BANK OF ENGLAND

Financial Policy Committee

Financial Stability Report

December 2019

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The primary responsibility of the Financial Policy Committee (FPC), a committee of the Bank of England, is to contribute to the Bank of England's financial stability objective. It does this primarily by identifying, monitoring and taking action to remove or reduce systemic risks, with a view to protecting and enhancing the resilience of the UK financial system. Subject to that, it supports the economic policy of Her Majesty's Government, including its objectives for growth and employment.

This *Financial Stability Report* sets out the FPC's view of the outlook for UK financial stability, including its assessment of the resilience of the UK financial system and the main risks to UK financial stability, and the action it is taking to remove or reduce those risks. It also reports on the activities of the Committee over the reporting period and on the extent to which the Committee's previous policy actions have succeeded in meeting the Committee's objectives. The Report meets the requirement set out in legislation for the Committee to prepare and publish a *Financial Stability Report* twice per calendar year.

In addition, the Committee has a number of duties, under the Bank of England Act 1998. In exercising certain powers under this Act, the Committee is required to set out an explanation of its reasons for deciding to use its powers in the way they are being exercised and why it considers that to be compatible with its duties.

'The results of the 2019 stress test of UK banks' chapter has been produced by Bank staff under the guidance of the FPC and Prudential Regulation Committee (PRC). It sets out the judgements and actions taken by the PRC and FPC that were informed by the test results and analysis.

Annexes 3 and 4 of this *Report*, setting out the individual bank results and supervisory stance with respect to those banks, have been formally approved by the PRC.

The chapter and annexes were finalised on 13 December 2019.

This document, unless otherwise stated, uses data available as at 4 December 2019.

PowerPoint™ versions of the *Financial Stability Report* charts and Excel spreadsheets of the data underlying most of them are available at www.bankofengland.co.uk/financial-stability-report/2019/december-2019.

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Financial Policy Summary

The Financial Policy Committee (FPC) aims to ensure the UK financial system is resilient to, and prepared for, the wide range of risks it could face — so that the system can serve UK households and businesses in bad times as well as good.

At its meeting on 13 December the FPC reviewed developments since its meeting on 2 October.

2019 annual cyclical scenario stress test

The 2019 annual cyclical scenario stress test (ACS) shows the UK banking system would be resilient to deep simultaneous recessions in the UK and global economies that are more severe overall than the global financial crisis, combined with large falls in asset prices and a separate stress of misconduct costs. It would therefore be able to continue to meet credit demand from UK households and businesses even in the unlikely event of these highly adverse conditions.

- In the 2019 stress-test scenario, world GDP falls by 2.6%, UK GDP falls by 4.7%, Bank Rate rises to 4% and the UK unemployment rate rises to 9.2%.
- Losses on corporate exposures are higher than in previous tests, reflecting some deterioration in asset quality and a more severe global scenario. Despite this and weakness in banks' underlying profitability (which reduces their ability to offset losses with earnings), all seven participating banks and building societies (together 'banks') remain above their hurdle rates.
- The major UK banks' aggregate common equity Tier 1 (CET1) capital ratios after the 2019 stress scenario would still be more than twice their level before the crisis.
- Banks' resilience relies in part on their ability in stress to cut dividend payments, employee variable remuneration, and coupon payments on additional Tier 1 instruments. If banks had not cut their distributions during the stress, in aggregate they would not have met the 2019 ACS hurdle rate. Investors should be aware that banks would make such cuts as necessary if a stress were to materialise.

Major UK banks' capital ratios have remained stable since year-end 2018 (the starting point of the 2019 stress test). At the end of 2019 Q3, their CET1 ratios were over three times higher than at the start of the global financial crisis. Major UK banks also continue to hold sizable liquid asset buffers.

Global developments

The global economy has continued to slow, reflecting in part the broad effects of the trade war between the United States and China. In Hong Kong, rising political tensions have contributed to the sharpest fall in economic activity since the global financial crisis.

The FPC judges that the 2019 stress-test scenario for the global economy was sufficiently severe to encompass economic risks from both a broader trade war and tensions in Hong Kong. Major UK banks were resilient to the stress scenario, and so will be able to continue to lend to UK households and businesses, even if these risks play out further.

The Committee continues to judge that underlying global vulnerabilities remain material, and that there are risks of further deterioration.

- A broadening of the trade war beyond tariff measures to restrictions on technology and capital would further fragment the global economy and slow its rate of potential growth.

- While lower risk-free interest rates will support global growth, monetary authorities have correspondingly less room to respond in the event of further shocks to the global outlook.

- Although overall debt levels in advanced economies are rising no faster than incomes, debt vulnerabilities remain in China and in the US corporate sector. Risks remain in the euro-area banking sector. Flows of capital to emerging markets remain vulnerable to changes in risk sentiment. And political tensions in Hong Kong pose risks due to its position as a major financial centre.

Domestic vulnerabilities and Brexit

In the UK, against a backdrop of Brexit-related uncertainty, growth has slowed and international investor demand for UK assets, notably commercial real estate, has fallen.

The core of the UK financial system — including banks, dealers and insurance companies — is resilient to, and prepared for, the wide range of UK economic and financial shocks that could be associated with a worst-case disorderly Brexit.

- The 2019 stress-test scenario for the UK economy was severe enough to encompass the range of economic shocks that could be associated with a disorderly Brexit. The core UK banking system demonstrated its resilience to — and capacity to keep lending in — that stress scenario.

- Even if a protectionist-driven global slowdown were to spill over to the UK at the same time as a worst-case disorderly Brexit, the FPC judges that the core UK banking system would be strong enough to absorb, rather than amplify, the resulting economic shocks.

Reflecting extensive preparations made by authorities and the private sector, most risks to UK financial stability that could arise from disruption to cross-border financial services in a worst-case disorderly Brexit have been mitigated.

- A range of measures have been put in place by financial services firms and authorities, including in the European Union (EU), to address these risks. Since November 2017, the FPC has regularly published a checklist of actions to avoid disruption to end-users of financial services during Brexit. The FPC updated this checklist at its most recent meeting.

- With over £1 trillion of high-quality liquid assets, major UK banks can meet their maturing obligations without any need to access wholesale funding for many months. They can also withstand an unprecedented loss of access to foreign currency markets. As a further precaution, the Bank is maintaining operations to lend in all major currencies on a weekly basis.

- The FPC welcomes the recent proposal from the European Commission to extend the temporary equivalence arrangements relating to UK central counterparties (CCPs). It expects confirmation of this and extended recognition of UK CCPs to be provided by end-December.

- Financial stability is not the same as market stability. Significant further volatility and asset price changes would be expected in a disorderly Brexit.

The FPC judges that domestic vulnerabilities (excluding Brexit) that can amplify economic shocks have not changed materially since July and remain at a standard level overall.

- Credit growth remains moderate. Household and corporate debt-servicing burdens are low. Interest rates would need to rise materially in order to return the share of households and companies with high debt-servicing burdens to historical averages.

Irrespective of the particular form of the UK's future relationship with the EU, and consistent with its statutory responsibilities, the FPC will remain committed to the implementation of robust prudential standards in the UK. This will require maintaining a level of resilience that is at least as great as that currently planned, which itself exceeds that required by international baseline standards, as well as maintaining UK authorities' ability to manage UK financial stability risks.

Bank capital requirements

Stepping back from current risks, the FPC, together with the Prudential Regulation Committee and the Bank, has reviewed the structural level and balance of capital requirements for the UK banking system. As a result of that review:

- The FPC is raising the level of the UK countercyclical capital buffer (CCyB) rate that it expects to set in a standard risk environment from in the region of 1% to in the region of 2%.

- Reflecting the additional resilience associated with higher macroprudential buffers, the Prudential Regulation Authority (PRA) will consult in 2020 on proposals to reduce minimum capital requirements in a way that leaves overall loss-absorbing capacity (capital plus bail-inable debt) in the banking system broadly unchanged.

- The Bank, in its capacity as the UK resolution authority, is also clarifying that, in the event of a bank resolution, it expects all debt that is bailed in to be written down or converted to the highest quality of capital, CET1.

Together, these changes will ensure the banking system can support the wider economy through financial and business cycles. They:

- **Increase resilience**. While leaving the overall loss-absorbing capacity for the banking system broadly unaffected, the changes will shift the balance of that capacity towards higher-quality Tier 1 capital.

  The changes will keep capital requirements for major UK banks in line with the benchmark level first set by the FPC in 2015. That benchmark balances the need for banks to be able to keep lending through downturns with the need for them to provide the finance that supports growth over the medium term.

  Unless banks increase their risk appetite significantly, the Committees expect overall capital requirements for major UK banks to remain broadly flat in the coming period.

- **Improve the responsiveness of capital requirements to economic conditions.** By shifting the balance of capital requirements from minimum requirements that should be maintained at all times towards buffers that can be drawn down as needed, these changes will mean banks are more able to absorb losses while maintaining lending to the real economy through the cycle.

  In a stress, the FPC would be prepared to release the CCyB. If the UK CCyB rate was cut from 2% to 0%, this would enable banks to absorb up to £23 billion of losses, which might otherwise lead them to restrict lending. Given losses of that scale, a cut in the UK CCyB rate to 0% could preserve up to £500 billion of banks' capacity to lend to UK households and businesses. This compares with around £100 billion of net lending in the past year.

  A higher setting of the UK countercyclical buffer rate in standard conditions will allow the FPC to pursue a gradual approach to raising the buffer as the risks faced by banks build up. It will also ensure that the buffer is sufficiently large when risks are elevated to create the capacity for banks to lend through subsequent downturns.

- **Enhance resolvability.** The Bank's intention, in resolution, to write down or convert debt to CET1 capital will make resolved banks resilient to further losses, supporting their resolution and minimising the wider economic costs of their failure.

The FPC judges a 2% UK CCyB rate to be appropriate for the current standard risk environment. It is therefore raising the CCyB rate from 1% to 2%. This will take effect in one year.

- Alongside the Prudential Regulation Authority, the FPC will now pilot options for an enduring approach for incorporating the new IFRS 9 accounting standard into bank stress tests and capital requirements. The approaches to be piloted are consistent with the principle that the new accounting standard, which is being phased in until 2023, should not result in an unwarranted *de facto* increase in capital requirements.

The FPC stands ready to move the UK CCyB rate in either direction as economic conditions and the overall risk environment evolve. If a major economic stress were to materialise, the FPC is prepared to cut the UK CCyB rate, as it did in July 2016. In the absence of such a stress, the FPC remains vigilant to developments, particularly in the domestic credit environment.

Review of FPC mortgage market Recommendations

The FPC has reviewed its limit on the amount of new mortgage lending at or above 4.5 times the borrower's income, and its calibration of the test that lenders should use to assess whether a borrower can afford a mortgage.

- Mortgages are households' largest financial liability and lenders' largest loan exposure. In the past, lenders' underwriting standards have loosened sharply and at times shifted from responsible to reckless. This can lead to a significant increase in the number of more highly indebted households.

- In a downturn, these households are more likely to face difficulties and can cut back sharply on spending to make their mortgage payments. This poses risks to the wider economy and ultimately to lenders.

- To insure against this, the FPC has, since June 2014, recommended a limit of 15% on the proportion of new mortgages extended at or above 4.5 times a borrower's income. Building on Financial Conduct Authority (FCA) rules, the FPC has also recommended that lenders assess whether borrowers could meet their mortgage payments if their mortgage interest rate switched to the contractual reversion rate and increased by 3 percentage points.

The FPC's measures prevent a loosening of underwriting standards that would otherwise lead to an increase in the number of more highly indebted households. These benefits substantially outweigh any macroeconomic costs. These standards therefore maintain financial stability and support economic growth through the cycle.

Alternative policies to achieve similar benefits would be much more costly to the wider economy and pose greater risks to the Committee's secondary objective to support the Government's economic policy of strong, sustainable and balanced growth.

- Without the FPC's insurance policies, monetary policy might need to address the financial stability consequences of deteriorating underwriting standards and rapid credit growth. Since monetary policy cannot be targeted at the mortgage market alone, this could generate a potentially severe economic slowdown, far outweighing any macroeconomic costs of the FPC's policies.

- Alternatively, looser underwriting standards would result in an increase in the number of more highly indebted households and greater economic volatility. In those circumstances, to maintain the resilience of banks, the prudential authorities would need to require banks to have materially higher levels of capital, raising the cost of credit.

The FPC therefore judges it is appropriate to maintain both Recommendations. It views them as structural measures intended to remain in place through cycles in the housing market.

These measures have had limited effect to date on mortgage availability. Lenders have maintained their underwriting standards in recent years.

- The FPC's limit on high loan to income mortgage lending has not been reached. Mortgage approvals have remained steady. First-time buyers — who tend to have a greater reliance on borrowing at higher loan to income ratios — now account for a higher share of activity than when the measures were introduced. Thus far, the measures have not constrained a material number of prospective home buyers from purchasing a home.

Financial market liquidity

The recent period of volatility in the US dollar repo market shows how markets can become illiquid in the face of shocks and may not be able to rely on dealers to maintain levels of liquidity. Investors should not assume that markets will remain liquid at all times.

- Post-crisis reforms have contributed to the resilience of, and reduced the interconnections between, dealers that sit at the centre of many financial markets. That, in turn, has reduced the risk of severe and sudden reductions in market liquidity.

- Maintaining those standards is crucial to supporting financial stability. However, these reforms may have affected how some dealers behave in response to shocks, reducing market liquidity in some circumstances.

- The FPC emphasises that firms are able to draw down liquidity buffers and draw on Bank of England facilities to support market functioning through the cycle, as well as in a stress. The 2019 biennial exploratory scenario will be used to illustrate how liquidity buffers can be drawn down, how the Bank of England's facilities can be used, as well as how the PRA's approach to supervision would align with this.

Vulnerabilities in open-ended funds

The FPC judges that the mismatch between redemption terms and the liquidity of some funds' assets means there is an advantage to investors who redeem ahead of others, particularly in a stress. This has the potential to become a systemic risk.

As part of the ongoing review by the Bank and FCA of open-ended funds, the FPC has established that there should be greater consistency between the liquidity of a fund's assets and its redemption terms. In that regard:

- Liquidity of funds' assets should be assessed either as the price discount needed for a quick sale of a representative sample (or vertical slice) of those assets or the time period needed for a sale to avoid a material price discount. In the US, the Securities Exchange Commission (SEC) has recently adopted measures of liquidity based on this concept.

- Redeeming investors should receive a price for their units in the fund that reflects the discount needed to sell the required portion of a fund's assets in the specified redemption notice period.

- Redemption notice periods should reflect the time needed to sell the required portion of a fund's assets without discounts beyond those captured in the price received by redeeming investors.

In addition to enhancing financial stability, these changes should also promote funds' ability to invest in illiquid investments, helping to increase the supply of productive finance to the economy through business and financial cycles, in line with the Committee's secondary objective.

Ensuring that rapidly evolving payment systems support financial stability

Innovation in payments could bring significant benefits for users.

At the same time, the ability to transact safely and smoothly is critical to financial stability and the regulatory framework will need to keep pace with innovation. HM Treasury's current review of the payments landscape is an opportunity to ensure that it can.

The FPC considers that the current framework will need adjustment in order to accommodate innovation in this sector. It has therefore developed the following approach that could usefully inform the Treasury review.

- Regulation of payments should reflect the financial stability risk, rather than the legal form, of payments activities. Firms that are systemically important should be subject to standards of operational and financial resilience that reflect the risks they pose.

- The systemic importance of any single firm should be informed by whether it is part of one or more systemic 'payment chains' — the set of activities necessary for a payment to be made — and whether its failure could disrupt the end-to-end chain. Innovation has made payment chains more complex. New firms, separate to regulated banks and payment systems have become involved in providing payment services and could become systemically important.

- In order to ensure the information necessary for regulation and supervision to be effective, all firms above a certain threshold carrying out the activities that make up the payment chain should provide sufficient information to support the identification of systemically important payments firms as they emerge.

In future, digital tokens known as stablecoins might increasingly be used to make payments. Stablecoin-based payment chains pose additional issues for regulation. In assessing how stablecoins should be treated in the regulatory framework, the FPC has

considered them against its principle that the regulation of payments activities should reflect the financial stability risks they pose, rather than their legal form. It judges that:

- Payment chains that use stablecoins should be regulated to standards equivalent to those applied to traditional payment chains. Firms in stablecoin-based systemic payment chains that are critical to their functioning should be regulated accordingly.

- Where stablecoins are used in systemic payment chains as money-like instruments they should meet standards equivalent to those expected of commercial bank money in relation to stability of value, robustness of legal claim and the ability to redeem at par in fiat.

Libra is a high-profile example of a stablecoin proposal. It would have the potential to become systemically important. The regulatory framework that would apply to Libra must be clear and in place in advance of any launch.

The transition away from Libor

Continued reliance of financial markets on Libor poses a risk to financial stability that can only be reduced through a transition to alternative risk-free rates. The intention is that sterling Libor will cease to exist after the end of 2021. No firm should plan otherwise.

Sterling markets show encouraging signs in the development of new products linked to the sterling overnight interbank average (SONIA), and the transition of some legacy products. But important gaps remain so these efforts will need to continue to accelerate in the first half of 2020.

- The UK industry working group for transition has set a target to cease issuance of cash products linked to sterling Libor by 2020 Q3. The FPC endorses this target and encourages all lenders and borrowers to take the necessary steps to prepare themselves to meet this timeline.

- The PRA and FCA have taken steps to ensure that each of the largest regulated firms has nominated a senior manager to be responsible for that firm's transition away from Libor, and the FPC considers this good practice for all firms with material Libor exposures.

- The Bank is currently reviewing its risk management approach to Libor-linked collateral delivered in its Sterling Monetary Framework.

- The FPC has also considered further potential supervisory tools that could be deployed by authorities to encourage the reduction in the stock of legacy Libor contracts to an irreducible minimum ahead of end-2021, and will keep this under review in light of progress made by firms in the transition.

- Compared to progress in sterling Libor markets, transition remains further behind in US dollars, the largest Libor market.

The results of the 2019 stress test of UK banks

The 2019 stress test shows the UK banking system is resilient to deep simultaneous recessions in the UK and global economies that are more severe overall than the global financial crisis, combined with large falls in asset prices and a separate stress of misconduct costs. It would therefore be able to withstand the stress and continue to meet credit demand from UK households and businesses.

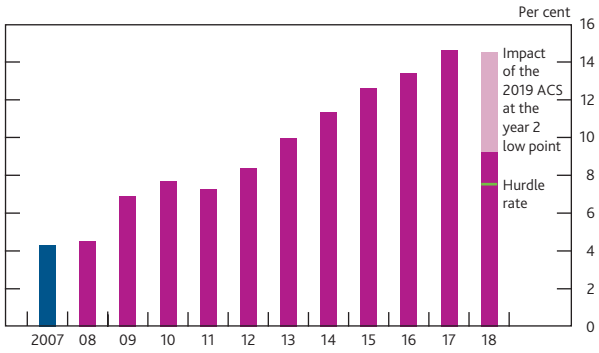
Losses on corporate exposures are higher than in previous tests, reflecting some deterioration in asset quality and a more severe global scenario. Despite this, and weakness in banks' underlying profitability (which reduces their ability to offset losses with earnings), all seven participating banks and building societies remain above their hurdle rates. The major UK banks' aggregate CET1 capital ratio after the 2019 stress scenario would still be more than twice its level before the crisis.

Banks' resilience relies in part on their ability in stress to cut dividend payments, employee variable remuneration, and coupon payments on additional Tier 1 instruments. If banks had not cut their distributions during the stress, in aggregate they would not have met the 2019 ACS hurdle rate. Investors should be aware that banks would make such cuts as necessary if a stress were to materialise.

Major UK banks' capital ratios have remained stable since year end 2018, the starting point of the 2019 stress test. At the end of 2019 Q3, their CET1 ratios were over three times higher than at the start of the global financial crisis. Major UK banks also continue to hold sizeable liquid asset buffers.

Chart A.1 Even at the low point of the stress the aggregate CET1 ratio is more than twice its pre-crisis level

Aggregate CET1 capital ratio of major UK banks since the financial crisis[a][b][c]



Sources: PRA regulatory returns, published accounts, participating banks' Stress Testing Data Framework (STDF) data submissions, Bank analysis and calculations.

(a) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets (RWAs). Major UK banks are Barclays, The Co-operative Bank (until 2013), HSBC, Lloyds Banking Group, Nationwide, The Royal Bank of Scotland, Santander UK and Standard Chartered (from 2014). From 2011, data are CET1 capital ratios as reported by banks. Prior to 2011, data are Bank estimates of banks' CET1 ratios.
(b) Capital figures are year-end.
(c) The impact of the 2019 ACS does not include the conversion of AT1 instruments.

The results of the Bank's 2019 stress test show that major UK banks remain much better capitalised than in the period before the global financial crisis.

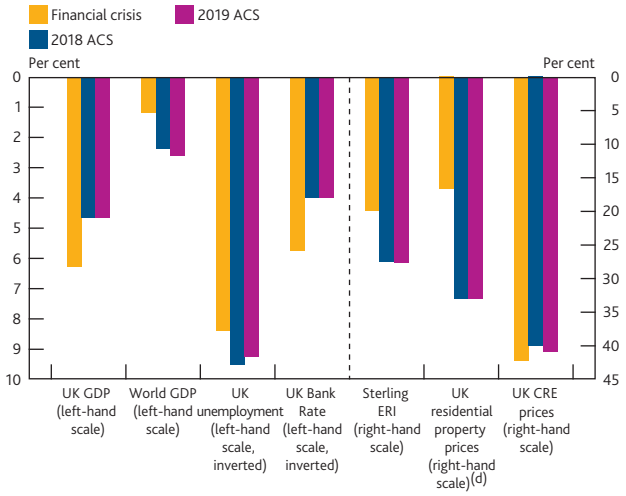
A key purpose of the Bank's annual stress test — the annual cyclical scenario (ACS) — is to measure the resilience of the seven major UK banks and building societies (hereafter referred to as 'banks') to hypothetical adverse scenarios like severe recessions, to ensure those banks have sufficient resilience to withstand shocks.(1) The Bank's 2019 stress test incorporates a stress scenario that is more severe overall than the global financial crisis.

At the point in the test where banks' capital ratios are lowest, the common equity Tier 1 (CET1) capital ratios of the seven banks are, in aggregate, more than twice their pre-crisis level (**Chart A.1**). These banks started the 2019 test with an

(1) The seven participating banks and building societies are: Barclays, HSBC, Lloyds Banking Group, Nationwide, The Royal Bank of Scotland Group, Santander UK Group Holdings plc and Standard Chartered. Throughout this chapter the term 'banks' is used to refer to the seven participating banks and building societies. These banks account for around 75% of the outstanding stock of PRA-regulated bank lending to the UK real economy.

Chart A.2 Participating banks are judged against a severe hypothetical stress scenario

Peak-to-trough falls in key variables: global financial crisis, 2018 ACS and 2019 ACS[a][b][c]

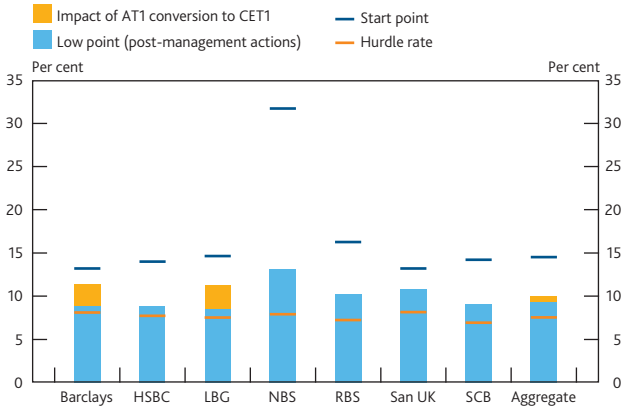


Sources: Halifax/Markit, IMF World Economic Outlook, Eikon from Refinitiv, MSCI Investment Property Databank, Nationwide, ONS and Bank calculations.

(a) Figures for world GDP are the trough four-quarter growth rate.
(b) The unemployment bars show the peak level of the Labour Force Survey UK unemployment rate.
(c) The Bank Rate bars show the peak level reached.
(d) Financial crisis data are a combination of the quarterly Halifax/Markit and Nationwide house price indices.

Chart A.3 All banks clear their CET1 capital ratio hurdle rates in the test

Projected CET1 capital ratios in the stress scenario[a][b][c]



Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of RWAs, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook. Aggregate CET1 capital ratios are calculated by dividing aggregate CET1 capital by aggregate RWAs at the aggregate low point of the stress in 2020.
(b) The minimum CET1 capital ratios shown in the chart do not necessarily occur in the same year of the stress scenario for all banks. For individual banks, low-point years are based on their post-strategic management actions and CRD IV restrictions, pre-AT1 conversion projections.
(c) According to the specific contractual terms of banks' AT1 instruments currently in issue, conversion is based on a definition of CET1 that excludes the benefit of transitional arrangements under IFRS 9. As two banks (Barclays and Lloyds Banking Group) see their CET1 ratios fall below 7% in the stress on this non-transitional basis, their AT1 instruments convert into CET1 in the test. This effect is therefore shown in the chart.

aggregate Tier 1 capital ratio of around 17.7% and a CET1 capital ratio of 14.5% of risk-weighted assets; over three times higher than prior to the financial crisis. In the stress, in aggregate, banks' capital ratios remain well above the aggregate CET1 hurdle rate, which is adjusted for the impact of the new IFRS 9 accounting standard (see Box 1).

Since the end-2018 balance sheet cut-off date for the 2019 stress test, major UK banks' capital ratios have been broadly stable; the aggregate CET1 capital ratio was 14.4% in 2019 Q3 (see Box 2).

The stress scenario remains very severe in a historical context, with a slightly tougher international macroeconomic scenario than the 2018 test.

Earlier in 2019, the Bank published the hypothetical stress scenario to be used in the test. The scenario incorporates paths for economic and financial market variables, including GDP, property prices and unemployment (**Chart A.2**). It also includes a slightly more severe global recession than the 2018 test. The global recession reflects the FPC's previous judgements that underlying vulnerabilities in China are elevated and there are material vulnerabilities in the US relating to increased corporate leverage (see Global vulnerabilities chapter). The UK scenario is in line with the FPC's assessment that vulnerabilities to the UK financial system are at a standard level overall (see Overview of risks to UK financial stability chapter).

As in previous years, the 2019 stress test includes a financial market scenario to test banks' trading risks that is designed to be aligned with the macroeconomic scenario. Stressed projections for misconduct costs related to known misconduct issues beyond those already paid or provided for at the end of 2018 are also included.

Banks are assessed on the basis of IFRS 9 transitional arrangements, against an IFRS 9 adjusted hurdle rate framework.

As set out in March 2019, the results of the 2019 test continue to reflect internationally agreed transitional arrangements for the IFRS 9 accounting standard. Banks participating in the stress test have been assessed on this transitional basis — that is, they have been allowed to 'add back' a proportion of capital losses that are associated with earlier recognition of impairments under IFRS 9, relative to the previous accounting standard (see Box 1).

Each bank's performance in the test is assessed against 'hurdle rates' for their risk-weighted CET1 capital ratio and Tier 1 leverage ratio.

Hurdle rates are adjusted to take into account the impact of the new IFRS 9 accounting standard, which is to reduce CET1 at the capital low point by bringing forward the point in a stress at which banks provision for losses. These adjustments,

Table A.A Banks' CET1 capital and Tier 1 leverage ratios compared against their hurdle rates[(a)(b)(c)(d)(e)(f)]

Results of the 2019 ACS on a transitional IFRS 9 basis

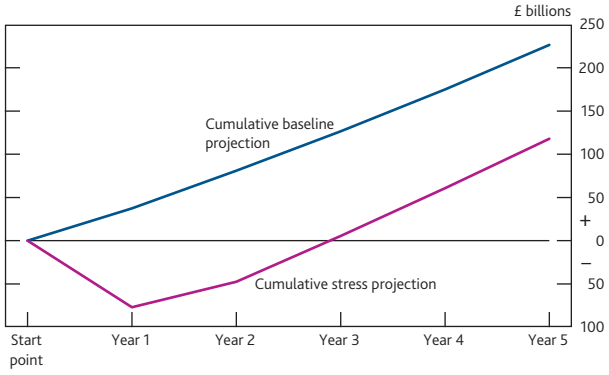
	CET 1 capital ratios			Tier 1 leverage ratios		
	Dec. 2018	Low point	2019 ACS hurdle rate	Dec. 2018	Low point	2019 ACS hurdle rate
Barclays	13.2	8.9	8.1	5.1	3.8	3.63
HSBC	14.0	8.9	7.7	6.0	5.3	3.86
Lloyds Banking Group	14.6	8.5	7.5	5.5	4.3	3.47
Nationwide	31.7	13.1	7.9	5.0	4.8	3.57
The Royal Bank of Scotland	16.2	10.3	7.2	6.2	4.7	3.56
Santander UK	13.2	10.8	8.1	4.5	3.8	3.57
Standard Chartered	14.2	9.0	6.9	5.6	5.1	3.55
Aggregate	**14.5**	**9.3**	**7.5**	**5.6**	**4.8**	**3.69**

Sources: Banks' STDF data submissions, Bank analysis and calculations.

(a) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
(b) The Tier 1 leverage ratio is Tier 1 capital expressed as percentage of the leverage exposure measure excluding central bank reserves, in line with the PRA's Policy Statement 21/17.
(c) CET1 low points are shown before the effect of AT1 conversion.
(d) Minimum aggregate CET1 ratios are calculated by dividing aggregate CET1 capital by aggregate risk-weighted assets at the aggregate low point of the stress in 2020. Minimum aggregate Tier 1 leverage ratios are calculated by dividing aggregate Tier 1 capital by the aggregate leverage exposure measure at the aggregate low point of the stress in 2019.
(e) The minimum CET1 ratios and leverage ratios shown in the table do not necessarily occur in the same year of the stress scenario for all banks. For individual banks, low-point years are based on their post-strategic management action and CRD IV restrictions.
(f) The aggregate hurdle rate is calculated as a weighted average of hurdle rates in the aggregate low-point year.

Chart A.4 Banks' profits are projected to decrease by half during the stress

Cumulative profit before tax in baseline and stress projections[(a)]



Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) For HSBC and Standard Chartered, annual profits are converted from US dollars to sterling using exchange rates consistent with the baseline and stress scenarios, respectively.

which follow the approach adopted in 2018, are designed to be consistent with the FPC's commitment that the interaction of the IFRS 9 accounting standard and the stress-testing framework should not result in an unwarranted *de facto* increase in capital requirements.

The stress reduces banks' capital positions significantly, but the system remains above its aggregate hurdle rate…

Participating banks started the 2019 stress test with an aggregate CET1 ratio of 14.5% of risk-weighted assets and Tier 1 leverage ratio of 5.6% of total exposures.

The stress reduces banks' aggregate CET1 capital ratio to a low of 9.3% in the second year of the stress — a decrease of 5.2 percentage points — before the conversion of AT1 instruments into CET1 capital. The aggregate Tier 1 leverage ratio falls by 0.8 percentage points to a low of 4.8%. If individual banks' hurdle rates were aggregated, the UK banking sector would have cleared its indicative CET1 capital and Tier 1 leverage hurdle rates by 1.8 percentage points and 1.1 percentage points respectively at the capital low points (**Chart A.3** and **Table A.A**). The UK banking sector remains above the indicative aggregate hurdle rates in all years of the stress.

Some AT1 instruments convert into CET1 in the test. For banks' AT1 instruments currently in issue, conversion is based on a contractual definition of CET1 that excludes the benefit of transitional arrangements under IFRS 9. As two banks' CET1 capital ratios are projected to fall below 7% in the stress on this non-transitional basis, their AT1 instruments are projected to convert into CET1 (see Box 1). This increases the low-point aggregate CET1 ratio in the stress by 0.6 percentage points, to 9.9% on a transitional basis (**Chart A.3**).

…and no individual bank is required to strengthen its capital position as a result of the test.

The results of the stress test show that no individual bank falls below its hurdle rate (**Chart A.3** and **Table A.A**) after taking management actions and before converting contingent AT1 capital instruments.

Banks must conduct the test on the basis that they maintain the supply of credit to UK households and businesses in the stress, with lending to the real economy expanding by around 1.5% in total over the five years of the scenario, in line with the projected demand for credit. This reflects an important macroprudential goal of stress testing — to help assess whether the banking system is sufficiently capitalised not just to withstand the stress but also to be able to maintain the supply of credit to the real economy in the face of severe adverse shocks.

The results of the stress test incorporate a number of key judgements about what would happen if a stress were to

Box 1
The IFRS 9 accounting standard in the 2019 stress test

The 2019 ACS is the second of the Bank's annual stress tests to be conducted under International Financial Reporting Standard 9 (IFRS 9), which was introduced on 1 January 2018.

Under IFRS 9, banks set aside provisions for expected credit losses on all loans, not just where a loan is past due or has already fallen into default. Banks are therefore expected to set aside provisions to cover credit losses earlier than under the previous accounting standard, IAS 39. Under IAS 39, credit losses are recognised only once there is objective evidence a loss event has actually occurred (known as an 'incurred loss' basis). Bank staff judge that under IFRS 9 in aggregate, approximately 80% of impairments are recognised in the first two years of the five-year stress scenario, compared with 64% under IAS 39 (Box 3). However, the introduction of IFRS 9 is not judged to have materially changed the total level of impairments taken across the five years of the test.

This box sets out how the Bank takes into account the impact of IFRS 9 in the stress test, including how the ACS hurdle rate framework has been adjusted. It also shows how banks might perform in stress tests in the future, under the assumption that nothing changes in their results beyond the phasing out of the internationally agreed transitional arrangements for IFRS 9.

The Bank has taken into account IFRS 9 transitional arrangements when assessing participating banks in the 2019 ACS.

Under EU law, transitional arrangements mean that the full capital impact of IFRS 9 will be phased in over time. In 2019, banks are allowed to 'add back' CET1 equivalent to up to 85% of their 'IFRS 9-related' provisions. At the CET1 capital low point of this year's stress test in 2020, this falls to 70%. Full recognition of IFRS 9 takes effect from 2023. As set out in the March 2019 'Key elements' document, and in line with the approach taken in the 2018 test, the Bank has assessed participating banks' results taking account of these transitional arrangements.

The Bank has also adjusted the hurdle rates faced by each bank to take into account the impact of earlier loss recognition under IFRS 9.

The Bank has taken action to avoid an unwarranted *de facto* increase in capital requirements that could result from the interaction of IFRS 9 and the annual stress test. The Bank adjusted participating banks' stress-test hurdle rates in the 2018 and 2019 ACS to recognise the additional resilience provided by the earlier provisions taken under IFRS 9.

Banks' capital adequacy in the stress test is assessed by comparing their projected capital ratios in the stress to their hurdle rates. Individual banks' hurdle rates are comprised of: their Pillar 1 CET1 and Tier 1 requirements; uplifts to their CET1 minimum as set by the Prudential Regulation Authority (Pillar 2A); and any applicable global or domestic systemically important institution buffers.

The introduction of IFRS 9 has not led to an increase in the total impairments incurred by banks over the course of the stress, but has resulted in more provisions being taken earlier in the stress. Therefore IFRS 9 has led to a larger decrease in capital to the low point of the stress, compared to IAS 39. To offset the impact of banks incurring impairments earlier under the new standard, the Bank adjusts hurdle rates by subtracting the capital impact of impairments (net of transitional add-back) that have been incurred earlier due to IFRS 9 from the banks' individual hurdle rates (**Table 1**).

Table 1 Aggregate CET1 capital and Tier 1 leverage minimum requirements and hurdle rates(a)(b)

	Minimum requirements	Hurdle rate (no IFRS 9 adjustment)	Hurdle rate (with transitional IFRS 9 adjustment)
CET1 capital	6.3	7.9	7.5
Tier 1 leverage	3.25	3.81	3.69

Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) Adjusted hurdle rates are floored at banks' minimum requirements.
(b) Hurdle rates shown are those that correspond to CET1 capital and Tier 1 leverage ratio low points respectively.

The reduction in hurdle rates is subject to two constraints. First, the effect of the adjustments on system-wide capital requirements is no bigger than the impact, in aggregate, of the change in accounting standard. And second, no bank is left with a hurdle rate below its minimum CET1 capital (Pillar 1 plus Pillar 2A) and minimum Tier 1 leverage requirements.

The Bank calculates and publishes numbers on a non-transitional basis but does not assess participating banks on this basis.

Although participating banks are judged on a transitional basis, for transparency the Bank also calculates and publishes both capital low points and hurdle rates on an assumed non-transitional basis. These non-transitional numbers embed two assumptions:

- Banks' results do not change beyond the planned phasing out of the IFRS 9 transitional relief. This is unlikely to be true as the mix of participating banks' exposures will likely change over time.

- CET1 capital and Tier 1 leverage non-transitional hurdle rates include IFRS 9 adjustments made using the Bank's current approach as published in the November 2018 *Report*. The Bank is considering options for a more enduring treatment of the IFRS 9 adjustments.

Table 2 sets out the aggregate stress-test results on both the transitional and assumed non-transitional basis. The Bank does not consider either of these assumptions likely to hold in reality when the IFRS 9 transitional arrangements do phase out (see The UK bank capital framework chapter). On that basis the figures shown in **Table 2** are not a forecast of how banks will perform in future tests once the IFRS 9 transitional arrangements have phased out as planned. Further detail on individual bank results can be found in Annex 3.

The removal of the transitional arrangements will, other things equal, reduce banks' capital low points, given that they will no longer be able to 'add back' any of the CET1 related to additional impairments they recognise in the early years of the stress scenario. The aggregate CET1 capital (after the effect of AT1 conversion) and Tier 1 leverage low points fall from 9.9% and 4.8% to 8.8% and 4.2%, respectively (**Table 2**).

Reflecting this larger CET1 capital impact, when IFRS 9 transitional arrangements are fully phased out, based on the Bank's current methodology, it is assumed that banks' non-transitional CET1 capital and Tier 1 leverage hurdle rates will be set lower. The aggregate non-transitional CET1 ratio and Tier 1 leverage hurdle rates are assumed to fall to 6.7% and 3.29%, respectively.

Many banks' assumed non-transitional hurdle rates reach their CET1 capital and Tier 1 leverage minimum requirements and are not adjusted down any further. In fact, only Nationwide and HSBC's assumed non-transitional Tier 1 leverage hurdle rates are above their minimum requirements.

Because the current hurdle rate adjustment is floored at banks' minimum requirements, some banks' (Barclays and Lloyds Banking Group) non-transitional capital low points are below their Tier 1 leverage hurdle rates on the assumed non-transitional basis. The Bank's approach to taking into account the impact of IFRS 9 on a more enduring basis is currently under review (see The UK bank capital framework chapter). As explained above, this is not the basis on which the Bank has assessed the capital adequacy of participating banks.

Table 2 CET1 and Tier 1 leverage ratios at the low points and hurdle rates[(a)(b)(c)(d)(e)(f)]

Results of 2019 ACS on a transitional IFRS 9 basis
(assumed non-transitional numbers in parentheses)

	CET1 capital			Tier 1 leverage		
	Dec. 2018	Low point	2019 ACS hurdle rate	Dec. 2018	Low point	2019 ACS hurdle rate
Barclays	13.2	11.3	8.1	5.1	3.8	3.63
	(12.8)	*(9.0)*	*(7.0)*	*(4.9)*	*(3.0)*	*(3.25)*
HSBC	14.0	8.9	7.7	6.0	5.3	3.86
	(13.9)	*(8.1)*	*(6.6)*	*(6.0)*	*(4.8)*	*(3.35)*
Lloyds Banking Group	14.6	11.3	7.5	5.5	4.3	3.47
	(14.3)	*(8.9)*	*(6.9)*	*(5.4)*	*(3.0)*	*(3.25)*
Nationwide	31.7	13.1	7.9	5.0	4.8	3.57
	(31.5)	*(13.1)*	*(7.8)*	*(4.9)*	*(4.7)*	*(3.41)*
The Royal Bank of Scotland	16.2	10.3	7.2	6.2	4.7	3.56
	(16.2)	*(9.5)*	*(6.2)*	*(6.2)*	*(4.3)*	*(3.25)*
Santander UK	13.2	10.8	8.1	4.5	3.8	3.57
	(13.2)	*(10.4)*	*(7.3)*	*(4.5)*	*(3.7)*	*(3.25)*
Standard Chartered	14.2	9.0	6.9	5.6	5.1	3.55
	(14.1)	*(8.5)*	*(6.2)*	*(5.6)*	*(4.8)*	*(3.25)*
Aggregate	**14.5**	**9.9**	**7.5**	**5.6**	**4.8**	**3.69**
	(14.3)	***(8.8)***	***(6.7)***	***(5.5)***	***(4.2)***	***(3.29)***

Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
(b) The Tier 1 leverage ratio is Tier 1 capital expressed as percentage of the leverage exposure measure excluding central bank reserves, in line with the PRA's Policy Statement 21/17.
(c) CET1 low points are shown after the effect of AT1 conversion.
(d) Minimum aggregate CET1 ratios are calculated by dividing aggregate CET1 capital by aggregate risk-weighted assets at the aggregate low point of the stress in 2020. Minimum aggregate Tier 1 leverage ratios are calculated by dividing aggregate Tier 1 capital by the aggregate leverage exposure measure at the aggregate low point of the stress in 2019.
(e) The minimum CET1 ratios and leverage ratios shown in the table do not necessarily occur in the same year of the stress scenario for all banks. For individual banks, low-point years are based on their post-strategic management action and CRD IV restrictions.
(f) The aggregate hurdle rate is calculated as a weighted average of hurdle rates in the aggregate low-point year.

Box 2
Banking sector resilience in 2019

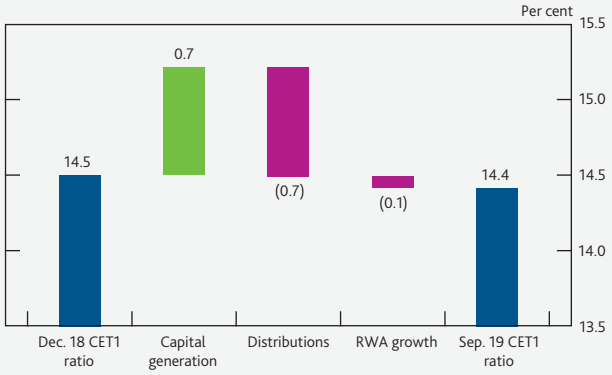
Banks' capital ratios have remained stable in 2019.

Major UK banks' capital ratios have been broadly stable since the end-2018 balance sheet cut-off date for this year's stress test (**Chart A**). In aggregate, as of September 2019 major UK banks had a common equity Tier 1 (CET1) ratio of 14.4% of risk-weighted assets (RWAs), a total Tier 1 capital ratio of 17.0% of RWAs and a leverage ratio of 5.3%.(1)(2)

The stabilisation of banks' capital positions reflects the fact that banks have now broadly reached their publicly stated capital ratio targets. This has also allowed them to balance their capital generation with distributions and RWA growth. Flexibility to adjust the level of distributions is a key element of banks' resilience, as cuts to dividends and discretionary payments can bolster banks' capital positions during a stress (Box 5).

Chart A The UK banking system is well capitalised

Changes in the major UK banks' aggregate CET1 ratio(a)(b)



Sources: Published accounts and Bank calculations.

(a) For the purposes of aggregation, HSBC and Standard Chartered financials are converted to sterling using constant FX rates.
(b) Major UK banks are Barclays, HSBC, Lloyds Banking Group, Nationwide, RBS, Santander UK and Standard Chartered.

UK banks' profitability has declined since last year…

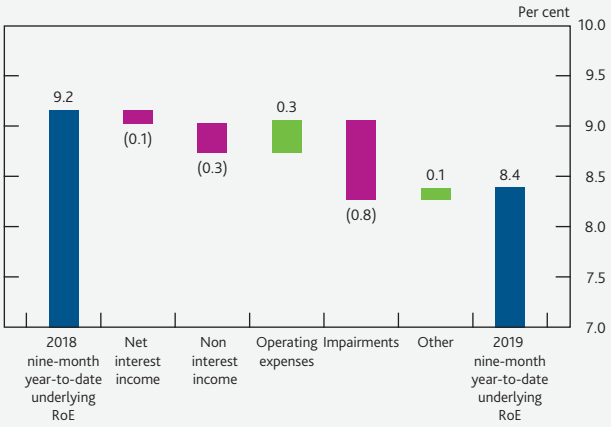
Banks' profitability influences their ability to rebuild capital following a shock while also maintaining credit supply. UK banks' statutory return on equity (RoE) decreased to 6.7% in the nine months to September 2019, from 7.2% over the same period in 2018.

Capital generation has been impacted by a further £4.5 billion of provisions relating to payment protection insurance (PPI) in banks' 2019 Q3 results, ahead of the August 2019 deadline for new complaints.

'Underlying' RoE, which strips out misconduct charges and one-time items such as restructuring costs, decreased to 8.4% in the nine months to September 2019 from 9.2% over the same period in 2018, driven by an increase in impairments and a decrease in non-interest income (**Chart B**). UK banks' aggregate impairment rate has increased to 0.29% in the year to September 2019 from 0.19% over the same period last year, largely driven by specific international and UK large corporate exposures. However, the current impairment rate remains below its long-term historical average.

Chart B UK banks' profitability has declined

Decomposition of changes in underlying RoE(a)(b)(c)



Sources: Published accounts and Bank calculations.

(a) For the purposes of aggregation, HSBC and Standard Chartered financials are converted to sterling using constant FX rates.
(b) UK banks are Barclays, HSBC, Lloyds Banking Group, RBS, Santander UK and Standard Chartered.
(c) Annualised year to date RoE is not directly comparable to full-year RoE.

…and the outlook remains subdued, which is reflected in market valuations of their equity.

Price to book ratios, which measure the market value of shareholders' equity relative to the accounting value of that equity, have remained low since the crisis. The average ratio for major UK banks is below one, reflecting concerns over expected future profitability.

UK banks' market valuations remain consistent with the relationship between price to book ratios and expected future returns on equity observed internationally (**Chart C**).

The challenge of weak profitability is also reflected in the baseline projection for profits in the 2019 ACS. Banks' profits in the first year of baseline projections are broadly in line with underlying profitability experienced so far this year.

Concerns about profitability reflect potential headwinds, including from competition in the mortgage market.

UK banks are competing aggressively on price in the mortgage market — quoted rates on mortgages and spreads over risk-free reference rates have decreased significantly since 2013.

(1) Tier 1 capital has been calculated on a Capital Requirements Regulation (CRR) end-point basis, including application of IFRS 9 transitional arrangements.
(2) The leverage ratio is a measure of bank capital that does not vary by the riskiness of assets. It is calculated based on banks' aggregate Tier 1 capital as a proportion of total exposures, excluding central bank reserves.

Chart C There is a strong positive correlation between banks' price to book ratio and expected return on equity

Price to book ratios for major global banks compared with expected one year ahead returns on equity(a)(b)

Sources: Bloomberg Finance L.P., Eikon from Refinitiv and Bank calculations.

(a) The price to book ratio relates the share price with the book, or accounting, value of shareholders' equity per share.
(b) UK banks are Barclays, HSBC, Lloyds Banking Group, RBS and Standard Chartered.

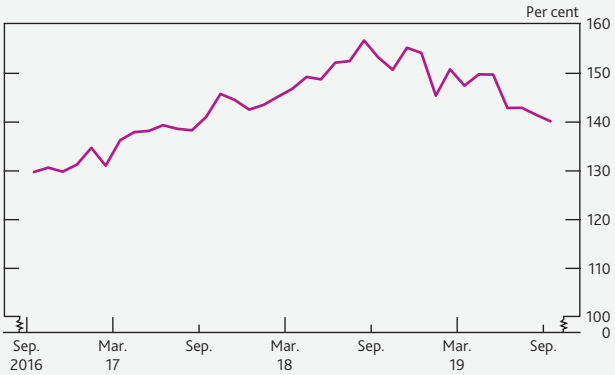
The continued compression in mortgage rates may have been driven in part by the impact of ring-fencing on mortgage competition. Ring-fenced banks (RFBs) are subject to restrictions on the type of banking activity they can undertake, and ring-fencing has increased the share of deposit funding relative to wholesale funding within RFBs.(3) Because deposits are cheaper than wholesale funding, this compositional shift results in lower 'blended' funding costs. This allows RFBs to compete more aggressively. Other factors, such as banks' strategies around their desired level of mortgage lending, are also likely to have played a role in the recent mortgage rate compression.

UK banks' liquidity positions remain strong.

At the group level, major UK banks continue to hold more than £1 trillion of high-quality liquid assets. This is more than four times the level they held before the crisis. Banks' aggregate liquidity coverage ratio (LCR) has decreased over the past year (**Chart D**). This has largely been driven by methodological changes, which resulted in banks reclassifying some deposits into higher outflow categories in the LCR calculation. Nonetheless, major UK banks continue to comfortably meet the LCR standard, which is designed to help ensure banks' resilience to short-term acute liquidity stresses.

Chart D Banks have significant liquid asset buffers

Major UK banks' aggregate level of LCR standard(a)



Sources: PRA regulatory returns and Bank calculations.

(a) Major UK banks are Barclays, HSBC, Lloyds Banking Group, Nationwide, RBS, Santander UK and Standard Chartered.

Moreover, because of supervisory actions and their own prudential risk management, major UK banking groups can withstand a loss of access to wholesale funding markets for many months. UK banks have also pre-positioned collateral at the Bank of England such that they can access over £300 billion of liquidity through the Bank's regular facilities.

Banks' liquidity positions are not tested in the ACS. However, the ongoing 2019 biennial exploratory scenario (BES) will examine the implications of a severe and broad-based liquidity stress affecting major UK banks simultaneously. The Bank intends to publish the results of this exploratory exercise in mid-2020.(4)

(3) For more information see Britton, K, Dawkes, L, Debbage, S and Idris, T (2016), 'Ring-fencing: what is it and how will it affect banks and their customers?', *Bank of England Quarterly Bulletin*, 2016 Q4.
(4) For more information see July 2019 *Financial Stability Report*, the 2019 and 2020 biennial exploratory scenarios chapter.

Table A.B Contributions to the shortfall in the aggregate CET1 capital ratio and Tier 1 leverage ratio at the low point of the stress relative to the baseline projection[a]

Percentage points (unless otherwise stated)

	CET1 ratio[b]	Tier 1 leverage ratio[c]
End-2018	**14.5%**	**5.6%**
Baseline (at CET1 capital/leverage low point)[d][e]	**14.3%**	**5.6%**
Impairments	-5.7	-1.5
of which mortgages	-1.2	-0.3
of which consumer credit	-1.4	-0.4
of which lending to businesses	-2.9	-0.8
of which other impairments	-0.2	-0.1
Traded risk losses[f]	-2.0	-0.8
Risk-weighted assets / leverage exposure[g][h]	-1.7	0.1
IFRS 9 transitional relief	1.0	0.7
Misconduct costs	-0.7	-0.2
Net interest income	1.3	0.2
of which sterling	0.4	0.0
of which non-sterling	0.8	0.1
Reductions in discretionary distributions in stress	2.2	0.4
of which dividends	1.4	0.2
of which variable remuneration	0.4	0.1
of which AT1 coupons and other distributions	0.4	0.1
Expenses and taxes[i]	0.9	0.3
Other[j]	-0.3	-0.1
Stress end low point (before AT1 conversion)	**9.3%**	**4.8%**
Impact of AT1 conversion	0.6	0.0
Stress end low point (after AT1 conversion)	**9.9%**	**4.8%**

Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) The CET1 ratio aggregate low point is in year 2. The Tier 1 leverage ratio aggregate low point is in year 1.
(b) The CET1 ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets (RWAs), where both terms are defined in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
(c) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves in line with the PRA's Policy Statement 21/17.
(d) The baseline low point refers to the equivalent baseline position at the stressed low point.
(e) The Bank anticipates major UK banks will maintain broadly stable capital ratios over the coming years. Banks' corporate plans reflect this view but include, in aggregate, lower risk weights associated with planned changes to their risk weight models. These planned models changes are not factored into banks' baseline and stress projections, in line with the Bank's stress-test methodology. Also, the Bank's stress-testing methodology does not permit banks to reduce their baseline dividends to meet a target CET1 capital ratio unless this is their explicitly stated policy. Therefore, some banks planning RWA model changes see their capital ratios fall in their baseline projections because these model changes are excluded and there is no offsetting cut in dividends. For ease of comparison, Bank staff have adjusted the baseline projected CET1 and Tier 1 leverage ratios at the respective capital low points upwards by 0.5 and 0.1 percentage points respectively to take account of this fall in baseline capital positions driven by the Bank's stress-testing methodology. The effect of this adjustment has been reflected in the residual 'other' item.
(f) Traded risk losses comprise: market risk losses, counterparty credit risk losses, losses arising from changes in banks' fair value adjustments, prudential valuation adjustments (PVA) and losses on fair value positions not held for trading. This also includes investment banking revenues net of costs.
(g) Changes in RWAs impact the CET1 ratio, whereas changes in the leverage exposure measure impact the Tier 1 leverage ratio.
(h) To produce aggregate results in a single currency, the Bank converts the results of US dollar reporters HSBC and SCB into sterling. This aggregation is done on a dynamic exchange rate basis, i.e. based on the exchange rate paths specified in the scenario, except for the row showing the contribution of changes in 'risk-weighted assets/leverage exposure'. For this row alone, the impact is calculated on a constant exchange rate basis, ie based on exchange rates prevailing at the start of the test. The rationale is that given the large depreciation in sterling in the stress, showing these impacts on a dynamic exchange rate basis would suggest a larger than warranted impact from increasing RWAs/exposures. On the alternative dynamic exchange rate basis, the RWA impact would have been -3.9 percentage points and the leverage exposure impact would have been -0.7 percentage points. The aggregate low points are unaffected by this presentational choice.
(i) Expenses comprise administrative and staff expenses, excluding variable remuneration which is included in reductions in discretionary distributions.
(j) 'Other' comprises other profit and loss and other capital movements. Other profit and loss includes share of profit/loss of investment in associates, fees and commissions and other income. Other capital movements include pension assets devaluation, prudential filters, accumulated other comprehensive income, IRB shortfall of credit risk adjustments to expected losses, and actuarial gain/loss from defined-benefit pension schemes.

materialise. These judgements inform adjustments Bank staff make to the participating banks' projections (see Box 3).

The deterioration in banks' capital positions reflects a large decrease in profits during the stress.

Banks' profitability has been subdued in recent years and this continues in the early years of the 2019 ACS baseline projections.[1] In this period, profitability is weak relative to long-term averages, with banks earning an average underlying return on equity of around 7.5% in year one of the baseline — consistent with their currently low ratios of market valuation to book valuation (see Box 2).[2]

In the five years of the stress scenario, banks are projected to earn £118 billion in profit before tax, roughly half the projected baseline profit. In the first year of the stress, they make a loss of £77 billion, and banks only return to a cumulative profit after the third year of the stress (**Chart A.4**).

The key sources of reduction in banks' capital and profitability are more strongly weighted towards impairments and traded risk losses, as misconduct costs continue to recede.

A number of factors reduce banks' capital positions during the stress, with other factors cushioning the impact of the stress. Credit impairments and traded risk losses are key factors reducing banks' capital, while net interest income (NII) and banks cutting distributions are key factors cushioning the impact of the stress (**Table A.B**).

The 2019 stress leads to a slightly smaller reduction in banks' CET1 capital ratios than in the 2018 ACS, and the balance of different drivers' contribution to the reduction has shifted (**Table A.C**). Specifically, misconduct costs are lower than in the 2018 test and non-sterling interest income is higher. In the other direction, loan impairments and traded risks losses are higher, and banks receive less benefit from IFRS 9 transitional relief at the capital low point of the 2019 ACS due to the planned phasing out of these arrangements (see Box 1). Further details on the main drivers of the stress impact are set out below.

Banks incur impairment charges of £151 billion over the five years of the 2019 stress, slightly higher than in the 2018 test.

Impairments reduce the aggregate CET1 capital ratio by 5.7 percentage points (**Table A.B**). Over the five years of the stress, banks incur impairment charges totalling around £151 billion, which translate to an aggregate impairment rate on their loans of 4.5%. Impairments are higher than in the 2018 stress test, where they totalled £143 billion (an impairment rate of 4.3%).

(1) The baseline scenario is based on a macroeconomic scenario in line with the Bank's February 2019 *Inflation Report* forecast. Staff have adjusted banks' baseline scenario projections to ensure they take account of expected headwinds to profitability, so these will also be reflected in banks' stress projections.
(2) Staff estimate. Underlying return on equity (RoE) calculated before the impact of restructuring and other one-off items.

Box 3
Key judgements underpinning the 2019 ACS results

A wide range of judgements about what would happen in the stress scenario underpin the results of the 2019 ACS. This box summarises the most significant of these judgements, and explains the rationale for taking them, to provide greater transparency around the way the FPC and PRC approach the stress test and assess key risks. It also illustrates the sensitivity of the aggregate CET1 capital ratio at the low point of the stress to these judgements.

The Bank makes adjustments to the participating banks' submitted results, many of which relate to the key judgements set out in **Table 1**. In the 2019 ACS, as in previous years, the Bank made adjustments to participating banks' submitted projections for their capital ratios in the stress scenario. In the 2019 test, these adjustment decreased the projected CET1 capital ratio at the low point by around 100 basis points.

Table 1 Key judgements underpinning the 2019 ACS results and the sensitivity of the stressed aggregate CET1 capital ratio at the low point to these judgements

Judgement applicable to the 2019 ACS	Sensitivity of the stressed aggregate CET1 capital ratio low point to the judgement
The severity of the UK stress scenario and the increase in the size of the buy-to-let sector lead projected **UK mortgage impairment rates** in the stress to be higher than in the global financial crisis. In the 2019 ACS the projected two-year mortgage impairment rate is 1.6% compared with 0.5% in the global financial crisis.(a)	A 1 percentage point increase in the UK mortgage impairment rate would reduce the aggregate CET1 capital ratio by 39 basis points.
Historically, **UK consumer credit impairment rates** have tended to move in line with UK unemployment, and the Bank expects this relationship to hold during the stress. In the 2019 ACS, the unemployment rate peaks at 9.2% and the projected two-year consumer credit impairment rate is 18.5%, compared to a peak unemployment rate of 8.4% and two-year consumer credit impairment rate of 16.0% during the global financial crisis.(a)	A 1 percentage point increase in the UK consumer credit impairment rate would reduce the aggregate CET1 capital ratio by 4 basis points.
UK corporate impairments are higher in the stress than the global financial crisis. This reflects: the higher path of Bank Rate; assumptions around individual large counterparty defaults in stress; and weaker standards in leveraged lending. In the 2019 ACS, the projected two-year impairment rate is 8.5% compared with 6.9% in the global financial crisis.(a)	A 1 percentage point increase in the UK corporate credit impairment rate would reduce the aggregate CET1 capital ratio by 9 basis points.
The IFRS 9 accounting standard requires losses to be taken on an expected, rather than incurred basis. This change leads to around 80% of projected credit losses occurring in the first two years of the stress under IFRS 9, compared to around 64% under IAS 39. Box 1 provides further information about IFRS 9 in the 2019 stress test.	Every 1 percentage point increase in the proportion of credit losses taken in the first two years of the stress reduce the aggregate CET1 capital ratio by 6 basis points.
The increase in Bank Rate and the rise in long-term interest rates in the stress allows banks to widen **net interest margins**. In the 2019 ACS, banks pass through 80% of the increase in Bank Rate to sterling household deposit rates. This is in line with historical pass-through rates following episodes of significant monetary policy tightening and is higher than the pass-through rates observed following recent rises in Bank Rate.	A 5 percentage point increase in the sterling deposit pass-through rate would reduce the aggregate CET1 capital ratio by 5 basis points.
Accounting rules for misconduct require provisions to be made only once settlement is considered probable and where a reliable estimate of the settlement amount can be made. The ACS includes **stressed projections for £13 billion of misconduct costs**, which have a low likelihood of being exceeded. These should exceed accounting provisions.	If the stressed misconduct projection was £1 billion higher at the capital low point, the aggregate CET1 capital ratio would reduce by 5 basis points.
Banks are permitted to take **plausible strategic management actions**, cushioning the impact of the stress. Box 5 provides further information on cuts to distributions.	If banks cut distributions by an additional 1 percentage point at the capital low point, the aggregate CET1 capital ratio would increase by 2 basis points.

(a) For comparison, global financial crisis impairment rates have been adjusted to reflect the impact of the introduction of IFRS 9.

Table A.C Contributions to the shortfall in the aggregate CET1 capital ratio at the low point relative to the baseline in the 2019 and 2018 ACS[a]

Percentage points (unless otherwise stated)

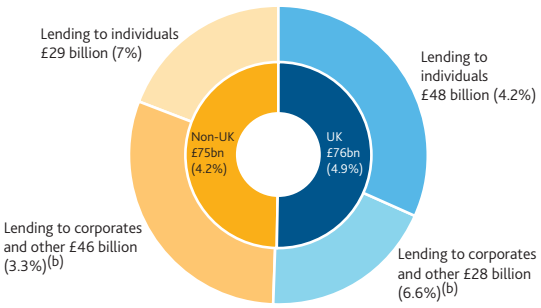
	CET1 ratio[b]	
	2019 ACS	2018 ACS
End-2018/2017	**14.5%**	**14.5%**
Baseline (at CET1 capital)[c][d]	**14.3%**	**14.3%**
Impairments	-5.7	-5.4
of which mortgages	-1.2	-1.2
of which consumer credit	-1.4	-1.5
of which lending to corporates	-2.9	-2.6
of which other impairments	-0.2	-0.1
Traded risk losses[e]	-2.0	-1.7
Risk-weighted assets[f][g]	-1.7	-1.7
IFRS 9 transitional relief	1.0	1.3
Misconduct costs	-0.7	-1.0
Net interest income	1.3	0.7
of which sterling	0.4	0.3
of which non-sterling	0.8	0.4
Reductions in discretionary distributions in stress[h]	2.2	2.3
of which dividends	1.4	1.5
of which variable remuneration	0.4	0.5
of which AT1 coupons and other distributions	0.4	0.2
Expenses and taxes[i]	0.9	0.6
Other[j]	-0.3	-0.2
Stress end low point (before AT1 conversion)	**9.3%**	**9.2%**
Impact of AT1 conversion	0.6	0.5
Stress end low point (after AT1 conversion)	**9.9%**	**9.7%**

Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) See footnote (a) to Table A.B.
(b) See footnote (b) to Table A.B.
(c) See footnote (d) to Table A.B.
(d) See footnote (e) to Table A.B.
(e) See footnote (f) to Table A.B.
(f) Prudential valuation adjustments (PVAs) as included in the traded risk loss include fair value adjustments, these fair value adjustments were erroneously not included in the 2018 traded risk loss and are restated on the correct basis in this table.
(g) Changes in RWAs impact the CET1 capital ratio.
(h) See footnote (h) to Table A.B. This represents a change in methodology relative to 2018 ACS report, published in the November 2018 *Financial Stability Report*. The 2018 results in this table are calculated using the updated methodology.
(i) See footnote (i) to Table A.B.
(j) See footnote (j) to Table A.B.

Chart A.5 Projected stressed impairment charges are split roughly evenly between UK and non-UK exposures

Aggregate cumulative impairment charges (and rates) over the five years of stress[a]



Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) Cumulative impairment charge rates = (five-year total impairment charge)/(average gross on balance sheet exposure), where the denominator is a simple average of 2018, 2019, 2020, 2021 and 2022 year-end positions.
(b) 'Other' includes loans to financial institutions and sovereigns.

The increase is also attributable to a more granular analysis of banks' leveraged lending exposures. Bank staff have gathered more detailed data to enhance their analysis on risks arising from the banks' leveraged lending activity (typically loans to non-investment grade firms that are highly indebted or are owned by a private equity sponsor). Over the five years of the stress, banks incur £9 billion of impairments on their leveraged lending loan book which they retain on their balance sheets.

Impairments on leveraged lending account for just under 13% of banks' total impairments on corporate lending. At the two year CET1 capital low point, that translates to a 0.3 percentage point reduction in the banks' aggregate capital position. For more detail on banks' leveraged lending exposures and how they perform in the 2019 ACS, see Box 4.

Roughly half of banks' impairment charges in the stress are related to exposures to UK counterparties…

Impairments on UK exposures accounts for around half of all impairments incurred on banks' exposures in the 2019 ACS (**Chart A.5**), in line with the share of UK lending in banks' global credit exposures. Just under two thirds of impairments on UK exposures are incurred on lending to individuals (mortgages and consumer credit), with the rest made up of lending to corporates (**Table A.D**).

Relative to the 2018 test, UK mortgages account for a smaller proportion of impairments, consistent with the low proportion of highly-indebted mortgage holders in the UK (see UK household indebtedness chapter).

The impairment rate on consumer credit is similar to that in the 2018 ACS, and its relationship with the projected unemployment rate in the stress is in line with the historic average (**Table A.D**). The higher overall consumer credit impairment charges in the 2019 ACS are therefore due to banks projecting larger exposures to consumer credit than in the 2018 test.

Impairment rates on lending to corporates are slightly higher in the 2019 ACS than they were in the 2018 test (**Table A.D**). This is consistent with a deterioration in asset quality as shown by a small uptick in the proportion of debt owed by UK corporates with an interest coverage ratio of less than 2.5 and a smaller proportion of UK corporate exposures of banks being considered as investment grade (**Chart A.6**).

…and the other half relates to non-UK exposures.

Lending to corporates accounts for around 60% of banks' overall impairments on non-UK lending, despite representing only around 40% of non-UK exposures.

The impairment rate and total impairment charges on non-UK lending increased compared to the 2018 test, with an increase in impairments on lending to non-UK corporates more than

Table A.D Impairments on both UK and non-UK exposures have increased compared to the 2018 test

Aggregate cumulative impairment charges and rates over the five years of the stress[a]

Per cent

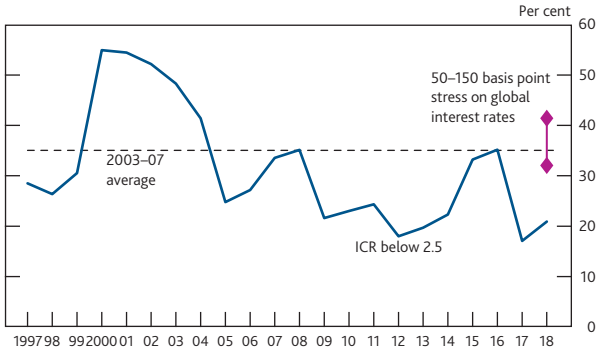
	2019 ACS		2018 ACS[b]	
	Charge (£ billion)	Rate (per cent)	Charge (£ billion)	Rate (per cent)
UK lending to corporates[c]	**27.3**	**9.5**	**25.2**	**8.6**
of which leveraged lending	3.2	–	–	–
UK lending to individuals	**47.8**	**4.2**	**46.4**	**4.2**
of which UK consumer credit	31.2	27.8	29.4	27.6
of which UK mortgages	16.6	1.6	17.0	1.7
Total UK	**76.2**	**4.9**	**73.7**	**4.7**
Non-UK lending to corporates[c]	**43.2**	**6.2**	**37.5**	**5.8**
of which leveraged lending	5.8	–	–	–
Non-UK lending to individuals	**28.6**	**7.0**	**30.0**	**7.4**
Total non-UK	**74.5**	**4.2**	**69.8**	**4.0**

Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) Cumulative impairment charge rates = (five-year total impairment charge) / (average gross on balance sheet exposure), where the denominator is a simple average of 2018, 2019, 2020, 2021 and 2022 year-end positions.
(b) Due to the change in methodology around measuring leveraged lending losses, 2018 ACS data are not comparable and are therefore not displayed.
(c) Does not include other wholesale lending.

Chart A.6 The share of debt held by firms with low interest coverage ratios (ICRs) is low by historical standards

The share of debt owed by corporates with interest coverage ratios less than 2.5[a][b]

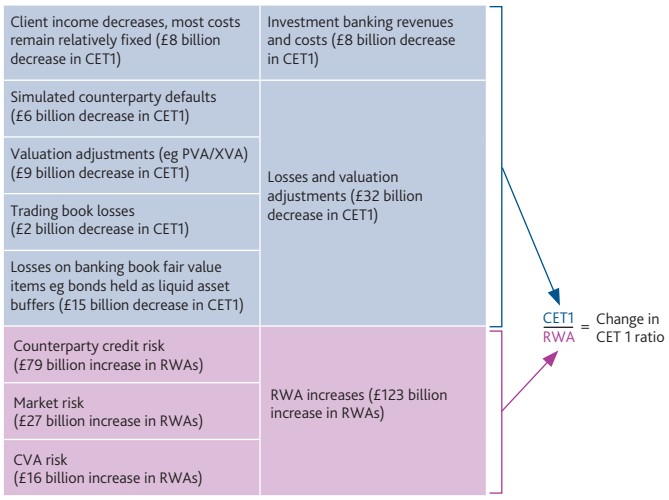


Sources: LCD, an offering of S&P Global Market Intelligence and Bank calculations.

(a) Interest coverage ratio is calculated as the three-year moving average of earnings before interest and tax as a share of interest expenses and interest capitalised.
(b) The sample includes non-financial corporates, outside of those engaged in real estate, oil, gas and mining, and for each year, includes only those companies that were listed at that point in time.

Chart A.7 The traded risk scenario impacts on banks' CET1 ratios through three channels

Change to banks' projected capital positions and RWAs in the first year of the 2019 stress, relative to the base



Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

offsetting a decrease in impairments on lending to non-UK individuals.

The increase in the impairment rate on non-UK businesses lending was spread across banks' global portfolios, and is in line with the more severe global stress scenario. These impairments also include those incurred on banks' non-UK exposures to leveraged lending (see Box 4).

Conversely, the impairment rate on lending to non-UK individuals is lower than in the 2018 test (**Table A.D**). This is almost entirely driven by the decreasing impairment rate on consumer credit, which is a result of banks moving away from riskier tranches of non-UK credit card lending.

The traded risk scenario reduces banks' capital by around £41 billion in the first year of the stress.

The test includes sharp falls in a range of asset prices, including a 30% decrease in the sterling-dollar exchange rate, a fall of more than 50% in the S&P 500; an 18% decline in US collateralised loan obligation (CLO) prices; and significant rises in volatility and in global term premia. These lead to a reduction in banks' CET1 capital ratios through three main channels: lower investment banking income; losses and valuation adjustments; and an increase in RWAs (**Chart A.7**).

Relative to the baseline, the traded risk scenario reduces banks' capital positions by £41 billion in the first year of the stress. The largest source of capital loss comes from reductions in the fair value of items held on banking books, such as bonds held as part of banks' liquid asset buffers and strategic equity investments (**Chart A.7**). The traded risk scenario also increases projected RWAs by £123 billion in the first year of the stress relative to the baseline. More detail on how RWAs evolve during the stress scenario can be found below.

In the 2019 ACS, the traded risk scenario reduces the aggregate CET1 capital ratio at the low point by 2 percentage points, 0.3 percentage points more than in the 2018 test (**Table A.C**). This is mostly driven by a larger decrease to investment banking revenue compared to the 2018 test.

Despite the recent increase in PPI claims, headwinds from stressed misconduct projections were lower in the 2019 ACS than in the 2018 test.

Banks are only required to make provisions for misconduct redress costs where an obligation exists, once settlement is considered probable, and a reliable estimate of the settlement amount can be made.

The ACS includes a projection of stressed misconduct costs for known misconduct issues beyond existing provisions.

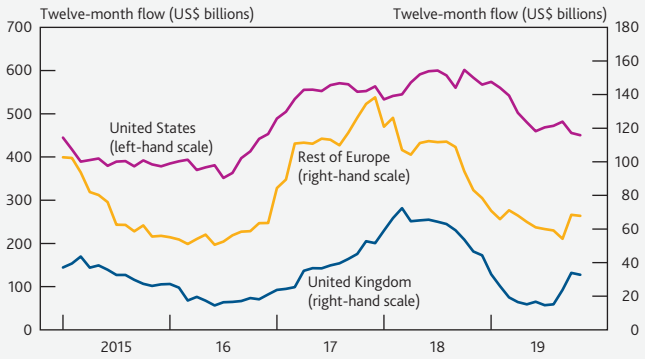
Box 4
Leveraged lending

The stock of leveraged loans has risen further to a new all-time high.

The stock of global leveraged loans (typically loans to non-investment grade firms that are highly indebted or are owned by a private equity sponsor) has reached US$3.4 trillion and now represents around 11% of total advanced-economy credit to non-financial companies.(1) While global gross issuance has slowed in 2019, it still remains at 2015–16 levels (**Chart A**).

Chart A Growth in the global leveraged loan market has slowed this year with a recent pickup in the UK

Twelve-month rolling global issuance of leveraged loans(a)



Sources: LCD, an offering of S&P Global Market Intelligence and Bank calculations.

(a) Based on public syndication transactions, and excluding private bilateral deals.

The majority of the stock resides within large international banks, although UK banks account for just four percent of the market.

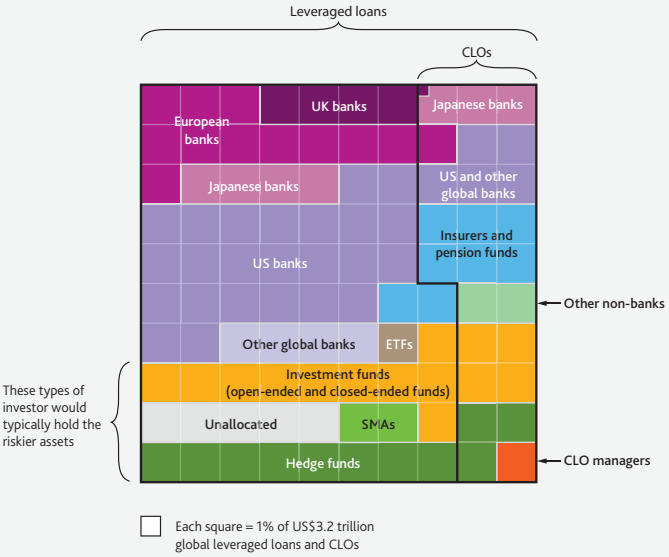
As at end-2018, global banks had exposures to over half of the leveraged loan market through credit exposures retained on balance sheet and collateralised loan obligation (CLO) holdings (**Chart B**).(2)(3) Major UK banks represent around 4% of the market.

Global exposures are concentrated in a subset of the most active global systemically important banks in the market. Exposures for these banks on average equate to approximately 60% of CET1 capital. Most of the credit exposures are in the form of revolving credit facilities (effectively corporate overdrafts) and, to a lesser extent, holdings of term loans. Banks also take contingent market risk exposure for loans being originated and distributed to third party investors ('pipeline' exposures) and have CLO exposures (for market-making or as part of treasury portfolios).

The stock of leveraged loans has grown by 30% since 2015. This has been driven by investors searching for yield given expectations of higher interest rates (though this has recently

Chart B A material share of the overall leveraged loan market is held by global banks

Indicative estimate of leveraged loans and CLOs outstanding globally by investor type(a)(b)(c)(d)



Sources: Association for Financial Markets in Europe (AFME), bank public disclosures, Bloomberg Finance L.P., FCA Alternative Investment Fund Managers Directive (AIFMD), Financial Stability Board (FSB), LCD, an offering of S&P Global Market Intelligence, private supervisory data, Morningstar, Securities and Exchange Commission (SEC), Securities Industry and Financial Markets Association (SIFMA) and Bank calculations.

(a) 1 square = 1% of US$3.2 trillion global leveraged lending market, data as of end-2018.
(b) Individual holdings estimates combine Bank of England estimates from the July 2019 Financial Stability *Report* with new data published in the forthcoming FSB December 2019 report 'Vulnerabilities associated with leveraged loans and CLOs'.
(c) Other non-banks includes the FSB's estimates of the CLO holdings of US 'other financial organisations' and US 'other non-financial organisations'.
(d) For further details please see footnotes (a)–(f), (h) associated with Chart F.7 in the July 2019 Financial Stability Report.

reduced) and high availability of funding and competition for loan mandates by arranging banks. These factors have also reduced lending standards.

Global banks and other lenders continue to face elevated credit risk to highly indebted corporates…

Corporates in the global leveraged loan market are increasingly indebted with a average reported debt to Earnings Before Interest, Taxes, Depreciation and Amortisation (EBITDA) ratio of around 5.4x on newly originated loans in 2019.(4) This is higher than the 5.0x peak before the financial crisis.

As outlined in the July 2019 *Report*, indebtedness of highly leveraged corporates can be understated. Add-backs and subsequent borrowing are typically not fully captured in commonly used market data sources that track the market.(5) Stripping out these add-backs would increase average leverage

(1) Around US$0.4 trillion of undrawn revolving credit facilities within this figure are excluded when calculating the estimate as a share of total advanced-economy credit for consistency.
(2) This is primarily revolving credit facilities measured on a fully drawn basis and loans as retained by the banks.
(3) CLOs are asset-backed securities issued by a special purpose vehicle which acquire a portfolio of leveraged loans.
(4) All references to 'corporates' and market trends in this box refer to the global leveraged lending market.
(5) 'Add-backs' are adjustments which assume potential future earnings improvements are realised. This may further overstate EBITDA and, therefore, understate leverage.

to between 6–7x EBITDA. Recent research shows that most of the planned synergies or cost savings used to justify add-backs in deals originated in 2015 and 2016 missed targets by at least 25% in 55%–65% of deals over a two-year time span.(6)

Increases in leverage had little effect on interest coverage given falling borrowing costs. However, since 2017 interest coverage ratios on new deals have fallen from an average of 4.0x to currently around 3.3x.

…and lending conditions are accommodative.

In addition to understated leverage, documentation standards continue to be weak. The share of new global loans with no maintenance covenants remains around 60%. The vast majority of loan documents now include deductibles which allow corporates to undertake additional activity such as raising additional debt which previously may have been restricted. Other traditional investor protections have weakened due to changes in loan documentation and deals having fewer subordinated debt instruments that can absorb losses before loans are impacted. Altogether, these developments will increase losses in a downturn.

The most active major UK banks were stressed on their direct and indirect exposures in the 2019 ACS.

Given these trends, Bank staff have gathered better data and have enhanced their analysis on risks arising from UK banks' leveraged lending activity. The most active ACS banks (banks with material leveraged lending operations in advanced economies) reported total exposures — across the hold book, pipeline and CLO exposures — of £90 billion. This represents 47% of these banks' CET1 capital. Most of the exposures were originated in 2017–18 during the post crisis peak of new issuance in the market. Total projected losses on these exposures in the 2019 ACS were estimated to be £9.7 billion (a loss rate of 11%) at the two-year scenario low point. That is equivalent to a 0.4 percentage point decrease in aggregate CET1 capital ratio.

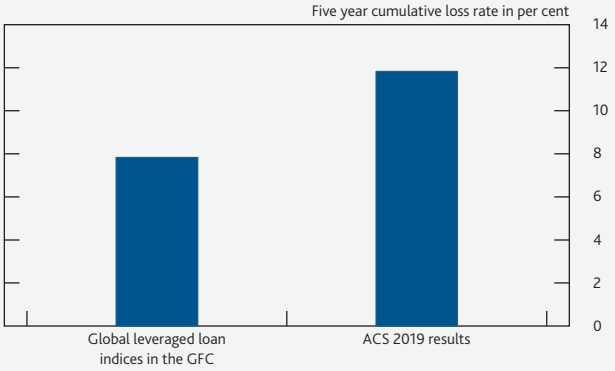
Loan book exposures were stressed to a greater severity than the financial crisis given weaker underwriting standards and the magnitude of the scenario.

The loan book of these ACS banks' exposures totalled £76 billion in aggregate (39% of CET1) at the start of the stress.(7) Most of these exposures are in the form of revolving credit facilities. During downturns, corporates increase their usage of credit lines thereby increasing the exposures at risk of default. In the ACS drawdown rates are assumed to be at least as severe as previous periods of stress.(8)

In the 2019 ACS, the projected cumulative five-year stressed credit impairment rate is 12% for these banks' leveraged lending loan books, relative to their loan book exposures at the start of the scenario. By comparison, actual aggregate impairment rates on US and European leveraged loans in the financial crisis were 8% (**Chart C**). The 4 percentage point difference is accounted for by the fact that UK interest rates rise sharply in the 2019 stress scenario and likely stressed rates of loss given default are judged to have risen reflecting looser underwriting standards since the financial crisis.(9)

Chart C Loan book exposures had a higher cumulative impairment rate, accounting for the weaker market compared to the financial crisis

Banks' aggregate five-year cumulative impairment rates compared with observed impairment rates of the leveraged loan market during the global financial crisis (GFC)



Sources: LCD, an offering of S&P Global Market Intelligence and Bank calculations.

The 12% projected aggregate loss rate in the 2019 ACS equates to around £9 billion of losses over the five years of the stress, just under 13% of total corporate losses. At the two-year capital low point, these losses are £7.7 billion and reduce aggregate CET1 capital by 0.3 percentage points.

The ACS includes a stress on banks' exposures to CLOs and pipelines of loans.

ACS banks' pipelines of loans originated to distribute amounted to £11 billion at the start of the 2019 ACS, representing 6% of CET1 capital. Loans are assumed to be stuck on banks' balance sheets following market disruption at the start of the scenario and then subject to asset price falls incorporated in the 2019 traded risk scenario (see **Table 1**). The shocks included in the stress scenario range from 34%–41%. The peak shocks are slightly more severe than the 36% shock observed during the global financial crisis, reflecting deterioration in lending standards.

(6) On a median basis, actual reported net leverage was close to two turns higher than management forecasts for 2017 (the first full-year performance since syndication), growing to 2.5 turns in the second year — see *S&P When The Cycle Turns: The Continued Attack Of The EBITDA Add-Back, September, 2019*.
(7) Measured on an exposure at default basis, as modelled by banks' expected usage of committed facilities by corporates in a stress.
(8) An average of 80% drawdown was estimated based on usage of credit facilities just before default by leveraged corporates since 1999. This results in loan book exposures increasing to around £90 billion in the ACS.
(9) Which will increase interest payments on these (largely unhedged) floating rate instruments.

Table 1 The traded risk scenario published price paths for leveraged lending and CLOs

Region	Index	One year
US	S&P LLI price index	-40%
	S&P LLI BB price index	-34%
Europe	S&P ELLI price index	-41%
	S&P ELLI BB price index	-35%
US	JP Morgan AAA CLO price index	-18%

Source: Bank of England.

This leads to a projected aggregate gross loss rate of 32% on pipeline loans in the first year of the test. Banks benefit from some recovery in asset prices in the second year of the scenario and some firms employ hedges on their traded risk portfolios, which reduce the net mark-to-market loss rate to 17% over two years. That translates to £1.9 billion of losses, reducing banks' aggregate CET1 capital ratio by 0.1 percentage points.

The major UK banks have very limited CLO related exposures, around £3 billion in aggregate. These are tested against the CLO price paths in the traded risk scenario and projected losses amount to £0.2 billion at the two-year capital low point.

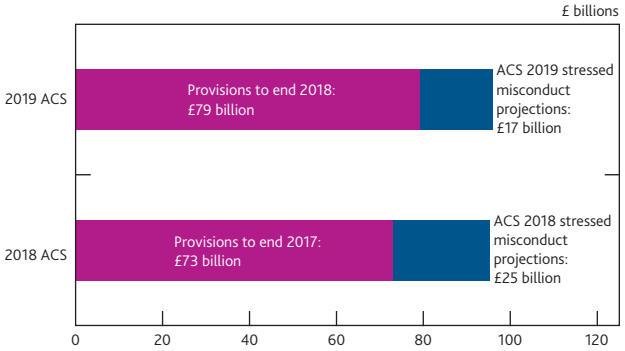
Overall, losses on leveraged loans reduced major UK banks' aggregate capital by £9.7 billion at the capital low point in the 2019 ACS.

The FPC and PRC continue to monitor closely the underwriting standards of UK banks originating leveraged loans and the risks posed to UK financial stability. The Bank is also working with international regulators to better understand the interconnectedness of the global leveraged loan market and the related macro and financial system implications.(10)

(10) Forthcoming FSB December 2019 Report 'Vulnerabilities associated with leveraged loans and CLOs'.

Chart A.8 A greater proportion of banks' overall misconduct costs have already been provisioned for

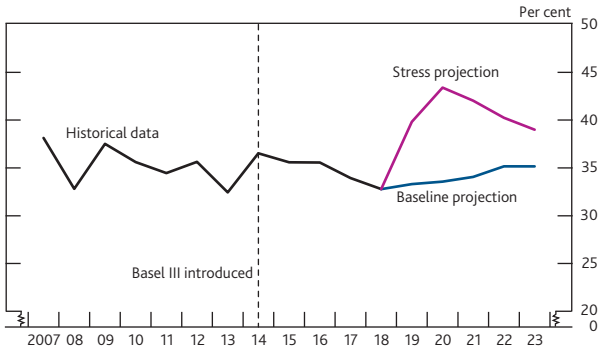
Provisions for historic misconduct costs and five year stressed projections of future misconduct costs



Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

Chart A.9 Aggregate risk weights have decreased since the period immediately before the global financial crisis

Participating banks' historic and projected aggregate risk weights(a)

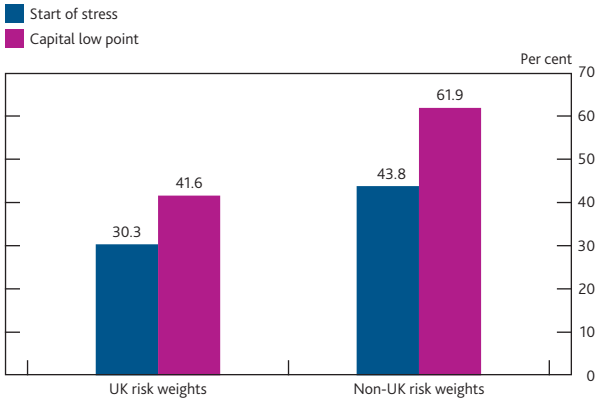


Sources: Banks' published accounts and related public disclosures, PRA regulatory returns, participating banks' STDF data submissions, Bank analysis and calculations.

(a) For the period from 2007–11, the aggregate risk weight is defined as RWAs divided by Total Balance Sheet Assets. For the period from 2012–15, the aggregate risk weight is defined as RWAs divided by the Basel III leverage exposure measure, and from 2016 it is defined as RWAs divided by the UK leverage exposure measure (excluding certain central bank reserves). RWAs are defined using the prevailing regulatory standard at each date.

Chart A.10 Average credit risk weights on non-UK exposures grow more sharply than credit risk weights on UK exposures

Risk weights on UK and non-UK exposures



Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

Bank staff target a high level of confidence that banks will settle at or below the stressed misconduct projections.(1)

In the 2019 ACS, the aggregate stressed projection for misconduct costs over and above that incurred or provided for at end-2018 is around £17 billion over the five years of the stress. Around £13 billion of these are costs realised in the first two years of the stress. Stressed projections reflect the recent surge in PPI information requests related to the FCA's August 2019 final deadline for making a claim and the claims these could reasonably lead to (Box 2). Even accounting for this rise in PPI information requests, the projected stressed misconduct costs in ACS 2019 are £8 billion lower than those from the 2018 test.

In total, banks face a similar level of overall misconduct costs comparing the 2019 and 2018 tests. But a larger proportion of these costs have already been provisioned for in the 2019 ACS (**Chart A.8**).

Rising risk-weighted assets also reduce banks' CET1 ratios.

By the CET1 capital low point of the stress, aggregate RWAs rise by 28%. This is primarily driven by a sharp increase in banks' aggregate risk weights in the stress scenario (**Chart A.9**). The increase in aggregate risk weights is largely associated with banks' credit exposures.

Risk weights on non-UK exposures start from a higher position and rise more sharply than risk weights on exposures to UK counterparties (**Chart A.10**). The higher non-UK starting risk weights reflect the fact that banks' non-UK lending is more heavily weighted towards corporate loans, which tend to have higher risk weights than lending to individuals on average.(2) Additionally, over the course of the stress, the share of exposures to non-UK corporate lending as a proportion of all non-UK exposures increases, reflecting a rise in corporate drawings of 38% in the stress.

Despite the further observed squeeze in banks' sterling net interest margins since the previous ACS, sterling net interest income is slightly higher in the 2019 ACS.

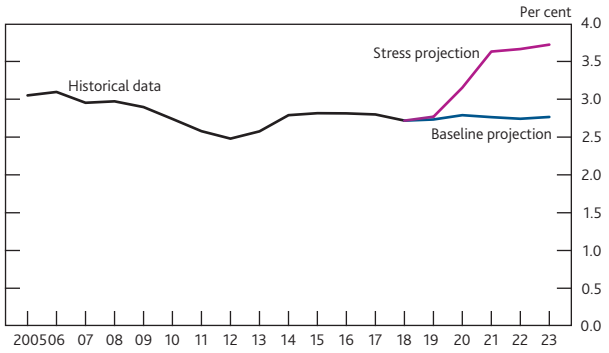
Banks earn net interest income (NII) by receiving higher interest on assets, like loans, than they pay out on liabilities, like deposits. Total NII earned by banks is the product of the net interest margin (NIM) they earn on interest bearing assets and the volume of these assets the bank has available.

In recent years, downward pressure on mortgage margins has depressed sterling loan margins and NII as UK banks have competed aggressively on price in the mortgage market

(1) The stressed projections have been calibrated by Bank staff to have a low likelihood of being exceeded. For example, where an accounting provision has not been raised and current evidence is insufficient to reliably quantify liabilities that may exist, a confidence level of 90% of settling at or below the stressed projection has been targeted.
(2) Including other wholesale lending.

Chart A.11 Sterling loan margins have been depressed but widen in the stress

Sterling loan margins in the 2019 ACS[a]

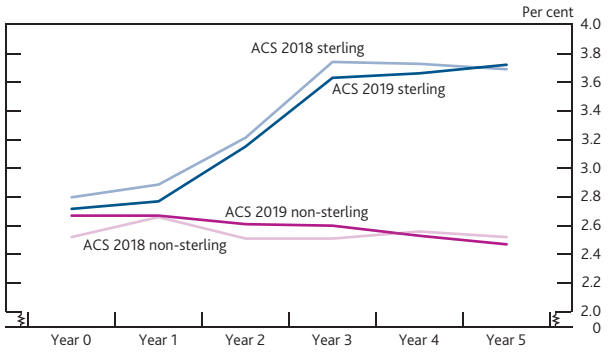


Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) Sterling loan margin calculated as net interest income received on sterling loans minus that paid on deposits divided by sterling loans.

Chart A.12 Sterling loan margins are broadly below 2018 ACS levels, while non-sterling loan margins are broadly above 2018 levels

Sterling and non-sterling loan margins in the 2019 and 2018 ACS[a][b]



Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) Sterling loan margin calculated as net interest income received on sterling loans and minus that paid on deposits divided by sterling loans.
(b) Non-sterling loan margin calculated as net interest income received on non-sterling loans and minus that paid on deposits divided by non-sterling loans.

(**Chart A.11**) (see UK household indebtedness chapter). This continues a trend of sterling loan margins generally decreasing since the period immediately before the financial crisis. As a result, sterling loan margins start the 2019 ACS at a lower level than the 2018 test (**Chart A.12**).

Overall, sterling loan margins widen in the stress compared to the baseline (**Chart A.11**). In large part, this is driven by banks' ability to reinvest their non-interest bearing liabilities (such as zero-interest current account balances and equity) in assets on which yields go up in the stress. For example, the yield on 10-year UK government bonds increases by 5.45 percentage points to the capital low point of the stress.

However, the extent to which banks' could expand margins would be limited by factors such as customer behaviour and competitive pressures. The Bank assesses banks' margin projections to ensure their assumptions are plausible in this context. For example, Bank staff judge that in aggregate banks would pass on 80% of the assumed rise in Bank Rate to sterling depositors, and that customers would switch away from non-interest bearing current accounts in the stress scenario (see Box 3).

Although sterling loan margins increase in the 2019 stress, they are lower at the capital low point of the 2019 stress than they were at the 2018 stress low point. This reflects the lower starting point for sterling loan margins in the 2019 ACS. But banks' sterling balances are around 3% higher than in the 2018 stress by the capital low point. This rise in balances more than offsets the weaker margins, such that banks generate a slightly larger amount of sterling NII in the 2019 ACS, relative to the 2018 test (**Table A.B**).

Up to the capital low point, non-sterling NII is higher than in the 2018 test, due to higher non-sterling loan margins.

In contrast to sterling, non-sterling margins start and remain higher than their 2018 levels in the early years of the stress (**Chart A.12**). This is partially driven by Hong Kong dollar margins starting higher than in the previous test, with the HIBOR rate peaking at a higher level than in the 2018 test. Overall, banks earned £73 billion of non-sterling NII in the first two years of the stress, an increase of £8 billion compared to the 2018 ACS. That translates to a CET1 capital ratio boost of 0.4 percentage points relative to the 2018 test (**Table A.C**).

Banks cut distributions by about £41 billion in the first two years of the stress.

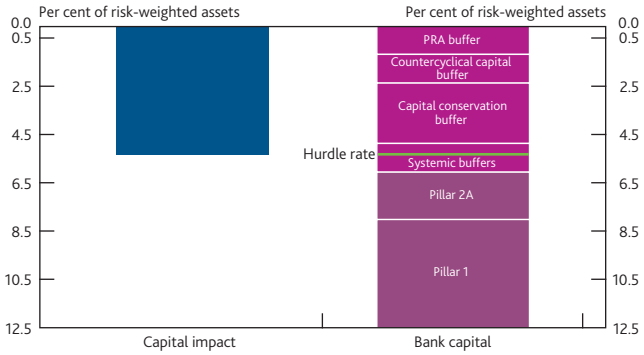
Banks make several different types of distribution, for example dividends to shareholders and variable remuneration (such as bonuses) to staff. In a stress, when a bank falls below a certain level of capital it is subject to restrictions on the amount of distributions it can make, but a bank can voluntarily cut these distributions before it gets to this stage.

Relative to the baseline, banks cut distributions by around £41 billion over the first two years of the stress. They do so by cutting their dividends to near zero and reducing variable remuneration and AT1 coupons (and other distributions) by 75% and 67% respectively. These cuts offset 2.2 percentage points of the reduction in the CET1 capital ratio, relative to the baseline. This represents a 0.1 percentage point decrease compared to the 2018 test, reflecting banks' projections to continue paying a higher level of distributions after the cuts in the 2019 stress (**Table A.C**).

Banks' resilience relies in part on their ability in a stress to cut distributions. If banks had not cut their distributions during the stress, in aggregate they would not have met the 2019 ACS hurdle rate. Investors should be aware that banks would make such cuts as necessary if a stress were to materialise (see Box 5).

Chart A.13 Buffers are set so that banks could absorb the impact of the stress and remain above their hurdle rate

How the stress test interacts with the CET1 capital framework for an illustrative bank[a]



Sources: Bank of England, participating banks' STDF data submissions, Bank analysis and calculations.

(a) The hurdle rate includes banks' minimum capital requirements plus a proportion of their systemic buffers. The effect of the IFRS 9 hurdle rate adjustment means that different banks will have different amounts of systemic buffers in the hurdle rates against which they will be judged this year. That reflects how IFRS 9 impacts individual banks differently and the constraint that hurdle rates are floored at a bank's minimum capital requirements.

The stress-test results inform the setting of regulatory capital buffers.

The FPC and PRC use the results of the ACS to inform the setting of banks' regulatory capital buffers. Buffers are typically set so that if each bank enters the stress scenario with capital equal to its minimum capital requirement plus its regulatory capital buffers, its capital position at the stress low point would equal its hurdle rate (**Chart A.13**).

The FPC sets the UK CCyB rate based on the capital impact of the UK macroeconomic stress and its assessment of system-wide cyclical risks. With that in mind, the PRC then sets individual banks' PRA buffers (see Overview of risks to UK financial stability and The UK bank capital framework chapters).

The Bank has assessed participating banks against the updated BCBS stress testing principles.

An important objective of the Bank's stress-testing framework is to support a continued improvement in banks' own risk management and capital planning activities. For this reason the Bank undertakes a qualitative review of banks' stress-testing capabilities as part of the stress test.

The qualitative review focused on assessing banks' stress-testing capabilities against the updated Basel Committee on Banking Supervision stress-testing principles. The review found that banks' stress-testing frameworks have continued to improve, but that improvements are largely focused on delivering the ACS and could be extended to also enhance internal stress-testing capabilities. The review also found that banks could further embed stress testing by consistently using insights from stress-testing results in business planning and risk management. Bank staff note some participating banks are considering improvements to their stress-testing capabilities. More detail can be found in the Bank's published review of the effectiveness of banks' stress-testing frameworks and their implementation.

Forthcoming changes in 2020.

In the 2018 and 2019 ACS, the Bank adopted an approach to adjusting stress-test hurdle rates to take account of IFRS 9 (see Box 1). The Bank is considering other options for a more enduring treatment of IFRS 9 (see The UK bank capital framework chapter). These options will be piloted over the coming year, which includes engagement with relevant stakeholders.

As previously agreed by the FPC and PRC, future stress tests will include additional participants: Virgin Money UK will take part in the 2020 stress test for the first time, and the test will also assess the ring-fenced subgroups of existing stress-test participant banks on a standalone basis.

Reviews of the ICAAPs are also a key component of how the PRA assesses the resilience of banks to stress, particularly those that do not participate in the concurrent stress test. The PRA intends to consult on enhancing the ICAAP review process for mid-sized UK banks and building societies from 2020. The PRA intends to engage with relevant firms in coming months to take this forward.

Box 5
The impact of the 2019 stress test on banks' projected distributions

Banks make several different types of distributions, including dividends to shareholders, variable remuneration payments to employees (such as bonuses), and coupons on AT1 capital instruments to institutional investors. If their capital position deteriorates, or is expected to deteriorate, banks have the capacity to take action to cut their distributions. Some of these actions are mandatory and determined by the impact of the stress, and others are discretionary. In the first two years of the 2019 stress scenario, in aggregate, banks bolster their CET1 capital positions by 2.2 percentage points by cutting distributions.

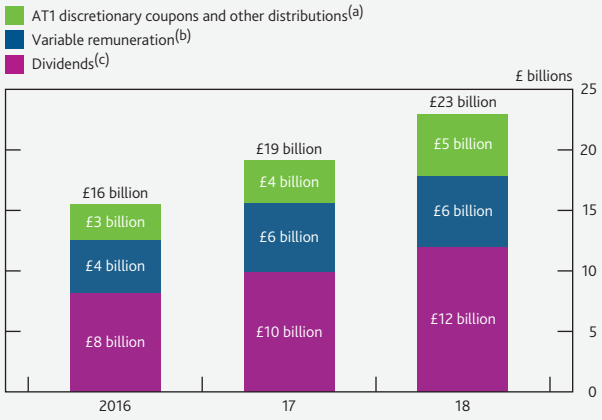
In aggregate, participating banks would fall below the CET1 capital ratio hurdle rate if these distribution cuts were not made. Therefore, the assumption that banks are committed to reducing distributions in stress, in conjunction with the significant role of mandatory cuts to distributions, is an important factor in the FPC and PRC's judgement that banks are adequately capitalised.

Banks' distributions have increased in recent years…

Over the past three years, banks have increased their total distributions by approximately £3 billion per year (**Chart A**). Broadly, most distribution types have increased in similar proportions each year.

Chart A Banks have increased their distributions in recent years

Dividends, variable remuneration, AT1 coupons and other distributions paid out since 2016



Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) Other distributions includes preference dividends and other discretionary distributions.
(b) Variable remuneration reflects discretionary distributions (ie upfront cash awards awarded in the current year, paid in the current year) and deferred distributions, pre-tax.
(c) Dividends shown net of scrip payments and are in respect of the year noted.

…and they project making significant distributions in the first two years of the ACS baseline scenario.

Banks project making distributions of around £48 billion in the first two years of the baseline scenario. This is a slight increase in annual distributions compared to their recent distributions (**Chart A**).

Banks cut back almost all of their planned dividends, and the majority of their other distributions in the stress.

Compared to the baseline, banks project around a £41 billion (86%) reduction in distributions in the first two years of the 2019 stress scenario (**Table 1**). This is slightly lower than the almost £42 billion (91%) cut they projected in the 2018 test. Banks cut almost all of their dividends in the first two years of the stress. They also reduce variable remuneration, AT1 coupons and other distributions by significant proportions.

Table 1 Banks cut a significant proportion of distributions in the stress, relative to the baseline

Dividends, variable remuneration, AT1 coupons and other distributions in the 2019 ACS(a)

£ billions (stress reduction proportion in parentheses)

	Actual 2018	To end-2020 in the baseline	To end-2020 in the stress
Ordinary dividends(b)	12.0	25.2	0.2 (99%)
Variable remuneration(c)	5.9	11.6	2.9 (75%)
AT1 coupons and other distributions(d)	5.1	11.2	3.7 (67%)
All distributions	23.0	48.0	6.8 (86%)

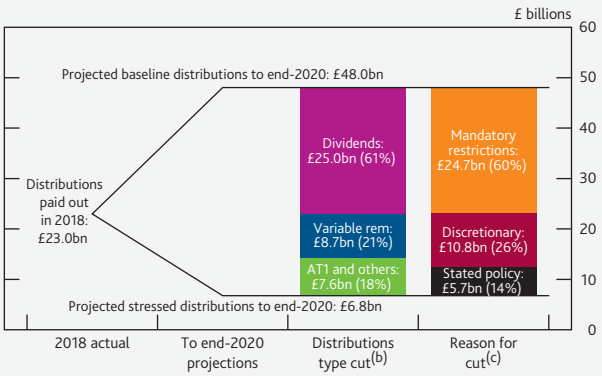
Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) HSBC and Standard Chartered figures have been converted to sterling using start exchange rates.
(b) Ordinary dividends shown net of scrip dividends and are in respect of the year noted. They are on a foreseeable basis.
(c) Variable remuneration reflects discretionary distributions (ie upfront cash awards awarded in the current year, paid in the current year) and deferred distributions, pre-tax.
(d) Other distributions includes preference dividends, scrip dividends and other discretionary distributions.

Banks make a similar pattern of distribution cuts in both years 1 and 2 of the stress. 61% of the overall cut comes from dividends, and 21% comes from variable remuneration. The remainder includes reducing other distributions such as cancelling AT1 coupons (**Chart B**, left-hand bar).

Chart B The majority of distribution cuts are made due to mandatory restrictions

Composition of distribution reductions by type of distribution and reason for cut(a)



Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) HSBC and Standard Chartered figures have been converted to sterling using start exchange rates.
(b) Percentage figures in parentheses show proportion of total distribution cut.
(c) Percentage figures in parentheses show proportion of total cut by reason.

The majority of distribution cuts are taken due to mandatory restrictions.

Broadly, banks cut distributions in the stress scenario for three reasons:

First, banks cut distributions according to established policies. These tend to involve varying dividends in line with earnings. Most banks also have policies linking at least a part of their variable remuneration to financial performance. As this deteriorates through the stress, they are able to follow these policies to reduce variable remuneration. The decision to alter the policy, however, remains at the discretion of their Boards.

Second, where banks do not have policies in place they can voluntarily cut distributions, but this is an active decision for their Boards to take.

Third, and most significantly in the stress, under European capital regulations, if a bank's capital falls into its combined capital buffer, it is subject to a limit on the proportion of its profits it is allowed to distribute.(1) The total amount it is allowed to distribute is the maximum distributable amount, which is a share of a banks' earnings. As a bank's capital position falls further into its regulatory buffer, the maximum share of earnings that can be distributed decreases further, eventually reducing to zero.

In the first year of the stress, banks generate losses. So in many cases they are not permitted to make distributions.

As a result, 60% of all distribution cuts in the 2019 stress are made as a result of mandatory restrictions becoming applicable, with the rest being due to banks either following existing policies or taking a Board level discretionary decision (**Chart B**, right-hand bar).

Banks' AT1 capital instruments convert into CET1 capital during the stress, which could be costly to investors in these instruments.

According to the specific contractual terms of AT1 instruments currently in issue, conversion to CET1 is based on a definition of CET1 capital that does not include the benefit of IFRS 9 transitional arrangements. The CET 1 capital ratios of both Barclays and Lloyds Banking Group are projected to fall below the AT1 conversion trigger point of 7% on this non-transitional basis. As a result, approximately £16 billion of AT1 debt instruments are projected to convert into CET1 capital over the course of the 2019 ACS.

When banks' AT1 instruments convert into CET1, bondholders become shareholders and are no longer eligible to receive coupons, but instead receive ordinary dividends alongside other shareholders.

(1) The combined buffer is defined as a bank's countercyclical buffer, its capital conservation buffer, and any applicable systemic risk buffers. More information on the PRA's implementation of distribution restrictions can be found in *PRA SS6/14,* 'Implementing CRD IV: capital buffers', April 2014.

Resilience of the UK financial system to Brexit

The core of the UK financial system — including banks, dealers and insurance companies — is resilient to and prepared for the wide range of UK economic and financial risks it could face, including a worst-case disorderly Brexit.

The FPC judges that its 2019 stress test of the core UK banking system was sufficiently severe to encompass the range of economic shocks that could be associated with a disorderly Brexit. The core UK banking system demonstrated its resilience to — and capacity to keep lending in — that stress scenario.

Reflecting extensive preparations made by authorities and the private sector, most risks to UK financial stability that could arise from disruption to cross-border financial services in a worst-case disorderly Brexit have been mitigated.

The FPC welcomes the recent proposal from the European Commission to extend the temporary equivalence of the regulatory framework for UK CCPs. It expects confirmation of this and extended recognition of UK CCPs to be provided by end-December.

In the absence of further actions by EU authorities on some risks, some disruption to cross-border financial services is possible. Although such disruption would primarily affect EU households and businesses, it could increase volatility and spill back to the UK in ways that cannot be fully anticipated or mitigated.

Financial stability is not the same as market stability. Significant market volatility and asset price changes are to be expected in a disorderly Brexit.

Irrespective of the particular form of the UK's future relationship with the EU, and consistent with its statutory responsibilities, the FPC will remain committed to the implementation of robust prudential standards in the UK. This will require maintaining a level of resilience that is at least as great as that currently planned, which itself exceeds that required by international baseline standards, as well as maintaining UK authorities' ability to manage UK financial stability risks.

The UK and EU have agreed a new Withdrawal Agreement. They also agreed to extend the UK's membership of the EU until 31 January 2020, or earlier should the Withdrawal Agreement be ratified by both the UK and EU before then.

Consistent with the FPC's remit to protect and enhance the resilience of the UK financial system to major shocks, in considering the risks arising from Brexit the FPC has focused on outcomes that would have the greatest potential impact on financial stability.

The core of the UK financial system is resilient to, and prepared for, the wide range of UK economic and financial shocks that could be associated with a worst-case disorderly Brexit.

To assess the resilience of the UK banking system to the range of Brexit outcomes, the FPC has considered a disorderly Brexit scenario underpinned by a set of worst-case assumptions. These include the sudden imposition of trade barriers, severe disruption at the border, a sharp increase in the risk premium on UK assets and negative spillovers to wider UK financial markets.

The FPC judges that its 2019 stress test of the major UK banks is sufficiently severe to encompass such a worst-case disorderly Brexit.

As set out in the Results of the 2019 stress test of UK banks chapter, in the stress scenario UK GDP falls by 4.7%, the unemployment rate rises to 9.2%, UK residential property prices fall by 33% and UK commercial real estate prices fall by 41%. The stress scenario also includes a major global shock, sudden loss of overseas investor appetite for UK assets, a 28% fall in the sterling exchange rate index, Bank Rate rising to 4% and significant misconduct fines.

Major UK banks have demonstrated their resilience to — and capacity to keep lending in — that scenario. As it encompasses a worst-case Brexit, the FPC reaffirms its judgement that the UK banking system is strong enough to continue to serve UK households and businesses through Brexit.

With over £1 trillion of high-quality liquid assets, major UK banks can meet their maturing obligations without any need to access wholesale funding for many months. They can also withstand an unprecedented loss of access to foreign currency markets.

As a further prudent precaution, the Bank of England has operations in place to lend in all major currencies on a weekly basis. Banks have pre-positioned collateral with the Bank of England to borrow around £300 billion through these regular facilities.

Post-crisis reforms have contributed to the resilience of dealers that sit at the centre of many financial markets. This has reduced the risk that losses on their market-making activity could lead to their distress or failure. Insurance companies have sufficient surplus capital to withstand very sharp falls in property and equity prices (see Resilience of market-based finance chapter).

Most risks to UK financial stability that could arise from disruption to cross-border financial services in a worst-case disorderly Brexit have been mitigated.

In November 2017, the FPC published a checklist of actions that would mitigate risks of disruption to important financial services used by households and businesses to support their economic activity. It has since updated its judgements of progress against this checklist on a quarterly basis (**Table B.A**).

The checklist is focused on the risks of disruption to the financial services provided by EU institutions to UK households and businesses. The FPC also considers risks of disruption to financial services provided by UK institutions to the EU where the impact of that could spill back to the UK economy.

Legislation, temporary permissions and recognitions and other preparations have been made by UK authorities to ensure that UK households and businesses will be able to use existing and new services from EU financial institutions.

UK financial institutions continue to take steps to ensure the continued flow of services to EU counterparties and clients, including advancing onboarding processes to their EU entities. It is important that they continue to do so to reduce further risks of disruption.

Firms have taken steps to facilitate the continued flow of personal data from EU service providers to the UK. Standard contractual clauses (SCCs) in particular are being utilised to comply with the EU's cross-border personal data transfer rules. The Advocate General's opinion on the validity of SCCs in the context of an ongoing case before the Court of Justice of the European Union (CJEU) on personal data protection is due imminently. If the opinion calls into question the validity of SCCs, firms should review the potential disruption to processes and services reliant on EU-to-UK data flows and consider potential mitigants in the event that the CJEU deemed SCCs invalid.

The FPC welcomes the recent proposal from the European Commission to extend the temporary equivalence of the regulatory framework for UK CCPs. The FPC expects confirmation of this and extended recognition of UK CCPs to be provided by end-December.

In the absence of further action by EU authorities on some risks, some disruption to cross-border financial services in the event of a no-deal Brexit is possible. Such disruption would primarily affect EU households and businesses, but it could

increase volatility or spill back to the UK in ways that cannot be fully anticipated or mitigated.

The FPC also continues to monitor other risks that could cause some, albeit less material, disruption to activity if they are not mitigated (**Table B.B**).

Significant market volatility and asset price changes are to be expected in a disorderly Brexit.

In a disorderly Brexit, sharp adjustments in financial market prices would be expected. A fall in demand for UK assets could be expected to put additional downward pressure on the sterling exchange rate, and tighten financial conditions for UK households and businesses through adjustments in equity prices and corporate and bank funding costs.

The UK faces risks from a reduction in international investor appetite for UK assets which could amplify any market volatility and repricing of assets in a disorderly Brexit. Commercial real estate and leveraged lending markets in particular are dependent on foreign capital.

In addition, EU banks and insurance companies could immediately face tougher prudential requirements on their holdings of UK sovereign and bank debt when the UK leaves the EU.

Volatility could be amplified by any residual risks of disruption, for example should restrictions on 'lifecycle' events on uncleared derivatives compromise the ability of derivatives users to manage risks or if last-minute migrations of EU clients to UK banks' EU entities crystallise operational risks.

Table B.A Checklist of actions to avoid disruption to end-users of financial services during Brexit

This checklist reflects the risk of disruption to end-users, including households and companies, if barriers emerge to cross-border trade in financial services after 31 January. The risk assessment takes account of progress made in mitigating any risks. It assesses risks of disruption to end-users of financial services in the UK and, because the impact could spill back, also to end-users in the EU.(a)

Risks of disruption are categorised as low, medium or **high**. Arrows reflect developments since the FPC's previously published checklist in the October 2019 Financial Policy Summary. **Blue text** is news since then.

The checklist is not a comprehensive assessment of risks to economic activity arising from Brexit. It covers only the risks to activity that could stem from disruption to provision of cross-border financial services.

	Risk to UK	Risk to EU	
Most risks to financial stability that could arise from disruption to cross-border financial services in a no-deal Brexit have been mitigated.			
Ensure a UK legal and regulatory framework is in place			The passage of the EU (Withdrawal) Act 2018 and secondary legislation has ensured that an effective framework for the regulation of financial services will be in place, and that EU financial services companies can continue to serve UK customers. Some secondary legislation is still required to implement the domestic state aid framework and to ensure EU legislation that begins to apply during the Brexit extension period can operate effectively after exit day. The FPC expects this to be completed before exit day.
OTC derivatives (cleared)			The UK Government has legislated to ensure that UK businesses can continue to use clearing services provided by EU-based clearing houses. EU authorities have provided temporary equivalence and recognition arrangements which will allow EU counterparties to continue clearing trades with UK CCPs until end-March 2020. The FPC welcomes the recent proposal from the European Commission to extend the temporary equivalence of the regulatory framework for UK CCPs. It expects confirmation of this and extended recognition of UK CCPs to be provided by end-December. There are currently £59 trillion of derivatives contracts between the UK CCPs and the EU, £46 trillion of which is currently due to expire after March.

(a) In most cases, the impact on EU end-users will apply to the wider European Economic Area (EEA).

Insurance contracts			The UK Government has legislated to ensure that the 16 million insurance policies that UK households and businesses have with EU insurance companies can continue to be serviced after Brexit. UK insurance companies continue to make good progress in restructuring their business in order to service £60 billion of EU liabilities after Brexit. £55 billion of this liability is expected to be addressed by 31 January 2020. Temporary regimes announced by EU states are expected to further reduce the residual 'at risk' liabilities by over 50%. The European Insurance and Occupational Pensions Authority (EIOPA) has published recommendations to national authorities supporting recognition or facilitation of UK insurance companies' continued servicing of EU contracts.
Asset management			Co-operation agreements between the Financial Conduct Authority, European Securities Markets Authority and EU National Competent Authorities have been agreed. This enables EU asset managers to delegate the management of their assets to the UK after exit. The UK Government has legislated for EU asset management firms to continue operating and marketing in the UK after exit. And to operate in the EU, the largest UK asset managers have completed their establishment of EU authorised management companies.

In the absence of actions by EU authorities, some risks remain. Although these primarily affect EU households and businesses, they can also be expected to increase volatility or spill back to the UK.

Banking services			The UK Government has legislated to ensure that UK households and businesses can continue to be served by EU-based banks after Brexit. EU authorities have not taken similar action. As a result, major UK-based banks are transferring their EU clients to subsidiaries in the EU so that they can keep providing services to them. All material subsidiaries are now authorised, fully operational and trading. Firms continue to build the capacity of their EU entities and have made further progress to be ready to serve more EU clients after exit. On average, close to two thirds of clients, including larger clients which represent a greater share of activity, of major UK-based banks have now completed the necessary documentation to enter into derivatives trades with the EU entities. The number of clients actively trading in the new entities is lower. Some operational risks therefore remain, including if many clients seek to migrate to the EU entities in a short period of time. These could amplify any other disruption in the market.
OTC derivative contracts (uncleared)			Certain 'lifecycle'[(b)] events will not be able to be performed on cross-border derivative contracts after Brexit. This could affect £19 trillion of uncleared derivatives contracts between the EU and UK, of which £15 trillion matures after January 2020. This could compromise the ability of derivatives users to manage risks, and could therefore amplify any stress around the UK's exit from the EU. The UK Government has legislated to ensure that EU banks can continue to perform lifecycle events on contracts they have with UK businesses. The European Commission has not reciprocated for UK-based banks' contracts with EU businesses. Most EU states with material uncleared derivatives activity have implemented legislative measures which seek to address this risk at national level but the scope and effectiveness of these measures will vary between jurisdictions. For some jurisdictions, uncertainty remains about the scope of activity which will be possible once the legislation is implemented. And for some jurisdictions, the published measures only provide a partial solution.
Personal data			The UK Government has legislated to continue to allow the free flow of personal data from the UK to the EU. The European Commission has not taken similar action to ensure the free flow of personal data from the EU to the UK in a no-deal scenario. While the action by the UK Government will reduce disruption, both UK and EU households and businesses may be affected due to the two-way data transfers required to access certain financial services. Companies can add standard contractual clauses (SCCs) into contracts in order to comply with the EU's cross-border personal data transfer rules. UK firms are making use of the time provided by the extension of the UK's membership of the EU to continue to implement these clauses. An ongoing case before the Court of Justice of the European Union (CJEU), judgement on which may be passed by early 2020, could impact the validity of SCCs. The FPC notes that the Advocate General's opinion on this case is expected imminently. If the opinion calls into question the validity of SCCs, firms should review the potential disruption to processes and services reliant on EU-to-UK data flows and consider potential mitigants in the event that the CJEU judgement deemed SCCs invalid.
Implementation period to allow mitigating actions by firms			The UK and European Commission have completed negotiations on a new Withdrawal Agreement that includes an implementation period to 31 December 2020. If agreed, such an implementation period would reduce all of the risks set out in the FPC's checklist.

(b) These lifecycle events include amendments, compressions, rolling of contracts or exercise of some options.

Table B.B Other risks of disruption to financial services

These risks could cause some disruption to economic activity if they are not mitigated and the UK leaves the EU without an agreement or implementation period. The FPC judges their disruptive effect to be somewhat less than that of those issues in its checklist.

Access to euro payment systems	The Single Euro Payments Area (SEPA) schemes are currently used by UK payment service providers (PSPs, including banks) to make lower-value euro payments such as bank transfers between businesses, mortgage and salary payments on behalf of their customers. The European Payments Council (EPC) has confirmed that the UK will retain SEPA access in the event of a no-deal exit. Once the UK becomes a third country, processing some payments — notably direct debits — may require additional information to be included for the payment instructions to meet regulatory requirements. Firms continue to seek to put the necessary information in place where possible, but may not resolve all payments in time. This could result in disruption to both EEA and UK customers and businesses seeking to make and receive payments. UK firms will also need to maintain access to TARGET2 to use it to make high-value euro payments. UK banks intend to access TARGET2 through their EU branches or subsidiaries or correspondent relationships with other banks.
Servicing banking and insurance customers	Major UK banks' and insurers' continued actions to prepare their EU subsidiaries, as covered in the Banking Services and Insurance Contracts rows in **Table B.A**, will enable their provision of services to many EU customers after exit. However, depending on the scope and availability of national regimes, the loss of passporting might also impact the ability of UK banks and insurers[(a)] to provide some services to existing customers resident in the EEA.
Ability of EEA firms to trade on UK trading venues	EU-listed or traded securities are traded heavily at UK venues which offer deep liquidity pools for a range of securities traded by UK and EU firms. The EU's Trading Obligations require EU investment firms to trade EU-listed or traded shares, and some classes of OTC derivative, on EU trading venues (or venues in jurisdictions deemed equivalent by the EU). The UK will also have reciprocal trading obligations when it leaves the EU. Firms and venues are taking action to ensure they can trade securities and affected derivatives in both the EU and UK and other equivalent jurisdictions. However, the process of adjustment might pose operational risks. And it would fragment liquidity across jurisdictions and venues, which may particularly impact EU clients given their reliance on UK liquidity pools. The EU and UK could deem each other's regulatory frameworks as equivalent, thereby mitigating risks of disruption.
Increased prudential requirements	EU regulations subject EU banks' and insurance companies' non-EU exposures (which, after exit, will include their holdings of UK securities) to stricter capital and liquidity requirements. Some restrictions might also be imposed for EU Money Market Funds and institutional investors on holdings of UK-managed or located exposures. UK legislation, which is aligned with EU rules, would similarly subject UK-authorised firms to stricter requirements on non-UK exposures. Secondary legislation passed in the UK allows regulators to delay the impact for UK firms. The Bank expects to publish the final transitional direction ahead of the UK's withdrawal from the EU.
Credit Rating Agencies (CRAs)	EU rules will prevent some banks and insurance companies in the EU from calculating prudential requirements using ratings issued by UK CRAs unless the ratings are endorsed by an EU CRA. A co-operation agreement exists between ESMA and the FCA, and UK CRAs have EU entities to endorse UK ratings. EU and UK authorities have also completed assessments to facilitate such endorsements. The decision to endorse ratings ultimately lies with the CRA.
Settlement finality protection for financial market infrastructure	After the UK exits the EU, UK financial market infrastructure firms (FMIs) will no longer be protected under EU law against payments or transfers being revoked, or collateral being clawed back, in the event that an EEA member enters insolvency. EEA countries accounting for almost all the EEA members of UK FMIs have implemented national legislation intended to provide settlement finality protection in the event of insolvency of local firms using financial market infrastructure in non-EU countries. For countries where protections are not in place, UK FMIs have implemented other mitigants.

(a) See PRA communications to firms regarding ACPR's statement regarding UK insurers' use of the French Run-Off Ordinance.

Overview of risks to UK financial stability

The global economy has continued to slow, in part reflecting the broad effects of the trade war between the United States and China. In Hong Kong, rising political tensions have contributed to the sharpest fall in economic activity since the financial crisis.

The FPC judges that the 2019 stress-test scenario for the global economy was sufficiently severe to encompass economic risks from both a broader trade war and tensions in Hong Kong.

The FPC continues to judge that underlying global vulnerabilities remain material, and there are risks of further deterioration. These include debt vulnerabilities in some areas, risks in the euro-area banking sector, exposure of some non-China emerging market economies to changes in risk sentiment, risk of illiquidity in financial markets, and less room for some monetary authorities to respond to shocks.

In the UK, against a backdrop of Brexit-related uncertainty, growth has slowed and international investor demand for UK assets, notably commercial real estate, has fallen. There have been some tentative signs of tighter corporate credit conditions and the supply conditions in the mortgage market have stabilised after a prolonged period of easing.

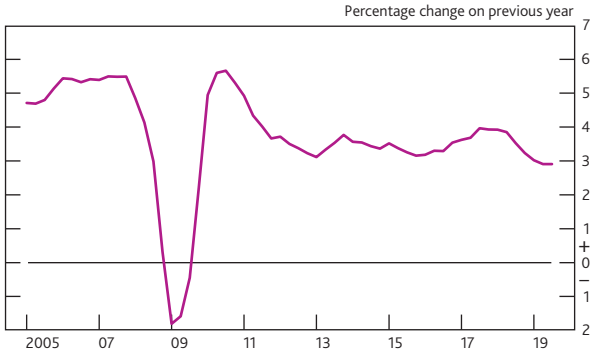
The FPC judges that its 2019 stress test of the major UK banks is sufficiently severe to encompass a worst-case disorderly Brexit.

Domestic vulnerabilities (excluding Brexit) that can amplify economic shocks have not changed materially since the July *Report* and remain at a standard level overall.

The FPC is raising the level of the UK countercyclical capital buffer (CCyB) rate that it expects to set in a standard risk environment. Given the current standard risk environment, the FPC judges the 2% UK CCyB rate to be appropriate. It is therefore raising the UK CCyB rate from 1% to 2%. This will take effect in one year. The FPC stands ready to move the UK CCyB rate in either direction as economic conditions and the overall risk environment evolve.

Chart C.1 Global GDP growth is at its lowest rate since 2009

PPP-weighted world GDP[a]

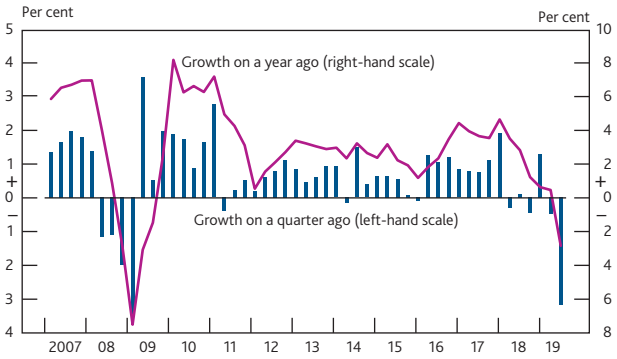


Sources: IMF *World Economic Outlook* (*WEO*), Eikon from Refinitiv and Bank calculations.

(a) Constructed using real GDP growth rates of 189 countries weighted according to their shares in world GDP using the IMF's purchasing power parity (PPP) weights.

Chart C.2 Hong Kong is now in recession

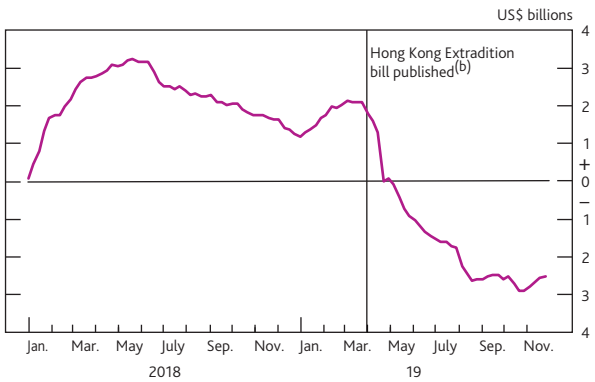
Hong Kong real GDP



Sources: Eikon from Refinitiv and Bank calculations.

Chart C.3 There have been outflows from investment funds in Hong Kong since April

Portfolio capital flows via investment funds in Hong Kong[a]



Sources: EPFR Global, Eikon from Refinitiv and Bank calculations.

(a) Cumulative weekly capital flows from January 2018.
(b) Bill published on 29th March 2019.

The global economy has continued to slow, in part reflecting the broad effects of the trade war between the United States and China…

Global GDP growth has continued to slow over 2019, and is now at its lowest rate since 2009 (**Chart C.1**). The slowdown partly reflects increasing trade protectionism, the impact of the past tightening in global financial conditions and domestic weakness in some large emerging market economies.

The trade war between the United States and China intensified in August, but appears to have eased somewhat recently. In October, the US and Chinese governments agreed the outline of the first phase of a trade deal. Nevertheless, uncertainty over future trade policies remains high.

Trade protectionism can have a direct effect on world GDP growth via trade flows, supply chains and import costs, and an indirect effect, for example through lower investment as a result of lower business confidence and higher uncertainty. Bank staff estimate that both the direct and indirect effects of protectionism have reduced world GDP by 0.5% to date, with further potential drag in coming years, such that protectionism could weigh on global GDP by up to 1.1% in total.(1)

…which has also increased downside risks to the global outlook.

Global growth could slow more sharply if the trade war were to lead to a tightening of financial conditions or to further reductions in business confidence and investment. A broadening of the trade war beyond tariff measures to restrictions on technology and capital would further fragment and slow potential growth in the global economy.

In Hong Kong, rising political tensions have contributed to the sharpest fall in economic activity since the financial crisis.

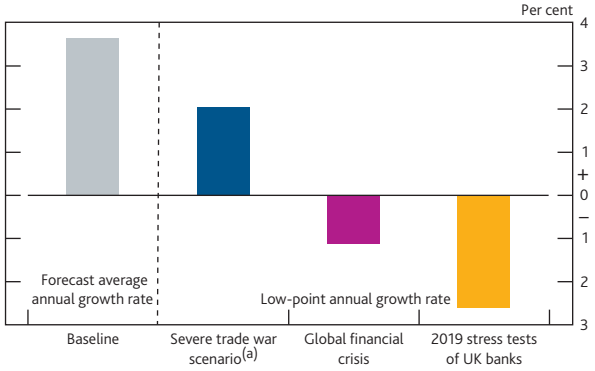
UK banks have significant exposure to Hong Kong, representing around 160% of their common equity Tier 1 (CET1) capital. The recent political protests in Hong Kong have been accompanied by a sharp slowdown in growth and falling asset prices. GDP growth contracted by 3.2% in Q3 — the weakest quarterly growth rate since the peak of the financial crisis in 2009 (**Chart C.2**). The major Hong Kong equity index is 12% lower than its level seen in April when protests began. Transactions in the commercial real estate (CRE) market since April contracted by 31% when compared to the same period last year, although falls in property prices so far have been moderate.

There have also been significant portfolio capital outflows from investment funds in Hong Kong. The total cumulative outflows since April were around US$5 billion, accounting for around 1¼% of Hong Kong GDP (**Chart C.3**).

(1) See November 2019 *Monetary Policy Report*, Section 3, In focus: Trade protectionism and the global outlook, page 37.

Chart C.4 Trade tensions could materially slow global growth, but UK banks have shown they could lend through a significantly more severe stress

PPP-weighted world real GDP annual growth

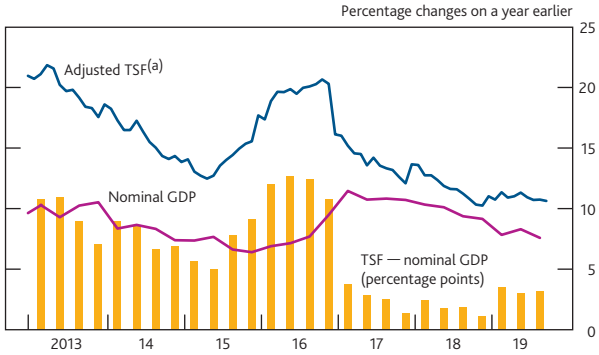


Sources: IMF *WEO* and Bank calculations.

(a) This includes the estimated impact of all implemented and contemplated tariff measures, combined with a severe business confidence shock and a sharp tightening in global financial conditions.

Chart C.5 Credit growth in China has picked up over 2019

China total social financing (TSF) and nominal GDP

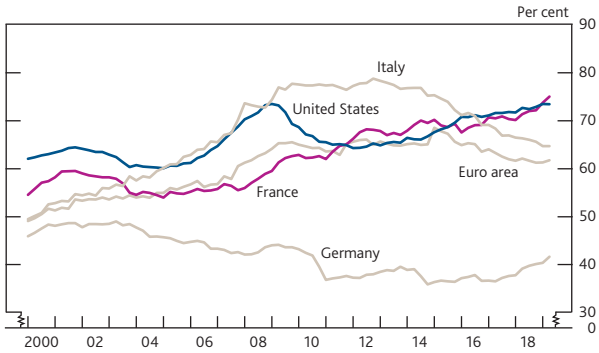


Sources: CEIC Data Company Ltd and Bank calculations.

(a) Adjusted total social financing allows for the statistical effect of replacing local government borrowing via financing vehicles with the issuances of municipal bonds.

Chart C.6 Corporate debt is high in some advanced economies

Total non-financial corporate debt as a percentage of GDP in the US, euro area, France and Germany(a)



Sources: Eikon from Refinitiv, Eurostat and Bank calculations.

(a) Debt is net of intercompany loans. Euro-area figures include publically owned corporations due to euro-area data reporting. In France, publically owned corporations accounted for 8.6% of total private non-financial corporate debt in 2017.

The protests, and their impact on the real economy, highlight political risk as a key vulnerability in Hong Kong. And these political tensions pose risks, given Hong Kong's position as a major financial centre.

The FPC judges that the 2019 stress-test scenario for the global economy was sufficiently severe to encompass economic risks from both a broader trade war and tensions in Hong Kong.

The 2019 stress-test scenario included outright falls in PPP-weighted world GDP of 2.6% and in Chinese GDP of 1.2% during the first year of the stress scenario. The FPC judges that this scenario was of a severity that encompassed a worst-case scenario for global trade tensions. The imposition of all implemented and contemplated tariff measures, combined with a severe business confidence shock and a sharp tightening in global financial conditions, could slow GDP growth materially, potentially detracting over 2 percentage points from cumulative growth, over a three-year period. Even an impact of this magnitude however, would be insufficient to cause an outright fall in global output, which is expected to grow at around 3½% per year in the 2019 stress-test baseline scenario (**Chart C.4**).(2)

Recent developments in Hong Kong are also encompassed within that stress scenario. It incorporated a fall of almost 8% in Hong Kong GDP and falls in property prices of more than 50%.

Through the 2019 stress test, major UK banks have demonstrated that they will be able to continue to lend to UK households and businesses, even if these risks play out further.

The FPC continues to judge that underlying global vulnerabilities remain material and that there are risks of further deterioration. These include debt vulnerabilities in some areas…

Although overall debt levels in advanced economies are rising no faster than incomes, debt vulnerabilities remain in China and in the US corporate sector. In mainland China, private non-financial sector debt as a share of GDP increased to around 210% in 2019 Q1, and has risen nearly 90 percentage points since 2008. The gap between credit growth and nominal GDP growth in China has widened a little since the end of 2018 (**Chart C.5**). A sustained pick up in credit relative to nominal GDP could lead to renewed concerns about the sustainability of China's already elevated debt levels. This could affect UK financial stability via the banking system because of UK banks' exposures to mainland China, which are around 75% of their CET1 capital. Overall, the FPC judges that vulnerabilities in China are elevated.

Corporate indebtedness is high in some advanced economies (**Chart C.6**). In the US, corporate debt is close to pre-crisis levels as a share of GDP. However, the pace of corporate credit

(2) Stress testing the UK banking system: key elements of the 2019 annual cyclical scenario, March 2019.

growth relative to GDP growth has slowed a little recently, with the latest data showing credit growing broadly in line with GDP. And while the stock of leveraged lending remains high, new issuance has fallen back a little over 2019 (see Box 4).

…risks in the euro-area banking sector…

Euro-area bank resilience has improved in recent years, with aggregate CET1 capital now at 14% of risk-weighted assets. But, as noted in the ECB's latest *Financial Stability Review*, the improvement in capital ratios has been reliant on falling risk weights, and the European authorities have yet to implement some elements of the Basel III capital standards. Price to book ratios for euro-area banks remain low in comparison to international peers, possibly reflecting overcapacity in the sector as well as challenges to some bank business models posed by low, and in some cases negative, interest rates. These issues mean that the euro-area banking system may be less able to cushion future shocks.

…exposure of some non-China emerging markets to changes in risk sentiment…

Non-China emerging market economies (NCEMEs) remain vulnerable to changes in risk sentiment. NCEMEs in aggregate saw renewed inflows of portfolio capital in the first half of 2019, but experienced portfolio outflows in August, driven by an elevated risk of slower global growth as the US-China trade war intensified. This episode highlights that, although NCEMEs have reduced external deficits and many have significant foreign currency reserves, they are still vulnerable to shifts in sentiment driven by external factors. Structural changes in the international financial system may also have increased NCEMEs' vulnerability to external shocks. Market-based finance has accounted for all of the increase in capital flows to emerging markets since the crisis and, within this, the share due to investment fund flows has also increased. Through their exposure to external shocks, as well as domestic vulnerabilities, and the structure of the international financial system, NCEMEs could amplify any crystallisation of vulnerabilities elsewhere, exacerbating spillovers to global growth and asset prices.

…risk of illiquidity in financial markets…

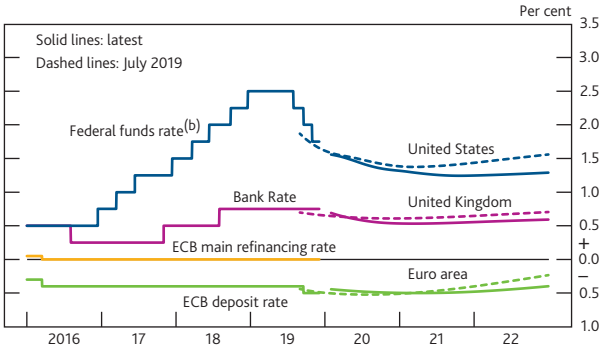
A recent period of volatility in the US dollar repo market shows how markets can become illiquid in the face of shocks. In mid-September, US dollar repo markets became highly volatile. The timing of the volatility — on the deadline for corporate tax payments and a settlement date for US Treasuries — suggests that it was triggered by an idiosyncratic shock to the amount of central bank reserves in the financial system. In this case, there were limited spillovers to broader market conditions. However, the episode served to highlight how investors should not assume that dealers will maintain the liquidity of markets at all times.

A number of core markets rely on dealer intermediation for the provision of liquidity. Post-crisis reforms have contributed to the resilience of, and reduced the interconnections between, dealers that sit at the centre of many financial markets. That, in turn, has reduced the risk of severe and sudden reductions in market liquidity. Maintaining those standards is crucial to supporting financial stability. However, these reforms may have affected how some dealers behave in response to shocks, reducing market liquidity in some circumstances.

The FPC emphasises that dealers are able to draw down liquidity buffers and draw on Bank of England facilities to support market functioning through the cycle, as well as in a stress. The 2019 biennial exploratory scenario will be used to illustrate how liquidity buffers can be drawn down in a stress, that the Bank of England facilities can be drawn on and how the PRA's approach to supervision would align with this (see Resilience of market-based finance chapter).

Chart C.7 Risk-free rates have fallen since July

Short-term interest rates and expectations[a]



Sources: Bloomberg Finance L.P. and Bank calculations.

(a) All data as of 4 December 2019. The curves are estimated using instantaneous forward overnight index swap rates in the 15 working days to 4 December 2019 and 1 July 2019 respectively.
(b) Upper bound of the target range.

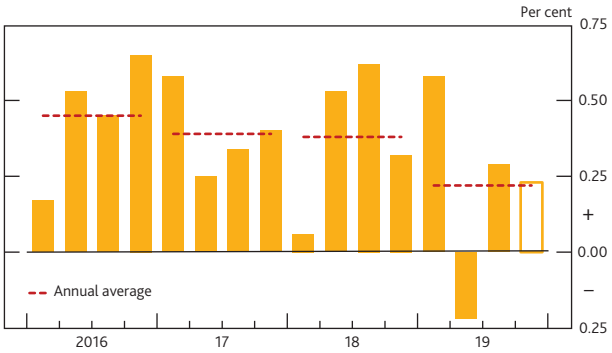
…and less room for monetary authorities to respond in the event of further shocks to the global outlook.

Risk-free real interest rates have fallen since the July *Report*, consistent with the weaker and more uncertain outlook. In the face of weakening growth, some countries have reduced official interest rates, and market expectations for policy rates have fallen a little (**Chart C.7**). In addition, term premia have compressed and reached all-time lows in Q3 as investors perceived increased downside risks to the economic outlook. Advanced economy government bond yields have moved broadly in line with the global outlook — falling initially in July and August, but increasing from early October onwards supported by generally positive trade news.

While lower interest rates should support global growth, they further limit space for some monetary authorities to respond in the event of a shock to the global outlook.

Chart C.8 Abstracting from temporary factors, UK underlying growth has slowed

Quarterly GDP growth[a]



Sources: ONS and Bank calculations.

(a) Chained-volume measure. The hollow bar in 2019 Q4 is a Bank staff projection as at the time of the November 2019 *Monetary Policy Report*.

In the UK, against a backdrop of Brexit-related uncertainty, underlying growth has slowed…

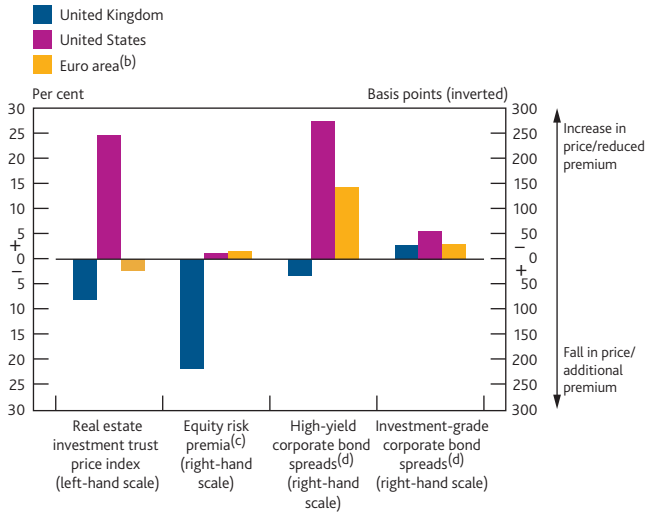
UK growth has been volatile this year. But even abstracting from temporary factors, underlying growth has slowed with quarterly growth over 2019 as a whole expected to have averaged 0.2%, lower than in previous years (**Chart C.8**). The slowdown can be partly explained by Brexit-related uncertainties, with investment by businesses being particularly affected, having fallen during five of the past six quarters. Weakening global growth is also likely to have reduced investment in the UK.

…which have also weighed down on appetite for UK assets.

There remains evidence of reduced investor appetite for UK-focused equities, sterling high-yield corporate bonds and the UK CRE market since the referendum. Estimates of equity risk premia for UK-focused companies have risen since 2016,

Chart C.9 Demand for UK assets continued to be affected by Brexit uncertainties

Change in UK, US and euro-area asset prices since 4 January 2016[a]

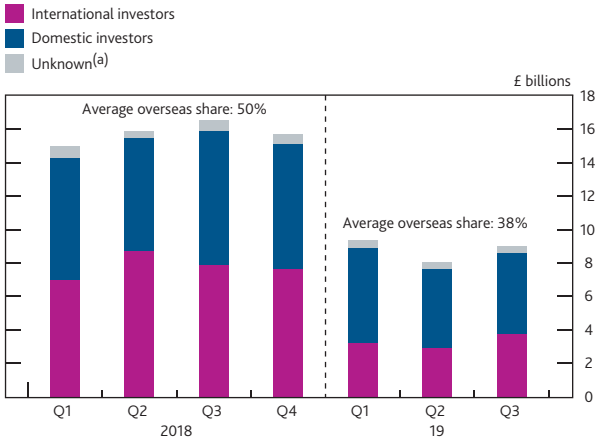


Sources: Bloomberg Finance L.P., Eikon from Refinitiv, ICE/BofAML, IMF *WEO*, LCD, an offering of S&P Global Market Intelligence, TradeWeb, and Bank calculations.

(a) Data to 4 December 2019.
(b) The euro-area real estate investment trust price series is for Europe excluding the UK.
(c) As implied by a dividend discount model. Equity risk premia are estimated for the UK focused companies, S&P 500 and Euro Stoxx indices.
(d) The US dollar series refers to US dollar-denominated bonds issued in the US domestic market, while the sterling and euro series refer to bonds issued in domestic or eurobond markets in the respective currencies.

Chart C.10 Foreign investment in CRE fell sharply in 2019

Quarterly investment in UK CRE



Sources: Property Market Analysis LLP and Bank calculations.

(a) The unknown bars represent transactions where it is not possible to determine the investor nationality.

whereas premia for the S&P 500 and Euro Stoxx indices have fallen. Spreads on high-yield sterling corporate bonds have been higher than those in US dollars, but sterling investment-grade corporate bond spreads are at similar levels to those seen at the beginning of 2016 and have moved in line with euro-area spreads over that period. The UK real estate investment trust price index has also underperformed its US equivalent (**Chart C.9**).

UK CRE markets are particularly reliant on international investors. Investment in UK CRE fell sharply in 2019 (**Chart C.10**). While this partly reflected slowing in global demand for CRE, the slowdown was more pronounced for international investors specifically: the share of international investors in these flows fell from 50% in 2018 to 38% in the year to September 2019. This was accompanied by a 2.5% year on year fall in UK CRE prices.

There have been some tentative signs of tighter corporate credit conditions…

Corporate credit conditions have been accommodative in recent years, particularly for large firms. But there are some tentative signs that conditions have begun to tighten slightly. While the *Credit Conditions Survey* (*CCS*) indicated that overall corporate credit supply was broadly unchanged in Q3, an increasing proportion of contacts reported to the Bank's Agents that finance has become slightly more expensive or less available over the past year, and that the range of sectors affected has broadened.[3] Consistent with that, *CCS* respondents expect the availability of bank lending to corporates to fall in Q4.

Corporate credit growth has slowed to 4.5% in the year to 2019 Q2 (relative to earnings growth of 5.1%). Within that, debt raised through market-based finance grew by 3.7%, reflecting weaker net bond issuance. Borrowing from UK banks was stable at an annual rate of 5.2% in October. Net lending to UK small and medium-enterprises (SMEs) remains positive, and grew at an annual rate of 1% in October, supported by strong net lending from smaller banks. Lenders responding to the *CCS* continued to report a decrease in such demand from businesses of all sizes in Q3, with a further decrease for medium-sized and large businesses expected in Q4.

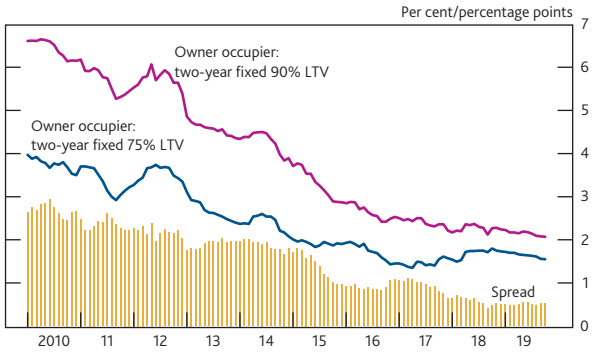
…and supply conditions in the mortgage market have stabilised.

Mortgage price and non-price terms have loosened in recent years, as competition has intensified, but conditions appear to have stabilised in 2019. Mortgage rates were broadly unchanged in 2019, and significantly below their post-crisis average. The additional compensation that lenders demand for a 90% loan to value (LTV) mortgage over a 75% LTV mortgage is broadly unchanged since the start of the year, having fallen since 2010 (**Chart C.11**).

(3) See November 2019 *Monetary Policy Report*, Section 2, Current economic conditions, Box 3 Agents' updates on business conditions, page 30.

Chart C.11 Mortgage rates are broadly unchanged in 2019

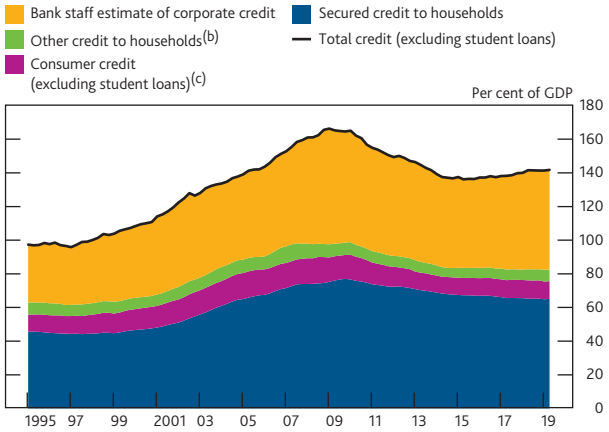
Quoted rates on 75% and 90% mortgage lending and the differential between them



Sources: Bank of England, FCA Product Sales Data and Bank calculations.

Chart C.12 UK private non-financial debt relative to GDP is below its 2008 peak but remains high

Private non-financial sector credit to GDP[a]



Sources: Association of British Insurers, Bank of England, Cass Commercial Real Estate Lending survey, Deloitte, Eikon from Refinitiv, LCD, an offering of S&P Global Market Intelligence, London Stock Exchange, ONS, Peer-To-Peer Finance Association, Preqin and Bank calculations.

(a) Credit is defined as debt claims on the UK private non-financial sector. This includes all liabilities of households and non-profit institutions serving households (NPISH), except for unfunded pension liabilities and financial derivatives associated with NPISH. Also contains private non-financial corporations' loans and debt securities, excluding direct investment loans and loans secured on dwellings. Data are all currency and are not seasonally adjusted.
(b) Calculated as sum of debt securities and rest of world short-term loans and other accounts receivable.
(c) Calculated as sum of short-term UK monetary financial institution (MFI) loans and other unsecured lending excluding student loans.

Annual mortgage credit growth was 3.2% in October 2019, broadly in line with household income growth and significantly below the growth rates seen in the decade prior to the financial crisis.

The FPC judges that its 2019 stress test of the major UK banks is sufficiently severe to encompass a worst-case disorderly Brexit.

To assess the resilience of the UK banking system to the range of Brexit outcomes, the FPC has considered a disorderly Brexit scenario underpinned by a set of worst-case assumptions. These include the sudden imposition of trade barriers, severe disruption at the border, a sharp increase in the risk premium on UK assets, and negative spillovers to wider UK financial markets.

The FPC judges that its 2019 stress test of the major UK banks is sufficiently severe to encompass such a worst-case disorderly Brexit. The scenario includes UK GDP falling by 4.7%, the unemployment rate increasing to 9.2%, UK residential property prices falling by 33% and UK CRE prices falling by 41%. The scenario also includes a major global shock, a sudden loss of overseas investor appetite for UK assets, a 28% fall in the sterling exchange rate index, Bank Rate rising to 4% and significant misconduct fines (see The results of the 2019 stress test of UK banks chapter).

Major UK banks have demonstrated their resilience to — and capacity to keep lending in — that scenario. As it encompasses a worst-case disorderly Brexit, the FPC reaffirms its judgement that the UK banking system is strong enough to continue to serve UK households and businesses through Brexit.

The FPC continues to judge that domestic vulnerabilities (excluding Brexit) remain at a standard level overall. Debt-servicing burdens remain low, supported by low interest rates.

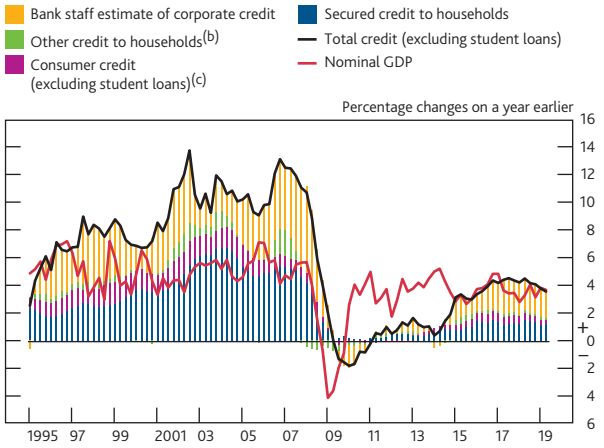
Although the stock of total non-financial credit (excluding student loans) relative to GDP remains high by historical standards, it has fallen by around 25 percentage points since 2008 (**Chart 12**). The UK's credit to GDP gap, which measures the difference between credit to GDP ratio and a simple statistical estimate of its long-term trend, remained significantly negative at -11.4 percentage points in 2019 Q2.

The growth in the stock of total private non-financial sector credit (excluding student loans) has also been modest. It slowed to 3.5% in the year to 2019 Q2 from 3.8% the previous quarter. This is broadly in line with nominal GDP growth of 3.7% over the period (**Chart 13**).

UK household indebtedness (excluding student loans) has come down from 141% of incomes prior to the crisis to 121% in 2019 Q2. The low interest rate environment is supporting sustainable debt-servicing costs for households. The share of households with a mortgage debt-servicing ratio at or above

Chart C.13 Total credit growth remains modest

Nominal GDP and contributions to total private non-financial sector credit growth[a]

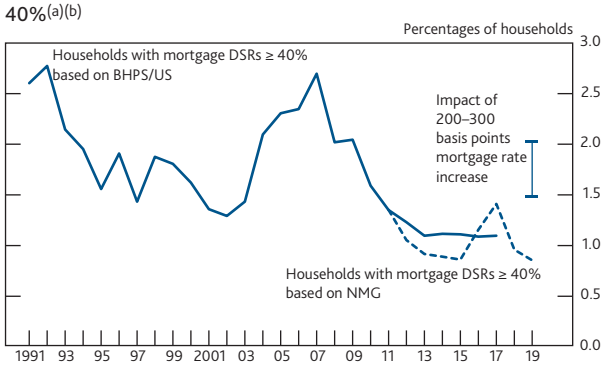


Sources: Association of British Insurers, Bank of England, Cass Commercial Real Estate Lending survey, Deloitte, Eikon from Refinitiv, LCD, an offering of S&P Global Market Intelligence, London Stock Exchange, ONS, Peer-To-Peer Finance Association, Preqin and Bank calculations.

(a) Credit is defined as debt claims on the UK private non-financial sector. This includes all liabilities of households and non-profit institutions serving households (NPISH), except for unfunded pension liabilities and financial derivatives associated with NPISH. Also contains private non-financial corporations' loans and debt securities, excluding direct investment loans and loans secured on dwellings. Data are all currency and are not seasonally adjusted.
(b) Calculated as sum of debt securities and rest of world short-term loans and other accounts receivable.
(c) Calculated as sum of short-term UK MFI loans and other unsecured lending excluding student loans.

Chart C.14 Mortgage debt-servicing costs are low, supported by low interest rates

Percentage of households with mortgage debt-service ratios (DSRs) above 40%[a][b]



Sources: British Household Panel Survey/Understanding Society (BHPS/US), NMG Consulting survey, ONS and Bank calculations.

(a) Percentage of households with mortgage DSR at or above 40% calculated using BHPS (1991–2008), US (2008–16), and the online waves of NMG Consulting survey (2011–19).
(b) A new household income question was introduced in the NMG survey in 2015. Adjustments have been made to data from previous waves to produce a consistent time series.

40% — a level above which households are more likely to experience payment difficulties — has remained low at around 1% over the past two years, according to the NMG survey (**Chart C.14**). Mortgage interest rates would have needed to increase by 200–300 basis points for this share to be around its historical average of 1.8%.

Total corporate debt remains around 2007 levels as a share of GDP in the UK. The proportion of debt held by listed firms with interest coverage ratios (ICRs) less than 2.5 — a level below which companies are more likely to experience repayment difficulties — is low by historical standards, at around 20% (**Chart C.15**). In order for this share to return to its pre-crisis average, global interest rates would need to increase by around 50–150 basis points (**Chart C.15**), and corporates would also need to see no growth in earnings. In practice, the interest rates on a large proportion of this debt would be fixed or hedged, so any rises in interest rates would take time to pass through to borrowing firms.

There are some signs that corporate credit quality has deteriorated slightly. The number of companies going into insolvency has ticked up over the past year and a half: 16,857 businesses went into insolvency in the year to 2019 Q3, a 7.4% increase on the same period last year. However, this recent increase comes from a low base and the level of UK corporate insolvencies remains close to post-crisis lows.

The UK remains vulnerable to a reduction in investor appetite for UK assets due its reliance on foreign capital inflows.

The UK's current account deficit narrowed to 4.6% of GDP in 2019 Q2, but remains large by international standards (**Chart C.16**) and international investors have significant holdings of UK assets. The deficit has been financed by gross capital inflows over recent years. A significant share of these inflows have been in the 'other investment' category (consisting mainly of deposits and short-term loans), which are particularly volatile and short term in nature. This makes the UK vulnerable to a reduction in international investor appetite for UK assets, which could lead to a tightening in credit conditions for households and businesses.

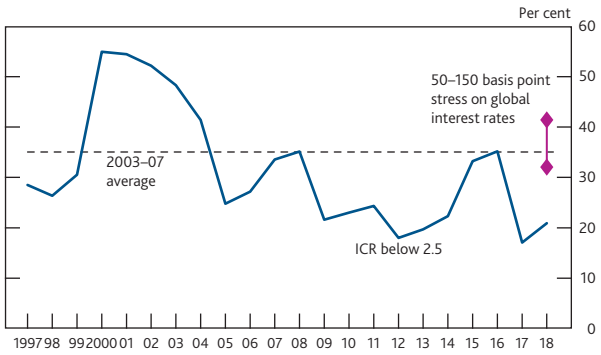
The FPC's 2019 Q4 UK CCyB rate decision

The FPC is raising the level of the UK countercyclical capital buffer (CCyB) rate that it expects to set in a standard risk environment from in the region of 1% to in the region of 2% (see The UK bank capital framework chapter). The FPC judges the 2% UK CCyB rate to be appropriate for the current standard risk environment.

The FPC, together with the Prudential Regulation Committee and the Bank, has reviewed the structural level and balance of capital requirements for the UK banking system. As a result of that review, the FPC is raising the level of the UK CCyB rate that it expects to set in a standard risk environment from in the region of 1% to in the region of 2%.

Chart C.15 The share of debt held by firms with low interest coverage ratios (ICRs) is low by historical standards

The share of debt owed by corporates with interest coverage ratios less than 2.5[(a)(b)]

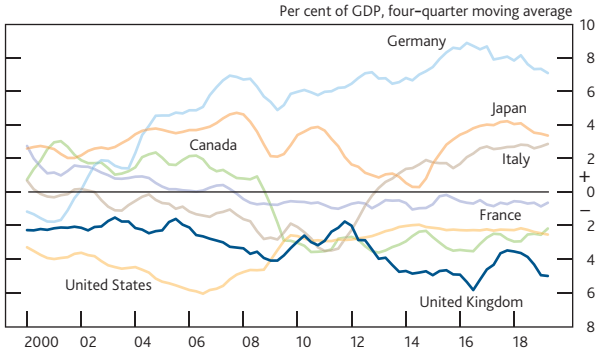


Sources: LCD, an offering of S&P Global Market Intelligence and Bank calculations.

(a) Interest coverage ratio is calculated as the three-year moving average of earnings before interest and tax as a share of interest expenses and capitalised interest.
(b) The sample includes non-financial corporates, outside of those engaged in real estate, oil, gas and mining, and for each year, includes only those companies that were listed at that point in time.

Chart C.16 The UK has the widest current account deficit in the G7

G7 current account balances



Source: OECD, Key Short-Term Economic Indicators: Current Account % of GDP, OECD.Stat, accessed on 4 December 2019.

The FPC judges the 2% UK CCyB rate to be appropriate for the current standard risk environment. It is therefore raising the CCyB rate from 1% to 2%. This will take effect in one year. The decision reflects the FPC's judgement that domestic vulnerabilities, apart from those related to Brexit, remain at a standard level overall.

The FPC also uses the results of the annual cyclical scenario (ACS) to inform its decisions. Major UK banks have demonstrated their resilience to — and capacity to keep lending in — that scenario (see The results of the 2019 stress test of UK banks chapter).

The FPC stands ready to move the UK CCyB rate in either direction as economic conditions and the overall risk environment evolve. If a major economic stress were to materialise, the FPC would be prepared to cut the UK CCyB rate as it did in July 2016. This would enable banks to use the released buffer to absorb losses without needing to restrict lending to the real economy.

In the absence of such a stress, the FPC remains vigilant to developments, particularly in the domestic credit environment. For example, were Brexit uncertainty to fade, and lending conditions to remain accommodative, credit demand could rebound significantly, leading to an increase in the riskiness of banks' exposures. This could require a timely policy response to ensure resilience.

The UK bank capital framework

The FPC, together with the Prudential Regulation Committee and the Bank, has reviewed the structural level and balance of capital requirements for the UK banking system. As a result of that review:

- The FPC is raising the level of the UK countercyclical capital buffer (CCyB) rate that it expects to set in a standard risk environment from in the region of 1% to in the region of 2%.

- Reflecting the additional resilience associated with higher macroprudential buffers, the Prudential Regulation Authority (PRA) will consult in 2020 on proposals to reduce minimum capital requirements in a way that leaves overall loss-absorbing capacity (capital plus bail-inable debt) in the banking system broadly unchanged.

- The Bank, in its capacity as the UK resolution authority, is also clarifying that, in the event of a bank resolution, it expects all debt that is bailed in to be written down or converted to the highest quality of capital, common equity Tier 1 (CET1).

Together, these changes will ensure the banking system can support the wider economy through financial and business cycles. They:

- **Increase resilience.** While leaving the overall loss-absorbing capacity for the banking system broadly unaffected, the changes will shift the balance of that capacity towards higher-quality Tier 1 capital.

  The changes will keep capital requirements for major banks in line with the benchmark level first set by the FPC in 2015. That benchmark balances the need for banks to be able to keep lending through downturns with the need for them to provide the finance that supports growth over the medium term.

  Unless banks increase their risk appetite significantly, the Committees expect overall capital requirements for major UK banks to remain broadly flat in the coming period.

- **Improve the responsiveness of capital requirements to economic conditions.** By shifting the balance of capital requirements from minimum requirements that should be maintained at all times towards buffers that can be drawn down as needed, these changes will mean banks will be more able to absorb losses while maintaining lending to the real economy through the cycle.

  In a stress, the FPC would be prepared to release the countercyclical capital buffer (CCyB). If the CCyB were cut from 2% to 0%, this would enable banks to absorb up to £23 billion of losses,

which might otherwise lead them to restrict lending. Given losses of that scale, a cut in the UK CCyB rate to 0% could preserve up to £500 billion of banks' capacity to lend to UK households and businesses. This compares with around £100 billion of net lending in the past year.

A higher setting of the UK countercyclical buffer in standard conditions will allow the FPC to pursue a gradual approach to raising the buffer if the risks faced by banks build up. It will also ensure that the buffer is sufficiently large when risks are elevated to create the capacity for banks to lend through subsequent downturns.

- **Enhance resolvability.** The Bank's intention, in resolution, to write down or convert debt to CET1 capital will make resolved banks resilient to further losses, supporting their resolution and minimising the wider economic costs of their failure.

The FPC judges a 2% UK CCyB rate to be appropriate given the current standard risk environment. It is therefore raising the CCyB rate from 1% to 2%. This will take effect in one year.

- Alongside the Prudential Regulation Authority, the FPC will now pilot options for an enduring approach for incorporating the new IFRS 9 accounting standard into bank stress tests and capital requirements. The approaches to be piloted are consistent with the principle that the new accounting standard, which is being phased in until 2023, should not result in an unwarranted *de facto* increase in capital requirements.

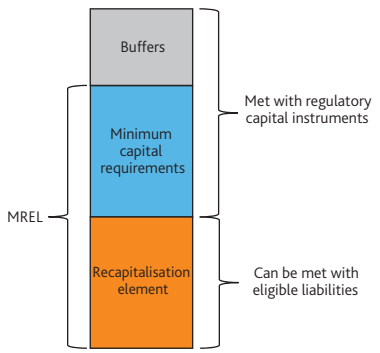
Banks need capacity to absorb losses so they are resilient to the wide range of risks they could face and dampen rather than amplify shocks.

Capital is a part of banks' funding that absorbs losses. The holders of bank capital instruments, including their common equity, bear the costs when a bank's assets decline in value. Holders of some other types of liabilities, such as deposits, are thereby protected from losses.(1)

The financial crisis demonstrated very clearly the costs to the economy of a banking system with too little capital, of insufficient quality, and too much debt. So since the crisis, authorities in the United Kingdom, and globally, have established much higher standards for banks' capital and other forms of loss-absorbing capacity. These reforms have now been finalised and are largely implemented. The three core elements of these standards are set out in (**Chart D.1**), and have different purposes.

Banks must meet minimum requirements for loss-absorbing capacity as well as regulatory buffers. Minimum requirements for loss-absorbing capacity are comprised of two elements — minimum capital requirements (which must be met with regulatory capital instruments), and any recapitalisation element (which can be met with eligible liabilities that are long-term, unsecured and subordinated debt). The sum of minimum capital requirements and any recapitalisation element are collectively referred to as 'MREL' (minimum requirements for own funds and eligible liabilities).

Chart D.1 Core elements of major UK banks' requirements for loss-absorbing capacity



Notes: For major UK banks, 2022 risk-weighted MREL requirements are expected to be set as two times minimum capital requirements.

- **Buffers** help ensure banks have sufficient capacity to absorb losses while continuing to lend to the economy, even in times of stress. They help to avoid a situation in which losses for banks prompt them to cut lending and make a downturn deeper. Buffers can be drawn down to absorb losses while a bank continues to operate.

(1) For a brief introduction to the structure of bank capital and balance sheets, see Farag, Harland and Nixon (2013).

They must therefore be met with the highest-quality, most readily loss-absorbing capital, common equity Tier 1 (CET1). The Bank's annual stress test (see The results of the 2019 stress test of UK banks chapter) is used to assess whether major UK banks have big enough capital buffers to absorb the losses they could make in a very severe stress.

- **Minimum capital requirements** aim to ensure that banks can continue to operate, even after a stress, with an adequate layer of capital to protect depositors, maintain the confidence of markets and enable an orderly failure without losses to the taxpayer. When a bank does not have sufficient loss-absorbing capacity to meet these requirements, the PRA may judge it to have breached its 'Threshold Conditions'.(2) In that event, minimum capital requirements provide the capacity to absorb losses on the bank's assets as the bank is being resolved without the need to use public funds. Minimum capital requirements can be met with a mix of different types of regulatory capital instruments.

- The **recapitalisation element** of MREL is intended to be used to recapitalise a bank that has failed and is subject to resolution by the Bank of England, in its capacity as the UK resolution authority. This helps minimise, without recourse to public funds, disruption to the wider economy that would otherwise occur if a major UK bank were to fail in a disorderly way. Once minimum capital requirements have absorbed the losses made by a failed bank, the recapitalisation element of MREL is used to build the capital base of a resolved bank, so that it meets Threshold Conditions. This recapitalisation element can be met with regulatory capital instruments or MREL-eligible liabilities, which are long-term, unsecured and subordinated debt.

In 2015, the FPC assessed the appropriate level of minimum Tier 1 capital requirements and buffers for the UK banking system.

In doing so, the FPC drew on analysis by Bank staff of the macroeconomic costs and benefits of bank capital. In particular:

- The benefits to society in terms of the reduction in the likelihood and costs of financial crises.

- The costs of bank capital to society arise due to the fact that loss-absorbing capital is a more expensive way for a bank to fund lending than certain other debt liabilities, such as deposits. Higher capital requirements therefore increase the cost of credit to the real economy, and, at the margin, this diminishes the capacity of the banking system to support sustainable economic growth over the long term.

The Bank's analysis suggested that the optimal level for minimum requirements and buffers together, met with Tier 1 capital, was in the region of 10%–14% of banks' risk-weighted assets assuming no gaps or shortcomings in the measurement of risk weights.

Overall, based on analysis of the economic costs and benefits of capital, the FPC judged at the time that the appropriate Tier 1 capital requirement for the UK banking system, in aggregate, was 11% of risk-weighted assets.

This assessment referred to the Tier 1 capital requirement at the system level appropriate for a standard risk environment. This requirement would be supplemented by additional time-varying buffers to reflect changes in the aggregate risks that banks face, and by firm-specific buffers set by the PRA to address microprudential, idiosyncratic risks.

At the time, the FPC also noted that there were shortcomings in the definitions of risk-weighted assets. These shortcomings, for example around risks associated with defined benefit pension fund deficits that are not included in risk-weighted assets, or risk weightings that are too low, are typically compensated for in additional capital requirements.

In light of this, the FPC judged at the time that the appropriate level of Tier 1 capital requirement for the UK banking system was 13.5% of risk-weighted assets, based on existing measures of risk weights.

The FPC judged that this should be supplemented by a setting in the region of 1% for the UK countercyclical capital buffer rate (UK CCyB rate) in a standard risk environment; that is, when risks are judged to be neither elevated nor subdued.

A 1% UK CCyB rate adds around 0.4 percentage points of risk-weighted assets to aggregate capital requirements of the major UK banks, given the current geographic composition of their activity, **bringing Tier 1 capital requirements to around 14% of risk-weighted assets in a standard risk environment**.

The FPC's assessment of the appropriate level of Tier 1 capital is lower than earlier estimates of the optimal level of capital for the banking system, including those that were produced by the Basel Committee on Banking Supervision (BCBS) to inform the post-crisis Basel III standards. This reflects three key judgements relating to (1) effective resolution arrangements; (2) effective supervision and structural reform; and (3) active use of the UK countercyclical capital buffer.

(2) The Threshold Conditions are the minimum requirements that firms must meet at all times in order to be permitted to carry on the regulated activities in which they engage. For more detail see *The PRA's approach to banking supervision*.

The FPC has reviewed the judgements underpinning its assessment of the appropriate level of capital for the UK banking system and is confirming that its 2015 benchmark remains appropriate.
This reflects the fact that there have been no significant developments (beyond those anticipated at the time) that affect the FPC's judgement of the benefits and costs of requiring banks to hold more capital.

Effective resolution arrangements

The FPC's benchmark reflected a judgement that effective resolution arrangements would materially reduce both the probability and costs of future financial crises, and therefore reduce the appropriate level of Tier 1 capital requirements by about 5 percentage points.

Since 2015, there has been further progress in banks' resolvability. UK banks are on track to meet MREL requirements.(3) This will help ensure that they maintain sufficient resources to provide for recapitalisation in resolution.

Much progress has also been made to eliminate barriers to resolvability and develop cross-border co-operation. The Bank set out its approach to the Resolvability Assessment Framework (RAF) in 2018, which builds on the work done since the financial crisis and sets out the next step in implementing the resolution regime: ensuring that firms are, and able to demonstrate publicly that they are, resolvable. The Bank, acting in its capacity as the UK resolution authority, will continue to assess firms as part of the first cycle of the RAF, with major UK firms and the Bank making public disclosures as to firms' resolvability from June 2021.

In light of this progress, the FPC is reconfirming its judgement that effective resolution arrangements reduce the appropriate level of capital requirements by around 5 percentage points.

The Bank, in its capacity as the UK resolution authority, is also clarifying that, in the event of a bank resolution, it expects all debt that is bailed in to be written down or converted to the highest quality of capital: common equity Tier 1 (CET1).
Writing down or converting liabilities into CET1 during resolution will help ensure that, even if buffers have been fully exhausted, a resolved bank would be recapitalised to a level that will make it resilient to further losses, supporting its resolution and minimising the wider economic costs of its failure.

Effective supervision and structural reform

The FPC placed weight on the role that forward-looking, judgement-led prudential supervision conducted by the Prudential Regulation Authority plays in ensuring safety and soundness of UK banks.

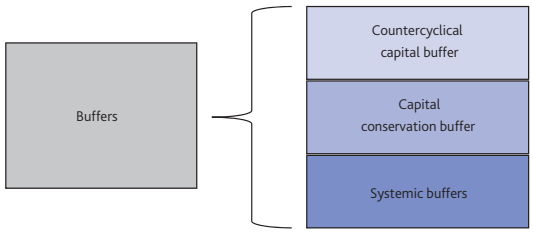
This is complemented by structural changes since the financial crisis. These include the implementation of ring-fencing since January 2019, as required by the Banking Reform Act, which separates core deposit-taking (from households and small/medium-sized businesses) from investment banking activities. These restructuring efforts support resolvability and increase the resilience of ring-fenced banks in the UK to risks originating in other parts of their group or the global financial system.

Active use of the UK countercyclical capital buffer

The FPC judged that the appropriate Tier 1 capital requirement for a standard risk environment should be supplemented by a time-varying UK CCyB rate. More detail on this judgement is set out later in the chapter.

Banks' capital buffers are made up of specific components, some of which vary across banks and through time (**Chart D.2**). All capital buffers must be met with CET1 and can be drawn down to absorb losses in stress without needing to cut back lending to the wider economy.

Chart D.2 The composition of buffers in the capital framework



Notes: Individual banks are also set PRA buffers. These are set on a firm-specific basis to ensure that banks that are more at risk of loss than the system in aggregate have additional capital buffers to reflect these idiosyncratic risks. These are set in addition to the FPC benchmark.

These buffers include:

- The **capital conservation buffer** which applies to all banks. This is set as 2.5% of risk-weighted assets and establishes a base level of capacity across the system to absorb losses while continuing to provide services to the real economy.

- **Systemic buffers** which are set for banks judged to be systemically important for either the global or domestic economy, because their distress or failure would cause more damage to the economy. By having bigger buffers they are held to higher standards, and are more able to absorb the effect of stresses.

(3) End-state MREL will apply from 2022, with interim MRELs from 2019 (for global systemically important banks (G-SIBs)) and 2020 (for non G-SIBs). The Bank's approach to MREL also implements the Financial Stability Board (FSB) Total Loss-Absorbing Capacity (TLAC) Standard for UK Global Systemically Important Banks (G-SIBs).

The countercyclical capital buffer can be used to ensure capital levels respond to the risk environment. By ensuring that the system has appropriate usable capital buffers the countercyclical capital buffer can reduce the size of economic downturns.

The **CCyB** is composed of UK and overseas elements, set by individual authorities. The FPC is responsible for the element of the buffer that is calculated by reference to banks' relevant UK exposures.

The CCyB serves two purposes over and above those served by other elements of banks' capital buffers.

The UK CCyB can be released by the FPC in a stress. This sends a clear signal to banks that the released capital should be drawn down as needed to absorb losses, and does not need to be replenished quickly. This also helps to reinforce that other elements of capital buffers can be drawn down too.

This means the CCyB can be used to help to avoid the impact on the wider economy of banks seeking to preserve capital ratios in the face of losses by cutting back lending. Active use of the CCyB can dampen economic shocks and help to reduce the size of economic downturns.

By varying the UK CCyB rate to reflect the risk environment, the FPC can avoid the need to capitalise the banking system for high risk conditions at all points in time: an outcome the FPC judges to be economically inefficient.

For example, when vulnerabilities are judged to be building up, either because banks could face bigger economic shocks, or because they are more sensitive to them, a larger buffer is needed to absorb potential losses.

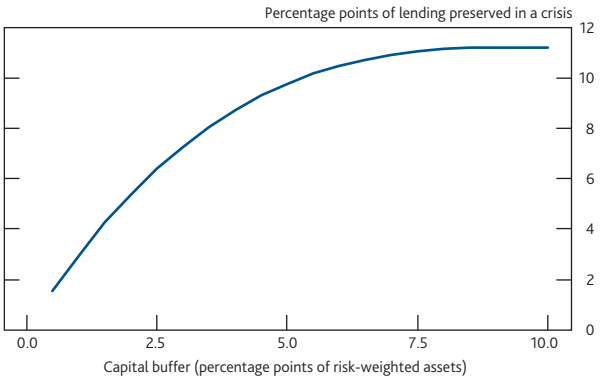
The FPC therefore intends to vary the buffer — both up and down — in line with the risk, at the system level, that banks will incur losses on UK exposures. Increasing the UK CCyB rate may also restrain credit growth and mitigate the build-up of risks to banks, but this is not its primary objective.

By moving early, before risks are elevated, the FPC expects to be able to vary the UK CCyB rate gradually, and to reduce the economic cost of increases in capital requirements.

The FPC is raising the level of the UK CCyB rate that it expects to set in a standard risk environment from in the region of 1% to in the region of 2%.

Empirical evidence suggests that if banks had bigger capital buffers to draw on in a stress, this could preserve a substantial amount of lending that may otherwise have been cut (**Chart D.3**). In aggregate, major UK banks are currently maintaining regulatory buffers amounting to 4.5% of risk-weighted assets — a level at which the evidence suggests there could still be benefits from increasing buffers.(4)

Chart D.3 The effect of larger capital buffers in preserving bank lending in a crisis



Notes: Bank estimates of the increases in the stock of lending after one year in the crisis that usable capital buffers of a given size could deliver (relative to not having any usable capital buffers). Illustrative approximation based on Bank analysis using US data following Carlson *et al* (2013). Carlson *et al* (2013) considers the marginal impact of additional usable capital on the lending decisions of US banks with large, medium or small voluntary capital buffers during the crisis.

When fully implemented, a 2% UK CCyB rate would enable banks to absorb up to £23 billion of losses which might otherwise lead them to restrict lending. Given losses of that scale, a cut in the UK CCyB rate to zero could preserve up to £500 billion of banks' capacity to lend to UK households and businesses. This compares with around £100 billion of net lending in the past year.

The FPC has also considered historical evidence around the level of UK CCyB that would have been appropriate in an elevated risk environment.

That evidence suggests that in 2007, the UK CCyB rate would have needed to be set in the range of 3.5%–5% for the UK banking system to have had sufficiently large usable capital buffers to absorb losses that followed the credit boom without severely restricting lending to the real economy.

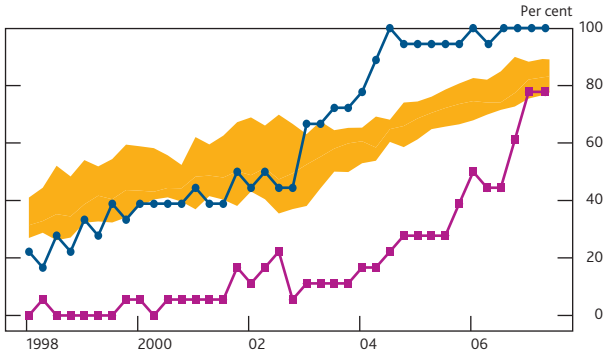
As one illustration, an adjusted version of the 'buffer guide' designed by the Basel Committee on Banking Supervision, which provides guidance for the appropriate setting of the CCyB, would have pointed to setting a UK CCyB rate of 3.9% of risk-weighted assets in 2007.(5)

An alternative estimate of the UK CCyB in an elevated risk environment can be constructed from historical data on bank losses. Losses for a sample of large international banks informed the Bank's estimates of optimal capital in a standard risk environment (Brooke *et al* (2015)). Conditioning the losses data on elevated risk environments suggests a UK CCyB rate of around 5% of risk-weighted assets could be warranted in these circumstances.

(4) This figure excludes the foreign element of the CCyB and PRA buffers which are set in addition to the FPC's assessment of Tier 1 requirements in a standard risk environment.
(5) The Basel buffer guide assumes that countries cap the CCyB rate at 2.5%. The adjusted version removes this cap.

In order to assess how to get to a UK CCyB rate of 3.5%–5%, the FPC has reviewed how indicators of risks faced by the banking system evolved in the run-up to the 2008 financial crisis. **Chart D.4** shows how a range of risk indicators that the FPC monitors were placed relative to their historic distributions during the run-up to the financial crisis.

Chart D.4 The FPC's core indicators leading up to 2007



Notes: The chart is based on 18 of the FPC's 'core indicators' that the FPC monitors in relation to the setting of its policy tools and for which data is available from 1998 to the crisis. The swathe shows the interquartile range of the core indicators. The blue line shows the share of indicators above the 50th percentile of their respective distributions. The magenta line shows the share of indicators above the 75th percentile of their respective distributions. FPC's judgement of the risk level is not mechanically linked to a fixed set of indicators.

The chart demonstrates that many indicators did not point towards elevated risks until 2004 or later. Given that any decision to increase the UK CCyB rate normally takes 12 months to become effective, the FPC judged that it was unlikely the Committee would have been able to identify risks sufficiently early to maintain a gradualist approach to raising the UK CCyB from a 1% rate in a standard risk environment and also ensure the banking system was appropriately capitalised for its risks at the peak of the cycle.

Starting from a higher UK CCyB in a standard risk environment would have facilitated a more gradualist approach in the lead-up to the crisis, allowing the FPC time to observe evidence of building risks and responding in a way that did not create a downturn in credit growth or the economy.

Overall, raising the level of the UK CCyB rate the FPC expects to set in a standard risk environment from in the region of 1% to in the region of 2% will improve the responsiveness of capital standards to the economic environment.

- Banks should have more releasable capital to absorb losses in stress without cutting lending. This will be even more important as the new accounting standard (IFRS 9) phases in and losses are recognised earlier.

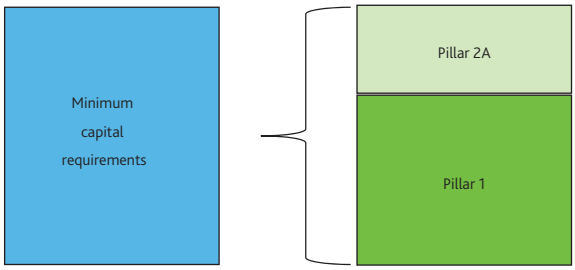
- It will facilitate a gradualist approach to raising the UK CCyB rate, while also ensuring that the banking system has appropriately large usable buffers in place at the peak of the cycle.

The FPC judges the 2% UK CCyB rate to be appropriate given the current standard risk environment. It is therefore raising the CCyB rate from 1% to 2%. This will take effect in one year (see Overview of risks to UK financial stability chapter).

In light of the FPC's decision to increase UK CCyB rate for a standard risk environment, the PRA will consult in 2020 on a reduction in minimum capital requirements to acknowledge the additional resilience associated with higher macroprudential buffers.

Banks' minimum capital requirements are made up of two components (**Chart D.5**):

Chart D.5 The composition of minimum capital requirements



- **Pillar 1** requirements are set by international standards and EU law, apply to all banks and are set as 8% of risk-weighted assets for all firms. Within that, 6% of risk-weighted assets must be met with Tier 1 capital. Of this 6%, three quarters (4.5%) must be met with CET1 capital. The remainder (1.5%) can be met with AT1.

- **Pillar 2A** requirements vary across banks. These are set to capitalise risks that are either not addressed or only partially addressed by the international standards for Pillar 1 risk weights (eg risks associated with firms' own pension schemes). These additional minimum requirements must be met with the same minimum quality of capital composition as in Pillar 1. These requirements are set periodically for UK banks by the PRA.

The PRA has undertaken a high-level review of the extent to which the FPC's decision to increase the standard risk environment UK CCyB rate impacts upon the appropriate level of minimum capital requirements needed to ensure safety and soundness of PRA-regulated firms. All else equal, the FPC's decision will increase the resources a bank is expected to have to absorb losses before breaching its minimum requirements, when the risk environment is judged to be standard. For a loss of a given size this additional layer of loss absorbency is likely to reduce the chances that minimum requirements will be insufficient to resolve a bank in an orderly manner if it fails.

Reflecting the additional resilience associated with higher macroprudential buffers, the PRA will consult in 2020 on

proposals to reduce minimum capital requirements in a way that leaves overall loss-absorbing capacity (capital plus bail-inable debt) in the banking system broadly unchanged. The PRA will consult in 2020 on a proposal to reduce variable Pillar 2A requirements for the largest UK banks by 50% of the relevant firm-specific increase in the UK CCyB rate. The proposal is intended to maintain loss-absorbency requirements because, unless banks are constrained by other requirements such as the leverage ratio, reductions in Pillar 2A will automatically result in an additional reduction in the recapitalisation element of MREL for these banks.(6)

For smaller banks that have MREL requirements set equal to their minimum capital requirements (ie that are not required to maintain any additional recapitalisation element of MREL), and taking into account its competition objective, the PRA will consult in 2020 on reducing variable Pillar 2A requirements by 100% of the relevant firm-specific increase in the UK CCyB rate. This proposal is also intended to maintain loss-absorbency requirements for these banks, where appropriate.

These proposed reductions in Pillar 2A requirements will be subject to supervisory judgement to ensure that each bank's minimum capital requirement continues to provide adequate coverage of all the risks to which it is exposed.

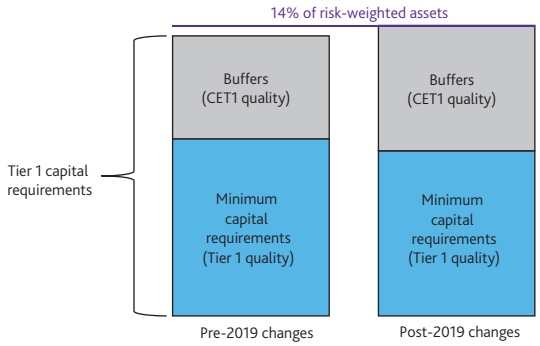
On balance, after considering a range of options, the PRC considers that the proposed approach is the fairest across firms, having regard to the PRA's primary and secondary objectives.

The PRA intends to review its Pillar 2A methodologies in more detail by 2024, in light of changes in buffers and improvements in the way in which risk-weighted assets are measured following the finalisation of Basel 3.

The changes will keep capital requirements for major UK banks in line with the benchmark level first set by the FPC in 2015.
Because the proposals increase capital buffers while lowering other forms of loss absorbency, the changes described above will lead to an increase in the share of overall requirements that have to be met with the highest-quality capital instruments, boosting the resilience of the system.

Based on current major UK banks' balance sheets, the proposed changes to the capital framework are estimated to increase aggregate Tier 1 requirements and buffers by 0.35 percentage points from around 13.7% to around 14% of risk-weighted assets (stylised in **Chart D.6**). This keeps aggregate Tier 1 minimum requirements and buffers in line with the FPC's assessment for Tier 1 requirements in a standard risk environment.

Chart D.6 Major UK banks' Tier 1 capital requirements



Notes: 2019 changes include effect of increasing the UK CCyB and the proposed reduction in Pillar 2A requirements. Requirements shown in chart exclude the foreign element of the CCyB and PRA buffers which are set in addition to the FPC assessment.

The FPC and PRC recognise that the proposed changes to the capital framework may increase individual banks' loss-absorbency requirements, including where banks currently do not have sufficient Pillar 2A to benefit from the proposed reduction, do not receive the proposed reduction as a matter of supervisory judgement, or are bound by the leverage ratio requirement. However, at this point it appears likely that the recent downward trend in capital requirements for misconduct will continue, particularly given the PPI time bar. Given this, and pending policy developments related to IFRS 9, unless banks significantly increase their risk appetite then the Committees expect overall capital requirements for UK banks to remain broadly flat in the coming period, with major UK banks' loss-absorbency requirements remaining at around 28% of risk-weighted assets in aggregate.

The FPC continues to view leverage requirements as an essential part of the framework of capital requirements for UK banks.
The leverage ratio is a simpler indicator of a firm's solvency that relates a firm's capital resources to the nominal value of its exposures as opposed to the riskiness of its portfolio. The purpose of the leverage framework is to make the capital framework robust to the inherent errors and uncertainties in assigning risk weights. It can also curtail excessive balance sheet growth or act as a constraint to such excess before it occurs. Without a leverage ratio requirement, a bank with low average risk weights would be able to fund its assets with a substantial amount of debt and only very little equity, a structure that would be particularly susceptible to small errors in estimated risk weights.

The FPC has therefore established a framework of leverage requirements that complements and sits alongside the framework of risk-weighted requirements. Currently, the UK leverage ratio framework requires major banks and building

(6) For major UK banks, 2022 risk-weighted MREL requirements are expected to be set as two times (Pillar 1 + Pillar 2A requirements). So the proposal to reduce Pillar 2A by 50% of the increase in the UK CCyB rate would, in principle, reduce MREL requirements for these banks by 100% of the increase in the UK CCyB rate from in the region of 1% to in the region of 2% in a standard risk environment.

societies to satisfy a minimum Tier 1 leverage ratio of 3.25% on a measure of exposures that excludes qualifying central bank reserves. Mirroring the risk-weighted capital framework, three quarters of this must be met with CET1 capital instruments. The UK leverage ratio framework also includes regulatory buffers that must be met only with CET1 capital instruments — an additional leverage ratio buffer for systemically important banks and a countercyclical leverage ratio buffer.

The FPC and PRC intend to conduct a review of the UK leverage ratio framework in light of revised international standards once there is further clarity on how EU law might affect UK firms.

Box 6
IFRS 9 and the capital framework

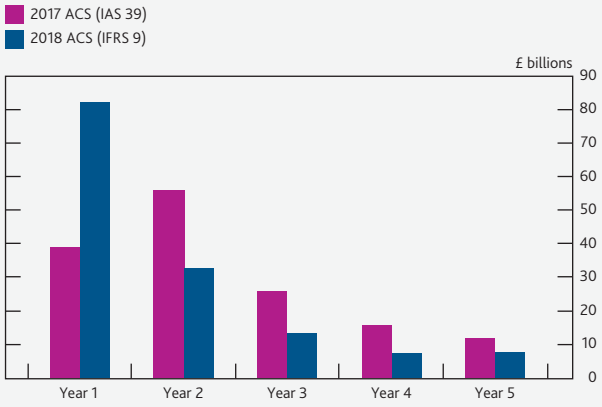
On 1 January 2018, most UK banks implemented a new accounting standard called International Financial Reporting Standard 9 (IFRS 9).

Under IFRS 9, banks set aside provisions for expected credit losses on all loans, not just where a loan is past due or has already fallen into default. Banks are therefore expected to set aside provisions to cover credit losses earlier than under the previous accounting standard, International Accounting Standard 39 (IAS 39). Under IAS 39, credit losses were recognised only once there was objective evidence a loss event had actually occurred (known as an 'incurred loss' basis).

Currently, banks can apply internationally agreed transitional arrangements for IFRS 9, which are designed to help them adjust to the new accounting standard. These arrangements provide relief for the capital impact of the new standard and will be phased out by 2023.

The change in accounting standard does not change the actual cumulative losses banks incur during any given stress episode. The losses will, however, be provided for earlier in the stress (as shown in **Chart A**). All else equal, bank capital, as measured under IFRS 9, is likely to fall more sharply in the early part of a stress as capital is drawn down earlier to raise provisions. By default, this would mean that banks need to run with bigger capital buffers in order to ensure that they do not breach their minimum requirements during a stress.

Chart A Time profile of impairments under IAS 39 and IFRS 9 in the ACS



Sources: Participating banks' STDF data submissions and Bank calculations.

The FPC continues to judge that the appropriate level of Tier 1 capital requirement for the UK banking system in a standard risk environment is around 14% of risk-weighted assets, based on existing measures of risk weights (see The UK bank capital framework chapter). This is calibrated so that banks could absorb cumulative losses during a severe stress and continue to provide essential services to the real economy. This judgement is invariant to accounting standards.

The Bank has therefore taken action to avoid an unwarranted *de facto* increase in capital requirements that could result from the interaction of IFRS 9 and the annual stress test. The Bank adjusted participating banks' stress-test hurdle rates in the 2018 and 2019 ACS to recognise the additional resilience provided by the earlier provisions taken under IFRS 9.

However, as set out in the 2018 stress-test results publication, the Bank has been considering options for a more enduring treatment for IFRS 9 in the capital framework. This box sets out an update of the FPC's and PRC's thinking on the interaction of IFRS 9 and the capital framework and seeks views on possible enduring treatments.

The Bank has considered options for recognising the additional loss absorbency that results from provisions under IFRS 9…

The change in accounting standard from IAS 39 to IFRS 9 has changed the amount of expected credit losses that are reflected in banks' provisions and capital. Under IAS 39, banks made provisions — and depleted capital — as defaults occurred in a stress. After a bank had eroded its capital buffers, it might still expect substantial additional losses that had not yet been recognised on its balance sheet. A bank's remaining loss absorbency at the point of resolution, which would be available to deal with those losses, would equal its MREL, which consists of regulatory minimum capital requirements and any additional recapitalisation element to be used in resolution (see The UK bank capital framework chapter and **Chart B**).

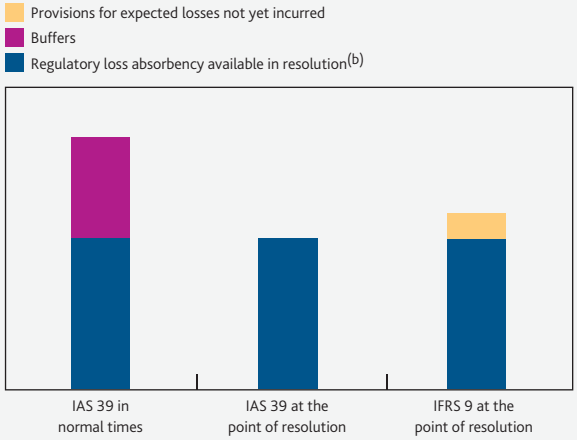
Chart B Stylised buffers and regulatory loss absorbency under IAS 39(a)

Source: Bank of England.

(a) For simplicity, this diagram assumes that the point of resolution occurs when minimum requirements are breached, and that buffers are exhausted solely by raising credit provisions.
(b) Regulatory loss absorbency available in resolution is equal to MREL. MREL is comprised of minimum capital requirements, plus any additional recapitalisation element of MREL.

Under IFRS 9, the expectation is that banks will make provisions — and deplete capital buffers — in a more timely way. This means that, all else equal, a bank will have more provisions for upcoming losses throughout a stress. In particular, at the point at which capital buffers are fully depleted, a bank is likely to have provisions for loss events that have not yet been incurred (as shown in **Chart C**).

Chart C Stylised buffers and regulatory loss absorbency under IFRS 9[a]



Source: Bank of England.

(a) For simplicity, this diagram assumes that the point of resolution occurs when minimum requirements are breached, and that buffers are exhausted solely by raising credit provisions.
(b) Regulatory loss absorbency available in resolution is equal to MREL. MREL is comprised of minimum capital requirements, plus any additional recapitalisation element of MREL.

When a bank enters resolution, it will therefore do so with more loss-absorbing capacity: in addition to its minimum capital requirements and any additional recapitalisation element of MREL, the bank will have provisioned for expected losses not yet incurred.

For banks subject to a bail-in strategy, the bail-in that occurs when the bank enters resolution is informed by a valuation on a conservative basis.(1) During this process, its remaining loss-absorbing capacity is used to absorb losses and recapitalise the firm on the basis of this resolution valuation. This valuation includes lifetime expected credit losses, which are similar to the additional provisions that a bank would have already taken under IFRS 9. Provisions for expected losses made ahead of resolution would thus directly reduce the losses that would be captured in resolution.

This means that a bank that has taken more provisions ahead of the point of resolution will require fewer additional resources to absorb losses, and thus less regulatory loss-absorbing capacity for use in resolution. Provisions and regulatory loss absorbency available in resolution are therefore directly substitutable for one another at the point of entering resolution, though not before that point given the greater fungibility of capital than provisions in going concern. It is therefore appropriate to make some adjustment to regulatory requirements to account for the additional loss absorbency resulting from the provisions for expected losses that will be made in a stress under IFRS 9.

…and will explore key considerations related to this approach in the coming year.

The FPC and PRC see merit in the concept that the additional provisions under IFRS 9 and regulatory loss absorbency are substitutable for one another at the point of resolution. The Committees' view is that this approach could in principle be applied to all firms, whether or not they participate in the ACS and whether or not they have a bail-in resolution strategy.

Before such a concept could be implemented in practice, there are at least three key implementation issues to consider. The remainder of this box discusses these. In addition to the key considerations below, the Bank is interested in the wider implications of this concept. The Bank will also continue to engage with stakeholders to understand other potential approaches to the interaction between IFRS 9 and the capital framework, before reaching any final decisions.

The Bank will use the 2020 ACS to explore how these approaches might work, and to understand better the effects of different options. As it explores these implementation questions, the Bank plans to continue to employ hurdle rate adjustments in the stress test, as it did in the 2018 ACS and 2019 ACS, to ensure that the test does not result in an unwarranted *de facto* increase in capital requirements as a result of IFRS 9.

The additional loss absorbency under IFRS 9 could be measured using provisions in excess of one-year regulatory expected loss.

The first key question for the approach is how to measure the additional loss absorbency that results from higher provisions at the low point of the stress under IFRS 9. The chosen measure should identify the additional provisions taken for expected losses under IFRS 9 that were not captured previously.(2)

The Bank, having engaged with relevant stakeholders in 2019, is minded to use an amount representing the provisions held on non-defaulted assets in excess of one-year regulatory expected loss.(3) The Bank plans to continue to consider the approach for assets under the standardised approach, as well as other implementation issues, in the coming year.(4)

(1) The valuation would incorporate all expected future losses based on fair, prudent and realistic assumptions. This applies to any write-down or conversion to CET1.
(2) For assets under the internal ratings based (IRB) approach, the regulatory capital framework deducts one-year regulatory expected loss net of provisions from capital resources, which means that provisions below these expected losses were already captured under IAS 39; expected credit losses were also already taken into account on defaulted assets under IAS 39.
(3) The Bank will also consider the interaction between these proposals and existing international standards which allow general provisions to be added to Tier 2 capital, subject to certain restrictions.
(4) Regulatory expected loss is not calculated on assets which fall under the standardised approach to calculating risk weights. The Bank will continue to work on an appropriate way to measure the increase in loss absorbency due to additional IFRS 9 provisions made in respect of these assets.

The resilience value of additional provisions could be recognised in advance or as provisions are made.

The second key consideration is whether minimum regulatory loss-absorbency requirements (including any recapitalisation component for resolution) should be adjusted as provisions are made, or before, in anticipation of them being made.

For example, minimum capital requirements could be adjusted in a stress to reflect the provisions that firms are making. Under such an approach, regulatory minima would be adjusted as and when firms report additional provisions. This would allow greater flexibility and certainty to match any adjustment to the additional loss absorbency resulting from provisions when they are actually made.

This option could, however, result in uncertainty for banks and their investors, particularly if there were delays between provisions being reported and regulatory requirements being released.

Alternatively, minimum capital requirements and capital buffers could be adjusted in advance to account for the additional provisions that banks are likely to raise in a future stress. Such an adjustment would be informed by stress testing.

In this approach, the capital needed to fund provisions in a future stress would be held in the regulatory buffers part of the capital stack, rather than in minimum requirements. This could give banks and markets more assurance that capital could be depleted to raise provisions without making it more likely that a bank would breach its regulatory minima and be placed into resolution.

However, it would also require taking a judgement *ex ante* on the amount of additional provisions that banks would be likely to accumulate by the point of resolution, as buffers and minima would need to be adjusted in advance of a stress occurring in reality. The stress test would be an input into that judgement.

Under both options, any adjustment of minimum capital requirements would be subject to supervisory discretion to ensure that overall minimum capital requirements are appropriate on a firm-by-firm basis.

An adjustment could be made via minimum capital requirements, the recapitalisation element of MREL, or a combination thereof.

The third question is which components of the minimum regulatory loss-absorbency requirements should be adjusted, regardless of whether this is done in advance or during a stress as provisions are made.

The adjustment could be made to minimum capital requirements (which must be met in fixed minimum proportions of CET1, Tier 1 and Tier 2), or the recapitalisation element of MREL (which can be met with MREL-eligible liabilities), or a combination of the two.

For firms subject to a bail-in resolution strategy, the recapitalisation component for resolution is sized to match minimum capital requirements. This ensures that if a bank is placed in resolution and losses wipe out its minimum capital, it can still be recapitalised to meet its regulatory minimum capital requirements and continue to operate.

A range of considerations would inform any decision on these options, including:

- the quality of banks' loss-absorbing capacity after buffers are exhausted;
- subject to engagement with the Bank in its capacity as the UK resolution authority, the merits or otherwise of decoupling the Bank's policy for setting MREL from the PRA's minimum capital requirements;
- the extent to which banks would become more likely to breach their minimum requirements under stress, if minimum capital requirements are adjusted by less than the additional provisions;
- the ability of minimum capital requirements to ensure that banks maintain the confidence of depositors and the markets in stress; and
- the efficiency of capital use (**Table 1**).

Table 1 Comparison of different sources of loss absorbency under IFRS 9

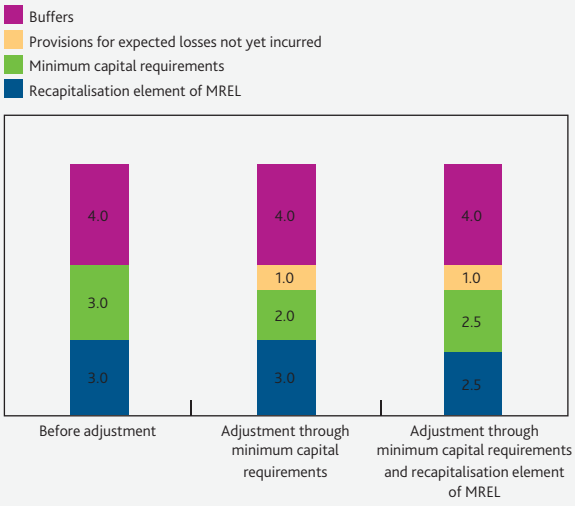
	IFRS 9 provisions	Common equity Tier 1 (CET1)	Additional Tier 1 (AT1)	Tier 2	MREL-eligible debt
Absorb losses in gone concern	Yes	Yes	Yes	Yes	Yes
Absorb losses in going concern	Yes	Yes	Once converted/ written down	Under certain circumstances[(a)]	–
Associated with specific exposure	Yes	–	–	–	–

Source: Bank of England.

(a) Under certain circumstances, Tier 2 capital can be written down or converted to CET1 by the Bank of England pre-resolution, ie while a firm is still a going concern.

Chart D sets out a stylised depiction of two options. The Bank will use the 2020 ACS to understand the implications of these options better. Implementation of these proposals will be considered in light of any changes to international standards and the UK legal framework.

Chart D Stylised depiction of illustrative options for implementation of the IFRS 9 adjustment(a)



Source: Bank of England.

(a) Numbers shown were chosen for ease of illustration, and do not correspond to banks' actual capital requirements.

The Committees remain open to views on how best to take this forward, including other options.

The Bank would welcome feedback on the overarching principles outlined above, and on the considerations for implementation, as well as potential alternative approaches for incorporating IFRS 9 into the framework for bank capital requirements.

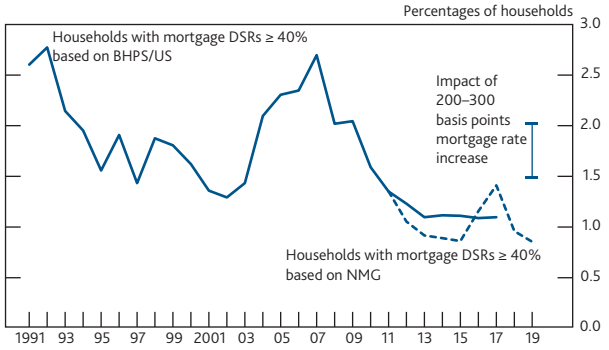
The implementation options above focus on minimum capital requirements on a risk-weighted basis. Alongside these, the FPC and PRC will consider implementation possibilities for firms whose binding minimum capital requirements are determined by the leverage framework.

UK household indebtedness

The proportion of very highly indebted households in the UK remains low. Mortgage lending conditions remain accommodative, but muted demand has limited lending growth, and the FPC's mortgage market Recommendations continue to guard against a material deterioration in borrower resilience. Consumer credit growth has continued to slow, reflecting both tightening supply and muted demand. The 2019 stress test shows that the UK banking system would be able to absorb losses on household debt, even in a severe downturn.

Chart E.1 Debt-servicing costs are low, supported by low interest rates

Percentage of households with mortgage debt-servicing ratios (DSRs) at or above 40%(a)(b)

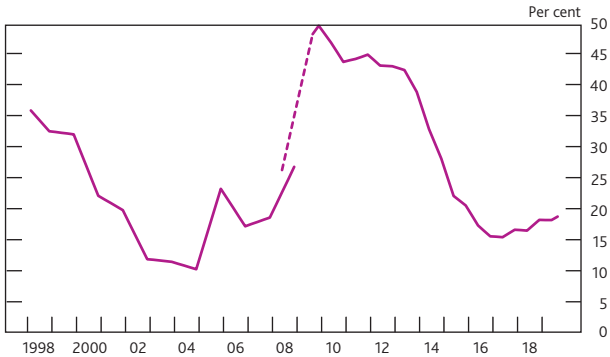


Sources: British Household Panel Survey/Understanding Society (BHPS/US), NMG Consulting survey, ONS and Bank calculations.

(a) Percentage of households with mortgage DSR at or above 40% calculated using BHPS (1991–2008), US (2008–16), and the online waves of NMG Consulting survey (2011–19).
(b) A new household income question was introduced in the NMG survey in 2015. Adjustments have been made to data from previous waves to produce a consistent time series.

Chart E.2 The share of the stock of mortgages with high LTVs is little changed in recent years

Share of the stock of mortgages for UK lenders with LTV ratios at or above 75%(a)(b)(c)(d)



Sources: BHPS, HM Land Registry, PRA regulatory returns and Bank calculations.

(a) The series shows current LTV ratios (ie updated for house price changes and repayments since the loan was originated).
(b) Data up to June 2008 are annual based on responses to the BHPS, where respondents were asked to report their outstanding mortgage debt and estimate the current value of their property or properties.
(c) Data from March 2009 onwards are quarterly. The series was created by combining different regulatory returns in order to represent the entire UK mortgage market. Definitions of product types will differ slightly between sources.
(d) The dashed line estimates the impact of the change in house prices on the series in the intervening period using the UK house price index.

The proportion of very highly indebted households in the UK remains low.

UK household indebtedness (excluding student loans) has come down from 141% of incomes prior to the crisis to 121% in 2019 Q2. High household indebtedness can pose risks to the financial system and the UK economy through two channels:

- **Borrower resilience:** *highly indebted households are more likely to cut back sharply on spending to make their mortgage payments during a stress. This may amplify a downturn, increasing the risk of losses to lenders on all forms of lending.* Low interest rates are supporting sustainable debt-servicing costs for households. The share of households with a mortgage debt-servicing ratio at or above 40% — a level above which they are much more likely to experience repayment difficulties — has remained low, at 0.9%–1.4% over the past two years, according to the NMG Consulting survey (**Chart E.1**). Mortgage interest rates would need to increase by 200–300 basis points, without an accompanying increase in income, for this share to be around its 1997–2006 average of 1.8%.

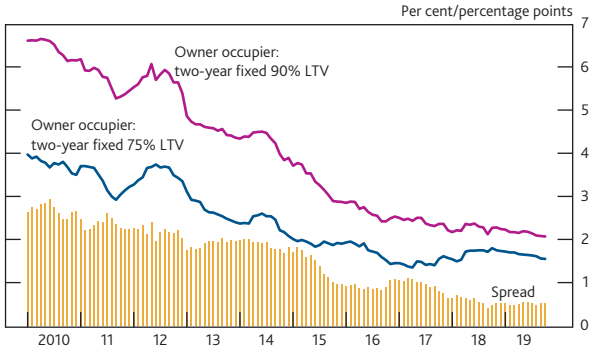
- **Lender resilience:** *highly indebted households are more likely to face difficulties in making debt repayments in a downturn. This can lead to losses for lenders and test their resilience.* Lenders are more vulnerable to losses if borrowers default on mortgages with high loan to value (LTV) ratios. The proportion of the stock of mortgages with LTVs above 75% is little changed in recent years, at just under 20% (**Chart E.2**).

The UK banking system would be able to absorb losses on household debt, even in a severe downturn.

The 2019 annual cyclical scenario included a rise in unemployment to 9.2% and a 33% fall in house prices (see The results of the 2019 stress test of UK banks chapter). Major UK banks were shown to be resilient to this stress, including severe consumer credit losses, while continuing to meet credit demands from households in this scenario.

Chart E.3 Mortgage rates are broadly unchanged in 2019

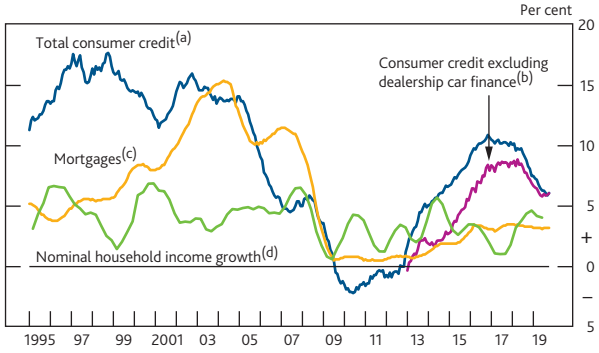
Quoted rates on 75% and 90% mortgage lending and the differential between them



Sources: Bank of England, FCA Product Sales Data and Bank calculations.

Chart E.4 Mortgage growth has been modest recently while consumer credit growth has slowed

Annual growth rate of mortgage lending, household income and consumer credit

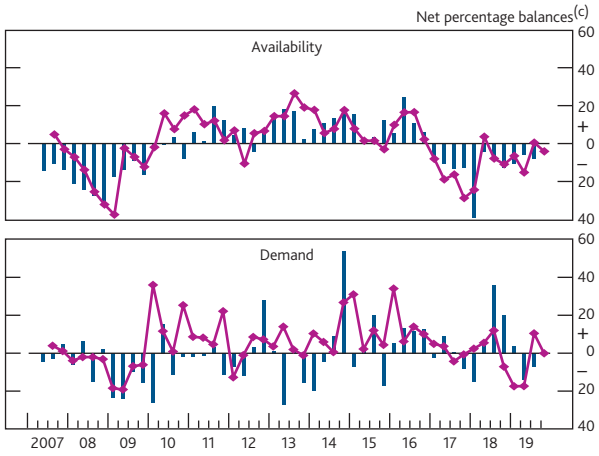


Sources: Bank of England, ONS and Bank calculations.

(a) Sterling net lending by UK monetary financial institutions (MFIs) and other lenders to UK individuals (excluding student loans). Seasonally adjusted.
(b) Identified dealership car finance lending by UK MFIs and other lenders.
(c) Twelve-month growth rate of total sterling net secured lending to individuals seasonally adjusted.
(d) Quarterly nominal disposable household income. Seasonally adjusted. Household disposable income series is adjusted for financial intermediation services indirectly measured (FISIM).

Chart E.5 Lenders continue to report tightening in the availability of unsecured credit and muted demand

Weighted responses to the Bank's *Credit Conditions Survey* reporting an increase/reduction in the demand and availability of unsecured lending over the previous quarter(a)(b)



Source: Bank of England *Credit Conditions Survey*.

(a) Net percentage balances are calculated by weighting together the responses of those lenders who answered the question. The blue bars show the responses over the previous three months. The magenta diamonds show the expectations over the next three months. Expectations balances have been moved forward one quarter so that they can be compared to the actual outturns in the following quarter.
(b) Question: 'How has availability/demand for unsecured lending from households changed?'.
(c) A positive balance indicates an increase in availability/demand.

Mortgage lending conditions remain accommodative…

Mortgage price and non-price terms have loosened in recent years, but conditions appear to have stabilised in 2019. Although the proportion of new mortgage lending at LTV ratios at or above 90% reached a new post-crisis peak of 20.5% in 2019 Q3, there are some signs that competition in this segment of the market has stabilised. The number of mortgage products being advertised in these categories has been broadly flat in 2019, having increased year on year since 2010. Mortgage rates were broadly unchanged in 2019 (**Chart E.3**), and significantly below their post-crisis average. And the additional compensation lenders demand for a 90%, over a 75%, LTV mortgage is broadly unchanged since the start of the year, having fallen year on year since 2010 (**Chart E.3**).

…but muted demand has limited lending growth…

Mortgage lending grew 3.2% in the year to October 2019, broadly in line with household incomes and significantly below the growth rates seen in the decade prior to the crisis (**Chart E.4**). Brexit-related uncertainty, housing affordability constraints, and policy changes in the buy-to-let market have all contributed to reduced mortgage demand in recent years.

… and the FPC's mortgage market Recommendations continue to guard against a material deterioration in borrower resilience.

Were Brexit-related uncertainty to fade, borrower demand could rebound significantly. If lending conditions remained accommodative, mortgage lending could grow faster than the economy, putting pressure on affordability. The FPC's mortgage market Recommendations guard against the risk of a marked loosening in underwriting standards that could cause a significant increase in the number of more highly indebted households, especially if house price growth were to exceed income growth. See FPC's review of its mortgage market Recommendations chapter for further information on the impact of these Recommendations.

Consumer credit growth has continued to slow, reflecting a combination of tighter supply conditions and muted demand.

Consumer credit is an important determinant of bank losses in a downturn. Loss rates can be far higher than for mortgages, because borrowers are more likely to default on unsecured debt and lenders do not have collateral to cushion losses. In the 2019 stress test, consumer credit accounted for 41% of losses on banks' UK lending, despite being only 7% of exposures.

Consumer credit growth was 6.1% in the year to October 2019, much lower than its post-crisis peak of 10.9% in late 2016 (**Chart E.4**). Respondents to the *Credit Conditions Survey* have reported a tightening availability of unsecured credit for the past two and a half years (**Chart E.5**). This has been particularly evident in the credit card balance transfer market, where the average interest-free period offered to new customers has fallen year on year since 2017. Lenders also reported that demand for unsecured lending had fallen in 2019 Q3, and expected it to be flat in the next three months (**Chart E.5**).

FPC's review of its mortgage market Recommendations

In the UK, mortgages are households' largest financial liability and lenders' largest loan exposure.

In the past, lenders' underwriting standards have loosened sharply and at times shifted from responsible to reckless. This can lead to a significant increase in household indebtedness and the number of more highly indebted households which, in turn, can make subsequent economic downturns worse.

Excessive household debt has the potential to threaten financial and economic stability. Highly indebted households are more likely to cut back sharply on spending to make their mortgage payments in the face of adverse shocks. And, if they face repayment difficulties, this could compromise the ability of lenders to keep supplying credit to the economy.

To insure against this, in June 2014 the FPC introduced a policy package consisting of two Recommendations:

- a loan to income (LTI) flow limit to restrain the proportion of new mortgages extended at or above 4.5 times a borrower's income; and
- when assessing affordability, building on FCA rules, mortgage lenders should apply an interest rate stress test that assesses whether borrowers could still afford their mortgages if, at any point over the first five years of the loan, their mortgage rate were to be 3 percentage points higher than the contractual reversion rate.

The FPC has reviewed its Recommendations. They prevent a loosening in underwriting standards that would otherwise lead to an increase in the number of more highly indebted households.

This promotes financial stability and supports economic growth through the business and financial cycle. The FPC judges that these benefits substantially outweigh any macroeconomic costs of forgoing any temporary boost to economic activity that a loosening of lending standards might otherwise generate.

Alternative policies to achieve similar benefits would be much more costly to the wider economy and present a greater risk to the Committee's secondary objective to support the government's economic policy of strong, sustainable and balanced growth.

The FPC's macroprudential tools are the first line of defence against potential risks to financial stability. Without them, monetary policy might need to address the financial stability consequences of deteriorating underwriting standards and rapid credit growth. Since monetary policy cannot be targeted at the mortgage market alone, this could generate a potentially severe economic slowdown, far outweighing any costs of the FPC's policies.

Alternatively, looser underwriting standards would result in an increase in the number of more highly indebted households and greater economic volatility. In those circumstances, to maintain the resilience of lenders, the prudential authorities would need to require lenders to have materially higher levels of capital, raising the cost of credit.

The FPC therefore judges it is appropriate to maintain both Recommendations. It views them as structural measures intended to remain in place through cycles in the housing market.

The FPC monitors the extent to which its policies are, as intended, holding back increases in the number of more highly indebted households. These measures have had limited effect to date on mortgage availability. Lenders have maintained their underwriting standards in recent years.

The FPC's limit on high LTI mortgage lending has not been reached. Mortgage approvals have remained steady. First-time buyers — who tend to have a greater reliance on borrowing at higher LTI ratios — now account for a higher share of activity than when the measures were introduced. Thus far, the measures have not constrained a material number of prospective homebuyers from purchasing a home.

At the margin some borrowers may have taken out smaller mortgages as a result of the Recommendations, as intended. This effect is likely to have been small in aggregate.

The housing market can be a key source of risk to UK financial stability

In the UK, mortgages are households' largest financial liability and lenders' largest loan exposure in aggregate. Housing accounts for nearly half of the total assets of UK households. And around two thirds of house purchases are financed by mortgage debt.

Historically, the rapid build-up of household debt has been a key source of risk to financial and economic stability — and not just in the UK. More than two thirds of the 46 systemic banking crises for which house price data are available were preceded by housing boom-bust cycles.(1) Mortgage booms have also tended to be followed by periods of considerably slower economic growth than non-mortgage credit booms, irrespective of whether a financial crisis occurred or not.(2)

Consistent with its statutory objectives, the FPC aims to limit the extent to which high levels of household indebtedness amplify the size and frequency of economic downturns, but without damaging prospects for growth over the medium term.(3)

Highly indebted households are more likely to cut back sharply on spending to make their mortgage payments in the face of adverse shocks.

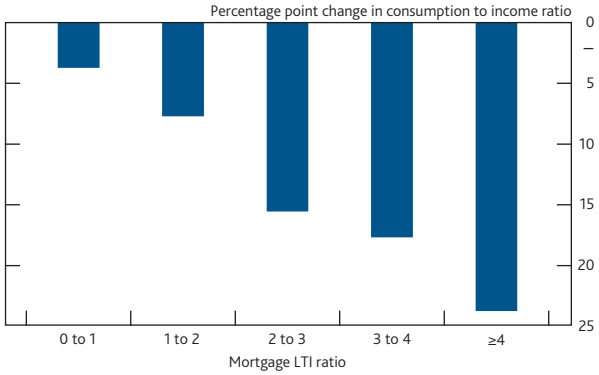
Highly indebted households are more vulnerable if they experience unexpected falls in their incomes or increases in their mortgage repayments. In an economic downturn, they are more likely to cut spending sharply in order to continue to service their debts, making the downturn worse. This ultimately increases the risk of losses to lenders, damaging their ability to maintain lending through the cycle.

The latest empirical evidence suggests a strong link between household debt and the size of consumer spending cuts in a downturn. During the financial crisis, countries that had higher levels of household debt relative to income initially saw larger falls in aggregate consumption.(4) Analysis of household-level data suggests that individual households with higher mortgage debt relative to income adjust spending more sharply in response to shocks. For example, data from the Living Costs and Food Survey show that, during the financial crisis, the fall in consumption relative to income among UK households with loan to income (LTI) ratios above four was around three times larger than the fall for those with ratios between one and two (**Chart F.1**). Econometric studies confirm these results, even after controlling for other household characteristics.(5)

(1) Crowe, C, Dell'Ariccia, G, Igan, D and Rabanal, P (2011), 'How to deal with real estate booms: lessons from country experiences', *IMF Working Paper No. 11/91*.
(2) See Jordà, O, Schularick, M and Taylor, A M (2016), 'The great mortgaging: housing finance, crises and business cycles', *Economic Policy*, Vol. 31, Issue 85, January, pages 107–52.
(3) For more detail see the June 2017 *Report*.
(4) See Flodén, M (2014), 'Did household debt matter in the Great Recession?'.
(5) See Bunn, P and Rostom, M (2015), 'Household debt and spending in the United Kingdom', *Bank of England Working Paper No. 554*.

Chart F.1 Individual households with higher mortgage debt adjusted spending more sharply during the crisis

Change in consumption relative to income among mortgagors with different LTI ratios between 2007 and 2009[a][b][c]

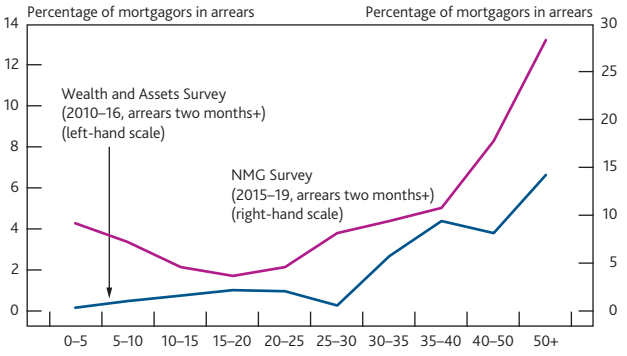


Sources: Living Costs and Food (LCF) Survey, ONS and Bank calculations.

(a) Change in average non-housing consumption as a share of average post-tax income (net of mortgage interest payments) among households in each mortgage LTI category between 2007 and 2009.
(b) LCF Survey data scaled to match National Accounts (excluding imputed rental income, income received by pension funds on behalf of households and FISIM). LTI ratio is calculated using secured debt only as a proportion of gross income.
(c) Repeat cross-section methodology used, with no controls for other factors, or how households may have moved between LTI categories between 2007 and 2009.

Chart F.2 Households with high DSRs are more likely to experience repayment difficulties

Households in two-month arrears by gross DSR[a]



Sources: NMG Consulting survey, Wealth and Assets Survey and Bank calculations.

(a) The share of mortgagors who have been in arrears for at least two months. The mortgage DSR is calculated as total mortgage payments on the household's main property (including principal repayments) as a percentage of pre-tax income. Reported repayments may not account for endowment mortgage premia.

There are several reasons why more highly indebted households might cut spending more in a downturn. Recent econometric studies from the US and UK indicate that highly indebted households are more prone to cutting spending sharply because they are more likely to lose access to credit in a downturn, which reduces their ability to smooth consumption.(6) Relatedly, higher repayment burdens associated with higher debt levels also reduce cash flow available for savings, which can reduce liquid asset buffers that could be drawn to support consumption in a downturn.(7)(8)

If highly indebted households face repayment difficulties, this could compromise the ability of lenders to keep supplying credit to the wider economy.

The proportion of households experiencing repayment difficulties can rise sharply as the share of income spent on servicing mortgage debt — also known as the mortgage debt-servicing ratio (DSR) — increases beyond 35%–40% (**Chart F.2**). In a severe downturn, some borrowers will be unable to repay their mortgages even after cutting back on spending, for example, in the event of a rise in unemployment or mortgage rates.

The resilience of lenders could be tested if more highly indebted households default on their debts in response to adverse shocks, resulting in losses for the lender, not just on mortgages, but on other lending too. For instance if borrowers default on other credit commitments to prioritise mortgage payments, this can lead to direct losses for lenders. Alternatively, if they cut consumption to maintain their mortgage payments, this can lead to material losses on loans to businesses. During the 1990s recession for example, which was marked by a significant rise in interest rates and unemployment, cumulative mortgage loss rates were around 2.5%.(9) This poses a direct risk to UK financial stability.

The build-up of mortgage debt can be self-reinforcing.

Housing is the main source of collateral in the real economy, so higher house prices tend to lead to higher levels of mortgage lending, feeding back into higher valuations. And in an upturn, when risks are perceived to be low, lenders' underwriting standards can loosen sharply and at times shift from responsible to reckless, as they seek to maintain or build market share.

The FPC has taken action to mitigate these risks

To insure against such risks, the FPC introduced two Recommendations in 2014. These limit the proportion of new mortgages with high LTI ratios and promote minimum standards for how lenders test affordability for borrowers. In June 2017, the FPC clarified its affordability test Recommendation to ensure consistency in its application across lenders. The two Recommendations are:

- **an LTI flow limit** which limits the number of new mortgages extended at LTI ratios of 4.5 or higher to 15% of the new mortgages issued by a lender;

- **an affordability test** which specifies that mortgage lenders should assess whether borrowers could still afford their

(6) Kovacs, A, Rostom, M and Bunn, P (2018), 'Consumption response to aggregate shocks and the role of leverage'.
(7) Dynan, K and Edelberg, W (2013), 'The relationship between leverage and household spending behaviour: evidence from the 2007–2009 survey of consumer finances', *Federal Reserve Bank of St. Louis Review*, Vol. 95(5), pages 425-48.
(8) Baker, S R (2018), 'Debt and the response to household income shocks: validation and application of linked financial account data', *Journal of Political Economy*, Vol. 126, No. 4, August, pages 1,504–57.
(9) Includes 1 percentage points of losses incurred by insurers who held mortgage exposures at the time.

mortgages if, at any point over the first five years of the loan, their mortgage rate were to be 3 percentage points higher than the reversion rate specified in the mortgage contract at origination. The affordability test builds on the FCA's rules that require lenders to assess whether prospective borrowers could afford their mortgage, taking into account their income, spending patterns and potential future interest rate increases.

The affordability test builds a 'safety margin' between a household's mortgage payments and income that seeks to ensure the household sector is better able to withstand adverse shocks to income, employment and mortgage interest rates.

The FPC's two Recommendations complement each other in protecting households' ability in aggregate to service their debt (see Box 7). They also complement the annual stress test of major lenders, which assesses whether lenders can withstand sharp economic downturns, including large falls in house prices, while continuing to lend.

The insurance provided by the FPC's Recommendations continues to provide significant macroeconomic benefits

The FPC considered the benefits and costs of the Recommendations when it introduced them in 2014 and reviewed them in 2016 and 2017. It judged that by guarding against a build-up in household debt the measures helped to support financial stability — at a limited cost. It further judged that, without policy action, the risk of excessive household indebtedness was material.

In concluding its 2019 review, the Committee continues to judge that the Recommendations provide benefits that substantially outweigh any macroeconomic costs. To support this judgement, the Committee considered the possible impact of its Recommendations in different hypothetical scenarios (see Box 8).

The FPC's measures prevent a loosening of underwriting standards that would otherwise lead to an increase in the number of more highly indebted households.

The Recommendations hold back increases in risky mortgage lending. In doing so, they provide significant benefits:

- By limiting the number of more highly indebted households, they reduce the extent to which debt can amplify cuts in household consumption in response to adverse shocks.

- By limiting the deterioration in the stock of household debt, they further reduce the probability that households default on their mortgages.

- They can also reduce the risk of a self-reinforcing feedback loop between mortgage lending and house prices, which could amplify a fall in house prices in a downturn.

Together, they reduce the extent to which household debt can amplify a downturn, improving the financial resilience of both the UK financial system and the economy as a whole. By reducing the severity of crises and dampening financial amplifiers in economic downturns, the FPC's Recommendations support economic growth through the business and financial cycle.

These benefits significantly exceed any temporary macroeconomic costs.

The macroeconomic costs of the FPC's Recommendations arise from forgoing a temporary boost to housing activity if underwriting standards loosen. Such a temporary boost might result in some uptick in durable goods spending, though this effect would also be temporary, particularly if monetary policy acted to stabilise economic activity in order to meet the inflation target.

The Committee further judges that it is unlikely that a restriction in mortgage credit supply in circumstances in which underwriting standards loosened would have a material effect on the economy's longer-term growth rate or productive capacity. By preventing a sharp increase in mortgage credit supply, the Recommendations could hold back the collateral available to borrow for small businesses. But the empirical evidence suggests that this effect is likely to be small. Indeed, a number of studies find that increased household credit generally has a negative impact on long-run growth.(10) This could be, for instance, because during a housing boom banks may lean towards household lending at the expense of corporate lending, thereby reducing the credit available for productive investment.(11)

Alternative policies to achieve similar benefits would be much more costly to the wider economy and present a greater risk to the Committee's secondary objective to support the government's economic policy of strong, sustainable and balanced growth.

The remits of the MPC and FPC state that the FPC's macroprudential tools are the first line of defence against risks to UK financial stability. The remits also make it clear that if the FPC judged that its tools were insufficient to meet its objectives, monetary policy could act as a substitute for the

(10) See Mian, A, Sufi, A and Verner, E (2017), 'Household debt and business cycles worldwide', *The Quarterly Journal of Economics*, Vol. 132(4), pages 1,755–817 or Lombardi, M J, Mohanty, M and Shim, I (2017), 'The real effects of household debt in the short and long run', *BIS Working Paper No. 607*.

(11) Chakraborty, I, Goldstein, I and MacKinlay, A (2018), 'Housing price booms and crowding-out effects in bank lending', *The Review of Financial Studies*, Vol. 31 (7), pages 2,806–53.

Box 7

The FPC's affordability test and how it works with the LTI flow limit

The LTI flow limit and affordability test are complementary measures. They are applied in different ways, but they both work by limiting the amount that prospective mortgagors can borrow relative to their incomes.

The 'LTI flow limit' Recommendation limits the number of mortgages extended at LTI ratios of 4.5 or higher to 15% of a lender's new mortgage lending.

The 4.5 multiple was calibrated to ensure that, at a stressed mortgage rate of 7% and a typical mortgage term of around 25 years, mortgage payments would not exceed 35%–40% of a borrowers income.(1) That is the point beyond which the proportion of mortgagors that start experiencing repayment difficulties can rise sharply (**Chart F.2**).

The 15% flow at or above the 4.5 threshold ensures that access to high LTI mortgages remains for those borrowers who can afford it even if they were to experience a shock to their income, employment or mortgage rate.

The FPC's affordability test requires lenders to test that borrowers would still be able to afford their mortgage if mortgage rates were 3 percentage points higher than the reversion rate. This effectively sets an LTI cap for each borrower that depends primarily on the term of the mortgage (or 'tenor'), the borrower's spending commitments and the reversion rate on the mortgage.

For example, a borrower seeking a 25-year mortgage with a reversion rate of 4% (and hence a rate in the test of 7%) would be able to borrow 4.7 times their income if they could spend 40% of income on mortgage payments.

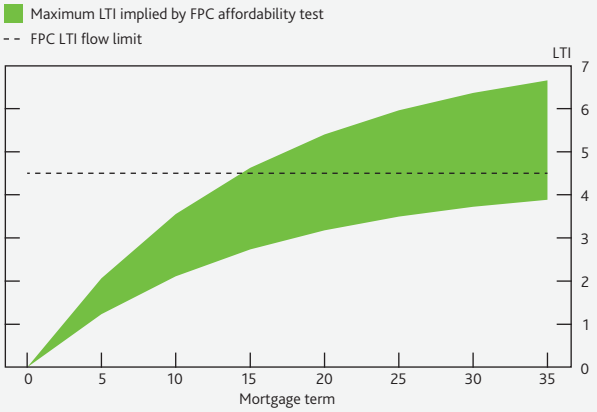
The relationship between the effective LTI cap implied by the affordability test and the mortgage term is illustrated in **Chart A**. The swathe reflects variations in the amount of income that can be devoted to mortgage payments (which depends on the borrower's spending commitments).

As Bank Rate rises, the affordability test could become more constraining if any higher level of Bank Rate is reflected in reversion rates. This would tighten the affordability test relative to the 4.5 LTI flow limit.

The Committee will consider the measures together when keeping the Recommendations under review.

Chart A The affordability test and LTI flow limit complement each other

Relationship between the affordability test and the LTI flow limit in constraining lending(a)(b)



Source: Bank of England.

(a) Swathe for affordability test assumes borrowers have 30% to 50% of gross income available to support mortgage repayments, and lenders assess affordability at stress interest rates of 6.75% to 7%. A majority of loans completed in 2016 Q3 were affordability tested at a stress interest rate of 7%.
(b) The FPC flow limit restricts the share of new mortgages at LTIs of 4.5 or greater to 15%.

The calibration of the policies will depend on the FPC's judgement around risks to both interest rates and incomes. Increases in Bank Rate lead to higher mortgage rates and, accordingly, higher mortgage payments. Higher unemployment raises the probability that borrowers suffer a reduction to their income, reducing the available resources to meet mortgage costs. Both types of shock increase mortgagors' DSRs, other things equal, and high DSRs have historically been associated with increases in arrears rates and falls in consumption.

The FPC will draw upon a range of indicators to inform its judgements around risks to interest rates and incomes. These indicators include, but are not limited to: the distance between variables' current values and their estimated equilibrium values; and historical and international evidence on the scale of potential shocks.

When assessing potential future changes to interest rates, the Committee is more likely to be guided by slow-moving, 'structural' measures of interest rates than by market expectations of future interest rates. Given the long-term nature of mortgage contracts, it judges that it would be imprudent to rely too heavily on potentially volatile short-term measures or solely on market-implied measures.

The affordability test is based on the mortgage reversion rate because this is the rate the mortgage will revert to contractually and can be avoided only if the borrower is able to refinance.(2)

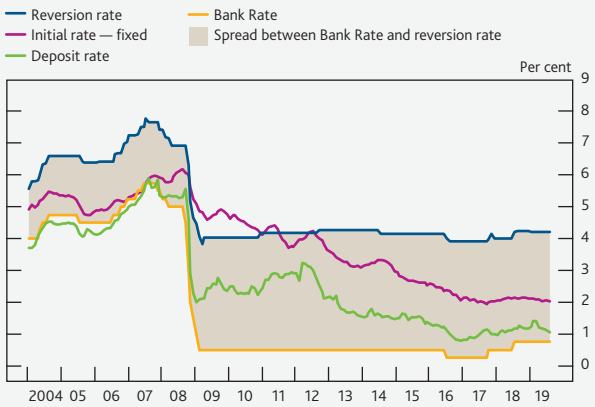
(1) This calculation is based on the mechanical relationship between a borrower's DSR and LTI, assuming their mortgage amortises over 25 years.
(2) The reversion rate is the (typically floating) interest rate to which a mortgage reverts after an initial contractual period that is often based on a fixed interest rate.

Borrowers may be unable to refinance in an adverse shock. For example, after the crisis, one third of mortgagors were on the standard variable rate.

Reversion rates have been relatively static in recent years. While initial mortgage rates have fallen, in part reflecting lower funding costs for banks, reversion rates have remained largely unchanged. As a result, reversion rates have remained just above 4%, much higher than Bank Rate at 0.75% and deposit rates of around 1%. This implies a spread between reversion rates and Bank Rate of around 3.5 percentage points, compared to a spread of under 2 percentage points in the lead up to the crisis (**Chart B**).

Chart B Reversion rates are high relative to Bank Rate and deposit rates

Mortgage and deposit rates and Bank Rate[a][b]



Sources: Bank of England and Bank calculations.

(a) The deposit rate series refers to time deposits.
(b) The reversion rate series is a weighted average of quoted rates across lenders using constant market shares. Initial rates and deposit rates are average quoted rates across lenders.

This spread between initial mortgage rates and reversion rates increases the risk that households could experience a sudden rise in their effective mortgage rate. It is therefore appropriate to capture these risks in the affordability test by linking it to the reversion rate. If the spread of reversion rates over Bank Rate were to come down, the risks to households would diminish and the affordability test would appropriately be based on the lower reversion rate.

The current wide spread between reversion rates and Bank Rate could be temporary, reflecting the current low level of Bank Rate and mortgage rates. Lenders could restore the previous spread by passing on less of any future increase in Bank Rate to reversion rates.

This would reduce the risk that reversion rates rise in the future and could merit an adjustment to the 3 percentage point increase in reversion rate included in the affordability test.

The FPC will therefore monitor the extent to which Bank Rate changes are passed through to mortgage reversion rates to assess whether there is a case for revisiting the calibration of its Recommendations.

mortgage market Recommendations by setting a higher interest rate than would otherwise be warranted to restrain growth in household debt. If such circumstances did arise, monetary policy would be a blunt tool. A material tightening of policy would be needed to reduce household credit growth to a similar degree to the Recommendations.

This would likely come at significant costs, including below-target inflation, a significant fall in GDP and higher unemployment. Research suggests that a sustained 2 percentage point increase in Bank Rate over 2004–06 would have reduced credit growth by around 4% by the end of the period. The reduction in credit growth would have been trivial, compared to the almost 50% increase in the stock of credit over that time. It would, however, have come at the cost of a cumulative GDP loss of 3%.(12)

In the absence of the FPC's Recommendations or monetary policy action, a loosening of underwriting standards would result in an increase in the number of more highly indebted households. This would result in greater economic volatility and deeper recessions.

In such a scenario, the FPC could raise the UK countercyclical capital buffer (CCyB) rate applicable to UK exposures or direct the PRA to set a sectoral capital requirement to help ensure lenders are resilient to larger potential losses, not just on their mortgage exposures but on all lending to the economy more widely. These higher levels of capital would be needed to ensure lenders could maintain lending through more severe downturns.(13)

The FPC could further seek to enhance borrower resilience by raising, or directing the PRA to raise, capital requirements even further to dampen any increase in mortgage lending. In theory, that could deliver the same benefits as the FPC's mortgage market Recommendations. But in practice, large increases in capital are likely to be needed and lenders' behaviour in response to such a rise in capital requirements would be highly uncertain.

Raising capital requirements could also come at a higher and more persistent cost. The FPC's mortgage market Recommendations target the risks directly, whereas higher capital requirements would increase the cost of lending across the economy.

Overall, these outcomes would be detrimental to the FPC's secondary objective to support the government's economic policy of strong, sustainable and balanced growth.

The FPC therefore judges it appropriate to maintain both Recommendations. It views them as structural measures, intended to remain in place through cycles in the housing market

The FPC monitors the extent to which its policies are, as intended, holding back increases in the number of more highly indebted households.

These measures have had limited effect to date on mortgage availability. Lenders have maintained their underwriting standards in recent years.

The Recommendations were not intended to rein in mortgage lending at the time of their introduction. They were calibrated to provide 'insurance' against the risk of a marked loosening in underwriting standards and a further significant rise in household indebtedness and the number of more highly indebted households. They were intended to affect mortgage lending only in circumstances in which lenders' underwriting standards loosened further.

Any impact of the FPC's Recommendations on UK housing market activity is difficult to disentangle from other factors, such as tighter underwriting standards as part of the Mortgage Market Review introduced in April 2014; policy changes made to the buy-to-let market in 2016–17; weaker housing demand in light of the EU referendum and Brexit-related uncertainty; or changes in lenders' own risk appetite.

Overall, mortgage approvals have increased to slightly above the levels seen before the FPC's Recommendations were introduced. In the year to 2019 Q3 there were 179,000 mortgage approvals per quarter, compared to 177,000 per quarter in the year to 2014 Q2 (**Chart F.3**).

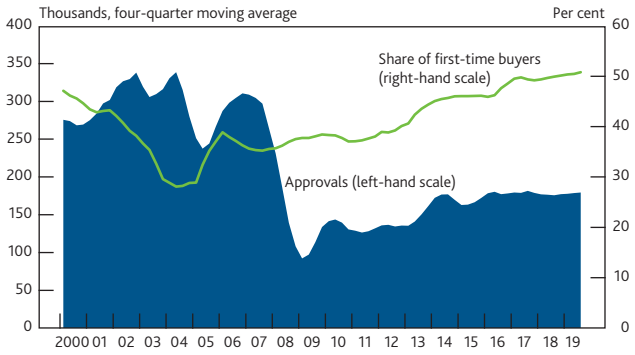
At the time the FPC's Recommendations were introduced, LTI ratios were rising rapidly and were above pre-crisis levels. Since then, the share of lending at LTI ratios at or above 4 has continued to rise but, within that, the share with an LTI ratio at or above 4.5 has remained below 11% (**Chart F.4**). The FPC's limit on high LTI mortgage lending has not been reached. There continues to be headroom for lending above the LTI limit in aggregate.

Assessing the impact of the FPC's *affordability* test is more difficult because the total number of prospective borrowers who fail the test is not directly observable. However, the evidence suggests that it has not had a large impact on mortgage availability:

(12) See Bean, C, Paustian, M, Penalver, A and Taylor, T (2010), 'Monetary policy after the fall', Proceedings — Economic Policy Symposium — Jackson Hole, pages 267–328.
(13) See 'The Financial Policy Committee's approach to setting the countercyclical capital buffer' and 'The Financial Policy Committee's powers to supplement capital requirements'.

Chart F.3 Mortgage approvals have been stable, and the share of first-time buyers has increased in recent years

Owner-occupier mortgage approvals and share of approvals to first-time buyers[a][b]

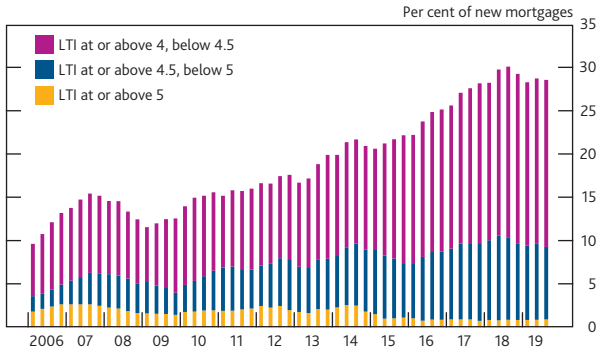


Sources: Bank of England and Bank calculations.

(a) Seasonally adjusted approvals for sterling loans secured on dwellings, net of cancellations.
(b) The split of approvals by borrower type is based on UK Finance mortgage completions data. Series have been smoothed to account for data volatility.

Chart F.4 There remains headroom for further high LTI lending

Per cent of new mortgages at LTI ratios at or above 4[a][b][c]



Sources: FCA Product Sales Data and Bank calculations.

(a) The Product Sales Data includes regulated mortgage contracts only. LTI ratio calculated as loan value divided by the total reported gross income for all named borrowers. Chart excludes lifetime mortgages, second charge mortgages, advances for business purposes and remortgages with no change in amount borrowed.
(b) Includes loans to first-time buyers, and council/registered social tenants exercising their right to buy.
(c) Data include regulated mortgage contracts only, and therefore exclude other regulated home finance products such as home purchase plans and home reversions, and unregulated products such as buy-to-let mortgages.

- On average, mortgagors borrow much less relative to their incomes than the amount at which the affordability test becomes a binding constraint. That amount is determined by the term of the mortgage, the reversion rate and the borrower's spending commitments (see Box 7). For example, a borrower seeking a 25-year mortgage and whose mortgage repayments would not exceed 40% of gross income when stressed to a 7% mortgage rate, would be able to borrow up to 4.7 times their income. This increases to 5 times income for a first-time buyer seeking a 30-year mortgage. By comparison, on average mortgagors borrow 3.2 times their income and first-time buyers borrow 3.5 times their income.

- When the FPC introduced its Recommendations in 2014 it noted that it was possible that some borrowers would be more affected than others. In particular, the Committee noted that borrowers who had a greater reliance on high LTI borrowing — such as first-time buyers or those in London and the South East where house prices are higher relative to incomes — could be more affected. However, as noted above, the share of first-time buyers has been increasing (**Chart F.3**). And even in London the share of new mortgages extended to first-time buyers had increased from 32% between 2005 and 2014 to around 40% since the policies were introduced.

- Renters who wish to purchase a house continue to be primarily constrained by lenders' deposit requirements to meet maximum loan to value (LTV) ratios — regardless of the affordability test. Bank staff estimate that only 1 in every 10 renters have enough savings for the 10% deposit required to take out a 90% LTV loan to purchase the average first-time buyer home.[14] Consistent with this, model-based analysis on trends in mortgage lending suggests that the FPC's Recommendations have had little effect on mortgage approvals for prospective borrowers.

- Were the affordability test to be excluding a large number of prospective mortgagors, borrowers could, in principle, seek to pass the test by lengthening mortgage tenor, which lowers monthly repayments. While there has been a long-run trend towards longer mortgage terms since the crisis, there has been no material acceleration in that trend since 2014 (**Chart F.5**). Bank staff analysis suggests the affordability test only accounts for up to 4 months of the 29 months increase in average mortgage terms since 2013.[15]

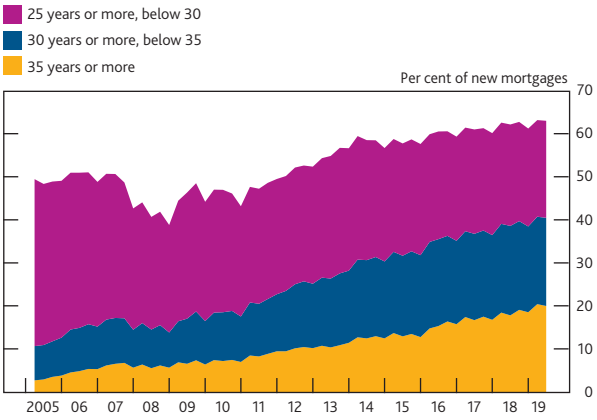
There is evidence that some borrowers are getting a smaller loan as a result of the Recommendations, as intended. The impact is small in aggregate.

Since the Recommendations were introduced, mortgage loans have 'bunched' just below 4.5 times LTI. At the same time, lending at LTI multiples above 5 has declined (**Chart F.4**). In part, this is likely to represent some individuals being constrained to smaller loans than they would have otherwise obtained. The size of this impact is small in aggregate. If the share of borrowers with an LTI between 4 and 4.5 had not increased from the level before the FPC Recommendations were made, and the additional borrowers in that category were to obtain an LTI of 5 instead, the value of new mortgage lending since the measures were put in place would be only 1% higher than it is today.

(14) In some cases first-time buyers receive financial help from family members to secure a deposit.
(15) Calculated using an econometric event study to identify the impact of the FPC Recommendations and FCA Mortgage Market Review on average mortgage term across borrowers with varying loan to income ratios.

Chart F.5 There has been a long-run trend towards longer mortgage terms

Share of new mortgages by mortgage terms[(a)(b)(c)]



Sources: FCA Product Sales Data and Bank calculations.

(a) The Product Sales Data includes regulated mortgages only. Chart excludes lifetime mortgages, advances for business purposed and remortgages with no change in the amount borrowed.
(b) Includes loans to first-time buyers, and council/registered social tenants exercising their right to buy.
(c) Data include regulated mortgage contracts only, and therefore exclude other regulated home finance products such as home purchase plans and home reversions, and unregulated products such as buy-to-let mortgages.

The limited impact of the policy to date is evidence that lenders have maintained their underwriting standards. In the event that underwriting standards were to loosen in future or housing market activity to pick up significantly, the FPC's housing tools would have a stronger impact on the availability of high LTI mortgages. The benefits of this — limiting the extent to which more highly indebted households amplify downturns — would far outweigh the costs of forgoing any temporary boost to economic activity that a loosening of underwriting standards might otherwise generate.

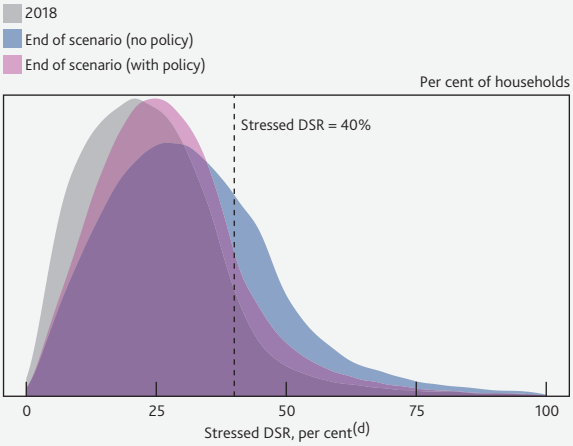
Box 8
Benefits and costs of the FPC's mortgage market Recommendations

To assess the benefits and costs of the Recommendations, the FPC considered a hypothetical 'housing boom' scenario in which a loosening of underwriting standards pushed mortgage lending higher and led to an increase in the aggregate house price to income ratio comparable to that seen before the crisis.

In this 'housing boom' scenario, the Recommendations would prevent a significant increase in the number of more highly indebted households. This maintains the resilience of household balance sheets. For example, the proportion of households with 'stressed' DSRs — the DSR after households are hit by a shock such as higher interest rates or unemployment — above 40% in this scenario would be around 5%, compared with 9% in the absence of the Recommendations (**Chart A**). That translates to over a million fewer households with a stressed DSR ratio above 40% as a result of the FPC's actions. Evidence suggests that a DSR of 40% is the point beyond which the proportion of borrowers that start experiencing repayment difficulties can rise sharply (**Chart F.2**).

Chart A In a housing boom, the share of households with high stressed DSRs would be much higher without FPC policies in place

Per cent of households with stressed DSR ratios above 40%[a][b][c]



Sources: FCA Product Sales Data and Bank calculations.

(a) Mortgages include loans to first-time buyers, and council/registered social tenants exercising their right to buy.
(b) Mortgage data include regulated mortgage contracts only, and therefore exclude other regulated home finance products such as home purchase plans and home reversions, and unregulated products such as second charge lending and buy-to-let mortgages.
(c) Projections of the stock of households in 2019 and at the end of a seven-year 'housing boom' scenario, with or without the FPC Recommendations in place. See Levina, I, Sturrock, R, Varadi, A and Wallis, G (2019), 'Modelling the distribution of mortgage debt', *Bank of England Staff Working Paper No. 808* for a description of modelling approach for new mortgage lending.
(d) Stressed DSR defined as mortgage payment as a percentage of gross income computed assuming mortgage rate is 300 basis points above reversion rates, remaining mortgage term and income. .

If a downturn similar in size to the financial crisis were to follow the hypothetical 'housing boom' scenario, the presence of the FPC's Recommendations should make the downturn less severe. Based on past build-ups of household debt and downside risks to economic growth, Bank staff estimate that GDP would be up to 1.5% lower in the absence of the policies.[1]

These benefits significantly exceed any temporary macroeconomic costs that may arise in those circumstances because the Recommendations prevent a temporary increase in housing market activity. In the 'housing boom' scenario, the presence of the FPC's policies would dampen the rise in mortgage approvals and, in turn, dampen any acceleration of house prices. The Bank's suite of macroeconomic models suggests that policies would might attenuate a temporary 0.2% uptick in GDP in the 'housing boom' scenario — potentially less if the uptick were assumed in any case to be offset by monetary policy.[2]

In reaching its judgement, the FPC considered different scenarios constructed by staff. These pointed to the net benefits of the Recommendations rising as housing booms became stronger — making downturns more severe — and the Recommendations became increasingly constraining relative to lenders' own underwriting standards.

(1) Aikman, D, Bridges, J, Hacioglu Hoke, S, O'Neill, C and Raja, A (2019) 'Credit, capital and crises: a GDP-at-Risk approach', *Bank of England Staff Working Paper No. 824*.
(2) See Burgess, S, Fernandez-Corugedo, E, Groth, C, Harrison, R, Monti, F, Theodoridis, K and Waldron, M (2013), 'The Bank of England's forecasting platform: COMPASS, MAPS, EASE and the suite of models', *Bank of England Working Paper No. 471*.

Global vulnerabilities

Global vulnerabilities — the factors that could amplify future shocks to the world economy — remain material and there are risks of further deterioration.

The global economy has continued to slow since the July 2019 *Report*, reflecting in part the broad effects of the trade war between the United States and China. A broadening of the trade war beyond tariff measures to restrictions on technology and capital would further fragment the global economy, and slow its rate of potential growth. In the face of weakening growth, some authorities have reduced official interest rates. Lower rates will support global growth, but monetary authorities have correspondingly less room to respond in the event of further shocks to the global outlook.

While global debt is not growing significantly faster than global GDP, debt levels are high by historical standards, and there are important areas of risk that could amplify any shocks to the global economy. In mainland China, private sector debt has increased and credit continues to grow faster than GDP. Corporate debt remains high in some advanced economies, including the US, where corporate credit growth appears to be levelling off. Risks remain in the euro-area banking sector. Flows of capital to non-China emerging market economies remain vulnerable to changes in risk sentiment. Political tensions in Hong Kong pose risks due to its position as a major financial centre.

The FPC continues to assess UK banks' ongoing resilience to risks from global vulnerabilities in its annual stress test. The global scenario in the 2019 stress test is, overall, very slightly more severe than in the 2018 test. Major UK banks were resilient to the stress scenario, and so will be able to continue to lend to UK households and businesses, even if these risks play out further.

Risks to UK financial stability from global vulnerabilities remain material.

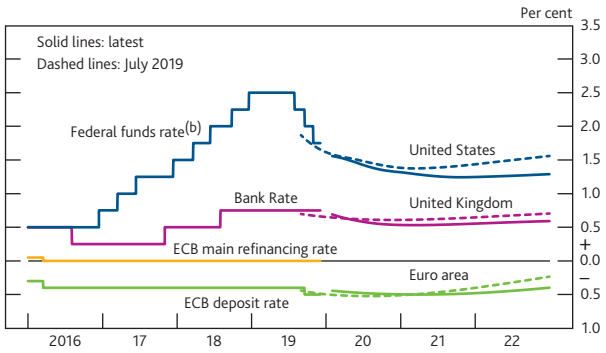
Global vulnerabilities, including debt vulnerabilities, can affect UK financial stability: directly through UK banks' exposures to vulnerable economies; indirectly by financial contagion through UK banks' exposures to other affected banks; and through macroeconomic spillovers to the UK economy, that test banks' and borrowers' resilience to UK economic downturns. The FPC judges that global vulnerabilities remain material, and that there are risks of further deterioration.

Concerns about slowing global growth, in part reflecting the broad effects of the US-China trade war, have caused risk-free rates to decline and monetary authorities have correspondingly less room to respond in the event of a shock to the global outlook.

The global economy has continued to slow since the July 2019 *Report*, in part reflecting the effects of the trade war between

Chart G.1 Official interest rates have been cut in some countries

Short-term interest rates and expectations[a]

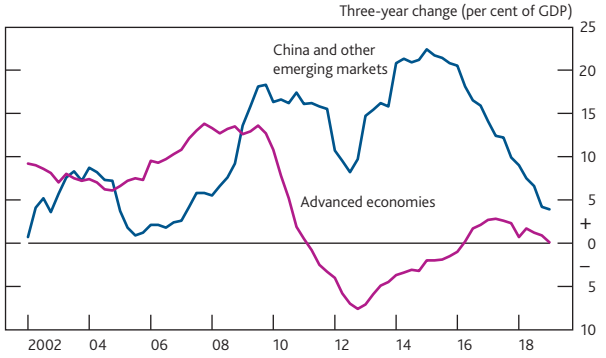


Sources: Bloomberg Finance L.P. and Bank calculations.

(a) All data as of 4 December 2019. The curves are estimated using instantaneous forward overnight index swap rates in the 15 working days to 4 December 2019 and 1 July 2019 respectively.
(b) Upper bound of the target range.

Chart G.2 Credit growth remains subdued

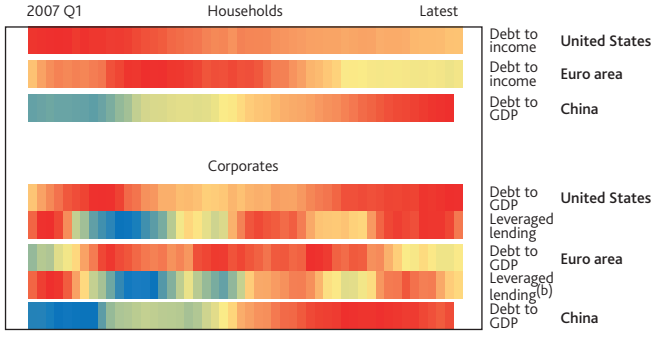
Credit in private non-financial sector



Sources: BIS total credit statistics and Bank calculations.

Chart G.3 Areas of risk are relatively 'hot'

Heatmap of credit indicators[a]



Sources: BIS total credit statistics, Eikon from Refinitiv, Eurostat, Federal Reserve, LCD, an offering of S&P Global Intelligence and Bank calculations.

(a) Red cells highlight debt levels towards the top of the historical distribution. Blue cells are towards the bottom.
(b) Consists of European Union excluding UK.

the United States and China. A broadening of the trade war beyond tariff measures to restrictions on technology and capital would further fragment the global economy and slow its rate of potential growth.

In response to the economic slowdown and increasing downside risks to growth, risk-free interest rates have fallen since July. Some countries have reduced official interest rates, and market expectations for policy rates have fallen a little as well (**Chart G.1**). While lower interest rates will support global growth, monetary authorities have correspondingly less room to respond in the event of further shocks to the global outlook.

In aggregate financial imbalances have not increased in recent years, but there are important areas of risk.

Aggregate global financial imbalances have not increased in recent years. While debt levels are high by historical standards, debt is not growing significantly faster than global GDP. Total private sector credit growth relative to GDP growth, which is among the best early warning indicators of a downturn,[1] remains subdued in advanced economies (**Chart G.2**). In advanced economies, household sector resilience has improved in recent years and debt-servicing burdens are relatively low, reflecting low interest rates.

China is a key exception. There are also important areas of vulnerabilities in advanced economies (**Chart G.3**). Future shocks to the global economy could be amplified by these material debt vulnerabilities, less room for some monetary authorities to respond to shocks and periods of illiquidity in financial markets (see Resilience of market-based finance chapter).

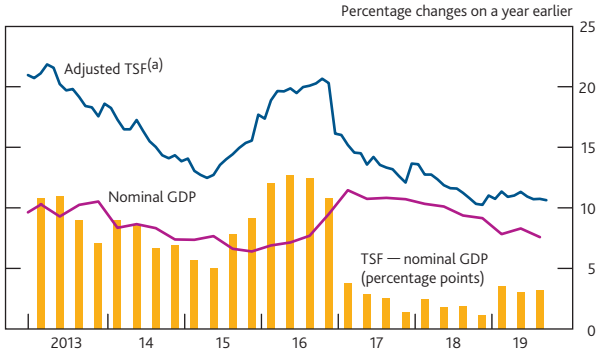
Chinese private non-financial sector debt is over 200% of GDP. The gap between credit growth and nominal GDP growth has increased a little since end-2018.

Chinese private non-financial sector debt as a share of GDP increased to around 210% in 2019 Q1, and has risen over 90 percentage points since 2008. Such rapid rises in credit have, historically, preceded financial crises in several other countries.

The gap between credit and nominal GDP growth in mainland China has widened a little since the end of 2018. Annual growth in total social financing (TSF) eased during 2017 and 2018, partly reflecting a number of policies by Chinese authorities to improve financial regulation and restrain the growth of shadow banking. But annual TSF growth has picked up a little since end-2018, reaching 10.7% in October. This has occurred alongside a slowdown in the Chinese economy, with annual growth in nominal GDP falling to 7.6% in 2019 Q3. As a result TSF growth is outstripping nominal GDP growth by around 3 percentage points (**Chart G.4**). This highlights the

(1) See Carney, M (2019), 'The global outlook'.

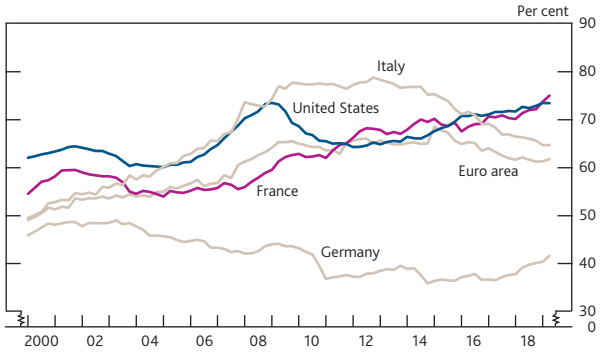
Chart G.4 Credit is growing faster than nominal GDP in China
China total social financing and nominal GDP growth



Sources: CEIC Data Company Ltd and Bank calculations.

(a) Adjusted total social financing allows for the statistical effect of replacing local government borrowing via financing vehicles with the issuances of municipal bonds.

Chart G.5 Corporate indebtedness is high in the US and France
Private non-financial corporate debt to GDP(a)



Sources: Eikon from Refinitiv, Eurostat and Bank calculations.

(a) Debt is net of intercompany loans. Euro-area figures include publically owned corporations due to euro-area data reporting. In France, publically owned corporations accounted for 8.6% of total private non-financial corporate debt in 2017.

trade-off faced by the Chinese authorities as they look to support growth while managing financial stability risks.

Actions by Chinese authorities appear to have restrained lending in the more opaque shadow banking sector. Non-bank lending growth has averaged 6.5% in 2019, down from a peak of over 27% in 2016, while bank lending growth has averaged 12.7%. And the ratio of non-bank credit to GDP has been stable since mid-2018, at around 70% of GDP. The sectoral distribution of credit is unclear, particularly for loans advanced by shadow banks. But BIS data show that the composition of Chinese credit growth has gradually shifted away from firms and towards households, probably reflecting the gradual rebalancing of the Chinese economy towards consumption.

A sustained pickup in credit relative to nominal GDP could lead to renewed concerns about the sustainability of mainland China's already elevated debt levels. Crystallisation of these risks would affect global growth more broadly. It could also contribute to a tightening in global financial conditions, if investors grow more concerned about broader risks as a result. More directly it could affect financial stability in the UK via the banking system because of UK banks' exposure to mainland China, which are around 75% of their common equity Tier 1 (CET1) capital. Overall, the FPC judges that vulnerabilities in China are elevated.

As discussed in the Overview of risks to financial stability chapter, political unrest in Hong Kong has led to a sharp economic slowdown, with the economy officially entering recession in Q3. The FPC judges that vulnerabilities in Hong Kong are elevated. In addition, the recent protests, and their impact on the real economy, highlight further political risk as another key vulnerability in Hong Kong. These pose risks given Hong Kong's position as a major financial centre. UK banks have significant exposure to Hong Kong, representing around 160% of their CET1 capital. The 2019 ACS incorporates sharp falls in output and asset prices in Hong Kong.

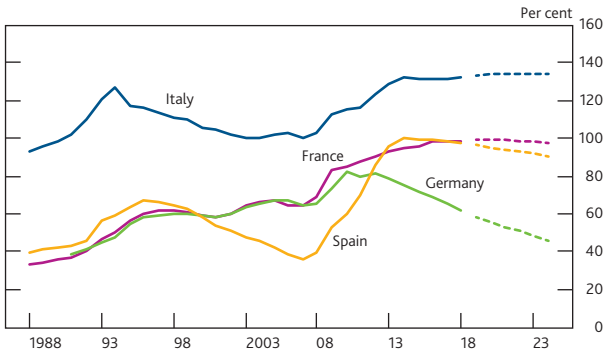
Corporate indebtedness is high in some advanced economies. In the US corporate debt is close to pre-crisis levels although credit growth has slowed this year.

In contrast to more subdued levels of total credit relative to the GDP, corporate debt is high in some advanced economies (**Chart G.5**). In the US, corporate debt to GDP is close to its pre-crisis level. And in France it has reached historical highs. The French authorities have recently set exposure limits on the amount of lending that systemically important French institutions can provide to large and highly indebted companies.

In the US, the pace of corporate credit growth relative to GDP has slowed a little recently. Corporate credit is now growing broadly in line with nominal GDP. There are particular risks

Chart G.6 Public debt is high in some euro-area countries

Gross government debt to GDP[a]

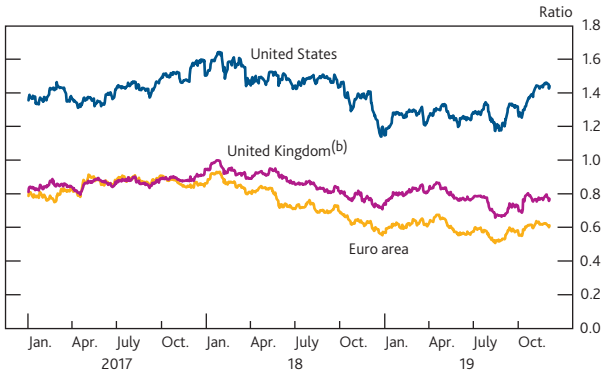


Source: IMF *WEO* (October 2019).

(a) Solid lines show data and dashed lines show forecasts.

Chart G.7 Price to book ratios remain low in the euro area

Bank price to book ratios[a]

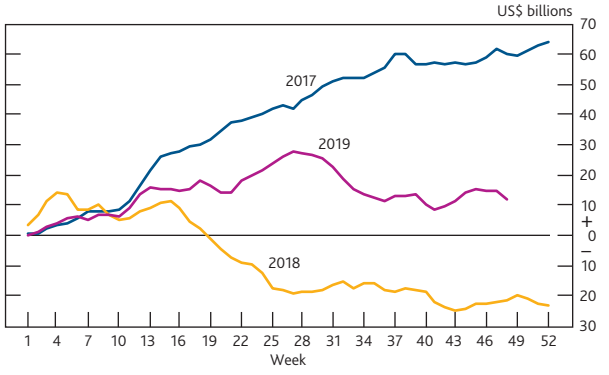


Sources: Bloomberg Finance L.P. and Bank calculations.

(a) Simple average price to book ratio of ten largest EA and US banks, by bank asset.
(b) Consists of the simple average of the four largest banks.

Chart G.8 Non-China emerging market economies experienced portfolio outflows over the summer

Cumulative portfolio inflows to NCEMEs



Sources: IIF and Bank calculations.

associated with leveraged loans, and although the stock of leveraged lending remains high, new issuance has fallen back a little over 2019, in line with the global market (see Box 4). Credit quality appears to have deteriorated further, with over half of leverage loan issuance in 2019 undertaken by firms with debt to EBITDA ratios above six (compared to one fifth in 2018). Outside the corporate sector, households continue to deleverage and banks appear resilient.

Despite fairly subdued aggregate credit growth in the euro area, vulnerabilities remain.

Household and corporate credit growth appears fairly subdued, relative to nominal GDP growth, in the euro area in aggregate. But high levels of sovereign debt in some countries remain a vulnerability (**Chart G.6**).

These underline the vulnerabilities created more broadly in the euro area by high public debt levels and interlinkages between banks and sovereigns in a currency union. Euro-area bank resilience has improved in recent years, with aggregate CET1 ratios now at 14%. But, as noted in the ECB's latest *Financial Stability Review*, the improvement in capital ratios has been reliant on lower risk weights, and the European authorities have yet to implement some elements of the Basel III capital standards. Price to book ratios for euro-area banks remain low in comparison to international peers (**Chart G.7**), possibly reflecting overcapacity in the sector as well as challenges to some bank business models posed by low, and in some cases negative, interest rates. These issues suggest that the euro-area banking system may be less able to cushion future shocks.

Overall the FPC judges that vulnerabilities in the euro area are material. If serious strains were to emerge within the euro area, UK financial stability could be affected through a wide range of channels. UK bank exposures to the euro area as a whole are around 250% of their CET1 capital.

Flows to non-China emerging markets remain vulnerable to changes in risk sentiment.

Turkey and Argentina have faced further periods of market pressure since the July 2019 *Report*, as political events have exposed underlying vulnerabilities relating to high levels of external and dollar-denominated debt. But there are few signs that these concerns have spread to other emerging market economies.

Non-China emerging market economies (NCEMEs) in aggregate saw renewed inflows of portfolio capital in the first half of 2019, but experienced portfolio outflows in August, driven by an elevated risk of slower global growth as the US-China trade war intensified (**Chart G.8**). This episode highlighted that, although NCEMEs have generally reduced external deficits and many have significant foreign currency reserves, they are still vulnerable to shifts in sentiment driven

by external factors. Structural changes in the international financial system may also have increased NCEMEs' vulnerability to external shocks. Market-based finance has accounted for all of the increase in foreign lending to emerging markets since the crisis and, within this, the share due to investment fund flows has also increased. Liquidity mismatch in investment funds, which account for around one third of total portfolio flows to EMEs, could amplify price movements and increase spillovers to other markets (see Resilience of market-based finance chapter and Vulnerabilities in open-ended funds chapter).

Direct financial links between the UK and NCEMEs are unlikely to pose a material risk to UK financial stability on their own. UK banks' direct exposures to NCEMEs total around 150% of CET1, considerably lower than exposures to the US or the euro area. But through their exposure to external shocks, as well as domestic vulnerabilities, and the structure of the international financial system, NCEMEs could amplify any crystallisation of vulnerabilities elsewhere, increasing spillovers to global growth and asset prices.

Reflecting material global vulnerabilities, the FPC incorporated a severe global downturn in its 2019 stress test.

The FPC continues to assess UK banks' ongoing resilience to risks from global vulnerabilities in its annual stress test. The global scenario in the 2019 stress test is, overall, very slightly more severe than in the 2018 test. Major UK banks were resilient to the stress scenario, and so will be able to continue to lend to UK households and businesses, even if these risks play out further.

Resilience of market-based finance

Market-based finance is crucially important for the provision of financial services to the UK economy. Its resilience relies on the behaviour of a range of intermediaries, investors and infrastructure that collectively determine how smoothly markets function.

A recent period of volatility in the US dollar repo market had limited spillovers to broader market conditions. However, it showed how markets can become illiquid in the face of shocks and may not be able to rely on dealer intermediation to maintain levels of liquidity. Investors should not assume that markets will remain liquid at all times.

The resilience of market liquidity will not be improved by lowering the standards to which banks and dealers are held. The FPC considers that maintaining the standards established through post-crisis reforms is crucial to supporting financial stability. The FPC emphasises that firms are able to draw down on liquidity buffers and draw on the Bank of England's liquidity facilities. This supports market functioning through the cycle, as well as in a stress. The 2019 biennial exploratory scenario (BES) will be used to help illustrate how the liquidity buffers can be drawn down, how the Bank of England's facilities can be used, as well as how the PRA's approach to supervision would align with this.

Reducing incentives and constraints that could cause sudden fire sales of assets is central to ensuring resilience in market-based finance. As part of this, the Bank and FCA are undertaking a joint review of open-ended investment funds and the risks posed by their liquidity mismatch, which can lead to fire sales. Insurers and pension funds also have the potential to amplify shocks — for example in response to falls in market interest rates. But they have acted to increase their resilience to such shocks. And progress has been made since the FPC's 2018 review into risks from non-banks' leverage to improve monitoring of liquidity risks arising from the use of derivatives.

Market-based finance is crucially important for the provision of financial services to the UK economy.

Market-based finance is the system of markets, non-bank financial institutions and infrastructure that complements the banking system in providing financial services to support the real economy, such as financing productive investment (see Box 9). Market-based finance has become increasingly important over the past decade. It accounts for around half of financial sector assets. It also accounts for all of the net increase in debt finance to UK non-financial businesses since 2008 (**Chart H.1**).

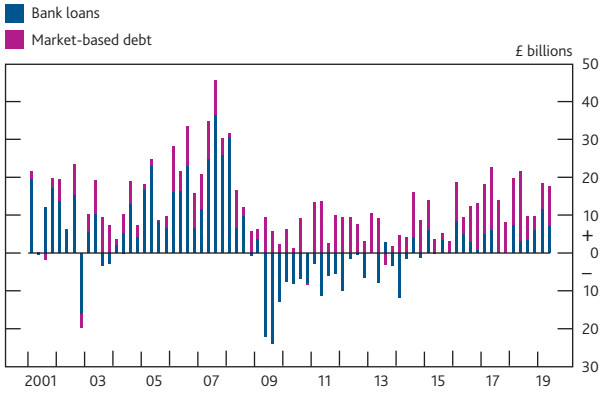
Resilient markets absorb rather than amplify shocks and thus continue to support the UK economy in bad times as well as good. No part of the system of market-based finance can be assessed fully in isolation. Resilience depends on the behaviour of a range of intermediaries, investors and infrastructure that, together, determine the reliability of market functioning. If financial markets lack resilience — for example, if they jump to illiquidity — they may amplify a market adjustment, causing a tightening in the cost and availability of finance for businesses. In extreme cases, markets can become dysfunctional and shut out firms' access to finance.

The repo market plays a vital role in supporting broader financial system functioning...

The repo market is used, for example, by: dealers to finance their inventories of securities and source securities for customers; bank treasuries to monetise liquid assets; and investors, such as hedge funds, life insurers and pension funds, both to borrow cash by placing securities as collateral with dealers, and to borrow securities from dealers, offering cash in

Chart H.1 Market-based finance is increasingly important to UK firms

Bank staff estimate of net flows of debt raised by UK non-financial companies[a]

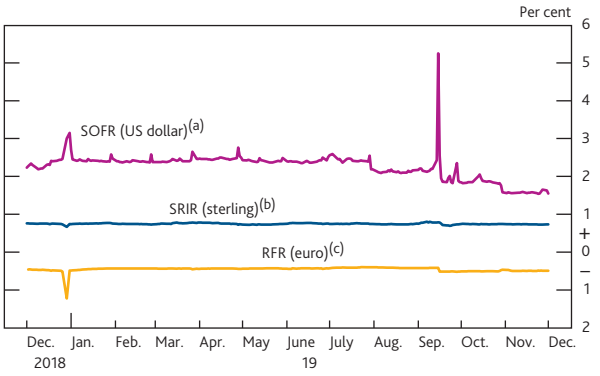


Sources: Association of British Insurers, Cass Commercial Real Estate Lending survey, Deloitte, Eikon from Refinitiv, LCD, an offering of S&P Global Market Intelligence, London Stock Exchange, ONS, Peer-to-Peer Finance Association, Preqin and Bank calculations.

(a) Market-based debt consists of: debt securities, including commercial paper, bonds and private placements; as well as loans held by non-bank financial institutions.

Chart H.2 US dollar repo rates spiked in mid-September while sterling and euro rates remained stable

Overnight rates in US dollar, sterling and euro repo markets



Sources: Bloomberg Finance L.P., Federal Reserve Bank of New York and NexData.

(a) The secured overnight financing rate (SOFR) is a broad measure of the cost of borrowing cash overnight collateralised by Treasury securities.
(b) The sterling repo index rate (SRIR) measures the effective cost of funding through repo trades in the UK government bond market. The index is calculated from repo trades that use UK sovereign government bonds as the underlying collateral.
(c) The repofunds rate euro (RFR euro) measures the effective cost of funding euro-zone government bonds. The index is calculated from repo trades that use sovereign government bonds issued by any euro-zone country as collateral.

return. There is evidence that some investors are increasing their reliance on this form of short-term funding.(1)

…but a recent period of volatility in the US dollar repo market showed how these markets can become illiquid.

In mid-September, the US dollar repo market became highly volatile. Overnight repo rates spiked, rising above 8% intraday on 17 September, suggesting limits to lenders' ability or willingness to meet cash demands, and therefore a lack of liquidity (**Chart H.2**). The Federal Reserve launched a number of operations, aimed at returning the market to conditions consistent with its target monetary policy range. These stabilised the market, with overnight rates quickly returning to normal levels, and helped to limit spillovers to broader market conditions. Rates in sterling and euro repo markets remained stable throughout (**Chart H.2**).

While the immediate cause of volatility was a sudden, idiosyncratic shock…

The timing of the volatility — on the deadline for corporate tax payments and a settlement date for US Treasuries — suggests that it was triggered by an idiosyncratic shock to the amount of central bank reserves in the financial system. And it occurred against a backdrop of a gradual reduction in the supply of reserves since the Federal Reserve began quantitative tightening.

…the episode also highlighted that some post-crisis regulations might have changed how dealers behave in response to shocks, reducing market liquidity in some circumstances.

Some regulatory reforms may have constrained dealers' willingness to intermediate.(2)(3) In 2016, the FPC reviewed how the liquidity of some core financial markets has changed in recent years. It concluded that the changes in market liquidity might, in part, reflect the impacts of post-crisis regulations, as firms adjusted their risk management and business models to the new framework.

In the US repo market episode, banks' willingness to mitigate the stress may, in part, have been constrained by a preference to hold central bank reserves over other forms of high-quality liquid assets (HQLA) in order to manage intraday liquidity needs associated with, for example, US banks' resolution recovery planning.

Post-crisis reforms have contributed to the resilience of, and reduced the interconnections between, dealers that sit at the centre of many financial markets. Maintaining those standards is crucial to supporting financial stability…

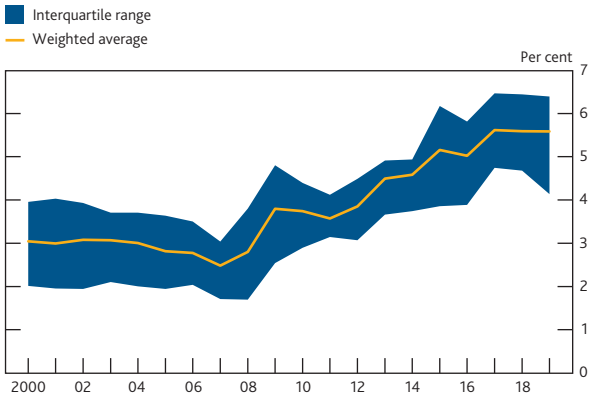
A number of post-crisis reforms have increased the resilience of dealers to both losses and liquidity shocks. Reflecting the new leverage ratio framework, the aggregate leverage ratio of the world's largest dealers was 5.6% at end-September 2019 (**Chart H.3**).(4) And those dealers have an average Liquidity Coverage Ratio of 137% (**Chart H.4**).(5) Furthermore, since the crisis, major UK banks' use of short-term wholesale funding,

(1) For example, the most recent Hedge Fund as Counterparty Survey showed that cash borrowing by hedge funds in repo markets increased by 41% in the six months to April 2019.
(2) Some analysis has found that the resilience of liquidity in the gilt repo market decreased after the leverage ratio policy was announced. See Bicu, A, Chen, L and Elliot, D (2017), 'The leverage ratio and liquidity in the gilt repo markets', *Bank of England Staff Working Paper No. 690*.
(3) The Committee on the Global Financial System study group on repo market functioning also found that regulatory changes, which have made intermediation more costly in terms of regulatory capital, contributed to banks being less willing to undertake repo intermediation. See 'Repo market functioning'. Report prepared by a Study Group established by the Committee on the Global Financial System, April 2017.
(4) The Basel III Leverage Ratio is a simple, non risk based measure of capital requirements, defined as the value of a firm's capital in relation to its total assets and other commitments (referred to as 'exposures').
(5) The Basel III Liquidity Coverage Ratio ensures that banks have sufficient HQLA to survive a significant stress scenario lasting 30 calendar days.

excluding repo, as a proportion of total funding, has fallen to 3.9% from around 15% in 2007. Consequently, these reforms have reduced the risk of severe and sudden reductions in market liquidity.

Chart H.3 Aggregate dealer leverage ratios remain high

Dealers' leverage ratios[a][b]

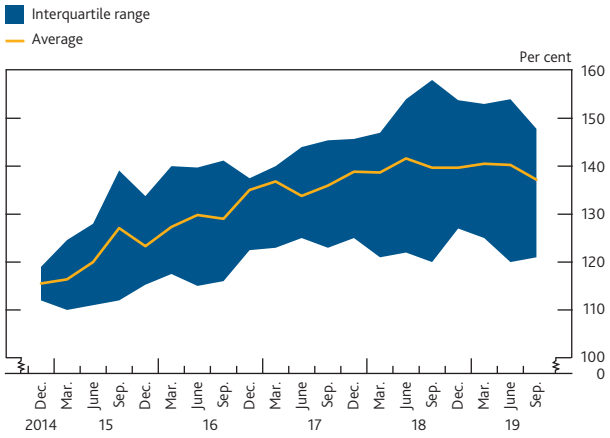


Sources: Banks' published accounts, SNL Financial, The Banker Database and Bank calculations.

(a) Leverage ratio defined as reported Tier 1 capital (or common equity where not available) divided by total assets, adjusted for accounting differences on a best-endeavours basis. This accounting measure differs from regulatory leverage ratios.
(b) Dealers included are Bank of America Merrill Lynch, Barclays, BNP Paribas, Citigroup, Crédit Agricole, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan, Mitsubishi UFJ, Morgan Stanley, RBS, Société Générale and UBS. Pre-crisis data also include Bear Stearns, Lehman Brothers and Merrill Lynch.

Chart H.4 Dealers have high liquidity coverage ratios (LCRs)

Dealers' LCRs[a][b]



Sources: SNL Financial and Bank calculations.

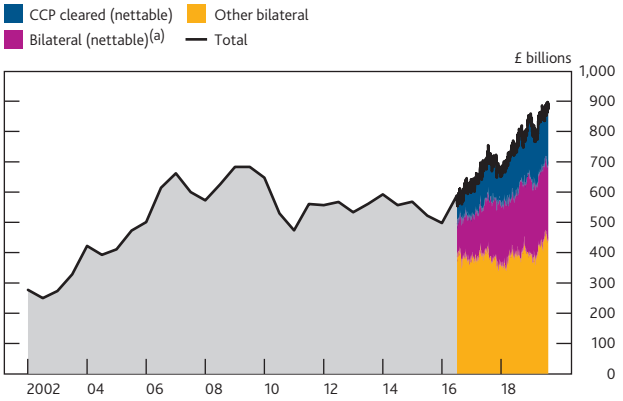
(a) Dealers included are Barclays, BNP Paribas, Citigroup, Crédit Agricole, Deutsche Bank, RBS and Société Générale from 2014 Q4; Credit Suisse and Mitsubishi UFJ from 2015 Q1; HSBC from 2015 Q4; UBS from 2017 Q1; Bank of America Merrill Lynch, Goldman Sachs, JPMorgan and Morgan Stanley from 2017 Q2. Quarterly data, where available. Some banks report on a lower frequency prior to 2017.
(b) The Basel LCR has been phased in with the minimum requirement rising from 60% to 100% between 2015 to 2019. See the Bank for International Settlement's publication 'Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools', (January 2013). Reported LCRs prior to the introduction of requirements are estimates.

…and adjustments to dealers' market practices and to regulatory requirements can alleviate some of the impacts on liquidity, without reducing resilience.

There has already been evidence of dealers adjusting how they conduct their intermediation activity to minimise regulatory costs. For example, functioning in the gilt repo market has been supported in recent years by netting arrangements, which minimise the impact of repo trades on the size of dealers' balance sheets, and therefore their capital requirements against this activity. Half of gilt repo transaction volume in the year to date is estimated to have been eligible for netting (**Chart H.5**). Analysis of changes in the price and volume of repo activity also suggest that nettable transactions show less price sensitivity in response to changes in demand, although netting arrangements could be more difficult to use in a stress.[6][7]

Chart H.5 The volume of outstanding gilt repo has grown since early 2016

Decomposition of growth in outstanding stock of gilt repo and reverse repo



Sources: Bank of England Sterling Money Market data collection, data collected from a number of UK asset managers and Bank calculations.

(a) The volume of outstanding repo from bilateral netted activity (based on transactions between dealers and clients, with same maturity date) is an estimation of the maximum value that can be netted between the counterparties, if netting was agreed and agreements existed between the relevant counterparties.

The FPC have also made recommendations that minimise the impact of regulatory measures on the liquidity of core financial markets, without compromising their positive effect on resilience. The exclusion of central bank reserves from the leverage ratio in the UK improves the ability of the banking system to draw on central bank liquidity facilities. This improves the banking system's ability to cushion shocks, and to maintain the supply of credit and support market functioning. At the same time, the UK's minimum leverage ratio has been recalibrated to ensure the level of resilience delivered by the leverage ratio framework is maintained.

The final impact of changes in market liquidity will depend on how market participants continue to adjust to the post-crisis economic and regulatory environment. In this context, the FPC emphasises the importance of usable regulatory buffers for both capital and liquidity in absorbing the impact of shocks. Buffers allow intermediaries to continue to provide market-making services when they are most needed and where withdrawal of those services would risk amplifying the

(6) Noss, J and Patel, R (2019), 'Decomposing changes in the functioning of the sterling repo market', *Bank of England Staff Working Paper No. 797*.
(7) Transaction flows may become one-sided making it difficult to match trades. For example, nettable repo packages require borrowers to source short-term government bonds, which could be difficult to source. There is evidence that the amount of lendable securities and those on loan fell significantly during the global financial crisis.

effect of shocks on credit conditions and the real economy. Furthermore, the FPC restates its intention for the UK leverage ratio framework not to be applied at the level of individual activities.(8)

The Bank stands ready to use its balance sheet to provide liquidity support…

As demonstrated by the episode of illiquidity in the US repo market in September, markets may not always distribute liquidity appropriately across the system, particularly during periods of market volatility or dysfunction. The Bank's liquidity facilities are open for business and are intended to meet eligible firms' liquidity needs through the cycle, as well as in a stress, thereby reducing the risk of disruption to the critical financial services that they provide to the broader economy.(9) Eligible firms can choose to meet a liquidity need by using the Bank's liquidity facilities, alongside market sources of liquidity and their own liquidity buffers, according to their own judgement. There is no presumptive order in which the Bank or the PRA assumes firms would use these sources of liquidity.(10)

The Bank has also taken steps in recent years to ensure appropriate access to its reserves accounts. Since 2006, access to reserves accounts has expanded to include all banks and building societies, and more recently, PRA-authorised broker-dealers and central counterparties (CCPs). As such, the number of firms with access to accounts has increased from just 17 in 2006 to over 200 today. As a result, the distribution of reserve account balances is well spread, which helps reduce reliance on a few key intermediaries.

…and is exploring how major UK banks would respond to a liquidity shock.

While regulatory and business model refinements are helping market liquidity to adapt to the post-crisis framework, investors should not assume that markets will remain liquid at all times. Questions remain about how the resilience of market liquidity would be tested under a stress, as highlighted by the FPC over the past few years.(11) Understanding how intermediaries' incentives and constraints may evolve in a stress is central to understanding whether markets could absorb or amplify a shock.

The Bank monitors liquidity risks closely, with the PRA's regulatory framework designed to ensure that individual banks have an appropriate degree of resilience to liquidity stress. To complement this, the 2019 biennial exploratory scenario (BES) features a severe and broad-based liquidity stress affecting the major UK banks. It will focus on their responses and the implications of those responses for the broader system. The 2019 BES will also be used to help illustrate how firms' liquidity buffers can be drawn down, how the Bank's facilities can be used, as well as how the PRA's approach to supervision would align with this. The results will be published in mid-2020.

Reducing incentives and constraints that could cause sudden fire sales of assets is central to ensuring resilience in market-based finance.

The potential amplification effects within market-based finance centre on 'fire sales' of assets, which affect prices of financial assets and the functioning of markets. Certain market participants can be incentivised, or forced, to suddenly sell assets in certain scenarios. For example, funds may face liquidity shortages, or insurance companies and pension funds may face increases in the valuation of their liabilities, affecting their net worth. Because fire sales require a buyer to be found at short notice, they can cause asset prices to fall quickly, and below their fundamental values. This can cause losses for financial institutions and affect the provision of finance to the real economy.

For example, asset price volatility could be amplified by the mismatch between the liquidity of open-ended funds' assets and their redemption terms, which can create incentives for investors to withdraw funds ahead of others, particularly in a stress.

The FPC judges that the mismatch between redemption terms and the liquidity of some open-ended funds' assets has the potential to become a systemic issue. Open-ended funds play an increasing and important role in some markets, with total assets managed globally reaching US$55 trillion. Many offer daily redemptions while investing in assets that can take longer to sell in an orderly way. This liquidity mismatch can incentivise investors to redeem when they expect others to do so, which could create run dynamics and lead to forced asset sales, particularly in a stress. Forced sales of less liquid assets could amplify price moves, transmitting stress to other parts of the system, and disrupting the availability of finance in the real economy. The Bank and FCA's review will examine the costs and benefits of different policy options to reduce the liquidity mismatch in funds (see Vulnerabilities in open-ended funds chapter).

The potential amplification of asset price moves partly depends on market liquidity and the behaviour of intermediaries. For example, in the UK corporate bond market, there is evidence that dealers continue to absorb sales by other investors when necessary.(12) However, it is not certain that this intermediation would continue in a severe stress. Bank staff estimate that a sharp increase in sterling investment grade corporate bond spreads of around 70–80 basis points — in line with the largest historical weekly moves — could test

(8) The UK leverage ratio framework applies to UK banks and building societies in scope on a group consolidated and, where applicable, ring-fenced body subconsolidated basis.
(9) See 'Bank of England Market Operations Guide: Our Tools' for information on firm eligibility.
(10) See CP27/19, 'Liquidity: The PRA's approach to supervising liquidity and funding risks', October 2019.
(11) See, for example, July 2016 *Report* chapter 'Developments in market liquidity' and June 2018 *Report* chapter 'Market-based finance resilience'.
(12) Bank analysis of FCA transaction data for UK corporate bonds suggests that dealers have been willing to absorb net sales from insurance companies, asset managers and pension funds during periods of 2018 and 2019.

the capacity of dealers to absorb sales of these assets, further amplifying price falls.(13) Analysis of the structure of the sterling corporate bond market also suggests that the trading network is concentrated in a small number of dealers.(14) The top five dealers account for over half of trading volume in newly issued bonds. Liquidity is therefore vulnerable to a few key dealers ceasing their market-making activities.

Insurance companies and pension funds also have the potential to amplify shocks — for example in response to falls in interest rates, although actions have been taken to increase UK insurance companies' resilience to falling rates…

Long-term UK market interest rates have fallen in 2019. For insurance companies, low interest rates increase the valuation of their liabilities and hence put pressure on their balance sheets. From a financial stability perspective, one risk is that this prompts insurers to de-risk their balance sheets, shifting away from risky assets and towards government bonds, thereby amplifying the initial market shock.(15)

A key mitigant against this is the resilience of insurers' balance sheets. The largest life insurers have an aggregate surplus of capital above their regulatory requirements of £30.8 billion; 40% more than their regulatory requirements. And flexibility in recalculating 'transitional measures on technical provision' under the Solvency II regime helps reduce insurers' sensitivity to risk-free rates.(16)

The PRA's Insurance stress test assesses losses across the UK insurance industry to severe but conceivable scenarios to inform the PRA's view of sector resilience. A summary of the aggregate results of the 2019 test are expected to be published in 2020 Q1.

…and UK pension funds have hedged the risk of low interest rates in recent years.

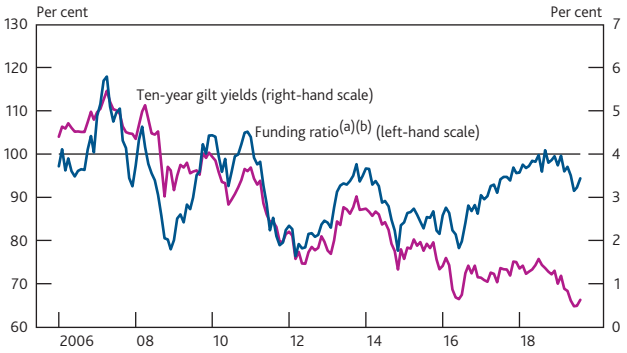
Lower long-term interest rates also increase the present value of defined-benefit pension fund liabilities. As a result they can be associated with increasing deficits in these pension schemes (**Chart H.6**). However, their deficits have become smaller since 2017, despite falling yields in that period. This in part reflects use of so-called 'liability driven investment' strategies, which have seen schemes hedge against interest rate risks by pivoting asset portfolios toward long-dated fixed-income securities. 59% of the assets held by defined-benefit pension schemes at end-2018 were bonds, compared with 33% a decade ago.

Following the FPC's 2018 review into non-banks' use of leverage, there is ongoing work to improve management and monitoring of liquidity risks arising from use of derivatives by pension funds, investment funds and insurers.

The Bank has worked with The Pensions Regulator (TPR) to survey defined-benefit pension funds' use of leverage, including via derivatives.(17) Respondents reported obtaining

Chart H.6 Falling yields in 2019 have had a much smaller impact on defined-benefit pension fund deficits than previously

Defined-benefit pension schemes' aggregate funding position(a)(b)



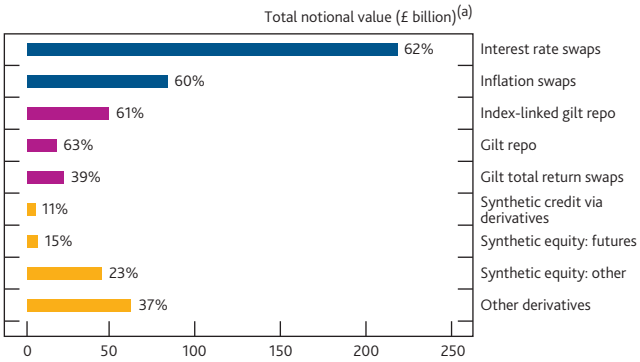
Sources: Bloomberg Finance L.P., Pension Protection Fund and Bank calculations.

(a) This covers UK pension funds eligible for entry in the Pension Protection Fund (PPF).
(b) Assets as a percentage of liabilities measured on a section 179 (s179) basis. Schemes' s179 liabilities broadly represent the premium that would have to be paid to an insurance company to take on the payment of PPF levels of compensation. It does not take into account schemes' use of derivative instruments to hedge risks.

leverage most commonly through interest rate and inflation swaps, and through gilt repo (**Chart H.7**). Use of such instruments exposes pension funds to liquidity risk via margin calls. However, the survey confirmed that pension funds manage collateral to meet these margin calls. And they use a variety of measures to assess potential collateral needs under stress.

Chart H.7 Pension funds use a variety of leveraged instruments

Total notional value of each leveraged instrument and percentage of pension funds that use them



Source: The Pensions Regulator and OMB Research. The survey covered 137 of the UK's 400 largest defined benefit pension schemes. Together, the assets of the schemes that responded totalled £697 billion.

(a) Total notional value does not always provide a meaningful comparison. Instrument types that are relatively comparable are grouped by colour.

(13) Baranova, Y, Douglas, G and Silvestri, L (2019), 'Simulating stress in the UK corporate bond market: investor behaviour and asset fire-sales', *Bank of England Staff Working Paper No. 803*.
(14) Mallaburn, D, Roberts-Sklar, M and Silvestri, L (2019), 'Resilience of trading networks: evidence from the sterling corporate bond market', *Bank of England Staff Working Paper No. 813*.
(15) See November 2016 *Report* chapter 'Risks to financial stability from insurers' investment behaviour'.
(16) See SS6/16, 'Maintenance of the 'transitional measure on technical provisions' under Solvency II', April 2017.
(17) DB Pension Scheme Leverage and Liquidity Survey, December 2019, prepared for The Pensions Regulator by OMB Research.

The survey was prompted by the FPC's 2018 deep-dive into risks from leverage in the non-bank financial system, where the FPC judged that risks appeared limited, but required more comprehensive and consistent monitoring across institution types. For investment funds, International Organization of Securities Commissions is operationalising the Financial Stability Board's recommendation on the development of consistent leverage measures for funds. For insurance companies, the PRA has released a supervisory statement on liquidity risks, including those arising from derivatives positions.(18) The Bank will continue to work with domestic supervisors — the PRA, FCA and TPR — to enhance the monitoring of risks from the use of leverage.

The FPC continues to monitor progress in mitigating the financial stability risks around Libor.

In November 2018, the FPC agreed that it would continue to monitor progress on the risks associated with financial markets' reliance on Libor. Continued reliance poses a risk to financial stability that can only be reduced through a transition to alternative risk-free rates. The intention is that sterling Libor will cease to exist after the end of 2021. No firm should plan otherwise. Box 10 updates the FPC's assessment in light of recent developments.

(18) See PS18/19, 'Liquidity risk management for insurers', September 2019.

Box 9
Supply of finance for productive investment

Subject to its primary objective, the FPC has a secondary objective to support the economic policy of Her Majesty's Government…

As set out in its November 2019 Remit letter for the FPC, the Government's economic policy objective is to achieve strong, sustainable and balanced growth.(1)

The FPC supports the Government's economic policy objective by acting to ensure that the UK financial system can serve UK households and businesses in bad times as well as good. Recent experience demonstrates that financial stability is a precondition for sustainable economic growth; a stable and resilient financial system should help to facilitate a sustainable and efficient flow of funds within the economy, and an effective allocation of savings to investment.

…which includes, where possible, facilitating the supply of finance for productive investment provided by the UK's financial system.

Productive investment is investment by businesses that expands the capacity of the economy where the marginal expected return to society as a whole is greater than the marginal expected cost.

As specified in the 2018 Remit letter, the Government's framework for raising productivity is built around:

- encouraging long-term investment in economic capital, including infrastructure, skills, and knowledge; and
- promoting a dynamic economy that encourages innovation and helps resources flow to their most productive use.

The Bank has explored ways in which it can safeguard the stable provision of financial services to the real economy, including finance for productive investment. The Bank published a Discussion Paper in April 2016 on 'Understanding and measuring finance for productive investment'.(2) To encourage more research on this issue, in September 2016 the Bank hosted a workshop on 'Finance, investment and productivity'.(3)

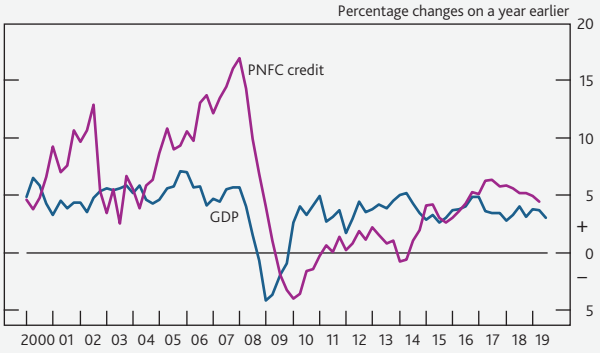
In 2017, the Bank published the results of a bespoke survey to collect data on firms' investment and financing decisions through its Agency network.(4) The survey provided insights into the mix of financial and economic barriers to investment. These included a lack of incentives to invest, insufficient access to finance, uncertainty about the economy, inertia over investment decisions, and discouraged investors. But the majority of businesses surveyed reported being able to invest at an appropriate level.

Overall, access to finance is not a widespread issue in the current environment…

The results of the Bank's work did not suggest an aggregate shortage of corporate credit. Consistent with this, UK private non-financial corporation (PNFC) credit growth now outpaces GDP growth (**Chart A**) and the sector has been a net borrower of funds.

Chart A Evidence does not suggest that obtaining finance is a widespread issue

UK GDP and PNFC credit growth(a)



Sources: Association of British Insurers, Bank of England, Cass Commercial Real Estate Lending survey, Deloitte, Eikon from Refinitiv, LCD, an offering of S&P Global Market Intelligence, London Stock Exchange, ONS, Peer-to-Peer Finance Association, Preqin and Bank calculations.

(a) PNFC credit consists of loans and debt securities, excluding direct investment loans and loans secured on dwellings. Data are of loans and debt securities in all currencies and are not seasonally adjusted.

…but small and medium-sized enterprises (SMEs) face particular barriers to finance, which can become greater during a downturn.

In general, SMEs are more reliant on internal funds, which account for around three quarters of investment finance for UK SMEs.(5) However, when they do use external funds, the majority of this comes from banks.

Bank lending makes up 84% of the estimated stock of outstanding debt for SMEs (**Chart B**). When seeking external finance, the majority of SMEs apply to only one bank. This reliance on existing banking relationships can create a risk to the supply of credit during a downturn, as firms borrowing from weaker banks may struggle to access credit.

Much of the net growth in SME lending since 2017 has come from smaller banks or from alternative sources such as peer-to-peer lenders(6) — these are important sources of diversification for SMEs seeking to raise funding. But there are uncertainties around how these new and untested lenders would maintain their supply of credit in a downturn.

(1) See 'Remit and recommendations for the Financial Policy Committee: 2019'.
(2) See 'Understanding and measuring finance for productive investment'.
(3) See 'Workshop on 'Finance, investment and productivity'', *Bank of England Quarterly Bulletin*, 2017 Q1.
(4) See Levina, I, Melolinna, M, Saleheen, J and Tatomir, S (2017), 'The financial system and productive investment: new survey evidence', *Bank of England Quarterly Bulletin*, 2017 Q1.
(5) European Investment Bank survey, 2019.
(6) Peer-to-peer lending refers to direct lending between borrowers and lenders outside traditional financial intermediaries like banks.

Chart B Banks are the primary source of external funds for SMEs
Map of estimated outstanding SME debt[a]

Sources: Bank of England, ONS, Peer-to-Peer Finance Association and Bank calculations.

(a) Data are up to 2019 Q3 for large UK banks and other UK-based banks. Data are up to 2019 Q2 for asset finance and peer-to-peer finance.
(b) Large UK banks are Barclays, HSBC, Lloyds Banking Group, RBS and Santander UK.

One challenge affecting SME access to finance is asymmetries of information between lenders and businesses. This affects new firms without a visible track record especially, as well as sectors that are more reliant on intangible assets that cannot be used as collateral against loans.

In response to the June 2019 'Future of Finance' report, the Bank has proposed a portable SME credit file as a means to facilitate SMEs access to credit.(7) The Bank is working to develop the concept. This would augment credit history and financial data with tax data. It could then be shared with credit providers, to allow better access to diverse and competitive financing options, and to create a more level playing field.

The ability to raise external finance is not necessarily a good proxy for productive finance…

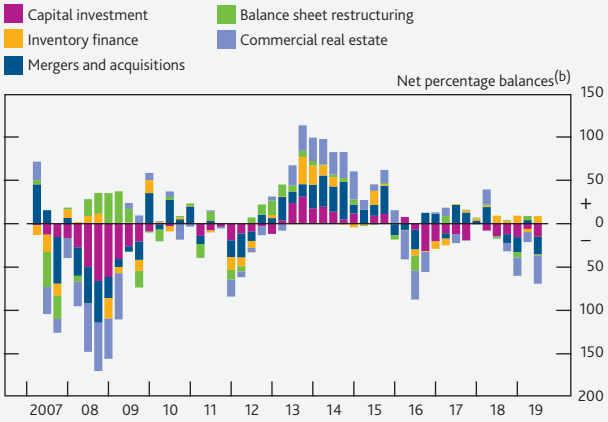
Despite the evidence suggesting that access to finance is not a widespread issue, growth in business investment as a share of GDP has been broadly flat. This is affected by both demand and supply-side factors. Corporate demand for finance for capital investment has generally been weak since 2016 (**Chart C**).

This weak investment growth may also reflect a shortage in the supply of finance best suited to longer-term productive investment. For example, despite recent growth in SMEs' use of alternative finance in addition to bank lending, the industry panel convened for HM Treasury's 'patient capital' review still estimated a shortfall of £3 billion–£6 billion per year in 'patient capital' for funding innovative firms.(8) To address this, the government announced a 10-year plan to finance growth in innovative firms.(9)

…so the Bank is exploring further work to support the availability of finance best suited to productive investment…

Some current fund structures are constrained in the extent to which they can invest in long-term, less liquid assets.

Chart C Corporate demand for lending has been weak
Changes in demand from UK PNFCs for bank finance[a]



Source: Bank of England *Credit Conditions Survey*.

(a) Net percentage balances are calculated by weighting together the responses of those lenders who answered the question 'What have been the main factors contributing to changes in demand for lending?'. The bars show the responses over the previous three months.
(b) A positive balance indicates that the changes in the factors described have served to increase credit demand.

Proposals have been developed for alternative fund structures, such as the Investment Association's 'Long-Term Asset Fund', which it argues could be more appropriate for illiquid assets.

The Bank and the FCA are undertaking a joint review into vulnerabilities associated with the liquidity mismatch in open-ended funds. In line with the FPC's secondary objective, this joint review should seek to promote the supply of productive finance over the business and financial cycles through closer alignment of redemption terms and the liquidity of funds' assets (see Vulnerabilities in open-ended funds chapter).

…including by conducting a new survey into businesses' access to finance for productive investment.

While the 2017 survey of firms was broadly representative across industries, firm sizes and UK regions, the sample underrepresented young businesses (for example, start-ups). Another limitation was that it provided information about firm behaviour at a single point in time only.

To address these issues, **the FPC has supported a proposal from the Bank to repeat the survey and extend it to capture fast-growing and innovative firms more effectively**. The survey could shed light on barriers to finance, including for fast-growing firms, and on the extent to which access to finance — rather than other factors — might be constraining investment.

(7) See 'The Bank of England's response to the van Steenis review on the Future of Finance'.
(8) See HM Treasury, 'Patient capital review: industry panel response'. Patient capital is defined by the FCA as 'a broad range of alternative assets intended to deliver long-term returns'.
(9) See HM Treasury, 'Financing growth in innovative firms: one-year on'.

Box 10
Progress on the transition away from Libor

Risks from continued reliance on Libor

The London interbank offered rate (Libor) is one of the predominant interest rate benchmarks used in global financial markets. It is estimated that about US$400 trillion of financial contracts reference Libor rates across five major currencies.(1) It is also widely used in supporting risk management and valuation infrastructure, and non-financial contracts.

However, Libor has a fundamental weakness: it references markets — term unsecured deposit transactions — that are not active. It is therefore reliant on rate submissions from panel banks based largely on expert judgement, which is not a sustainable model. That fundamental design flaw has no prospect of changing.

The intention is that sterling Libor will cease to exist after the end of 2021, and no firm should plan otherwise. The Libor benchmarks remain supported until that point by a voluntary agreement among panel banks to continue making rate submissions, but the FCA, the UK's benchmark regulator, expects departures from the panels once this agreement ends. With fewer submissions to rely on, the FCA would be required to reassess whether each Libor benchmark remains 'representative'. Once they are not, they may become unusable in some contracts and ultimately publication would be expected to cease.

Libor contracts still outstanding at the end of 2021 will be subject to legal uncertainty unless they include a robust and effective fallback provision for a different rate to replace Libor, should the latter become unavailable or unrepresentative. Many legacy contracts did not envisage that Libor could become permanently unavailable, so may not perform as expected unless they are amended or replaced. Contracts referencing Libor are likely to become less liquid and more volatile as the end of the voluntary agreement with panel banks approaches.

Without changes to valuation and accounting systems, firms may also lose their ability to monitor and report on their financial position accurately when these rates are no longer available.

The continued reliance of global financial markets on Libor poses a risk to financial stability that can only be reduced through a transition to alternative risk-free rates (RFRs) by end-2021.

Firms need to end the use of Libor in new contracts as soon as possible. Firms that do not yet have credible plans to complete this work by end-2021 run significant financial and reputational risks.

Sterling markets in particular show encouraging signs in the development of new Sterling Overnight Index Average (SONIA) products and the transition of some legacy products. But **important gaps remain so these efforts will need to continue to accelerate in the first half of 2020. In support of that**:

- **The UK's Working Group on Sterling Risk-Free Reference Rates (the Working Group) has set a target for market participants to cease issuance of cash products linked to sterling Libor by end-2020 Q3. The FPC endorses this target** and encourages all lenders and borrowers to take the necessary steps to prepare themselves to meet this timeline.

- **The PRA and FCA have taken steps to ensure that each of the largest regulated firms has nominated a senior manager to be responsible for that firm's transition away from Libor, and the FPC considers this good practice for all firms with material Libor exposures**. Regulated firms should expect increasing scrutiny of their transition efforts. Firms are now expected to maintain and share transition project plans, and analysis of risks to their transition with their supervisors.

- **The FPC welcomes the announcements made by some central counterparties (CCPs) of their intentions to adopt appropriate fallback arrangements for derivative products and that they may elect to use those fallbacks in the event that Libor is found to be unrepresentative**.

- **The Bank is currently reviewing its risk management approach to Libor-linked collateral delivered in its Sterling Monetary Framework**.(2) This has the potential to play an important role in incentivising firms to transition these instruments in advance of 2021 (for example, if changes are made to eligibility or haircuts). The Bank will need to balance the need to manage risks to its balance sheet and accelerate away from Libor against any concerns raised by industry, including the time some firms might need to adapt to any changes in collateral policy.

- **The FPC has considered further potential supervisory tools that could be deployed** by authorities to encourage the reduction in the stock of legacy Libor contracts to an

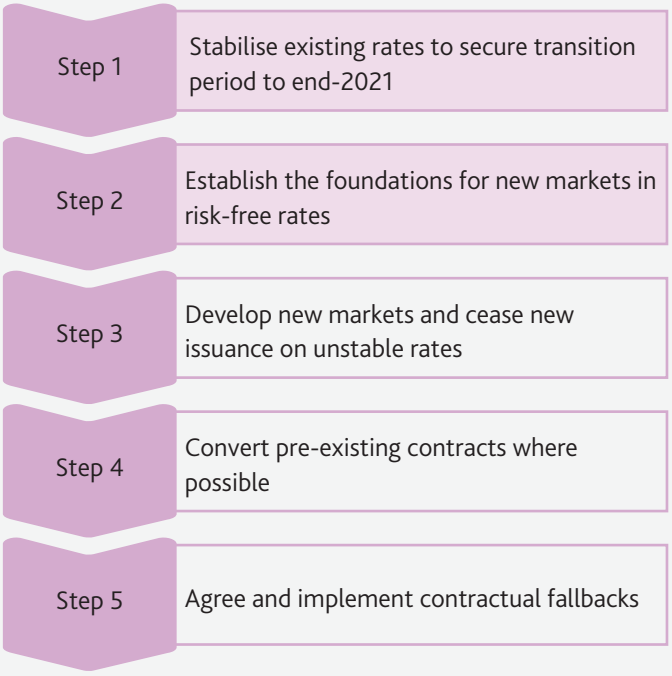
(1) Libor rates are currently published across a range of tenors in sterling, US dollar, euro, Swiss Franc and Japanese yen. Estimated exposures based on www.bis.org/publ/qtrpdf/r_qt1903e.pdf.
(2) The Bank sought views from market participants to inform its review of this policy in June 2019. See *Bank of England Discussion Paper*, 'The Bank of England's risk management approach to collateral referencing LIBOR for use in the Sterling Monetary Framework'.

irreducible minimum ahead of end-2021, and will keep this under review in light of progress made by firms on the transition.

- The FCA has recently published a statement to provide clarity on its conduct expectations of firms in the context of Libor transition, including appropriate communication with their clients.(3)

Progress in securing an orderly transition

The diagram below summarises the main steps required from market participants and the authorities to deliver an orderly transition:



The first two steps have been completed, through the FCA's agreement with panel banks and the establishment of new RFRs in each of the five Libor currencies. The preferred RFR for the last of the five, the euro short-term rate (€STR), was first published on 2 October 2019.

Progress in building liquidity in new markets and securing conversion of existing contracts remains mixed across currencies and products. Compared to progress in sterling Libor markets, **transition remains further behind in US dollars, the largest Libor market**. The FPC agrees that it is important to maintain momentum behind the transition away from sterling Libor, even if the transition for other currencies, such as the US dollar, is progressing less quickly.

Sterling markets

Key derivatives markets already have well-established liquidity in SONIA. Around 50% of cleared sterling swaps are denominated in SONIA, with an increasing share of transactions at longer dates. But progress appears to have plateaued. The share of futures referencing SONIA has remained around 8% of total sterling futures volumes since July 2019. Key next steps in these markets include a target to adopt SONIA as the primary convention for quoting sterling swaps in 2020 Q1, and the development of markets in more complex SONIA derivatives.

Compounded SONIA has become the dominant interest rate benchmark for new issuance in sterling bond and securitisation markets. Since the July *Report*, around 85% of floating-rate bond issuance with maturity post-2021 referenced SONIA, including the first SONIA bond issued by a non-financial corporate. Similarly, almost 90% of sterling securitisations sold since the July *Report* referenced SONIA rather than Libor.

Further work is needed to establish a SONIA based loans market, which remains the slowest area of progress in sterling markets. The first loan referencing compounded SONIA was launched in June, providing a proof of concept for this market. But these products are not yet widely available. The Working Group has acknowledged the importance of progress in this area, and as noted above has set a target to cease issuance of cash products linked to sterling Libor by end-2020 Q3.

Firms should not delay their transition programmes while development of a forward-looking term rate based on SONIA takes place. The majority of new business is increasingly expected to reference compounded overnight SONIA,(4) so it will be important for firms to make these products available as soon as possible to support delivery of the 2020 Q3 target.

Nonetheless, UK authorities continue to work with market participants to support the development of robust forward-looking term rates for use in those market segments where they may be needed to support transition, particularly for legacy contracts. Following an agreement from banks to provide the necessary electronic swap quotes, benchmark providers will be able to produce term rates in test form from February 2020.

Momentum in converting legacy products (step 4 in the diagram above) has gathered pace in sterling bond and securitisation markets in recent months. Since the first bond conversion in June, four of the UK's major banks and building societies have undertaken exercises to agree conversion of a total of £4.2 billion Libor products to SONIA. This accounts for an estimated 7% of outstanding floating rate sterling bonds

(3) See 'Conduct risk during LIBOR transition'.
(4) For example, the UK Working Group expects future use of forward risk-free term rates in cash markets to be more limited than the current use of Libor and anticipates that corporate borrowers will increasingly prefer contracts that reference compounded overnight SONIA. See 'Statement on behalf of the Working Group on Sterling Risk-Free Reference Rates: progress on adoption of risk-free rates in sterling markets'.

and securitisations maturing after 2021. Proactive reduction of existing Libor exposures remains relatively limited across sterling markets as a whole, however, so it will be important for the early steps taken in recent months to be built upon and extended to a broader range of markets in 2020.

International markets

Exposures to Libor extend far beyond the jurisdictions directly responsible for the five currencies in which Libor is published. Financial institutions that operate in the UK are exposed to risk not only from sterling Libor but also from contracts linked to other Libor currencies. For example, UK banks have significant exposure to US dollar Libor-linked contracts that have similar vulnerabilities, and pose the same risks, as those linked to sterling Libor. Authorities and firms in all jurisdictions will therefore need to ensure that those risks are identified and mitigated ahead of end-2021.

In US dollar markets, which account for the largest proportion of Libor exposures globally, widespread adoption of risk-free rates has not yet been achieved. The Secured Overnight Financing Rate (SOFR) was chosen as the preferred RFR and first published in April 2018. New SOFR markets have been developed in many areas, but the more established Effective Fed Funds Rate (EFFR) and US dollar Libor remain the most widely traded interest rate benchmarks at present.

Since July 2019, around 8% of floating rate bonds issued maturing post-2021 have referenced SOFR. In derivative markets, trading volumes in SOFR swaps remain below 1% of Libor equivalents, though adoption of SOFR in the futures markets has been greater, reaching around 7% of Libor equivalent volumes since July 2019. Major clearing venues for US dollar swaps are expected to adopt SOFR in discounting practices in 2020 H2.

In Europe, non-Libor benchmarks are more widely used. The status of the two most prominent euro benchmarks has been clarified in recent months. The methodology of the legacy overnight rate (EONIA) has been updated and linked to €STR through a fixed spread, while European regulators have confirmed that the primary term benchmark (EURIBOR) is considered to meet the regulatory requirements for continued publication.(5)(6)

Co-ordinated work by international standard-setting bodies continues, for example, to clarify the application of margin requirements and hedge accounting treatments in relation to existing contracts.

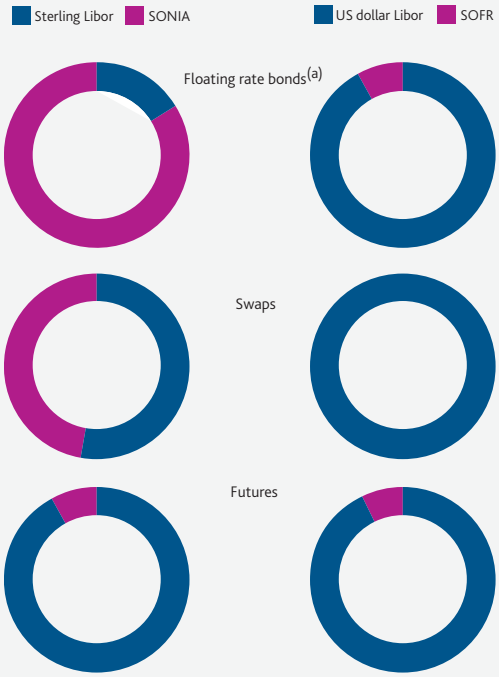
Contractual fallbacks

Introducing robust fallback provisions in financial contracts (step 5) is a priority to avoid legal uncertainty. For derivatives, the International Swaps and Derivatives Association (ISDA) confirmed the final methodology for calculating fallback rates for key benchmarks in most major currencies in November 2019, with implementation expected in 2020.(7) Widespread uptake of the new fallbacks will be required to mitigate risks around contract performance in the event of Libor discontinuation.

A further important element to be finalised is how these contracts would respond in the event Libor is declared 'unrepresentative'. ISDA is currently considering a request from authorities to broaden consensus on the inclusion of a trigger that would ensure fallbacks take effect at this point.(8) The actions of CCPs have a particularly important role to play in this respect, and at least two major CCPs have indicated their support for converting cleared contracts away from Libor at this point.(9)

Chart A Market share of RFRs is further advanced in most sterling markets than in US dollar markets

Proportions of issuance/trading in RFR-linked products relative to Libor equivalents since July 2019 based on notional volumes



Sources: Bloomberg Finance L.P., CME Group, CurveGlobal, ICE, ISDA SwapsInfo and LCH Group.

(a) Maturity post-2021.

(5) See 'ECB provides a one-off spread between €STR and EONIA'.
(6) EURIBOR and the euro overnight index average (EONIA) are the most widely used interest rate benchmarks for euro-denominated financial contracts.
(7) See 'ISDA publishes results of consultation on final parameters for benchmark fallback adjustments'.
(8) See 'FSB letter to ISDA on pre-cessation triggers'.
(9) For example, see statements from LCH and CME in ISDA's May 2019 consultation.

Vulnerabilities in open-ended funds

Open-ended funds play an important and increasing role in the provision of finance, both globally and in the UK. The FPC judges that the mismatch between redemption terms and the liquidity of some funds' assets means there is an advantage to investors to redeem ahead of others, particularly in a stress. This has the potential to become a systemic risk. It could result in forced asset sales, testing markets' ability to absorb them, further amplifying asset price moves, transmitting stress to other parts of the system, and disrupting the availability of finance in the real economy.

As part of the ongoing review by the Bank and the FCA of open-ended funds, the FPC has established that there should be greater consistency between the liquidity of a fund's assets and its redemption terms. In that regard:

- Liquidity of funds' assets should be assessed either as the price discount needed for a quick sale of a representative sample (or vertical slice) of those assets or the time period needed for a sale to avoid a material price discount. In the US, the Securities and Exchange Commission has recently adopted measures of liquidity based on this concept.

- Redeeming investors should receive a price for their units in the fund that reflects the discount needed to sell the required portion of a fund's assets in the specified redemption notice period.

- Redemption notice periods should reflect the time needed to sell the required portion of a fund's assets without discounts beyond those captured in the price received by redeeming investors.

In addition to enhancing UK financial stability, these changes should also promote funds' ability to invest in illiquid investments, helping to increase the supply of productive finance to the economy through the business and financial cycles, in line with the FPC's secondary objective.

The review will now consider how these principles could be implemented and, in particular, the degree of market stress against which liquidity measures and redemption terms should be calibrated. The conclusions of the review in 2020 will, where appropriate, inform the development of the FCA's standards for open-ended funds and they will be used in UK regulators' engagement with the industry. Recognising the global nature of asset management, the conclusions could also be used by the UK regulators in international work at the Financial Stability Board and the International Organization of Securities Commissions and with other competent authorities on the financial stability risks of asset management activity.

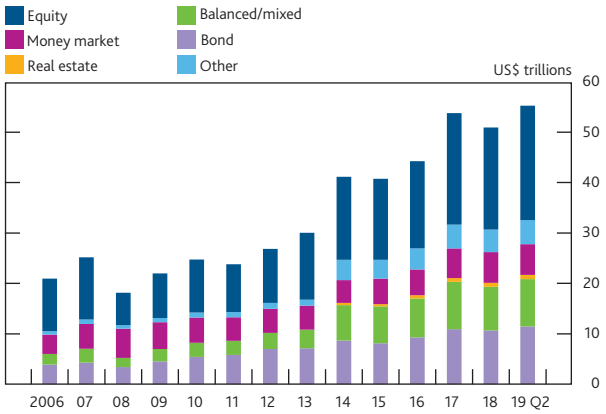
Open-ended funds play an important and increasing role in the provision of finance, both globally and in the UK.

Open-ended funds are collective investment vehicles that can create units and sell them directly to investors. When investors exit an open-ended fund, the fund pays them the unit's price, which is based on the fund's net asset value (NAV).(1) In contrast, in a closed-ended fund, investors generally sell their interests to other investors in the secondary market, for their market value, which can be at a discount or premium to the fund's NAV.

Open-ended funds play an important and increasing role in the provision of finance in some markets, both globally and in the UK. Total assets managed by open-ended funds worldwide have more than doubled following the global financial crisis, to around US$55 trillion (**Chart I.1**).

Chart I.1 Total net assets of open-ended funds have more than doubled since the financial crisis

Open-ended fund assets worldwide(a)



Sources: European Fund and Asset Management Association and Bank calculations.

(a) Total net assets of worldwide regulated open-ended funds. Includes exchange-traded funds and funds of funds.

By offering daily redemptions while investing in illiquid assets, funds create incentives for investors to redeem ahead of others.

The vast majority of open-ended funds domiciled in the UK offer daily redemptions to investors. Those that do account for over 95% of UK open-ended funds' assets.(2) For some funds, this matches the ability to sell the assets held by the fund, particularly in normal market conditions. For example, equities account for 64% of UK domiciled funds' holdings.(3)

However, funds' holdings of assets that take longer to liquidate in an orderly way, especially during a period of market stress, are increasing. Globally, more than US$30 trillion of assets are now held in open-ended funds that offer short-term redemptions while investing in longer-dated and potentially illiquid assets, such as corporate bonds. That has more than tripled since 2006.(4) And according to Bank estimates, UK and foreign funds now hold around 12% of the sterling corporate bonds outstanding, up from 8% in 2006.(5)

Moreover, in aggregate, around 8% of UK NURS funds' holdings are real estate.

Investors may assess that they could benefit by redeeming early if they anticipate the fund may use the most liquid part of the portfolio to pay redeeming investors. This behaviour could be accentuated if the fund holds assets that are difficult to value because they are traded infrequently in illiquid markets, such as commercial real estate.

It is therefore important that, when fund managers sell assets to meet redemption requests, they sell a representative vertical 'slice' of a fund's assets. This will include both liquid and illiquid elements. However, a fund may need to sell its less liquid assets at a discount relative to what could be realised if it had more time to undertake the sale. If redeeming investors received a price that did not reflect that discount, they could benefit at the expense of the remaining investors, contrary to the collective nature of the investment scheme.

Thus, the investment structure creates an incentive to redeem ahead of others, particularly in a stress. In contrast, if investors were investing directly in the same assets outside of a fund structure, they would bear the price impact and, more generally, the costs of quick sales. Hence, they would not have the same incentive to sell the same quantity of assets or, if selling, may do so over a longer time period.

The problem may also be compounded if fund investors anticipate that the price for a unit in the fund may be 'stale', ie not yet factoring in the latest information, with further adjustment to come once assets are sold, possibly at a large discount.

These incentives to redeem ahead of other investors can be self-reinforcing, leading so many investors to redeem that funds have no choice but to suspend redemptions. Although prompt and consistent suspensions are important to ensure fairness to investors and to avoid fire sales of assets, fear of future suspension can further reinforce the incentive for investors to redeem.

(1) Unless otherwise stated, all references to funds in this chapter refer to open-ended funds. In the UK, there are two types of open-ended fund structures marketable to institutional and retail investors: (i) an undertaking for collective investment in transferable securities (UCITS), which is a fund that invests in transferable securities and other liquid financial instruments; and (ii) a non-UCITS retail scheme (NURS), which is a fund with greater investment flexibility than a UCITS.
(2) Source: Morningstar.
(3) Funds also hold bonds (23%), cash (7%) and other assets (6%), such as commercial real estate.
(4) Estimates are based on the FSB's measure of 'collective investment vehicles with features that make them susceptible to runs'. See 'FSB Global Monitoring Report on Non-Bank Financial Intermediation 2018'. Similarly, the largest leveraged loan funds and high-yield bond funds in the US have increased their relative holdings of assets that are hardest to value. See Anadu, KE and Cai, F (2019), 'Liquidity transformation risks in US bank loan and high-yield mutual funds', *Federal Reserve Bank of Boston Supervisory Research and Analysis Notes*.
(5) This is a lower bound estimate based on reported allocation to corporate bonds by sterling fixed-income funds in Morningstar. The amount outstanding is calculated at face value and estimated using Thomson Reuters Deals Business Intelligence.

The FPC continues to judge that the liquidity mismatch in funds has the potential to become a systemic risk.

The liquidity mismatch in funds could result in forced asset sales. These sales could test markets' ability to absorb them, further amplifying asset price moves, transmitting stress to other parts of the system, and disrupting the availability of finance in the real economy.

Numerous case studies illustrate that liquidity mismatch in funds is a vulnerability that goes beyond any single market or fund type. And a large body of research suggests this could create financial instability under severe stress and/or if it was compounded by other vulnerabilities in market-based finance. It could also become more important if more funds expand into less liquid assets (see Box 11).

Thus, the FPC continues to judge that the mismatch between redemption terms and liquidity of some funds' assets has the potential to become a systemic risk. The issue should be addressed before it grows further or interdependencies between funds and the rest of the financial system become more prominent.

The Bank and the FCA are undertaking a joint review into vulnerabilities in open-ended funds.

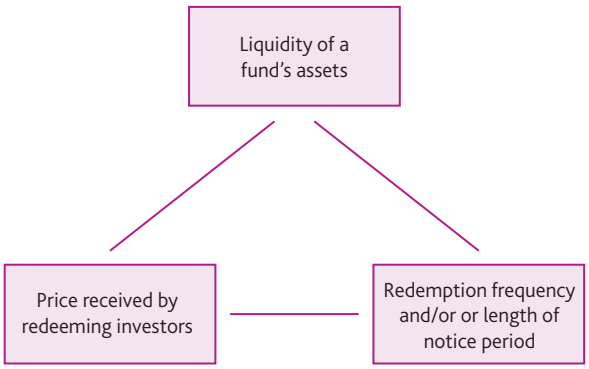
As set out in the July 2019 *Report*, the Bank and the FCA are undertaking a joint review into vulnerabilities associated with liquidity mismatch in open-ended funds. The review builds on the FPC's 2015 assessment; the FCA's 2019 Policy Statement on funds investing in inherently illiquid assets; and the work by the Financial Stability Board (FSB) and the International Organization of Securities Commissions (IOSCO).

Following its October 2018 consultation, the FCA published a Policy Statement in September 2019, setting out a number of changes to the way that certain open-ended funds investing in inherently illiquid assets should operate. These changes addressed a number of specific issues that had arisen following the UK referendum on EU membership in June 2016. The Policy Statement included a requirement for funds investing in property and other immovables to suspend dealing if there was material uncertainty about the value of at least 20% of the fund's assets.(6)

In addition, at its October meeting, the FPC highlighted that the structural incentives for investors to redeem ahead of others should be reduced through greater consistency in the design of funds between:

- the liquidity of a fund's assets;
- the price received by redeeming investors for their units in the fund; and
- the redemption frequency and/or length of notice periods(7) (**Figure I.1**).

Figure I.1 There should be greater consistency between the liquidity of a fund's assets and its redemption terms



The FPC has now established the principles for fund design that would deliver greater consistency.

The FPC has reviewed progress of the Bank and FCA review into open-ended funds. The FPC has now established the principles for fund design that would deliver greater consistency between asset liquidity, pricing of redemptions and the length of notice period:

(1) Liquidity of funds' assets should be assessed either as the price discount needed for a quick sale of a representative sample (or vertical slice) of those assets or the time period needed for a sale to avoid a material price discount.

Liquidity risk in the context of funds could be viewed as the risk of not being able to fulfil redemption requests without a price discount on the assets sold. As such, liquidity could be measured based on the time needed to liquidate a given volume of assets following a redemption request without taking a discount on the price (or, similarly, as the price discount typically required to liquidate a given volume of assets in a short period).

Classifying and measuring liquidity this way has been considered internationally. For example, in the US, the Securities and Exchange Commission has recently adopted measures of liquidity based on this concept. US funds must classify their assets into buckets based on the time period of sale and settlement needed to avoid a material price discount. Formalising measurement of liquidity by building on such practices could create greater transparency around fund liquidity.

Although the measurement of liquidity is a necessary step, additional measures would be needed to ensure redemption terms in the design of funds are aligned with the liquidity of

(6) Unless fund managers agreed with the depositary that continued dealing was in the investors' best interests.
(7) Notice period refers to how much notice the investor has to give before their money is returned to them. Redemption frequency refers to how often the investor can request to have their money returned to them, eg once per month.

their underlying assets. This could be achieved via pricing adjustments, longer notice periods, or an appropriate combination of the two.

(2) Redeeming investors should receive a price for their units in the fund that reflects the discount needed to sell the required portion of a fund's assets in the specified redemption notice period.

This principle would ensure that there was no incentive to redeem from a fund ahead of other investors. Selling assets quickly or in large volumes could require funds to accept a discount, particularly in stressed conditions. This could disadvantage the remaining investors in the collective investment scheme. To avoid that, redeeming investors should bear the consequences of those discounts.

Swing pricing, which allows the price to be adjusted to reflect such potential dilution costs to other investors in the fund, is already used by some funds across different jurisdictions. Proceeds from anti-dilutive measures such as swing pricing accrue to investors in the scheme, unlike redemptions fees which go to the fund managers. FCA research has found that funds that used pricing adjustments during periods of low liquidity and/or market stress did not experience significant outflows.(8)

Although UK authorised funds are obliged to treat all investors fairly, funds are currently under no specific obligation to offset dilution costs. And to reflect the true marginal impact of a redemption on the fund, the calculation and application of swing pricing may need to go beyond its typical use at present. More generally, pricing adjustment techniques may also help address incentives related to stale pricing.

There are challenges to applying such a mechanism, which requires an assessment of the potential sale price before a redemption is made. Swing pricing would vary with market conditions and redemption pressure and so may be difficult to calibrate in practice. And in the case of the most illiquid assets, market prices may not exist for a quick sale.

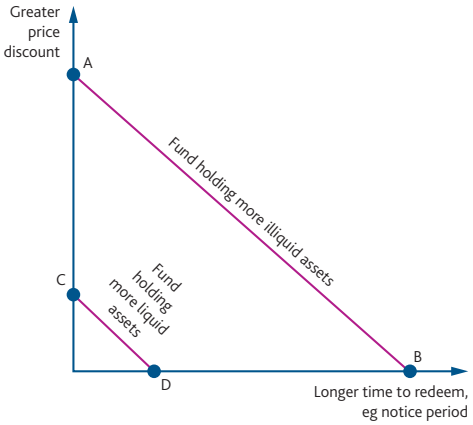
(3) Redemption notice periods should reflect the time needed to sell the required portion of a fund's assets without discounts beyond those captured in the price received by redeeming investors.

Longer notice periods would allow more time to sell the assets, without having to accept a lower price that could, without appropriate pricing mechanisms, potentially disadvantage the remaining investors in the collective investment scheme.

However, there are challenges to implementing longer notice periods. For example, redeeming investors would bear some uncertainty about the price they would receive, and queueing mechanisms would need to be carefully designed to ensure the fair treatment of all investors.

Conceptually, funds should apply a pricing tool, a notice period, or a combination of both, that reflects the liquidity of the underlying assets held in the fund. **Figure I.2** presents a stylised example of the range of combinations that might be appropriate. For a fund invested in illiquid assets and offering a short redemption period, a significant price discount might need to be applied for redeeming investors in order to reduce incentives to redeem ahead of others (point A). Alternatively, such a fund could reduce the price discount applied by increasing the time to redeem, eg via notice periods, (moving along the stylised line from A up to and including B). For more liquid assets, the appropriate pricing discount and/or time to redeem could be much less (along the stylised line C to D).

Figure I.2 Stylised combinations of price discounts and notice periods needed to reduce incentives to redeem ahead of others



A closer alignment of redemption terms and the liquidity of funds' assets should also promote greater supply of productive finance through the business and financial cycles.

Subject to meeting its primary objective, the FPC's secondary objective is to support the government's economic policy, which includes, where possible, facilitating the supply of finance for productive investment provided by the UK's financial system (see Box 9). This objective will be part of the Bank and FCA review.

In addition to enhancing UK financial stability, these principles should also promote funds' ability to invest in illiquid investments, helping to increase the supply of productive finance to the economy through the business and financial cycles, in line with the FPC's secondary objective.

(8) The findings also showed that the pricing adjustment factor was determined primarily by the illiquidity of a fund's holdings: it was significantly larger when the portfolio illiquidity was higher and during periods of stress. See Jin, D, Kacperczyk, M, Kahraman, B and Suntheim, F (2019), 'Swing pricing and fragility in open-ended mutual funds', *FCA Occasional Paper No. 48*.

Financing productive investment opportunities may require investing in long-term assets that can be very illiquid at times. If such investment is offered via funds with short redemption periods and inadequate pricing adjustments, this can result in sudden suspension of redemptions, loss of confidence in such structures and disruption to the provision of long-term finance. Over time, the shortcomings with these investment vehicles can reduce the overall supply of productive finance.

Structures with longer redemption terms exist or have been proposed in the UK and elsewhere in Europe. Closed-ended funds also exist as vehicles to invest in illiquid assets. However, such structures may look unattractive to investors and be crowded out when compared to funds that invest in less liquid assets, such as real estate and infrastructure, but that still offer daily redemption and little price adjustment.

The conclusions of the review will, where appropriate, inform the development of the FCA's standards for open-ended funds.

The ongoing Bank and FCA review into open-ended funds will now consider how these principles could be implemented and, in particular, the degree of market stress against which liquidity measures and redemption terms should be calibrated. This will be informed by estimates of the costs and benefits of different policy options to reduce the liquidity mismatch in funds, including by drawing lessons from other jurisdictions. The review will also consider practicalities around implementation and oversight, among other factors. It will also have regard to the importance of transparency and investor communication when the policy is applied. The FPC will continue to monitor progress of the review.

The review will consider appropriate calibrations of these principles, for normal and stressed conditions. It will also consider whether a combination of tools, with each introduced for a given severity of stress, is practical. For example, pricing adjustment could be used in normal conditions until a level of stress is reached where it would become impractical, with obligations for funds' managers to take certain actions, which could include suspensions in some circumstances.

The conclusions of the review in 2020 will, where appropriate, inform the development of the FCA's standards for open-ended funds. And they will be used in UK regulators' engagement with the industry. Following its 'Asset Management Market Study' in 2015, the FCA introduced a number of additional governance measures for authorised funds. These measures include the mandatory appointment of independent non-executive directors to fund boards; a requirement to produce and publish an annual assessment of value report; and the introduction of a new prescribed responsibility for the assessment of value under the Senior Managers and Certification Regime.

The review will carefully consider possible data needs in 2020 Q1.

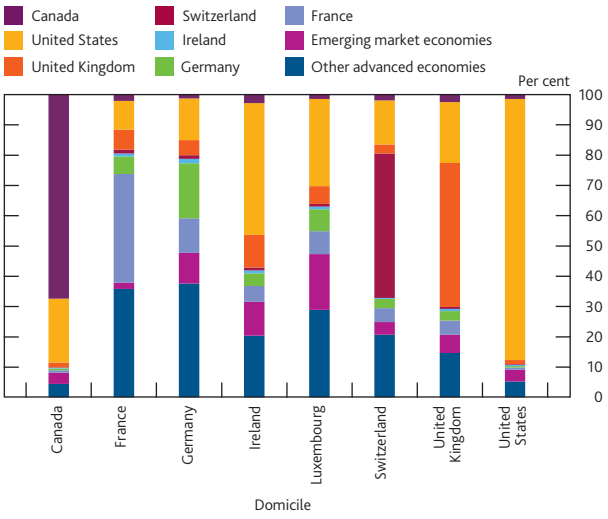
This will include how best to collect, report, monitor, and disclose data. Initial data collection will likely take the form of a survey — informed by its usefulness for cost-benefit analysis; the extent to which it complements other data gathering exercises; and proportionality, among other factors.

Recognising the global nature of asset management, the conclusions could also be used by the UK regulators in international work.

The FPC recognises the importance of addressing liquidity mismatches in open-ended funds internationally, given the global nature of asset management and the UK's role in it. For example, the UK is the ninth largest domicile for funds globally;(9) around two-thirds of UK assets held by funds are held by funds domiciled in other jurisdictions; and for UK-domiciled funds, around half of their fixed-income assets are foreign assets (**Chart I.2**).

Chart I.2 The open-ended fund industry is interconnected across countries

Geographical composition of open-ended funds' fixed-income asset holdings by domicile(a)



Sources: Morningstar and Bank calculations.

(a) Total sample includes 75,000 funds with £25 trillion of assets under management, of which around £7 trillion is in fixed income.

Thus, the effectiveness of domestic policy measures will depend in part on the policies implemented in other jurisdictions. Different approaches globally could lead to sub-optimal outcomes. This has underpinned the FPC's continued support for the FSB's 2017 recommendation that funds' assets and investment strategies should be consistent with their redemption terms. The UK regulators will continue to engage with the relevant international bodies to achieve consistent implementation of this recommendation.

(9) European Funds and Asset Management Association, International Statistical Release (2019 Q2).

Box 11
Financial stability risks from liquidity mismatch in open-ended funds

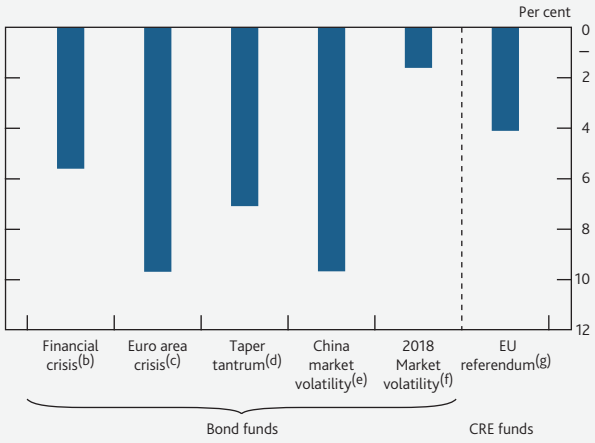
This box sets out evidence for how liquidity mismatch in open-ended funds could affect financial stability. In particular, numerous case studies illustrate that this vulnerability goes beyond any single market or fund type. And a large body of research suggests it could create financial instability by causing forced sales that may amplify shocks in the financial system. This may affect the provision of finance to the economy.

Episodes across a range of markets have illustrated liquidity mismatch in some open-ended funds.

Funds often experience large investor withdrawals at times of market volatility (**Chart A**). For example, UK CRE funds faced significant redemption requests in the period around the UK's referendum on EU membership in June 2016. Six CRE funds suspended redemptions and nine funds adjusted the prices that redeeming investors could receive to account for asset price movements or uncertainty. More recently, M&G Investment's property fund faced large outflows prompted by continued Brexit-related uncertainty and structural shifts in the UK retail sector, and suspended dealing in December 2019. The suspension of LF Woodford Equity Income Fund in June 2019 illustrated potential liquidity mismatch in an equity fund. And internationally, there were several episodes in the past few years where funds experienced large redemption requests (eg funds within Third Avenue in 2015, GAM in 2018, H2O in 2019 and some mutual funds in India in 2018–19).

Chart A Funds often see large investor withdrawals over short periods of time when market volatility is high

Net flows into global open-ended funds as proportion of total net asset value in selected episodes[a]



Sources: Financial Conduct Authority, Morningstar and Bank calculations.

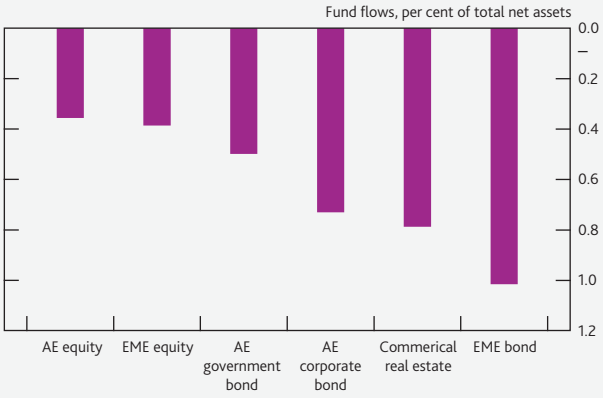
(a) Outflows in the chart are shown for the relevant subset of funds and over time periods of different length, as follows.
(b) Global open-ended bond funds, four months September–December 2008 (AUM per sample: US$3.4 trillion).
(c) Funds that are majority invested in euro-denominated bonds, seven months, August–November 2011 (US$600 billion).
(d) Emerging market bond funds, four months June–September 2013 (US$400 billion).
(e) Emerging market bond funds, six months, August–September 2015 (US$300 billion).
(f) Global open-ended bond funds, two months November–December, 2018; Taper tantrum (US$7.2 trillion).
(g) Fifteen funds that are majority invested in UK commercial real estate (CRE), eight business days, 24 June–5 July 2016 (£25 billion).

The sensitivity of fund flows to their performance is higher when funds hold less liquid assets.

Research considering different markets and regions shows that outflows from funds are more sensitive to fund performance when funds hold more illiquid assets and when market liquidity conditions are worse.[1] For example, in response to a 5% fall in returns, funds investing in advanced economy corporate bonds face redemptions in the following month that are more than two times greater than redemptions from funds investing in advanced economy equities (**Chart B**). In addition, this effect is asymmetric: outflows from funds tend to be more sensitive to asset returns than inflows.[2]

Chart B The sensitivity of fund outflows to their performance is higher for funds invested in less liquid assets

Model estimates of fund outflows following a 5% fall in fund returns in the previous month[a]



Sources: Morningstar and Bank calculations.

(a) Estimates from a non-linear panel regression model using monthly data between 2005 and 2019, in advanced economies (AE) and emerging market economies (EME).

Large-scale redemptions from funds could cause forced sale of assets amplifying shocks in the system.

Large-scale redemptions from funds could result in them selling less liquid assets below their fundamental value. This can amplify shocks to the wider financial system, such as sudden price falls, rather than absorb them, and lead to higher market volatility. These effects can be further amplified by other vulnerabilities in market-based finance, including possible reduced willingness of dealers to intermediate in the corporate bond markets at times of stress (see the Resilience of market-based finance chapter).

(1) See, for example, Arora, R (2018), 'Redemption runs in Canadian corporate bond funds?', *Bank of Canada Staff Analytical Note*.
(2) See, for example, Coudert, V and Salakhova, D (2019), 'Price effect of mutual fund flows on the corporate bond market. The French case', *Banque de France Working Paper*; Goldstein, I, Jiang, H and Ng, DT (2017), 'Investor flows and fragility in corporate bond funds', *Journal of Financial Economics*, Vol. 126, No. 3, pages 592–613.

The Bank has developed models to explore these dynamics. This work initially focused on the corporate bond market. In 2019, an updated simulation found that under a severe but plausible set of assumptions, redemptions could result in material increases in corporate bond spreads — with an initial shock to credit risk premia of 60 basis points being amplified by 26 basis points. And shocks of a similar size to those observed during the crisis could overwhelm dealers' capacity to absorb those sales, resulting in market dysfunction.(3)

Analysis by the International Monetary Fund (IMF) concluded that global open-ended fixed-income funds are vulnerable to liquidity shocks. It considered a scenario with a redemption shock equivalent to the worst percentile of funds' monthly outflows in 2000–19. In this scenario, funds accounting for nearly one sixth of fixed-income assets and nearly a half of high-yield assets held by funds were shown to be unable to absorb redemption requests, which could lead to fire sales.(4)

This may be accentuated if funds hold a large proportion of the assets in a specific market.

The degree to which outflows from funds may amplify market shocks depends on whether funds hold a large proportion of the assets in a specific market, or if holdings of assets are concentrated in a few funds. Model estimates for the Canadian bond market, for example, show that because bond funds have grown in size and have increased their exposures to corporate bonds, their asset sales would have a much larger impact on market liquidity during stress now than they had in the past.(5) Similarly, research based on French corporate bonds shows that fund flows affect bond prices, with the impact being larger for outflows than inflows and greater where a higher proportion of a specific bond is held by funds.(6) The majority of UK corporate bonds held in funds are rated BBB or below, so fund outflows may have a particularly high impact on these bonds (**Chart C**).

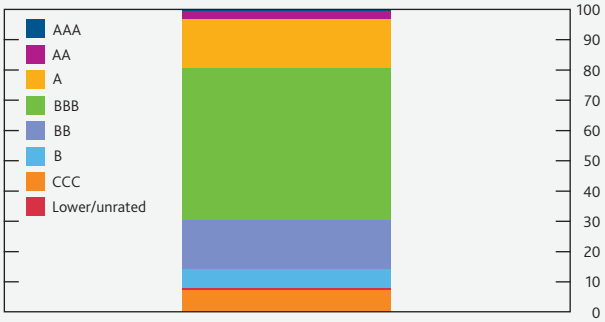
The risk of fire sales by funds is also higher if funds use leverage. Thus, meaningful measurement of leverage is key to monitoring and addressing risks from funds.

The risk of fire sales by open-ended funds may also be magnified if funds use leverage, either by borrowing or the use of derivatives (synthetic leverage). According to research by the European Central Bank, leveraged funds experience greater investor outflows after bad performance than unleveraged funds.(7) This may be because investors in leveraged funds expect that following substantial outflows, they need to adjust their portfolios more than unleveraged funds, forcing them to conduct unprofitable trades.

The FPC's in-depth assessment of leverage in the non-bank financial system in 2018 found that data currently reported to the supervisors of non-banks, including funds, do not include all the information needed to monitor risks associated with leverage appropriately. Internationally, IOSCO is operationalising the FSB's recommendation to develop consistent leverage measures for funds. As set out in the November 2018 *Report*, the FPC considers that to deliver the objective of the FSB recommendation in this area, a core set of measures will need to be consistent globally. Such measures will need to enable monitoring not only as to whether funds are using borrowing or derivatives, but also the potential losses and liquidity demands those funds could face.

Chart C The majority of UK corporate bonds held in funds are rated BBB or below

The composition of UK corporate bonds held in UK-focused funds by rating(a)



Sources: FCA transaction (MiFID II) data, Morningstar, S&P Capital IQ and Bank calculations.

(a) Ratings of UK corporate bonds held in UK-focused funds (based on S&P ratings). Funds identified as holding UK corporate bonds by Morningstar or trading in UK corporate bonds in FCA transaction data. The ratings coverage is limited to around half of UK corporate bonds held by these funds.

The resulting asset price falls may be transmitted to other funds, institutions and markets affecting the provision of finance.

In turn, asset price falls amplified by funds' sales may increase the cost of finance for companies, eg by raising the cost of issuing finance in capital markets and by reducing the value of collateral used by businesses and thus their ability to borrow. Asset price falls can also transmit to other parts of the financial system, including banks and insurers, eg via their common asset holdings with funds and a broader impact on market sentiment. This could further reduce the supply of finance to the real economy. Funds could also be affiliated to banks, which can result in reputational risks to these banks from fund stress and thus affect provision of finance.(8)

(3) Baranova, Y, Douglas, G and Silvestri, L (2019), 'Simulating stress in the UK corporate bond market: investor behaviour and asset fire-sales', *Bank of England Staff Working Paper No. 803*.
(4) IMF (2019), *Global Financial Stability Report*, October.
(5) Arora, R, Bédard-Pagé, G, Ouellet Leblanc, G and Shotlander, R (2019), 'Could Canadian bond funds add stress to the financial system?', *Bank of Canada Staff Analytical Note*.
(6) Coudert, V and Salakhova, D (2019), 'Price effect of mutual fund flows on the corporate bond market. The French case', *Banque de France Working Paper*. And research by the IMF shows that during the global financial crisis, bonds with a higher ownership concentration by funds experienced larger increases in spreads. See IMF (2015), *Global Financial Stability Report*, April.
(7) Molestina Vivar, L, Wedow, M and Weistroffer, C (2019), 'Burned by leverage? Procyclical flows and fragility in mutual bond funds', *ECB Working Paper Series*, forthcoming.
(8) According to academic research on the global equity mutual funds, in December 2010 funds affiliated to a bank represented around 20% of funds' total net assets. The proportion was similar for domestic UK funds, but exceeded 50% in some other European countries. See Ferreira, MA, Matos, P and Pires, P (2018), 'Asset management within commercial banking groups: international evidence', *The Journal of Finance*, Vol. 73, No. 5, pages 2,181–227.

Developments in payments

Innovation in payments could bring significant benefits for users.

At the same time, the ability to transact safely and smoothly is critical to financial stability and the regulatory framework will need to keep pace with innovation. HM Treasury's current review of the payments landscape is an opportunity to ensure that it can.

The FPC considers that the current framework will need adjustment in order to accommodate innovation in this sector. It has therefore developed the following approach that could usefully inform the Treasury review:

- Regulation of payments should reflect the financial stability risk, rather than the legal form, of payments activities. Firms that are systemically important should be subject to standards of operational and financial resilience that reflect the risks they pose.

- The systemic importance of any single firm should be informed by whether it is part of one or more systemic 'payment chains' — the set of activities necessary for a payment to be made — and whether its failure could disrupt the end-to-end chain. Innovation has made payment chains more complex. New firms, separate to regulated banks and payment systems, have become involved in providing payment services and could become systemically important.

- In order to ensure the information necessary for regulation and supervision to be effective, all firms above a certain threshold carrying out the activities that make up payment chains should provide sufficient information to support the identification of systemically important payments firms as they emerge.

In future, digital tokens known as stablecoins might increasingly be used to make payments. Stablecoin-based payment chains pose additional issues for regulation. In assessing how stablecoins should be treated in the regulatory framework, the FPC has considered them against its principle that the regulation of payments activities should reflect the financial stability risks they pose, rather than their legal form. It judges that:

- Payment chains that use stablecoins should be regulated to standards equivalent to those applied to traditional payment chains. Firms in stablecoin-based systemic payment chains that are critical to their functioning should be regulated accordingly.

- Where stablecoins are used in systemic payment chains as money-like instruments they should meet standards equivalent to those expected of commercial bank money in relation to stability of value, robustness of legal claim and the ability to redeem at par in fiat.

Libra is one high-profile example of a stablecoin proposal. It would have the potential to become systemically important. The regulatory framework that would apply to it must be clear and in place in advance of any launch.

There continues to be considerable innovation in payments.
In recent years there have been significant developments in UK payments as the sector has been opened up to competition and innovation and as a result of technological developments. New institutions, including non-banks, using new business or operational models have emerged, transforming the UK payments landscape.

A typical 'payment chain' (the set of activities necessary for a payment to be made) may now start with new non-bank entities using new technologies. This includes digital wallet providers, that can enable devices such as a mobile phone, to make a payment. New entrants may also be adding a new service within traditional payment chains, increasing the number of activities and players and thus lengthening the chain. One example is aggregators who provide smaller banks with IT access to payment systems and clearing infrastructure.

These changes could bring significant benefits for users, for example by meeting unfulfilled customer needs, widening access to financial services, lowering costs, and facilitating better integration of payments with other platforms. Innovation could also support financial stability by increasing diversity in payment methods and underlying infrastructure, mitigating risks that can arise from concentration.

The ability of individuals and businesses to transact safely and smoothly is critical to financial stability.
Robust and well-functioning payment chains are essential for the provision of financial services, as they allow people and businesses to make and receive payments on time, with confidence, and even in periods of economic uncertainty. This is explicitly recognised in the FPC's response to HM Treasury's annual remit letter, which states 'the purpose of preserving stability is to contribute to avoiding serious interruptions in the vital functions which the financial system as a whole performs in our economy: notably, the provision of payment and settlement services…'.

Adequate regulation and supervision of payment chains is therefore important to financial stability. Poorly designed, operated or regulated payment chains pose risks not just to economic activity directly, but also indirectly via confidence in the financial system and the real economy. The negative impacts of disruption of payments can extend well beyond payment chains and their participants, threatening the stability of the broader economy. The primary threats to financial stability from disruption in payments arise from:

- Contagion in financial markets if payments are outstanding, meaning increased exposures between counterparties and the inability to manage liquidity or meet payment obligations.
- Disruption to routine banking or payment operations leading to the inability of consumers to access their money and make both vital and everyday payments.

The FPC welcomes the ongoing HM Treasury review of the payments landscape as an opportunity to ensure that payments regulation can keep pace with changes in payments activities, and innovation can be encouraged and sustained. The FPC also notes the related work of the Cryptoassets Taskforce(1) to develop a response to cryptoassets, stablecoins and distributed ledger technology.

Payment chains are becoming more complex, posing challenges to regulation.
Figure J.1 describes a typical card payment chain, where a person uses a credit or debit card in a shop. It shows the main activities that make up the typical payment chain for electronic payments.

First there are *initiation* services which initiate the transfer of funds from or between accounts. Then *access* arrangements which connect front-end services, for example card readers, to the underlying payment systems which provide clearing and settlement. The *authorisation* process follows — it involves the set of rules for payment arrangements and checking of payments as they are processed. In card payments, authorisation systems are provided by card schemes such as Visa or Mastercard. *Clearing* reconciles payment messages by aggregating all orders for transactions into net amounts, which are communicated to *settlement* systems, where the final debiting and crediting of gross or net amounts due to each participant occurs. The final result, in this example, is that the money is received in the retailer's bank account.

Traditionally, these activities were performed by banks and core payment systems. But as innovation introduces more actors in the processing of each transaction, some payment chains are becoming 'unbundled', with a wider range of firms providing each link in the payment chain.

The whole payment chain can potentially be disrupted by issues in any one of these links. For example, an operational or financial failure could cause a service outage at a firm providing one 'link', which could impair the whole chain, leading to payments being denied or delayed. Where disruption to a payment chain would cause material risks to financial stability, such a chain would be systemic and would need to be treated as such.

The FPC judges that the current framework will need adjustment.
The current regulatory framework to mitigate risks to financial stability from payments was designed with vertically

(1) The Cryptoassets Taskforce was announced in March 2018 by the Chancellor of the Exchequer, as part of the government's FinTech Sector Strategy. It consists of HM Treasury, the Financial Conduct Authority and the Bank of England.

Figure J.1 An illustrative (card network) payment chain

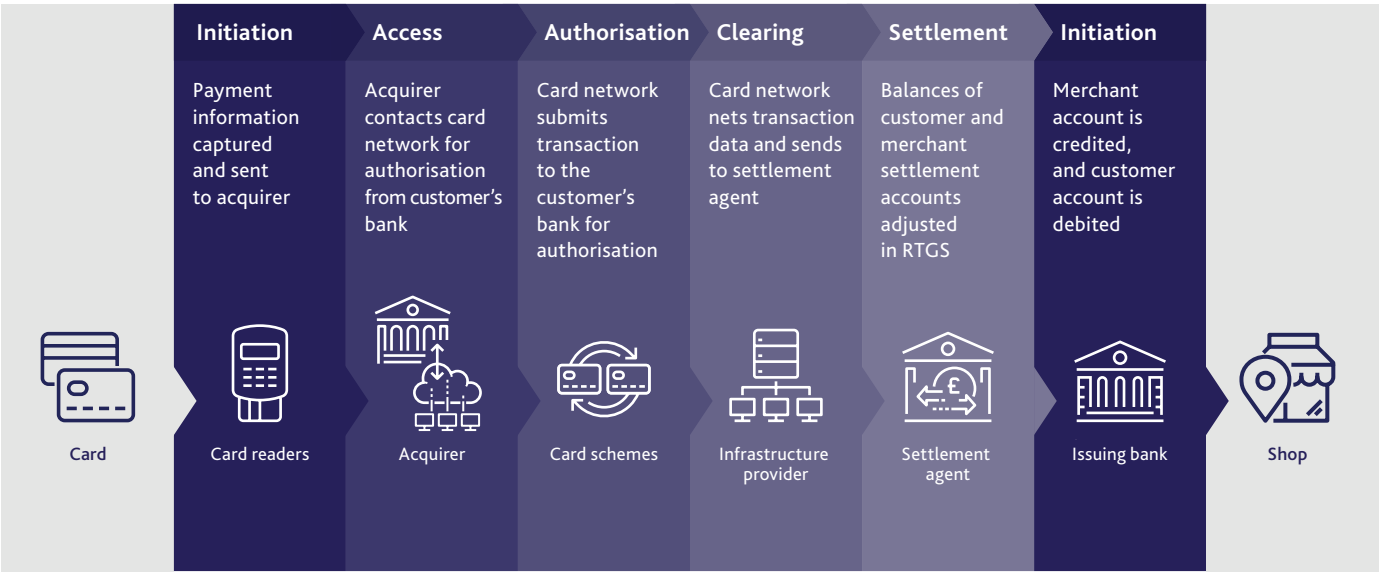


Figure J.1 is a stylised representation of a typical card payment chain, showing the main payments entities and associated payments activities. Risks can arise across each stage of the chain, which can impair the whole chain if they were to materialise. The terms used to describe payments entities and activities are conceptual for the purposes of this diagram and are not intended to correspond with any related legal definitions.

integrated payment chains in mind, with payments activities conducted primarily by banks and payment systems. Under the current framework, systemically important payment systems (the core infrastructure that undertakes the activities of authorisation, clearing and settlement) and some critical providers to them, are subject to regulation and supervision by the Bank of England. The current payments framework regulates only these core systems for financial stability purposes. In the past this, combined with separate regulation of banks which provided initiation and access, generally captured the entire payment chain.

Today, however, regulation may no longer fully capture payment chains end-to-end. **Figure J.2** shows how regulation of payments from a primarily financial stability objective currently only focuses on a subset of key payments activities that remain with 'payment systems' (ie authorisation and clearing). Some innovations in undertaking payment initiation and access activities may be regulated against other objectives or fall outside of the regulatory perimeter.

It is possible that new entrants could ultimately become critical links in systemically important payment chains without being subject to commensurate financial stability regulatory standards.

The FPC has therefore developed a new approach to financial stability regulation of systemic payment chains.

Regulation of payments should reflect the financial stability risk, rather than the legal form, of payments activities. Firms that are systemically important should be subject to standards of operational and financial resilience that reflect the risks they pose. This may include firms not currently regulated.

The systemic importance of any single firm should be informed by whether it is part of one or more systemic payment chains and whether its failure could disrupt the end-to-end chain.

Given the speed of innovation in payments, firms providing payment services can quickly become critical links in systemic payments chains. Providing information to support the identification of systemically important payment firms as they emerge will help ensure regulation can keep pace. **In order to ensure the information necessary for regulation and supervision to be effective, all firms above a certain threshold carrying out the activities that make up payment chains should provide sufficient information to support the identification of systemically important payments firms as they emerge.**

One model that could accomplish these aims would: (1) bring within the regulatory perimeter all firms carrying out, above a threshold, the payments activities described earlier in this chapter; and (2) categorise these firms according to the financial stability risks they pose. Firms that pose the least risk to financial stability could be required only to provide information to enable regulators to monitor them. Systemically important payments firms could be categorised and regulated accordingly.

Figure J.2 Overview of payment chain activities and the limits of current payments regulation

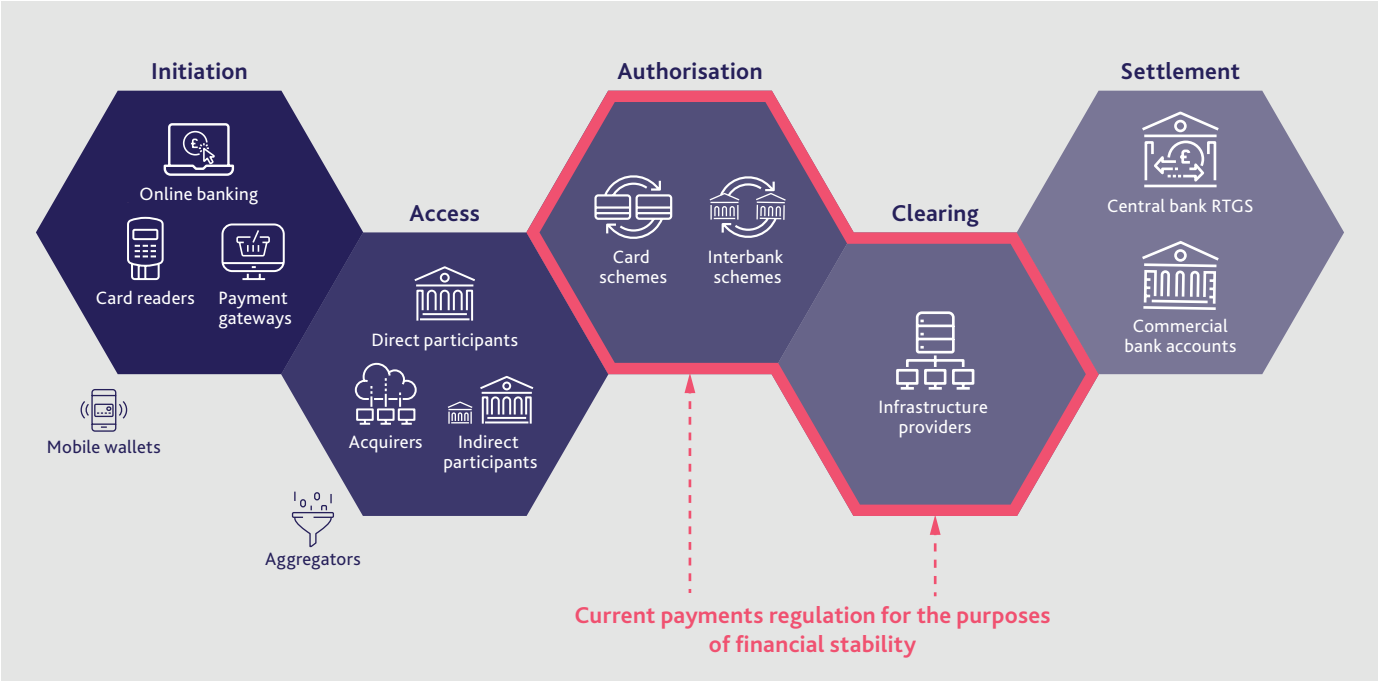


Figure J.2 is a stylised representation of the regulation of the key activities in a typical payment chain. It shows where various payments entities generally sit, where current payments regulation from a financial stability objective is currently focused, and where certain payments entities may not be fully captured by payments regulation. The terms used to describe payments entities and activities are conceptual for the purposes of this diagram and are not intended to correspond with any related legal definitions.

Payment chains that use stablecoins present additional challenges.

Some forms of innovation can both unbundle existing payment chains and create new links in the chain — introducing new entities and firms into the payments process. These innovations are underpinned by existing routes for payments, namely direct transfer between banks or transfer that is managed by a credit or debit card system, such as Visa or Mastercard.

But there is also innovation taking place that could partially replace or substitute for existing payments arrangements. A number of firms, including new entrants and existing technology companies have proposed business models that would use cryptoassets known as 'stablecoins' for transactions currently processed by retail or wholesale payments systems.

Early forms of cryptoassets such as Bitcoin have so far proven too volatile to become widely accepted as a means of payment. 'Stablecoins' aim to address this by maintaining a more stable value against fiat currencies. Like other cryptoassets, stablecoins involve the issuance of digital tokens or 'coins'. They generally aim to achieve stability via some form of asset backing designed to establish and maintain a value for these coins. They use technology platforms to provide networks across which transactions denominated in these new digital coins could be exchanged.

Libra is one high-profile example of a stablecoin proposal. It would have the potential to become systemically important. The regulatory framework that would apply to Libra must be clear and in place in advance of any launch.

Stablecoins could offer potential benefits to industry and consumers in terms of wider access to payments infrastructure. Stablecoins may also offer the potential for faster transmission of payments transactions and reduced costs. This may be of particular benefit for cross-border payments, where there are often higher costs and long transmission times. Stablecoins may offer increased convenience, including via integration with other technology, such as social media platforms or retail services.

Not all stablecoins will be used for payments activities. Some stablecoin proposals are primarily designed for investment purposes, akin to un-backed cryptoassets like Bitcoin. However, where a stablecoin is used to facilitate the transfer of 'money' for buying goods and services and the settling of debts it could pose, depending on the scale of usage, the same financial stability risks as traditional payment chains. For those payment chains that use stablecoins, the FPC considers that they should be subject to comparable regulation to existing payment chains.

This should include regulation and oversight that ensures end-to-end resilience (as outlined in the first half of this chapter). Stablecoin payment chains could involve new actors

in the chain (such as exchanges and wallet providers), which may partly fall outside of the regulatory perimeter. It is important to ensure that the activities in a stablecoin payment chain are regulated based on the financial stability risks they pose.

Regarding the regulatory treatment of stablecoins used for payments, the FPC judges that:

Payment chains that use stablecoins should be regulated to standards equivalent to those applied to traditional payment chains. Firms in stablecoin-based systemic payment chains that are critical to their functioning should be regulated accordingly.

In addition, the use of digital tokens or 'coins' for transactional purposes poses potential risks that go beyond those usually associated with existing payments systems. (See **Box 12**).

Box 12
Stablecoins as money-like instruments

In contrast to existing payment system models, some stablecoins create additional risks related to the issuance of new money-like instruments in the form of digital tokens. Existing payment systems transfer money that has been created by other entities — central banks or commercial banks. Stablecoins propose to *create* the digital tokens or 'coins' they transfer. These tokens may need to be stored, at least temporarily, to make transactions. This creation of money (or money-like instruments) for transactional purposes poses potential risks that go beyond those usually associated with existing payment systems. It is necessary therefore to ensure that in addition to the risks of the payment system itself, the risks of this money creation aspect are also managed.

Existing payment chains offer protections that may not be present in stablecoin-based chains.

In order to achieve equivalent standards of stability to traditional payment systems, regulation of stablecoins will need to be broader than the regulation of current payment chains. Regulation of payment chains largely focuses on the robustness and resilience of its arrangements to provide smooth and reliable transfer of money. However, the reliability and integrity of those chains also crucially depends on the stability of the instrument they transfer.

Current payment chains ensure this by only transferring central bank or commercial bank money that is subject to separate protections and regulations to help maintain stability and confidence. Specifically, international principles for payments regulation state that payment systems should settle transactions in central bank money where practical and available, or commercial bank money.

This ensures that the holders of money transferred through existing payment systems benefit from:

- **Legal claim:** Existing money used in payment systems gives its holders a legal claim on its issuer. In the case of commercial bank money, this gives holders a claim against their bank, which is denominated in fiat currency units that do not change.

- **Protections to ensure redeemability and stability of value:** In the UK, commercial banks' ability to make good on the claims they issue is protected by robust prudential regulation including capital and liquidity requirements, and, in the event of bank failure there is a Financial Services Compensation Scheme payout (up to £85,000 of eligible deposits). The value of central bank money is protected via the Bank's monetary stability mandate and inflation targeting regime.

These measures are important as they underpin confidence in the system. They ensure that the value transferred at initiation of the payment process is the same that is received at the other end. For example, a retailer who receives a debit card payment from a customer does not generally need to worry that the value of the payment will change materially by the time it reaches its bank account. While the money used in existing payment chains is not risk free — for example, commercial banks can and do fail — regulation and supervision helps to ensure that these failures happen rarely. And, in those rare events, a variety of protections as well as the rules of existing payment systems govern those failures, limiting their impact on financial stability.

Uncertainty about, or large fluctuations in, the value of instruments being used in systemic payment chains could give rise to similar risks to financial stability associated with the operational or financial failure of the payments system itself. These could include risks to the users' ability to manage their liquidity or to meet payment obligations, or the risk of such fluctuations causing a collapse in confidence with potential contagion risks for the system.

Absent additional regulation, some stablecoins held to be used for payments may not offer similar protections to central bank or commercial bank money held to be used for transactions in traditional payment systems. Stablecoins vary widely in their design features. Some may offer holders a robust legal claim; others propose to offer no claim at all. Most stablecoins seek to provide stability of value via some form of backing.

A common approach is to 'back' a digital token with commercial bank deposits; other proposals involve backing with central bank money or sovereign debt. Depending on the nature of assets backing the 'coin', and how they are held, the stablecoin's ability to provide stability of value and redeemability at par could come with additional risks.

As per the FPC's principle that regulation should be in line with the financial stability risk, rather than the legal form, of payments activities, the FPC judges that:

Where stablecoins are used in systemic payment chains as money-like instruments they should meet standards equivalent to those expected of commercial bank money in relation to stability of value, robustness of legal claim and the ability to redeem at par in fiat.

Annex 1: Macroprudential policy decisions

This annex lists any FPC Recommendations from previous periods that have been implemented or withdrawn since the previous *Report*, as well as Recommendations and Directions that are currently outstanding. It also includes those FPC policy decisions that have been implemented by rule changes and are therefore still in force.

Each Recommendation or Direction has been given an identifier to ensure consistent referencing over time. For example, the identifier 17/Q2/1 refers to the first Recommendation made at the 2017 Q2 Committee meeting.

Recommendations implemented or withdrawn since the previous *Report*

There are no Recommendations that have been implemented or withdrawn since the July 2019 *Report*.

Recommendations and Directions currently outstanding

There are currently no outstanding Recommendations or Directions awaiting implementation.

Other FPC policy decisions

Set out below are previous FPC decisions, which remain in force, on the setting of its policy tools. The calibration of these tools is kept under review.

Countercyclical capital buffer (CCyB)

The FPC agreed at its meeting on 13 December to set the UK CCyB rate at 2%. This will take effect in one year. This rate is reviewed on a quarterly basis. See the Overview of risks to UK financial stability chapter and The UK bank capital framework chapter of this *Report* for further detail.

The UK has also previously reciprocated a number of foreign CCyB decisions — for more details see the Bank of England website. Under PRA rules, foreign CCyB rates applying from 2016 onwards will be automatically reciprocated up to and including 2.5%.

Recommendation on loan to income ratios

In June 2014, the FPC made the following Recommendation (14/Q2/2):

The Prudential Regulation Authority (PRA) and the Financial Conduct Authority (FCA) should ensure that mortgage lenders do not extend more than 15% of their total number of new residential mortgages at loan to income ratios at or greater than 4.5. This Recommendation applies to all lenders which extend residential mortgage lending in excess of £100 million per annum. The Recommendation should be implemented as soon as practicable.

The PRA and the FCA have published approaches to implementing this Recommendation: the PRA issued a Policy Statement in October 2014, including rules, and the FCA issued general guidance in October 2014 which it clarified in February 2017.

The FPC reviewed this Recommendation in December 2019 and decided not to amend the calibration. The explanation for this is set out in the FPC's review of its mortgage market Recommendations chapter of this *Report*.

FPC Recommendation on mortgage affordability tests

In June 2017, the FPC made the following Recommendation (17/Q2/1), revising its June 2014 Recommendation:

When assessing affordability, mortgage lenders should apply an interest rate stress test that assesses whether borrowers could still afford their mortgages if, at any point over the first five years of the loan, their mortgage rate were to be 3 percentage points higher than the reversion rate specified in the mortgage contract at the time of origination (or, if the mortgage contract does not specify a reversion rate, 3 percentage points higher than the product rate at origination). This Recommendation is intended to be read together with the FCA requirements around considering the effect of future interest rate rises as set out in MCOB 11.6.18(2). This Recommendation applies to all lenders which extend residential mortgage lending in excess of £100 million per annum.

Lenders were required to have regard to the FPC's June 2017 revision to its June 2014 affordability Recommendation immediately, by virtue of the existing FCA MCOB rule. At its September 2017 meeting the FPC confirmed that the affordability Recommendation did not apply to any remortgaging where there is no increase in the amount of borrowing, whether done by the same or different lender.

The FPC reviewed this Recommendation in December 2019 and decided not to amend the calibration. The explanation for this is set out in the FPC's review of its mortgage market Recommendations chapter of this *Report*.

Other FPC activities since the previous *Report*

The Chancellor sent the FPC a remit and recommendations letter on 4 November 2019. The FPC will send its response in December 2019.

The Committee agreed in November 2018 that it would monitor risks from the provision of cloud services to the UK financial sector. At its December meeting the FPC noted that the PRA's Draft Supervisory Statement on Outsourcing and third party risk management had set out conditions that could help give firms assurance on the use of cloud services. The FPC agreed to return to risks from the provision of cloud services in 2020.

The Committee agreed in June 2019 that the Bank should use the 2021 biennial exploratory scenario to assess the financial stability risks associated with climate change. To facilitate this, the FPC agreed in July 2019 that the Bank should publish a discussion paper to gather views on the design of the exercise.

Annex 2: Core indicators

Table A.1 Core indicator set for the countercyclical capital buffer* [a]

Indicator	Average, 1987–2006[b]	Average 2006[c]	Minimum since 1987[b]	Maximum since 1987[b]	Previous value (oya)	Latest value (as of 4 December 2019)
Non-bank balance sheet stretch[d]						
1 Credit to GDP[e]						
Ratio	120.5%	161.6%	86.7%	174.8%	147.2%	145.6% (2019 Q2)
Gap	7.2%	9.1%	-29.2%	21.0%	-12.3%	-11.4% (2019 Q2)
2 Private non-financial sector credit growth[f]	9.8%	9.1%	-2.2%	24.0%	3.8%	3.4% (2019 Q2)
3 Net foreign asset position to GDP[g]	3.7%	-6.9%	-28.1%	20.9%	-13.6%	-13.9% (2019 Q2)
4 Gross external debt to GDP[h]	180.6%	314.8%	113.1%	399.4%	305.4%	307.0% (2019 Q2)
of which bank debt to GDP	*119.4%*	*192.6%*	*77.6%*	*263.5%*	*170.9%*	*172.4% (2019 Q2)*
5 Current account balance to GDP[i]	-1.8%	-2.8%	-6.5%	0.7%	-4.4%	-4.6% (2019 Q2)
Conditions and terms in markets						
6 Long-term real interest rate[j]	1.4%	1.2%	-3.1%	2.2%	-1.9%	-2.6% (4 Dec. 2019)
7 VIX[k]	19.1	12.8	9.8	65.5	19.4	12.9 (4 Dec. 2019)
8 Global corporate bond spreads[l]	84 bps	84 bps	74 bps	482 bps	132 bps	112 bps (4 Dec. 2019)
9 Spreads on new UK lending						
Household[m]	480 bps	352 bps	284 bps	844 bps	595 bps	648 bps (Sep. 2019)
Corporate[n]	104 bps	97 bps	82 bps	392 bps	234 bps	222 bps (June 2019)
Bank balance sheet stretch[o]						
10 Capital ratio						
Basel II core Tier 1[p]	6.6%	6.3%	6.1%	12.3%	n.a.	n.a.
Basel III common equity Tier 1[q]	n.a.	n.a.	n.a.	n.a.	14.7%	14.5% (2019 Q3)
11 Leverage ratio[r]						
Simple	4.7%	4.1%	2.9%	6.9%	6.6%	6.6% (2019 H1)
Basel III (2014 proposal)	n.a.	n.a.	n.a.	n.a.	4.9%	4.9% (2019 H1)
12 Average risk weights[s]	53.6%	46.4%	30.4%	65.4%	31.3%	30.4% (2019 H1)
13 Return on assets before tax[t]	1.0%	1.1%	-0.2%	1.5%	0.7%	0.7% (2019 H1)
14 Loan to deposit ratio[u]	114.5%	132.4%	92.3%	133.3%	92.3%	93.9% (2019 H1)
15 Short-term wholesale funding ratio[v]	n.a.	22.8%	8.4%	24.9%	10.0%	9.9% (2018)
of which excluding repo funding	*n.a.*	*15.5%*	*3.9%*	*15.5%*	*3.9%*	*3.9% (2018)*
16 Overseas exposures indicator: countries to which UK banks have 'large' and 'rapidly growing' total exposures[w][x]		In 2006 Q4: AU, BR, CA, CH, CN, DE, ES, FR, IE, IN, JP, KR, KY, LU, NL, US, ZA		In 2018 Q2: AU, CA, CN, DE, FR, JP, KR, NL, SG, TW, US		In 2019 Q2: AU, CA, FR, JP, SG
17 CDS premia[y]	12 bps	8 bps	6 bps	298 bps	72 bps	36 bps (4 Dec. 2019)
18 Bank equity measures						
Price to book ratio[z]	2.11	1.89	0.50	2.86	0.77	0.74 (4 Dec. 2019)
Market-based leverage ratio[aa]	9.7%	7.6%	1.9%	15.7%	4.6%	4.1% (4 Dec. 2019)

Table A.2 Core indicator set for sectoral capital requirements[a]

Indicator	Average, 1987–2006[b]	Average 2006[c]	Minimum since 1987[b]	Maximum since 1987[b]	Previous value (oya)	Latest value (as of 4 December 2019)
Bank balance sheet stretch[o]						
1 Capital ratio						
Basel II core Tier 1[p]	6.6%	6.3%	6.1%	12.3%	n.a.	n.a.
Basel III common equity Tier 1[q]	n.a.	n.a.	n.a.	n.a.	14.7%	14.5% (2019 Q3)
2 Leverage ratio[r]						
Simple	4.7%	4.1%	2.9%	6.9%	6.6%	6.6% (2019 H1)
Basel III (2014 proposal)	n.a.	n.a.	n.a.	n.a.	4.9%	4.9% (2019 H1)
3 Average mortgage risk weights[ab]	n.a.	n.a.	11.3%	22.4%	11.3%	11.8% (2019 H1)
UK average mortgage risk weights[ac]	n.a.	n.a.	9.7%	15.8%	9.7%	10.1% (2019 H1)
4 Balance sheet interconnectedness[ad]						
Intra-financial lending growth[ae]	12.0%	13.0%	-29.8%	45.5%	-29.8%	8.0% (2019 H1)
Intra-financial borrowing growth[af]	14.1%	13.7%	-21.5%	29.5%	6.4%	5.4% (2019 H1)
Derivatives growth (notional)[ag]	37.7%	34.2%	-25.9%	52.0%	5.7%	16.3% (2019 H1)
5 Overseas exposures indicator: countries to which UK banks have 'large' and 'rapidly growing' non-bank private sector exposures[ah][x]		In 2006 Q4: AU, CA, DE, ES, FR, IE, IT, JP, KR, KY, NL, US, ZA			In 2018 Q2: CA, FR, HK, US	In 2019 Q2: JP
Non-bank balance sheet stretch[d]						
6 Credit growth						
Household[ai]	10.6%	10.7%	-0.9%	21.6%	3.6%	2.8% (2019 Q2)
Commercial real estate[aj]	15.3%	18.5%	-9.7%	59.8%	1.8%	5.1% (2019 Q3)
7 Household debt to income ratio[ak]	98.4%	139.1%	77.1%	145.7%	128.5%	127.8% (2019 Q2)
8 PNFC debt to profit ratio[al]	262.5%	358.9%	157.7%	421.4%	327.6%	315.3% (2019 Q2)
9 NBFI debt to GDP ratio (excluding insurance companies and pension funds)[am]	54.5%	127.7%	13.7%	171.7%	124.6%	122.5% (2019 Q2)
Conditions and terms in markets						
10 Real estate valuations						
Residential price to rent ratio[an]	100.0	151.3	68.5	162.4	155.4	155.6 (2019 Q3)
Commercial prime market yields[ao]	5.4%	4.1%	3.6%	7.1%	3.7%	3.6% (2019 Q3)
Commercial secondary market yields[ao]	8.6%	5.6%	5.1%	10.2%	5.9%	6.0% (2019 Q3)
11 Real estate lending terms						
Residential mortgage LTV ratio (mean above the median)[ap]	90.6%	90.6%	81.6%	90.8%	87.8%	88.5% (2019 Q3)
Residential mortgage LTI ratio (mean above the median)[ap]	3.8	3.8	3.6	4.2	4.2	4.2 (2019 Q3)
Commercial real estate mortgage LTV (average maximum)[aq]	77.6%	78.3%	57.0%	79.6%	57.2%	57.6% (2019 Q2)
12 Spreads on new UK lending						
Residential mortgage[ar]	80 bps	50 bps	35 bps	369 bps	97 bps	132 bps (Sep. 2019)
Commercial real estate[as]	137 bps	135 bps	119 bps	422 bps	268 bps	261 bps (June 2019)

* The FPC considers this set of core indicators when reaching decisions on the UK countercyclical capital buffer (CCyB) rate. Firms use the UK CCyB rate to calculate their institution-specific CCyB rate and the countercyclical leverage ratio buffer (CCLB) rate. Currently, the CCLB rate for each major UK bank is calculated as 35% of its institution-specific CCyB rate with the CCLB rate percentage rounded to the nearest 10 basis points.

(a) A spreadsheet of the series shown in this table is available at www.bankofengland.co.uk/financial-stability.

(b) If the series starts after 1987, the average between the start date and 2006 end and the maximum/minimum since the start date are used.

(c) 2006 was the last year before the start of the global financial crisis.

(d) The current vintage of ONS data is not available prior to 1997. Data prior to this and beginning in 1987 have been assumed to remain unchanged since *The Blue Book 2013*.

(e) Credit is defined as debt claims on the UK private non-financial sector. This includes all liabilities of the household and not-for-profit sector except for the unfunded pension liabilities and financial derivatives of the not-for-profit sector, and private non-financial corporations' (PNFCs') loans and debt securities excluding direct investment loans and loans secured on dwellings. The credit to GDP gap is calculated as the percentage point difference between the credit to GDP ratio and its long-term trend, where the trend is based on a one-sided Hodrick-Prescott filter with a smoothing parameter of 400,000. See Countercyclical Capital Buffer Guide at www.bankofengland.co.uk/financial-stability for further explanation of how this series is calculated. Sources: ONS, Revell, J and Roe, A (1971), 'National balance sheets and national accounting — a progress report', *Economic Trends*, No. 211, UK Finance and Bank calculations.

(f) Twelve-month growth rate of nominal credit (defined as the four-quarter cumulative net flow of credit as a proportion of the stock of credit twelve months ago). Credit is defined as above. Sources: ONS and Bank calculations.

(g) As per cent of annual GDP (four-quarter moving sum). Sources: ONS and Bank calculations.

(h) Ratios computed using a four-quarter moving sum of GDP. Monetary financial institutions (MFIs) cover banks and building societies resident in the United Kingdom. Sources: ONS and Bank calculations.

(i) As per cent of quarterly GDP. Sources: ONS and Bank calculations.

(j) Five-year real interest rates five years forward, implied from inflation swaps and nominal fitted yields. Data series runs from October 2004. Sources: Bloomberg Finance L.P., Tradeweb and Bank calculations.

(k) 22-day moving average. The VIX is a measure of market expectations of 30-day volatility as conveyed by S&P 500 stock index options prices. Sources: Bloomberg Finance L.P. and Bank calculations.

(l) Global corporate bond spreads refers to a 22-day moving average of the global aggregate market non-financial, non-utility corporate bond spread. This tracks the performance of investment-grade corporate debt publicly issued in the global and regional markets from both developed and emerging market issuers. Index constituents are weighted based on market value. Spreads are option-adjusted (ie they show the number of basis points the matched-maturity government spot curve needs to be shifted in order to match a bond's present value of discounted cash flows). Prior to 2016, published versions of this indicator showed the ICE/BofAML Global Industrial Index. Sources: Barclays and Bank calculations.

(m) The household lending spread is a weighted average of mortgage and unsecured lending spreads, with weights based on relative volumes of new lending. The mortgage spread is a weighted average of quoted mortgage rates over risk-free rates, using 90% LTV two-year fixed-rate mortgages and 75% LTV tracker, two and five-year fixed-rate mortgages. For the fixed-rate products, spreads are taken relative to the instantaneous forward rate of matching maturity until July 2008, after which spreads are taken relative to the OIS spot rate of the same maturity. Spreads are taken relative to Bank Rate for the tracker product. The unsecured component is a weighted average of spreads on credit cards, overdrafts and personal loans. Spreads on unsecured lending are taken relative to Bank Rate. FCA Product Sales Data includes regulated mortgage contracts only but is used to weight all mortgage products. Series starts in 1997. Sources: Bank of England, Bloomberg Finance L.P., FCA Product Sales Data, UK Finance and Bank calculations.

(n) The UK corporate lending spread is a weighted average of: SME lending rates over Bank Rate; CRE average senior loan margins over Bank Rate; and, as a proxy for the rate at which banks lend to large, non-CRE corporates, UK investment-grade company bond spreads over maturity-matched government bond yields (adjusted for any embedded option features such as convertibility into equity). Weights are based on relative amounts outstanding of loans. Series starts in October 2002. Sources: Bank of England, Bloomberg Finance L.P., Cass Commercial Real Estate Lending survey, Department for Business, Energy and Industrial Strategy, ICE/BofAML, UK Finance and Bank calculations.

(o) Unless otherwise stated, indicators are based on the major UK bank peer group defined as: Abbey National (until 2003); Alliance & Leicester (until 2007); Bank of Ireland (from 2005); Bank of Scotland (until 2000); Barclays; Bradford & Bingley (from 2001 until 2007); Britannia (from 2005 until 2008); Co-operative Banking Group (from 2005); Halifax (until 2000); HBOS (from 2001 until 2008); HSBC (from 1992); Lloyds TSB/Lloyds Banking Group; Midland (until 1991); National Australia Bank (from 2005 until February 2015); National Westminster (until 1999); Nationwide; Northern Rock (until 2011); Royal Bank of Scotland; Santander (from 2004); TSB (until 1994); Virgin Money (from 2012) and Woolwich (from 1990 until 1997). Accounting changes, eg the introduction of IFRS in 2005, result in discontinuities in some series. Restated figures are used where available.

(p) Major UK banks' aggregate core Tier 1 capital as a percentage of their aggregate risk-weighted assets. The core Tier 1 capital ratio series starts in 2000 and uses the major UK banks peer group as at 2014 and their constituent predecessors. Data exclude Northern Rock/Virgin Money from 2008. From 2008, core Tier 1 ratios are as published by banks, excluding hybrid capital instruments and making deductions from capital based on PRA definitions. Prior to 2008, that measure was not typically disclosed and Bank calculations approximating it as previously published in the *Financial Stability Report* are used. The series are annual until end-2012, half-yearly until end-2013 and quarterly afterwards. Sources: PRA regulatory returns, published accounts and Bank calculations.

(q) The Basel II series was discontinued with CRD IV implementation on 1 January 2014. The 'Basel III common equity Tier 1 capital ratio' is calculated as aggregate peer group common equity Tier 1 capital divided by aggregate risk-weighted assets, according to the CRD IV definition as implemented in the UK. The Basel III peer group includes Barclays, Co-operative Banking Group, HSBC, Lloyds Banking Group, Nationwide, RBS and Santander UK. From 2018, the Basel III CET1 ratio reflects IFRS 9 transitional arrangements as agreed in European law.

(r) A simple leverage ratio calculated as aggregate shareholders' equity over aggregate assets. The Basel III (2014 proposal) series corresponds to aggregate CRD IV end-point Tier 1 capital over aggregate leverage exposures, using the CRR definition since 2015 and the 2014 proposal before that. This series consists of Barclays, HSBC, Lloyds Banking Group, Nationwide, RBS, Santander UK and The Co-operative Bank. Latest published figures have been used (2019 H1). In August 2016, the PRA implemented the FPC Recommendation allowing firms subject to the leverage ratio framework in the United Kingdom to exclude certain claims on central banks from their leverage exposures; no adjustment has been made for this. Sources: PRA regulatory returns, published accounts and Bank calculations.

(s) Aggregate peer group risk-weighted assets divided by aggregate peer group published balance sheet assets according to applicable regulatory regimes. The series begins in 1992 and is annual until end-2012 and half-yearly onwards. Latest published figures have been used (2019 H1). Sources: Published accounts and Bank calculations.

(t) Calculated as major UK banks' profit before tax as a proportion of total assets, averaged over the current and previous year. When banks in the sample have merged, aggregate profits for the year are approximated by those of the acquiring group. Series is annual until 2015 when it becomes semi-annual. The latest value uses latest published figures (2019 H1). In November 2018, the figures for 2015 H1, 2016 H1, 2017 H1, 2018 H1 were corrected. Sources: Published accounts and Bank calculations.

(u) Major UK banks' loans and advances to customers as a percentage of customer deposits, where customer refers to all non-bank borrowers and depositors. Repurchase agreements are excluded from loans and deposits where disclosed. One weakness of the current measure is that it is not possible to distinguish between retail deposits from households and deposits placed by non-bank financial corporations on a consolidated basis. Additional data collections would be required to improve the data in this area. The series begins in 2000 and is annual until end-2012 and half-yearly afterwards. The latest value uses latest published figures (2019 H1). Sources: Published accounts and Bank calculations.

(v) Share of total funding (including capital) accounted for by wholesale funding with residual maturity of under three months. Wholesale funding comprises deposits by banks, debt securities, subordinated liabilities and repo. Funding is proxied by total liabilities excluding derivatives and liabilities to customers under investment contracts. Latest published figures have been used (2019 H1). Where underlying data are not published estimates have been used. Repo includes repurchase agreements and securities lending. On 28 November 2018, the short-term wholesale funding ratio series were revised to reflect methodology changes. The series starts in 2005. Sources: Published accounts and Bank calculations.

(w) This indicator highlights the countries where UK-owned monetary financial institutions' (MFIs') overall exposures are greater than 10% of UK-owned MFIs' tangible equity on an ultimate risk basis and have grown by more than 1.5 times nominal GDP growth in that country. Foreign exposures as defined in BIS consolidated banking statistics. Uses latest data available, with the exception of tangible equity figures for 2006–07, which are estimated using published accounts. Sources: Bank of England, ECB, Eikon from Refinitiv, IMF *World Economic Outlook* (*WEO*), published accounts and Bank calculations.

(x) Abbreviations used are: Australia (AU), Brazil (BR), Canada (CA), Switzerland (CH), People's Republic of China (CN), Germany (DE), Spain (ES), France (FR), Hong Kong (HK), Ireland (IE), India (IN), Italy (IT), Japan (JP), Republic of Korea (KR), Cayman Islands (KY), Luxembourg (LU), Netherlands (NL), Singapore (SG), Taiwan (TW), United States (US) and South Africa (ZA).

(y) Average of major UK banks' five-year euro-denominated senior CDS premia, weighted by end-year total assets until 2014 and by half-year total assets from 2015. Series starts in 2003. Includes Nationwide from July 2003, The Co-operative Bank between 2005 and June 2017 and National Australia Bank between 2005 and June 2015. For June 2018, RBS CDS series was adjusted for a succession event. Sources: Markit Group Limited, published accounts and Bank calculations.

(z) Relates the share price with the book, or accounting, value of shareholders' equity per share. Averages of the ratios in the peer group are weighted by end-year total assets until 2014 and by half-year assets from 2015. The sample comprises the major UK banks and National Australia Bank between 2005 and 2015 H2, excluding Britannia, Co-operative Banking Group and Nationwide. Northern Rock/Virgin Money is excluded from 2008. Series starts in 2000. Sources: Bloomberg Finance L.P., Eikon from Refinitiv, published accounts and Bank calculations.

(aa) Total peer group market capitalisation divided by total peer group assets (note a discontinuity due to introduction of IFRS accounting standards in 2005, which tends to reduce leverage ratios thereafter). The sample comprises the major UK banks, excluding Britannia, Co-operative Banking Group and Nationwide. National Australia Bank is included between 2005 and 2015 H2. Northern Rock/Virgin Money is excluded from 2008. Series starts in 2000. Sources: Bloomberg Finance L.P., Eikon from Refinitiv, published accounts and Bank calculations.

(ab) Sample consists of Barclays Group, Co-operative Banking Group, HSBC Holdings Group, Lloyds Banking Group, Nationwide Building Society Group, RBS Group, Santander UK Group and excludes Nationwide for 2008 H2 only. Average risk weights for residential mortgages (exposures on the Retail IRB method only) are calculated as total risk-weighted assets divided by total exposure value for all banks in the sample. Calculated on a consolidated basis, except for Nationwide for 2014 H2/2015 H1 where only solo data were available. Series starts in 2009 and is updated half-yearly. Sources: PRA regulatory returns and Bank calculations.

(ac) Sample consists of Bank of Scotland, Barclays Bank, HSBC Bank, Lloyds Bank, National Westminster Bank, Nationwide, Santander UK, Co-operative Bank, Royal Bank of Scotland, Ulster Bank and excludes Nationwide for 2008 H2 only. Average risk weights for residential mortgages (exposures on the Retail IRB method only) are calculated as total risk-weighted assets divided by total exposure value for all banks in the sample. Calculated on an unconsolidated basis, Royal Bank of Scotland data includes National Westminster, Ulster Bank and RBS. Historical data updated as of June 2016 to improve data series consistency. Series starts in 2009 and is updated half-yearly. Sources: PRA regulatory returns and Bank calculations.

(ad) The disclosures the series are based on are not currently sufficient to ensure that all intra-financial activity is included in these series, nor is it possible to be certain that no real-economy activity is included. Additional data collections would be required to improve the data in this area. The intra-financial lending and borrowing growth series are adjusted for the acquisitions of Midland by HSBC in 1992, and of ABN AMRO by RBS in 2007 to avoid reporting large growth rates resulting from step changes in the size and interconnectedness of the major UK bank peer group. Series exclude National Australia Bank.

(ae) Lending to other banks and other financial corporations. Growth rates are year on year. Latest value shows growth rate for year to 2019 H1. Data point excludes National Australia Bank. Sources: Published accounts, regulatory data and Bank calculations.

(af) Wholesale borrowing, composed of deposits from banks and non-subordinated securities in issue. Growth rates are year on year. Latest value shows growth rate for year to 2019 H1. Data point excludes National Australia Bank. One weakness of the current measure is that it is not possible to distinguish between retail deposits and deposits placed by non-bank financial institutions on a consolidated basis. Sources: Published accounts, regulatory data and Bank calculations.

(ag) Based on notional value of derivatives (some of which may support real-economy activity). The sample includes Barclays, HSBC and RBS who account for a significant share of UK banks' holdings of derivatives, though the sample could be adjusted in the future should market shares change. Series starts in 2002. Growth rates are year on year. Latest value shows growth rate for year to 2019 H1. Sources: Published accounts, regulatory data and Bank calculations.

(ah) This indicator highlights the countries where UK-owned MFIs' non-bank private sector exposures are greater than 10% of UK-owned MFIs' tangible equity on an ultimate risk basis and have grown by more than 1.5 times nominal GDP growth in that country. Foreign exposures as defined in BIS consolidated banking statistics. Overseas sectoral exposures cannot currently be broken down further at the non-bank private sector level. The intention is to divide them into households and corporates as new data become available. Uses latest data available, with the exception of tangible equity figures for 2006–07, which are estimated using published accounts. Sources: Bank of England, ECB, Eikon from Refinitiv, IMF *World Economic Outlook* (*WEO*), published accounts and Bank calculations.

(ai) The twelve-month growth rate of nominal credit. Defined as the four-quarter cumulative net flow of credit divided by the stock of credit twelve months ago. Credit is defined as all liabilities of the household and not-for-profit sector except for the unfunded pension liabilities and financial derivatives of the not-for-profit sector. Sources: ONS and Bank calculations.

(aj) Four-quarter growth rate of UK-resident MFIs' loans to the real estate sector. The real estate sector is defined as: buying, selling and renting of own or leased real estate; real estate and related activities on a fee or contract basis; and development of buildings. Not seasonally adjusted. Quarterly data. Data cover lending in both sterling and foreign currency from 1998. Prior to this period, data cover sterling only. Source: Bank of England.

(ak) Gross debt as a percentage of a four-quarter moving sum of gross disposable income of the UK household and non-profit sector. Includes all liabilities of the household sector except for the unfunded pension liabilities and financial derivatives of the non-profit sector. Disposable income is adjusted for financial intermediation services indirectly measured (FISIM) and changes in pension entitlements. Sources: ONS and Bank calculations.

(al) Gross debt as a percentage of a four-quarter moving sum of gross operating surplus. Gross debt is measured as loans and debt securities excluding derivatives, direct investment loans and loans secured on dwellings. The corporate gross operating surplus series is adjusted for FISIM. Sources: ONS and Bank calculations.

(am) Gross debt as a percentage of four-quarter moving sum of nominal GDP. The NBFI sector includes all financial corporations apart from monetary financial institutions (ie deposit-taking institutions). This indicator additionally excludes insurance companies and pension funds. Sources: ONS and Bank calculations.

(an) Ratio between UK house price index and RPI housing rent. The series is rebased so that the average between 1987 and 2006 is 100. Sources: ONS and Bank calculations.

(ao) The prime (secondary) yield is the ratio between the weighted averages, across the lowest (highest) yielding quartile of commercial properties, of MSCI Inc.'s measures of rental income and capital values. Sources: MSCI Inc. and Bank calculations.

(ap) Mean LTV (respectively LTI) ratio on new advances above the median LTV (LTI) ratio, based on loans to first-time buyers, council/registered social tenants exercising their right to buy and homemovers, and excluding lifetime mortgages and advances with LTV above 130% (LTI above 10x). FCA Product Sales Data includes regulated mortgage contracts only. Series starts in 2005. Sources: FCA Product Sales Data and Bank calculations.

(aq) Average of the maximum offered loan to value ratios across major CRE lenders. Sources: Cass Commercial Real Estate Lending survey and Bank calculations.

(ar) The residential mortgage lending spread is a weighted average of quoted mortgage rates over risk-free rates, using 90% LTV two-year fixed-rate mortgages and 75% LTV tracker, two and five-year fixed-rate mortgages. For the fixed-rate products, spreads are taken relative to the instantaneous forward rate of matching maturity until July 2008, after which spreads are taken relative to the OIS spot rate of the same maturity. Spreads are taken relative to Bank Rate for the tracker product. Weights based on relative volumes of new lending. Series starts in 1997. FCA Product Sales Data includes regulated mortgage contracts only. Sources: Bank of England, Bloomberg Finance L.P., FCA Product Sales Data, UK Finance and Bank calculations.

(as) The CRE lending spread is the average of senior loan margins across major CRE lenders relative to Bank Rate. Series starts in 2002. Sources: Bank of England, Bloomberg Finance L.P., Cass Commercial Real Estate Lending survey and Bank calculations.

Table A.3 Core indicator set for LTV and DTI limits[a]

Indicator	Average, 1987–2006[b]	Average 2006[c]	Minimum since 1987[b]	Maximum since 1987[b]	Previous value (oya)	Latest value (as of 4 December 2019)
Lender and household balance sheet stretch						
1 LTI and LTV ratios on new residential mortgages						
Owner-occupier mortgage LTV ratio (mean above the median)[d]	90.6%	90.6%	81.6%	90.8%	87.8%	88.5% (2019 Q3)
Owner-occupier mortgage LTI ratio (mean above the median)[d]	3.8	3.8	3.6	4.2	4.2	4.2 (2019 Q3)
Buy-to-let mortgage LTV ratio (mean)[e]	n.a.	n.a.	56.9%	75.4%	57.4%	58.4% (2019 Q3)
2 Household credit growth[f]	10.6%	10.7%	-0.9%	21.6%	3.6%	2.8% (2019 Q2)
3 Household debt to income ratio[g]	98.4%	139.1%	77.1%	145.7%	128.5%	127.8% (2019 Q2)
of which: mortgages[h]	*68.9%*	*101.7%*	*49.3%*	*109.1%*	*95.9%*	*95.3% (2019 Q2)*
of which: owner-occupier mortgages[i]	*78.2%*	*93.1%*	*65.1%*	*96.4%*	*78.9%*	*78.2% (2019 Q2)*
Conditions and terms in markets						
4 Approvals of loans secured on dwellings[j]	97,928	119,047	26,357	132,406	66,804	64,602 (Oct. 2019)
5 Housing transactions[k]	129,508	139,039	51,660	221,978	99,440	103,680 (Oct. 2019)
Advances to homemovers[l]	48,954	58,901	14,080	93,500	28,550	29,050 (Sep. 2019)
% interest only[m]	52.6%	24.0%	0.1%	81.3%	0.2%	0.1% (Sep. 2019)
Advances to first-time buyers[l]	39,167	33,406	8,430	55,800	28,650	29,100 (Sep. 2019)
% interest only[m]	52.7%	31.1%	1.7%	87.9%	2.4%	2.2% (Sep. 2019)
Advances to buy-to-let purchasers[l]	10,128	14,113	3,600	29,100	5,700	5,500 (Sep. 2019)
% interest only[n]	n.a.	n.a.	50.0%	74.3%	72.6%	72.6% (Sep. 2019)
6 House price growth[o]	1.7%	2.2%	-5.8%	6.6%	0.8%	0.7% (Sep. 2019)
7 House price to household disposable income ratio[p]	2.9	4.3	2.1	4.5	4.5	4.4 (2019 Q2)
8 Rental yield[q]	5.8%	5.1%	4.7%	7.6%	4.8%	4.7% (Apr. 2019)
9 Spreads on new residential mortgage lending						
All residential mortgages[r]	80 bps	50 bps	35 bps	369 bps	97 bps	132 bps (Sep. 2019)
Difference between the spread on high and low LTV residential mortgage lending[r]	18 bps	25 bps	1 bps	293 bps	47 bps	51 bps (Oct. 2019)
Buy-to-let mortgages[s]	n.a.	n.a.	61 bps	397 bps	182 bps	194 bps (2019 Q2)

(a) A spreadsheet of the series shown in this table is available at www.bankofengland.co.uk/financial-stability.
(b) If the series start after 1987, the average between the start date and 2006 end and the maximum/minimum since the start date are used.
(c) 2006 was the last year before the global financial crisis.
(d) Mean LTV (respectively LTI) ratio on new advances above the median LTV (LTI) ratio, based on loans to first-time buyers, council/registered social tenants exercising their right to buy and homemovers, and excluding lifetime mortgages and advances with LTV ratio above 130% (LTI above 10x). FCA Product Sales Data includes regulated mortgage contracts only. Series starts in 2005. Sources: FCA Product Sales Data and Bank calculations.
(e) From 2017 Q3, mean LTV ratio is calculated on a value-weighted basis, using market-wide buy-to-let loan-level data submissions to the Bank of England, including further advances and remortgages. Prior to 2017 Q3, estimated mean LTV ratio of new non-regulated lending advances, of which buy-to-let is 88% by value. The figures include further advances and remortgages. The raw data are categorical: the share of mortgages with LTV ratio less than 75%; between 75% and 90%; between 90% and 95%; and greater than 95%. An approximate mean is calculated by giving these categories weights using the average LTV in equivalent buckets in loan-level buy-to-let data gathered by UK Finance. Series starts in 2007. UK Finance data available from 2014; weights prior to this date are average LTVs across the respective buckets using all data gathered in 2014. The share of mortgages with LTV ratio at 75% from 2014 until 2017 Q2 used are adjusted to estimate the LTV of each loan before any fees or charges are added. This approximates the LTV at which the loan was originated. Sources: Bank of England, UK Finance and Bank calculations.
(f) The twelve-month growth rate of nominal credit. Defined as the four-quarter cumulative net flow of credit divided by the stock of credit twelve months ago. Credit is defined as all liabilities of the household and not-for-profit sector except for the unfunded pension liabilities and financial derivatives of the not-for-profit sector. Sources: ONS and Bank calculations.
(g) Gross debt as a percentage of a four-quarter moving sum of disposable income. Includes all liabilities of the household sector except for the unfunded pension liabilities and financial derivatives of the non-profit sector. The household disposable income series is adjusted for financial intermediation services indirectly measured (FISIM). Sources: ONS and Bank calculations.
(h) Total debt secured on dwellings as a percentage of a four-quarter moving sum of gross disposable income of the UK household and non-profit sector. Disposable income is adjusted for FISIM and changes in pension entitlements. The 1987–2006 average for owner-occupied mortgage debt to income starts in December 1999. Sources: ONS and Bank calculations.
(i) Total debt associated with owner-occupier mortgages divided by the four-quarter moving sum of gross disposable income of the UK household and non-profit sector. Disposable income is adjusted for FISIM and changes in pension entitlements. Owner-occupier mortgage debt estimated by multiplying aggregate household debt secured on dwellings by the share of mortgages on lender balances that are not buy-to-let loans. Series starts in 1999. Sources: ONS, UK Finance and Bank calculations.
(j) Data are for monthly number of house purchase approvals covering sterling lending by UK MFIs and other lenders to UK individuals. Approvals secured on dwellings are measured net of cancellations. Seasonally adjusted. Series starts in 1993. Source: Bank of England.
(k) The number of houses sold/bought in the current month is sourced from HMRC's Land Transaction Return. From 2008 the Return excluded properties priced at less than £40,000 (2006 and 2007 data have also been revised by HMRC to correct for this). Data prior to 2005 comes from the Survey of Property Transactions; the UK total figure is computed by assuming that transactions in the rest of the United Kingdom grew in line with England, Wales and Northern Ireland. Seasonally adjusted. Sources: HMRC, UK Finance and Bank calculations.
(l) The number of new mortgages advanced for house purchase in the current month. Buy-to-let series starts in 2001. There are structural breaks in the series in April 2005 where the UK Finance switches source. Data prior to 2002 are at a quarterly frequency. Sources: UK Finance and Bank calculations.
(m) The share of new owner-occupied mortgages advanced for house purchase that are interest only. Interest-only mortgages exclude mixed capital and interest mortgages. There are structural breaks in the series in April 2005 where the UK Finance switches source. Data prior to 2002 are at a quarterly frequency. Sources: UK Finance and Bank calculations.
(n) The share of non-regulated mortgages that are interest only. The data include all mortgages, not just those for house purchase. Interest-only mortgages exclude mixed capital and interest mortgages. Sources: Bank of England and Bank calculations.
(o) House prices takes the quarterly index of UK HPI up until March 2005. From June 2005 onwards, the series uses the monthly index of UK HPI. The growth rate is calculated as the quarter-on-quarter percentage change until March 2005 then calculated as the percentage change three months on three months earlier. Seasonally adjusted. Sources: Land Registry, ONS and Bank calculations.
(p) The ratio is calculated using a four-quarter moving sum of gross disposable income of the UK household and non-profit sector per household as the denominator. Disposable income is adjusted for FISIM and changes in pension entitlements. Historical UK household population estimated using annual GB data assuming linear growth in the Northern Ireland household population between available data points. House prices takes the seasonally adjusted UK HPI quarterly £ value series from 2005 onwards. Data prior to 2005 back-projects the UK HPI quarterly £ value series using the quarterly UK HPI index series. Series starts in 1990. Sources: Department for Communities and Local Government, Land Registry, ONS and Bank calculations.
(q) Using Association of Residential Letting Agents (ARLA) data up until 2014. From 2015 onwards, the series uses LSL Property Services plc data normalised to the ARLA data over 2008 to 2014, when both series are available. Series starts in 2001. Sources: Association of Residential Letting Agents, LSL Property Services plc and Bank calculations.
(r) The overall spread on residential mortgage lending is a weighted average of quoted mortgage rates over risk-free rates, using 90% LTV two-year fixed-rate mortgages and 75% LTV tracker, two and five-year fixed-rate mortgages. For fixed-rate products, spreads are taken relative to the instantaneous forward rate of matching maturity until July 2008, after which spreads are taken relative to the OIS spot rate of the same maturity. Spreads are taken relative to Bank Rate for the tracker product. Weights are based on relative volumes of new lending. The difference in spread between high and low LTV lending is the rate on 90% LTV two-year fixed-rate mortgages less the 75% LTV two-year fixed-rate. Series starts in 1997. FCA Product Sales Data includes regulated mortgage contracts only. Sources: Bank of England, Bloomberg Finance L.P., FCA Product Sales Data, UK Finance and Bank calculations.
(s) The spread on new buy-to-let mortgages is the weighted average effective spread charged on new floating and fixed-rate non-regulated mortgages over safe rates. Spreads are taken relative to Bank Rate for the floating-rate products. The safe rate for fixed-rate mortgages is calculated by weighting two-year, three-year and five-year gilts by the number of buy-to-let fixed-rate mortgage products offered at these maturities. Series starts in 2007. Sources: Bank of England, Bloomberg Finance L.P., Moneyfacts and Bank calculations.

Annex 3: 2019 annual cyclical scenario: bank-specific results

Annexes 3 and 4 of this *Report*, setting out the individual bank results and supervisory stance with respect to those banks, have been formally approved by the PRC. These were finalised on 13 December 2019.

The Prudential Regulation Authority (PRA) is a part of the Bank of England and responsible for the prudential regulation and supervision of banks, building societies, credit unions, insurers and major investment firms. The PRA's most significant supervisory decisions are taken by the PRC. The PRC is accountable to Parliament.

The Prudential Regulation Committee:
Mark Carney, Governor
Sam Woods, Deputy Governor responsible for prudential regulation
Jon Cunliffe, Deputy Governor responsible for financial stability
Ben Broadbent, Deputy Governor responsible for monetary policy
David Ramsden, Deputy Governor responsible for markets and banking
Andrew Bailey, Chief Executive of the Financial Conduct Authority
David Belsham
Julia Black
Sandra Boss
Norval Bryson
Jill May
Mark Yallop

Table A3.A Projected CET1 capital ratios and Tier 1 leverage ratios in the stress scenario[a][b][c][d][e]

	Actual (end-2018)	Minimum stressed ratio (before 'strategic' management actions or AT1 conversions)	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1		Minimum stressed ratio (after the impact of 'strategic' management actions and conversion of AT1)	Hurdle rate[g]	Actual (2019 Q3)
			Non-dividend 'strategic' management actions only[f]	All 'strategic' management actions including CRD IV related restrictions			
CET1 ratios							
Barclays	13.2	7.5	8.0	8.9	11.3	8.1	13.4
HSBC	14.0	5.4	6.8	8.9	8.9	7.7	14.3
Lloyds Banking Group	14.6	5.0	5.5	8.5	11.3	7.5	13.5
Nationwide	31.7	12.7	13.1	13.1	13.1	7.9	31.5
The Royal Bank of Scotland Group	16.2	9.9	9.9	10.3	10.3	7.2	15.7
Santander UK	13.2	9.5	10.1	10.8	10.8	8.1	13.9
Standard Chartered	14.2	7.6	7.8	9.0	9.0	6.9	13.5
Aggregate	**14.5**	**6.8**	**7.6**	**9.3**	**9.9**	**7.5**	**14.4**
Leverage ratios							
Barclays	5.1	3.4	3.5	3.8	3.8	3.63	4.8
HSBC	6.0	4.2	4.7	5.3	5.3	3.86	5.8
Lloyds Banking Group	5.5	3.0	3.2	4.3	4.3	3.47	4.9
Nationwide	5.0	4.8	4.8	4.8	4.8	3.57	4.6
The Royal Bank of Scotland Group	6.2	4.7	4.7	4.7	4.7	3.56	5.7
Santander UK	4.5	3.2	3.6	3.8	3.8	3.57	4.6
Standard Chartered	5.6	4.7	4.8	5.1	5.1	3.55	5.1
Aggregate	**5.6**	**4.2**	**4.4**	**4.8**	**4.8**	**3.69**	**5.3**

Sources: Participating banks' published accounts and STDF data submissions, Bank analysis and calculations.

(a) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
(b) The Tier 1 leverage ratio is Tier 1 capital expressed as percentage of the leverage exposure measure excluding central bank reserves, in line with the *PRA's Policy Statement PS21/17*.
(c) Minimum aggregate CET1 ratios are calculated by dividing aggregate CET1 capital by aggregate risk-weighted assets at the aggregate low point of the stress in 2020. Minimum aggregate Tier 1 leverage ratios are calculated by dividing aggregate Tier 1 capital by the aggregate leverage exposure measure at the aggregate low point of the stress in 2019.
(d) The minimum CET1 ratios and leverage ratios shown in the table do not necessarily occur in the same year of the stress scenario for all banks. For individual banks, low-point years are based on their post-strategic management action and CRD IV restrictions.
(e) All figures shown on a transitional IFRS 9 basis.
(f) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management' actions including CRD IV related restrictions. This should not be interpreted as a judgment by the Bank that any or all of such cuts are conditional on such restrictions.
(g) The aggregate hurdle rate is calculated as a weighted average of hurdle rates in the aggregate low-point year.

Table A3.B Dividends, variable remuneration, AT1 coupons and other distributions in the 2019 ACS

£ billions	Dividends[a]		Variable remuneration[b]		AT1 discretionary coupons and other distributions[c]	
	Actual 2018	To end-2020 in the stress	Actual 2018	To end-2020 in the stress	Actual 2018	To end-2020 in the stress
Barclays	1.1	0.0	1.6	0.1	1.0	0.2
HSBC[d]	6.5	0.0	2.5	2.5	2.1	1.5
Lloyds Banking Group	2.3	0.0	0.5	0.3	0.8	0.9
Nationwide[e]	0.1	0.2	0.1	0.1	0.1	0.1
The Royal Bank of Scotland Group	0.2	0.0	0.2	0.5	0.5	1.1
Santander UK	1.1	0.0	0.2	0.0	0.2	0.3
Standard Chartered[d]	0.6	0.0	0.9	0.1	0.5	0.0
Aggregate[f]	**12.0**	**0.2**	**5.9**	**3.6**	**5.1**	**4.1**

Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) Dividends shown net of scrip payments, and are in respect of the year noted.
(b) Variable remuneration reflects discretionary distributions only (ie upfront cash awards awarded in the current year, paid in the current year only), pre tax.
(c) Other distributions includes preference dividends, and other discretionary distributions.
(d) HSBC and Standard Chartered figures have been converted to sterling using exchange rates consistent with the stress scenario.
(e) Dividend figures for Nationwide refer to distributions relating to its Core Capital Deferred Shares, a CET1 capital instrument.
(f) Aggregate is the sum of all firms with HSBC and SCB converted at start £/$ rates.

Table A3.C Projected consolidated solvency ratios in the stress scenario

	Actual (end-2018)	Minimum stressed ratio (*before* 'strategic' management actions or AT1 conversions)	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1		Minimum stressed ratio (*after* the impact of 'strategic' management actions and conversion of AT1)	Hurdle rate	Actual (2019 Q3)	Submit revised capital plan?
			Non-dividend 'strategic' management actions only[i]	All 'strategic' management actions including CRD IV related restrictions				
IFRS 9 Transitional								
Common equity Tier 1 ratio[a][b]	13.2%	7.5%	8.0%	8.9%	11.3%	8.1%	13.4%	
Tier 1 capital ratio[c]	17.0%	10.1%[g]	10.6%[g]	11.5%[g]	11.5%[g]		17.0%	
Total capital ratio[d]	20.7%	13.9%[g]	14.4%[g]	15.3%[g]	15.3%[g]		21.1%	
Memo: risk-weighted assets (£ billions)	312	394[g]	391[g]	391[g]	391[g]		313	
Memo: CET1 (£ billions)	41	30[g]	31[g]	35[g]	44[g]		42	Not required
Tier 1 leverage ratio[a][e]	5.1%	3.4%	3.5%	3.8%	3.8%	3.63%	4.8%	
Memo: leverage exposure (£ billions)	999	1,148[h]	1,147[h]	1,147[h]	1,147[h]		1,100	
IFRS 9 non-transitional								
Common equity Tier 1 ratio[f]	12.8%	5.1%	5.6%	6.5%	9.0%	7.0%	13.0%	
Tier 1 leverage ratio[f]	4.9%	2.6%	2.7%	3.0%	3.0%	3.25%	4.7%	

Sources: Participating firms' published accounts and STDF data submissions, Bank analysis and calculations.

(a) The low points for the common equity Tier 1 (CET1) ratio and leverage ratio shown in the table do not necessarily occur in the same year of the stress scenario and correspond to the year where the minimum stressed ratio is calculated after 'strategic' management actions and before AT1 conversion.
(b) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
(c) Tier 1 capital ratio is defined as Tier 1 capital expressed as a percentage of RWAs where Tier 1 capital is defined as the sum of CET1 capital and additional Tier 1 capital in line with the UK implementation of CRD IV.
(d) Total capital ratio is defined as total capital expressed as a percentage of RWAs where total capital is defined as the sum of Tier 1 capital and Tier 2 capital in line with the UK implementation of CRD IV.
(e) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the *PRA's Policy Statement PS21/17*.
(f) The low point year for the non-transitional IFRS 9 may differ to the low point year on a transitional IFRS 9 basis.
(g) Corresponds to the same year as the minimum CET1 ratio over the stress scenario after 'strategic' management actions.
(h) Corresponds to the same year as the minimum leverage ratio over the stress scenario after 'strategic' management actions.
(i) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non-business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management actions including CRD IV distribution restrictions'. This should not be interpreted as a judgment by the Bank that any or all of such cuts are conditional on such restrictions.

Barclays plc

Barclays is a retail, corporate and investment bank with trading operations, operating primarily in the United Kingdom and United States. The results show that Barclays' capital position remains above its CET1 ratio hurdle rate of 8.1% and Tier 1 leverage ratio hurdle rate of 3.63% in the hypothetical stress scenario with a low point of 8.9% CET1 ratio in 2019 and 3.8% leverage ratio in 2019 after 'strategic' management actions. **The PRC judged that this stress test did not reveal capital inadequacies for Barclays given its balance sheet at end-2018.**

On a non-transitional IFRS 9 basis, Barclays' capital position fell to a low point of 6.5% CET1 ratio in 2019 and a low point of 3.0% leverage ratio in 2019 after 'strategic' management actions. The contractual trigger in Barclays' AT1 capital references a 7% non-transitional CET1 ratio. Therefore, Barclays' AT1 capital converted into CET1, increasing the transitional and non-transitional low points to 11.3% and 9.0% respectively.

The scenario for the 2019 stress test included a synchronised global downturn and a traded risk shock in many of the economies where Barclays operates, including North America and the United Kingdom. The size of Barclays' large UK and international credit card business, as well as its UK mortgage and personal loan book, meant it faced increases in impairments as a result of the global macroeconomic stress. An increase in market and counterparty credit risk losses contributed further to the deterioration, though these recover in outer years. This is offset by an increase in net interest income over the stress and favourable sterling depreciation.

IFRS 9 results in a material proportion of credit loss impairments being realised early in the stress scenario, however the impact on capital is partially mitigated due to the application of IFRS 9 transitional arrangements, the extent of which is dependent on the low point year. The assessment includes stressed projections of misconduct costs. Up to the transitional CET1 low point, Barclays pays no ordinary dividends and is subject to CRD IV restrictions on distributions in 2019 and 2020. The assessment also incorporates the impact of 'strategic' management actions that the PRC judged Barclays could realistically take in the stress scenario, including cost reductions.

The Interim Management Statement published on 25 October 2019 showed CET1 capital and Tier 1 leverage ratios of 13.4% and 4.8% respectively. **The PRC did not require Barclays to submit a revised capital plan.**

Table A3.D Projected consolidated solvency ratios in the stress scenario

	Actual (end-2018)	Minimum stressed ratio (*before* 'strategic' management actions or AT1 conversions)	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1		Minimum stressed ratio (*after* the impact of 'strategic' management actions and conversion of AT1)	Hurdle rate	Actual (2019 Q3)	Submit revised capital plan?
			Non-dividend 'strategic' management actions only[i]	All 'strategic' management actions including CRD IV related restrictions				
IFRS 9 Transitional								Not required
Common equity Tier 1 ratio[a][b]	14.0%	5.4%	6.8%	8.9%	8.9%	7.7%	14.3%	
Tier 1 capital ratio[c]	17.0%	7.5%[g]	9.1%[g]	11.2%[g]	11.2%[g]		17.3%	
Total capital ratio[d]	20.0%	9.4%[g]	11.2%[g]	13.3%[g]	13.3%[g]		20.2%	
Memo: risk-weighted assets (US$ billions)	865	1,189[g]	1,066[g]	1,071[g]	1,071[g]		865	
Memo: CET1 (US$ billions)	121	65[g]	72[g]	95[g]	95[g]		124	
Tier 1 leverage ratio[a][e]	6.0%	4.2%	4.7%	5.3%	5.3%	3.86%	5.8%	
Memo: leverage exposure (US$ billions)	2,413	2,292[h]	2,160[h]	2,162[h]	2,162[h]		2,571	
IFRS 9 non-transitional								
Common equity Tier 1 ratio[f]	13.9%	5.9%	6.9%	8.1%	8.1%	6.6%	14.2%	
Tier 1 leverage ratio[f]	6.0%	3.8%	4.2%	4.8%	4.8%	3.35%	5.8%	

Sources: Participating firms' published accounts and STDF data submissions, Bank analysis and calculations.

(a) The low points for the common equity Tier 1 (CET1) ratio and leverage ratio shown in the table do not necessarily occur in the same year of the stress scenario and correspond to the year where the minimum stressed ratio is calculated after 'strategic' management actions and before AT1 conversion.
(b) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
(c) Tier 1 capital ratio is defined as Tier 1 capital expressed as a percentage of RWAs where Tier 1 capital is defined as the sum of CET1 capital and additional Tier 1 capital in line with the UK implementation of CRD IV.
(d) Total capital ratio is defined as total capital expressed as a percentage of RWAs where total capital is defined as the sum of Tier 1 capital and Tier 2 capital in line with the UK implementation of CRD IV.
(e) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the *PRA's Policy Statement PS21/17*.
(f) The low point year for the non-transitional IFRS 9 may differ to the low point year on a transitional IFRS 9 basis.
(g) Corresponds to the same year as the minimum CET1 ratio over the stress scenario after 'strategic' management actions.
(h) Corresponds to the same year as the minimum leverage ratio over the stress scenario after 'strategic' management actions.
(i) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non-business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management actions including CRD IV distribution restrictions'. This should not be interpreted as a judgment by the Bank that any or all of such cuts are conditional on such restrictions.

HSBC Holdings plc

HSBC is a global, universal bank. The results show that HSBC's capital position remains above its CET1 ratio hurdle rate of 7.7% and Tier 1 leverage ratio hurdle rate of 3.86% in the hypothetical stress scenario with a low point of 8.9% CET1 ratio in 2020 and 5.3% leverage ratio in 2019 after 'strategic' management actions. **The PRC judged that this stress test did not reveal capital inadequacies for HSBC given its balance sheet at end-2018.**

On a non-transitional IFRS 9 basis, HSBC's capital position fell to a low point of 8.1% CET1 ratio in 2019 and a low point of 4.8% leverage ratio in 2019 after 'strategic' management actions.

The scenario for the 2019 stress test included a synchronised global downturn and a traded risk shock in many of the economies where HSBC operates, including Asia, North America, the United Kingdom and the euro area, as well as a generalised downturn in emerging market economies. The stress results in increased impairments and RWAs for HSBC.

IFRS 9 results in a material proportion of credit loss impairments being realised early in the stress scenario, however the impact on capital is partially mitigated due to the application of IFRS 9 transitional arrangements, the extent of which is dependent on the low point year. The assessment includes stressed projections of misconduct costs. Up to the transitional CET1 low point, HSBC pays no ordinary dividends and is subject to CRD IV restrictions on distributions in 2019 and 2020. The assessment also incorporates the impact of 'strategic' management actions that the PRC judged HSBC could realistically take in the stress scenario, including cost and asset reductions.

The Interim Management Statement published on 28 October 2019 showed CET1 capital and Tier 1 leverage ratios of 14.3% and 5.8%, respectively. **The PRC did not require HSBC to submit a revised capital plan.**

Table A3.E Projected consolidated solvency ratios in the stress scenario

	Actual (end-2018)	Minimum stressed ratio (*before* 'strategic' management actions or AT1 conversions)	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1		Minimum stressed ratio (*after* the impact of 'strategic' management actions and conversion of AT1)	Hurdle rate	Actual (2019 Q3)	Submit revised capital plan?
			Non-dividend 'strategic' management actions only[i]	All 'strategic' management actions including CRD IV related restrictions				
IFRS 9 Transitional								Not required
Common equity Tier 1 ratio[a][b]	14.6%	5.0%	5.5%	8.5%	11.3%	7.5%	13.5%	
Tier 1 capital ratio[c]	18.2%	7.7%[g]	8.3%[g]	11.3%[g]	11.3%[g]		16.3%	
Total capital ratio[d]	22.9%	12.5%[g]	13.4%[g]	16.3%[g]	16.3%[g]		21.4%	
Memo: risk-weighted assets (£ billions)	206	240[g]	228[g]	229[g]	229[g]		209	
Memo: CET1 (£ billions)	30	12[g]	12[g]	20[g]	26[g]		28	
Tier 1 leverage ratio[a][e]	5.5%	3.0%	3.2%	4.3%	4.3%	3.47%	4.9%	
Memo: leverage exposure (£ billions)	663	626[h]	611[h]	611[h]	611[h]		684	
IFRS 9 non-transitional								
Common equity Tier 1 ratio[f]	14.3%	2.7%	3.0%	6.1%	8.9%	6.9%	13.2%	
Tier 1 leverage ratio[f]	5.4%	2.5%	2.5%	3.0%	3.0%	3.25%	4.8%	

Sources: Participating firms' published accounts and STDF data submissions, Bank analysis and calculations.

(a) The low points for the common equity Tier 1 (CET1) ratio and leverage ratio shown in the table do not necessarily occur in the same year of the stress scenario and correspond to the year where the minimum stressed ratio is calculated after 'strategic' management actions and before AT1 conversion.
(b) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
(c) Tier 1 capital ratio is defined as Tier 1 capital expressed as a percentage of RWAs where Tier 1 capital is defined as the sum of CET1 capital and additional Tier 1 capital in line with the UK implementation of CRD IV.
(d) Total capital ratio is defined as total capital expressed as a percentage of RWAs where total capital is defined as the sum of Tier 1 capital and Tier 2 capital in line with the UK implementation of CRD IV.
(e) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the *PRA's Policy Statement PS21/17*.
(f) The low point year for the non-transitional IFRS 9 may differ to the low point year on a transitional IFRS 9 basis.
(g) Corresponds to the same year as the minimum CET1 ratio over the stress scenario after 'strategic' management actions.
(h) Corresponds to the same year as the minimum leverage ratio over the stress scenario after 'strategic' management actions.
(i) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non-business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management actions including CRD IV distribution restrictions'. This should not be interpreted as a judgment by the Bank that any or all of such cuts are conditional on such restrictions.

Lloyds Banking Group plc

Lloyds Banking Group (LBG) is a retail and commercial bank with a small trading business operating primarily in the United Kingdom. The results show that LBG's capital position remains above its CET1 ratio hurdle rate of 7.5% and Tier 1 leverage ratio hurdle rate of 3.47% in the hypothetical stress scenario with a low point of 8.5% CET1 ratio in 2020 and 4.3% leverage ratio in 2020 after 'strategic' management actions. **The PRC judged that this stress test did not reveal capital inadequacies for Lloyds Banking Group given its balance sheet at end-2018.**

On a non-transitional IFRS 9 basis, LBG's capital position fell to a low point of 6.1% CET1 ratio in 2020 and a low point of 3.0% leverage ratio in 2019 after 'strategic' management actions. The contractual trigger in LBG's AT1 capital references a 7% non-transitional CET1 ratio. Therefore, LBG's AT1 capital converted into CET1, increasing the transitional and non-transitional low points to 11.3% and 8.9% respectively.

LBG's largely UK-centric business model meant it faced increases in impairments and RWAs as a result of the UK macroeconomic stress, driven by higher interest rates, unemployment and house price falls. In the scenario, higher income from rising interest rates was offset by an increase in impairments across all major portfolios. Increased RWAs contributed to higher capital consumption in the scenario, particularly in LBG's wholesale portfolios.

IFRS 9 results in a material proportion of credit loss impairments being realised early in the stress scenario, however the impact on capital is partially mitigated due to the application of IFRS 9 transitional arrangements, the extent of which is dependent on the low point year. The assessment includes stressed projections of misconduct costs. Up to the transitional CET1 low point, LBG pays no ordinary dividends and is subject to CRD IV restrictions on distributions in 2020. The assessment also incorporates the impact of other 'strategic' management actions that the PRC judged LBG could realistically take in the stress scenario, including cost reductions.

The Interim Management Statement published on 31 October 2019 showed CET1 capital and Tier 1 leverage ratios of 13.5% and 4.9%, respectively. **The PRC did not require Lloyds Banking Group to submit a revised capital plan.**

Table A3.F Projected consolidated solvency ratios in the stress scenario

	Actual (end-2018)	Minimum stressed ratio (*before* 'strategic' management actions or AT1 conversions)	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1		Minimum stressed ratio (*after* the impact of 'strategic' management actions and conversion of AT1)	Hurdle rate	Actual (2019 Q3)	Submit revised capital plan?
			Non-dividend 'strategic' management actions only[i]	All 'strategic' management actions including CRD IV related restrictions				
IFRS 9 Transitional								Not required
Common equity Tier 1 ratio[a][b]	31.7%	12.7%	13.1%	13.1%	13.1%	7.9%	31.5%	
Tier 1 capital ratio[c]	35.4%	14.2%[g]	14.7%[g]	14.7%[g]	14.7%[g]		34.0%	
Total capital ratio[d]	44.8%	18.1%[g]	18.5%[g]	18.5%[g]	18.5%[g]		43.6%	
Memo: risk-weighted assets (£ billions)	33	77[g]	77[g]	77[g]	77[g]		33	
Memo: CET1 (£ billions)	11	10[g]	10[g]	10[g]	10[g]		11	
Tier 1 leverage ratio[a][e]	5.0%	4.8%	4.8%	4.8%	4.8%	3.57%	4.6%	
Memo: leverage exposure (£ billions)	232	228[h]	228[h]	228[h]	228[h]		241	
IFRS 9 non-transitional								
Common equity Tier 1 ratio[f]	31.5%	12.6%	13.1%	13.1%	13.1%	7.8%	31.3%	
Tier 1 leverage ratio[f]	4.9%	4.6%	4.7%	4.7%	4.7%	3.41%	4.6%	

Sources: Participating firms' published accounts and STDF data submissions, Bank analysis and calculations.

(a) The low points for the common equity Tier 1 (CET1) ratio and leverage ratio shown in the table do not necessarily occur in the same year of the stress scenario and correspond to the year where the minimum stressed ratio is calculated after 'strategic' management actions and before AT1 conversion.
(b) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
(c) Tier 1 capital ratio is defined as Tier 1 capital expressed as a percentage of RWAs where Tier 1 capital is defined as the sum of CET1 capital and additional Tier 1 capital in line with the UK implementation of CRD IV.
(d) Total capital ratio is defined as total capital expressed as a percentage of RWAs where total capital is defined as the sum of Tier 1 capital and Tier 2 capital in line with the UK implementation of CRD IV.
(e) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the *PRA's Policy Statement PS21/17*.
(f) The low point year for the non-transitional IFRS 9 may differ to the low point year on a transitional IFRS 9 basis.
(g) Corresponds to the same year as the minimum CET1 ratio over the stress scenario after 'strategic' management actions.
(h) Corresponds to the same year as the minimum leverage ratio over the stress scenario after 'strategic' management actions.
(i) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non-business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management actions including CRD IV distribution restrictions'. This should not be interpreted as a judgment by the Bank that any or all of such cuts are conditional on such restrictions.

Nationwide Building Society

Nationwide is a UK building society. The results show that Nationwide's capital position remains above its CET1 ratio hurdle rate of 7.9% and Tier 1 leverage ratio hurdle rate of 3.57% in the hypothetical stress scenario with a low point of 13.1% CET1 ratio in 2020 and 4.8% leverage ratio in 2019 after 'strategic' management actions. **The PRC judged that this stress test did not reveal capital inadequacies for Nationwide given its balance sheet at end-2018.**

On a non-transitional IFRS 9 basis, Nationwide's capital position fell to a low point of 13.1% CET1 ratio in 2020 and a low point of 4.7% leverage ratio in 2019 after 'strategic' management actions.

Nationwide's UK-centric business model meant it faced increases in retail impairments and RWAs as a result of the UK macroeconomic stress, driven by higher interest rates, unemployment and house price falls. The stress results in a significant increase in RWAs for the retail secured portfolio, largely due to Nationwide's use of a 'point in time' based modelling approach for these portfolios.

IFRS 9 results in a material proportion of credit loss impairments being realised early in the stress scenario, however the impact on capital is partially mitigated due to the application of IFRS 9 transitional arrangements, the extent of which is dependent on the low point year. The assessment includes stressed projections of misconduct costs. Up to the transitional CET1 low point, Nationwide continues to make annual distributions on its Core Capital Deferred Shares (CCDS). This assessment incorporates the impact of 'strategic' management actions that the PRC judged Nationwide could realistically take in the stress scenario, including cost reductions.

The Interim Management Statement published on 22 November 2019 showed CET1 capital and Tier 1 leverage ratios of 31.3% and 4.6%, respectively. **The PRC did not require Nationwide to submit a revised capital plan.**

Table A3.G Projected consolidated solvency ratios in the stress scenario

	Actual (end-2018)	Minimum stressed ratio (*before* 'strategic' management actions or AT1 conversions)	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1: Non-dividend 'strategic' management actions only[i]	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1: All 'strategic' management actions including CRD IV related restrictions	Minimum stressed ratio (*after* the impact of 'strategic' management actions and conversion of AT1)	Hurdle rate	Actual (2019 Q3)	Submit revised capital plan?
IFRS 9 Transitional								
Common equity Tier 1 ratio[a][b]	16.2%	9.9%	9.9%	10.3%	10.3%	7.2%	15.7%	
Tier 1 capital ratio[c]	19.2%	12.2%[g]	12.2%[g]	12.6%[g]	12.6%[g]		18.7%	
Total capital ratio[d]	23.4%	14.8%[g]	14.9%[g]	15.2%[g]	15.2%[g]		22.0%	
Memo: risk-weighted assets (£ billions)	189	254[g]	254[g]	254[g]	254[g]		189	
Memo: CET1 (£ billions)	31	25[g]	25[g]	26[g]	26[g]		30	Not required
Tier 1 leverage ratio[a][e]	6.2%	4.7%	4.7%	4.7%	4.7%	3.56%	5.7%	
Memo: leverage exposure (£ billions)	560	631[h]	631[h]	631[h]	631[h]		589	
IFRS 9 non-transitional								
Common equity Tier 1 ratio[f]	16.2%	9.5%	9.5%	9.5%	9.5%	6.2%	15.7%	
Tier 1 leverage ratio[f]	6.2%	4.3%	4.3%	4.3%	4.3%	3.25%	5.7%	

Sources: Participating firms' published accounts and STDF data submissions, Bank analysis and calculations.

(a) The low points for the common equity Tier 1 (CET1) ratio and leverage ratio shown in the table do not necessarily occur in the same year of the stress scenario and correspond to the year where the minimum stressed ratio is calculated after 'strategic' management actions and before AT1 conversion.
(b) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
(c) Tier 1 capital ratio is defined as Tier 1 capital expressed as a percentage of RWAs where Tier 1 capital is defined as the sum of CET1 capital and additional Tier 1 capital in line with the UK implementation of CRD IV.
(d) Total capital ratio is defined as total capital expressed as a percentage of RWAs where total capital is defined as the sum of Tier 1 capital and Tier 2 capital in line with the UK implementation of CRD IV.
(e) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the *PRA's Policy Statement PS21/17*.
(f) The low point year for the non-transitional IFRS 9 may differ to the low point year on a transitional IFRS 9 basis.
(g) Corresponds to the same year as the minimum CET1 ratio over the stress scenario after 'strategic' management actions.
(h) Corresponds to the same year as the minimum leverage ratio over the stress scenario after 'strategic' management actions.
(i) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non-business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management actions including CRD IV distribution restrictions'. This should not be interpreted as a judgment by the Bank that any or all of such cuts are conditional on such restrictions.

The Royal Bank of Scotland Group plc

The Royal Bank of Scotland Group (RBS) is a retail and commercial bank with a trading business operating primarily in the United Kingdom. The results show that RBS's capital position remains above its CET1 ratio hurdle rate of 7.2% and its Tier 1 leverage ratio hurdle rate of 3.56% in the hypothetical stress scenario, with a low point of 10.3% CET1 ratio in 2020 and 4.7% leverage ratio in 2019 after 'strategic' management actions. **The PRC judged that this stress test did not reveal capital inadequacies for RBS given its balance sheet at end-2018.**

On a non-transitional IFRS 9 basis, RBS's capital position fell to a low point of 9.5% CET1 ratio in 2019 and a low point of 4.3% leverage ratio in 2019 after 'strategic' management actions.

RBS's largely UK-centric business model meant it faced increases in impairments and RWAs as a result of the UK macroeconomic stress, driven by higher interest rates, unemployment and house price falls. In the scenario, higher income from rising interest rates was offset by an increase in impairments relating to RBS's corporate and retail lending books. Increased RWAs contributed to higher capital consumption in the scenario, particularly in RBS's retail secured and wholesale portfolios.

IFRS 9 results in a material proportion of credit loss impairments being realised early in the stress scenario, however the impact on capital is partially mitigated due to the application of IFRS 9 transitional arrangements, the extent of which is dependent on the low point year. This assessment also includes stressed projections of misconduct costs. Up to the transitional CET1 low point, RBS pays no ordinary dividends. The assessment incorporates the impact of 'strategic' management actions that the PRC judged RBS could realistically take in this stress scenario, including cost reductions.

The Interim Management Statement published on 24 October 2019 showed CET1 capital and Tier 1 leverage ratios of 15.7% and 5.7%, respectively. **The PRC did not require RBS to submit a revised capital plan.**

Table A3.H Projected consolidated solvency ratios in the stress scenario

	Actual (end-2018)	Minimum stressed ratio (*before* 'strategic' management actions or AT1 conversions)	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1		Minimum stressed ratio (*after* the impact of 'strategic' management actions and conversion of AT1)	Hurdle rate	Actual (2019 Q3)	Submit revised capital plan?
			Non-dividend 'strategic' management actions only[i]	All 'strategic' management actions including CRD IV related restrictions				
IFRS 9 Transitional								
Common equity Tier 1 ratio[a][b]	13.2%	9.5%	10.1%	10.8%	10.8%	8.1%	13.9%	
Tier 1 capital ratio[c]	16.2%	12.4%[g]	13.1%[g]	13.8%[g]	13.8%[g]		17.4%	
Total capital ratio[d]	19.1%	16.1%[g]	17.0%[g]	17.7%[g]	17.7%[g]		21.4%	
Memo: risk-weighted assets (£ billions)	79	75[g]	72[g]	72[g]	72[g]		75	
Memo: CET1 (£ billions)	10	7[g]	7[g]	8[g]	8[g]		16	Not required
Tier 1 leverage ratio[a][e]	4.5%	3.2%	3.6%	3.8%	3.8%	3.57%	4.6%	
Memo: leverage exposure (£ billions)	276	282[h]	258[h]	258[h]	258[h]		274	
IFRS 9 non-transitional								
Common equity Tier 1 ratio[f]	13.2%	9.9%	10.4%	10.4%	10.4%	7.3%	13.8%	
Tier 1 leverage ratio[f]	4.5%	3.3%	3.7%	3.7%	3.7%	3.25%	4.6%	

Sources: Participating firms' published accounts and STDF data submissions, Bank analysis and calculations.

(a) The low points for the common equity Tier 1 (CET1) ratio and leverage ratio shown in the table do not necessarily occur in the same year of the stress scenario and correspond to the year where the minimum stressed ratio is calculated after 'strategic' management actions and before AT1 conversion.
(b) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
(c) Tier 1 capital ratio is defined as Tier 1 capital expressed as a percentage of RWAs where Tier 1 capital is defined as the sum of CET1 capital and additional Tier 1 capital in line with the UK implementation of CRD IV.
(d) Total capital ratio is defined as total capital expressed as a percentage of RWAs where total capital is defined as the sum of Tier 1 capital and Tier 2 capital in line with the UK implementation of CRD IV.
(e) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the *PRA's Policy Statement PS21/17*.
(f) The low point year for the non-transitional IFRS 9 may differ to the low point year on a transitional IFRS 9 basis.
(g) Corresponds to the same year as the minimum CET1 ratio over the stress scenario after 'strategic' management actions.
(h) Corresponds to the same year as the minimum leverage ratio over the stress scenario after 'strategic' management actions.
(i) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non-business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management actions including CRD IV distribution restrictions'. This should not be interpreted as a judgment by the Bank that any or all of such cuts are conditional on such restrictions.

Santander UK Group Holdings plc

Santander UK Group Holdings Plc (Santander UK) is the UK subsidiary of Banco Santander S.A. and is a retail and commercial bank with a small trading business. The results show that Santander UK's capital position remains above its CET1 ratio hurdle rate of 8.1% and Tier 1 leverage ratio hurdle rate of 3.57% in the hypothetical stress scenario with a low point of 10.8% CET1 ratio in 2021 and 3.8% leverage ratio in 2021 after 'strategic' management actions. **The PRC judged that this stress test did not reveal capital inadequacies for Santander UK given its balance sheet at end-2018.**

On a non-transitional IFRS 9 basis, Santander UK's capital position fell to a low point of 10.4% CET1 ratio and a low point of 3.7% leverage ratio in 2020, both after 'strategic' management actions.

Santander UK's UK-centric business model meant it faced increases in impairments as a result of the UK macroeconomic stress, driven by higher interest rates, unemployment and house price falls. Net interest income increases in the stress driven by higher interest rates.

IFRS 9 results in a material proportion of credit loss impairments being realised early in the stress scenario, however the impact on capital is partially mitigated due to the application of IFRS 9 transitional arrangements, the extent of which is dependent on the low point year. This assessment includes stressed projections of misconduct costs. Up to the transitional CET1 low point Santander UK does not pay ordinary dividends. The assessment also incorporates the impact of 'strategic' management actions that the PRC judged Santander UK could realistically take in the stress scenario, including cost and asset reductions.

The Interim Management Statement published on 30 September 2019 showed CET1 capital and Tier 1 leverage ratios of 13.9% and 4.6%, respectively. **The PRC did not require Santander UK to submit a revised capital plan.**

Table A3.I Projected consolidated solvency ratios in the stress scenario

	Actual (end-2018)	Minimum stressed ratio (*before* 'strategic' management actions or AT1 conversions)	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1		Minimum stressed ratio (*after* the impact of 'strategic' management actions and conversion of AT1)	Hurdle rate	Actual (2019 Q3)	Submit revised capital plan?
			Non-dividend 'strategic' management actions only[i]	All 'strategic' management actions including CRD IV related restrictions				
IFRS 9 Transitional								
Common equity Tier 1 ratio[a][b]	14.2%	7.6%	7.8%	9.0%	9.0%	6.9%	13.5%	
Tier 1 capital ratio[c]	16.8%	8.8%[g]	9.5%[g]	10.7%[g]	10.7%[g]		16.2%	
Total capital ratio[d]	21.6%	11.0%[g]	12.3%[g]	13.5%[g]	13.5%[g]		20.4%	
Memo: risk-weighted assets (US$ billions)	258	358[g]	358[g]	359[g]	359[g]		269	
Memo: CET1 (US$ billions)	37	27[g]	28[g]	32[g]	32[g]		36	Not required
Tier 1 leverage ratio[a][e]	5.6%	4.7%	4.8%	5.1%	5.1%	3.55%	5.1%	
Memo: leverage exposure (US$ billions)	741	698[h]	697[h]	699[h]	699[h]		815	
IFRS 9 non-transitional								
Common equity Tier 1 ratio[f]	14.1%	7.7%	7.8%	8.5%	8.5%	6.2%	13.4%	
Tier 1 leverage ratio[f]	5.6%	4.4%	4.5%	4.8%	4.8%	3.25%	5.1%	

Sources: Participating firms' published accounts and STDF data submissions, Bank analysis and calculations.

(a) The low points for the common equity Tier 1 (CET1) ratio and leverage ratio shown in the table do not necessarily occur in the same year of the stress scenario and correspond to the year where the minimum stressed ratio is calculated after 'strategic' management actions and before AT1 conversion.
(b) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
(c) Tier 1 capital ratio is defined as Tier 1 capital expressed as a percentage of RWAs where Tier 1 capital is defined as the sum of CET1 capital and additional Tier 1 capital in line with the UK implementation of CRD IV.
(d) Total capital ratio is defined as total capital expressed as a percentage of RWAs where total capital is defined as the sum of Tier 1 capital and Tier 2 capital in line with the UK implementation of CRD IV.
(e) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the *PRA's Policy Statement PS21/17*.
(f) The low point year for the non-transitional IFRS 9 may differ to the low point year on a transitional IFRS 9 basis.
(g) Corresponds to the same year as the minimum CET1 ratio over the stress scenario after 'strategic' management actions.
(h) Corresponds to the same year as the minimum leverage ratio over the stress scenario after 'strategic' management actions.
(i) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non-business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management actions including CRD IV distribution restrictions'. This should not be interpreted as a judgment by the Bank that any or all of such cuts are conditional on such restrictions.

Standard Chartered plc

Standard Chartered is a retail and commercial bank with a trading business, mainly operating in Asia, Africa and the Middle East. The results show that Standard Chartered's capital position remains above its CET1 ratio hurdle rate of 6.9% and Tier 1 leverage ratio hurdle rate of 3.55% in the hypothetical stress scenario with a low point of 9.0% CET1 ratio in 2020 and 5.1% leverage ratio in 2019 after 'strategic' management actions. **The PRC judged that this stress test did not reveal capital inadequacies for Standard Chartered given its balance sheet at end-2018.**

On a non-transitional IFRS 9 basis, Standard Chartered's capital position fell to a low point of 8.5% CET1 ratio in 2019 and a low point of 4.8% leverage ratio in 2019 after 'strategic' management actions.

The scenario for the 2019 stress test included a synchronised global downturn and a traded risk shock in many of the economies where Standard Chartered operates, including Asia, as well as a generalised downturn in emerging market economies. The stress results in increased impairments and RWAs across Standard Chartered operations in these economies.

IFRS 9 results in a material proportion of credit loss impairments being realised early in the stress scenario, however the impact on capital is partially mitigated due to the application of IFRS 9 transitional arrangements, the extent of which is dependent on the low point year. The assessment includes stressed projections of misconduct costs. Up to the transitional CET1 low point, Standard Chartered pays no ordinary dividends and is subject to CRD IV restrictions on distributions in 2019 and 2020. The assessment incorporates the impact of 'strategic' management actions that the PRC judged Standard Chartered could realistically take in the stress scenario, including cost and asset reductions.

The Interim Management Statement published on 30 October 2019 showed CET1 capital and Tier 1 leverage ratios of 13.5% and 5.1%, respectively. **The PRC did not require Standard Chartered to submit a revised capital plan.**

Annex 4: 2019 annual cyclical scenario: bank-specific projected impairment charges and traded risk losses

Table A4.A Projected cumulative five-year impairment charge rates on UK lending in the stress scenario[a][b]

Per cent

	Mortgage lending to individuals	Non-mortgage lending to individuals	Commercial real estate lending	Lending to businesses excluding commercial real estate
Barclays	0.9	35.3	7.2	9.3
HSBC	0.8	20.7	7.8	9.3
Lloyds Banking Group	3.2	27.3	8.5	11.5
Nationwide	1.1	24.9	–	–
The Royal Bank of Scotland Group	0.9	26.9	6.2	9.8
Santander UK	1.4	22.7	6.7	12.5
Standard Chartered	–	–	–	3.0

Sources: Participating Banks STDF data submissions, Bank analysis and calculations.

(a) Cumulative impairment charge rates = (five-year total impairment charge) / (average gross on balance sheet exposure), where the denominator is a simple average of 2018, 2019, 2020, 2021, 2022 year-end positions. The HSBC and Standard Chartered impairment charge rates are calculated by first converting each component to sterling using exchange rates consistent with the stress scenario.
(b) Portfolios with cumulative impairment charges of £0.0 billion or end-2018 drawn balances of £0.0 billion (ie below £0.05 billion) are excluded.

Table A4.B Projected cumulative five-year impairment charges on UK lending in the stress scenario[a][b]

£ billions

	Mortgage lending to individuals	Non-mortgage lending to individuals	Commercial real estate lending	Lending to businesses excluding commercial real estate
Barclays	1.3	9.9	0.3	3.6
HSBC	0.8	3.1	0.9	7.7
Lloyds Banking Group	8.8	10.4	1.2	4.7
Nationwide	2.0	1.3	–	–
The Royal Bank of Scotland Group	1.5	3.9	0.6	6.1
Santander UK	2.3	2.5	0.4	1.8
Standard Chartered	–	–	–	0.1

Sources: Participating Banks STDF data submissions, Bank analysis and calculations.

(a) Cumulative impairment charge rates = (five-year total impairment charge) / (average gross on balance sheet exposure), where the denominator is a simple average of 2018, 2019, 2020, 2021, 2022 year-end positions. The HSBC and Standard Chartered impairment charge rates are calculated by first converting each component to sterling using exchange rates consistent with the stress scenario.
(b) Portfolios with cumulative impairment charges of £0.0 billion or end-2018 drawn balances of £0.0 billion (ie below £0.05 billion) are excluded.

Table A4.C Projected cumulative five-year impairment charge rates in the stress scenario[a][b][c]

Per cent

	Lending to individuals					Lending to businesses				
	United Kingdom	Hong Kong and China	United States	Euro area	Rest of world	United Kingdom	Hong Kong and China	United States	Euro area	Rest of world
Barclays	6.5	–	28.0	6.6	–	9.1	–	10.3	6.3	14.0
HSBC	3.3	4.7	5.3	2.1	8.1	9.1	6.6	6.8	3.6	4.8
Lloyds Banking Group	6.2	–	–	1.7	–	10.7	–	7.4	5.6	14.1
Nationwide	1.8	–	–	–	–	9.3	–	–	–	–
The Royal Bank of Scotland Group	3.0	–	–	5.2	–	9.4	–	1.7	9.8	5.6
Santander UK	2.8	–	–	–	–	10.9	–	–	–	–
Standard Chartered	–	4.6	–	–	6.6	2.9	8.6	2.0	3.0	7.3

Sources: Participating Banks STDF data submissions, Bank analysis and calculations.

(a) Cumulative impairment charge rates = (five-year total impairment charge) / (average gross on balance sheet exposure), where the denominator is a simple average of 2018, 2019, 2020, 2021, 2022 year-end positions. The HSBC and Standard Chartered impairment charge rates are calculated by first converting each component to sterling using exchange rates consistent with the stress scenario.
(b) Portfolios with cumulative impairment charges of £0.0 billion or end-2018 drawn balances of £0.0 billion (ie below £0.05 billion) are excluded.
(c) Data exclude material associates.

Table A4.D Projected cumulative five-year impairment charges in the stress scenario[a][b][c]

£ billions

	Lending to individuals					Lending to businesses				
	United Kingdom	Hong Kong and China	United States	Euro area	Rest of world	United Kingdom	Hong Kong and China	United States	Euro area	Rest of world
Barclays	11.2	–	7.0	1.2	–	3.9	–	2.4	0.4	0.8
HSBC	3.9	5.1	1.1	0.5	6.8	8.6	13.5	4.4	2.2	9.3
Lloyds Banking Group	19.2	–	–	0.2	–	5.9	–	0.2	0.1	0.4
Nationwide	3.3	–	–	–	–	0.1	–	–	–	–
The Royal Bank of Scotland Group	5.4	–	–	0.9	–	6.7	–	0.1	1.1	0.5
Santander UK	4.7	–	–	–	–	2.2	–	–	–	–
Standard Chartered	–	1.7	–	–	4.1	0.1	1.8	0.1	0.2	5.7

Sources: Participating Banks STDF data submissions, Bank analysis and calculations.

(a) Cumulative impairment charge rates = (five-year total impairment charge) / (average gross on balance sheet exposure), where the denominator is a simple average of 2018, 2019, 2020, 2021, 2022 year-end positions. The HSBC and Standard Chartered impairment charge rates are calculated by first converting each component to sterling using exchange rates consistent with the stress scenario.
(b) Portfolios with cumulative impairment charges of £0.0 billion or end-2018 drawn balances of £0.0 billion (ie below £0.05 billion) are excluded.
(c) Data exclude material associates.

Table A4.E Projected traded risk losses in 2019 of the stress scenario[a][b][c]

	£ billions
Barclays	9.3
HSBC	11.6
Lloyds Banking Group	2.3
The Royal Bank of Scotland Group	3.1
Santander UK	0.5
Standard Chartered	4.8

Sources: Participating Banks STDF data submissions, Bank analysis and calculations.

(a) Traded risk losses include: market risk losses; counterparty credit risk losses, losses arising from changes in banks' credit and fair value adjustments; prudential value adjustment; gain/losses from fair value through other comprehensive income items and fair value options; excluding securitisation positions. They exclude banking revenues and costs.
(b) Nationwide is excluded as it has minimal traded risk exposures.
(c) Losses for HSBC and SCB are converted to sterling using exchange rates consistent with the annual cyclical scenario for comparability with other banks.

Glossary

Glossary of selected data and instruments

CDS – credit default swap.
GDP – gross domestic product.
HPI – house price index.
Libor – London interbank offered rate.
OIS – overnight index swap.
SOFR – secured overnight financing rate.
SONIA – sterling overnight index average.

Abbreviations

ACS – annual cyclical scenario.
AT1 – additional Tier 1.
BCBS – Basel Committee on Banking Supervision.
BES – biennial exploratory scenario.
BIS – Bank for International Settlements.
CCLB – countercyclical leverage buffer.
CCP – central counterparty.
CCyB – countercyclical capital buffer.
CET1 – common equity Tier 1.
CJEU – Court of Justice of the European Union.
CLO – collateralised loan obligation.
CRD IV – Capital Requirements Directive.
CRE – commercial real estate.
CRR – Capital Requirements Regulation.
CVA – credit valuation adjustment.
DSR – debt-servicing ratio.
DTI – debt to income.
EBITDA – earnings before interest, tax, depreciation and amortisation.
ECB – European Central Bank.
EEA – European Economic Area.
EFFR – Effective Fed Funds Rate.
EIOPA – European Insurance and Occupational Pensions Authority.
EME – emerging market economy.
ESMA – European Securities and Markets Authority.
ETF – exchange-traded fund.
EU – European Union.
FCA – Financial Conduct Authority.
FISIM – financial intermediation services indirectly measured.
FPC – Financial Policy Committee.
FSB – Financial Stability Board.
G7 – Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.
GFC – global financial crisis.
G-SIB – global systemically important bank.
HMRC – Her Majesty's Revenue and Customs.
HQLA – high-quality liquid asset.
IAS – International Accounting Standard.
ICAAP – The Internal Capital Adequacy Assessment Process.
ICE/BofAML – Intercontinental Exchange/Bank of America Merrill Lynch.
ICR – interest coverage ratio.
IFRS – International Financial Reporting Standard.
IMF – International Monetary Fund.
IOSCO – International Organization of Securities Commissions.
IRB – internal ratings based.
ISDA – International Swaps and Derivatives Association.
LCD – Leveraged Commentary & Data.
LCR – Liquidity Coverage Ratio.
LTI – loan to income.
LTV – loan to value.
MCOB – Mortgages and Home Finance: Conduct of Business sourcebook.
MiFID – Markets in Financial Instruments Directive.
MREL – minimum requirement for own funds and eligible liabilities.
MSCI – Morgan Stanley Capital International Inc.
NAV – net asset value.
NBFI – non-bank financial institution.
NCEME – non-China emerging market economy.
NII – net interest income.
NIM – net interest margin.
NPISH – non-profit institutions serving households.
NURS – non-UCITS retail scheme.
OECD – Organisation for Economic Co-operation and Development.
ONS – Office for National Statistics.
OTC – over the counter.
PNFC – private non-financial corporation.
PPI – payment protection insurance.
PPP – purchasing power parity.
PRA – Prudential Regulation Authority.
PRC – Prudential Regulation Committee.
PVA – prudential valuation adjustment.
RBS – Royal Bank of Scotland.
RFB – ring-fenced bank.
RFR – risk-free rate.
RoE – return on equity.
RTGS – real-time gross settlement.
RWA – risk-weighted asset.
S&P – Standard & Poor's.
SCC – standard contractual clause.
SME – small and medium-sized enterprise.
STDF – Stress Testing Data Framework.
TSF – total social financing.
UCITS – undertakings for collective investment in transferable securities.
WEO – IMF *World Economic Outlook*.
XVA – x-value adjustment.