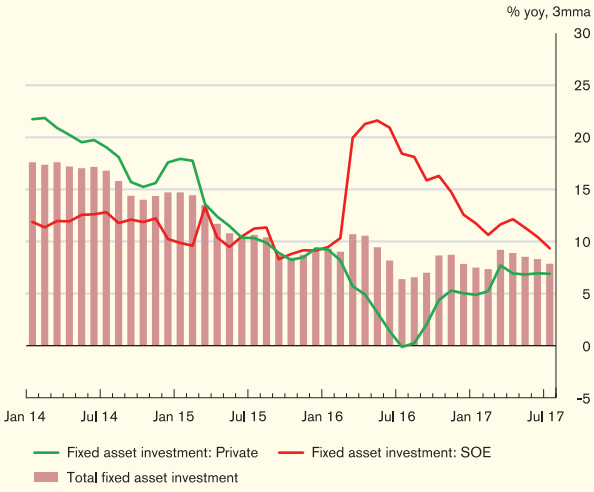
Chart 2.13
Mainland China: contribution to GDP growth by demand component



Sources: CEIC, NBS and HKMA staff estimates.

Among major GDP components, consumption remained the major contributor to the growth in the first half of 2017 amid firm labour market conditions and faster increases in household income. In particular, real per capita disposable income growth accelerated to 7.3% year on year in the first half of 2017 from 6.3% in 2016. In comparison, the contribution of investment to GDP growth picked up during the period on the back of a rebound in private investment since early 2017 amid buoyant property market conditions and solid infrastructure spending (Chart 2.14). The contribution of net exports turned positive in the first half of 2017 as greater external demand led to a larger expansion in exports compared to imports.

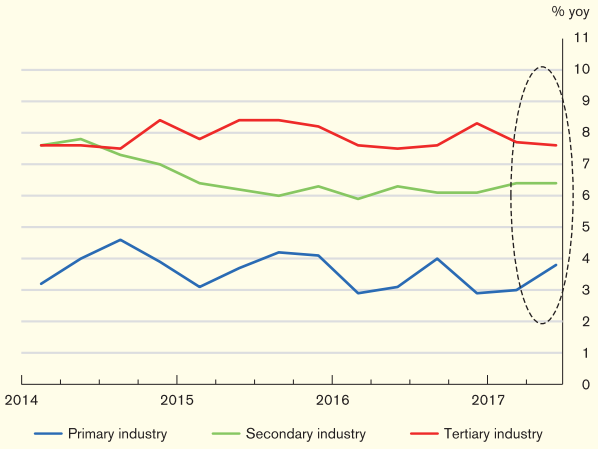
Chart 2.14
Mainland China: Fixed asset investment by type of firms



Sources: CEIC and HKMA staff estimates.

In value added terms, the tertiary industry grew at a slower pace in the first half of 2017 (Chart 2.15). Among major service sectors, growth of the real estate and financial sectors moderated likely due to prudential measures introduced by the authorities to contain risks in the property market and the financial system, while growth of transport and storage, wholesale and retail trade as well as accommodation and catering trade expanded at a faster pace. In comparison, growth of the secondary industry picked up in the first half of 2017 as industrial activities improved along with better external and domestic demand conditions. With the growth rate of tertiary industry continuing to outpace other industries, the share of tertiary industry in GDP rose further to 54.1% in the first half of 2017 from 51.6% in 2016.

Chart 2.15
Mainland China: GDP growth by industry



Sources: CEIC, NBS and HKMA staff estimates.

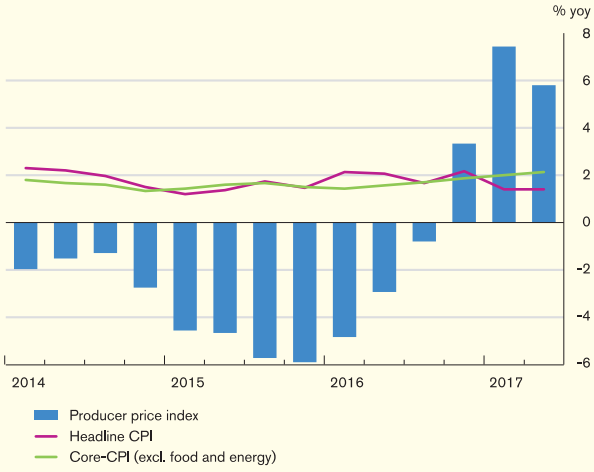
The near-term growth outlook for the Mainland economy remains positive. On the external front, further improvement in the advanced economies may continue to underpin export performance. On the domestic front, stabilised economic environment and recovery in business confidence should render support to private investment. Meanwhile, tight labour market conditions and solid household income growth should also bode well for private consumption.

Nonetheless, the future outlook also hinges on how the authorities strike a balance between supporting the economy and preventing the build-up of financial risks. During the review period, the authorities further introduced tightening measures amid the house price rally and pushed ahead with financial deleveraging in view of increased bank exposure to off-balance sheet activities, while having lowered the growth target for 2017 to the level around 6.5% from 6.5%–7% for 2016. The better-than-expected economic performance in recent quarters may give more room for the authorities to bring forward the tightening measures on the property market as well as financial deleveraging, which would in turn weigh on growth especially through the investment channel. Latest consensus forecasts by market analysts expected that real GDP would grow by 6.7% for 2017, slightly higher than the government target of around 6.5%.

While overall economic conditions continued to improve, consumer price inflation remained benign during the review period. Headline consumer price inflation eased from 2.2% year on year in the last quarter of 2016 to an average of 1.4% in the first half of 2017 (Chart 2.16), as food prices declined during the period. However, core inflation, after excluding food and energy prices, inched up from 1.9% year on year to 2.1% during the same period on the back of faster increases in service prices. At the wholesale level, producer price inflation tapered from the recent peak of 7.8% year on year in February to 5.5% in June, as upstream prices such as raw material costs came down somewhat in the second quarter.

Going forward, upside risks to inflation may remain in the near term should growth momentum show further improvement. However, the tightening policies in place aimed at containing systemic risks may, to some extent, provide an offset. In addition, the renminbi exchange rate may also affect import prices and thus the near-term inflation outlook.

Chart 2.16
Mainland China: Consumer price and producer price inflation



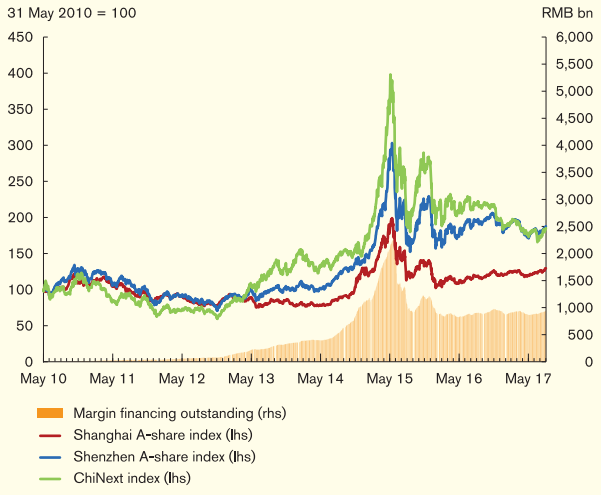
Sources: NBS and HKMA staff estimates.

Asset Markets

During the review period, the tightening measures introduced by the authorities to contain systemic risks continued to affect the asset market performance in Mainland China. For instance, Mainland commodity prices came down early this year amid tightening liquidity conditions associated with financial deleveraging but rebounded afterwards, likely due to improved market sentiment amid better-than-expected economic conditions in recent periods.

In the equity market, investors' sentiment remained benign, with leveraged trading having subsided. Tightened liquidity conditions appeared to have suppressed market risk appetite, increasingly shifting the preference of investors from growth to value during the review period. As a result, the prices of large-cap stocks inched up on the Shanghai Stock Exchange, while the small-cap stocks with rich valuation continued to report losses on the Shenzhen Stock Exchange, especially on the start-ups board (ChiNext) (Chart 2.17). In fact, the ChiNext index in the Shenzhen Stock Exchange fell by around 5.1% on 17 July right after the announcement by policy makers to further contain financial risks by establishing the Financial Stability and Development Committee.

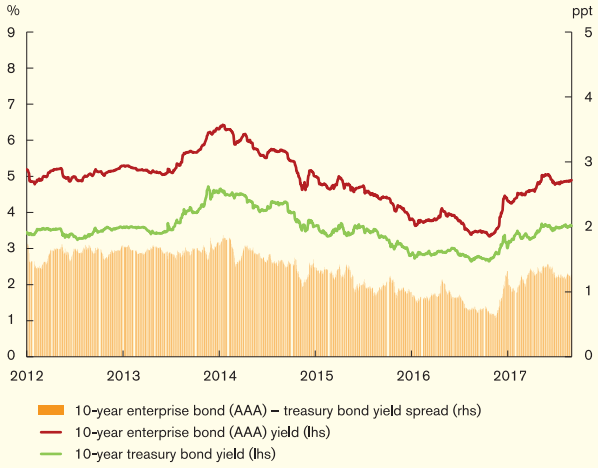
Chart 2.17
Mainland China: Major stock market indices



Sources: CEIC and HKMA staff estimates.

Tightened interbank liquidity conditions also drove up the issuance costs in the bond market, with both government and enterprise bond yields picking up during the review period (Chart 2.18). The yield spread between corporate bonds and government bonds also increased, despite improved corporate financial positions amid better-than-expected economic performance. Increased corporate bond yield spread might have in part reflected stronger financing needs of Mainland firms during this round of tightening in bank lending as well as suppressed risk appetite of investors.

Chart 2.18
Mainland China: 10-year enterprise and government bond yields

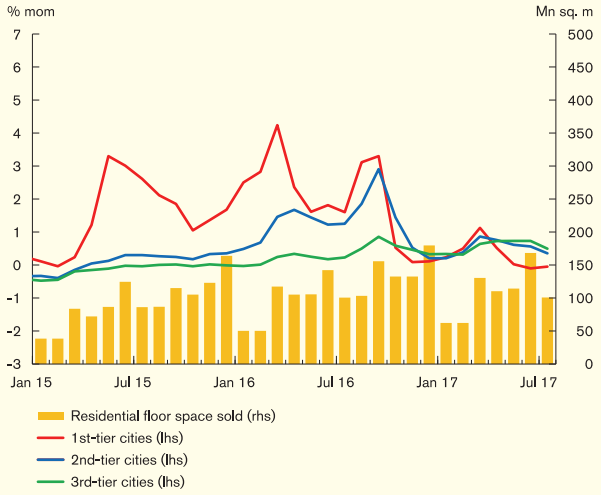


Sources: WIND and HKMA staff estimates.

Mainland property markets remained buoyant, with both house prices and transactions continuing to pick up in the first half of 2017. While buoyant property market conditions provided some support to the economy, a prolonged period of exuberance would likely sow the seeds for future instability in the financial system. In view of this, the authorities further stepped up tightening measures including tightened down-payment requirements and linking land supply to housing inventory in different cities.

As a result, property market performance exhibited signs of divergence in different tiers of cities in recent periods, after house price growth accelerated somewhat in the first quarter of 2017 (Chart 2.19). In tandem with declined transactions, house price growth moderated on a sequential basis recently in higher-tier cities where the property market was overheating. In first-tier cities, house prices even fell on a sequential basis for a second consecutive month in July. In comparison, both house price growth and transactions, during the same period, inched up in lower-tier cities where house stock overhang issues prevailed. That said, more time is needed to discern whether such trend may sustain.

Chart 2.19
Mainland China: Residential prices by tier of cities and floor space sold

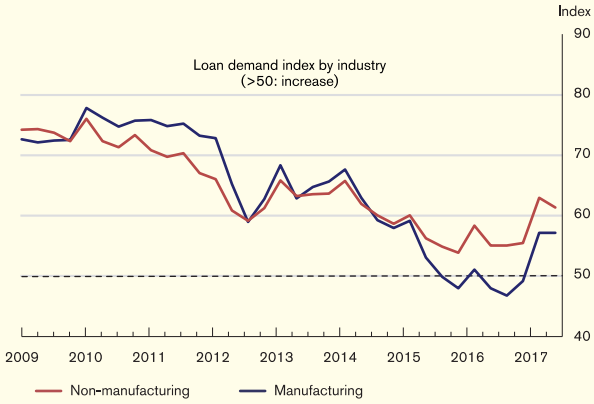


Sources: CEIC and HKMA staff estimates.

Bank lending and asset quality

Amid improved economic activities, corporate loan demand improved during the review period. According to a quarterly survey by the People's Bank of China (PBoC), for instance, loan demand from both the manufacturing and non-manufacturing sectors rebounded notably in the first half of 2017 (Chart 2.20).

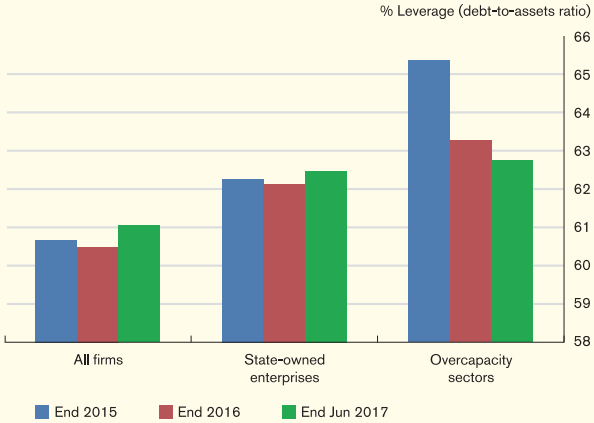
Chart 2.20
Mainland China: Loan demand index by industry



Sources: PBoC and HKMA staff estimates.

Despite improved loan demand, growth in renminbi bank loans remained largely stable during the review period amid the tightening measures aimed at corporate deleveraging. In particular, banks continued to tighten their loan underwriting standards to vulnerable borrowers, such as inefficient state-owned enterprises (SOEs) and firms in overcapacity sectors. As a result, the leverage of firms in the overcapacity sectors further declined in the first half of 2017, while that of SOEs rose slightly (Chart 2.21).

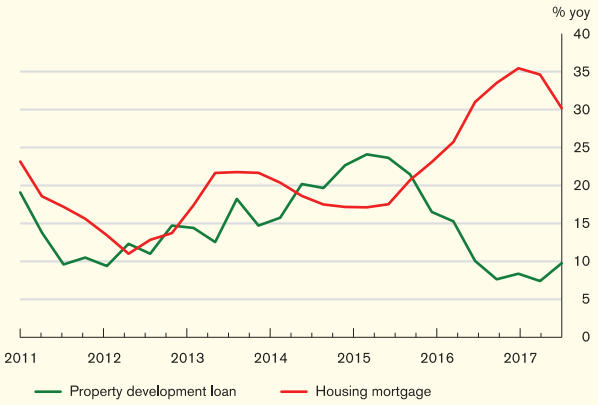
Chart 2.21
Mainland China: Corporate leverage: SOEs and overcapacity sectors



Sources: Bloomberg and HKMA staff estimates.

In view of the potential risks associated with the exuberance in the property market, Mainland banks also tightened their loan underwriting standards to property developers. As a result, the growth of developer loans stayed subdued albeit picking up slightly to 9.8% year on year at the end of June 2017 from 8.4% at the end of 2016 (Chart 2.22).

Chart 2.22
Mainland China: Loan growth for property development and housing mortgage



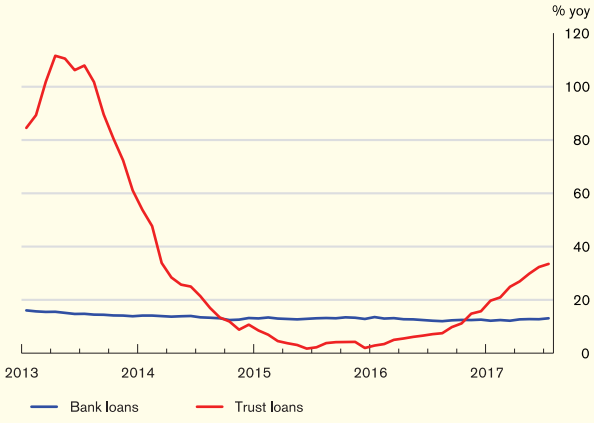
Sources: PBoC and HKMA staff estimates.

In comparison, after having accelerated for more than one year, mortgage loan growth started to moderate in the first half of 2017 amid the tightening measures on the property market. For now, the risk associated with the fast growth in mortgage loans should be manageable. In particular, the leverage of Mainland households remained relatively low, as the outstanding size of mortgage loans was only equivalent to about 35% of household deposits in June, thanks to macro-prudential measures in place, such as the tightened down-payment requirements.

While the direct exposure of banks to the property market should be manageable, bank exposure to the property market through the collateral channel should not be ignored, given the key role played by the property market in the collateral-based lending system in Mainland China. Box 2 discusses the risk associated with banks' exposure to the property market by examining the effect of property prices on corporate borrowing through the collateral channel. Our analysis shows that property price changes have a positive effect on firms' debt growth, especially for financially constrained firms such as smaller and non-state-owned companies. Our findings therefore suggest that while collateral-based lending may help alleviate the financing difficulties facing smaller or private Mainland firms, banks' heavy reliance on properties and land as collateral may also lead to a pro-cyclical swing in the indebtedness of these firms.

As tightened bank lending may not be able to fulfil the increased financing needs of Mainland corporates, signs of resurgence in shadow banking activities emerged in recent quarters. In particular, trust loan growth increased from 15.8% year on year at the end of 2016 to 33.5% in July 2017, notably outpacing the growth in bank lending (Chart 2.23). Despite the fast increase in trust loan growth, the outstanding size of trust loans has so far remained relatively small. By July 2017, the outstanding size of trust loans stood at RMB7.7 trillion, equivalent to 6.6% of total bank loans.

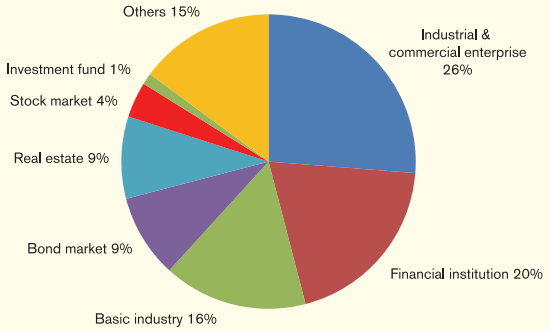
Chart 2.23
Mainland China: Bank loans and trust loans growth



Sources: CEIC and HKMA staff estimates.

Although there is little information about which sectors have received loans from trust companies, breakdown by trust funds allocation suggests that in total about 25% of trust funds had been invested in vulnerable sectors such as real estate and basic industries as of June 2017 (Chart 2.24). That said, given the complex and opaque nature of shadow banking products, the overall exposure of trust companies to these vulnerable sectors could be larger through the holdings of financial instruments such as equities, bonds and investment funds.

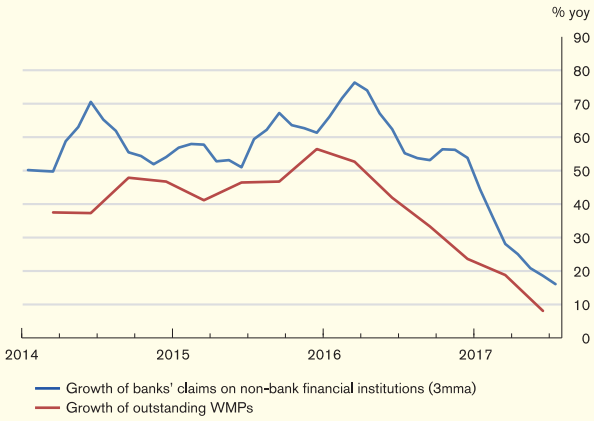
Chart 2.24
Mainland China: Trust funds by sector at the end of June 2017



Sources: CEIC and HKMA staff estimates.

In view of the risk associated with expanding shadow banking activities, the China Banking Regulatory Commission (CBRC) has stepped up supervision of banks' lending to non-bank financial institutions in the interbank market as this was deemed to be an important funding source for shadow banking activities. As a result, the growth in banks' claims on non-bank financial institutions came down significantly in the first half of 2017 (Chart 2.25). In addition, the growth in the outstanding size of Wealth Management Products (WMPs), another important funding source of shadow banking activities, also declined following the inclusion of off-balance sheet WMPs into the Macro Prudential Assessment (MPA) for Mainland banks by the authorities which started from the first quarter of 2017.

Chart 2.25
Mainland China: Banks' claims on non-bank financial institutions and outstanding wealth management products

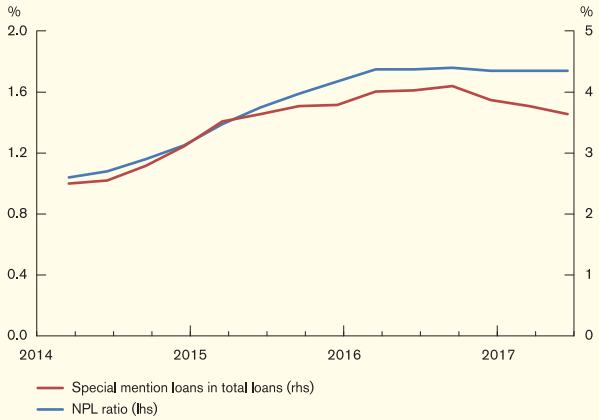


Sources: CEIC, WIND and HKMA staff estimates.

In addition to the tightening measures in place, the policy makers also announced at the Financial Work Conference in July to establish the Financial Stability and Development Committee. The set-up of the new committee highlighted the ongoing drive by the authority to deepen financial reform and formulate a coordinated supervision framework to better contain financial risks, especially those associated with corporate leverage and local government debt.

Thanks to the improved business and financial conditions of Mainland corporates and the stricter loan underwriting standards, the asset quality of Mainland banks showed signs of improvement during the review period. While the non-performing loans (NPL) ratio remained stable at a relatively low level of 1.74% in the second quarter of 2017, the share of special mention loans in total loans further declined to around 3.6% from about 3.9% at the end of 2016 (Chart 2.26).

Chart 2.26
Mainland China: NPL ratio and share of special mention loans in total loans

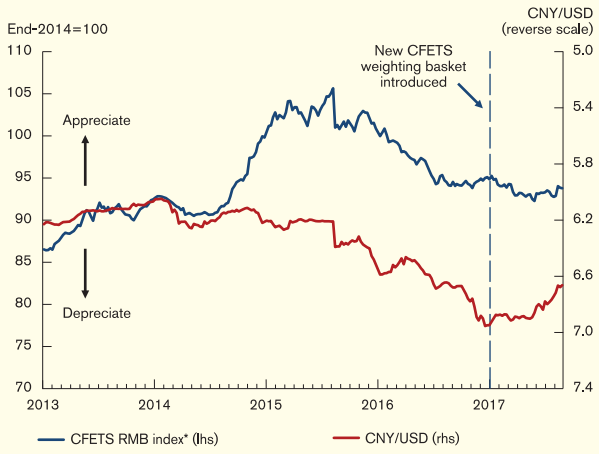


Sources: CBRC and HKMA staff estimates.

Exchange rate and cross-border capital flows

Against the backdrop of improved economic conditions and market sentiment, as well as the weakening of the US dollar, the renminbi exchange rate strengthened against the US dollar recently. In particular, during the period March to August 2017, the renminbi appreciated by 4.1% against the US dollar (Chart 2.27). In comparison, the China Foreign Exchange Trade System (CFETS) RMB index, a trade-weighted index capturing the movement of the renminbi against a basket of currencies, edged down slightly by 0.1% during the review period.

Chart 2.27
Mainland China: The CFETS RMB index and the renminbi exchange rate against the US dollar



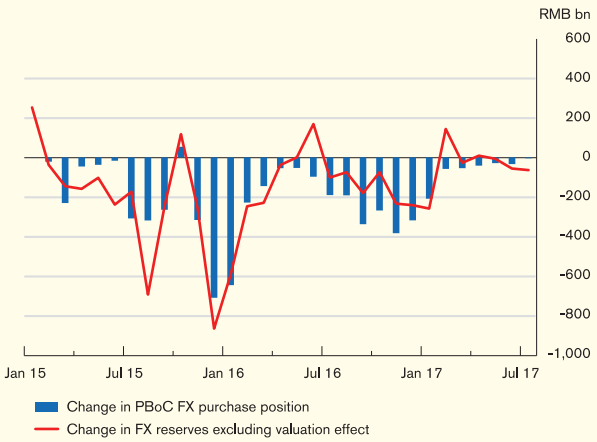
* Index before December 2015 is estimated according to the weight of the CFETS RMB basket.

Sources: CEIC and HKMA staff estimates.

The recent stabilisation in the CFETS RMB index was also due in part to the refinement of the onshore renminbi (CNY) fixing formation formula. According to the authorities, a counter-cyclical factor was added into the CNY fixing formation formula in May in order to help offset the pro-cyclical movements in the CNY exchange rate driven by market sentiment and herd behaviour in the forex market, and therefore to maintain the renminbi largely stable against the currency basket.

Amid improved market sentiment, capital outflow pressures continued to ease. The declines in both the PBoC's forex purchase position and Mainland's foreign reserves, excluding valuation effects, have narrowed notably since early 2017 (Chart 2.28). As a result, foreign reserves in Mainland China had been standing above US$3,000 billion for the sixth consecutive month in July.

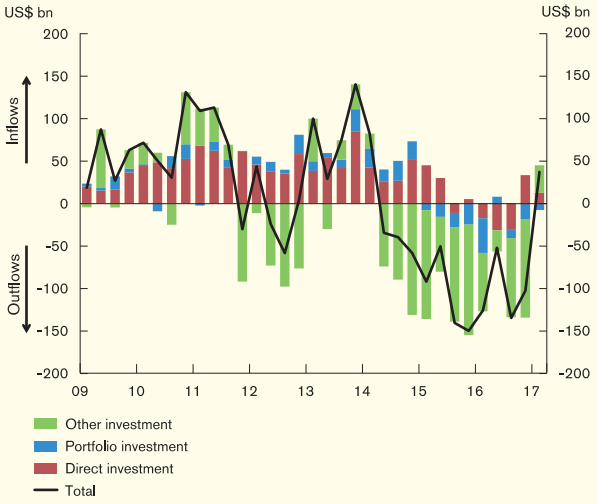
Chart 2.28
Mainland China: Changes in PBoC's foreign exchange purchase position and foreign reserves



Sources: CEIC, SAFE and HKMA staff estimates.

The latest statistics on the balance of payments also pointed to reduced capital outflow pressures, with cross-border capital flows turning to a net inflow in the first quarter of 2017, the first time since the first quarter of 2014. The turnaround in net cross-border fund flows was mainly driven by a reversal in capital outflows through other investment in the first quarter of 2017 (Chart 2.29). In particular, trade credit saw a seasonal net inflow in the first quarter due to greater repayments of trade credit by non-residents. Meanwhile, external borrowing by Mainland banks and corporates also picked up during the period amid tightened liquidity conditions in the onshore credit market.

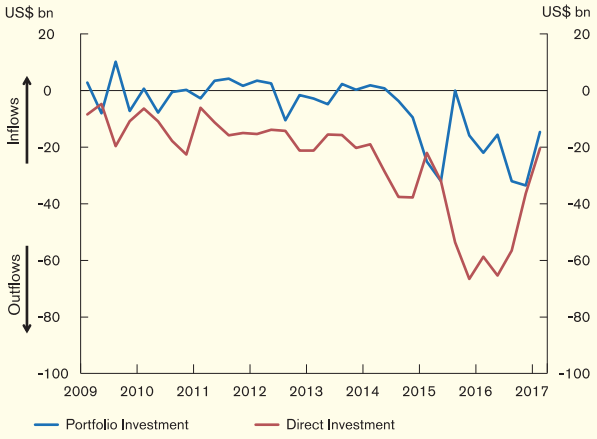
Chart 2.29
Mainland China: Net cross-border capital flows by type of flows



Sources: CEIC, SAFE and HKMA staff estimates.

Lower capital outflow pressures were also reflected in a significant slowdown in the allocation of assets overseas by residents through both direct investment and portfolio investment in recent periods (Chart 2.30). That said, since cross-border fund flows tend to be volatile, more time is needed to discern the new trend in direct investment and portfolio investment.

Chart 2.30
Mainland China: Cross-border capital flows through portfolio and direct investment: asset side



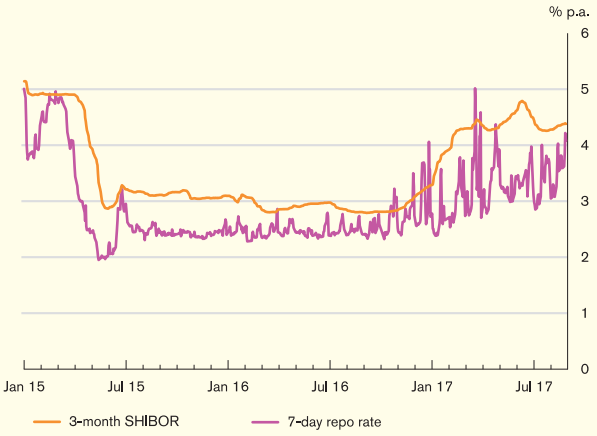
Sources: CEIC, SAFE and HKMA staff estimates.

Looking ahead, the launch of the Bond Connect and the inclusion of A-shares in the MSCI emerging markets index would likely facilitate more capital inflows through the portfolio investment channel. However, uncertainties in monetary conditions among major economies, as well as global market sentiment, may still play an important role in shaping the near-term outlook for cross-border fund flows. Over the longer term, the current account surplus and robust economic and productivity growth would continue to provide support to the renminbi exchange rates.

Fiscal and monetary policy

On the monetary policy front, the PBoC maintained a prudent and neutral policy stance during the review period, while tightening the interbank liquidity conditions in view of increased risks facing the banking system, especially those associated with the exposure of banks to non-bank financial institutions. As a result, both repo rates and Shanghai Interbank Offered Rate (SHIBOR) increased in 2017 (Chart 2.31), with the interbank funding costs of non-bank financial institutions increasing more.

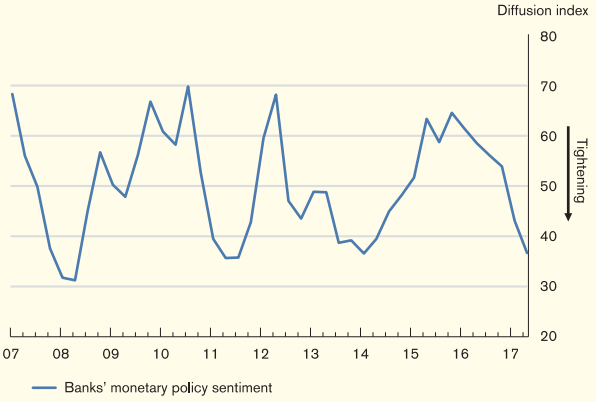
Chart 2.31
Mainland China: 7-day repo rate and 3-month SHIBOR



Sources: CEIC and HKMA staff estimates.

Higher interbank funding costs seemed to have passed through to the end users, though the PBoC utilized targeted measures such as the Medium-term Lending Facility (MLF) to support the funding needs of financial institutions and kept the benchmark lending and deposit rates unchanged. In particular, the weighted average interest rate of loans offered to non-financial enterprises and other sectors increased to around 5.7% in the second quarter of 2017 from about 5.3% in the last quarter of 2016. As a result, an increasing number of banks reported to see a tightening in monetary policy in the first and second quarters of 2017, according to the monetary policy sentiment index compiled by the PBoC (Chart 2.32).

Chart 2.32
Mainland China: Banks' monetary policy sentiment index



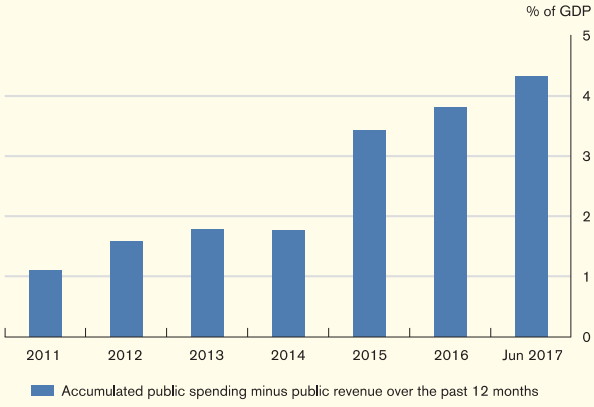
Source: CEIC.

On the fiscal policy front, the authorities continued to adopt a more proactive policy stance. In particular, in order to facilitate private spending, the government announced to further cut taxes and fees for business owners by RMB 283 billion in June in addition to the measures rolled out early this year which have already led to a cut of RMB718 billion.

On the spending side, to facilitate infrastructure investment at the local level, the authorities encouraged the participation of private capital in local infrastructure projects. For instance, the scale of registered infrastructure projects under the public-private partnership program increased markedly by 54.3% year on year in the second quarter of 2017 to RMB16.4 trillion. In comparison, the size of projects at the implementation phase also increased to RMB3.3 trillion from RMB1.1 trillion a year earlier.

Reflecting the proactive fiscal policy stance, public expenditure of Mainland China continued to expand at a faster pace than public revenue during the first half of 2017. As a result, the gap between public expenditure and revenue over the past 12 months widened from 3.8% of GDP at the end of 2016 to 4.3% in June 2017 (Chart 2.33).

Chart 2.33
Mainland China: Difference between public spending and public revenue



Sources: WIND and HKMA staff estimates.

The widened budget deficit might have led to a further expansion in government debt, especially at the local level. According to the latest report by the National Audit Office issued in June 2017 covering 16 provinces, 16 cities and 14 counties, government debt indeed expanded at a relatively fast pace for some local governments. The report also emphasised that the overall risk of local government debt remained manageable.

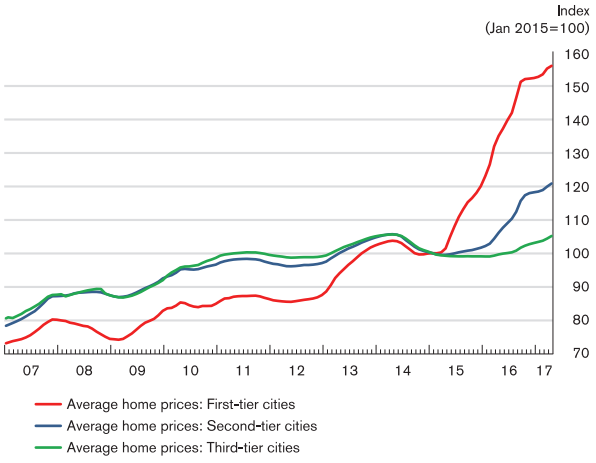
To better contain the risks associated with local government debt, the authorities strengthened the management of local government debt issuance. For instance, in June the authorities introduced a pilot scheme of local land reserve bond issuance, to lower the incentives of local governments to borrow from unregulated channels. In addition, the authorities announced, at the Financial Work Conference, to impose fiscal discipline for local governments and curb ballooning debt by establishing a lifetime responsibility mechanism for local government officials.

Box 2
Real estate prices and corporate borrowing in Mainland China

Introduction

Property prices in Mainland China have picked up notably since 2015. In first-tier cities including Beijing, Shanghai, Guangzhou and Shenzhen, property prices have, on average, jumped by nearly 60% in the past two years (Chart B2.1). Following the price rally in first-tier cities, second-tier cities have also recorded solid increases in property prices since 2016. The soaring property prices have raised concerns, given the strong link between real estate cycles and financial stability.

Chart B2.1
Residential prices in Mainland China by tier of cities



Sources: CEIC and HKMA staff estimates.

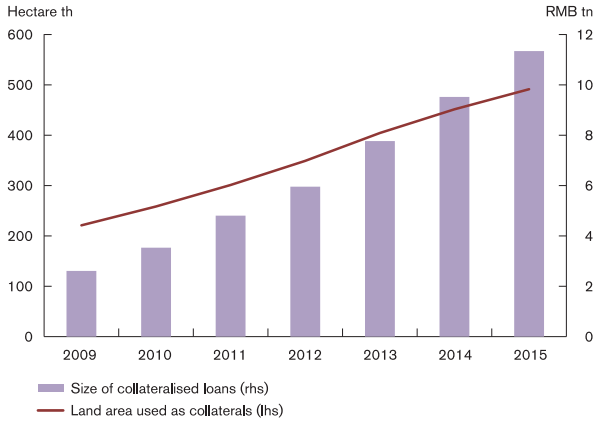
For now, the direct exposure of banks to the property market should be manageable. First, the size of the direct exposure of banks to the property market is not very large. By June 2017, only 6% of bank loans had been extended to developers. The share of mortgages in total bank loans was a little higher at around 18%. Second, or more importantly, in view of the potential risks associated with overheated property markets, Mainland authorities had already rolled out prudential measures. For instance, banks had tightened their loan underwriting standards to developers, especially the smaller and more vulnerable ones. For mortgage borrowers, their leverage level remained low thanks to macro-prudential measures in place, such as the tightened down-payment requirements. By June 2017, the outstanding size of mortgages was only equivalent to around 35% of the total household deposits.

While the direct exposure of banks to the property market should be manageable, the bank exposure to the property market through the collateral channel should not be ignored, given the key role played by the property market in the collateral-based lending system in Mainland China.

In particular, to access credit in financial markets, most borrowers in Mainland China are required to hold collateral[4], the majority of which seemed to be properties and land following the development of the real estate markets. According to the statistics compiled by the Ministry of Land and Resources, the total area of land being used as collateral in 84 major cities increased notably by about 120% from 2009 to 2015 (Chart B2.2). The amount of loans backed by land also rose from RMB2.6 trillion to RMB11.3 trillion during the same period.

[4] According to the latest World Bank Enterprise Survey, collateral was required for around 80% of corporate loans in Mainland China in 2012, and on average, the value of collateral was around 200% of the loan borrowed. In comparison, in some economies, such as the US and Italy where bank lending is risk-based, most borrowers can still access credit, even if they do not hold collateral (Kunieda and Shibata (2011) and Fabbri and Padula (2004)).

Chart B2.2
Land area pledged as collateral in 84 major cities and size of collateralised loans



Source: Ministry of Land and Resources.

The amount of bank loans secured by land and properties together could be even larger, but there is little publicly available information on this. Some anecdotal evidence, for instance, a report by the IMF issued in 2011, pointed out that 30-45% of loans in the five biggest Mainland banks were found to be backed by collateral, the majority of which was real estate.

Given the key role played by the property market in the collateral-based lending system in Mainland China, it is not surprising that property prices, or the value of collateral, will affect firms' borrowing behaviour and therefore banks' exposure to the property market as well as loan quality. However, there have been few studies on this issue, most likely due to data limitation. To fill this gap and shed some light on the risk associated with banks' exposure to the property market, this study looks at the effect of property prices on corporate borrowing through the collateral channel.

Empirical framework

To estimate how property prices, or the value of collateral, could affect firms' borrowing behaviour, we employ the approach of Banerjee and Blickle (2016), and Adelino et. al. (2015) to explain the growth of corporate debt by a set of variables as follows,

$$\Delta \boldsymbol{Debt} = \boldsymbol{f}(\boldsymbol{Firm\ Characteristics}, \Delta \boldsymbol{House\ Price}, \boldsymbol{Controlling\ Variables}),$$

where $\Delta \boldsymbol{Debt}$ is firms' annual debt growth proxied by annual changes in firms' total liabilities and $\Delta \boldsymbol{House\ Price}$ is the change in the average property prices in the province where the head office of a firm is located.

Apart from the changes in property prices, firm characteristics such as cash position, leverage, profitability and total sales that can reflect a firm's financial positions or operating conditions are also included in the specification, as these factors are relevant to the firm's demand for funds as well as the availability of funds for the firm.

To single out the collateral effect of property prices on corporate borrowing, we also include some controlling variables. For instance, industrial sales growth is included to control for the fact that firms borrow more not because of increased collateral value, but because these firms are in the property-related industries and therefore borrow more to expand when the property market booms. Provincial GDP growth is also included as higher GDP growth may lead to both higher property prices and faster loan growth in a particular province. In addition, time dummy is added to the specification to control for other common factors such as monetary conditions that may drive both overall debt growth and property prices.

Data and results

Using a firm-level panel dataset covering around 2,600 non-financial listed Mainland companies from 2007 to 2015[5], matched with provincial property price changes, our results suggest that on average the debt growth of Mainland corporates seemed to have increasingly reacted to housing prices. Specifically, property prices appeared to have little impact on corporate debt growth in an earlier sample period from 2007 to 2010, as the coefficient is not significant (Table B2.A). In more recent years, however, Mainland corporate debt growth seemed to have positively reacted to property prices. In particular, our results show that for the sample period 2011–2015, on average a one percentage point increase in housing price growth would lead to around a 0.9 percentage point increase in corporate debt growth.

One interesting question is whether borrowings by financially constrained firms in Mainland China would have reacted differently to housing prices compared with large or SOEs which usually have better access to credit markets. By financially constrained firms, we refer to either firms with the smallest 30% of asset size in the sample, or firms that are not SOEs. To answer this question, we introduce the interaction term between the dummy variable for financially constrained firms and the changes in housing prices into the specification[6]. If property prices matter more for financially constrained firms, a statistically significantly positive coefficient of the interaction term should be detected.

Table B2.A
Estimated impact of property prices on corporate borrowing

	Benchmark	Smaller firms as financially constrained firms	Non-SOEs as financially constrained firms
	Full sample		
ΔHouse price (t)	0.363	0.392	0.597*
ΔHouse price (t)* dummy for financially constrained firms		-0.139	-0.422
Total effect of Δhouse price (t)	*0.363*	*0.253*	*0.175*
	2007-2010		
ΔHouse price (t)	-0.021	-0.066	-0.331
ΔHouse price (t)* dummy for financially constrained firms		0.271	0.661*
Total effect of Δhouse price (t)	*-0.021*	*0.206*	*0.330*
	2011-2015		
ΔHouse price (t)	0.927**	0.414	0.644
ΔHouse price (t)* dummy for financially constrained firms		1.970**	0.462
Total effect of Δhouse price (t)	*0.927***	*2.384****	*1.106***

Note: ***, ** and * denote the estimated coefficient is statistically significant at 1%, 5% and 10% respectively. The significance of *Total effect of Δhouse price* reports the *p*-value of the joint significance of the interaction term and Δhouse price. Independent variables include liquidity, leverage, profitability and total sales of a firm, industry sales growth, and provincial GDP growth. Time and firm dummies are also included in the panel model.

Our results indeed pointed to a positive and statistically significant coefficient for the interaction term between smaller firms and housing price growth for the sample period 2011–2015 (Table B2.A), suggesting that house prices were more relevant for smaller firms to get access to credit markets in recent periods. However, the coefficient of the interaction term between non-SOEs and housing price growth is found to be positive, but not statistically significant for the sample period 2011–2015. In comparison, the borrowing by larger firms or SOEs in Mainland China is found, in general, to be little affected by property price changes.

In a robustness check, we divide our sample by smaller versus larger firms and non-SOEs versus SOEs, and then re-estimate our model for each sub-sample for the period of 2011–2015. The results of the split sample analyses are reported in Table B2.B. The coefficients of housing price growth for the sub-samples of smaller firms and non-SOEs are found to be statistically significantly positive, while the coefficients of housing price growth for larger firms and SOEs

[5] To focus on the exposure of banks to property markets through the collateral channel, property developers are therefore excluded from our sample.

[6] There is no need to include the dummy variable for financially constrained firms into the specification as firm-level dummies have already been included in the panel regression.

are found to be statistically insignificant. This suggests that the strong correlation between housing price changes and corporate debt growth for the full sample is likely driven by smaller or private firms, which are deemed to have difficulty in gaining access to financial markets.

Table B2.B
Estimated impact of property prices on corporate borrowing during 2011–2015: split sample analyses

	Smaller vs larger firms		Non-SOEs vs SOEs	
	Smaller	Larger	Non-SOEs	SOEs
ΔHouse price (t)	2.689***	0.227	1.664***	0.395

Note: ***, ** and * denote the estimated coefficient is statistically significant at 1%, 5% and 10% respectively. Independent variables include liquidity, leverage, profitability and total sales of a firm, industry sales growth, and provincial GDP growth. Time and firm dummies are also included in the panel model.

These findings actually help alleviate the concern that our results are driven by reverse causality, that is, firms borrow to invest in property markets and thus drive up property prices. If this is the case, we should have observed a much stronger correlation between the debt growth of financially less constrained firms and property prices. Instead, we find the opposite.

Conclusion

Using data of non-financial listed companies and provincial property prices in Mainland China, this study finds that collateral value matters for corporate borrowing in recent years. In particular, we find that property price changes have a positive effect on firms' debt growth, especially for financially constrained firms such as smaller and non-state-owned companies.

Our findings, therefore, suggest that collateral-based lending may help alleviate financing difficulties facing smaller or private Mainland firms, given that the Mainland financial sector remains under-developed and information asymmetries prevail.

However, the use of properties and land as collateral may lead to a pro-cyclical swing in the indebtedness of smaller or private firms. For instance, a property market boom may result in faster accumulation of corporate debt, which may in turn exacerbate the vulnerability facing the financial system. A property market bust, on the other hand, may lead to a sudden decline or even a stop in bank lending to corporates, which would, in turn, cause refinancing problems for firms, or even jeopardise firms' business operations and therefore their repayment ability. Meanwhile, the declines in collateral value would also result in a deterioration in loan quality.

In this sense, the exposure of banks to property markets through the collateral channel also warrants close monitoring together with banks' direct exposure.

Our study, however, has some caveats. First, the sample period is relatively short due to data limitation. Secondly, this study tried to link property prices to corporate borrowing in Mainland China. However, Mainland property markets have barely experienced meaningful busts during our sample period. Lastly, this study focuses only on banks' exposure to the property market through the collateral channel, although property markets can indirectly affect financial stability through many other ways. For instance, property prices can affect the revenue of local governments as well as the profitability of local government financing vehicles and, in turn, their repayment ability. Also, the wealth of households and the growth in upstream and downstream industries of the property sector can also be affected by property market performance, which would also have a feedback effect on banks' asset quality and therefore financial stability. These indirect effects of the property market on financial stability are not covered in this study, which therefore warrant further research.

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Fabbri, Daniela and Padula, Mario. 2004. "Does poor legal enforcement make households credit-constrained?" *Journal of Banking and Finance*, 28(10): 2369–2397.

Kunieda, Takuma and Shibata, Akihisa. 2011. "Collateral Constraints and Legal Protection of Lenders: A Macroeconomic Perspective," MPRA Paper 35356, University Library of Munich, Germany.

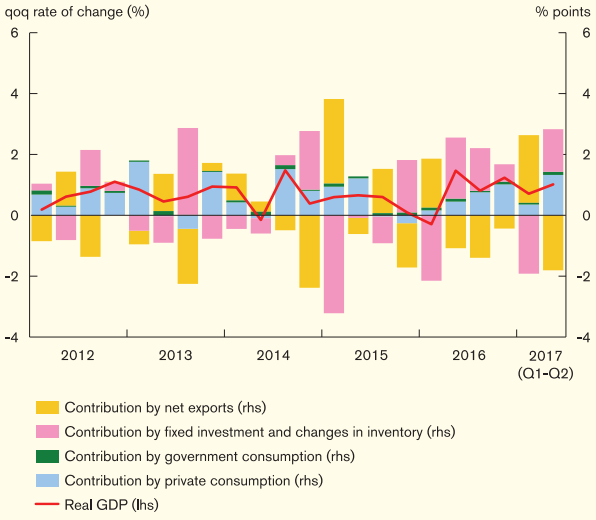
3. Domestic economy

The Hong Kong economy sustained its growth momentum during the first half of 2017 underpinned by the strength in domestic demand. Growth momentum in the second half is expected to be slightly slower but still solid amid a higher comparison base. This outlook is subject to various uncertainties including those from US monetary policy normalisation and heightened geopolitical tensions. Local inflationary pressures are likely to stay moderate with soft imported inflation and a stable increase in local costs in the near term.

3.1 Real activities

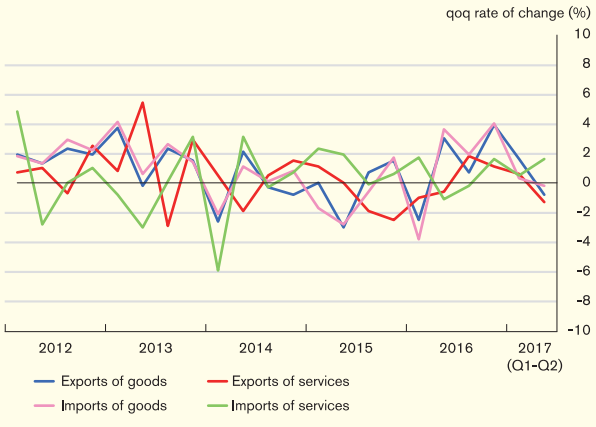
The Hong Kong economy maintained its sequential growth in the first half of 2017. On a seasonally adjusted quarter-on-quarter basis, real Gross Domestic Product (GDP) grew by 0.7% in the first quarter and 1.0% in the second, similar to the average growth rate of 1% over the preceding two quarters (Chart 3.1). Compared with the second half of 2016, private consumption held up well and continued to be one of the major contributors to GDP growth. The resilience in private consumption was partly attributable to robust job and income conditions as well as sanguine consumer sentiment. As building and construction activities remained active and capital expenditure picked up on improving business sentiment, overall investment spending revived towards mid-2017. On the external front, Hong Kong's exports of goods recorded four successive quarters of brisk growth before moderating somewhat in the second quarter (Chart 3.2). Exports of services fell back due in part to reduced demand for tourism-related services. Growth in imports of services continued amid strong travel interest among residents. Overall, net exports contributed positively to GDP growth in the first quarter, but turned into a drag on growth in the second.

Chart 3.1
Real GDP growth and contribution by major expenditure components



Sources: C&SD and HKMA staff estimates.

Chart 3.2
Exports and imports in real terms



Source: C&SD.

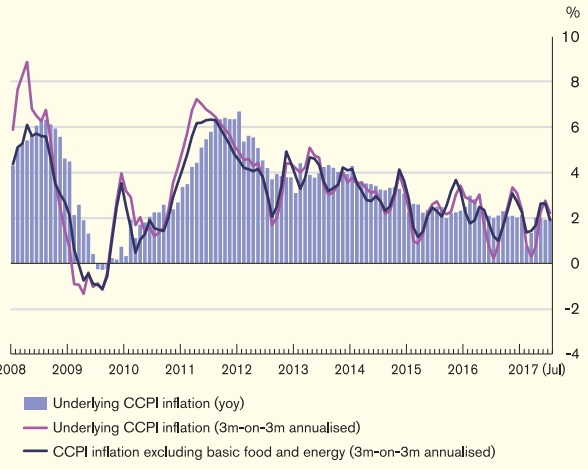
The favourable economic growth created more jobs in the first half of the year. Total employment rose by around 0.9% during the period, to over 3,800,000, led by increases in public administration, the social and personal services sector, and the retail, accommodation and food services sector. As real output growth outweighed employment growth, labour productivity improved cyclically as a result.

In the second half of the year, the Hong Kong economy is expected to sustain its growth momentum, albeit at a slightly softer, but still solid pace, amid a higher comparison base in the first half. Externally, the gradual recovery in world economic growth, international trade flows, global manufacturing activities and visitor arrivals in Hong Kong should continue to benefit Hong Kong's export performance. Domestically, private consumption is likely to hold up, underpinned by the resilient labour market. As for fixed investment, improved economic conditions will stimulate capital spending, while rising private housing supply in the primary market will support building and construction activities. For 2017 as a whole, the Government, taking into account the solid data in the first half, has revised upwards its range forecast of real GDP growth to 3–4% from 2–3% as announced earlier in February. Private-sector analysts have also recently adjusted upwards their growth forecasts to an average of 3.3%. That said, this growth outlook is subject to various uncertainties in the external environment as highlighted in the previous chapter, as well as Mainland's economic performance and the pace of recovery in inbound tourism.

3.2 Inflation and unemployment

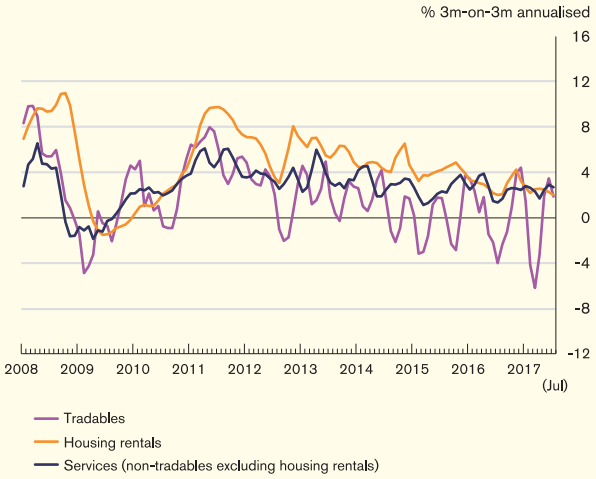
Local inflationary pressures stayed moderate in the first half of 2017, although the sequential momentum has been accelerating in recent months. On a year-on-year comparison, the underlying composite consumer price index (CCPI) picked up to 2.0% in the second quarter from 1.4% in the first quarter (Chart 3.3). Inflation momentum, as measured by the annualised three-month-on-three-month underlying inflation rate, also rose from 0.8% in April to 2.2% in July. The stronger inflation momentum was mainly driven by price increases in tradables (Chart 3.4) as their price inflation turned positive to 2.4% in the three months ending July from a negative territory in the preceding three-month period. Growth in the housing rental component of the CCPI remained soft in the first half of 2017 amid the feed-through of the earlier moderation in private residential rentals (Chart 3.5).

Chart 3.3
Different measures of consumer price inflation



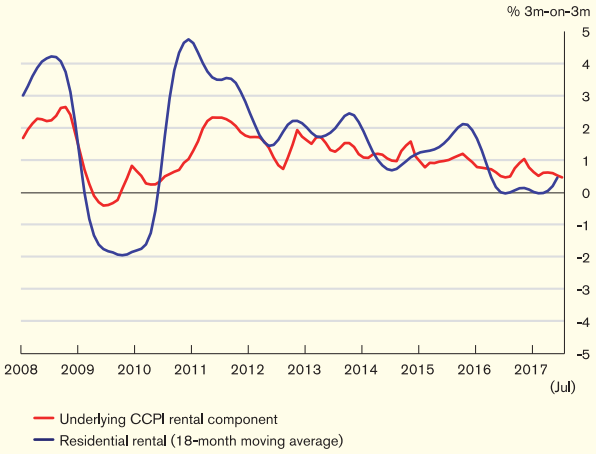
Sources: C&SD and HKMA staff estimates.

Chart 3.4
Consumer price inflation by broad component



Sources: C&SD and HKMA staff estimates.

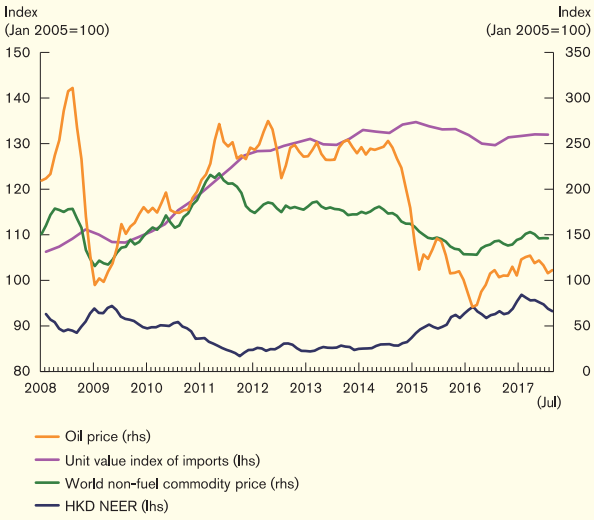
Chart 3.5
CCPI rental component and market rental



Sources: C&SD and Rating and Valuation Department.

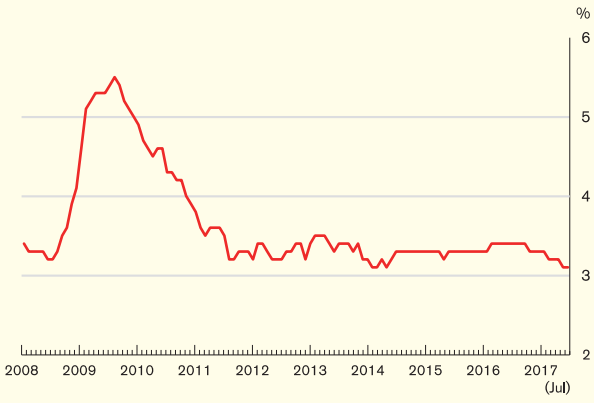
In the near term, inflationary pressures are likely to be limited on the back of low imported inflation and moderate rises in local costs. Despite the recent rebound, external price pressures are expected to stay contained amid the mild recovery in global commodity prices (Chart 3.6). Domestically, notwithstanding the tightness in the labour market, with the seasonally adjusted unemployment rate easing from 3.4% in 2016 to 3.2% in the first half of 2017 (Chart 3.7), growth in labour costs has been modest in recent quarters. Real payroll per person rose by 1.2% in the fourth quarter of 2016 and 0.6% in the first quarter of 2017 (Chart 3.8). As the output gap is estimated to remain close to zero in the second quarter of 2017, local inflationary pressures are expected to remain tame. On the whole, the annual year-on-year inflation rate in 2017 is expected to ease, with the Government forecasting an annual underlying inflation rate of 1.8%, down from 2.3% in 2016.

Chart 3.6
Commodity and import prices



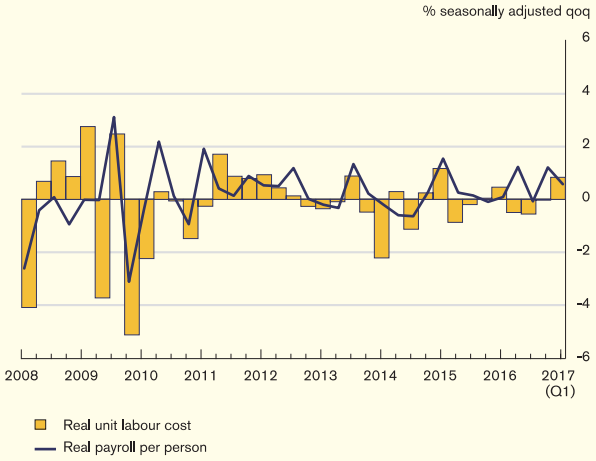
Sources: C&SD and IMF.

Chart 3.7
Unemployment rate



Source: C&SD.

Chart 3.8
Unit labour cost and payroll per person



Sources: C&SD and HKMA staff estimates.

The risks to inflation outlook are tilted to the upside. The recent recovery in inbound tourism, if strengthened further, could render extra support to business performance and wage growth in retail-related industries in the period ahead. Although the upward momentum in residential property prices has shown some signs of softening since early July, the still low mortgage interest rates and stable labour market conditions could continue to support the property market and rentals in the near term. All these factors, if materialised, could bolster inflation momentum in the near term.

4. Monetary and financial conditions

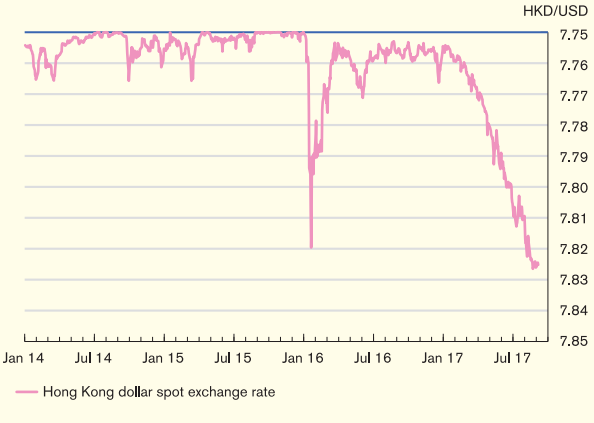
Exchange rate, capital flows and monetary developments

The Hong Kong dollar interest rates remained soft given the ample liquidity in the banking system and despite rises in US dollar interest rates. The Hong Kong dollar spot exchange rate eased gradually amid widening negative HIBOR-LIBOR spreads. Underpinned by low funding costs and improved economic conditions, loan growth accelerated during the first half. Looking ahead, the Hong Kong dollar exchange rate may ease during the US monetary policy normalisation process, which is a natural process under the currency board system.

4.1 Exchange rate and capital flows

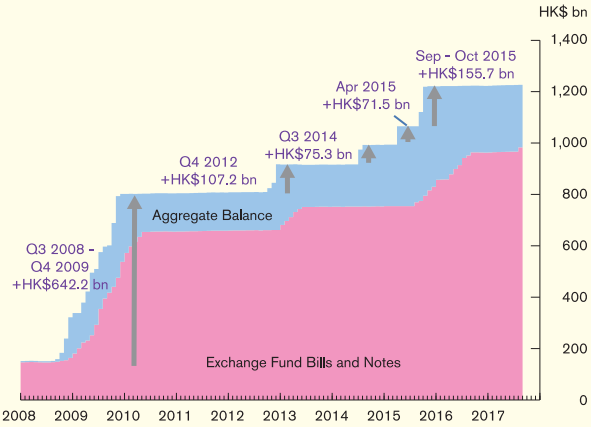
The Hong Kong dollar spot exchange rate eased gradually between February and August, and surpassed the 7.80 mark in June (Chart 4.1). The easing was driven primarily by interest rate arbitrage activities amid the widening of negative HIBOR-LIBOR spreads. Specifically, the spread continued to widen during the review period as abundant Hong Kong dollar liquidity kept Hong Kong interest rates, particularly those at the short-end, soft, while the Fed made three interest rate hikes from December 2016 to June 2017. During the review period, the Convertibility Undertaking (CU) was not triggered (Chart 4.2).

Chart 4.1
Hong Kong dollar exchange rate



Source: HKMA.

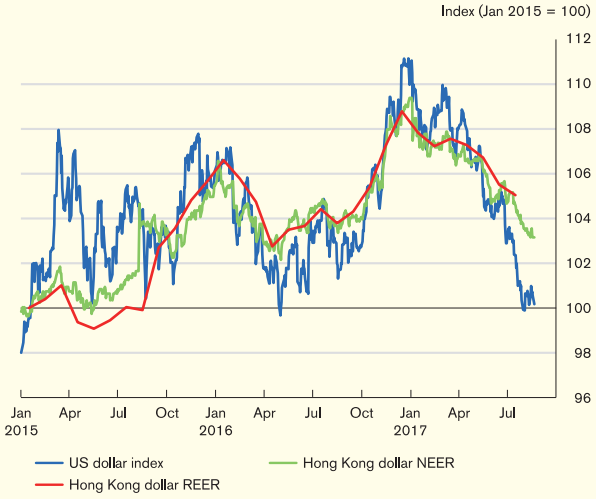
Chart 4.2
Fund flow indicators



Source: HKMA.

Due to the weakening in the US dollar, the Hong Kong dollar nominal effective exchange rate index (NEER) decreased by 6.4% between January and August (Chart 4.3). The Hong Kong dollar real effective exchange rate index (REER) continued to move closely with the NEER, given the small inflation differential between Hong Kong and its trading partners, which had a limited impact on the movement of the REER.

Chart 4.3
Nominal and real effective exchange rates



Note: REER is seasonally adjusted and only available on a monthly basis.
Sources: C&SD and HKMA staff estimates.

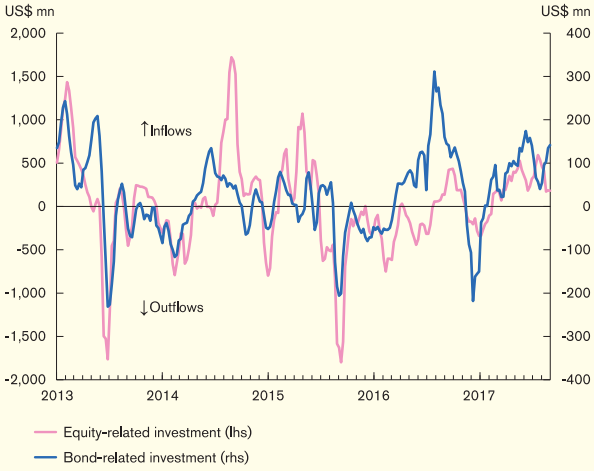
Portfolio investment saw inflows by non-residents in the first half of 2017. According to the latest Balance of Payments (BoP) statistics, there were debt portfolio investment inflows by both residents and non-residents in the first quarter amid improved market sentiment towards Asian bond markets since the beginning of the year (Table 4.A).[7] Data based on a survey from global mutual funds suggest that bond inflows remained robust going into the second quarter (Chart 4.4). While the BoP statistics for equity investment showed large outflows by residents in the fourth quarter of 2016 and the first quarter of 2017, there were equity inflows by non-residents in the first quarter of 2017, the same trend as other Asian market. And, data from a mutual funds survey pointed to continued equity inflows in the second quarter.

Table 4.A
Cross-border portfolio investment flows

	2014	2015	2016				2017
(HK$ bn)			Q1	Q2	Q3	Q4	Q1
By Hong Kong residents							
Equity and investment fund shares	-318.2	-420.2	22.5	-45.6	-9.4	-198.8	-64.1
Debt securities	42.1	-241.0	111.6	-19.9	-262.1	40.6	108.0
By non-residents							
Equity and investment fund shares	136.7	-329.7	-48.5	41.4	37.2	-10.9	14.2
Debt securities	75.0	20.0	-0.9	5.2	20.6	-8.6	44.9

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

Chart 4.4
Market survey of equity and bond-related flows



Note: Data refer to moving four-week sums.
Source: EPFR Global.

Looking ahead, interest rate arbitrage activities are expected to lead to the easing of the Hong Kong dollar exchange rate as the US monetary policy normalisation process continues. The possibility of triggering the weak-side CU should not be ruled out. This is a natural process under the currency board system.

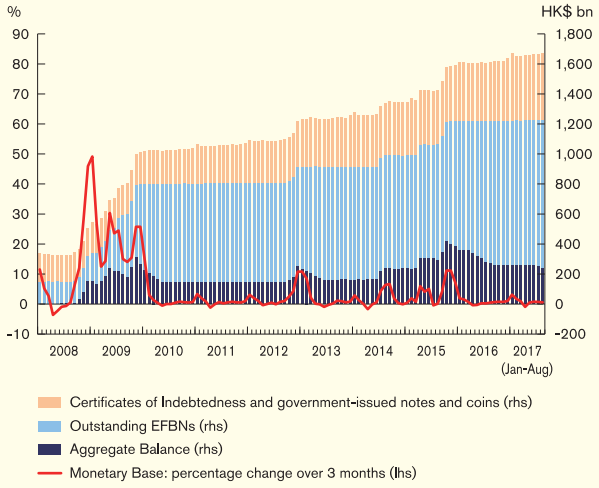
Nevertheless, the direction of the Hong Kong dollar fund flows will not only depend on the pace of US interest rate normalisation and any potential impact stemming from the Fed's balance sheet normalisation, but also on non-residents' demand for Hong Kong dollar financial and real assets.

[7] At the time of writing, the second-quarter BoP statistics were not yet available.

4.2 Money and credit

Hong Kong's monetary environment remained accommodative in the first half of 2017, despite concerns about the US interest rate hikes and the Fed's plan to reduce its balance sheet. The Hong Kong dollar Monetary Base increased modestly by 1.7% during the first half, mainly due to the increases in Certificates of Indebtedness for banknote issuances (Chart 4.5). While the Hong Kong dollar eased gradually against the US dollar, the weak-side CU was not triggered. As a result, the total of the Aggregate Balance and the outstanding Exchange Fund Bills and Notes (EFBNs) remained stable, closing at HK$1,225.6 billion at the end of June.[8]

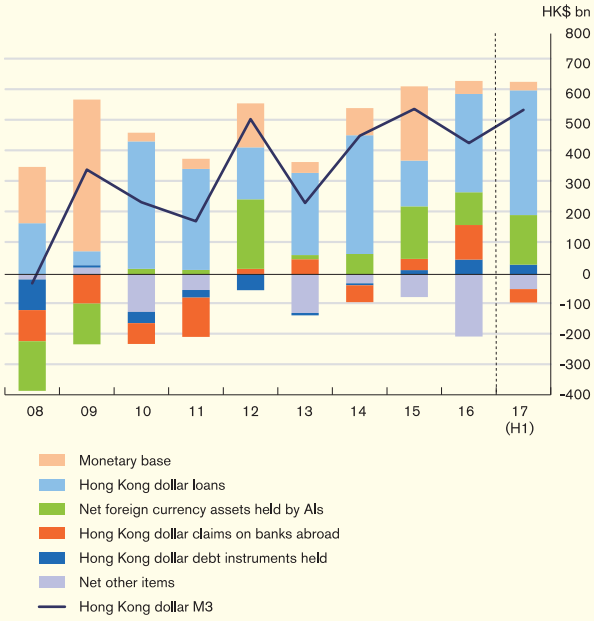
Chart 4.5
Monetary Base components



Source: HKMA.

Notwithstanding the slight increase in the Monetary Base, the Hong Kong dollar monetary aggregate expanded at a relatively fast pace. In particular, growth in the Hong Kong dollar broad money supply (HK$M3) accelerated further to 8.9% in the first half of 2017 from 6.5% in the second half of 2016. As the major component of HK$M3, Hong Kong dollar deposits grew faster by 9.2% in the first half (Chart 4.7) on the back of strengthened economic activities as well as equity-related money demand amid improved market sentiment. Analysis by the asset-side counterparts suggests the growth in HK$M3 was mainly due to money creation through credit expansion and net Hong Kong dollar inflows into the non-bank private sector. This was reflected by the growth in Hong Kong dollar lending and banks' net foreign currency assets respectively (Chart 4.6).

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



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

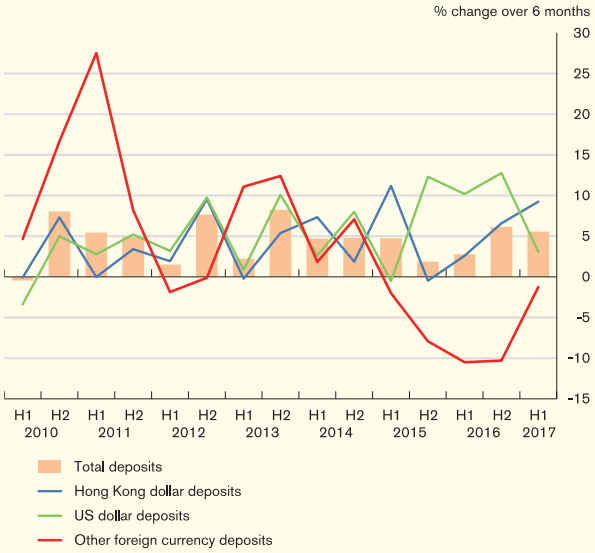
Source: HKMA staff estimates.

By contrast, growth in foreign currency deposits decelerated, mainly through slower growth in US dollar deposits. In the first half, US dollar deposits grew by 3.0% compared with a stronger increase of 12.8% in the preceding half-year period (Chart 4.7), along with the US dollar depreciation against most major currencies. Other foreign currency deposits continued to decline but at a slower pace of 1.2%, reflecting signs of stabilisation in renminbi deposits,

[8] On 9 August, the HKMA announced issuances of additional Exchange Fund Bills in August and September, totalling HK$40 billion to meet banks' increased demand for liquidity management. This is consistent with Currency Board Principles, representing a change in the composition of the Monetary Base from the Aggregate Balance to the outstanding EFBNs. The interbank liquidity remained abundant after the additional issuances of the Exchange Fund Bills.

particularly during the second quarter. On the whole, total deposits with authorized institutions (AIs) grew at a roughly steady pace of 5.6% in the first half, compared with 6.2% in the second half of 2016.

Chart 4.7
Deposit growth

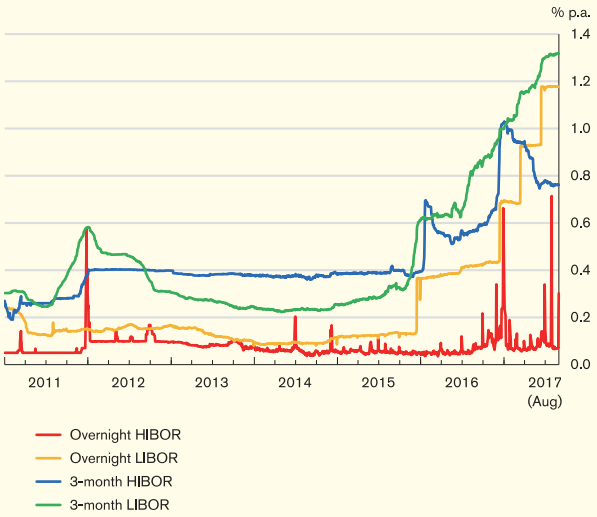


Source: HKMA.

Despite the rise in US dollar interbank interest rates and the upward adjustment of the HKMA Base Rate[9], the Hong Kong dollar interbank interest rates trended downwards partly reflecting ample liquidity in the banking system. For instance, the overnight and three-month HIBOR fixings decreased by 36 and 26 basis points over the first eight months, closing at 0.30% and 0.76% respectively at the end of August (Chart 4.8). As such, the negative spreads between the Hong Kong dollar and the US dollar interbank rates widened. Against this background, Box 3 analyses the fundamental drivers of the Hong Kong dollar-US dollar interbank interest rate spreads and how they can explain the recent widening of the negative spreads.

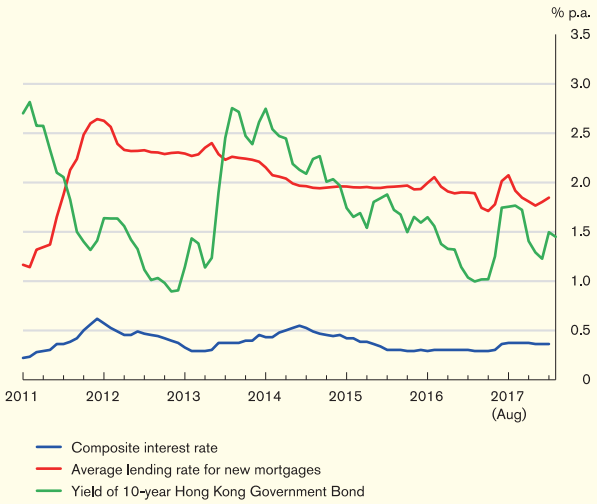
Meanwhile, the long-term Hong Kong Government Bond yields experienced bigger drops in comparison with their US counterparts, with yield of the 10-year Hong Kong Government Bond falling by 56 basis points to 1.38% at the end of August (Chart 4.9).[10]

Chart 4.8
Hong Kong dollar and US dollar interbank interest rates



Sources: CEIC and HKMA.

Chart 4.9
Yield of the 10-year Government Bond, the composite interest rate, and the average lending rate for new mortgages



Sources: HKMA and staff estimates.

[9] During the first half of 2017, the HKMA Base Rate was adjusted upwards by 50 basis points from 1.00% at the end of 2016 to 1.50% at the end of June. The increase in the Base Rate followed an upward shift totalling 50 basis points in the target range for the US federal funds rate during the period, in accordance with the revised formula announced on 26 March 2009.

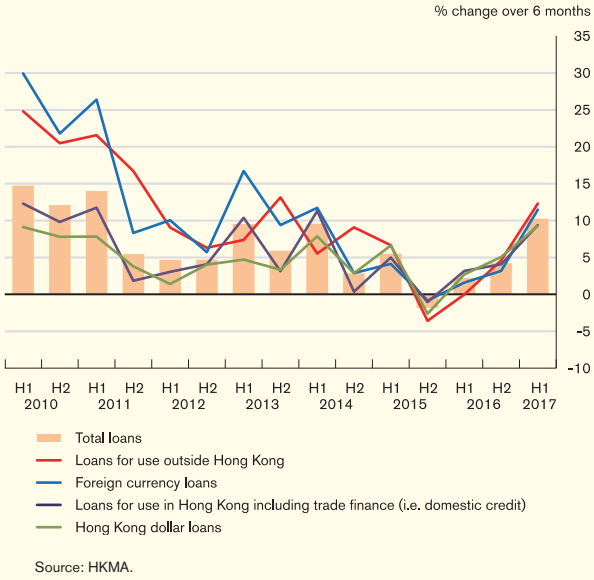
[10] During the same period, the 10-year US Treasury yield declined slightly by 33 basis points to 2.12% at the end of August.

As the Hong Kong dollar interbank rates continued to stay low and the deposit base remained sizeable, there was no noticeable upward pressure on retail-level interest rates. The composite interest rate, as an indicator of retail banks' Hong Kong dollar funding cost, remained steady at a low level of around 0.31% over the first seven months of 2017 (Chart 4.9). As for mortgage interest rate, banks' average lending rate for new mortgages gradually declined from 2.01% in December 2016 to 1.76% in May amid low funding costs and fierce competition in the mortgage market. The average mortgage rate edged up to 1.85% in July as some banks increased the pricing spreads of HIBOR-based mortgages after the eighth round of prudential measures for mortgage lending was announced on 19 May.

Looking ahead, Hong Kong dollar interest rates will eventually face more significant upward pressure as US monetary policy normalisation continues. The pace and magnitude of rises in the Hong Kong dollar interest rates would hinge on the pace of US monetary policy normalisation, the pattern of fund flows and the tightness in domestic liquidity conditions.

Bank credit grew rapidly, underpinned by the low funding costs and improved economic environment. Total loan growth accelerated to 10.2% (or an annualised 20.5%) in the first half of 2017 from 4.2% in the preceding half-year period (Chart 4.10), with Chinese banks being particularly active in the loan business. The strong growth in total loans was broad-based, with both loans for use in and outside Hong Kong registering strong growth. Analysed by currency, both Hong Kong dollar and foreign currency loans picked up strongly by 9.3% and 11.5% respectively.

Chart 4.10
Loan growth

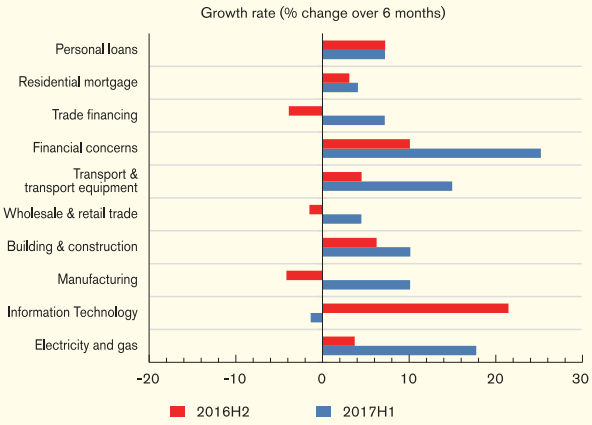


Source: HKMA.

Specifically, loans for use in Hong Kong (including trade finance) expanded by an accelerated 9.4% in the first half, with loans to most of the major business sectors witnessing faster growth (Chart 4.11). Loans to financial concerns registered a notable 25.2% rise in the first half, in part reflecting increased funding demand for business expansion amid better prospects in the local financial services industry. Loans to building, construction and property development also expanded faster, partly reflecting strong financing activities for land acquisitions and property development projects.[11] Growth in trade finance and loans to manufacturing, wholesale and retail trade reverted to positive territory along with the continued improvement in the value of merchandise trade and retail sales.

[11] In view of recent development that some property developers used high gearing to finance land acquisition and development projects, the HKMA announced on 12 May measures to strengthen banks' credit risk management for loans to property developers. For construction financing, since 1 June, AIs are required to lower the financing caps respectively to 40% of the site value and 80% of the construction cost, with an overall cap lowered to 50% of the expected value of the completed properties.

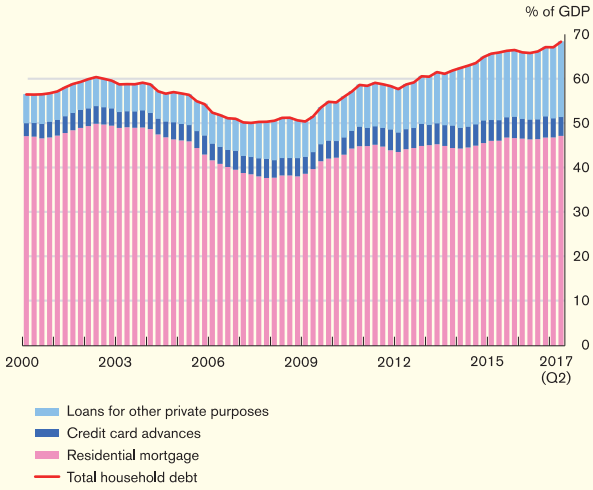
Chart 4.11
Growth in domestic loans by selected sectors



Source: HKMA.

Despite seeing a moderate expansion relative to loans to business sectors, household debt grew by an accelerated 5.0% in the first half following a 4.3% increase in the preceding half-year period. Within the household debt, personal loans (which comprise credit card advances and loans for other private purposes) continued to record robust growth of 7.2%, partly reflecting better economic and financial environment (Chart 4.11). With mortgage interest rates still at low levels and strong property market sentiment particularly since March, growth in residential mortgage loans quickened from 3.1% in the second half last year to 4.1% in the first half of 2017. Reflecting the fast growth in household loans, the household debt-to-GDP ratio climbed higher to 68.3% in the second quarter of 2017 from 67.1% in the fourth quarter of 2016 (Chart 4.12).

Chart 4.12
Household debt-to-GDP ratio and its components



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

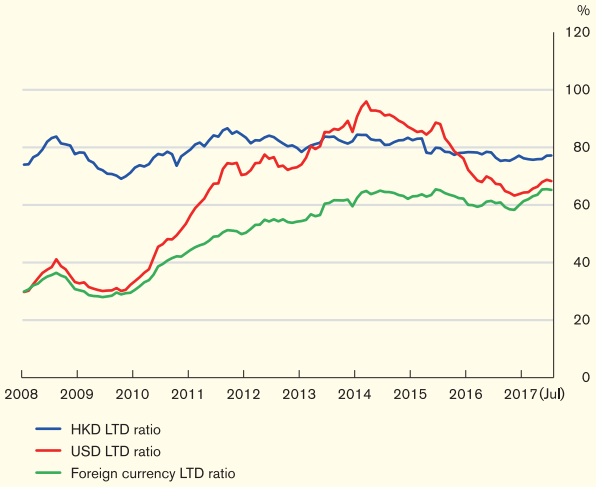
Loans for use outside Hong Kong rose notably faster by 12.3% during the first half due to increases in funding demand from domestic and multinational corporations amid the improved external environment.

Funding demand from Mainland enterprises picked up significantly during the review period. For the banking sector as a whole[12], Mainland-related lending grew faster by 11.9% in the first half compared with 3.6% in the preceding half-year period. Despite the concerns about rapid credit growth, the credit risk associated with Mainland-related lending should be manageable as 76% of borrowers were Mainland state-owned enterprises and non-Mainland multinational companies. Although lending to Mainland private entities rose significantly during the first half of 2017, the majority of loans were secured by collaterals and/or guarantees. Nevertheless, in view of the fast credit growth, banks should continue to maintain prudent underwriting standards and strengthen risk management for their Mainland-related lending.

[12] Including AIs' Hong Kong offices, Mainland branches and subsidiary banks in Mainland China.

Banks' funding conditions were broadly stable underpinned by a large deposit base, despite the strong credit growth. As Hong Kong dollar loans and deposits expanded roughly at the same pace, the Hong Kong dollar loan-to-deposit (LTD) ratio stayed virtually unchanged at 77.1% at the end of June compared to six months ago (Chart 4.13). On the other hand, the overall foreign currency LTD ratio moved up from 59.9% at the end of 2016 to 65.5% at the end of June as foreign currency loans grew faster than deposits. Although the US dollar LTD ratio picked up from 63.8% to 68.8% during the same period, the level remained low compared with the high of over 90% in 2014.

Chart 4.13
LTD ratios



Source: HKMA.

Looking ahead, loan growth momentum may continue to be supported by the improving domestic and external environment as well as potential funding needs for infrastructure investments. According to the HKMA Opinion Survey on Credit Condition Outlook, banks expect to be more neutral on the growth of credit demand in the near term (see Table 5.A in Chapter 5).

Offshore renminbi banking business

The offshore (CNH) and the onshore (CNY) renminbi exchange rate strengthened against the US dollar (Chart 4.14), in part reflecting the improved economic conditions in Mainland China and the weakening of the US dollar against most major currencies. However, with some momentary tightening of liquidity in the offshore market, the CNH strengthened more than the CNY in late May, as indicated by notable positive CNY-CNH spreads. The tight liquidity conditions largely eased moving into the third quarter and the spread narrowed significantly.

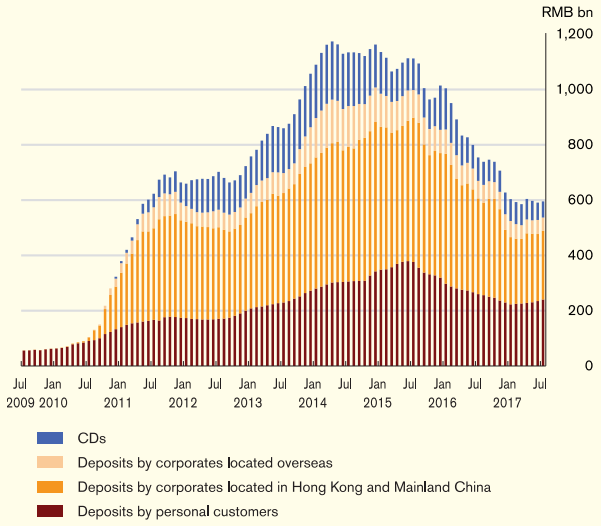
Consistent with the recent improvement in liquidity in the offshore market, the three-month CNH HIBOR fixings fell from the high of 7.00% in June to 3.97% at the end of August. Some retail banks also reduced their preferential renminbi deposit rates.

Chart 4.14
CNY and CNH exchange rates and interbank interest rates

Sources: Bloomberg and CEIC.

Clouded by cautious sentiment in the renminbi exchange rate movements earlier, the offshore renminbi liquidity pool in Hong Kong continued to face downward pressure in early period of 2017, although some signs of stabilisation were seen in the second quarter. Compared with the preceding half-year period, the total outstanding amount of renminbi customer deposits and certificates of deposit (CDs) declined at a slower pace of 5.8% in the first half of 2017 to RMB588.7 billion at the end of June (Chart 4.15 and Table 4.B). Among the total, after falling by 7.2% in the first quarter, renminbi customer deposits reverted to a modest 3.7% increase in the second quarter along with the stabilisation of the renminbi exchange rate, with both personal and corporate customer deposits picking up in the second quarter. On the other hand, outstanding CDs dropped by 20.1% for the first half as a whole, mainly attributable to a relatively large amount of CDs reaching maturity towards the end of June.

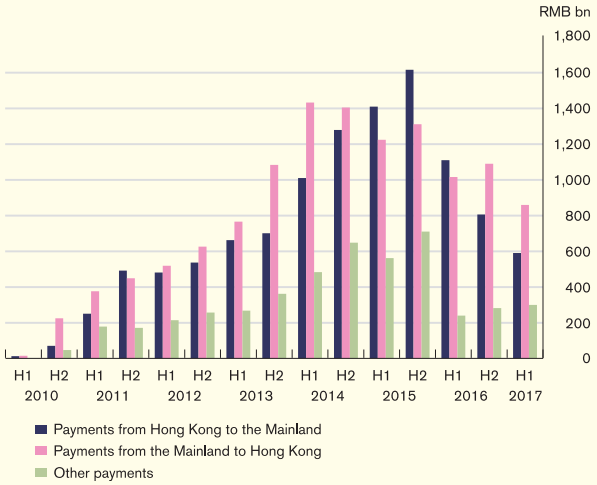
Chart 4.15
Renminbi deposits and CDs in Hong Kong



Source: HKMA.

Other renminbi banking business also consolidated during the first half of 2017. The outstanding amount of renminbi bank loans declined significantly by 30.0% to RMB206.3 billion at the end of June. Renminbi trade settlement handled by banks in Hong Kong declined to RMB1,749.3 billion in the first half, down 19.6% from the second half of 2016, with outward trade remittances to Mainland China dropping more than inward trade remittances to Hong Kong (Chart 4.16).

Chart 4.16
Flows of renminbi trade settlement payments



Source: HKMA.

Nevertheless, the size of the renminbi liquidity pool remained adequate to support a large amount of renminbi payments and financial transactions. The average daily turnover of the renminbi real time gross settlement system continued to stay high at RMB886.2 billion in the first half of 2017, compared with RMB869.0 billion in the same period in 2016.

The development of offshore renminbi business in the period ahead will continue to depend on market expectations of the renminbi exchange rate movements and Mainland's economic prospects, amongst other factors. Hong Kong's offshore renminbi business will likely be supported by the increasing use of renminbi-denominated assets through the ongoing initiatives of Mainland's capital account liberalisation.[13] In addition, with increasing regional and international co-operation under the Belt and Road Strategy, it is expected that Hong Kong could benefit from the international use of the renminbi through renminbi business links with other regions. Against the background of continued renminbi internationalisation, Box 4 analyses to what extent the renminbi has been perceived as a safe-haven currency over the past few years.

Table 4.B
Offshore renminbi banking statistics

	Dec 2016	Jun 2017
Renminbi deposits & certificates of deposit (CDs) (RMB bn)	625.1	588.7
Of which:		
Renminbi deposits (RMB bn)	546.7	526.1
Share of renminbi deposits in total deposits (%)	5.2	4.9
Renminbi certificates of deposit (CDs) (RMB bn)	78.3	62.6
Renminbi outstanding loans (RMB bn)	294.8	206.3
Number of participating banks in Hong Kong's renminbi clearing platform	210	207
Amount due to overseas banks (RMB bn)	69.0	87.8
Amount due from overseas banks (RMB bn)	91.6	132.8
	Jan - Jun 2017	
Renminbi trade settlement in Hong Kong (RMB bn)	1,749.3	
Of which:		
Inward remittances to Hong Kong (RMB bn)	859.5	
Outward remittances to Mainland China (RMB bn)	590.3	
Turnover in Hong Kong's RMB RTGS system (Daily average during the period; RMB bn)	886.2	

Source: HKMA.

[13] These include the recent launch of Bond Connect and the expansion of Hong Kong's RQFII quota, which facilitate overseas investors to participate in the Mainland financial markets through Hong Kong's platforms.

Box 3
Analysis on the determinants of HIBOR-LIBOR spreads

The US Fed has increased the target range for the federal funds rate since 2015, but HIBORs have not closely followed. As a result, the HIBOR-LIBOR spreads have generally widened. The overnight HIBOR in particular stayed close to zero, resulting in a much wider negative HIBOR-LIBOR spread than its longer-tenor counterparts. Against this backdrop, this Box studies the determinants of the HIBOR-LIBOR spreads and helps provide a conceptual understanding of the underlying mechanism.[14]

Determinants of HIBOR-LIBOR spreads

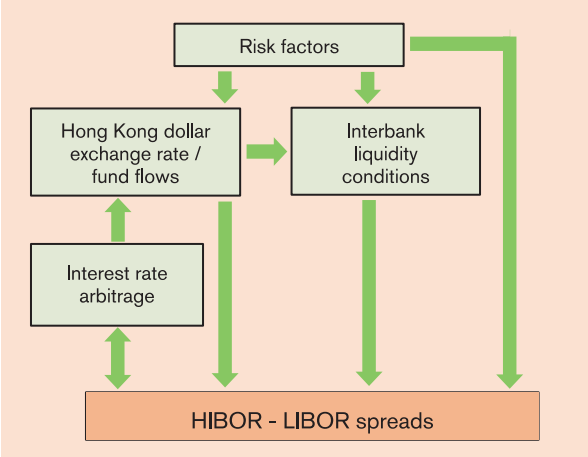
Conceptually, HIBOR-LIBOR spreads are affected by four categories of interacting factors as shown in Chart B3.1. A larger interest rate gap may induce arbitrage activities consistent with the automatic interest rate adjustment mechanism under the Linked Exchange Rate System (LERS) to subsequently narrow the interest rate gap. During the process, if the Hong Kong dollar exchange rate touches the CU and banks trigger the CU, there will be changes in the Aggregate Balance and hence interbank liquidity conditions. Since the Aggregate Balance is a key determinant of the level of HIBORs, arbitrage activities will provide a fundamental force that drives the HIBOR-LIBOR spreads.

Even without arbitrage activities, the interest rate spread could fluctuate due to several transient factors. Specifically, the spread could be affected by variations in domestic interbank liquidity conditions alone. For instance, a higher Hong Kong dollar LTD ratio could raise liquidity pressure in the interbank market and affect HIBORs.

The Hong Kong dollar exchange rate or fund flows could also influence the HIBOR-LIBOR spreads. Under the uncovered interest rate parity conditions, the spreads should be linked to the expectation of the movement in the Hong Kong dollar exchange rate against the US dollar. Besides this direct channel, more Hong Kong dollar inflows could lead to a triggering of the strong-side CU, resulting in looser domestic interbank liquidity conditions. This, in turn, drives the HIBORs down and temporarily widens their spreads with the LIBORs.

Finally, risks that are specific to Hong Kong could also lead to higher HIBORs and larger HIBOR-LIBOR differentials both directly and indirectly through their impact on interbank liquidity conditions and the Hong Kong dollar exchange rate and fund flows. For example, negative shocks leading to a loss in confidence in the Hong Kong dollar would raise the risk premium and result in a rise in the HIBORs directly. At the same time, it could also lead to the selling of Hong Kong dollars and a tightening of interbank liquidity, thereby increasing the HIBOR-LIBOR spreads.

Chart B3.1
Theoretical determinants of HIBOR-LIBOR spreads



Source: HKMA staff illustration.

[14] A longer version of the analysis can be found in the paper by Cheung et al. (2017), "Analysis on the determinants of HIBOR-LIBOR spreads", *Research Memorandum 07/2017*, Hong Kong Monetary Authority.

Table B3.A lists the indicators of the determinants of the HIBOR-LIBOR spreads that we employ in our empirical analysis. Based on this table, we review some of these indicators and their relationship with the interest rate spreads in greater detail below.

Table B3.A
Indicators of the theoretical determinants

Underlying determinants	Indicators
1. Interest rate arbitrage	HIBOR-LIBOR spread (lagged values)
2. Interbank liquidity conditions	Hong Kong dollar LTD ratio
3. Hong Kong dollar exchange rate and fund flows	HKMA's (net) foreign exchange operations
	Monthly equity returns differential – Hang Seng Index vs S&P 500 Index
	HKD/USD exchange rate expectation – information from option prices
4. Risk factors	Standard deviation of daily equity returns – Hang Seng Index vs S&P 500 Index

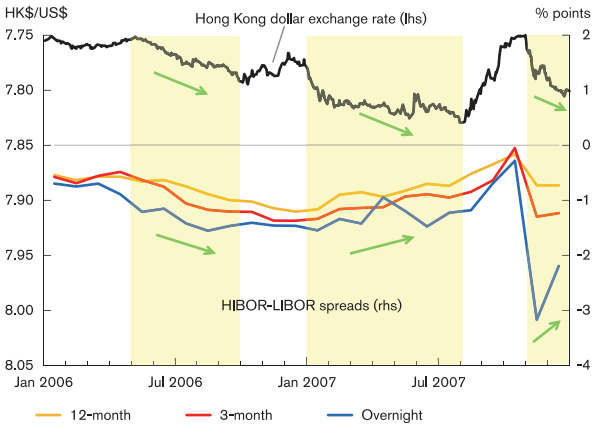
Source: HKMA staff.

Interest rate arbitrage

Under the automatic interest rate adjustment mechanism of the LERS, a larger HIBOR-LIBOR spread can subsequently induce interest rate arbitrage activities that are conducive to the narrowing of the spreads. Such activities, in a narrow sense, feature the triggering of the CU with a corresponding change in the Aggregate Balance. Nevertheless, experience during 2006–2007 showed that when interest carry trade occurred, the negative HIBOR-LIBOR spreads had a tendency to narrow (Chart B3.2). However, the Hong Kong dollar spot exchange rate would weaken, but not necessarily touch the weak-side CU in the short run.

In light of the experience, our empirical analysis defines interest rate arbitrage activities in a broader sense which does not necessarily involve the triggering of the CU. Specifically, we capture the impact of arbitrage activities on the current HIBOR-LIBOR spreads by including the lagged values of the spreads in our empirical model. If arbitrage activities are present, the coefficient should lie between zero and one, meaning that the spreads have a tendency to narrow over time, other things being equal. That said, our model may not fully capture the arbitrage dynamics. For example, regulatory changes that limit the risk-taking capacity of banks after the global financial crisis may have increased the level of HIBOR-LIBOR spreads required for the same level of arbitrage activities to take place.

Chart B3.2
Reported episodes of interest carry trade in 2006–2007



Note: The highlighted areas represent periods of reported interest carry trade.
Sources: CEIC and HKMA.

Hong Kong dollar loan-to-deposit ratio

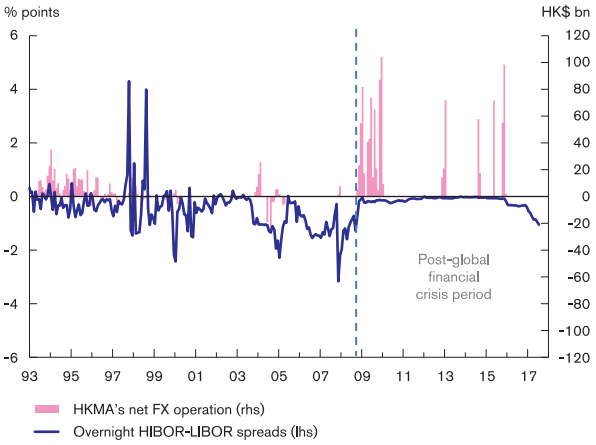
Interbank liquidity conditions, as measured by the Hong Kong dollar LTD ratio, appear to be positively correlated with the HIBOR-LIBOR spreads. For example, even though the US dollar interest rate is unchanged, tighter domestic interbank liquidity – due perhaps to increased funding needs arising from bank clients' loan demand – will exert upward pressure on local interbank rates to increase the HIBOR-LIBOR spreads.

Foreign exchange operations by the HKMA

With the strengthening of the currency board arrangements over the years, the foreign exchange operation by the HKMA has become largely passive, mainly in response to banks' triggering of the CU. These operations could affect the HIBOR-LIBOR spreads through their influence on the supply of domestic interbank

liquidity. An increase in the supply of domestic interbank liquidity caused by the HKMA's foreign exchange operation could have a knock-on effect on HIBORs and therefore decrease the HIBOR-LIBOR spreads (Chart B3.3). However, the negative relationship between the foreign exchange operation and the HIBOR-LIBOR spread has become much weaker following the global financial crisis due to abundant interbank liquidity and interest rates heading towards zero.

Chart B3.3
Interest rate spreads and HKMA's foreign exchange operations



Sources: CEIC and HKMA.

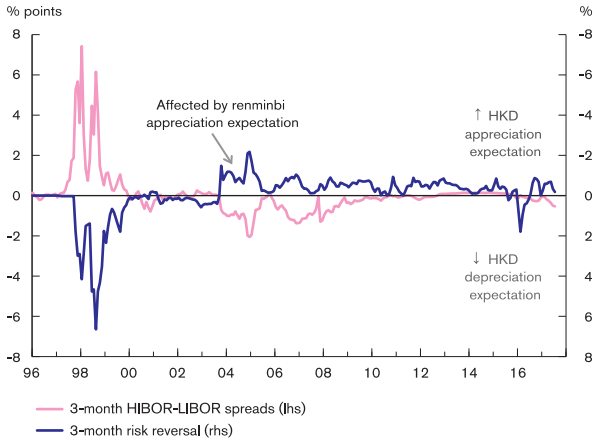
Equity return differences between Hong Kong and the US

The difference in the performances of the Hong Kong and US equity markets could generate short-term Hong Kong dollar flows of funds that temporarily affect HIBOR-LIBOR spreads. More specifically, a strong appetite for Hong Kong dollar assets tends to induce Hong Kong dollar inflows into the non-bank private sector and helps keep the HIBORs relatively low. Indeed, the HIBOR-LIBOR spreads and the difference between the monthly returns of the Hang Seng Index and the S&P 500 Index are negatively correlated.

Hong Kong dollar exchange rate expectation

Historical evidence indicates that the Hong Kong dollar-US dollar exchange rate expectations appear to be highly correlated with the HIBOR-LIBOR gaps (Chart B3.4). Theoretically, the uncovered interest rate parity postulates that, at equilibrium, the interest rate differential reflects the expected exchange rate movement. In reality, the expectation that the Hong Kong dollar would be allowed to follow the renminbi to appreciate against the US dollar was an important contributor to the large negative HIBOR-LIBOR spreads that emerged between 2003 and 2005.

Chart B3.4
Interest rate spreads and Hong Kong dollar exchange rate expectations



Sources: CEIC, JP Morgan and HKMA.

Risk factors

A large risk premium specific to the Hong Kong economy (e.g. macro-financial risks, etc.) could lead to a surge in HIBORs relative to LIBORs. The Asian financial crisis was a case in point. Taking into account coverage and data availability, we use the realised volatility (i.e. standard deviation of daily equity returns) of the Hang Seng Index relative to the S&P 500 Index as a proxy for the risk premium.

Empirical models

We estimate an autoregressive model to examine empirically the effect of different drivers on the HIBOR-LIBOR spreads for different tenors.[15] Estimation results show that the above-mentioned variables (or indicators) have explanatory power over the HIBOR-LIBOR spreads. Their coefficients generally have the expected signs and many of them are statistically significant (Table B3.B). In particular, the estimated coefficients on the lag term of the HIBOR-LIBOR spread (between zero and one) suggest that the interest rate spread had a tendency to narrow over time, partly reflecting the force of arbitrage. Tighter interbank liquidity conditions as indicated by a higher Hong Kong dollar LTD ratio as well as a higher risk premium are found to be associated with an increase in the HIBOR-LIBOR spreads. More Hong Kong dollar inflows as suggested by higher equity market return in Hong Kong relative to the US, as well as Hong Kong dollar exchange rate appreciation expectations tend to decrease the spreads. The foreign exchange operation by the HKMA could also decrease the spreads, but this relationship became much weaker after the global financial crisis. This result lends support to the claim that in the interbank money market, the supply curve now intersects the demand curve on the flat portion of the demand curve so that changes in the supply (e.g. the Aggregate Balance) exert little impact on the HIBOR-LIBOR spreads.

Table B3.B
Estimation results from the autoregressive models

Model: spread(t) = average spread + α spread(t-1) + β variables(t) + ε(t)

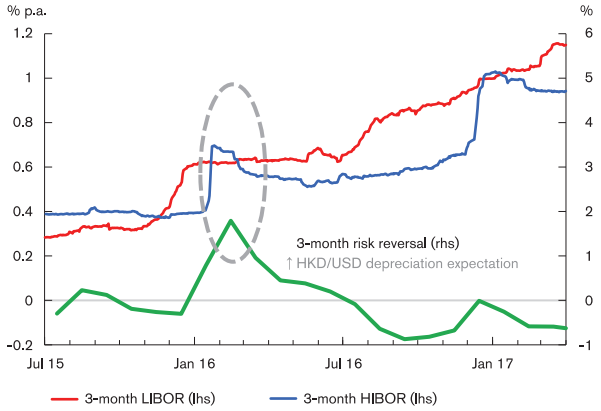
Explanatory variables	Overnight model	1-month model	3-month model	12-month model
HIBOR-LIBOR spread (lag)	0.43	0.38	0.54	0.74
Net FX operation by HKMA				
(Jan 1996 – Oct 2003)	–	–	–	–
(Nov 2003 – Sep 2008)	≈ 0	–	–	–
(Oct 2008 – Now)	≈ 0	≈ 0	≈ 0	≈ 0
HKD LTD ratio	+	+	+	+
HK-US stock return diff.	–	–	–	–
HKD/USD expectation	–	–	–	–
Risk premium	+	+	+	+

Note: Grey entries indicate statistically insignificant estimates.
Source: HKMA staff estimates.

Our model can help explain why the HIBOR-LIBOR spreads could fluctuate in the absence of any change in the Aggregate Balance or foreign exchange operations by the HKMA. For example, decomposition results from our models suggest that the fluctuations in term HIBOR-LIBOR spreads following the US rate hikes in late-2015 and late-2016 were driven by swings in the Hong Kong dollar-US dollar exchange rate expectations amid a stable Aggregate Balance (Chart B3.5). In particular, this expectation variable explained over 70% of the predicted increase in the 3-month HIBOR-LIBOR spread in the first two months of 2016. Similar decomposition results were found in the December 2016 episode when the HIBOR-LIBOR spreads also increased rapidly, although anecdotal evidence suggests that ad hoc factors including the anticipation of US money market reform and year-end funding demands also had an impact.

[15] For more details on the autoregressive models and estimation results, see Cheung et al. (2017).

Chart B3.5
The impact of Hong Kong dollar expectations on the recent movements in the HIBOR-LIBOR spreads



Sources: CEIC, JP Morgan and HKMA.

Concluding remarks

This Box provides a conceptual understanding of the fundamental drivers of the HIBOR-LIBOR spreads. The size of the HIBOR-LIBOR spreads is found to be affected not only by interest rate arbitrage activities, but also interbank liquidity conditions, the Hong Kong dollar exchange rate and fund flows, and risk factors. In particular, although arbitrage activities could narrow the HIBOR-LIBOR spreads, such a process does not necessarily involve triggering the CU in the short run and hence the foreign exchange operations by the HKMA. We then apply the model to explain the recent fluctuations of HIBORs despite a stable Aggregate Balance, and illustrate that movements in the term HIBOR-LIBOR spreads during 2016 were, in part, driven by swings in the Hong Kong dollar-US dollar exchange rate expectations.

Box 4
Safehavenness of the Chinese renminbi[16]

Introduction

Following a quarter of phenomenal growth, Mainland China has become the world's largest trading nation, accounting for more than 12% of world exports and 10% of imports. This, coupled with a more-than-twofold expansion of foreign direct investment in Mainland China from 2005 to 2015, has made the renminbi one of the most commonly used currencies for international payments.[17] With its inclusion in the IMF's Special Drawing Right (SDR) basket in October 2016, the renminbi is now widely recognised as an international currency. Against this backdrop, we assess how safe this currency is as a financial asset.

What is safehavenness and how is it measured?

By "safehavenness", we refer to the extent to which a currency plays the role of a safe haven from the perspective of the investor. A safe haven usually relates to a place or shelter which can provide protection from being hurt in disastrous or catastrophic situations, such as wars and natural calamities. A safe-haven currency generally means one that retains its purchasing power in times of financial turmoil.

We use the currency option market to gauge the safehavenness of a currency, as it can provide the investor with a fast and efficient means of taking a position in a currency or hedging against the exchange rate risk of a foreign investment. However, it is imperative to note that the price of a call or put option alone cannot indicate whether a currency is safe or risky. The reason is that in times of turbulence the prices of both the call and the put are likely to increase, as volatility rises. Therefore, we focus on the price difference between a call and a put option, which is known as the risk reversal of a currency. The risk reversal increases if there is heavier betting for the currency to rise, and *vice versa*. We argue that a currency is regarded as a safe haven when the risk reversal of the currency increases in market turmoil.

Methodology

When risk in global financial markets increases, investors will flee currencies regarded as risky to those perceived to be safe havens; and when risk reduces, investors will find it relatively more comfortable in holding assets denominated in riskier currencies. Therefore, the risk reversal of a currency should bear a positive relationship with risk aversion if the currency is thought to be safe (or its downside risk is lower) or a negative relationship if it is considered risky (or its downside risk is higher). We estimate this relationship by quantile regression, which can capture the relationship under extreme market conditions, i.e., a scenario of tail risk.[18] Specifically, the empirical model is defined as:

$$\Delta RR_{it} = const + \beta_i \, \Delta RiskAversion_t + \gamma_i \Delta RR_{i,t-1} + \varepsilon_{it}$$

where RR_{it} is the risk reversal of currency i at time t, *RiskAversion* is the index of risk aversion, coefficient β_i measures the responsiveness of investors to an index of risk aversion, *const* and ε

[16] The box is based on Fong and Wong (2017) "Safehavenness of the Chinese Renminbi", *HKMA Research Memorandum* No.10/2017.

[17] Based on the Society for Worldwide Interbank Financial Telecommunication (SWIFT)'s December 2015 report, the renminbi ranks as the world's fifth most-used payment currency.

[18] Specifically, the quantile level q is chosen to be either 0.95 or 0.05, depending on the sign of β_i estimated additionally by the ordinary least squares (OLS) method. If the sign of the OLS coefficient is significantly positive (negative), q will be set to be 0.95 (0.05). In the case of insignificance, q will be chosen to be the one giving a larger β_i in absolute value when estimating the quantile regression.

denote the constant and error term respectively. The Δ is the first difference operator, and the lag of ΔRR_{it} is used to control for serial correlation.

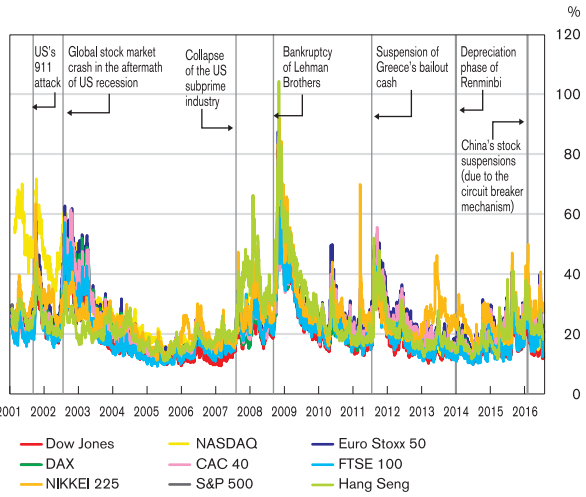
Data

Our data consist of the risk reversal for the twenty most-traded currencies (and gold for reference).[19] These currencies include the five in the SDR basket, i.e., US dollar, euro, British pound, Japanese yen, and Chinese renminbi CNY as well as CNH.[20]

The index of risk aversion is constructed by taking the first principal component of nine major stock market volatility indices for the S&P 500, Dow Jones Industrial Average, NASDAQ, Euro Stoxx 50, DAX, CAC 40, FTSE 100, NIKKEI 225, and Hang Seng index (Chart B4.1).

This study covers the sample period from 27 July 2011 (constrained by data availability) to 31 March 2017.[21]

Chart B4.1
Stock market volatility indices



Source: Bloomberg.

Empirical results

Chart B4.2 sums up the empirical results about the responsiveness of risk reversal (vis-à-vis the US dollar) to the risk aversion index for the whole sample period. With the notable exception of the Japanese yen, all currencies are regarded as riskier than the US dollar by dollar-based investors, as their estimated coefficients are negative.[22] The Chinese renminbi is the safest among the riskier currencies for the whole period.

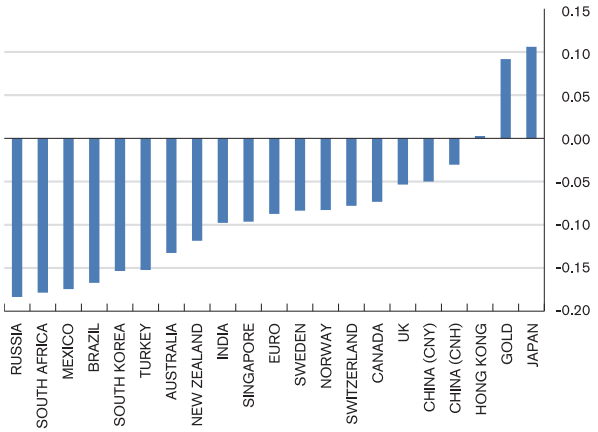
[19] We use the three-month 25-delta risk reversal of each currency. An option with 25-delta moneyness level means that its price will move 25% for a 100% movement in the exchange rate of the underlying currency.

[20] Others include African rand, Australian dollar, Brazilian real, Canadian dollar, Hong Kong dollar, Indian rupee, Korean won, Mexico peso, New Zealand dollar, Norwegian krone, Russian ruble, Singapore dollar, Sweden krona, Swiss franc, and Turkish lira. The selection of these currencies is based on the currencies' daily average turnover in the *2016 Triennial Central Bank Survey of FX and Over-the-counter Derivatives Markets* published by the Bank for International Settlements.

[21] Within this period, the renminbi was broadly on an appreciating trend until the end of 2013, but since about the beginning of 2014, it has been on a depreciating trend. Fong and Wong (2017) also divide the sample period into two but the results are very similar.

[22] The estimated coefficient of the Hong Kong dollar is very close to zero, suggesting that the currency is perceived to have similar safehavenness as the US dollar. This could be attributable to the Linked Exchange Rate System. Meanwhile, the Swiss franc ranked lower than the British pound and Canadian dollar in terms of safehavenness during our sample period. This could be due to the turmoil triggered by the Swiss National Bank's unexpected decision to abolish the franc's peg to the euro in early 2015.

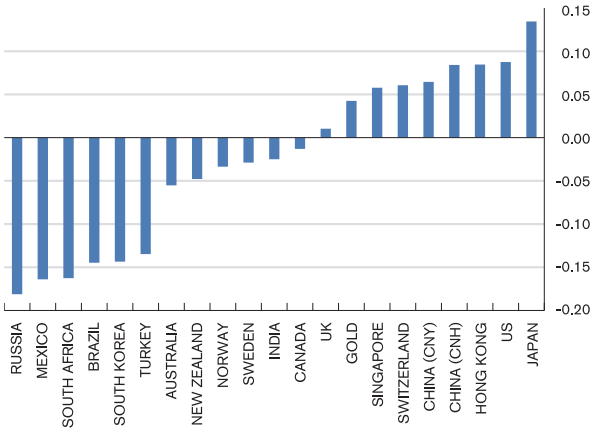
Chart B4.2
Responsiveness of risk reversal (vis-à-vis the US dollar) to risk aversion index



Source: HKMA staff estimates.

Of the risk reversals vis-à-vis the euro for the whole sample period, there are comparatively more positive coefficients, with that of the Japanese yen being the largest, followed by those of the US dollar, Swiss franc, and a few Asian currencies (Chart B4.3). This suggests that, in times of market turmoil, these currencies are regarded as safe havens by euro-based investors. Again, the Chinese renminbi is generally regarded as safer than the euro and also among the safest.

Chart B4.3
Responsiveness of risk reversal (vis-à-vis the euro) to risk aversion index

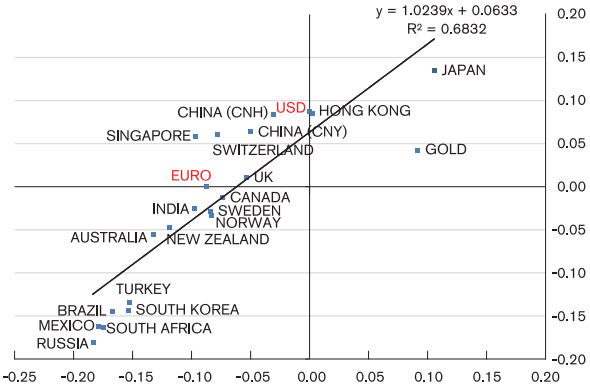


Source: HKMA staff estimates.

In addition, the CNY and CNH register very similar levels of safehavenness from the perspectives of both dollar-based and euro-based investors, despite the fragmented markets. The CNH consistently enjoys a higher safe-haven status than the CNY, albeit only marginally, which may be due to the stronger price discovery process of the offshore market.[23]

Finally, in order to compare the perception of dollar-based and euro-based investors regarding the safe-haven status of the currencies, we have a scatter plot of their respective safehavenness for the whole sample period (Chart B4.4). As can be seen, the slope of the best-fitted regression line is very close to one, suggesting that the safehavenness of a currency is, on average, viewed to be about the same by both groups of investors.[24]

Chart B4.4
Currency safehavenness vis-à-vis the US dollar against that vis-à-vis the euro



x-axis: Safehavenness vis-a-vis USD
y-axis: Safehavenness vis-a-vis EUR

Source: HKMA staff estimates.

[23] For details, see Cheung et al.(2016), "The Renminbi Central Parity: An Empirical Investigation", *HKIMR Working Paper* No.10/2016, and Cheung et al. (2017) "The RMB Central Parity Formation Mechanism after August 2015: A Statistical Analysis", *HKIMR Working Paper* No.06/2017.

[24] The fact that the best-fitted regression line has a positive intercept suggests that the US dollar is regarded as safer than the euro.

Concluding Remarks

The study estimates the safehavenness of the Chinese renminbi in its onshore and offshore markets along with other most traded currencies, including those in the SDR basket, based on the behavior of their risk reversals under extreme market conditions. The empirical results found that the CNY and CNH rank consistently quite high on the scale of currency safehavenness by both dollar-based and euro-based investors. Within the SDR basket, they are regarded as riskier than the Japanese yen and US dollar, but safer than the euro and British pound.

Asset markets

Hong Kong equity prices rose further on the back of optimism about the global economy and corporate earnings. However, while volatilities hovered near all-time low levels, there are signs that investors have become more cautious about the possibility of a "black swan" event. The Hong Kong dollar debt market expanded steadily amid fund inflows, while the offshore renminbi debt market experienced further contraction. The residential property market became buoyant again, although housing price growth showed signs of moderation following the macro-prudential measures introduced in May.

4.3 Equity market

The Hong Kong equity market rose further in the review period, with the Hang Seng Index (HSI) advancing to a 27-month high in late August (Chart 4.17). The rally reflected optimism that the global economy and corporate earnings remained on track for sustained growth. In line with the bullish sentiment, the local market registered net fund inflows since February, in contrast with the preceding two years when net fund flow was largely negative (Chart 4.18). Meanwhile, the decision by the Morgan Stanley Capital International (MSCI) to include Shanghai and Shenzhen listed A-shares into its Emerging Markets Index was a milestone for global participation in Mainland stocks, although market reaction to the long-awaited news was muted.[25]

Against the backdrop of the strong rally, market volatilities remained relatively subdued despite geopolitical risk events, such as tension on the Korean Peninsula and more frequent terrorist attacks in Europe, with the option implied volatility of the HSI (VHSI) hovering near its all-time low (Chart 4.19). However, the SKEW Index (also known as the "Black Swan Index", a measure of the tail risk for the US market) remained well above its long-term historical average, suggesting that downside protection was in high demand.[26] This, in turn, implies that a tangible possibility of a black swan event has been priced into the US market. Should a shock occur, the spillover to the local market could be substantial given Hong Kong's high degree of openness.

Overall, the HSI and the Hang Seng China Enterprises Index (HSCEI), also known as the H-share index, increased by 17.8% and 10.1% respectively between March and August, with the VHSI staying in a relatively low range of 10% to 20%.

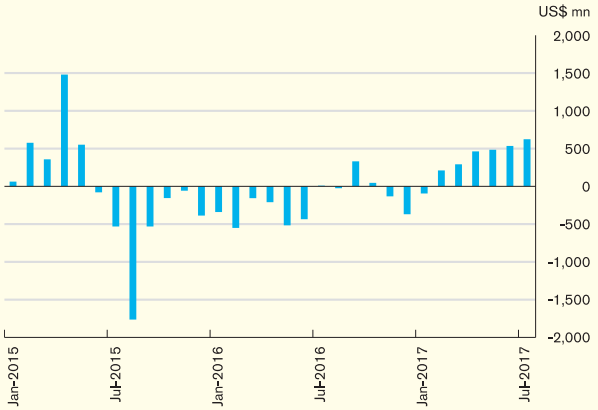
[25] MSCI Inc. announced on 20 June 2017 that it would include China A shares in the MSCI Emerging Markets Index beginning in June 2018. The 222 China A Large Cap stocks to be included would represent approximately 0.73% of the weight of the index on a pro forma basis.

[26] The SKEW Index is calculated by the Chicago Board Options Exchange from the prices of S&P 500 out-of-the-money options. A SKEW value of 100 means that the probability of outlier negative returns at a 30-day horizon is negligible. As SKEW rises above 100, the left tail of the S&P 500 returns distribution acquires more weight, suggesting that the probability of outlier negative returns become more significant. For details, see https://www.cboe.com/products/vix-index-volatility/volatility-indicators/skew.

Chart 4.17
Equity prices in Hong Kong

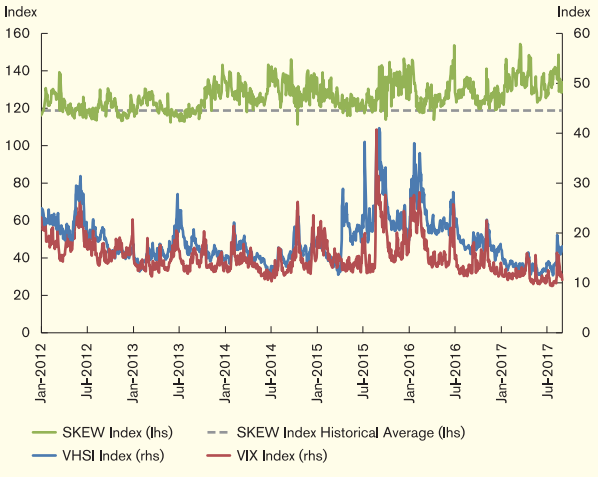
Source: Bloomberg.

Chart 4.18
Equity fund flows into Hong Kong



Source: EPFR Global.

Chart 4.19
Option-implied volatilities of the HSI and S&P 500, and the SKEW Index



Sources: Bloomberg and HKMA staff estimates.

The price discrepancy between stocks listed on the Mainland and Hong Kong markets widened moderately during the review period. By the end of August, the Hang Seng China AH Premium Index had increased by around 8.7% from the level at the end of February (Chart 4.20). The widening of the price discrepancy could be attributable to disparities in the equity valuation between Mainland and Hong Kong investors, possibly because of lingering uncertainties surrounding the Mainland economy.[27]

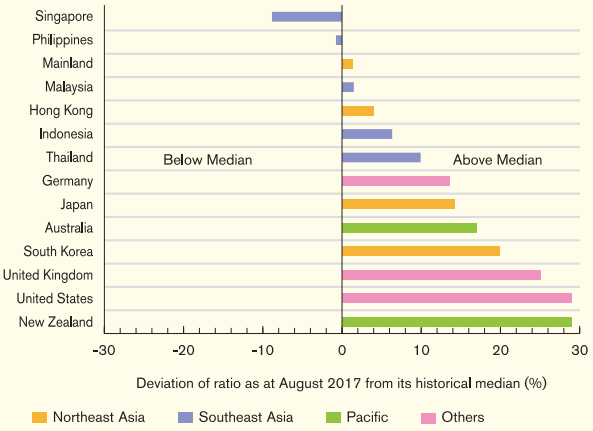
Chart 4.20
Hang Seng China AH Premium Index

Source: Bloomberg.

[27] See Chung, Hui and Li (2013) "Explaining share price disparity with parameter uncertainty: Evidence from Chinese A- and H-shares", *Journal of Banking and Finance*, 37 (2013) pp1073–1083.

Driven by optimism over the economic outlook, the price-earnings ratio of Hong Kong stocks has climbed to a six-year high. However, the valuations of the Hong Kong market as measured by the cyclically-adjusted price-to-earnings (CAPE) ratio are still attractive compared with other major markets (Chart 4.21).[28] Looking ahead, the local equity market is expected to remain susceptible to external market conditions. In particular, in view of the SKEW index for the US, the tail risk is high for all stock markets, including Hong Kong.

Chart 4.21
Cyclically-adjusted price-earnings ratios of Asia Pacific and other major markets

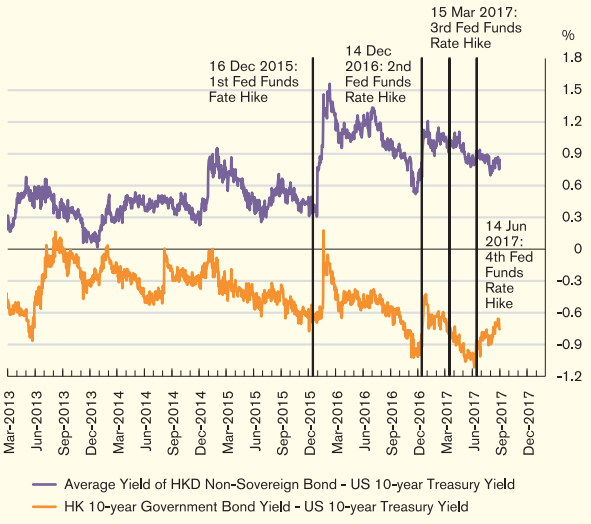


Sources: Bloomberg, CEIC and HKMA staff estimates.

4.4 Debt market

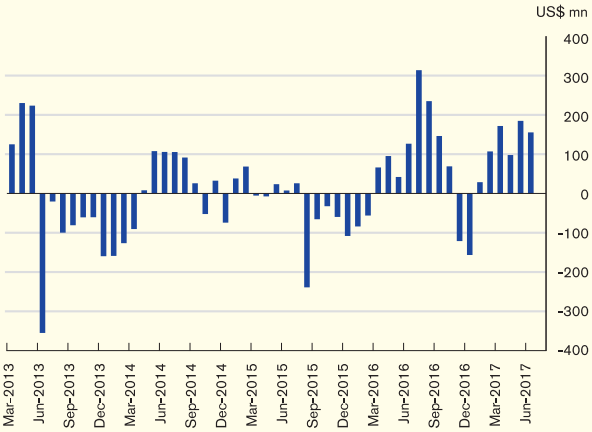
The Hong Kong dollar debt market registered a steady expansion in the first half of 2017, amid narrowing yield spreads and continued fund inflows since the beginning of the year. As the two hikes in the US federal funds rate target range so far this year were well anticipated by the market, the Hong Kong dollar bond market remained calm with the credit spread over US Treasury yields generally trending downwards (Chart 4.22). Against this backdrop, the Hong Kong bond market saw continued fund inflows during the first half of this year (Chart 4.23).

Chart 4.22
Hong Kong dollar yield spreads with the US 10-year Treasury yield



Sources: HKMA, Bank of America Merrill Lynch and Bloomberg.

Chart 4.23
Bond fund flows into Hong Kong



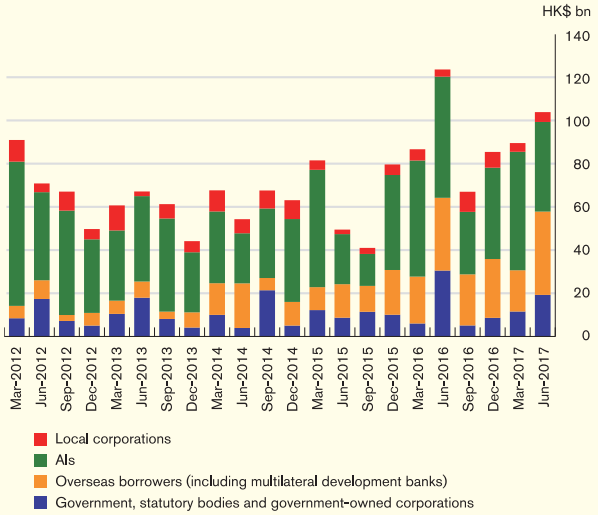
Source: EPFR Global.

In view of the narrowing yield spreads and continued inflows, total Hong Kong dollar debt issuance increased by 7.4% year on year to HK$1,621.4 billion. The 9.2% growth registered by the public sector and the 4.0% growth by overseas borrowers (including MDBs), more than offset the 11.3% decline by the domestic private

[28] The CAPE ratio is based on Campbell and Shiller (1988) "Stock prices, earnings, and expected dividends", *Journal of Finance*, 43(3), pp661–676. Unlike the conventional price-to-earnings ratio, the CAPE ratio uses a 10-year moving average of real earnings in the denominator to smooth out the cyclical effect on corporate earnings and provides a more consistent estimate on stock valuations over time.

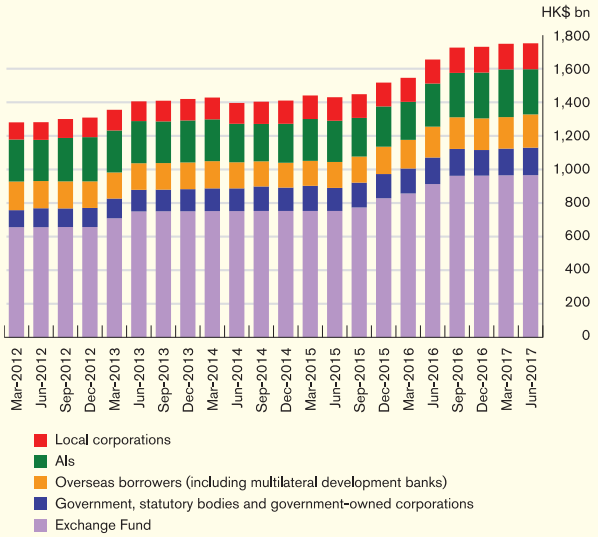
sector (Chart 4.24). On the back of the continued increase in issuance, the total amount of Hong Kong dollar debt outstanding rose by 5.9% to HK$1,751.6 billion at the end of June 2017, equivalent to 25.6% of Hong Kong dollar M3 or 22.1% of Hong Kong dollar denominated assets of the entire banking sector (Chart 4.25). The Exchange Fund remains the largest contributor to the growth, with debt outstanding rising by 5.8% to HK$965.6 billion.

Chart 4.24
New issuance of non-Exchange Fund Bills and Notes Hong Kong dollar debt



Source: HKMA.

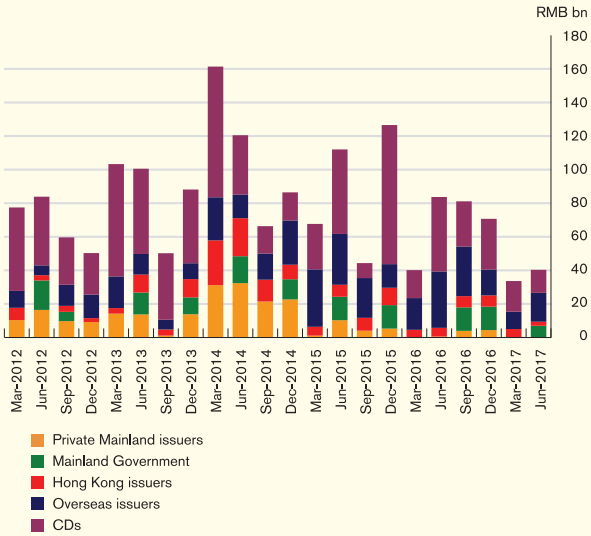
Chart 4.25
Outstanding Hong Kong dollar debt



Source: HKMA.

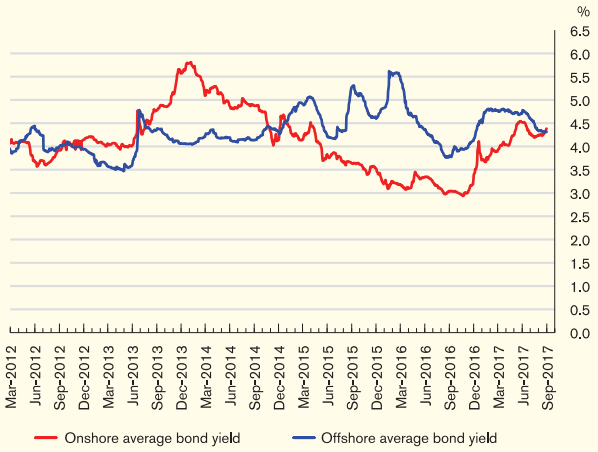
The offshore renminbi debt market in Hong Kong continued to shrink, amid sizable decreases in CD issuance, and non-CD debt issuance by overseas issuers. In the first half of 2017, total offshore renminbi debt issuance amounted to RMB74.3 billion, declining by 40.1% year on year (Chart 4.26). Within the total, new non-CD debts issued by Mainland private issuers, Hong Kong issuers and overseas issuers dropped by 58.3%, 24.0% and 47.4% to RMB0.3 billion, RMB7.4 billion and RMB27.6 billion respectively. This was partly due to the persistently lower funding costs onshore (Chart 4.27).

Chart 4.26
New Issuance of offshore renminbi debt securities



Sources: Newswires and HKMA staff estimates.

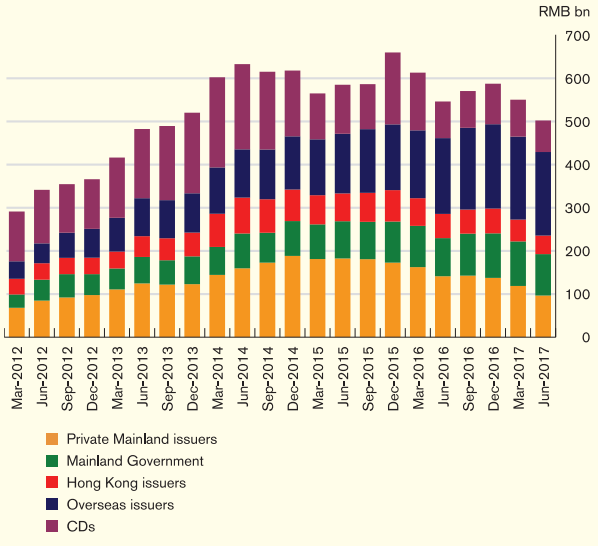
Chart 4.27
Average yields of onshore vs. offshore renminbi bond indices



Sources: Bloomberg, Hang Seng Indexes Company Ltd, and China Central Depository & Clearing Co., Ltd.

As a result of the decline in new debt issuance, offshore renminbi debt securities outstanding in Hong Kong contracted by 8.1% year on year to RMB502.2 billion at the end of June 2017 (Chart 4.28). The decrease in non-CD debt outstanding by private Mainland issuers and Hong Kong issuers together with the reduction in CDs outstanding more than offset the increase in outstanding debt by overseas issuers and the Mainland Government.

Chart 4.28
Outstanding amount of offshore renminbi debt securities by remaining tenor



Sources: Newswires and HKMA staff estimates.

Looking ahead, the near term development of the offshore renminbi bond market will be subject to the uncertainty of the renminbi exchange rate and the onshore-offshore funding cost gap. In the longer term, the offshore renminbi bond market is expected to interact more closely with the onshore market through various channels, including the Bond Connect launched in July, the first offshore futures market on Chinese sovereign bonds,[29] and the inclusion of onshore bonds into global indices.[30]

4.5 *Property markets*

Residential property market

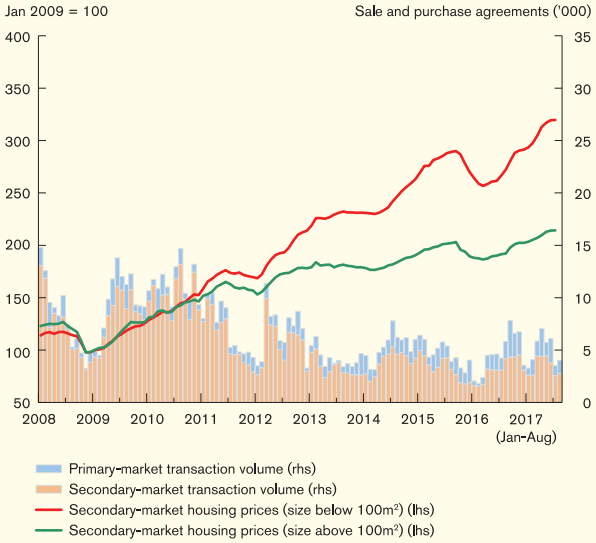
The residential property market turned buoyant again from March after a brief period of moderation at the beginning of the year. Amid strong market sentiment and intensifying competition for mortgage business among banks, average monthly housing transactions increased to about 6,200 units during March to June 2017, from 3,700 units in the first two months (Chart 4.29). In particular, transactions in the primary market increased to a level similar to that in the second half of 2016, while transactions in the secondary market also rose. Indeed, housing prices in the secondary market continued to climb, and in June surpassed the peak recorded in September 2015 by 9.9%. Prices of small and medium-sized flats (with a saleable area of less than 100m^2) increased faster than that of large flats (with a saleable area of at least 100m^2).

[29] On 24 March 2017, Hong Kong Futures Exchange Limited announced the introduction of the 5-year China Ministry of Finance Treasury Bond futures contract. The product is the first of its kind that introduces an offshore interest rate risk management tool in the renminbi fixed income market based on onshore Chinese government bonds.

[30] On 1 March 2017, Bloomberg launched the "Global Aggregate + China Index" and the "Emerging Market Local Currency Government + China Index" to include renminbi-denominated bonds into the global fixed income indices. On 7 March 2017, Citigroup announced that China's onshore bonds would be included in its Emerging Markets Government Bond Index, Asian Government Bond Index, and Asia Pacific Government Bond Index.

As a result of the rising property prices and the intensifying competition for mortgage business among banks, the HKMA introduced the eighth round of prudential measures for property mortgage loans on 19 May to strengthen banks' risk management and safeguard banking stability.[31] Following these measures, housing price growth showed signs of moderation, while average transaction volume declined in July and August compared with the first half of the year.

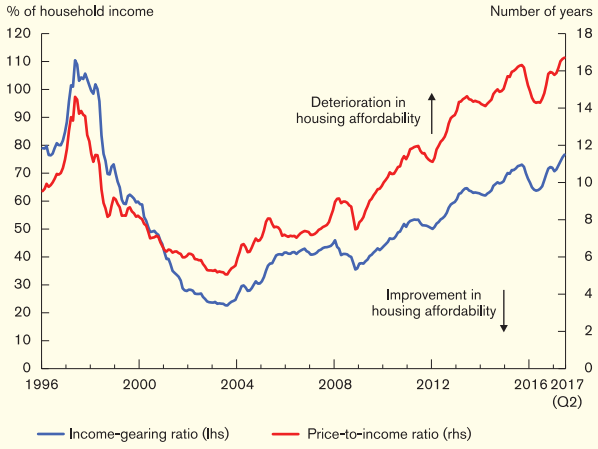
Chart 4.29
Residential property prices and transaction volume



Sources: R&VD and Land Registry.

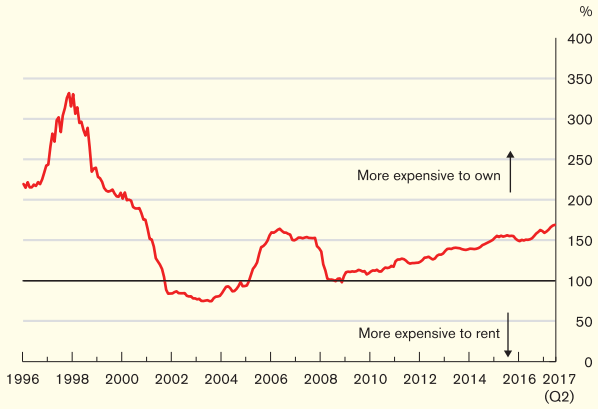
The recent market buoyancy renewed concerns about household affordability. The housing price-to-income ratio stood at 16.6 in the second quarter, higher than the 1997 peak of 14.6, while the income-gearing ratio reached 75.5%, much higher than the long-term average of about 50% (Chart 4.30).[32] The buy-rent gap as a measure of relative user costs remained at a high level of 176.1% as the residential rental yields remained low at 2.0–2.8% in June (Chart 4.31).[33]

Chart 4.30
Indicators of housing affordability



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

Chart 4.31
Buy-rent gap



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

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

[31] For details, see "Circular on Prudential Measures for Property Mortgage Loans" issued by the HKMA on 19 May.

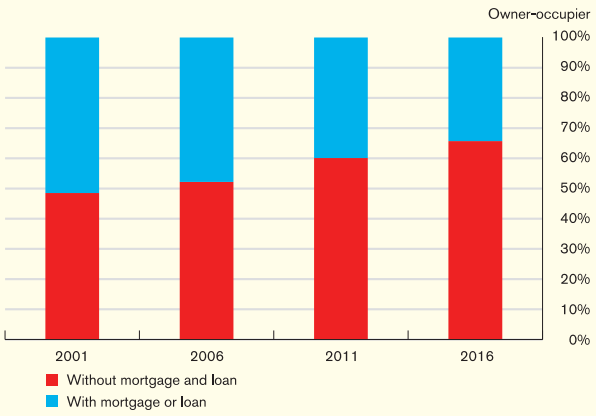
[32] The price-to-income ratio measures the average price of a typical 50m² flat relative to the median income of households living in private housing. Alternately, the income-gearing ratio compares the amount of mortgage payment for a typical 50m² flat (under a 20-year mortgage scheme with a 70% loan-to-value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

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

In general, although the stretched housing affordability environment implies a higher systemic risk arising from the excessive leverage of homebuyers, the eight rounds of macro-prudential measures for mortgage loans introduced by the HKMA since 2009 have effectively dampened such risks and strengthened banks' risk management and resilience. The average LTV ratio for new mortgages approved declined to 48% in July from 64% before the measures were first introduced, while the DSR also decreased to 34.0%.

Nevertheless, recent developments in new sources of home financing deserve careful monitoring as they could have implications when viewed from a broader financial stability perspective. Anecdotal evidence suggests that support to young homebuyers from parents has become more popular. Some young homebuyers have financed their purchases partially by the proceeds of re-mortgages or top-up mortgages of their parents' properties. While data on the number of property transactions with parental support are not available, this method of home financing is likely to have become more common because of the high property prices and the high share of owner-occupied properties without mortgages (Chart 4.32).

Chart 4.32
Share of owner-occupier with and without mortgages



Source: C&SD.

Property developers have also been active in providing high-LTV first mortgages in the primary market. While the banking system is not directly exposed to such lending, there are concerns about the potential risk stemming from bank lending to these property developers. As a result, on 12 May the HKMA announced new measures to require banks to set aside adequate capital for exposures to property developers offering mortgages, by increasing the risk-weights for credit exposures to property developers offering mortgages.[34] While the market share of mortgages extended by property developers is currently small, the trend deserves close monitoring.

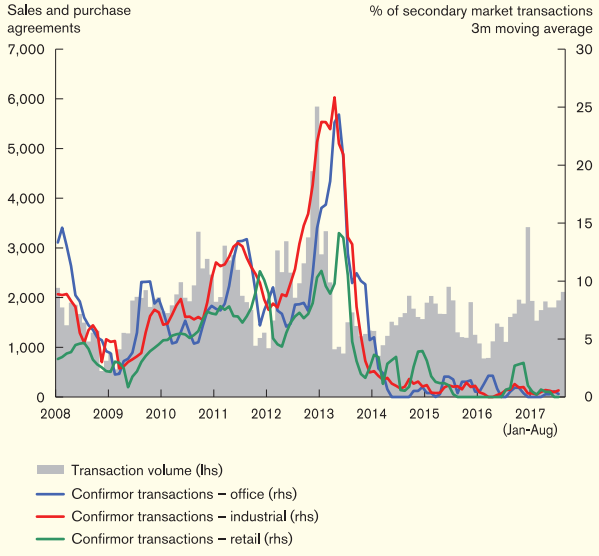
The outlook for the residential property market remains highly uncertain. In the near term, given that the expectation of low interest rates and housing shortage remain, positive market sentiment may continue to support property market. In addition, the strategies of property developers to promote sales, including offering mortgage plans for new launches with mortgage rates below the prevailing market rates, may also boost the demand. That said, the gradual improvement in housing supply might narrow the housing supply-demand gap which would contain property price growth. The potential impact of the Fed's balance sheet reduction and further US rate hikes on global and domestic financial conditions could also have a significant impact on the housing market further down the road.

[34] For details, see "Circular on Risk management for lending to property developers" issued by the HKMA on 12 May.

Non-residential property market

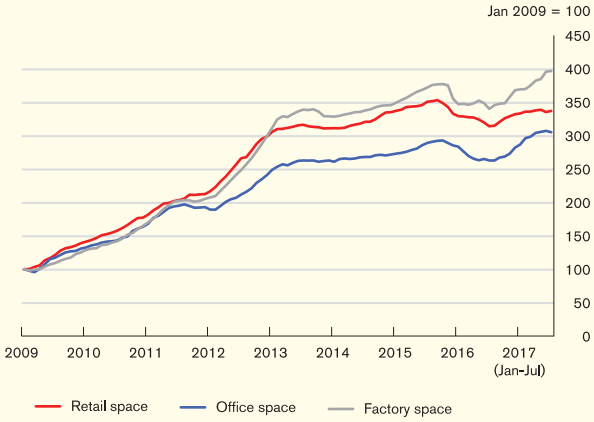
The non-residential property market saw robust activity in the first half of 2017. The average monthly transaction volume stayed at around 1,800 units, while speculative activities as indicated by confirmor transactions remained low (Chart 4.33). Analysed by segments, the price of office space increased at a fast pace of 8.8% in the first half amid strong demand for prime office locations, particularly on Hong Kong Island (Chart 4.34). Factory-space prices also picked up by 7.6% amid upbeat market sentiment in this segment, and the demand driven by private sector re-development plans. However, prices for retail premises grew slowly and fell in June despite retail sales and inbound tourism stabilising. Meanwhile, rentals of flatted factories kept pace with the respective price increase, although this was not the case with rentals of office space which lagged behind. The overall rental yields across segments declined somewhat to 2.5–2.9%.

Chart 4.33
Transactions in non-residential properties



Sources: Land Registry and Centaline Property Agency Limited.

Chart 4.34
Non-residential property price indices



Source: R&VD.

In the near future, the non-residential property market may grow steadily amid investors' continued interest in office space and flatted factories, while the attractiveness of prime retail locations may improve given the better outlook for retail sales and inbound tourism. Yet, the risk of rising domestic interest rates, uncertainties surrounding global financial conditions and capital flows could put downward pressure on the investment demand for non-residential properties. In addition, the supply of shopping centres is expected to increase in the coming two years, which could have an impact on the retail segment.

5. Banking sector performance

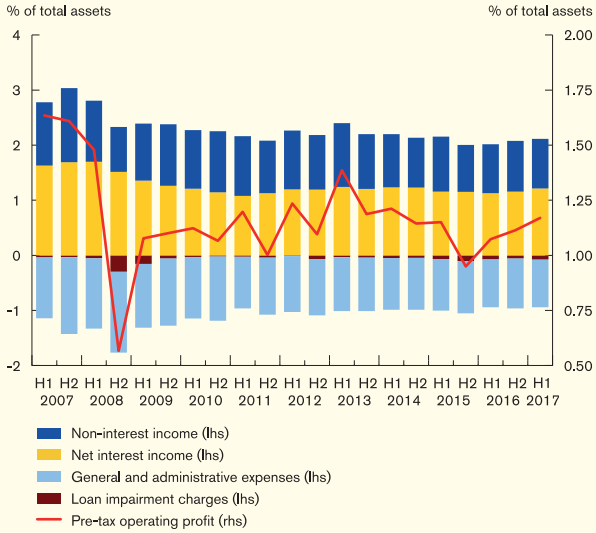
The profitability of retail banks improved in the first half of 2017 over the same period last year, mainly due to higher net interest income and non-interest income. Banks maintained strong capital and liquidity positions, while lending grew more rapidly in the first half of 2017 amid the improved economic environment. Asset quality remained sound. Despite the US interest rate hikes, banks' funding costs remained low and stable, underpinned by a large retail deposit base. Nevertheless, with the widened interest rate differential between Hong Kong and the US, banks should remain vigilant about the risk of significant capital outflows and their impact on local interest rates amid the ongoing US monetary policy normalisation. Banks should also maintain prudent credit risk management as sharp rises in interest rates could test their asset quality given the rising levels of corporate leverage and increasing household debt-servicing burdens.

5.1 Profitability and capitalisation

Profitability

The aggregate pre-tax profit of retail banks[35] rose notably by 18.2% in the first half of 2017 compared with the same period last year. The improvement was broad-based, with increases in both net interest income and non-interest income. As a result, the return on assets[36] increased to 1.17% in the first half of 2017 from 1.07% in the same period of 2016 (the red line in Chart 5.1).

Chart 5.1
Profitability of retail banks



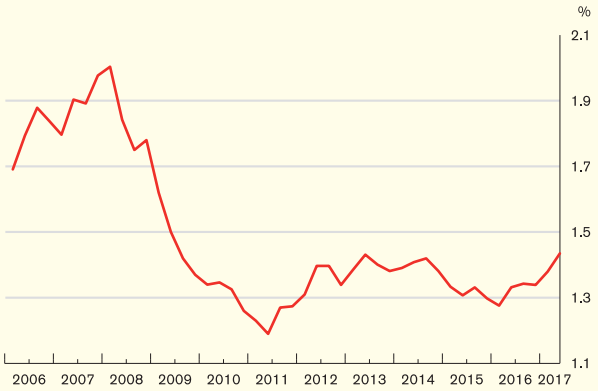
Note: Semi-annually annualised figures.
Source: HKMA.

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

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

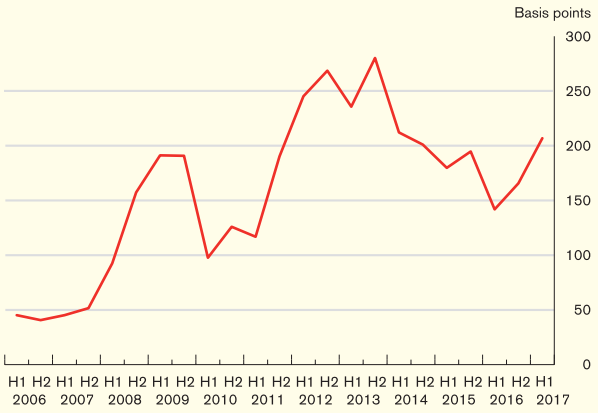
The net interest margin (NIM) of retail banks widened to 1.43% in the second quarter of 2017 from 1.33% in the same period of 2016 (Chart 5.2). The improvement in NIM was in line with anecdotal evidence of a rising average spread of Hong Kong dollar corporate loans that emerged from the syndicated loan market in Hong Kong (Chart 5.3).

Chart 5.2
NIM of retail banks



Note: Quarterly annualised figures.
Source: HKMA.

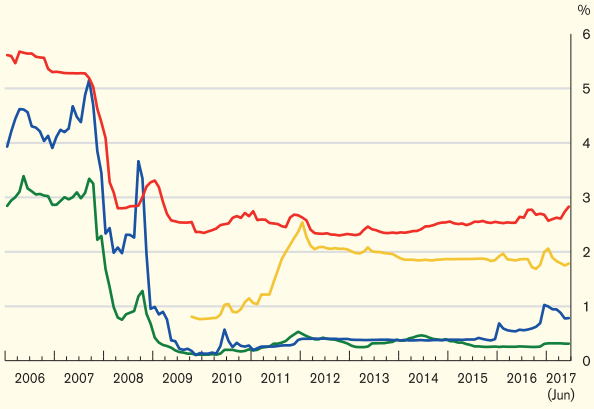
Chart 5.3
Average spread of Hong Kong dollar syndicated loans



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.

Despite the two interest rate hikes by the Fed in March and June 2017, wholesale funding costs in Hong Kong have trended down from the recent peak, largely due to ample liquidity in the Hong Kong banking sector. The three-month HIBOR has declined to 0.78% from the post-crisis high of 1% recorded in December 2016 (the blue line in Chart 5.4). The Hong Kong dollar retail deposit rates remained low and stable in the review period. The composite interest rate, a measure of the average cost of Hong Kong dollar funds for retail banks, hovered at 0.31% at the end of June 2017.

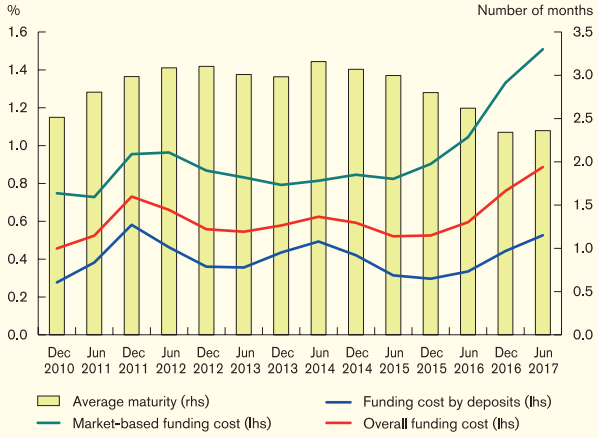
Chart 5.4
Interest rates



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

More broadly, although the funding costs for licensed banks in Hong Kong as a whole began trending up since the Fed started its rate hike cycle in December 2015, the upward pace slowed somewhat in the review period. Specifically, the average overall Hong Kong and US dollar funding cost increased by 13 basis points in the first half of 2017 (the red line in Chart 5.5), compared with a 17-basis-point increase in the second half of 2016.

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



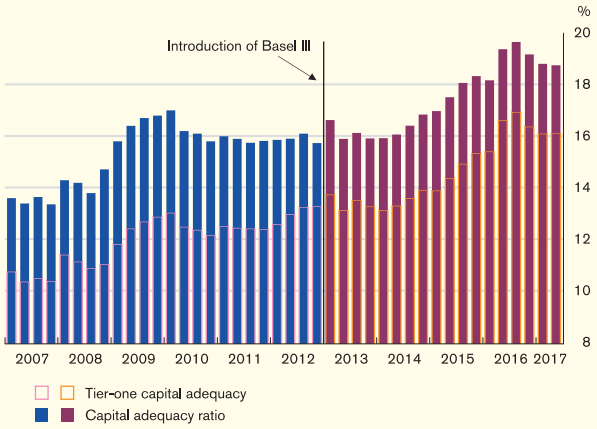
Source: HKMA.

Although the improvement in NIMs was underpinned by stable funding conditions amid US interest rate normalisation, such improvement may be partially offset by keen competition in the mortgage market. In particular, the average HIBOR-based mortgage rates for new mortgages have declined from 2.0% in December 2016 to 1.78% in June 2017. Looking ahead, with further US interest rate hikes in the pipeline as well as the Fed's plan to reduce its balance sheet later this year, banks may soon face a more significant upward pressure on their funding costs which could weigh on their NIMs.

Capitalisation

The consolidated capital adequacy ratio (CAR) of locally incorporated AIs fell slightly by 0.5 percentage points to 18.7% at the end of June 2017 (Chart 5.6). The tier-one CAR[37] also edged down to 16.1%, of which 15.1% was contributed by common equity tier-one (CET1) capital.[38] Nevertheless, capitalisation of the Hong Kong banking sector continued to be strong and well above the minimum international standards.

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.

5.2 *Liquidity and interest rate risks*

Liquidity and funding

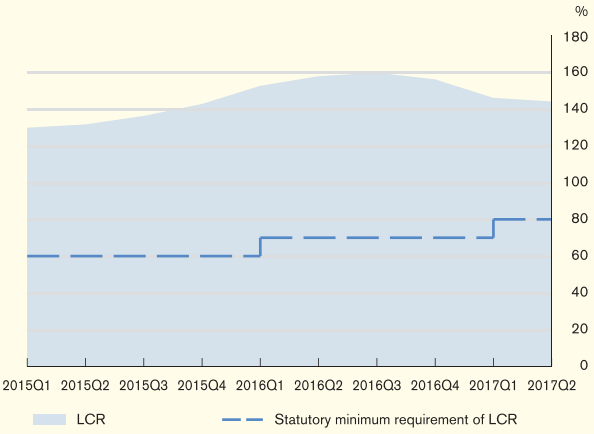
The liquidity position of the banking sector, as measured by the Basel III Liquidity Coverage Ratio (LCR)[39] requirement, remained sound during the review period. While the average LCR of category 1 institutions fell from 156.3% in the fourth quarter of 2016 to 144.2% in the second quarter of 2017 (Chart 5.7), the LCR ratio remained well above the statutory minimum requirement of 80%. The average Liquidity Maintenance Ratio (LMR) of category 2 institutions remained steady at 49.7%. The strong liquidity positions of AIs suggest that the Hong Kong banking sector will be able to withstand liquidity shocks arising from possible capital outflows from Hong Kong.

37 The ratio of tier-one capital to total risk-weighted assets.

38 CET1 capital comprises the core capital of an 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.

39 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".

Chart 5.7
LCR

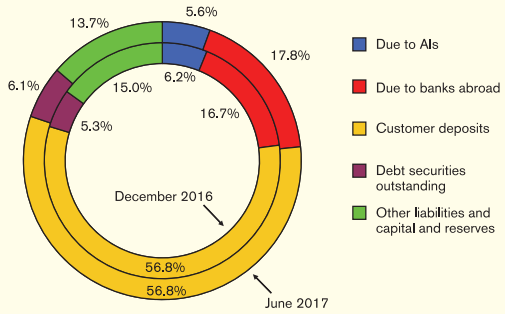


Notes:
1. Consolidated positions.
2. Quarterly average figures.

Source: HKMA.

Customer deposits continued to be the primary funding source for AIs, underpinning a stable funding structure. At the end of June 2017, the share of customer deposits to banks' total liabilities[40] remained unchanged at 56.8% from six months ago (Chart 5.8).

Chart 5.8
The liability structure of all AIs

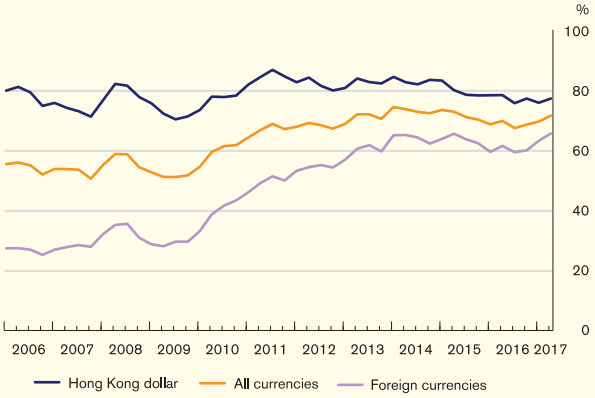


Notes:
1. Figures may not add up to total due to rounding.
2. Figures refer to the percentage of total liabilities (including capital and reserves).
3. Debt securities comprise negotiable certificates of deposit and all other negotiable debt instruments.

Source: HKMA.

Reflecting the faster growth in foreign currency-denominated loans and advances than deposits during the review period, the foreign currency loan-to-deposit (LTD) ratio[41] of all AIs increased to 65.5% in June 2017 from 59.9% in December (Chart 5.9). Meanwhile, as Hong Kong dollar loans and deposits grew at a similar pace during the review period, the Hong Kong dollar LTD ratio remained unchanged at 77.1% in June 2017. Overall, the all-currency LTD ratio increased to 71.4% from 68.4% six months ago.

Chart 5.9
Average LTD ratios of all AIs



Source: HKMA.

Interest rate risk

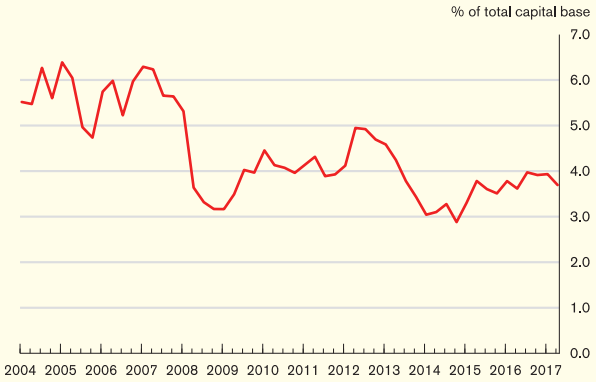
The interest rate risk exposures of locally incorporated licensed banks remained stable at low levels. It is estimated that under a hypothetical shock of an across-the-board 200-basis-point increase in interest rates, the economic value of locally incorporated licensed banks' interest rate positions could be subject to a decline equivalent to 3.69% of their total capital base at the end of June 2017 (Chart 5.10).[42] Nevertheless, with expected US interest rate hikes and the Fed's forthcoming balance sheet normalisation, banks should assess the implications for their interest rate risk management.

[40] The figures reported here are not comparable to those published in previous issues of this *Report* due to the different coverage of banks.

[41] The LTD figures reported here are not comparable to those published in previous issues of this *Report* due to the different coverage of banks.

[42] This estimation does not take into account for the effects of any mitigating actions by banks in response to the shock. The impact would be smaller if mitigating actions is taken.

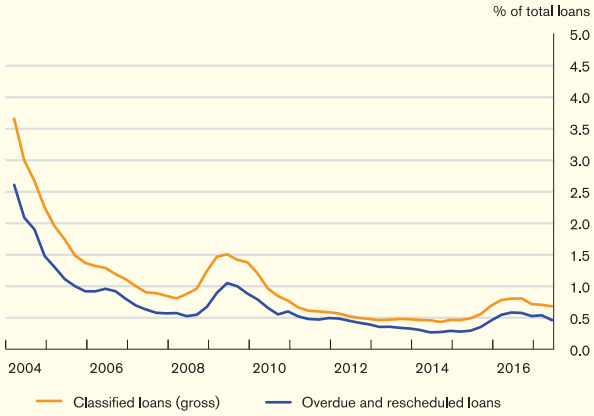
Chart 5.10
Impact of an interest rate shock on locally incorporated licensed banks



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[43], expressed as a percentage of the total capital base of banks.

Source: HKMA.

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.

5.3 Credit risk

Overview

There was a slight improvement in the asset quality of banks' loan portfolios during the review period. The gross classified loan ratio and the ratio of overdue and rescheduled loans of all AIs reduced to 0.83% and 0.61% at the end of June 2017 respectively, compared with 0.85% and 0.67% at the end of 2016. For retail banks, both the gross classified loan ratio and the ratio of overdue and rescheduled loans edged down to 0.68% and 0.46% respectively (Chart 5.11).

Credit growth continued to accelerate, largely supported by the improved domestic and external environments. On a half-year basis, total lending of AIs grew rapidly by a rate of 10.2% in the first half of 2017 compared with 4.2% in the second half of 2016.

However, expectations of credit growth in the near term have become more neutral. The results of the HKMA Opinion Survey on Credit Condition Outlook in June 2017 showed that the share of surveyed AIs expecting loan demand to remain the same in the next three months had increased notably to 86% from 62% in December 2016, while the share of AIs expecting higher loan demand had decreased to 5% (Table 5.A).

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

% of total respondents	Sep-16	Dec-16	Mar-17	Jun-17
Considerably higher	0	0	0	0
Somewhat higher	5	14	5	5
Same	71	62	81	86
Somewhat lower	24	24	14	10
Considerably lower	0	0	0	0
Total	100	100	100	100

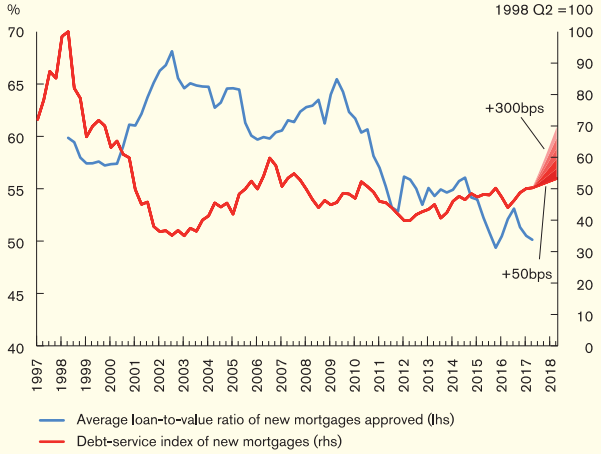
Note: Figures may not add up to total due to rounding.
Source: HKMA.

[43] 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.

Household exposure[44]

Credit risk of household loans stayed low during the review period. Banks' mortgage portfolios remained healthy, with the delinquency ratio at a low level of 0.03% at the end of June 2017. The average loan-to-value ratio (LTV) of new mortgage loans approved decreased further to 50.1% in the second quarter of 2017 from 51.3% in the last quarter of 2016 (Chart 5.12).

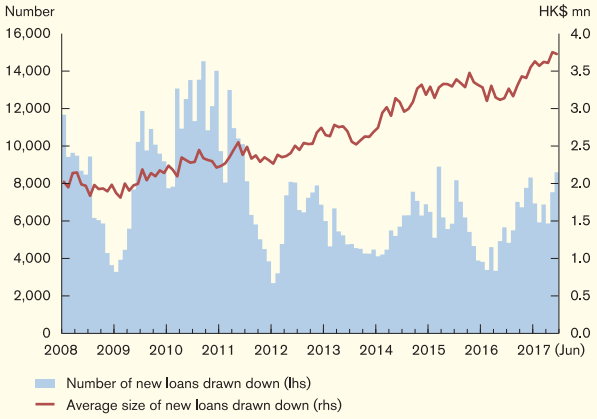
Chart 5.12
Average LTV ratio and household debt-servicing burden for new mortgage loans



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

However, the debt-service index of new mortgages[45] increased further to 50.3 in the second quarter of 2017 from 48.8 in the fourth quarter of 2016 (the red line in Chart 5.12), mainly due to an increase in the average size of new mortgage loans (Chart 5.13). The ongoing US interest rate hikes and the prospective start to the Fed's balance sheet normalisation could weigh further on the already rising household debt-servicing burden. A sensitivity test suggests that the index could rise significantly to 69.6 in a four-quarter period if interest rates were to increase by 300 basis points[46], other things being constant. Therefore, the affordability of household could be under significant pressures if interest rates rise rapidly. To further strengthen banks' risk management of their mortgage loan portfolio, the HKMA implemented the eighth round of macro-prudential measures on banks' mortgage lending in May 2017.[47]

Chart 5.13
New mortgage loans of surveyed AIs



Source: HKMA Residential Mortgage Survey.

[44] Loans to households constitute lending to professional and private individuals, excluding lending for other business purposes. Mortgage lending accounts for a major proportion of household loans while the remainder comprises mainly unsecured lending through credit card lending and other personal loans for private purposes. At the end of June, the share of household lending in domestic lending was 28.5%.

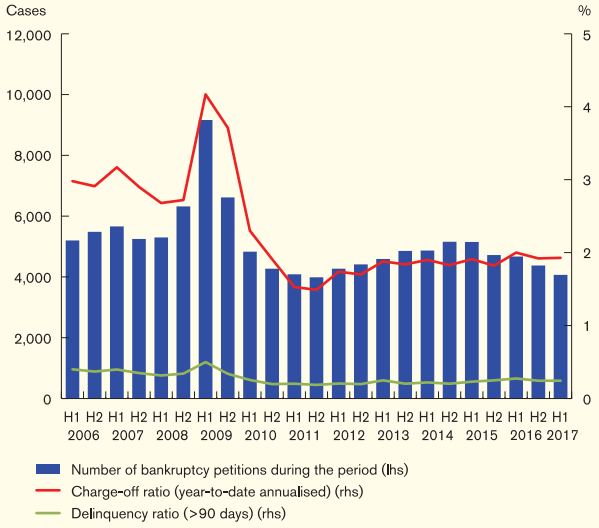
[45] A higher value of the debt-service index indicates that there is either a drop in household income, or an increase in interest rates, or an increase in the average mortgage loan amount drawn by households. Historical movements in the index suggest that a sharp rise in the index may lead to a deterioration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

[46] 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.

[47] On 19 May 2017, the HKMA introduced a new round of prudential supervisory measures on property mortgage business, which included lowering the maximum LTV ratio and debt-servicing ratio for specified groups of borrowers, to strengthen the risk management of AIs and safeguard banking stability. The HKMA also requires AIs using the internal ratings-based approach to raise the risk-weight floor from 15% to 25% for new residential mortgage loans approved after 19 May 2017. For details, see HKMA press release "Prudential Measures for Property Mortgage Loans" on the same date.

The credit risk of unsecured household exposure remained contained in the first half of 2017, with the annualised credit card charge-off ratio and the delinquency ratio largely unchanged at 1.93% and 0.25% (Chart 5.14) at the end of June 2017 respectively.

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



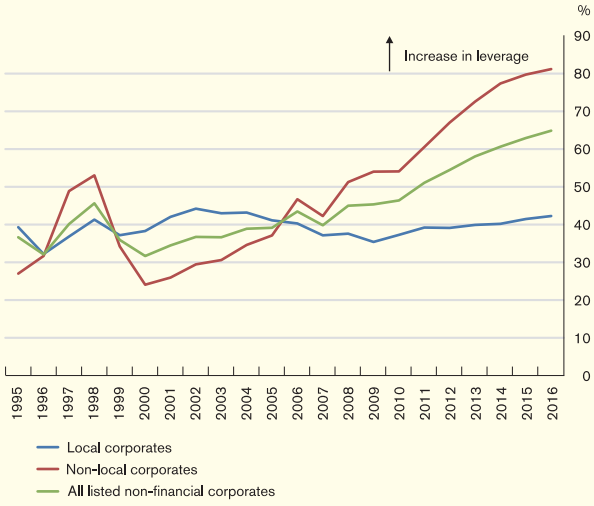
Sources: Official Receiver's Office and HKMA.

Corporate exposure[48]

The pace of US interest rate normalisation continued to be one key factor affecting the credit risk of corporate exposures, given the rising trends of corporate sector leverage (Chart 5.15). As discussed in previous issues of this *Report*,[49] the leverage of local and non-local corporates exhibited very different developments after the GFC, therefore it is important to separately assess the leverage of these two groups. Using accounting data up to the end of 2016, the leverage for non-local corporates (as measured by the weighted average debt-to-equity ratio) continued to stay high at around 81%, while the leverage for local corporates also increased slightly to 42%. The higher level of leverage for non-local corporates implies that these corporates would be more vulnerable to interest rate shocks. As such, banks should carefully assess how interest rates rise will affect the credit risk in relation to their exposure to non-local corporates.

Looking ahead, given the recent strong growth in corporate loans and loans for use outside Hong Kong which were registered in the first half of 2017, the leverage for both local and non-local corporates would likely rise further. In view of the rising levels of corporate sector leverage, banks should maintain prudent credit risk management.

Chart 5.15
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-August 2017.

Source: HKMA staff estimates based on data from Bloomberg.

[48] Excluding interbank exposure. At the end of June, the share of corporate loans in domestic lending was 71.4%.

[49] For details, see "Box 4: Assessing corporate leverage in Hong Kong", *Half-yearly Monetary and Financial Stability Report*, September 2016.

Mainland-related lending and non-bank exposures

The banking sector's Mainland-related lending increased during the first half of 2017. Total Mainland-related lending rose by 11.9% to HK$3,992 billion (16.6% of total assets) at the end of June 2017 from HK$3,566 billion (15.6% of total assets) at the end of 2016 (Table 5.B).

Other non-bank exposures also edged up by 4.8% to HK$1,298 billion (Table 5.C).

Table 5.B
Mainland-related lending

HK$ bn	Sep 2016	Dec 2016	Mar 2017	Jun 2017
Mainland-related loans	3,554	3,566	3,808	3,992
Mainland-related loans excluding trade finance	3,260	3,294	3,509	3,695
Trade finance	294	273	299	297
By type of AIs:				
Overseas incorporated AIs	1,552	1,531	1,686	1,777
Locally incorporated AIs*	1,442	1,490	1,548	1,613
Mainland banking subsidiaries of locally incorporated AIs	560	545	574	603
By type of borrowers:				
Mainland state-owned entities	1,481	1,436	1,545	1,663
Mainland private entities	772	834	921	969
Non Mainland entities	1,301	1,297	1,342	1,361

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

Source: HKMA.

Table 5.C
Other non-bank exposures

HK$ bn	Sep 2016	Dec 2016	Mar 2017	Jun 2017
Negotiable debt instruments and other on-balance sheet exposures	709	722	764	815
Off-balance sheet exposures	453	517	483	483
Total	**1,162**	**1,238**	**1,246**	**1,298**

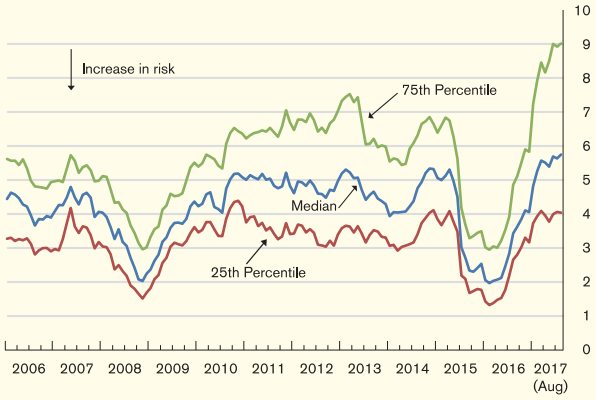
Note: Figures may not add up to total due to rounding.

Source: HKMA.

Despite the concerns over the rising share of banks' Mainland-related lending, the credit risks arising from this should remain manageable as 76% of the Mainland-related lending at the end of June 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.

Partly reflecting improved economic conditions and market sentiment in Mainland China, the distance-to-default index,[50] a market-based default risk indicator, points to a broad-based reduction in the default risk of the Mainland corporate sector since early 2016 (Chart 5.16).

Chart 5.16
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.

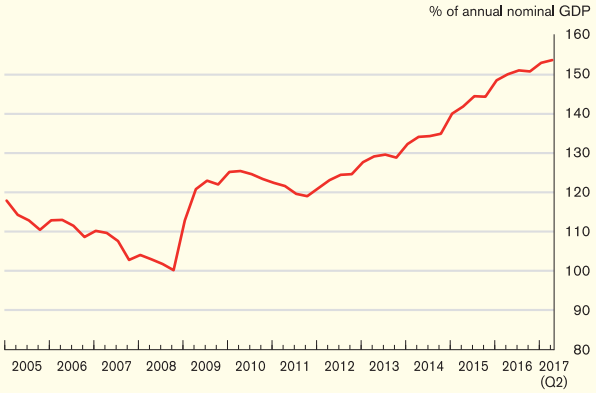
Source: HKMA staff estimates based on data from Bloomberg.

The gross classified loan ratio of Mainland-related lending of all AIs[51] increased marginally to 0.88% at the end of June 2017 from 0.80% at the end of 2016. In view of the rising trends of the credit-to-GDP ratio and corporate sector leverage in the Mainland (Chart 5.17 and Chart 5.18), banks are reminded to maintain prudent credit risk management for their Mainland-related lending.

[50] 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.

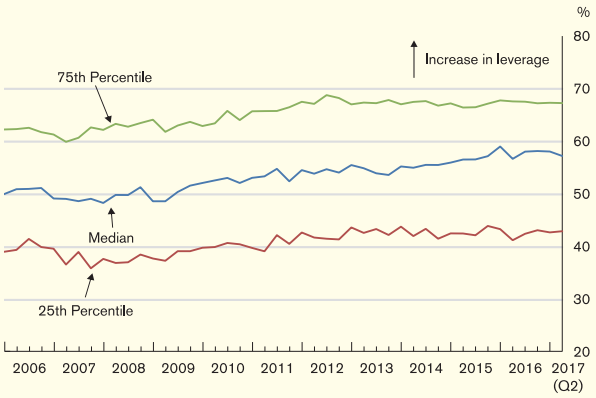
[51] Figures cover AIs' Hong Kong offices and Mainland branches and subsidiaries.

Chart 5.17
Credit-to-GDP ratio in Mainland China



Note: Credit-to-GDP ratio is defined as the ratio of total bank loans (all currencies) to the sum of quarterly nominal GDP for the latest four quarters.
Sources: CEIC and HKMA staff estimates.

Chart 5.18
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 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.

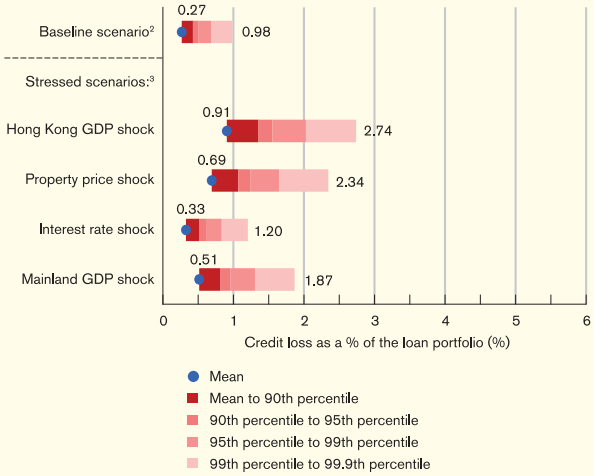
Source: HKMA staff estimates based on data from Bloomberg.

Macro stress testing of credit risk[52]

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 5.19 presents the simulated future credit loss rate of retail banks in the second quarter of 2019 under four specific macroeconomic shocks[53] using information up to the second quarter of 2017.

Taking account of tail risk, banks' credit losses (at the confidence level of 99.9%) under the stress scenarios range from 1.20% (Interest rate shock) to 2.74% (Hong Kong GDP shock), which are significant, but smaller than the estimated loan loss of 4.39% following the Asian financial crisis.

Chart 5.19
The mean and value-at-risk statistics of simulated credit loss distributions[1]



Notes:
1. The assessments assume the economic conditions in 2017 Q2 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 2017 Q3 to 2018 Q2.

   Property price shock: Reductions in Hong Kong's real property prices by 4.4%, 14.5%, 10.8%, and 16.9% respectively in each of the four consecutive quarters starting from 2017 Q3 to 2018 Q2.

   Interest rate shock: A rise in real interest rates (HIBORs) by 300 basis points in the first quarter (i.e. 2017 Q3), followed by no change in the second and third quarters and another rise of 300 basis points in the fourth quarter (i.e. 2018 Q2).

   Mainland GDP shock: Slowdown in the year-on-year annual real GDP growth rate to 4% in one year.

Source: HKMA staff estimates.

[52] Macro stress testing refers to a range of techniques used to assess the vulnerability of a financial system to "exceptional but plausible" macroeconomic shocks. 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 issue are not strictly comparable to those estimates from previous issues of this *Report*.

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

5.4 Systemic risk

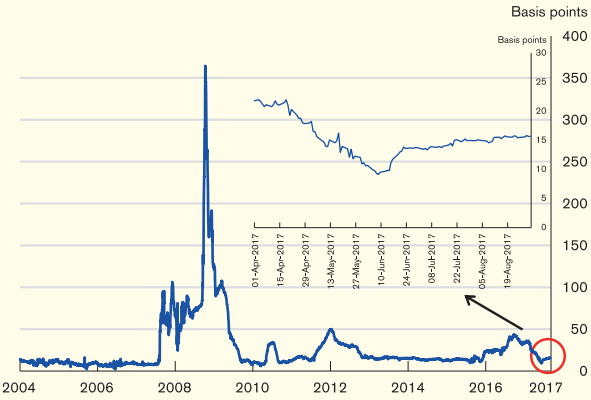
Policy uncertainties in major advanced economies are one important factor affecting the systemic risk of the Hong Kong banking sector. In the US, the Fed's intention to implement balance sheet normalisation in the near term has raised market concerns about its potential impacts on global financial markets. Although the pace of the Fed's balance sheet normalisation is expected to be gradual, it remains to be seen how it will affect the US Treasury market. Should the Fed's balance sheet normalisation and the ongoing US rate hikes trigger significant volatilities in US interest rates, this may have ramifications for global financial conditions. If this scenario occurs, it could pose various challenges for banks in Hong Kong.

In particular, sharper-than-expected rises in US interest rates may translate into higher financing costs for corporates 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. Banks in Hong Kong could also face higher risks of mark-to-market losses in their investment portfolios, as they have generally increased holdings of government debt securities since the crisis.[54]

In view of the widened interest rate differential between the Hong Kong dollar and US dollar, the US monetary policy normalisation could heighten the risks of significant capital outflows from the Hong Kong banking sector, which may result in an overshooting of interest rates in Hong Kong.

In the UK, uncertainty about the outcome of the Brexit negotiations has increased following the results of the UK election. 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 significant interbank linkage between Hong Kong and the UK. However, during the review period, there was no apparent deterioration in interbank funding conditions. The spread between the three-month US dollar LIBOR and its corresponding overnight index swap (OIS) rate[55], which is a common indicator of systemic liquidity risks in the short-term dollar funding market, has been broadly stable (Chart 5.20).

Chart 5.20
3-month US dollar LIBOR-OIS spreads



Source: Bloomberg.

[54] For details, see "Box 5: Changes in the business models of banks in Hong Kong after the crisis and their implications", *Half-yearly Monetary and Financial Stability Report*, March 2017.

[55] 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.

Elsewhere, there has been market speculation on whether the ECB and the BoJ may start tapering their unconventional monetary policies. Although it is not expected to happen immediately, when it occurs, the potential spillover effects arising from the joint tightening of monetary policies to the Hong Kong banking sector should not be underestimated given the strong presence of global banks. Box 5 examines how foreign banks in Hong Kong respond to changes in monetary policies by major central banks. The findings suggest that the negative spillover effects arising from the joint tightening of monetary policies in these economies would exert pressure on US dollar credit availability in Hong Kong. Nevertheless, the ongoing regulatory reforms and prudential measures, which encourage banks to develop more resilient capital and liquidity positions, may help to mitigate the adverse impact.

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 27 January 2017 that the CCyB ratio for Hong Kong will increase to 1.875% with effect from 1 January 2018, from the current 1.25%.[56] This reflects the fact that, under the Basel III phase-in arrangements, the maximum CCyB under Basel III will increase to 1.875% of banks' risk-weighted assets on 1 January 2018 from 1.25% effective from 1 January 2017.[57]

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[58]). Based on the information up to the decision date at the end of the second quarter, both the credit-to-GDP gap and the property price-to-rent gap widened to 13.4% and 10.0% respectively, from 11.5% and 8.2% on the last announcement date. Both gaps remained at elevated levels and the risks associated with credit and property market conditions have not abated. A simple mapping from the indicative buffer guide would signal a CCyB rate of 2.5%, which is at the upper end of the Basel III range.

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

[56] Further details of the decision may be found in the press release "Monetary Authority Announces Countercyclical Capital Buffer for Hong Kong" issued on 27 January 2017 which is available on the HKMA website.

[57] 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.

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

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

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

	14-Jan-16	27-Jan-17	Q2-2017
Announced CCyB rate	1.25%	1.875%	
Date effective	01/01/2017	01/01/2018	
Indicative buffer guide	2.5%	2.4%	2.5%
Basel Common Reference Guide	2.5%	2.5%	2.5%
Property Buffer Guide	2.5%	2.0%	2.5%
Composite CCyB Guide	2.5%	2.4%	2.5%
Indicative CCyB Ceiling	None	None	None
Primary gap indicators			
Credit/GDP gap	15.3%	11.5%	13.4%
Property price/rent gap	13.1%	8.2%	10.0%
Primary stress indicators			
3-month HIBOR spread (percentage points)	0.30%	0.75%	0.47%*
Quarterly change in classified loan ratio (percentage points)	0.07%	0.01%	-0.02%

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 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.
2. * 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[1] (%)

	Jun 2016	Mar 2017	Jun 2017
Interest rates			
1-month HIBOR fixing[2] (quarterly average)	0.22	0.55	0.40
3-month HIBOR fixing (quarterly average)	0.54	0.97	0.83
BLR[3] and 1-month HIBOR fixing spread (quarterly average)	4.78	4.45	4.60
BLR and 3-month HIBOR fixing spread (quarterly average)	4.46	4.03	4.17
Composite interest rate[4]	0.26	0.32	0.31
		All AIs	
Balance sheet developments[5]			
Total deposits	0.7	3.0	2.4
Hong Kong dollar	1.8	5.1	4.0
Foreign currency	-0.4	1.0	0.9
Total loans	2.4	4.6	5.4
Domestic lending[6]	3.1	4.0	5.2
Loans for use outside Hong Kong[7]	0.7	6.0	5.9
Negotiable instruments			
Negotiable certificates of deposit (NCDs) issued	1.3	7.4	8.1
Negotiable debt instruments held (excluding NCDs)	2.1	1.4	-1.7
Asset quality			
As a percentage of total loans[8]			
Pass loans	97.36	97.51	97.77
Special mention loans	1.74	1.66	1.40
Classified loans[9] (gross)	0.90	0.83	0.83
Classified loans (net)[10]	0.58	0.50	0.47
Overdue > 3 months and rescheduled loans	0.69	0.68	0.61
Classified loan ratio (gross) of Mainland related lending[11]	0.87	0.78	0.88
Liquidity ratios (quarterly average, consolidated)			
Liquidity Coverage Ratio — category 1 institutions	158.0	146.2	144.2
Liquidity Maintenance Ratio — category 2 institutions	53.8	49.9	49.7
		Retail banks	
Profitability			
Loan impairment charges as a percentage of average total assets[12]	0.07	0.06	0.08
Net interest margin[12]	1.30	1.38	1.41
Cost-to-income ratio[13]	42.7	41.1	40.7
		Surveyed institutions	
Asset quality			
Delinquency ratio of residential mortgage loans	0.04	0.04	0.03
Credit card lending			
Delinquency ratio	0.27	0.27	0.25
Charge-off ratio — quarterly annualised	2.17	1.88	2.08
— year-to-date annualised	2.00	1.88	1.93
		All locally incorporated AIs	
Capital adequacy (consolidated)			
Common Equity Tier 1 capital ratio	15.8	15.2	15.1
Tier 1 capital ratio	16.6	16.1	16.1
Total capital ratio	19.4	18.8	18.7

Notes:
1. Figures are related to Hong Kong offices only except where otherwise stated.
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.
12. Year-to-date annualised.
13. Year-to-date figures.

Box 5
Inward monetary policy spillover and implications for US dollar lending of foreign banks in Hong Kong

Introduction

Foreign banks are important vehicles for transmitting foreign monetary policies to host countries. Being an international financial centre, Hong Kong is not immune from such inward spillovers. As the US monetary policy normalisation continues and the European Central Bank and the Bank of Japan may possibly wind down their unconventional monetary policies (UMPs), the supply of US dollar loans of foreign banks in Hong Kong (FBHKs)[60] could be affected significantly amid tighter liquidity conditions. The issue deserves an in-depth assessment in view of the fact that many foreign bank branches in Hong Kong have been more active in the dollar loan market since the global financial crisis. And, they have funded their dollar loans primarily by overseas funding, particularly from countries adopting UMPs.[61]

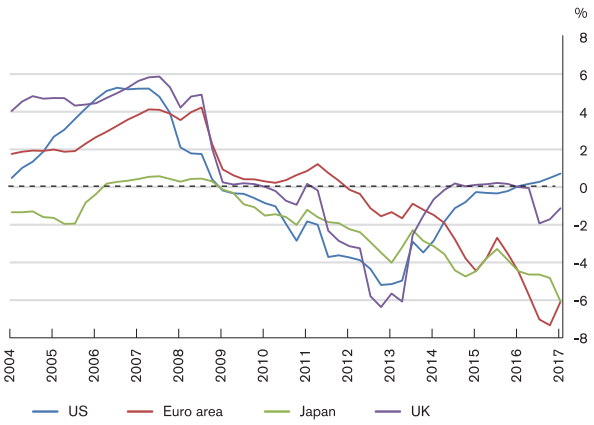
Against such a background, this box empirically examines how the supply of dollar loans of FBHKs would be affected if major advanced economies that have adopted UMPs (i.e. the US, euro area, Japan and the UK, and henceforth referred to as UMP countries) tighten their monetary policies.

The empirical models

We start the analysis by constructing a quarterly monetary policy index (MPI) that reflects monetary policies of the four major UMP countries. We then estimate econometric models to explain quarterly changes of dollar loans of FBHKs in the logarithm form (ΔL) by quarterly changes of the MPI (ΔMPI) and other factors.

We construct the MPI as follows. First, we obtain a shadow policy rate for each of the four UMP countries as estimated by Krippner (2015).[62] In essence, the shadow rate coincides with the policy rate before it hits zero, and contains information about the monetary policy stance when the policy rate reaches the zero lower bound. Chart B5.1 shows the shadow policy rate for the four countries. Apart from the US, which started its monetary policy normalisation in December 2015, shadow policy rates of other countries remained at negative levels as their central banks continued to adopt UMPs.

Chart B5.1
Shadow policy rates for UMP countries



Source: Estimated shadow rates are sourced from Krippner (2015).

Secondly, for each FBHK, we compute a weighted average of the four shadow rates for each time point, with the weights reflecting funding dependence of the FBHK with respective countries. More specifically, we proxy the funding dependence of the FBHK on a UMP country by its net US dollar cross-border

[60] Foreign banks include both foreign bank branches and subsidiaries.

[61] See "Box 5: Changes in business models of banks in Hong Kong after the crisis and their implications", *Half-yearly Monetary and Financial Stability Report*, March 2017.

[62] For details, see http://www.rbnz.govt.nz/research-and-publications/research-programme/additional-research/measures-of-the-stance-of-united-states-monetary-policy/comparison-of-international-monetary-policy-measures.

liabilities from the banking sector of that country as a share of the FBHK's total liabilities in the previous quarter.[63] Essentially, we assume that an FBHK would respond differently to monetary policies in the four UMP countries such that the more dollar funding it directly obtains from a UMP country, the more responsive is that FBHK to the monetary policy in that UMP country.[64]

Apart from direct dollar funding flows from the four UMP countries, FBHKs may also source dollar funding from parent banks. Since a typical way for parent banks to obtain dollar funding is from the US wholesale funding market,[65] FBHKs may be responsive to monetary policy in the US through this indirect channel. In order to capture the potential spillover effect through this indirect channel in constructing the MPI, we increase the weight for the US shadow rate if the FBHK receives net dollar funding from its home country's banking sector.[66] We define the resulting bank-specific time series as the MPI. By construction, a positive value of ΔMPI indicates a tighter monetary policy condition of the four major UMP countries.

To capture a fuller effect of ΔMPI on ΔL, our benchmark model includes the contemporaneous and the first three lag terms of ΔMPI as explanatory variables. We also include bank-fixed and time-fixed effects in the model. The former captures unobservable time-invariant characteristics of FBHKs, while the latter takes into account changes in loan demand and economic conditions in Hong Kong that commonly affect FBHKs over time.[67] Under this specification, the sum of the estimated coefficients of contemporaneous and lag terms of ΔMPI can be interpreted as the cumulative effect of ΔMPI on changes in the supply of dollar loans of FBHKs in a one-year horizon.

We also consider a modified model that studies how balance sheet factors would affect the extent of inward monetary policy spillover. In particular, we conjecture that FBHKs with a higher capital ratio (at the parent level) and a more stable funding structure would be less responsive to monetary policy changes in the UMP countries. For the former factor, we argue that highly capitalised banks could have broader access to alternative funding other than retail deposits, by which they can counterbalance some of the contractionary effect of monetary policy tightening. Also, FBHKs with a more stable funding structure, such as taking more local retail deposits and long-term funding, are arguably less subject to inward monetary policy spillover or, at least, tend to have a smaller immediate spillover effect.

To test these two conjectures, we include the tier-one capital ratio of the parent bank and the ratio of the sum of customer deposits and non-deposit liabilities with a maturity over three months to total liabilities (henceforth referred to as the stable funding ratio) of FBHKs in the model. These two variables are separately interacted with all ΔMPI terms in the regression equation to reveal how these two balance sheet factors affect the extent of inward monetary policy spillover. The structure of the empirical model is summarised by Chart B5.2.

[63] A zero weight is assigned if net US dollar cross-border liabilities from that country are negative, i.e. the FBHK is a net funding provider to the banking sector of that country.

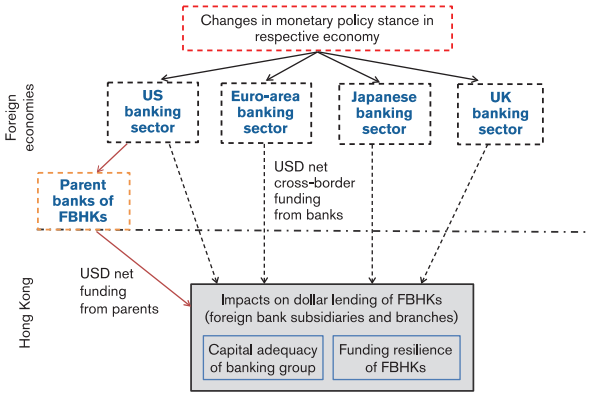
[64] As the direct dollar banking flows are used in the model, these essentially assume that banks in the respective UMP countries would first obtain US dollar funding either from wholesale markets or through foreign exchange (FX) swap markets before lending to FBHKs.

[65] Alternatively, parent banks could also obtain dollar funding through FX swap markets and such dollar funding is also captured in FBHK's US dollar net funding from parents.

[66] In practice, the weight for the US shadow rate is increased by the ratio of FBHK's net US dollar cross-border liabilities from the home-country's banking sector to its total liabilities in the previous quarter if the ratio is positive.

[67] The model also includes some control variables, including (1) log assets of parent bank; (2) tier-one capital ratio of FBHK's parent bank; (3) FBHK's total loans as a share of its assets; and (4) FBHK's stable funding as a share of its liabilities.

Chart B5.2
The structure of the empirical models



The model is estimated using a quarterly panel dataset of 79 foreign banks in Hong Kong covering from the first quarter of 2004 to the first quarter of 2017. The foreign branch- and subsidiaries-level variables are constructed using regulatory data filed by FBHKs to the HKMA, while parent-level variables are constructed using consolidated balance sheet data of their respective parents from *SNL* and *Capital IQ*.

Estimation results and scenario analysis

Table B5.1
Estimated impact of inward monetary policy spillover on dollar lending of foreign banks in Hong Kong

Explanatory variables	ΔUSD Loans	ΔUSD Loans
∑ΔMPI (t to t-3)	–**	–***
∑ΔMPI (t to t-3) * T1 ratio		+**
∑ΔMPI (t to t-3) * stable funding ratio		+*
Bank control	Yes	Yes
Bank fixed effect	Yes	Yes
Time fixed effect	Yes	Yes

Note: ***, ** and * denote the estimated coefficients are significant at 1%, 5% and 10% levels respectively.
Source: HKMA staff estimates.

Our preliminary estimation results are summarised in Table B5.1, which are in line with our expectations. In particular –

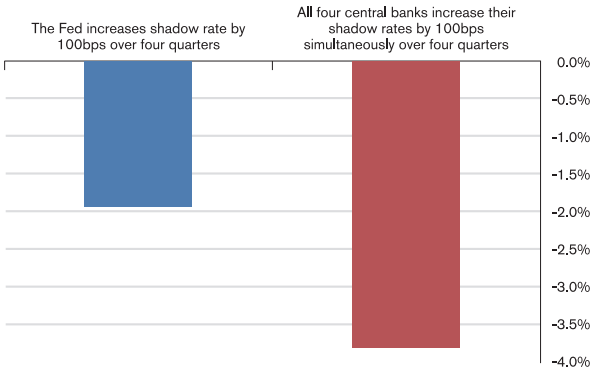
(1) First, estimation results from the benchmark model (i.e. the first column of Table B5.1) show that FBHKs would reduce their dollar lending in response to monetary policy tightening in the UMP countries. As implied by the construction of the MPI, the estimated impact tends to be larger for those FBHKs that rely more on funding from UMP countries and the home country.

(2) Secondly, the balance sheet factors are found to significantly affect the extent of inward monetary spillover (i.e. see the second column of Table B5.1). Specifically, those FBHKs that have a higher tier-one capital ratio (at the parent level) or a higher stable funding ratio tend to have a smaller reduction in dollar lending in response to monetary policy tightening in UMP countries than other FBHKs.

Based on the estimation results from the modified model, we further conduct analysis based on two hypothetical scenarios. We assume a 100-basis-point increase in the shadow policy rates in a one-year horizon by the US Fed in the first scenario, and by all the four UMP countries jointly in the second scenario. We put our focus on the estimated impact of dollar loans of FBHKs from the four UMP countries for two reasons. First, European and Japanese banks and, to a lesser extent, US banks are major providers of dollar loans. Secondly, analysing granular data finds that this group of FBHKs relied much more on funding from UMP countries than other FBHKs, suggesting that the inward monetary spillover effect would mainly pass through FBHKs from UMP countries.

Chart B5.3 presents the estimated cumulative impact[68] on dollar loans for the two hypothetical scenarios based on the latest average balance sheet position of FBHKs from the UMP countries. The FBHKs from UMP countries are estimated to reduce their dollar loans by 1.9% if the US Fed raises the policy rate by 100 basis points (i.e. the first scenario), while in the more extreme scenario, the estimated decline in dollar loans is much larger at 3.8% (the second scenario).

Chart B5.3
Estimated cumulative impact on dollar lending of a 100-basis-point rise in shadow rates in the US and in all four UMP countries



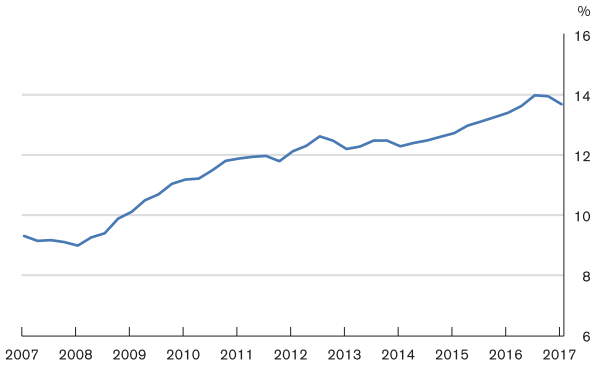
Source: HKMA staff estimates.

The relatively moderate estimated impact on dollar loans[69] may be partly attributable to post-crisis development in the balance sheet characteristics of FBHKs. Specifically, both the average tier-one capital ratio and the stable funding ratio of FBHKs have improved notably after the crisis and even surpassed their pre-crisis levels (Charts B5.4 and B5.5). These developments partly reflect the policy effects of Basel III capital requirements introduced since 2007 and the Stable Funding Requirement introduced by the HKMA in 2013.

[68] We assume a 25-basis-point increase in the policy rate for four consecutive quarters. The cumulative impact is defined as the sum of the estimated impact of each quarter rise in the policy rate on dollar loans over four quarters.

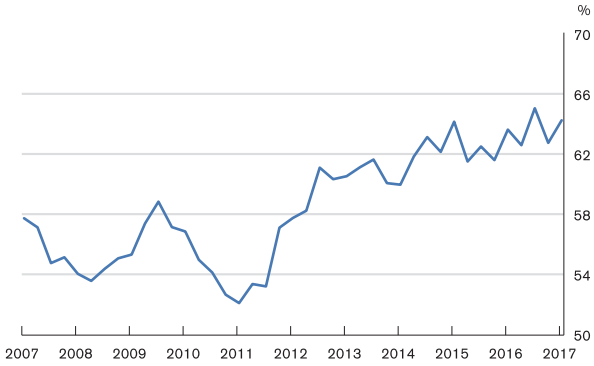
[69] As a reference, dollar loans of the Hong Kong banking sector declined by 4.6% in the fourth quarter of 2006 after a total of 84 basis points increase in the effective Fed Fund Rate from March to December 2006.

Chart B5.4
Average tier-one capital ratio of FBHKs



Note: Figures refer to the simple average of the consolidated tier-one capital ratio of parent banks of FBHKs.
Source: HKMA staff estimates based on data obtained from SNL and Capital IQ.

Chart B5.5
Stable funding ratio of FBHKs



Note: Stable funding sources are defined as the sum of customer deposits and non-deposit liabilities with maturity over three months.
Source: HKMA.

To evaluate how far the post-crisis improvement in bank balance sheet factors may have dampened the inward monetary policy spillover effect, we conduct a counterfactual exercise by assuming that the average tier-one capital ratio and stable funding ratio of FBHKs from UMP countries were to stay at their levels at the end of 2008. We then re-estimate the loan responses in two hypothetical scenarios as shown in Chart B5.3 previously. Had their balance sheets not improved after the crisis, FBHKs from UMP countries would reduce their dollar loans more significantly by 4.8% if the US Fed raises the policy rate by 100 basis points in the first scenario, while the estimated decline in dollar loans in the second scenario is larger at 9.5%.

Conclusion

Our study finds that the Hong Kong banking sector is not immune from the inward spillover of monetary policy. In particular, FBHKs' cross-border funding linkages with UMP countries are one significant channel through which the supply of dollar loans could be affected by monetary policy tightening in UMP countries. Yet, our empirical results suggest that the potential impact on the supply of dollar loans would be much smaller than before because of the notable post-crisis improvement in FBHKs' capitalisation and funding structure. Looking ahead, the stronger balance sheet of FBHKs may help reduce the risk of a sharp disruption in the supply of dollar loans in the Hong Kong banking sector when major advanced economies eventually unwind their unconventional monetary policies.

Glossary of terms

Aggregate Balance

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

Authorized Institution (AI)

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

Best Lending Rate

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

Certificates of Indebtedness (CIs)

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

Composite Consumer Price Index (CCPI)

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

Composite Interest Rate

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

Convertibility Undertaking (CU)

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

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

Convertibility Zone

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

Exchange Fund Bills and Notes (EFBN)

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

Monetary Base

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

Nominal and Real Effective Exchange Rate (NEER and REER)

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

Abbreviations

3m moving average	Three-month moving average
3m-on-3m	Three-month-on-three-month
AEs	Advanced economies
AFC	Asian Financial Crisis
ASEAN	Association of Southeast Asian Nations
AIs	Authorized Institutions
BIS	Bank for International Settlements
bn	Billion
BLR	Best lending rate
BoJ	Bank of Japan
BoP	Balance of Payments
BSD	Buyer's stamp duty
CAPE	Cyclically-adjusted price-to-earnings
CAR	Capital Adequacy Ratio
CBRC	China Banking Regulatory Commission
CCPI	Composite Consumer Price Index
CCyB	Countercyclical capital buffer
CDs	Certificates of deposits
CDS	Credit default swap
CET1	Common equity tier-one
CFETS	China Foreign Exchange Trade System
ChiNext	The start-ups board in the Shenzhen Stock Exchange
CIs	Certificates of Indebtedness
CNH	Offshore renminbi in Hong Kong
CNY	Onshore renminbi
C&SD	Census and Statistics Department
CPI	Consumer Price Index
CU	Convertibility Undertaking
DF	Deliverable forward
DI	Direct investment
DSD	Doubling of the ad valorem stamp duty rates

DSR	Debt-servicing ratio
ECB	European Central Bank
EFBNs	Exchange Fund Bills and Notes
EMEs	Emerging Market Economies
EPIFs	External primary income flows
EPU	Economic policy uncertainty
ETFs	Exchange traded funds
EU	European Union
EUR	Euro
FDI	Foreign direct investment
Fed	Federal Reserve
FOMC	Federal Open Market Committee
FSB	Financial Stability Board
FX	Foreign exchange
GBs	Government Bonds
GDP	Gross Domestic Product
GFC	Global Financial Crisis
G-SIBs	Global systemically important banks
HIBOR	Hong Kong Interbank Offered Rate
HK	Hong Kong
HKD	Hong Kong dollar
HKEx	The Hong Kong Exchanges and Clearing Limited
HKMA	Hong Kong Monetary Authority
HK$M3	Hong Kong dollar broad money supply
HSCEI	Hang Seng China Enterprises Index
HSI	Hang Seng Index
IFC	International Finance Corporation
IMF	International Monetary Fund
IPO	Initial Public Offering
IT	Information technology
LCR	Liquidity Coverage Ratio
LEI	Composite index of leading economic indicators
LIBOR	London Interbank Offered Rate
LERS	Linked Exchange Rate System
LMR	Liquidity Maintenance Ratio
lhs	Left-hand scale

IRB	Internal Ratings-Based Approach
LTD	Loan-to-deposit
LTV	Loan-to-value
mn	Million
MDBs	Multilateral Development Banks
MLF	Medium-term Lending Facility
MPA	Macro Prudential Assessment
MRF	Mutual Recognition of Funds
MSCI	Morgan Stanley Capital International
MTN	Medium-term Note
NBER	National Bureau of Economic Research
NBS	National Bureau of Statistics
NCD	Negotiable certificate of deposit
NEER	Nominal effective exchange rate
NIE	Newly industrialised economies
NIM	Net interest margin
NPL	Non-performing loan
OIS	Overnight indexed swap
OTC	Over-the-counter
p.a.	Per annum
P2P	Peer-to-peer
PBoC	People's Bank of China
PMI	Purchasing Managers' Index
PPI	Producer Price Index
PSL	Pledged Supplementary Lending
qoq	Quarter-on-quarter
qoqa	Quarter-on-quarter annualised
QE	Quantitative Easing
QQE	Quantitative and Qualitative Easing
R&VD	Rating and Valuation Department
REER	Real effective exchange rate
Repo	Repurchase operation
rhs	Right-hand scale
RMB	Renminbi
RQFII	Renminbi Qualified Foreign Institutional Investor
RTGS	Real time gross settlement

SAFE	State Administration of Foreign Exchange
SDR	Special Drawing Rights
SHIBOR	Shanghai Interbank Offered Rate
SKEW	Chicago Board Options Exchange Skew Index
SLO	Short-term Liquidity operation
SME	Small and medium-sized enterprise
SOEs	State-owned enterprises
SPM	Supervisory Policy Manual
SSD	Special stamp duty
SSE	Shanghai Stock Exchange
SWIFTs	Society for Worldwide Interbank Financial Telecommunication
S&P	Sale and Purchase Agreements of Building Units
S&P 500	Standard & Poor's 500 Index
TLTRO	Targeted Longer-Term Refinancing Operation
TWI	Trade Weighted Index
UK	United Kingdom
US	United States
USD	US dollar
VAR	Vector autoregressive
VHSI	HSI Volatility Index
VIX	Chicago Board Options Exchange Market Volatility Index
WMPs	Wealth management products
yoy	Year-on-year

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

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