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## 2. Global setting and outlook

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*During the review period, the global economy remained in expansion but growth momentum, especially outside the US, moderated amid a confluence of idiosyncratic and cyclical headwinds. In view of the less optimistic growth outlook, the Federal Reserve adjusted its stance on monetary policy, emphasising “data dependence” and the need for “patience” instead of providing forward guidance on further rate hikes. As the Federal Reserve becomes more data dependent, financial markets could become more sensitive to incoming data, and monetary policy could be perceived as more uncertain. At the same time, heightened global trade policy uncertainty and geopolitical risks will likely continue to cloud the world economic outlook.*

*In East Asia<sup>3</sup>, amid signs of a slowing US rate hike cycle and a levelling-off in the US dollar, financial markets have generally stabilised since late 2018. However, the region could face a broad-based slowdown given the deteriorating external environment, namely the unresolved trade conflict between the US and Mainland China and weakening growth in the advanced economies.*

*In Mainland China, growth momentum eased further in the second half of 2018 and growth outlook has become more uncertain amid the US-China trade conflict and financing difficulties that confront small firms. In response, policymakers adopted more targeted measures to stabilise the economy and to help private and small firms. Facing these challenges, policymakers will need to strike a delicate balance between continuing with the containment of systemic risks and supporting firms and the real economy.*

### 2.1 External environment

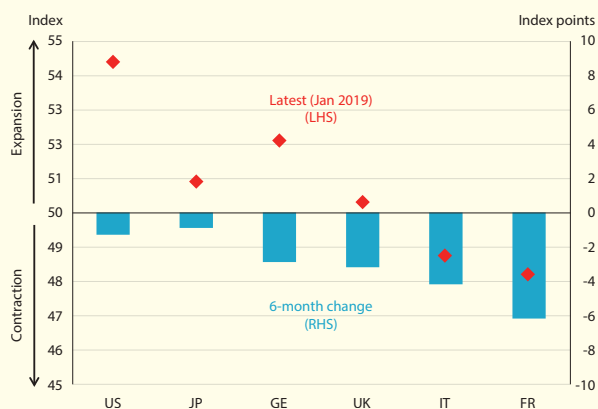
The global economy continued to enjoy broad-based expansion in the second half of 2018. However, while the US economic performance remained solid overall, some signs of moderation emerged. There are also clear signs that growth momentum outside the US is slowing down. A number of country-specific shocks — including natural disasters in Japan, the introduction of new automobile emission standards in Germany, a spike in Italy’s sovereign yields amid the fiscal standoff with the European Union (EU) and the

outbreak of civil unrest in France — weighed on economic activities in advanced economies (AEs) (Chart 2.1). In addition, a cyclical moderation in world import growth has posed headwinds to industrial production in emerging market economies (EMEs) (Chart 2.2). The slump in oil prices during the fourth quarter also presented fresh challenges to commodity-exporting EMEs. In view of the softer growth momentum in the second half of 2018, the International Monetary Fund revised downward its 2019 global growth forecasts in January, by 0.2 percentage points to 3.5%.

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<sup>3</sup> In this chapter, East Asia refers to a group of seven economies; they are Indonesia, Malaysia, the Philippines, Singapore, South Korea, Taiwan and Thailand.

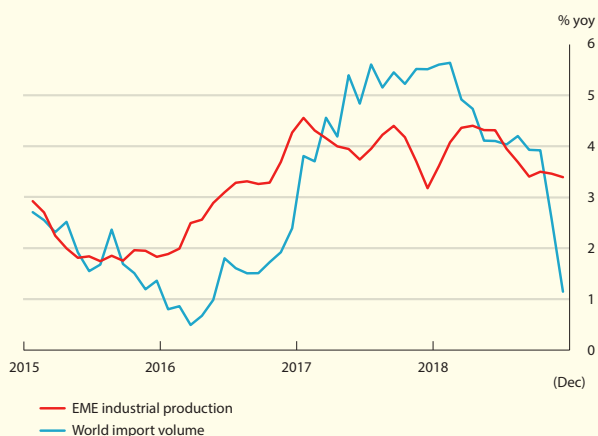
**Chart 2.1**  
Composite Purchasing Managers' Index (PMI) in selected AEs



Note: US = United States, JP = Japan, GE = Germany, UK = United Kingdom, IT = Italy, FR = France.

Source: CEIC.

**Chart 2.2**  
World import volume and industrial production in EMEs

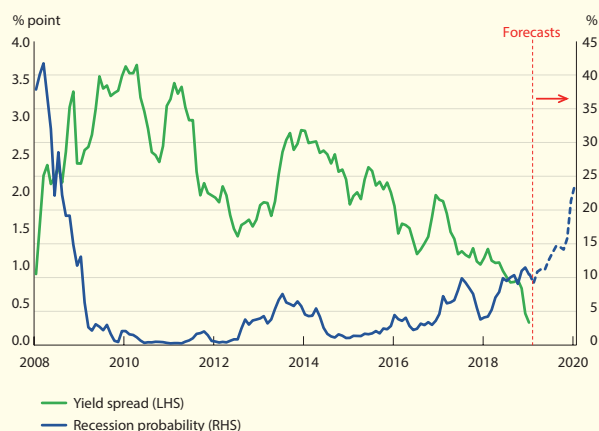


Note: Data shown are three-month moving averages.

Source: CPB Netherlands Bureau for Policy Analysis.

In the fourth quarter, against the backdrop of slowing global growth, heightened trade policy uncertainty, concerns about the sustainability of US corporate earnings growth, and communications from the Federal Reserve (Fed) indicating that US monetary policy would continue to tighten, global equity markets corrected sharply. As financial market sentiment deteriorated, the flattening of the US Treasury yield curve accelerated to levels not seen since the global financial crisis, which led some market participants to speculate about the risks of an imminent US recession (Chart 2.3).

**Chart 2.3**  
Spread between ten-year and three-month US Treasury yields and US recession probability



Note: The New York Fed provides monthly estimates of the probability that the US economy would fall into a recession in the next 12 months, based on an econometric model that makes use of the spread between ten-year and three-month US Treasury rates.

Source: New York Fed.

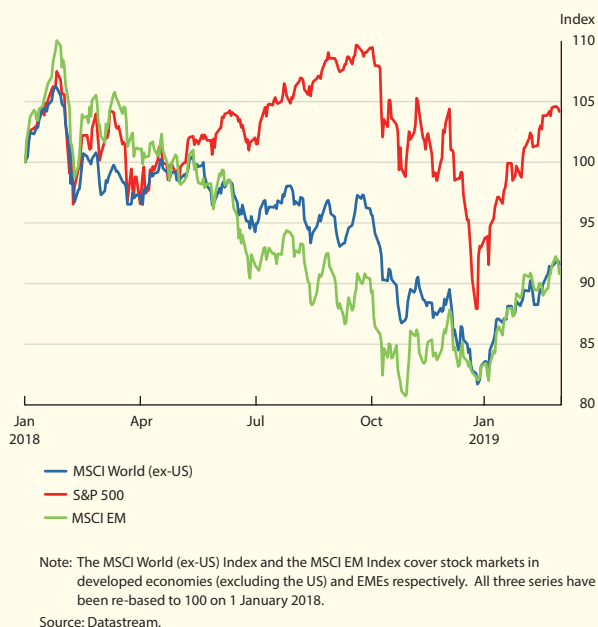
That said, a near-term US recession is unlikely. The US economic fundamentals remain solid, particularly in view of the tight labour market that will likely continue to underpin private consumption. At the same time, with the output gap estimated to have just returned to positive last year, the risks of an overheating economy prompting aggressive Fed tightening are relatively remote.<sup>4</sup>

Nonetheless, conceivably taking into account the sharp tightening in financial conditions since the fourth quarter, senior Fed officials began to emphasise a data-dependent approach to monetary policy in early January, highlighting that inflation pressure was “muted” and that they could be “patient” in determining future adjustments to monetary policy. In addition, following the January Federal Open Market Committee (FOMC) meeting, the Fed dropped its forward guidance on further interest rate hikes, and announced that it would be “prepared to adjust any of the details for completing balance sheet normalisation in light of economic and

<sup>4</sup> In January, the Congressional Budget Office estimated that the US output gap turned positive (at +0.3% of potential gross domestic product (GDP)) in the second quarter of 2018, the first time since the global financial crisis, and the positive output gap is expected to peak at +0.9% in the third quarter of 2019.

financial developments”.<sup>5</sup> This shift in communications triggered a rally on global equity markets (Chart 2.4).

**Chart 2.4**  
**S&P 500, MSCI World (ex-US) and MSCI EM indices**

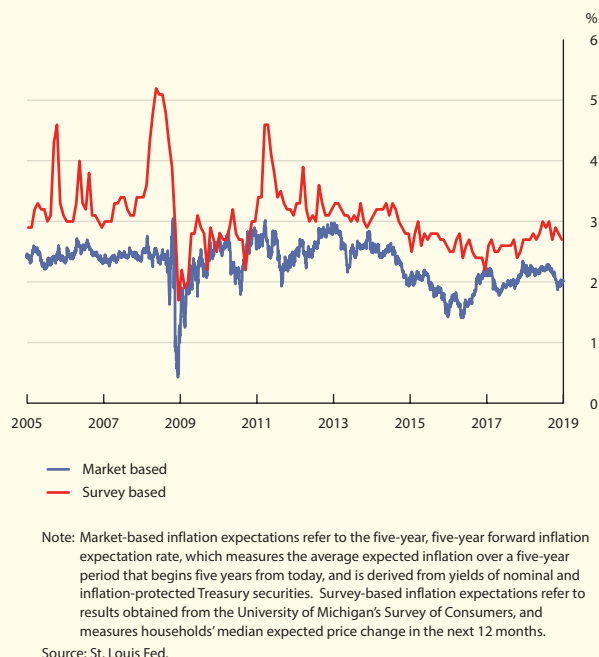


Despite the Fed’s recent dovish signals, the US monetary policy outlook remains quite uncertain, and hinges on inflation and other developments. Modest inflation pressures so far have afforded the Fed leeway to pursue monetary policy normalisation in a gradual manner.<sup>6</sup> This “can afford to be patient” view is supported by well-anchored inflation expectations in recent years (Chart 2.5). In addition, as highlighted by Fed Chairman Jerome Powell in January, the US economic outlook has been facing a number of “cross currents”, including the growth slowdown outside the US and trade policy uncertainty. These developments would likely call for a more cautious monetary policy stance.

<sup>5</sup> Please see “Statement Regarding Monetary Policy Implementation and Balance Sheet Normalisation”, published by the Fed on 30 January 2019.

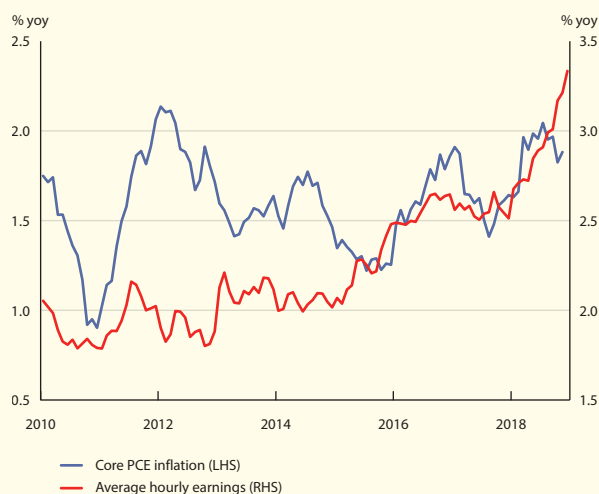
<sup>6</sup> According to the minutes of the December 2018 FOMC meeting, many participants expressed the view that, “... in an environment of muted inflation pressures, the Committee could afford to be patient about further policy firming”.

**Chart 2.5**  
**Market-based and survey-based indicators of US inflation expectations**



Nonetheless, the overall US economy is likely to continue to perform, underpinned by a tight labour market. In this environment, wage growth may accelerate, which typically translates into higher inflation ahead (Chart 2.6). As such, there is a risk that market expectations, which have effectively priced out any prospects of Fed rate hikes in 2019, may have been overly complacent (Chart 2.7).

**Chart 2.6**  
**Average hourly earnings and core personal consumption expenditure inflation**



**Chart 2.7**  
**Futures-implied probability of no changes, versus**  
**at least one hike, in Fed funds target rate in 2019**



Note: The probability series are imputed from prices of Fed funds futures contracts.  
 Source: Bloomberg.

To summarise, an extended pause in Fed rate hikes is not a foregone conclusion. In an attempt to minimise policy errors, the Fed has increasingly emphasised data dependency in its policymaking as a risk management strategy.<sup>7</sup> As a corollary, it is likely that financial markets could become more sensitive to incoming data, especially those that warrant monetary tightening.

The monetary policy outlook of other major central banks is also uncertain. In the euro area, the European Central Bank (ECB) ended its asset purchase programme (APP) in December, while continuing to reinvest the principal payments from maturing securities purchased under the APP in full, and reiterated its forward guidance of keeping policy rates unchanged at least through the summer of 2019. Nevertheless, the ECB downgraded its assessment of the near-term growth momentum in January, characterising the risks surrounding the growth outlook as having

“moved to the downside”<sup>8</sup>; the implication of this downgrade for monetary policy remains to be seen.

In Japan, recent policy meetings of the Bank of Japan (BoJ) have indicated the Bank it could further ease its monetary policy stance, if needed, amid rising downside risks. However, hurdles for further policy easing are likely to be very high as the effectiveness of the measures has been called into question; and as the drawbacks of the prolonged ultra-low interest rate environment have become more visible. For instance, the regional banks’ capital ratio has declined from 10.6% in 2015 to 9.7% in 2018 as low yields continued to weigh on their profitability. As such, the BoJ is likely to struggle within an already very limited policy space in the near term.

In addition to the uncertainty surrounding the global monetary policy outlook, the future outcomes of trade negotiations and heightened geopolitical risks represent two other key sources of risks to the global economic outlook. In early December, the US administration announced it would hold off tariff hikes against Mainland imports for 90 days, and extended the deadline again in late February, but it remains to be seen whether the two sides can reach a long-term trade deal. At the same time, the trade talks between the US and the EU have, at this stage, yielded little progress so far. As the outcomes of these trade negotiations remain uncertain, they may continue to cloud the global economic outlook.

Policy and geopolitical risks also abound. In the US, bipartisan disagreement over the funding of border security resulted in a 35-day shutdown of the federal government between late December 2018 and late January 2019. Although the impact of the shutdown on economic growth is likely to be transitory, there is a risk that the acrimonious relationship between the Trump

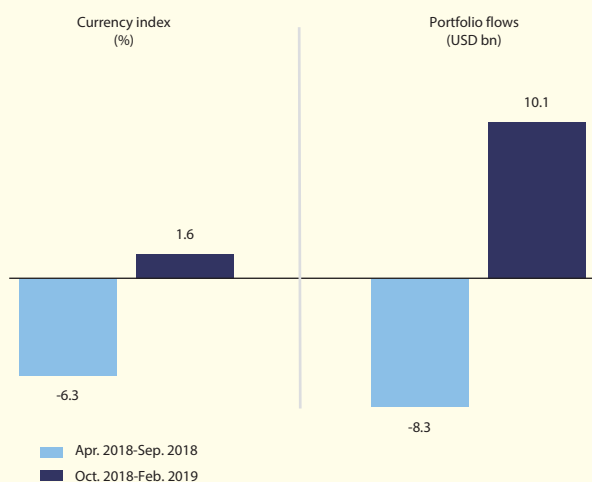
<sup>7</sup> See, for example, speech by Fed Chairman Powell titled “Monetary Policy in a Changing Economy”, delivered at the Jackson Hole Symposium on 24 August 2018, and speech by Fed Vice Chairman Clarida titled “Data Dependence and US Monetary Policy”, delivered at The Clearing House and The Bank Policy Institute Annual Conference, 27 November 2018.

<sup>8</sup> Separately, the European Commission revised downward the 2019 growth projection for the euro area, from 1.9% to 1.3%, in February.

administration and the House controlled by the Democratic Party could lead to more policy gridlock ahead. In the UK, the risks associated with Brexit and its spillover effects increased after the overwhelming defeat of the May administration's Brexit proposal in mid-January, and it remains to be seen whether last-minute solutions to prevent a disruptive "hard" Brexit can be found. Elsewhere, geopolitical tensions in the Middle East, such as the US's renewed sanctions on Iran, may also pose uncertainty to oil prices that could affect the global growth outlook.

In East Asia, financial markets generally stabilised in the fourth quarter of 2018 after experiencing bouts of market volatility in the first three quarters. The levelling-off in the US dollar since October and signs that the Fed may be patient with further rate hikes have alleviated the depreciation and capital outflow pressures faced by East Asian economies. Many regional currencies strengthened slightly against the US dollar in the fourth quarter, while portfolio inflows resumed (Chart 2.8).

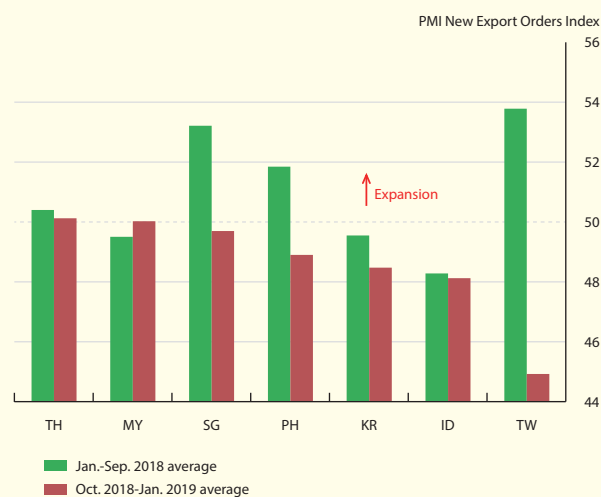
**Chart 2.8**  
**East Asia: Currency index and capital flows**



Note: Currency index is Bloomberg JPM Asia dollar index (ADXY).  
Sources: CEIC, EPFR and HKMA staff calculations.

Despite the stabilisation in financial markets, there are increasing signs that the region's economies may face a broad-based slowdown. Amid the weakening global trade momentum associated with the US-China trade conflicts, real GDP growth in most East Asian economies slowed in the second half of last year, largely driven by a decline in export growth. Indeed, the PMI new export orders sub-index, which indicates the external sector performance in the near-term, has declined to contractionary territory since the fourth quarter for many East Asian economies, suggesting that near-term growth momentum may further moderate (Chart 2.9).

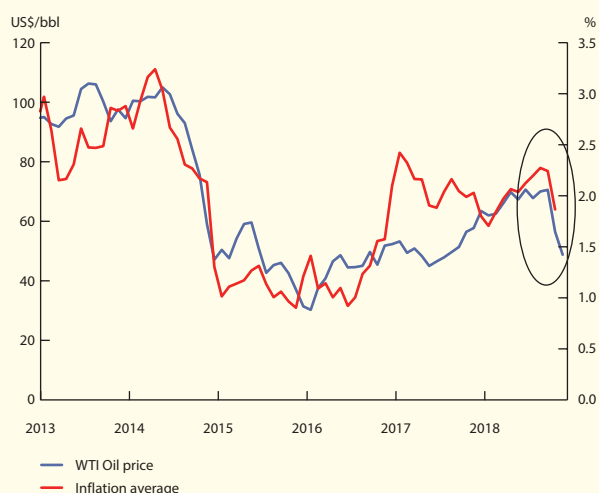
**Chart 2.9**  
**East Asia Markit PMI new export orders index**



Note: Whole economy PMI for Singapore and manufacturing PMI for other economies.  
Source: CEIC.

Amid the slowing growth environment and a recent drop in oil prices, inflationary pressures have weakened in East Asia (Chart 2.10).

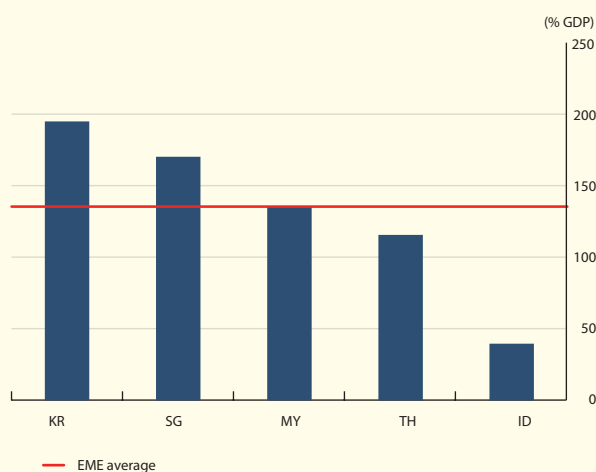
**Chart 2.10**  
**East Asia: Headline inflation and oil prices**



Sources: Bloomberg, CEIC and HKMA staff estimates.

Coupled with modest inflationary pressures and weakened upward stress on the US dollar, the need for rate hikes among East Asian central banks has largely faded, alleviating the typical policy dilemma of supporting economic growth and taming inflation and capital outflows. Nonetheless, the presence of financial imbalances continues to pose a challenge for central banks, as private sector indebtedness remains high in some East Asian countries by emerging market standards (Chart 2.11).

**Chart 2.11**  
**Credit to the private non-financial sector (% of GDP) in East Asia**



Note: data shown is for 2018: Q2  
Source: BIS.

In the near term, economies in East Asia still face a number of headwinds. First, while the US and Mainland China's trade talks have been ongoing, the outcome of the trade conflict remains uncertain. Further escalation in the US-China trade dispute could dim the outlook for East Asia given the region's high degree of trade integration with Mainland China and the dampening effect of the conflict on investor confidence.

Second, US monetary policy and the outlook for the US dollar remain a source of uncertainty for the region. The Fed's recent communications indicate a pause in the rate hiking cycle, which may prompt strong capital inflows into the region. Depending on inflation and other developments, the uncertainty lies on whether the rate hike cycle could resume later in the year, which would pose familiar pressure on the region's currencies and financial assets and trigger a reversal of capital flows. Indeed, Box 1 shows that Fed policy shocks tend to have large spillover effects on EME sovereign bonds, including those issued by East Asian economies.



## Box 1

### Predictability of sovereign bond returns using technical trading rules with machine learning

#### Introduction<sup>9</sup>

This box studies return predictability of sovereign bond markets. In theory, future asset prices in an efficient market cannot be predicted by analysing historical data since prices only respond to new information. Therefore, predictability yielded by historical data analysis may suggest a less efficient price discovery in sovereign bond prices. The resulting impact can have important implications for borrowing costs and access to financing for governments and corporates and, consequently, economy-wide financial conditions. Thus, the predictability of sovereign bond markets merits closer scrutiny.<sup>10</sup>

We examine the predictability in two steps. First, we provide an overview of the return predictability by applying numerous trading rules to sovereign bond markets with the aid of a supervised machine learning (ML) technique. The trading rule is useful in identifying trends developed in financial asset prices, while the ML technique is useful to explain complicated price dynamics. Second, we specifically assess the extent to which predictability is affected by US monetary policies. This is motivated by the fact that, as global markets continue to manage their transition towards US monetary policy normalisation, such interest rate changes may create predictable moves in interest rates, and thus, predictable trends in the values of interest-rate sensitive assets such as sovereign bonds. Based on these steps, we aim to shed light on the potential spillover effects of Fed monetary policy shocks on global sovereign bond markets.

#### Data and Methodology

The study employs 48 sovereign bond market indices covering both AEs and EMEs in Table B1.1. These indices are in the form of the total return, which includes capital gain, accrued interest and any cash flow received. The sample period spans from 3 January 2000 to 30 September 2017. All time series are in daily frequency.

In our empirical study, we conduct an in-sample analysis to provide an overview of sovereign bond market predictability in the sample period. Specifically, the trading-rule strategy for each sovereign bond market is based on buy-and-sell signals indicated by 27,000 technical trading rules selected from moving average, filtering, support and resistance, and channel breakout rules (denoted as the primary strategy).<sup>11</sup> The predictability of each market is then measured by the excess return from the primary strategy over the return from a buy-and-hold strategy.<sup>12</sup> A sovereign bond market is considered more predictable when the primary strategy generates a higher excess return.

<sup>9</sup> Details are in Fong and Wu (2019) “Predictability in sovereign bond returns using technical trading rules: Do developed and emerging markets differ?” *HKIMR working paper*, 03/2019.

<sup>10</sup> A predictable market return can also reflect a higher risk premium embedded in asset prices. Nonetheless, how significantly the risk premium explains the predictability remains inconclusive in literature.

<sup>11</sup> These 27,000 technical trading rules are formulated by considering a number of variants of each of these classes and a range of plausible parameterisations of each variant.

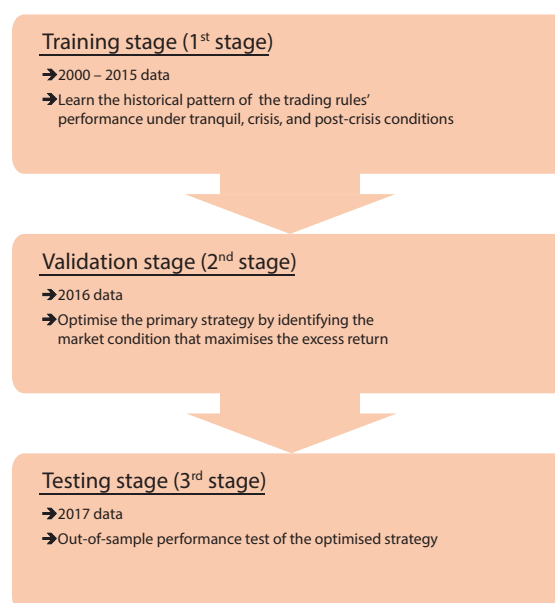
<sup>12</sup> The excess return of the primary strategy is calculated as the simple average of the excess return from each of its 27,000 trading rules.

**Table B1.1:**  
**Sovereign bond market by market groups**

Market group	Economies
Advanced economies (AEs)	Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, UK, US
Emerging Asia	Mainland China, India, Indonesia, South Korea, Malaysia, the Philippines, Taiwan, Thailand
Other emerging market economies (other EMEs)	Brazil, Chile, Czech Republic, Egypt, Greece, Hungary, Mexico, Morocco, Nigeria, Peru, Poland, Russia, Slovakia, Slovenia, South Africa, Turkey

We also conduct an out-of-sample analysis using an ML algorithm (naïve Bayesian classifier) to assess the predictability in 2017. The ML algorithm plays a role in optimising the primary strategy under a given market condition. The analysis consists of three stages (see Chart B1.1). In the first (training) stage, the algorithm learns the pattern of historical performances of each trading rule under the tranquil, crisis and post-crisis conditions based on the sample period from 2000 to 2015.<sup>13</sup> In the second (validation) stage, the algorithm optimises the primary strategy by identifying the market condition that maximises the excess return based on the 2016 data.<sup>14</sup> In the third (testing) stage, the algorithm uses the optimised strategy to predict the potential improvement in excess return in 2017. Given this setting, a more predictable sovereign bond market is expected to have a larger improvement in excess return by switching from the primary strategy to the optimised strategy.

**Chart B1.1: Overview of the machine learning algorithm**



### Empirical evidence

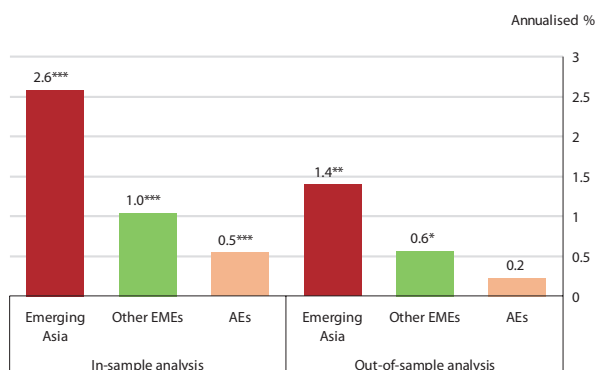
There are two empirical findings. First, both in-sample and out-of-sample analyses consistently show that the excess returns from our trading rule strategy are significantly larger for Emerging Asia than for other economies. Chart B1.2 depicts the average in-sample excess return (on the left) and the out-of-sample increment in excess return (on the right) across the three market groups. The in-sample analysis shows that the average excess returns are higher for Emerging Asia and other EMEs at 2.6% and 1% respectively, while only 0.5% for AEs. In our out-of-sample analysis, using the ML algorithm generates higher excess returns than not using it, with average increments of 1.4% and 0.6% for Emerging Asia and other EMEs respectively, whereas the increment for AEs is not significant (0.2%).

<sup>13</sup> The three conditions are defined based on the following sample periods: (i) 2000 to 2007 for tranquil condition; (ii) 2008 to 2013 for crisis condition; and (iii) 2014 to 2015 for post-crisis condition.

<sup>14</sup> The optimisation assigns a higher weight to rules with a higher chance of having a positive return, and a zero weight to rules that likely have a negative excess return.



**Chart B1.2:**  
Average excess returns of our trading-rule strategies by market group

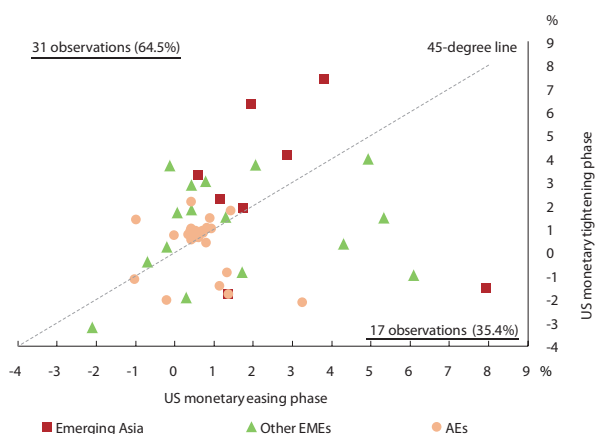


Notes:

- (1) In-sample excess returns by the primary strategy, based on full sample data from January 2000 to September 2017;
- (2) Out-of-sample increment in excess returns by the optimised strategy, based on 2017 data;
- (3) \*\*\*, \*\* and \* denote statistical significance at 1, 5 and 10% respectively.

Second, the excess returns are generally larger when the US tightens its monetary policy. Chart B1.3 is a scatter plot of excess returns acquired from the primary strategy during the US tightening monetary cycle against those acquired during the easing cycle. Among these sovereign bond markets, about two-thirds scatter above the 45 degree line (i.e. the dotted line), suggesting that these markets generally acquire higher excess returns during the tightening phase. Compared to EMEs, most of the AEs scatter closer to the 45-degree line, reflecting that AEs' sovereign bond markets are less responsive to US monetary cycles.

**Chart B1.3:**  
Excess return of primary strategy during different cycles of US monetary policy



Note: In-sample excess returns by the primary strategy, based on full sample data from January 2000 to September 2017.

### Empirical implications

Based on the predictability of 48 sovereign bond markets in AEs and EMEs, our findings suggest that EMEs' sovereign bond markets, particularly in Emerging Asia, are more predictable. In comparison, the predictability of AEs remains lower despite using a machine learning algorithm to optimise our trading-rule strategy. This may reflect that sovereign bond market predictability is associated with an economy's fundamentals, such as the level of market openness.<sup>15</sup>

Our findings also suggest that shocks originating from US monetary policies may have greater impact on some Emerging Asia's sovereign bond markets. This may be attributable to the fact that, while these economies experienced more capital inflows during the US monetary easing cycle, tightening monetary policy by the US may create a destabilising effect on international capital flows, which could increase volatility in financial market and slow down the bond price adjustments to information. This highlights the need for policymakers in these markets to contend with potential spillovers from shifts in monetary policy expectations in the US. In particular, developing an efficient sovereign bond market is vital for EMEs facing the headwinds of higher government bond interest rates and bouts of volatility.

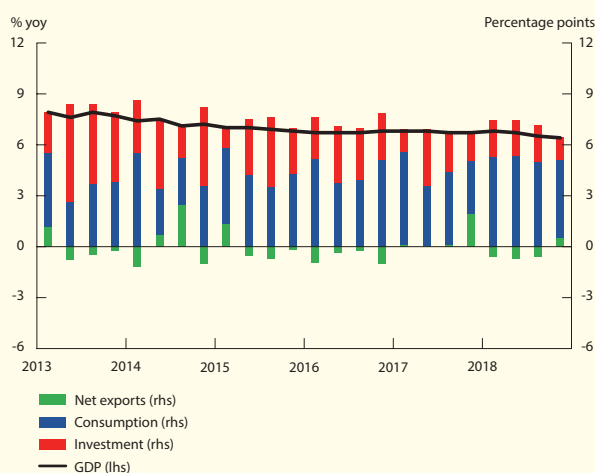
<sup>15</sup> Based on a logistic regression analysis, Fong and Wu (2019) identify that stronger fundamentals, such as faster economic growth, more effective government, higher financial openness and lower political risk, are significantly associated with the lower predictability of the trading-rule strategy.

## 2.2 Mainland China

### Real sector

Economic growth in Mainland China decelerated further in the second half of 2018 amid increased uncertainties in the external environment and some moderation in domestic demand. Year-on-year real GDP growth declined to 6.4% in the fourth quarter from 6.7% and 6.5% in the second and third quarters respectively, registering the lowest year-on-year growth rate since 2009 (Chart 2.12). Taking the year as a whole, real economic growth moderated from 6.8 % in 2017 to 6.6% in 2018, slightly higher than the government growth target of around 6.5%.

**Chart 2.12**  
Mainland China: Contribution to GDP growth by demand component



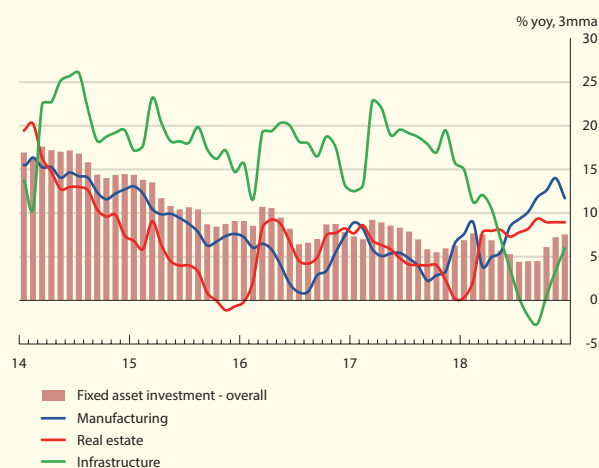
Sources: CEIC, National Bureau of Statistics (NBS) and HKMA staff estimates.

Behind the headline growth number, consumption growth moderated in the second half of 2018 alongside weaker consumer confidence. A breakdown of retail sales data of enterprises above designated size shows that sales of automobiles declined significantly towards the fourth quarter, while sales of some luxury items, such as cosmetics and jewellery, also slowed.<sup>16</sup>

<sup>16</sup> Enterprises above designated size include wholesale firms with business turnover equal to or higher than RMB20 million, retail firms with business turnover equal to or higher than RMB5 million and accommodation & catering businesses with turnover equal to or higher than RMB2 million.

Fixed asset investment growth rebounded in the last few months of 2018, underpinned by a pick-up in infrastructure investment projects amid government measures to stabilise growth, as well as faster growth in manufacturing investment (Chart 2.13). On the external front, export growth weakened towards the end of 2018 amid the slowdown in global economic growth. The impact of the US-China trade conflict also appeared to have set in. As imports slowed at a faster pace than exports in the fourth quarter, the contribution of net exports to overall growth turned from negative in the third quarter to slightly positive in the fourth quarter.

**Chart 2.13**  
Mainland China: Fixed asset investment by industry

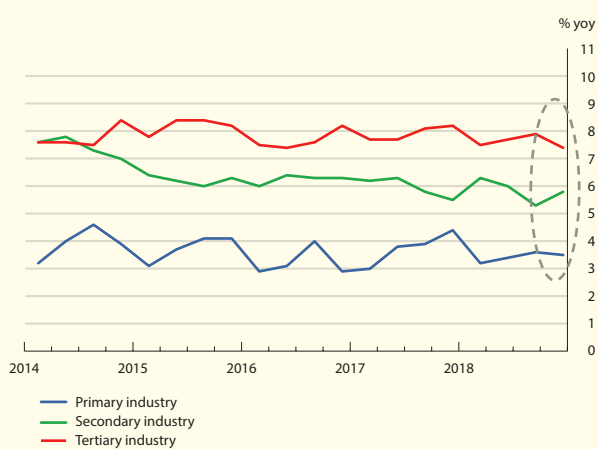


Sources: CEIC, NBS and HKMA staff estimates.

In value-added terms, the tertiary industry continued to fare well in the second half of 2018, albeit with growth softening somewhat towards the end of the year (Chart 2.14). While most sub-sectors in the industry registered slower growth in the second half, the information technology and software sub-sector continued to expand at an exceptionally fast pace of around 30% year on year during the period; the transportation and storage and financial sub-sectors even recorded accelerated growth. As for the secondary industry, business expansion of manufacturing activities slowed in the second half of the year, but some high-tech manufacturing sub-sectors such as electronic

equipment and electrical machinery held up. On the back of accelerated infrastructure spending, construction sector growth also rebounded notably in the fourth quarter. As growth in the tertiary industry continued to outpace other sectors, its value-added share in the overall economy rose to 52.2% in 2018 from 51.9% a year ago.

**Chart 2.14**  
**Mainland China: Growth of value-added by industry**



Sources: CEIC, NBS and HKMA staff estimates.

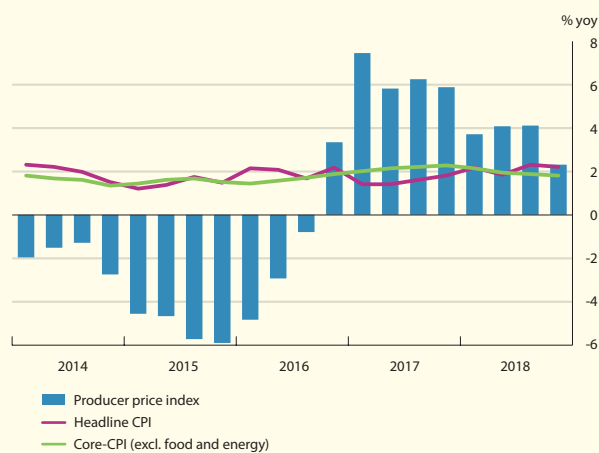
Looking ahead, the growth outlook has become more uncertain. On the external front, whether exports will weaken further mainly hinges on the economic performance of advanced economies, as well as the outcome of the ongoing US-China trade talk. On the domestic front, lingering concerns about the longer-term impact of the trade conflicts may continue to weigh on the confidence of business owners. In addition, the ability of higher value-added and high-tech manufacturing and service sectors to continue to drive economic growth appears to have weakened against the backdrop of rising financing difficulties facing private business owners, especially small firms, in the past few quarters.

In view of this more challenging economic environment, policy-makers have less room for error as they strive to strike a better balance between stabilising the economy and containing potential systemic risks. While supply-side

reform — structural deleveraging, de-capacity and disciplining local government financing — remains a priority in 2019, monetary policy has become more accommodative, in order to support bank lending to small and private firms through focused and targeted easing measures. On the fiscal front, authorities have pledged to be more proactive through new tax and fee cuts and infrastructure projects. The latest consensus forecasts suggest that Mainland economic growth would ease to 6.2% in 2019, close to the midpoint of the government growth target range of around 6–6.5%.

Inflationary pressure was benign in the second half of 2018 amid slower economic growth. Headline consumer price inflation came in at an average of 2.3% year on year in the second half of 2018, slightly higher than the 2.0% recorded in the first half (Chart 2.15). Among the major components, food prices rose further from 1.2% year on year to 2.4% during the same period, but core inflation, measured as consumer prices excluding food and energy items, eased further from 2.0% year on year in the first half of 2018 to 1.8% in the second half. Meanwhile, producer price inflation further subsided from 3.9% year on year in the first half of 2018 to 3.2% in the second half amid declines in commodity prices and a moderation in overall economic activities.

**Chart 2.15**  
**Mainland China: Consumer price and producer price inflation**

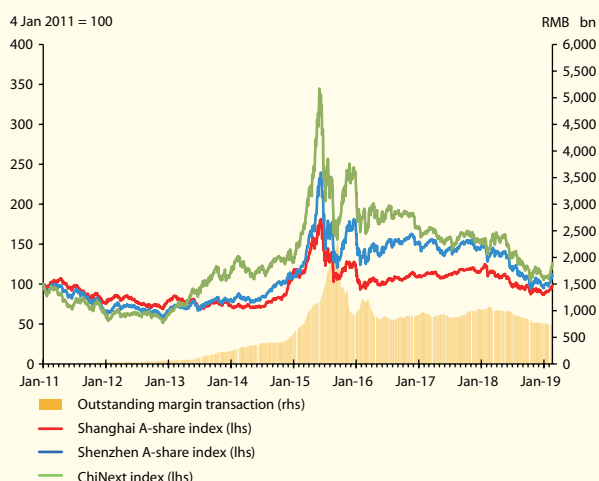


Sources: CEIC, NBS and HKMA staff estimates.

### Asset Markets

Amid rising downward pressure on growth and the intensified US-China trade conflict, investor confidence in the stock market deteriorated notably during the review period. The Mainland equity market further slumped in the second half of 2018 before recovering somewhat in early 2019, with smaller-cap shares, especially those listed on the Shenzhen Stock Exchange, recording steeper losses than larger-cap stocks (Chart 2.16). Margin transactions also declined. In January 2019, outstanding margin loans reached their lowest level since July 2015.

**Chart 2.16**  
Mainland China: The Mainland stock market indices and margin transactions



Sources: CEIC and HKMA staff estimates.

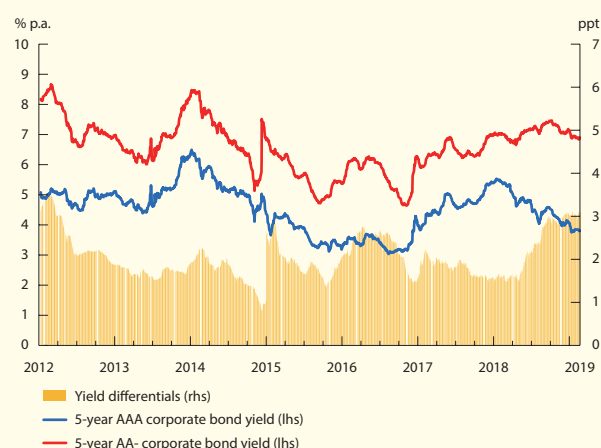
The drop in stock prices seemed to have triggered the selling of shares used as collateral, notably those pledged by small and medium-sized listed firms in return for loans. By the end of 2018, the outstanding contract value of shares pledged as collateral had dropped by some 13% in one year to around RMB5.5 trillion<sup>17</sup>; the market value of pledge shares is equivalent to about 10% of the total market capitalisation of the mainland-traded A-shares. Further analyses suggest that listed industrial firms may have faced more pressure than others, as a relatively big portion of the shares of these firms were pledged as collateral, coinciding with large declines in their stock price.

<sup>17</sup> Based on pledged loan contract data provided by Wind.

While lending on pledged shares appeared to have posed limited systemic risk to financial stability, given the low average pledge ratio and high average margin ratio<sup>18</sup>, further declines in stock prices and the forced selling of pledged shares could reinforce each other in some extreme cases. In response, the authorities announced in October the setting up of a special fund to help ease the liquidity pressure that pledge borrowers might face in refinancing maturing pledged-share loans. This, in turn, lowered the credit risk that would be faced by creditors, such as securities companies. Following the introduction of the scheme, the stock market showed some signs of stabilisation.

In the bond market, funding costs further declined for corporate issuers with better credit ratings after several rounds of targeted required reserve ratio (RRR) cuts in the second half of 2018 (Chart 2.17). By contrast, yields of lower-rated corporate bonds stayed at higher levels, likely reflecting the reduced risk appetite of investors in the face of rising uncertainty in Mainland's economic outlook, as well as a deteriorated debt servicing ability of firms with weaker financial positions.

**Chart 2.17**  
Mainland China: five-year corporate bond yields

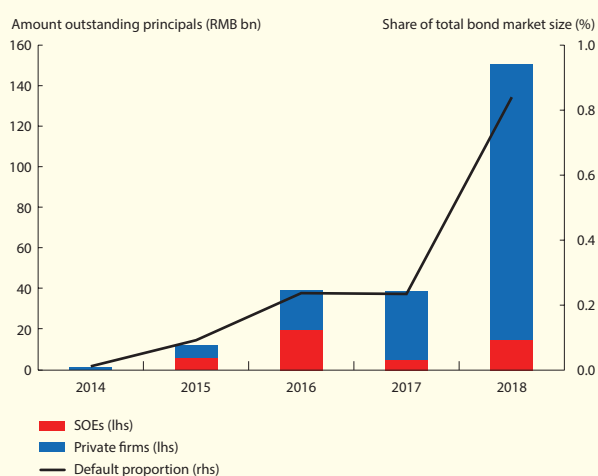


Sources: Wind and HKMA staff estimates.

<sup>18</sup> Pledge ratio=loan value/contract value of pledged shares. Margin ratio=current market value of pledge shares/(loan value\*(1+interest rate)). According to market analysts, the pledge ratio in the A-share market ranges from 30% to 50% and the margin ratio from 140% to 160%, depending on the riskiness of the pledged shares.

Indeed, the second half of 2018 witnessed bond defaults by 46 corporate issuers, compared with just 15 in the first half<sup>19</sup>. The total size of default bonds increased to RMB150.7 billion in 2018, equivalent to around one percent of the total outstanding size of non-financial debt securities (Chart 2.18). Further analyses suggest the recent defaults were concentrated mainly in lower-rated private issuers, especially in the energy and materials industry.

**Chart 2.18**  
Mainland China: Bond default size and proportion

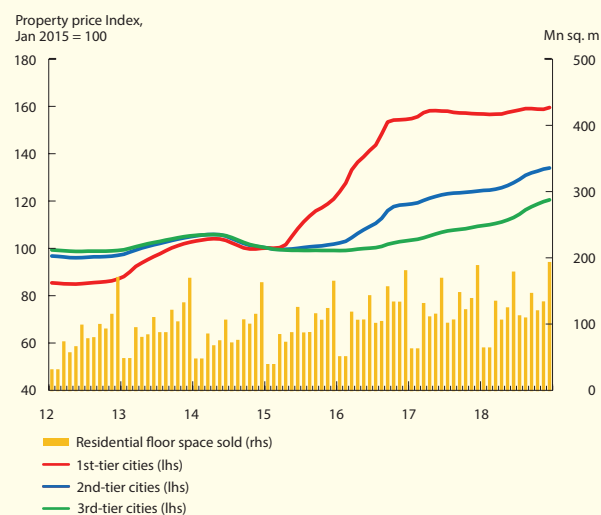


Sources: Wind and HKMA staff estimates.

In October, the People's Bank of China (PBoC) announced supportive measures to shore up demand in the bond market to facilitate bond issuance by private companies that were having difficulties with increased bond defaults. In particular, a credit risk swap called "credit risk mitigation warrants" became available to investors interested in holding bonds issued by private firms. At present, such a hedging market remains largely state-led, as the credit risk mitigation warrants have been mainly issued by the China Bond Insurance Co., a state-owned financial institution, together with commercial banks.

During the review period, housing prices in the Mainland property market remained largely stable in first-tier cities, likely restrained by tightening measures put in place in recent years, including increased down-payment requirements, and home purchase and sale restrictions (Chart 2.19). In lower-tier cities, property prices edged up, albeit at a much slower pace compared with 2016 when Mainland China was facing a home-buying frenzy.

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

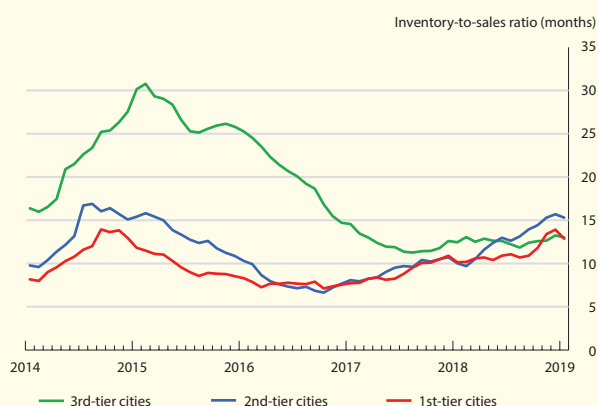


Sources: CEIC and HKMA staff estimates.

Housing oversupply, which plagued third-tier cities in previous years, remained largely in check, partly due to robust sales amid bullish market sentiment. By January 2019, the inventory-to-sales ratio in third-tier cities was stable at around 13 months, much lower than the peak of 31 months in early 2015 (Chart 2.20).

<sup>19</sup> Data collected from Wind, including enterprise and corporate bonds, medium-term notes, short-term commercial papers and private placement notes.

**Chart 2.20**  
Mainland China: Inventory-to-sales ratios by city tier



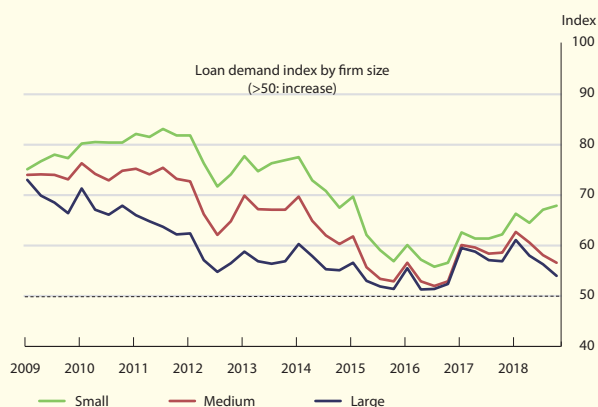
Sources: Wind and HKMA staff estimates.

To contain the potential risk and promote a stable and healthy development of the property market, the authorities accelerated the construction of indemnificatory housing, and sped up the development of the rental market along with a more flexible system to increase land supply.

### Credit and asset quality

In the second half of 2018, loan demand showed a notable divergence among Mainland firms with different sizes. A quarterly survey by the PBoC shows that an increasing proportion of Mainland bankers reported rising loan demand from small firms, but declining demand from large and medium-sized firms (Chart 2.21).

**Chart 2.21**  
Mainland China: Loan demand index by firm size

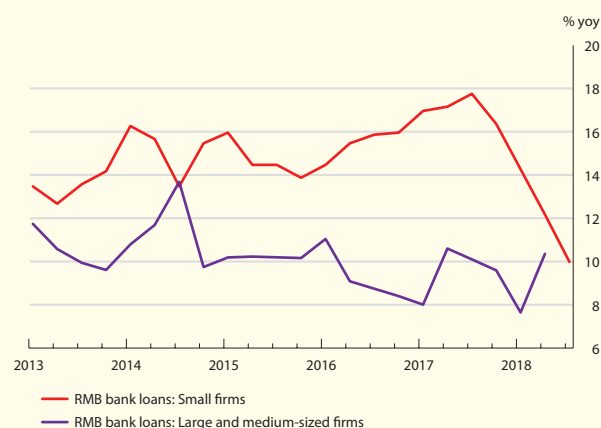


Source: PBoC.

The strong and growing demand for bank loans by small firms in the second half of 2018 was partly due to the reduced availability of credit for those small firms from informal channels. Continued financial deleveraging during the year also led to a notable deceleration in shadow banking activities, which had previously provided important funding support for small and private firms, especially those with limited access to formal finance. In response to this development, the PBoC introduced several rounds of easing measures in 2018, including targeted RRR cuts and a Targeted Medium-term Lending Facility (TMLF) to better support bank lending to small firms (see the “fiscal and monetary policy” section for details).

Following the targeted easing measures, the pace of growth in bank loans to the “smallest” firms, which are the small corporate borrowers with a total credit limit of less than RMB5 million, almost doubled from 9.8% year on year at the end of 2017 to 18% at the end of 2018. However, overall lending by banks to small firms continued to decelerate in the first three quarters of the year (Chart 2.22), possibly because Mainland banks had become more risk-averse amid rising economic uncertainties and thus preferred limiting their exposure to inferior borrowers with weaker financial positions including small firms.

**Chart 2.22**  
Mainland China: Growth in bank lending to corporate borrowers

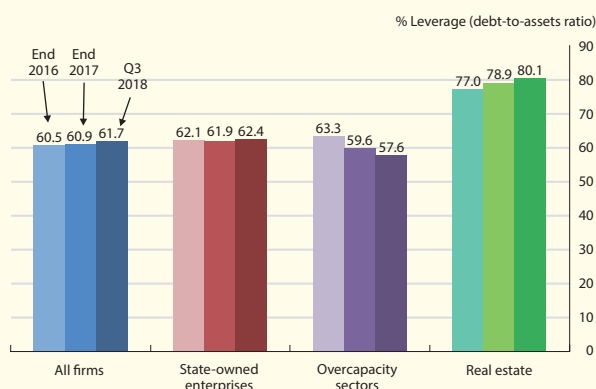


Sources: PBoC and HKMA staff estimates.



Despite decelerated bank lending to small borrowers, the year-on-year growth in overall bank credit to Mainland firms accelerated to 13.4% in January of 2019 from 12.7% in June 2018. This suggests that an increasing amount of bank loans may have been granted to larger borrowers including state-owned enterprises (SOEs). Increased bank lending to larger borrowers reflected not only increased risk-aversion of banks, but also the government's counter-cyclical measures to support the economy, such as through accelerated infrastructure spending. As a result, the leverage ratio of listed state-owned enterprises (SOEs) rebounded slightly in the first three quarters of 2018, following a decline in 2017 (Chart 2.23). By contrast, the leverage ratio of firms in overcapacity sectors further declined in the first three quarters, as banks continued to tighten underwriting standards on vulnerable borrowers, such as firms in overcapacity sectors. In addition, continued improvement in corporate earnings of overcapacity sectors in the past few years also helped lower the leverage ratio.

**Chart 2.23**  
Mainland China: Corporate leverage of listed SOEs, firms in overcapacity sectors and real estate companies



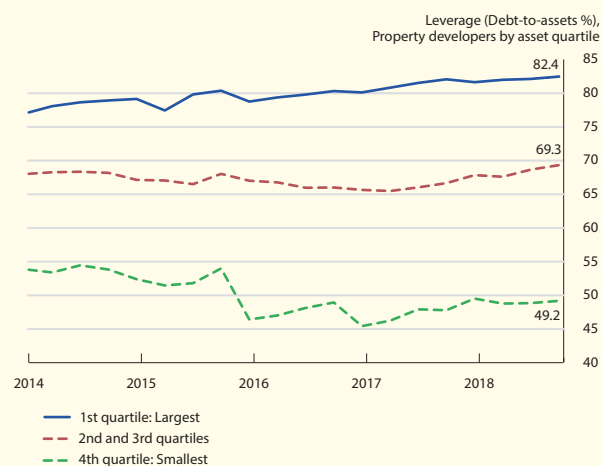
Sources: Bloomberg and HKMA staff estimates.

The reason behind recent improvements in the profitability of overcapacity sectors is the key to the assessment of whether such improvements can be sustained. Box 2 (page 32) finds that the improved return on equity (ROE) of listed firms in overcapacity sectors mainly stemmed from

favourable developments, particularly in gross margin and administration efficiency. However, the still-subdued level of the asset turnover ratio seems to suggest that capacity utilisation remains far from ideal in these overcapacity sectors, and further improvement is needed to enhance the efficiency and long-term profitability of these sectors.

In the first three quarters of 2018, the leverage ratio of property developers further increased (Chart 2.24), amid buoyant market conditions especially in lower-tier cities. More in-depth analyses suggest that while larger developers with stronger financial positions are more leveraged, there are some signs that leverage has increased across developers of different sizes in the second half of the year (Chart 2.24). This is worth closer monitoring as the vulnerability of developers to a property price correction is likely to be greater with higher leverage.

**Chart 2.24**  
Mainland China: Corporate leverage of listed real estate developers by firm size

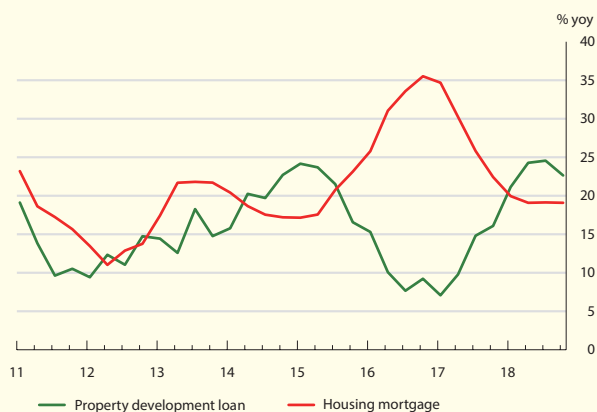


Sources: Bloomberg and HKMA staff estimates.

Reflecting the increased leverage of property developers, the growth rate of property development loans remained high at above 20% year on year in the second half of 2018. In comparison, year-on-year growth in mortgages slipped to 19.0% in the last quarter amid tightening measures on home purchases (Chart 2.25). As a result, the share of property

development loans and mortgages together in total bank loans, which measures banks' direct exposure to the property market, increased slightly to 27.3% at the end of 2018 from 26.5% six months earlier.

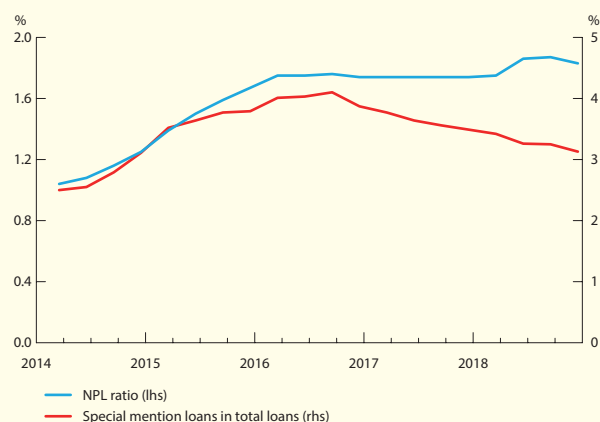
**Chart 2.25**  
**Mainland China: Growth in mortgage and property development loans**



Sources: CEIC and HKMA staff estimates.

The asset quality of banks seemed to have faced some pressure in the second half of 2018 as economic growth momentum moderated. While the share of special mention loans in total bank loans continued to decline<sup>20</sup>, the NPL ratio of Mainland banks remained at a relatively high level of 1.8% at the end of 2018 compared to the past few years, albeit having edged down in the last quarter of 2018 (Chart 2.26).

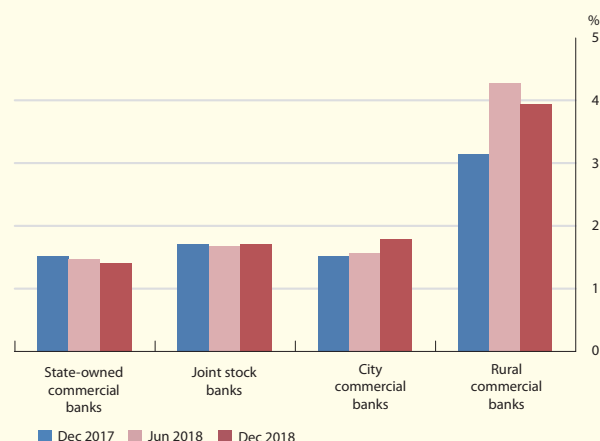
**Chart 2.26**  
**Mainland China: NPL ratio and special mention loan ratio**



Source: CEIC.

A further examination suggests that the recent increase in the NPL ratio was mainly concentrated in smaller banks. More specifically, while the NPL ratio of state-owned and joint stock commercial banks remained largely stable in the second half of 2018, the NPL ratio of city commercial banks edged up further (Chart 2.27). Meanwhile, the NPL ratio of rural commercial banks, though declined, remained at a much higher level compared to other banks.

**Chart 2.27**  
**Mainland China: NPL ratio by bank type**



Source: CEIC.

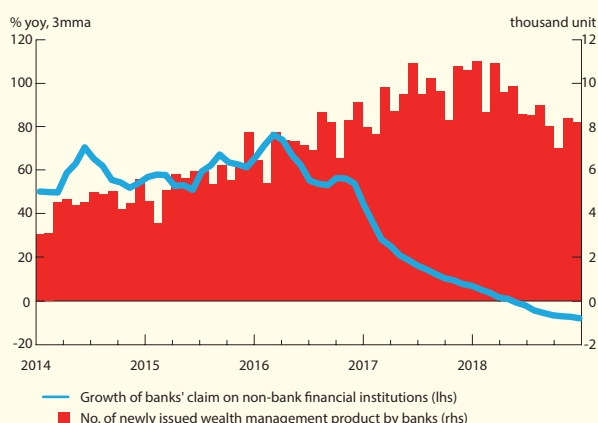
<sup>20</sup> A loan will be classified as “special mention loans” if the borrower has the ability to repay the loan currently, but may be affected by some unfavourable factors, according to the China Banking and Insurance Regulatory Commission. Non-performing loans (NPL) include loans that are classified as substandard, doubtful or loss, which are loans that are unlikely to be fully repaid and banks would thus suffer losses of different degrees.

The increase in the NPL ratios of certain smaller banks was, in part, a result of more stringent enforcement of the NPL reporting standard to include all loans more than 90 days overdue (see for example related discussion in the Report issued in September 2018 for more details). That said, the rising NPL ratio of smaller banks may arguably also be attributable to increased exposure to the smallest borrowers and the deterioration in the repayment ability of borrowers amid moderating economic activities.

Despite higher NPL ratios, an imminent deterioration in overall bank asset quality is still remote. For now, the NPL ratio of Mainland banks, especially the systemically important ones, remains low. In addition, relatively high loan loss provisions can also help protect banks against future losses. At the end of 2018, the bad debt coverage ratio of banks increased to 186% from 179% in the second quarter.

During the review period, authorities continued to push ahead with financial deleveraging to contain the involvement of banks in shadow banking activities. As a result, banks' claims on non-bank financial institutions have started to decline since June 2018 (Chart 2.28), with the share of such claims in the total bank assets retreating to 9.7% at the end of 2018.

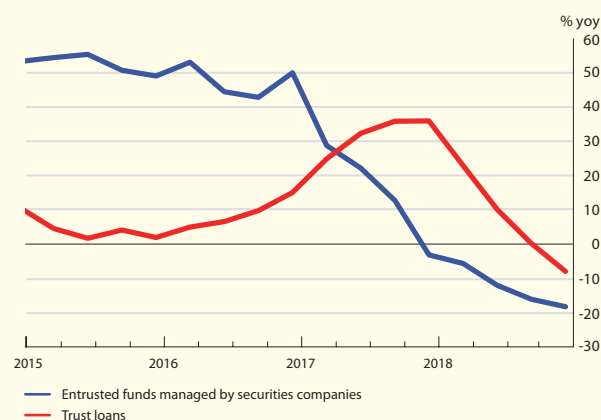
**Chart 2.28**  
**Mainland China: Growth of bank's claim on non-bank financial institutions and newly issued wealth management products (WMPs)**



Sources: CEIC, Wind and HKMA staff estimates.

In the second half of 2018, the authorities also strengthened the risk management of WMPs issued or distributed by banks, as these products are also a major funding source for shadow banking activities<sup>21</sup>. Following the decline of banks' involvement in shadow banking activities (Chart 2.28), shadow banking activities, such as trust lending and entrusted funds managed by securities companies, declined in the second half of 2018 (Chart 2.29).

**Chart 2.29**  
**Mainland China: Growth of trust loans and entrusted funds managed by securities companies**



Sources: CEIC and Securities Association of China and HKMA staff estimates.

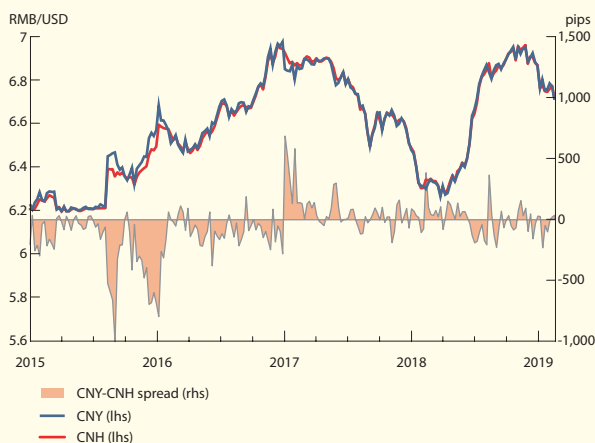
### Exchange rate and cross-border capital flows

The onshore renminbi (CNY) exchange rate weakened further by 2.1% against the US dollar in September and October. Since then, it rebounded by 4.2% in the following four months amid stabilised market sentiment as the US-China trade talks restarted (Chart 2.30). Tracking closely its onshore counterpart, the offshore renminbi (CNH) exchange rate also strengthened in recent months, with the CNY-CNH spread trading within the range of -256 pips to 174 pips in November-February. The Bloomberg consensus forecast of renminbi exchange rate against the US dollar for the first quarter of 2019

<sup>21</sup> For instance, in several newly introduced measures in the second half of 2018, principal-guaranteed WMPs need to be brought back on the balance sheet of banks, and the investment of WMPs in structured asset management plans is prohibited.

was revised stronger to 6.78 at the end of February 2019 from 6.99 at the end of November 2018.

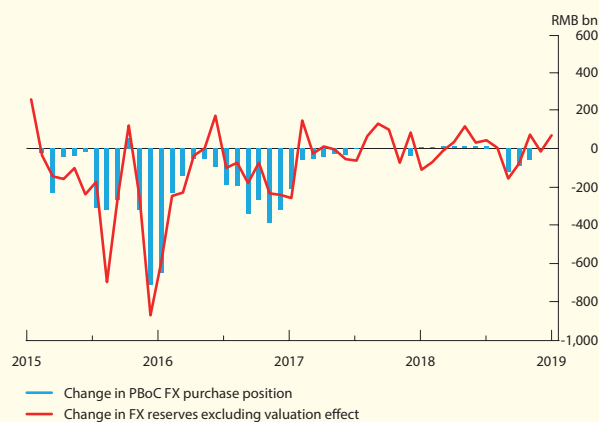
**Chart 2.30**  
Mainland China: Onshore and offshore renminbi exchange rates against the US dollar



Sources: Bloomberg and HKMA staff estimates.

Amid moderated economic activities and rising uncertainties, capital outflow pressures increased somewhat in the second half of 2018. In particular, the two most commonly used measures for cross-border capital flows — the foreign reserves excluding valuation effects and the PBoC foreign exchange (FX) purchase position — showed some declines in the second half of last year before stabilising towards the end of the year, but the magnitude of such declines was considerably smaller than in the previous episodes when the renminbi also faced significant depreciation pressures (Chart 2.31), such as in 2015 and 2016. Overall, the Mainland headline foreign reserves remained largely stable in the review period and stood at US\$3,088 billion at end-January 2019.

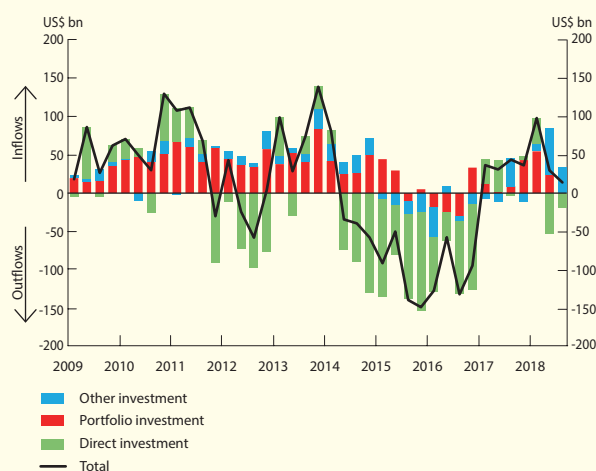
**Chart 2.31**  
Mainland China: Changes in PBoC FX purchase position and FX reserves



Sources: CEIC, SAFE and HKMA staff estimates.

The latest statistics on the balance of payments also indicated that net inflows through the capital account eased in the second and third quarters of 2018 (Chart 2.32). In particular, net inflows through direct investment subsided notably during the period as inward direct investment from foreign firms faltered. Cross-border flows through “other investment” also turned to net outflows in the second and third quarters, mainly due to stronger cross-border lending than borrowing, as well as outflows in deposits and currency held by Mainland residents. In contrast, net inflows through portfolio investment accelerated during the period as Mainland investors slowed down overseas purchases while foreign investors continued to increase holdings of Mainland securities.

**Chart 2.32**  
Mainland China: Net cross-border capital flows by type of flows



Sources: CEIC, SAFE and HKMA staff estimates.

The prospect of cross-border capital flows remains uncertain as concerns about the trade relationship between the US and China continues to linger. The evolving monetary policy divergence — Chinese monetary policy is tilted towards easing while Fed policy is expected to be neutral — could weigh on the renminbi exchange rate and thus affect cross-border fund flows. On the other hand, the inclusion of an increasing number of Mainland securities in benchmark indexes could be supportive of net inflows.

### Fiscal and monetary policy

In view of the increased downward pressures on economic growth, the authorities, including the PBoC, the Ministry of Finance (MoF) and the National Development and Reform Commission, have taken concerted efforts to step up both supply-side and demand-side measures to support economic expansion, especially through private sector activities. In particular, the government advocated for level-playing fields and encourage fair business competition between private firms and SOEs with measures such as pushing ahead with market opening up, strengthening legal protection for private firms

and supporting bond issuance by private firms. The authorities also decided to strengthen social safety nets to provide better education and health care, and accelerate infrastructure projects such as inter-city transportation and logistics. Other initiatives include introducing countercyclical measures such as further targeted monetary easing aimed at improving credit availability for small firms and fiscal measures to cut taxes and fees for both private firms and individuals.

On the monetary policy front, the PBoC rolled out more targeted easing measures to support bank lending to private and small firms (Table 2.1). In particular, the central bank injected liquidity into the banking system by further slashing the RRR in October 2018 and again in January 2019. The PBoC also expanded the coverage of small and micro-sized firms under the targeted RRR programme by making the guidelines less stringent: a firm with a total credit limit of less than RMB10 million is now eligible, compared to the previous threshold of RMB5 million. Meanwhile, the central bank had established a new Targeted Medium-term Lending Facility (TMLF), aimed at providing low-cost, longer-term funding to banks with enough exposure to small and private borrowers. To ease bank lending constraints posed by insufficient capital, the PBoC introduced a new Central Bank Bills Swap (CBS) programme in January to promote bank issuance of perpetual bonds. This measure allows primary dealers to swap the perpetual bonds issued by qualified banks with central bank bills, which should help increase the appeal of perpetual bonds and thereby supporting bank issuances of this bond to shore up their capital positions. On the bond financing front, the central bank had provided initial funds to set up financial instruments, such as credit risk mitigation instruments and credit enhancement guarantees, to support bond issuance by private firms.

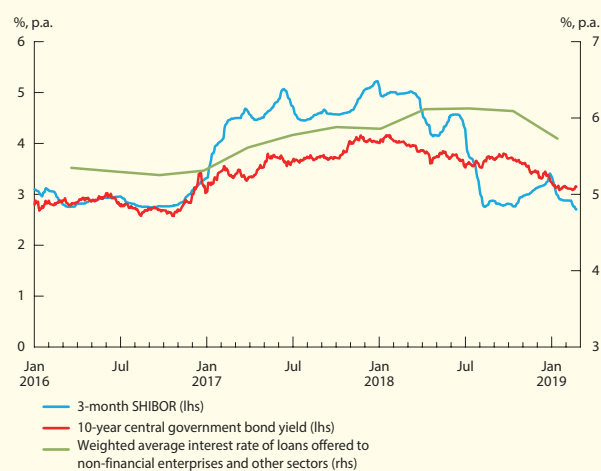
**Table 2.1**  
Mainland China: Major monetary policy measures supporting private and small firms in 2018/19

Date	Measures
Jan 18	Targeted required reserve ratio (RRR) cut of 50–150 bps
Apr 18	RRR cut of 100 bps for most financial institutions (FIs)
Jun 18	Including AA-above green & agricultural financial bonds as well as high-quality small firm & green loans as qualified collaterals for Medium-term Lending Facility (MLF)
	Raising the quota of central bank lending supporting small firms, as well as sectors concerning rural areas and central bank discount (支小支農再貸款和再貼現額度) by a total of RMB150 billion
	Lowering interest rate for central bank lending dedicated to supporting small firms by 50 basis points
	Revitalising credit of more than RMB100 billion through measures facilitating the issuance of small firm supporting financial bonds and the issuance of securities backed by small firm loans
	Including loans for small firms with a credit line of up to RMB5 million as qualified collaterals for the MLF
	Assigning more weight on loans to small firms in the macroprudential assessment (MPA)
Jul 18	RRR cut of 50 bps for most FIs
Oct 18	RRR cut of 100 bps for most FIs
	Raising further the quota of central bank lending supporting small firms, as well as sectors concerning rural areas and central bank discount by another RMB150 billion
	Offering the initial funding for setting up bond-financing supporting instruments such as the credit risk mitigation instruments and credit enhancement guarantees
Nov 18	State Council announced to raise the coverage of loans for small firms qualified as MLF collaterals from a credit line of up to RMB5 million to RMB10 million
Dec 18	Establishing the targeted MLF (TMLF)
	Raising further the quota of central bank lending supporting small firms, as well as sectors concerning rural areas and central bank discount by another RMB100 billion
Jan 19	Expanding the coverage of small firms under the targeted RRR program from a credit line of less than RMB5 million to less than RMB10 million
	RRR cut of 100 bps for all FIs
	Establishing Central Bank Bills Swap (CBS)

Sources: PBoC and www.gov.cn.

Following the introduction of these accommodative measures, liquidity conditions in the banking system improved since the second half of 2018, with the three-month Shanghai Interbank Offered Rate (SHIBOR) notably easing back to the level in the first half of 2016 (Chart 2.33). Alongside the lower interbank funding costs, the ten-year central government bond yield also subsided to around 3.2% at end-February from around 3.6% at end-August. Meanwhile, the weighted average bank lending rate to the non-financial sector also edged down from 5.97% at end-June to 5.63% at end-December 2018. In particular, the weighted average bank lending rate to the corporate sector declined for a fourth consecutive month in December by a total of 25 basis points to 5.35%.

**Chart 2.33**  
Mainland China: Major market interest rates



Sources: CEIC, PBoC and HKMA staff estimates.

The targeted easing measures seemed to have helped ease the financing difficulties for some firms, especially the smallest ones. According to the PBoC, the average lending rate to the smallest corporate borrowers with a credit limit of less than RMB5 million declined from 6.6% at the end of 2017 to 6.25% in September 2018. Meanwhile, growth in bank lending to these smallest borrowers also notably accelerated, with significantly more credit being extended to those in high-tech industries, such as scientific research and information. (For details please refer to the “credit and asset quality” section)

However, as illustrated in Chart 2.22, bank lending to small firms decelerated in the third quarter and shadow banking credit continued to contract. This suggests that overall credit conditions for small firms are still not ideal. In this sense, it remains to be seen whether the series of easing measures rolled out by Mainland authorities will further help improve credit access for private borrowers especially small firms, despite the better-than-expected aggregate financing figures in early 2019, which was mainly driven by a surge in bank bill financing and short-term loans.



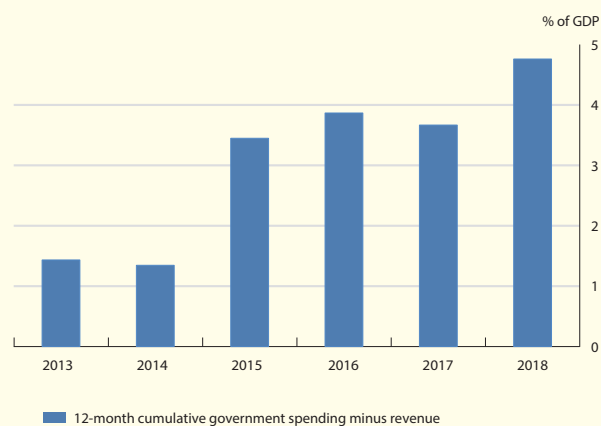
On the fiscal policy front, the authorities have adopted a more forceful and proactive policy stance to boost domestic demand. In an effort to support small business expansion, the authorities stepped up tax and fee cuts. For example, in January this year, the State Council announced to expand the value-added tax allowance coverage by raising the monthly sales ceiling for small firms from RMB30,000 to RMB100,000. Meanwhile, small and low profit businesses with an annual taxable income between RMB1–3 million and less than RMB1 million can enjoy a 50 percent and 25 percent reduction in income tax, respectively. In the 2019 government work report, the authorities announced to roll out more tax cuts particularly for manufacturing and small firms and lowering social security burden on business owners. In total, the government planned to cut tax and fees of business owners by around RMB2 trillion this year.

To lower the tax burden of households and shore up consumption, the authorities announced in December 2018 a special individual income tax deduction arrangement by excluding personal expenditures on children's education, continuing education, health treatment for serious diseases, housing loan interests, rent and elderly care from taxable income.

On the expenditure side, policymakers accelerated the approval of new infrastructure projects. In the latest government work report, the authorities decided to invest RMB2.6 trillion in 2019 into railway, highway, and waterway construction. Apart from conventional infrastructure projects, the government announced to push ahead with “new-form” infrastructure projects relating to artificial intelligence, the Industrial Internet, the Internet of Things and 5G commercialisation.

Reflecting the expansionary fiscal policy, the planned budget deficit is raised from RMB2.38 trillion in 2018 to RMB2.76 trillion in 2019, equivalent to 2.8 % of GDP, 0.2 percentage point higher than 2018. The gap between the expenditure and revenue in the government's general public budget and government-managed funds therefore is expected to further widen to 6.6% of GDP in 2019, after rising to 4.7% in 2018 (Chart 2.34).

**Chart 2.34**  
**Mainland China: Difference between public spending and public revenue**

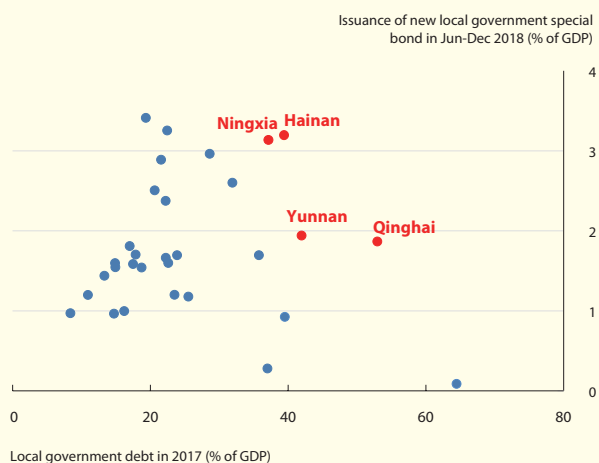


Sources: Wind, MoF and HKMA staff estimates.

To fill the funding shortfall, outstanding local government debt rose by 11.4% in 2018, accelerating from an increase of 7.5% in 2017. For now, the overall risk of local government debt remains manageable as the local government debt-to-GDP ratio remained low at 20.4 % by 2018. However, for some provinces, fast increases in indebtedness combined with relatively weaker fiscal positions could be a concern. Provincial level data indicates that, between June and December 2018, amid government measures to support economic growth, some provinces with already relatively higher indebtedness, such as Hainan, Ningxia, Qinghai and Yunnan, also notably increased the issuance of local government bonds, particularly special bonds, to finance local infrastructure spending (Chart 2.35).

**Chart 2.35**

**Mainland China: Issuance of local government special bonds in June-December 2018 and local government debt**



Sources: Wind and HKMA staff estimates.

## Box 2

### Drivers behind the recent recovery in Mainland overcapacity sectors

#### Introduction

Overcapacity has gradually become a blight on the industrial landscape in Mainland China, in part due to over-investment through fiscal stimulus following the Global Financial Crisis (GFC). In 2013, Mainland authorities identified seven industries suffering severe overcapacity, including aluminium, cement, coal, flat glass, photovoltaic systems, shipbuilding, and steel.

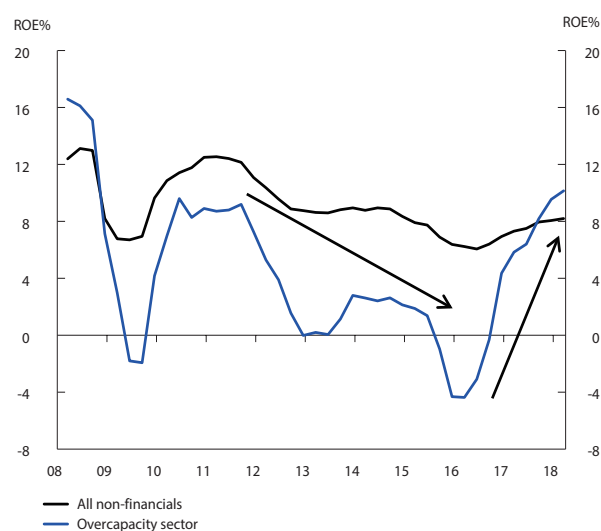
Among global competitors, Mainland companies have a sizeable presence in these seven industries. Despite mainly serving the domestic market, Mainland's production of steel, coal and cement occupies about 50%, 46% and 56% of world production, respectively. But the capacity utilisation ratios of these industries have fallen below 80% in recent years.

Indeed, the performance of overcapacity sectors has implications for both economic performance and financial stability. In 2015, around 3% of bank loans had been extended to overcapacity sectors<sup>22</sup>, and their financial health could also have an impact on the business and financial conditions of their associated upstream and downstream industries.

Therefore, it is not surprising that tackling the overcapacity issue facing the Mainland economy has become a supply-side reform priority for the authorities since 2016. Amid the government's efforts to reduce capacity in those areas, the profitability of overcapacity sectors started to improve, snapping the deteriorating trend between 2011 and 2015 (Chart B2.1).

That said, other sectors not suffering overcapacity also enjoyed rising profitability during the same period, which raises the question of whether the recent improvement in the efficiency of overcapacity sectors reflects the success of the de-capacity campaign, or if it was just the result of a broad-based cyclical recovery. By using the data of listed non-financial Mainland firms, our analysis helps shed light on this question by exploring the potential drivers of improvements in the ROE of the Mainland overcapacity sectors after the GFC.

**Chart B2.1**  
ROE% of listed firms in Mainland China



Sources: Bloomberg and HKMA staff estimates.

#### Methodology explained: the DuPont analysis

To identify the key factor affecting the profitability of Mainland overcapacity sectors, we use the DuPont analysis, a common form of financial statement analysis to decompose the ROE of Mainland firms into six multiplicative components: *financial leverage*, *administration efficiency*, *gross margin*, *financial expenses*, *tax retention rate*, and *asset turnover*<sup>23</sup>. The definitions and the interpretation of the six components are listed in Table B2.1.

<sup>22</sup> "Interest-bearing debt of major overcapacity sectors stood at 0.54 billion RMB, the experience from 1998" (<http://finance.sina.com.cn/stock/hyyj/2016-01-29/doc-ifxznzanh0302556.shtml>)

<sup>23</sup> Alternative forms of decomposition are also discussed by the financial statement analysis literature, for instance, Soliman (2008) and Dehning and Stratopoulos (2002).

**Table B2.1**  
**The DuPont equation and the six components**

**DuPont equation**

Return on equity (ROE)  
= Net Income (NI)/Equity (E)  
= (Asset (A)/Equity (E))\*  
(Trading profit (EBIT)/Gross profit (GP))\*  
(Gross profit (GP)/Sales (S))\*  
(Trading profit (EBIT)/Pre-tax income (PTI))<sup>-1</sup>\*  
(Net income (NI)/Pre-tax income (PTI))\*  
(Sales (S)/Equity (E))

DuPont components	Interpretation
<b>Financial leverage:</b> Asset (A) / Equity (E)	A higher value suggests greater reliance of a firm on borrowed capital to finance its business activities.
<b>Administration efficiency:</b> Trading profit (EBIT)/ Gross profit (GP)	A higher value indicates lower administration expenses relative to gross profit of a firm.
<b>Gross margin:</b> Gross profit (GP)/ Sales (S)	A higher value represents lower production costs related to the revenue of a firm.
<b>Financial expenses:</b> (Trading profit (EBIT)/ Pre-tax income (PTI)) <sup>-1</sup>	A higher value indicates higher financial expenses including interest expenses, relative to EBIT.
<b>Tax retention rate:</b> Net income (NI)/ Pre-tax income (PTI)	A higher value indicates lower effective taxes relative to pre-tax income.
<b>Asset turnover:</b> Sales (S)/ Asset (A)	A higher value indicates higher asset use efficiency.

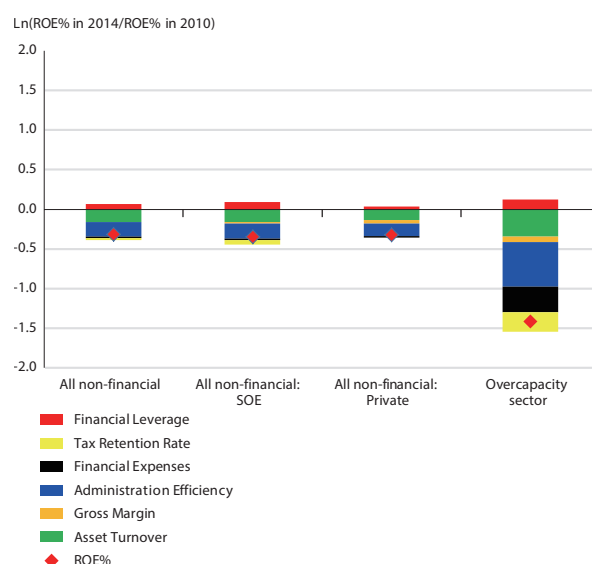
Among the six components, *asset turnover*, the ratio of the gross value of sales generated to the value of total assets, is of particular interest given its relevance to evaluating the extent of overcapacity of firms. *Asset turnover* is often used as a measure of asset utilisation and efficiency, which generally comes from the efficient use of property, plant, and equipment; efficient inventory processes; and other forms of working capital management (Nissim and Penman (2001)), and therefore deemed to have explanatory power about changes in future profitability (e.g. Soliman (2008) and Dehning and Stratopoulos (2002)).

### Data and results

From some 2,800 listed non-financial firms in Mainland China, we identified 108 firms that belong to seven overcapacity industries as classified by Mainland authorities. Our analysis suggests there was an across-the-board decline in profitability of non-financial corporates from

2010 to 2014 (Chart B2.2)<sup>24</sup>. The decline in profitability of overcapacity sectors seemed to be particularly large, driven by a significant deterioration in *administration efficiency*, *asset turnover* and *tax retention rate*, notable increases in *financial expenses*, as well as a slightly weaker *gross margin*. In comparison, financial leverage of overcapacity sectors slightly increased, the only component contributing positively to profitability.

**Chart B2.2**  
**Changes in ROE% of listed firms from 2010 to 2014**



Sources: Bloomberg and HKMA staff estimates.

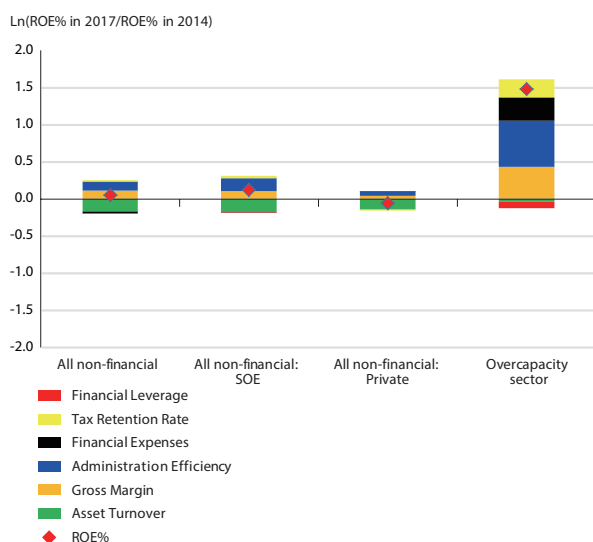
These results suggest that a worsening ROE after the GFC may well reflect over-investment and decreased efficiency in the economy. More specifically, an expansion in asset size and operating scale that cannot be compensated by proportional increases in profit, will lead to a deterioration in *asset turnover* and *administration efficiency*. If such expansion is mainly financed by credit rather than self-generated cash flows, which was the case in Mainland China from 2010 to 2015, *financial leverage* will increase and so will financial expenses. Other things being equal, expansion in production will increase

<sup>24</sup> ROE of Mainland overcapacity sectors troughed and declined to -4% in 2015. A negative value, however, makes it not feasible to calculate percentage changes in ROE for the 2010 to 2015 period. Therefore, the ROE in 2014 is used instead of 2015.

supply and drive down prices and thus gross margin. If such increases in supply are excessive relative to demand, overcapacity emerges.

In 2016 and 2017, the profitability of overcapacity sectors rebounded significantly amid the de-capacity efforts of the government. Although profitability of other sectors also improved, they did so to a much lesser extent than that of overcapacity sectors. The DuPont analysis suggests that improved *administration efficiency* and *gross margin* made the biggest contributions to the rebound in profitability of the overcapacity sectors, followed by lowered *financial expenses* and higher *tax retention rate*. However, the key component, asset turnover, the indicator for overcapacity, seemed little changed (Chart B2.3).

**Chart B2.3**  
Changes in ROE% of listed firms from 2014 to 2017



Sources: Bloomberg and HKMA staff estimates.

The notable increases in both *administration efficiency* and *gross margin* of overcapacity sectors during 2015 to 2017 mainly reflect stronger growth in gross profit relative to administration

or operation costs, due in part to global commodity price reflation, slashed overcapacity sector production amid the de-capacity campaign and cyclical improvement in domestic demand amid, for instance, buoyant property market conditions. In addition, *financial leverage* also slightly declined owing to the government's continued debt-reducing efforts on inefficient sectors, which helped lower *financial expenses* together with relatively loosened liquidity conditions.

However, there was little change in the *asset turnover* ratio in 2017 compared to 2014, which raises the question of whether overcapacity remained an issue for Mainland firms by 2017. If the de-capacity campaign slashed mainly production rather than production capacity, *asset turnover* would not significantly improve. It is also possible the campaign successfully cut outdated production capacity, and part of the outdated capacity was replaced by more advanced and productive capacity, which had yet to generate returns.

Whatever the reason, a low level of *asset turnover* suggests that capacity utilisation remains far from ideal. In 2017, the *asset turnover* ratio was 64.5%, only slightly higher than the level in 2015 when the profitability of overcapacity sectors reached a trough (first panel of Table B2.2). It remains much lower than the *asset turnover* ratio in 2010 and before the GFC when the ratio was close to 100%, and also compared with the long-term average of firms from similar industries in three major advanced economies<sup>25</sup> (second panel of Table B2.2). In this sense, further improvement in asset utilisation is needed to ensure the long-term profitability of the overcapacity sectors.

<sup>25</sup> The comparison group is 147 listed firms from the same seven industries in Germany, Japan and the US.

**Table B2.2**  
**The DuPont components of ROE: Overcapacity sectors in Mainland China and similar industries in AEs**

	Mainland China			AEs
	Right after the GFC	When ROE troughed	Latest observation	Average of similar industrial sectors
Unit: %	2010	2015	2017	1986–2017
<b>ROE</b>	8.8	-4.5	9.4	6.5
<b>Financial leverage</b>	251.3	284.0	260.8	353.0
<b>Administration efficiency</b>	52.8	-14.2*	56.3	35.0
<b>Gross margin</b>	10.7	7.3	15.3	14.9
<b>Finance expenses</b>	115.5	38.7*	116.3	140.0
<b>Tax retention rate</b>	76.3	109.2*	75.9	56.0
<b>Asset turnover</b>	94.1	53.3	64.5	97.0

Sources: Bloomberg and HKMA staff estimates.

\*: As the EBIT was negative during 2015, it is not meaningful to compare these financial ratios to those in other years.

The cyclical performance of the Mainland economy in 2015–2017 could have accounted for notable improvements in some of the DuPont components. The sharp rebound in gross margins is unlikely to be driven by upgrades in production efficiency alone — rather, buoyant market conditions mentioned earlier provided a cyclical tailwind that may have also led to high gross margins. If this is the case, and the cyclical tailwind is to fade, robust improvement in gross margins seen in 2015–2017 may not be sustained for these overcapacity industries. For these firms to maintain long-term financial viability, they must persist in their efforts to improve capacity utilisation, such as the replacement of out-dated facilities, development of high-value-added production methods and the adoption of commercially-based decision making procedures regarding investment and deployment of assets. In summary, while the Mainland overcapacity sectors experienced a good financial performance in 2015–2017 against the backdrop of a favourable cyclical landscape, tackling the overcapacity problem remains a necessary task for firms in these sectors to sustain financial health for the long term.

### Conclusions

In Mainland China, the profitability of overcapacity sectors has clearly improved after the government instituted industrial capacity

cuts in 2016. What is less clear are the reasons behind the rebound in the profitability of these overcapacity sectors. Using financial data of listed firms and the DuPont analysis, we find that improved ROE of the Mainland overcapacity sectors mainly stemmed from favourable developments, particularly in gross margins amid the de-capacity campaign and cyclical improvement in domestic demand, as well as administration efficiency, likely reflecting improved efficiency in business operations.

Despite these developments, the subdued level of the asset turnover ratio seems to suggest that capacity utilisation remains far from ideal in the overcapacity sectors. Further improvement in asset utilisation is therefore needed to promote efficiency and, in turn, the long-term profitability of overcapacity sectors.

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