2. Global setting and outlook

The global economy plunged into recession in the first half of 2020, as lockdown measures to contain the COVID-19 pandemic brought real activities to a standstill. While unprecedented fiscal and monetary policy accommodation drove a rebound in financial markets, the resulting disconnect from the underlying economic prospects, coupled with rising global geopolitical tensions, may point to risks of heightened financial market volatility ahead. Without medical breakthroughs, the global economic outlook will hinge on striking a delicate balance between reopening the economy and avoiding a resurgence of the pandemic. Further down the road, policy responses to the pandemic may risk exacerbating the global debt build-up and entrenching "low-for-long" monetary policy.

In East Asia, despite the early signs of recovery since mid-2020, the region will continue to grapple with the lingering impacts of the pandemic. A prolonged outbreak will raise concerns about the sustainability and capacity of policy supports. With rising corporate debt issuances, weakening business earnings will also challenge corporates' debt repayment capability.

In Mainland China, the economy bounced back to growth in the second quarter after a deep slump in the first quarter amid the COVID-19 outbreak. Looking ahead, whether the recovery will continue greatly hinges on future developments of the pandemic as well as the tensions between Mainland China and the US. In view of the economic headwinds, the government scrapped an annual growth target for this year while putting more emphasis on stabilising the economy and employment.

2.1 External environment

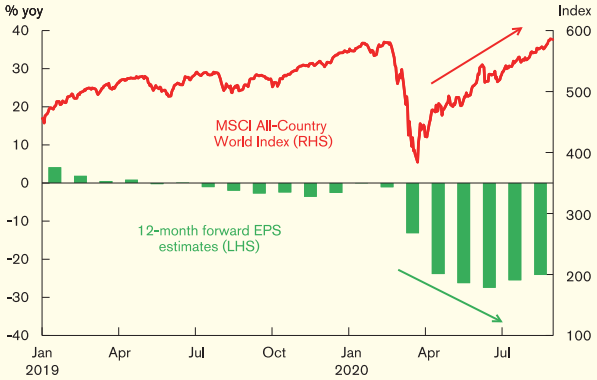
The increasingly widespread implementation of lockdown measures to contain the COVID-19 pandemic resulted in precipitous year-on-year contractions in real gross domestic product (GDP) across major economies (except Mainland China) in the second quarter.[3] To prevent the economic standstill from spiralling into systemic crises, unprecedented policy accommodation was deployed, including fiscal transfers and loan guarantees by governments to support affected households and businesses, and aggressive balance sheet expansions by major central banks in the form of lending facilities and asset purchases.

Amid the concerted global policy easing and liquidity backstops, earlier signs of distress in short-term funding and high-yield credit markets that emerged in late-March rapidly subsided. This, together with increased investor optimism of a "V-shaped" rebound in economic activity,

[3] In addition to the impact of virus containment measures, many emerging market economies (EMEs) were further hit by plummeting exports and commodity prices as global demand evaporated.

underpinned a rally in global equity markets. However, in view of the deteriorated corporate earnings outlook (Chart 2.1), such a rebound in financial markets appeared disconnected from the underlying economic prospects and may prove fragile.

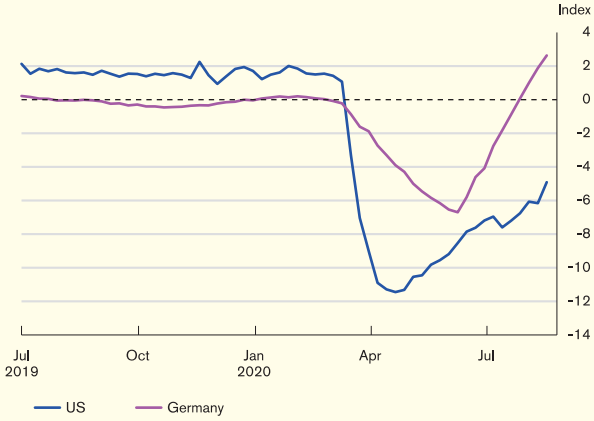
Chart 2.1
MSCI All-Country (AC) World Index and consensus estimates on 12-month forward earnings per share (EPS)



Sources: Bloomberg and HKMA staff calculations.

Lingering uncertainties over the pandemic could risk triggering heightened financial market volatility ahead. While high-frequency indicators showed tentative signs of recovering economic activities in major economies towards the end of the second quarter, as containment measures were relaxed (Chart 2.2), any resurgence in the COVID-19 outbreak could force renewed lockdowns. Indeed, such risks have already materialised in the US, where resurging COVID-19 cases led several states to re-impose restrictions (Chart 2.3). Concerns over new waves of the outbreak, in turn, have triggered several rounds of sell-offs in the US equity markets since mid-June.

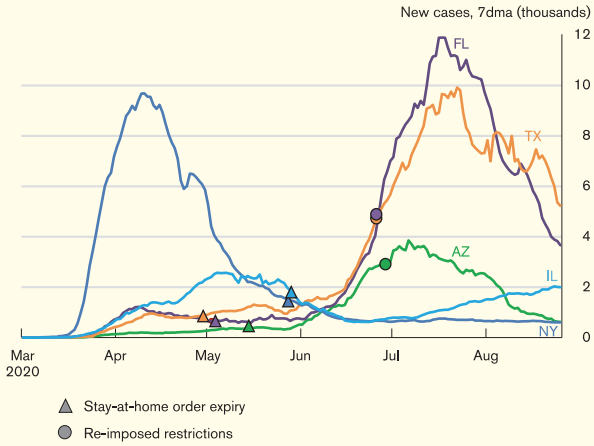
Chart 2.2
Weekly economic activity indicators in selected advanced economies (AEs)



Note: The Weekly Activity Index (for Germany) measures changes in trend-adjusted economy activity over the preceding 13 weeks, while the Weekly Economic Index (for the US) is scaled to align with the year-on-year real GDP growth rate in that quarter.

Sources: Bundesbank and New York Fed.

Chart 2.3
COVID-19 cases in selected US states and dates of restrictions easing and re-imposition



Notes: AZ = Arizona, FL = Florida, IL = Illinois, NY = New York, TX = Texas.

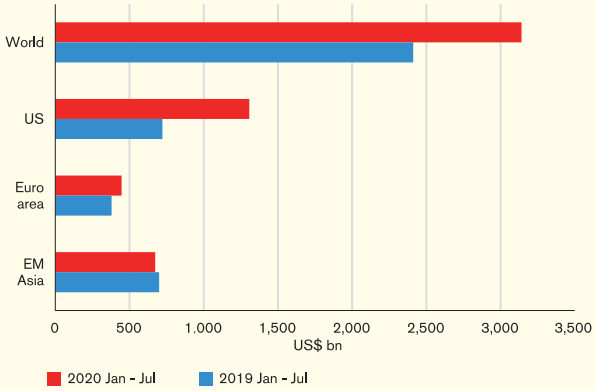
Sources: The COVID Tracking Project and the New York Times.

The near-term financial market outlook is also clouded by rising geopolitical uncertainties. US-China relationships turned increasingly acrimonious following the outbreak of the pandemic, while the US and European Union (EU) faced increasing trans-Atlantic trade tensions amid disputes over a new global taxation framework for technology companies, as well as prior World Trade Organisation (WTO) rulings that allowed the US to impose retaliatory tariffs on European products. In the UK, Brexit

negotiations remained unsettled on a number of sticking points including fishing rights and the interpretation over "level playing field" provisions, raising the risk of EU-UK trade relationships falling back to WTO standards (i.e. "no-deal Brexit"). Such uncertainties may threaten to undermine investor optimism, should future developments take a turn for the worse.

Beyond the near-term risks of increased financial market gyrations, the unprecedented global fiscal and monetary easing may also have longer-term side effects through undermining debt sustainability and financial stability. Global corporate bond issuance surged (Chart 2.4), as companies took advantage of major central banks' backstops to secure liquidity, while public indebtedness is also expected to rise significantly as governments increase spending to support the economy. With global economic growth expected to remain soft in the years ahead, it may be difficult for corporates and sovereigns to "grow their ways out of debt", raising concerns about their debt-servicing ability.

Chart 2.4
Corporate bond issuance (in US$ billion)

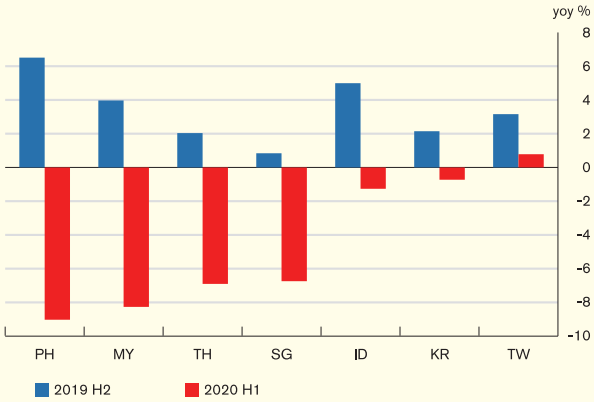


Note: EM Asia includes Mainland China, Hong Kong, Indonesia, Malaysia, the Philippines, Singapore, South Korea and Thailand. All types of corporate issuers, including financial firms, are included.
Source: Dealogic.

The sharp global debt build-up, in turn, might constrain the leeway for major central banks to normalise monetary policy, for fear of upsetting governments' fiscal sustainability and the private sector's debt repayment capacity. With policy interest rates expected to remain close to or slightly below zero in the coming years across major AEs, banks' profitability will likely remain under pressure, possibly motivating them to engage in yield-searching activities to the detriment of financial stability. Meanwhile, the rapid expansion of central banks' balance sheets could risk undermining their credibility in maintaining price stability in the longer term.

In East Asia, real GDP growth plummeted in the first half of 2020 (Chart 2.5), with manufacturing activities, exports and consumption plunging amid the broad-based containment measures. While there were signs of bottoming out since June, according to the PMI and mobility trends data, a meaningful rebound has yet to be seen, especially in those economies where the pandemic has still to be contained.

Chart 2.5
East Asia: Real GDP growth



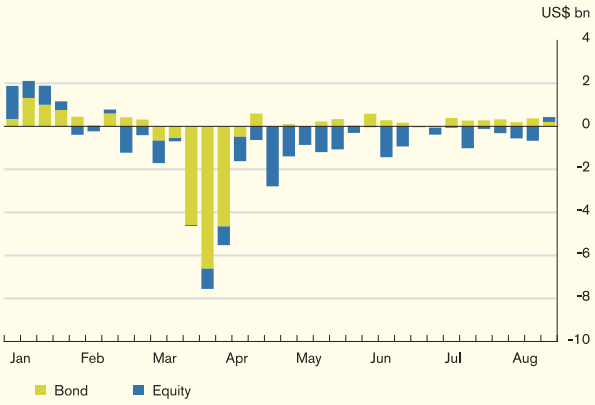
Sources: CEIC and HKMA staff calculations.

Regional financial markets have stabilised from the turmoil in March. Historically, the region experienced its largest portfolio outflows in March and early April, with abrupt outflows from both institutional and retail bond funds underscoring the surge in risk aversion (Chart 2.6)[4]. The heightened redemption pressure has fuelled fire sales by fund managers with a low cash-holding level, causing sharp

[4] The EPFR portfolio fund flows data started from mid-2000s.

equity exchange traded funds (ETFs) outflows from the region. Box 1 discusses how such cash-redemption pressure affects equity fund flows of ETFs in the region and other EMEs. The outflow pressure eased after sentiment improved with global central banks' aggressive accommodation. Meanwhile, after widening in March, cross currency basis swap spreads of most East Asian currencies – a gauge of offshore US dollar liquidity – also narrowed in April after some central banks in the region (Singapore and South Korea) established swap lines with the US Federal Reserve (Fed). Most regional currencies have also regained some ground since April.

Chart 2.6
East Asia: Portfolio fund flows

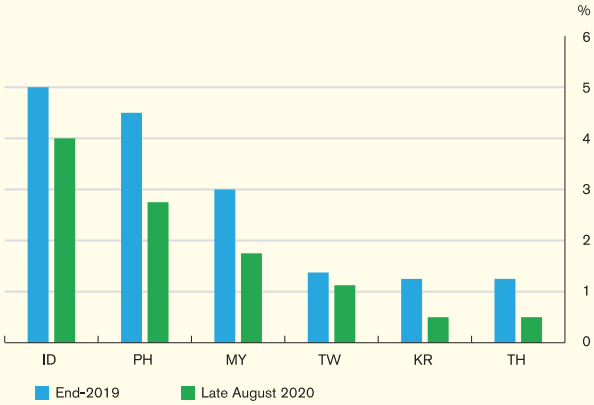


Sources: EPFR and HKMA staff calculations.

In the near term, the region will continue to face the lingering impacts of the pandemic. First, the pandemic poses an unprecedented policy dilemma for regional economies. On one hand, keeping or strengthening the containment restrictions could reduce the rate of infection, but the mounting economic loss could be increasingly unbearable for governments and societies. On the other hand, early relaxation of restrictive policies could boost economic activities, especially for those severely affected sectors like restaurants, hotels and airlines, but will entail the risks of renewed outbreak.

Secondly, a prolonged outbreak will raise concerns on the sustainability and capacity of policy support. On the fiscal front, given the pandemic is still evolving, the size of a stimulus package may need to be increased in order to adequately address the consequences of the pandemic. Nevertheless, markets usually apply more stringent fiscal standards for emerging markets than major AEs for several reasons, including the latter's reserve currency status. On the monetary front, after cutting their policy interest rates multiple times to support the economy (Chart 2.7), the room for further monetary easing is limited given policy interest rates are already at very low levels for many economies, and the potential depreciation pressures for those with weaker external positions.

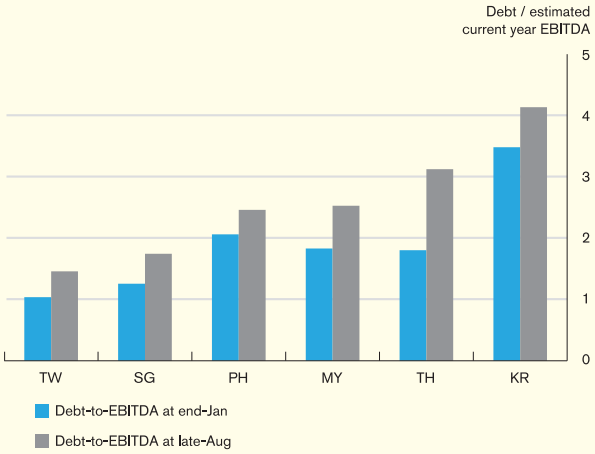
Chart 2.7
East Asia: Policy interest rate



Source: CEIC.

Thirdly, rising corporate debt along with the highly uncertain business outlook could sow seeds of financial instability, thus undermining corporate debt repayment ability further down the road. Indeed, the debt-earnings ratio estimates of listed firms in the region has increased since the pandemic outbreak, indicating an increasing challenge to firms' repayment capability (Chart 2.8).

Chart 2.8
East Asia: Debt relative to expected EBITDA of listed firms



Note: Constituents of benchmark index covered. Relevant data series for Indonesia has not been updated since early 2019 and is thus not included.
Source: Bloomberg.

Box 1
Does cash redemption amplify the outflows from Exchange traded funds?

Introduction

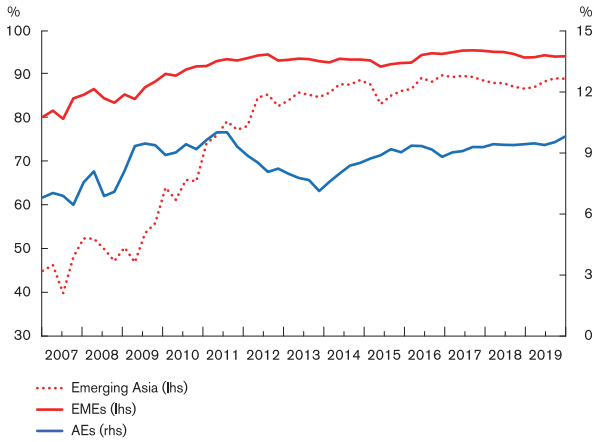
ETFs have been growing rapidly, reflecting their merit in such areas as index-tracking at low cost, intra-day trading, and flexibility to buy on margin or to sell short. Partly as a result of these qualities, equity ETFs saw their assets under management surging to US$4.8 trillion at the end of 2019, a six-fold increase from the end of 2009. However, the growing reliance on ETFs has raised concerns about their resilience to a deterioration in a fund's performance.

In this Box, we show that for those ETFs that are cash-redeemable, but holding a low level of cash, an initial redemption shock to these ETFs could lead to a downward spiral in fund performance and outflows. Such potential downward spirals have systemic implications given the growing role of ETFs in the global financial market and, more importantly, a fire sale of underlying securities triggered by redemptions could, more broadly, also amplify a financial market downturn.

For EMEs, the above concern is particularly noteworthy since cash-redeemable ETFs are far more common than in AEs. At the end of 2019, the majority of the ETFs investing in EMEs were cash-redeemable (94.2%), compared to only one-tenth of the ETFs investing in AEs (Chart B1.1). In particular, for emerging Asia, cash-redeemable ETFs accounted for 89.0% of all ETFs primarily investing in the region, or one-quarter of all cash-redeemable ETFs destined for EMEs.

Against this backdrop, this Box first discusses the redemption mechanisms of ETFs in order to explain why cash-redeemable ETFs may pose higher financial stability risks than other ETFs. We will then present our empirical findings, which show that cash-redeemable ETFs with a low level of cash holdings could face stronger pressure on outflows than other types of ETFs when the ETFs' performance is weak. We also associate such stronger pressure with a fire sale of the ETFs' underlying assets by their fund managers who "dash for cash" to meet redemption orders.

Chart B1.1
Share of cash-redeemable ETFs across regions



Sources: Morningstar Direct, Bloomberg and HKMA staff calculations.

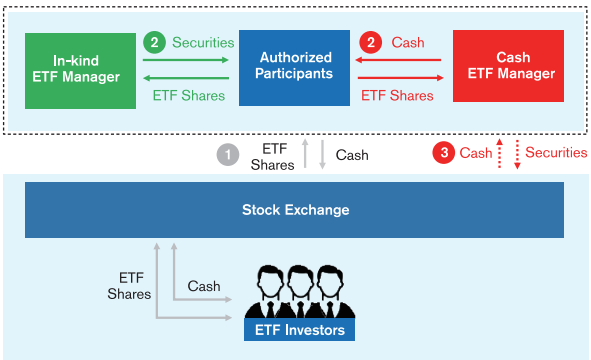
Redemption mechanisms of ETFs

The redemption of ETF shares is confined to the primary market, which only involves direct dealing between the ETFs and their authorized participants (APs), who are usually broker-dealers or market makers in the underlying securities (Chart B1.2). When an ETF price is below the value of the underlying securities, APs can take arbitrage by buying ETF shares (Step 1) from the secondary market and then redeeming the shares from the ETF manager (Step 2).[5] The redemption can be either in cash (namely, cash redemption), or in kind – that is, to exchange ETF shares for a basket of equivalent underlying securities (namely, in-kind redemption).

[5] If the ETF price is higher than the value of the underlying securities, APs can take arbitrage the other way round, i.e. buying underlying securities and delivering them to the ETF fund managers (for in-kind ETFs), or paying the equivalent amount of cash to the manager (for cash ETFs), in exchange for ETF shares. The acquired ETF shares can then be sold for a profit.

The cash redemption method might offer flexibility or a cost advantage to ETF managers on one hand, as they do not need to own all the index securities on a pro rata basis, which matters for ETFs investing in illiquid markets where the trading costs of all index securities can be prohibitively high. On the other hand, this method can increase the vulnerability of the ETFs. Specifically, when an ETF that adopts this method has to meet massive redemptions in cash (Step 2 in red), but its cash holdings are not sufficient, the ETF manager may be compelled to sell its assets in the secondary market at unfavourable terms (Step 3). Such a "fire sale" will worsen the subsequent return of the ETF, possibly widening its tracking error (i.e. ETF return minus its benchmark index return) and further weakening the demand for the ETF shares, causing another round of redemptions, and so on. Therefore, the cash redemption method can potentially cause the fund flows of ETFs more sensitive to their fund performance when the ETF has a low cash level.

Chart B1.2
Cash and in-kind redemption mechanisms of ETFs



Methodology and Data

In order to assess the vulnerability of cash-redeemable and in-kind ETFs, we examine (1) the sensitivity of their fund flows[6] to the fund's poor performance and (2) the sensitivity of tracking errors to redemption orders. For both sensitivities, we distinguish ETFs with a normal level of cash holdings from those with a low level of cash holdings.[7] A fixed-effect panel-data regression model is used to evaluate these sensitivities. In this model, we control for several fund-specific variables, such as fund size, fund age, and lagged fund flow, and control for global market conditions using the Chicago Board Options Exchange Volatility Index. All the fund specific variables are lagged by one quarter to avoid reverse causality bias.

Our empirical studies make use of quarterly ETF data retrieved from the Morningstar Direct for the period the first quarter of 2007 to the fourth quarter of 2019. Our sample consists of 2,293 equity ETFs domiciled all over the world, among which 910 ETFs are redeemed in kind only ("in-kind ETFs") and the remaining ETFs are cash-redeemable. Of these cash-redeemable ETFs, 551 are redeemed in cash only ("cash ETFs"), while 832 ETFs can be redeemed either in cash or in kind ("hybrid ETFs"). In terms of asset size, the sampled ETFs totalled US$4.37 trillion at the end of 2019, accounting for 91.24% of the total asset value of the equity ETF universe in the Morningstar Direct.[8]

Empirical findings

First, we assess the sensitivity of ETF fund flows to their fund performance. For ETFs with a normal level of cash holdings, we find that redemption types make little difference. Specifically, a 1% decline in the ETF's investment return is associated with an outflow of around 0.3% at a 10% level of significance, regardless of the redemption type (Chart B1.3).

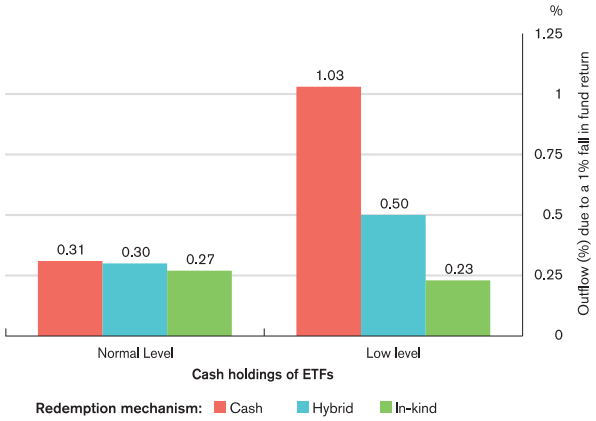
[6] Fund flow is defined as the percentage change in the value of ETF's total net assets, net of ETF price change.

[7] In this study, an ETF is regarded as holding a low level of cash if its cash holdings as a percentage of its total assets is below the bottom quartile of all the ETFs with the same redemption arrangement for each quarter.

[8] Following the literature, we exclude certain ETFs from our sample, such as ETFs with a history of less than one year or net asset value less than US$50 million, and ETFs with an unknown redemption mechanism.

However, for ETFs with a low level of cash holdings, the same 1% decline in the ETF's investment return would lead to a significant outflow from cash ETFs by 1.03%, which is larger than that for cash ETFs with a normal level of cash holdings (by around 0.72 percentage points). For other types of ETFs with a low level of cash holdings, the estimates of outflows are found to be much lower, albeit significantly, at around 0.5% for hybrid ETFs and 0.23% for in-kind ETFs.

Chart B1.3
Sensitivity of outflows to poor performance

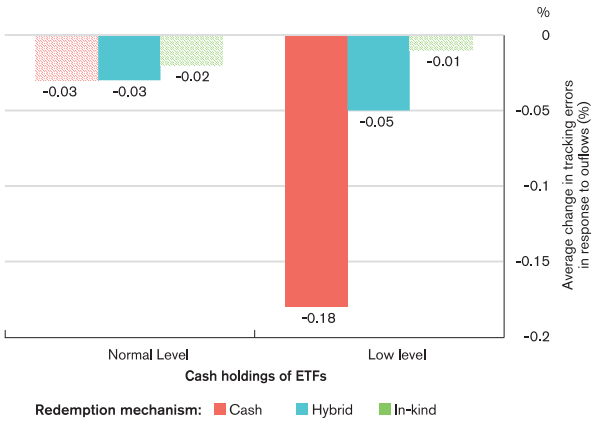


Note: All estimates are statistically significant at the 10% level.
Source: HKMA staff calculations.

Second, we assess the sensitivity of tracking errors to outflows. When an ETF has a normal cash level, the estimated tracking errors are immaterially small across redemption types, in response to outflows of funds. However, under the condition of low cash holdings, a cash ETF is found to underperform its index significantly by 0.18% in a quarterly return on average, and a hybrid ETF by 0.05%, compared with an insignificant level of 0.01% for the in-kind ETFs (Chart B1.4).

In sum, these results show that, when an ETF has low cash holdings, outflows of a cash-redeemable ETF, especially the cash ETF, would be more sensitive to its poor performance and would materially widen the tracking errors of the ETF, compared to the in-kind one. The widened tracking error of these ETFs may be due to managers' fire sale of the underlying assets of their funds to meet cash redemptions given their low cash level.

Chart B1.4
Sensitivity of tracking errors to outflows



Note: All estimates with a solid bar are statistically significant at the 10% level.
Source: HKMA staff calculation.

Conclusion

While cash redemption mechanism might offer flexibility to ETFs investing in illiquid markets, our results imply that outflows from cash-redeemable ETFs are more prone to deterioration in financial market performance in stressful periods. Such a higher sensitivity is likely attributable to the fund managers' fire sale, which may potentially trigger subsequent rounds of redemptions, leading to a downward spiral in fund performance and outflows.

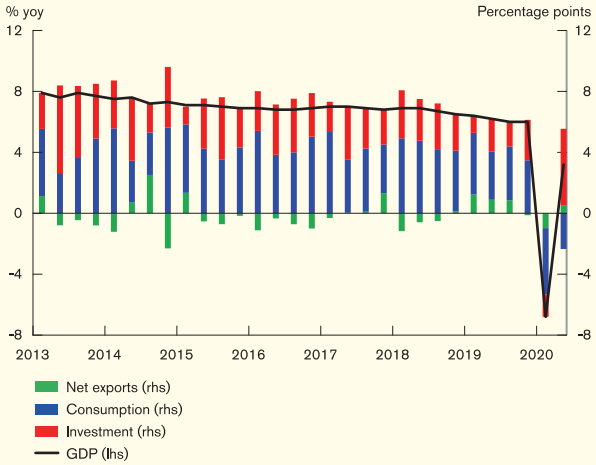
In addition, our results may underscore the potential financial vulnerability of EMEs that is led by cash-redeemable ETFs, as about 90% of all ETFs investing in EMEs, particularly emerging Asia, are cash-redeemable. Although these cash-redeemable ETFs account for only a minor share (about one-tenth) of all ETFs globally in asset size, their rapid growth warrants policymakers' attention. In particular, policymakers should give careful policy scrutiny when balancing the pros and cons of cash-redeemable ETFs for overall financial stability.

2.2 Mainland China

Real sector

After a deep slump of 6.8% year on year in the first quarter amid the COVID-19 outbreak, the Mainland economy bounced back and expanded by 3.2% year on year in the second quarter, following a gradual resumption of work and production (Chart 2.9). Altogether, real GDP contracted 1.6% year on year in the first half of 2020.

Chart 2.9
Mainland China: Contribution to GDP growth by demand component



Sources: CEIC, NBS and HKMA staff estimates.

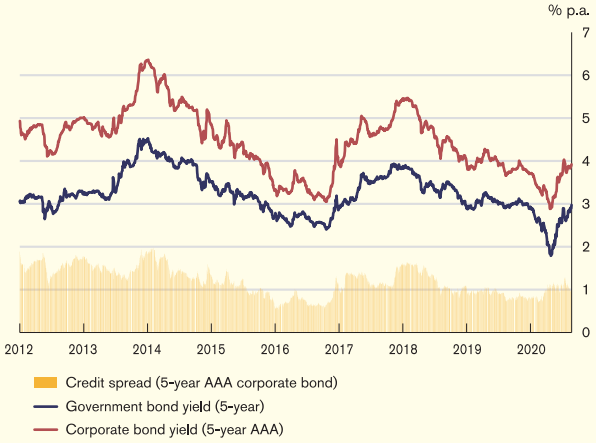
The economic recovery in the second quarter was primarily led by a strong pickup in investment amid accelerated infrastructure and real estate spending. Manufacturing investment also improved in the second quarter, though not yet reverting to the pre-pandemic level. In comparison, while overall consumption rebounded, a breakdown of retail sales suggests that business activities in some segments that rely heavily on in-person interaction, such as entertainment and catering, remained lacklustre in the second quarter. As a result, consumption contributed negatively to GDP growth in the second quarter, albeit at a smaller magnitude compared with the first quarter. Externally, the contribution of net exports to overall growth turned positive in the second quarter, as imports remained sluggish but exports surprised on the upside, in part due to a surge in shipments of medical supplies. Our own daily economic activity index showed that the Mainland economy continued to recover in the third quarter, but volatility increased recently (see more details in Box 2).

In view of the considerable uncertainties surrounding the development of the pandemic and global economic recovery, the government scrapped an annual growth target at this year's National People's Congress. Instead, it put more emphasis on stabilising the economy and employment by supporting the private sector, especially small and medium-sized enterprises (SMEs). To this end, the government vowed to introduce more proactive fiscal policies and additional targeted easing, while keeping potential systemic risks in check. Whether the recovery will continue greatly hinges on future developments of the pandemic as well as the tensions between Mainland China and the US. The latest consensus forecasts expect the Mainland economy to expand by 2.1% in 2020.

Asset and credit Markets

In the bond market, government bond yields rebounded in May on accelerated government bond issuance. As a result, funding costs of corporate issuers also increased and hovered around high levels in the following months (Chart 2.10). Despite rising funding costs, credit spreads of corporate bonds remained largely stable since May, in part reflecting improved market sentiment amid economic normalisation.

Chart 2.10
Mainland China: Five-year corporate and government bond yields



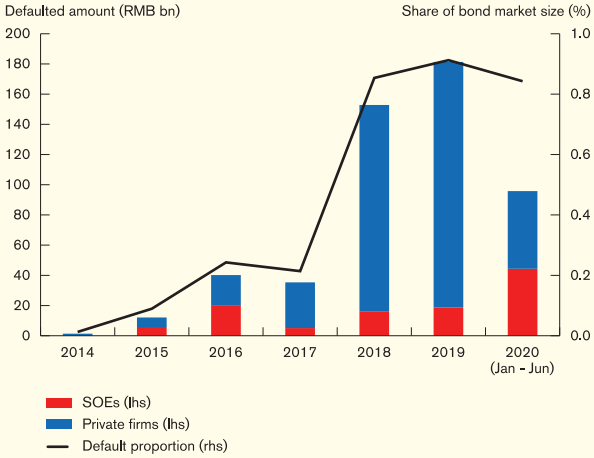
Sources: Wind and HKMA staff estimates.

In the first half of 2020, non-financial corporate bond issuance in the onshore market reached RMB6.33 trillion, almost 50% more than the same period last year. In comparison, Mainland corporates only raised RMB1.83 trillion (US$259 billion) in the offshore market, about 15% less than in the same period one year ago, partly due to lockdowns of international borders as well as increased volatility in overseas financial markets.

The impact of the COVID-19 outbreak on the repayment ability of corporate issuers appeared to be limited so far. The number of bond defaults in the onshore market picked up in February as the COVID-19 outbreak loomed, and then reduced after work resumed. Taking the first half of 2020 as a whole, the share of defaulted bonds remained low in the onshore market, partly due to a variety of supportive measures introduced by authorities aimed at lowering the financial burden of firms affected by the pandemic.

More specifically, although the amount of defaulted bonds in the onshore market increased to RMB95.8 billion in the first half of 2020, 21.6% up from the same period in 2019, the share of defaulted bonds in total outstanding non-financial debt securities declined to 0.84% from 0.91% in 2019 (Chart 2.11).[9] Similar to the onshore market, the annualised default rate in the offshore market remained at a low level of 0.54% in the first half of 2020, albeit higher than 0.21% in 2019 and 0.43% in 2018.

Chart 2.11
Mainland China: Onshore bond default size and proportion



Note: Annualised default proportion is reported for Jan–Jun 2020, including defaults of enterprise and corporate bonds, medium-term notes, short-term commercial papers and private placement notes.

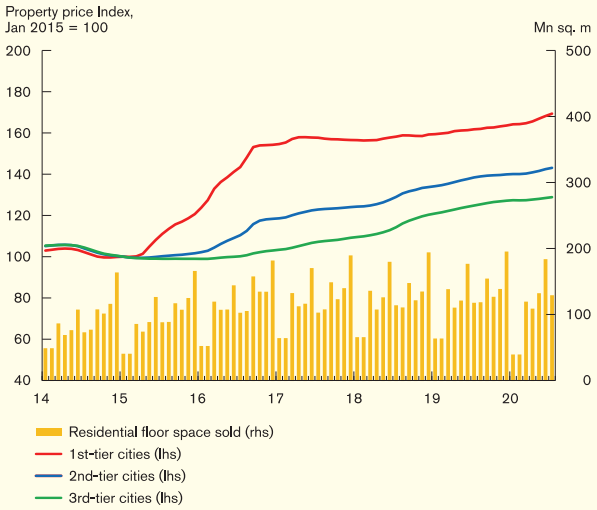
Sources: Wind and HKMA staff estimates.

Further analyses suggest that the onshore and offshore defaults in the first half of 2020 were mainly concentrated in lower-rated issuers, especially information technology (IT), diversified holding and construction firms. During the period, the share of state-owned enterprise (SOE) defaults increased, mainly driven by the multiple defaults by a state-owned IT manufacturer.

[9] The first half of 2020 witnessed bond defaults by 36 corporate issuers, compared with 47 in the first half and 55 in the second half of 2019.

In the property market, housing prices continued to inch up in the first half of 2020, especially in first-tier cities despite the pandemic. On the transaction side, floor space sold declined year on year in the first quarter, but quickly picked up and returned to the pre-pandemic level in the second quarter (Chart 2.12). As a result of declined sales in the first quarter, the inventory-to-sales ratio rose to 14.1 months in June 2020 from 12.5 months in December 2019, but still remained at a much lower level than the peak of 31 months in early 2015.

Chart 2.12
Mainland China: Residential prices by tier of cities and floor space sold

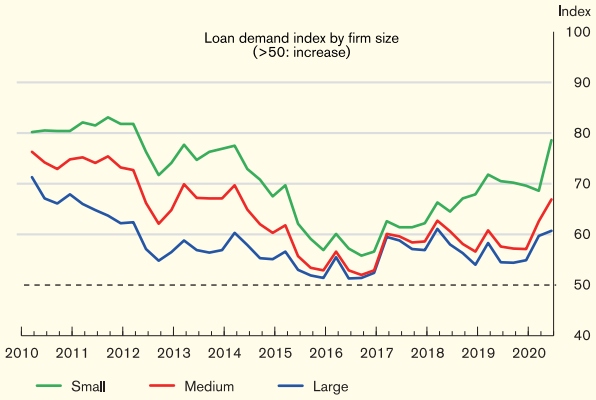


Sources: CEIC and HKMA staff estimates.

To contain potential risks in the real estate sector, the government reiterated in the 2020 government work report that "houses are for living in, not for speculation". In the near term, measures to temper speculative activities and encourage adequate land supply are likely to remain in place to promote steady and healthy development of the property market.

In the loan market, loan demand rebounded notably in the first half of 2020, according to the quarterly survey by the People's Bank of China (PBoC). Loan demand from small and medium-sized firms, in particular, showed a much stronger rebound than that from large firms in the second quarter (Chart 2.13).

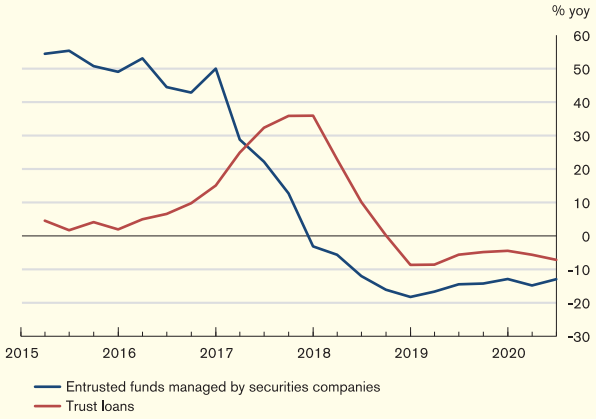
Chart 2.13
Mainland China: Loan demand index by firm size



Source: PBoC.

The strong rebound in loan demand may have partly reflected increased financing needs of Mainland firms amid the resumption of work after the COVID-19 outbreak. In addition, continued contraction in informal lending amid government efforts to contain financial risks may also have pushed up firms' demand for formal financing, such as bank loans. Indeed, shadow banking activities such as trust lending and entrusted funds managed by securities companies contracted further in the first half of 2020 (Chart 2.14), in tandem with the decline in banks' involvement in shadow banking activities.

Chart 2.14
Mainland China: Growth of trust loans and entrusted funds managed by securities companies

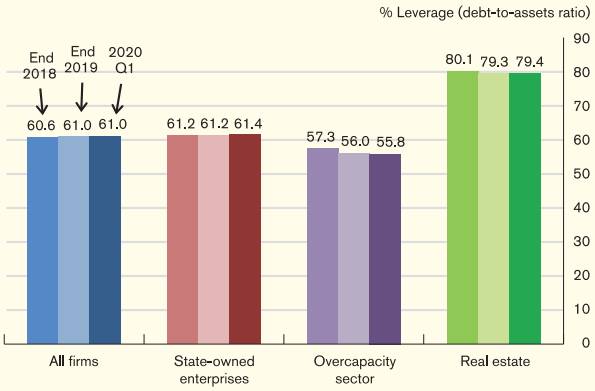


Sources: CEIC, Securities Association of China and HKMA staff estimates.

To meet firms' financing needs, the PBoC conducted several rounds of required reserve ratio (RRR) and interest rate cuts in the first half of 2020 alongside other easing measures to encourage bank lending, especially to smaller firms (see the fiscal and monetary policy section for details). As a result, the expansion of the overall bank loans extended to the corporate sector remained largely stable at around 13%, while the outstanding size of bank loans extended to the "smallest" firms with credit limit less than RMB10 million accelerated further from 25% year on year at the end of 2019 to 27% by the end of June 2020. In tandem, the average borrowing cost of the "smallest" firms further eased to 5.94% at the end of June 2020 from 6.70% at the end of 2019.

While there is no further public information on the distribution of bank credit among firms with different sizes, other than the "smallest" ones, analyses of listed firm data show that the leverage of less efficient borrowers, such as firms in overcapacity sectors, declined marginally in the first quarter of 2020, while the leverage of the real estate sector remained largely steady (Chart 2.15).

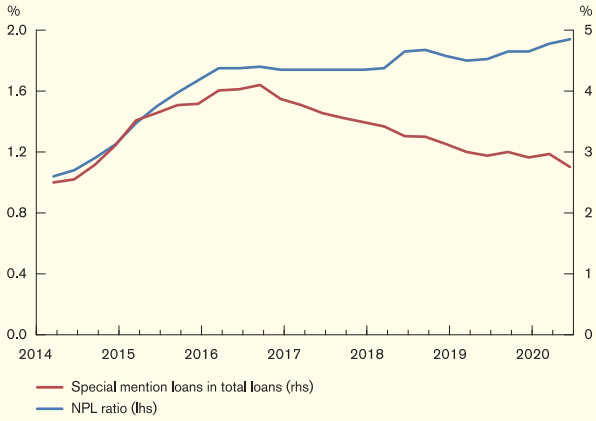
Chart 2.15
Mainland China: Corporate leverage of SOEs, firms in overcapacity sectors and real estate companies



Sources: Bloomberg and HKMA staff estimates.

The overall bank asset quality remained robust during the review period. The overall non-performing loan (NPL) ratio stayed below 2%, though slightly edging up to 1.94% in the first half of 2020 from 1.86% at the end of 2019. The share of special mention loans in total bank loans decreased slightly to 2.8% during the same period[10] (Chart 2.16).

Chart 2.16
Mainland China: NPL ratio and special mention loan ratio

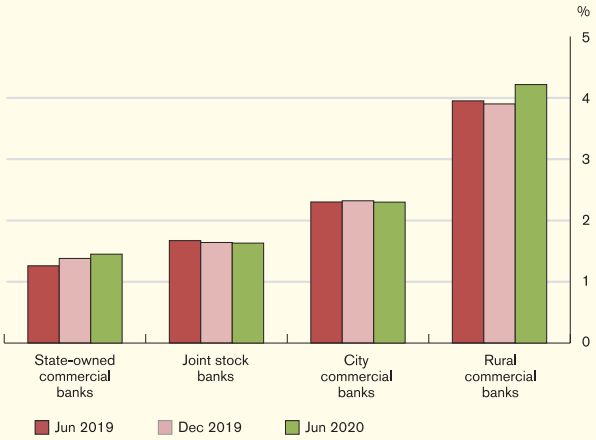


Source: CEIC.

The overall risk in the Mainland banking sector appears moderate. On one hand, the asset quality of smaller banks seems to have faced some pressures, in part reflecting the fact that the repayment ability of corporate borrowers, especially smaller ones, deteriorated amid increased economic headwinds. In particular, the NPL ratio of rural commercial banks rebounded to above 4% in the first half of this year (Chart 2.17). On the other hand, the NPL ratio of Mainland banks, especially the systemically important ones, remains largely stable at low levels. In addition, relatively high loan loss provisions can also help protect banks against future losses. As of June 2020, the provision coverage ratio of Mainland banks stood at 182%, well above the regulatory requirement.

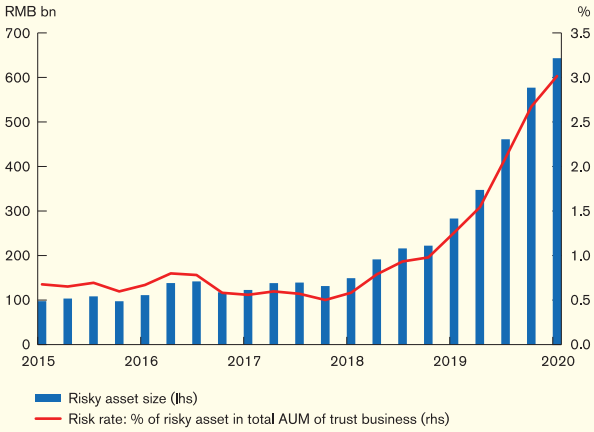
[10] A loan will be classified as special mention loans if the borrower has the ability to repay the loan currently, but may be affected by some unfavourable factors, according to the China Banking and Insurance Regulatory Commission. NPLs include loans that are classified as substandard, doubtful or loss, which are loans that are unlikely to be fully repaid and banks will thus suffer losses of different degrees.

Chart 2.17
Mainland China: NPL ratio by bank types



Source: CEIC.

Chart 2.18
Mainland China: Risky asset size and risk rate of trust companies



Sources: Wind and HKMA staff estimates.

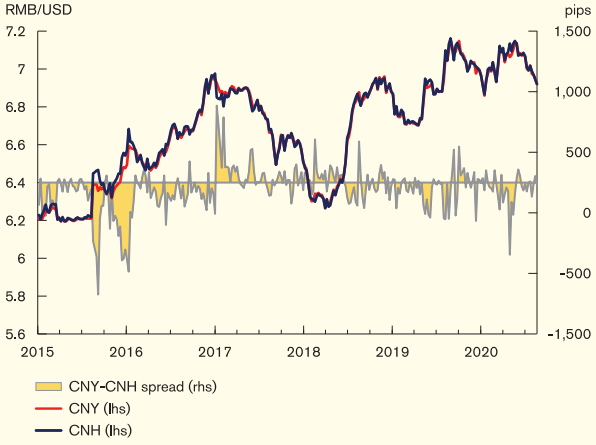
To contain potential systemic risks facing the banking system, the authorities have implemented multiple measures to support smaller banks during the review period. On the liquidity front, RRR cuts as well as re-lending and re-discounting schemes were introduced targeting smaller banks to help ease liquidity conditions. On the capital front, the authorities accelerated the approval for small bank perpetual bond issuance, and announced plans to purchase convertible bonds issued by smaller banks needing to replenish their capital.

While the banking sector remained largely sound, anecdotal evidence suggests the asset quality of non-bank financial institutions might have deteriorated amid recent economic fluctuations. For instance, latest statistics show that in the first quarter of 2020, the risk rate, measured as the percentage of risky assets in the total assets under management of the trust industry, rose to 3.02% from 2.67% at the end of 2019 (Chart 2.18). While the risk rate of trust companies does not appear to be high, whether the rising trend will continue warrants close monitoring.

Exchange rate and cross-border capital flows

After strengthening in January, the onshore renminbi (CNY) weakened in the following months amid the pandemic and renewed US-China tensions, but a strong rebound since June with the weakening of the US dollar brought the renminbi exchange rate back to about the same level at the beginning of 2020 (Chart 2.19). The offshore renminbi (CNH) was traded weaker than its onshore counterpart for most of the time, with the CNY-CNH spread once widening to more than 700 pips in May amid escalating US-China tensions. However, the spread narrowed alongside the renminbi appreciation towards the end of the review period. With the Mainland economy recovering, the Bloomberg consensus forecast for the renminbi exchange rate against the US dollar at the end of 2020 was revised higher to 7.00 on 26 August 2020 from 7.05 in June.

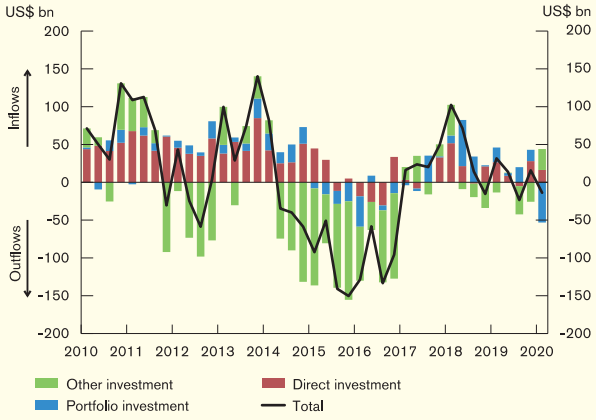
Chart 2.19
Mainland China: Onshore and offshore renminbi exchange rates against the US dollar



Sources: Bloomberg and HKMA staff estimates.

Despite the weakening of the renminbi in most of the first half, capital outflow pressure remains subdued. The latest statistics on the balance of payments pointed to limited capital outflows in the first quarter of 2020 (Chart 2.20). In particular, portfolio investment recorded net outflows mainly as residents increased overseas security purchases and international investors reduced their holdings of Mainland equities. Direct investment recorded net inflows during the period due to robust inward direct investment by non-residents. Meanwhile, other investment recorded strong net inflows due to increased cross-border borrowing of residents as well as the strong repayment of trade credit by non-residents in the first quarter.

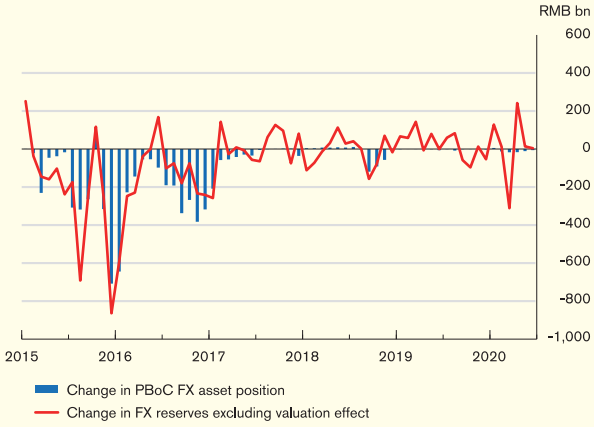
Chart 2.20
Mainland China: Net cross-border capital flows by type of flows



Sources: CEIC, SAFE and HKMA staff estimates.

Changes in Mainland foreign exchange (FX) reserves and the PBoC FX asset position, two common indicators related to cross-border capital flows, also pointed to subdued capital outflow pressures in the first half of 2020. Excluding the valuation effect, Mainland FX reserves are estimated to have increased in the first half of 2020 while the PBoC FX asset position slightly decreased (Chart 2.21). Overall, Mainland headline foreign reserves remained largely stable at above US$3 trillion.

Chart 2.21
Mainland China: Changes in PBoC FX asset position and FX reserves



Sources: CEIC, SAFE and HKMA staff estimates.

Despite subdued capital outflow pressure, the volatility in cross-border capital flows appeared to have increased in the second quarter amid uncertainties in the development of the pandemic and the US-China tensions. In the short run, capital flows are likely to stay volatile as uncertainties may continue to weigh on market sentiment. That said, further opening up of the Mainland financial markets is likely to attract foreign investment and thus provide support to the exchange rate[11]. In fact, based on more frequent and recent data, there were significant net inflows into the equity market in the second quarter of 2020, reversing the outflow trend in the first quarter.

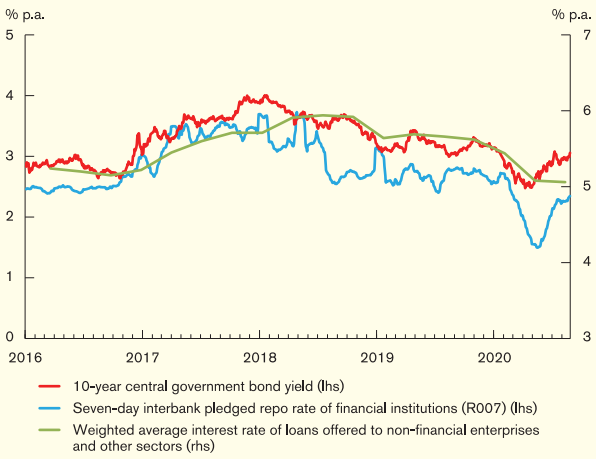
[11] For instance, the Mainland authorities lifted foreign ownership limits on securities and fund management firms in April.

Fiscal and monetary policy

On the monetary policy front, while adopting a prudent monetary policy stance, the PBoC took several steps to lower financing costs for the real sector in the review period. Apart from directly cutting the interest rates, such as the one-year medium-term lending facility rate and the loan prime rate in April, the PBoC facilitated bank lending particularly to smaller firms by cutting RRR twice in March and April, and also providing re-lending and re-discounting support for smaller banks. In addition, the PBoC created two new policy tools in early June to encourage banks to extend loan repayment deadlines and increase non-collateral lending to small borrowers.

As a result of the accommodative measures, liquidity stayed largely ample in the banking system. Both the average seven-day interbank pledged repo rate of financial institutions (R007) and the 10-year central government bond yield trended down in the first four months of 2020, before picking up gradually since May, in part reflecting accelerated government bond issuance and the recovery in funding demand amid the resumption of work. Despite the increase, interbank funding costs remained low compared with previous years. Reflecting favourable liquidity conditions, the weighted average bank lending rate to the non-financial sector declined in the first half of 2020 (Chart 2.22).

Chart 2.22
Mainland China: Major market interest rates

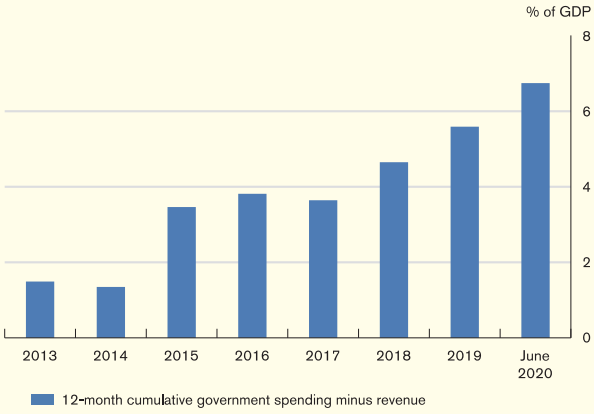


Sources: CEIC, PBoC and HKMA staff estimates.

On the fiscal policy front, the government adopted a more proactive stance amid recent economic headwinds. In particular, the government announced in May that it would raise the fiscal deficit target to 3.6% in 2020 from 2.8% in 2019, with tax and fee breaks to be provided, especially to smaller firms which were the most affected by the COVID-19 outbreak.

Reflecting the economic slowdown and the government's efforts to reduce the tax burden and fees for the real economy, the overall government tax revenue declined 11.3% year on year in the first half of 2020. In contrast, overall public expenditure remained largely stable during the period. As a result, the 12-month cumulative gap between expenditure and revenue in the government's general public budget and government-managed funds widened further to 6.7% of GDP in June 2020, after rising to 5.6% in 2019 (Chart 2.23).

Chart 2.23
Mainland China: Difference between public spending and public revenue



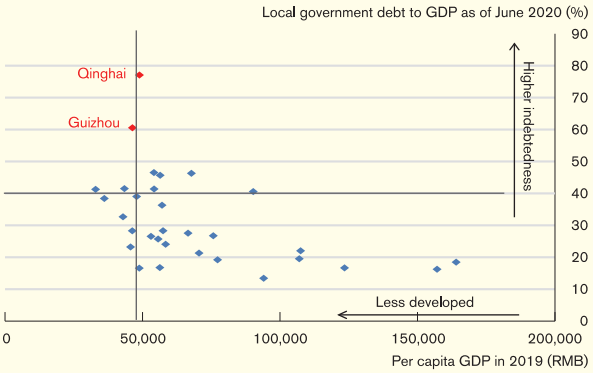
Sources: Wind, MoF and HKMA staff estimates.

In view of the funding shortfall and increased needs to support the economy, Mainland authorities announced this year to issue RMB1 trillion in special treasury bonds to support infrastructure investment and fight the pandemic. The authorities also decided to increase the local government special bond quota to RMB3.75 trillion from RMB2.15 trillion in 2019. Amid accelerated bond issuance, the

outstanding local government debt increased by 14.3% from the end of 2019 to RMB24 trillion at the end of June 2020.

The overall risk of local government debt remains manageable as the local government debt-to-GDP ratio stays at a relatively low level, albeit edging higher to 24.4% at the end of June 2020 from 21.5% at the end of 2019. However, some local governments may face refinancing pressures given their relatively higher debt-to-GDP ratios, but weaker economic fundamentals (Chart 2.24).

Chart 2.24
Mainland China: Local government debt to GDP ratio and per capita GDP by province



Sources: Wind and HKMA staff estimates.

Box 2
A daily index tracking Mainland China's economic conditions

Introduction

The economic recovery in Mainland China is facing high uncertainties due not only to the development of the pandemic, but also the renewed US-China tensions. Against this backdrop, it would be useful to policy makers if high-frequency indicators are available to help monitor economic activities closely. However, in practice, most aggregate-level economic indicators are available only monthly or quarterly with a considerable publication lag. While some higher-frequency indicators are available at the sectoral level[12], these indicators are often subject to noises and point to different directions, making it difficult to get a clear picture of the overall economic performance.

This Box introduces a daily composite economic condition index to provide a more up-to-date assessment of aggregate economic activities in Mainland China. The component indicators of this daily economic condition index are 13 Mainland sectoral higher-frequency indicators that are publicly available. Our composite economic condition index tracks economic activities closely with the advantage of being more timely than traditional aggregate-level indicators.

Data and methodology

Our daily index is built on higher-frequency indicators covering various aspects of economic activities in Mainland industrial and service sectors. Table B2.A lists the details of these indicators. On the industrial side, the indicators are: (1) coal consumption by six major power plants; (2) coke coal production; (3) crude steel production; (4) utilisation rate of blast furnace; (5) utilisation rate of auto tyre production; (6) the China Containerised Freight Index (export); and (7) importation delivery volume of iron ore.

The first five indicators mainly capture production related activities and the last two indicators partly capture trade or logistics related activities. On the service side, the indicators include: (1) floor space of commercial buildings sold; (2) land acquisition area; (3) automobile retail sales; (4) cinema box office sales; (5) urban traffic congestion index; and (6) subway passenger volume. The first four indictors measure consumption of durable goods and entertainment services, while the last two indictors track inner-city transportation and partly capture work resumption status.

Table B2.A
Component indicators of our daily index

Indicators	Starting Date	Frequency
Industry-related		
1. Coal consumption by 6 major power plants	01/10/2009	Daily
2. Coke coal production	10/06/2014	10 days
3. Crude steel production	04/01/2009	10 days
4. Blast furnace utilisation rate	28/07/2012	Weekly
5. Auto tyre production utilisation rate	01/06/2013	Weekly
6. China Containerized Freight Index (export)	11/01/2002	Weekly
7. Iron ore importation delivery volume	03/06/2010	Weekly
Service-related		
1. Floor space of commercial buildings sold in 30 major cities	01/01/2010	Daily
2. Land acquisition area in 100 cities	31/12/2007	Weekly
3. Automobile retail sales	06/03/2015	Weekly
4. Cinema box office sales	25/02/2013	Weekly
5. Urban traffic congestion index for 100 cities	01/01/2017	Daily
6. Subway passenger volume in 6 major cities	27/07/2017	Daily

Source: Wind.

To construct our daily index, we use the Dynamic Factor Model (DFM), a standard tool for analysing high-dimensional time series and a widely used model in economic condition analysis[13]. The DFM extracts a daily economic activity index out of the 13 component indicators. One merit of the DFM is that it can filter out idiosyncratic shocks and capture a latent common "trend" from a set of time series, which suits well the purpose of the study.

[12] By higher-frequency indicators, we refer to indicators with reporting intervals shorter than one month.

[13] For example, see Aruoba et al. (2009), Altissimo et al. (2010), Giannone et al. (2008), etc.

The specification of the DFM can be represented as follows:

$$\mathbf{x}_t = \mathbf{\Lambda}\mathbf{f}_t + \mathbf{u}_t$$
$$\mathbf{f}_t = \mathbf{\Phi}(L)\mathbf{z}_t,$$

where $\mathbf{x}_t$ is a vector containing 13 higher-frequency economic indicators listed above, $\mathbf{f}_t$ is a vector of static factors and the economic condition index we are interested in, and $\mathbf{\Lambda}$ is a matrix of factor loadings. In this specification, each indicator $x_{i,t}$ is the sum of two independent and unobservable components: a common component $\boldsymbol{\lambda}_i'\mathbf{f}_t$, and the remaining idiosyncratic component $u_{i,t}$. As a latent vector, $\mathbf{f}_t$ is function of $\mathbf{z}_t$, a vector of dynamic factors driving the co-movements of all individual indicators, with $\mathbf{\Phi}(L)$, a lag polynomial matrix of constants loading onto it.[14]

All indicators are adjusted and transformed into daily data following the common practice in literature.[15, 16] A few points are worthy of note. First, all indicators are expressed as year-on-year growth, facilitating an easier comparison with official economic indicators. Second, we calculate seven-day moving average of all daily observations to reduce volatility while maintaining the sensitivity to detect any turning points. Third, all indicators are standardized to equalize the impacts of their volatility.

[14] We estimate the DFM using the two-step algorithm as proposed by Doz et al. (2011). In the first step, we estimate the preliminary parameters of the model with principle component analysis, using a balanced panel of data. In the second step, we apply the Kalman smoother to the data panel and re-estimate the factors as latent states based on the estimates obtained in the first step. One advantage of the Kalman smoother is allowing unbalanced data sets with missing values at the end of the panel, which is helpful for economic condition analysis since economic indicators are usually released on a staggered basis.

[15] (1) Chinese New Year effect is smoothed for 2019 to moderate highly volatile movements in January and February due to seasonal effect. Yet, it's not adjusted for 2020 as the nationwide lockdown and suspension of economic activities in the COVID-19 outbreak disrupted the seasonal pattern.
(2) Outliers are winsorised.

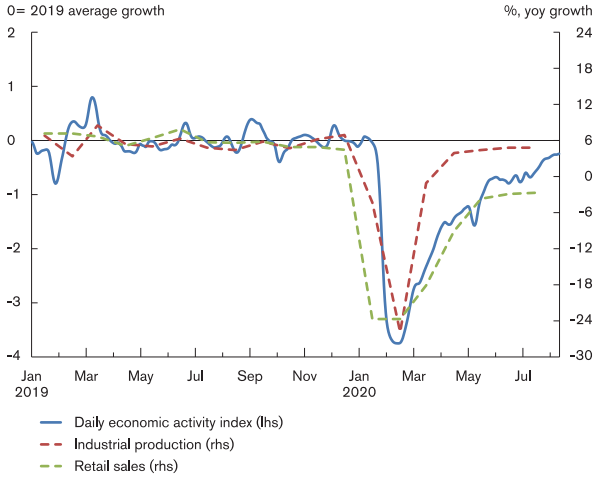
[16] In frequency conversion, flow series (sales and production variables) are converted with quadratic interpolation, while others are linear-interpolated.

Result

Our daily economic activity index covers the period from January 2019 to 10 August 2020. In particular, this index measures how much economic activities in a specific day deviates from the average pace of economic expansion in the year of 2019. Positive values indicate better economic conditions than the 2019 average, whereas negative values signal worse economic conditions.

Our index appears to track official monthly indicators well, both before and after the COVID-19 outbreak. Chart B2.1 plots the index against two key monthly economic indicators, namely the year-on-year growth of industrial production and retail sales. The Chart shows that the daily index and the two economic indicators co-moved over time, with high correlation coefficients of 0.843 and 0.848 respectively. Along with industrial production and retail sales, our daily index plummeted in February amid the COVID-19 outbreak, followed by a rebound in the following months as work resumption started.

Chart B2.1
A comparison between in-house index and official indicators



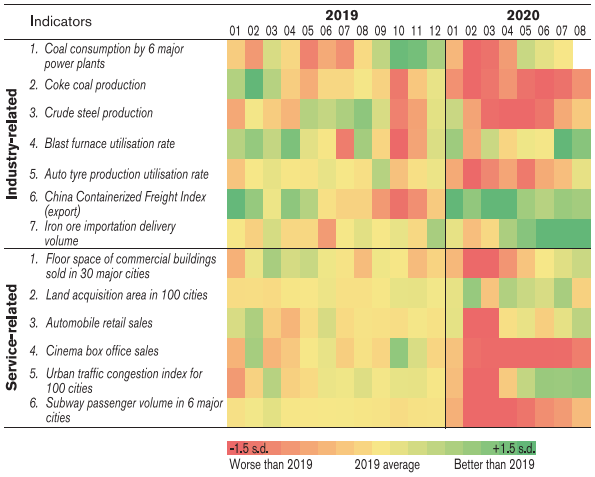
Notes: (1) A zero value on the left axis is associated with our index expanding at its 2019 average growth rate. Positive values indicate better-than-average conditions, whereas negative values indicate worse-than-average economic growth.
(2) National Bureau of Statistics of China only reports cumulative growth of retail sales for January and February.
Sources: Wind and HKMA staff estimates.

Our daily index points to several interesting observations:

- First, our index suggests that the Mainland economy continued to rebound in recent months but with increased volatilities. The bumpy recovery likely reflected increased uncertainty amid the new developments of the pandemic at home and abroad, recent widespread floods and mudslides in Southern China, and increased US-China tensions.

- Second, while the economy was recovering, our daily index suggests that the expansion pace of economic activities had not yet reverted to the 2019 level. A closer look at the 13 constituent indicators of the index shows that around half of them were either still below the 2019 level or softened in recent weeks (Chart B2.2). More specifically, business expansion in some heavy industries (production of coke coal and crude steel) and certain service industries (cinemas and subways) remained lacklustre compared with the previous year. While some indicators returned to the 2019 level, their growth rate softened in recent weeks including utilisation rate of blast furnace and land sales, as the economy faced increased headwinds.

Chart B2.2
A heatmap of individual indicators' movement over time



Notes: (1) The readings in August are a simple average of the first ten days.
(2) The release of the component indicator of coal consumption by six major power plants has been suspended since July 6. Thus, the cell for August is left blank.

Sources: Wind and HKMA staff estimates.

Concluding remarks

This Box introduces a daily index tracking Mainland China's economic conditions, constructed from 13 Mainland sectoral higher-frequency indicators that are publicly available. As a monitoring tool, this daily index appears to track official monthly indicators well. For the most recent period, our daily index suggests that the Mainland economy continued to rebound but with increased volatilities. In addition, our index shows that while the economy was recovering, the expansion pace of economic activities had not yet reverted to the 2019 level.

Care should be taken when interpreting the daily index. First, it is a qualitative economic condition tracker rather than a quantitative nowcast of GDP, and it measures only the current economic conditions relative to a historical point such as the 2019 level. Second, the higher-frequency indicators included in our model may not be representative enough for the whole economy (e.g. e-commerce is not included as data are not available), although the underlying trend of the indicators should be largely in line with the overall economic performance.

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